

**Creating the Future of Automobiles**

**AUTOMOTIVE**  
PRODUCT CATALOG **Ver.2.5**

# Creating the Future of Automobiles

ROHM will continue to **innovate** to promote vehicle **safety**.

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# Along with evolving technologies, ROHM continues to propose optimized solutions for the automotive industry.

Throughout their history cars have continued to evolve in response to the growing awareness for safety, comfort, and the environment, in step towards continued electrification.

In response to this demand for next-generation vehicles that embody these principles, and with automatic driving and smart cities soon to be realized, high performance ICs and high power devices are becoming indispensable.

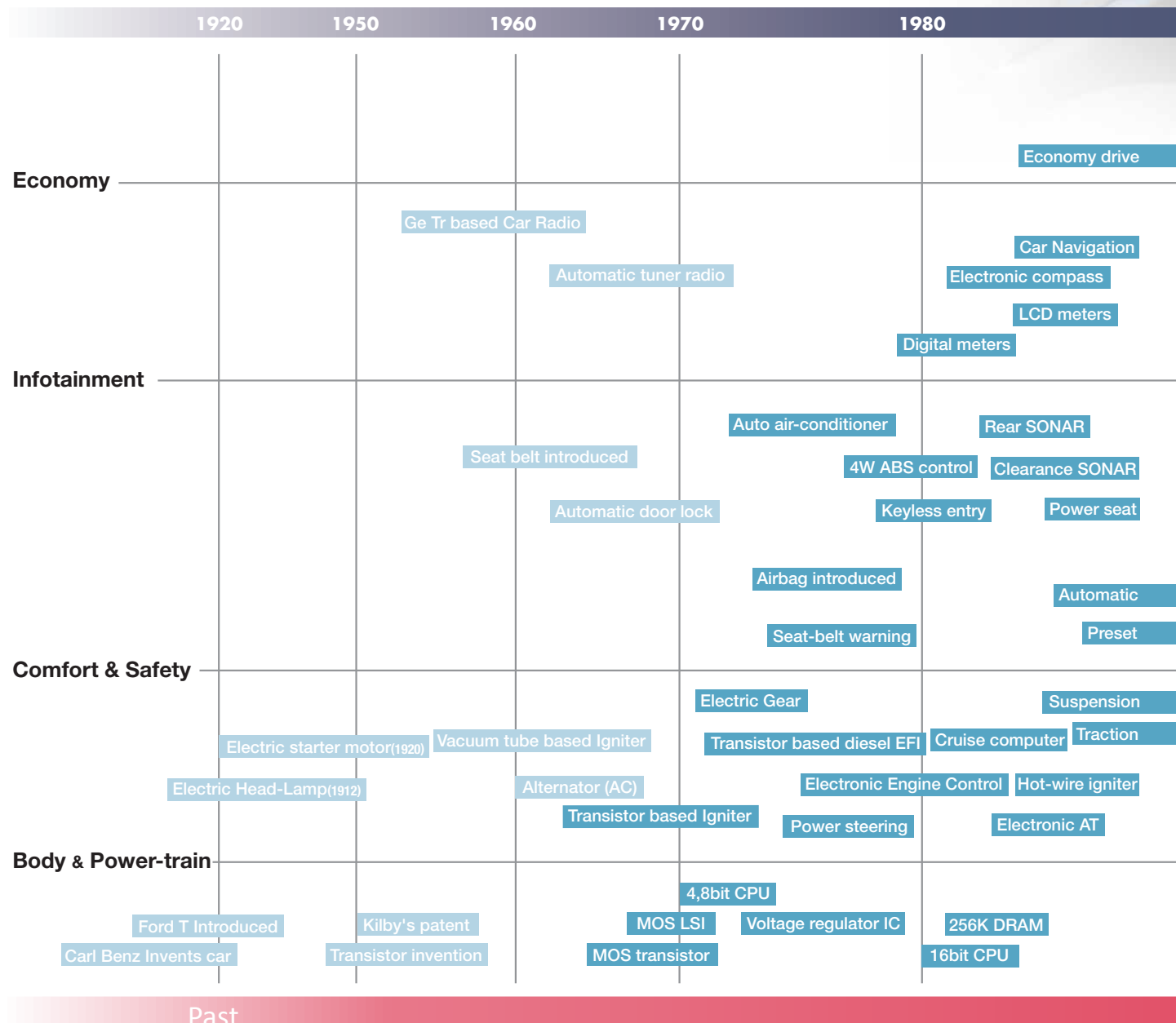
ROHM contributes to the evolution and advancement of the automotive sector and next-generation cars by taking a quality-first approach to manufacturing and ensuring a long-term, stable supply of products.

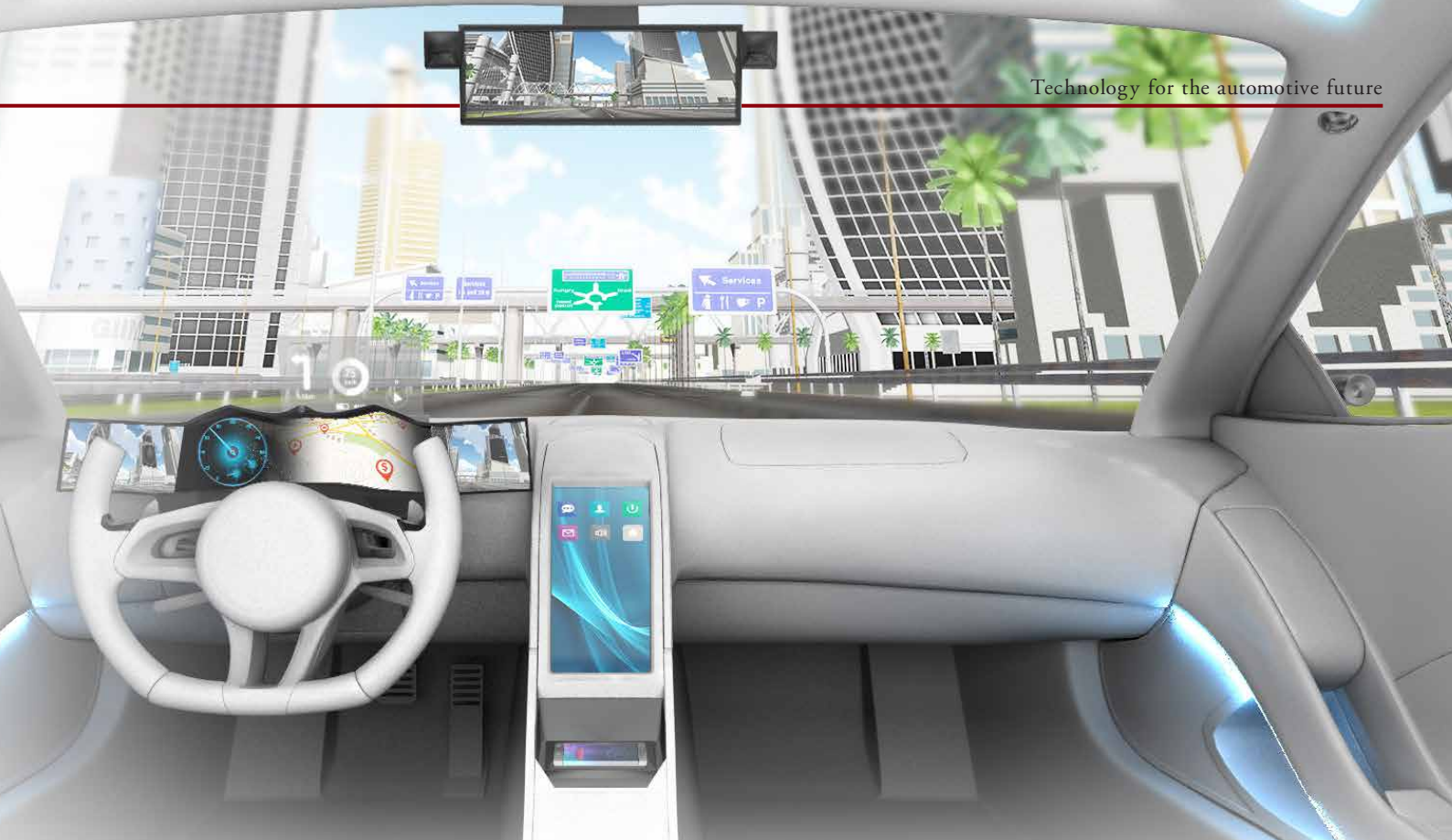
## Company Mission

Quality is our top priority at all times.

Our objective is to contribute to the advancement and progress of our culture through a consistent supply, under all circumstances, of high quality products in large volumes to the global market.

## Automotive evolution





1990

2000

2010

2020

(ROHM Survey)

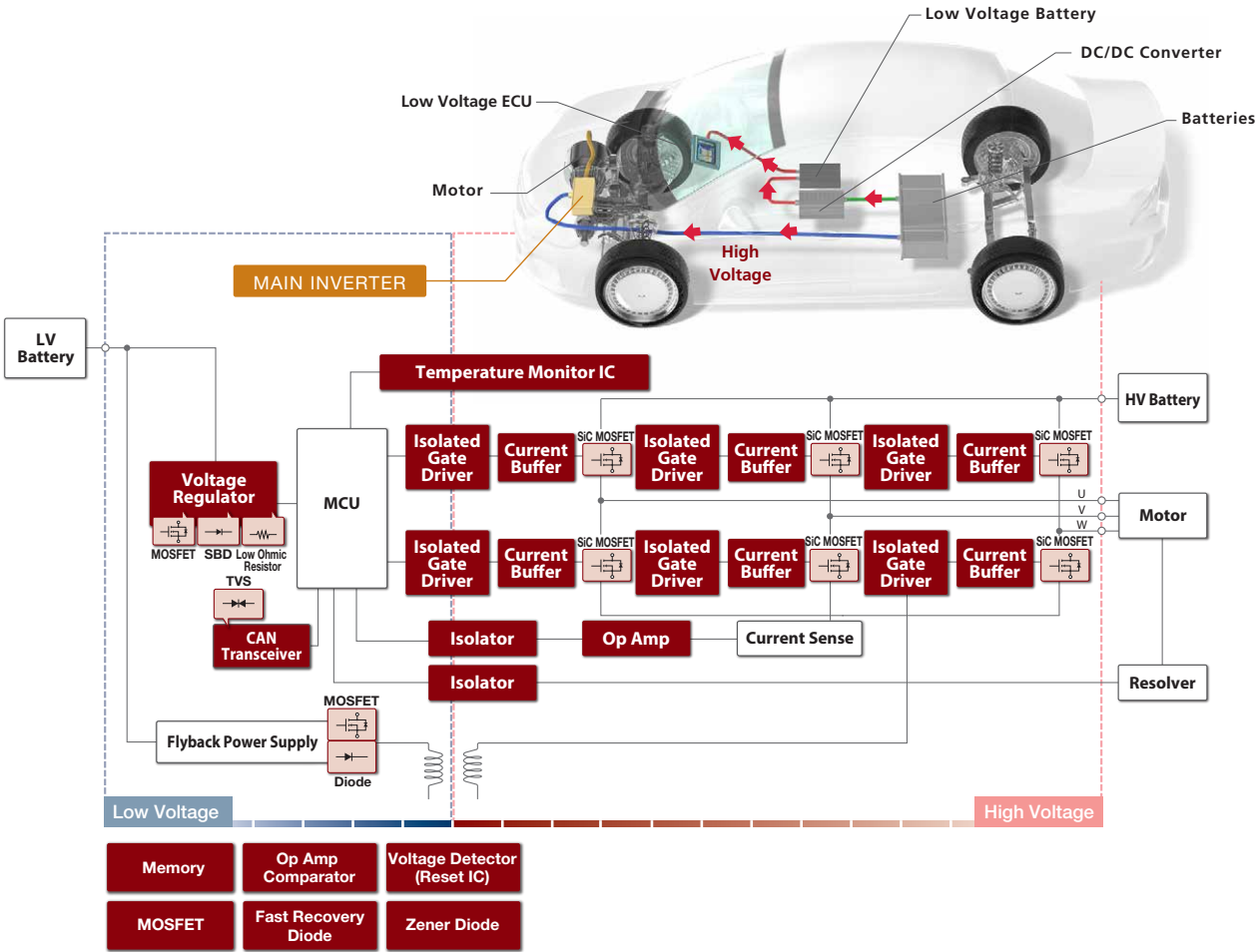
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|----------|----------------------------------|------------------------|-----------------------|----------------------------|
|          |                                  | Hybrid                 |                       |                            |
|          |                                  | Regenerative braking   |                       | EV > 1000km                |
| mode     |                                  | Idle-stop start        | 48V hybrid            | Solar cells                |
|          |                                  |                        |                       | Vehicle wireless charging  |
|          | Holographic HUD                  |                        |                       | Intelligent HMI            |
|          | GPS based navigation             |                        | Automotive telematics | Gesture interface          |
|          | Navigation(bird view)+Voice      |                        | X-by-wire             |                            |
|          | Hands-free car phone             | Navigation with VICS   | Multi-color HUD       |                            |
|          | Integrated instrumentation panel |                        | Online services       |                            |
|          |                                  | On-demand infotainment |                       |                            |
|          | Electronic suspension            | Radar cruise control   | AFS                   | Stereo camera              |
|          | Tire pressure monitor            | Drowsiness detection   | Front & Side monitor  |                            |
|          |                                  | Side Airbag            | Power slide door      |                            |
|          | Inter-car distance warning       |                        | Lane assistance       | Crash detect               |
|          | i-SRS airbag system              |                        | Night vision          | Intelligent parking assist |
| wiper    | Brake assist                     |                        |                       | Low speed ACC              |
| steering | Wireless door-lock               | LIDAR based ACC        |                       |                            |
|          |                                  |                        |                       |                            |
| control  | Automatic engine oil control     | 6 speed level AT       | Mirror less           | 9 speed level AT           |
| control  | Rack assist EPS                  | Electric parking brake | Occupant detection    |                            |
|          | Active exhaust system            | 7 speed level AT       |                       |                            |
|          |                                  |                        |                       |                            |
|          |                                  | LED Lamp               |                       | Laser head lamp            |
|          |                                  |                        |                       | Harness less               |

Future

**ROHM**  
SEMICONDUCTOR

# MAIN INVERTER

The main inverter converts DC voltage supplied by the battery into 3-phase AC voltage for driving the motor. Conventional power devices for inverters typically utilize a combination of IGBTs and diodes, but SiC MOSFETs that reduce conduction and switching losses are attracting increased attention.



## MAIN INVERTER Products

Op Amp

BA8290x series

The high EMI tolerance contributes to reduced use of anti-noise parts.

...P.48

SOP8

Power Supply (LDO)

BD4xxd1x series

Standard LDOs are offered in a range of packages to support a variety of applications.

...P.28

HTSOP-J8

Schottky Barrier Diodes

Ultra Low Vr series  
Low Vr series

Select from among 4 different series to meet application requirements for Vr and Ir. Enables optimized proposals based on circuit requirements.

...P.76 to 84

D0-214AC  
S0D-123FL

Memory

Operational Amplifier  
Comparator

Voltage Detector  
(Reset IC)

MOSFET

Fast Recovery Diodes

Zener Diodes

SiC Power Device

...P.46

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...P.50

...P.66

...P.85

...P.89

...P.63

High Power Ultra Low Ohmic Chip Shunt Resistors

PSR series

5W rated power guaranteed in the ultra-low-resistance region from 0.1mΩ.

...P.109

PSR100

TVS

RESD1CAN

Ideal for CAN BUS protection.

...P.92

SOT-23

IPD (Intelligent Power Device)

BV1H/BV1L series

High performance semiconductor power switches with built-in protection circuits are capable of absorbing energy such as inductive loads.

...P.37

HTSOP-J8

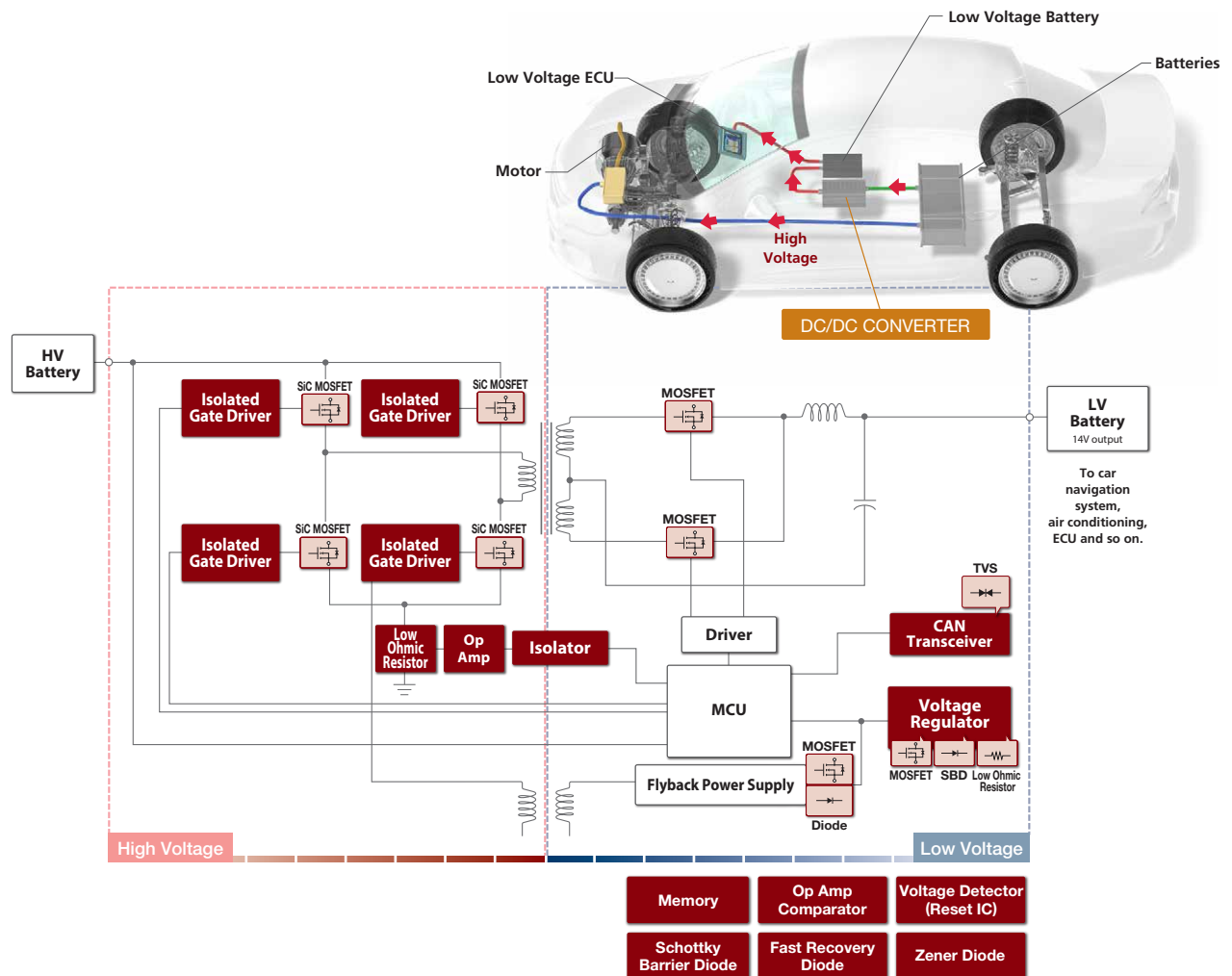
# DC/DC CONVERTER

xEV is driven by a high-voltage battery and motor instead of the engine.

The DC/DC converter converts the power device from the high voltage battery to a low DC voltage using a transformer.

In order to protect the electronic circuits operating at low voltage, it is necessary to electrically isolate both the ground and signal from the low voltage board and high voltage board.

Also, ROHM's DC/DC converter system that uses SiC MOSFET enables high-speed switching operation, achieving miniaturization and high performance while improving safety.



## DC/DC CONVERTER Products

### Power Supply (LDO)

BD4xxMx series

Standard LDOs are offered in a range of packages to support a variety of applications.

...P.28



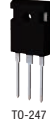
HTSOP-J8

### SiC MOSFET

SCT3 series

These SiC MOSFETs deliver superior operation at high temperatures, and as such are expected to be used as next-generation power devices.

...P.64



TO-247

### High Power Ultra Low Ohmic Chip Shunt Resistors

PSR series

5W rated power guaranteed in the ultra-low-resistance region from 0.1mΩ.

...P.109



PSR400

### TVS

RES01CAN

Ideal for CAN BUS protection.

...P.92



SOT-23

|                                  |         |
|----------------------------------|---------|
| Memory                           | ...P.46 |
| Operational Amplifier Comparator | ...P.48 |
| Voltage Detector (Reset IC)      | ...P.50 |
| MOSFET                           | ...P.66 |
| Schottky Barrier Diodes          | ...P.76 |
| Fast Recovery Diodes             | ...P.85 |
| Zener Diodes                     | ...P.89 |

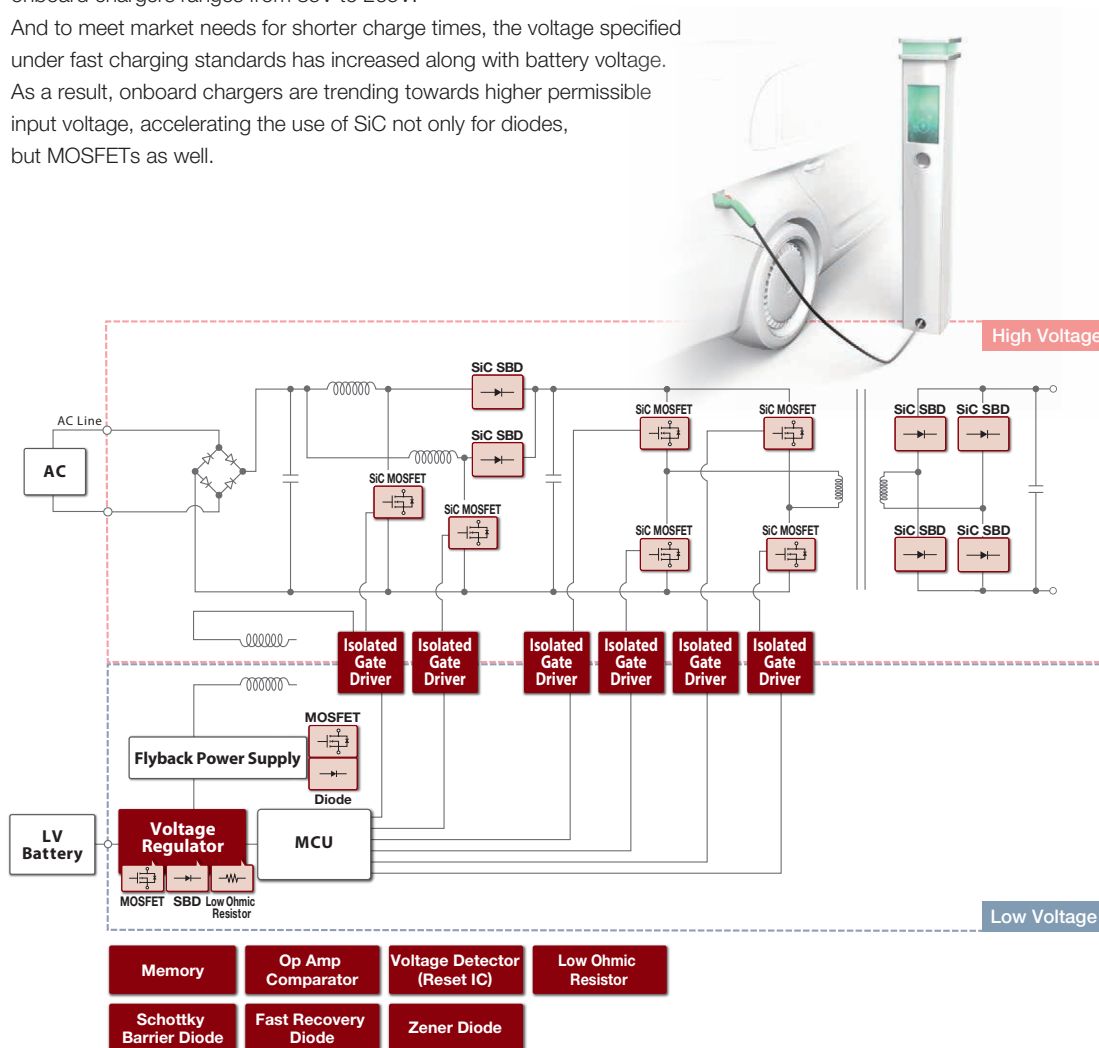
# ON BOARD CHARGER

Onboard chargers (car chargers) consist of AC/DC converters that convert AC voltage (100V to 240V) to DC voltage to charge the high-voltage battery.

To ensure worldwide compatibility, the permissible input voltage of many onboard chargers ranges from 85V to 265V.

And to meet market needs for shorter charge times, the voltage specified under fast charging standards has increased along with battery voltage.

As a result, onboard chargers are trending towards higher permissible input voltage, accelerating the use of SiC not only for diodes, but MOSFETs as well.



## ONBOARD CHARGER Products

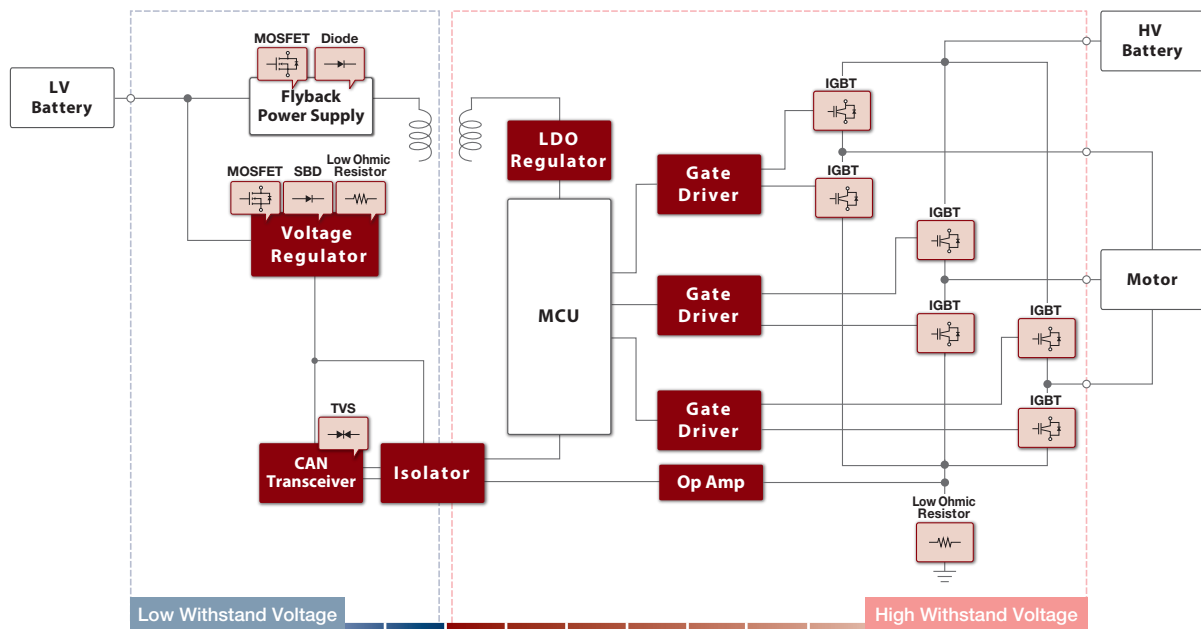
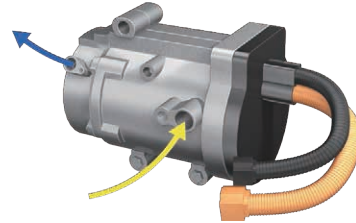
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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Op Amp</b><br><b>BA8290x series</b><br>The high EMI tolerance contributes to reduced use of anti-noise parts.<br>...P.48                                                                                             | <b>SiC Power Device</b><br><b>SCT3 series SCT2 series</b><br>ROHM offers SiC MOSFETs and Schottky barrier diodes, which feature superior operation under high temperatures and are expected to be used as next-generation power devices.<br>...P.63 to 64 | <b>High Power Ultra Low Ohmic Chip Shunt Resistors</b><br><b>PSR series</b><br>5W rated power guaranteed in the ultra-low-resistance region from 0.1mΩ.<br>...P.109 | Memory ...P.46<br>Operational Amplifier Comparator ...P.48<br>Voltage Detector (Reset IC) ...P.50<br>MOSFET ...P.66<br>Schottky Barrier Diodes ...P.76<br>Fast Recovery Diodes ...P.85<br>Zener Diodes ...P.89 |
| <b>IPD (Intelligent Power Device)</b><br><b>BVIH/BVIL series</b><br>High performance semiconductor power switches with built-in protection circuits are capable of absorbing energy such as inductive loads.<br>...P.37 |                                                                                                                                                                                                                                                           |                                                                                                                                                                     |                                                                                                                                                                                                                |

# ELECTRIC COMPRESSOR

In xEVs, the AC compressor is electric.

High voltage is used to increase motor efficiency, and for inverters that control rotation, high voltage, along with high efficiency, are important factors.

ROHM IGBTs for electric compressors are high-performance, low-loss devices that provide superior short-circuit tolerance.



## ELECTRIC COMPRESSOR Products

### LIN Transceiver

BD41030FJ-C

Complies with the automotive local network standard LIN Ver. 2.1.

...P.40



SOP-J8

### High Power Ultra Low Ohmic Chip Shunt Resistors

PSR series

5W rated power guaranteed in the ultra-low-resistance region from 0.1mΩ.

...P.109



PSR500

### Power Supply (LDO)

BD4xx0Lx series

Standard LDOs are offered in a range of packages to support a variety of applications.

...P.28



HTS0P-J8

### CXPI Transceiver

...P.40

### Operational Amplifier Comparator

...P.48

### Schottky Barrier Diodes

...P.76

### Op Amp

BA8290x series

The high EMI tolerance contributes to reduced use of anti-noise parts.

...P.48



SOP8

### IGBT RGS series

RGS series

Broad lineup of high voltage, large current products.

...P.65



TO-247N

### TVS

RES01CAN

Ideal for CAN BUS protection.

...P.92



SOT-23

# PTC HEATER

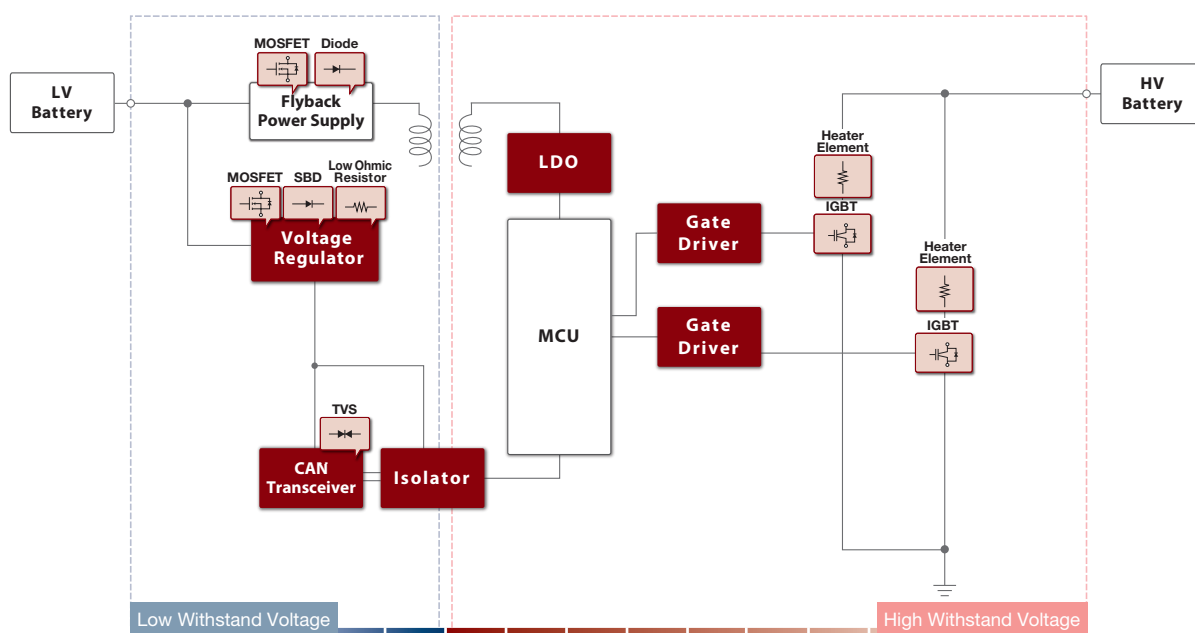
## (Positive Temperature Coefficient Heater)

Conventional automotive heating systems utilize the exhaust heat of the internal combustion engines, but EVs have no internal combustion engines, and PHEVs generate little exhaust heat, so new heat sources are needed.

As a result, PTC heater systems that integrate IGBTs to switch ON/OFF the PTC heater element are seeing increased adoption.

An IGBT is used to turn the PTC heater element on and off.

ROHM offers a lineup of 650V withstand voltage products along with 1,200V models capable of supporting high voltage batteries.



### PTC HEATER Products

|                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>LIN Transceiver</b><br><b>BD41030FJ-C</b><br>Complies with the automotive local network standard LIN Ver. 2.1.<br><br>SOP-J8<br>...P.40 | <b>High Power Ultra Low Ohmic Chip Shunt Resistors</b><br><b>PSR series</b><br>5W rated power guaranteed in the ultra-low-resistance region from 0.1mΩ.<br><br>PSR500<br>...P.109 | <b>Power Supply (LDO)</b><br><b>BD4xxdMx series</b><br>Standard LDOs are offered in a range of packages to support a variety of applications.<br><br>HTSOP-J8<br>...P.28 | Memory ...P.46<br>Operational Amplifier Comparator ...P.48<br>Voltage Detector (Reset IC) ...P.50<br>MOSFET ...P.66<br>Schottky Barrier Diodes ...P.76<br>Fast Recovery Diodes ...P.85<br>Zener Diodes ...P.89 |
| <b>Op Amp</b><br><b>BA8290x series</b><br>The high EMI tolerance contributes to reduced use of anti-noise parts.<br><br>SOP8<br>...P.48    | <b>IGBT RGS series</b><br><b>RGS series</b><br>Broad lineup of high voltage, large current products.<br><br>TO-247N<br>...P.65                                                    | <b>TVS</b><br><b>RESD1CAN</b><br>Ideal for CAN BUS protection.<br><br>SOT-23<br>...P.92                                                                                  |                                                                                                                                                                                                                |

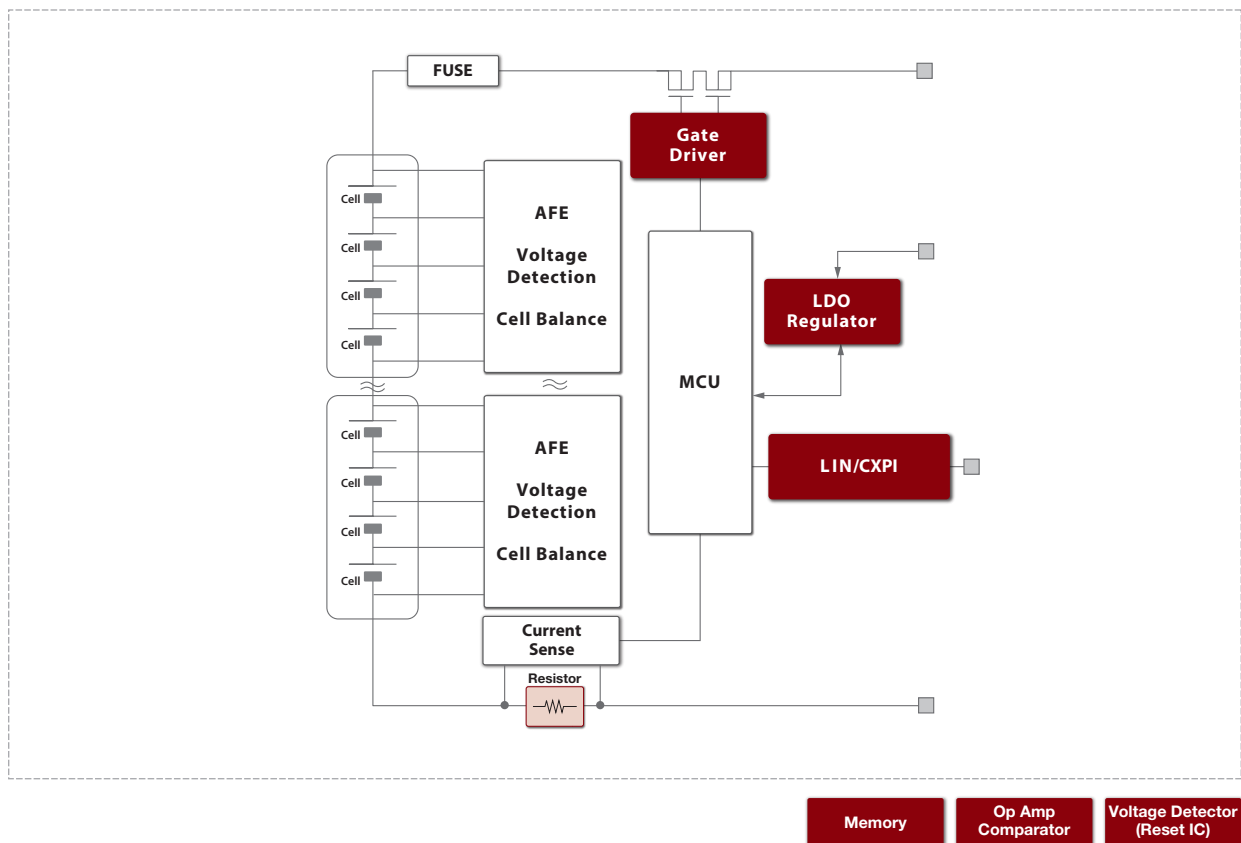
# BMS

## (Battery Management System)

BMS are necessary for controlling the required power and maximizing the range of electric vehicles.

ROHM develops discrete products such as BMS switches (MOSFETs) and current detection resistors along with power supply ICs for battery control MCUs.

Optimized solutions are offered for next-generation BMS that support multiple series connections.



### BMS Products

#### LDO Regulator

BD4xxMx series

High voltage LDOs that supply voltage to MCUs with low quiescent current.

...P.28



T0252-3

#### Isolated Power Supply Controller

BD8325FVT-M

Controls the power supply for isolating the high voltage battery and internal circuits.

...P.35



TSSOP-B30

#### MOSFET

40V series  
60V series

Used for high side switches of 12V battery lines.

...P.66 to 68



SOP8

#### CXPI Transceiver

...P.40

#### Operational Amplifier Comparator

...P.48

#### Schottky Barrier Diodes

...P.76

#### Gate Drivers

ML5810

Drives the MOS gate voltage for battery protection.

...P.45



TSSOP-20

#### TVS

RESD1CAN

Ideal for CAN BUS protection.

...P.92



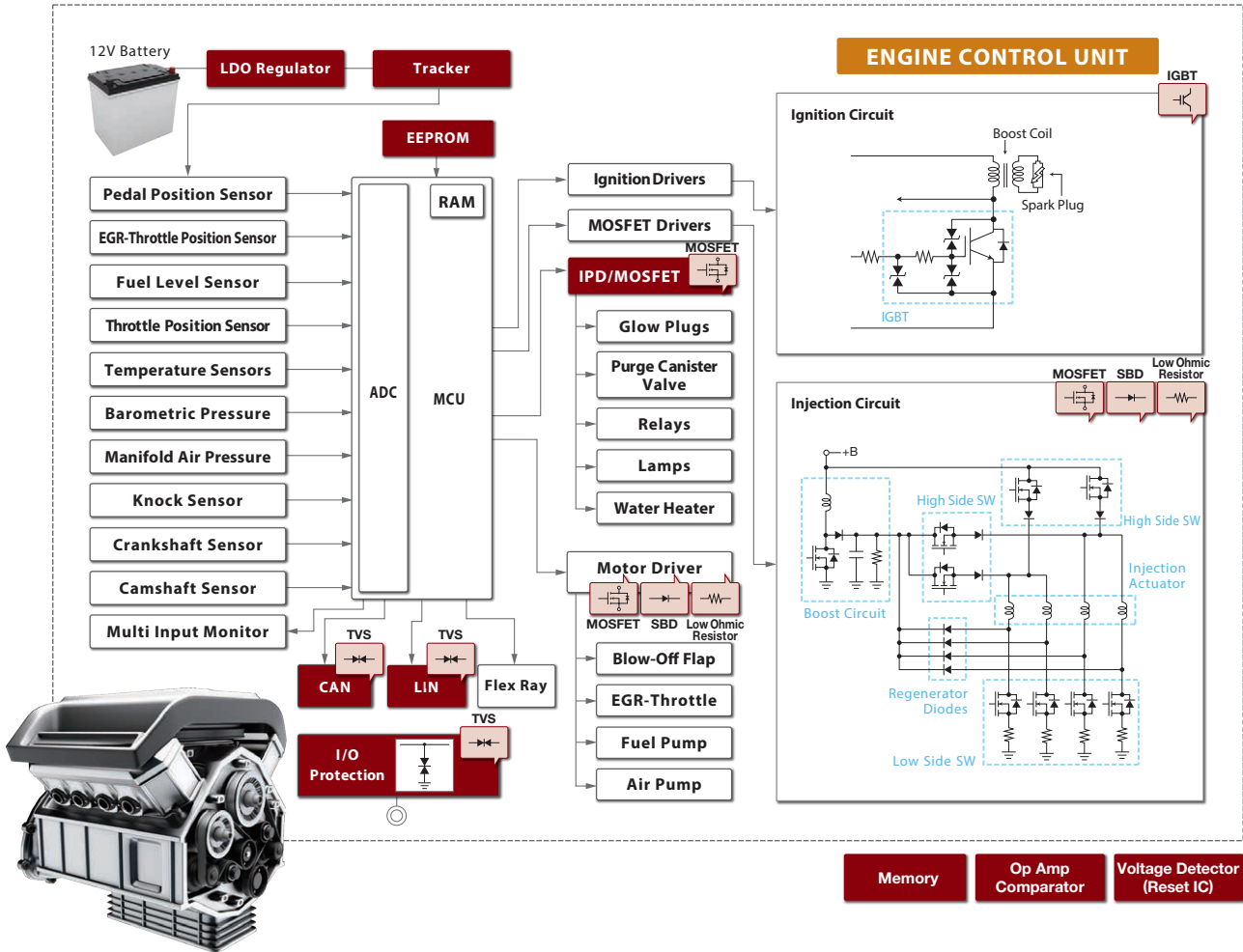
SOT-23

# ENGINE CONTROL UNIT

With an emphasis on reducing emissions and increasing fuel economy, there is a race on increasing the engine efficiency. The purpose of the engine control unit is to sense the status of the engine and the surrounding systems and control the engine, especially the ignition.

Sensor and driver accuracy play a large role in engine efficiency. This applies to power supplies as well. ROHM offers a wide lineup of power supplies that contribute to greater energy savings, miniaturization, and performance in ECUs of all types.

ROHM has also developed a broad portfolio of automotive-grade discrete products, including IGBTs for ignition control.



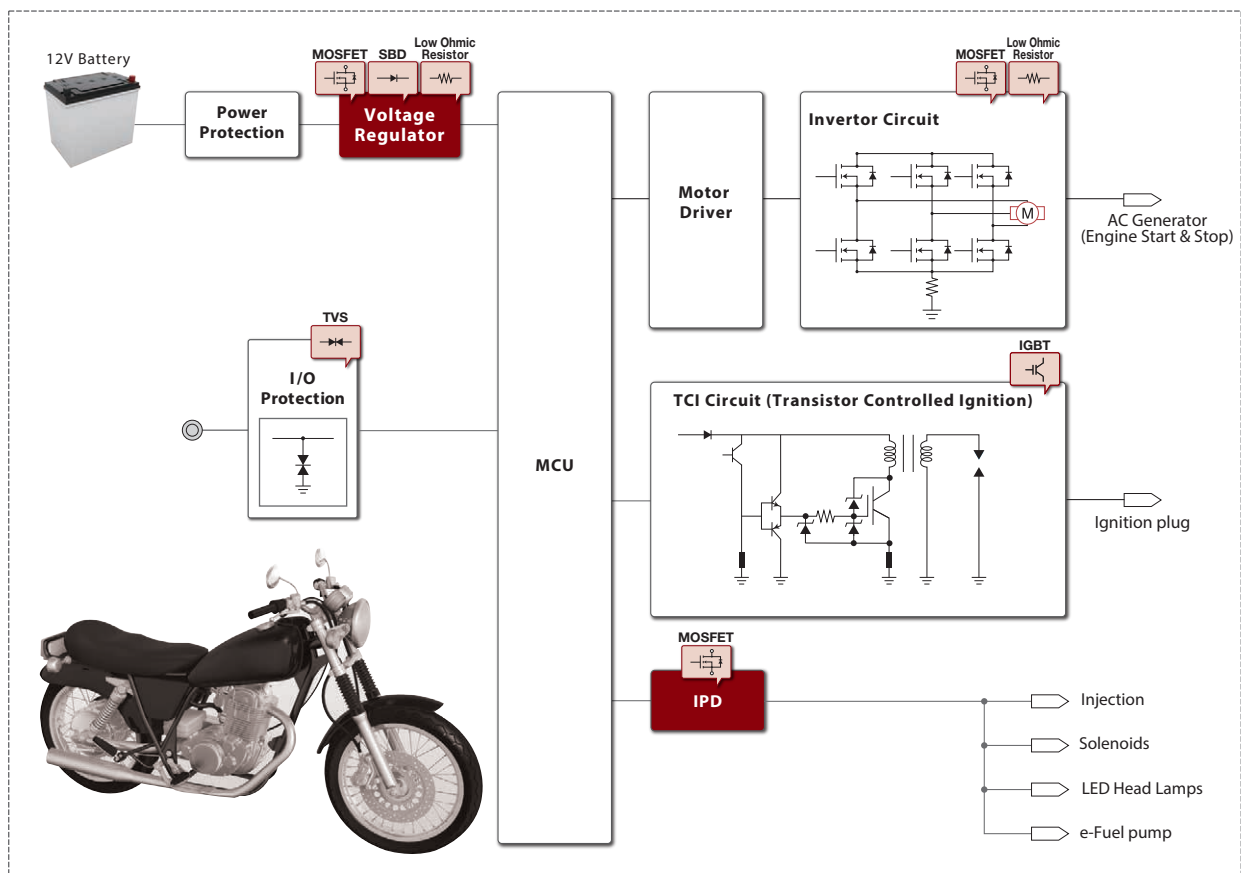
## ENGINE CONTROL UNIT Products

|                                                                                                                                                                                              |                                                                                                                                                                                                           |                                                                                                                                  |                                                                                                                                                  |                                                                                                                           |                                      |                                       |                                       |                                                    |                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------------------|-----------------------------------------------|
| <b>IPD (Intelligent Power Device)</b><br>High performance semiconductor power switches with built-in protection circuits are capable of absorbing energy such as inductive loads.<br>...P.37 | <b>BV1H/BV1L series</b><br>HTSOP-J8<br>...P.41                                                                                                                                                            | <b>Multi Input Monitor</b><br>Contributes to using fewer MCU ports. Intermittent operation reduces power consumption.<br>...P.41 | <b>LIN Transceiver</b><br>Complies with the automotive local network standard LIN Ver. 2.1.<br>...P.40                                           | <b>TVS</b><br>Ideal for CAN BUS protection.<br>...P.92                                                                    | <b>RESD1CAN</b><br>SOT-23<br>...P.65 | <b>LDO Regulator</b><br>...P.27       | <b>Memory</b><br>...P.46              | <b>Operational Amplifier Comparator</b><br>...P.48 | <b>Voltage Detector (Reset IC)</b><br>...P.50 |
| <b>MOSFET</b><br>Supports a variety of drive circuits (i.e. actuators). Advanced processes provide low ON resistances.<br>...P.66 to 68                                                      | <b>Schottky Barrier Diodes</b><br>Select from among 4 different series to meet application requirements for $V_R$ and $I_R$ . Enables optimized proposals based on circuit requirements.<br>...P.76 to 84 | <b>Ultra Low <math>I_R</math> series Low <math>V_F</math> series</b><br>DO-214AC SOD-123FL<br>...P.76 to 84                      | <b>Anti-surge Chip Resistors</b><br>Newly developed lineup features improved surge resistance, contributing to improved reliability.<br>...P.102 | <b>IGBT</b><br>IGBT for ignition circuits features high avalanche withstand capability and low $V_{CE(sat)}$ .<br>...P.65 | <b>R6P series</b><br>TO-252          | <b>Bipolar Transistors</b><br>...P.69 | <b>Digital Transistors</b><br>...P.72 |                                                    |                                               |

# ENGINE CONTROL UNIT for MOTORCYCLE

Emissions regulations for 4-wheel and even 2-wheel vehicles are getting stricter every year, increasing the need to upgrade systems by digitizing control.

Engine control is carried out by first detecting the status of the engine and condition of the vehicle, converting to electrical signals, then feeding back these electrical signals to the engine control unit.



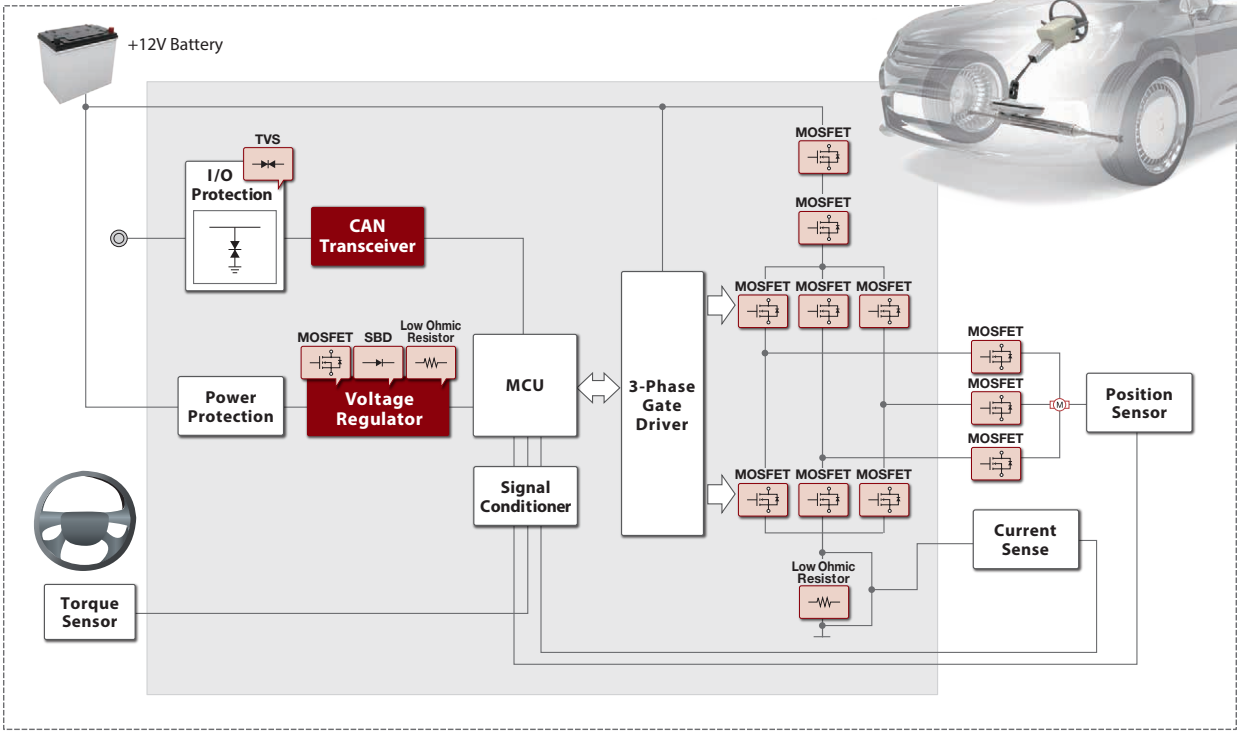
## ENGINE CONTROL UNIT Products

|                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                 |                                                                                                                                                                                   |                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>IPD (Intelligent Power Device)</b> <b>BV1H/BV1L series</b><br>High performance semiconductor power switches with built-in protection circuits are capable of absorbing energy such as inductive loads.<br>HTSOP-J8<br>...P.37                                  | <b>IGBT</b> <b>RGP series</b><br>IGBT for ignition circuits features high avalanche withstand capability and low VCE(sat).<br>TO-252<br>...P.65                                                 | <b>MOSFET</b> <b>60V/100V/200V/250V series</b><br>Supports a variety of drive circuits(i.e. actuators). Advanced processes provide low ON resistances.<br>TO-252<br>...P.66 to 68 | <b>LDO Regulator</b> ...P.27<br><b>Memory</b> ...P.46<br><b>Operational Amplifier</b> ...P.48<br><b>Comparator</b><br><b>Voltage Detector (Reset IC)</b> ...P.50 |
| <b>Schottky Barrier Diodes</b> <b>Ultra Low Ir series Low Vr series</b><br>Select from among 4 different series to meet application requirements for Vr and Ir. Enables optimized proposals based on circuit requirements.<br>DO-214AC S00-123FL<br>...P.76 to 84 | <b>Anti-surge Chip Resistors</b> <b>SDR series ESR series</b><br>Newly developed lineup features improved surge resistance, contributing to improved reliability.<br>SDR03<br>ESR03<br>...P.102 | <b>TVS</b> <b>RES01CAN</b><br>Ideal for CAN BUS protection.<br>SOT-23<br>...P.92                                                                                                  | <b>Bipolar Transistors</b> ...P.69<br><b>Digital Transistors</b> ...P.72                                                                                         |

# ELECTRONIC POWER STEERING (EPS)

Recent years have seen the increased adoption of electric power steering systems (EPS) in the latest vehicle models. In EPS systems the hydraulic pump is eliminated, reducing vehicle weight and improving fuel consumption by 3%. These systems are capable of adjusting the torque via software to achieve superior operability and driving performance. In addition, the steering torque is easier to adjust to the speed of the vehicle, and vehicle safety is improved by generating active torque based on the driving environment. Additional driver support features such as lane and parking assist are also possible by expanding the EPS functionality.

In an EPS system, a torque sensor detects the steering position and the motor is driven using a gate driver in combination with power transistors. In order to control the feedback of the motor, the supply current to the motor is detected to achieve motor output torque and position control. The figure below shows a block diagram of a solution using an MCU, but equivalent operation can be achieved with a gate driver controlled via SPI communication.



Memory    Op Amp Comparator

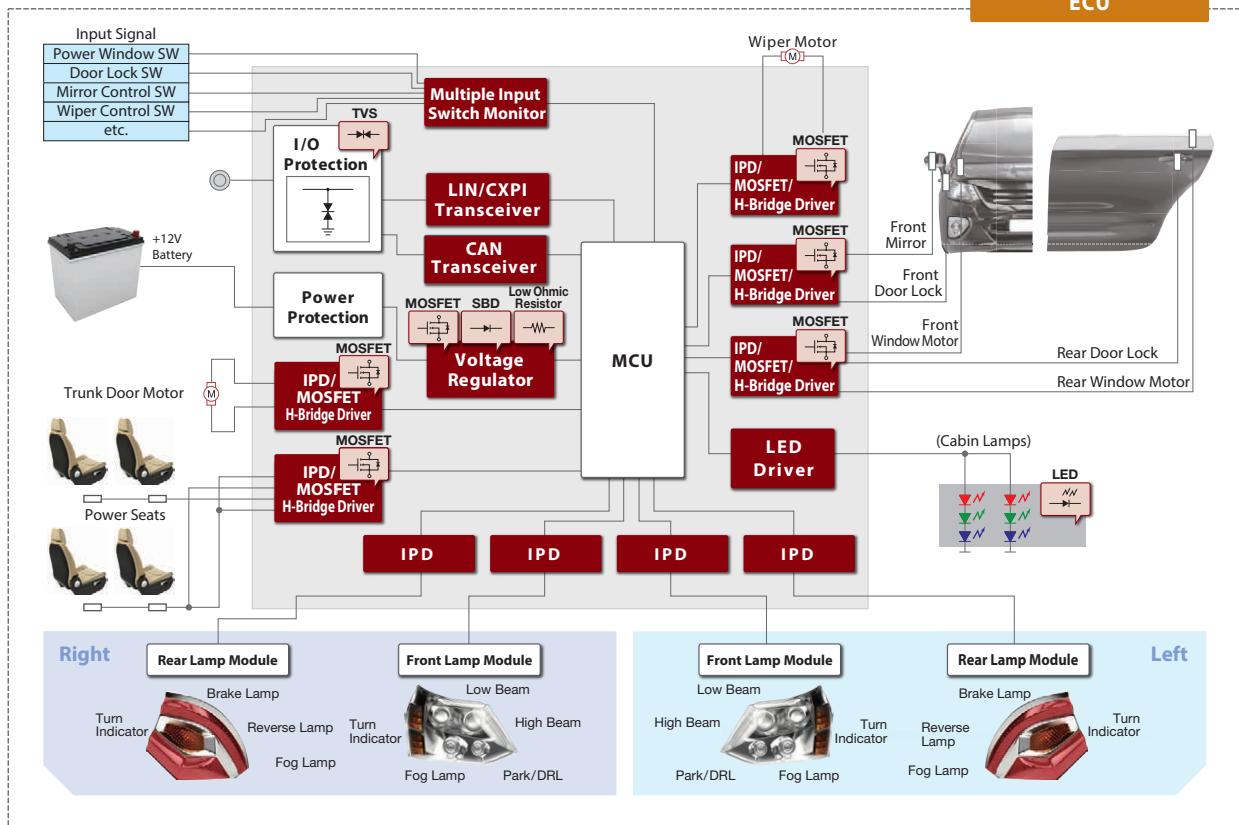
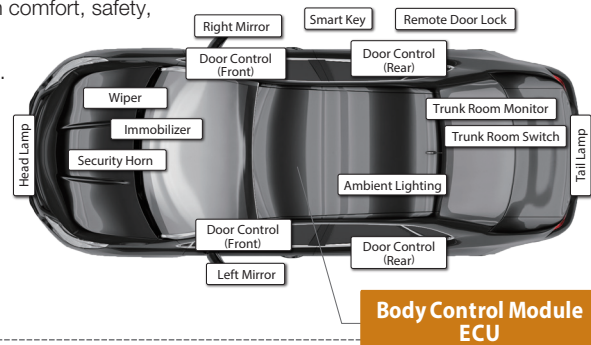
## ELECTRONIC POWER STEERING(EPS)Products

|                                                                                                                                                                                                                                                                         |                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>MOSFET</div> <div>40V series<br/>60V series</div> <div>Optimized for a variety of drive circuits(i.e. motor drive). Advanced processes provide low ON resistances.</div> <div>...P.66 to 68</div>                                                                  | <div>High Power Ultra Low Ohmic Chip Shunt Resistors</div> <div>5W rated power guaranteed in the ultra-low-resistance region from 0.1mΩ.</div> <div>...P.109</div> | <div>Automotive EEPROM</div> <div>BR24A/25H/33H series</div> <div>Industry standard interfaces and packages are available. The expanded lineup includes our next-generation series that improves on several key characteristics, including low-voltage 1.6V drive, 4 million rewrites, and high-speed 3.5ms write time.</div> <div>...P.47</div> | <div>Memory</div> <div>Operational Amplifier Comparator</div> <div>Voltage Detector (Reset IC)</div> <div>...P.46</div> <div>...P.48</div> <div>...P.50</div> |
| <div>Schottky Barrier Diodes</div> <div>Ultra Low In series<br/>Low Vf series</div> <div>Select from among 4 different series to meet application requirements for Vf and Ia. Enables optimized proposals based on circuit requirements.</div> <div>...P.76 to 84</div> | <div>TVS</div> <div>RESD1CAN</div> <div>Ideal for CAN BUS protection.</div> <div>...P.92</div>                                                                     |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                               |

# BODY CONTROL MODULE (BCM)

The Body Control Module(BCM)ECU provides centralized control of all body systems, from interior/exterior lighting, HVAC, doors and mirrors, windows, and wipers.

The continued electrification in the automotive sector centered on comfort, safety, and eco-friendliness - together with in-vehicle infotainment - is expanding BCM functionality along with the number of harnesses. This demands multiplex communication such as LIN and CAN to reduce vehicle weight.



Memory

Op Amp  
ComparatorVoltage Detector  
(Reset IC)

## BODY CONTROL MODULE Products

|                                                                                                                                                                                                                                                          |                                                                                                                                                                                |                                                                                                                                                                                                                                            |                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>LIN Transceiver</b><br><b>BD41030FJ-C</b><br>Complies with the automotive local network standard LIN Ver. 2.1.<br>...P.40                                                                                                                             | <b>RGB LED Driver</b><br><b>BD2808MUV-M</b><br>Integrated 8-bit dimming function and 6-bit current DAC for RGB make it possible to produce a broad range of colors.<br>...P.35 | <b>MOSFET</b><br><b>60V series</b><br><b>100V series</b><br>Suitable for a variety of drive circuits(i.e. LEDs). Advanced processes provide low ON resistances.<br>...P.66 to 68                                                           | <b>IPD (Intelligent Power Device)</b><br><b>BV1H/BV1L series</b><br>Ideal for drive and protection switches in a variety of automotive applications.<br>...P.37 | <b>Voltage Regulator</b><br>...P.27<br><b>Memory</b><br>...P.46<br><b>Operational Amplifier</b><br><b>Comparator</b><br>...P.48<br><b>Voltage Detector (Reset IC)</b><br>...P.50<br><b>Bipolar Transistors</b><br>...P.69<br><b>Digital Transistors</b><br>...P.72<br><b>Rectifier Diodes</b><br>...P.88 |
| <b>Schottky Barrier Diodes</b><br><b>Ultra Low Is series</b><br><b>Low Vf series</b><br>Select from among 4 different series to meet application requirements for Vf and Is. Enables optimized proposals based on circuit requirements.<br>...P.76 to 84 | <b>Bi-Directional Zener Diode</b><br><b>RSB12WM</b><br>Bi-Directional Zener Diode series optimized for LIN & CAN.<br>...P.91                                                   | <b>High Power Low Ohmic Chip Shunt Resistors</b><br><b>GMR series</b><br>Adopting a new structure results in high heat dissipation and superior temperature characteristics. 3W rated power guaranteed in a compact 6432 size.<br>...P.109 |                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                          |

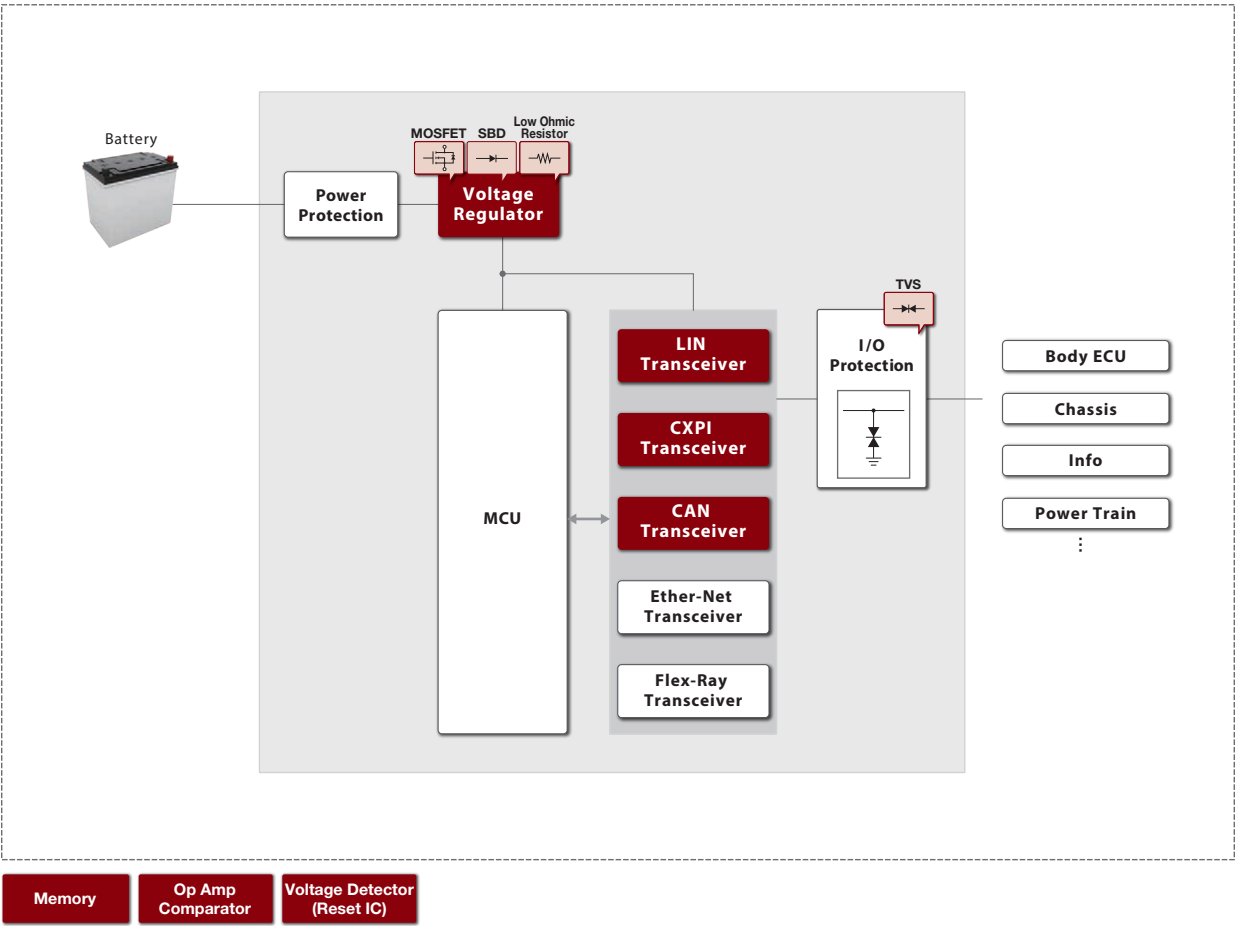
# GATEWAY ECU

Following the increasing adoption of electronic control for the engine, body, and other systems, cars require multiple ECUs (Electronic Control Units).

However, this entails increased network complexity.

The Gateway ECU connects multiple ECUs with different protocols.

In addition to communication and power supply ICs that contribute to lower system power consumption, ROHM offers a broad lineup of protection elements.



## GATEWAY ECU Products

LIN Transceiver

BD41030FJ-C

Complies with the automotive local network standard LIN Ver. 2.1.

SOP-8

...P.40

CXPI Transceiver

BD41000FJ-C

Transceiver for automotive networks using the CXPI (Clock Extension Peripheral Interface) protocol. Supports bidirectional Master/Slave operation.

SOP-8

...P.40

MOSFET

40V series 60V series

Optimized for a variety of drive circuits (i.e. motor drive). Advanced processes provide low ON resistances.

TO-252

...P.66 to 68

Schottky Barrier Diodes

Ultra Low In series Low Vr series

Select from among 4 different series to meet application requirements for Vr and Ir. Enables optimized proposals based on circuit requirements.

BD-214AC SOD-123FL

...P.76 to 84

Low Ohmic Chip Resistors

LTR series PMR series

Broad lineup of high power high reliability low ohmic resistors offered in a range of sizes (1005 to 6432).

LTR18

...P.107 to 108

Bi-Directional Zener Diode

RSB12WM

Bi-Directional Zener Diode series optimized for LIN & CAN.

SOT-416FL

...P.91

|                                                |          |
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| Voltage Regulator                              | ...P.27  |
| Memory                                         | ...P.46  |
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| Voltage Detector (Reset IC)                    | ...P.50  |
| Bipolar Transistors                            | ...P.69  |
| Digital Transistors                            | ...P.72  |
| High Power Chip Resistors (Wide Terminal Type) | ...P.107 |

# HVAC CONTROL MODULE

HVAC(Heating, Ventilation, and Air Conditioning) and car AC control modules perform system control of both cooling (via the refrigerant cycle) utilizing a compressor as well as heating by extracting exhaust heat from the engine using coolant water.

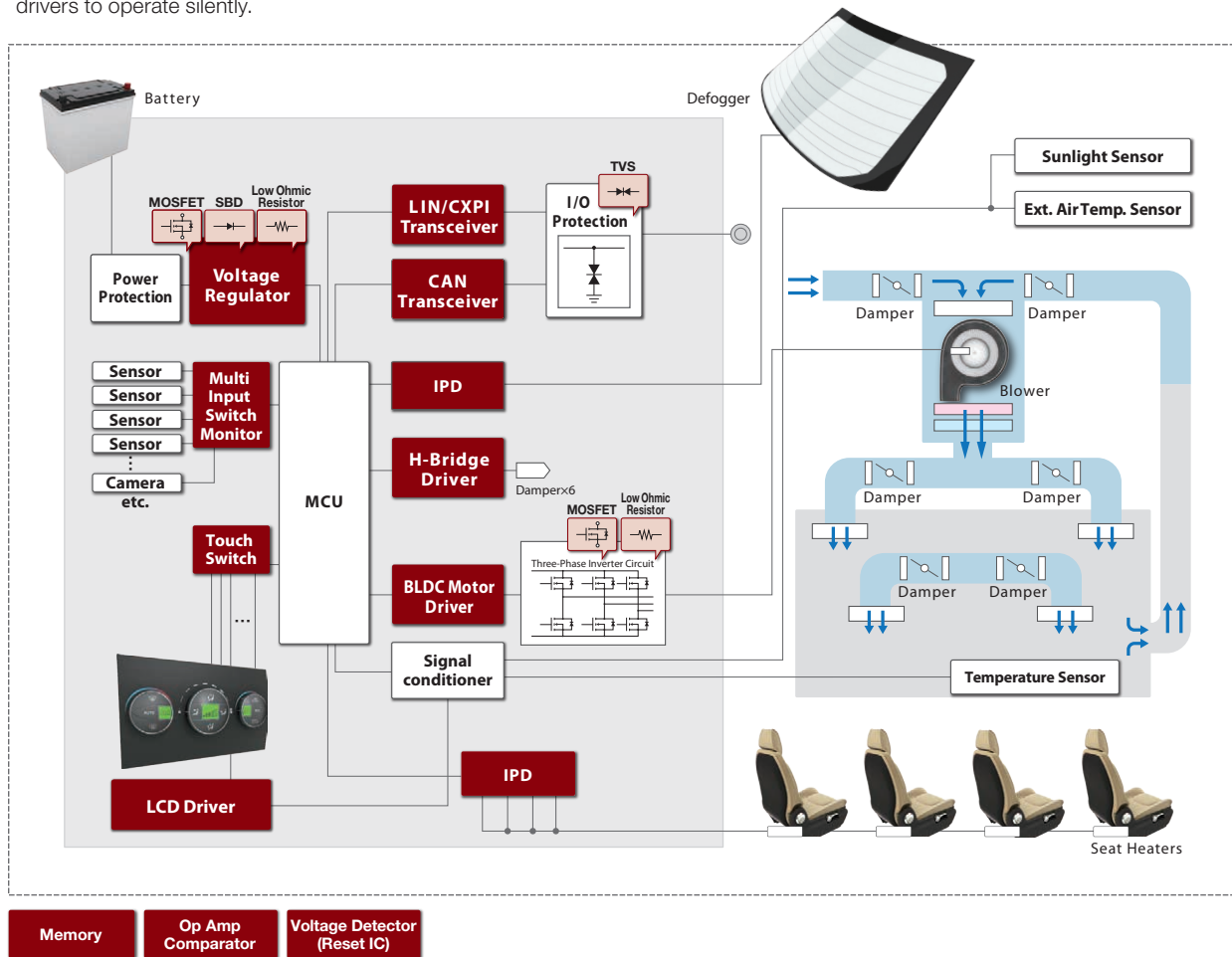
HVAC systems typically include a manual mode enabling manual operation of the ratio between warm and cold air as well as fan speed, and an automatic mode that automatically adjusts the temperature and air flow based on a preset value.

The following figure shows the block diagram of a typical HVAC system.

The transition from conventional gas-powered engines to electric motors used in HEVs/EVs has significantly reduced cabin noise. Consequently, it has become necessary for motor drivers in vehicle cabin cooling and heating systems (which typically run noisy) to operate silently.

Until recently, DC motors were commonly used in blower motors, but brushless motors are seeing increased adoption due to their superior thermal efficiency.

Consequently, the motors used for cooling and heating in vehicle cabins can be particularly noisy, making it necessary for motor drivers to operate silently.



Memory

Op Amp  
ComparatorVoltage Detector  
(Reset IC)

## HVAC CONTROL MODULE Products

### LCD Driver BU97530KVT-M

Includes all functions required for panel operation, such as LCD control, button press detection, and LED dimming.

...P.39 TQFP100V

### MOSFET 40V series 60V series

Optimized for a variety of drive circuits (e.g. motor drive). Advanced processes provide low ON resistances.

...P.66 to 68

### LCD Driver ML94xx series

Broad lineup offered, supports a wide range of needs, from high reliability types and EMS-tolerant units to highly integrated models that minimize board space by minimizing the external parts.

...P.39 QFP100

### Schottky Barrier Diodes Ultra Low Vr series Low Vr series

Select from among 4 different series to meet application requirements for Vr and Ir. Enables optimized proposals based on circuit requirements.

...P.76 to 84

### BLDC Motor Driver BD16805FV-M

180° commutation reduces noise and improves efficiency through advance control.

...P.36 SSOP-B40

### High Power Ultra Low Ohmic Chip Shunt Resistors PSR series

5W rated power guaranteed in the ultra-low-resistance region from 0.1mΩ.

...P.109

### H-Bridge Driver BD16922EFV-M

Built-in low ON resistance DMOSFET improves efficiency while reducing heat generation.

...P.36 HTSSOP-B24

### IPD (Intelligent Power Device) BV1H/BV1L series

Ideal for drive and protection switches in a variety of automotive applications.

...P.37

Voltage Regulator ...P.27

LIN Transceiver ...P.40

Memory ...P.46

Operational Amplifier ...P.48

Comparator

Voltage Detector (Reset IC) ...P.50

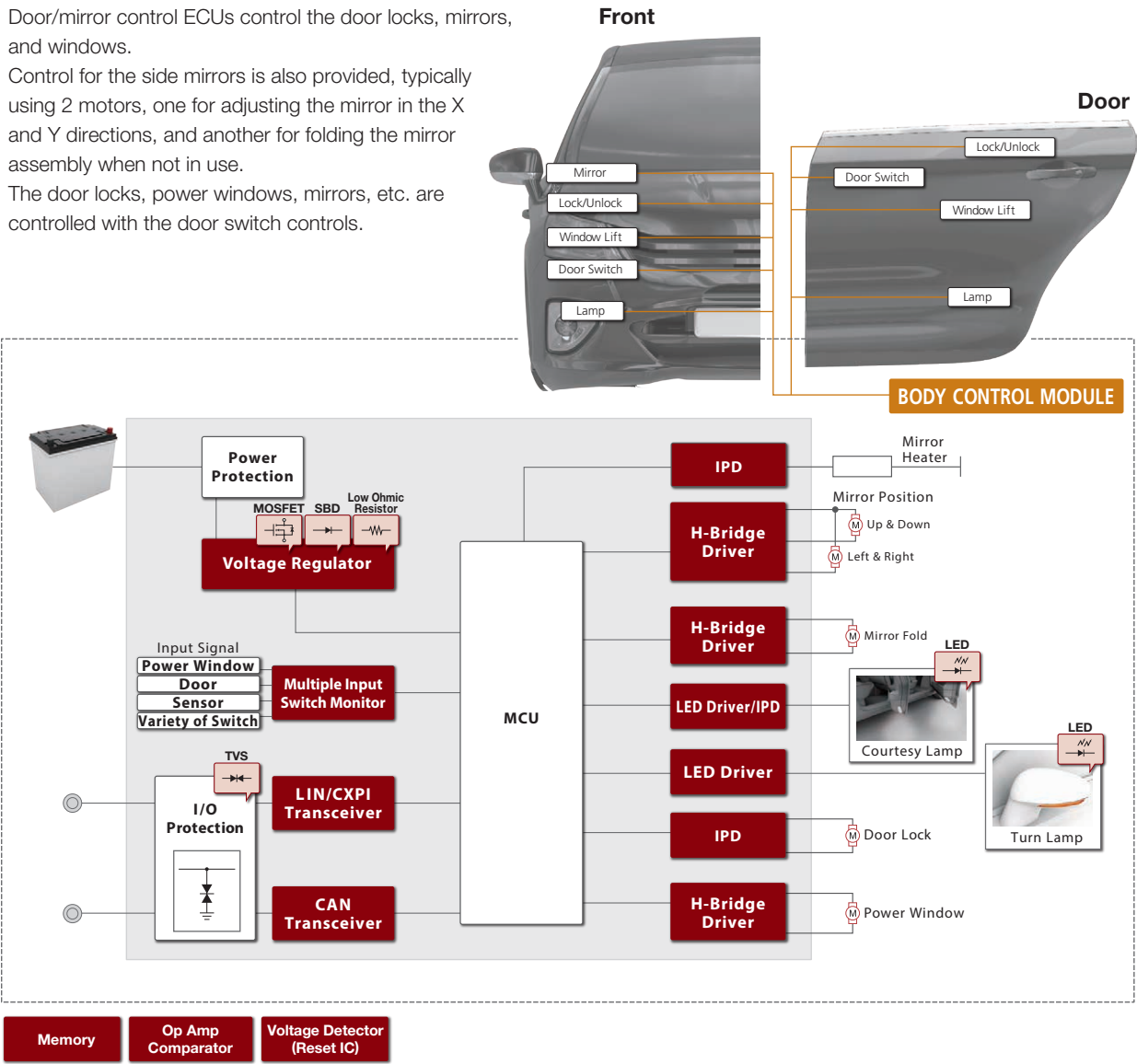
Chip Resistors for Current Detection ...P.107

# DOOR & MIRROR CONTROL MODULE

Door/mirror control ECUs control the door locks, mirrors, and windows.

Control for the side mirrors is also provided, typically using 2 motors, one for adjusting the mirror in the X and Y directions, and another for folding the mirror assembly when not in use.

The door locks, power windows, mirrors, etc. are controlled with the door switch controls.



## DOOR & MIRROR CONTROL MODULE Products

**LIN Transceiver** **BD41030FJ-C**

Complies with the automotive local network standard LIN Ver. 2.1.

...P.40 S0P-J8

**H-Bridge Driver** **BD16922EFV-M**

Built-in low ON resistance DMOSFET improves efficiency while reducing heat generation.

...P.36 HTSOP-B24

**MOSFET** **40V series 60V series**

Optimized for a variety of drive circuits (i.e. motor drive). Advanced processes provide low ON resistances.

...P.66 to 68 T0-252

**IPD (Intelligent Power Device)** **BV1H/BV1L series**

High performance semiconductor power switches with built-in protection circuits are capable of absorbing energy such as inductive loads.

...P.37 HTSOP-J8

**Schottky Barrier Diodes** **Ultra Low In series Low Vr series**

Select from among 4 different series to meet application requirements for Vr and In. Enables optimized proposals based on circuit requirements.

...P.76 to 84 DD-214AC S0D-123FL

**Low Ohmic Chip Resistors** **LTR series PMR series**

Broad lineup of high power high reliability low ohmic resistors offered in a range of sizes (1005 to 6432).

...P.107 to 108 LTR18

**Bi-Directional Zener Diode** **RSB12WM**

Bi-Directional Zener Diode series optimized for LIN & CAN.

...P.91 S0T-416FL

|                                                |          |
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| Digital Transistors                            | ...P.72  |
| High Power Chip Resistors (Wide Terminal Type) | ...P.107 |

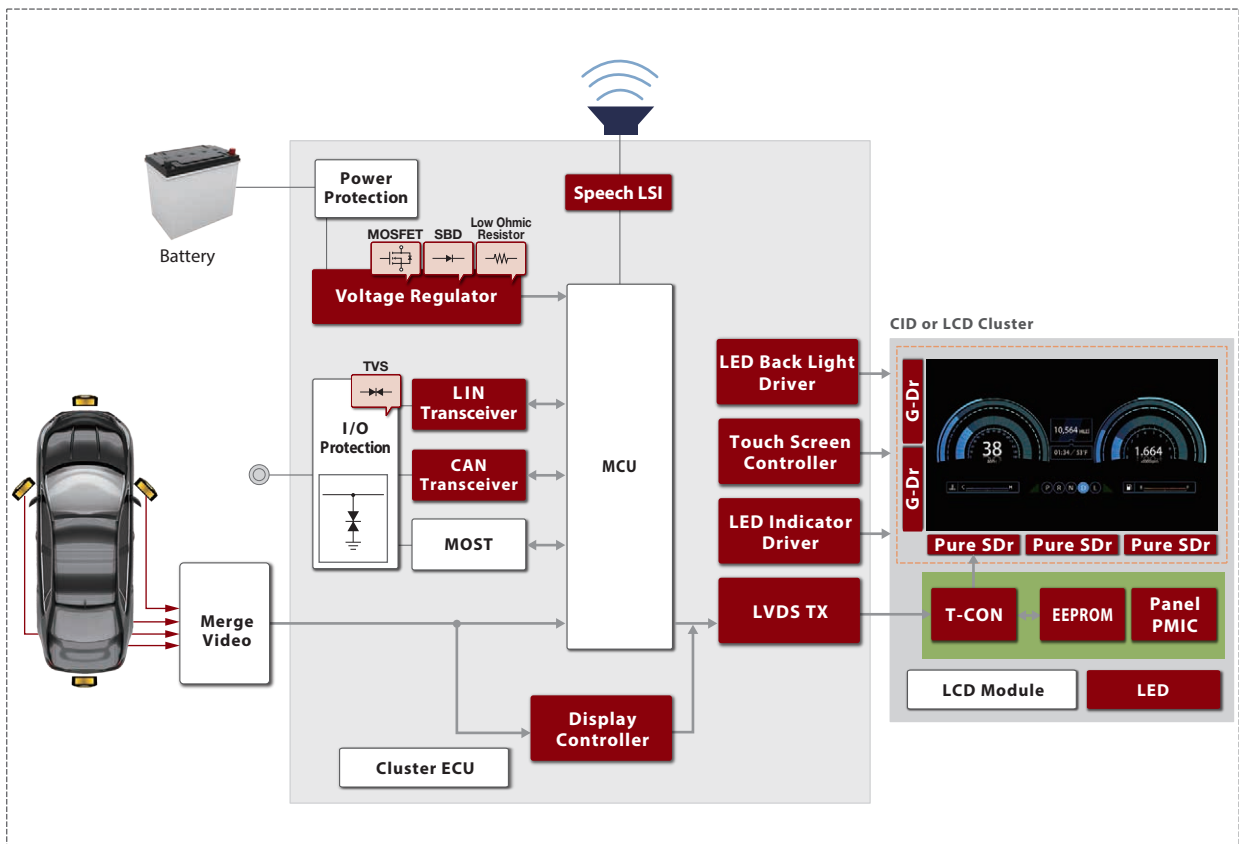


# TFT CLUSTER & CID (CENTER INFORMATION DISPLAY)

The instrument cluster(or dashboard)refers to the group of meters and indicators that provides the driver with information about the engine and other parameters like vehicle speed, fuel level, and engine oil level.

This is also commonly referred to as a dashboard.

As more and more vehicles move towards electrification and utilize Advanced Driver Assist Systems (ADAS), LCDs are being adopted in instrument panels to display a wide range of useful information in graphics format. ROHM contributes to greater energy conservation with a broad array of switching and linear regulators for automotive clusters.



Memory Op Amp Comparator Voltage Detector (Reset IC)

## AUTOMOTIVE CLUSTER & LCD MONITOR Products

|                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                 |                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>LED Driver (for Backlighting)</b><br><b>BD61A44EFV</b><br><b>BD61A44MUU</b><br>Built-in boost-buck switching regulator ensures stable operation even during battery fluctuations.<br>HTSSOP-B28<br>VQFN28SV5050<br>...P.35 | <b>LED Driver (for Indicators)</b><br><b>BD6378FV-M</b><br><b>BD6379FV-M</b><br>Compact packages contribute to increased space savings. Supports cascade connections for efficient driving of multiple LEDs.<br>SSOP-B16<br>SSOP-B20<br>...P.35 | <b>LVDS Interface</b><br><b>BU92T101-M</b><br><b>BU92T82-M</b><br>Converts 24bit parallel data to OpenLDI. The reverse is also possible.<br>HTQFP64AV<br>...P.41                     | <b>Touch Screen Controller</b><br><b>BU21024FV-M</b><br>Enables 2-point touch detection in 4-wire resistive touchscreens.<br>SSOP-B28<br>...P.40                                                                                                                                                                                                                |
| <b>Video Decoder</b><br><b>ML86101A</b><br><b>ML86V7675</b><br>Compatibility with the 3 international standards (NTSC/PAL/SECAM) makes them ideal for video equipment around the world.<br>TQFP48<br>TQFP64<br>...P.43        | <b>Speech LSI</b><br><b>ML22(Q)xxx</b><br>Features include 4ch mixing, built-in speaker amp, guaranteed operation up to +105°C, and multiple fail-safe functions required by automotive applications.<br>SSOP30<br>...P.42                      | <b>LEDs (1608-size Lens Type)</b><br><b>CSL-0901</b><br><b>CSL-0902 series</b><br>Provides a countermeasure against light leakage to the surrounding areas when mounted.<br>...P.114 | <b>Display Controller</b><br><b>Memory</b><br><b>Operational Amplifier Comparator</b><br><b>Voltage Detector (Reset IC)</b><br><b>Digital Transistors</b><br><b>Bi-Directional Zener Diode</b><br><b>High Power Chip Resistors (Wide Terminal Type)</b><br><b>LED</b><br>...P.43<br>...P.46<br>...P.48<br>...P.50<br>...P.72<br>...P.91<br>...P.107<br>...P.111 |

# CAR AUDIO

## Providing greater comfort through high fidelity audio

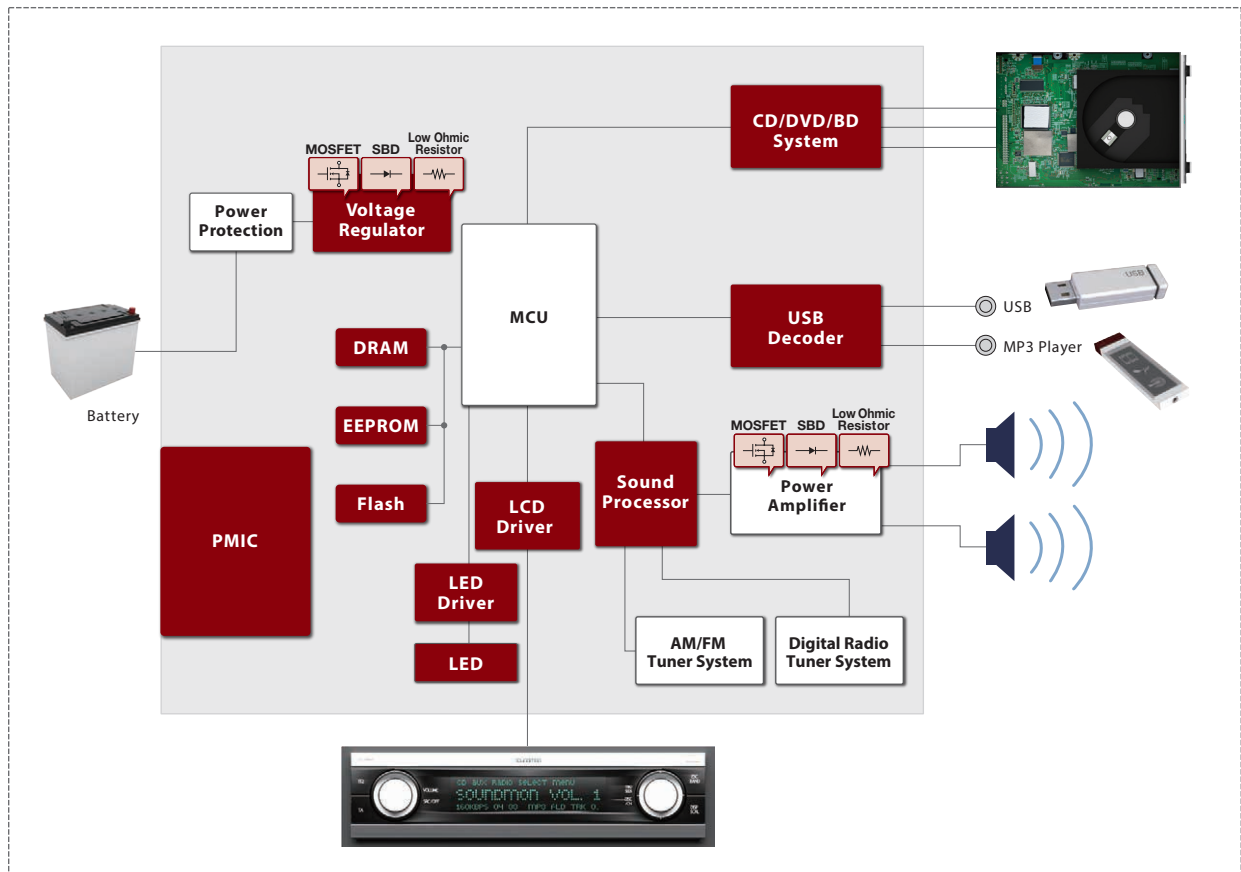
Car audio is becoming indispensable for not only creating a comfortable space for the driver and passengers through music, but for providing useful information as well.

Recent years have also seen the rapid proliferation of new audio sources such as MP3 players and USB flash memory.

ROHM provides products designed for both conventional music sources such as CDs and radio, and also easy-to-use solutions that enable plug-and-play connectivity for the latest USB and MP3 players.

As cars become quieter following the emergence of EVs and HEVs, higher audio quality is needed.

In addition, ROHM brings in analog technology that matured over many years of experience to develop high fidelity sound processors that significantly improve the listening experience by reducing noise at low frequencies optimized for high resolution audio sources as well as HEVs and EVs with quieter interiors that demand superior audio quality.



Memory

Op Amp  
ComparatorVoltage Detector  
(Reset IC)

### CAR AUDIO Products

#### Sound Processor

BD37033FV-M  
BD37034FV-M

Leveraging market-leading analog technology that has matured over the years has allowed ROHM to integrate an R-nr noise removal function that cuts R-nr noise interference in audio equipment due to mobile phone calls.

...P.42



SSOP-B28

#### System Motor Driver for ODD

BD8266FV  
BD8255MUV

Hall-equipped driver enables ultra-quiet operation while the custom built protection functions provide superior reliability.

...P.36

HTSSOP-B24  
VOFN48SV7070

#### LCD Driver

BU97530KVT-M

Includes all functions required for panel operation, such as LCD control, button press detection, and LED dimming.

...P.39



TQFP100V

#### IPD (Intelligent Power Device)

BV1H/BV1L series

Ideal for drive and protection switches in a variety of automotive applications.

...P.37

HTSOP-J8  
HSOP8

#### Schottky Barrier Diodes

Ultra Low In series  
Low Vr series

Select from among 4 different series to meet application requirements for Vr and Ir. Enables optimized proposals based on circuit requirements.

...P.76 to 84

DO-214AC  
S0D-123FL

#### Low Ohmic Chip Resistors

UCR series

Compact, high heat resistance low-ohmic lineup delivers superior rated power in a variety of sizes, from 0603 to 3216.

...P.106



UCR10

#### LED

SML-D15 series

High-brightness single-rank LEDs that eliminate brightness variations offered in a standard surface-mount package.

...P.113



1.6x0.8(t=0.55)

Voltage Regulator ...P.27

LCD Driver ...P.38

Memory ...P.46

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Comparator ...P.48

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Bipolar Transistors ...P.69

Digital Transistors ...P.72

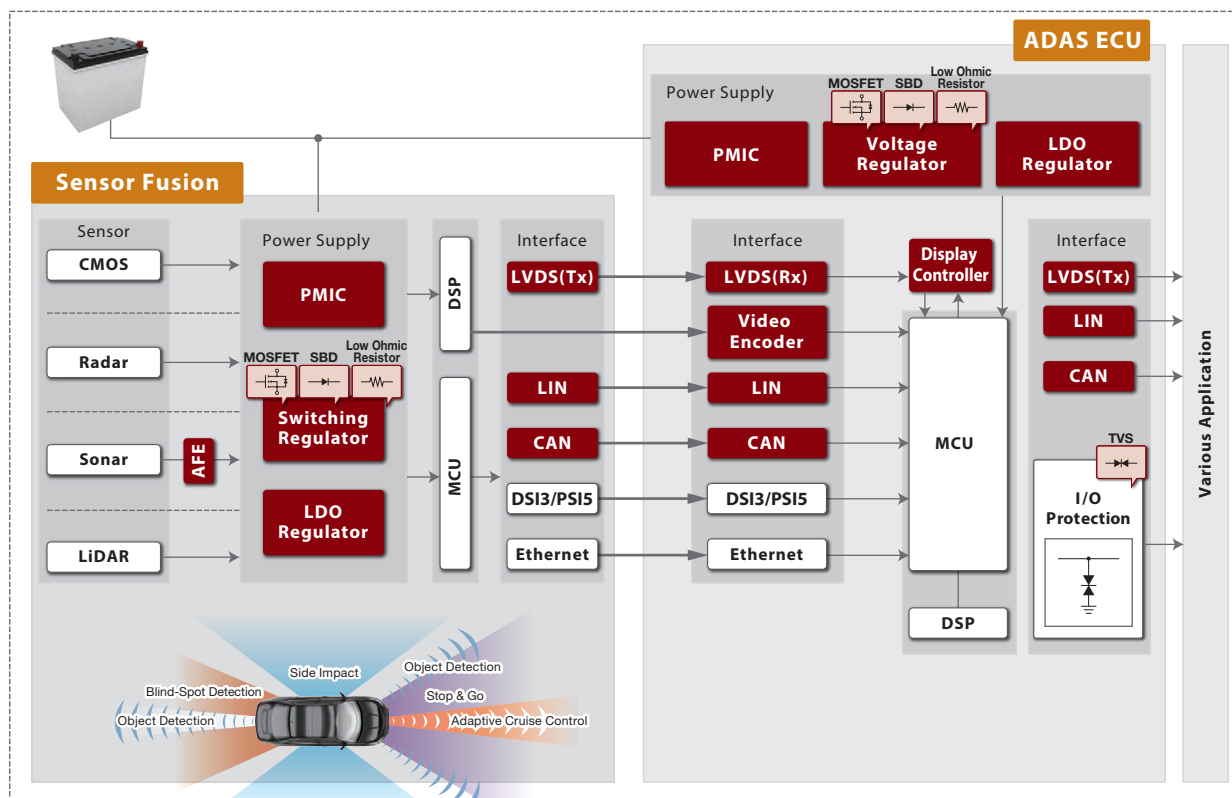
Bi-Directional Zener Diode ...P.91

# ADAS

## (Advanced Driver Assistance System)

The advent of Automatic Driver Assistance Systems(ADAS) is pioneering autonomous driving systems, accelerating the introduction of ADAS-equipped vehicles along with R&D. A variety of sensing devices required for system operation are used in different applications depending on features, and in recent years in addition to improving recognition and detection methods and reducing module size, the development of devices that take functional safety into account is increasingly demanded.

ROHM develops a range of solutions, from interface ICs for transferring sensor data and system power supply ICs ideal for ADAS ECUs to discrete devices and peripheral ICs that contribute to the continuing evolution of ADAS/autonomous driving.



Memory Op Amp Comparator Voltage Detector (Reset IC)

### ADAS Products

Power Management IC for Automotive Camera Modules Under Development

Multi-channel PMIC integrated into a compact form factor. Broad lineup compatible with CMOS sensors.



VOFN32SV5050

Low Ohmic Chip Resistors UCR series

Compact, high heat resistance low-ohmic lineup delivers superior rated power in a variety of sizes, from 0603 to 3216.



UCR006

Switching Regulator BD9Sxxx series

A lineup of compact secondary DC/DC with low consumption and high efficiency that can be selected according to the output current.



BD9S008X2020

Schottky Barrier Diodes Ultra Low In series Low Vr series

Select from among 4 different series to meet application requirements for Vr and Ir. Enables optimized proposals based on circuit requirements.



DO-214AC SOD-123FL

LDO Regulator BUxxJA2MNVX-C

ROHM's ultra-compact secondary LDO series provide the optimum power supply in modules.



SS0N004R1010

MOSFET 40V series 60V series

Optimized for a variety of drive circuits(i.e. switching power supply). Advanced processes provide low ON resistances.



S0P8

Automotive EEPROM BR24A/25H/33H series

Industry standard interfaces and packages are available. The expanded lineup includes our next-generation series that improves on several key characteristics, including low-voltage 1.6V drive, 4 million rewrites, and high-speed 3.5ms write time.



S0P-J8

MS0P8

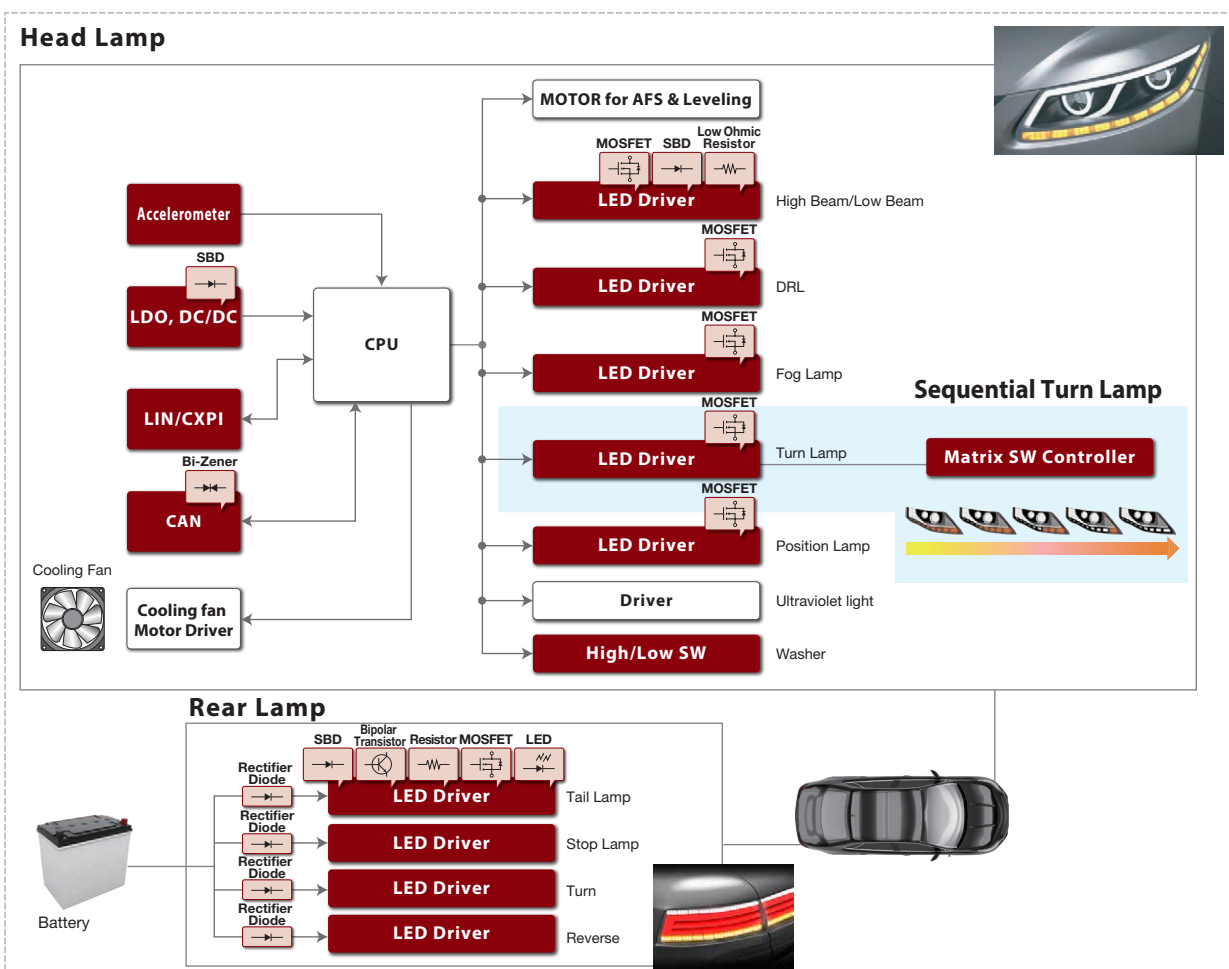


MS0P8

|                                  |         |
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| Switching Regulator              | ...P.33 |
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| Bi-Directional Zener Diode       | ...P.91 |

# LED LAMP MODULE

Automotive exterior lamps are increasingly adopting LEDs to meet the growing needs for low power consumption and longer life. ROHM offers a broad lineup of driver ICs designed to drive LEDs, and is actively involved in a number of activities to support the future of automotive lighting, such as developing controller ICs for ADB (Adaptive Driving Beam) systems that are expected to see widespread use.



Memory

Op Amp  
ComparatorVoltage Detector  
(Reset IC)

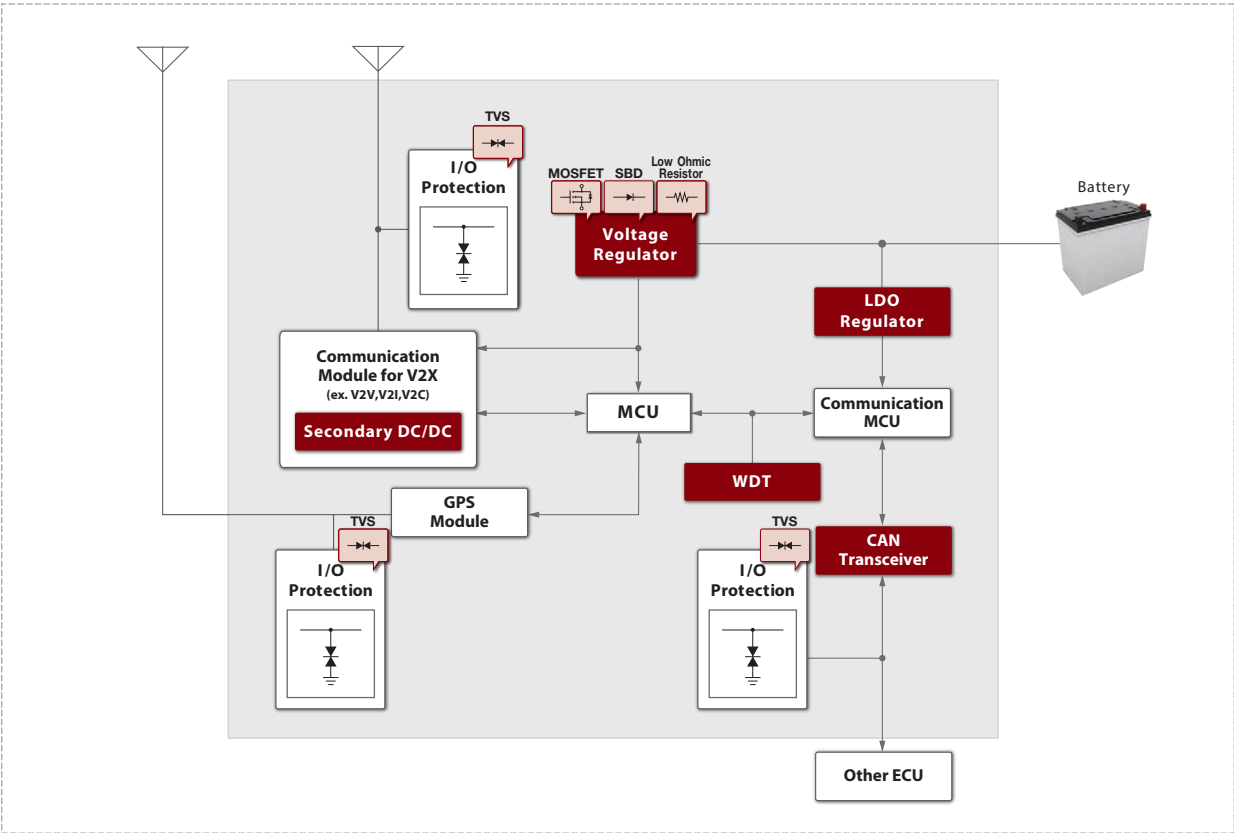
## LAMP MODULE Products

|                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                            |                                                                                                                                                                                                                                     |                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>IPD (Intelligent Power Device)</b><br><b>BYVH/BVIL series</b><br>High performance semiconductor power switches with built-in protection circuits are capable of absorbing energy such as inductive loads.<br>HTSOP-J8<br>...P.37 | <b>LED Driver (for Rear Lamps)</b><br><b>BD18341FV-M</b><br>Constant current controller capable of driving up to 10 external PNP transistors. Includes LED current derating along with LED open/short protection functions.<br>SSOP-B16<br>...P.36                   | <b>Matrix SW Controller</b><br><b>BD18362EFV-M</b><br>Built-in patterns facilitate sequential control without an MCU.<br>HTSSOP-B28<br>...P.35                                                             | <b>Accelerometer</b><br><b>KX123-6000</b><br>AEC-Q100 qualified compact low power 3-axis accelerometer for non-safety related vehicle systems<br>LGA<br>...P.40                                                                     | <b>Voltage Regulator</b> ...P.27<br><b>LIN Transceiver</b> ...P.40<br><b>Memory</b> ...P.46<br><b>Operational Amplifier Comparator</b> ...P.48<br><b>Voltage Detector (Reset IC)</b> ...P.50 |
| <b>MOSFET</b><br><b>60V series 100V series</b><br>Suitable for a variety of drive circuits (e.g. LEDs). Advanced processes provide low ON resistances.<br>TO-252<br>...P.66 to 68                                                   | <b>Schottky Barrier Diodes</b><br><b>Ultra Low In series Low Vr series</b><br>Select from among 4 different series to meet application requirements for Vr and Ir. Enables optimized proposals based on circuit requirements.<br>DO-214AC SOD-123FL<br>...P.76 to 84 | <b>Low Ohmic Chip Resistors</b><br><b>LTR series PMR series</b><br>Broad lineup of high power high reliability low ohmic resistors offered in a range of sizes (1005 to 6432).<br>LTR18<br>...P.107 to 108 | <b>Silver-Free Red LED</b><br><b>SML-Y18U2T(G)</b><br>The industry's first high brightness red LED featuring a completely silver-free design ensures superior sulfuration resistance.<br>PLCC<br>...P.114<br>※ROHM March 2019 study | <b>Rectifier Diodes</b> ...P.88<br><b>High Power Chip Resistors (Wide Terminal Type)</b> ...P.107<br><b>Bipolar Transistor</b> ...P.69<br><b>Bi-Directional Zener Diode</b> ...P.91          |

# V2X

## (Vehicle to Everything)

V2X is an emerging radio technology that incorporates various types of communication between cars and traffic-related systems, including V2V (Vehicle to Vehicle), V2I (Vehicle to Infrastructure), V2P (Vehicle to Pedestrian), and V2G (Vehicle to Grid). This technology hopes to achieve 4 objectives: 1) Prevent traffic accidents, 2) Eliminate traffic congestion, 3) Enable autonomous driving, and 4) Provide in-vehicle entertainment. ROHM supports stable wireless communication by supplying power ICs and discretes optimized for ECUs used in V2X systems.



- Memory
- Op Amp Comparator
- Voltage Detector (Reset IC)

### V2X Products

|                                                                                                                                                                      |                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>Switching Regulator</div> <div>BD906x0EFJ-C</div> <div>Power supply ICs that supply 3.3V or 5V from a 12V battery.</div> <div>...P.33</div> <div>HTSOP-J8</div> | <div>Switching Regulator</div> <div>BD9Sxxx series</div> <div>Compact secondary DC/DC regulators that deliver low voltage for the core.</div> <div>...P.33</div> <div>VS0N008X2020</div> | <div>LDO Regulator</div> <div>BD4xxMx series</div> <div>High voltage LDOs that supply voltage to MCUs with low quiescent current.</div> <div>...P.28</div> <div>T0252-3</div>                                                                                                                                                                                                       | <div>Memory</div> <div>...P.46</div>                                                                                                                                                                                                                                                                              |
| <div>LDO Regulator</div> <div>BUxxJA2MNVX-C</div> <div>Provides low voltage in an ultra-compact package.</div> <div>...P.31</div> <div>SS0N004R1010</div>            | <div>TVS</div> <div>RESD1CAN</div> <div>Ideal for CAN BUS protection.</div> <div>...P.92</div> <div>SOT-23</div>                                                                         | <div>Automotive EEPROM</div> <div>BR24A/25H/93H series</div> <div>Industry standard interfaces and packages are available. The expanded lineup includes our next-generation series that improves on several key characteristics, including low-voltage 1.6V drive, 4 million rewrites, and high-speed 3.5ms write time.</div> <div>...P.47</div> <div>SOP-J8</div> <div>MSOP8</div> | <div>Operational Amplifier Comparator</div> <div>...P.48</div> <div>Voltage Detector (Reset IC)</div> <div>...P.50</div> <div>MOSFET</div> <div>...P.66</div> <div>Schottky Barrier Diodes</div> <div>...P.76</div> <div>Fast Recovery Diodes</div> <div>...P.85</div> <div>Zener Diodes</div> <div>...P.89</div> |

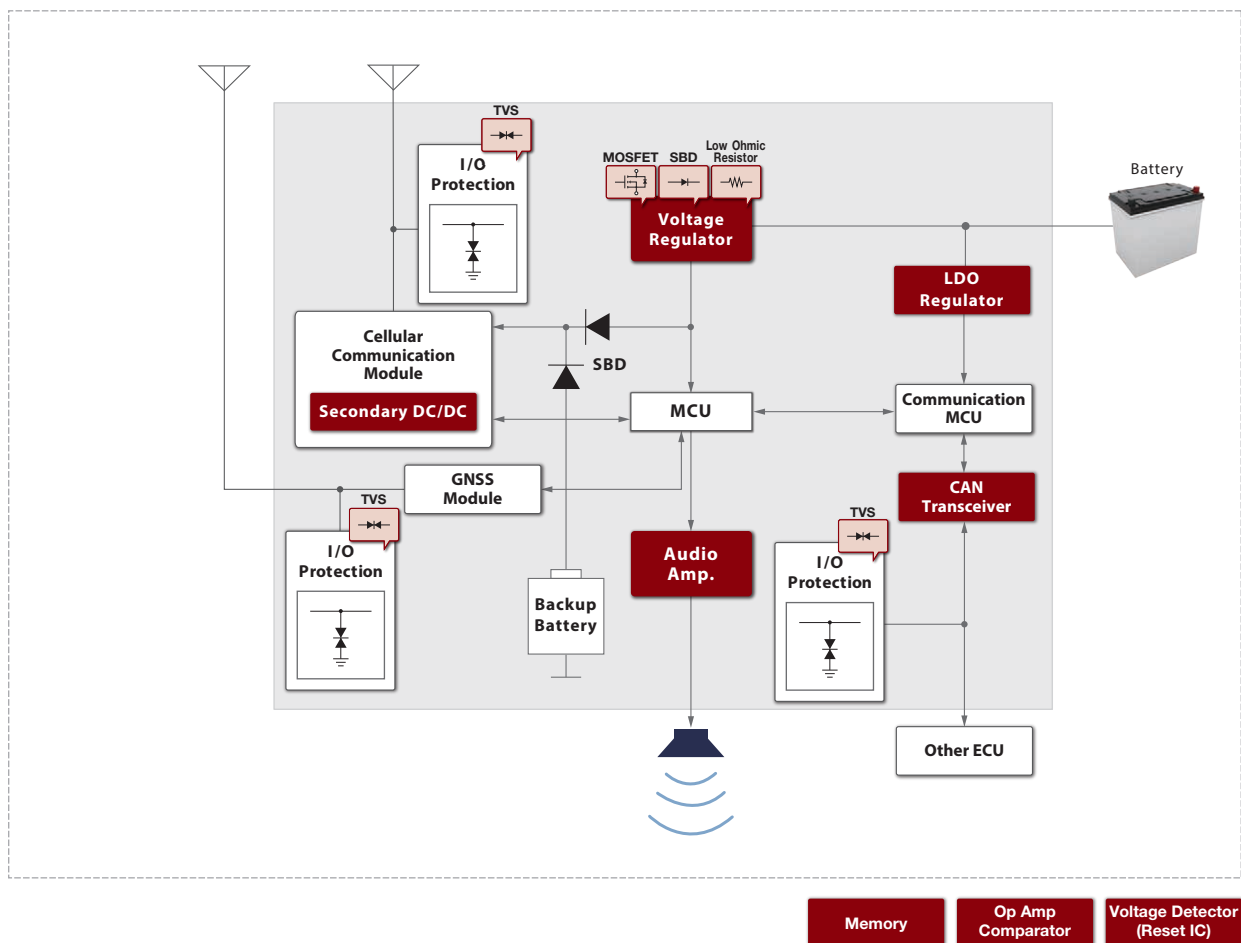
# eCALL

In the event of an accident eCall automatically reports vehicle location together with other relevant information (i.e. airbag deployment).

This shortens the response time of emergency vehicles and helps prevent secondary injuries such as frostbite.

Introduced in Russia in 2017, it was deployed throughout the EU in 2018.

Besides power supply ICs ideal for ECUs used for eCall, ROHM offers speaker amps for generating emergency sounds and discretes that ensure stable communication during emergencies.



## eCALL Products

|                                                                                                                                                                                                                                    |                                                                                                                                                                                                                              |                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>Switching Regulator</b><br><b>BD9Sxxx series</b><br>Compact secondary DC/DC regulators that deliver low voltage for the core.<br>...P.33<br> | <b>LDO Regulator</b><br><b>BD4xxMx series</b><br>High voltage LDOs that supply voltage to MCUs with low quiescent current.<br>...P.28<br> | <b>LDO Regulator</b><br><b>BUxxJA2MNVX-C</b><br>Provides low voltage in an ultra-compact package.<br>...P.31<br>          | <b>Automotive EEPROM</b><br><b>BR24A/25H/33H series</b><br>Industry standard interfaces and packages are available. The expanded lineup includes our next-generation series that improves on several key characteristics, including low-voltage 1.6V drive, 4 million rewrites, and high-speed 3.5ms write time.<br>...P.47<br> | CXPI Transceiver ...P.40<br>Operational Amplifier Comparator ...P.48<br>Schottky Barrier Diodes ...P.76 |
| <b>Speaker Amplifier</b><br><b>BD78xxEFJ-III series</b><br>Drives speakers for generating emergency sounds.<br>...P.42<br>                      | <b>TVS</b><br><b>RESD1CAN</b><br>Ideal for CAN BUS protection.<br>...P.92<br>                                                             | <b>Voltage Detector</b><br><b>BD62xxG-2C series</b><br>Reset ICs used to accurately monitor voltage lines.<br>...P.50<br> |                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                         |



# Automotive

[ICs]



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### LED Drivers

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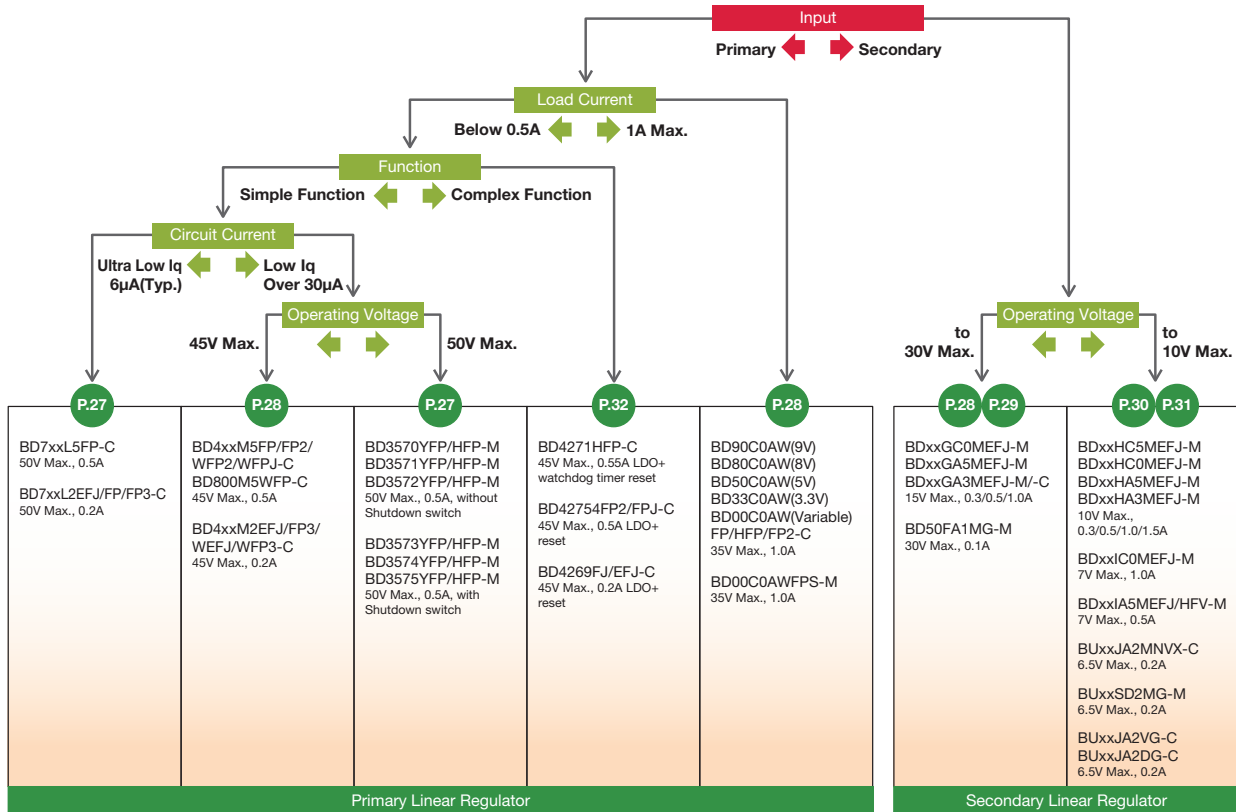
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## Power Management

### Linear Regulators

Automotive DC/DC system diagram



### Single-Output LDO Regulators

Please ensure that minimum input voltage always exceeds the sum of output voltage and drop out voltage for the device.

| 50V Resistance Output 500mA LDO Regulators                       |                   |                      |                              |                    |                                      |                      |                            |                 |                              |                              |                                     |     |  |
|------------------------------------------------------------------|-------------------|----------------------|------------------------------|--------------------|--------------------------------------|----------------------|----------------------------|-----------------|------------------------------|------------------------------|-------------------------------------|-----|--|
| Part No.                                                         | Input Voltage (V) | Output Voltage (V)   | Output Voltage Precision (%) | Output Current (A) | I/O Voltage Difference :Io=200mA (V) | Circuit Current (μA) | Operating Temperature (°C) | Shutdown Switch | Protection Circuit           | Package                      | Automotive Grade Available AEC-Q100 |     |  |
| BD3570YFP-M                                                      | 4.5 to 36.0       | 3.3                  | ±2<br>(Ta=-40 to +125°C)     | 0.5                | —                                    | 30                   | -40 to +125                | —               | Over-Current/<br>Temperature | TO252-3                      | —                                   |     |  |
| BD3570YHFP-M                                                     |                   | HRP5                 |                              |                    |                                      |                      |                            |                 |                              | —                            |                                     |     |  |
| BD3571YFP-M                                                      | 5.5 to 36.0       | 5.0                  |                              |                    | 0.25                                 |                      |                            |                 |                              | TO252-3                      | —                                   |     |  |
| BD3571YHFP-M                                                     |                   | HRP5                 |                              |                    |                                      |                      |                            |                 |                              | —                            |                                     |     |  |
| BD3572YFP-M                                                      | 4.5 to 36.0       | Variable 2.8 to 12.0 |                              |                    | —                                    |                      |                            |                 |                              | TO252-5                      | —                                   |     |  |
| BD3572YHFP-M                                                     |                   | HRP5                 |                              |                    |                                      |                      |                            |                 |                              | —                            |                                     |     |  |
| BD3573YFP-M                                                      |                   | 3.3                  |                              |                    |                                      |                      |                            |                 |                              | TO252-5                      | —                                   |     |  |
| BD3573YHFP-M                                                     |                   | HRP5                 |                              |                    |                                      |                      |                            |                 |                              | —                            |                                     |     |  |
| BD3574YFP-M                                                      | 5.5 to 36.0       | 5.0                  |                              |                    | 0.25                                 |                      |                            | ✓               |                              | TO252-5                      | —                                   |     |  |
| BD3574YHFP-M                                                     |                   | HRP5                 |                              |                    |                                      |                      |                            |                 |                              | —                            |                                     |     |  |
| BD3575YFP-M                                                      | 4.5 to 36.0       | Variable 2.8 to 12.0 |                              |                    | —                                    |                      |                            |                 |                              | TO252-5                      | —                                   |     |  |
| BD3575YHFP-M                                                     |                   | HRP5                 |                              |                    |                                      |                      |                            |                 |                              | —                            |                                     |     |  |
| 50V Resistance Output Low Quiescent Current 200mA LDO Regulators |                   |                      |                              |                    |                                      |                      |                            |                 |                              |                              |                                     |     |  |
| BD733L2EFJ-C                                                     | 4.37 to 45.0      | 3.3                  | ±2<br>(Ta=-40 to +125°C)     | 0.2                | 0.6                                  | 6                    | -40 to +125                |                 | —                            | Over-Current/<br>Temperature | HTSOP-J8                            | YES |  |
| BD750L2EFJ-C                                                     | 5.8 to 45.0       | 5.0                  |                              |                    | 0.4                                  |                      |                            | HTSOP-J8        |                              |                              | YES                                 |     |  |
| BD733L2FP-C                                                      | 4.37 to 45.0      | 3.3                  |                              |                    | 0.6                                  |                      |                            | TO252-3         |                              |                              | YES                                 |     |  |
| BD733L2FP3-C                                                     |                   | 3.3                  |                              |                    | 0.6                                  |                      |                            | SOT223-4        |                              |                              | YES                                 |     |  |
| BD750L2FP-C                                                      | 5.8 to 45.0       | 5.0                  |                              |                    | 0.4                                  |                      |                            | TO252-3         |                              |                              | YES                                 |     |  |
| BD750L2FP3-C                                                     |                   | 5.0                  |                              |                    |                                      |                      |                            | SOT223-4        |                              |                              | YES                                 |     |  |
| 50V Resistance Output Low Quiescent Current 500mA LDO Regulators |                   |                      |                              |                    |                                      |                      |                            |                 |                              |                              |                                     |     |  |
| BD733L5FP-C                                                      | 4.17 to 45.00     | 3.3                  | ±2<br>(Ta=-40 to +125°C)     | 0.5                | 0.4                                  | 6                    | -40 to +125                | —               | Over-Current/<br>Temperature | TO252-3                      | YES                                 |     |  |
| BD750L5FP-C                                                      | 5.6 to 45.0       | 5.0                  |                              |                    | 0.25                                 |                      |                            |                 |                              | TO252-3                      | YES                                 |     |  |

## Single-Output LDO Regulators

Please ensure that minimum input voltage always exceeds the sum of output voltage and drop out voltage for the device.

## 45V Resistance Output Low Quiescent Current 500mA LDO Regulators

| Type     | Input Voltage (V) | Output Voltage (V) | Output Voltage Precision (%)           | Output Current (A) | I/O Voltage Difference (V)  | Circuit Current (μA) | Operating Temperature (°C)   | Shutdown Switch | Protection Circuit           | Package/Part No. |              |               |               | Automotive Grade Available AEC-Q100 |
|----------|-------------------|--------------------|----------------------------------------|--------------------|-----------------------------|----------------------|------------------------------|-----------------|------------------------------|------------------|--------------|---------------|---------------|-------------------------------------|
|          |                   |                    |                                        |                    |                             |                      |                              |                 |                              | TO252-3          | TO263-3      | TO263-5       | TO252-J5      |                                     |
| BD433M5  | 4.0 to 42.0       | 3.3                | ±2<br>(T <sub>J</sub> = -40 to +150°C) | 0.5                | 0.25(I <sub>O</sub> =300mA) | 38                   | T <sub>J</sub> = -40 to +150 | —               | Over-Current/<br>Temperature | BD433M5FP-C      | BD433M5FP2-C | —             | —             | YES                                 |
| BD450M5  | 5.5 to 42.0       | 5.0                |                                        |                    | 0.2(I <sub>O</sub> =300mA)  |                      |                              |                 |                              | BD450M5FP-C      | BD450M5FP2-C | —             | —             | YES                                 |
| BD433M5W | 4.0 to 42.0       | 3.3                |                                        |                    | 0.25(I <sub>O</sub> =300mA) |                      |                              |                 |                              | —                | —            | BD433M5WFP2-C | BD433M5WFPJ-C | YES                                 |
| BD450M5W | 5.5 to 42.0       | 5.0                |                                        |                    | 0.2(I <sub>O</sub> =300mA)  |                      |                              |                 |                              | —                | —            | BD450M5WFP2-C | BD450M5WFPJ-C | YES                                 |

## 45V Resistance Output Low Quiescent Current 200mA LDO Regulators

| Type     | Input Voltage (V) | Output Voltage (V) | Output Voltage Precision (%)           | Output Current (A) | I/O Voltage Difference (V)  | Circuit Current (μA) | Operating Temperature (°C)   | Shutdown Switch | Protection Circuit           | Package/Part No. |               | Automotive Grade Available AEC-Q100 |
|----------|-------------------|--------------------|----------------------------------------|--------------------|-----------------------------|----------------------|------------------------------|-----------------|------------------------------|------------------|---------------|-------------------------------------|
|          |                   |                    |                                        |                    |                             |                      |                              |                 |                              | HTSOP-J8         | SOT223-4      |                                     |
| BD433M2  | 3.9 to 42.0       | 3.3                | ±2<br>(T <sub>J</sub> = -40 to +150°C) | 0.2                | 0.2(I <sub>O</sub> =100mA)  | 40                   | T <sub>J</sub> = -40 to +150 | —               | Over-Current/<br>Temperature | BD433M2EFJ-C     | BD433M2FP3-C  | YES                                 |
| BD450M2  | 5.5 to 42.0       | 5.0                |                                        |                    | 0.16(I <sub>O</sub> =100mA) |                      |                              |                 |                              | BD450M2EFJ-C     | BD450M2FP3-C  | YES                                 |
| BD433M2W | 3.9 to 42.0       | 3.3                |                                        |                    | 0.2(I <sub>O</sub> =100mA)  |                      |                              |                 |                              | BD433M2WEFJ-C    | BD433M2WFP3-C | YES                                 |
| BD450M2W | 5.5 to 42.0       | 5.0                |                                        |                    | 0.16(I <sub>O</sub> =100mA) |                      |                              |                 |                              | BD450M2WEFJ-C    | BD450M2WFP3-C | YES                                 |

## 36V Resistance Output 300mA LDO Regulators

| Part No.   | Input Voltage (V) | Output Voltage (V) | Output Voltage Precision (%)           | Output Current (A) | I/O Voltage Difference (V)     | Circuit Current (mA) | Operating Temperature (°C) | Protection Circuit           | Package | Automotive Grade Available AEC-Q100 |
|------------|-------------------|--------------------|----------------------------------------|--------------------|--------------------------------|----------------------|----------------------------|------------------------------|---------|-------------------------------------|
| BD3650FP-M | 5.6 to 30.0       | 5.0                | ±2<br>(T <sub>A</sub> = -40 to +125°C) | 0.3                | 0.2<br>(I <sub>O</sub> =200mA) | 0.5                  | -40 to +125                | Over-Current/<br>Temperature | TO252-3 | YES                                 |

## 35V Resistance Output 1A LDO Regulators

| Type    | Input Voltage (V) | Output Voltage (V) | Output Voltage Precision (%)           | Output Current (A) | Bias Current (mA) | I/O Voltage Difference (V)     | Ripple Rejection (dB) | Load Regulation (V)                                  | Protection Circuit           | Package/Part No. |              |              |              | Automotive Grade Available AEC-Q100 |
|---------|-------------------|--------------------|----------------------------------------|--------------------|-------------------|--------------------------------|-----------------------|------------------------------------------------------|------------------------------|------------------|--------------|--------------|--------------|-------------------------------------|
|         |                   |                    |                                        |                    |                   |                                |                       |                                                      |                              | TO252-3          | HRP5         | TO263-3      | TO252S-3     |                                     |
| BD33C0A | 4.3 to 26.5       | 3.3                | ±3<br>(T <sub>A</sub> = -40 to +125°C) | 1.0                | 0.5               | —                              | 55                    | V <sub>O</sub> *×0.01<br>(I <sub>O</sub> =5mA to 1A) | Over-Current/<br>Temperature | BD33C0AFP-C      | BD33C0AHFP-C | BD33C0AFP2-C | —            | YES                                 |
| BD50C0A | 6.0 to 26.5       | 5.0                |                                        |                    |                   | —                              |                       |                                                      |                              | BD50C0AFP-C      | BD50C0AHFP-C | BD50C0AFP2-C | —            | YES                                 |
| BD80C0A | 9.0 to 26.5       | 8.0                |                                        |                    |                   | 0.3<br>(I <sub>O</sub> =500mA) |                       |                                                      |                              | BD80C0AFP-C      | BD80C0AHFP-C | BD80C0AFP2-C | BD80C0AFPS-C | YES                                 |
| BD90C0A | 10.0 to 26.5      | 9.0                |                                        |                    |                   | —                              |                       |                                                      |                              | BD90C0AFP-C      | BD90C0AHFP-C | BD90C0AFP2-C | —            | YES                                 |

## 35V Resistance 1A LDO Regulators with Shutdown Switch

| Part No.      | Input Voltage (V) | Output Voltage (V)      | Output Voltage Precision (%)           | Output Current (A) | I/O Voltage Difference (V)     | Circuit Current (mA) | Operating Temperature (°C) | Protection Circuit           | Package  | Automotive Grade Available AEC-Q100 |
|---------------|-------------------|-------------------------|----------------------------------------|--------------------|--------------------------------|----------------------|----------------------------|------------------------------|----------|-------------------------------------|
| BD00C0AWFPS-M | 4.0 to 26.5       | Variable<br>3.0 to 15.0 | ±3<br>(T <sub>A</sub> = -40 to +105°C) | 1.0                | 0.3<br>(I <sub>O</sub> =500mA) | 0.5                  | -40 to +105                | Over-Current/<br>Temperature | TO252S-5 | YES                                 |

| Type     | Input Voltage (V) | Output Voltage (V)      | Output Voltage Precision (%)           | Output Current (A) | Bias Current (mA) | I/O Voltage Difference (V)     | Ripple Rejection (dB) | Load Regulation (V)                                  | Protection Circuit           | Package/Part No. |               |               | Automotive Grade Available AEC-Q100 |
|----------|-------------------|-------------------------|----------------------------------------|--------------------|-------------------|--------------------------------|-----------------------|------------------------------------------------------|------------------------------|------------------|---------------|---------------|-------------------------------------|
|          |                   |                         |                                        |                    |                   |                                |                       |                                                      |                              | TO252-5          | HRP5          | TO263-5       |                                     |
| BD00C0AW | 4.0 to 26.5       | Variable<br>1.0 to 15.0 | ±3<br>(T <sub>A</sub> = -40 to +125°C) | 1.0                | 0.5               | 0.3<br>(I <sub>O</sub> =500mA) | 55                    | V <sub>O</sub> *×0.01<br>(I <sub>O</sub> =5mA to 1A) | Over-Current/<br>Temperature | BD00C0AWFP-C     | BD00C0AWHFP-C | BD00C0AWFP2-C | YES                                 |
| BD33C0AW | 4.3 to 26.5       | 3.3                     |                                        |                    |                   | —                              |                       |                                                      |                              | BD33C0AWFP-C     | BD33C0AWHFP-C | BD33C0AWFP2-C | YES                                 |
| BD50C0AW | 6.0 to 26.5       | 5.0                     |                                        |                    |                   | —                              |                       |                                                      |                              | BD50C0AWFP-C     | BD50C0AWHFP-C | BD50C0AWFP2-C | YES                                 |
| BD80C0AW | 9.0 to 26.5       | 8.0                     |                                        |                    |                   | 0.3<br>(I <sub>O</sub> =500mA) |                       |                                                      |                              | BD80C0AWFP-C     | BD80C0AWHFP-C | BD80C0AWFP2-C | YES                                 |
| BD90C0AW | 10.0 to 26.5      | 9.0                     |                                        |                    |                   | —                              |                       |                                                      |                              | BD90C0AWFP-C     | BD90C0AWHFP-C | BD90C0AWFP2-C | YES                                 |

## 30V Resistance 100mA LDO Regulator with Shutdown Switch

| Part No.    | Input Voltage (V)       | Output Voltage (V) | Output Voltage Precision (%) | Output Current (A) | Bias Current (mA) | I/O Voltage Difference (V)   | Load Regulation (%) | Protection Circuit           | Input Capacitor (μF) | Output Capacitor (μF) | Package | Automotive Grade Available AEC-Q100 |
|-------------|-------------------------|--------------------|------------------------------|--------------------|-------------------|------------------------------|---------------------|------------------------------|----------------------|-----------------------|---------|-------------------------------------|
| BD50FA1MG-M | V <sub>O</sub> +3 to 25 | 5                  | ±1                           | 0.1                | 0.5               | 2<br>(I <sub>O</sub> =100mA) | ±1.5                | Over-Current/<br>Temperature | 1.0                  | 1.0                   | SSOP5   | YES                                 |

\* V<sub>O</sub> is Output voltage/Unit: V

## Single-Output LDO Regulators

Please ensure that minimum input voltage always exceeds the sum of output voltage and drop out voltage for the device.

| 15V Resistance 1A LDO Regulators with Shutdown Switch    |                   |                      |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           |          |                                     |
|----------------------------------------------------------|-------------------|----------------------|------------------------------|--------------------|-------------------|----------------------------|-----------------------------|----------------------|----------------------|-----------------------|-----------------|---------------------------|----------|-------------------------------------|
| Part No.                                                 | Input Voltage (V) | Output Voltage (V)   | Output Voltage Precision (%) | Output Current (A) | Bias Current (mA) | I/O Voltage Difference (V) | Ripple Rejection (dB)       | Load Regulation (mV) | Input Capacitor (μF) | Output Capacitor (μF) | Shutdown Switch | Protection Circuit        | Package  | Automotive Grade Available AEC-Q100 |
| BD00GC0MEFJ-M                                            | 4.5 to 14.0       | Variable 1.5 to 13.0 | ±3 (Ta= −40 to +105°C)       | 1.0                | 0.6               | 0.6 (Io=1A)                | 60 (f=100Hz, 50mVpp, Io=0A) | 25 (Io=0 to 1A)      | 1.0                  | 1.0                   | ✓               | Over-Current/ Temperature | HTSOP-J8 | YES                                 |
| BD15GC0MEFJ-M                                            |                   | 1.5                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD18GC0MEFJ-M                                            |                   | 1.8                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD25GC0MEFJ-M                                            |                   | 2.5                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD30GC0MEFJ-M                                            |                   | 3.0                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD33GC0MEFJ-M                                            |                   | 3.3                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD50GC0MEFJ-M                                            |                   | 5.0                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD60GC0MEFJ-M                                            |                   | 6.0                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD70GC0MEFJ-M                                            |                   | 7.0                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD80GC0MEFJ-M                                            |                   | 8.0                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD90GC0MEFJ-M                                            |                   | 9.0                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BDJ0GC0MEFJ-M                                            |                   | 10.0                 |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BDJ2GC0MEFJ-M                                            |                   | 12.0                 |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| 15V Resistance 500mA LDO Regulators with Shutdown Switch |                   |                      |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           |          |                                     |
| BD00GA5MEFJ-M                                            | 4.5 to 14.0       | Variable 1.5 to 13.0 | ±3 (Ta= −40 to +105°C)       | 0.5                | 0.6               | 0.6 (Io=500mA)             | 60 (f=100Hz, 50mVpp, Io=0A) | 25 (Io=0 to 500mA)   | 1.0                  | 1.0                   | ✓               | Over-Current/ Temperature | HTSOP-J8 | YES                                 |
| BD15GA5MEFJ-M                                            |                   | 1.5                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD18GA5MEFJ-M                                            |                   | 1.8                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD25GA5MEFJ-M                                            |                   | 2.5                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD30GA5MEFJ-M                                            |                   | 3.0                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD33GA5MEFJ-M                                            |                   | 3.3                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD50GA5MEFJ-M                                            |                   | 5.0                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD60GA5MEFJ-M                                            |                   | 6.0                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD70GA5MEFJ-M                                            |                   | 7.0                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD80GA5MEFJ-M                                            |                   | 8.0                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD90GA5MEFJ-M                                            |                   | 9.0                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BDJ0GA5MEFJ-M                                            |                   | 10.0                 |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BDJ2GA5MEFJ-M                                            |                   | 12.0                 |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| 15V Resistance 300mA LDO Regulators with Shutdown Switch |                   |                      |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           |          |                                     |
| BD00GA3MEFJ-M                                            | 4.5 to 14.0       | Variable 1.5 to 13.0 | ±3 (Ta= −40 to +105°C)       | 0.3                | 0.6               | 0.6 (Io=300mA)             | 60 (f=100Hz, 50mVpp, Io=0A) | 25 (Io=0 to 300mA)   | 1.0                  | 1.0                   | ✓               | Over-Current/ Temperature | HTSOP-J8 | YES                                 |
| BD15GA3MEFJ-M                                            |                   | 1.5                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD18GA3MEFJ-M                                            |                   | 1.8                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD25GA3MEFJ-M                                            |                   | 2.5                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD30GA3MEFJ-M                                            |                   | 3.0                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD33GA3MEFJ-M                                            |                   | 3.3                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD50GA3MEFJ-M                                            |                   | 5.0                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD60GA3MEFJ-M                                            |                   | 6.0                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD70GA3MEFJ-M                                            |                   | 7.0                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD80GA3MEFJ-M                                            |                   | 8.0                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BD90GA3MEFJ-M                                            |                   | 9.0                  |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BDJ0GA3MEFJ-M                                            |                   | 10.0                 |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |
| BDJ2GA3MEFJ-M                                            |                   | 12.0                 |                              |                    |                   |                            |                             |                      |                      |                       |                 |                           | HTSOP-J8 | YES                                 |

## Single-Output LDO Regulators

Please ensure that minimum input voltage always exceeds the sum of output voltage and drop out voltage for the device.

## 10V Resistance 1.5A LDO Regulators with Shutdown Switch

| Part No.      | Input Voltage (V) | Output Voltage (V)  | Output Voltage Precision (%) | Output Current (A) | Bias Current (mA) | I/O Voltage Difference (V) | Ripple Rejection (dB)          | Load Regulation (mV) | Input Capacitor (μF) | Output Capacitor (μF) | Shutdown Switch | Protection Circuit           | Package  | Automotive Grade Available AEC-Q100 |
|---------------|-------------------|---------------------|------------------------------|--------------------|-------------------|----------------------------|--------------------------------|----------------------|----------------------|-----------------------|-----------------|------------------------------|----------|-------------------------------------|
| BD00HC5MEFJ-M | 4.5 to 8.0        | Variable 1.5 to 7.0 | ±3<br>(Ta= -40 to +105°C)    | 1.5                | 0.6               | 0.6<br>(Io=1.5A)           | 60<br>(f=100Hz, 50mVpp, Io=0A) | 25<br>(Io=0 to 1.5A) | 1.0                  | 1.0                   | ✓               | Over-Current/<br>Temperature | HTSOP-J8 | YES                                 |
| BD15HC5MEFJ-M |                   | 1.5                 |                              |                    |                   |                            |                                |                      |                      |                       |                 |                              | HTSOP-J8 | YES                                 |
| BD18HC5MEFJ-M |                   | 1.8                 |                              |                    |                   |                            |                                |                      |                      |                       |                 |                              | HTSOP-J8 | YES                                 |
| BD25HC5MEFJ-M |                   | 2.5                 |                              |                    |                   |                            |                                |                      |                      |                       |                 |                              | HTSOP-J8 | YES                                 |
| BD30HC5MEFJ-M |                   | 3.0                 |                              |                    |                   |                            |                                |                      |                      |                       |                 |                              | HTSOP-J8 | YES                                 |
| BD33HC5MEFJ-M |                   | 3.3                 |                              |                    |                   |                            |                                |                      |                      |                       |                 |                              | HTSOP-J8 | YES                                 |
| BD50HC5MEFJ-M |                   | 5.0                 |                              |                    |                   |                            |                                |                      |                      |                       |                 |                              | HTSOP-J8 | YES                                 |
| BD60HC5MEFJ-M |                   | 6.0                 |                              |                    |                   |                            |                                |                      |                      |                       |                 |                              | HTSOP-J8 | YES                                 |
| BD70HC5MEFJ-M |                   | 7.0                 |                              |                    |                   |                            |                                |                      |                      |                       |                 |                              | HTSOP-J8 | YES                                 |

## 10V Resistance 1A LDO Regulators with Shutdown Switch

|               |            |                                                               |                           |     |     |                |                                |                    |     |     |   |                              |          |     |
|---------------|------------|---------------------------------------------------------------|---------------------------|-----|-----|----------------|--------------------------------|--------------------|-----|-----|---|------------------------------|----------|-----|
| BD00HC0MEFJ-M | 4.5 to 8.0 | Variable 0.8 to 7.0<br>(Automotive Grade Variable 1.5 to 7.0) | ±3<br>(Ta= -40 to +105°C) | 1.0 | 0.6 | 0.6<br>(Io=1A) | 60<br>(f=100Hz, 50mVpp, Io=0A) | 25<br>(Io=0 to 1A) | 1.0 | 1.0 | ✓ | Over-Current/<br>Temperature | HTSOP-J8 | YES |
| BD15HC0MEFJ-M |            | 1.5                                                           |                           |     |     |                |                                |                    |     |     |   |                              | HTSOP-J8 | YES |
| BD18HC0MEFJ-M |            | 1.8                                                           |                           |     |     |                |                                |                    |     |     |   |                              | HTSOP-J8 | YES |
| BD25HC0MEFJ-M |            | 2.5                                                           |                           |     |     |                |                                |                    |     |     |   |                              | HTSOP-J8 | YES |
| BD30HC0MEFJ-M |            | 3.0                                                           |                           |     |     |                |                                |                    |     |     |   |                              | HTSOP-J8 | YES |
| BD33HC0MEFJ-M |            | 3.3                                                           |                           |     |     |                |                                |                    |     |     |   |                              | HTSOP-J8 | YES |
| BD50HC0MEFJ-M |            | 5.0                                                           |                           |     |     |                |                                |                    |     |     |   |                              | HTSOP-J8 | YES |
| BD60HC0MEFJ-M |            | 6.0                                                           |                           |     |     |                |                                |                    |     |     |   |                              | HTSOP-J8 | YES |
| BD70HC0MEFJ-M |            | 7.0                                                           |                           |     |     |                |                                |                    |     |     |   |                              | HTSOP-J8 | YES |

## 10V Resistance 500mA LDO Regulators with Shutdown Switch

|               |            |                     |                           |     |     |                   |                                |                       |     |     |   |                              |          |     |
|---------------|------------|---------------------|---------------------------|-----|-----|-------------------|--------------------------------|-----------------------|-----|-----|---|------------------------------|----------|-----|
| BD00HA5MEFJ-M | 4.5 to 8.0 | Variable 1.5 to 7.0 | ±3<br>(Ta= -40 to +105°C) | 0.5 | 0.6 | 0.6<br>(Io=500mA) | 60<br>(f=100Hz, 50mVpp, Io=0A) | 25<br>(Io=0 to 500mA) | 1.0 | 1.0 | ✓ | Over-Current/<br>Temperature | HTSOP-J8 | YES |
| BD15HA5MEFJ-M |            | 1.5                 |                           |     |     |                   |                                |                       |     |     |   |                              | HTSOP-J8 | YES |
| BD18HA5MEFJ-M |            | 1.8                 |                           |     |     |                   |                                |                       |     |     |   |                              | HTSOP-J8 | YES |
| BD25HA5MEFJ-M |            | 2.5                 |                           |     |     |                   |                                |                       |     |     |   |                              | HTSOP-J8 | YES |
| BD30HA5MEFJ-M |            | 3.0                 |                           |     |     |                   |                                |                       |     |     |   |                              | HTSOP-J8 | YES |
| BD33HA5MEFJ-M |            | 3.3                 |                           |     |     |                   |                                |                       |     |     |   |                              | HTSOP-J8 | YES |
| BD50HA5MEFJ-M |            | 5.0                 |                           |     |     |                   |                                |                       |     |     |   |                              | HTSOP-J8 | YES |
| BD60HA5MEFJ-M |            | 6.0                 |                           |     |     |                   |                                |                       |     |     |   |                              | HTSOP-J8 | YES |
| BD70HA5MEFJ-M |            | 7.0                 |                           |     |     |                   |                                |                       |     |     |   |                              | HTSOP-J8 | YES |

## 10V Resistance 300mA LDO Regulators with Shutdown Switch

|               |            |                     |                           |     |     |                   |                                |                       |     |     |   |                              |          |     |
|---------------|------------|---------------------|---------------------------|-----|-----|-------------------|--------------------------------|-----------------------|-----|-----|---|------------------------------|----------|-----|
| BD00HA3MEFJ-M | 4.5 to 8.0 | Variable 1.5 to 7.0 | ±3<br>(Ta= -40 to +105°C) | 0.3 | 0.6 | 0.6<br>(Io=300mA) | 60<br>(f=100Hz, 50mVpp, Io=0A) | 25<br>(Io=0 to 300mA) | 1.0 | 1.0 | ✓ | Over-Current/<br>Temperature | HTSOP-J8 | YES |
| BD15HA3MEFJ-M |            | 1.5                 |                           |     |     |                   |                                |                       |     |     |   |                              | HTSOP-J8 | YES |
| BD18HA3MEFJ-M |            | 1.8                 |                           |     |     |                   |                                |                       |     |     |   |                              | HTSOP-J8 | YES |
| BD25HA3MEFJ-M |            | 2.5                 |                           |     |     |                   |                                |                       |     |     |   |                              | HTSOP-J8 | YES |
| BD30HA3MEFJ-M |            | 3.0                 |                           |     |     |                   |                                |                       |     |     |   |                              | HTSOP-J8 | YES |
| BD33HA3MEFJ-M |            | 3.3                 |                           |     |     |                   |                                |                       |     |     |   |                              | HTSOP-J8 | YES |
| BD50HA3MEFJ-M |            | 5.0                 |                           |     |     |                   |                                |                       |     |     |   |                              | HTSOP-J8 | YES |
| BD60HA3MEFJ-M |            | 6.0                 |                           |     |     |                   |                                |                       |     |     |   |                              | HTSOP-J8 | YES |
| BD70HA3MEFJ-M |            | 7.0                 |                           |     |     |                   |                                |                       |     |     |   |                              | HTSOP-J8 | YES |

## 7V Resistance 1A LDO Regulators with Shutdown Switch

|               |            |                     |                             |     |     |                |                                |                    |     |     |   |                              |          |     |
|---------------|------------|---------------------|-----------------------------|-----|-----|----------------|--------------------------------|--------------------|-----|-----|---|------------------------------|----------|-----|
| BD00IC0MEFJ-M | 2.4 to 5.5 | Variable 0.8 to 4.5 | ±3.0<br>(Ta= -40 to +105°C) | 1.0 | 0.3 | 0.4<br>(Io=1A) | 60<br>(f=100Hz, 50mVpp, Io=0A) | 25<br>(Io=0 to 1A) | 1.0 | 1.0 | ✓ | Over-Current/<br>Temperature | HTSOP-J8 | YES |
| BD10IC0MEFJ-M |            | 1.0                 |                             |     |     |                |                                |                    |     |     |   |                              | HTSOP-J8 | YES |
| BD12IC0MEFJ-M |            | 1.2                 |                             |     |     |                |                                |                    |     |     |   |                              | HTSOP-J8 | YES |
| BD15IC0MEFJ-M |            | 1.5                 |                             |     |     |                |                                |                    |     |     |   |                              | HTSOP-J8 | YES |
| BD18IC0MEFJ-M |            | 1.8                 |                             |     |     |                |                                |                    |     |     |   |                              | HTSOP-J8 | YES |
| BD25IC0MEFJ-M |            | 2.5                 |                             |     |     |                |                                |                    |     |     |   |                              | HTSOP-J8 | YES |
| BD30IC0MEFJ-M |            | 3.0                 |                             |     |     |                |                                |                    |     |     |   |                              | HTSOP-J8 | YES |
| BD33IC0MEFJ-M |            | 3.3                 |                             |     |     |                |                                |                    |     |     |   |                              | HTSOP-J8 | YES |

**Single-Output LDO Regulators**

Please ensure that minimum input voltage always exceeds the sum of output voltage and drop out voltage for the device.

**7V Resistance 500mA LDO Regulators with Shutdown Switch**

| Part No.                        | Input Voltage (V) | Output Voltage (V)  | Output Voltage Precision (%)          | Output Current (A) | Bias Current (mA) | I/O Voltage Difference (V) | Ripple Rejection (dB)                       | Load Regulation (mV)  | Input Capacitor (μF) | Output Capacitor (μF) | Shutdown Switch | Protection Circuit           | Package  | Automotive Grade Available AEC-Q100 |
|---------------------------------|-------------------|---------------------|---------------------------------------|--------------------|-------------------|----------------------------|---------------------------------------------|-----------------------|----------------------|-----------------------|-----------------|------------------------------|----------|-------------------------------------|
| <b>BD00IA5MEFJ-M</b>            | 2.4 to 5.5        | Variable 0.8 to 4.5 | ±3<br>(Ta=-40 to +105°C)              | 0.5                | 0.25              | 0.4<br>(Io=500mA)          | 60<br>(f=100Hz, 50mV <sub>PP</sub> , Io=0A) | 25<br>(Io=0 to 500mA) | 1.0                  | 1.0                   | ✓               | Over-Current/<br>Temperature | HTSOP-J8 | YES                                 |
| <b>BD10IA5MEFJ-M</b>            |                   | 1.0                 |                                       |                    |                   |                            |                                             |                       |                      |                       |                 |                              | HTSOP-J8 | YES                                 |
| <b>BD12IA5MEFJ-M</b>            |                   | 1.2                 |                                       |                    |                   |                            |                                             |                       |                      |                       |                 |                              | HTSOP-J8 | YES                                 |
| <b>BD15IA5MEFJ-M</b>            |                   | 1.5                 |                                       |                    |                   |                            |                                             |                       |                      |                       |                 |                              | HTSOP-J8 | YES                                 |
| <b>BD18IA5MEFJ-M</b>            |                   | 1.8                 |                                       |                    |                   |                            |                                             |                       |                      |                       |                 |                              | HTSOP-J8 | YES                                 |
| <b>BD25IA5MEFJ-M</b>            |                   | 2.5                 |                                       |                    |                   |                            |                                             |                       |                      |                       |                 |                              | HTSOP-J8 | YES                                 |
| <b>BD30IA5MEFJ-M</b>            |                   | 3.0                 |                                       |                    |                   |                            |                                             |                       |                      |                       |                 |                              | HTSOP-J8 | YES                                 |
| <b>BD33IA5MEFJ-M</b>            |                   | 3.3                 |                                       |                    |                   |                            |                                             |                       |                      |                       |                 |                              | HTSOP-J8 | YES                                 |
| Part No.                        | Input Voltage (V) | Output Voltage (V)  | Output Voltage Precision (%)          | Output Current (A) | Bias Current (mA) | I/O Voltage Difference (V) | Ripple Rejection (dB)                       | Load Regulation (mV)  | Input Capacitor (μF) | Output Capacitor (μF) | Shutdown Switch | Protection Circuit           | Package  | Automotive Grade Available AEC-Q100 |
| <b>New</b> <b>BD00IA5MHFV-M</b> | 2.4 to 5.5        | Variable 0.8 to 4.5 | ±1(Ta=+25°C)/<br>±3(Ta=-40 to +105°C) | 0.5                | 0.25              | 0.4<br>(Io=500mA)          | 60<br>(f=100Hz, 50mV <sub>PP</sub> , Io=0A) | 25<br>(Io=0 to 500mA) | 1.0                  | 1.0                   | ✓               | Over-Current/<br>Temperature | HVSOF6   | YES                                 |

**6.5V Resistance 200mA CMOS LDO Regulators with Shutdown Switch**

|             | Part No.      | Input Voltage (V) | Output Voltage (V) | Output Voltage Precision (%) | Output Current (A) | I/O Voltage Difference (mV) | Ripple Rejection (dB) | Load Regulation (mV) | Circuit Current (μA) | Output Short Current (mA) | Input Capacitor (μF) | Output Capacitor (μF) | Shutdown Switch | Over Current Protection | Thermal Protection | Discharge Function | Package      | Automotive Grade Available AEC-Q100 |             |     |     |             |       |     |             |     |     |             |     |       |     |
|-------------|---------------|-------------------|--------------------|------------------------------|--------------------|-----------------------------|-----------------------|----------------------|----------------------|---------------------------|----------------------|-----------------------|-----------------|-------------------------|--------------------|--------------------|--------------|-------------------------------------|-------------|-----|-----|-------------|-------|-----|-------------|-----|-----|-------------|-----|-------|-----|
|             | BU12SD2MG-M   | 1.7 to 6.0        | 1.2                | ±2 (Ta=-40 to +105°C)        | 0.2                | 400 (Io=100mA)              | 68                    | 1 (Io=1 to 200mA)    | 33                   | 100                       | 1.0                  | 1.0                   | ✓               | ✓                       | ✓                  | —                  | SSOP5        | YES                                 |             |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU15SD2MG-M   |                   | 1.5                |                              |                    | 280 (Io=100mA)              |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    | SSOP5        | YES                                 |             |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU18SD2MG-M   |                   | 1.8                |                              |                    | 150 (Io=100mA)              |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    | SSOP5        | YES                                 |             |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU25SD2MG-M   |                   | 2.5                |                              |                    | 100 (Io=100mA)              |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    | SSOP5        | YES                                 |             |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU28SD2MG-M   |                   | 2.8                |                              |                    | 85 (Io=100mA)               |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    | SSOP5        | YES                                 |             |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU30SD2MG-M   |                   | 3.0                |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    | SSOP5        | YES                                 |             |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU33SD2MG-M   |                   | 3.3                |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    | SSOP5        | YES                                 |             |     |     |             |       |     |             |     |     |             |     |       |     |
| New         | BU10JA2MNVX-C | 1.7 to 6.0        | 1.0                | ±36mV                        | 0.2                | 800                         | 70                    | 10                   | 35                   | 70                        | 0.47                 | 0.47                  | ✓               | ✓                       | ✓                  | ✓                  | SSON004R1010 | YES                                 |             |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU11JA2MNVX-C |                   | 1.1                |                              |                    | 600                         |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    | SSON004R1010 | YES                                 |             |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU12JA2MNVX-C |                   | 1.2                |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    | SSON004R1010 | YES                                 |             |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU1CJA2MNVX-C |                   | 1.25               |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    | SSON004R1010 | YES                                 |             |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU15JA2MNVX-C |                   | 1.5                |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    | SSON004R1010 | YES                                 |             |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU18JA2MNVX-C |                   | 1.8                |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    | 380          | SSON004R1010                        | YES         |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU25JA2MNVX-C |                   | 2.5                |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    | 280          | SSON004R1010                        | YES         |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU28JA2MNVX-C |                   | 2.8                |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    | 260          | SSON004R1010                        | YES         |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU2JJA2MNVX-C |                   | 2.85               |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    | 240          | SSON004R1010                        | YES         |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU29JA2MNVX-C |                   | 2.9                |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    |              | SSON004R1010                        | YES         |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU30JA2MNVX-C |                   | 3.0                |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    |              | SSON004R1010                        | YES         |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU33JA2MNVX-C |                   | 3.3                |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    | 220          | SSON004R1010                        | YES         |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU10JA2VG-C   |                   | 1.0                | ±2                           |                    | 0.2                         | —                     | 68                   | 0.5                  | 33                        | 100                  | 1.0                   | 1.0             | ✓                       | ✓                  | ✓                  | —            | SSOP5                               | YES         |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU12JA2VG-C   |                   | 1.2                |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    |              | SSOP5                               | YES         |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU1CJA2VG-C   |                   | 1.25               |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    |              | SSOP5                               | YES         |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU15JA2VG-C   |                   | 1.5                |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    |              | SSOP5                               | YES         |     |     |             |       |     |             |     |     |             |     |       |     |
|             | BU18JA2VG-C   |                   | 1.8                |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    |              | 160                                 | SSOP5       | YES |     |             |       |     |             |     |     |             |     |       |     |
|             | BU25JA2VG-C   |                   | 2.5                |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    |              | 100                                 | SSOP5       | YES |     |             |       |     |             |     |     |             |     |       |     |
|             | BU28JA2VG-C   |                   | 2.8                |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    |              | 85                                  | SSOP5       | YES |     |             |       |     |             |     |     |             |     |       |     |
| BU2JJA2VG-C | 2.85          | SSOP5             | YES                |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    |              |                                     |             |     |     |             |       |     |             |     |     |             |     |       |     |
| BU30JA2VG-C | 3.0           | SSOP5             | YES                |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    |              |                                     |             |     |     |             |       |     |             |     |     |             |     |       |     |
| BU33JA2VG-C | 3.3           | SSOP5             | YES                |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    |              |                                     |             |     |     |             |       |     |             |     |     |             |     |       |     |
| New         | BU10JA2DG-C   | 1.0               | —                  |                              | 85                 |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    |              | New                                 | BU12JA2DG-C | 1.2 | New | BU1CJA2DG-C | 1.25  | New | BU15JA2DG-C | 1.5 | New | BU18JA2DG-C | 1.8 | SSOP5 | YES |
| New         | BU25JA2DG-C   | 2.5               |                    |                              |                    |                             |                       |                      |                      |                           |                      |                       |                 |                         |                    |                    |              |                                     |             | 100 |     |             | SSOP5 |     |             | YES |     |             |     |       |     |
| New         | BU28JA2DG-C   | 2.8               |                    |                              |                    |                             | SSOP5                 | YES                  |                      |                           |                      |                       |                 |                         |                    |                    |              |                                     |             |     |     |             |       |     |             |     |     |             |     |       |     |
| New         | BU2JJA2DG-C   | 2.85              |                    |                              |                    |                             | SSOP5                 | YES                  |                      |                           |                      |                       |                 |                         |                    |                    |              |                                     |             |     |     |             |       |     |             |     |     |             |     |       |     |
| New         | BU30JA2DG-C   | 3.0               |                    |                              |                    |                             | SSOP5                 | YES                  |                      |                           |                      |                       |                 |                         |                    |                    |              |                                     |             |     |     |             |       |     |             |     |     |             |     |       |     |
| New         | BU33JA2DG-C   | 3.3               |                    |                              |                    |                             | SSOP5                 | YES                  |                      |                           |                      |                       |                 |                         |                    |                    |              |                                     |             |     |     |             |       |     |             |     |     |             |     |       |     |

## LDO Regulators with Voltage Detector and Watchdog Timer

| 550mA Output LDO Regulator with Voltage Detector and Watchdog Timer |                   |                    |                             |                    |                            |                               |                                |                                                |                      |                            |         |                                     |
|---------------------------------------------------------------------|-------------------|--------------------|-----------------------------|--------------------|----------------------------|-------------------------------|--------------------------------|------------------------------------------------|----------------------|----------------------------|---------|-------------------------------------|
| Part No.                                                            | Input Voltage (V) | LDO                |                             |                    |                            | Reset                         |                                |                                                | Circuit Current (μA) | Operating Temperature (°C) | Package | Automotive Grade Available AEC-Q100 |
|                                                                     |                   | Output Voltage (V) | Output Voltage Precision(%) | Output Current (A) | I/O Voltage Difference (V) | Detection Voltage (V)         | Voltage Detector Precision (%) | Function                                       |                      |                            |         |                                     |
| BD4271HFP-C                                                         | 5.5 to 45.0       | 5                  | ±2<br>(Tj=-40 to +150°C)    | 0.55               | 0.2 (Io=300mA)             | 4.65                          | ±2.6                           | 4.65V Voltage Detector + WDT                   | 75                   | Tj= -40 to +150            | HRP7    | YES                                 |
| BD4271FP2-C                                                         |                   |                    |                             |                    |                            |                               |                                |                                                |                      |                            | TO263-7 | YES                                 |
| 500mA Output LDO Regulator with Voltage Detector and Watchdog Timer |                   |                    |                             |                    |                            |                               |                                |                                                |                      |                            |         |                                     |
| BD3021HFP                                                           | 5.6 to 36.0       | 5                  | ±2<br>(Ta=-40 to +125°C)    | 0.5                | 0.3<br>(Io=200mA)          | 4.5                           | ±2                             | 4.5V Voltage Detector + WDT<br>(Active switch) | 80                   | Ta= -40 to +125            | HRP7    | —                                   |
| BD3020HFP                                                           |                   |                    |                             |                    |                            | Variable<br>(at Vs open:4.1V) |                                | Adjustable Voltage Detector+WDT                |                      |                            | HRP7    | —                                   |

## LDO Regulators with Voltage Detector

| 500mA Output LDO Regulators with Voltage Detector       |                   |                    |                                                          |                    |                            |                                         |                                 |                 |                      |                            |          |                                     |
|---------------------------------------------------------|-------------------|--------------------|----------------------------------------------------------|--------------------|----------------------------|-----------------------------------------|---------------------------------|-----------------|----------------------|----------------------------|----------|-------------------------------------|
| Part No.                                                | Input Voltage (V) | LDO                |                                                          |                    |                            | Reset                                   |                                 | Shutdown Switch | Circuit Current (μA) | Operating Temperature (°C) | Package  | Automotive Grade Available AEC-Q100 |
|                                                         |                   | Output Voltage (V) | Output Voltage Precision (%)                             | Output Current (A) | I/O Voltage Difference (V) | Detection Voltage (V)                   | Voltage Detection Precision (%) |                 |                      |                            |          |                                     |
| BD42754FPJ-C                                            | 5.5 to 45.0       | 5                  | ±2<br>(Tj= -40 to +150°C, Voc=6.0 to 28V, Io=5 to 400mA) | 0.5                | 0.25<br>(Io=300mA)         | 4.62                                    | ±2.8                            | —               | 75                   | Tj= -40 to +150            | TO252-J5 | YES                                 |
| BD42754FP2-C                                            |                   |                    | TO263-5                                                  |                    |                            |                                         |                                 |                 |                      |                            | YES      |                                     |
| 200mA/300mA Output LDO Regulators with Voltage Detector |                   |                    |                                                          |                    |                            |                                         |                                 |                 |                      |                            |          |                                     |
| BD4269FJ-C                                              | 5.5 to 45.0       | 5                  | ±2<br>(Tj= -40 to +150°C, Voc=6.0 to 16V, Io=1 to 100mA) | 0.2                | 0.25<br>(Io=100mA)         | Variable<br>(with RAdj not used: 4.62V) | ±2.6                            | —               | 70                   | Tj= -40 to +150            | SOP-J8   | YES                                 |
| BD4269EFJ-C                                             |                   |                    | 0.3                                                      | HTSOP-J8           |                            |                                         |                                 |                 |                      |                            | YES      |                                     |

## Voltage Tracker

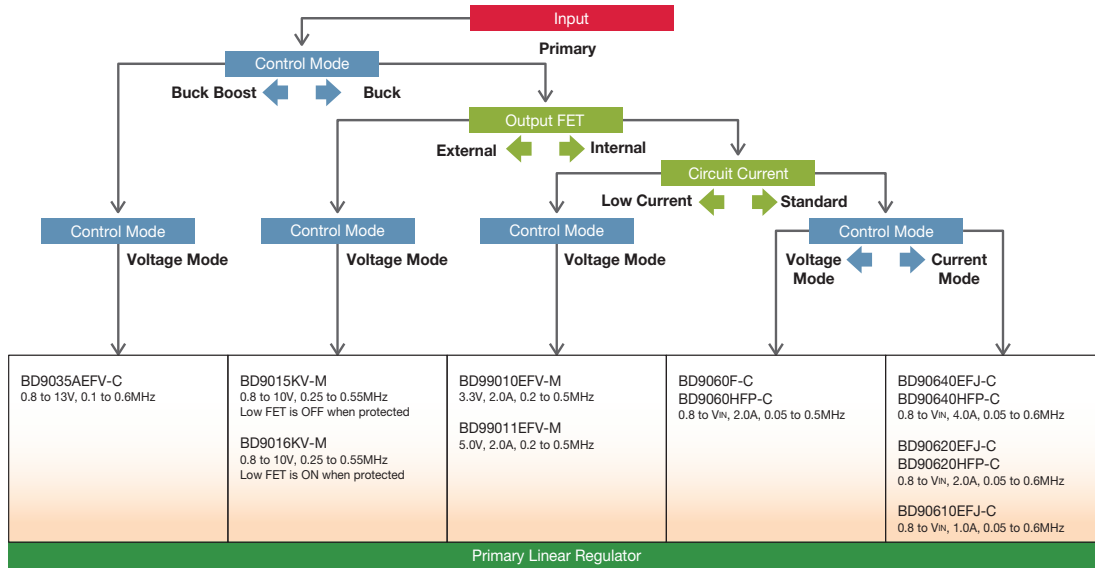
| 50mA/70mA Voltage Tracker |                   |                    |                                                        |                      |                            |          |                                     |
|---------------------------|-------------------|--------------------|--------------------------------------------------------|----------------------|----------------------------|----------|-------------------------------------|
| Part No.                  | Input Voltage (V) | Output Current (A) | Offset Voltage (mV)                                    | Circuit Current (μA) | Operating Temperature (°C) | Package  | Automotive Grade Available AEC-Q100 |
| <b>BD42500G-C</b>         | 5.3* to 42.0      | 0.05               | ±15(Tj= -40 to +150°C, Vcc=6 to 40V, Io=1 to 50mA)     | 40                   | Tj= -40 to +150            | SSOP5    | YES                                 |
| <b>BD42540FJ-C</b>        | 5.4* to 42.0      | 0.07               | ±10(Tj= -40 to +150°C, Vcc=5.5 to 26V, Io=0.1 to 60mA) | 40                   | Tj= -40 to +150            | SOP-J8   | YES                                 |
| 250mA Voltage Tracker     |                   |                    |                                                        |                      |                            |          |                                     |
| <b>BD42530EFJ-C</b>       | 5.6* to 42.0      | 0.25               | ±10(Tj= -40 to +150°C, Vcc=6 to 32V, Io=0.1 to 250mA)  | 40                   | Tj= -40 to +150            | HTSOP-J8 | YES                                 |
| <b>BD42530FP2-C</b>       | 5.6* to 42.0      | 0.25               | ±10(Tj= -40 to +150°C, Vcc=6 to 32V, Io=0.1 to 250mA)  | 40                   | Tj= -40 to +150            | TO263-5  | YES                                 |
| <b>BD42530FPJ-C</b>       | 5.6* to 42.0      | 0.25               | ±10(Tj= -40 to +150°C, Vcc=6 to 32V, Io=0.1 to 250mA)  | 40                   | Tj= -40 to +150            | TO252-J5 | YES                                 |

\* 5V setting

## Linear Regulators for DDR SDRAM

| Termination Regulators for DDR SDRAM |                                   |                                                  |                                              |                                    |                                        |                                    |                                      |          |            |            |      |                                         |                    |             |              |               |             |               |               |               |             |         |                                     |     |
|--------------------------------------|-----------------------------------|--------------------------------------------------|----------------------------------------------|------------------------------------|----------------------------------------|------------------------------------|--------------------------------------|----------|------------|------------|------|-----------------------------------------|--------------------|-------------|--------------|---------------|-------------|---------------|---------------|---------------|-------------|---------|-------------------------------------|-----|
| Part No.                             | V <sub>CC</sub> Input Voltage (V) | V <sub>TT-IN</sub> Termination Input Voltage (V) | V <sub>DDQ</sub> Reference Input Voltage (V) | V <sub>TT</sub> Output Voltage (V) | V <sub>TT</sub> Voltage Precision (mV) | V <sub>TT</sub> Output Current (A) | V <sub>REF</sub> Output Current (mA) | Function |            |            |      |                                         |                    |             |              |               |             |               |               |               |             | Package | Automotive Grade Available AEC-Q100 |     |
|                                      |                                   |                                                  |                                              |                                    |                                        |                                    |                                      | Enable   | Soft Start | Power Good | UVLO | Output Ceramic Capacitors Compatibility | Thermal Protection | Recovery    | DDR(VDDQ)    |               |             |               |               |               |             |         |                                     |     |
|                                      |                                   |                                                  |                                              |                                    |                                        |                                    |                                      |          |            |            |      |                                         | DDR1 (2.5V/2.6V)   | DDR2 (1.8V) | DDR2L (1.5V) | LPDDR2 (1.2V) | DDR3 (1.5V) | DDR3L (1.35V) | DDR3U (1.25V) | LPDDR3 (1.2V) | DDR4 (1.2V) |         |                                     |     |
| BD35395FJ-M                          | 2.7 to 5.5                        | 1.0 to 5.5                                       | 1.00 to 2.75                                 | 0.500 to 1.375                     | ±13.5                                  | ±1.0                               | —                                    | ✓        | ✓          | ✓          | ✓    | ✓                                       | Recovery           | ✓           | ✓            | ✓             | —           | ✓             | ✓             | —             | —           | —       | SOP-J8                              | YES |

## Switching Regulators



## Switching Regulators

| Primary Integrated Switch Buck Converter   |                |              |              |                       |                         |                   |      |                         |                                        |                             |                     |                |                |            |                          |                          |                           |                           |                        |                  |                            |             |                                     |     |
|--------------------------------------------|----------------|--------------|--------------|-----------------------|-------------------------|-------------------|------|-------------------------|----------------------------------------|-----------------------------|---------------------|----------------|----------------|------------|--------------------------|--------------------------|---------------------------|---------------------------|------------------------|------------------|----------------------------|-------------|-------------------------------------|-----|
| Part No.                                   | No. of Outputs | Output FET   |              | Operating Voltage (V) | Output Current (A) Max. | Input Voltage (V) |      | Output Voltage (V) Typ. | Output Voltage Precision (%)           | Quiescent Current (μA) Typ. | Switching Frequency |                | Control Method | Function   |                          |                          |                           |                           |                        |                  | Operating Temperature (°C) | Package     | Automotive Grade Available AEC-Q100 |     |
|                                            |                | Upper (Typ.) | Lower (Typ.) |                       |                         | Min.              | Max. |                         |                                        |                             | Range (kHz)         | Precision (%)  |                | Power Good | External Synchronization | Variable Soft Start      | Synchronous Rectification | Light Load Efficiency     | Overvoltage Protection | Spread Spectrum  |                            |             |                                     |     |
| New Nano                                   | BD8P250MUF-C   | 1            | Nch (110mΩ)  | Nch (110mΩ)           | 42                      | 2.0               | 3.5  | 36                      | 5.0                                    | ±2.0                        | 8                   | 2,200          | ±10            | Current    | ✓                        | —                        | —                         | ✓                         | ✓                      | ✓                | ✓                          | —40 to +125 | VQFN24FV4040                        | YES |
| New Nano                                   | BD9P233MUF-C   | 1            | Pch (190mΩ)  | Nch (120mΩ)           | 42                      | 2.0               | 3.0  | 36                      | 3.3                                    | ±2.0                        | 26                  | 200 to 2,400   | ±9             | Current    | ✓                        | ✓                        | ✓                         | ✓                         | ✓                      | ✓                | ✓                          | —40 to +125 | VQFN32FAV050                        | YES |
|                                            | BD99010EFV-M   | 1            | Pch (170mΩ)  | Nch (130mΩ)           | 42                      | 2.0               | 3.6  | 35                      | 3.3                                    | ±2.0                        | 22                  | 200 to 500     | ±20            | Current    | —                        | —                        | —                         | ✓                         | ✓                      | ✓                | —                          | —40 to +105 | HTSSOP-B24                          | YES |
|                                            | BD99011EFV-M   | 1            | Pch (170mΩ)  | Nch (130mΩ)           | 42                      | 2.0               | 3.6  | 35                      | 5.0                                    | ±2.0                        | 22                  | 200 to 500     | ±20            | Current    | —                        | —                        | —                         | ✓                         | ✓                      | ✓                | —                          | —40 to +105 | HTSSOP-B24                          | YES |
|                                            | BD90610EFJ-C   | 1            | Pch (160mΩ)  | —                     | 42                      | 1.25              | 3.5  | 36                      | Variable (0.8 to V <sub>IN</sub> )     | ±2.0                        | 2,200               | 50 to 600      | ±10            | Current    | —                        | ✓                        | —                         | —                         | —                      | —                | —                          | —40 to +125 | HTSOP-J8                            | YES |
|                                            | BD90620EFJ-C   | 1            | Pch (160mΩ)  | —                     | 42                      | 2.5               | 3.5  | 36                      | Variable (0.8 to V <sub>IN</sub> )     | ±2.0                        | 2,200               | 50 to 600      | ±10            | Current    | —                        | ✓                        | —                         | —                         | —                      | —                | —                          | —40 to +125 | HTSOP-J8                            | YES |
|                                            | BD90620HFP-C   | 1            | Pch (160mΩ)  | —                     | 42                      | 2.5               | 3.5  | 36                      | Variable (0.8 to V <sub>IN</sub> )     | ±2.0                        | 2,200               | 50 to 600      | ±10            | Current    | —                        | ✓                        | —                         | —                         | —                      | —                | —                          | —40 to +125 | HRP7                                | YES |
|                                            | BD90640EFJ-C   | 1            | Pch (160mΩ)  | —                     | 42                      | 4.0               | 3.5  | 36                      | Variable (0.8 to V <sub>IN</sub> )     | ±2.0                        | 2,200               | 50 to 600      | ±10            | Current    | —                        | ✓                        | —                         | —                         | —                      | —                | —                          | —40 to +125 | HTSOP-J8                            | YES |
|                                            | BD90640HFP-C   | 1            | Pch (160mΩ)  | —                     | 42                      | 4.0               | 3.5  | 36                      | Variable (0.8 to V <sub>IN</sub> )     | ±2.0                        | 2,200               | 50 to 600      | ±10            | Current    | —                        | ✓                        | —                         | —                         | —                      | —                | —                          | —40 to +125 | HRP7                                | YES |
|                                            | BD9060F-C      | 1            | Pch (300mΩ)  | —                     | 42                      | 2.0               | 5.0  | 35                      | Variable (0.8 to V <sub>IN</sub> )     | ±2.0                        | 4,500               | 50 to 500      | ±5             | Voltage    | —                        | ✓                        | —                         | —                         | —                      | —                | —                          | —40 to +125 | SOP8                                | YES |
|                                            | BD9060HFP-C    | 1            | Pch (300mΩ)  | —                     | 42                      | 2.0               | 5.0  | 35                      | Variable (0.8 to V <sub>IN</sub> )     | ±2.0                        | 4,500               | 50 to 500      | ±5             | Voltage    | —                        | ✓                        | —                         | —                         | —                      | —                | —                          | —40 to +125 | HRP7                                | YES |
| Nano                                       | BD9V100MUF-C   | 1            | Nch (600mΩ)  | Nch (400mΩ)           | 70                      | 1.0               | 16   | 60                      | Variable (0.8 to 5.5)                  | ±2.0                        | 2,500               | 1,900 to 2,300 | ±10            | Current    | ✓                        | —                        | —                         | ✓                         | —                      | ✓                | —                          | —40 to +125 | VQFN24FV4040                        | YES |
| Secondary Integrated Switch Buck Converter |                |              |              |                       |                         |                   |      |                         |                                        |                             |                     |                |                |            |                          |                          |                           |                           |                        |                  |                            |             |                                     |     |
| Part No.                                   | No. of Outputs | Output FET   |              | Operating Voltage (V) | Output Current (A) Max. | Input Voltage (V) |      | Output Voltage (V) Typ. | Output Voltage Precision (%)           | Quiescent Current (μA) Typ. | Switching Frequency |                | Control Method | Function   |                          |                          |                           |                           |                        |                  | Operating Temperature (°C) | Package     | Automotive Grade Available AEC-Q100 |     |
|                                            |                | Upper (Typ.) | Lower (Typ.) |                       |                         | Min.              | Max. |                         |                                        |                             | Range (kHz)         | Precision (%)  |                | Power Good | SLIM                     | External Synchronization | Variable Soft Start       | Synchronous Rectification | Overvoltage Protection | Output Discharge |                            |             |                                     |     |
| New                                        | BD9S000NUX-C   | 1            | Pch (270mΩ)  | Nch (180mΩ)           | 7                       | 0.6               | 2.7  | 5.5                     | Variable (0.8 to V <sub>IN</sub> )     | ±1.5                        | 350                 | 2,200          | ±10            | Current    | ✓                        | —                        | —                         | ✓                         | ✓                      | ✓                | ✓                          | —40 to +125 | VSON008X2020                        | YES |
| New                                        | BD9S012NUX-C   | 1            | Pch (270mΩ)  | Nch (180mΩ)           | 7                       | 0.6               | 2.7  | 5.5                     | 1.1V                                   | ±1.5                        | 350                 | 2,200          | ±10            | Current    | ✓                        | —                        | —                         | ✓                         | ✓                      | ✓                | ✓                          | —40 to +125 | VSON008X2020                        | YES |
| New                                        | BD9S100NUX-C   | 1            | Pch (270mΩ)  | Nch (180mΩ)           | 7                       | 1.0               | 2.7  | 5.5                     | Variable (0.8 to V <sub>IN</sub> )     | ±1.5                        | 350                 | 2,200          | ±10            | Current    | ✓                        | —                        | —                         | ✓                         | ✓                      | ✓                | ✓                          | —40 to +125 | VSON008X2020                        | YES |
| New                                        | BD9S110NUX-C   | 1            | Pch (270mΩ)  | Nch (180mΩ)           | 7                       | 1.0               | 2.7  | 5.5                     | 1.2                                    | ±1.5                        | 350                 | 2,200          | ±10            | Current    | ✓                        | —                        | —                         | ✓                         | ✓                      | ✓                | ✓                          | —40 to +125 | VSON008X2020                        | YES |
| New                                        | BD9S111NUX-C   | 1            | Pch (270mΩ)  | Nch (180mΩ)           | 7                       | 1.0               | 2.7  | 5.5                     | 1.8                                    | ±1.5                        | 350                 | 2,200          | ±10            | Current    | ✓                        | —                        | —                         | ✓                         | ✓                      | ✓                | ✓                          | —40 to +125 | VSON008X2020                        | YES |
|                                            | BD9S200MUF-C   | 1            | Nch (35mΩ)   | Nch (35mΩ)            | 7                       | 2.0               | 2.7  | 5.5                     | Variable (0.8 to V <sub>IN</sub> ×0.8) | ±1.5                        | 650                 | 2,200          | ±10            | Current    | ✓                        | ✓                        | ✓                         | ✓                         | ✓                      | ✓                | —                          | —40 to +125 | VQFN16FV3030                        | YES |
|                                            | BD9S300MUF-C   | 1            | Nch (35mΩ)   | Nch (35mΩ)            | 7                       | 3.0               | 2.7  | 5.5                     | Variable (0.8 to V <sub>IN</sub> ×0.8) | ±1.5                        | 650                 | 2,200          | ±10            | Current    | ✓                        | ✓                        | ✓                         | ✓                         | ✓                      | ✓                | —                          | —40 to +125 | VQFN16FV3030                        | YES |
|                                            | BD9S400MUF-C   | 1            | Nch (35mΩ)   | Nch (35mΩ)            | 7                       | 4.0               | 2.7  | 5.5                     | Variable (0.8 to V <sub>IN</sub> ×0.8) | ±1.5                        | 650                 | 2,200          | ±10            | Current    | ✓                        | ✓                        | ✓                         | ✓                         | ✓                      | ✓                | —                          | —40 to +125 | VQFN16FV3030                        | YES |

## Switching Regulators

### Primary Integrated Switch Buck/Boost Converter(Quick Buck Booster<sup>®</sup>)

| Part No.                                                                    | No. of Outputs | Output FET   |              | Operating Voltage (V) | Output Current (A) Max. | Input Voltage (V) |      | Output Voltage (V) Typ. | Output Voltage Precision (%) | Quiescent Current (μA) Typ. | Switching Frequency |               | Control Method | Function   |                      |                     |                           |                       |                        |                 | Operating Temperature (°C) | Package      | Automotive Grade Available AEC-Q100 |
|-----------------------------------------------------------------------------|----------------|--------------|--------------|-----------------------|-------------------------|-------------------|------|-------------------------|------------------------------|-----------------------------|---------------------|---------------|----------------|------------|----------------------|---------------------|---------------------------|-----------------------|------------------------|-----------------|----------------------------|--------------|-------------------------------------|
|                                                                             |                | Upper (Typ.) | Lower (Typ.) |                       |                         | Min.              | Max. |                         |                              |                             | Range (kHz)         | Precision (%) |                | Power Good | External Synchronize | Variable Soft Start | Synchronous Rectification | Light Load Efficiency | Overvoltage Protection | Spread Spectrum |                            |              |                                     |
| <div>New</div> <div>BD8P250MUF-C</div> <div>+</div> <div>BD90302NUF-C</div> | 1              | Nch (110mΩ)  | Nch (110mΩ)  | 42                    | 0.8                     | 2.7               | 36   | 5.0                     | ±2.0                         | 8                           | 2,200               | ±10           | Current        | ✓          | —                    | —                   | ✓                         | ✓                     | ✓                      | ✓               | -40 to +125                | VQFN24FV4040 | YES                                 |
| <div>New</div> <div>BD90302NUF-C</div>                                      | 1              | Pch (55mΩ)   | Nch (65mΩ)   | 7                     |                         |                   |      |                         |                              | 65                          |                     |               |                |            |                      |                     |                           |                       |                        |                 |                            | VSON10FV3030 | YES                                 |

### Primary External Switch Buck Controller

|            |   |          |          |    |   |     |    |                      |      |       |            |     |         |   |   |   |   |   |                 |   |             |         |     |
|------------|---|----------|----------|----|---|-----|----|----------------------|------|-------|------------|-----|---------|---|---|---|---|---|-----------------|---|-------------|---------|-----|
| BD9015KV-M | 2 | Ext. Nch | Ext. Nch | 35 | — | 3.9 | 30 | Variable (0.8 to 10) | ±1.5 | 4,000 | 250 to 550 | ±10 | Current | ✓ | ✓ | ✓ | ✓ | — | ✓ <sup>*1</sup> | — | -40 to +105 | VQFP48C | YES |
| BD9016KV-M | 2 | Ext. Nch | Ext. Nch | 35 | — | 3.9 | 30 | Variable (0.8 to 10) | ±1.5 | 4,000 | 250 to 550 | ±10 | Current | ✓ | ✓ | ✓ | ✓ | — | ✓ <sup>*2</sup> | — | -40 to +105 | VQFP48C | YES |

### Primary External Switch Buck/Boost Controller

|              |   |          |          |    |   |     |    |          |      |       |            |    |         |   |   |   |   |   |   |   |             |            |     |
|--------------|---|----------|----------|----|---|-----|----|----------|------|-------|------------|----|---------|---|---|---|---|---|---|---|-------------|------------|-----|
| BD9035AEFV-C | 1 | Ext. Pch | Ext. Nch | 40 | — | 3.8 | 30 | Variable | ±1.5 | 7,000 | 100 to 600 | ±7 | Voltage | ✓ | ✓ | ✓ | — | — | ✓ | — | -40 to +125 | HTSSOP-B24 | YES |
|--------------|---|----------|----------|----|---|-----|----|----------|------|-------|------------|----|---------|---|---|---|---|---|---|---|-------------|------------|-----|

© The **Nano** mark is applicable to Nano Pulse Control<sup>®</sup> products.

Nano Pulse Control<sup>®</sup> is trademark of ROHM.

\*1: When over voltage is detected, Bottom FET is OFF

\*2: When over voltage is detected, Bottom FET is ON

## Switching Regulators(System Power Supplies)

### System Power Supply IC for Car Audio

#### Power Supply IC for Car Audio Systems

| Part No.                            | Supply Voltage (V)           | Function         |                                |                       |                    |                                                     | Input I/F | Package          | Automotive Grade Available AEC-Q100                                                                          |             |
|-------------------------------------|------------------------------|------------------|--------------------------------|-----------------------|--------------------|-----------------------------------------------------|-----------|------------------|--------------------------------------------------------------------------------------------------------------|-------------|
|                                     |                              |                  |                                | Reference Voltage (V) | Output Current (A) | Protection Circuit                                  |           |                  |                                                                                                              |             |
|                                     |                              |                  |                                |                       |                    | Over Current                                        |           |                  |                                                                                                              | Temperature |
| BD49101AEFS-M*1/<br>BD49101ARFS-M*2 | 5.5 to 25.0                  | Step-down DC/DC1 | Controller                     | 0.8                   | —                  | Current Limit with Short Current Protection Circuit | ✓         | I <sup>2</sup> C | HTSSOP-A44<br>(EXP-PAD down<br>HTSSOP-A44 package)<br><br>HTSSOP-A44R<br>(EXP-PAD up<br>HTSSOP-A44R package) | YES         |
|                                     |                              | Step-down DC/DC2 | Low Power Standby REG          | 0.8                   | 1.0                |                                                     |           |                  |                                                                                                              |             |
|                                     |                              | REG1             | Secondary                      | 0.6                   | 0.5                | Foldback                                            |           |                  |                                                                                                              |             |
|                                     |                              | REG2             | —                              | 0.8                   | 0.1                |                                                     |           |                  |                                                                                                              |             |
|                                     |                              | REG3             | Secondary                      | 0.8                   | 0.3                |                                                     |           |                  |                                                                                                              |             |
|                                     |                              | REG4             | Secondary, Voltage Calibration | 0.8                   | 1.5(Variable)      |                                                     |           |                  |                                                                                                              |             |
|                                     |                              | REG5             | —                              | 0.8                   | 0.1                |                                                     |           |                  |                                                                                                              |             |
|                                     |                              | High Side Switch | —                              | —                     | 0.5                |                                                     |           |                  |                                                                                                              |             |
| +B Detection Circuit                | Over/Under Current Detection | —                | —                              | —                     |                    |                                                     |           |                  |                                                                                                              |             |

#### Automotive Panel Power Management IC

| Part No.     | Supply Voltage (V) | Operating Temperature (°C) | Operating Frequency (MHz) | Output for Source Voltage 1 (V) | Output for Source Voltage 2 (V) | Output for Logic Voltage (V) | Output for Gate Voltage (V)                       | Start up Sequence Circuit | V COM (ch) | Package      | Automotive Grade Available AEC-Q100 |
|--------------|--------------------|----------------------------|---------------------------|---------------------------------|---------------------------------|------------------------------|---------------------------------------------------|---------------------------|------------|--------------|-------------------------------------|
| BD81842MUV-M | 2.0 to 5.5         | -40 to +105                | 2.1                       | Up to 18.0                      | —                               | —                            | Variable                                          | Internal                  | 1          | VQFN24SV4040 | YES                                 |
| BM81810MUV-M | 2.6 to 5.5         | -40 to +105                | 0.525/1.05/2.1            | 5.0 to 17.0<br>0.1V step        | —                               | 0.9 to 3.4<br>50mV step      | 8.0 to 35.0 0.2V step/<br>-14.0 to -4.0 0.1V step | Internal                  | 1          | VQFN32SV5050 | YES                                 |
| BD81870EFV-M | 2.5 to 5.5         | -40 to +105                | 2.1                       | Up to 18.0                      | V <sub>DD</sub> -13.0 to -1.0   | —                            | —                                                 | Internal                  | —          | HTSSOP-B20   | YES                                 |

#### Automotive Panel High Precision Gradation Voltage Generation IC with Built-in DAC

| Part No.     | Supply Voltage(V) |            | Operating Temperature (°C) | Clock Frequency (MHz) | DAC (bit) | Serial I/F type      | Automatic Data Reading | V COM (ch) | Gradation Buffer (ch) | Package      | Automotive Grade Available AEC-Q100 |
|--------------|-------------------|------------|----------------------------|-----------------------|-----------|----------------------|------------------------|------------|-----------------------|--------------|-------------------------------------|
|              | Gradation Input   | Logic Part |                            |                       |           |                      |                        |            |                       |              |                                     |
| BD81849MUV-C | 10 to 18          | 2.1 to 3.6 | -40 to +105                | 0.4                   | 10        | I <sup>2</sup> C BUS | Internal               | —          | 12                    | VQFN32SV5050 | YES                                 |

\*1: BD49101AEFS-M : EXP-PAD down HTSSOP-A44 package

\*2: BD49101ARFS-M : EXP-PAD up HTSSOP-A44R package

## System Power Supply ICs

### 3ch System Power Supply ICs

| Part No.     | Supply Voltage (V)      | Operating Frequency (kHz) | Operating Temperature (°C) | Sequence | Initial Accuracy | Output          |                                                  | Function                |     |                              |       |            | Package  | Automotive Grade Available AEC-Q100 |
|--------------|-------------------------|---------------------------|----------------------------|----------|------------------|-----------------|--------------------------------------------------|-------------------------|-----|------------------------------|-------|------------|----------|-------------------------------------|
|              |                         |                           |                            |          |                  | No. of Channels | Vout/Max. Iout                                   | Over Current Protection | TSD | Under/Over Voltage Detection | Reset | WDT        |          |                                     |
| BD39000EKV-C | 4 to 30<br>(Rating 40V) | 200 to 550                | -40 to +125                | ✓        | ±2               | CH1 (DC/DC)     | Buck-Boost DC/DC Controller (Vout/Iout variable) | ✓                       | ✓   | ✓                            | —     | WINDOW WDT | HTQFP48V | YES                                 |
|              |                         |                           |                            |          |                  | CH2 (DC/DC)     | Synchronous Buck DC/DC Converter(1.23V, 0.9A)    |                         |     |                              | ✓     |            |          |                                     |
|              |                         |                           |                            |          |                  | CH3 (LDO)       | LDO(5V, 0.6A)                                    |                         |     |                              | —     |            |          |                                     |
| BD39001EKV-C | 4 to 30<br>(Rating 40V) | 200 to 550                | -40 to +125                | ✓        | ±2               | CH1 (DC/DC)     | Buck-Boost DC/DC Controller (Vout/Iout variable) | ✓                       | ✓   | ✓                            | —     | WINDOW WDT | HTQFP48V | YES                                 |
|              |                         |                           |                            |          |                  | CH2 (DC/DC)     | Synchronous Buck DC/DC Converter(3.3V, 0.9A)     |                         |     |                              | ✓     |            |          |                                     |
|              |                         |                           |                            |          |                  | CH3 (LDO)       | LDO(5V, 0.6A)                                    |                         |     |                              | —     |            |          |                                     |

### 2ch System Power Supply ICs

|              |                         |            |             |                                            |    |             |                                                     |   |   |   |   |            |            |     |
|--------------|-------------------------|------------|-------------|--------------------------------------------|----|-------------|-----------------------------------------------------|---|---|---|---|------------|------------|-----|
| BD39012EFV-C | 4 to 36<br>(Rating 45V) | 200 to 600 | -40 to +125 | External Control<br>EN1: DC/DC<br>EN2: LDO | ±2 | CH1 (DC/DC) | Synchronous Buck DC/DC Converter(Vout Variable, 1A) | ✓ | ✓ | ✓ | — | WINDOW WDT | HTSSOP-B24 | YES |
|              |                         |            |             |                                            |    | CH2 (DC/DC) | LDO(5V, 0.4A)                                       |   |   |   | ✓ |            |            |     |

## Power Supply Monitoring IC

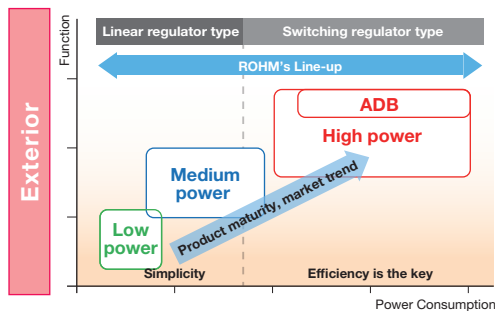
| 4ch Power Supply Monitoring IC |                    |                            |                       |                                   |                         |                       |                       |            |      |       |             |                                     |
|--------------------------------|--------------------|----------------------------|-----------------------|-----------------------------------|-------------------------|-----------------------|-----------------------|------------|------|-------|-------------|-------------------------------------|
| Part No.                       | Supply Voltage (V) | Operating Temperature (°C) | No. of Reset Channels | No. of Voltage Detection Channels | Detection Precision (%) | Function              |                       |            |      |       | Package     | Automotive Grade Available AEC-Q100 |
|                                |                    |                            |                       |                                   |                         | Overvoltage Detection | Low Voltage Detection | WDT        | BIST | RESET |             |                                     |
| BD39040MUF-C                   | 2.7 to 5.5V        | -40 to +125                | 1                     | 4                                 | ±3                      | ✓                     | ✓                     | WINDOW WDT | ✓    | ✓     | VQFN16FV303 | YES                                 |

## Isolated/Non-Isolated Power Supply

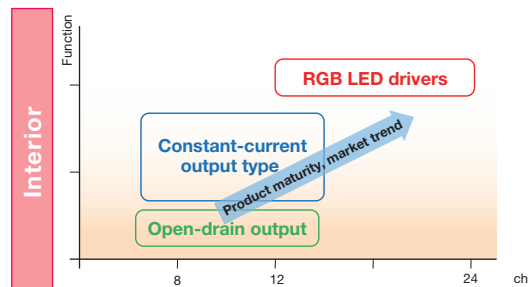
| Isolated DC/DC Controller |                      |                   |                    |                           |                           |     |           |                                     |
|---------------------------|----------------------|-------------------|--------------------|---------------------------|---------------------------|-----|-----------|-------------------------------------|
| Part No.                  | Topology             | Primary/Secondary | Supply Voltage (V) | Switching Frequency (kHz) | Frequency Synchronization | I/F | Package   | Automotive Grade Available AEC-Q100 |
| <b>BD8325FVT-M</b>        | Active Clamp Forward | Primary IC        | 9 to 18            | 50 to 500                 | ✓                         | —   | TSSOP-B30 | YES                                 |

## LED Drivers

### LED Drivers



The automotive LED driver market is picking up, with DRL and CHMSL leading the way. Thanks to the design flexibility of LEDs, RCL and turn indicator lamps are also increasingly becoming LEDs. Issues with heat-dissipation have prevented LEDs from being implemented as headlights (Low/ High beams), but with the introduction of ADB (Adaptive Driving Beam), LEDs are becoming key.



LEDs are used in dashboard lights, ambient lighting, dome and map lighting, center stack lighting, and other automotive interior lighting. The heads-up display also uses LED lights, as shown in the block diagram on page 18. The LED drivers used in automotive interior lighting are key to the number of channels, the interface, and thus the output type (open-drain, constant-current, etc.).

### Buck-Boost LED Drivers

| White LED Drivers for Head Light |                    |               |    |                           |                           |             |            |                            |            |                                     |
|----------------------------------|--------------------|---------------|----|---------------------------|---------------------------|-------------|------------|----------------------------|------------|-------------------------------------|
| Part No.                         | Supply Voltage (V) | Application   | ch | Maximum Input Voltage (V) | Output Current            | Dimmer Mode | DC/DC      | Operating Temperature (°C) | Package    | Automotive Grade Available AEC-Q100 |
| <b>BD18351EFV-M</b>              | 4.5 to 65.0        | Head Lamp/DRL | 1  | 65                        | Depends on external parts | PWM/DC      | Buck Boost | -40 to +125                | HTSSOP-B24 | YES                                 |

| White LED Drivers       |                    |           |    |                    |                     |                           |                   |                            |              |                                     |
|-------------------------|--------------------|-----------|----|--------------------|---------------------|---------------------------|-------------------|----------------------------|--------------|-------------------------------------|
| Part No.                | Supply Voltage (V) | Boost FET | ch | Output Voltage (V) | Output Current (mA) | Switching Frequency (MHz) | PWM Dimming Ratio | Operating Temperature (°C) | Package      | Automotive Grade Available AEC-Q100 |
| <b>BD81A24EFV-M</b>     | 4.5 to 35.0        | Internal  | 4  | 35 Max.            | 120 Max./ch         | 0.2 to 2.2                | 10,000:1@100Hz    | -40 to +125                | HTSSOP-B28   | YES                                 |
| <b>BD81A24MUV-M</b>     | 4.5 to 35.0        | Internal  | 4  | 35 Max.            | 120 Max./ch         | 0.2 to 2.2                | 10,000:1@100Hz    | -40 to +125                | VQFN28SV5050 | YES                                 |
| <b>BD81A24MUF-M</b>     | 4.5 to 35.0        | Internal  | 4  | 35 Max.            | 120 Max./ch         | 0.2 to 2.2                | 10,000:1@100Hz    | -40 to +125                | VQFN28FV5050 | YES                                 |
| <b>BD81A44EFV-M</b>     | 4.5 to 35.0        | External  | 4  | 35 Max.            | 120 Max./ch         | 0.2 to 2.2                | 10,000:1@100Hz    | -40 to +125                | HTSSOP-B28   | YES                                 |
| <b>BD81A44MUV-M</b>     | 4.5 to 35.0        | External  | 4  | 35 Max.            | 120 Max./ch         | 0.2 to 2.2                | 10,000:1@100Hz    | -40 to +125                | VQFN28SV5050 | YES                                 |
| <b>BD81A44MUF-M</b>     | 4.5 to 35.0        | External  | 4  | 35 Max.            | 120 Max./ch         | 0.2 to 2.2                | 10,000:1@100Hz    | -40 to +125                | VQFN28FV5050 | YES                                 |
| <b>New BD81A74EFV-M</b> | 4.5 to 35.0        | External  | 4  | 35 Max.            | 120 Max./ch         | 0.2 to 2.2                | 10,000:1@100Hz    | -40 to +125                | HTSSOP-B28   | YES                                 |
| <b>New BD81A74MUV-M</b> | 4.5 to 35.0        | External  | 4  | 35 Max.            | 120 Max./ch         | 0.2 to 2.2                | 10,000:1@100Hz    | -40 to +125                | VQFN28SV5050 | YES                                 |

| White LED Drivers for Head Light |                    |               |    |                           |                           |             |                         |                            |            |                                     |
|----------------------------------|--------------------|---------------|----|---------------------------|---------------------------|-------------|-------------------------|----------------------------|------------|-------------------------------------|
| Part No.                         | Supply Voltage (V) | Application   | ch | Maximum Input Voltage (V) | Output Current            | Dimmer Mode | DC/DC                   | Operating Temperature (°C) | Package    | Automotive Grade Available AEC-Q100 |
| <b>BD8381AEFV-M</b>              | 5 to 30            | Head Lamp/DRL | 1  | 50                        | Depends on external parts | PWM/DC      | Buck-Boost, Boost, Buck | -40 to +125                | HTSSOP-B28 | YES                                 |

### Constant Current/Serial-in Parallel-out LED Drivers

| Parallel-out LED Drivers |                    |                    |                     |                  |                  |                                      |                                                |                |                            |              |                                     |
|--------------------------|--------------------|--------------------|---------------------|------------------|------------------|--------------------------------------|------------------------------------------------|----------------|----------------------------|--------------|-------------------------------------|
| Part No.                 | Supply Voltage (V) | Output Voltage (V) | No. of Outputs (ch) | Output Method    | Max. LED Current | Each Output Format                   | Others                                         | Control Method | Max. Clock Frequency (MHz) | Package      | Automotive Grade Available AEC-Q100 |
| <b>BD2808MUV-M</b>       | 3.0 to 5.5         | 20                 | RGB×8 (24ch)        | Constant Current | 50mA/ch          | Built-in 64-step current DAC for RGB | Built-in 256-step PWM control for all channels | 2-Wire Serial  | 1                          | VQFN48MCV070 | YES                                 |
| <b>New BD8388FV-M</b>    | 3.0 to 5.5         | 40                 | 8                   | Open Drain       | 50mA/ch          | ON/OFF                               | —                                              | SPI            | 1.25                       | SSOP-B16     | YES                                 |
| <b>New BD8389FV-M</b>    | 3.0 to 5.5         | 40                 | 12                  | Open Drain       | 50mA/ch          | ON/OFF                               | —                                              | SPI            | 1.25                       | SSOP-B20     | YES                                 |

## Constant Current/Serial-in Parallel-out LED Drivers

| LED Source Drivers |                    |                            |                     |                           |                           |                             |                           |                      |                            |            |                                     |
|--------------------|--------------------|----------------------------|---------------------|---------------------------|---------------------------|-----------------------------|---------------------------|----------------------|----------------------------|------------|-------------------------------------|
| Part No.           | Supply Voltage (V) | Application                | No. of Channels(ch) | Output                    | Maximum Input Voltage (V) | Maximum Output Current (mA) | Dimmer Mode               | Accuracy of Current  | Operating Temperature (°C) | Package    | Automotive Grade Available AEC-Q100 |
| BD18340FV-M        | 4.5 to 19.0        | DRL/Position/FOG/Turn/Rear | 1 to 10             | Controller (External PNP) | 70                        | Total 1,000                 | PWM/DC (±5%)              | ±3(Ta=25°C to 125°C) | -40 to +125                | SSOP-B16   | YES                                 |
| BD18341FV-M        | 4.5 to 19.0        | DRL/Position/FOG/Turn/Rear | 1 to 10             | Controller (External PNP) | 70                        | Total 1,000                 | PWM/DC (±13%)             | ±3(Ta=25°C to 125°C) | -40 to +125                | SSOP-B16   | YES                                 |
| BD18342FV-M        | 4.5 to 19.0        | DRL/Position/FOG/Turn/Rear | 1 to 10             | Controller (External PNP) | 70                        | Total 1,000                 | PWM                       | ±3(Ta=25°C to 125°C) | -40 to +125                | SSOP-B16   | YES                                 |
| BD18343FV-M        | 4.5 to 19.0        | DRL/Position/FOG/Turn/Rear | 1 to 10             | Controller (External PNP) | 70                        | Total 1,000                 | PWM(External Input Only)  | ±3(Ta=25°C to 125°C) | -40 to +125                | SSOP-B16   | YES                                 |
| BD18345EFV-M       | 4.5 to 19.0        | DRL/Position/FOG/Turn/Rear | 1 to 10             | Controller (External PNP) | 70                        | Total 1,000                 | PWM/DC (±3%)              | ±3(Ta=25°C to 125°C) | -40 to +125                | HTSSOP-B20 | YES                                 |
| BD8372EFJ-M        | 5.5 to 40.0        | DRL/Position/FOG/Turn/Rear | 1                   | Internal                  | 50                        | 200                         | High Current/ Low Current | ±3 (Ta=25°C)         | -40 to +125                | HTSOP-J8   | YES                                 |
| BD8372HFP-M        | 5.5 to 40.0        | DRL/Position/FOG/Turn/Rear | 1                   | Internal                  | 50                        | 200                         | High Current/ Low Current | ±3 (Ta=25°C)         | -40 to +125                | HRP7       | YES                                 |
| BD8374EFJ-M        | 4.5 to 42.0        | DRL/Position/FOG/Turn/Rear | 1                   | Internal                  | 50                        | 500                         | PWM                       | ±3 (Ta=25°C)         | -40 to +125                | HTSOP-J8   | YES                                 |
| BD8374HFP-M        | 4.5 to 42.0        | DRL/Position/FOG/Turn/Rear | 1                   | Internal                  | 50                        | 500                         | PWM                       | ±3 (Ta=25°C)         | -40 to +125                | HRP7       | YES                                 |
| BD83732HFP-M       | 4.5 to 42.0        | DRL/Position/FOG/Turn/Rear | 1                   | Internal                  | 50                        | 500                         | PWM/DC                    | ±3 (Ta=25°C)         | -40 to +125                | HRP7       | YES                                 |
| BD83733HFP-M       | 4.5 to 42.0        | DRL/Position/FOG/Turn/Rear | 1                   | Internal                  | 50                        | 500                         | PWM/DC                    | ±3 (Ta=25°C)         | -40 to +125                | HRP7       | YES                                 |
| BD83740EFJ-M       | 4.5 to 42.0        | DRL/Position/FOG/Turn/Rear | 1                   | Internal                  | 50                        | 500                         | PWM                       | ±3 (Ta=25°C)         | -40 to +125                | HTSOP-J8   | YES                                 |
| BD83740HFP-M       | 4.5 to 42.0        | DRL/Position/FOG/Turn/Rear | 1                   | Internal                  | 50                        | 500                         | PWM                       | ±3 (Ta=25°C)         | -40 to +125                | HRP7       | YES                                 |

## Motor Drivers

### 3-Phase Brushless Motor Drivers

| 3-Phase Brushless Motor Pre-drivers with Speed Control |                           |                    |                            |                      |                             |         |                                                         |       |                     |           |                                        |
|--------------------------------------------------------|---------------------------|--------------------|----------------------------|----------------------|-----------------------------|---------|---------------------------------------------------------|-------|---------------------|-----------|----------------------------------------|
| Part No.                                               | Maximum Input Voltage (V) | Supply Voltage (V) | Operating Temperature (°C) | Circuit Current (mA) | Input Threshold Voltage (V) |         | External FET Drive Voltage (V)<br>V <sub>CC</sub> =6.5V |       | PWM Frequency (kHz) | Package   | Automotive Grade Available<br>AEC-Q100 |
|                                                        |                           |                    |                            |                      | H Level                     | L Level | Upper                                                   | Lower |                     |           |                                        |
| <b>BD63030EKV-C</b>                                    | 50                        | 6.5 to 18.0        | -40 to +125                | 18                   | 3.8                         | 1.9     | 2×V <sub>CC</sub> -1.0                                  | 5.5   | 20                  | HTQFP64AV | YES                                    |

| 3-Phase Brushless Motor Pre-drivers |                           |                    |                            |                      |                         |             |                                                   |          |                     |          |                                        |
|-------------------------------------|---------------------------|--------------------|----------------------------|----------------------|-------------------------|-------------|---------------------------------------------------|----------|---------------------|----------|----------------------------------------|
| Part No.                            | Maximum Input Voltage (V) | Supply Voltage (V) | Operating Temperature (°C) | Circuit Current (mA) | Input Threshold Voltage |             | External FET Drive Voltage<br>V <sub>CC</sub> =8V |          | PWM Frequency (kHz) | Package  | Automotive Grade Available<br>AEC-Q100 |
|                                     |                           |                    |                            |                      | H Level (V)             | L Level (V) | Upper(V)                                          | Lower(V) |                     |          |                                        |
| <b>BD16805FV-M</b>                  | 60                        | 8 to 18            | -40 to +110                | 15.2                 | 3.0                     | 1.0         | 2×V <sub>CC</sub> -0.5                            | 8        | 25                  | SSOP-B40 | YES                                    |

| 3-Phase Brushless Motor Drivers |                           |                    |                            |                          |                         |             |                          |                     |            |                                        |  |
|---------------------------------|---------------------------|--------------------|----------------------------|--------------------------|-------------------------|-------------|--------------------------|---------------------|------------|----------------------------------------|--|
| Part No.                        | Maximum Input Voltage (V) | Supply Voltage (V) | Operating Temperature (°C) | Consumption Current (mA) | Input Threshold Voltage |             | Output ON Resistance (Ω) | PWM Frequency (kHz) | Package    | Automotive Grade Available<br>AEC-Q100 |  |
|                                 |                           |                    |                            |                          | H Level (V)             | L Level (V) |                          |                     |            |                                        |  |
| <b>BD63035EFV-M</b>             | 36                        | 8 to 28            | -40 to +105                | 8                        | 2                       | 0.8         | 0.6                      | 22.7                | HTSSOP-B20 | YES                                    |  |

### H-Bridge Motor Driver

| 40V Max. H-Bridge Drivers |                           |                    |                    |                 |                                               |                                                                   |                            |            |                                     |
|---------------------------|---------------------------|--------------------|--------------------|-----------------|-----------------------------------------------|-------------------------------------------------------------------|----------------------------|------------|-------------------------------------|
| Part No.                  | Maximum Input Voltage (V) | Supply Voltage (V) | Output Current (A) | ch              | Output ON Resistance (Upper + Lower) (Ω Typ.) | Output Modes                                                      | Operating Temperature (°C) | Package    | Automotive Grade Available AEC-Q100 |
| BD16950EFV-C              | 40                        | 5.5 to 40.0        | —                  | 1               | —                                             | Vertical output can be turned ON/OFF for each output channel unit | −40 to +125                | HTSSOP-B24 | YES                                 |
| BD16938EFV-C              | 40                        | 6.3 to 32.0        | 1.0                | 4 (Half 8 ch)   | 1.4                                           | Vertical output can be turned ON/OFF for each output channel unit | −40 to +125                | HTSSOP-B28 | YES                                 |
| BD16939EFV-C              | 40                        | 6.3 to 32.0        | 1.0                | 3 (Half 6 ch)   | 1.35                                          | Vertical output can be turned ON/OFF for each output channel unit | −40 to +125                | HTSSOP-B28 | YES                                 |
| New BD16912EFV-C          | 40                        | 6.0 to 18.0        | 3.0                | 1               | 0.36                                          | Forward/Reverse/Standby/Brake                                     | −40 to +125                | HTSSOP-B20 | YES                                 |
| 60V Max. H-Bridge Drivers |                           |                    |                    |                 |                                               |                                                                   |                            |            |                                     |
| Part No.                  | Maximum Input Voltage (V) | Supply Voltage (V) | Output Current (A) | ch              | Output ON Resistance (Upper + Lower) (Ω Typ.) | Output Modes                                                      | Operating Temperature (°C) | Package    | Automotive Grade Available AEC-Q100 |
| BD16933EFV-C              | 60                        | 7.0 to 36.0        | 1.0                | 1.5 (Half 3 ch) | 1.81                                          | Vertical output can be turned ON/OFF for each output channel unit | −40 to +125                | HTSSOP-B20 | YES                                 |
| BD16922EFV-M              | 60                        | 8.0 to 36.0        | 1.0                | 2               | 2.25                                          | Forward/Reverse/Standby/Brake                                     | −40 to +110                | HTSSOP-B24 | YES                                 |

### Driver for ODD

| 4ch System Motor Driver ICs        |                   |              |                 |               |                 |         |                   |                                  |                                  |                       |       |              |                                     |
|------------------------------------|-------------------|--------------|-----------------|---------------|-----------------|---------|-------------------|----------------------------------|----------------------------------|-----------------------|-------|--------------|-------------------------------------|
| Part No.                           | Supply Voltage(V) | I/F          | FOCUS TILT (ch) | TRACKING (ch) | SLED            | LOADING | SPINDLE           | Loading Short Circuit Protection | Protection for Pickup            | Regulator             | Reset | Package      | Automotive Grade Available AEC-Q100 |
| BD8266EFV-M                        | 4.5 to 10.0       | Analog & PWM | 1               | 1             | DC Select input | DC      |                   | —                                | Self off                         | —                     | —     | HTSSOP-B24   | YES                                 |
| BD8263EFV-M                        | 4.5 to 10.0       | Analog & PWM | 1               | 1             | DC Select input | DC      |                   | ✓                                | —                                | —                     | —     | HTSSOP-B28   | YES                                 |
| 5ch to 9ch System Motor Driver ICs |                   |              |                 |               |                 |         |                   |                                  |                                  |                       |       |              |                                     |
| Part No.                           | Supply Voltage(V) | I/F          | FOCUS TILT (ch) | TRACKING (ch) | SLED            | LOADING | SPINDLE           | Loading Short Circuit Protection | Protection for Pickup            | Regulator             |       | Package      | Automotive Grade Available AEC-Q100 |
| BD8205EFV-M                        | 6.0 to 10.0       | Analog & PWM | 1               | 1             | DC              | DC      | DC                | —                                | —                                | —                     |       | HTSSOP-B24   | YES                                 |
| Part No.                           | Supply Voltage(V) | I/F          | FOCUS TILT (ch) | TRACKING (ch) | SLED            | LOADING | SPINDLE           | LVDS for SA                      | Loading Short Circuit Protection | Protection for Pickup |       | Package      | Automotive Grade Available AEC-Q100 |
| BD8255MUV-M                        | 4.5 to 5.5        | SPI          | 1               | 1             | 2ch STTEPING    | DC      | 3-Phase Brushless | —                                | ✓                                | —                     |       | VQFN48SV7070 | YES                                 |
| BD8256EFV-M                        | 4.5 to 10.5       | SPI          | 2               | 1             | 2ch STTEPING    | DC      | 3-Phase Brushless | 2ch                              | ✓                                | Self off              |       | HTSSOP-B54   | YES                                 |

## IPD(Intelligent Power Device)

### High Side/Low Side Switch

|           | IPD(Intelligent Power Device)Lineup |       |      |       |       |       |            | Application                                  |
|-----------|-------------------------------------|-------|------|-------|-------|-------|------------|----------------------------------------------|
|           | ON Resistance [Low] [High]          |       |      |       |       |       |            |                                              |
| SINGLE    | High Side                           | 90mΩ  |      |       |       |       | 500mΩ      | Relay, Solenoid, Interior lamp, Water heater |
|           | Low Side                            | 28mΩ  | 45mΩ | 85mΩ  | 105mΩ | 150mΩ | 300mΩ      |                                              |
| DUAL      | High Side                           |       |      |       |       |       |            | Relay, Solenoid, Interior lamp               |
|           | Low Side                            | 105mΩ |      | 120mΩ | 150mΩ | 300mΩ |            |                                              |
| Over QUAD | High Side                           |       |      |       |       |       |            | Relay, Solenoid, Stepping motor, LED etc.    |
|           | Low Side                            | 600mΩ |      |       |       |       | 700mΩ(8ch) |                                              |

:High Side:Low Side

### Smart High Side Switch

| High Side Switch |                  |               |    |                                  |                          |               |                                                                                                    |                                       |           |                                     |
|------------------|------------------|---------------|----|----------------------------------|--------------------------|---------------|----------------------------------------------------------------------------------------------------|---------------------------------------|-----------|-------------------------------------|
| Part No.         | Power Supply (V) | VDS (Max.)(V) | ch | Over Current Detection (min.)(A) | ON Resistance (Typ.)(mΩ) | TSD           | Function                                                                                           | Abnormality Detection types           | Package   | Automotive Grade Available AEC-Q100 |
| ☆BV1HF045EFJ-C   | 6.0 to 28.0      | 45            | 1  | 21                               | 45                       | Self Recovery | Abnormality detection                                                                              | Overheat/overcurrent load open/shorts | HTSOP-J8  | YES                                 |
| ☆BV1HJ045EFJ-C   | 6.0 to 28.0      | 45            | 1  | 5                                | 45                       | Self Recovery | Abnormality detection                                                                              | Overheat/overcurrent load open/shorts | HTSOP-J8  | YES                                 |
| BV1HD090FJ-C     | 4.5 to 36.0      | 45            | 1  | 2.7                              | 90                       | Self Recovery | Overcurrent /Intermittent operation abnormality detection                                          | Overheat/overcurrent/ load open       | SOP-J8    | YES                                 |
| BD1HC500EFJ-C    | 4.0 to 18.0      | 44.5          | 1  | 0.8                              | 500                      | Off Latch     | Abnormality detection                                                                              | Overheat/overcurrent/ load open       | HTSOP-J8  | YES                                 |
| BD1HC500FVM-C    | 4.0 to 18.0      | 44.5          | 1  | 0.8                              | 500                      | Off Latch     | Abnormality detection                                                                              | Overheat/overcurrent/ load open       | MSOP8     | YES                                 |
| BD1HC500HFN-C    | 4.0 to 18.0      | 44.5          | 1  | 0.8                              | 500                      | Off Latch     | Abnormality detection                                                                              | Overheat/overcurrent/ load open       | HSOP8     | YES                                 |
| BD1HD500EFJ-C    | 4.0 to 18.0      | 44.5          | 1  | 0.8                              | 500                      | Self Recovery | Abnormality detection                                                                              | Overheat/overcurrent/ load open       | HTSOP-J8  | YES                                 |
| BD1HD500FVM-C    | 4.0 to 18.0      | 44.5          | 1  | 0.8                              | 500                      | Self Recovery | Abnormality detection                                                                              | Overheat/overcurrent/ load open       | MSOP8     | YES                                 |
| BD1HD500HFN-C    | 4.0 to 18.0      | 44.5          | 1  | 0.8                              | 500                      | Self Recovery | Abnormality detection                                                                              | Overheat/overcurrent/ load open       | HSOP8     | YES                                 |
| ☆BV1HB045EFJ-C   | 3.0 to 36.0      | 45            | 1  | 21                               | 45                       | Self Recovery | Current sense abnormality detection                                                                | Overheat/overcurrent/ load open       | HTSOP-J8  | YES                                 |
| ☆BV2HC045EFU-C   | 6.0 to 28.0      | 45            | 2  | Fixed: 21 adjustable             | 45                       | Off Latch     | 2-Stage overcurrent detection (variable/fixed) Overcurrent mask time setting abnormality detection | Overheat/ overcurrent/ load open      | HSSOP-C16 | YES                                 |
| ☆BV2HD045EFU-C   | 6.0 to 28.0      | 45            | 2  | Fixed: 21 adjustable             | 45                       | Self Recovery | 2-Stage overcurrent detection (variable/fixed) Overcurrent mask time setting abnormality detection | Overheat/ overcurrent/ load open      | HSSOP-C16 | YES                                 |
| ☆BV2HD070EFU-C   | 6.0 to 28.0      | 45            | 2  | Fixed: 21 adjustable             | 70                       | Self Recovery | 2-Stage overcurrent detection (variable/fixed) Overcurrent mask time setting abnormality detection | Overheat/ overcurrent/ load open      | HSSOP-C16 | YES                                 |

☆ : Under Development

### Smart Low Side Switch

| Low Side Switch |                                         |               |    |                                  |                          |               |                                 |                             |            |                                     |
|-----------------|-----------------------------------------|---------------|----|----------------------------------|--------------------------|---------------|---------------------------------|-----------------------------|------------|-------------------------------------|
| Part No.        | Power Supply (V)                        | VDS (Max.)(V) | ch | Over Current Detection (min.)(A) | ON Resistance (Typ.)(mΩ) | TSD           | Function                        | Abnormality Detection types | Package    | Automotive Grade Available AEC-Q100 |
| ☆BV1LB010FPJ-C  | 3.0 to 5.5                              | 42            | 1  | 42                               | 10                       | Self Recovery | —                               | —                           | TO252-J3   | YES                                 |
| BV1LB028FPJ-C   | 3.0 to 5.5                              | 42            | 1  | 30                               | 28                       | Self Recovery | —                               | —                           | TO252-J3   | YES                                 |
| BV1LB045FPJ-C   | 3.0 to 5.5                              | 42            | 1  | 18                               | 45                       | Self Recovery | —                               | —                           | TO252-J3   | YES                                 |
| BV1LB085FJ-C    | 3.0 to 5.5                              | 42            | 1  | 13                               | 85                       | Self Recovery | —                               | —                           | SOP-J8     | YES                                 |
| BV1LB085HFS-C   | 3.0 to 5.5                              | 42            | 1  | 13                               | 85                       | Self Recovery | —                               | —                           | HSOP-A8    | YES                                 |
| BV1LB150FJ-C    | 3.0 to 5.5                              | 42            | 1  | 6.5                              | 150                      | Self Recovery | —                               | —                           | SOP-J8     | YES                                 |
| BV1LB150HFS-C   | 3.0 to 5.5                              | 42            | 1  | 6.5                              | 150                      | Self Recovery | —                               | —                           | HSOP-A8    | YES                                 |
| BV1LB300FJ-C    | 3.0 to 5.5                              | 42            | 1  | 1.7                              | 300                      | Self Recovery | —                               | —                           | SOP-J8     | YES                                 |
| BV1LB300HFS-C   | 3.0 to 5.5                              | 42            | 1  | 1.7                              | 300                      | Self Recovery | —                               | —                           | HSOP-A8    | YES                                 |
| BD1LB500EFJ-C   | 3.0 to 5.5                              | 42            | 1  | 0.8                              | 350                      | Self Recovery | —                               | —                           | HTSOP-J8   | YES                                 |
| BD1LB500FVM-C   | 3.0 to 5.5                              | 42            | 1  | 0.8                              | 350                      | Self Recovery | —                               | —                           | MSOP8      | YES                                 |
| BV1LC085EFJ-C   | 3.0 to 5.5                              | 42            | 1  | 5                                | 85                       | Self Recovery | Overheat/overcurrent/ load open | —                           | HTSOP-J8   | YES                                 |
| BV1LC105FJ-C    | 3.0 to 5.5                              | 42            | 1  | 3                                | 105                      | Self Recovery | Overheat/overcurrent/ load open | —                           | SOP-J8     | YES                                 |
| BV1LC150EFJ-C   | 3.0 to 5.5                              | 42            | 1  | 3.5                              | 150                      | Self Recovery | Overheat/overcurrent/ load open | —                           | HTSOP-J8   | YES                                 |
| BV1LC300FJ-C    | 3.0 to 5.5                              | 42            | 1  | 1.7                              | 350                      | Self Recovery | Overheat/overcurrent/ load open | —                           | SOP-J8     | YES                                 |
| BV1LC300EFJ-C   | 3.0 to 5.5                              | 42            | 1  | 1.7                              | 350                      | Self Recovery | Overheat/overcurrent/ load open | —                           | HTSOP-J8   | YES                                 |
| BM2LB110FJ-C    | 3.0 to 5.5                              | 42            | 2  | 2.5                              | 120                      | Self Recovery | —                               | —                           | SOP-J8     | YES                                 |
| BM2LB150FJ-C    | 3.0 to 5.5                              | 42            | 2  | 6.5                              | 150                      | Self Recovery | —                               | —                           | SOP-J8     | YES                                 |
| BM2LB300FJ-C    | 3.0 to 5.5                              | 42            | 2  | 1.7                              | 300                      | Self Recovery | —                               | —                           | SOP-J8     | YES                                 |
| BM2LC105FJ-C    | 3.0 to 5.5                              | 42            | 2  | 3                                | 105                      | Self Recovery | Overheat/overcurrent/ load open | —                           | SOP-J8     | YES                                 |
| BM2LC300FJ-C    | 3.0 to 5.5                              | 42            | 2  | 1.7                              | 350                      | Self Recovery | Overheat/overcurrent/ load open | —                           | SOP-J8     | YES                                 |
| BD8LB600FS-C    | 3.0 to 5.5(Digital)/ 4.0 to 5.5(Analog) | 45            | 8  | 1                                | 600                      | Self Recovery | Overheat/overcurrent/ load open | —                           | SSOP-A24   | YES                                 |
| BD8LA700EFV-C   | 3.0 to 5.5(Digital)/ 4.0 to 5.5(Analog) | 45            | 8  | 0.5                              | 700                      | Off Latch     | Overheat/overcurrent/ load open | —                           | HTSSOP-B24 | YES                                 |

☆ : Under Development

## Power Management Switch

### 1 Channel Compact High Side Switch ICs

| Part No.          | Supply Voltage (V) | ON Resistance (mΩ) | Control Input Logic | Output Current (A) | Over Current Detection(A) Min./Typ./Max. | Output Turn on Time (ms) | OC Protection | Thermal Protection | Flag Output Delay at Over Current (ms) | Discharge Resistance(Ω) | Package | Automotive Grade Available AEC-Q100 |
|-------------------|--------------------|--------------------|---------------------|--------------------|------------------------------------------|--------------------------|---------------|--------------------|----------------------------------------|-------------------------|---------|-------------------------------------|
| <b>BD22621G-M</b> | 2.7 to 5.5         | 120                | H Active            | 0.15               | 0.18/0.30/0.42                           | 1.0                      | Recovery      | Recovery           | 15                                     | 60                      | SSOP5   | YES                                 |
| <b>BD2262G-M</b>  | 2.7 to 5.5         | 120                | H Active            | 0.2                | 0.2/0.3/0.4                              | 1.0                      | Recovery      | Recovery           | 15                                     | 60                      | SSOP5   | YES                                 |
| <b>BD22641G-M</b> | 2.7 to 5.5         | 120                | H Active            | 0.5                | 0.57/0.76/0.96                           | 1.0                      | Recovery      | Recovery           | 15                                     | 60                      | SSOP5   | YES                                 |
| <b>BD2264G-M</b>  | 2.7 to 5.5         | 120                | H Active            | 0.5                | 0.63/0.765/0.9                           | 1.0                      | Recovery      | Recovery           | 15                                     | 60                      | SSOP5   | YES                                 |
| <b>BD2265G-M</b>  | 2.7 to 5.5         | 120                | L Active            | 0.5                | 0.63/0.765/0.9                           | 1.0                      | Recovery      | Recovery           | 15                                     | 60                      | SSOP5   | YES                                 |
| <b>BD2266G-M</b>  | 2.7 to 5.5         | 120                | H Active            | 0.75               | 0.82/0.97/1.12                           | 1.0                      | Recovery      | Recovery           | 15                                     | 60                      | SSOP5   | YES                                 |
| <b>BD2267G-M</b>  | 2.7 to 5.5         | 120                | L Active            | 0.75               | 0.82/0.97/1.12                           | 1.0                      | Recovery      | Recovery           | 15                                     | 60                      | SSOP5   | YES                                 |
| <b>BD2268G-M</b>  | 2.7 to 5.5         | 110                | H Active            | 1.0                | 1.15/1.275/1.4                           | 1.0                      | Recovery      | Recovery           | 15                                     | 60                      | SSOP5   | YES                                 |
| <b>BD2269G-M</b>  | 2.7 to 5.5         | 110                | L Active            | 1.0                | 1.15/1.275/1.4                           | 1.0                      | Recovery      | Recovery           | 15                                     | 60                      | SSOP5   | YES                                 |
| <b>BD2244G-M*</b> | 2.8 to 5.5         | 100                | H Active            | 1.5                | 0.2 to 1.7(adjustable)                   | 0.6                      | Recovery      | Recovery           | 7                                      | 60                      | SSOP6   | YES                                 |
| <b>BD2245G-M*</b> | 2.8 to 5.5         | 100                | L Active            | 1.5                | 0.2 to 1.7(adjustable)                   | 0.6                      | Recovery      | Recovery           | 7                                      | 60                      | SSOP6   | YES                                 |

### 1 Channel High Side Switch ICs

|                     |            |    |          |     |             |     |          |          |    |   |           |     |
|---------------------|------------|----|----------|-----|-------------|-----|----------|----------|----|---|-----------|-----|
| <b>BD82004FVJ-M</b> | 2.7 to 5.5 | 70 | H Active | 0.9 | 1.0/1.5/2.0 | 0.8 | Recovery | Recovery | 15 | — | TSSOP-B8J | YES |
| <b>BD82005FVJ-M</b> | 2.7 to 5.5 | 70 | L Active | 0.9 | 1.0/1.5/2.0 | 0.8 | Recovery | Recovery | 15 | — | TSSOP-B8J | YES |
| <b>BD82006FVJ-M</b> | 2.7 to 5.5 | 70 | H Active | 1.1 | 1.5/2.4/3.0 | 0.8 | Recovery | Recovery | 15 | — | TSSOP-B8J | YES |
| <b>BD82007FVJ-M</b> | 2.7 to 5.5 | 70 | L Active | 1.1 | 1.5/2.4/3.0 | 0.8 | Recovery | Recovery | 15 | — | TSSOP-B8J | YES |

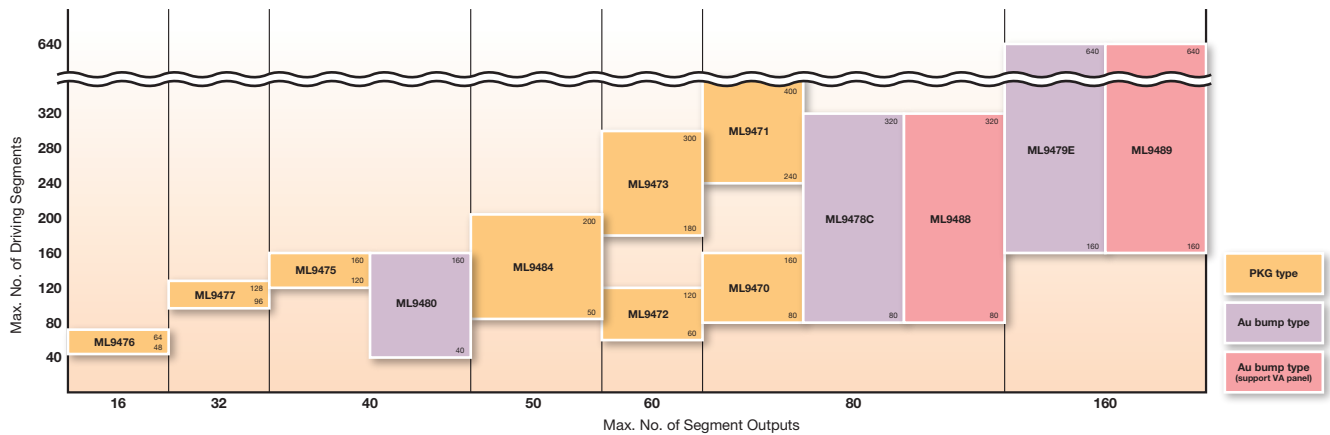
### 2 Channel High Side Switch ICs

|                   |            |    |          |     |             |     |          |          |    |   |        |     |
|-------------------|------------|----|----------|-----|-------------|-----|----------|----------|----|---|--------|-----|
| <b>BD2068FJ-M</b> | 2.7 to 5.5 | 80 | H Active | 1.0 | 1.5/2.4/3.0 | 0.8 | Recovery | Recovery | 15 | — | SOP-J8 | YES |
| <b>BD2069FJ-M</b> | 2.7 to 5.5 | 80 | L Active | 1.0 | 1.5/2.4/3.0 | 0.8 | Recovery | Recovery | 15 | — | SOP-J8 | YES |

\*: UL approved File No. E243261

## Display Drivers

### TN/STN LCD Driver series



# TN/STN LCD Driver series

## Controller Driver for Low Duty LCD

(LAPIS Semiconductor products)

| LCD Controller Drivers(Package product)   |                             |                              |     |     |     |     |                                                     |                          |                           |                            |                                                                                                                 |                   |                                      |                                          |
|-------------------------------------------|-----------------------------|------------------------------|-----|-----|-----|-----|-----------------------------------------------------|--------------------------|---------------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------|--------------------------------------|------------------------------------------|
| Part No.                                  | Max. No. of Segment Outputs | Max. No. of Driving Segments |     |     |     |     | Internal Oscillation Frame Frequency (Hz)           | Logic Supply Voltage (V) | Driver Supply Voltage (V) | Operating Temperature (°C) | Features                                                                                                        | Package           | Halogen Free Supported <sup>*1</sup> | Automotive Grade Available <sup>*2</sup> |
|                                           |                             | static                       | 1/2 | 1/3 | 1/4 | 1/5 |                                                     |                          |                           |                            |                                                                                                                 |                   |                                      |                                          |
| ML9470-12                                 | 80                          | 80                           | 160 | —   | —   | —   | —                                                   | 3.0 to 5.5 (single)      | —                         | -40 to +105                | Supports external clock input                                                                                   | QFP100-1420-0.65  | ✓                                    | YES                                      |
| ML9471                                    | 80                          | —                            | —   | 240 | 320 | 400 | —                                                   | 3.0 to 5.5 (single)      | —                         | -40 to +105                | Supports external clock input                                                                                   | TQFP100-1414-0.50 | ✓                                    | YES                                      |
| ML9472                                    | 60                          | 60                           | 120 | —   | —   | —   | —                                                   | 3.0 to 5.5 (single)      | —                         | -40 to +105                | Supports external clock input                                                                                   | TQFP80-1212-0.50  | ✓                                    | YES                                      |
| ML9473                                    | 60                          | —                            | —   | 180 | 240 | 300 | —                                                   | 3.0 to 5.5 (single)      | —                         | -40 to +105                | Supports external clock input                                                                                   | TQFP80-1212-0.50  | ✓                                    | YES                                      |
| ML9475                                    | 40                          | —                            | —   | 120 | 160 | —   | —                                                   | 3V±10%/5V±10%            | 3.5 to 5.5                | -40 to +105                | Supports external clock input/<br>Bias generator built in/<br>EMS countermeasure built in                       | QFP56-910-0.65    | ✓                                    | YES                                      |
| ML9476                                    | 16                          | —                            | —   | 48  | 64  | —   | —                                                   | 3V±10%/5V±10%            | 3.5 to 5.5                | -40 to +105                | Supports external clock input/<br>Bias generator built in/<br>EMS countermeasure built in                       | TQFP48-0707-0.50  | ✓                                    | YES                                      |
| ML9477                                    | 32                          | —                            | —   | 96  | 128 | —   | —                                                   | 3V±10%/5V±10%            | 3.5 to 5.5                | -40 to +105                | Supports external clock input/<br>Bias generator built in/<br>EMS countermeasure built in                       | TQFP48-0707-0.50  | ✓                                    | YES                                      |
| ML9484                                    | 50                          | 50                           | 100 | 150 | 200 | —   | —                                                   | 2.7 to 5.5               | 4.5 to 5.5                | -40 to +105                | Supports external clock input/<br>Bias generator built in                                                       | TQFP64-1010-0.50  | ✓                                    | YES                                      |
| LCD Controller Drivers(Gold Bump Product) |                             |                              |     |     |     |     |                                                     |                          |                           |                            |                                                                                                                 |                   |                                      |                                          |
| ML9480                                    | 40                          | 40                           | 80  | 120 | 160 | —   | 65/75/85/95<br>130/150/170/190<br>command switching | 2.7 to 5.5               | 4.5 to 5.5                | -40 to +105                | Supports external clock input/<br>Bias generator built in/<br>EMS countermeasure built in/<br>No external parts | Au bump chip      | ✓                                    | YES                                      |
| ML9478C                                   | 80                          | 80                           | 160 | 240 | 320 | —   | 65/75/85/95<br>command switching                    | 2.7 to 5.5               | 4.5 to 5.5                | -40 to +105                | Supports external clock input/<br>Bias generator built in/<br>EMS countermeasure built in/<br>No external parts | Au bump chip      | ✓                                    | YES                                      |
| ML9479E                                   | 160                         | 160                          | 320 | 480 | 640 | —   | 65/75/85/95<br>command switching                    | 2.7 to 5.5               | 4.5 to 5.5                | -40 to +105                | Supports external clock input/<br>Bias generator built in/<br>EMS countermeasure built in/<br>No external parts | Au bump chip      | ✓                                    | YES                                      |
| ML9488                                    | 80                          | 80                           | 160 | 240 | 320 | —   | 130/150/170/190<br>command switching                | 2.7 to 5.5               | 4.5 to 5.5                | -40 to +105                | Supports external clock input/<br>Bias generator built in                                                       | Au bump chip      | ✓                                    | YES                                      |
| ML9489                                    | 160                         | 160                          | 320 | 480 | 640 | —   | 130/150/170/190<br>command switching                | 2.7 to 5.5               | 4.5 to 5.5                | -40 to +105                | Supports external clock input/<br>Bias generator built in                                                       | Au bump chip      | ✓                                    | YES                                      |

\*1: Halogen-free models are available for products with the halogen free compatible mark "✓". Please contact a sales representative for further details. \*2: Please contact a sales representative for details regarding AEC-Q100.

## Controller Driver for Graphic LCD

(LAPIS Semiconductor products)

| LCD Controller Drivers |                             |                           |                          |                           |                            |                                  |                   |                                      |                                          |  |  |
|------------------------|-----------------------------|---------------------------|--------------------------|---------------------------|----------------------------|----------------------------------|-------------------|--------------------------------------|------------------------------------------|--|--|
| Part No.               | Max. No. of Segment Outputs | Max. Driving Display size | Logic Supply Voltage (V) | Driver Supply Voltage (V) | Operating Temperature (°C) | Features                         | Package           | Halogen Free Supported <sup>*1</sup> | Automotive Grade Available <sup>*2</sup> |  |  |
| <b>ML9058E</b>         | 132                         | 132×65 dot                | 3.7 to 5.5               | 6 to 18                   | -40 to +85                 | Integrated RAM/Boost circuit     | Au bump chip      | ✓                                    | YES                                      |  |  |
| <b>ML9059E</b>         | 132                         | 132×49 dot                | 3.7 to 5.5               | 6 to 18                   | -40 to +85                 | Integrated RAM/Boost circuit     | Au bump chip      | ✓                                    | YES                                      |  |  |
| <b>ML9445</b>          | 180                         | 180×65 dot                | 2.7 to 5.5               | 6 to 18.5                 | -40 to +105                | Integrated RAM/Boost circuit     | Au bump chip      | ✓                                    | YES                                      |  |  |
| <b>ML9092-01</b>       | 56                          | 56×10 dot                 | 4.5 to 5.5               | 4.5 to 16.5               | -40 to +85                 | Integrated RAM/Boost circuit/PWM | TQFP100-1414-0.50 | ✓                                    | YES                                      |  |  |
| <b>ML9092-02</b>       | 60                          | 60×10 dot                 | 4.5 to 5.5               | 4.5 to 16.5               | -40 to +85                 | Integrated RAM/Boost circuit     | TQFP100-1414-0.50 | ✓                                    | YES                                      |  |  |
| <b>ML9092-03</b>       |                             |                           |                          |                           |                            | Integrated RAM                   |                   |                                      |                                          |  |  |
| <b>ML9092-04</b>       |                             |                           |                          |                           |                            | Integrated RAM/PWM               |                   |                                      |                                          |  |  |

\*1: Halogen-free models are available for products with the halogen free compatible mark "✓". Please contact a sales representative for further details. \*2: Please contact a sales representative for details regarding AEC-Q100.

## LCD Segment Drivers

| Low Duty LCD Segment Drivers |                |         |     |                       |             |                                 |               |              |     |                   |     |                   |            |                |              |         |                                     |
|------------------------------|----------------|---------|-----|-----------------------|-------------|---------------------------------|---------------|--------------|-----|-------------------|-----|-------------------|------------|----------------|--------------|---------|-------------------------------------|
| Part No.                     | Display (dots) | Outputs |     | Operating Voltage (V) |             | Operating Temperature (°C)      | Duty          | Bias         | I/F | EVR               | GPO | Independent Blink | LED Driver | PWM Gen.       | Keyscan      | Package | Automotive Grade Available AEC-Q100 |
|                              |                | SEG     | COM | I/F (VDD)             | LCD (VLCD)  |                                 |               |              |     |                   |     |                   |            |                |              |         |                                     |
| BU97601FV-M                  | 116            | 29      | 4   | 2.7 to 6.0            | -40 to +85  | 1/4, 1/3, 1/2, Static           | 1/3, 1/2      | 3wire+KEYOUT | ✓   | 16port (16ch PWM) | —   | —                 | 6ch 9bit   | 4x5 Max. 20Key | SSOP-B40     | YES     |                                     |
| BU9797FUV-M                  | 144            | 36      | 4   | 2.5 to 5.5            | -40 to +85  | 1/4                             | 1/3, 1/2      | 2wire        | —   | —                 | —   | —                 | —          | —              | TSSOP-C48V   | YES     |                                     |
| BU97510CKV-M                 | 216            | 54      | 4   | 2.7 to 6.0            | -40 to +85  | 1/4, 1/3                        | 1/3, 1/2      | 3wire        | —   | 6port (6ch PWM)   | —   | —                 | 6ch 6bit   | —              | VQFP64       | YES     |                                     |
| BU97520AKV-M                 | 276            | 69      | 4   | 2.7 to 6.0            | -40 to +85  | 1/4, 1/3                        | 1/3, 1/2      | 3wire+KEYOUT | —   | 6port (6ch PWM)   | —   | —                 | 6ch 8bit   | 5x6 Max. 30Key | VQFP80       | YES     |                                     |
| BU97540KV-M                  | 335            | 67      | 5   | 2.7 to 6.0            | -40 to +85  | 1/5, 1/4, 1/3, Static           | 1/3, 1/2      | 3wire+KEYOUT | ✓   | 9port (9ch PWM)   | —   | —                 | 9ch 9bit   | 5x6 Max. 30Key | VQFP80       | YES     |                                     |
| BU97530KVT-M                 | 445            | 89      | 5   | 2.7 to 6.0            | -40 to +85  | 1/5, 1/4, 1/3, Static           | 1/3, 1/2      | 3wire+KEYOUT | ✓   | 9port (9ch PWM)   | —   | —                 | 9ch 8bit   | 5x6 Max. 30Key | TQFP100V     | YES     |                                     |
| BU97550KV-M                  | 528            | 66      | 8   | 2.7 to 6.0            | -40 to +85  | 1/8, 1/7, 1/5, 1/4, 1/3, Static | 1/4, 1/3, 1/2 | 3wire+KEYOUT | ✓   | 9port (9ch PWM)   | —   | —                 | 9ch 9bit   | 5x6 Max. 30Key | VQFP80       | YES     |                                     |
| BU91795MUF-M                 | 48             | 12      | 4   | 2.5 to 6.0            | -40 to +105 | 1/4                             | 1/3           | 2wire        | —   | —                 | —   | —                 | —          | —              | VQFN24FV4040 | YES     |                                     |
| BU91796FS-M                  | 80             | 20      | 4   | 2.5 to 6.0            | -40 to +105 | 1/4                             | 1/3           | 2wire        | —   | —                 | —   | —                 | —          | —              | SSOP-A32     | YES     |                                     |
| BU91600FV-M                  | 116            | 29      | 4   | 2.7 to 6.0            | -40 to +105 | 1/4, 1/3, 1/2, Static           | 1/3, 1/2      | 3wire+KEYOUT | ✓   | 16port (16ch PWM) | —   | —                 | 6ch 9bit   | 4x5 Max. 20Key | SSOP-B40     | YES     |                                     |
| BU91797MUF-M                 | 144            | 36      | 4   | 2.5 to 6.0            | -40 to +105 | 1/4                             | 1/3           | 2wire        | —   | —                 | —   | —                 | —          | —              | VQFN48FV7070 | YES     |                                     |
| BU91797FUV-M                 | 144            | 36      | 4   | 2.5 to 6.0            | -40 to +105 | 1/4                             | 1/3           | 2wire        | —   | —                 | —   | —                 | —          | —              | TSSOP-C48V   | YES     |                                     |
| BU91600FUV-M                 | 148            | 37      | 4   | 2.7 to 6.0            | -40 to +105 | 1/4, 1/3, 1/2, Static           | 1/3, 1/2      | 3wire+KEYOUT | ✓   | 16port (16ch PWM) | —   | —                 | 6ch 9bit   | 4x5 Max. 20Key | TSSOP-C48V   | YES     |                                     |
| BU91799KV-M                  | 200            | 50      | 4   | 2.5 to 6.0            | -40 to +105 | 1/4                             | 1/3           | 2wire        | ✓   | —                 | —   | —                 | —          | —              | VQFP64       | YES     |                                     |
| BU91501KV-M                  | 204            | 51      | 4   | 2.7 to 6.0            | -40 to +105 | 1/4, 1/3                        | 1/3, 1/2      | 3wire+KEYOUT | —   | 4port             | —   | —                 | —          | 5x6 Max. 30Key | VQFP64       | YES     |                                     |
| BU91510KV-M                  | 216            | 54      | 4   | 2.7 to 6.0            | -40 to +105 | 1/4, 1/3                        | 1/3, 1/2      | 3wire        | —   | 6port (6ch PWM)   | —   | —                 | 6ch 6bit   | —              | VQFP64       | YES     |                                     |
| BU91520KV-M                  | 276            | 69      | 4   | 2.7 to 6.0            | -40 to +105 | 1/4, 1/3                        | 1/3, 1/2      | 3wire+KEYOUT | —   | 6port (6ch PWM)   | —   | —                 | 6ch 8bit   | 5x6 Max. 30Key | VQFP80       | YES     |                                     |
| BU91530KVT-M                 | 445            | 89      | 5   | 2.7 to 6.0            | -40 to +105 | 1/5, 1/4, 1/3, Static           | 1/3, 1/2      | 3wire+KEYOUT | ✓   | 9port (9ch PWM)   | —   | —                 | 9ch 8bit   | 5x6 Max. 30Key | TQFP100V     | YES     |                                     |
| BU91R63CH-M                  | 176            | 44      | 4   | 2.7 to 6.0            | -40 to +105 | 1/4, 1/3, 1/2, Static           | 1/3, 1/2      | 2wire        | ✓   | —                 | —   | —                 | —          | —              | Au Bump Chip | YES     |                                     |
| BU91R64CH-M                  | 320            | 80      | 4   | 2.7 to 6.0            | -40 to +105 | 1/4, 1/3, 1/2, Static           | 1/3, 1/2      | 2wire/3wire  | ✓   | —                 | ✓   | —                 | —          | —              | Au Bump Chip | YES     |                                     |
| BU91R65CH-M                  | 640            | 160     | 4   | 2.7 to 6.0            | -40 to +105 | 1/4, 1/3, 1/2, Static           | 1/3, 1/2      | 2wire/3wire  | ✓   | —                 | ✓   | —                 | —          | —              | Au Bump Chip | YES     |                                     |
| BU91R66CH-M                  | 960            | 240     | 4   | 2.7 to 6.0            | -40 to +105 | 1/4, 1/3, 1/2, Static           | 1/3, 1/2      | 2wire/3wire  | ✓   | —                 | ✓   | —                 | —          | —              | Au Bump Chip | YES     |                                     |

## Car Clock Drivers

(LAPIS Semiconductor products)

| Car Clock      |             |                         |                          |                            |                       |                                |                  |                                      |                                          |
|----------------|-------------|-------------------------|--------------------------|----------------------------|-----------------------|--------------------------------|------------------|--------------------------------------|------------------------------------------|
| Part No.       | Duty        | VFD Driving Voltage (V) | Logic Supply Voltage (V) | Operating Temperature (°C) | Supply Current (Max.) | No. of Digits                  | Package          | Halogen Free Supported <sup>*1</sup> | Automotive Grade Available <sup>*2</sup> |
| <b>ML9298</b>  | 1/2         | 4.0 to 18               | No need                  | -40 to +85                 | 0.6mA                 | 4digits×1line and col.         | SSOP32-430-1.00  | ✓                                    | YES                                      |
| <b>ML9098B</b> | Static, 1/2 | 3.0 to 5.5              | 3.0 to 5.5               | -40 to +105                | 0.6mA                 | 4digits×1line and col., AM, PM | TQFP48-0707-0.50 | —                                    | YES                                      |

\*1: Halogen-free models are available for products with the halogen free compatible mark "✓". Please contact a sales representative for further details.  
 \*2: Please contact a sales representative for details regarding AEC-Q100.

## VFD Driver series

(LAPIS Semiconductor products)

| Anode/Grid Driver for VFD           |                                |                         |                         |                            |                                                            |                                         |                  |                                      |                                          |
|-------------------------------------|--------------------------------|-------------------------|-------------------------|----------------------------|------------------------------------------------------------|-----------------------------------------|------------------|--------------------------------------|------------------------------------------|
| Part No.                            | No. of Driver Outputs          | Driving Target          | VFD Driving Voltage (V) | Power Supply type          | Operating Temperature (°C)                                 | Features                                | Package          | Halogen Free Supported <sup>*1</sup> | Automotive Grade Available <sup>*2</sup> |
| ML9271                              | 48                             | Anode/Grid              | 18                      | Positive supply            | −40 to +105                                                | Cascade connection                      | QFP64-1414-0.80  | —                                    | YES                                      |
| ML9272                              | 40                             | Anode/Grid              | 65                      | Positive supply            | −40 to +105                                                | Cascade connection                      | SSOP60-700-0.65  | ✓                                    | YES                                      |
| Controller Driver for Character VFD |                                |                         |                         |                            |                                                            |                                         |                  |                                      |                                          |
| Part No.                            | Display Pixels                 | VFD Driving Voltage (V) | Power Supply type       | Operating Temperature (°C) | Features                                                   |                                         | Package          | Halogen Free Supported <sup>*1</sup> | Automotive Grade Available <sup>*2</sup> |
| ML9286-xxGA                         | 5 x 7 Dots                     | 80                      | Positive supply         | −40 to +105                | Multigrid function/<br>8-bit gradation/ Cascade connection |                                         | QFP80-1414-0.65  | ✓                                    | YES                                      |
| ML9286-xxTB                         | 5 x 7 Dots                     | 80                      | Positive supply         | −40 to +105                | Multigrid function/<br>8-bit gradation/ Cascade connection |                                         | TQFP80-1212-0.50 | ✓                                    | YES                                      |
| Controller Drivers for Low Duty VFD |                                |                         |                         |                            |                                                            |                                         |                  |                                      |                                          |
| Part No.                            | Max. No. of Driving Segments   |                         | VFD Driving Voltage (V) | Power Supply type          | Operating Temperature (°C)                                 | Features                                | Package          | Halogen Free Supported <sup>*1</sup> | Automotive Grade Available <sup>*2</sup> |
| ML9212GA                            | 64 (1/2Duty)<br>96 (1/3Duty)   |                         | 18                      | Positive supply            | −40 to +85                                                 | 10-bit gradation/<br>Cascade connection | QFP56-910-0.65   | ✓                                    | YES                                      |
| ML9213GP                            | 112 (1/2Duty)<br>168 (1/3Duty) |                         | 18                      | Positive supply            | −40 to +85                                                 | 10-bit gradation/<br>Cascade connection | QFP80-1414-0.65  | ✓                                    | YES                                      |

\*1: Halogen-free models are available for products with the halogen free compatible mark "✓". Please contact a sales representative for further details.  
 \*2: Please contact a sales representative for details regarding AEC-Q100.

## Touch Screen Controller ICs

| Resistive type     |                    |           |            |                 |                       |                     |                      |                            |              |                                     |
|--------------------|--------------------|-----------|------------|-----------------|-----------------------|---------------------|----------------------|----------------------------|--------------|-------------------------------------|
| Part No.           | Supply Voltage (V) | MCU (bit) | Resolution | Touch Detection | Stand-by Current (μA) | Active Current (mA) | Host I/F             | Operating Temperature (°C) | Package (mm) | Automotive Grade Available AEC-Q100 |
| <b>BU21028FV-M</b> | 2.7 to 3.6         | —         | 4096×4096  | 2 point/1 point | 100                   | 0.8                 | I <sup>2</sup> C     | -40 to +85                 | SSOP-B20     | YES                                 |
| <b>BU21024FV-M</b> | 2.7 to 3.6         | 8         | 1024×1024  | 2 point/1 point | 60                    | 4                   | I <sup>2</sup> C/SPI | -40 to +85                 | SSOP-B28     | YES                                 |

## Accelerometer

(Kionix Product)

| 3-Axis Accelerometer         |      |                            |                              |                          |                                 |                                                                                                                                                                                                 |  | Automotive Grade Available AEC-Q100 |
|------------------------------|------|----------------------------|------------------------------|--------------------------|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------|
| Part No.                     | Axis | Full Scale Range           | I/F Output                   | Current Consumption (μA) | Size, No. of Pins, Package type | Features                                                                                                                                                                                        |  |                                     |
| <b>New</b> <b>KX123-6000</b> | 3    | User Selectable 2g, 4g, 8g | Digital SPI/I <sup>2</sup> C | 10 to 145                | 3×3×0.9mm, 16pin, LGA           | Supports AEC-100, Operating Temperature of -40 to +85°C, 2KB FIFO/ FILO Buffer, Broadband ODR Setting of 0.781 Hz to 25.6 kHz, Directional Tap/Double-Tap™, Free Fall, Device Posture Detection |  | YES*                                |

\* Model for Non-safety Vehicles  
 \* Directional Tap/Double-Tap™ is a trademark of Kionix Corporation.

## Car Communication IC(LSI)

## Transceiver

| LIN Transceivers    |                                 |                    |                            |                                         |                         |                                         |                               |                                     |                                     |
|---------------------|---------------------------------|--------------------|----------------------------|-----------------------------------------|-------------------------|-----------------------------------------|-------------------------------|-------------------------------------|-------------------------------------|
| Part No.            | Supported Standards             | Supply Voltage (V) | Operating Temperature (°C) | Absolute Maximum Voltage on LIN pin (V) | Baud Rates (Max.)(kbps) | Supply Current at Sleep Mode (Typ.)(μA) | Package                       | Automotive Grade Available AEC-Q100 |                                     |
| BD41030FJ-C         | LIN2.0, LIN2.1, LIN2.2, LIN2.2A | 5 to 27            | -40 to +125                | -27 to +40                              | 20                      | 3                                       | SOP-J8                        | YES                                 |                                     |
| BD41030HFN-C        | LIN2.0, LIN2.1, LIN2.2, LIN2.2A | 5 to 27            | -40 to +125                | -27 to +40                              | 20                      | 3                                       | HSOP8                         | YES                                 |                                     |
| CAN Transceivers    |                                 |                    |                            |                                         |                         |                                         |                               |                                     |                                     |
| Supported Standards | Supported Standards             | Supply Voltage (V) | Operating Temperature (°C) | Absolute Maximum Voltage on CAN pin (V) | Baud Rates (Max.)(Mbps) | Standby Current Consumption (Typ.)(μA)  | Package                       | Automotive Grade Available AEC-Q100 |                                     |
| BD41041FJ-C         | ISO 11898-2:2016                | 4.75 to 5.25       | -40 to +125                | -27.0 to +40.0                          | 1                       | 10                                      | SOP-J8                        | YES                                 |                                     |
| BD41044FJ-C         | ISO 11898-2:2016                | 4.75 to 5.25       | -40 to +125                | -27.0 to +40.0                          | 5                       | 10                                      | SOP-J8                        | YES                                 |                                     |
| CXPI Transceiver    |                                 |                    |                            |                                         |                         |                                         |                               |                                     |                                     |
| Part No.            | Supported Standards             | Supply Voltage (V) | Operating Temperature (°C) | Absolute Maximum Voltage on BUS pin (V) | Baud Rates (kbps)       | Supply Current at Sleep Mode (Typ.)(μA) | EMI                           | Package                             | Automotive Grade Available AEC-Q100 |
| BD41000AFJ-C        | JASO_D015_3                     | 7 to 18            | -40 to +125                | -27 to +40                              | 5 to 20                 | 3                                       | —                             | SOPJ-8                              | YES                                 |
| BD41001FJ-C         | JASO_D015_3                     | 7 to 18            | -40 to +125                | -27 to +40                              | 18.8 to 20.0            | 3                                       | Improved against BD41000AFJ-C | SOPJ-8                              | YES                                 |

## Car Communication IC(LSI)

### LVDS Interface ICs

#### LVDS Signal Conversion ICs

| Part No.                            | Function                | Input Signal type     | Output Signal type  | Clock Frequency (MHz)                        | Supply Voltage (V)         | Operating Temperature (°C) | Package               | Functional Safety | Automotive Grade Available AEC-Q100 |
|-------------------------------------|-------------------------|-----------------------|---------------------|----------------------------------------------|----------------------------|----------------------------|-----------------------|-------------------|-------------------------------------|
| <b>BU92T101</b>                     | Serializer              | LVC MOS (35bit)       | Open LDI (Data:5ch) | 15 to 174                                    | 3.0 to 3.3                 | -40 to +105                | Exposed-QFP64V 12mm□  | —                 | YES                                 |
| <b>BU92R101</b>                     | Deserializer            | Open LDI (Data : 5ch) | LVC MOS (35bit)     | 8 to 150                                     |                            |                            |                       | —                 | YES                                 |
| <b>BU92T82</b>                      | Serializer              | LVC MOS (56bit)       | Open LDI (Data:8ch) | 15 to 174                                    | 3.0 to 3.3                 | -40 to +105                | Exposed-QFP100V 14mm□ | —                 | YES                                 |
| <b>BU92RT82</b><br><b>BU92RT82A</b> | Serializer/Deserializer | Open LDI (Data:8ch)   |                     | 20 to 150(Single -In)<br>40 to 260(Dual -In) | 3.0 to 3.3                 | -40 to +105                | Exposed-QFP64V 12mm□  | —                 | YES                                 |
| ☆ <b>BU92RTF82</b>                  | Serializer/Deserializer | Open LDI (Data:8ch)   |                     | 20 to 150(Single -In)<br>40 to 240(Dual -In) | 3.0 to 3.3<br>1.35 to 1.65 | -40 to +105                | Exposed-QFP64V 12mm□  | Support           | YES                                 |

☆ : Under Development

### Timing Controllers

#### Timing Controller for FHD, WUXGA

| Part No.           | Supply Voltage (V)          | Input Signal type | Output Signal type | Input bits (bit) | Output bits (bit) | Clock Frequency (MHz) | Operating Temperature (°C) | Resolution      | Package   | Automotive Grade Available AEC-Q100 |
|--------------------|-----------------------------|-------------------|--------------------|------------------|-------------------|-----------------------|----------------------------|-----------------|-----------|-------------------------------------|
| <b>BU90AL210-M</b> | 2.3 to 3.6/<br>1.35 to 1.65 | LVDS Dual         | mini-LVDS Dual     | 8/6              | 8/6               | 20 to 240             | -40 to +105                | Up to 2880×1080 | HTQFP100V | YES                                 |
| <b>BU90AL211-M</b> | 2.3 to 3.6                  | LVDS Dual         | mini-LVDS Single   | 8/6              | 8/6               | 20 to 200             | -40 to +105                | Up to 1920×1200 | UQFP80    | YES                                 |

### Car Communication LSI

#### FM Data Broadcast Reception LSI

(LAPIS Semiconductor products)

#### FM Data Reception Tuner

| Part No.      | Features                                                                                                                               | Supply Voltage (V) | Supply Current (Max.)(mA) | Operating Temperature (°C) | Package               | Halogen Free Supported* | Automotive Grade Available* |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------|----------------------------|-----------------------|-------------------------|-----------------------------|
| <b>ML7174</b> | FM VICS® tuner, FM multiplexing demodulate LSI for VICS®, Built-in BPF, frame memory, and VICS® descrambler, Frames A, B, C, SPI slave | 3.0 to 3.6         | 85                        | -40 to +85                 | P-WQFN64-0909-0.50-63 | ✓                       | YES                         |
| <b>ML7183</b> | FM VICS® tuner & Filter LSI, BPF, I²C slave                                                                                            | 3.0 to 3.6         | 75                        | -40 to +85                 | P-WQFN64-0909-0.50-63 | ✓                       | YES                         |

#### FM multiplexing demodulate for VICS®

|               |                                                                                                                                        |            |    |            |                       |   |     |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------|------------|----|------------|-----------------------|---|-----|
| <b>ML7154</b> | VICS® compliant FM multiplexing demodulate LSI for VICS®, Built-in BPF, frame memory, and VICS® descrambler, Frames A, B, C, SPI slave | 3.0 to 3.6 | 28 | -40 to +85 | P-WQFN64-0909-0.50-63 | ✓ | YES |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------|------------|----|------------|-----------------------|---|-----|

VICS® is a registered trademark of the Vehicle Information and Communication System Center.

\*1: Halogen-free models are available for products with the halogen free compatible mark "✓". Please contact a sales representative for further details.

\*2: Please contact a sales representative for details regarding AEC-Q100.

## Monitoring ICs

### Multiple Input Switch Monitor ICs

#### 22ch Models

| Part No.                      | Supply Voltage (V)                          | Switch Input | Switch Input Voltage (V) | Wetting Current (mA)               | Operating Current Intermittent Monitoring 50ms(Max.)(μA) | Control I/F | Clock Frequency (MHz) | Operating Temperature (°C) | Package      | Automotive Grade Available AEC-Q100 |
|-------------------------------|---------------------------------------------|--------------|--------------------------|------------------------------------|----------------------------------------------------------|-------------|-----------------------|----------------------------|--------------|-------------------------------------|
| <b>BD3375MUV-M</b>            | 8.0 to 26.0(VPUA/VPUB)<br>3.1 to 5.25(VDDI) | 22           | -14 to +40               | 1/3/5/10/15<br>(Pull up/Pull down) | 100                                                      | SPI         | Up to 4.4             | -40 to +125                | VQFN48MCV070 | YES                                 |
| <b>BD3375KV-C</b>             | 8.0 to 26.0(VPUA/VPUB)<br>3.1 to 5.25(VDDI) | 22           | -14 to +40               | 1/3/5/10/15<br>(Pull up/Pull down) | 100                                                      | SPI         | Up to 4.4             | -40 to +125                | VQFP48C      | YES                                 |
| <b>New</b> <b>BD3378MUV-M</b> | 6.0 to 28(VPUA/VPUB)<br>3.1 to 5.25(VDDI)   | 22           | -14 to +40               | 1/3/5/10/15<br>(Pull up/Pull down) | 100                                                      | SPI         | Up to 4.4             | -40 to +125                | VQFN48MCV070 | YES                                 |

#### 33ch Models

|                               |                                             |    |            |                                    |     |     |           |             |              |     |
|-------------------------------|---------------------------------------------|----|------------|------------------------------------|-----|-----|-----------|-------------|--------------|-----|
| <b>New</b> <b>BD3380MUV-M</b> | 6.0 to 28.0(VPUA/VPUB)<br>3.1 to 5.25(VDDI) | 33 | -14 to +40 | 1/3/5/10/15<br>(Pull up/Pull down) | 110 | SPI | Up to 4.4 | -40 to +125 | VQFN48MDV070 | YES |
| <b>New</b> <b>BD3381EKV-C</b> | 6.0 to 28.0(VPUA/VPUB)<br>3.1 to 5.25(VDDI) | 33 | -14 to +40 | 1/3/5/10/15<br>(Pull up/Pull down) | 110 | SPI | Up to 4.4 | -40 to +125 | HTQFP64BV    | YES |

#### 10ch Models

|                    |                                             |    |            |                                    |     |     |           |             |              |     |
|--------------------|---------------------------------------------|----|------------|------------------------------------|-----|-----|-----------|-------------|--------------|-----|
| <b>BD3376MUV-M</b> | 8.0 to 26.0(VPUA/VPUB)<br>3.1 to 5.25(VDDI) | 10 | -14 to +40 | 1/3/5/10/15<br>(Pull up/Pull down) | 100 | SPI | Up to 4.4 | -40 to +125 | VQFN28SV5050 | YES |
| <b>BD3376EFV-C</b> | 8.0 to 26.0(VPUA/VPUB)<br>3.1 to 5.25(VDDI) | 10 | -14 to +40 | 1/3/5/10/15<br>(Pull up/Pull down) | 100 | SPI | Up to 4.4 | -40 to +125 | HTSSOP-B30   | YES |

## Audio &amp; Video

## Speech Synthesis LSI

(LAPIS Semiconductor products)

## Clock Synchronization Serial Interface, 4ch Simultaneous Playback, Speaker Amplifier Built in, Support for 105°C

| Part No.             | Operating Voltage (V) | Operating Frequency (MHz) | Operating Temperature (°C) | ROM Capacity (bit) | Number of Phrases | Maximum Playback Time (sec.) | CPU I/F                      | SP Amp Output (W)/ Class | Number of Mixing (Internal) (ch) | DAC (bit) | Others                                            | Package          | Halogen Free Supported* | Automotive Grade Available** |
|----------------------|-----------------------|---------------------------|----------------------------|--------------------|-------------------|------------------------------|------------------------------|--------------------------|----------------------------------|-----------|---------------------------------------------------|------------------|-------------------------|------------------------------|
| ML22572              | 2.7 to 5.5            | 4.096                     | -40 to +85                 | Mask 2M            | 1024              | 98*1                         | Clock Synchronization Serial | 1.0/AB-class             | 4                                | 16        | Fail safe                                         | P-SSOP30-56-0.65 | ✓                       | YES                          |
| ML22573/<br>ML22Q573 | 2.7 to 5.5            | 4.096                     | -40 to +85                 | Mask/Flash 4M      | 1024              | 201*1                        | Clock Synchronization Serial | 1.0/AB-class             | 4                                | 16        | Fail safe                                         | P-SSOP30-56-0.65 | ✓                       | YES                          |
| ML22Q553             | 4.5 to 5.5            | 4.096                     | -40 to +85                 | Flash 4M           | 1024              | 201*1                        | Clock Synchronization Serial | 1.0/AB-class             | 4                                | 16        | Speaker terminal short circuit detection function | P-SSOP30-56-0.65 | ✓                       | YES                          |

## Clock Synchronization Serial Interface Speaker Amplifier Built in

|                      |            |       |            |                 |    |      |                              |                  |   |    |                                                                                     |                  |   |     |
|----------------------|------------|-------|------------|-----------------|----|------|------------------------------|------------------|---|----|-------------------------------------------------------------------------------------|------------------|---|-----|
| ML22321/<br>ML22Q321 | 2.3 to 5.5 | 4.096 | -40 to +85 | Mask/Flash 920K | 62 | 43*1 | Clock Synchronization Serial | 1.0/<br>AB-class | 1 | 16 | Disconnection detection/<br>Temperature protection circuit<br>Analog volume control | P-SSOP30-56-0.65 | ✓ | YES |
|----------------------|------------|-------|------------|-----------------|----|------|------------------------------|------------------|---|----|-------------------------------------------------------------------------------------|------------------|---|-----|

## Clock Synchronization Serial Interface Class D Speaker Amplifier Built in

|          |            |                     |            |            |    |      |                              |             |   |   |                                                              |                    |   |     |
|----------|------------|---------------------|------------|------------|----|------|------------------------------|-------------|---|---|--------------------------------------------------------------|--------------------|---|-----|
| ML22Q374 | 2.0 to 5.5 | 4.096<br>(Built-in) | -40 to +85 | Flash 692K | 30 | 27*2 | Clock Synchronization Serial | 1.0/D-class | 1 | — | Disconnection/Short circuit<br>detection built-in oscillator | P-SSOP16-0225-0.65 | — | YES |
|----------|------------|---------------------|------------|------------|----|------|------------------------------|-------------|---|---|--------------------------------------------------------------|--------------------|---|-----|

I<sup>2</sup>C Interface/Class D Speaker Amplifier Built in

|          |            |                     |            |            |    |      |                  |             |   |   |                                                              |                    |   |     |
|----------|------------|---------------------|------------|------------|----|------|------------------|-------------|---|---|--------------------------------------------------------------|--------------------|---|-----|
| ML22Q394 | 2.0 to 5.5 | 4.096<br>(Built-in) | -40 to +85 | Flash 692K | 30 | 27*2 | I <sup>2</sup> C | 1.0/D-class | 1 | — | Disconnection/Short circuit<br>detection built-in oscillator | P-SSOP16-0225-0.65 | — | YES |
|----------|------------|---------------------|------------|------------|----|------|------------------|-------------|---|---|--------------------------------------------------------------|--------------------|---|-----|

## 4ch Simultaneous Playback, Built-in Mask ROM + Serial External Memory, Speaker Amplifier Built-in, Support for 105°C

|         |            |       |             |                                                   |                                                       |                                                                  |                              |                  |   |    |                                                   |                  |   |     |
|---------|------------|-------|-------------|---------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------|------------------------------|------------------|---|----|---------------------------------------------------|------------------|---|-----|
| ML22594 | 4.5 to 5.5 | 4.096 | -40 to +105 | Mask 6M <sup>†4</sup><br>External<br>maximum 128M | 1024 <sup>†5</sup><br>(Built-in 512,<br>External 512) | Built-in 303sec. <sup>†2</sup><br>External 109min. <sup>†2</sup> | Clock Synchronization Serial | 1.0/<br>AB-class | 4 | 16 | Speaker terminal short circuit detection function | P-SSOP30-56-0.65 | ✓ | YES |
|---------|------------|-------|-------------|---------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------|------------------------------|------------------|---|----|---------------------------------------------------|------------------|---|-----|

\*1: Maximum playback time when the sampling frequency is 6.4kHz in HQ-ADPCM. \*2: Maximum playback time when the sampling frequency is 6.4kHz in ADPCM2.

\*3: With an external memory module (Max. 128Mbit). Maximum playback time when the sampling frequency is 6.4kHz in HQ-ADPCM. \*4: Mask's built-in ROM is 6Mbit and an external memory module (Max. 128Mbit) can be connected.

\*5: Total of mask's internal 512 phrases and external memory's 512 phrases. \*6: Halogen-free models are available for products with the halogen free compatible mark "✓". Please contact a sales representative for further details.

\*7: Please contact a sales representative for details regarding AEC-Q100.

## Sound Processors

## Analog Sound Processors

| Part No.    | Supply Voltage (V)                  | Current Consumption (mA) | Input Selector |     | Input Gain (dB) | Volume (dB)       |                | Parametric EQ | Loudness | LPF/HPF for Sub Woofer | Mixing |     | Level Meter | Option              | Serial Interface     | Output Noise Voltage (μVrms) | Distortion (%) | Package  | Automotive Grade Available AEC-Q100 |
|-------------|-------------------------------------|--------------------------|----------------|-----|-----------------|-------------------|----------------|---------------|----------|------------------------|--------|-----|-------------|---------------------|----------------------|------------------------------|----------------|----------|-------------------------------------|
|             |                                     |                          | Single         | ISO |                 | (dB)              | No. of Outputs |               |          |                        | ATT    | ATT |             |                     |                      |                              |                |          |                                     |
| BD37033FV-M | 7 to 9.5                            | 31                       | 3/5            | 2/1 | 0 to +16        | +15 to -79,<br>-∞ | 6              | ✓             | ✓        | LPF                    | ✓      | ✓   | ✓           | —                   | I <sup>2</sup> C BUS | 5.5                          | 0.002          | SSOP-B28 | YES                                 |
| BD37034FV-M | 7 to 9.5<br>V <sub>CC</sub> L to 13 | 36                       | 3/5            | 2/1 | 0 to +16        | +15 to -79,<br>-∞ | 6              | ✓             | ✓        | LPF + HPF              | ✓      | ✓   | ✓           | High Voltage Output | I <sup>2</sup> C BUS | 6                            | 0.002          | SSOP-B28 | YES                                 |

## General-Purpose Electronic Volume with Built-in Advanced Switch

| Part No.    | Supply Voltage(V)                     | Current Consumption (mA) | Input Selector |           | Input Gain(dB)           | Fader Volume (dB)            | No. of Outputs | Mixing               |                             | Post Filter | High Voltage Output (dB) | Serial Interface     | Output Noise Voltage (μVrms) | Distortion (%) | Package  | Automotive Grade Available AEC-Q100 |
|-------------|---------------------------------------|--------------------------|----------------|-----------|--------------------------|------------------------------|----------------|----------------------|-----------------------------|-------------|--------------------------|----------------------|------------------------------|----------------|----------|-------------------------------------|
|             |                                       |                          | Single         | ISO       |                          |                              |                | No. of Channels (ch) | ATT (dB)                    |             |                          |                      |                              |                |          |                                     |
| BD34602FS-M | 7 to 9.5                              | 35                       | —              | —         | —                        | +23 to -79, -∞<br>(1dB/Step) | 6              | 3                    | +0 to -79, -∞<br>(1dB/Step) | —           | —                        | I <sup>2</sup> C BUS | 1.3                          | 0.0004         | SSOP-A24 | YES                                 |
| BD37067FV-M | 7 to 9.5                              | 37                       | 2/3/4/5        | 4/3/2/1   | +23 to -15<br>(1dB/Step) | +23 to -79, -∞<br>(1dB/Step) | 6              | 1                    | —                           | ✓           | —                        | I <sup>2</sup> C BUS | 8                            | 0.003          | SSOP-B40 | YES                                 |
| BD37068FV-M | 7 to 9.5<br>V <sub>CC</sub> L to 17.8 | 30/7                     | 1/2/3/4/5      | 5/4/3/2/1 | +23 to -15<br>(1dB/Step) | +23 to -79, -∞<br>(1dB/Step) | 6              | 1                    | —                           | ✓           | 0/8.3                    | I <sup>2</sup> C BUS | 23<br>(High-Voltage Mode)    | 0.003          | SSOP-B40 | YES                                 |
| BD37069FV-M | 7 to 9.5<br>V <sub>CC</sub> L to 17.8 | 30/7                     | 2/3/4/5        | 4/3/2/1   | +23 to -15<br>(1dB/Step) | +23 to -79, -∞<br>(1dB/Step) | 6              | 1                    | —                           | ✓           | 2/4.6/8.3                | I <sup>2</sup> C BUS | 23<br>(High-Voltage Mode)    | 0.003          | SSOP-B40 | YES                                 |

## Sound Processors with Built-In DSP/Codec

| Part No.         | AVDD Power Supply  |                          | DVDD Power Supply  |                          | Selector |          | ADC          |          | DAC          |          | Fader            |                | Distortion (%) | DSP Function                       | Serial Interface     | Package    | Automotive Grade Available AEC-Q100 |
|------------------|--------------------|--------------------------|--------------------|--------------------------|----------|----------|--------------|----------|--------------|----------|------------------|----------------|----------------|------------------------------------|----------------------|------------|-------------------------------------|
|                  | Supply Voltage (V) | Current Consumption (mA) | Supply Voltage (V) | Current Consumption (mA) | Analog   | Digital  | No. Built-in | S/N (dB) | No. Built-in | S/N (dB) | Attenuation (dB) | No. of Outputs |                |                                    |                      |            |                                     |
| New BD32105EFV-M | 4.75 to 6.00       | 72                       | 3.0 to 3.6         | 53                       | 5-system | 5-system | 2            | 100      | 5            | 100      | 0 to -79, -∞     | 4              | 0.007          | 13Band-PEQ<br>Time Alignment, etc. | I <sup>2</sup> C BUS | HTSSOP-B54 | YES                                 |
| New BD32107EFV-M | 4.75 to 6.00       | 72                       | 3.0 to 3.6         | 53                       | 5-system | 4-system | 2            | 100      | 6            | 100      | 0 to -79, -∞     | 6              | 0.007          | 13Band-PEQ<br>Time Alignment, etc. | I <sup>2</sup> C BUS | HTSSOP-B54 | YES                                 |

General-Purpose Electronic Volume with Built-in Advanced Switch: BD34602FS-M, BD37067FV-M, and BD37068FV-M are terminal compatible.

## Audio Amplifiers

## Automotive Monaural Speaker Amps

| Part No.         | Supply Voltage (V) | Thermal Resistance (°C/W) | Quiescent Circuit (mA) | Standby Current (μA) | Voltage Gain(dB)<br>:Po=0.5W | Output Power (W)<br>: VDD=5V, RL=8Ω,<br>THD=10%, 90s | THD+N(%)<br>:Po=1W        | Output Noise Voltage (μVrms) | Package  | Automotive Grade Available AEC-Q100 |
|------------------|--------------------|---------------------------|------------------------|----------------------|------------------------------|------------------------------------------------------|---------------------------|------------------------------|----------|-------------------------------------|
| New BD78306EFJ-M | 4.0 to 5.5         | 39.8                      | 2.5                    | 0.1                  | 6                            | 1.6                                                  | 0.05(Typ.)*1<br>0.5(Max.) | 15(Typ.)*1<br>100(Max.)      | HTSOP-J8 | YES                                 |
| New BD78308EFJ-M |                    |                           |                        |                      | 8                            |                                                      |                           |                              |          |                                     |
| New BD78310EFJ-M |                    |                           |                        |                      | 10                           |                                                      |                           |                              |          |                                     |
| New BD78312EFJ-M |                    |                           |                        |                      | 12                           |                                                      |                           |                              |          |                                     |
| New BD78314EFJ-M |                    |                           |                        |                      | 14                           |                                                      |                           |                              |          |                                     |
| New BD78316EFJ-M |                    |                           |                        |                      | 16                           |                                                      |                           |                              |          |                                     |
| New BD78318EFJ-M |                    |                           |                        |                      | 18                           |                                                      |                           |                              |          |                                     |
| New BD78320EFJ-M |                    |                           |                        |                      | 20                           |                                                      |                           |                              |          |                                     |
| New BD78322EFJ-M |                    |                           |                        |                      | 22                           |                                                      |                           |                              |          |                                     |
| New BD78324EFJ-M |                    |                           |                        |                      | 24                           |                                                      |                           |                              |          |                                     |
| New BD78326EFJ-M |                    |                           |                        |                      | 26                           |                                                      |                           |                              |          |                                     |

\*1: BD78306EFJ-M

## Image Correction

| Image Correction ICs for Panel |                      |                     |                      |                                 |                      |                                                  |                          |            |                  |         |                                     |
|--------------------------------|----------------------|---------------------|----------------------|---------------------------------|----------------------|--------------------------------------------------|--------------------------|------------|------------------|---------|-------------------------------------|
| Part No.                       | Supply Voltage(V)    |                     |                      | Image Data size                 | Control I/F          | Input/Output Digital Interface                   | Image quality adjustment | PWM Output | LVDS Transmitter | Package | Automotive Grade Available AEC-Q100 |
|                                | V <sub>DD</sub> Core | V <sub>DD</sub> I/O | V <sub>DD</sub> LVDS |                                 |                      |                                                  |                          |            |                  |         |                                     |
| BU1523KV                       | 1.65 to 1.95         | 3.0 to 3.6          | 3.0 to 3.6           | Supports up to WVGA + (864x480) | I <sup>2</sup> C BUS | 24bit RGB I/F<br>8bit YUV=4 : 2 : 2 ITU-R BT.656 | ✓                        | —          | ✓                | VQFP100 | —                                   |

| Video Encoder Built-in Image Correction |                      |                     |                  |                 |                                           |                                 |               |               |         |                                     |  |
|-----------------------------------------|----------------------|---------------------|------------------|-----------------|-------------------------------------------|---------------------------------|---------------|---------------|---------|-------------------------------------|--|
| Part No.                                | Supply Voltage(V)    |                     |                  | Image Data size | Control I/F                               | Input/Output Digital Interface  | Fog Reduction | Video Encoder | Package | Automotive Grade Available AEC-Q100 |  |
|                                         | V <sub>DD</sub> Core | V <sub>DD</sub> I/O | AV <sub>DD</sub> |                 |                                           |                                 |               |               |         |                                     |  |
| BU6521KV                                | 1.4 to 1.6           | 2.7 to 3.6          | 2.7 to 3.6       | ITU-R BT.656    | I <sup>2</sup> C BUS<br>Serial EEPROM I/F | 8bit YUV=4 : 2 : 2 ITU-R BT.656 | ✓             | ✓             | VQFP48C | YES                                 |  |

## Video LSIs

### Video Decoder

(LAPIS Semiconductor products)

| CVBS/S-video      |                    |                                                       |                      |                                          |                                              |                              |                  |                            |                     |                                      |                                          |
|-------------------|--------------------|-------------------------------------------------------|----------------------|------------------------------------------|----------------------------------------------|------------------------------|------------------|----------------------------|---------------------|--------------------------------------|------------------------------------------|
| Part No.          | Supply Voltage (V) | Input(Analog)                                         |                      | Output (Digital)                         | Pixel Frequency                              | Crystal Oscillator Supported | Features         | Operating Temperature (°C) | Package             | Halogen Free Supported <sup>*1</sup> | Automotive Grade Available <sup>*2</sup> |
|                   |                    | Terminal                                              | Type                 |                                          |                                              |                              |                  |                            |                     |                                      |                                          |
| <b>ML86101A</b>   | 3.3/1.5            | CVBS×4<br>or<br>CVBS×2 + S-video×1<br>or<br>S-video×2 | NTSC<br>PAL<br>SECAM | ITU-R BT.656<br>YUV 8bit                 | 12.2727MHz, 13.5MHz,<br>14.3181MHz, 14.75MHz | ✓                            | Simple,<br>Small | −40 to +85                 | P-TQFP48-0707-0.50  | ✓                                    | YES                                      |
| <b>ML86V7668A</b> | 3.3/2.5            | CVBS×4<br>or<br>CVBS×1<br>+ S-video×3                 | NTSC<br>PAL<br>SECAM | ITU-R BT.656<br>YUV 8/16bit<br>RGB 18bit | 12.2727MHz, 13.5MHz                          | —                            | RGB output       | −40 to +85                 | P-TQFP100-1414-0.50 | ✓                                    | YES                                      |

| CVBS/S-video/Component/RGB |         |                                            |                      |                          |                              |   |                                      |            |                    |   |     |
|----------------------------|---------|--------------------------------------------|----------------------|--------------------------|------------------------------|---|--------------------------------------|------------|--------------------|---|-----|
| <b>ML86V7675</b>           | 3.3/1.5 | CVBS×4<br>+(Comp or S-video)×1<br>+ Comp×1 | NTSC<br>PAL<br>SECAM | ITU-R BT.656<br>YUV 8bit | 7.9930MHz<br>to<br>33.333MHz | ✓ | WVGA,<br>EGA analog<br>RGB supported | −40 to +85 | P-TQFP64-1010-0.50 | ✓ | YES |

\*1: Halogen-free models are available for products with the halogen free compatible mark "✓". Please contact a sales representative for further details.  
 \*2: Please contact a sales representative for details regarding AEC-Q100.

### Video Encoder

(LAPIS Semiconductor products)

| CVBS              |                    |                                             |                 |             |                                              |                              |                                |                            |                    |                                      |                                          |
|-------------------|--------------------|---------------------------------------------|-----------------|-------------|----------------------------------------------|------------------------------|--------------------------------|----------------------------|--------------------|--------------------------------------|------------------------------------------|
| Part No.          | Supply Voltage (V) | Input (Digital)                             | Output (Analog) |             | Pixel Frequency                              | Crystal Oscillator Supported | Features                       | Operating Temperature (°C) | Package            | Halogen Free Supported <sup>*1</sup> | Automotive Grade Available <sup>*2</sup> |
|                   |                    |                                             | Terminal        | Type        |                                              |                              |                                |                            |                    |                                      |                                          |
| <b>ML86V76580</b> | 3.3/1.8            | ITU-R.BT.656<br>YUV 8bit                    | CVBS            | NTSC<br>PAL | 12.2727MHz, 13.5MHz,<br>14.3181MHz, 14.75MHz | —                            | 75Ω<br>drive                   | −40 to +85                 | P-TQFP48-0707-0.50 | ✓                                    | YES                                      |
| <b>ML86640</b>    | 3.3                | ITU-R BT.656<br>YUV 8/16/24bit<br>RGB 24bit | CVBS            | NTSC<br>PAL | 13.5MHz, 27MHz                               | —                            | 75Ω drive<br>P/I<br>conversion | −40 to +105                | P-TQFP48-0707-0.50 | ✓                                    | YES                                      |

| CVBS/S-video/Component/RGB |         |                                             |                              |             |                                                     |   |                        |            |                     |   |     |
|----------------------------|---------|---------------------------------------------|------------------------------|-------------|-----------------------------------------------------|---|------------------------|------------|---------------------|---|-----|
| <b>ML86V7655</b>           | 3.3/2.5 | ITU-R.BT.656<br>YUV 8/16/24bit<br>RGB 24bit | CVBS<br>S-video<br>Component | NTSC<br>PAL | 12.2727MHz, 13.5MHz,<br>14.3181MHz, 14.75MHz, 18MHz | — | I/P,<br>P/I conversion | −40 to +85 | P-TQFP100-1414-0.50 | ✓ | YES |

\*1: Halogen-free models are available for products with the halogen free compatible mark "✓". Please contact a sales representative for further details.  
 \*2: Please contact a sales representative for details regarding AEC-Q100.

### Video Interface

(LAPIS Semiconductor products)

| LVTTTL/LVDS/MIPI Video Interface  |                    |                                                                                                                                    |                                                                                                                                                                     |                                                                                                        |                            |                    |                                      |                                          |
|-----------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------|--------------------|--------------------------------------|------------------------------------------|
| Part No.                          | Supply Voltage (V) | Input                                                                                                                              | Output                                                                                                                                                              | Features                                                                                               | Operating Temperature (°C) | Package            | Halogen Free Supported <sup>*1</sup> | Automotive Grade Available <sup>*2</sup> |
| <div>New</div> <div>ML86795</div> | 3.3(1.8)/1.5       | ITU-R BT.656<br>YUV 8bit<br>Single/Dual LVDS<br>(RGB 18/24bit)<br>MIPI-CSI2 2ch<br>(RGB565/888,<br>YUV422-8bit)<br>1Gbps/Lane Max. | ITU-R BT.656<br>YUV 16bit<br>Single/Dual LVDS<br>(RGB 18/24bit)<br>MIPI-CSI2<br>(RGB565/888,<br>YUV422-8bit)<br>Two Virtual Channel<br>Supported<br>1Gbps/Lane Max. | LVTTTL/LVDS/MIPI-CSI2 I/F,<br>LVTTTL/LVDS/MIPI to LVTTTL/LVDS/<br>MIPI translate, MIPI Virtual Channel | −40 to +105                | P-WQFN64-0909-0.50 | ✓                                    | YES                                      |

\*1: Halogen-free models are available for products with the halogen free compatible mark "✓". Please contact a sales representative for further details.  
 \*2: Please contact a sales representative for details regarding AEC-Q100.

## Display Controller series for Small to Medium-sized TFT LCD

(LAPIS Semiconductor products)

| T-CON, Video Decoder, Scaler Included |                    |                                                           |                      |                                                                                                                                                        |                                                                                                                                     |                   |              |     |                                                                                                                                                                                                                                |                            |                          |                                      |                                          |
|---------------------------------------|--------------------|-----------------------------------------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------|--------------------------------------|------------------------------------------|
| Part No.                              | Supply Voltage (V) | Input(Analog)                                             |                      | Input (Digital)                                                                                                                                        | Output                                                                                                                              | Resolution        | OSD          | MCU | Features                                                                                                                                                                                                                       | Operating Temperature (°C) | Package                  | Halogen Free Supported <sup>*1</sup> | Automotive Grade Available <sup>*2</sup> |
|                                       |                    | Terminal                                                  | type                 |                                                                                                                                                        |                                                                                                                                     |                   |              |     |                                                                                                                                                                                                                                |                            |                          |                                      |                                          |
| ML86V8201                             | 3.3/1.5            | CVBS×2<br>or<br>S-video×1                                 | NTSC<br>PAL<br>SECAM | ITU-R BT.656<br>YUV 8/16/24bit<br>RGB 18/24bit                                                                                                         | ITU-R BT.656<br>YUV 8bit<br>RGB 18/24bit                                                                                            | QVGA to<br>WVGA   | Line         | —   | Rear camera function<br>Image quality<br>adjustment                                                                                                                                                                            | −40 to +85                 | P-TQFP100-<br>1414-0.50  | ✓                                    | YES                                      |
| ML86203                               | 3.3/1.5            | CVBS×1                                                    | NTSC<br>PAL          | ITU-R BT.656<br>YUV 8/16/24bit<br>RGB 18/24bit                                                                                                         | ITU-R BT.656<br>YUV 8bit<br>Single LVDS<br>(RGB 18/24bit)                                                                           | VGA to<br>WXGA    | —            | —   | WXGA panel support<br>Rear camera function<br>Image quality<br>adjustment                                                                                                                                                      | −40 to +85                 | P-TQFP80-<br>1010-0.40   | ✓                                    | YES                                      |
| ML86207                               | 3.3/1.5            | CVBS×2                                                    | NTSC<br>PAL          | ITU-R BT.656<br>YUV 8/16/24bit<br>RGB 18/24bit<br>+<br>Single LVDS<br>(RGB 18/24bit)                                                                   | ITU-R BT.656<br>YUV 8bit<br>RGB 18/24bit<br>Single LVDS<br>(RGB 18/24bit)                                                           | VGA to<br>WXGA    | Text<br>Line | —   | LVTT/LVDS I/F<br>Digital video input×2<br>WXGA panel support<br>Rear camera function<br>Image quality adjustment<br>OSD function                                                                                               | −40 to +85                 | P-TQFP100-<br>1414-0.50  | ✓                                    | YES                                      |
| ML86287                               | 3.3/1.5            | CVBS×2                                                    | NTSC<br>PAL          | ITU-R BT.656<br>YUV 8/16/24bit<br>RGB 18/24bit<br>+<br>Single LVDS<br>(RGB 18/24bit)                                                                   | ITU-R BT.656<br>YUV 8bit<br>RGB 18/24bit<br>Single LVDS<br>(RGB 18/24bit)                                                           | VGA to<br>WXGA    | Text<br>Line | —   | LVTT/LVDS I/F<br>Digital video input×2<br>WXGA panel support<br>Rear camera function<br>Picture in Picture<br>Image quality adjustment<br>OSD, ROM-OSD function                                                                | −40 to +85                 | P-TQFP128-<br>1414-0.40  | ✓                                    | YES                                      |
| ☆ML86209                              | 3.3/1.5            | CVBS<br>single×2<br>or<br>differential×1                  | NTSC<br>PAL          | ITU-R BT.656<br>ITU-R BT.1120 like<br>YUV 8/16bit<br>Single/Dual LVDS<br>(RGB 18/24bit)<br>MIPI-CS12<br>(RGB565/888,<br>YUV422-8bit)<br>1Gbps/Lane Max | ITU-R BT.656<br>or<br>MIPI-CS12<br>(RGB565/888,<br>YUV422-8bit)<br>1Gbps/Lane Max<br>+<br>Single/Dual LVDS<br>(RGB 18/24bit)        | VGA to<br>Full HD | Text<br>Line | —   | LVTT/LVDS<br>MIPI-CS12 I/F<br>Digital video input×4<br>Full HD panel support<br>Rear camera function<br>Image quality<br>adjustment<br>OSD, ROM-OSD<br>function                                                                | −40 to +85                 | P-TQFP128-<br>1414-0.40  | ✓                                    | YES                                      |
| ☆ML86289                              | 3.3/1.5            | CVBS<br>single×2<br>or<br>differential×1                  | NTSC<br>PAL          | ITU-R BT.656<br>ITU-R BT.1120 like<br>YUV 8/16bit<br>Single/Dual LVDS<br>(RGB 18/24bit)<br>MIPI-CS12<br>(RGB565/888,<br>YUV422-8bit)<br>1Gbps/Lane Max | ITU-R BT.656<br>or<br>MIPI-CS12<br>(RGB565/888,<br>YUV422-8bit)<br>1Gbps/Lane Max<br>+<br>Single/Dual LVDS<br>(RGB 18/24bit)        | VGA to<br>Full HD | Text<br>Line | —   | LVTT/LVDS<br>MIPI-CS12 I/F<br>Digital video input×4<br>Full HD panel support<br>Rear camera function<br>Picture in Picture<br>Image quality adjustment<br>OSD, ROM-OSD function                                                | −40 to +85                 | P-TQFP128-<br>1414-0.40  | ✓                                    | YES                                      |
| ML86V8202C                            | 3.3/1.8            | CVBS×2<br>+(Comp or S-video)×1<br>+Comp×1                 | NTSC<br>PAL<br>SECAM | ITU-R BT.656<br>YUV 8/16/24bit<br>RGB 18/24bit                                                                                                         | ITU-R BT.656 style<br>YUV 8/16/24bit<br>RGB 18/24bit                                                                                | QVGA to<br>WVGA   | —            | —   | Component video support<br>image quality adjustment                                                                                                                                                                            | −40 to +85                 | P-TQFP100-<br>1414-0.50  | ✓                                    | YES                                      |
| ML86240                               | 3.3/1.5            | CVBS×4<br>or<br>CVBS×2<br>+(Comp or S-video)×1<br>+Comp×1 | NTSC<br>PAL<br>SECAM | ITU-R BT.656<br>YUV 8/16/24bit<br>RGB 18/24bit 2ch                                                                                                     | ITU-R BT.656<br>YUV 8bit<br>RGB 18/24bit                                                                                            | QVGA to<br>WVGA   | Text<br>Line | —   | Component video support<br>Digital video input×2<br>Rear camera function<br>Image quality adjustment<br>OSD function                                                                                                           | −40 to +85                 | P-TFBGA144-<br>1111-0.80 | —                                    | YES                                      |
| ML86241                               | 3.3(1.8)/<br>1.5   | CVBS×4<br>or<br>CVBS×2<br>+(Comp or S-video)×1<br>+Comp×1 | NTSC<br>PAL<br>SECAM | ITU-R BT.656<br>YUV 8/16/24bit<br>RGB 18/24bit<br>+<br>Single LVDS<br>(RGB 18/24bit)                                                                   | ITU-R BT.656<br>YUV 8/16bit<br>+<br>RGB 18/24bit<br>YUV 16bit<br>Single LVDS<br>(RGB 18/24bit)                                      | QVGA to<br>WXGA   | Text<br>Line | —   | Component video support<br>LVTT/LVDS I/F<br>Digital video input×2<br>WXGA panel support<br>Rear camera function<br>Image quality adjustment<br>OSD, ROM-OSD function                                                           | −40 to +85                 | P-TFBGA144-<br>1111-0.80 | ✓                                    | YES                                      |
| ☆ML86243                              | 3.3/1.5            | CVBS<br>single×2<br>or<br>differential×1                  | NTSC<br>PAL          | *3<br>ITU-R BT.656<br>YUV 8/16bit<br>ITU-R BT.1120<br>like<br>YUV 8/16bit<br>Single/Dual LVDS<br>(YUV 8/16bit<br>RGB 18/24bit)                         | *3<br>ITU-R BT.656<br>(YUV 8/16bit<br>RGB 24bit)<br>Single/Dual LVDS<br>(RGB 18/24bit)<br>MIPI-CS12<br>(RGB565/888<br>YUV422-16bit) | QVGA to<br>WXGA   | Text<br>Line | —   | Multi Input/Output support<br>LVTT/LVDS/MIPI-CS12/<br>CVBS I/F<br>Rear camera function<br>Picture in Picture<br>Image quality adjustment<br>OSD, ROM-OSD function<br>State monitor function                                    | −40 to +85                 | P-TQFP128-<br>1414-0.40  | ✓                                    | YES                                      |
| ☆ML86245                              | 3.3/1.5            | —                                                         | —                    | *3<br>ITU-R BT.656<br>YUV 8/16bit<br>ITU-R BT.1120<br>like<br>YUV 8/16bit<br>Single/Dual LVDS<br>(YUV 8/16bit<br>RGB 18/24bit)                         | *3<br>ITU-R BT.656<br>(YUV 8/16bit<br>RGB 24bit)<br>Single/Dual LVDS<br>(RGB 18/24bit)<br>MIPI-CS12<br>(RGB565/888<br>YUV422-16bit) | QVGA to<br>WXGA   | Text<br>Line | —   | Multi Input/Output support<br>LVTT/LVDS/MIPI-<br>CS12 I/F<br>Rear camera function<br>Picture in Picture<br>Image quality adjustment<br>OSD, ROM-OSD function<br>State monitor function                                         | −40 to +85                 | P-TQFP128-<br>1414-0.40  | ✓                                    | YES                                      |
| ☆ML86321                              | 3.3/1.5            | CVBS<br>single×2<br>or<br>differential×1                  | NTSC<br>PAL          | ITU-R BT.656<br>ITU-R BT.1120<br>like<br>YUV 8/16bit<br>MIPI-CS12<br>(RGB565/888,<br>YUV422-8bit)<br>1Gbps/Lane Max                                    | Single LVDS<br>(RGB 18/24bit)<br>YUV 8/16bit                                                                                        | QVGA to<br>WXGA   | Text<br>Line | —   | Electronic rear-view mirror support<br>3-screen synthesis<br>Image correction function<br>(Angle/Aspherical/Keystone/<br>Lens distortion correction)<br>OSD, ROM-OSD function<br>(15windows, 1layer)<br>State monitor function | −40 to +85                 | P-TQFP128-<br>1414-0.40  | ✓                                    | YES                                      |

\*1: Halogen-free models are available for products with the halogen free compatible mark "✓". Please contact a sales representative for further details.

☆ : Under Development

\*2: Please contact a sales representative for details regarding AEC-Q100.

\*3: Please inquire with sales for input/output specification.

## Display Controller series for Small to Medium-sized TFT LCD

(LAPIS Semiconductor products)

| TCON, Image Adjustment Functions Included |                    |                             |                |                                                                                 |                                 |                                                                  |      |             |                                                                                                                                                                 |                            |                     |                                      |                                          |
|-------------------------------------------|--------------------|-----------------------------|----------------|---------------------------------------------------------------------------------|---------------------------------|------------------------------------------------------------------|------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------------------|--------------------------------------|------------------------------------------|
| Part No.                                  | Supply Voltage (V) | Input (Analog)              |                | Input (Digital)                                                                 | Output                          | Resolution                                                       | OSD  | MCU         | Features                                                                                                                                                        | Operating Temperature (°C) | Package             | Halogen Free Supported <sup>*1</sup> | Automotive Grade Available <sup>*2</sup> |
|                                           |                    | Terminal                    | Type           |                                                                                 |                                 |                                                                  |      |             |                                                                                                                                                                 |                            |                     |                                      |                                          |
| ML86V8101                                 | 3.3                | —                           | —              | RGB 18bit                                                                       | RGB 18bit                       | QVGA to QHD                                                      | —    | —           | Image quality adjustment                                                                                                                                        | −40 to +85                 | P-TQFP64-1010-0.50  | ✓                                    | YES                                      |
| ML86V8102                                 | 3.3                | —                           | —              | RGB 18/24bit                                                                    | RGB 18/24bit                    | QVGA to QHD                                                      | —    | —           | Image quality adjustment<br>RGB 24 bits supported                                                                                                               | −40 to +85                 | P-TQFP80-1010-0.40  | ✓                                    | YES                                      |
| ☆ML86173                                  | 3.3/1.5            | —                           | —              | ITU-R BT.656 YCbCr 8/10bit<br>RGB 18/24bit<br>Single/Dual LVDS (RGB 18/24bit)   | Single/Dual LVDS (RGB 18/24bit) | WVGA to H 2880(Max.)<br>V 1080(Max.)<br>(Pixel rate 160MHz Max.) | Text | —           | Image quality adjustment<br>OSD, ROM OSD function (30windows, 2layers)<br>Frequency conversion function<br>State monitor function                               | −40 to +85                 | P-TQFP100-1414-0.50 | ✓                                    | YES                                      |
| ☆ML86175                                  | 3.3/1.5            | —                           | —              | ITU-R BT.656 YUV 8/16bit<br>RGB 18/24bit<br>Single/Dual LVDS 4ch (RGB 18/24bit) | Single/Dual LVDS (RGB 18/24bit) | H 2048(Max.)<br>V 2048(Max.)<br>(Pixel rate 160MHz Max.)         | Text | —           | Image quality adjustment<br>90 degree rotation function<br>OSD, ROM OSD function (15windows, 1layer)<br>Frequency conversion function<br>State monitor function | −40 to +85                 | TQFP128-1414-0.40   | ✓                                    | YES                                      |
| Video Decoder, 8051MCU Included           |                    |                             |                |                                                                                 |                                 |                                                                  |      |             |                                                                                                                                                                 |                            |                     |                                      |                                          |
| ML86V8401                                 | 3.3/1.8            | CVBS×3 or CVBS×2 +S-video×1 | NTSC PAL SECAM | ITU-R BT.656 YUV 8/16/24bit<br>RGB 18/24bit                                     | ITU-R BT.656 RGB 18/24bit       | QVGA to WVGA                                                     | Text | 8051 (8bit) | System control<br>MCU installed                                                                                                                                 | −40 to +85                 | P-TQFP100-1414-0.50 | —                                    | YES                                      |

<sup>\*1</sup>: Halogen-free models are available for products with the halogen free compatible mark "✓". Please contact a sales representative for further details.

☆ : Under Development

<sup>\*2</sup>: Please contact a sales representative for details regarding AEC-Q100.

<sup>\*3</sup>: Please inquire with sales for input/output specification.

## EV/HEV

## Gate Drivers

### Isolated Gate Drivers

| Isolated Gate Drivers          |                               |                                         |                                         |                          |                     |                                |                            |                            |                                                                                                                                                                        |           |                                     |  |
|--------------------------------|-------------------------------|-----------------------------------------|-----------------------------------------|--------------------------|---------------------|--------------------------------|----------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------|--|
| Part No.                       | Input-side Supply Voltage (V) | Output-side Positive Supply Voltage (V) | Output-side Negative Supply Voltage (V) | Isolation Voltage (Vrms) | I/O Delay Time (ns) | Minimum Input Pulse Width (ns) | Maximum Output Current (A) | Operating Temperature (°C) | Function                                                                                                                                                               | Package   | Automotive Grade Available AEC-Q100 |  |
| <b>BM6101FV-C</b>              | 4.5 to 5.5                    | 14 to 24                                | −12 to 0                                | 2500                     | 350                 | 180                            | 3.0                        | −40 to +125                | Miller Clamp/Fail Output/Built-in under voltage lock out circuit/Thermal protection/Short-circuit protection/DESAT/Soft turn-off function for short-circuit protection | SSOP-B20W | YES                                 |  |
| <b>BM6102FV-C</b>              | 4.5 to 5.5                    | 14 to 20                                | —                                       | 2500                     | 200                 | 100                            | 3.0                        | −40 to +125                | Miller Clamp/Fail Output/Built-in under voltage lock out circuit/Thermal protection/Short-circuit protection/DESAT/Soft turn-off function for short-circuit protection | SSOP-B20W | YES                                 |  |
| <b>BM6104FV-C</b>              | 4.5 to 5.5                    | 10 to 24                                | −12 to 0                                | 2500                     | 150                 | 90                             | 3.0                        | −40 to +125                | Miller Clamp/Fail Output/Built-in under voltage lock out circuit/Short-circuit protection/DESAT/Soft turn-off function for short-circuit protection                    | SSOP-B20W | YES                                 |  |
| <b>New</b> <b>BM61S40RFV-C</b> | 4.5 to 5.5                    | 16 to 20                                | —                                       | 3750                     | 65                  | 60                             | 4.0                        | −40 to +125                | Miller Clamp/Built-in under voltage lock out circuit/Overvoltage protection                                                                                            | SSOP-B10W | YES                                 |  |
| <b>BM61S41RFV-C</b>            | 4.5 to 5.5                    | 16 to 24                                | —                                       | 3750                     | 65                  | 60                             | 4.0                        | −40 to +125                | Miller Clamp/Built-in under voltage lock out circuit                                                                                                                   | SSOP-B10W | YES                                 |  |
| <b>BM61M41RFV-C</b>            | 4.5 to 5.5                    | 9.0 to 24                               | —                                       | 3750                     | 65                  | 60                             | 4.0                        | −40 to +125                | Miller Clamp/Built-in under voltage lock out circuit                                                                                                                   | SSOP-B10W | YES                                 |  |

| Isolated Gate Drivers(with Flyback Controller) |                               |                                         |                                         |                             |                     |                                |                            |                            |                                                                                                                                                                                                           |           |                                     |  |
|------------------------------------------------|-------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------|---------------------|--------------------------------|----------------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------|--|
| Part No.                                       | Input-side Supply Voltage (V) | Output-side Positive Supply Voltage (V) | Output-side Negative Supply Voltage (V) | Isolation Resistance (Vrms) | I/O Delay Time (ns) | Minimum Input Pulse Width (ns) | Maximum Output Current (A) | Operating Temperature (°C) | Function                                                                                                                                                                                                  | Package   | Automotive Grade Available AEC-Q100 |  |
| <b>BM60051FV-C</b>                             | 4.5 to 24/<br>4.5 to 5.5      | 9.0 to 24                               | —                                       | 2500                        | 260                 | 180                            | 5.0                        | −40 to +125                | Miller Clamp/Fail Output/Built-in under voltage lock out circuit/Short-circuit protection/Soft turn-off function for short-circuit protection                                                             | SSOP-B28W | YES                                 |  |
| <b>New</b> <b>BM60052AFV-C</b>                 | 4.0 to 32                     | 10 to 20                                | −12 to 0                                | 2500                        | 120                 | 90                             | 3.0                        | −40 to +125                | Miller Clamp/Fail Output/Ready Output/Built-in under voltage lock out circuit/Thermal protection/DESAT/Soft turn-off function for DESAT                                                                   | SSOP-B28W | YES                                 |  |
| <b>New</b> <b>BM60054AFV-C</b>                 | 4.0 to 32                     | 10 to 20                                | −12 to 0                                | 2500                        | 120                 | 90                             | 3.0                        | −40 to +125                | Miller Clamp/Fail Output/Ready Output/Built-in under voltage lock out circuit/Thermal protection/Short-circuit protection/Soft turn-off function for short-circuit protection                             | SSOP-B28W | YES                                 |  |
| <b>BM60055FV-C</b>                             | 4.5 to 30                     | 9.0 to 24                               | —                                       | 2500                        | 250                 | 170                            | 5.0                        | −40 to +125                | Miller Clamp/Fail Output/Built-in under voltage lock out circuit/Thermal protection/Short current protection/Soft turn-off function for short current protection/Over current protection/2 Level Turn Off | SSOP-B28W | YES                                 |  |
| <b>New</b> <b>BM60056FV-C</b>                  | 6.0 to 30                     | 14 to 24                                | —                                       | 2500                        | 3000                | 3000                           | 1.5                        | −40 to +125                | Miller Clamp/Fail Output/Built-in under voltage lock out circuit/Temperature Monitor/Short current protection/Soft turn-off function for short current protection                                         | SSOP-B28W | YES                                 |  |

### Others

| IGBT/MOSFET High Side/Low Side Gate Driver |                               |                     |                     |                            |                |    |                            |           |                                     |  |  |  |
|--------------------------------------------|-------------------------------|---------------------|---------------------|----------------------------|----------------|----|----------------------------|-----------|-------------------------------------|--|--|--|
| Part No.                                   | Input-side Supply Voltage (V) | Floating Voltage(V) | I/O Delay Time (ns) | Minimum Output Current (A) | Dead Time (ns) | ch | Operating Temperature (°C) | Package   | Automotive Grade Available AEC-Q100 |  |  |  |
| <b>New</b> <b>BM60212FV-C</b>              | 10 to 24                      | 1,200               | 75                  | 3/−3                       | —              | 2  | −40 to +125                | SSOP-B20W | YES                                 |  |  |  |

| Non-insulated Gate Driver for BMS (LAPIS Semiconductor products) |                    |                              |                       |                        |                            |          |                                                   |  |  |  |  |  |
|------------------------------------------------------------------|--------------------|------------------------------|-----------------------|------------------------|----------------------------|----------|---------------------------------------------------|--|--|--|--|--|
| Part No.                                                         | Supply Voltage (V) | Gate Driving Voltage(V) Min. | Turn on Time(μs) Max. | Turn off Time(μs) Max. | Operating Temperature (°C) | Package  | Automotive Grade Available AEC-Q100 <sup>*1</sup> |  |  |  |  |  |
| ☆ <b>ML5810</b>                                                  | 6.5 to 64          | 10                           | 350                   | 70                     | −40 to +125                | TSSOP-20 | —                                                 |  |  |  |  |  |

<sup>\*1</sup>: Please contact a sales representative for details regarding AEC-Q100.

☆ : Under Development

## Temperature Monitor

| Isolated Temperature Monitor |                                 |                                 |                          |                                   |                                   |                        |                            |                         |                            |           |                                     |  |
|------------------------------|---------------------------------|---------------------------------|--------------------------|-----------------------------------|-----------------------------------|------------------------|----------------------------|-------------------------|----------------------------|-----------|-------------------------------------|--|
| Part No.                     | Supply Voltage <sup>1</sup> (V) | Supply Voltage <sup>2</sup> (V) | Isolation Voltage (Vrms) | Circuit Current <sup>1</sup> (mA) | Circuit Current <sup>2</sup> (mA) | Input Voltage Range(V) | Output Current Accuracy(%) | Output Duty Accuracy(%) | Operating Temperature (°C) | Package   | Automotive Grade Available AEC-Q100 |  |
| <b>BM66002FV-C</b>           | 9.0 to 24.0                     | 3.0 to 5.5                      | 2,500                    | 3.75                              | 0.2                               | 1.4 to 4.0             | ±2.0                       | ±2.0                    | −40 to +125                | SSOP-B20W | YES                                 |  |

## Standard

## Memory

### Legacy DRAM SDRAM

(LAPIS Semiconductor products)

| Automotive (85°C/95°C Supported) |                |                    |                       |                     |                               |                               |                                                        |                 |                     |                              |            |                                      |                                     |
|----------------------------------|----------------|--------------------|-----------------------|---------------------|-------------------------------|-------------------------------|--------------------------------------------------------|-----------------|---------------------|------------------------------|------------|--------------------------------------|-------------------------------------|
| Part No.                         | Data Rate type | Supply Voltage (V) | Memory Capacity (bit) | Number of Data bits | Configuration (bank×word×bit) | Max Operating Frequency (MHz) | Refresh Cycle (cycles/ms)                              | Cycle Time (ns) | Features            | Operating Temperature Ta(°C) | Package    | Halogen Free Supported <sup>1)</sup> | Automotive Grade Available AEC-Q100 |
| MSM56V16161NP-xxTFEX             | SDR            | 3.3±0.3            | 16M                   | ×16                 | 2×512K×16                     | 143                           | 4096/64                                                | 7/7.5/10        | Drivability Control | -40 to +85                   | TSOP(II)50 | ✓                                    | YES                                 |
| MD56V62161M-xxTAL42X             |                |                    | 64M                   |                     | 4×1M×16                       | 143                           |                                                        | 7/7.5/10        |                     |                              | TSOP(II)54 | ✓                                    | YES                                 |
| ☆MD56V62161R-xxTAL42X            |                |                    | 64M                   |                     | 4×1M×16                       | 166                           |                                                        | 6/7/7.5/10      |                     |                              |            |                                      |                                     |
| MD56V72161C-xxTAL42X             |                |                    | 128M                  |                     | 4×2M×16                       | 166                           |                                                        | 6/7/7.5/10      |                     |                              |            |                                      |                                     |
| MD56V82161A-xxTAL42X             |                |                    | 256M                  |                     | 4×4M×16                       | 166                           |                                                        | 6/7/7.5/10      |                     |                              |            |                                      |                                     |
| ☆MD60Y1G160A-xxLAL43L            | DDR3           | 1.5±0.075          | 1G                    | ×16                 | 8×8M×16                       | 800 (1600Mbps)                | Average Refresh Period: 7.8μs(Tc≤85°C), 3.9μs(Tc>85°C) | 1.25/1.5        | —                   | -40 to +95                   | TFBGA96    | ✓                                    | YES                                 |
| ☆MD60S1G160A-xxLAL43L            | DDR3L          | 1.35 +0.1, -0.067  | 1G                    | ×16                 | 8×8M×16                       | 800 (1600Mbps)                | Average Refresh Period: 7.8μs(Tc≤85°C), 3.9μs(Tc>85°C) | 1.25/1.5        | —                   | -40 to +95                   | TFBGA96    | ✓                                    | YES                                 |
| Automotive(Support for 105°C)    |                |                    |                       |                     |                               |                               |                                                        |                 |                     |                              |            |                                      |                                     |
| MD56V62161M-xxTALQ2X             | SDR            | 3.3±0.3            | 64M                   | ×16                 | 4×1M×16                       | 143                           | 4096/16                                                | 7/7.5/10        | Drivability Control | -40 to +105                  | TSOP(II)54 | ✓                                    | YES                                 |
| ☆MD56V62161R-xxTALQ2X            |                |                    | 64M                   |                     | 4×1M×16                       | 166                           |                                                        | 6/7/7.5/10      |                     |                              |            |                                      |                                     |
| MD56V72161C-xxTALQ2X             |                |                    | 128M                  |                     | 4×2M×16                       | 166                           |                                                        | 6/7/7.5/10      |                     |                              |            |                                      |                                     |
| MD56V82161A-xxTALQ2X             |                |                    | 256M                  |                     | 4×4M×16                       | 166                           |                                                        | 6/7/7.5/10      |                     |                              |            |                                      |                                     |
| ☆MD60Y1G160A-xxLALQ3L            | DDR3           | 1.5±0.075          | 1G                    | ×16                 | 8×8M×16                       | 800 (1600Mbps)                | Average Refresh Period: 7.8μs(Tc≤85°C), 3.9μs(Tc>85°C) | 1.25/1.5        | —                   | -40 to +105                  | TFBGA96    | ✓                                    | YES                                 |
| ☆MD60S1G160A-xxLALQ3L            | DDR3L          | 1.35 +0.1, -0.067  | 1G                    | ×16                 | 8×8M×16                       | 800 (1600Mbps)                | Average Refresh Period: 7.8μs(Tc≤85°C), 3.9μs(Tc>85°C) | 1.25/1.5        | —                   | -40 to +105                  | TFBGA96    | ✓                                    | YES                                 |

DDR 3: Double Data Rate 3 Synchronous DRAM, SDR: Single Data Rate Synchronous DRAM

\*1: Halogen-free models are available for products with the halogen free compatible mark "✓". Please contact a sales representative for further details.

☆ : Under Development

### SDRAM for SiP

(LAPIS Semiconductor Products)

| Automotive    |                    |               |                     |                               |                                |                           |                 |                              |          |                                          |
|---------------|--------------------|---------------|---------------------|-------------------------------|--------------------------------|---------------------------|-----------------|------------------------------|----------|------------------------------------------|
| Part No.      | Supply Voltage (V) | Density (bit) | Number of Data bits | Configuration (bank×word×bit) | Max. Operating Frequency (MHz) | Refresh Cycle (cycles/ms) | Cycle Time (ns) | Operating Temperature Tj(°C) | Features | Automotive Grade Available <sup>1)</sup> |
| MSM56V16160NP | 3.3±0.3            | 16M           | ×16                 | 2×512K×16                     | 143                            | 4096/16                   | 7/7.5/10        | -40 to +125                  | KGD      | YES                                      |
| MD56V62160M   |                    | 64M           |                     | 4×1M×16                       | 143                            |                           | 7/7.5/8/10      |                              |          |                                          |
| MD56V72160C   |                    | 128M          |                     | 4×2M×16                       | 166                            |                           | 6/7/7.5/10      |                              |          |                                          |

\*1: Please contact a sales representative for details regarding AEC-Q100.

### Video Memory for Automotive

(LAPIS Semiconductor products)

| Automotive         |                    |               |                               |                     |                                |                  |                 |                       |         |                              |                   |                                                                                                                     |                                      |                                          |
|--------------------|--------------------|---------------|-------------------------------|---------------------|--------------------------------|------------------|-----------------|-----------------------|---------|------------------------------|-------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------|
| Part No.           | Supply Voltage (V) | Density (bit) | Configuration (word×bit)×port | Number of Data bits | Max. Operating Frequency (MHz) | Access Time (ns) | Cycle Time (ns) | Power Consumption(mW) |         | Operating Temperature Ta(°C) | Package           | Remarks                                                                                                             | Halogen Free Supported <sup>1)</sup> | Automotive Grade Available <sup>2)</sup> |
|                    |                    |               |                               |                     |                                |                  |                 | Operating             | Standby |                              |                   |                                                                                                                     |                                      |                                          |
| MS81V26000-25TPZP3 | 3.3±0.3            | 26M           | 1,114,112×24                  | ×24                 | 40                             | 12               | 25              | 576                   | 18      | −40 to +85                   | TQFP100-1414-0.50 | Asynchronous serial read/write, Write mask function, Output data control, Cascade, The top address can be specified | ✓                                    | YES                                      |

\*1: Halogen-free models are available for products with the halogen free compatible mark "✓". Please contact a sales representative for further details.

\*2: Please contact a sales representative for details regarding AEC-Q100.

# Serial EEPROM

## Automotive EEPROM

### 105°C Operation I<sup>2</sup>C BUS EEPROM(2-Wire)BR24Axx-WM series

| Part No. | Package and Suffix |        |        | Capacity (bit) | Bit Format (word×bit) | Supply Voltage (V) | Current Consumption (Max.) |             | Write Cycle Time (Max.)(ms) | Operating Temperature (°C) | Endurance (times) | Data Retention (years) | Automotive Grade Available AEC-Q100 |
|----------|--------------------|--------|--------|----------------|-----------------------|--------------------|----------------------------|-------------|-----------------------------|----------------------------|-------------------|------------------------|-------------------------------------|
|          | SOP8               | SOP-J8 | MSOP8  |                |                       |                    | Operating (mA)             | Standby(μA) |                             |                            |                   |                        |                                     |
| BR24A01A | F-WM               | FJ-WM  | —      | 1K             | 128×8                 | 2.5 to 5.5         | 2                          | 2           | 5                           | -40 to +105                | 10 <sup>6</sup>   | 40                     | YES                                 |
| BR24A02  | F-WM               | FJ-WM  | FVM-WM | 2K             | 256×8                 | 2.5 to 5.5         | 2                          | 2           | 5                           |                            |                   |                        |                                     |
| BR24A04  | F-WM               | FJ-WM  | —      | 4K             | 512×8                 | 2.5 to 5.5         | 2                          | 2           | 5                           |                            |                   |                        |                                     |
| BR24A08  | F-WM               | FJ-WM  | —      | 8K             | 1K×8                  | 2.5 to 5.5         | 2                          | 2           | 5                           |                            |                   |                        |                                     |
| BR24A16  | F-WM               | FJ-WM  | —      | 16K            | 2K×8                  | 2.5 to 5.5         | 2                          | 2           | 5                           |                            |                   |                        |                                     |
| BR24A32  | F-WM               | —      | —      | 32K            | 4K×8                  | 2.5 to 5.5         | 3                          | 2           | 5                           |                            |                   |                        |                                     |
| BR24A64  | F-WM               | —      | —      | 64K            | 8K×8                  | 2.5 to 5.5         | 3                          | 2           | 5                           |                            |                   |                        |                                     |

### 85°C Operation I<sup>2</sup>C BUS EEPROM(2-Wire)BR24Txx-3AM series

| Part No. | Package and Suffix |        |          | Capacity (bit) | Bit Format (word×bit) | Supply Voltage (V) | Current Consumption (Max.) |             | Write Cycle Time (Max.)(ms) | Operating Temperature (°C) | Endurance (times) | Data Retention (years) | Automotive Grade Available AEC-Q100 |
|----------|--------------------|--------|----------|----------------|-----------------------|--------------------|----------------------------|-------------|-----------------------------|----------------------------|-------------------|------------------------|-------------------------------------|
|          | SOP8               | SOP-J8 | TSSOP-B8 |                |                       |                    | Operating (mA)             | Standby(μA) |                             |                            |                   |                        |                                     |
| BR24T512 | F-3AM              | FJ-3AM | FVT-3AM  | 512K           | 64K×8                 | 1.7 to 5.5         | 4.5                        | 3           | 5                           | -40 to +85                 | 10 <sup>6</sup>   | 40                     | YES                                 |
| BR24T1M  | F-3AM              | FJ-3AM | —        | 1M             | 128K×8                | 1.7 to 5.5         | 4.5                        | 3           | 5                           | -40 to +85                 | 10 <sup>6</sup>   | 40                     | YES                                 |

### 125°C Operation Microwire BUS EEPROM(3-Wire)BR93Hxx-2C series

| Part No. | Package and Suffix |        |          |         | Capacity (bit) | Bit Format (word×bit) | Supply Voltage (V) | Current Consumption (Max.) |             | Write Cycle Time (Max.)(ms) | Operating Temperature (°C) | Endurance (times) | Data Retention (years) | Automotive Grade Available AEC-Q100 |
|----------|--------------------|--------|----------|---------|----------------|-----------------------|--------------------|----------------------------|-------------|-----------------------------|----------------------------|-------------------|------------------------|-------------------------------------|
|          | SOP8               | SOP-J8 | TSSOP-B8 | MSOP8   |                |                       |                    | Operating (mA)             | Standby(μA) |                             |                            |                   |                        |                                     |
| BR93H46  | RF-2C              | RFJ-2C | RFVT-2C  | RFVM-2C | 1K             | 64×16                 | 2.5 to 5.5         | 3                          | 10          | 4                           | -40 to +125                | 10 <sup>6</sup>   | 100                    | YES                                 |
| BR93H56  | RF-2C              | RFJ-2C | RFVT-2C  | RFVM-2C | 2K             | 128×16                | 2.5 to 5.5         | 3                          | 10          | 4                           |                            |                   |                        |                                     |
| BR93H66  | RF-2C              | RFJ-2C | RFVT-2C  | RFVM-2C | 4K             | 256×16                | 2.5 to 5.5         | 3                          | 10          | 4                           |                            |                   |                        |                                     |
| BR93H76  | RF-2C              | RFJ-2C | RFVT-2C  | RFVM-2C | 8K             | 512×16                | 2.5 to 5.5         | 3                          | 10          | 4                           |                            |                   |                        |                                     |
| BR93H86  | RF-2C              | RFJ-2C | RFVT-2C  | RFVM-2C | 16K            | 1K×16                 | 2.5 to 5.5         | 3                          | 10          | 4                           |                            |                   |                        |                                     |

### 125°C Operation I<sup>2</sup>C BUS EEPROM(2-Wire)BR24Hxx-5AC series

| Part No. | Package and Suffix |        |          |         |               | Capacity (bit) | Bit Format (word×bit) | Supply Voltage (V) | Current Consumption (Max.) |             | Write Cycle Time (Max.)(ms) | Operating Temperature (°C) | Endurance (times) | Data Retention (years) | Automotive Grade Available AEC-Q100 |
|----------|--------------------|--------|----------|---------|---------------|----------------|-----------------------|--------------------|----------------------------|-------------|-----------------------------|----------------------------|-------------------|------------------------|-------------------------------------|
|          | SOP8               | SOP-J8 | TSSOP-B8 | MSOP8   | VSON008 X2030 |                |                       |                    | Operating (mA)             | Standby(μA) |                             |                            |                   |                        |                                     |
| BR24G32  | F-5AC              | FJ-5AC | FVT-5AC  | FVM-5AC | NUX-5AC       | 32K            | 4K×8                  | 1.7 to 5.5         | 2                          | 10          | 3.5                         | -40 to +125                | 40 <sup>6</sup>   | 100                    | YES                                 |
| BR24G64  | F-5AC              | FJ-5AC | FVT-5AC  | FVM-5AC | NUX-5AC       | 64K            | 8K×8                  | 1.7 to 5.5         | 2                          | 10          | 3.5                         |                            |                   |                        |                                     |
| BR24G128 | F-5AC              | FJ-5AC | FVT-5AC  | FVM-5AC | NUX-5AC       | 128K           | 16K×8                 | 1.7 to 5.5         | 2                          | 10          | 3.5                         |                            |                   |                        |                                     |
| BR24G256 | F-5AC              | FJ-5AC | FVT-5AC  | FVM-5AC | NUX-5AC       | 256K           | 32K×8                 | 1.7 to 5.5         | 2                          | 10          | 3.5                         |                            |                   |                        |                                     |

### 105°C Operation Microwire BUS EEPROM(3-Wire)BR93Axx-WM series

| Part No. | Package and Suffix |        |          |         | Capacity (bit) | Bit Format (word×bit) | Supply Voltage (V) | Current Consumption (Max.) |             | Write Cycle Time (Max.)(ms) | Operating Temperature (°C) | Endurance (times) | Data Retention (years) | Automotive Grade Available AEC-Q100 |
|----------|--------------------|--------|----------|---------|----------------|-----------------------|--------------------|----------------------------|-------------|-----------------------------|----------------------------|-------------------|------------------------|-------------------------------------|
|          | SOP8               | SOP-J8 | TSSOP-B8 | MSOP8   |                |                       |                    | Operating (mA)             | Standby(μA) |                             |                            |                   |                        |                                     |
| BR93A46  | RF-WM              | RFJ-WM | RFVT-WM  | RFVM-WM | 1K             | 64×16                 | 2.5 to 5.5         | 3                          | 2           | 5                           | -40 to +105                | 10 <sup>6</sup>   | 40                     | YES                                 |
| BR93A56  | RF-WM              | RFJ-WM | RFVT-WM  | RFVM-WM | 2K             | 128×16                | 2.5 to 5.5         | 3                          | 2           | 5                           |                            |                   |                        |                                     |
| BR93A66  | RF-WM              | RFJ-WM | RFVT-WM  | RFVM-WM | 4K             | 256×16                | 2.5 to 5.5         | 3                          | 2           | 5                           |                            |                   |                        |                                     |
| BR93A76  | RF-WM              | RFJ-WM | RFVT-WM  | RFVM-WM | 8K             | 512×16                | 2.5 to 5.5         | 3                          | 2           | 5                           |                            |                   |                        |                                     |
| BR93A86  | RF-WM              | RFJ-WM | RFVT-WM  | RFVM-WM | 16K            | 1K×16                 | 2.5 to 5.5         | 3                          | 2           | 5                           |                            |                   |                        |                                     |

### 125°C Operation SPI BUS EEPROM BR25Hxxx-2C series

|          |      |       |        |        |      |       |            |     |    |   |             |                 |     |     |
|----------|------|-------|--------|--------|------|-------|------------|-----|----|---|-------------|-----------------|-----|-----|
| BR25H010 | F-2C | FJ-2C | FVT-2C | FVM-2C | 1K   | 128×8 | 2.5 to 5.5 | 4   | 10 | 4 | -40 to +125 | 10 <sup>6</sup> | 100 | YES |
| BR25H020 | F-2C | FJ-2C | FVT-2C | FVM-2C | 2K   | 256×8 | 2.5 to 5.5 | 4   | 10 | 4 |             |                 |     |     |
| BR25H040 | F-2C | FJ-2C | FVT-2C | FVM-2C | 4K   | 512×8 | 2.5 to 5.5 | 4   | 10 | 4 |             |                 |     |     |
| BR25H080 | F-2C | FJ-2C | FVT-2C | FVM-2C | 8K   | 1K×8  | 2.5 to 5.5 | 4   | 10 | 4 |             |                 |     |     |
| BR25H160 | F-2C | FJ-2C | FVT-2C | FVM-2C | 16K  | 2K×8  | 2.5 to 5.5 | 4   | 10 | 4 |             |                 |     |     |
| BR25H320 | F-2C | FJ-2C | FVT-2C | FVM-2C | 32K  | 4K×8  | 2.5 to 5.5 | 4   | 10 | 4 |             |                 |     |     |
| BR25H640 | F-2C | FJ-2C | FVT-2C | —      | 64K  | 8K×8  | 2.5 to 5.5 | 5.5 | 10 | 4 |             |                 |     |     |
| BR25H128 | F-2C | FJ-2C | —      | —      | 128K | 16K×8 | 2.5 to 5.5 | 5.5 | 10 | 4 |             |                 |     |     |

### 125°C Operation SPI BUS EEPROM with ECC Function BR25Hxxx-2AC series

|          |       |        |         |         |      |       |            |     |    |   |             |                 |     |     |
|----------|-------|--------|---------|---------|------|-------|------------|-----|----|---|-------------|-----------------|-----|-----|
| BR25H640 | F-2AC | FJ-2AC | FVT-2AC | FVM-2AC | 64K  | 8K×8  | 2.5 to 5.5 | 5.5 | 10 | 4 | -40 to +125 | 10 <sup>6</sup> | 100 | YES |
| BR25H128 | F-2AC | FJ-2AC | FVT-2AC | —       | 128K | 16K×8 | 2.5 to 5.5 | 5.5 | 10 | 4 |             |                 |     |     |
| BR25H256 | F-2AC | FJ-2AC | —       | —       | 256K | 32K×8 | 2.5 to 5.5 | 5.5 | 10 | 4 |             |                 |     |     |

### 105°C Operation SPI BUS EEPROM BR25Axxx-3M series

|          |      |       |        |   |      |        |            |   |    |   |             |                 |     |     |
|----------|------|-------|--------|---|------|--------|------------|---|----|---|-------------|-----------------|-----|-----|
| BR25A256 | F-3M | FJ-3M | FVT-3M | — | 256K | 32K×8  | 2.5 to 5.5 | 4 | 10 | 5 | -40 to +105 | 10 <sup>6</sup> | 100 | YES |
| BR25A512 | F-3M | FJ-3M | FVT-3M | — | 512K | 64K×8  | 2.5 to 5.5 | 4 | 10 | 5 |             |                 |     |     |
| BR25A1M  | F-3M | FJ-3M | —      | — | 1M   | 128K×8 | 2.5 to 5.5 | 4 | 10 | 5 |             |                 |     |     |

## FeRAM

### Ferroelectric Memory

(LAPIS Semiconductor products)

| Parallel BUS FeRAM                          |               |                          |                    |                          |                              |                        |                              |           |                                      |                                          |
|---------------------------------------------|---------------|--------------------------|--------------------|--------------------------|------------------------------|------------------------|------------------------------|-----------|--------------------------------------|------------------------------------------|
| Part No.                                    | Density (bit) | Configuration (word×bit) | Supply Voltage (V) | Operating Speed          | Read/Write Endurance (times) | Data Retention (years) | Operating Temperature Ta(°C) | Package   | Halogen Free Supported <sup>*1</sup> | Automotive Grade Available <sup>*2</sup> |
| MR48V256C                                   | 256K          | 32K×8                    | 2.7 to 3.6         | t <sub>RC</sub> =150ns   | 10 <sup>13</sup>             | 10                     | −40 to +85                   | TSOP(I)28 | —                                    | YES                                      |
| I <sup>2</sup> C BUS FeRAM MR44Vxxxx series |               |                          |                    |                          |                              |                        |                              |           |                                      |                                          |
| MR44V064B                                   | 64K           | 8K×8                     | 1.8 to 3.6         | f <sub>clk</sub> =3.4MHz | 10 <sup>13</sup>             | 10                     | −40 to +85                   | SOP8      | ✓                                    | YES                                      |
| MR44V100A                                   | 1M            | 128K×8                   | 1.8 to 3.6         | f <sub>clk</sub> =3.4MHz |                              |                        |                              |           | ✓                                    |                                          |
| SPI BUS FeRAM MR45Vxxxx series              |               |                          |                    |                          |                              |                        |                              |           |                                      |                                          |
| MR45V032A                                   | 32K           | 4K×8                     | 2.7 to 3.6         | f <sub>clk</sub> =15MHz  | 10 <sup>13</sup>             | 10                     | −40 to +85                   | SOP8      | ✓                                    | YES                                      |
| MR45V064B                                   | 64K           | 8K×8                     | 1.8 to 3.6         | f <sub>clk</sub> =40MHz  |                              |                        |                              |           |                                      |                                          |
| MR45V256A                                   | 256K          | 32K×8                    | 3.0 to 3.6         | f <sub>clk</sub> =15MHz  |                              |                        |                              |           |                                      |                                          |
| MR45V100A                                   | 1M            | 128K×8                   | 1.8 to 3.6         | f <sub>clk</sub> =40MHz  |                              |                        |                              | SOP8      | ✓                                    | YES                                      |

<sup>1)</sup> Halogen-free models are available for products with the halogen free compatible mark "✓". Please contact a sales representative for further details.

<sup>2)</sup> Please contact a sales representative for details regarding AEC-Q100.

## Operational Amplifiers

### Standard Ground Sense Operational Amplifiers

| Ground Sense Operational Amplifiers                    |    |                    |                      |                           |                         |                            |                                         |                                         |                   |           |           |                  |                              |                            |            |                                     |
|--------------------------------------------------------|----|--------------------|----------------------|---------------------------|-------------------------|----------------------------|-----------------------------------------|-----------------------------------------|-------------------|-----------|-----------|------------------|------------------------------|----------------------------|------------|-------------------------------------|
| Part No.                                               | ch | Supply Voltage (V) | Circuit Current (mA) | Input Offset Voltage (mV) | Input Bias Current (nA) | Output Source Current (mA) | Input Voltage (V)                       | Output Voltage (V)                      | Voltage Gain (dB) | CMRR (dB) | PSRR (dB) | Slew Rate (V/μs) | Gain Bandwidth Product (MHz) | Operating Temperature (°C) | Package    | Automotive Grade Available AEC-Q100 |
| BA2904YF-C                                             | 2  | 3 to 36            | 0.5                  | 2.0                       | 20                      | 30                         | V <sub>EE</sub> to V <sub>CC</sub> −1.5 | V <sub>EE</sub> to V <sub>CC</sub> −1.5 | 100               | 80        | 100       | 0.2              | 0.5                          | −40 to +125                | SOP8       | YES                                 |
| BA2904YFV-C                                            |    |                    |                      |                           |                         |                            |                                         |                                         |                   |           |           |                  |                              |                            | SSOP-B8    | YES                                 |
| BA2904YFVM-C                                           |    |                    |                      |                           |                         |                            |                                         |                                         |                   |           |           |                  |                              |                            | MSOP8      | YES                                 |
| BA2902YF-C                                             | 4  | 3 to 36            | 0.7                  | 2.0                       | 20                      | 30                         | V <sub>EE</sub> to V <sub>CC</sub> −1.5 | V <sub>EE</sub> to V <sub>CC</sub> −1.5 | 100               | 80        | 100       | 0.2              | 0.5                          | −40 to +125                | SOP14      | YES                                 |
| BA2902YFV-C                                            |    |                    |                      |                           |                         |                            |                                         |                                         |                   |           |           |                  |                              |                            | SSOP-B14   | YES                                 |
| BA2904YF-M                                             | 2  | 3 to 36            | 0.5                  | 2.0                       | 20                      | 30                         | V <sub>EE</sub> to V <sub>CC</sub> −1.5 | V <sub>EE</sub> to V <sub>CC</sub> −1.5 | 100               | 80        | 100       | 0.2              | 0.5                          | −40 to +125                | SOP8       | YES                                 |
| BA2904YFV-M                                            |    |                    |                      |                           |                         |                            |                                         |                                         |                   |           |           |                  |                              |                            | SSOP-B8    | YES                                 |
| BA2904YFVM-M                                           |    |                    |                      |                           |                         |                            |                                         |                                         |                   |           |           |                  |                              |                            | MSOP8      | YES                                 |
| BA2902YF-M                                             | 4  | 3 to 36            | 0.7                  | 2.0                       | 20                      | 30                         | V <sub>EE</sub> to V <sub>CC</sub> −1.5 | V <sub>EE</sub> to V <sub>CC</sub> −1.5 | 100               | 80        | 100       | 0.2              | 0.5                          | −40 to +125                | SOP14      | YES                                 |
| BA2902YFV-M                                            |    |                    |                      |                           |                         |                            |                                         |                                         |                   |           |           |                  |                              |                            | SSOP-B14   | YES                                 |
| High EMI Tolerance Ground Sense Operational Amplifiers |    |                    |                      |                           |                         |                            |                                         |                                         |                   |           |           |                  |                              |                            |            |                                     |
| BA82904YF-C                                            | 2  | 3 to 36            | 0.5                  | 2.0                       | 20                      | 30                         | V <sub>EE</sub> to V <sub>CC</sub> −1.5 | V <sub>EE</sub> to V <sub>CC</sub> −1.5 | 100               | 80        | 100       | 0.2              | 0.5                          | −40 to +125                | SOP8       | YES                                 |
| BA82904YFVM-C                                          |    |                    |                      |                           |                         |                            |                                         |                                         |                   |           |           |                  |                              |                            | MSOP8      | YES                                 |
| BA82902YF-C                                            | 4  | 3 to 36            | 0.7                  | 2.0                       | 20                      | 30                         | V <sub>EE</sub> to V <sub>CC</sub> −1.5 | V <sub>EE</sub> to V <sub>CC</sub> −1.5 | 100               | 80        | 100       | 0.2              | 0.5                          | −40 to +125                | SOP14      | YES                                 |
| BA82902YFJ-C                                           |    |                    |                      |                           |                         |                            |                                         |                                         |                   |           |           |                  |                              |                            | SOP-J14    | YES                                 |
| BA82902YFV-C                                           |    |                    |                      |                           |                         |                            |                                         |                                         |                   |           |           |                  |                              |                            | SSOP-B14   | YES                                 |
| BA82902YFVJ-C                                          |    |                    |                      |                           |                         |                            |                                         |                                         |                   |           |           |                  |                              |                            | TSSOP-B14J | YES                                 |

### High Speed Ground Sense Operational Amplifiers

| Ground Sense Operational Amplifiers |                     |                    |                      |                           |                         |                     |                                         |                                              |                  |           |           |                  |                              |                            |          |                                     |
|-------------------------------------|---------------------|--------------------|----------------------|---------------------------|-------------------------|---------------------|-----------------------------------------|----------------------------------------------|------------------|-----------|-----------|------------------|------------------------------|----------------------------|----------|-------------------------------------|
| Part No.                            | No. of Channel (ch) | Supply Voltage (V) | Circuit Current (mA) | Input Offset Voltage (mV) | Input Bias Current (nA) | Output Current (mA) | Input Voltage Range(V)                  | Output Voltage Range(V)                      | Voltage Gain(dB) | CMRR (dB) | PSRR (dB) | Slew Rate (V/μs) | Gain Bandwidth Product (MHz) | Operating Temperature (°C) | Package  | Automotive Grade Available AEC-Q100 |
| <b>BA3472YF-C</b>                   | 2                   | 3 to 36            | 4.0                  | 1.0                       | 100                     | 30                  | V <sub>EE</sub> to V <sub>CC</sub> −2.0 | V <sub>EE</sub> +0.3 to V <sub>CC</sub> -1.0 | 100              | 97        | 97        | 10               | 4.0                          | −40 to +125                | SOP8     | YES                                 |
| <b>BA3472YFV-C</b>                  |                     |                    |                      |                           |                         |                     |                                         |                                              |                  |           |           |                  |                              |                            | SSOP-B8  | YES                                 |
| <b>BA3472YFVM-C</b>                 |                     |                    |                      |                           |                         |                     |                                         |                                              |                  |           |           |                  |                              |                            | MSOP8    | YES                                 |
| <b>BA3472WFFV-C</b>                 |                     |                    |                      |                           |                         |                     |                                         |                                              |                  |           |           |                  |                              |                            | SSOP-B8  | YES                                 |
| <b>BA3474WFFV-C</b>                 | 4                   | 3 to 36            | 8.0                  | 1.0                       | 100                     | 30                  | V <sub>EE</sub> to V <sub>CC</sub> −2.0 | V <sub>EE</sub> +0.3 to V <sub>CC</sub> -1.0 | 100              | 97        | 97        | 10               | 4.0                          | −40 to +125                | SSOP-B14 | YES                                 |
| <b>BA3474YFV-C</b>                  |                     |                    |                      |                           |                         |                     |                                         |                                              |                  |           |           |                  |                              |                            | SSOP-B14 | YES                                 |

### Low Current Consumption

| Input-Output Full Swing Operational Amplifiers |    |                    |                      |                           |                         |                     |                                    |                                                |                   |           |           |                  |                              |                            |          |                                     |
|------------------------------------------------|----|--------------------|----------------------|---------------------------|-------------------------|---------------------|------------------------------------|------------------------------------------------|-------------------|-----------|-----------|------------------|------------------------------|----------------------------|----------|-------------------------------------|
| Part No.                                       | ch | Supply Voltage (V) | Circuit Current (μA) | Input Offset Voltage (mV) | Input Bias Current (nA) | Output Current (mA) | Input Voltage Range (V)            | Output Voltage Range (V)                       | Voltage Gain (dB) | CMRR (dB) | PSRR (dB) | Slew Rate (V/μs) | Gain Bandwidth Product (MHz) | Operating Temperature (°C) | Package  | Automotive Grade Available AEC-Q100 |
| <b>BU7241YG-C</b>                              | 1  | 1.8 to 5.5         | 70                   | 1.0                       | 0.001                   | 10                  | V <sub>SS</sub> to V <sub>DD</sub> | V <sub>SS</sub> +0.05 to V <sub>DD</sub> -0.05 | 100               | 70        | 80        | 0.4              | 1.0                          | −40 to +125                | SSOP5    | YES                                 |
| <b>BU7242YFVM-C</b>                            | 2  | 1.8 to 5.5         | 180                  | 1.0                       | 0.001                   | 10                  | V <sub>SS</sub> to V <sub>DD</sub> | V <sub>SS</sub> +0.05 to V <sub>DD</sub> -0.05 | 100               | 70        | 80        | 0.4              | 1.0                          | −40 to +125                | MSOP8    | YES                                 |
| <b>New</b> <b>BU7244YFV-C</b>                  | 4  | 1.8 to 5.5         | 360                  | 1.0                       | 0.001                   | 10                  | V <sub>SS</sub> to V <sub>DD</sub> | V <sub>SS</sub> +0.05 to V <sub>DD</sub> -0.05 | 100               | 70        | 80        | 0.4              | 1.0                          | −40 to +125                | SSOP-B14 | YES                                 |

## Low Noise

### Operational Amplifiers

| Part No.            | ch | Supply Voltage (V) | Circuit Current (mA) | Input Offset Voltage (mV) | Input Bias Current (nA) | Input Referred Noise Voltage (μVrms) | Input Voltage Range (V) | Output Voltage Range (V) | Voltage Gain (dB) | CMRR (dB) | PSRR (dB) | Slew Rate (V/μs) | Gain Bandwidth Product (MHz) | Operating Temperature (°C) | Package  | Automotive Grade Available AEC-Q100 |
|---------------------|----|--------------------|----------------------|---------------------------|-------------------------|--------------------------------------|-------------------------|--------------------------|-------------------|-----------|-----------|------------------|------------------------------|----------------------------|----------|-------------------------------------|
| <b>BA4558YF-M</b>   | 2  | ±4 to ±15          | 3.0                  | 0.5                       | 60                      | 1.8                                  | VEE+1.0 to VCC-1.0      | VEE+1.0 to VCC-1.0       | 100               | 90        | 90        | 1.0              | 2.0                          | -40 to +105                | SOP8     | YES                                 |
| <b>BA4558YFV-M</b>  |    |                    |                      |                           |                         |                                      |                         |                          |                   |           |           |                  |                              |                            | SSOP-B8  | YES                                 |
| <b>BA4558YFVM-M</b> |    |                    |                      |                           |                         |                                      |                         |                          |                   |           |           |                  |                              |                            | MSOP8    | YES                                 |
| <b>BA4560YF-M</b>   | 2  | ±4 to ±15          | 3.0                  | 0.5                       | 50                      | 1.0                                  | VEE+1.0 to VCC-1.0      | VEE+1.0 to VCC-1.0       | 100               | 90        | 90        | 4.0              | 4.0                          | -40 to +105                | SOP8     | YES                                 |
| <b>BA4560YFV-M</b>  |    |                    |                      |                           |                         |                                      |                         |                          |                   |           |           |                  |                              |                            | SSOP-B8  | YES                                 |
| <b>BA4560YFVM-M</b> |    |                    |                      |                           |                         |                                      |                         |                          |                   |           |           |                  |                              |                            | MSOP8    | YES                                 |
| <b>BA4580YF-M</b>   | 2  | ±2 to ±16          | 6.0                  | 0.3                       | 100                     | 0.8                                  | VEE+1.5 to VCC-1.5      | VEE+1.5 to VCC-1.5       | 110               | 110       | 110       | 5.0              | 10.0                         | -40 to +105                | SOP8     | YES                                 |
| <b>BA4580YFVM-M</b> |    |                    |                      |                           |                         |                                      |                         |                          |                   |           |           |                  |                              |                            | MSOP8    | YES                                 |
| <b>BA4584YFV-M</b>  | 4  | ±2 to ±16          | 11.0                 | 0.3                       | 100                     | 0.8                                  | VEE+1.5 to VCC-1.5      | VEE+1.5 to VCC-1.5       | 110               | 110       | 110       | 5.0              | 10.0                         | -40 to +105                | SSOP-B14 | YES                                 |

## Comparators

### Standard

#### Open-Collector Comparators

| Part No.            | ch | Supply Voltage (V) | Consumption Current (mA) | Input Offset Voltage (mV) | Input Bias Current (nA) | Output Current (mA) | Input Voltage Range (V) | Voltage Gain (dB) | Response Time (μs) | Operating Temperature (°C) | Package  | Automotive Grade Available AEC-Q100 |
|---------------------|----|--------------------|--------------------------|---------------------------|-------------------------|---------------------|-------------------------|-------------------|--------------------|----------------------------|----------|-------------------------------------|
| <b>BA2903YF-C</b>   | 2  | 2 to 36            | 0.6                      | 2                         | 50                      | 16                  | VEE to VCC -1.5         | 100               | 1.3                | -40 to +125                | SOP8     | YES                                 |
| <b>BA2903YFV-C</b>  |    |                    |                          |                           |                         |                     |                         |                   |                    |                            | SSOP-B8  | YES                                 |
| <b>BA2903YFVM-C</b> |    |                    |                          |                           |                         |                     |                         |                   |                    |                            | MSOP8    | YES                                 |
| <b>BA2901YF-C</b>   | 4  | 2 to 36            | 0.8                      | 2                         | 50                      | 16                  | VEE to VCC -1.5         | 100               | 1.3                | -40 to +125                | SOP14    | YES                                 |
| <b>BA2901YFV-C</b>  |    |                    |                          |                           |                         |                     |                         |                   |                    |                            | SSOP-B14 | YES                                 |
| <b>BA2903YF-M</b>   | 2  | 2 to 36            | 0.6                      | 2                         | 50                      | 16                  | VEE to VCC -1.5         | 100               | 1.3                | -40 to +125                | SOP8     | YES                                 |
| <b>BA2903YFV-M</b>  |    |                    |                          |                           |                         |                     |                         |                   |                    |                            | SSOP-B8  | YES                                 |
| <b>BA2903YFVM-M</b> |    |                    |                          |                           |                         |                     |                         |                   |                    |                            | MSOP8    | YES                                 |
| <b>BA2901YF-M</b>   | 4  | 2 to 36            | 0.8                      | 2                         | 50                      | 16                  | VEE to VCC -1.5         | 100               | 1.3                | -40 to +125                | SOP14    | YES                                 |
| <b>BA2901YFV-M</b>  |    |                    |                          |                           |                         |                     |                         |                   |                    |                            | SSOP-B14 | YES                                 |

#### High EMI Tolerance Open-Collector Comparators

| Part No.             | Product Grade | ch | Supply Voltage (V) | Circuit Current (mA) | Input Offset Voltage (mV) | Input Bias Current (nA) | Output Current (mA) | Input Voltage Range (V) | Voltage Gain (dB) | Response Time (μs) | Operating Temperature (°C) | Package  | Automotive Grade Available AEC-Q100 |
|----------------------|---------------|----|--------------------|----------------------|---------------------------|-------------------------|---------------------|-------------------------|-------------------|--------------------|----------------------------|----------|-------------------------------------|
| <b>BA82903YF-C</b>   | ●             | 2  | 2 to 36            | 0.6                  | 2                         | 50                      | 16                  | VEE -0.3 to VCC -1.5    | 100               | 1.3                | -40 to +125                | SOP8     | YES                                 |
| <b>BA82903YFVM-C</b> | ●             |    |                    |                      |                           |                         |                     |                         |                   |                    |                            | MSOP8    | YES                                 |
| <b>BA82901YF-C</b>   | ●             | 4  | 2 to 36            | 0.8                  | 2                         | 50                      | 16                  | VEE -0.3 to VCC -1.5    | 100               | 1.3                | -40 to +125                | SOP14    | YES                                 |
| <b>BA82901YFV-C</b>  | ●             |    |                    |                      |                           |                         |                     |                         |                   |                    |                            | SSOP-B14 | YES                                 |

Product Grade : ●...Automotive Grade

## Low Current Consumption

#### Push Pull Comparator

| Part No.              | Product Grade | ch | Supply Voltage (V) | Circuit Current (μA) | Input Offset Voltage (mV) | Input Bias Current (nA) | Output Current (mA) | Input Voltage Range (V) | Voltage Gain (dB) | Response Time (μs) | Operating Temperature (°C) | Package | Automotive Grade Available AEC-Q100 |
|-----------------------|---------------|----|--------------------|----------------------|---------------------------|-------------------------|---------------------|-------------------------|-------------------|--------------------|----------------------------|---------|-------------------------------------|
| ☆ <b>BU7232YFVM-C</b> | ●             | 2  | 1.8 to 5.5         | 10                   | 1                         | 0.001                   | 7                   | VSS to VDD              | 100               | 1.7                | -40 to +125                | MSOP8   | YES                                 |

#### Open-Drain Comparators

| Part No.          | ch | Supply Voltage (V) | Circuit Current (μA) | Input Offset Voltage (mV) | Input Bias Current (nA) | Output Current (mA) | Input Voltage Range (V) | Voltage Gain (dB) | Response Time (μs) | Operating Temperature (°C) | Package | Automotive Grade Available AEC-Q100 |
|-------------------|----|--------------------|----------------------|---------------------------|-------------------------|---------------------|-------------------------|-------------------|--------------------|----------------------------|---------|-------------------------------------|
| <b>BU7233YF-C</b> | 2  | 1.8 to 5.5         | 10                   | 1                         | 0.001                   | 7                   | VSS to VDD              | 100               | 1.8                | -40 to +125                | SOP8    | YES                                 |

☆ : Under Development

## Voltage Detectors (Reset ICs)

### Over Voltage Detectors(Reset ICs)

#### Over Voltage Detector ICs(125°C Supported)

| Part No.                      | Types             | Voltage Detection Precision Within The Full Temperature Range (%) | Detection Voltage (V) | Reset Active Voltage (V) | Detection Step (V) | Output Method | Circuit Current(μA) |     | Hysteresis Voltage (V) | *L*Output Current(mA) |                       | Package | Automotive Grade Available AEC-Q100 |
|-------------------------------|-------------------|-------------------------------------------------------------------|-----------------------|--------------------------|--------------------|---------------|---------------------|-----|------------------------|-----------------------|-----------------------|---------|-------------------------------------|
|                               |                   |                                                                   |                       |                          |                    |               | ON                  | OFF |                        | V <sub>DD</sub> =1.2V | V <sub>DD</sub> =1.2V |         |                                     |
| <b>New</b> BD70HxxG-2C series | 0.1V step 4 types | ±1.4                                                              | 3.46 to 3.76          | 0.8 to 6.0               | 0.1                | Open Drain    | 0.27                | 0.3 | —                      | 1.0mA or more         |                       | SSOP5   | YES                                 |
| <b>New</b> BD73HxxG-2C series | 0.1V step 4 types |                                                                   | 3.46 to 3.76          | 0.8 to 6.0               | 0.1                | CMOS          |                     |     |                        |                       |                       | SSOP5   | YES                                 |

\* Detection voltage is inserted in the "xx" of the part No. Please see the data sheet specifications.

### Voltage Detectors

#### Support for 105°C

|      | Part No.           | Types              | Voltage Detection Precision<br>Ta=+25°C(%) | Detection Voltage<br>(V) | Reset Active Voltage Range<br>(V) | Detection Step<br>(V) | Output Method | Circuit Current(μA)            |                                | Hysteresis Voltage<br>(V) | *L*Output Current (mA) |               | Reset Active Timeout Period (ms) | Delay Circuit Resistance (MΩ) | Manual Reset PIN | Packages | Automotive Grade Available<br>AEC-Q100 |
|------|--------------------|--------------------|--------------------------------------------|--------------------------|-----------------------------------|-----------------------|---------------|--------------------------------|--------------------------------|---------------------------|------------------------|---------------|----------------------------------|-------------------------------|------------------|----------|----------------------------------------|
|      |                    |                    |                                            |                          |                                   |                       |               | ON                             | OFF                            |                           | VDD=1.2V               | VDD=2.4V      |                                  |                               |                  |          |                                        |
|      | BD48ExxG-M series  | 0.1V step 38 types | ±1                                         | 2.3 to 6.0               | 0.95 to 10.00                     | 0.1                   | Open Drain    | 0.60<br>(V <sub>S</sub> =4.8V) | 0.85<br>(V <sub>S</sub> =4.8V) | Vs×0.05                   | 1.0                    | 4             | —                                | —                             | Unavailable      | SSOP5    | YES                                    |
|      | BD49ExxG-M series  | 0.1V step 38 types |                                            | 2.3 to 6.0               | 0.95 to 10.00                     | 0.1                   | CMOS          |                                |                                |                           | 1.0                    | 4             | —                                | —                             | Unavailable      | SSOP5    | YES                                    |
|      | BD45Exx5G-M series | 0.1V step 26 types |                                            | 2.3 to 4.8               | 0.95 to 10.00                     | 0.1                   | Open Drain    | 0.80<br>(VDET=4.8V)            | 0.85<br>(VDET=4.8V)            | VDET×0.05                 | 1.2                    | 5             | 50                               | —                             | Available        | SSOP5    | YES                                    |
|      | BD45Exx1G-M series | 0.1V step 26 types |                                            | 2.3 to 4.8               | 0.95 to 10.00                     | 0.1                   |               |                                |                                |                           |                        |               | 100                              | —                             | Available        | SSOP5    | YES                                    |
|      | BD45Exx2G-M series | 0.1V step 26 types |                                            | 2.3 to 4.8               | 0.95 to 10.00                     | 0.1                   |               |                                |                                |                           |                        |               | 200                              | —                             | Available        | SSOP5    | YES                                    |
|      | BD46Exx5G-M series | 0.1V step 26 types |                                            | 2.3 to 4.8               | 0.95 to 10.00                     | 0.1                   |               |                                |                                |                           |                        |               | 50                               | —                             | Available        | SSOP5    | YES                                    |
|      | BD46Exx1G-M series | 0.1V step 26 types |                                            | 2.3 to 4.8               | 0.95 to 10.00                     | 0.1                   | CMOS          |                                |                                |                           |                        |               | 100                              | —                             | Available        | SSOP5    | YES                                    |
|      | BD46Exx2G-M series | 0.1V step 26 types |                                            | 2.3 to 4.8               | 0.95 to 10.00                     | 0.1                   |               |                                |                                |                           |                        |               | 200                              | —                             | Available        | SSOP5    | YES                                    |
| Nano | BD52xxG-2M series  | 0.1V step 42 types | ±2.5 (Full Temperature Range)              | 0.9 to 5.0               | 0.8 to 6.0                        | 0.1                   | Open Drain    | 0.23                           | 0.27                           | VDET×0.05                 | 1.0mA or more          | 2.0mA or more | Variable                         | ±30% (Full Temperature Range) | Unavailable      | SSOP5    | YES                                    |
| Nano | BD53xxG-2M series  | 0.1V step 42 types |                                            | 0.9 to 5.0               | 0.8 to 6.0                        | 0.1                   | CMOS          |                                |                                |                           | Variable               |               | Unavailable                      | SSOP5                         | YES              |          |                                        |

#### Support for 125°C

| Part No.                       | Types              | Voltage Detection Precision Within The Full Temperature Range (%) | Detection Voltage (V) | Reset Active Voltage Range (V) | Detection Step (V) | Output Method | Circuit Current(μA) |      | Hysteresis Voltage (V) | *L*Output Current (mA) |                       | Reset Active Timeout Period (ms) | Delay Time Precision (%)     | Manual Reset PIN | Packages     | Automotive Grade Available AEC-Q100 |
|--------------------------------|--------------------|-------------------------------------------------------------------|-----------------------|--------------------------------|--------------------|---------------|---------------------|------|------------------------|------------------------|-----------------------|----------------------------------|------------------------------|------------------|--------------|-------------------------------------|
|                                |                    |                                                                   |                       |                                |                    |               | ON                  | OFF  |                        | V <sub>DD</sub> =1.2V  | V <sub>DD</sub> =2.4V |                                  |                              |                  |              |                                     |
| <b>Nano</b> BD52xxG-2C series  | 0.1V step 42 types | ±3                                                                | 0.9 to 5.0            | 0.8 to 6.0                     | 0.1                | Open Drain    | 0.23                | 0.27 | V <sub>DET</sub> ×0.05 | 1.0mA or more          | 2.0mA or more         | Variable                         | ±50 (Full Temperature Range) | Unavailable      | SSOP5        | YES                                 |
| <b>Nano</b> BD53xxG-2C series  | 0.1V step 42 types |                                                                   | 0.9 to 5.0            | 0.8 to 6.0                     | 0.1                | CMOS          |                     |      |                        |                        |                       | Variable                         |                              | Unavailable      | SSOP5        | YES                                 |
| <b>New</b> BD52xxNVX-2C series | 0.1V step 6 types  | ±2.5                                                              | 2.6 to 3.1            | 0.8 to 6.0                     | 0.1                | Open Drain    |                     |      |                        |                        |                       | Variable                         |                              | Unavailable      | SSON004R1010 | YES                                 |

Detection voltage is inserted in the "xx" of the part No. Ex. : For 2.3V detection voltage in BD48ExxG-M series, Part No. is BD48E23G-M.

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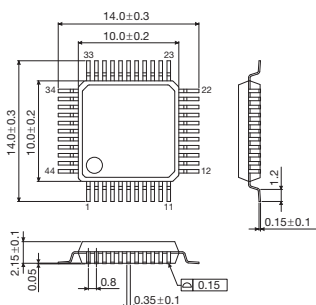
## QFP Packages

(Unit: mm)

### QFP <Pin Pitch: 0.8mm>

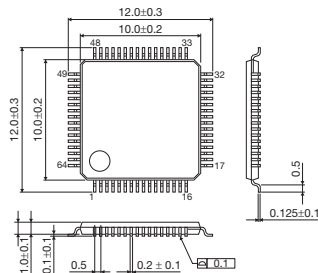
### TQFPV <Pin Pitch: 0.5mm>

#### QFP44



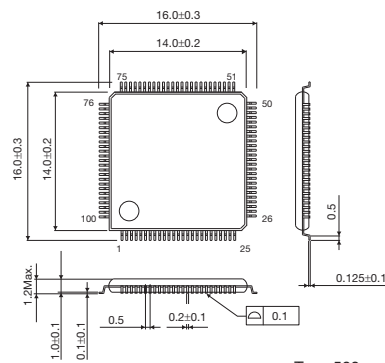
Tray: 1,000pcs  
 Embossed carrier tape: 1,000pcs

#### TQFP64V



Tray: 1,000pcs  
 Embossed carrier tape: 1,000pcs

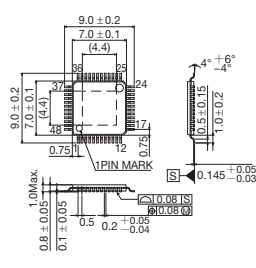
#### TQFP100V



Tray: 500pcs  
 Embossed carrier tape: 500pcs

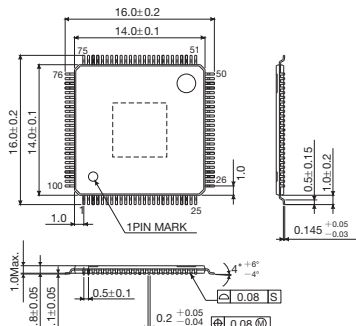
### HTQFPV <Pin Pitch: 0.5mm>

#### HTQFP48V



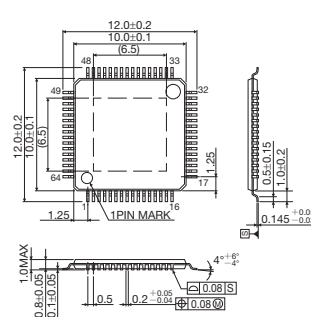
Tray: 1,000pcs  
 Embossed carrier tape: 1,500pcs

#### HTQFP100V



Tray: 500pcs

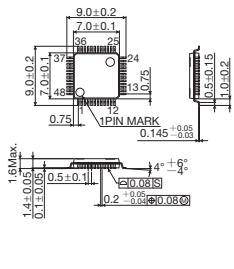
#### HTQFP64BV



Embossed carrier tape: 1,000pcs

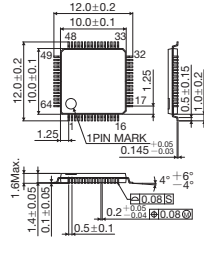
### VQFP <Pin Pitch: 0.5mm>

#### VQFP48C



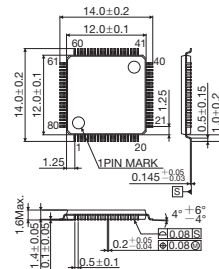
Tray: 1,000pcs  
 Embossed carrier tape: 1,500pcs

#### VQFP64



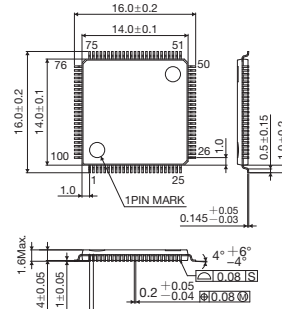
Tray: 1,000pcs  
 Embossed carrier tape: 1,000pcs

#### VQFP80



Tray: 1,000pcs  
 Embossed carrier tape: 1,000pcs

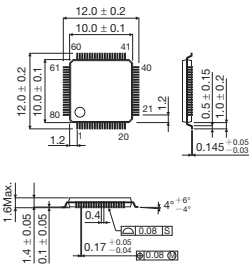
#### VQFP100



Tray: 500pcs  
 Embossed carrier tape: 500pcs

### UQFP <Pin Pitch: 0.4mm>

#### UQFP80



Tray: 1,000pcs  
 Embossed carrier tape: 1,000pcs

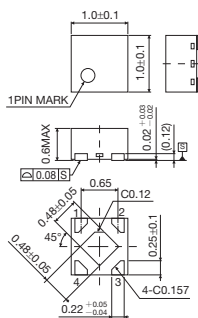
The packages on this page are ROHM product supported packages. Please refer to page 57 and onward for LAPIS Semiconductor product supported packages.

## SON/QFN Packages

(Unit: mm)

### SSON-R <Pin Pitch: 0.65mm>

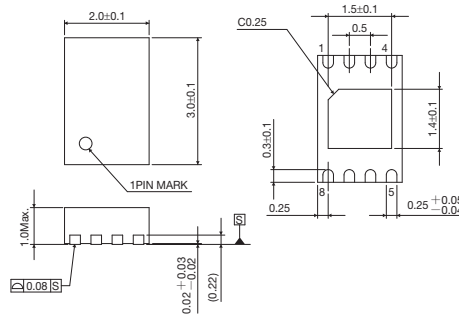
SSON004R1010



Embossed carrier tape: 5,000pcs

### VSON-V <Pin Pitch: 0.5mm>

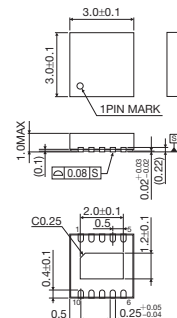
VSON008V2030



Embossed carrier tape: 3,000pcs

### VSON-FV <Pin Pitch: 0.5mm>

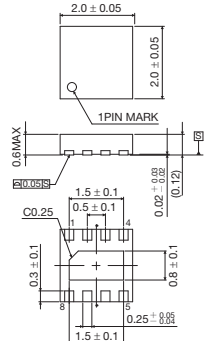
VSON10FV3030



Embossed carrier tape: 3,000pcs

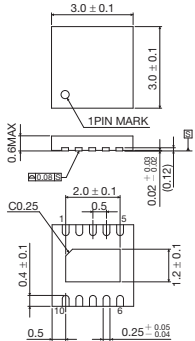
### VSON-X <Pin Pitch: 0.5mm>

VSON008X2020



Embossed carrier tape: 4,000pcs

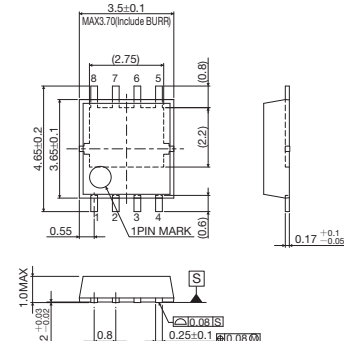
VSON10X3030



Embossed carrier tape: 4,000pcs

### HSON <Pin Pitch: 0.8mm>

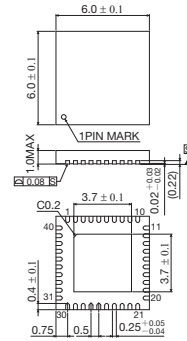
HSON-A8



Embossed carrier tape: 2,500pcs

### VQFN-V <Pin Pitch: 0.5mm>

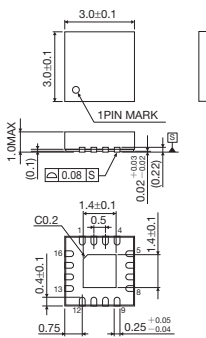
VQFN040V6060



Embossed carrier tape: 2,000pcs

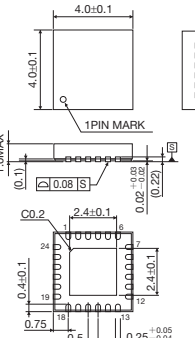
### VQFN-FV <Pin Pitch: 0.5mm>

VQFN16FV3030



Embossed carrier tape: 3,000pcs

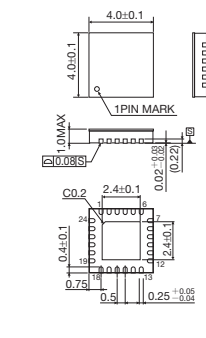
VQFN24FV4040



Embossed carrier tape: 2,500pcs

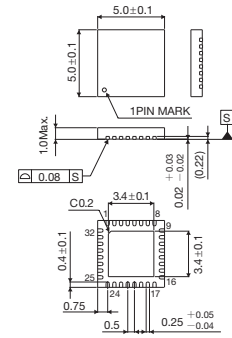
### VQFN-SV <Pin Pitch: 0.5mm>

VQFN24SV4040



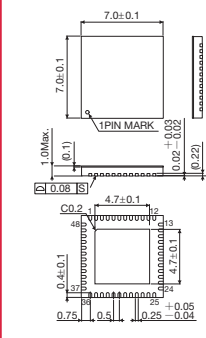
Embossed carrier tape: 2,500pcs

VQFN32SV5050



Embossed carrier tape: 2,500pcs

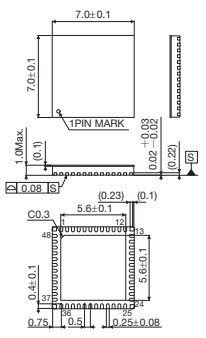
VQFN48SV7070



Embossed carrier tape: 1,500pcs

### VQFN-MCV <Pin Pitch: 0.5mm>

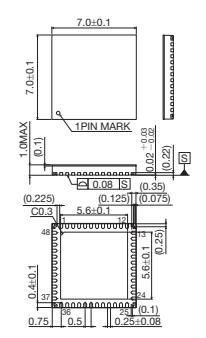
VQFN48MCV070



Embossed carrier tape: 1,500pcs

### VQFN-MDV <Pin Pitch: 0.5mm>

VQFN48MDV070



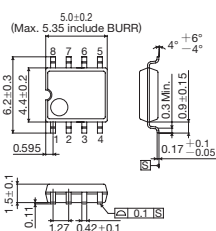
Embossed carrier tape: 1,500pcs

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## SOP Packages

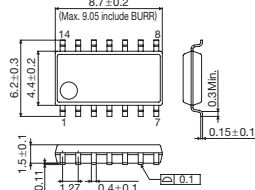
**SOP <Pin Pitch: 1.27mm>**

## SOP8



Embossed carrier tape: 2,500pcs

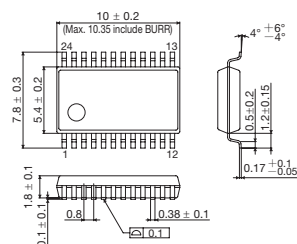
**SOP14**



Embossed carrier tape: 2,500pcs

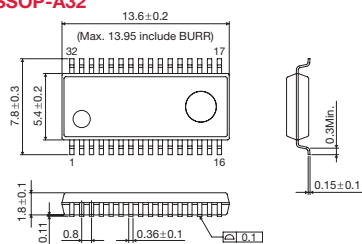
## SSOP-A <Pin Pitch: 0.8mm>

SSOP-A24



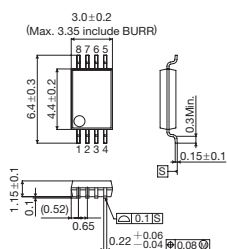
Embossed carrier tape: 2,000pcs

SSOP-A32



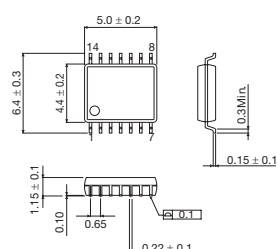
Embossed carrier tape: 2,000pcs

## SSOP-B <Pin Pitch: 0.65mm>

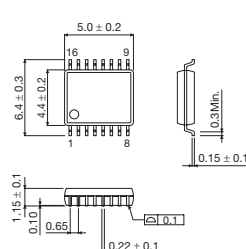
**SSOP-B8**

Embossed carrier tape: 2,500pcs

SSOP-B14

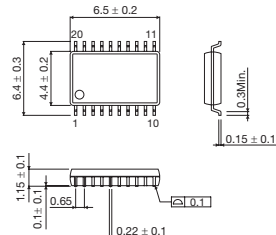


Embossed carrier tape: 2,500pcs

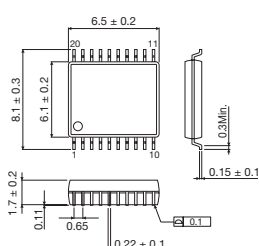
**SSOP-B16**

Embossed carrier tape: 2,500pcs

SSOP-B20

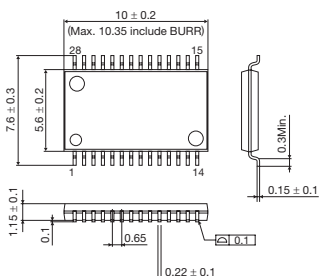


Embossed carrier tape: 2,500pcs

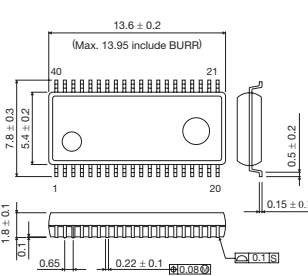
**SSOP-B20W**

Embossed carrier tape: 2,000pcs

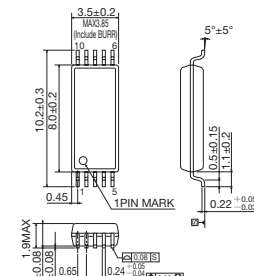
SSOP-B28



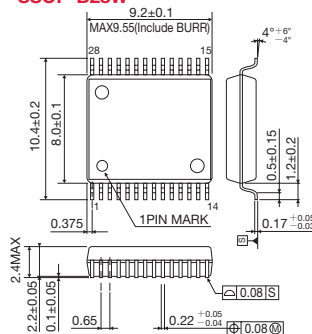
Embossed carrier tape: 2,000pcs

**SSOP-B40**

Embossed carrier tape: 2,000pcs

**SSOP-B10W**

Embossed carrier tape: 1,500pcs

**SSOP-B28W**

Embossed carrier tape: 1,500pcs

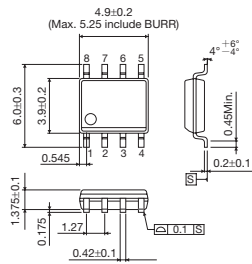
The packages on this page are ROHM product supported packages. Please refer to page 57 and onward for LAPIS Semiconductor product supported packages.

## SOP Packages

(Unit: mm)

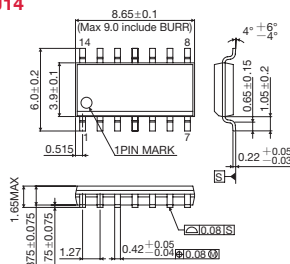
### JEDEC <Pin Pitch: 1.27mm/0.65mm/0.5mm>

#### SOP-J8



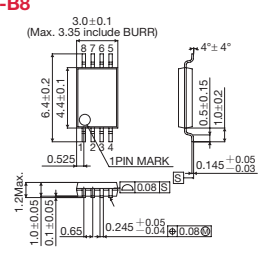
Embossed carrier tape: 2,500pcs

#### SOP-J14



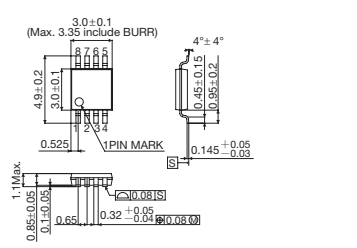
Embossed carrier tape: 2,500pcs

#### TSSOP-B8



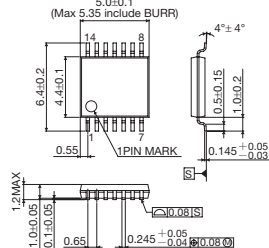
Embossed carrier tape: 3,000pcs

#### TSSOP-B8J



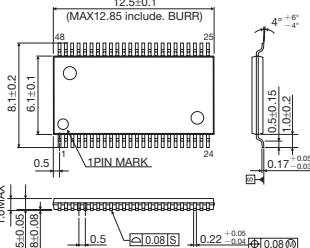
Embossed carrier tape: 2,500pcs

#### TSSOP-B14J



Embossed carrier tape: 2,500pcs

#### TSSOP-C48V



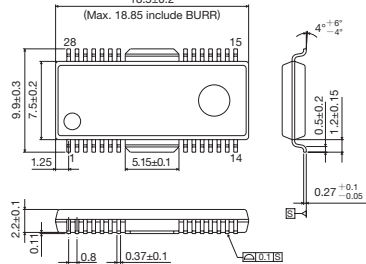
Embossed carrier tape: 2,000pcs

## HSOP Packages

(Unit: mm)

### HSOP <Pin Pitch: 0.8mm>

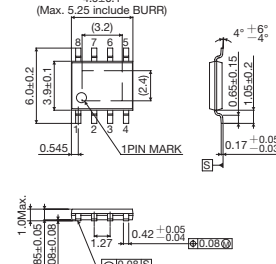
#### HSOP-M28



Embossed carrier tape: 1,500pcs

### HTSOP-J <Pin Pitch: 1.27mm>

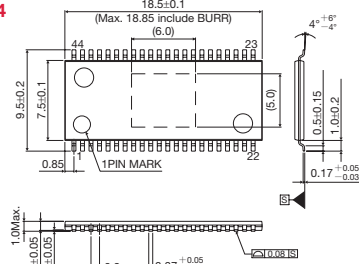
#### HTSOP-J8



Embossed carrier tape: 2,500pcs

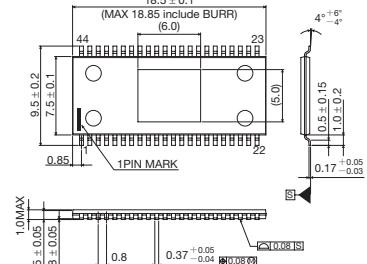
### HTSSOP-A <Pin Pitch: 0.8mm>

#### HTSSOP-A44



Embossed carrier tape: 1,500pcs

#### HTSSOP-A44R



Embossed carrier tape: 1,500pcs



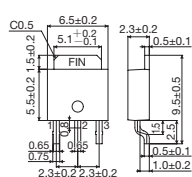
The packages on this page are ROHM product supported packages. Please refer to page 57 and onward for LAPIS Semiconductor product supported packages.

## Power Packages

(Unit: mm)

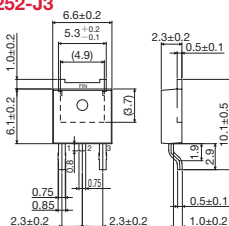
### POWER-3PIN

#### TO252-3



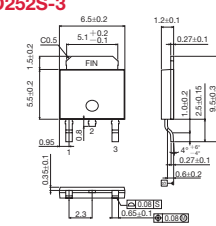
Embossed carrier tape: 2,000pcs

#### TO252-J3



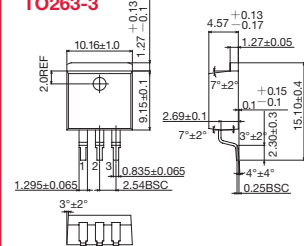
Embossed carrier tape: 2,000pcs

#### TO252S-3



Embossed carrier tape: 2,000pcs

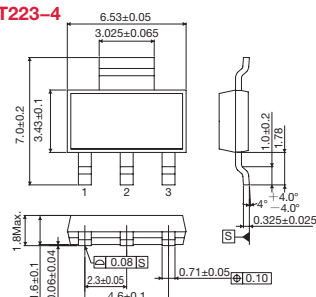
#### TO263-3



Embossed carrier tape: 500pcs

### POWER-4PIN

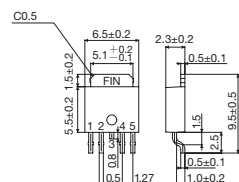
#### SOT223-4



Embossed carrier tape: 2,000pcs

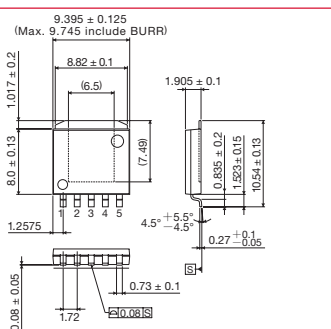
### POWER-5PIN

#### TO252-5



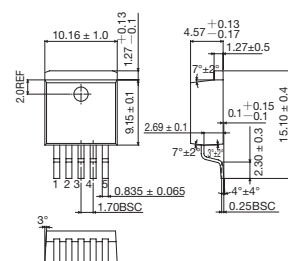
Embossed carrier tape: 2,000pcs

#### HRP5



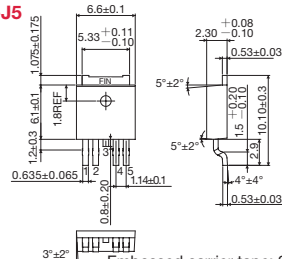
Embossed carrier tape: 2,000pcs

#### TO263-5



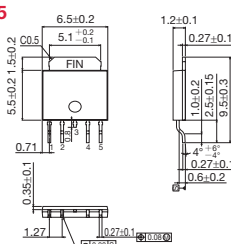
Embossed carrier tape: 500pcs

#### TO252-J5



Embossed carrier tape: 2,000pcs

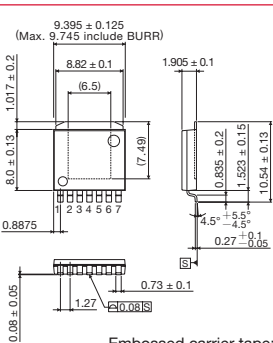
#### TO252S-5



Embossed carrier tape: 2,000pcs

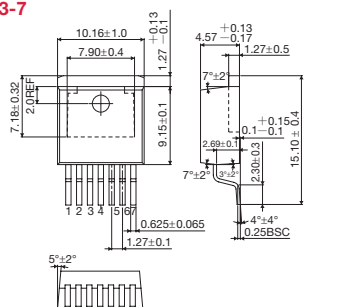
### POWER-7PIN

#### HRP7



Embossed carrier tape: 2,000pcs

#### TO263-7



Embossed carrier tape: 2,000pcs

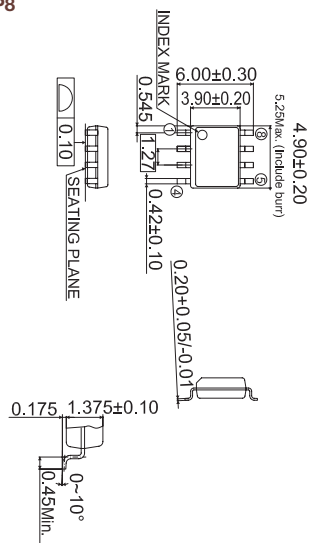
These package sizes are an example. Please contact a ROHM sales representative for details.

# SOP Packages

(Unit: mm)

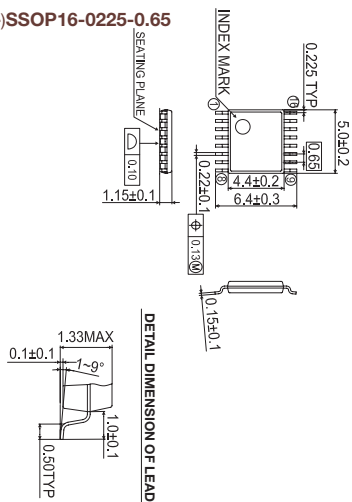
## SOP

SOP8

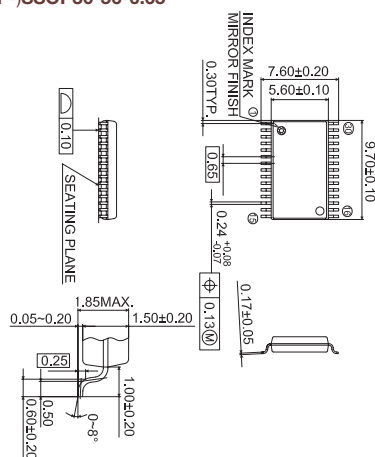


## SSOP

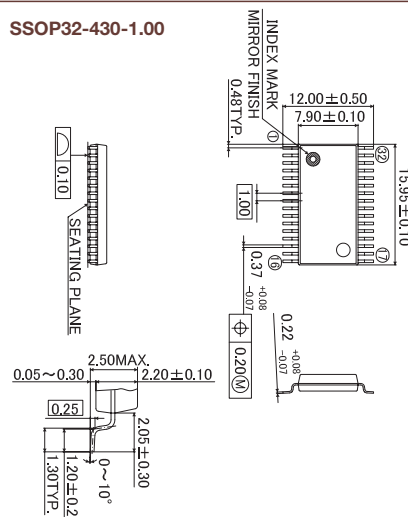
(P-)SSOP16-0225-0.65



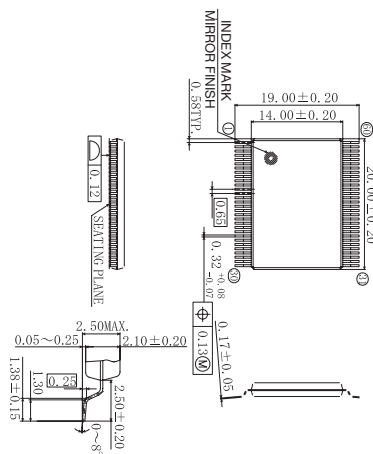
(P-)SSOP30-56-0.65



SSOP32-430-1.00



SSOP60-700-0.65



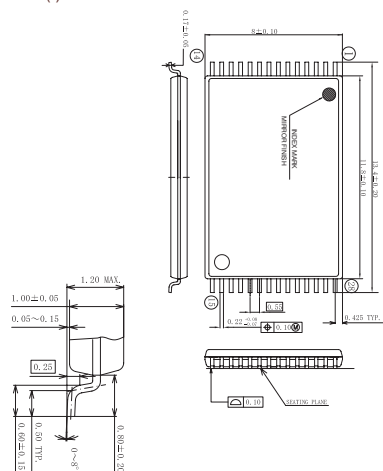
These package sizes are an example. Please contact a ROHM sales representative for details.

## SOP Packages

(Unit: mm)

### TSOP (type I)

TSOP(I)28-08134-0.55

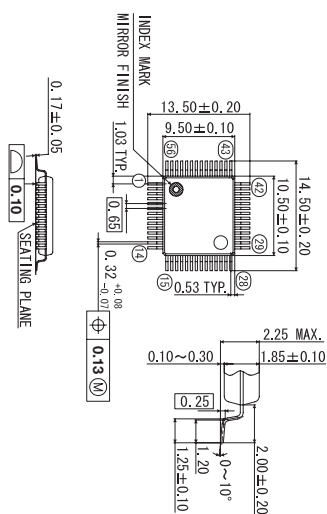


## QFP Packages

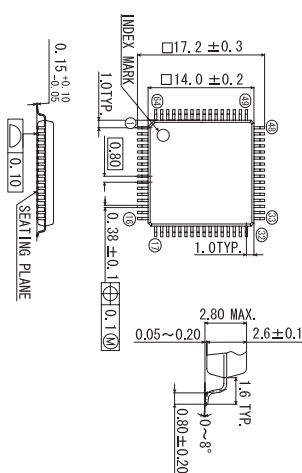
(Unit: mm)

### QFP

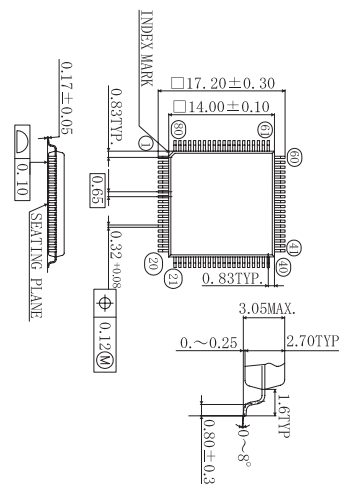
(P-)QFP56-910-0.65



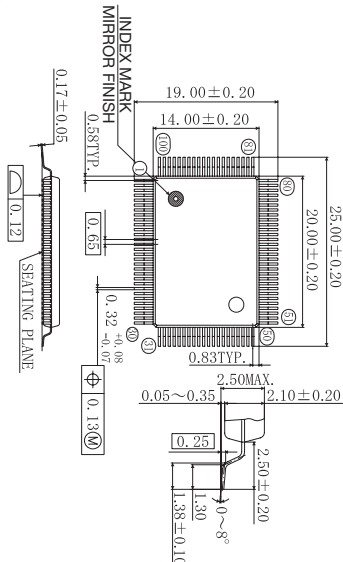
(P-)QFP64-1414-0.80



(P-)QFP80-1414-0.65



(P-)QFP100-1420-0.65



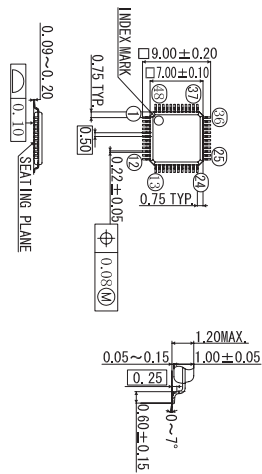
These package sizes are an example. Please contact a ROHM sales representative for details.

## QFP Packages

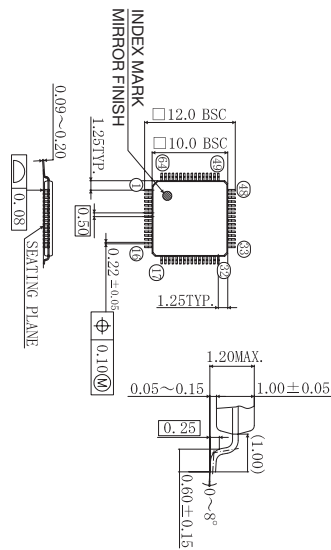
(Unit: mm)

### TQFP

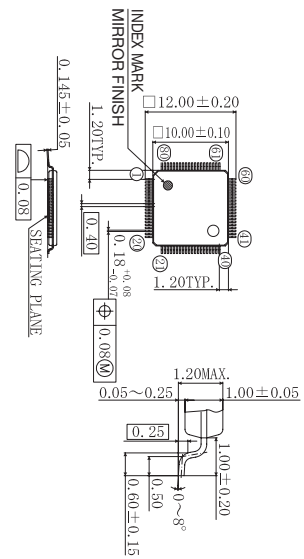
(P-)TQFP48-0707-0.50



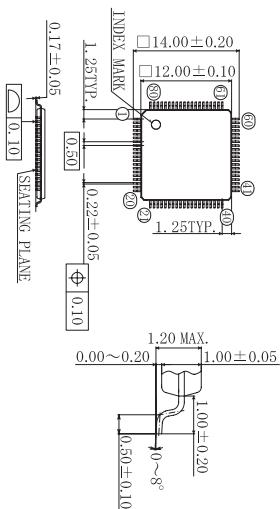
(P-)TQFP64-1010-0.50



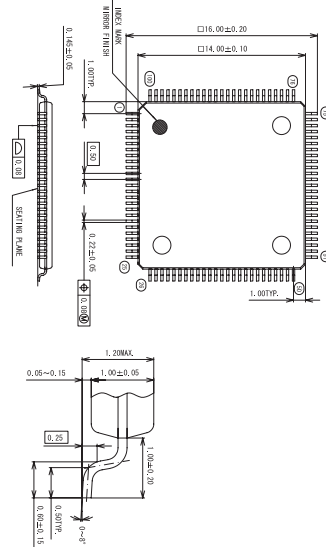
(P-)TQFP80-1010-0.40



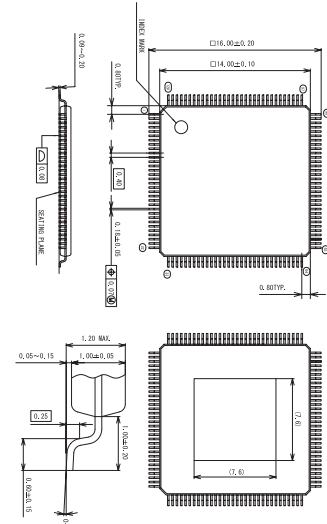
(P-)TQFP80-1212-0.50



(P-)TQFP100-1414-0.50



(P-)TQFP128-1414-0.40



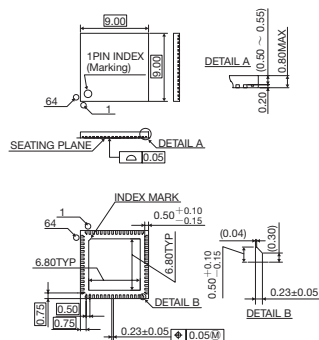
These package sizes are an example. Please contact a ROHM sales representative for details.

## QFN Packages

(Unit: mm)

### WQFN

(P-)WQFN64-0909-0.50





# Automotive

[Power Devices/Discrete Devices/Passive Devices/Opto Devices]





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## SiC Power Devices

## ● Quick Reference for SiC Power Devices

|                             | $V_{RM}$<br>(V)  | $I_F$<br>(A)         | Lead type                                                                         |    |                                                                                   |    |                                                                                   |    | Surface Mount type                                                                  |   |
|-----------------------------|------------------|----------------------|-----------------------------------------------------------------------------------|----|-----------------------------------------------------------------------------------|----|-----------------------------------------------------------------------------------|----|-------------------------------------------------------------------------------------|---|
|                             |                  |                      |  |    |  |    |  |    |  |   |
|                             |                  |                      | TO-220AC                                                                          |    | TO-247                                                                            |    | TO-247N                                                                           |    | TO-263AB (LPTL)                                                                     |   |
| SiC Schottky Barrier Diodes | 650              | 6                    | SCS206AGHR                                                                        | 7  |                                                                                   |    |                                                                                   |    | SCS206AJHR                                                                          | 1 |
|                             |                  | 8                    | SCS208AGHR                                                                        | 8  |                                                                                   |    |                                                                                   |    | SCS208AJHR                                                                          | 2 |
|                             |                  | 10                   | SCS210AGHR                                                                        | 9  |                                                                                   |    |                                                                                   |    | SCS210AJHR                                                                          | 3 |
|                             |                  | 12                   | SCS212AGHR                                                                        | 10 |                                                                                   |    |                                                                                   |    | SCS212AJHR                                                                          | 4 |
|                             |                  | 15                   | SCS215AGHR                                                                        | 11 |                                                                                   |    |                                                                                   |    | SCS215AJHR                                                                          | 5 |
|                             |                  | 20                   | SCS220AGHR                                                                        | 12 | SCS220AE2HR                                                                       | 13 |                                                                                   |    | SCS220AJHR                                                                          | 6 |
|                             |                  | 30                   |                                                                                   |    | SCS230AE2HR                                                                       | 14 |                                                                                   |    |                                                                                     |   |
|                             |                  | 40                   |                                                                                   |    | SCS240AE2HR                                                                       | 15 |                                                                                   |    |                                                                                     |   |
|                             | 1,200            | 5                    | SCS205KGHR                                                                        | 16 |                                                                                   |    |                                                                                   |    |                                                                                     |   |
|                             |                  | 10                   | SCS210KGHR                                                                        | 17 | SCS210KE2HR                                                                       | 20 |                                                                                   |    |                                                                                     |   |
|                             |                  | 15                   | SCS215KGHR                                                                        | 18 |                                                                                   |    |                                                                                   |    |                                                                                     |   |
|                             |                  | 20                   | SCS220KGHR                                                                        | 19 | SCS220KE2HR                                                                       | 21 |                                                                                   |    |                                                                                     |   |
|                             | $V_{DSS}$<br>(V) | $R_{DS(ON)}$<br>(mΩ) | TO-220AC                                                                          |    | TO-247                                                                            |    | TO-247N                                                                           |    | TO-263AB (LPTL)                                                                     |   |
| SiC MOSFET                  | 650              | 17                   |                                                                                   |    |                                                                                   |    | SCT3017ALHR                                                                       | 22 |                                                                                     |   |
|                             |                  | 22                   |                                                                                   |    |                                                                                   |    | SCT3022ALHR                                                                       | 23 |                                                                                     |   |
|                             |                  | 30                   |                                                                                   |    |                                                                                   |    | SCT3030ALHR                                                                       | 24 |                                                                                     |   |
|                             |                  | 60                   |                                                                                   |    |                                                                                   |    | SCT3060ALHR                                                                       | 25 |                                                                                     |   |
|                             |                  | 80                   |                                                                                   |    |                                                                                   |    | SCT3080ALHR                                                                       | 26 |                                                                                     |   |
|                             |                  | 120                  |                                                                                   |    |                                                                                   |    | SCT3120ALHR                                                                       | 27 |                                                                                     |   |
|                             | 1,200            | 22                   |                                                                                   |    |                                                                                   |    | SCT3022KLHR                                                                       | 28 |                                                                                     |   |
|                             |                  | 30                   |                                                                                   |    |                                                                                   |    | SCT3030KLHR                                                                       | 29 |                                                                                     |   |
|                             |                  | 40                   |                                                                                   |    |                                                                                   |    | SCT3040KLHR                                                                       | 30 |                                                                                     |   |
|                             |                  | 80                   |                                                                                   |    | SCT2080KEAHR                                                                      | 34 | SCT3080KLHR                                                                       | 31 |                                                                                     |   |
|                             |                  | 105                  |                                                                                   |    |                                                                                   |    | SCT3105KLHR                                                                       | 32 |                                                                                     |   |
|                             |                  | 160                  |                                                                                   |    |                                                                                   |    | SCT3160KLHR                                                                       | 33 |                                                                                     |   |

Note: Package is JEDEC code. ( ) : ROHM Package.

## ● SiC Schottky Barrier Diodes

| SiC Schottky Barrier Diodes |             |                                    |                       |                       |                                     |                                      |                    |                             |                    |                 |                                                                                       |                                     |
|-----------------------------|-------------|------------------------------------|-----------------------|-----------------------|-------------------------------------|--------------------------------------|--------------------|-----------------------------|--------------------|-----------------|---------------------------------------------------------------------------------------|-------------------------------------|
| No.                         | Part No.    | Absolute Maximum Ratings (Ta=25°C) |                       |                       |                                     | Electrical Characteristics (Ta=25°C) |                    |                             |                    | Package         | Equivalent Circuit Diagram                                                            | Automotive Grade Available AEC-Q101 |
|                             |             | V <sub>RM</sub><br>(V)             | V <sub>R</sub><br>(V) | I <sub>F</sub><br>(A) | I <sub>FSM</sub><br>(A)<br>50Hz, 1~ | V <sub>F</sub> (V)<br>Typ.           | I <sub>F</sub> (A) | I <sub>R</sub> (μA)<br>Max. | V <sub>R</sub> (V) |                 |                                                                                       |                                     |
| 1                           | SCS206AJHR  | 650                                | 650                   | 6                     | 22                                  | 1.35                                 | 6                  | 120                         | 600                | TO-263AB (LPTL) |  | YES                                 |
| 2                           | SCS208AJHR  | 650                                | 650                   | 8                     | 29                                  | 1.35                                 | 8                  | 160                         | 600                |                 |                                                                                       | YES                                 |
| 3                           | SCS210AJHR  | 650                                | 650                   | 10                    | 38                                  | 1.35                                 | 10                 | 200                         | 600                |                 |                                                                                       | YES                                 |
| 4                           | SCS212AJHR  | 650                                | 650                   | 12                    | 42                                  | 1.35                                 | 12                 | 240                         | 600                |                 |                                                                                       | YES                                 |
| 5                           | SCS215AJHR  | 650                                | 650                   | 15                    | 52                                  | 1.35                                 | 15                 | 300                         | 600                |                 |                                                                                       | YES                                 |
| 6                           | SCS220AJHR  | 650                                | 650                   | 20                    | 67                                  | 1.35                                 | 20                 | 400                         | 600                |                 |                                                                                       | YES                                 |
| 7                           | SCS206AGHR  | 650                                | 650                   | 6                     | 22                                  | 1.35                                 | 6                  | 120                         | 600                | TO-220AC        |  | YES                                 |
| 8                           | SCS208AGHR  | 650                                | 650                   | 8                     | 29                                  | 1.35                                 | 8                  | 160                         | 600                |                 |                                                                                       | YES                                 |
| 9                           | SCS210AGHR  | 650                                | 650                   | 10                    | 38                                  | 1.35                                 | 10                 | 200                         | 600                |                 |                                                                                       | YES                                 |
| 10                          | SCS212AGHR  | 650                                | 650                   | 12                    | 42                                  | 1.35                                 | 12                 | 240                         | 600                |                 |                                                                                       | YES                                 |
| 11                          | SCS215AGHR  | 650                                | 650                   | 15                    | 52                                  | 1.35                                 | 15                 | 300                         | 600                |                 |                                                                                       | YES                                 |
| 12                          | SCS220AGHR  | 650                                | 650                   | 20                    | 67                                  | 1.35                                 | 20                 | 400                         | 600                |                 |                                                                                       | YES                                 |
| 13                          | SCS220AE2HR | 650                                | 650                   | 10/20*1               | 38/76*1                             | 1.35                                 | 10                 | 200                         | 600                | TO-247          |  | YES                                 |
| 14                          | SCS230AE2HR | 650                                | 650                   | 15/30*1               | 52/104*1                            | 1.35                                 | 15                 | 300                         | 600                |                 |                                                                                       | YES                                 |
| 15                          | SCS240AE2HR | 650                                | 650                   | 20/40*1               | 67/135*1                            | 1.35                                 | 20                 | 400                         | 600                |                 |                                                                                       | YES                                 |
| 16                          | SCS205KGHR  | 1,200                              | 1,200                 | 5                     | 22                                  | 1.4                                  | 5                  | 100                         | 1,200              | TO-220AC        |  | YES                                 |
| 17                          | SCS210KGHR  | 1,200                              | 1,200                 | 10                    | 42                                  | 1.4                                  | 10                 | 200                         | 1,200              |                 |                                                                                       | YES                                 |
| 18                          | SCS215KGHR  | 1,200                              | 1,200                 | 15                    | 62                                  | 1.4                                  | 15                 | 300                         | 1,200              |                 |                                                                                       | YES                                 |
| 19                          | SCS220KGHR  | 1,200                              | 1,200                 | 20                    | 78                                  | 1.4                                  | 20                 | 400                         | 1,200              |                 |                                                                                       | YES                                 |
| 20                          | SCS210KE2HR | 1,200                              | 1,200                 | 5/10*1                | 22/45*1                             | 1.4                                  | 5                  | 100                         | 1,200              | TO-247          |  | YES                                 |
| 21                          | SCS220KE2HR | 1,200                              | 1,200                 | 10/20*1               | 42/84*1                             | 1.4                                  | 10                 | 200                         | 1,200              |                 |                                                                                       | YES                                 |

Note: Package is JEDEC code. ( ) : ROHM Package.

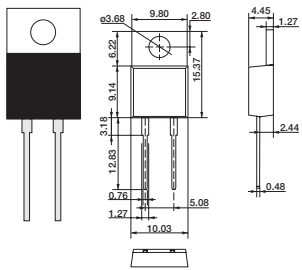
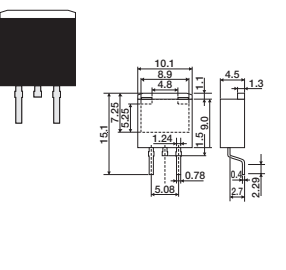
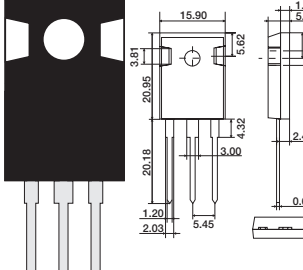
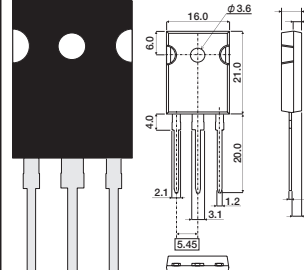
\*1: (Per Leg/Device)

## ● SiC MOSFET

| SiC MOSFET |              |               |                      |                    |                                 |                                 |                            |                     |         |                                        |
|------------|--------------|---------------|----------------------|--------------------|---------------------------------|---------------------------------|----------------------------|---------------------|---------|----------------------------------------|
| No.        | Part No.     | Polarity (ch) | V <sub>DSS</sub> (V) | I <sub>D</sub> (A) | P <sub>D</sub> (W)<br>(Tc=25°C) | R <sub>DS(on)</sub><br>Typ.(mΩ) | Q <sub>g</sub><br>Typ.(nC) |                     | Package | Automotive Grade Available<br>AEC-Q101 |
|            |              |               |                      |                    |                                 | V <sub>GS</sub> =18V            | V <sub>GS</sub> =18V       | Driving Voltage (V) |         |                                        |
| 22         | SCT3017ALHR  | N             | 650                  | 118                | 427                             | 17                              | 172                        | 18                  | TO-247N | YES                                    |
| 23         | SCT3022ALHR  | N             | 650                  | 93                 | 339                             | 22                              | 133                        | 18                  |         | YES                                    |
| 24         | SCT3030ALHR  | N             | 650                  | 70                 | 262                             | 30                              | 104                        | 18                  |         | YES                                    |
| 25         | SCT3060ALHR  | N             | 650                  | 39                 | 165                             | 60                              | 58                         | 18                  |         | YES                                    |
| 26         | SCT3080ALHR  | N             | 650                  | 30                 | 134                             | 80                              | 48                         | 18                  |         | YES                                    |
| 27         | SCT3120ALHR  | N             | 650                  | 21                 | 103                             | 120                             | 38                         | 18                  |         | YES                                    |
| 28         | SCT3022KLHR  | N             | 1,200                | 95                 | 427                             | 22                              | 178                        | 18                  |         | YES                                    |
| 29         | SCT3030KLHR  | N             | 1,200                | 72                 | 339                             | 30                              | 131                        | 18                  |         | YES                                    |
| 30         | SCT3040KLHR  | N             | 1,200                | 55                 | 262                             | 40                              | 107                        | 18                  |         | YES                                    |
| 31         | SCT3080KLHR  | N             | 1,200                | 31                 | 165                             | 80                              | 60                         | 18                  |         | YES                                    |
| 32         | SCT3105KLHR  | N             | 1,200                | 24                 | 134                             | 105                             | 51                         | 18                  |         | YES                                    |
| 33         | SCT3160KLHR  | N             | 1,200                | 17                 | 103                             | 160                             | 42                         | 18                  |         | YES                                    |
| 34         | SCT2080KEAHR | N             | 1,200                | 40                 | 262                             | 80                              | 106                        | 18                  | TO-247  | YES                                    |

Note: Package is JEDEC code.

## ● Dimensions (Unit: mm)

| Lead type                                                                                                               |         |  | Surface Mount type                                                                                                        |  |
|-------------------------------------------------------------------------------------------------------------------------|---------|--|---------------------------------------------------------------------------------------------------------------------------|--|
| TO-220AC                                                                                                                |         |  | TO-263AB(LPTL)                                                                                                            |  |
|  <p>Each lead has same dimensions</p> | TO-247  |  |  <p>Each lead has same dimensions</p> |  |
|  <p>Each lead has same dimensions</p> | TO-247N |  |  <p>Each lead has same dimensions</p>  |  |

Note: Package is JEDEC code. ( ) : ROHM Package.

## ● Part No. Explanation

## ● SiC Schottky Barrier Diode Part No. Explanation

|   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|
| S | C | S | 2 | 1 | 0 | A | G | H | R |
| ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |   |   |   |

- ① SiC Discrete Device
- ② Schottky Barrier Diode
- ③ Generation
- ④ Rated Current(A)  
05 → 5A  
10 → 10A
- ⑤ Withstand Voltage  
A → 650V  
K → 1,200V
- ⑥ Package  
J → TO-263AB(LPTL)  
G → TO-220AC  
E2 → TO-247(Dual chip)
- ⑦ Automotive-grade

## ● MOSFET Part No. Explanation

|   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S | C | T | 2 | 0 | 8 | 0 | K | E | A | H | R |
| ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ | ⑨ |   |   |   |

- ① SiC Discrete Device
- ② T → MOSFET Stand-alone
- ③ Generation
- ④ ON-resistance(mΩ)  
⑤ } 080=80mΩ  
⑥ } H12=1.2Ω
- ⑦ Withstand Voltage  
A → 650V  
K → 1,200V
- ⑧ Package  
E → TO-247  
L → TO-247N
- ⑨ Automotive-grade

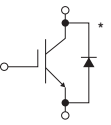
## ● Packaging type

| Package        | Code | Packaging type | Basic Ordering Unit (pcs) |
|----------------|------|----------------|---------------------------|
| TO-220AC       | C    | Tube           | 50                        |
| TO-247         | C    | Tube           | 30                        |
| TO-247N        | C11  | Tube           | 30                        |
| TO-263AB(LPTL) | TLL  | Embossed Tape  | 1,000                     |

Note: Package is JEDEC code. ( ) : ROHM Package.

# Field Stop Trench IGBT

## Field Stop Trench IGBT

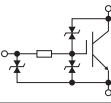
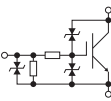
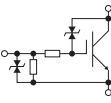
| Part No.         | V <sub>CE(S)</sub><br>(V) | I <sub>C</sub> (A)   |                       | P <sub>D</sub><br>(W) | V <sub>CE(sat)</sub><br>Typ. (V) | I <sub>C</sub> (A) | t <sub>sc</sub> Min.<br>(μsec.) | I <sub>F</sub> (Diode) (A) |                       | V <sub>CE(sat)</sub><br>Typ. (V) | I <sub>F</sub> (A) | Package | Internal Circuit Diagram                                                            | Automotive Grade Available<br>AEC-Q101 |
|------------------|---------------------------|----------------------|-----------------------|-----------------------|----------------------------------|--------------------|---------------------------------|----------------------------|-----------------------|----------------------------------|--------------------|---------|-------------------------------------------------------------------------------------|----------------------------------------|
|                  |                           | T <sub>C</sub> =25°C | T <sub>C</sub> =100°C |                       |                                  |                    |                                 | T <sub>C</sub> =25°C       | T <sub>C</sub> =100°C |                                  |                    |         |                                                                                     |                                        |
| RGS60TS65DHR     | 650                       | 56                   | 30                    | 223                   | 1.65                             | 30                 | 8                               | 56                         | 30                    | 1.45                             | 30                 | TO-247N |  | YES                                    |
| RGS80TS65DHR     | 650                       | 73                   | 40                    | 272                   | 1.65                             | 40                 | 8                               | 56                         | 30                    | 1.45                             | 30                 |         |                                                                                     | YES                                    |
| RGS00TS65DHR     | 650                       | 88                   | 50                    | 326                   | 1.65                             | 50                 | 8                               | 56                         | 30                    | 1.45                             | 30                 |         |                                                                                     | YES                                    |
| RGS00TS65EHR     | 650                       | 88                   | 50                    | 326                   | 1.65                             | 50                 | 8                               | 84                         | 50                    | 1.45                             | 50                 |         |                                                                                     | YES                                    |
| New RGS50TSX2DHR | 1,200                     | 50                   | 25                    | 395                   | 1.7                              | 25                 | 10                              | 50                         | 25                    | 1.65                             | 25                 |         |                                                                                     | YES                                    |
| New RGS80TSX2DHR | 1,200                     | 80                   | 40                    | 535                   | 1.7                              | 40                 | 10                              | 80                         | 40                    | 1.75                             | 40                 |         |                                                                                     | YES                                    |

Note: Package is JEDEC code.

\*Built in Fast Recovery Diodes

# Ignition IGBT

## Ignition IGBT

| Part No.       | V <sub>CE(S)</sub><br>(V) | V <sub>GES</sub><br>(V) | I <sub>C</sub><br>(A) | P <sub>D</sub><br>(W) | E <sub>ss</sub><br>(mJ) | V <sub>CE(sat)</sub> Typ.<br>(V) | Package       | Internal Circuit Diagram                                                              | Automotive Grade Available<br>AEC-Q101 |
|----------------|---------------------------|-------------------------|-----------------------|-----------------------|-------------------------|----------------------------------|---------------|---------------------------------------------------------------------------------------|----------------------------------------|
| RGPZ10BM40FH   | 430±30                    | ±10                     | 20                    | 107                   | 250                     | 1.6                              | TO-252        |    | YES                                    |
| ☆ RGPZ30BM56HR | 560±30                    | ±10                     | 30                    | 166                   | 300                     | 1.4                              | TO-252        |                                                                                       | YES                                    |
| RGPR10BM40FH   | 430±30                    | ±10                     | 20                    | 107                   | 250                     | 1.6                              | TO-252        |    | YES                                    |
| ☆ RGPR20BM36HR | 360±30                    | ±10                     | 20                    | 107                   | 250                     | 1.6                              | TO-252        |                                                                                       | YES                                    |
| RGPR20NS43HR   | 430±30                    | ±10                     | 20                    | 107                   | 250                     | 1.6                              | TO-263S(LPDS) |  | YES                                    |
| ☆ RGPR30BM56HR | 560±30                    | ±10                     | 30                    | 166                   | 300                     | 1.4                              | TO-252        |                                                                                       | YES                                    |
| RGPR30BM40HR   | 400±30                    | ±10                     | 30                    | 125                   | 300                     | 1.6                              | TO-252        |                                                                                       | YES                                    |
| RGPR30NS40HR   | 400±30                    | ±10                     | 30                    | 125                   | 300                     | 1.6                              | TO-263S(LPDS) |                                                                                       | YES                                    |
| ☆ RGPR50NS45HR | 450±30                    | ±10                     | 50                    | 187                   | 500                     | 1.6                              | TO-263S(LPDS) |                                                                                       | YES                                    |

Note: Package is JEDEC code. ( ) : ROHM Package.

☆ : Under Development

## Part No. Explanation

|   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|
| R | G | S | 6 | 0 | T | S | 6 | 5 | D | H | R |
| ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |   |   |   |   |   |

① IGBT

② Series Name

③ Current (I<sub>C</sub>) < T<sub>C</sub>=100°C >

30 → 15A

40 → 20A

50 → 25A

60 → 30A

80 → 40A

00 → 50A

④ Package

TS → TO-247N

BM → TO-252

NS → TO-263S(LPDS)

⑤ Voltage (V<sub>CE(S)</sub>)

65 → 650V

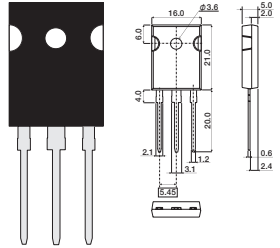
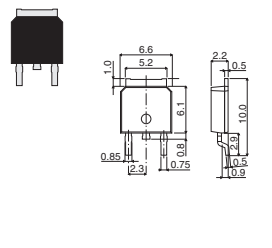
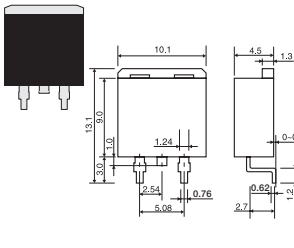
X2 → 1,200V

⑥ Built-in Fast Recovery Diodes

D → Built-in Fast Recovery Diodes

⑦ Automotive-grade

## Dimensions (Unit: mm)

| Lead type                                                                           | Surface Mount type                                                                  |                                                                                      |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| TO-247N                                                                             | TO-252                                                                              | TO-263S(LPDS)                                                                        |
|  |  |  |
| Each lead has same dimensions                                                       | Each lead has same dimensions                                                       | Each lead has same dimensions                                                        |

Note: Package is JEDEC code. ( ) : ROHM Package.

## Packaging type

| Package       | Code | Packaging type | Basic Ordering Unit (pcs) |
|---------------|------|----------------|---------------------------|
| TO-247N       | C11  | Tube           | 30                        |
| TO-252        | TL   | Embossed Tape  | 2,500                     |
| TO-263S(LPDS) | TL   | Embossed Tape  | 1,000                     |

Note: Package is JEDEC code. ( ) : ROHM Package.

## MOSFETs

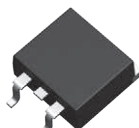
| MOSFETs                                                                                                                    |                                                                                                                           |               |             |               |                     |                    |                     |                          |       |                       |                     |                       |        |                       |      |                       |       |                          |                     |                                     |     |
|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|---------------|-------------|---------------|---------------------|--------------------|---------------------|--------------------------|-------|-----------------------|---------------------|-----------------------|--------|-----------------------|------|-----------------------|-------|--------------------------|---------------------|-------------------------------------|-----|
| Package                                                                                                                    | Type                                                                                                                      |               |             | Polarity (ch) | V <sub>DS</sub> (V) | I <sub>D</sub> (A) | V <sub>GS</sub> (V) | R <sub>DS(on)</sub> (mΩ) |       |                       |                     |                       |        |                       |      |                       |       | Q <sub>g</sub> Typ. (nC) | Ciss Typ. (pF)      | Automotive Grade Available AEC-Q101 |     |
|                                                                                                                            | Part No.                                                                                                                  | Grade Code    | Taping Code |               |                     |                    |                     | V <sub>GS</sub> =10V     |       | V <sub>GS</sub> =4.5V |                     | V <sub>GS</sub> =2.5V |        | V <sub>GS</sub> =1.8V |      | V <sub>GS</sub> =1.5V |       |                          |                     |                                     |     |
|                                                                                                                            |                                                                                                                           |               |             |               |                     |                    |                     | Typ.                     | Max.  | Typ.                  | Max.                | Typ.                  | Max.   | Typ.                  | Max. | Typ.                  | Max.  |                          |                     |                                     |     |
| <br>SOT-323 (UMT3) [SC-70] 2021 size      | RJU003N03                                                                                                                 | FRA           | T106        | N             | 30                  | 0.3                | ±12                 | —                        | —     | 800                   | 1,100               | 1,400                 | 1,900  | —                     | —    | —                     | —     | 24                       | YES                 |                                     |     |
|                                                                                                                            | RHU003N03                                                                                                                 | FRA           | T106        |               | 30                  | 0.3                | ±20                 | 800                      | 1,200 | 1,200                 | 1,900               | —                     | —      | —                     | —    | —                     | 20    | YES                      |                     |                                     |     |
|                                                                                                                            | RJU002N06                                                                                                                 | FRA           | T106        |               | 60                  | 0.2                | ±12                 | —                        | —     | 1,600                 | 2,300               | 2,200                 | 3,100  | —                     | —    | —                     | —     | 18                       | YES                 |                                     |     |
|                                                                                                                            | RHU002N06                                                                                                                 | FRA           | T106        |               | 60                  | 0.2                | ±20                 | 1,700                    | 2,400 | 2,800 <sup>*3</sup>   | 4,000 <sup>*3</sup> | —                     | —      | —                     | —    | 2.2 <sup>*1</sup>     | 15    | YES                      |                     |                                     |     |
|                                                                                                                            | ☆BSS138BKW                                                                                                                | HZG           | T106        |               | 60                  | 0.38               | ±20                 | 500                      | 700   | 600                   | 840                 | 1,000                 | 4,000  | —                     | —    | —                     | —     | YES                      |                     |                                     |     |
|                                                                                                                            | ☆BSS138W                                                                                                                  | HZG           | T106        |               | 60                  | 0.31               | ±20                 | 1,700                    | 2,400 | 2,100                 | 3,000               | 3,000                 | 12,000 | —                     | —    | —                     | —     | YES                      |                     |                                     |     |
|                                                                                                                            | ☆BSS84W                                                                                                                   | HZG           | T106        | P             | -60                 | -0.21              | ±20                 | 3,600                    | 5,300 | 4,300                 | 6,400               | —                     | —      | —                     | —    | —                     | —     | YES                      |                     |                                     |     |
| <br>SOT-363 (UMT6) [SC-88] 2021 size      | UM6K31N                                                                                                                   | FHA           | TCN         | N+N           | 60                  | 0.25               | ±20                 | 1,700                    | 2,400 | 2,100                 | 3,000               | 3,000                 | 12,000 | —                     | —    | —                     | —     | 15 <sup>*4</sup>         | YES                 |                                     |     |
| <br>SOT-323T (TUMT3) [SC-113A] 2021 size  | RUF025N02                                                                                                                 | FRA           | TL          | N             | 20                  | 2.5                | ±10                 | —                        | —     | 39                    | 54                  | 49                    | 68     | 65                    | 91   | 80                    | 160   | 5 <sup>*2</sup>          | 370                 | YES                                 |     |
|                                                                                                                            | RTF025N03                                                                                                                 | FRA           | TL          |               | 30                  | 2.5                | ±12                 | —                        | —     | 48                    | 67                  | 70                    | 98     | —                     | —    | —                     | —     | 3.7 <sup>*2</sup>        | 270                 | YES                                 |     |
|                                                                                                                            | RTF016N05                                                                                                                 | FRA           | TL          |               | 45                  | 1.6                | ±12                 | —                        | —     | 140                   | 190                 | 200                   | 280    | —                     | —    | —                     | —     | 2.3 <sup>*2</sup>        | 150                 | YES                                 |     |
|                                                                                                                            | RSF015N06                                                                                                                 | FRA           | TL          |               | 60                  | 1.5                | ±20                 | 210                      | 290   | 240                   | 330                 | —                     | —      | —                     | —    | —                     | 2     | 110                      | YES                 |                                     |     |
| <br>SOT-363T (TUMT6) [SC-113DA] 2021 size | RTL035N03                                                                                                                 | FRA           | TR          | N+N           | 30                  | 3.5                | ±12                 | —                        | —     | 40                    | 56                  | 56                    | 79     | —                     | —    | —                     | —     | 4.6 <sup>*2</sup>        | 350                 | YES                                 |     |
|                                                                                                                            | US6K41                                                                                                                    | FRA           | TR          | N+N           | 20                  | 1                  | ±8                  | —                        | —     | 130                   | 190                 | 170                   | 240    | 220                   | 310  | 290                   | 410   | 2 <sup>*2</sup>          | 75                  | YES                                 |     |
|                                                                                                                            | RTL020P02                                                                                                                 | FRA           | TR          |               | -20                 | -2                 | ±12                 | —                        | —     | 100                   | 135                 | 180                   | 250    | —                     | —    | —                     | —     | 4.9 <sup>*2</sup>        | 430                 | YES                                 |     |
|                                                                                                                            | RRL035P03                                                                                                                 | FRA           | TR          | P             | -30                 | -3.5               | ±20                 | 36                       | 50    | 52                    | 72                  | —                     | —      | —                     | —    | —                     | —     | 8                        | 800                 | YES                                 |     |
|                                                                                                                            | RRL025P03                                                                                                                 | FRA           | TR          |               | -30                 | -2.5               | ±20                 | 55                       | 75    | 85                    | 115                 | —                     | —      | —                     | —    | —                     | —     | 5.2                      | 480                 | YES                                 |     |
|                                                                                                                            | RSL020P03                                                                                                                 | FRA           | TR          |               | -30                 | -2                 | ±20                 | 80                       | 120   | 125                   | 190                 | —                     | —      | —                     | —    | —                     | —     | 3.9                      | 350                 | YES                                 |     |
|                                                                                                                            | US6J41                                                                                                                    | FRA           | TR          | P+P           | -20                 | -1                 | ±8                  | —                        | —     | 180                   | 260                 | 240                   | 340    | 320                   | 450  | 400                   | 560   | 2 <sup>*2</sup>          | 80                  | YES                                 |     |
| <br>SOT-23 (SST3) 2924 size               | RUC002N05                                                                                                                 | HZG           | T116        | N             | 50                  | 0.2                | ±8                  | —                        | —     | 1,600                 | 2,200               | 1,700                 | 2,400  | —                     | —    | 2,000                 | 4,000 | —                        | 25                  | YES                                 |     |
|                                                                                                                            | New BSS670                                                                                                                | HZG           | T116        |               | 60                  | 0.6                | ±20                 | 500                      | 650   | 600                   | 820                 | —                     | —      | —                     | —    | —                     | —     | —                        | —                   | YES                                 |     |
|                                                                                                                            | New BSS138BKW                                                                                                             | HZG           | T116        |               | 60                  | 0.4                | ±20                 | 500                      | 700   | 600                   | 840                 | —                     | —      | —                     | —    | —                     | —     | —                        | —                   | YES                                 |     |
|                                                                                                                            | RK7002BM                                                                                                                  | HZG           | T116        |               | 60                  | 0.25               | ±20                 | 1,700                    | 2,400 | 2,100                 | 3,000               | 3,000                 | 12,000 | —                     | —    | —                     | —     | 15                       | YES                 |                                     |     |
|                                                                                                                            | ☆BSS123                                                                                                                   | HZG           | T116        |               | 100                 | 0.2                | ±20                 | 5,500                    | 7,700 | 5,900                 | 8,200               | —                     | —      | —                     | —    | —                     | —     | —                        | YES                 |                                     |     |
|                                                                                                                            | New BSS84W                                                                                                                | HZG           | T116        |               | P                   | -60                | -0.2                | ±20                      | 3,600 | 5,300                 | 4,300               | 6,400                 | —      | —                     | —    | —                     | —     | —                        | —                   | YES                                 |     |
|                                                                                                                            | <br>SOT-346 (SMT3HP) [SC-59] 2928 size | RJK005N03     | FRA         | T146          | N                   | 30                 | 0.5                 | ±12                      | —     | —                     | 400                 | 580                   | 650    | 940                   | —    | —                     | —     | —                        | 2 <sup>*3</sup>     | 60                                  | YES |
| RHK005N03                                                                                                                  |                                                                                                                           | FRA           | T146        | 30            |                     | 0.5                | ±20                 | 350                      | 550   | 510                   | 720                 | —                     | —      | —                     | —    | —                     | —     | —                        | 45                  | YES                                 |     |
| RHK003N06                                                                                                                  |                                                                                                                           | FRA           | T146        | 60            |                     | 0.3                | ±20                 | 700                      | 1,000 | 1,100 <sup>*3</sup>   | 1,500 <sup>*3</sup> | —                     | —      | —                     | —    | —                     | —     | 3 <sup>*1</sup>          | 33                  | YES                                 |     |
| <br>SOT-346T (TSMT3) [SC-96] 2928 size  |                                                                                                                           | New RUR040N02 | HZG         | TL            | N                   | 20                 | 4                   | ±10                      | —     | —                     | 25                  | 35                    | 33     | 46                    | —    | —                     | 55    | 110                      | 8 <sup>*2</sup>     | 680                                 | YES |
|                                                                                                                            | New RTR040N03                                                                                                             | HZG           | TL          | 30            |                     | 4                  | ±12                 | —                        | —     | 34                    | 48                  | 47                    | 66     | —                     | —    | —                     | —     | 5.9 <sup>*2</sup>        | 475                 | YES                                 |     |
|                                                                                                                            | New RTR025N03                                                                                                             | HZG           | TL          | 30            |                     | 2.5                | ±12                 | —                        | —     | 66                    | 92                  | 95                    | 133    | —                     | —    | —                     | —     | 3.3 <sup>*2</sup>        | 220                 | YES                                 |     |
|                                                                                                                            | New RSR025N03                                                                                                             | HZG           | TL          | 30            |                     | 2.5                | ±20                 | 50                       | 70    | 74                    | 105                 | —                     | —      | —                     | —    | —                     | —     | 2.9                      | 165                 | YES                                 |     |
|                                                                                                                            | New RTR030N05                                                                                                             | HZG           | TL          | 45            |                     | 3                  | ±12                 | —                        | —     | 48                    | 67                  | 68                    | 95     | —                     | —    | —                     | —     | 6.2 <sup>*2</sup>        | 510                 | YES                                 |     |
|                                                                                                                            | New RSR025N05                                                                                                             | HZG           | TL          | 45            |                     | 2.5                | ±20                 | 70                       | 100   | 95                    | 150                 | —                     | —      | —                     | —    | —                     | —     | 3.6                      | 260                 | YES                                 |     |
|                                                                                                                            | New RTR025N05                                                                                                             | HZG           | TL          | 45            |                     | 2.5                | ±12                 | —                        | —     | 95                    | 130                 | 125                   | 175    | —                     | —    | —                     | —     | 3.2 <sup>*2</sup>        | 250                 | YES                                 |     |
|                                                                                                                            | New RTR020N05                                                                                                             | HZG           | TL          | 45            |                     | 2                  | ±12                 | —                        | —     | 130                   | 180                 | 180                   | 250    | —                     | —    | —                     | —     | 2.9 <sup>*2</sup>        | 200                 | YES                                 |     |
|                                                                                                                            | New RSR030N06                                                                                                             | HZG           | TL          | 60            |                     | 3                  | ±20                 | 60                       | 85    | 70                    | 100                 | —                     | —      | —                     | —    | —                     | —     | 5                        | 380                 | YES                                 |     |
|                                                                                                                            | New RSR020N06                                                                                                             | HZG           | TL          | 60            |                     | 2                  | ±20                 | 120                      | 170   | 140                   | 195                 | —                     | —      | —                     | —    | —                     | —     | 2.7                      | 180                 | YES                                 |     |
|                                                                                                                            | New RSR010N10                                                                                                             | HZG           | TL          | 100           | 1                   | ±20                | 370                 | 520                      | 400   | 560                   | —                   | —                     | —      | —                     | —    | —                     | 3.5   | 140 <sup>*4</sup>        | YES                 |                                     |     |
|                                                                                                                            | New RTR030P02                                                                                                             | HZG           | TL          | P             | -20                 | -3                 | ±12                 | —                        | —     | 55                    | 75                  | 90                    | 125    | —                     | —    | —                     | —     | 9.3 <sup>*2</sup>        | 840                 | YES                                 |     |
|                                                                                                                            | New RTR025P02                                                                                                             | HZG           | TL          |               | -20                 | -2.5               | ±12                 | —                        | —     | 70                    | 95                  | 115                   | 160    | —                     | —    | —                     | —     | 7 <sup>*2</sup>          | 630                 | YES                                 |     |
|                                                                                                                            | New RTR020P02                                                                                                             | HZG           | TL          |               | -20                 | -2                 | ±12                 | —                        | —     | 100                   | 135                 | 180                   | 250    | —                     | —    | —                     | —     | 4.9 <sup>*2</sup>        | 430                 | YES                                 |     |
|                                                                                                                            | New RRR040P03                                                                                                             | HZG           | TL          |               | -30                 | -4                 | ±20                 | 32                       | 45    | 45                    | 63                  | —                     | —      | —                     | —    | —                     | —     | 10.5                     | 1,000               | YES                                 |     |
|                                                                                                                            | New RRR030P03                                                                                                             | HZG           | TL          |               | -30                 | -3                 | ±20                 | 55                       | 75    | 85                    | 115                 | —                     | —      | —                     | —    | —                     | —     | 5.2                      | 480                 | YES                                 |     |
|                                                                                                                            | New RSR025P03                                                                                                             | HZG           | TL          |               | -30                 | -2.5               | ±20                 | 70                       | 98    | 100                   | 140                 | —                     | —      | —                     | —    | —                     | —     | 5.4                      | 460                 | YES                                 |     |
|                                                                                                                            | New RSR020P05                                                                                                             | HZG           | TL          |               | -45                 | -2                 | ±20                 | 130                      | 190   | 180                   | 260                 | —                     | —      | —                     | —    | —                     | —     | 4.5 <sup>*2</sup>        | 500                 | YES                                 |     |
|                                                                                                                            | New RSR015P06                                                                                                             | HZG           | TL          |               | -60                 | -1.5               | ±20                 | 200                      | 280   | 240                   | 340                 | —                     | —      | —                     | —    | —                     | —     | 10 <sup>*1</sup>         | 500                 | YES                                 |     |
|                                                                                                                            | New RUQ050N02                                                                                                             | HZG           | TR          |               | N                   | 20                 | 5                   | ±10                      | —     | —                     | 22                  | 30                    | 27     | 38                    | —    | —                     | 40    | 80                       | 12 <sup>*2</sup>    | 900                                 | YES |
| New RTQ045N03                                                                                                              | HZG                                                                                                                       | TR            | 30          |               |                     | 4.5                | ±12                 | —                        | —     | 30                    | 43                  | 42                    | 60     | —                     | —    | —                     | —     | —                        | 7.6 <sup>*2</sup>   | 540                                 | YES |
| New RSQ045N03                                                                                                              | HZG                                                                                                                       | TR            | 30          | 4.5           |                     | ±20                | 27                  | 38                       | 36    | 51                    | —                   | —                     | —      | —                     | —    | —                     | —     | 6.8                      | 520                 | YES                                 |     |
| New RSQ035N03                                                                                                              | HZG                                                                                                                       | TR            | 30          | 3.5           |                     | ±20                | 44                  | 62                       | 60    | 84                    | —                   | —                     | —      | —                     | —    | —                     | —     | 5.3                      | 290                 | YES                                 |     |
| New RTQ035N03                                                                                                              | HZG                                                                                                                       | TR            | 30          | 3.5           |                     | ±12                | —                   | —                        | 38    | 54                    | 55                  | 77                    | —      | —                     | —    | —                     | —     | 4.6 <sup>*2</sup>        | 285                 | YES                                 |     |
| New RSQ020N03                                                                                                              | HZG                                                                                                                       | TR            | 30          | 2             |                     | ±20                | 96                  | 134                      | 148   | 207                   | —                   | —                     | —      | —                     | —    | —                     | —     | 2.2                      | 110                 | YES                                 |     |
| New RVQ040N05                                                                                                              | HZG                                                                                                                       | TR            | 45          | 4             |                     | ±21                | 38                  | 53                       | 47    | 66                    | —                   | —                     | —      | —                     | —    | —                     | —     | 6.3                      | 530                 | YES                                 |     |
| New RTQ020N05                                                                                                              | HZG                                                                                                                       | TR            | 45          | 2             |                     | ±12                | —                   | —                        | 140   | 190                   | 200                 | 280                   | —      | —                     | —    | —                     | —     | 2.3 <sup>*2</sup>        | 150                 | YES                                 |     |
| New RSQ035N06                                                                                                              | HZG                                                                                                                       | TR            | 60          | 3.5           |                     | ±20                | 50                  | 70                       | 58    | 82                    | —                   | —                     | —      | —                     | —    | —                     | —     | 6.5                      | 430                 | YES                                 |     |
| New RSQ015N06                                                                                                              | HZG                                                                                                                       | TR            | 60          | 1.5           |                     | ±20                | 210                 | 290                      | 240   | 330                   | —                   | —                     | —      | —                     | —    | —                     | —     | 2                        | 110                 | YES                                 |     |
| <br>SOT-457T (TSMT6) [SC-95] 2928 size  | QS6K1                                                                                                                     | FRA           | TR          | N+N           | 30                  | 1                  | ±12                 | —                        | —     | 170                   | 238                 | 260                   | 364    | —                     | —    | —                     | —     | 1.7 <sup>*2</sup>        | 77                  | YES                                 |     |
|                                                                                                                            | QS6K21                                                                                                                    | FRA           | TR          |               | 45                  | 1                  | ±12                 | —                        | —     | 300                   | 420                 | 415                   | 585    | —                     | —    | —                     | —     | 1.5 <sup>*2</sup>        | 95                  | YES                                 |     |
|                                                                                                                            | New RTQ035P02                                                                                                             | HZG           | TR          | P             | -20                 | -3.5               | ±12                 | —                        | —     | 50                    | 65                  | 80                    | 100    | —                     | —    | —                     | —     | 10.5 <sup>*2</sup>       | 1,200               | YES                                 |     |
|                                                                                                                            | New RTQ025P02                                                                                                             | HZG           | TR          |               | -20                 | -2.5               | ±12                 | —                        | —     | 72                    | 100                 | 140                   | 190    | —                     | —    | —                     | —     | 6.4 <sup>*2</sup>        | 580                 | YES                                 |     |
|                                                                                                                            | New RRQ045P03                                                                                                             | HZG           | TR          |               | -30                 | -4.5               | ±20                 | 25                       | 35    | 34                    | 48                  | —                     | —      | —                     | —    | —                     | —     | 14                       | 1,350               | YES                                 |     |
|                                                                                                                            | New RSQ035P03                                                                                                             | HZG           | TR          |               | -30                 | -3.5               | ±20                 | 45                       | 65    | 65                    | 90                  | —                     | —      | —                     | —    | —                     | —     | 9.2                      | 780                 | YES                                 |     |
|                                                                                                                            | New RRQ030P03                                                                                                             | HZG           | TR          | P             | -30                 | -3                 | ±20                 | 55                       | 75    | 85                    | 115                 | —                     | —      | —                     | —    | —                     | —     | 5.2                      | 480                 | YES                                 |     |
|                                                                                                                            | New RSQ025P03                                                                                                             | HZG           | TR          |               | -30                 | -2.5               | ±20                 | 80                       | 110   | 120                   | 165                 | —                     | —      | —                     | —    | —                     | —     | 4.4                      | 320                 | YES                                 |     |
|                                                                                                                            | New RSQ015P10                                                                                                             | HZG           | TR          |               | -100                | -1.5               | ±20                 | 350                      | 470   | 380                   | 510                 | —                     | —      | —                     | —    | —                     | —     | 17                       | 950 <sup>*4</sup>   | YES                                 |     |
|                                                                                                                            | New RRQ030P03                                                                                                             | HZG           | TR          |               | -30                 | -3                 | ±20                 | 55                       | 75    | 85                    | 115                 | —                     | —      | —                     | —    | —                     | —     | 5.2                      | 480                 | YES                                 |     |
| <br>(TSMT8) 3028 size                   | New RQ1C075UN                                                                                                             | HZG           | TR          | N+N           | 20                  | 7.5                | ±10                 | —                        | —     | 11                    | 16                  | 14                    | 20     | —                     | —    | 20                    | 40    | 18 <sup>*2</sup>         | 1,400               | YES                                 |     |
|                                                                                                                            | New QS8K2                                                                                                                 | HZG           | TR          |               | 30                  | 3.5                | ±12                 | —                        | —     | 38                    | 54                  | 55                    | 77     | —                     | —    | —                     | —     | 4.6 <sup>*2</sup>        | 285                 | YES                                 |     |
|                                                                                                                            | New RQ1A070ZP                                                                                                             | HZG           | TR          | P             | -12                 | -7                 | ±10                 | —                        | —     | 8                     | 12                  | 11                    | 16     | —                     | —    | 19                    | 38    | 58 <sup>*2</sup>         | 7,400 <sup>*5</sup> | YES                                 |     |
|                                                                                                                            | New RQ1E070RP                                                                                                             | HZG           | TR          |               | -30                 | -7                 | ±20                 | 12                       | 17    | 17                    | 24                  | —                     | —      | —                     | —    | —                     | 26    | 2,700                    | YES                 |                                     |     |
|                                                                                                                            | New RQ1E050RP                                                                                                             | HZG           | TR          | P+P           | -30                 | -5                 | ±20                 | 22                       | 31    | 32                    | 45                  | —                     | —      | —                     | —    | —                     | 13    | 1,300                    |                     |                                     |     |

## Power MOSFETs

| Power MOSFETs 1                                                                                                      |            |            |             |               |                      |                    |                     |                          |      |                       |      |                       |      |                         |                      |               |                                     |
|----------------------------------------------------------------------------------------------------------------------|------------|------------|-------------|---------------|----------------------|--------------------|---------------------|--------------------------|------|-----------------------|------|-----------------------|------|-------------------------|----------------------|---------------|-------------------------------------|
| Package                                                                                                              | Type       |            |             | Polarity (ch) | V <sub>DSS</sub> (V) | I <sub>D</sub> (A) | V <sub>GS</sub> (V) | R <sub>DS(on)</sub> (mΩ) |      |                       |      |                       |      | Q <sub>g</sub> Typ.(nC) |                      | Ciss Typ.(pF) | Automotive Grade Available AEC-Q101 |
|                                                                                                                      | Part No.   | Grade Code | Taping Code |               |                      |                    |                     | V <sub>GS</sub> =10V     |      | V <sub>GS</sub> =4.5V |      | V <sub>GS</sub> =4.0V |      | V <sub>GS</sub> =5V     | V <sub>DS</sub> =10V |               |                                     |
|                                                                                                                      |            |            |             |               |                      |                    |                     | Typ.                     | Max. | Typ.                  | Max. | Typ.                  | Max. |                         |                      |               |                                     |
| <br>SOT-89 (MPT3) [SC-62] 4540 size | RHP030N03  | FRA        | T100        | N             | 30                   | 3                  | ±20                 | 90                       | 120  | 160                   | 210  | —                     | —    | 6.5*1                   | 160                  | YES           |                                     |
|                                                                                                                      | RJP020N06  | FRA        | T100        |               | 60                   | 2                  | ±12                 | —                        | —    | 165                   | 240  | 210                   | 300  | 5*2                     | 160                  | YES           |                                     |
|                                                                                                                      | RHP020N06  | FRA        | T100        |               | 60                   | 2                  | ±20                 | 150                      | 200  | 200                   | 280  | —                     | —    | 7*1                     | 140                  | YES           |                                     |
| <br>(HSMT8AG) 3333 size             | ☆AG009DGQ3 | —          | TB          | N             | 40                   | 30                 | ±20                 | 6                        | 8.8  | 7.3                   | 11   | —                     | —    | 32*1                    | 1,790                | YES           |                                     |
| <br>(SOP8) 5060 size               | RSS130N03  | FRA        | TB          | N             | 30                   | 13                 | ±20                 | 5.9                      | 8.3  | 7.4                   | 10.4 | —                     | —    | 25                      | 2,000                | YES           |                                     |
|                                                                                                                      | RSS100N03  | FRA        | TB          |               | 30                   | 10                 | ±20                 | 9.5                      | 13.3 | 12.5                  | 17.5 | —                     | —    | 14                      | 1,070                | YES           |                                     |
|                                                                                                                      | RSS095N05  | FRA        | TB          |               | 45                   | 9.5                | ±20                 | 11                       | 16   | 14                    | 20   | —                     | —    | 18.9                    | 1,830                | YES           |                                     |
|                                                                                                                      | RSS070N05  | FRA        | TB          |               | 45                   | 7                  | ±20                 | 18                       | 25   | 23                    | 32   | —                     | —    | 12                      | 1,000                | YES           |                                     |
|                                                                                                                      | RSS065N06  | FRA        | TB          |               | 60                   | 6.5                | ±20                 | 24                       | 37   | 28                    | 44   | —                     | —    | 11                      | 900                  | YES           |                                     |
|                                                                                                                      | SP8K3      | FRA        | TB          | N+N           | 30                   | 7                  | ±20                 | 17                       | 24   | 23                    | 33   | —                     | —    | 8.4                     | 600                  | YES           |                                     |
|                                                                                                                      | SP8K2      | FRA        | TB          |               | 30                   | 6                  | ±20                 | 21                       | 30   | 30                    | 42   | —                     | —    | 7.2                     | 520                  | YES           |                                     |
|                                                                                                                      | SP8K24     | FRA        | TB          |               | 45                   | 6                  | ±20                 | 18                       | 25   | 24                    | 34   | —                     | —    | 15.4                    | 1,400                | YES           |                                     |
|                                                                                                                      | SP8K22     | FRA        | TB          |               | 45                   | 4.5                | ±20                 | 33                       | 46   | 41                    | 57   | —                     | —    | 6.8                     | 550                  | YES           |                                     |
|                                                                                                                      | SP8K33     | FRA        | TB          |               | 60                   | 5                  | ±20                 | 34                       | 48   | 38                    | 54   | —                     | —    | 8                       | 620                  | YES           |                                     |
|                                                                                                                      | SP8K32     | FRA        | TB          |               | 60                   | 4.5                | ±20                 | 46                       | 65   | 52                    | 73   | —                     | —    | 7                       | 500                  | YES           |                                     |
|                                                                                                                      | SP8K31     | FRA        | TB          |               | 60                   | 3.5                | ±20                 | 85                       | 120  | 100                   | 140  | —                     | —    | 3.7                     | 250                  | YES           |                                     |
|                                                                                                                      | SP8K41     | FRA        | TB          |               | 80                   | 3.4                | ±20                 | 90                       | 130  | 110                   | 150  | 120                   | 160  | 6.6                     | 600                  | YES           |                                     |
|                                                                                                                      | SP8K52     | FRA        | TB          |               | 100                  | 3                  | ±20                 | 120                      | 170  | 130                   | 180  | —                     | —    | 8.5                     | 610*3                | YES           |                                     |
|                                                                                                                      | RRS140P03  | FRA        | TB          | P             | −30                  | −14                | ±20                 | 5                        | 7    | 6.7                   | 9.4  | —                     | —    | 80                      | 8,000                | YES           |                                     |
|                                                                                                                      | RRS100P03  | FRA        | TB          |               | −30                  | −10                | ±20                 | 9                        | 12.6 | 12.5                  | 17.5 | —                     | —    | 39                      | 3,600                | YES           |                                     |
|                                                                                                                      | RRS090P03  | FRA        | TB          |               | −30                  | −9                 | ±20                 | 11                       | 15.4 | 15                    | 21   | —                     | —    | 30                      | 3,000                | YES           |                                     |
|                                                                                                                      | RRS050P03  | FRA        | TB          |               | −30                  | −5                 | ±20                 | 36                       | 50   | 52                    | 72   | —                     | —    | 9.2                     | 850                  | YES           |                                     |
|                                                                                                                      | RSS070P05  | FRA        | TB          |               | −45                  | −7                 | ±20                 | 19                       | 27   | 25                    | 35   | —                     | —    | 34                      | 4,100                | YES           |                                     |
|                                                                                                                      | RSS060P05  | FRA        | TB          | P+P           | −45                  | −6                 | ±20                 | 26                       | 36   | 35                    | 49   | —                     | —    | 23                      | 2,700                | YES           |                                     |
|                                                                                                                      | SP8J66     | FRA        | TB          |               | −30                  | −9                 | ±20                 | 13.5                     | 18.5 | 17.5                  | 23.6 | —                     | —    | 35                      | 3,000                | YES           |                                     |
|                                                                                                                      | SP8M4      | FRA        | TB          | N+P           | 30                   | 9                  | ±20                 | 12                       | 18   | 16                    | 24   | —                     | —    | 15                      | 1,190                | YES           |                                     |
|                                                                                                                      | SP8M5      | FRA        | TB          |               | −30                  | −7                 | ±20                 | 20                       | 28   | 25                    | 35   | —                     | —    | 25                      | 2,600                | YES           |                                     |
|                                                                                                                      | SP8M5      | FRA        | TB          |               | 30                   | 6                  | ±20                 | 21                       | 30   | 30                    | 42   | —                     | —    | 7.2                     | 520                  | YES           |                                     |
|                                                                                                                      | SP8M3      | FRA        | TB          |               | −30                  | −7                 | ±20                 | 20                       | 28   | 25                    | 35   | —                     | —    | 25                      | 2,600                | YES           |                                     |
|                                                                                                                      | SP8M3      | FRA        | TB          |               | 30                   | 5                  | ±20                 | 36                       | 51   | 52                    | 73   | —                     | —    | 3.9                     | 230                  | YES           |                                     |
|                                                                                                                      | SP8M6      | FRA        | TB          |               | −30                  | −4.5               | ±20                 | 40                       | 56   | 57                    | 80   | —                     | —    | 8.5                     | 850                  | YES           |                                     |
|                                                                                                                      | SP8M6      | FRA        | TB          |               | 30                   | 5                  | ±20                 | 36                       | 51   | 52                    | 73   | —                     | —    | 3.9                     | 230                  | YES           |                                     |
|                                                                                                                      | SP8M21     | FRA        | TB          |               | −30                  | −3.5               | ±20                 | 65                       | 90   | 100                   | 140  | —                     | —    | 5.5                     | 490                  | YES           |                                     |
|                                                                                                                      | SP8M21     | FRA        | TB          |               | 45                   | 6                  | ±20                 | 18                       | 25   | 24                    | 34   | —                     | —    | 15.4                    | 1,400                | YES           |                                     |
|                                                                                                                      | SP8M24     | FRA        | TB          |               | −45                  | −4                 | ±20                 | 33                       | 46   | 43                    | 60   | —                     | —    | 20                      | 2,400                |               |                                     |
|                                                                                                                      | SP8M24     | FRA        | TB          |               | 45                   | 4.5                | ±20                 | 33                       | 46   | 41                    | 57   | —                     | —    | 6.8                     | 550                  | YES           |                                     |
|                                                                                                                      | SP8M41     | FRA        | TB          |               | −45                  | −3.5               | ±20                 | 45                       | 63   | 60                    | 84   | —                     | —    | 13                      | 1,700                |               |                                     |
|                                                                                                                      | SP8M41     | FRA        | TB          |               | 80                   | 3.4                | ±20                 | 90                       | 130  | 110                   | 150  | —                     | —    | 6.6                     | 600                  | YES           |                                     |
|                                                                                                                      | SP8M51     | FRA        | TB          |               | −80                  | −2.6               | ±20                 | 165                      | 240  | 220                   | 300  | —                     | —    | 8.2                     | 1,000                |               |                                     |
|                                                                                                                      | SP8M51     | FRA        | TB          |               | 100                  | 3                  | ±20                 | 120                      | 170  | 130                   | 180  | —                     | —    | 8.5                     | 610*3                | YES           |                                     |
|                                                                                                                      | SP8M51     | FRA        | TB          |               | −100                 | −2.5               | ±20                 | 210                      | 290  | 230                   | 320  | —                     | —    | 12.5                    | 1,550*3              |               |                                     |

Note 1: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.  
 Note 2: \*1: V<sub>GS</sub>=10V \*2: V<sub>GS</sub>=4V \*3: V<sub>GS</sub>=25V

☆ : Under Development

| Power MOSFETs 2                                                                                                               |               |               |                |                  |                         |                       |                        |                          |       |                       |      |                         |                      |                                              |
|-------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|----------------|------------------|-------------------------|-----------------------|------------------------|--------------------------|-------|-----------------------|------|-------------------------|----------------------|----------------------------------------------|
| Package                                                                                                                       | Type          |               |                | Polarity<br>(ch) | V <sub>DSS</sub><br>(V) | I <sub>D</sub><br>(A) | V <sub>GS</sub><br>(V) | R <sub>DS(on)</sub> (mΩ) |       |                       |      | Q <sub>g</sub> Typ.(nC) | Ciss Typ.(pF)        | Automotive<br>Grade<br>Available<br>AEC-Q101 |
|                                                                                                                               | Part No.      | Grade<br>Code | Taping<br>Code |                  |                         |                       |                        | V <sub>GS</sub> =10V     |       | V <sub>GS</sub> =4.5V |      | V <sub>GS</sub> =10V    | V <sub>DS</sub> =10V |                                              |
|                                                                                                                               |               |               |                |                  |                         |                       |                        | Typ.                     | Max.  | Typ.                  | Max. |                         |                      |                                              |
| <br>TO-252<br>[DPAK]                         | New RD3H200SN | FRA           | TL             | N                | 45                      | 20                    | ±20                    | 20                       | 28    | 25                    | 35   | 12*3                    | 950                  | YES                                          |
|                                                                                                                               | New RD3L220SN | FRA           | TL             |                  | 60                      | 22                    | ±20                    | 18                       | 26    | 21                    | 30   | 30                      | 1,500                | YES                                          |
|                                                                                                                               | New RD3L150SN | FRA           | TL             |                  | 60                      | 15                    | ±20                    | 28                       | 40    | 33                    | 47   | 18                      | 930                  | YES                                          |
|                                                                                                                               | New RD3L080SN | FRA           | TL             |                  | 60                      | 8                     | ±20                    | 57                       | 80    | 70                    | 98   | 9.4                     | 380                  | YES                                          |
|                                                                                                                               | New RD3L050SN | FRA           | TL             |                  | 60                      | 5                     | ±20                    | 78                       | 109   | 94                    | 131  | 8                       | 290                  | YES                                          |
|                                                                                                                               | New RD3P200SN | FRA           | TL             |                  | 100                     | 20                    | ±20                    | 33                       | 46    | 36*2                  | 50*2 | 55                      | 2,100*1              | YES                                          |
|                                                                                                                               | New RD3P175SN | FRA           | TL             |                  | 100                     | 17.5                  | ±20                    | 75                       | 105   | 80                    | 112  | 24                      | 950*1                | YES                                          |
|                                                                                                                               | New RD3P100SN | FRA           | TL             |                  | 100                     | 10                    | ±20                    | 95                       | 133   | 100                   | 140  | 18                      | 700*1                | YES                                          |
|                                                                                                                               | New RD3P050SN | FRA           | TL             |                  | 100                     | 5                     | ±20                    | 135                      | 190   | 142                   | 200  | 14                      | 530*1                | YES                                          |
|                                                                                                                               | ☆RD3U080AA    | FRA           | TL             |                  | 250                     | 8                     | ±30                    | 225                      | 300   | —                     | —    | 25                      | 1,440*1              | YES                                          |
|                                                                                                                               | ☆RD3U041AA    | FRA           | TL             |                  | 250                     | 4                     | ±30                    | 930                      | 1,300 | —                     | —    | 8.5                     | 350*1                | YES                                          |
|                                                                                                                               | ☆R5205PND3    | FRA           | TL             |                  | 525                     | 5                     | ±25                    | 1,300                    | 1,600 | —                     | —    | 10.8                    | 320*1                | YES                                          |
|                                                                                                                               | ☆R6006PND3    | FRA           | TL             |                  | 600                     | 6                     | ±30                    | 900                      | 1,200 | —                     | —    | 15                      | 460*1                | YES                                          |
|                                                                                                                               | ☆R6004PND3    | FRA           | TL             |                  | 600                     | 4                     | ±25                    | 1,400                    | 1,800 | —                     | —    | 11                      | 280*1                | YES                                          |
|                                                                                                                               | ☆R8002CND3    | FRA           | TL             |                  | 800                     | 2                     | ±30                    | 3,300                    | 4,300 | —                     | —    | 12.1                    | 240*1                | YES                                          |
|                                                                                                                               | ☆R8001CND3    | FRA           | TL             |                  | 800                     | 1                     | ±30                    | 6,700                    | 8,700 | —                     | —    | 7.2                     | 60*1                 | YES                                          |
|                                                                                                                               | New RD3H160SP | FRA           | TL             | P                | −45                     | −16                   | ±20                    | 35                       | 50    | 45                    | 63   | 16*3                    | 2,000                | YES                                          |
|                                                                                                                               | New RD3H080SP | FRA           | TL             |                  | −45                     | −8                    | ±20                    | 65                       | 91    | 95                    | 133  | 9*3                     | 1,000                | YES                                          |
|                                                                                                                               | New RD3H045SP | FRA           | TL             |                  | −45                     | −4.5                  | ±20                    | 110                      | 155   | 160                   | 225  | 12*3                    | 550                  | YES                                          |
| New RD3L140SP                                                                                                                 | FRA           | TL            | −60            |                  | −14                     | ±20                   | 60                     | 84                       | 73    | 103                   | 27   | 1,900                   | YES                  |                                              |
| New RD3P130SP                                                                                                                 | FRA           | TL            | −100           |                  | −13                     | ±20                   | 135                    | 200                      | 150   | 220                   | 40   | 2,400*1                 | YES                  |                                              |
| <br>TO-263S<br>(LPTS)<br>[SC-83]<br>[D2PAK] | RSJ451N04     | FRA           | TL             | N                | 40                      | 45                    | ±20                    | 9.5                      | 13.5  | —                     | —    | 43                      | 2,400*1              | YES                                          |
|                                                                                                                               | RSJ400N06     | FRA           | TL             |                  | 60                      | 40                    | ±20                    | 11                       | 16    | —                     | —    | 52                      | 2,400                | YES                                          |
|                                                                                                                               | RSJ400N10     | FRA           | TL             |                  | 100                     | 40                    | ±20                    | 19                       | 27    | 21*2                  | 30*2 | 90                      | 3,600*1              | YES                                          |
|                                                                                                                               | RSJ301N10     | FRA           | TL             |                  | 100                     | 30                    | ±20                    | 33                       | 46    | 36*2                  | 50*2 | 60                      | 2,100*1              | YES                                          |
|                                                                                                                               | RJ1U330AA     | FRG           | TL             |                  | 250                     | 33                    | ±30                    | 77                       | 105   | —                     | —    | 80                      | 4,500*1              | YES                                          |
|                                                                                                                               | R6020PNJ      | FRA           | TL             |                  | 600                     | 20                    | ±30                    | 190                      | 250   | —                     | —    | 65                      | 2,040*1              | YES                                          |
|                                                                                                                               | R8008ANJ      | FRG           | TL             |                  | 800                     | 8                     | ±30                    | 790                      | 1,030 | —                     | —    | 38                      | 1,100*1              | YES                                          |
|                                                                                                                               | R8005ANJ      | FRG           | TL             |                  | 800                     | 5                     | ±30                    | 1,600                    | 2,100 | —                     | —    | 20                      | 500*1                | YES                                          |
|                                                                                                                               | R8002ANJ      | FRG           | TL             |                  | 800                     | 2                     | ±30                    | 3,300                    | 4,300 | —                     | —    | 13                      | 250*1                | YES                                          |
|                                                                                                                               | RSJ250P10     | FRA           | TL             | P                | −100                    | −25                   | ±20                    | 45                       | 63    | 48                    | 67   | 60*3                    | 8,000*1              | YES                                          |

Note 1: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code, [ ] : GENERAL Code.

☆ : Under Development

Note 2: \*1: V<sub>DS</sub>=25V \*2: V<sub>GS</sub>=4V \*3: V<sub>GS</sub>=5V

## Bipolar Transistors

## General Purpose Amplification Bipolar Transistors (Flat type)

| Package                                                                                                                        | Application                   | Type      |                                  |             |                                |   |   | Polarity (ch) | P <sub>D</sub> *1 (W) | V <sub>CEO</sub> (V) | I <sub>C</sub> (A) | h <sub>FE</sub> *2 |                    | Automotive Grade Available AEC-Q101 |
|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------|----------------------------------|-------------|--------------------------------|---|---|---------------|-----------------------|----------------------|--------------------|--------------------|--------------------|-------------------------------------|
|                                                                                                                                |                               | Part No.  | Grade Code<br>Automotive Product | Taping Code | *2 : Codes For h <sub>FE</sub> |   |   |               |                       |                      |                    |                    |                    |                                     |
| <br>SOT-723 (VMT3)<br>[SC-105AA]<br>1212 size | General Purpose Amplification | 2SA2029   | FHA                              | T2L         | Q                              | R | S | PNP           | 0.15                  | −50                  | −0.15              | 120 to 560         | S: Not Recommended | YES                                 |
|                                                                                                                                |                               | 2SC5658   | FHA                              | T2L         | Q                              | R | S | NPN           | 0.15                  | 50                   | 0.15               | 120 to 560         | S: Not Recommended | YES                                 |
| <br>SOT-416FL (EMT3F)<br>[SC-89]<br>1616 size | General Purpose Amplification | 2SA1774EB | HZG                              | T2L         | Q                              | R | S | PNP           | 0.15                  | −50                  | −0.15              | 120 to 560         | S: Not Recommended | YES                                 |
|                                                                                                                                | Driver                        | 2SAR502EB | HZG                              | T2L         |                                |   |   |               | 0.15                  | −30                  | −0.5               | 200 to 500         |                    | YES                                 |
|                                                                                                                                | General Purpose Amplification | 2SC4617EB | HZG                              | TL          | Q                              | R | S | NPN           | 0.15                  | 50                   | 0.15               | 120 to 560         | S: Not Recommended | YES                                 |
|                                                                                                                                | Driver                        | 2SCR502EB | HZG                              | TL          |                                |   |   |               | 0.15                  | 30                   | 0.5                | 200 to 500         |                    | YES                                 |
| <br>SOT-323FL (UMT3F)<br>[SC-85]<br>2021 size | General Purpose Amplification | 2SA1576UB | HZG                              | TL          | Q                              | R | S | PNP           | 0.2                   | −50                  | −0.15              | 120 to 560         | S: Not Recommended | YES                                 |
|                                                                                                                                | Driver                        | 2SAR502UB | HZG                              | TL          |                                |   |   |               | 0.2                   | −30                  | −0.5               | 200 to 500         |                    | YES                                 |
|                                                                                                                                | General Purpose Amplification | 2SC4081UB | HZG                              | TL          | Q                              | R | S | NPN           | 0.2                   | 50                   | 0.15               | 120 to 560         | S: Not Recommended | YES                                 |
|                                                                                                                                | Driver                        | 2SCR502UB | HZG                              | TL          |                                |   |   |               | 0.2                   | 30                   | 0.5                | 200 to 500         |                    | YES                                 |

Note 1: \*1 With reference land installed.

Note 2: \*2 For h<sub>FE</sub>, Q: 120 to 270, R: 180 to 390, S: 270 to 560. Please see the technical specifications.

Note 3: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.

## General Purpose Amplification Bipolar Transistors (Gull type)

| Package                                                                                                                 | Application                                                                                                    | Type         |                    |             |                                |   |   | Polarity (ch) | P <sub>o</sub> *1 (W) | V <sub>CEO</sub> (V) | I <sub>C</sub> (A) | h <sub>FE</sub> *2 |                    | Automotive Grade Available AEC-Q101 |     |
|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|--------------|--------------------|-------------|--------------------------------|---|---|---------------|-----------------------|----------------------|--------------------|--------------------|--------------------|-------------------------------------|-----|
|                                                                                                                         |                                                                                                                | Part No.     | Grade Code         | Taping Code | *2 : Codes For h <sub>FE</sub> |   |   |               |                       |                      |                    |                    |                    |                                     |     |
|                                                                                                                         |                                                                                                                |              | Automotive Product |             |                                |   |   |               |                       |                      |                    |                    |                    |                                     |     |
| <br>SOT-416 (EMT3) [SC-75A] 1616 size | General Purpose Amplification                                                                                  | 2SA1774      | FRA                | TL          | Q                              | R | S | PNP           | 0.15                  | −50                  | −0.15              | 120 to 560         | S: Not Recommended | YES                                 |     |
|                                                                                                                         |                                                                                                                | 2SC4617      | FRA                | TL          | Q                              | R | S | NPN           | 0.15                  | 50                   | 0.15               | 120 to 560         |                    | YES                                 |     |
| <br>SOT-323 (UMT3) [SC-70] 2021 size | General Purpose Amplification                                                                                  | 2SA1576A     | FRA                | T106        | Q                              | R | S | PNP           | 0.2                   | −50                  | −0.15              | 120 to 560         | S: Not Recommended | YES                                 |     |
|                                                                                                                         |                                                                                                                | 2SA1576U3    | HZG                | T106        | Q                              | R | S |               | 0.2                   | −50                  | −0.15              | 120 to 560         | S: Not Recommended | YES                                 |     |
|                                                                                                                         | Low V <sub>CE(sat)</sub>                                                                                       | 2SB1694      | FRA                | T106        |                                |   |   |               | 0.2                   | −30                  | −1                 | 270 to 680         |                    | YES                                 |     |
|                                                                                                                         |                                                                                                                | 2SAR502U3    | HZG                | T106        |                                |   |   |               | 0.2                   | −30                  | −0.5               | 200 to 500         |                    | YES                                 |     |
|                                                                                                                         | High Speed SW                                                                                                  | 2SA2088U3    | HZG                | T106        | Q                              |   |   |               | 0.2                   | −60                  | −0.5               | 120 to 270         |                    | YES                                 |     |
|                                                                                                                         |                                                                                                                | 2SA2088      | FRA                | T106        | Q                              |   |   |               | 0.2                   | −60                  | −0.5               | 120 to 390         |                    | YES                                 |     |
|                                                                                                                         | High Voltage                                                                                                   | 2SA1579U3    | HZG                | T106        | R                              | S |   | 0.2           | −120                  | −0.05                | 180 to 560         |                    | YES                |                                     |     |
|                                                                                                                         |                                                                                                                | 2SA1579      | FRA                | T106        | R                              | S |   | 0.2           | −120                  | −0.05                | 180 to 560         |                    | YES                |                                     |     |
|                                                                                                                         | General Purpose Amplification                                                                                  | 2SC4081      | FRA                | T106        | Q                              | R | S | NPN           | 0.2                   | 50                   | 0.15               | 120 to 560         | S: Not Recommended | YES                                 |     |
|                                                                                                                         |                                                                                                                | 2SC4081U3    | HZG                | T106        | Q                              | R | S |               | 0.2                   | 50                   | 0.15               | 120 to 560         | S: Not Recommended | YES                                 |     |
|                                                                                                                         | Low V <sub>CE(sat)</sub>                                                                                       | 2SD2656      | FRA                | T106        |                                |   |   |               | 0.2                   | 30                   | 1                  | 270 to 680         |                    | YES                                 |     |
|                                                                                                                         |                                                                                                                | 2SCR502U3    | HZG                | T106        |                                |   |   |               | 0.2                   | 30                   | 0.5                | 200 to 500         |                    | YES                                 |     |
|                                                                                                                         | High Speed SW                                                                                                  | 2SC5876U3    | HZG                | T106        | Q                              | R |   |               | 0.2                   | 60                   | 0.5                | 120 to 390         |                    | YES                                 |     |
|                                                                                                                         |                                                                                                                | 2SC5876      | FRA                | T106        | Q                              | R |   |               | 0.2                   | 60                   | 0.5                | 120 to 390         |                    | YES                                 |     |
|                                                                                                                         | High Voltage                                                                                                   | 2SC4102U3    | HZG                | T106        | R                              | S |   |               | 0.2                   | 120                  | 0.05               | 180 to 560         |                    | YES                                 |     |
|                                                                                                                         |                                                                                                                | 2SC4102      | FRA                | T106        | R                              | S |   |               | 0.2                   | 120                  | 0.05               | 180 to 560         |                    | YES                                 |     |
| <br>SOT-346 (SMT3) [SC-59] 2928 size | Driver                                                                                                         | 2SA1036K     | FRA                | T146        | Q                              | R |   |               | PNP                   | 0.2                  | −32                | −0.5               | 120 to 390         |                                     | YES |
|                                                                                                                         |                                                                                                                | 2SB1197K     | FRA                | T146        | Q                              | R |   |               |                       | 0.2                  | −32                | −0.8               | 120 to 390         |                                     | YES |
|                                                                                                                         |                                                                                                                | 2SB1198K     | FRA                | T146        | Q                              | R |   | 0.2           |                       | −80                  | −0.5               | 120 to 390         |                    | YES                                 |     |
|                                                                                                                         | High Voltage                                                                                                   | 2SA1514K     | FRA                | T146        | R                              | S |   | 0.2           |                       | −120                 | −0.05              | 180 to 560         |                    | YES                                 |     |
|                                                                                                                         | Driver                                                                                                         | 2SC2411K     | FRA                | T146        | Q                              | R |   | NPN           | 0.2                   | 32                   | 0.5                | 120 to 390         |                    | YES                                 |     |
|                                                                                                                         |                                                                                                                | 2SD1781K     | FRA                | T146        | Q                              | R |   |               | 0.2                   | 32                   | 0.8                | 120 to 390         |                    | YES                                 |     |
|                                                                                                                         |                                                                                                                | 2SD1484K     | FRA                | T146        | Q                              | R |   |               | 0.2                   | 50                   | 0.5                | 120 to 390         |                    | YES                                 |     |
|                                                                                                                         |                                                                                                                | 2SD1782K     | FRA                | T146        | Q                              | R |   |               | 0.2                   | 80                   | 0.5                | 120 to 390         |                    | YES                                 |     |
|                                                                                                                         |                                                                                                                | High Voltage | 2SC3906K           | FRA         | T146                           | R | S |               |                       | 0.2                  | 120                | 0.05               | 180 to 560         |                                     | YES |
|                                                                                                                         | <br>SOT-23 (SST3) 2924 size | High Voltage | 2SARA41C           | HZG         | T116                           | R | S |               | PNP                   | 0.2                  | −120               | −0.05              | 180 to 560         |                                     | YES |
| 2SCRC41C                                                                                                                |                                                                                                                |              | HZG                | T116        | R                              | S |   | NPN           | 0.2                   | 120                  | 0.05               | 180 to 560         |                    | YES                                 |     |

Note 1: \*1 With reference land installed.

Note 2: \*2 For h<sub>FE</sub>, Q: 120 to 270, R: 180 to 390, S: 270 to 560. Please see the technical specifications.

Note 3: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.

| Bipolar Transistors (For Overseas Customers)                                                                          |                               |             |            |             |               |                       |                      |                    |                    |                                     |
|-----------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------|------------|-------------|---------------|-----------------------|----------------------|--------------------|--------------------|-------------------------------------|
| Package                                                                                                               | Application                   | Type        |            |             | Polarity (ch) | P <sub>D</sub> *1 (W) | V <sub>CE0</sub> (V) | I <sub>C</sub> (A) | h <sub>FE</sub> *2 | Automotive Grade Available AEC-Q101 |
|                                                                                                                       |                               | Part No.    | Grade Code | Taping Code |               |                       |                      |                    |                    |                                     |
| <br>SOT-323 (UMT3) [SC-70] 2021 size | General Purpose Amplification | ☆BC857BU3   | HZG        | T106        | PNP           | 0.15                  | −45                  | −0.1               | 210 to 480         | YES                                 |
|                                                                                                                       | Switching                     | UMT4403U3   | HZG        | T106        |               | 0.15                  | −40                  | −0.6               | 100 to 300         | YES                                 |
|                                                                                                                       | General Purpose Amplification | ☆BC847BU3   | HZG        | T106        | NPN           | 0.15                  | 45                   | 0.1                | 200 to 450         | YES                                 |
|                                                                                                                       | Switching                     | UMT4401U3   | HZG        | T106        |               | 0.15                  | 40                   | 0.6                | 100 to 300         | YES                                 |
|                                                                                                                       |                               | UM2222AU3   | HZG        | T106        |               | 0.15                  | 40                   | 0.6                | 100 to 300         | YES                                 |
| <br>SOT-23 (SST3) 2924 size          | General Purpose Amplification | BC858B      | HZG        | T116        | PNP           | 0.2                   | −30                  | −0.1               | 200 to 450         | YES                                 |
|                                                                                                                       |                               | BC857B      | HZG        | T116        |               | 0.2                   | −45                  | −0.1               | 200 to 480         | YES                                 |
|                                                                                                                       |                               | ☆BC857C     | HZG        | T116        |               | 0.2                   | −45                  | −0.15              | 420 to 800         | YES                                 |
|                                                                                                                       |                               | BC856B      | HZG        | T116        |               | 0.2                   | −65                  | −0.1               | 220 to 475         | YES                                 |
|                                                                                                                       |                               | New BSS63   | HZG        | T116        |               | 0.2                   | −100                 | −0.1               | 30 or more         | YES                                 |
|                                                                                                                       | Driver                        | New BSS5130 | HZG        | T116        |               | 0.2                   | −30                  | −1                 | 270 to 680         | YES                                 |
|                                                                                                                       |                               | BCX17       | HZG        | T116        |               | 0.2                   | −45                  | −0.5               | 100 to 600         | YES                                 |
|                                                                                                                       |                               | BC807-16    | HZG        | T116        |               | 0.2                   | −45                  | −0.8               | 100 to 250         | YES                                 |
|                                                                                                                       |                               | BC807-25    | HZG        | T116        |               | 0.2                   | −45                  | −0.8               | 160 to 400         | YES                                 |
|                                                                                                                       |                               | BC807-40    | HZG        | T116        |               | 0.2                   | −45                  | −0.8               | 250 to 600         | YES                                 |
|                                                                                                                       |                               | SSTA56      | HZG        | T116        |               | 0.2                   | −80                  | −0.5               | 100 or more        | YES                                 |
|                                                                                                                       |                               | SST4403     | HZG        | T116        |               | 0.2                   | −40                  | −0.6               | 100 to 300         | YES                                 |
|                                                                                                                       |                               | SST2907A    | HZG        | T116        |               | 0.2                   | −60                  | −0.6               | 100 to 300         | YES                                 |
|                                                                                                                       | Switching                     | SST3906     | HZG        | T116        |               | 0.2                   | −40                  | −0.2               | 100 to 300         | YES                                 |
|                                                                                                                       |                               | BC848B      | HZG        | T116        | NPN           | 0.2                   | 30                   | 0.1                | 200 to 450         | YES                                 |
|                                                                                                                       |                               | BC847B      | HZG        | T116        |               | 0.2                   | 45                   | 0.1                | 200 to 450         | YES                                 |
|                                                                                                                       | General Purpose Amplification | ☆BC847C     | HZG        | T116        |               | 0.2                   | 45                   | 0.15               | 420 to 800         | YES                                 |
|                                                                                                                       |                               | ☆BC846B     | HZG        | T116        |               | 0.2                   | 45                   | 0.12               | 200 to 450         | YES                                 |
|                                                                                                                       |                               | New BSS64   | HZG        | T116        |               | 0.2                   | 100                  | 0.1                | 30 or more         | YES                                 |
|                                                                                                                       |                               | New BSS4130 | HZG        | T116        |               | 0.2                   | 30                   | 1                  | 270 to 680         | YES                                 |
|                                                                                                                       |                               | BCX19       | HZG        | T116        |               | 0.2                   | 45                   | 0.5                | 100 to 600         | YES                                 |
|                                                                                                                       | Driver                        | BC817-16    | HZG        | T116        |               | 0.2                   | 45                   | 0.8                | 100 to 250         | YES                                 |
|                                                                                                                       |                               | BC817-25    | HZG        | T116        |               | 0.2                   | 45                   | 0.8                | 160 to 400         | YES                                 |
|                                                                                                                       |                               | BC817-40    | HZG        | T116        |               | 0.2                   | 45                   | 0.8                | 250 to 600         | YES                                 |
|                                                                                                                       |                               | SSTA06      | HZG        | T116        |               | 0.2                   | 80                   | 0.5                | 100 or more        | YES                                 |
|                                                                                                                       | Switching                     | SST3904     | HZG        | T116        |               | 0.2                   | 40                   | 0.2                | 100 to 300         | YES                                 |
|                                                                                                                       |                               | SST4401     | HZG        | T116        |               | 0.2                   | 40                   | 0.6                | 100 to 300         | YES                                 |
|                                                                                                                       |                               | SST2222A    | HZG        | T116        |               | 0.2                   | 40                   | 0.6                | 100 to 300         | YES                                 |

Note 1: \*1 With reference land installed.

Note 2: \*2 For h<sub>FE</sub>, please see the technical specifications.

Note 3: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.

☆ : Under Development

| Power Bipolar Transistors                                                                                              |             |          |                                  |             |                                |               |                       |                      |                    |                    |                                     |            |     |
|------------------------------------------------------------------------------------------------------------------------|-------------|----------|----------------------------------|-------------|--------------------------------|---------------|-----------------------|----------------------|--------------------|--------------------|-------------------------------------|------------|-----|
| Package                                                                                                                | Application | Type     |                                  |             |                                | Polarity (ch) | P <sub>D</sub> *1 (W) | V <sub>CE0</sub> (V) | I <sub>C</sub> (A) | h <sub>FE</sub> *2 | Automotive Grade Available AEC-Q101 |            |     |
|                                                                                                                        |             | Part No. | Grade Code<br>Automotive Product | Taping Code | *2 : Codes For h <sub>FE</sub> |               |                       |                      |                    |                    |                                     |            |     |
| <br>SOT-89 (MPT3) [SC-62] 4540 size | Driver      | 2SAR293P | FRA                              | T100        |                                |               |                       | PNP                  | 0.5                | −30                | −1                                  | 270 to 680 | YES |
|                                                                                                                        |             | 2SAR512P | FRA                              | T100        |                                |               |                       |                      | 0.5                | −30                | −2                                  | 200 to 500 | YES |
|                                                                                                                        |             | 2SAR552P | FRA                              | T100        |                                |               |                       |                      | 0.5                | −30                | −3                                  | 200 to 500 | YES |
|                                                                                                                        |             | 2SAR542P | FRA                              | T100        |                                |               |                       |                      | 0.5                | −30                | −5                                  | 200 to 500 | YES |
|                                                                                                                        |             | 2SAR513P | FRA                              | T100        |                                |               |                       |                      | 0.5                | −50                | −1                                  | 180 to 450 | YES |
|                                                                                                                        |             | 2SAR553P | FRA                              | T100        |                                |               |                       |                      | 0.5                | −50                | −2                                  | 180 to 450 | YES |
|                                                                                                                        |             | 2SAR533P | FRA                              | T100        |                                |               |                       |                      | 0.5                | −50                | −3                                  | 180 to 450 | YES |
|                                                                                                                        |             | 2SAR514P | FRA                              | T100        |                                |               |                       |                      | 0.5                | −80                | −0.7                                | 120 to 390 | YES |
|                                                                                                                        |             | 2SAR554P | FRA                              | T100        |                                |               |                       |                      | 0.5                | −80                | −1.5                                | 120 to 390 | YES |
|                                                                                                                        |             | 2SAR544P | FRA                              | T100        |                                |               |                       |                      | 0.5                | −80                | −2.5                                | 120 to 390 | YES |
|                                                                                                                        |             | 2SCR293P | FRA                              | T100        |                                |               |                       | NPN                  | 0.5                | 30                 | 1                                   | 270 to 680 | YES |
|                                                                                                                        |             | 2SCR512P | FRA                              | T100        |                                |               |                       |                      | 0.5                | 30                 | 2                                   | 200 to 500 | YES |
|                                                                                                                        |             | 2SCR552P | FRA                              | T100        |                                |               |                       |                      | 0.5                | 30                 | 3                                   | 200 to 500 | YES |
|                                                                                                                        |             | 2SCR542P | FRA                              | T100        |                                |               |                       |                      | 0.5                | 30                 | 5                                   | 200 to 500 | YES |
|                                                                                                                        |             | 2SCR513P | FRA                              | T100        |                                |               |                       |                      | 0.5                | 50                 | 1                                   | 180 to 450 | YES |
|                                                                                                                        |             | 2SCR553P | FRA                              | T100        |                                |               |                       |                      | 0.5                | 50                 | 2                                   | 180 to 450 | YES |
|                                                                                                                        |             | 2SCR533P | FRA                              | T100        |                                |               |                       |                      | 0.5                | 50                 | 3                                   | 180 to 450 | YES |
|                                                                                                                        |             | 2SCR514P | FRA                              | T100        |                                |               |                       |                      | 0.5                | 80                 | 0.7                                 | 120 to 390 | YES |
|                                                                                                                        |             | 2SCR554P | FRA                              | T100        |                                |               |                       |                      | 0.5                | 80                 | 1.5                                 | 120 to 390 | YES |
|                                                                                                                        |             | 2SCR544P | FRA                              | T100        |                                |               |                       |                      | 0.5                | 80                 | 2.5                                 | 120 to 390 | YES |
|                                                                                                                        |             | 2SCR372P | FRA                              | T100        | Q                              | R             |                       |                      | 0.5                | 120                | 0.7                                 | 120 to 390 | YES |
|                                                                                                                        |             | 2SCR375P | FRA                              | T100        | Q                              | R             |                       |                      | 0.5                | 120                | 1.5                                 | 120 to 390 | YES |

Note 1: \*1 With reference land installed.

Note 2: \*2 For h<sub>FE</sub>, Q: 120 to 270, R: 180 to 390. Please see the technical specifications.

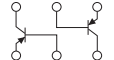
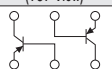
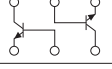
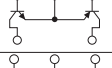
Note 3: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.

## Bipolar Transistors

| Power Bipolar Transistors                                                                            |             |               |                    |             |               |                       |                      |                    |                 |                                     |
|------------------------------------------------------------------------------------------------------|-------------|---------------|--------------------|-------------|---------------|-----------------------|----------------------|--------------------|-----------------|-------------------------------------|
| Package                                                                                              | Application | Type          |                    |             | Polarity (ch) | P <sub>D</sub> *1 (W) | V <sub>CEO</sub> (V) | I <sub>C</sub> (A) | h <sub>FE</sub> | Automotive Grade Available AEC-Q101 |
|                                                                                                      |             | Part No.      | Grade Code         | Taping Code |               |                       |                      |                    |                 |                                     |
|                                                                                                      |             |               | Automotive Product | Code        |               |                       |                      |                    |                 |                                     |
| <br>TO-252 (DPAK)   | Driver      | New 2SAR572D3 | FRA                | TL          | PNP           | 10                    | −30                  | −5                 | 200 to 500      | YES                                 |
|                                                                                                      |             | New 2SAR573D3 | FRA                | TL          |               | 10                    | −50                  | −3                 | 180 to 450      | YES                                 |
|                                                                                                      |             | New 2SAR574D3 | FRA                | TL          |               | 10                    | −80                  | −2                 | 120 to 390      | YES                                 |
|                                                                                                      |             | New 2SAR586D3 | FRA                | TL          |               | 10                    | −80                  | −5                 | 120 to 390      | YES                                 |
|                                                                                                      |             | New 2SCR572D3 | FRA                | TL          | NPN           | 10                    | 30                   | 5                  | 200 to 500      | YES                                 |
|                                                                                                      |             | New 2SCR573D3 | FRA                | TL          |               | 10                    | 50                   | 3                  | 180 to 450      | YES                                 |
|                                                                                                      |             | New 2SCR574D3 | FRA                | TL          |               | 10                    | 80                   | 2                  | 120 to 390      | YES                                 |
|                                                                                                      |             | New 2SCR586D3 | FRA                | TL          |               | 10                    | 80                   | 5                  | 120 to 390      | YES                                 |
|                                                                                                      |             |               |                    |             |               |                       |                      |                    |                 |                                     |
| <br>TO-263AB (LPTL) | Driver      | New 2SCR586J  | FRG                | TLL         | NPN           | 40                    | 80                   | 5                  | 120 to 390      | YES                                 |

Note 1: \*1 T<sub>C</sub>=25°C  
Note 2: Package is JEDEC code. ( ) : ROHM Package, [ ] : GENERAL Code.

## Complex Bipolar Transistors

| General Purpose Amplification Bipolar Transistors |             |                                                                                     |                                                                                   |                                                                                   |                                                                                   |                                      |                         |                       |                 |
|---------------------------------------------------|-------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------|-------------------------|-----------------------|-----------------|
| Configuration                                     | Package     |  | SOT-553/SOT-563<br>(EMT5/EMT6)<br>[SC-107BB/SC-107C]<br>1616 size                 | SOT-353/SOT-363<br>(UMT5/UMT6)<br>[SC-88A/SC-88]<br>2021 size                     | SOT-25/SOT-457<br>(SMT5/SMT6)<br>[SC-74A/SC-74]<br>2928 size                      | Equivalent<br>Element<br>Transistors | V <sub>CEO</sub><br>(V) | I <sub>C</sub><br>(A) | h <sub>FE</sub> |
|                                                   | Item        |                                                                                     |  |  |  |                                      |                         |                       |                 |
|                                                   | Application | Equivalent Circuit Diagram<br>(TOP View)                                            | Part No.                                                                          |                                                                                   |                                                                                   |                                      |                         |                       |                 |
| PNP×2                                             | Pre Amp.    |  | EMT1                                                                              | UMT1N                                                                             |                                                                                   | 2SA1037AK×2                          | −50                     | −0.15                 | 120 to 560      |
| NPN×2                                             | Pre Amp.    |  | EMX1                                                                              | UMX1N                                                                             |                                                                                   | 2SC2412K×2                           | 50                      | 0.15                  | 120 to 560      |
| PNP<br>+<br>NPN                                   | Pre Amp.    |  |                                                                                   |                                                                                   | FMY1A                                                                             | 2SA1037AK                            | −50                     | −0.15                 | 120 to 560      |
|                                                   |             |                                                                                     |                                                                                   |                                                                                   |                                                                                   | 2SC2412K                             | 50                      | 0.15                  | 120 to 560      |
|                                                   |             |  | EMZ1                                                                              | UMZ1N                                                                             |                                                                                   | 2SA1037AK                            | −50                     | −0.15                 | 120 to 560      |
|                                                   |             |                                                                                     |                                                                                   |                                                                                   |                                                                                   | 2SC2412K                             | 50                      | 0.15                  | 120 to 560      |

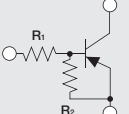
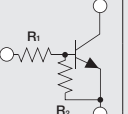
Note 1: For No.1 Pin location, please see the technical specifications.  
Note 2: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.

# Digital Transistors

| 100mA Digital Transistors                                      |           |           |                        |                        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |         |                                           |         |     |     |     |     |     |     |                                               |                                            |                                      |
|----------------------------------------------------------------|-----------|-----------|------------------------|------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------|-------------------------------------------|---------|-----|-----|-----|-----|-----|-----|-----------------------------------------------|--------------------------------------------|--------------------------------------|
| Item                                                           | Part No.  |           | R <sub>1</sub><br>(kΩ) | R <sub>2</sub><br>(kΩ) | Package                                                                           |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |         |                                           |         |     |     |     |     |     |     | V <sub>CC</sub><br>(V <sub>CE0</sub> )<br>(V) | I <sub>o</sub><br>(I <sub>C</sub> )<br>(A) | G <sub>1</sub><br>(h <sub>FE</sub> ) |
|                                                                | PNP       | NPN       |                        |                        | SOT-723<br>(VMT3)<br>[SC-105AA]<br>1212 size                                      | SOT-416FL<br>(EMT3F)<br>[SC-89]<br>1616 size                                      | SOT-416<br>(EMT3)<br>[SC-75A]<br>1616 size                                        | SOT-323FL<br>(UMT3F)<br>[SC-85]<br>2021 size                                      | SOT-323<br>(UMT3)<br>[SC-70]<br>2021 size                                         |                                                                                     | SOT-23<br>(SST3)<br>2924 size                                                       |         | SOT-346<br>(SMT3)<br>[SC-59]<br>2928 size |         |     |     |     |     |     |     |                                               |                                            |                                      |
|                                                                |           |           |                        |                        |  |  |  |  |  |  |  |         |                                           |         |     |     |     |     |     |     |                                               |                                            |                                      |
|                                                                |           |           |                        |                        | P <sub>D</sub> =150mW*                                                            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |         | P <sub>D</sub> =200mW*                    |         |     |     |     |     |     |     |                                               |                                            |                                      |
| Specifications                                                 |           |           |                        |                        | PNP                                                                               | NPN                                                                               | PNP                                                                               | NPN                                                                               | PNP                                                                               | NPN                                                                                 | PNP                                                                                 | NPN     | PNP                                       | NPN     | PNP | NPN | PNP | NPN | PNP | NPN |                                               |                                            |                                      |
| R <sub>1</sub> =R <sub>2</sub><br>Potential<br>Divider<br>type | DTA123Ex* | DTC123Ex* | 2.2                    | 2.2                    | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | New | New | ●   | ●   | ●   | ●   | 50                                            | 0.1                                        | 20 or more                           |
|                                                                | DTA143Ex* | DTC143Ex* | 4.7                    | 4.7                    | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | New | New | ●   | ●   | ●   | ●   |                                               | 0.1                                        | 30 or more                           |
|                                                                | DTA114Ex* | DTC114Ex* | 10                     | 10                     | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | New | New | ●   | ●   | ●   | ●   |                                               | 0.05                                       | 30 or more                           |
|                                                                | DTA124Ex* | DTC124Ex* | 22                     | 22                     | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | New | New | ●   | ●   | ●   | ●   |                                               | 0.03                                       | 56 or more                           |
|                                                                | DTA144Ex* | DTC144Ex* | 47                     | 47                     | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | New | New | ●   | ●   | ●   | ●   |                                               | 0.03                                       | 68 or more                           |
|                                                                | DTA115Ex* | DTC115Ex* | 100                    | 100                    | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | New | New | ●   | ●   | ●   | ●   |                                               | 0.02                                       | 82 or more                           |
| R <sub>1</sub> ≠R <sub>2</sub><br>Leak<br>Absorption<br>type   | DTA113Zx* | DTC113Zx* | 1                      | 10                     | New                                                                               | ●                                                                                 | New                                                                               | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | New | New | ●   | ●   | ●   | ●   |                                               | 0.1                                        | 33 or more                           |
|                                                                | DTA123Yx* | DTC123Yx* | 2.2                    | 10                     | New                                                                               | ●                                                                                 | New                                                                               | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | New | New | ●   | ●   | ●   | ●   |                                               | 0.1                                        | 33 or more                           |
|                                                                | DTA123Jx* | DTC123Jx* | 2.2                    | 47                     | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | New | New | ●   | ●   | ●   | ●   |                                               | 0.1                                        | 80 or more                           |
|                                                                | DTA143Xx* | DTC143Xx* | 4.7                    | 10                     | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | New | New | ●   | ●   | ●   | ●   |                                               | 0.1                                        | 30 or more                           |
|                                                                | DTA143Zx* | DTC143Zx* | 4.7                    | 47                     | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | New | New | ●   | ●   | ●   | ●   |                                               | 0.1                                        | 80 or more                           |
|                                                                | DTA114Wx* | DTC114Wx* | 10                     | 4.7                    | New                                                                               | ●                                                                                 | New                                                                               | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | ●   | ●   | ●   | ●   | ●   | ●   |                                               | 0.1                                        | 24 or more                           |
|                                                                | DTA114Yx* | DTC114Yx* | 10                     | 47                     | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | New | New | ●   | ●   | ●   | ●   |                                               | 0.07                                       | 68 or more                           |
|                                                                | DTA124Xx* | DTC124Xx* | 22                     | 47                     | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | New | New | ●   | ●   | ●   | ●   |                                               | 0.05                                       | 68 or more                           |
|                                                                | DTA144Vx* | DTC144Vx* | 47                     | 10                     | New                                                                               | ●                                                                                 | New                                                                               | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | ●   | ●   | New | New | ●   | ●   |                                               | 0.03                                       | 33 or more                           |
|                                                                | DTA144Wx* | DTC144Wx* | 47                     | 22                     | New                                                                               | ●                                                                                 | New                                                                               | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | ●   | ●   | New | New | ●   | ●   |                                               | 0.03                                       | 56 or more                           |
| Type<br>using R <sub>1</sub><br>alone<br>as Input<br>Resistor  | DTA123Tx* | DTC123Tx* | 2.2                    | —                      | New                                                                               | ●                                                                                 | New                                                                               | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | New                                       | New     | ●   | ●   | New | New | ●   | ●   |                                               | 0.1                                        | 100 to 600                           |
|                                                                | DTA143Tx* | DTC143Tx* | 4.7                    | —                      | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | New | New | ●   | ●   | ●   | ●   |                                               | 0.1                                        | 100 to 600                           |
|                                                                | DTA114Tx* | DTC114Tx* | 10                     | —                      | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | New | New | ●   | ●   | ●   | ●   |                                               | 0.1                                        | 100 to 600                           |
|                                                                | DTA124Tx* | DTC124Tx* | 22                     | —                      | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | ●   | ●   | New | New | ●   | ●   |                                               | 0.1                                        | 100 to 600                           |
|                                                                | DTA144Tx* | DTC144Tx* | 47                     | —                      | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | ●   | ●   | New | New | ●   | ●   |                                               | 0.1                                        | 100 to 600                           |
|                                                                | DTA115Tx* | DTC115Tx* | 100                    | —                      | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | ●   | ●   | New | New | ●   | ●   |                                               | 0.1                                        | 100 to 600                           |
| Type<br>using R <sub>2</sub><br>alone<br>as Input<br>Resistor  | DTA114Gx* | DTC114Gx* | —                      | 10                     | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | New | ●   | ●   | ●   | ●   | ●   |                                               | 0.1                                        | 30 or more                           |
|                                                                | DTA124Gx* | DTC124Gx* | —                      | 22                     | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | ●   | ●   | ●   | ●   | ●   | ●   |                                               | 0.1                                        | 56 or more                           |
|                                                                | DTA144Gx* | DTC144Gx* | —                      | 47                     | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | ●   | ●   | ●   | ●   | ●   | ●   |                                               | 0.1                                        | 68 or more                           |
|                                                                | DTA115Gx* | DTC115Gx* | —                      | 100                    | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                 | ●                                                                                   | ●                                                                                   | ●       | ●                                         | ●       | ●   | ●   | New | ●   | ●   | ●   |                                               | 0.1                                        | 82 or more                           |
| x: Packaging designation symbol                                |           |           |                        |                        | M                                                                                 | EB                                                                                | E                                                                                 | UB                                                                                | UA                                                                                | U3                                                                                  | CA                                                                                  | KA      |                                           |         |     |     |     |     |     |     |                                               |                                            |                                      |
| *: Specification+Packaging Symbol                              |           |           |                        |                        | FHAT2L                                                                            | HZGTL                                                                             | FRATL                                                                             | HZGTL                                                                             | FRAT106                                                                           |                                                                                     |                                                                                     | HZGT116 |                                           | FRAT146 |     |     |     |     |     |     |                                               |                                            |                                      |

Note 1: VMT3, EMT3F, EMT3 and UMT3F without suffix A.  
 Note 2: \*With reference land installed.  
 Note 3: PNP(-)symbol omitted.  
 Note 4: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.

## Digital Transistors

| 500mA Digital Transistors                                           |                                                                                   |                                                                                   |                                   |                                   |                                                                                   |     |                                                                                   |     |                                                                                     |   |                                                         |                                                      |                                               |            |
|---------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------------------------------------------------------|-----|-----------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------|---|---------------------------------------------------------|------------------------------------------------------|-----------------------------------------------|------------|
| Item                                                                | Part No.                                                                          |                                                                                   | <div>R<sub>1</sub><br/>(kΩ)</div> | <div>R<sub>2</sub><br/>(kΩ)</div> | Package                                                                           |     |                                                                                   |     |                                                                                     |   | <div>V<sub>CC</sub><br/>(V<sub>CE0</sub>)<br/>(V)</div> | <div>I<sub>O</sub><br/>(I<sub>C</sub>)<br/>(A)</div> | <div>G<sub>I</sub><br/>(h<sub>FE</sub>)</div> |            |
|                                                                     | PNP                                                                               | NPN                                                                               |                                   |                                   | SOT-323<br>(UMT3)<br>[SC-70]<br>2021 size                                         |     | SOT-23<br>(SST3)<br>2924 size                                                     |     | SOT-346<br>(SMT3)<br>[SC-59]<br>2928 size                                           |   |                                                         |                                                      |                                               |            |
|                                                                     |  |  |                                   |                                   |  |     |  |     |  |   |                                                         |                                                      |                                               |            |
|                                                                     | P <sub>D</sub> =200mW*1                                                           |                                                                                   |                                   |                                   |                                                                                   |     |                                                                                   |     |                                                                                     |   |                                                         |                                                      |                                               |            |
|                                                                     | PNP                                                                               | NPN                                                                               |                                   |                                   | PNP                                                                               | NPN | PNP                                                                               | NPN |                                                                                     |   |                                                         |                                                      |                                               |            |
| Specifications                                                      | <div>R<sub>1</sub>=R<sub>2</sub><br/>Potential<br/>Divider<br/>type</div>         | DTB113Ex*                                                                         | DTD113Ex*                         | 1                                 | 1                                                                                 | ●   | ●                                                                                 | ●   | ●                                                                                   | ● | ●                                                       | 50                                                   | 0.5                                           | 33 or more |
|                                                                     |                                                                                   | DTB123Ex*                                                                         | DTD123Ex*                         | 2.2                               | 2.2                                                                               | ●   | ●                                                                                 | ●   | ●                                                                                   | ● | ●                                                       |                                                      |                                               | 39 or more |
|                                                                     |                                                                                   | DTB143Ex*                                                                         | DTD143Ex*                         | 4.7                               | 4.7                                                                               | ●   | ●                                                                                 | ●   | ●                                                                                   | ● | ●                                                       |                                                      |                                               | 47 or more |
|                                                                     |                                                                                   | DTB114Ex*                                                                         | DTD114Ex*                         | 10                                | 10                                                                                | ●   | ●                                                                                 | ●   | ●                                                                                   | ● | ●                                                       |                                                      |                                               | 56 or more |
| <div>R<sub>1</sub>≠R<sub>2</sub><br/>Leak Absorption<br/>type</div> | DTB113Zx*                                                                         | DTD113Zx*                                                                         | 1                                 | 10                                | ●                                                                                 | ●   | ●                                                                                 | ●   | ●                                                                                   | ● | 56 or more                                              |                                                      |                                               |            |
|                                                                     | DTB123Yx*                                                                         | DTD123Yx*                                                                         | 2.2                               | 10                                | ●                                                                                 | ●   | ●                                                                                 | ●   | ●                                                                                   | ● | 56 or more                                              |                                                      |                                               |            |
|                                                                     | Type using R <sub>2</sub><br>alone as Bleeder<br>Resistor                         | DTB114Gx*                                                                         | DTD114Gx*                         | —                                 | 10                                                                                | ●   | ●                                                                                 | ●   | ●                                                                                   |   |                                                         |                                                      | 56 or more                                    |            |
|                                                                     | Type using R <sub>1</sub><br>alone as Input<br>Resistor                           | DTB123Tx*                                                                         | DTD123Tx*                         | 2.2                               | —                                                                                 | ●   | ●                                                                                 | ●   | ●                                                                                   |   |                                                         | 40                                                   |                                               | 100 to 600 |
| x: Packaging designation symbol                                     |                                                                                   |                                                                                   |                                   |                                   | U                                                                                 |     | C                                                                                 |     | K*2                                                                                 |   |                                                         |                                                      |                                               |            |
| *: Specification+Packaging Symbol                                   |                                                                                   |                                                                                   |                                   |                                   | HZGT106                                                                           |     | HZGT116                                                                           |     | FRAT146                                                                             |   |                                                         |                                                      |                                               |            |

Note 1: \*1 With reference land installed. \*2 is not recommended for a new design.

Note 2: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.

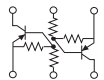
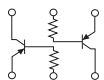
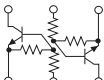
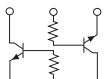
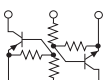
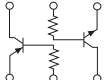
| Power Digital Transistors |                        |                                                                                              |                                                         |                                                         |                                          |                                                         |                                                      |                                               |
|---------------------------|------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-----------------------------------------------|
| Item                      | Part No.               |                                                                                              | <div><div></div><div>R<sub>1</sub><br/>(kΩ)</div></div> | <div><div></div><div>R<sub>2</sub><br/>(kΩ)</div></div> | Package                                  | <div>V<sub>CC</sub><br/>(V<sub>CE0</sub>)<br/>(V)</div> | <div>I<sub>O</sub><br/>(I<sub>C</sub>)<br/>(A)</div> | <div>G<sub>I</sub><br/>(h<sub>FE</sub>)</div> |
|                           | PNP                    | NPN                                                                                          |                                                         |                                                         | SOT-89<br>(MPT3)<br>[SC-62]<br>4540 size |                                                         |                                                      |                                               |
|                           | —                      | <div><div></div><div>R<sub>1</sub></div><div><div></div><div>R<sub>2</sub></div></div></div> |                                                         |                                                         | <div><div></div></div>                   |                                                         |                                                      |                                               |
|                           | P <sub>D</sub> =0.5W*1 |                                                                                              |                                                         |                                                         |                                          |                                                         |                                                      |                                               |
| Specifications            | —                      | DTDG23YP                                                                                     | 2.2                                                     | 10                                                      | DTDG23YP                                 | 60±10                                                   | 1                                                    | 300 or more                                   |
|                           | —                      | DTDG14GP                                                                                     | —                                                       | 10                                                      | DTDG14GP                                 |                                                         |                                                      | 300 or more                                   |

Note 1: \*1 With reference land installed.

Note 2: For internal circuit, please see the technical specifications.

Note 3: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.

## Complex Digital Transistors

| 100mA Complex Digital Transistors                                                   |                                                                                    |                                                                                   |                                                                                     |                                |                     |                     |                                         |                                      |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------|---------------------|---------------------|-----------------------------------------|--------------------------------------|
| Configuration                                                                       | Equivalent Circuit Diagram (TOP View)                                              | SOT-563 (EMT6) [SC-107C] 1616 size                                                | SOT-363 (UMT6) [SC-88] 2021 size                                                    | Equivalent Element Transistors | R <sub>1</sub> (kΩ) | R <sub>2</sub> (kΩ) | V <sub>CC</sub> (V <sub>CE0</sub> ) (V) | I <sub>o</sub> (I <sub>c</sub> ) (A) |
|                                                                                     |                                                                                    |  |    |                                |                     |                     |                                         |                                      |
|                                                                                     |                                                                                    | Part No.                                                                          |                                                                                     |                                |                     |                     |                                         |                                      |
| PNP×2                                                                               |   | EMB10FHAT2R                                                                       | UMB10NFHATN                                                                         | DTA123J×2                      | 2.2                 | 47                  | 50                                      | 0.1                                  |
|                                                                                     |                                                                                    | EMB11FHAT2R                                                                       | UMB11NFHATN                                                                         | DTA114E×2                      | 10                  | 10                  |                                         | 0.05                                 |
|                                                                                     |                                                                                    | EMB2FHAT2R                                                                        | UMB2NFHATN                                                                          | DTA144E×2                      | 47                  | 47                  |                                         | 0.03                                 |
|                                                                                     |   | EMB3FHAT2R                                                                        | UMB3NFHATN                                                                          | DTA143T×2                      | 4.7                 | —                   |                                         | 0.1                                  |
|                                                                                     |                                                                                    | EMB4FHAT2R                                                                        | UMB4NFHATN                                                                          | DTA114T×2                      | 10                  | —                   |                                         | 0.1                                  |
|                                                                                     |                                                                                    |                                                                                   |                                                                                     |                                |                     |                     |                                         |                                      |
| NPN×2                                                                               |   | EMH10FHAT2R                                                                       | UMH10NFHATN                                                                         | DTC123J×2                      | 2.2                 | 47                  |                                         | 0.1                                  |
|                                                                                     |                                                                                    | EMH25FHAT2R                                                                       | ☆UMH25NFHATN                                                                        | DTC143Z×2                      | 4.7                 | 47                  |                                         | 0.1                                  |
|                                                                                     |                                                                                    | EMH11FHAT2R                                                                       | UMH11NFHATN                                                                         | DTC114E×2                      | 10                  | 10                  |                                         | 0.05                                 |
|                                                                                     |                                                                                    | EMH9FHAT2R                                                                        | UMH9NFHATN                                                                          | DTC114Y×2                      | 10                  | 47                  |                                         | 0.07                                 |
|                                                                                     |                                                                                    | EMH1FHAT2R                                                                        | UMH1NFHATN                                                                          | DTC124E×2                      | 22                  | 22                  |                                         | 0.03                                 |
|                                                                                     |                                                                                    | EMH2FHAT2R                                                                        | UMH2NFHATN                                                                          | DTC144E×2                      | 47                  | 47                  |                                         | 0.03                                 |
|                                                                                     |  | EMH3FHAT2R                                                                        | UMH3NFHATN                                                                          | DTC143T×2                      | 4.7                 | —                   | 0.1                                     |                                      |
|                                                                                     |                                                                                    | EMH4FHAT2R                                                                        | UMH4NFHATN                                                                          | DTC114T×2                      | 10                  | —                   | 0.1                                     |                                      |
|                                                                                     |                                                                                    |                                                                                   | UMH8NFHATN                                                                          |                                |                     |                     |                                         |                                      |
|                                                                                     |                                                                                    | PNP+NPN complimentary                                                             |  | EMD22FHAT2R                    | UMD22NFHATR         | DTA143Z             | 4.7                                     | 47                                   |
| DTC143Z                                                                             | 4.7                                                                                |                                                                                   |                                                                                     |                                |                     | 47                  |                                         |                                      |
| EMD3FHAT2R                                                                          | UMD3NFHATR                                                                         |                                                                                   |                                                                                     | DTA114E                        | 10                  | 10                  | 0.05                                    |                                      |
|                                                                                     |                                                                                    |                                                                                   |                                                                                     | DTC114E                        | 10                  | 10                  |                                         |                                      |
| EMD9FHAT2R                                                                          | UMD9NFHATR                                                                         |                                                                                   |                                                                                     | DTA114Y                        | 10                  | 47                  | 0.07                                    |                                      |
|                                                                                     |                                                                                    |                                                                                   |                                                                                     | DTC114Y                        | 10                  | 47                  |                                         |                                      |
| EMD2FHAT2R                                                                          | UMD2NFHATR                                                                         |                                                                                   |                                                                                     | DTA124E                        | 22                  | 22                  | 0.03                                    |                                      |
|                                                                                     |                                                                                    |                                                                                   |                                                                                     | DTC124E                        | 22                  | 22                  |                                         |                                      |
| EMD12FHAT2R                                                                         | UMD12NFHATR                                                                        |                                                                                   |                                                                                     | DTA144E                        | 47                  | 47                  | 0.03                                    |                                      |
|                                                                                     |                                                                                    |                                                                                   |                                                                                     | DTC144E                        | 47                  | 47                  |                                         |                                      |
|  | EMD6FHAT2R                                                                         |                                                                                   | UMD6NFHATR                                                                          | DTA143T                        | 4.7                 | —                   | 0.1                                     |                                      |
|                                                                                     |                                                                                    |                                                                                   |                                                                                     | DTC143T                        | 4.7                 | —                   |                                         |                                      |

Note 1: For No.1 Pin location, please see the technical specifications.

Note 2: PNP(-)symbol omitted.

Note 3: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.

☆: Under Development

# Packages

## ● Dimensions (Unit: mm)

|                                                    |                                            |                                           |                                             |
|----------------------------------------------------|--------------------------------------------|-------------------------------------------|---------------------------------------------|
| <b>SOT-723</b><br>(VMT3)<br>[SC-105AA]<br>         | <b>SOT-416FL</b><br>(EMT3F)<br>[SC-89]<br> | <b>SOT-416</b><br>(EMT3)<br>[SC-75A]<br>  | <b>SOT-563</b><br>(EMT6)<br>[SC-107C]<br>   |
| <b>SOT-323FL</b><br>(UMT3F)<br>[SC-85]<br>         | <b>SOT-323</b><br>(UMT3)<br>[SC-70]<br>    | <b>SOT-363</b><br>(UMT6)<br>[SC-88]<br>   | <b>SOT-23</b><br>(SST3)<br>                 |
| <b>SOT-346</b><br>(SMT3)<br>[SC-59]<br>            | <b>SOT-25</b><br>(SMT5)<br>[SC-74A]<br>    | <b>SOT-457</b><br>(SMT6)<br>[SC-74]<br>   | <b>SOT-323T</b><br>(TUMT3)<br>[SC-113A]<br> |
| <b>SOT-363T</b><br>(TUMT6)<br>[SC-113DA]<br>       | <b>SOT-346T</b><br>(TSMT3)<br>[SC-96]<br>  | <b>SOT-457T</b><br>(TSMT6)<br>[SC-95]<br> | <b>(TSMT8)</b><br>                          |
| <b>(HSMT8AG)</b><br>                               | <b>SOT-89</b><br>(MPT3)<br>[SC-62]<br>     | <b>(SOP8)</b><br>                         | <b>TO-252</b><br>(DPAK)<br>                 |
| <b>TO-263S</b><br>(LPTS)<br>[SC-83]<br>(D2PAK)<br> | <b>TO-263AB</b><br>(LPTL)<br>              |                                           |                                             |

Note 1: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code. 2. For details of dimensions, please see the technical specifications.

## Schottky Barrier Diodes

## ● Quick Reference for Small Signal type Schottky Barrier Diodes

| $V_R$<br>(V) | $I_O$<br>(mA) | Surface Mount type                                                                |    |
|--------------|---------------|-----------------------------------------------------------------------------------|----|
|              |               | 2924 size                                                                         |    |
|              |               |  |    |
| 30           | 200           | SOT-23 (SSD3)                                                                     |    |
|              |               | BAT54CHM                                                                          | 59 |
|              |               | BAT54AHM                                                                          | 63 |
|              |               | BAT54SHM                                                                          | 69 |
| 40           | 120           | BAT54HM                                                                           | 73 |
|              |               | BAS40-05HM                                                                        | 60 |
|              |               | BAS40-04HM                                                                        | 70 |
|              |               | BAS40HM                                                                           | 74 |
| 500          | 500           | BAS40-06HM                                                                        | 64 |

| $V_R$<br>(V) | $I_O$<br>(mA) | Surface Mount type                                                                |    |                                                                                   |    |                                                                                   |    |                                                                                     |    |                                                                                     |    |
|--------------|---------------|-----------------------------------------------------------------------------------|----|-----------------------------------------------------------------------------------|----|-----------------------------------------------------------------------------------|----|-------------------------------------------------------------------------------------|----|-------------------------------------------------------------------------------------|----|
|              |               | 1608 size                                                                         |    | 2512 size                                                                         |    | 2514 size                                                                         |    | 1616 size                                                                           |    | 2120 size                                                                           |    |
|              |               |  |    |  |    |  |    |  |    |  |    |
|              |               | SOD-523 (EMD2)                                                                    |    | SOD-323FL (UMD2)                                                                  |    | (TUMD2M)                                                                          |    | SOT-416FL (EMD3F)                                                                   |    | SOT-323FL (UMD3F)                                                                   |    |
|              |               |                                                                                   |    |                                                                                   |    |                                                                                   |    |                                                                                     |    |                                                                                     |    |
| 30           | 30            | RB751SM-40                                                                        | 1  | RB751VM-40                                                                        | 19 |                                                                                   |    |                                                                                     |    |                                                                                     |    |
|              | 100           | RB510SM-30                                                                        | 2  | RB510VM-30                                                                        | 20 |                                                                                   |    | RB548WM                                                                             | 65 |                                                                                     |    |
|              |               | RB511SM-30                                                                        | 3  | RB530VM-30                                                                        | 21 |                                                                                   |    | RB557WM                                                                             | 61 |                                                                                     |    |
|              |               | RB500SM-30                                                                        | 4  | RB511VM-30                                                                        | 22 |                                                                                   |    | RB558WM                                                                             | 66 |                                                                                     |    |
|              |               | RB501SM-30                                                                        | 5  | RB531VM-30                                                                        | 23 |                                                                                   |    |                                                                                     |    |                                                                                     |    |
|              | 200           | RB520SM-30                                                                        | 6  | RB520VM-30                                                                        | 24 |                                                                                   |    |                                                                                     |    |                                                                                     |    |
|              |               | RB521SM-30                                                                        | 7  | RB521VM-30                                                                        | 25 |                                                                                   |    |                                                                                     |    |                                                                                     |    |
|              |               | RB530SM-30                                                                        | 8  | RB540VM-30                                                                        | 26 |                                                                                   |    |                                                                                     |    |                                                                                     |    |
|              |               | RB531SM-30                                                                        | 9  | RB541VM-30                                                                        | 27 |                                                                                   |    |                                                                                     |    |                                                                                     |    |
|              | 500           |                                                                                   |    | RB550VM-30                                                                        | 28 | RSX051VYM30                                                                       | 42 |                                                                                     |    |                                                                                     |    |
| 40           | 700           |                                                                                   |    |                                                                                   |    | RSX071VYM30                                                                       | 43 |                                                                                     |    |                                                                                     |    |
|              | 1,000         |                                                                                   |    |                                                                                   |    | RB168VYM-30                                                                       | 44 |                                                                                     |    |                                                                                     |    |
|              |               |                                                                                   |    |                                                                                   |    | RB550VYM-30                                                                       | 45 |                                                                                     |    |                                                                                     |    |
|              |               |                                                                                   |    |                                                                                   |    | RSX101VYM30                                                                       | 46 |                                                                                     |    |                                                                                     |    |
|              | 1,500         |                                                                                   |    |                                                                                   |    | RSX201VYM30                                                                       | 47 |                                                                                     |    |                                                                                     |    |
|              | 30            |                                                                                   |    |                                                                                   |    |                                                                                   |    | RB715WM                                                                             | 57 | RB715UM                                                                             | 58 |
|              |               |                                                                                   |    |                                                                                   |    |                                                                                   |    | RB706WM-40                                                                          | 67 | RB717UM                                                                             | 62 |
|              |               |                                                                                   |    |                                                                                   |    |                                                                                   |    |                                                                                     |    | RB706UM-40                                                                          | 68 |
|              | 100           | RB510SM-40                                                                        | 10 | RB510VM-40                                                                        | 29 |                                                                                   |    |                                                                                     |    | RB451UM                                                                             | 71 |
|              |               | RB511SM-40                                                                        | 11 | RB511VM-40                                                                        | 30 |                                                                                   |    |                                                                                     |    | RB450UM                                                                             | 72 |
|              |               | RB530SM-40                                                                        | 12 | RB530VM-40                                                                        | 31 |                                                                                   |    |                                                                                     |    |                                                                                     |    |
|              |               | RB531SM-40                                                                        | 13 | RB531VM-40                                                                        | 32 |                                                                                   |    |                                                                                     |    |                                                                                     |    |
|              |               | RB500VM-40                                                                        | 33 | RB500VM-40                                                                        | 33 |                                                                                   |    |                                                                                     |    |                                                                                     |    |
| 60           | 200           | RB501VM-40                                                                        | 34 | RB540VM-40                                                                        | 35 |                                                                                   |    |                                                                                     |    |                                                                                     |    |
|              |               | RB541SM-40                                                                        | 14 | RB541VM-40                                                                        | 36 |                                                                                   |    |                                                                                     |    |                                                                                     |    |
|              |               | RB520SM-40                                                                        | 15 | RB520VM-40                                                                        | 37 |                                                                                   |    |                                                                                     |    |                                                                                     |    |
|              |               | RB521SM-40                                                                        | 16 | RB521VM-40                                                                        | 38 |                                                                                   |    |                                                                                     |    |                                                                                     |    |
|              |               | RB550VM-40                                                                        | 17 | RB550VM-40                                                                        | 39 |                                                                                   |    |                                                                                     |    |                                                                                     |    |
|              | 500           | RB551VM-40                                                                        | 40 | RB551VM-40                                                                        | 40 |                                                                                   |    |                                                                                     |    |                                                                                     |    |
|              |               | RB560VM-40                                                                        | 41 | RB560VM-40                                                                        | 41 | RB400VYM-50                                                                       | 48 |                                                                                     |    |                                                                                     |    |
|              |               |                                                                                   |    |                                                                                   |    | RB160VYM-40                                                                       | 49 |                                                                                     |    |                                                                                     |    |
|              |               |                                                                                   |    |                                                                                   |    | RB168VYM-40                                                                       | 50 |                                                                                     |    |                                                                                     |    |
|              |               |                                                                                   |    |                                                                                   |    |                                                                                   |    |                                                                                     |    |                                                                                     |    |
| 100          | 200           | RB521SM-60                                                                        | 18 |                                                                                   |    |                                                                                   |    |                                                                                     |    |                                                                                     |    |
|              | 1,000         |                                                                                   |    |                                                                                   |    | RB160VYM-60                                                                       | 51 |                                                                                     |    |                                                                                     |    |
|              |               |                                                                                   |    |                                                                                   |    | RB168VYM-60                                                                       | 52 |                                                                                     |    |                                                                                     |    |
|              | 700           |                                                                                   |    |                                                                                   |    | RB578VYM100                                                                       | 53 |                                                                                     |    |                                                                                     |    |
| 150          | 1,000         |                                                                                   |    |                                                                                   |    | RB168VYM100                                                                       | 54 |                                                                                     |    |                                                                                     |    |
|              | 500           |                                                                                   |    |                                                                                   |    | RB558VYM150                                                                       | 55 |                                                                                     |    |                                                                                     |    |
|              | 1,000         |                                                                                   |    |                                                                                   |    | RB168VYM150                                                                       | 56 |                                                                                     |    |                                                                                     |    |

Note: Package is JEDEC code. ( ):ROHM Package.

Schottky Barrier Diodes



| Small Signal type Schottky Barrier Diodes 1 |             |            |             |                                    |                    |                        |                                |                                       |                     |                          |                    |                  |                            |                                     |
|---------------------------------------------|-------------|------------|-------------|------------------------------------|--------------------|------------------------|--------------------------------|---------------------------------------|---------------------|--------------------------|--------------------|------------------|----------------------------|-------------------------------------|
| No.                                         | Type        |            |             | Absolute Maximum Ratings (Tc=25°C) |                    |                        |                                | Electrical Characteristics(Tj=25°C)*2 |                     |                          |                    | Package          | Equivalent Circuit Diagram | Automotive Grade Available AEC-Q101 |
|                                             | Part No.    | Grade Code | Taping Code | V <sub>RM</sub> (V)                | V <sub>R</sub> (V) | I <sub>O</sub> *1 (mA) | I <sub>FSM</sub> (A)*2 60Hz.1~ | V <sub>F</sub> (V) Max.               | I <sub>F</sub> (mA) | I <sub>R</sub> (μA) Max. | V <sub>R</sub> (V) |                  |                            |                                     |
| 1                                           | RB751SM-40  | FH         | T2R         | 40                                 | 30                 | 30                     | 0.2                            | 0.37                                  | 1                   | 0.5                      | 30                 | SOD-523 (EMD2)   |                            | YES                                 |
| 2                                           | RB510SM-30  | FH         | T2R         | 30                                 | 30                 | 100                    | 0.5                            | 0.46                                  | 10                  | 0.3                      | 10                 |                  |                            | YES                                 |
| 3                                           | RB511SM-30  | FH         | T2R         | 30                                 | 30                 | 100                    | 0.5                            | 0.37                                  | 10                  | 7                        | 10                 |                  |                            | YES                                 |
| 4                                           | RB500SM-30  | FH         | T2R         | 30                                 | 30                 | 100                    | 1                              | 0.45                                  | 10                  | 0.5                      | 10                 |                  |                            | YES                                 |
| 5                                           | RB501SM-30  | FH         | T2R         | 30                                 | 30                 | 100                    | 1                              | 0.35                                  | 10                  | 10                       | 10                 |                  |                            | YES                                 |
| 6                                           | RB520SM-30  | FH         | T2R         | —                                  | 30                 | 200                    | 1                              | 0.58                                  | 200                 | 1                        | 10                 |                  |                            | YES                                 |
| 7                                           | RB521SM-30  | FH         | T2R         | —                                  | 30                 | 200                    | 1                              | 0.47                                  | 200                 | 30                       | 10                 |                  |                            | YES                                 |
| 8                                           | RB530SM-30  | FH         | T2R         | —                                  | 30                 | 200                    | 1                              | 0.45                                  | 10                  | 0.5                      | 10                 |                  |                            | YES                                 |
| 9                                           | RB531SM-30  | FH         | T2R         | —                                  | 30                 | 200                    | 1                              | 0.35                                  | 10                  | 10                       | 10                 |                  |                            | YES                                 |
| 10                                          | RB510SM-40  | FH         | T2R         | 40                                 | 40                 | 100                    | 0.5                            | 0.48                                  | 10                  | 2                        | 40                 |                  |                            | YES                                 |
| 11                                          | RB511SM-40  | FH         | T2R         | 40                                 | 40                 | 100                    | 0.5                            | 0.41                                  | 10                  | 25                       | 40                 |                  |                            | YES                                 |
| 12                                          | RB530SM-40  | FH         | T2R         | 40                                 | 40                 | 100                    | 1                              | 0.71                                  | 100                 | 15                       | 40                 |                  |                            | YES                                 |
| 13                                          | RB531SM-40  | FH         | T2R         | 40                                 | 40                 | 100                    | 1                              | 0.61                                  | 100                 | 100                      | 40                 |                  |                            | YES                                 |
| 14                                          | RB540SM-40  | FH         | T2R         | 40                                 | 40                 | 200                    | 1                              | 0.71                                  | 100                 | 15                       | 40                 |                  |                            | YES                                 |
| 15                                          | RB541SM-40  | FH         | T2R         | 40                                 | 40                 | 200                    | 1                              | 0.61                                  | 100                 | 100                      | 40                 |                  |                            | YES                                 |
| 16                                          | RB520SM-40  | FH         | T2R         | 45                                 | 40                 | 200                    | 1                              | 0.55                                  | 100                 | 10                       | 40                 |                  |                            | YES                                 |
| 17                                          | RB521SM-40  | FH         | T2R         | 45                                 | 40                 | 200                    | 1                              | 0.54                                  | 200                 | 90                       | 40                 |                  |                            | YES                                 |
| 18                                          | RB521SM-60  | FH         | T2R         | 60                                 | 60                 | 200                    | 1                              | 0.6                                   | 200                 | 100                      | 60                 |                  |                            | YES                                 |
| 19                                          | RB751VM-40  | FH         | TE-17       | 40                                 | 30                 | 30                     | 0.2                            | 0.37                                  | 1                   | 0.5                      | 30                 | SOD-323FL (UMD2) |                            | YES                                 |
| 20                                          | RB510VM-30  | FH         | TE-17       | 30                                 | 30                 | 100                    | 0.5                            | 0.46                                  | 10                  | 0.3                      | 10                 |                  |                            | YES                                 |
| 21                                          | RB530VM-30  | FH         | TE-17       | 30                                 | 30                 | 100                    | 0.5                            | 0.45                                  | 10                  | 0.5                      | 10                 |                  |                            | YES                                 |
| 22                                          | RB511VM-30  | FH         | TE-17       | 30                                 | 30                 | 100                    | 0.5                            | 0.37                                  | 10                  | 7                        | 10                 |                  |                            | YES                                 |
| 23                                          | RB531VM-30  | FH         | TE-17       | 30                                 | 30                 | 100                    | 1                              | 0.49                                  | 100                 | 10                       | 10                 |                  |                            | YES                                 |
| 24                                          | RB520VM-30  | FH         | TE-17       | 30                                 | 30                 | 200                    | 1                              | 0.58                                  | 200                 | 1                        | 10                 |                  |                            | YES                                 |
| 25                                          | RB521VM-30  | FH         | TE-17       | 30                                 | 30                 | 200                    | 1                              | 0.47                                  | 200                 | 30                       | 10                 |                  |                            | YES                                 |
| 26                                          | RB540VM-30  | FH         | TE-17       | 30                                 | 30                 | 200                    | 1                              | 0.45                                  | 10                  | 0.5                      | 10                 |                  |                            | YES                                 |
| 27                                          | RB541VM-30  | FH         | TE-17       | 30                                 | 30                 | 200                    | 1                              | 0.64                                  | 200                 | 10                       | 10                 |                  |                            | YES                                 |
| 28                                          | RB550VM-30  | FH         | TE-17       | 30                                 | 30                 | 500                    | 1                              | 0.59                                  | 500                 | 35                       | 30                 |                  |                            | YES                                 |
| 29                                          | RB510VM-40  | FH         | TE-17       | 40                                 | 40                 | 100                    | 0.5                            | 0.48                                  | 10                  | 2                        | 40                 |                  |                            | YES                                 |
| 30                                          | RB511VM-40  | FH         | TE-17       | 40                                 | 40                 | 100                    | 0.5                            | 0.41                                  | 10                  | 25                       | 40                 |                  |                            | YES                                 |
| 31                                          | RB530VM-40  | FH         | TE-17       | 40                                 | 40                 | 100                    | 1                              | 0.69                                  | 100                 | 15                       | 40                 |                  |                            | YES                                 |
| 32                                          | RB531VM-40  | FH         | TE-17       | 40                                 | 40                 | 100                    | 1                              | 0.61                                  | 100                 | 100                      | 40                 |                  |                            | YES                                 |
| 33                                          | RB500VM-40  | FH         | TE-17       | 45                                 | 40                 | 100                    | 1                              | 0.45                                  | 10                  | 1                        | 10                 |                  |                            | YES                                 |
| 34                                          | RB501VM-40  | FH         | TE-17       | 45                                 | 40                 | 100                    | 1                              | 0.55                                  | 100                 | 30                       | 10                 |                  |                            | YES                                 |
| 35                                          | RB540VM-40  | FH         | TE-17       | 40                                 | 40                 | 200                    | 1                              | 0.71                                  | 100                 | 15                       | 40                 |                  |                            | YES                                 |
| 36                                          | RB541VM-40  | FH         | TE-17       | 40                                 | 40                 | 200                    | 1                              | 0.61                                  | 100                 | 100                      | 40                 |                  |                            | YES                                 |
| 37                                          | RB520VM-40  | FH         | TE-17       | 40                                 | 40                 | 200                    | 1                              | 0.55                                  | 100                 | 10                       | 40                 |                  |                            | YES                                 |
| 38                                          | RB521VM-40  | FH         | TE-17       | 40                                 | 40                 | 200                    | 1                              | 0.54                                  | 200                 | 90                       | 40                 |                  |                            | YES                                 |
| 39                                          | RB550VM-40  | FH         | TE-17       | 40                                 | 40                 | 200                    | 1                              | 0.51                                  | 200                 | 40                       | 40                 |                  |                            | YES                                 |
| 40                                          | RB551VM-40  | FH         | TE-17       | 40                                 | 40                 | 200                    | 1                              | 0.43                                  | 200                 | 300                      | 40                 |                  |                            | YES                                 |
| 41                                          | RB560VM-40  | FH         | TE-17       | 40                                 | 40                 | 500                    | 2                              | 0.64                                  | 500                 | 40                       | 40                 |                  |                            | YES                                 |
| 42                                          | RSX051VYM30 | FH         | TR          | 30                                 | 30                 | 500                    | 5                              | 0.39                                  | 500                 | 200                      | 30                 | (TUMD2M)         |                            | YES                                 |
| 43                                          | RSX071VYM30 | FH         | TR          | 30                                 | 30                 | 700                    | 5                              | 0.42                                  | 700                 | 200                      | 30                 |                  |                            | YES                                 |
| 44                                          | RB168VYM-30 | FH         | TR          | 30                                 | 30                 | 1,000                  | 5                              | 0.73                                  | 1,000               | 0.3                      | 30                 |                  |                            | YES                                 |
| 45                                          | RB550VYM-30 | FH         | TR          | 30                                 | 30                 | 1,000                  | 3                              | 0.52                                  | 1,000               | 30                       | 10                 |                  |                            | YES                                 |
| 46                                          | RSX101VYM30 | FH         | TR          | 30                                 | 30                 | 1,000                  | 5                              | 0.47                                  | 1,000               | 200                      | 30                 |                  |                            | YES                                 |
| 47                                          | RSX201VYM30 | FH         | TR          | 30                                 | 30                 | 1,500                  | 8                              | 0.46                                  | 1,500               | 0.3                      | 30                 |                  |                            | YES                                 |
| 48                                          | RB400VYM-50 | FH         | TR          | 50                                 | 40                 | 500                    | 3                              | 0.55                                  | 500                 | 50                       | 30                 |                  |                            | YES                                 |
| 49                                          | RB160VYM-40 | FH         | TR          | 40                                 | 40                 | 1,000                  | 10                             | 0.55                                  | 700                 | 50                       | 40                 |                  |                            | YES                                 |
| 50                                          | RB168VYM-40 | FH         | TR          | 40                                 | 40                 | 1,000                  | 5                              | 0.79                                  | 1,000               | 0.5                      | 40                 |                  |                            | YES                                 |
| 51                                          | RB160VYM-60 | FH         | TR          | 60                                 | 60                 | 1,000                  | 5                              | 0.67                                  | 1,000               | 40                       | 60                 |                  |                            | YES                                 |
| 52                                          | RB168VYM-60 | FH         | TR          | 60                                 | 60                 | 1,000                  | 5                              | 0.82                                  | 1,000               | 1                        | 60                 |                  |                            | YES                                 |
| 53                                          | RB578VYM100 | FH         | TR          | 100                                | 100                | 700                    | 5                              | 0.85                                  | 700                 | 200                      | 100                |                  |                            | YES                                 |
| 54                                          | RB168VYM100 | FH         | TR          | 100                                | 100                | 1,000                  | 5                              | 0.84                                  | 1,000               | 0.3                      | 100                |                  |                            | YES                                 |
| 55                                          | RB558VYM150 | FH         | TR          | 150                                | 150                | 500                    | 3                              | 0.95                                  | 500                 | 0.5                      | 150                |                  |                            | YES                                 |
| 56                                          | RB168VYM150 | FH         | TR          | 150                                | 150                | 1,000                  | 5                              | 0.89                                  | 1,000               | 1                        | 150                |                  |                            | YES                                 |

Note: \*1: I<sub>O</sub>: Average output current per chip. In case of 1, 2 or 3 chip diodes. I<sub>O</sub> indicates average output current of 1, 2 or 3 chips.

\*2: Value/Chip

Package is JEDEC code. ( ): ROHM Package.

## Schottky Barrier Diodes

Schottky Barrier Diodes

Example 

|   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|
| R | B | 7 | 1 | 5 | W | M | F | H | T | L |
|---|---|---|---|---|---|---|---|---|---|---|

Part No.                      Grade Code                      Taping Code

| Small Signal type Schottky Barrier Diodes 2 |            |            |             |                                    |                    |                        |                                             |                                       |                     |                          |                    |                   |                            |                                     |
|---------------------------------------------|------------|------------|-------------|------------------------------------|--------------------|------------------------|---------------------------------------------|---------------------------------------|---------------------|--------------------------|--------------------|-------------------|----------------------------|-------------------------------------|
| No.                                         | Type       |            |             | Absolute Maximum Ratings (Tc=25°C) |                    |                        |                                             | Electrical Characteristics(Tj=25°C)*2 |                     |                          |                    | Package           | Equivalent Circuit Diagram | Automotive Grade Available AEC-Q101 |
|                                             | Part No.   | Grade Code | Taping Code | V <sub>RM</sub> (V)                | V <sub>R</sub> (V) | I <sub>O</sub> *1 (mA) | I <sub>FSM</sub> (A)*2 60Hz.1 <sub>eq</sub> | V <sub>F</sub> (V) Max.               | I <sub>F</sub> (mA) | I <sub>R</sub> (μA) Max. | V <sub>R</sub> (V) |                   |                            |                                     |
| 57                                          | RB715WM    | FH         | TL          | 40                                 | 40                 | 30*2                   | 0.2                                         | 0.37                                  | 1                   | 1                        | 10                 | SOT-416FL (EMD3F) |                            | YES                                 |
| 58                                          | RB715UM    | FH         | TL          | 40                                 | 40                 | 30                     | 0.2                                         | 0.37                                  | 1                   | 1                        | 10                 | SOT-323FL (UMD3F) |                            | YES                                 |
| 59                                          | BAT54CHM   | FH         | T116        | 30                                 | 30                 | 200*2                  | 0.6                                         | 0.8                                   | 100                 | 2                        | 25                 | SOT-23 (SSD3)     |                            | YES                                 |
| 60                                          | BAS40-05HM | FH         | T116        | 40                                 | 40                 | 120*2                  | 0.6                                         | 0.5                                   | 10                  | 1                        | 30                 | SOT-23 (SSD3)     |                            | YES                                 |
| 61                                          | RB557WM    | FH         | TL          | —                                  | 30                 | 100*2                  | 0.5                                         | 0.49                                  | 100                 | 10                       | 10                 | SOT-416FL (EMD3F) |                            | YES                                 |
| 62                                          | RB717UM    | FH         | TL          | 45                                 | 40                 | 30*2                   | 0.2                                         | 0.37                                  | 1                   | 1                        | 30                 | SOT-323FL (UMD3F) |                            | YES                                 |
| 63                                          | BAT54AHM   | FH         | T116        | 30                                 | 30                 | 200*2                  | 0.6                                         | 0.8                                   | 100                 | 2                        | 25                 | SOT-23 (SSD3)     |                            | YES                                 |
| 64                                          | BAS40-06HM | FH         | T116        | 40                                 | 40                 | 120*2                  | 0.6                                         | 0.5                                   | 10                  | 1                        | 30                 | SOT-23 (SSD3)     |                            | YES                                 |
| 65                                          | RB548WM    | FH         | TL          | —                                  | 30                 | 100*2                  | 0.5                                         | 0.45                                  | 10                  | 0.5                      | 10                 | SOT-416FL (EMD3F) |                            | YES                                 |
| 66                                          | RB558WM    | FH         | TL          | —                                  | 30                 | 100*2                  | 0.5                                         | 0.49                                  | 100                 | 10                       | 10                 |                   |                            | YES                                 |
| 67                                          | RB706WM-40 | FH         | TL          | 45                                 | 40                 | 30*2                   | 0.2                                         | 0.37                                  | 1                   | 0.5                      | 30                 |                   |                            | YES                                 |
| 68                                          | RB706UM-40 | FH         | TL          | 45                                 | 40                 | 30*2                   | 0.2                                         | 0.37                                  | 1                   | 1                        | 30                 |                   |                            | YES                                 |
| 69                                          | BAT54SHM   | FH         | T116        | 30                                 | 30                 | 200*2                  | 0.6                                         | 0.8                                   | 100                 | 2                        | 25                 | SOT-23 (SSD3)     |                            | YES                                 |
| 70                                          | BAS40-04HM | FH         | T116        | 40                                 | 40                 | 120*2                  | 0.6                                         | 0.5                                   | 10                  | 1                        | 30                 | SOT-23 (SSD3)     |                            | YES                                 |
| 71                                          | RB451UM    | FH         | TL          | 40                                 | 40                 | 100                    | 1                                           | 0.45                                  | 100                 | 90                       | 40                 | SOT-323FL (UMD3F) |                            | YES                                 |
| 72                                          | RB450UM    | FH         | TL          | 45                                 | 40                 | 100                    | 1                                           | 0.55                                  | 100                 | 10                       | 40                 | SOT-23 (SSD3)     |                            | YES                                 |
| 73                                          | BAT54HM    | FH         | T116        | 30                                 | 30                 | 200                    | 0.6                                         | 0.8                                   | 100                 | 2                        | 25                 | SOT-23 (SSD3)     |                            | YES                                 |
| 74                                          | BAS40HM    | FH         | T116        | 40                                 | 40                 | 120                    | 0.6                                         | 0.5                                   | 10                  | 1                        | 30                 |                   |                            | YES                                 |

Note: \*1: I<sub>O</sub>: Average output current per chip. In case of 1, 2 or 3 chip diodes. I<sub>O</sub> indicates average output current of 1, 2 or 3 chips.

\*2: Value/Chip

Package is JEDEC code. ( ): ROHM Package.

Schottky Barrier Diodes

● Quick Reference for Middle Power Schottky Barrier Diodes(High Efficiency type)

| V <sub>R</sub><br>(V)   | I <sub>O</sub><br>(A) | Surface Mount type                                                                |   |                                                                                   |                |                                                                                    |                |                                                                                     |                |
|-------------------------|-----------------------|-----------------------------------------------------------------------------------|---|-----------------------------------------------------------------------------------|----------------|------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------|----------------|
|                         |                       | 2513 size                                                                         |   | 3516 size                                                                         |                | 4725 size                                                                          |                | 5026 size                                                                           |                |
|                         |                       |  |   |  |                |  |                |  |                |
|                         |                       | (PMDE)                                                                            |   | SOD-123FL<br>(PMDU)                                                               |                | SOD-128<br>(PMDTM)                                                                 |                | DO-214AC(PMDS)<br>[SMA]                                                             |                |
| Low V <sub>F</sub> type |                       | Low V <sub>F</sub> type                                                           |   | Low V <sub>F</sub> type                                                           |                | Low V <sub>F</sub> type                                                            |                |                                                                                     |                |
| 30                      | 1                     | ☆RBR1VWM30A                                                                       | 1 | RBR1MM30A                                                                         | 7              | RBR1LAM30A                                                                         | 23             | RBR1L30A                                                                            | 41             |
|                         | 2                     | ☆RBR2VWM30A                                                                       | 2 | RBR2MM30A<br>RBR2MM30B                                                            | 8<br>9         | RBR2LAM30A                                                                         | 24             | RBR2L30A                                                                            | 42             |
|                         | 3                     |                                                                                   |   | RBR3MM30A                                                                         | 10             | RBR3LAM30A<br>RBR3LAM30B                                                           | 25<br>26       | RBR3L30A<br>RBR3L30B                                                                | 43<br>44       |
|                         | 5                     |                                                                                   |   |                                                                                   |                | RBR5LAM30A<br>RBR5LAM30B                                                           | 27<br>28       | RBR5L30A<br>RBR5L30B                                                                | 45<br>46       |
| 40                      | 1                     | ☆RBR1VWM40A                                                                       | 3 | RBR1MM40A                                                                         | 11             | RBR1LAM40A                                                                         | 29             | RBR1L40A                                                                            | 47             |
|                         | 2                     | ☆RBR2VWM40A                                                                       | 4 | RBR2MM40A<br>RBR2MM40B<br>RBR2MM40C                                               | 12<br>14<br>13 | RBR2LAM40A                                                                         | 30             | RBR2L40A                                                                            | 48             |
|                         | 3                     |                                                                                   |   | RBR3MM40A<br>RBR3MM40B                                                            | 16<br>15       | RBR3LAM40A<br>RBR3LAM40B<br>RBR3LAM40C                                             | 31<br>32<br>33 | RBR3L40A<br>RBR3L40B<br>RBR3L40C                                                    | 49<br>50<br>51 |
|                         | 5                     |                                                                                   |   |                                                                                   |                | RBR5LAM40A                                                                         | 34             | RBR5L40A                                                                            | 52             |
| 60                      | 1                     | ☆RBR1VWM60A                                                                       | 5 | RBR1MM60A                                                                         | 17             | RBR1LAM60A                                                                         | 35             | RBR1L60A                                                                            | 53             |
|                         | 2                     | ☆RBR2VWM60A                                                                       | 6 | RBR2MM60A<br>RBR2MM60B<br>RBR2MM60C                                               | 18<br>19<br>20 | RBR2LAM60A<br>RBR2LAM60B                                                           | 36<br>37       | RBR2L60A<br>RBR2L60B                                                                | 54<br>55       |
|                         | 3                     |                                                                                   |   | RBR3MM60B<br>RBR3MM60A                                                            | 21<br>22       | RBR3LAM60A<br>RBR3LAM60B                                                           | 38<br>39       | RBR3L60A<br>RBR3L60B                                                                | 56<br>57       |
|                         | 5                     |                                                                                   |   |                                                                                   |                | RBR5LAM60A                                                                         | 40             | RBR5L60A                                                                            | 58             |

Note: Package is JEDEC code. ( ) : ROHM Package, [ ] : GENERAL Code. ☆ : Under Development

● Quick Reference for Middle Power Schottky Barrier Diodes(Standard type)

| V <sub>R</sub><br>(V)         | I <sub>O</sub><br>(A) | Surface Mount type                                                                  |    |                                                                                     |   |                               |   |                                                                                     |    |                            |        |                                                                                       |             |                               |    |                          |        |                               |           |    |
|-------------------------------|-----------------------|-------------------------------------------------------------------------------------|----|-------------------------------------------------------------------------------------|---|-------------------------------|---|-------------------------------------------------------------------------------------|----|----------------------------|--------|---------------------------------------------------------------------------------------|-------------|-------------------------------|----|--------------------------|--------|-------------------------------|-----------|----|
|                               |                       | 2513 size                                                                           |    | 3516 size                                                                           |   |                               |   | 4725 size                                                                           |    |                            |        | 5026 size                                                                             |             |                               |    |                          |        |                               |           |    |
|                               |                       |  |    |  |   |                               |   |  |    |                            |        |  |             |                               |    |                          |        |                               |           |    |
|                               |                       | (PMDE)                                                                              |    | SOD-123FL<br>(PMDU)                                                                 |   |                               |   | SOD-128<br>(PMDTM)                                                                  |    |                            |        | DO-214AC(PMDS)<br>[SMA]                                                               |             |                               |    |                          |        |                               |           |    |
| Ultra-Low I <sub>R</sub> type |                       | Ultra-Low V <sub>F</sub> type                                                       |    | Low V <sub>F</sub> type                                                             |   | Ultra-Low I <sub>R</sub> type |   | Ultra-Low V <sub>F</sub> type                                                       |    | Low V <sub>F</sub> type    |        | Ultra-Low I <sub>R</sub> type                                                         |             | Ultra-Low V <sub>F</sub> type |    | Low V <sub>F</sub> type  |        | Ultra-Low I <sub>R</sub> type |           |    |
| 30                            | 1                     | ☆RB168VWM-30                                                                        | 11 | RSX101MM-30                                                                         | 1 |                               |   | RB168MM-30                                                                          | 16 |                            |        |                                                                                       | RB168LAM-30 | 25                            |    |                          |        |                               | RB168L-30 | 45 |
|                               | 2                     |                                                                                     |    |                                                                                     |   |                               |   | RB068MM-30                                                                          | 17 | RSX201LAM30<br>RSX205LAM30 | 2<br>3 |                                                                                       |             | RB068LAM-30                   | 26 | RSX201L-30<br>RSX205L-30 | 5<br>6 |                               | RB068L-30 | 46 |
|                               | 3                     |                                                                                     |    |                                                                                     |   |                               |   |                                                                                     |    | RSX301LAM30                | 4      |                                                                                       |             | RB058LAM-30                   | 27 | RSX301L-30               | 7      |                               | RB058L-30 | 47 |
|                               | 5                     |                                                                                     |    |                                                                                     |   |                               |   |                                                                                     |    |                            |        |                                                                                       |             | RB088LAM-30                   | 28 |                          |        |                               |           |    |
| 40                            | 1                     | ☆RB168VWM-40                                                                        | 12 |                                                                                     |   |                               |   | RB168MM-40                                                                          | 18 |                            |        |                                                                                       |             | RB168LAM-40                   | 29 |                          |        |                               | RB168L-40 | 48 |
|                               | 2                     |                                                                                     |    |                                                                                     |   |                               |   | RB068MM-40                                                                          | 19 |                            |        |                                                                                       |             | RB068LAM-40                   | 30 |                          |        |                               | RB068L-40 | 49 |
|                               | 3                     |                                                                                     |    |                                                                                     |   |                               |   |                                                                                     |    |                            |        |                                                                                       |             | RB058LAM-40                   | 31 |                          |        |                               | RB058L-40 | 50 |
|                               | 5                     |                                                                                     |    |                                                                                     |   |                               |   |                                                                                     |    |                            |        |                                                                                       |             | New RB088LAM-40               | 32 |                          |        |                               |           |    |
| 60                            | 1                     | ☆RB168VWM-60                                                                        | 13 |                                                                                     |   |                               |   | RB168MM-60                                                                          | 20 |                            |        |                                                                                       |             | RB168LAM-60                   | 33 |                          |        |                               | RB168L-60 | 51 |
|                               | 2                     |                                                                                     |    |                                                                                     |   |                               |   | RB068MM-60                                                                          | 21 |                            |        |                                                                                       |             | RB068LAM-60                   | 34 |                          |        |                               | RB068L-60 | 52 |
|                               | 3                     |                                                                                     |    |                                                                                     |   |                               |   |                                                                                     |    |                            |        |                                                                                       |             | RB058LAM-60                   | 35 |                          |        |                               | RB058L-60 | 53 |
|                               | 5                     |                                                                                     |    |                                                                                     |   |                               |   |                                                                                     |    |                            |        |                                                                                       |             | RB088LAM-60                   | 36 |                          |        |                               |           |    |
| 90                            | 1                     |                                                                                     |    |                                                                                     |   | RB160MM-90                    | 8 |                                                                                     |    |                            |        | RB160LAM-90                                                                           | 9           |                               |    |                          |        | RB160L-90                     | 10        |    |
| 100                           | 1                     | ☆RB168VWM100                                                                        | 14 |                                                                                     |   |                               |   | RB168MM100                                                                          | 22 |                            |        |                                                                                       |             | RB168LAM100                   | 37 |                          |        |                               | RB168L100 | 54 |
|                               | 2                     |                                                                                     |    |                                                                                     |   |                               |   | RB068MM100                                                                          | 23 |                            |        |                                                                                       |             | RB068LAM100                   | 38 |                          |        |                               | RB068L100 | 55 |
|                               | 3                     |                                                                                     |    |                                                                                     |   |                               |   |                                                                                     |    |                            |        |                                                                                       |             | RB058LAM100                   | 39 |                          |        |                               |           |    |
|                               | 5                     |                                                                                     |    |                                                                                     |   |                               |   |                                                                                     |    |                            |        |                                                                                       |             | RB088LAM100                   | 40 |                          |        |                               |           |    |
| 150                           | 1                     | ☆RB168VWM150                                                                        | 15 |                                                                                     |   |                               |   | RB168MM150                                                                          | 24 |                            |        |                                                                                       |             | RB168LAM150                   | 41 |                          |        |                               | RB168L150 | 56 |
|                               | 2                     |                                                                                     |    |                                                                                     |   |                               |   |                                                                                     |    |                            |        |                                                                                       |             | RB068LAM150                   | 42 |                          |        |                               | RB068L150 | 57 |
|                               | 3                     |                                                                                     |    |                                                                                     |   |                               |   |                                                                                     |    |                            |        |                                                                                       |             | RB058LAM150                   | 43 |                          |        |                               | RB058L150 | 58 |
|                               | 5                     |                                                                                     |    |                                                                                     |   |                               |   |                                                                                     |    |                            |        |                                                                                       |             | RB088LAM150                   | 44 |                          |        |                               |           |    |

Note: Package is JEDEC code. ( ) : ROHM Package, [ ] : GENERAL Code. ☆ : Under Development

## Schottky Barrier Diodes

Schottky Barrier Diodes

Example) 

|   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R | B | R | 1 | M | M | 3 | 0 | A | T | F | T | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

Part No.                      Grade Code                      Taping Code

| Middle Power Schottky Barrier Diodes (High Efficiency type) |             |            |             |                                    |                    |                    |                              |                                     |                    |                          |                     |                  |                            |                                     |
|-------------------------------------------------------------|-------------|------------|-------------|------------------------------------|--------------------|--------------------|------------------------------|-------------------------------------|--------------------|--------------------------|---------------------|------------------|----------------------------|-------------------------------------|
| No.                                                         | Type        |            |             | Absolute Maximum Ratings (Tc=25°C) |                    |                    |                              | Electrical Characteristics(Tj=25°C) |                    |                          |                     | Package          | Equivalent Circuit Diagram | Automotive Grade Available AEC-Q101 |
|                                                             | Part No.    | Grade Code | Taping Code | V <sub>RM</sub> (V)                | V <sub>R</sub> (V) | I <sub>O</sub> (A) | I <sub>FSM</sub> (A) 60Hz.1~ | V <sub>F</sub> (V) Max.             | I <sub>F</sub> (A) | I <sub>R</sub> (mA) Max. | V <sub>RR</sub> (V) |                  |                            |                                     |
| Low V <sub>F</sub> type                                     |             |            |             |                                    |                    |                    |                              |                                     |                    |                          |                     |                  |                            |                                     |
| 1                                                           | ☆RBR1VWM30A | TF         | TR          | 30                                 | 30                 | 1                  | 30                           | 0.48                                | 1                  | 0.05                     | 30                  | (PMDE)           |                            | YES                                 |
| 2                                                           | ☆RBR2VWM30A | TF         | TR          | 30                                 | 30                 | 2                  | 30                           | 0.53                                | 2                  | 0.05                     | 30                  |                  |                            | YES                                 |
| 3                                                           | ☆RBR1VWM40A | TF         | TR          | 40                                 | 40                 | 1                  | 20                           | 0.52                                | 1                  | 0.05                     | 40                  |                  |                            | YES                                 |
| 4                                                           | ☆RBR2VWM40A | TF         | TR          | 40                                 | 40                 | 2                  | 20                           | 0.62                                | 2                  | 0.05                     | 40                  |                  |                            | YES                                 |
| 5                                                           | ☆RBR1VWM60A | TF         | TR          | 60                                 | 60                 | 1                  | 20                           | 0.53                                | 1                  | 0.075                    | 60                  |                  |                            | YES                                 |
| 6                                                           | ☆RBR2VWM60A | TF         | TR          | 60                                 | 60                 | 2                  | 20                           | 0.65                                | 2                  | 0.075                    | 60                  |                  |                            | YES                                 |
| 7                                                           | RBR1MM30A   | TF         | TR          | 30                                 | 30                 | 1                  | 30                           | 0.48                                | 1                  | 0.05                     | 30                  | SOD-123FL (PMDU) |                            | YES                                 |
| 8                                                           | RBR2MM30A   | TF         | TR          | 30                                 | 30                 | 2                  | 30                           | 0.53                                | 2                  | 0.05                     | 30                  |                  |                            | YES                                 |
| 9                                                           | RBR2MM30B   | TF         | TR          | 30                                 | 30                 | 2                  | 30                           | 0.49                                | 2                  | 0.08                     | 30                  |                  |                            | YES                                 |
| 10                                                          | RBR3MM30A   | TF         | TR          | 30                                 | 30                 | 3                  | 30                           | 0.51                                | 3                  | 0.1                      | 30                  |                  |                            | YES                                 |
| 11                                                          | RBR1MM40A   | TF         | TR          | 40                                 | 40                 | 1                  | 20                           | 0.52                                | 1                  | 0.05                     | 40                  |                  |                            | YES                                 |
| 12                                                          | RBR2MM40A   | TF         | TR          | 40                                 | 40                 | 2                  | 20                           | 0.62                                | 2                  | 0.05                     | 40                  |                  |                            | YES                                 |
| 13                                                          | RBR2MM40C   | TF         | TR          | 40                                 | 40                 | 2                  | 30                           | 0.52                                | 2                  | 0.1                      | 40                  |                  |                            | YES                                 |
| 14                                                          | RBR2MM40B   | TF         | TR          | 40                                 | 40                 | 2                  | 30                           | 0.55                                | 2                  | 0.08                     | 40                  |                  |                            | YES                                 |
| 15                                                          | RBR3MM40B   | TF         | TR          | 40                                 | 40                 | 3                  | 30                           | 0.58                                | 3                  | 0.1                      | 40                  |                  |                            | YES                                 |
| 16                                                          | RBR3MM40A   | TF         | TR          | 40                                 | 40                 | 3                  | 30                           | 0.62                                | 3                  | 0.08                     | 40                  |                  |                            | YES                                 |
| 17                                                          | RBR1MM60A   | TF         | TR          | 60                                 | 60                 | 1                  | 20                           | 0.53                                | 1                  | 0.075                    | 60                  |                  |                            | YES                                 |
| 18                                                          | RBR2MM60A   | TF         | TR          | 60                                 | 60                 | 2                  | 20                           | 0.65                                | 2                  | 0.075                    | 60                  |                  |                            | YES                                 |
| 19                                                          | RBR2MM60B   | TF         | TR          | 60                                 | 60                 | 2                  | 30                           | 0.58                                | 2                  | 0.1                      | 60                  |                  |                            | YES                                 |
| 20                                                          | RBR2MM60C   | TF         | TR          | 60                                 | 60                 | 2                  | 30                           | 0.55                                | 2                  | 0.12                     | 60                  |                  |                            | YES                                 |
| 21                                                          | RBR3MM60B   | TF         | TR          | 60                                 | 60                 | 3                  | 30                           | 0.61                                | 3                  | 0.12                     | 60                  | YES              |                            |                                     |
| 22                                                          | RBR3MM60A   | TF         | TR          | 60                                 | 60                 | 3                  | 30                           | 0.66                                | 3                  | 0.1                      | 60                  | YES              |                            |                                     |
| 23                                                          | RBR1LAM30A  | TF         | TR          | 30                                 | 30                 | 1                  | 40                           | 0.48                                | 1                  | 0.05                     | 30                  | SOD-128 (PMDTM)  |                            | YES                                 |
| 24                                                          | RBR2LAM30A  | TF         | TR          | 30                                 | 30                 | 2                  | 45                           | 0.49                                | 2                  | 0.08                     | 30                  |                  |                            | YES                                 |
| 25                                                          | RBR3LAM30A  | TF         | TR          | 30                                 | 30                 | 3                  | 40                           | 0.58                                | 3                  | 0.05                     | 30                  |                  |                            | YES                                 |
| 26                                                          | RBR3LAM30B  | TF         | TR          | 30                                 | 30                 | 3                  | 45                           | 0.53                                | 3                  | 0.08                     | 30                  |                  |                            | YES                                 |
| 27                                                          | RBR5LAM30A  | TF         | TR          | 30                                 | 30                 | 5                  | 75                           | 0.54                                | 5                  | 0.1                      | 30                  |                  |                            | YES                                 |
| 28                                                          | RBR5LAM30B  | TF         | TR          | 30                                 | 30                 | 5                  | 100                          | 0.49                                | 5                  | 0.15                     | 30                  |                  |                            | YES                                 |
| 29                                                          | RBR1LAM40A  | TF         | TR          | 40                                 | 40                 | 1                  | 40                           | 0.52                                | 1                  | 0.05                     | 40                  |                  |                            | YES                                 |
| 30                                                          | RBR2LAM40A  | TF         | TR          | 40                                 | 40                 | 2                  | 45                           | 0.55                                | 2                  | 0.08                     | 40                  |                  |                            | YES                                 |
| 31                                                          | RBR3LAM40A  | TF         | TR          | 40                                 | 40                 | 3                  | 40                           | 0.69                                | 3                  | 0.05                     | 40                  |                  |                            | YES                                 |
| 32                                                          | RBR3LAM40B  | TF         | TR          | 40                                 | 40                 | 3                  | 45                           | 0.62                                | 3                  | 0.08                     | 40                  |                  |                            | YES                                 |
| 33                                                          | RBR3LAM40C  | TF         | TR          | 40                                 | 40                 | 3                  | 75                           | 0.55                                | 3                  | 0.1                      | 40                  |                  |                            | YES                                 |
| 34                                                          | RBR5LAM40A  | TF         | TR          | 40                                 | 40                 | 5                  | 100                          | 0.53                                | 5                  | 0.2                      | 40                  |                  |                            | YES                                 |
| 35                                                          | RBR1LAM60A  | TF         | TR          | 60                                 | 60                 | 1                  | 40                           | 0.53                                | 1                  | 0.075                    | 60                  |                  |                            | YES                                 |
| 36                                                          | RBR2LAM60A  | TF         | TR          | 60                                 | 60                 | 2                  | 40                           | 0.65                                | 2                  | 0.075                    | 60                  |                  |                            | YES                                 |
| 37                                                          | RBR2LAM60B  | TF         | TR          | 60                                 | 60                 | 2                  | 75                           | 0.52                                | 2                  | 0.15                     | 60                  |                  |                            | YES                                 |
| 38                                                          | RBR3LAM60A  | TF         | TR          | 60                                 | 60                 | 3                  | 45                           | 0.66                                | 3                  | 0.1                      | 60                  |                  |                            | YES                                 |
| 39                                                          | RBR3LAM60B  | TF         | TR          | 60                                 | 60                 | 3                  | 75                           | 0.56                                | 3                  | 0.15                     | 60                  |                  |                            | YES                                 |
| 40                                                          | RBR5LAM60A  | TF         | TR          | 60                                 | 60                 | 5                  | 100                          | 0.55                                | 5                  | 0.25                     | 60                  |                  |                            | YES                                 |
| 41                                                          | RBR1L30A    | DD         | TE25        | 30                                 | 30                 | 1                  | 30                           | 0.48                                | 1                  | 0.05                     | 30                  |                  |                            | DO-214AC (PMDS) [SMA]               |
| 42                                                          | RBR2L30A    | DD         | TE25        | 30                                 | 30                 | 2                  | 40                           | 0.49                                | 2                  | 0.08                     | 30                  | YES              |                            |                                     |
| 43                                                          | RBR3L30A    | DD         | TE25        | 30                                 | 30                 | 3                  | 30                           | 0.58                                | 3                  | 0.05                     | 30                  | YES              |                            |                                     |
| 44                                                          | RBR3L30B    | DD         | TE25        | 30                                 | 30                 | 3                  | 40                           | 0.53                                | 3                  | 0.08                     | 30                  | YES              |                            |                                     |
| 45                                                          | RBR5L30A    | DD         | TE25        | 30                                 | 30                 | 5                  | 50                           | 0.54                                | 5                  | 0.1                      | 30                  | YES              |                            |                                     |
| 46                                                          | RBR5L30B    | DD         | TE25        | 30                                 | 30                 | 5                  | 50                           | 0.49                                | 5                  | 0.15                     | 30                  | YES              |                            |                                     |
| 47                                                          | RBR1L40A    | DD         | TE25        | 40                                 | 40                 | 1                  | 30                           | 0.52                                | 1                  | 0.05                     | 40                  | YES              |                            |                                     |
| 48                                                          | RBR2L40A    | DD         | TE25        | 40                                 | 40                 | 2                  | 40                           | 0.55                                | 2                  | 0.08                     | 40                  | YES              |                            |                                     |
| 49                                                          | RBR3L40A    | DD         | TE25        | 40                                 | 40                 | 3                  | 30                           | 0.69                                | 3                  | 0.05                     | 40                  | YES              |                            |                                     |
| 50                                                          | RBR3L40B    | DD         | TE25        | 40                                 | 40                 | 3                  | 40                           | 0.62                                | 3                  | 0.08                     | 40                  | YES              |                            |                                     |
| 51                                                          | RBR3L40C    | DD         | TE25        | 40                                 | 40                 | 3                  | 50                           | 0.55                                | 3                  | 0.1                      | 40                  | YES              |                            |                                     |
| 52                                                          | RBR5L40A    | DD         | TE25        | 40                                 | 40                 | 5                  | 50                           | 0.53                                | 5                  | 0.2                      | 40                  | YES              |                            |                                     |
| 53                                                          | RBR1L60A    | DD         | TE25        | 60                                 | 60                 | 1                  | 30                           | 0.53                                | 1                  | 0.075                    | 60                  | YES              |                            |                                     |
| 54                                                          | RBR2L60A    | DD         | TE25        | 60                                 | 60                 | 2                  | 30                           | 0.65                                | 2                  | 0.075                    | 60                  | YES              |                            |                                     |
| 55                                                          | RBR2L60B    | DD         | TE25        | 60                                 | 60                 | 2                  | 50                           | 0.52                                | 2                  | 0.15                     | 60                  | YES              |                            |                                     |
| 56                                                          | RBR3L60A    | DD         | TE25        | 60                                 | 60                 | 3                  | 40                           | 0.66                                | 3                  | 0.1                      | 60                  | YES              |                            |                                     |
| 57                                                          | RBR3L60B    | DD         | TE25        | 60                                 | 60                 | 3                  | 50                           | 0.56                                | 3                  | 0.15                     | 60                  | YES              |                            |                                     |
| 58                                                          | RBR5L60A    | DD         | TE25        | 60                                 | 60                 | 5                  | 50                           | 0.55                                | 5                  | 0.25                     | 60                  | YES              |                            |                                     |

Note: Package is JEDEC code. ( ) : ROHM Package, [ ] : GENERAL Code.

☆ : Under Development

## Schottky Barrier Diodes

Schottky Barrier Diodes

Example) 

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R | S | X | 1 | 0 | 1 | M | M | - | 3 | 0 | T | F | T | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

Part No.                      Grade Code      Taping Code

| Middle Power Schottky Barrier Diodes (Standard type) |                 |            |             |                                                 |                    |                    |                              |                                                   |                    |                          |                    |                       |                                                                                       |                                     |
|------------------------------------------------------|-----------------|------------|-------------|-------------------------------------------------|--------------------|--------------------|------------------------------|---------------------------------------------------|--------------------|--------------------------|--------------------|-----------------------|---------------------------------------------------------------------------------------|-------------------------------------|
| No.                                                  | Type            |            |             | Absolute Maximum Ratings (T <sub>C</sub> =25°C) |                    |                    |                              | Electrical Characteristics (T <sub>J</sub> =25°C) |                    |                          |                    | Package               | Equivalent Circuit Diagram                                                            | Automotive Grade Available AEC-Q101 |
|                                                      | Part No.        | Grade Code | Taping Code | V <sub>RM</sub> (V)                             | V <sub>R</sub> (V) | I <sub>O</sub> (A) | I <sub>FSM</sub> (A) 60Hz.1~ | V <sub>F</sub> (V) Max.                           | I <sub>F</sub> (A) | I <sub>R</sub> (mA) Max. | V <sub>R</sub> (V) |                       |                                                                                       |                                     |
| Ultra-Low V <sub>F</sub> type                        |                 |            |             |                                                 |                    |                    |                              |                                                   |                    |                          |                    |                       |                                                                                       |                                     |
| 1                                                    | RSX101MM-30     | TF         | TR          | 30                                              | 30                 | 1                  | 45                           | 0.39                                              | 1                  | 0.2                      | 30                 | SOD-123FL (PMDU)      |    | YES                                 |
| 2                                                    | RSX201LAM30     | TF         | TR          | 30                                              | 30                 | 2                  | 60                           | 0.44                                              | 2                  | 0.15                     | 30                 | SOD-128 (PMDTM)       |                                                                                       | YES                                 |
| 3                                                    | RSX205LAM30     | TF         | TR          | 30                                              | 30                 | 2                  | 60                           | 0.49                                              | 2                  | 0.2                      | 30                 |                       |                                                                                       | YES                                 |
| 4                                                    | RSX301LAM30     | TF         | TR          | 30                                              | 30                 | 3                  | 100                          | 0.42                                              | 3                  | 0.2                      | 15                 |                       |                                                                                       | YES                                 |
| 5                                                    | RSX201L-30      | DD         | TE25        | 30                                              | 30                 | 2                  | 60                           | 0.44                                              | 2                  | 0.15                     | 30                 | DO-214AC (PMDS) [SMA] |                                                                                       | YES                                 |
| 6                                                    | RSX205L-30      | TF         | TE25        | 30                                              | 30                 | 2                  | 60                           | 0.49                                              | 2                  | 0.2                      | 30                 |                       |                                                                                       | YES                                 |
| 7                                                    | RSX301L-30      | DD         | TE25        | 30                                              | 30                 | 3                  | 70                           | 0.42                                              | 3                  | 0.2                      | 30                 |                       |                                                                                       | YES                                 |
| Low V <sub>F</sub> type                              |                 |            |             |                                                 |                    |                    |                              |                                                   |                    |                          |                    |                       |                                                                                       |                                     |
| 8                                                    | RB160MM-90      | TF         | TR          | 90                                              | 90                 | 1                  | 30                           | 0.73                                              | 1                  | 0.1                      | 90                 | SOD-123FL (PMDU)      |    | YES                                 |
| 9                                                    | RB160LAM-90     | TF         | TR          | 95                                              | 90                 | 1                  | 50                           | 0.73                                              | 1                  | 0.1                      | 90                 | SOD-128 (PMDTM)       |                                                                                       | YES                                 |
| 10                                                   | RB160L-90       | TF         | TE25        | 95                                              | 90                 | 1                  | 30                           | 0.73                                              | 1                  | 0.1                      | 90                 | DO-214AC (PMDS) [SMA] |                                                                                       | YES                                 |
| Ultra-Low I <sub>R</sub> type                        |                 |            |             |                                                 |                    |                    |                              |                                                   |                    |                          |                    |                       |                                                                                       |                                     |
| 11                                                   | ☆RB168VWM-30    | TF         | TR          | 30                                              | 30                 | 1                  | 30                           | 0.69                                              | 1                  | 0.0006                   | 30                 | (PMDE)                |    | YES                                 |
| 12                                                   | ☆RB168VWM-40    | TF         | TR          | 40                                              | 40                 | 1                  | 30                           | 0.69                                              | 1                  | 0.0005                   | 40                 |                       |                                                                                       | YES                                 |
| 13                                                   | ☆RB168VWM-60    | TF         | TR          | 60                                              | 60                 | 1                  | 30                           | 0.76                                              | 1                  | 0.0005                   | 60                 |                       |                                                                                       | YES                                 |
| 14                                                   | ☆RB168VWM100    | TF         | TR          | 100                                             | 100                | 1                  | 30                           | 0.84                                              | 1                  | 0.0003                   | 100                |                       |                                                                                       | YES                                 |
| 15                                                   | ☆RB168VWM150    | TF         | TR          | 150                                             | 150                | 1                  | 30                           | 0.89                                              | 1                  | 0.001                    | 150                |                       |                                                                                       | YES                                 |
| 16                                                   | RB168MM-30      | TF         | TR          | 30                                              | 30                 | 1                  | 30                           | 0.69                                              | 1                  | 0.0006                   | 30                 | SOD-123FL (PMDU)      |    | YES                                 |
| 17                                                   | RB068MM-30      | TF         | TR          | 30                                              | 30                 | 2                  | 50                           | 0.7                                               | 2                  | 0.0008                   | 30                 |                       |                                                                                       | YES                                 |
| 18                                                   | RB168MM-40      | TF         | TR          | 40                                              | 40                 | 1                  | 40                           | 0.65                                              | 1                  | 0.00055                  | 40                 |                       |                                                                                       | YES                                 |
| 19                                                   | RB068MM-40      | TF         | TR          | 40                                              | 40                 | 2                  | 40                           | 0.725                                             | 2                  | 0.00055                  | 40                 |                       |                                                                                       | YES                                 |
| 20                                                   | RB168MM-60      | TF         | TR          | 60                                              | 60                 | 1                  | 40                           | 0.68                                              | 1                  | 0.0015                   | 60                 |                       |                                                                                       | YES                                 |
| 21                                                   | RB068MM-60      | TF         | TR          | 60                                              | 60                 | 2                  | 40                           | 0.765                                             | 2                  | 0.0015                   | 60                 |                       |                                                                                       | YES                                 |
| 22                                                   | RB168MM100      | TF         | TR          | 100                                             | 100                | 1                  | 40                           | 0.81                                              | 1                  | 0.0004                   | 100                |                       |                                                                                       | YES                                 |
| 23                                                   | RB068MM100      | TF         | TR          | 100                                             | 100                | 2                  | 40                           | 0.87                                              | 2                  | 0.0004                   | 100                |                       |                                                                                       | YES                                 |
| 24                                                   | RB168MM150      | TF         | TR          | 150                                             | 150                | 1                  | 35                           | 0.84                                              | 1                  | 0.004                    | 150                |                       |                                                                                       | YES                                 |
| 25                                                   | RB168LAM-30     | TF         | TR          | 30                                              | 30                 | 1                  | 40                           | 0.69                                              | 1                  | 0.0006                   | 30                 | SOD-128 (PMDTM)       |  | YES                                 |
| 26                                                   | RB068LAM-30     | TF         | TR          | 30                                              | 30                 | 2                  | 50                           | 0.7                                               | 2                  | 0.0008                   | 30                 |                       |                                                                                       | YES                                 |
| 27                                                   | RB058LAM-30     | TF         | TR          | 30                                              | 30                 | 3                  | 80                           | 0.68                                              | 3                  | 0.0025                   | 30                 |                       |                                                                                       | YES                                 |
| 28                                                   | RB088LAM-30     | TF         | TR          | 30                                              | 30                 | 5                  | 80                           | 0.69                                              | 5                  | 0.0025                   | 30                 |                       |                                                                                       | YES                                 |
| 29                                                   | RB168LAM-40     | TF         | TR          | 40                                              | 40                 | 1                  | 40                           | 0.69                                              | 1                  | 0.0005                   | 40                 |                       |                                                                                       | YES                                 |
| 30                                                   | RB068LAM-40     | TF         | TR          | 40                                              | 40                 | 2                  | 50                           | 0.69                                              | 2                  | 0.001                    | 40                 |                       |                                                                                       | YES                                 |
| 31                                                   | RB058LAM-40     | TF         | TR          | 40                                              | 40                 | 3                  | 90                           | 0.69                                              | 3                  | 0.005                    | 40                 |                       |                                                                                       | YES                                 |
| 32                                                   | New RB088LAM-40 | TF         | TR          | 40                                              | 40                 | 5                  | 90                           | 0.71                                              | 5                  | 0.0036                   | 40                 |                       |                                                                                       | YES                                 |
| 33                                                   | RB168LAM-60     | TF         | TR          | 60                                              | 60                 | 1                  | 40                           | 0.68                                              | 1                  | 0.0015                   | 60                 |                       |                                                                                       | YES                                 |
| 34                                                   | RB068LAM-60     | TF         | TR          | 60                                              | 60                 | 2                  | 70                           | 0.68                                              | 2                  | 0.002                    | 60                 |                       |                                                                                       | YES                                 |
| 35                                                   | RB058LAM-60     | TF         | TR          | 60                                              | 60                 | 3                  | 90                           | 0.64                                              | 3                  | 0.004                    | 60                 |                       |                                                                                       | YES                                 |
| 36                                                   | RB088LAM-60     | TF         | TR          | 60                                              | 60                 | 5                  | 90                           | 0.71                                              | 5                  | 0.004                    | 60                 |                       |                                                                                       | YES                                 |
| 37                                                   | RB168LAM100     | TF         | TR          | 100                                             | 100                | 1                  | 40                           | 0.81                                              | 1                  | 0.0004                   | 100                |                       |                                                                                       | YES                                 |
| 38                                                   | RB068LAM100     | TF         | TR          | 100                                             | 100                | 2                  | 70                           | 0.81                                              | 2                  | 0.0015                   | 100                |                       |                                                                                       | YES                                 |
| 39                                                   | RB058LAM100     | TF         | TR          | 100                                             | 100                | 3                  | 80                           | 0.81                                              | 3                  | 0.003                    | 100                |                       |                                                                                       | YES                                 |
| 40                                                   | RB088LAM100     | TF         | TR          | 100                                             | 100                | 5                  | 80                           | 0.87                                              | 5                  | 0.003                    | 100                |                       |                                                                                       | YES                                 |
| 41                                                   | RB168LAM150     | TF         | TR          | 150                                             | 150                | 1                  | 50                           | 0.84                                              | 1                  | 0.0025                   | 150                |                       |                                                                                       | YES                                 |
| 42                                                   | RB068LAM150     | TF         | TR          | 150                                             | 150                | 2                  | 70                           | 0.81                                              | 2                  | 0.003                    | 150                |                       |                                                                                       | YES                                 |
| 43                                                   | RB058LAM150     | TF         | TR          | 150                                             | 150                | 3                  | 80                           | 0.84                                              | 3                  | 0.003                    | 150                |                       |                                                                                       | YES                                 |
| 44                                                   | RB088LAM150     | TF         | TR          | 150                                             | 150                | 5                  | 80                           | 0.9                                               | 5                  | 0.003                    | 150                |                       |                                                                                       | YES                                 |
| 45                                                   | RB168L-30       | TF         | TE25        | 30                                              | 30                 | 1                  | 30                           | 0.69                                              | 1                  | 0.0006                   | 30                 | DO-214AC (PMDS) [SMA] |  | YES                                 |
| 46                                                   | RB068L-30       | DD         | TE25        | 30                                              | 30                 | 2                  | 60                           | 0.7                                               | 2                  | 0.0008                   | 30                 |                       |                                                                                       | YES                                 |
| 47                                                   | RB058L-30       | DD         | TE25        | 30                                              | 30                 | 3                  | 90                           | 0.68                                              | 3                  | 0.0025                   | 30                 |                       |                                                                                       | YES                                 |
| 48                                                   | RB168L-40       | TF         | TE25        | 40                                              | 40                 | 1                  | 50                           | 0.65                                              | 1                  | 0.00055                  | 40                 |                       |                                                                                       | YES                                 |
| 49                                                   | RB068L-40       | DD         | TE25        | 40                                              | 40                 | 2                  | 50                           | 0.69                                              | 2                  | 0.001                    | 40                 |                       |                                                                                       | YES                                 |
| 50                                                   | RB058L-40       | DD         | TE25        | 40                                              | 40                 | 3                  | 100                          | 0.7                                               | 3                  | 0.005                    | 40                 |                       |                                                                                       | YES                                 |
| 51                                                   | RB168L-60       | TF         | TE25        | 60                                              | 60                 | 1                  | 50                           | 0.68                                              | 1                  | 0.0015                   | 60                 |                       |                                                                                       | YES                                 |
| 52                                                   | RB068L-60       | DD         | TE25        | 60                                              | 60                 | 2                  | 90                           | 0.68                                              | 2                  | 0.002                    | 60                 |                       |                                                                                       | YES                                 |
| 53                                                   | RB058L-60       | DD         | TE25        | 60                                              | 60                 | 3                  | 120                          | 0.64                                              | 3                  | 0.004                    | 60                 |                       |                                                                                       | YES                                 |
| 54                                                   | RB168L100       | DD         | TE25        | 100                                             | 100                | 1                  | 50                           | 0.81                                              | 1                  | 0.0004                   | 100                |                       |                                                                                       | YES                                 |
| 55                                                   | RB068L100       | DD         | TE25        | 100                                             | 100                | 2                  | 110                          | 0.79                                              | 2                  | 0.003                    | 100                |                       |                                                                                       | YES                                 |
| 56                                                   | RB168L150       | DD         | TE25        | 150                                             | 150                | 1                  | 50                           | 0.84                                              | 1                  | 0.004                    | 150                |                       |                                                                                       | YES                                 |
| 57                                                   | RB068L150       | DD         | TE25        | 150                                             | 150                | 2                  | 90                           | 0.81                                              | 2                  | 0.003                    | 150                |                       |                                                                                       | YES                                 |
| 58                                                   | RB058L150       | DD         | TE25        | 150                                             | 150                | 3                  | 90                           | 0.85                                              | 3                  | 0.003                    | 150                |                       |                                                                                       | YES                                 |

Note: Package is JEDEC code, ( ): ROHM Package, [ ] : GENERAL Code.

☆ : Under Development

# Schottky Barrier Diodes

## ● Quick Reference for Power Schottky Barrier Diodes(High Efficiency type)

| V <sub>R</sub><br>(V) | I <sub>O</sub><br>(A) | Surface Mount type                                                                |   |                         |             |                                                                                   |    |                          |          | Lead type                                                                           |    |                         |    |                                                                                     |            |    |  |
|-----------------------|-----------------------|-----------------------------------------------------------------------------------|---|-------------------------|-------------|-----------------------------------------------------------------------------------|----|--------------------------|----------|-------------------------------------------------------------------------------------|----|-------------------------|----|-------------------------------------------------------------------------------------|------------|----|--|
|                       |                       |  |   |                         |             |  |    |                          |          |  |    |                         |    |  |            |    |  |
|                       |                       | TO-252<br>[DPAK]                                                                  |   |                         |             | TO-263S<br>[D2PAK]                                                                |    |                          |          | TO-220FN<br><3pin>                                                                  |    |                         |    | TO-220FN<br><2pin>                                                                  |            |    |  |
|                       |                       | Low V <sub>F</sub> type                                                           |   | Low I <sub>R</sub> type |             | Low V <sub>F</sub> type                                                           |    | Low I <sub>R</sub> type  |          | Low V <sub>F</sub> type                                                             |    | Low I <sub>R</sub> type |    | Low I <sub>R</sub> type                                                             |            |    |  |
| 30                    | 10                    | RBR10BM30A                                                                        | 1 |                         |             | RBR10NS30A                                                                        | 10 |                          |          | RBR10T30A                                                                           | 22 |                         |    |                                                                                     |            |    |  |
|                       | 15                    | RBR15BM30A                                                                        | 2 |                         |             |                                                                                   |    |                          |          |                                                                                     |    |                         |    |                                                                                     |            |    |  |
|                       | 20                    | RBR20BM30A                                                                        | 3 |                         |             | RBR20NS30A                                                                        | 11 |                          |          | RBR20T30A                                                                           | 23 |                         |    |                                                                                     |            |    |  |
|                       | 30                    |                                                                                   |   |                         |             | RBR30NS30A                                                                        | 12 |                          |          | RBR30T30A                                                                           | 24 |                         |    |                                                                                     |            |    |  |
|                       | 40                    |                                                                                   |   |                         |             | RBR40NS30A                                                                        | 13 |                          |          |                                                                                     |    |                         |    |                                                                                     |            |    |  |
| 40/45                 | 10                    | RBR10BM40A                                                                        | 4 | RBQ10BM45A              | 31          | RBR10NS40A                                                                        | 14 | RBQ10NS45A               | 40       | RBR10T40A                                                                           | 25 | RBQ10T45A               | 50 |                                                                                     |            |    |  |
|                       | 15                    | RBR15BM40A                                                                        | 5 | RBQ15BM45A              | 32          |                                                                                   |    |                          |          |                                                                                     |    |                         |    |                                                                                     |            |    |  |
|                       | 20                    | RBR20BM40A                                                                        | 6 | RBQ20BM45A              | 33          | RBR20NS40A                                                                        | 15 | RBQ20NS45A               | 41       | RBR20T40A                                                                           | 26 | RBQ20T45A               | 51 |                                                                                     |            |    |  |
|                       | 30                    |                                                                                   |   |                         |             | RBR30NS40A                                                                        | 16 | RBQ30NS45A<br>RBQ30NS45B | 42<br>49 | RBR30T40A                                                                           | 27 | RBQ30T45A               | 52 | RBR30TB45B                                                                          | 59         |    |  |
|                       | 40                    |                                                                                   |   |                         |             | RBR40NS40A                                                                        | 17 |                          |          |                                                                                     |    |                         |    |                                                                                     |            |    |  |
| 60/65                 | 10                    | RBR10BM60A                                                                        | 7 | RBQ10BM65A              | 34          | RBR10NS60A                                                                        | 18 | RBQ10NS65A               | 43       | RBR10T60A                                                                           | 28 | RBQ10T65A               | 53 |                                                                                     |            |    |  |
|                       | 15                    | RBR15BM60A                                                                        | 8 | RBQ15BM65A              | 35          |                                                                                   |    |                          |          |                                                                                     |    |                         |    |                                                                                     |            |    |  |
|                       | 20                    | RBR20BM60A                                                                        | 9 | RBQ20BM65A              | 36          | RBR20NS60A                                                                        | 19 | RBQ20NS65A               | 44       | RBR20T60A                                                                           | 29 | RBQ20T65A               | 54 |                                                                                     |            |    |  |
|                       | 30                    |                                                                                   |   |                         |             | RBR30NS60A                                                                        | 20 | RBQ30NS65A               | 45       | RBR30T60A                                                                           | 30 | RBQ30T65A               | 55 |                                                                                     |            |    |  |
|                       | 40                    |                                                                                   |   |                         |             | RBR40NS60A                                                                        | 21 |                          |          |                                                                                     |    |                         |    |                                                                                     |            |    |  |
| 100                   | 10                    |                                                                                   |   | New                     | RBQ10BM100A | 37                                                                                |    |                          | New      | RBQ10NS100A                                                                         | 46 |                         |    | New                                                                                 | RBQ10T100A | 56 |  |
|                       | 15                    |                                                                                   |   | New                     | RBQ15BM100A | 38                                                                                |    |                          |          |                                                                                     |    |                         |    |                                                                                     |            |    |  |
|                       | 20                    |                                                                                   |   | New                     | RBQ20BM100A | 39                                                                                |    |                          | New      | RBQ20NS100A                                                                         | 47 |                         |    | New                                                                                 | RBQ20T100A | 57 |  |
|                       | 30                    |                                                                                   |   |                         |             |                                                                                   |    |                          | New      | RBQ30NS100A                                                                         | 48 |                         |    | New                                                                                 | RBQ30T100A | 58 |  |

Note: Package is JEDEC code. [ ] : GENERAL Code.

## ● Quick Reference for Power Schottky Barrier Diodes(Standard Parts)

| $V_R$<br>(V) | $I_O$<br>(A) | Surface Mount type                                                                  |    |                                                                                     |    | Lead type                                                                             |    |
|--------------|--------------|-------------------------------------------------------------------------------------|----|-------------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------|----|
|              |              |  |    |  |    |  |    |
|              |              | TO-252 [DPAK]                                                                       |    | TO-263S [D2PAK]                                                                     |    | TO-220FN <3pin>                                                                       |    |
|              |              | Ultra-Low $I_R$ type                                                                |    | Ultra-Low $I_R$ type                                                                |    | Ultra-Low $I_R$ type                                                                  |    |
| 30           | 5            | RB078BM30S                                                                          | 1  |                                                                                     |    |                                                                                       |    |
|              | 6            | RB098BM-30                                                                          | 2  |                                                                                     |    |                                                                                       |    |
|              | 10           | RB088BM-30                                                                          | 3  | RB088NS-30                                                                          | 13 | RB088T-30                                                                             | 34 |
|              | 20           |                                                                                     |    | RB218NS-30                                                                          | 14 | RB218T-30                                                                             | 35 |
|              | 30           |                                                                                     |    | RB228NS-30                                                                          | 15 | RB228T-30                                                                             | 36 |
| 40           | 40           |                                                                                     |    | RB238NS-30                                                                          | 16 | RB238T-30                                                                             | 37 |
|              | 5            | RB075BM40S                                                                          | 4  |                                                                                     |    |                                                                                       |    |
|              | 6            | RB098BM-40                                                                          | 5  |                                                                                     |    |                                                                                       |    |
|              | 10           | RB088BM-40                                                                          | 6  | RB088NS-40                                                                          | 17 | RB088T-40                                                                             | 38 |
|              | 20           |                                                                                     |    | RB218NS-40                                                                          | 18 | RB218T-40                                                                             | 39 |
| 60           | 30           |                                                                                     |    | RB228NS-40                                                                          | 19 | RB228T-40                                                                             | 40 |
|              | 40           |                                                                                     |    | RB238NS-40                                                                          | 20 | RB238T-40                                                                             | 41 |
|              | 6            | RB098BM-60                                                                          | 7  |                                                                                     |    |                                                                                       |    |
|              | 10           | RB088BM-60                                                                          | 8  | RB088NS-60                                                                          | 21 | RB088T-60                                                                             | 42 |
|              | 20           |                                                                                     |    | RB218NS-60                                                                          | 22 | RB218T-60                                                                             | 43 |
| 100          | 30           |                                                                                     |    | RB228NS-60                                                                          | 23 | RB228T-60                                                                             | 44 |
|              | 40           |                                                                                     |    | RB238NS-60                                                                          | 24 | RB238T-60                                                                             | 45 |
|              | 6            | RB098BM100                                                                          | 9  |                                                                                     |    |                                                                                       |    |
|              | 10           | RB088BM100                                                                          | 10 | RB088NS100                                                                          | 25 | RB088T100                                                                             | 46 |
|              | 20           |                                                                                     |    | RB218NS100                                                                          | 26 | RB218T100                                                                             | 47 |
| 150          | 30           |                                                                                     |    | RB228NS100                                                                          | 27 | RB228T100                                                                             | 48 |
|              | 40           |                                                                                     |    | RB298NS100                                                                          | 28 | RB298T100                                                                             | 49 |
|              |              |                                                                                     |    | RB238NS100                                                                          | 29 | RB238T100                                                                             | 50 |
|              | 6            | RB098BM150                                                                          | 11 |                                                                                     |    |                                                                                       |    |
|              | 10           | RB088BM150                                                                          | 12 | RB088NS150                                                                          | 30 | RB088T150                                                                             | 51 |
| 150          | 20           |                                                                                     |    | RB218NS150                                                                          | 31 | RB218T150                                                                             | 52 |
|              | 30           |                                                                                     |    | RB228NS150                                                                          | 32 | RB228T150                                                                             | 53 |
|              | 40           |                                                                                     |    | RB238NS150                                                                          | 33 | RB238T150                                                                             | 54 |

Note: Package is JEDEC code. [ ] : GENERAL Code.

## Schottky Barrier Diodes

Schottky Barrier Diodes

Example: **RBR10BM30A FH TL**

Part No. Grade Code Taping Code

| Power Schottky Barrier Diodes (High Efficiency type) |                        |            |             |                                    |                    |                       |                                |                                        |                    |                          |                    |                 |                                                                                       |                                     |
|------------------------------------------------------|------------------------|------------|-------------|------------------------------------|--------------------|-----------------------|--------------------------------|----------------------------------------|--------------------|--------------------------|--------------------|-----------------|---------------------------------------------------------------------------------------|-------------------------------------|
| No.                                                  | Type                   |            |             | Absolute Maximum Ratings (Tc=25°C) |                    |                       |                                | Electrical Characteristics (Tj=25°C)*2 |                    |                          |                    | Package         | Equivalent Circuit Diagram                                                            | Automotive Grade Available AEC-Q101 |
|                                                      | Part No.               | Grade Code | Taping Code | V <sub>RM</sub> (V)                | V <sub>R</sub> (V) | I <sub>O</sub> *1 (A) | I <sub>FSM</sub> (A)*2 60Hz.1~ | V <sub>F</sub> (V) Max.                | I <sub>F</sub> (A) | I <sub>R</sub> (mA) Max. | V <sub>R</sub> (V) |                 |                                                                                       |                                     |
| Low V <sub>F</sub> type                              |                        |            |             |                                    |                    |                       |                                |                                        |                    |                          |                    |                 |                                                                                       |                                     |
| 1                                                    | RBR10BM30A             | FH         | TL          | 30                                 | 30                 | 10                    | 50                             | 0.55                                   | 5                  | 0.1                      | 30                 | TO-252 [DPAK]   |    | YES                                 |
| 2                                                    | RBR15BM30A             | FH         | TL          | 30                                 | 30                 | 15                    | 100                            | 0.51                                   | 7.5                | 0.2                      | 30                 |                 |                                                                                       | YES                                 |
| 3                                                    | RBR20BM30A             | FH         | TL          | 30                                 | 30                 | 20                    | 100                            | 0.51                                   | 10                 | 0.3                      | 30                 |                 |                                                                                       | YES                                 |
| 4                                                    | RBR10BM40A             | FH         | TL          | 40                                 | 40                 | 10                    | 50                             | 0.62                                   | 5                  | 0.12                     | 40                 |                 |                                                                                       | YES                                 |
| 5                                                    | RBR15BM40A             | FH         | TL          | 40                                 | 40                 | 15                    | 100                            | 0.55                                   | 7.5                | 0.24                     | 40                 |                 |                                                                                       | YES                                 |
| 6                                                    | RBR20BM40A             | FH         | TL          | 40                                 | 40                 | 20                    | 100                            | 0.55                                   | 10                 | 0.36                     | 40                 |                 |                                                                                       | YES                                 |
| 7                                                    | RBR10BM60A             | FH         | TL          | 60                                 | 60                 | 10                    | 50                             | 0.65                                   | 5                  | 0.2                      | 60                 |                 |                                                                                       | YES                                 |
| 8                                                    | RBR15BM60A             | FH         | TL          | 60                                 | 60                 | 15                    | 100                            | 0.58                                   | 7.5                | 0.4                      | 60                 |                 |                                                                                       | YES                                 |
| 9                                                    | RBR20BM60A             | FH         | TL          | 60                                 | 60                 | 20                    | 100                            | 0.59                                   | 10                 | 0.6                      | 60                 |                 |                                                                                       | YES                                 |
| 10                                                   | RBR10NS30A             | FH         | TL          | 30                                 | 30                 | 10                    | 50                             | 0.55                                   | 5                  | 0.1                      | 30                 | TO-263S [D2PAK] |                                                                                       | YES                                 |
| 11                                                   | RBR20NS30A             | FH         | TL          | 30                                 | 30                 | 20                    | 100                            | 0.55                                   | 10                 | 0.2                      | 30                 |                 |                                                                                       | YES                                 |
| 12                                                   | RBR30NS30A             | FH         | TL          | 30                                 | 30                 | 30                    | 100                            | 0.55                                   | 15                 | 0.3                      | 30                 |                 |                                                                                       | YES                                 |
| 13                                                   | RBR40NS30A             | FH         | TL          | 30                                 | 30                 | 40                    | 100                            | 0.52                                   | 20                 | 0.6                      | 30                 |                 |                                                                                       | YES                                 |
| 14                                                   | RBR10NS40A             | FH         | TL          | 40                                 | 40                 | 10                    | 50                             | 0.62                                   | 5                  | 0.12                     | 40                 |                 |                                                                                       | YES                                 |
| 15                                                   | RBR20NS40A             | FH         | TL          | 40                                 | 40                 | 20                    | 100                            | 0.62                                   | 10                 | 0.24                     | 40                 |                 |                                                                                       | YES                                 |
| 16                                                   | RBR30NS40A             | FH         | TL          | 40                                 | 40                 | 30                    | 100                            | 0.62                                   | 15                 | 0.36                     | 40                 |                 |                                                                                       | YES                                 |
| 17                                                   | RBR40NS40A             | FH         | TL          | 40                                 | 40                 | 40                    | 100                            | 0.55                                   | 20                 | 0.43                     | 40                 |                 |                                                                                       | YES                                 |
| 18                                                   | RBR10NS60A             | FH         | TL          | 60                                 | 60                 | 10                    | 50                             | 0.65                                   | 5                  | 0.2                      | 60                 |                 |                                                                                       | YES                                 |
| 19                                                   | RBR20NS60A             | FH         | TL          | 60                                 | 60                 | 20                    | 100                            | 0.64                                   | 10                 | 0.4                      | 60                 |                 |                                                                                       | YES                                 |
| 20                                                   | RBR30NS60A             | FH         | TL          | 60                                 | 60                 | 30                    | 100                            | 0.67                                   | 15                 | 0.6                      | 60                 |                 |                                                                                       | YES                                 |
| 21                                                   | RBR40NS60A             | FH         | TL          | 60                                 | 60                 | 40                    | 100                            | 0.6                                    | 20                 | 0.8                      | 60                 |                 |                                                                                       | YES                                 |
| 22                                                   | RBR10T30A              | HZ         | C9          | 30                                 | 30                 | 10                    | 50                             | 0.55                                   | 5                  | 0.1                      | 30                 | TO-220FN <3pin> |                                                                                       | YES                                 |
| 23                                                   | RBR20T30A              | HZ         | C9          | 30                                 | 30                 | 20                    | 100                            | 0.55                                   | 10                 | 0.2                      | 30                 |                 |                                                                                       | YES                                 |
| 24                                                   | RBR30T30A              | HZ         | C9          | 30                                 | 30                 | 30                    | 100                            | 0.55                                   | 15                 | 0.3                      | 30                 |                 |                                                                                       | YES                                 |
| 25                                                   | RBR10T40A              | HZ         | C9          | 40                                 | 45                 | 10                    | 50                             | 0.62                                   | 5                  | 0.12                     | 40                 |                 |                                                                                       | YES                                 |
| 26                                                   | RBR20T40A              | HZ         | C9          | 40                                 | 45                 | 20                    | 100                            | 0.62                                   | 10                 | 0.24                     | 40                 |                 |                                                                                       | YES                                 |
| 27                                                   | RBR30T40A              | HZ         | C9          | 40                                 | 45                 | 30                    | 100                            | 0.62                                   | 15                 | 0.36                     | 40                 |                 |                                                                                       | YES                                 |
| 28                                                   | RBR10T60A              | HZ         | C9          | 60                                 | 60                 | 10                    | 50                             | 0.65                                   | 5                  | 0.2                      | 60                 |                 |                                                                                       | YES                                 |
| 29                                                   | RBR20T60A              | HZ         | C9          | 60                                 | 60                 | 20                    | 100                            | 0.64                                   | 10                 | 0.4                      | 60                 |                 |                                                                                       | YES                                 |
| 30                                                   | RBR30T60A              | HZ         | C9          | 60                                 | 60                 | 30                    | 100                            | 0.67                                   | 15                 | 0.6                      | 60                 |                 |                                                                                       | YES                                 |
| Low I <sub>R</sub> type                              |                        |            |             |                                    |                    |                       |                                |                                        |                    |                          |                    |                 |                                                                                       |                                     |
| 31                                                   | RBQ10BM45A             | FH         | TL          | 45                                 | 45                 | 10                    | 50                             | 0.65                                   | 5                  | 0.07                     | 45                 | TO-252 [DPAK]   |  | YES                                 |
| 32                                                   | RBQ15BM45A             | FH         | TL          | 45                                 | 45                 | 15                    | 100                            | 0.59                                   | 7.5                | 0.14                     | 45                 |                 |                                                                                       | YES                                 |
| 33                                                   | RBQ20BM45A             | FH         | TL          | 45                                 | 45                 | 20                    | 100                            | 0.59                                   | 10                 | 0.2                      | 45                 |                 |                                                                                       | YES                                 |
| 34                                                   | RBQ10BM65A             | FH         | TL          | 65                                 | 65                 | 10                    | 50                             | 0.69                                   | 5                  | 0.07                     | 65                 |                 |                                                                                       | YES                                 |
| 35                                                   | RBQ15BM65A             | FH         | TL          | 65                                 | 65                 | 15                    | 100                            | 0.63                                   | 7.5                | 0.14                     | 65                 |                 |                                                                                       | YES                                 |
| 36                                                   | RBQ20BM65A             | FH         | TL          | 65                                 | 65                 | 20                    | 100                            | 0.63                                   | 10                 | 0.2                      | 65                 |                 |                                                                                       | YES                                 |
| 37                                                   | <b>New</b> RBQ10BM100A | FH         | TL          | 100                                | 100                | 10                    | 100                            | 0.77                                   | 5                  | 0.08                     | 100                |                 |                                                                                       | YES                                 |
| 38                                                   | <b>New</b> RBQ15BM100A | FH         | TL          | 100                                | 100                | 15                    | 100                            | 0.71                                   | 7.5                | 0.14                     | 100                |                 |                                                                                       | YES                                 |
| 39                                                   | <b>New</b> RBQ20BM100A | FH         | TL          | 100                                | 100                | 20                    | 100                            | 0.69                                   | 10                 | 0.2                      | 100                |                 |                                                                                       | YES                                 |
| 40                                                   | RBQ10NS45A             | FH         | TL          | 45                                 | 45                 | 10                    | 100                            | 0.65                                   | 5                  | 0.07                     | 45                 | TO-263S [D2PAK] |                                                                                       | YES                                 |
| 41                                                   | RBQ20NS45A             | FH         | TL          | 45                                 | 45                 | 20                    | 100                            | 0.65                                   | 10                 | 0.14                     | 45                 |                 |                                                                                       | YES                                 |
| 42                                                   | RBQ30NS45A             | FH         | TL          | 45                                 | 45                 | 30                    | 100                            | 0.65                                   | 15                 | 0.2                      | 45                 |                 |                                                                                       | YES                                 |
| 43                                                   | RBQ10NS65A             | FH         | TL          | 65                                 | 65                 | 10                    | 100                            | 0.69                                   | 5                  | 0.07                     | 65                 |                 |                                                                                       | YES                                 |
| 44                                                   | RBQ20NS65A             | FH         | TL          | 65                                 | 65                 | 20                    | 100                            | 0.69                                   | 10                 | 0.14                     | 65                 |                 |                                                                                       | YES                                 |
| 45                                                   | RBQ30NS65A             | FH         | TL          | 65                                 | 65                 | 30                    | 100                            | 0.69                                   | 15                 | 0.2                      | 65                 |                 |                                                                                       | YES                                 |
| 46                                                   | <b>New</b> RBQ10NS100A | FH         | TL          | 100                                | 100                | 10                    | 100                            | 0.77                                   | 5                  | 0.08                     | 100                |                 |                                                                                       | YES                                 |
| 47                                                   | <b>New</b> RBQ20NS100A | FH         | TL          | 100                                | 100                | 20                    | 100                            | 0.77                                   | 10                 | 0.14                     | 100                |                 |                                                                                       | YES                                 |
| 48                                                   | <b>New</b> RBQ30NS100A | FH         | TL          | 100                                | 100                | 30                    | 100                            | 0.77                                   | 15                 | 0.2                      | 100                |                 |                                                                                       | YES                                 |
| 49                                                   | RBQ30NS45B             | FH         | TL          | 45                                 | 45                 | 30                    | 100                            | 0.59                                   | 30                 | 0.7                      | 45                 | TO-220FN <2pin> |  | YES                                 |
| 50                                                   | RBQ10T45A              | HZ         | C9          | 45                                 | 45                 | 10                    | 100                            | 0.65                                   | 5                  | 0.07                     | 45                 |                 |                                                                                       | YES                                 |
| 51                                                   | RBQ20T45A              | HZ         | C9          | 45                                 | 45                 | 20                    | 100                            | 0.65                                   | 10                 | 0.14                     | 45                 |                 |                                                                                       | YES                                 |
| 52                                                   | RBQ30T45A              | HZ         | C9          | 45                                 | 45                 | 30                    | 100                            | 0.65                                   | 15                 | 0.2                      | 45                 |                 |                                                                                       | YES                                 |
| 53                                                   | RBQ10T65A              | HZ         | C9          | 65                                 | 65                 | 10                    | 100                            | 0.69                                   | 5                  | 0.07                     | 65                 |                 |                                                                                       | YES                                 |
| 54                                                   | RBQ20T65A              | HZ         | C9          | 65                                 | 65                 | 20                    | 100                            | 0.69                                   | 10                 | 0.14                     | 65                 |                 |                                                                                       | YES                                 |
| 55                                                   | RBQ30T65A              | HZ         | C9          | 65                                 | 65                 | 30                    | 100                            | 0.69                                   | 15                 | 0.2                      | 65                 |                 |                                                                                       | YES                                 |
| 56                                                   | <b>New</b> RBQ10T100A  | HZ         | C9          | 100                                | 100                | 10                    | 100                            | 0.77                                   | 5                  | 0.08                     | 100                |                 |                                                                                       | YES                                 |
| 57                                                   | <b>New</b> RBQ20T100A  | HZ         | C9          | 100                                | 100                | 20                    | 100                            | 0.77                                   | 10                 | 0.14                     | 100                |                 |                                                                                       | YES                                 |
| 58                                                   | <b>New</b> RBQ30T100A  | HZ         | C9          | 100                                | 100                | 30                    | 100                            | 0.77                                   | 15                 | 0.2                      | 100                |                 |                                                                                       | YES                                 |
| 59                                                   | RBQ30TB45B             | HZ         | C9          | 45                                 | 45                 | 30                    | 100                            | 0.59                                   | 30                 | 0.7                      | 45                 | TO-220FN <2pin> |  | YES                                 |

Note: \*1: I<sub>O</sub>: Average current per chip. In case of 2 chip diodes, I<sub>O</sub> indicates average output current of 2 chips.

\*2: Value/Chip

Package is JEDEC code. [ ]: GENERAL Code.

## Schottky Barrier Diodes

Schottky Barrier Diodes

Example: **R B 0 9 8 B M - 3 0 F H T L**

Part No. Grade Code Taping Code

| Power Schottky Barrier Diodes (Standard type) |            |            |             |                                    |                    |                       |                                |                                       |                    |                          |                    |                 |                            |                                     |
|-----------------------------------------------|------------|------------|-------------|------------------------------------|--------------------|-----------------------|--------------------------------|---------------------------------------|--------------------|--------------------------|--------------------|-----------------|----------------------------|-------------------------------------|
| No.                                           | Type       |            |             | Absolute Maximum Ratings (Tc=25°C) |                    |                       |                                | Electrical Characteristics(Tj=25°C)*2 |                    |                          |                    | Package         | Equivalent Circuit Diagram | Automotive Grade Available AEC-Q101 |
|                                               | Part No.   | Grade Code | Taping Code | V <sub>RM</sub> (V)                | V <sub>R</sub> (V) | I <sub>O</sub> *1 (A) | I <sub>FSM</sub> (A)*2 60Hz,1~ | V <sub>F</sub> (V) Max.               | I <sub>F</sub> (A) | I <sub>R</sub> (mA) Max. | V <sub>R</sub> (V) |                 |                            |                                     |
| Ultra-Low I <sub>R</sub> type                 |            |            |             |                                    |                    |                       |                                |                                       |                    |                          |                    |                 |                            |                                     |
| 1                                             | RB078BM30S | FH         | TL          | 35                                 | 30                 | 5                     | 50                             | 0.72                                  | 5                  | 0.005                    | 30                 | TO-252 [DPAK]   |                            | YES                                 |
| 2                                             | RB098BM-30 | FH         | TL          | 35                                 | 30                 | 6                     | 50                             | 0.72                                  | 3                  | 0.0015                   | 30                 |                 |                            | YES                                 |
| 3                                             | RB088BM-30 | FH         | TL          | 35                                 | 30                 | 10                    | 50                             | 0.72                                  | 5                  | 0.003                    | 30                 |                 |                            | YES                                 |
| 4                                             | RB075BM40S | FH         | TL          | 40                                 | 40                 | 5                     | 50                             | 0.75                                  | 5                  | 0.005                    | 40                 |                 |                            | YES                                 |
| 5                                             | RB098BM-40 | FH         | TL          | 45                                 | 40                 | 6                     | 50                             | 0.77                                  | 3                  | 0.0015                   | 40                 |                 |                            | YES                                 |
| 6                                             | RB088BM-40 | FH         | TL          | 45                                 | 40                 | 10                    | 50                             | 0.77                                  | 5                  | 0.003                    | 40                 |                 |                            | YES                                 |
| 7                                             | RB098BM-60 | FH         | TL          | 60                                 | 60                 | 6                     | 50                             | 0.83                                  | 3                  | 0.0015                   | 60                 |                 |                            | YES                                 |
| 8                                             | RB088BM-60 | FH         | TL          | 60                                 | 60                 | 10                    | 50                             | 0.83                                  | 5                  | 0.003                    | 60                 |                 |                            | YES                                 |
| 9                                             | RB098BM100 | FH         | TL          | 110                                | 100                | 6                     | 100                            | 0.77                                  | 3                  | 0.003                    | 100                |                 |                            | YES                                 |
| 10                                            | RB088BM100 | FH         | TL          | 100                                | 100                | 10                    | 100                            | 0.87                                  | 5                  | 0.005                    | 100                |                 |                            | YES                                 |
| 11                                            | RB098BM150 | FH         | TL          | 150                                | 150                | 6                     | 100                            | 0.83                                  | 3                  | 0.007                    | 150                |                 |                            | YES                                 |
| 12                                            | RB088BM150 | FH         | TL          | 150                                | 150                | 10                    | 100                            | 0.88                                  | 5                  | 0.015                    | 150                |                 |                            | YES                                 |
| 13                                            | RB088NS-30 | FH         | TL          | 35                                 | 30                 | 10                    | 50                             | 0.72                                  | 5                  | 0.003                    | 30                 | TO-263S [D2PAK] |                            | YES                                 |
| 14                                            | RB218NS-30 | FH         | TL          | 35                                 | 30                 | 20                    | 100                            | 0.72                                  | 10                 | 0.005                    | 30                 |                 |                            | YES                                 |
| 15                                            | RB228NS-30 | FH         | TL          | 35                                 | 30                 | 30                    | 100                            | 0.72                                  | 15                 | 0.01                     | 30                 |                 |                            | YES                                 |
| 16                                            | RB238NS-30 | FH         | TL          | 35                                 | 30                 | 40                    | 100                            | 0.75                                  | 20                 | 0.012                    | 30                 |                 |                            | YES                                 |
| 17                                            | RB088NS-40 | FH         | TL          | 45                                 | 40                 | 10                    | 50                             | 0.77                                  | 5                  | 0.003                    | 40                 |                 |                            | YES                                 |
| 18                                            | RB218NS-40 | FH         | TL          | 45                                 | 40                 | 20                    | 100                            | 0.77                                  | 10                 | 0.005                    | 40                 |                 |                            | YES                                 |
| 19                                            | RB228NS-40 | FH         | TL          | 45                                 | 40                 | 30                    | 100                            | 0.77                                  | 15                 | 0.01                     | 40                 |                 |                            | YES                                 |
| 20                                            | RB238NS-40 | FH         | TL          | 45                                 | 40                 | 40                    | 100                            | 0.8                                   | 20                 | 0.012                    | 40                 |                 |                            | YES                                 |
| 21                                            | RB088NS-60 | FH         | TL          | 60                                 | 60                 | 10                    | 50                             | 0.83                                  | 5                  | 0.003                    | 60                 |                 |                            | YES                                 |
| 22                                            | RB218NS-60 | FH         | TL          | 60                                 | 60                 | 20                    | 100                            | 0.83                                  | 10                 | 0.005                    | 60                 |                 |                            | YES                                 |
| 23                                            | RB228NS-60 | FH         | TL          | 60                                 | 60                 | 30                    | 100                            | 0.83                                  | 15                 | 0.01                     | 60                 |                 |                            | YES                                 |
| 24                                            | RB238NS-60 | FH         | TL          | 60                                 | 60                 | 40                    | 100                            | 0.86                                  | 20                 | 0.012                    | 60                 |                 |                            | YES                                 |
| 25                                            | RB088NS100 | FH         | TL          | 110                                | 100                | 10                    | 100                            | 0.87                                  | 5                  | 0.005                    | 100                | TO-220FN <3pin> |                            | YES                                 |
| 26                                            | RB218NS100 | FH         | TL          | 110                                | 100                | 20                    | 100                            | 0.87                                  | 10                 | 0.007                    | 100                |                 |                            | YES                                 |
| 27                                            | RB228NS100 | FH         | TL          | 110                                | 100                | 30                    | 100                            | 0.87                                  | 5                  | 0.005                    | 100                |                 |                            | YES                                 |
| 28                                            | RB298NS100 | FH         | TL          | 110                                | 100                | 30                    | 100                            | 0.87                                  | 15                 | 0.01                     | 100                |                 |                            | YES                                 |
| 29                                            | RB238NS100 | FH         | TL          | 110                                | 100                | 40                    | 100                            | 0.86                                  | 20                 | 0.02                     | 100                |                 |                            | YES                                 |
| 30                                            | RB088NS150 | FH         | TL          | 150                                | 150                | 10                    | 50                             | 0.88                                  | 5                  | 0.015                    | 150                |                 |                            | YES                                 |
| 31                                            | RB218NS150 | FH         | TL          | 150                                | 150                | 20                    | 100                            | 0.88                                  | 10                 | 0.02                     | 150                |                 |                            | YES                                 |
| 32                                            | RB228NS150 | FH         | TL          | 150                                | 150                | 30                    | 100                            | 0.88                                  | 15                 | 0.025                    | 150                |                 |                            | YES                                 |
| 33                                            | RB238NS150 | FH         | TL          | 150                                | 150                | 40                    | 100                            | 0.87                                  | 20                 | 0.03                     | 150                |                 |                            | YES                                 |
| 34                                            | RB088T-30  | HZ         | C9          | 35                                 | 30                 | 10                    | 50                             | 0.72                                  | 5                  | 0.003                    | 30                 |                 |                            | YES                                 |
| 35                                            | RB218T-30  | HZ         | C9          | 35                                 | 30                 | 20                    | 100                            | 0.72                                  | 10                 | 0.005                    | 30                 |                 |                            | YES                                 |
| 36                                            | RB228T-30  | HZ         | C9          | 35                                 | 30                 | 30                    | 100                            | 0.72                                  | 15                 | 0.01                     | 30                 |                 |                            | YES                                 |
| 37                                            | RB238T-30  | HZ         | C9          | 35                                 | 30                 | 40                    | 100                            | 0.75                                  | 20                 | 0.012                    | 30                 |                 |                            | YES                                 |
| 38                                            | RB088T-40  | HZ         | C9          | 45                                 | 40                 | 10                    | 50                             | 0.77                                  | 5                  | 0.003                    | 40                 |                 |                            | YES                                 |
| 39                                            | RB218T-40  | HZ         | C9          | 45                                 | 40                 | 20                    | 100                            | 0.77                                  | 10                 | 0.005                    | 40                 |                 |                            | YES                                 |
| 40                                            | RB228T-40  | HZ         | C9          | 45                                 | 40                 | 30                    | 100                            | 0.77                                  | 15                 | 0.01                     | 40                 |                 |                            | YES                                 |
| 41                                            | RB238T-40  | HZ         | C9          | 45                                 | 40                 | 40                    | 100                            | 0.8                                   | 20                 | 0.012                    | 40                 |                 |                            | YES                                 |
| 42                                            | RB088T-60  | HZ         | C9          | 60                                 | 60                 | 10                    | 50                             | 0.83                                  | 5                  | 0.003                    | 60                 |                 |                            | YES                                 |
| 43                                            | RB218T-60  | HZ         | C9          | 60                                 | 60                 | 20                    | 100                            | 0.83                                  | 10                 | 0.005                    | 60                 |                 |                            | YES                                 |
| 44                                            | RB228T-60  | HZ         | C9          | 60                                 | 60                 | 30                    | 100                            | 0.83                                  | 15                 | 0.01                     | 60                 |                 |                            | YES                                 |
| 45                                            | RB238T-60  | HZ         | C9          | 60                                 | 60                 | 40                    | 100                            | 0.86                                  | 20                 | 0.012                    | 60                 |                 |                            | YES                                 |
| 46                                            | RB088T100  | HZ         | C9          | 110                                | 100                | 10                    | 100                            | 0.87                                  | 5                  | 0.005                    | 100                |                 |                            | YES                                 |
| 47                                            | RB218T100  | HZ         | C9          | 110                                | 100                | 20                    | 100                            | 0.87                                  | 10                 | 0.007                    | 100                |                 |                            | YES                                 |
| 48                                            | RB228T100  | HZ         | C9          | 110                                | 100                | 30                    | 100                            | 0.87                                  | 5                  | 0.005                    | 100                |                 |                            | YES                                 |
| 49                                            | RB298T100  | HZ         | C9          | 110                                | 100                | 30                    | 100                            | 0.87                                  | 15                 | 0.01                     | 100                |                 |                            | YES                                 |
| 50                                            | RB238T100  | HZ         | C9          | 110                                | 100                | 40                    | 100                            | 0.86                                  | 20                 | 0.02                     | 100                |                 |                            | YES                                 |
| 51                                            | RB088T150  | HZ         | C9          | 150                                | 150                | 10                    | 50                             | 0.88                                  | 5                  | 0.015                    | 150                |                 |                            | YES                                 |
| 52                                            | RB218T150  | HZ         | C9          | 150                                | 150                | 20                    | 100                            | 0.88                                  | 10                 | 0.02                     | 150                |                 |                            | YES                                 |
| 53                                            | RB228T150  | HZ         | C9          | 150                                | 150                | 30                    | 100                            | 0.88                                  | 15                 | 0.025                    | 150                |                 |                            | YES                                 |
| 54                                            | RB238T150  | HZ         | C9          | 150                                | 150                | 40                    | 100                            | 0.87                                  | 20                 | 0.03                     | 150                |                 |                            | YES                                 |

Note: \*1: I<sub>o</sub>: Average current per chip. In case of 2 chip diodes, I<sub>o</sub> indicates average output current of 2 chips.

\*2: Value/Chip

Package is JEDEC code. [ ]: GENERAL Code.

## Fast Recovery Diodes

## ● Quick Reference for Small Signal/Middle Power Fast Recovery Diodes

| V <sub>R</sub><br>(V) | I <sub>O</sub><br>(A) | Surface Mount type                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |  |  |  |  |  |  |
|-----------------------|-----------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|--|--|--|--|--|
|                       |                       |  |  |  |  |  |  |  |  |  |  |  |  |
|                       |                       | 2512 size<br>SOD-323FL<br>(UMD2)                                                  | 2514 size<br>(TUMD2M)                                                             | 3516 size<br>SOD-123FL<br>(PMDU)                                                  | 4725 size<br>SOD-128<br>(PMDTM)                                                   | 5026 size<br>DO-214AC (PMDS)<br>[SMA]                                               | 2928 size<br>SOT-457T<br>(TSM6)                                                     |  |  |  |  |  |  |
| 100                   | 0.5                   |                                                                                   | RF05VYM1S 2                                                                       |                                                                                   |                                                                                   |                                                                                     |                                                                                     |  |  |  |  |  |  |
|                       | 0.4                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     | RF04UA2D 29                                                                         |  |  |  |  |  |  |
|                       | 0.5                   |                                                                                   | RF05VYM2S 3                                                                       | RFC02MM2S 4                                                                       |                                                                                   |                                                                                     |                                                                                     |  |  |  |  |  |  |
|                       | 0.7                   |                                                                                   |                                                                                   | RF071MM2S 5                                                                       |                                                                                   |                                                                                     |                                                                                     |  |  |  |  |  |  |
|                       | 0.8                   |                                                                                   |                                                                                   | RF081MM2S 6                                                                       |                                                                                   |                                                                                     |                                                                                     |  |  |  |  |  |  |
| 200                   | 1                     |                                                                                   |                                                                                   |                                                                                   | RF101LAM2S 7                                                                      | RF101L2S 19                                                                         |                                                                                     |  |  |  |  |  |  |
|                       | 1.1                   |                                                                                   |                                                                                   |                                                                                   | RF081LAM2S 8                                                                      | RF081L2S 20                                                                         |                                                                                     |  |  |  |  |  |  |
|                       | 2                     |                                                                                   |                                                                                   |                                                                                   | RF201LAM2S 9<br>RF202LAM2S 10                                                     | RF201L2S 21                                                                         |                                                                                     |  |  |  |  |  |  |
|                       | 3                     |                                                                                   |                                                                                   |                                                                                   | RF302LAM2S 11                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |
| 250                   | 0.1                   | RF01VM2S 1                                                                        |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |  |  |  |  |  |  |
| 400                   | 1                     |                                                                                   |                                                                                   |                                                                                   | RF071LAM4S 12<br>RF101LAM4S 13                                                    | RF071L4S 22<br>RF101L4S 23                                                          |                                                                                     |  |  |  |  |  |  |
|                       | 1.5                   |                                                                                   |                                                                                   |                                                                                   | RF201LAM4S 14<br>RFN2LAM4S 15                                                     | RF201L4S 24<br>RFN2L4S 25                                                           |                                                                                     |  |  |  |  |  |  |
| 450                   | 0.1                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |  |  |  |  |  |  |
|                       | 0.2                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |  |  |  |  |  |  |
| 600                   | 0.8                   |                                                                                   |                                                                                   |                                                                                   | RFN1LAM6S 16                                                                      | RFN1L6S 26                                                                          |                                                                                     |  |  |  |  |  |  |
|                       | 1.5                   |                                                                                   |                                                                                   |                                                                                   | RFN2LAM6S 17                                                                      | RFN2L6S 27                                                                          |                                                                                     |  |  |  |  |  |  |
| 700                   | 0.8                   |                                                                                   |                                                                                   |                                                                                   | RFN1LAM7S 18                                                                      | RFN1L7S 28                                                                          |                                                                                     |  |  |  |  |  |  |
| 800                   | 0.2                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |  |  |  |  |  |  |

Note: Package is JEDEC code. ( ) : ROHM Package, [ ] : GENERAL Code.

Fast Recovery Diodes

Example: **R F 0 1 V M 2 S F H T E - 1 7**

Part No.      Grade Code      Taping Code

| Small Signal/Middle Power Fast Recovery Diodes |            |            |             |                                                                         |                    |                    |                                   |                                                    |                    |                          |                     |                           |                    |                    |                                                                                       |                                                                                       |                                     |
|------------------------------------------------|------------|------------|-------------|-------------------------------------------------------------------------|--------------------|--------------------|-----------------------------------|----------------------------------------------------|--------------------|--------------------------|---------------------|---------------------------|--------------------|--------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------|
| No.                                            | Type       |            |             | Absolute Maximum Ratings (T <sub>C</sub> =25°C or T <sub>I</sub> =25°C) |                    |                    |                                   | Electrical Characteristics(T <sub>J</sub> =25°C)*1 |                    |                          |                     |                           |                    |                    | Package                                                                               | Equivalent Circuit Diagram                                                            | Automotive Grade Available AEC-Q101 |
|                                                | Part No.   | Grade Code | Taping Code | V <sub>RM</sub> (V)                                                     | V <sub>R</sub> (V) | I <sub>O</sub> (A) | I <sub>FSM</sub> (A)*1<br>60Hz.1~ | V <sub>F</sub> (V) Max.                            | I <sub>F</sub> (A) | I <sub>R</sub> (μA) Max. | V <sub>RR</sub> (V) | t <sub>rr</sub> (ns) Max. | I <sub>r</sub> (A) | I <sub>n</sub> (A) |                                                                                       |                                                                                       |                                     |
| 1                                              | RF01VM2S   | FH         | TE-17       | 250                                                                     | 250                | 0.1                | 1                                 | 1.2                                                | 0.1                | 10                       | 250                 | 50                        | *2                 | SOD-323FL (UMD2)   |  | YES                                                                                   |                                     |
| 2                                              | RF05VYM1S  | FH         | TR          | 100                                                                     | 100                | 0.5                | 6                                 | 0.98                                               | 0.5                | 10                       | 100                 | 25                        | 0.5                | 1                  |                                                                                       | (TUMD2M)                                                                              | YES                                 |
| 3                                              | RF05VYM2S  | FH         | TR          | 200                                                                     | 200                | 0.5                | 6                                 | 0.98                                               | 0.5                | 10                       | 200                 | 25                        | 0.5                | 1                  |                                                                                       | SOD-123FL (PMDU)                                                                      | YES                                 |
| 4                                              | RFC02MM2S  | TF         | TR          | 200                                                                     | 200                | 0.5                | 10                                | 0.95                                               | 0.5                | 1                        | 200                 | 35                        | 0.1                | 0.2                |                                                                                       |                                                                                       | YES                                 |
| 5                                              | RF071MM2S  | TF         | TR          | 200                                                                     | 200                | 0.7                | 15                                | 0.85                                               | 0.7                | 10                       | 200                 | 25                        | 0.5                | 1                  |                                                                                       |                                                                                       | YES                                 |
| 6                                              | RF081MM2S  | TF         | TR          | 200                                                                     | 200                | 0.8                | 20                                | 0.95                                               | 0.8                | 10                       | 200                 | 25                        | 0.5                | 1                  |                                                                                       | SOD-128 (PMDTM)                                                                       | YES                                 |
| 7                                              | RF101LAM2S | TF         | TR          | 200                                                                     | 200                | 1                  | 20                                | 0.87                                               | 1                  | 10                       | 200                 | 25                        | 0.5                | 1                  |                                                                                       |                                                                                       | YES                                 |
| 8                                              | RF081LAM2S | TF         | TR          | 200                                                                     | 200                | 1.1                | 25                                | 0.98                                               | 1                  | 10                       | 200                 | 25                        | 0.5                | 1                  |                                                                                       |                                                                                       | YES                                 |
| 9                                              | RF201LAM2S | TF         | TR          | 200                                                                     | 200                | 2                  | 20                                | 0.87                                               | 2                  | 10                       | 200                 | 25                        | 0.5                | 1                  |                                                                                       |                                                                                       | YES                                 |
| 10                                             | RF202LAM2S | TF         | TR          | 200                                                                     | 200                | 2                  | 20                                | 0.93                                               | 2                  | 10                       | 200                 | 25                        | 0.5                | 1                  |                                                                                       |                                                                                       | YES                                 |
| 11                                             | RF302LAM2S | TF         | TR          | 200                                                                     | 200                | 3                  | 20                                | 0.92                                               | 3                  | 10                       | 200                 | 25                        | 0.5                | 1                  |                                                                                       |                                                                                       | YES                                 |
| 12                                             | RF071LAM4S | TF         | TR          | 400                                                                     | 400                | 1                  | 15                                | 1.25                                               | 0.7                | 10                       | 400                 | 25                        | 0.5                | 1                  |                                                                                       |                                                                                       | YES                                 |
| 13                                             | RF101LAM4S | TF         | TR          | 400                                                                     | 400                | 1                  | 25                                | 1.25                                               | 1                  | 10                       | 400                 | 25                        | 0.5                | 1                  |                                                                                       |                                                                                       | YES                                 |
| 14                                             | RF201LAM4S | TF         | TR          | 400                                                                     | 400                | 1.5                | 50                                | 1.2                                                | 1.5                | 1                        | 400                 | 30                        | 0.5                | 1                  |                                                                                       |                                                                                       | YES                                 |
| 15                                             | RFN2LAM4S  | TF         | TR          | 400                                                                     | 400                | 1.5                | 50                                | 1.2                                                | 1.5                | 1                        | 400                 | 30                        | 0.5                | 1                  |                                                                                       |                                                                                       | YES                                 |
| 16                                             | RFN1LAM6S  | TF         | TR          | 600                                                                     | 600                | 0.8                | 15                                | 1.45                                               | 0.8                | 1                        | 600                 | 35                        | 0.5                | 1                  |                                                                                       | YES                                                                                   |                                     |
| 17                                             | RFN2LAM6S  | TF         | TR          | 600                                                                     | 600                | 1.5                | 40                                | 1.55                                               | 1.5                | 1                        | 600                 | 35                        | 0.5                | 1                  |                                                                                       | YES                                                                                   |                                     |
| 18                                             | RFN1LAM7S  | TF         | TR          | 700                                                                     | 700                | 0.8                | 15                                | 1.5                                                | 0.8                | 1                        | 700                 | 80                        | 0.5                | 1                  |                                                                                       | YES                                                                                   |                                     |
| 19                                             | RF101L2S   | DD         | TE25        | 200                                                                     | 200                | 1                  | 20                                | 0.87                                               | 1                  | 10                       | 200                 | 25                        | 0.5                | 1                  | DO-214AC (PMDS) [SMA]                                                                 | YES                                                                                   |                                     |
| 20                                             | RF081L2S   | TF         | TE25        | 200                                                                     | 200                | 1.1                | 25                                | 0.98                                               | 1                  | 10                       | 200                 | 25                        | 0.5                | 1                  |                                                                                       | YES                                                                                   |                                     |
| 21                                             | RF201L2S   | DD         | TE25        | 200                                                                     | 200                | 2                  | 20                                | 0.87                                               | 2                  | 10                       | 200                 | 25                        | 0.5                | 1                  |                                                                                       | YES                                                                                   |                                     |
| 22                                             | RF071L4S   | TF         | TE25        | 400                                                                     | 400                | 1                  | 15                                | 1.25                                               | 0.7                | 10                       | 400                 | 25                        | 0.5                | 1                  |                                                                                       | YES                                                                                   |                                     |
| 23                                             | RF101L4S   | TF         | TE25        | 400                                                                     | 400                | 1                  | 25                                | 1.25                                               | 1                  | 10                       | 400                 | 25                        | 0.5                | 1                  |                                                                                       | YES                                                                                   |                                     |
| 24                                             | RF201L4S   | DD         | TE25        | 400                                                                     | 400                | 1.5                | 50                                | 1.2                                                | 1.5                | 1                        | 400                 | 30                        | 0.5                | 1                  |                                                                                       | YES                                                                                   |                                     |
| 25                                             | RFN2L4S    | DD         | TE25        | 400                                                                     | 400                | 1.5                | 50                                | 1.2                                                | 1.5                | 1                        | 400                 | 30                        | 0.5                | 1                  |                                                                                       | YES                                                                                   |                                     |
| 26                                             | RFN1L6S    | DD         | TE25        | 600                                                                     | 600                | 0.8                | 15                                | 1.45                                               | 0.8                | 1                        | 600                 | 35                        | 0.5                | 1                  |                                                                                       | YES                                                                                   |                                     |
| 27                                             | RFN2L6S    | DD         | TE25        | 600                                                                     | 600                | 1.5                | 40                                | 1.55                                               | 1.5                | 1                        | 600                 | 35                        | 0.5                | 1                  |                                                                                       | YES                                                                                   |                                     |
| 28                                             | RFN1L7S    | DD         | TE25        | 700                                                                     | 700                | 0.8                | 15                                | 1.5                                                | 0.8                | 1                        | 700                 | 80                        | 0.5                | 1                  |                                                                                       | YES                                                                                   |                                     |
| 29                                             | RF04UA2D   | FH         | TR          | 200                                                                     | 200                | 0.4                | 1                                 | 0.98                                               | 0.2                | 10                       | 200                 | 25                        | 0.5                | 1                  | SOT-457T (TSM6)                                                                       |  | YES                                 |

Note: \*1: Value/Chip

\*2: V<sub>R</sub>=6V, I<sub>F</sub>=10mA, I<sub>rr</sub>=0.1I<sub>F</sub>

Package is JEDEC code. ( ) : ROHM Package, [ ] : GENERAL Code.

## ● Quick Reference for Power Fast Recovery Diodes

| V <sub>R</sub><br>(V) | I <sub>O</sub><br>(A) | Surface Mount type                                                                |                      |                                                                                   |                | Lead type                                                                         |          |                                                                                    |          |                                                                                     |                |                                                                                     |                |
|-----------------------|-----------------------|-----------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------|----------------|
|                       |                       |  |                      |  |                |  |          |  |          |  |                |  |                |
|                       |                       | TO-252<br>[DPAK]                                                                  |                      | TO-263S<br>[D2PAK]                                                                |                | TO-220FN<br><2pin>                                                                |          | TO-220FN<br><3pin>                                                                 |          | TO-220NFM<br><2pin>                                                                 |                | TO-220ACFP                                                                          |                |
| 200                   | 3                     | RF301BM2S<br>RFN3BM2S                                                             | 17<br>18             |                                                                                   |                |                                                                                   |          |                                                                                    |          |                                                                                     |                |                                                                                     |                |
|                       | 5                     | RF501BM2S<br>RFN5BM2S                                                             | 19<br>20             |                                                                                   |                |                                                                                   |          |                                                                                    |          |                                                                                     |                |                                                                                     |                |
|                       | 6                     | RF601BM2D<br>RFN6BM2D                                                             | 1<br>2               |                                                                                   |                |                                                                                   |          | RFN6T2D<br>RF601T2D                                                                | 8<br>9   |                                                                                     |                |                                                                                     |                |
|                       | 10                    |                                                                                   |                      | RF1001NS2D                                                                        | 3              |                                                                                   |          | RF1001T2D<br>RFN10T2D                                                              | 10<br>11 |                                                                                     |                |                                                                                     |                |
|                       | 16                    |                                                                                   |                      | RF1601NS2D                                                                        | 4              |                                                                                   |          | RF1601T2D<br>RFN16T2D                                                              | 12<br>13 |                                                                                     |                |                                                                                     |                |
|                       | 20                    |                                                                                   |                      | RF2001NS2D                                                                        | 5              |                                                                                   |          | RF2001T2D<br>RFN20T2D                                                              | 14<br>15 |                                                                                     |                |                                                                                     |                |
| 300                   | 20                    |                                                                                   |                      | RF2001NS3D                                                                        | 6              |                                                                                   |          | RF2001T3D                                                                          | 16       | RF1501TF3S                                                                          | 49             |                                                                                     |                |
| 350                   | 5                     | RFN5BM3S                                                                          | 21                   |                                                                                   |                |                                                                                   |          |                                                                                    |          |                                                                                     |                |                                                                                     |                |
|                       | 10                    | RFN10BM3S                                                                         | 29                   | RFN10NS3S                                                                         | 31             |                                                                                   |          |                                                                                    |          |                                                                                     |                |                                                                                     |                |
|                       | 20                    |                                                                                   |                      | RFN20NS3S<br>RFUH25NS3S<br>RFUH20NS3S                                             | 32<br>33<br>34 | RFUH25TB3S<br>RFUH20TB3S                                                          | 43<br>44 |                                                                                    |          |                                                                                     |                |                                                                                     |                |
| 430                   | 10                    |                                                                                   |                      | RFN10NS4S<br>RFUH10NS4S                                                           | 35<br>36       | RFN10TB4S<br>RFUH10TB4S                                                           | 45<br>46 |                                                                                    |          |                                                                                     |                |                                                                                     |                |
|                       | 20                    |                                                                                   |                      | RFN20NS4S<br>RFUH20NS4S                                                           | 37<br>38       | RFN20TB4S<br>RFUH20TB4S                                                           | 47<br>48 |                                                                                    |          |                                                                                     |                |                                                                                     |                |
| 600                   | 3                     | RFN3BM6S<br>RF305BM6S                                                             | 22<br>23             |                                                                                   |                |                                                                                   |          |                                                                                    |          |                                                                                     |                |                                                                                     |                |
|                       | 5                     | RFN5BM6S<br>RFN15BM6S<br>RF505BM6S<br>RFV5BM6S                                    | 24<br>25<br>26<br>27 |                                                                                   |                |                                                                                   |          |                                                                                    |          | RFN5TF6S<br>RFUH5TF6S<br>RF505TF6S                                                  | 50<br>51<br>52 | RFN15TJ6S                                                                           | 59             |
|                       | 8                     | RFV8BM6S                                                                          | 28                   |                                                                                   |                |                                                                                   |          |                                                                                    |          |                                                                                     |                |                                                                                     |                |
|                       | 10                    | RFN10BM6S                                                                         | 30                   | RFUH10NS6S<br>RFN10NS6S                                                           | 39<br>40       |                                                                                   |          |                                                                                    |          | RFUH10TF6S<br>RFN10TF6S<br>RF1005TF6S                                               | 53<br>54<br>55 | RFN10TJ6S                                                                           | 60             |
|                       | 12                    |                                                                                   |                      |                                                                                   |                |                                                                                   |          |                                                                                    |          |                                                                                     |                |                                                                                     |                |
|                       | 15                    |                                                                                   |                      |                                                                                   |                |                                                                                   |          |                                                                                    |          |                                                                                     |                | RFN15TJ6S                                                                           | 61             |
|                       | 20                    |                                                                                   |                      | RFN20NS6S<br>RFUH20NS6S                                                           | 41<br>42       |                                                                                   |          |                                                                                    |          | RFN20TF6S<br>RFUH20TF6S                                                             | 56<br>57       | RFUH20TJ6S<br>RFN20TJ6S<br>RFN120TJ6S                                               | 62<br>63<br>64 |
|                       | 30                    |                                                                                   |                      |                                                                                   |                |                                                                                   |          |                                                                                    |          |                                                                                     |                |                                                                                     |                |
|                       | 60                    |                                                                                   |                      |                                                                                   |                |                                                                                   |          |                                                                                    |          |                                                                                     |                |                                                                                     |                |
| 800                   | 5                     |                                                                                   |                      |                                                                                   |                |                                                                                   |          |                                                                                    |          | RFN5TF8S                                                                            | 58             |                                                                                     |                |
|                       | 10                    |                                                                                   |                      | RFN10NS8D                                                                         | 7              |                                                                                   |          |                                                                                    |          |                                                                                     |                |                                                                                     |                |

Note: Package is JEDEC code. [ ]: GENERAL Code.

## Fast Recovery Diodes

Fast Recovery Diodes

Example) **R F N 6 B M 2 D F H T L**

Part No. Grade Code Taping Code

| Power Fast Recovery Diodes |             |            |             |                                                 |                    |                       |                                             |                                                     |                    |                          |                    |              |                    |                    |                  |                                                                                       |                                     |
|----------------------------|-------------|------------|-------------|-------------------------------------------------|--------------------|-----------------------|---------------------------------------------|-----------------------------------------------------|--------------------|--------------------------|--------------------|--------------|--------------------|--------------------|------------------|---------------------------------------------------------------------------------------|-------------------------------------|
| No.                        | Type        |            |             | Absolute Maximum Ratings (T <sub>C</sub> =25°C) |                    |                       |                                             | Electrical Characteristics (T <sub>J</sub> =25°C)*2 |                    |                          |                    |              |                    |                    | Package          | Equivalent Circuit Diagram                                                            | Automotive Grade Available AEC-Q101 |
|                            | Part No.    | Grade Code | Taping Code | V <sub>RM</sub> (V)                             | V <sub>R</sub> (V) | I <sub>O</sub> *1 (A) | I <sub>FSM</sub> (A)*2 60Hz,1 <sub>CT</sub> | V <sub>F</sub> (V) Max.                             | I <sub>F</sub> (A) | I <sub>R</sub> (μA) Max. | V <sub>R</sub> (V) | trr(ns)/Max. | I <sub>F</sub> (A) | I <sub>R</sub> (A) |                  |                                                                                       |                                     |
| 1                          | RF601BM2D   | FH         | TL          | 200                                             | 200                | 6                     | 60                                          | 0.93                                                | 3                  | 10                       | 200                | 25           | 0.5                | 1                  | TO-252 [DPAK]    |    | YES                                 |
| 2                          | RFN6BM2D    | FH         | TL          | 200                                             | 200                | 6                     | 40                                          | 0.98                                                | 3                  | 10                       | 200                | 25           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 3                          | RF1001NS2D  | FH         | TL          | 200                                             | 200                | 10                    | 80                                          | 0.93                                                | 5                  | 10                       | 200                | 25           | 0.5                | 1                  | TO-263S [D2PAK]  |                                                                                       | YES                                 |
| 4                          | RF1601NS2D  | FH         | TL          | 200                                             | 200                | 16                    | 100                                         | 0.93                                                | 8                  | 10                       | 200                | 30           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 5                          | RF2001NS2D  | FH         | TL          | 200                                             | 200                | 20                    | 100                                         | 0.93                                                | 10                 | 10                       | 200                | 30           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 6                          | RF2001NS3D  | FH         | TL          | 350                                             | 300                | 20                    | 100                                         | 1.3                                                 | 10                 | 10                       | 300                | 25           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 7                          | RFN10NS8D   | FH         | TL          | 800                                             | 800                | 10                    | 60                                          | 2.1                                                 | 5                  | 10                       | 800                | 40           | 0.5                | 1                  | TO-220FN <3pin>  |                                                                                       | YES                                 |
| 8                          | RFN6T2D     | HZ         | C9          | 200                                             | 200                | 6                     | 40                                          | 0.98                                                | 3                  | 10                       | 200                | 25           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 9                          | RF601T2D    | HZ         | C9          | 200                                             | 200                | 6                     | 60                                          | 0.93                                                | 3                  | 10                       | 200                | 25           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 10                         | RF1001T2D   | HZ         | C9          | 200                                             | 200                | 10                    | 80                                          | 0.93                                                | 5                  | 10                       | 200                | 30           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 11                         | RFN10T2D    | HZ         | C9          | 200                                             | 200                | 10                    | 80                                          | 0.98                                                | 5                  | 10                       | 200                | 25           | 0.5                | 1                  |                  | YES                                                                                   |                                     |
| 12                         | RF1601T2D   | HZ         | C9          | 200                                             | 200                | 16                    | 100                                         | 0.93                                                | 8                  | 10                       | 200                | 30           | 0.5                | 1                  |                  | YES                                                                                   |                                     |
| 13                         | RFN16T2D    | HZ         | C9          | 200                                             | 200                | 16                    | 100                                         | 0.98                                                | 8                  | 10                       | 200                | 30           | 0.5                | 1                  |                  | YES                                                                                   |                                     |
| 14                         | RF2001T2D   | HZ         | C9          | 200                                             | 200                | 20                    | 100                                         | 0.93                                                | 10                 | 10                       | 200                | 30           | 0.5                | 1                  |                  | YES                                                                                   |                                     |
| 15                         | RFN20T2D    | HZ         | C9          | 200                                             | 200                | 20                    | 100                                         | 0.98                                                | 10                 | 10                       | 200                | 30           | 0.5                | 1                  |                  | YES                                                                                   |                                     |
| 16                         | RF2001T3D   | HZ         | C9          | 350                                             | 300                | 20                    | 100                                         | 1.3                                                 | 10                 | 10                       | 300                | 25           | 0.5                | 1                  |                  | YES                                                                                   |                                     |
| 17                         | RF301BM2S   | FH         | TL          | 200                                             | 200                | 3                     | 40                                          | 0.93                                                | 3                  | 10                       | 200                | 25           | 0.5                | 1                  | TO-252 [DPAK]    |    | YES                                 |
| 18                         | RFN3BM2S    | FH         | TL          | 200                                             | 200                | 3                     | 40                                          | 0.98                                                | 3                  | 10                       | 200                | 25           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 19                         | RF501BM2S   | FH         | TL          | 200                                             | 200                | 5                     | 40                                          | 0.92                                                | 5                  | 1                        | 200                | 25           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 20                         | RFN5BM2S    | FH         | TL          | 200                                             | 200                | 5                     | 40                                          | 0.98                                                | 5                  | 10                       | 200                | 25           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 21                         | RFN5BM3S    | FH         | TL          | 350                                             | 350                | 5                     | 50                                          | 1.5                                                 | 5                  | 10                       | 350                | 30           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 22                         | RFN3BM6S    | FH         | TL          | 600                                             | 600                | 3                     | 20                                          | 1.55                                                | 3                  | 10                       | 600                | 30           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 23                         | RF305BM6S   | FH         | TL          | 600                                             | 600                | 3                     | 50                                          | 1.7                                                 | 3                  | 10                       | 600                | 30           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 24                         | RFNLSBM6S   | FH         | TL          | 600                                             | 600                | 5                     | 50                                          | 1.3                                                 | 5                  | 10                       | 600                | 60           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 25                         | RFN5BM6S    | FH         | TL          | 600                                             | 600                | 5                     | 30                                          | 1.55                                                | 5                  | 10                       | 600                | 50           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 26                         | RF505BM6S   | FH         | TL          | 600                                             | 600                | 5                     | 50                                          | 1.7                                                 | 5                  | 10                       | 600                | 30           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 27                         | RFV5BM6S    | FH         | TL          | 600                                             | 600                | 5                     | 60                                          | 2.8                                                 | 5                  | 10                       | 600                | 20           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 28                         | RFV8BM6S    | FH         | TL          | 600                                             | 600                | 8                     | 100                                         | 2.8                                                 | 8                  | 10                       | 600                | 25           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 29                         | RFN10BM3S   | FH         | TL          | 350                                             | 350                | 10                    | 80                                          | 1.5                                                 | 10                 | 10                       | 350                | 30           | 0.5                | 1                  | TO-252 [DPAK]    | YES                                                                                   |                                     |
| 30                         | RFN10BM6S   | FH         | TL          | 600                                             | 600                | 10                    | 100                                         | 1.55                                                | 10                 | 10                       | 600                | 50           | 0.5                | 1                  |                  | YES                                                                                   |                                     |
| 31                         | RFN10NS3S   | FH         | TL          | 350                                             | 350                | 10                    | 100                                         | 1.5                                                 | 10                 | 10                       | 350                | 30           | 0.5                | 1                  | TO-263S [D2PAK]  |  | YES                                 |
| 32                         | RFN20NS3S   | FH         | TL          | 350                                             | 350                | 20                    | 100                                         | 1.35                                                | 20                 | 10                       | 350                | 35           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 33                         | RFUH25NS3S  | FH         | TL          | 350                                             | 350                | 20                    | 100                                         | 1.45                                                | 20                 | 10                       | 350                | 30           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 34                         | RFUH20NS3S  | FH         | TL          | 350                                             | 350                | 20                    | 100                                         | 1.5                                                 | 20                 | 10                       | 350                | 25           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 35                         | RFN10NS4S   | FH         | TL          | 430                                             | 430                | 10                    | 80                                          | 1.55                                                | 10                 | 10                       | 430                | 30           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 36                         | RFUH10NS4S  | FH         | TL          | 430                                             | 430                | 10                    | 80                                          | 1.7                                                 | 10                 | 10                       | 430                | 25           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 37                         | RFN20NS4S   | FH         | TL          | 430                                             | 430                | 20                    | 100                                         | 1.55                                                | 20                 | 10                       | 430                | 30           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 38                         | RFUH20NS4S  | FH         | TL          | 430                                             | 430                | 20                    | 100                                         | 1.7                                                 | 20                 | 10                       | 430                | 25           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 39                         | RFUH10NS6S  | FH         | TL          | 600                                             | 600                | 10                    | 60                                          | 2.8                                                 | 10                 | 10                       | 600                | 25           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 40                         | RFN10NS6S   | FH         | TL          | 600                                             | 600                | 10                    | 100                                         | 1.55                                                | 10                 | 10                       | 600                | 50           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 41                         | RFN20NS6S   | FH         | TL          | 600                                             | 600                | 20                    | 100                                         | 1.55                                                | 20                 | 10                       | 600                | 60           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 42                         | RFUH20NS6S  | FH         | TL          | 600                                             | 600                | 20                    | 100                                         | 2.8                                                 | 20                 | 10                       | 600                | 35           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 43                         | RFUH25TB3S  | HZ         | C9          | 350                                             | 350                | 20                    | 100                                         | 1.45                                                | 20                 | 10                       | 350                | 30           | 0.5                | 1                  | TO-220FN <2pin>  |  | YES                                 |
| 44                         | RFUH20TB3S  | HZ         | C9          | 350                                             | 350                | 20                    | 100                                         | 1.5                                                 | 20                 | 10                       | 350                | 25           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 45                         | RFN10TB4S   | HZ         | C9          | 430                                             | 430                | 10                    | 80                                          | 1.7                                                 | 10                 | 10                       | 430                | 25           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 46                         | RFUH10TB4S  | HZ         | C9          | 430                                             | 430                | 10                    | 80                                          | 1.55                                                | 10                 | 10                       | 430                | 30           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 47                         | RFN20TB4S   | HZ         | C9          | 430                                             | 430                | 20                    | 100                                         | 1.55                                                | 20                 | 10                       | 430                | 30           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 48                         | RFUH20TB4S  | HZ         | C9          | 430                                             | 430                | 20                    | 100                                         | 1.7                                                 | 20                 | 10                       | 430                | 25           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 49                         | RF1501TF3S  | FH         | C9          | 350                                             | 300                | 20                    | 100                                         | 1.5                                                 | 20                 | 10                       | 300                | 30           | 0.5                | 1                  | TO-220NFN <2pin> |  | YES                                 |
| 50                         | RFN5TF6S    | FH         | C9          | 600                                             | 600                | 5                     | 30                                          | 1.55                                                | 5                  | 10                       | 600                | 50           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 51                         | RFUH5TF6S   | FH         | C9          | 600                                             | 600                | 5                     | 30                                          | 2.8                                                 | 5                  | 10                       | 600                | 25           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 52                         | RF505TF6S   | FH         | C9          | 600                                             | 600                | 5                     | 80                                          | 1.7                                                 | 5                  | 10                       | 600                | 30           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 53                         | RFUH10TF6S  | FH         | C9          | 600                                             | 600                | 10                    | 60                                          | 2.8                                                 | 10                 | 10                       | 600                | 25           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 54                         | RFN10TF6S   | FH         | C9          | 600                                             | 600                | 10                    | 100                                         | 1.55                                                | 10                 | 10                       | 600                | 50           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 55                         | RF1005TF6S  | FH         | C9          | 600                                             | 600                | 10                    | 100                                         | 1.7                                                 | 10                 | 10                       | 600                | 40           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 56                         | RFN20TF6S   | FH         | C9          | 600                                             | 600                | 20                    | 100                                         | 1.55                                                | 20                 | 10                       | 600                | 60           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 57                         | RFUH20TF6S  | FH         | C9          | 600                                             | 600                | 20                    | 100                                         | 2.8                                                 | 20                 | 10                       | 600                | 35           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 58                         | RFN5TF8S    | FH         | C9          | 800                                             | 800                | 5                     | 60                                          | 2.1                                                 | 5                  | 10                       | 800                | 40           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 59                         | RFNLSJTJ6S  | FHG        | C9          | 600                                             | 600                | 5                     | 50                                          | 1.3                                                 | 5                  | 10                       | 600                | 60           | 0.5                | 1                  | TO-220ACFP       |  | YES                                 |
| 60                         | RFNLS10TJ6S | FHG        | C9          | 600                                             | 600                | 10                    | 120                                         | 1.25                                                | 8                  | 10                       | 600                | 65           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 61                         | RFNLS15TJ6S | FHG        | C9          | 600                                             | 600                | 15                    | 160                                         | 1.3                                                 | 15                 | 10                       | 600                | 65           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 62                         | RFUH20TJ6S  | FHG        | C9          | 600                                             | 600                | 20                    | 120                                         | 2.8                                                 | 20                 | 10                       | 600                | 35           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 63                         | RFN20TJ6S   | FHG        | C9          | 600                                             | 600                | 20                    | 150                                         | 1.55                                                | 20                 | 10                       | 600                | 60           | 0.5                | 1                  |                  |                                                                                       | YES                                 |
| 64                         | RFNLS20TJ6S | FHG        | C9          | 600                                             | 600                | 20                    | 200                                         | 1.3                                                 | 20                 | 10                       | 600                | 70           | 0.5                | 1                  |                  |                                                                                       | YES                                 |

Note: \*1: I<sub>O</sub>: Average current per chip. In case of 2 chip diodes, I<sub>O</sub> indicates average output current of 2 chips.

\*2: Value/Chip

Package is JEDEC code. [ ] : GENERAL Code.

# Rectifier Diodes

## ● Quick Reference for Rectifier Diodes

|                                  | $V_R$<br>(V) | $I_O$<br>(A) | Surface Mount type                                                                |                                                                                   |                                                                                     |                                                                                     |           |  |  |   |
|----------------------------------|--------------|--------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------|--|--|---|
|                                  |              |              |  |  |  |  |           |  |  |   |
|                                  |              |              | 2513 size<br>(PMDE)                                                               | 2514 size<br>(TUMD2SM)                                                            | 3516 size<br>SOD-123FL<br>(PMDU)                                                    | TO-252<br>(DPAK)                                                                    |           |  |  |   |
| General Purpose Rectifier Diodes | 400          | 0.2          |                                                                                   | RRE02VTM4S                                                                        | 3                                                                                   |                                                                                     |           |  |  |   |
|                                  |              | 0.7          |                                                                                   | RRE07VTM4S                                                                        | 4                                                                                   | RR264MM-400                                                                         | 7         |  |  |   |
|                                  |              | 1            | RR1VWM4S                                                                          | 1                                                                                 |                                                                                     |                                                                                     |           |  |  |   |
|                                  | 600          | 0.2          |                                                                                   | RRE02VTM6S                                                                        | 5                                                                                   |                                                                                     |           |  |  |   |
|                                  |              | 0.7          |                                                                                   | RRE07VTM6S                                                                        | 6                                                                                   |                                                                                     |           |  |  |   |
|                                  |              | 1            | RR1VWM6S                                                                          | 2                                                                                 |                                                                                     | RR268MM-600                                                                         | 8         |  |  |   |
| Power Rectifier Diodes           | 400          | 6            |                                                                                   |                                                                                   |                                                                                     |                                                                                     | RR601BM4S |  |  | 9 |
|                                  | 1,000        | 20           |                                                                                   |                                                                                   |                                                                                     |                                                                                     |           |  |  |   |

Note: Package is JEDEC code. ( ) : ROHM Package, [ ] : GENERAL Code.

Rectifier Diodes

Example) 

|   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|
| R | R | 1 | V | W | M | 4 | S | T | F | T | R |
|---|---|---|---|---|---|---|---|---|---|---|---|

  
Part No.
Grade Code
Taping Code

## ● Rectifier Diodes

| General Purpose Rectifier Diodes |             |            |             |                                                 |                    |                    |                                 |                                       |                    |                             |                    |                 |                     |                     |                  |                                                                                       |                                     |
|----------------------------------|-------------|------------|-------------|-------------------------------------------------|--------------------|--------------------|---------------------------------|---------------------------------------|--------------------|-----------------------------|--------------------|-----------------|---------------------|---------------------|------------------|---------------------------------------------------------------------------------------|-------------------------------------|
| No.                              | Type        |            |             | Absolute Maximum Ratings (Tc=25° C or Tl=25° C) |                    |                    |                                 | Electrical Characteristics (Tj=25° C) |                    |                             |                    |                 |                     |                     | Package          | Equivalent Circuit Diagram                                                            | Automotive Grade Available AEC-Q101 |
|                                  | Part No.    | Grade Code | Taping Code | V <sub>RM</sub> (V)                             | V <sub>R</sub> (V) | I <sub>O</sub> (A) | I <sub>FSM</sub> (A)<br>60Hz,1ϕ | V <sub>F</sub> (V)<br>Max.            | I <sub>F</sub> (A) | I <sub>R</sub> (μA)<br>Max. | V <sub>R</sub> (V) | trr(ns)<br>Max. | I <sub>F</sub> (mA) | I <sub>R</sub> (mA) |                  |                                                                                       |                                     |
| 1                                | RR1VWM4S    | TF         | TR          | 400                                             | 400                | 1                  | 15                              | 1.2                                   | 1                  | 10                          | 400                | —               | —                   | —                   | (PMDE)           |  | YES                                 |
| 2                                | RR1VWM6S    | TF         | TR          | 600                                             | 600                | 1                  | 15                              | 1.2                                   | 1                  | 10                          | 600                | —               | —                   | —                   |                  |                                                                                       | YES                                 |
| 3                                | RRE02VTM4S  | FH         | TR          | 400                                             | 400                | 0.2                | 1                               | 1.1                                   | 0.2                | 1                           | 400                | —               | —                   | —                   | (TUMD2SM)        |                                                                                       | YES                                 |
| 4                                | RRE07VTM4S  | FH         | TR          | 400                                             | 400                | 0.7                | 2                               | 1.1                                   | 0.7                | 1                           | 400                | —               | —                   | —                   |                  |                                                                                       | YES                                 |
| 5                                | RRE02VTM6S  | FH         | TR          | 600                                             | 600                | 0.2                | 1                               | 1.1                                   | 0.2                | 1                           | 600                | —               | —                   | —                   |                  |                                                                                       | YES                                 |
| 6                                | RRE07VTM6S  | FH         | TR          | 600                                             | 600                | 0.7                | 2                               | 1.1                                   | 0.7                | 1                           | 600                | —               | —                   | —                   |                  |                                                                                       | YES                                 |
| 7                                | RR264MM-400 | TF         | TR          | 400                                             | 400                | 0.7                | 25                              | 1.1                                   | 0.7                | 10                          | 400                | —               | —                   | —                   | SOD-123FL (PMDU) |                                                                                       | YES                                 |
| 8                                | RR268MM-600 | TF         | TR          | 600                                             | 400                | 1                  | 25                              | 0.98                                  | 1                  | 10                          | 400                | —               | —                   | —                   |                  |                                                                                       | YES                                 |
| Power Rectifier Diodes           |             |            |             |                                                 |                    |                    |                                 |                                       |                    |                             |                    |                 |                     |                     |                  |                                                                                       |                                     |
| 9                                | RR601BM4S   | FH         | TL          | 400                                             | 400                | 6                  | 40                              | 1.1                                   | 6                  | 10                          | 400                | —               | —                   | —                   | TO-252 [DPAK]    |  | YES                                 |

Note: Package is JEDEC code. ( ) : ROHM Package, [ ] : GENERAL Code.

## Zener Diodes

Zener Diodes

Example: 

|          |   |   |            |   |             |   |               |   |   |              |   |   |
|----------|---|---|------------|---|-------------|---|---------------|---|---|--------------|---|---|
| E        | D | Z | V          | F | H           | T | 2             | R | 2 | .            | 0 | B |
| Part No. |   |   | Grade Code |   | Taping Code |   | Zener voltage |   |   | Sub division |   |   |

## 2-Terminal (Single) 4-Terminal (Dual) Zener Diodes 1

| Package                              | Surface Mount type         |                     |                                     |     |                              |                     |                                     |     |                              |                     |                                     |     |
|--------------------------------------|----------------------------|---------------------|-------------------------------------|-----|------------------------------|---------------------|-------------------------------------|-----|------------------------------|---------------------|-------------------------------------|-----|
|                                      | 1608 size<br>SOD-523(EMD2) |                     |                                     |     | 2512 size<br>SOD-323FL(UMD2) |                     |                                     |     | 2512 size<br>SOD-323FL(UMD2) |                     |                                     |     |
| Equivalent Circuit Diagram           |                            |                     |                                     |     |                              |                     |                                     |     |                              |                     |                                     |     |
| Series Name                          | EDZV series                |                     |                                     |     | UFZV series                  |                     |                                     |     | UDZV series                  |                     |                                     |     |
| Automotive Product                   | FH                         |                     |                                     |     | FH                           |                     |                                     |     | FH                           |                     |                                     |     |
| Power (mW)                           | 150                        |                     |                                     |     | 500                          |                     |                                     |     | 200                          |                     |                                     |     |
| Taping Code                          | T2R                        |                     |                                     |     | TE-17                        |                     |                                     |     | TE-17                        |                     |                                     |     |
| Electrical Characteristics (Ta=25°C) | V <sub>Z</sub> (V)         | I <sub>Z</sub> (mA) | Automotive Grade Available AEC-Q101 |     | V <sub>Z</sub> (V)           | I <sub>Z</sub> (mA) | Automotive Grade Available AEC-Q101 |     | V <sub>Z</sub> (V)           | I <sub>Z</sub> (mA) | Automotive Grade Available AEC-Q101 |     |
| Voltage                              | 2.0B                       | 2.02 to 2.20        | 5                                   | YES | —                            | —                   | —                                   | —   | 2.0B                         | 2.02 to 2.20        | 5                                   | YES |
|                                      | 2.2B                       | 2.22 to 2.41        | 5                                   | YES | —                            | —                   | —                                   | —   | 2.2B                         | 2.22 to 2.41        | 5                                   | YES |
|                                      | 2.4B                       | 2.43 to 2.63        | 5                                   | YES | —                            | —                   | —                                   | —   | 2.4B                         | 2.43 to 2.63        | 5                                   | YES |
|                                      | 2.7B                       | 2.69 to 2.91        | 5                                   | YES | —                            | —                   | —                                   | —   | 2.7B                         | 2.69 to 2.91        | 5                                   | YES |
|                                      | 3.0B                       | 3.01 to 3.22        | 5                                   | YES | —                            | —                   | —                                   | —   | 3.0B                         | 3.01 to 3.22        | 5                                   | YES |
|                                      | 3.3B                       | 3.32 to 3.53        | 5                                   | YES | —                            | —                   | —                                   | —   | 3.3B                         | 3.32 to 3.53        | 5                                   | YES |
|                                      | 3.6B                       | 3.600 to 3.845      | 5                                   | YES | 3.6B                         | 3.580 to 3.836      | 20                                  | YES | 3.6B                         | 3.600 to 3.845      | 5                                   | YES |
|                                      | 3.9B                       | 3.89 to 4.16        | 5                                   | YES | 3.9B                         | 3.870 to 4.151      | 20                                  | YES | 3.9B                         | 3.89 to 4.16        | 5                                   | YES |
|                                      | 4.3B                       | 4.17 to 4.43        | 5                                   | YES | 4.3B                         | 4.151 to 4.423      | 20                                  | YES | 4.3B                         | 4.17 to 4.43        | 5                                   | YES |
|                                      | 4.7B                       | 4.55 to 4.75        | 5                                   | YES | 4.7B                         | 4.534 to 4.795      | 20                                  | YES | 4.7B                         | 4.55 to 4.75        | 5                                   | YES |
|                                      | 5.1B                       | 4.98 to 5.20        | 5                                   | YES | 5.1B                         | 4.940 to 5.200      | 20                                  | YES | 5.1B                         | 4.98 to 5.20        | 5                                   | YES |
|                                      | 5.6B                       | 5.49 to 5.73        | 5                                   | YES | 5.6B                         | 5.450 to 5.730      | 20                                  | YES | 5.6B                         | 5.49 to 5.73        | 5                                   | YES |
|                                      | 6.2B                       | 6.06 to 6.33        | 5                                   | YES | 6.2B                         | 5.976 to 6.307      | 20                                  | YES | 6.2B                         | 6.06 to 6.33        | 5                                   | YES |
|                                      | 6.8B                       | 6.65 to 6.93        | 5                                   | YES | 6.8B                         | 6.525 to 6.865      | 20                                  | YES | 6.8B                         | 6.65 to 6.93        | 5                                   | YES |
|                                      | 7.5B                       | 7.28 to 7.60        | 5                                   | YES | 7.5B                         | 7.104 to 7.509      | 20                                  | YES | 7.5B                         | 7.28 to 7.60        | 5                                   | YES |
|                                      | 8.2B                       | 8.02 to 8.36        | 5                                   | YES | 8.2B                         | 7.827 to 8.265      | 20                                  | YES | 8.2B                         | 8.02 to 8.36        | 5                                   | YES |
|                                      | 9.1B                       | 8.85 to 9.23        | 5                                   | YES | 9.1B                         | 8.635 to 9.106      | 20                                  | YES | 9.1B                         | 8.85 to 9.23        | 5                                   | YES |
|                                      | 10B                        | 9.77 to 10.21       | 5                                   | YES | 10B                          | 9.497 to 10.050     | 20                                  | YES | 10B                          | 9.77 to 10.21       | 5                                   | YES |
|                                      | 11B                        | 10.76 to 11.22      | 5                                   | YES | 11B                          | 10.550 to 11.160    | 10                                  | YES | 11B                          | 10.76 to 11.22      | 5                                   | YES |
|                                      | 12B                        | 11.74 to 12.24      | 5                                   | YES | 12B                          | 11.510 to 12.160    | 10                                  | YES | 12B                          | 11.74 to 12.24      | 5                                   | YES |
|                                      | 13B                        | 12.91 to 13.49      | 5                                   | YES | 13B                          | 12.640 to 13.340    | 10                                  | YES | 13B                          | 12.91 to 13.49      | 5                                   | YES |
|                                      | 15B                        | 14.34 to 14.98      | 5                                   | YES | 15B                          | 14.000 to 14.790    | 10                                  | YES | 15B                          | 14.34 to 14.98      | 5                                   | YES |
|                                      | 16B                        | 15.85 to 16.51      | 5                                   | YES | 16B                          | 15.390 to 16.240    | 10                                  | YES | 16B                          | 15.85 to 16.51      | 5                                   | YES |
|                                      | 18B                        | 17.56 to 18.35      | 5                                   | YES | 18B                          | 17.000 to 17.950    | 10                                  | YES | 18B                          | 17.56 to 18.35      | 5                                   | YES |
|                                      | 20B                        | 19.52 to 20.39      | 5                                   | YES | 20B                          | 18.870 to 19.890    | 10                                  | YES | 20B                          | 19.52 to 20.39      | 5                                   | YES |
|                                      | 22B                        | 21.54 to 22.47      | 5                                   | YES | 22B                          | 20.770 to 21.920    | 5                                   | YES | 22B                          | 21.54 to 22.47      | 5                                   | YES |
|                                      | 24B                        | 23.72 to 24.78      | 5                                   | YES | 24B                          | 22.780 to 24.020    | 5                                   | YES | 24B                          | 23.72 to 24.78      | 5                                   | YES |
|                                      | 27B                        | 26.19 to 27.53      | 2                                   | YES | 27B                          | 25.190 to 26.560    | 5                                   | YES | 27B                          | 26.19 to 27.53      | 5                                   | YES |
|                                      | 30B                        | 29.19 to 30.69      | 2                                   | YES | 30B                          | 27.980 to 29.500    | 5                                   | YES | 30B                          | 29.19 to 30.69      | 5                                   | YES |
|                                      | 33B                        | 32.15 to 33.79      | 2                                   | YES | 33B                          | 30.660 to 32.320    | 5                                   | YES | 33B                          | 32.15 to 33.79      | 5                                   | YES |
|                                      | 36B                        | 35.07 to 36.87      | 2                                   | YES | 36B                          | 33.230 to 35.010    | 5                                   | YES | 36B                          | 35.07 to 36.87      | 5                                   | YES |
|                                      | —                          | —                   | —                                   | —   | 39B                          | 35.880 to 37.790    | 5                                   | YES | 39B                          | 38.02 to 39.98      | 2                                   | YES |
|                                      | —                          | —                   | —                                   | —   | —                            | —                   | —                                   | —   | 43                           | 40.00 to 45.00      | 2                                   | YES |
|                                      | —                          | —                   | —                                   | —   | —                            | —                   | —                                   | —   | 47                           | 44.00 to 49.00      | 2                                   | YES |
| Package                              | Surface Mount type         |                     |                                     |     |                              |                     |                                     |     |                              |                     |                                     |     |
|                                      | 2514 size<br>(TUMD2M)      |                     |                                     |     | 2514 size<br>(TUMD2M)        |                     |                                     |     | 2924 size<br>SOT-23(SSD3)    |                     |                                     |     |
| Equivalent Circuit Diagram           |                            |                     |                                     |     |                              |                     |                                     |     |                              |                     |                                     |     |
| Series Name                          | YFZX series                |                     |                                     |     | YDZX series                  |                     |                                     |     | BZX84B series                |                     |                                     |     |
| Automotive Product                   | FH                         |                     |                                     |     | FH                           |                     |                                     |     | FH                           |                     |                                     |     |
| Power (mW)                           | 500                        |                     |                                     |     | 500                          |                     |                                     |     | 250                          |                     |                                     |     |
| Taping Code                          | TR                         |                     |                                     |     | TR                           |                     |                                     |     | T116                         |                     |                                     |     |
| Electrical Characteristics (Ta=25°C) | V <sub>Z</sub> (V)         | I <sub>Z</sub> (mA) | Automotive Grade Available AEC-Q101 |     | V <sub>Z</sub> (V)           | I <sub>Z</sub> (mA) | Automotive Grade Available AEC-Q101 |     | V <sub>Z</sub> (V)           | I <sub>Z</sub> (mA) | Automotive Grade Available AEC-Q101 |     |
| Voltage                              | 2.0B                       | 2.02 to 2.20        | 20                                  | YES | —                            | —                   | —                                   | —   | 2V4L                         | 2.20 to 2.60        | 5                                   | YES |
|                                      | 2.2B                       | 2.22 to 2.41        | 20                                  | YES | —                            | —                   | —                                   | —   | 2V7L                         | 2.50 to 2.90        | 5                                   | YES |
|                                      | 2.4B                       | 2.43 to 2.63        | 20                                  | YES | —                            | —                   | —                                   | —   | 3V0L                         | 2.80 to 3.20        | 5                                   | YES |
|                                      | 2.7B                       | 2.69 to 2.91        | 20                                  | YES | —                            | —                   | —                                   | —   | 3V3L                         | 3.10 to 3.50        | 5                                   | YES |
|                                      | 3.0B                       | 3.01 to 3.22        | 20                                  | YES | —                            | —                   | —                                   | —   | 3V6L                         | 3.40 to 3.80        | 5                                   | YES |
|                                      | 3.3B                       | 3.32 to 3.53        | 20                                  | YES | —                            | —                   | —                                   | —   | 3V9L                         | 3.70 to 4.10        | 5                                   | YES |
|                                      | 3.6B                       | 3.600 to 3.845      | 20                                  | YES | —                            | —                   | —                                   | —   | 4V3L                         | 4.00 to 4.60        | 5                                   | YES |
|                                      | 3.9B                       | 3.89 to 4.16        | 20                                  | YES | —                            | —                   | —                                   | —   | 4V7L                         | 4.40 to 5.00        | 5                                   | YES |
|                                      | 4.3B                       | 4.17 to 4.43        | 20                                  | YES | 5.1                          | 4.60 to 5.60        | 10                                  | YES | 5V1L                         | 4.80 to 5.40        | 5                                   | YES |
|                                      | 4.7B                       | 4.55 to 4.80        | 20                                  | YES | 5.6                          | 5.10 to 6.10        | 10                                  | YES | 5V6L                         | 5.20 to 6.00        | 5                                   | YES |
|                                      | 5.1B                       | 4.94 to 5.20        | 20                                  | YES | 6.2                          | 5.60 to 6.80        | 10                                  | YES | 6V2L                         | 5.80 to 6.60        | 5                                   | YES |
|                                      | 5.6B                       | 5.45 to 5.73        | 20                                  | YES | 6.8                          | 6.20 to 7.40        | 10                                  | YES | 6V8L                         | 6.40 to 7.20        | 5                                   | YES |
|                                      | 6.2B                       | 5.96 to 6.27        | 20                                  | YES | 7.5                          | 6.80 to 8.30        | 10                                  | YES | 7V5L                         | 7.00 to 7.90        | 5                                   | YES |
|                                      | 6.8B                       | 6.49 to 6.83        | 20                                  | YES | 8.2                          | 7.40 to 9.00        | 10                                  | YES | 8V2L                         | 7.70 to 8.70        | 5                                   | YES |
|                                      | 7.5B                       | 7.07 to 7.45        | 20                                  | YES | 9.1                          | 8.20 to 10.00       | 10                                  | YES | 9V1L                         | 8.50 to 9.60        | 5                                   | YES |
|                                      | 8.2B                       | 7.78 to 8.19        | 20                                  | YES | 10                           | 9.00 to 11.00       | 10                                  | YES | 10VL                         | 9.40 to 10.60       | 5                                   | YES |
|                                      | 9.1B                       | 8.57 to 9.01        | 20                                  | YES | 11                           | 9.90 to 12.10       | 10                                  | YES | 11VL                         | 10.40 to 11.60      | 5                                   | YES |
|                                      | 10B                        | 9.41 to 9.90        | 20                                  | YES | 12                           | 10.80 to 13.20      | 10                                  | YES | 12VL                         | 11.40 to 12.70      | 5                                   | YES |
|                                      | 11B                        | 10.50 to 11.05      | 10                                  | YES | 13                           | 11.70 to 14.30      | 10                                  | YES | 13VL                         | 12.40 to 14.10      | 5                                   | YES |
|                                      | 12B                        | 11.44 to 12.03      | 10                                  | YES | 15                           | 13.50 to 16.50      | 10                                  | YES | 15VL                         | 13.80 to 15.60      | 5                                   | YES |
|                                      | 13B                        | 12.55 to 13.21      | 10                                  | YES | 16                           | 14.40 to 17.60      | 10                                  | YES | 16VL                         | 15.30 to 17.10      | 5                                   | YES |
|                                      | 15B                        | 13.89 to 14.62      | 10                                  | YES | 18                           | 16.20 to 19.80      | 10                                  | YES | 18VL                         | 16.80 to 19.10      | 5                                   | YES |
|                                      | 16B                        | 15.25 to 16.04      | 10                                  | YES | 20                           | 18.00 to 22.00      | 10                                  | YES | 20VL                         | 18.80 to 21.20      | 5                                   | YES |
|                                      | 18B                        | 16.82 to 17.70      | 10                                  | YES | 22                           | 19.80 to 24.20      | 10                                  | YES | 22VL                         | 20.80 to 23.30      | 5                                   | YES |
|                                      | 20B                        | 18.63 to 19.59      | 10                                  | YES | 24                           | 21.60 to 26.40      | 10                                  | YES | 24VL                         | 22.80 to 25.60      | 5                                   | YES |
|                                      | 22B                        | 20.64 to 21.71      | 5                                   | YES | 27                           | 24.30 to 29.70      | 10                                  | YES | 27VL                         | 25.10 to 28.90      | 2                                   | YES |
|                                      | 24B                        | 22.61 to 23.77      | 5                                   | YES | 30                           | 27.00 to 33.00      | 10                                  | YES | 30VL                         | 28.00 to 32.00      | 2                                   | YES |
|                                      | 27B                        | 24.97 to 26.26      | 5                                   | YES | —                            | —                   | —                                   | —   | 33VL                         | 31.00 to 35.00      | 2                                   | YES |
|                                      | 30B                        | 27.70 to 29.13      | 5                                   | YES | —                            | —                   | —                                   | —   | 36VL                         | 34.00 to 38.00      | 2                                   | YES |
|                                      | 33B                        | 30.32 to 31.88      | 5                                   | YES | —                            | —                   | —                                   | —   | —                            | —                   | —                                   | —   |
|                                      | 36B                        | 32.79 to 34.49      | 5                                   | YES | —                            | —                   | —                                   | —   | —                            | —                   | —                                   | —   |
|                                      | 39B                        | 35.36 to 37.19      | 5                                   | YES | —                            | —                   | —                                   | —   | —                            | —                   | —                                   | —   |

Note: This table shows available voltages.  
Package is JEDEC code. ( ) : ROHM Package.

## Zener Diodes

Zener Diodes

Example **P****D****Z****V** **T****F** **T****R** **1****0** **B**

Part No. Grade Code Taping Code Zener voltage Sub design

## 2-Terminal (Single) 4-Terminal (Dual) Zener Diodes 2

| Package                              | Surface Mount type                                                                |                     |                                     |     |                                                                                   |                     |                                     |     |                                                                                     |                     |                                     |     |
|--------------------------------------|-----------------------------------------------------------------------------------|---------------------|-------------------------------------|-----|-----------------------------------------------------------------------------------|---------------------|-------------------------------------|-----|-------------------------------------------------------------------------------------|---------------------|-------------------------------------|-----|
|                                      |  |                     |                                     |     |  |                     |                                     |     |  |                     |                                     |     |
| Equivalent Circuit Diagram           |  |                     |                                     |     |  |                     |                                     |     |   |                     |                                     |     |
| Series Name                          | 3516 size SOD-123FL(PMDU) KDZV series                                             |                     |                                     |     | 3516 size SOD-123FL(PMDU) KDZLV series                                            |                     |                                     |     | 4725 size SOD-128(PMDTM) PDZV series                                                |                     |                                     |     |
| Automotive Product                   | TF                                                                                |                     |                                     |     | TF                                                                                |                     |                                     |     | TF                                                                                  |                     |                                     |     |
| Power (mW)                           | 1,000                                                                             |                     |                                     |     | 1,000                                                                             |                     |                                     |     | 1,000                                                                               |                     |                                     |     |
| Taping Code                          | TR                                                                                |                     |                                     |     | TR                                                                                |                     |                                     |     | TR                                                                                  |                     |                                     |     |
| Electrical Characteristics (Ta=25°C) | V <sub>Z</sub> (V)                                                                | I <sub>Z</sub> (mA) | Automotive Grade Available AEC-Q101 |     | V <sub>Z</sub> (V)                                                                | I <sub>Z</sub> (mA) | Automotive Grade Available AEC-Q101 |     | V <sub>Z</sub> (V)                                                                  | I <sub>Z</sub> (mA) | Automotive Grade Available AEC-Q101 |     |
| Voltage                              | 2.0B                                                                              | 2.00 to 2.24        | 40                                  | YES | 51                                                                                | 48 to 54            | 2                                   | YES | 2.0B                                                                                | 2.00 to 2.24        | 40                                  | YES |
|                                      | 2.2B                                                                              | 2.20 to 2.45        | 40                                  | YES | 56                                                                                | 53 to 60            | 2                                   | YES | 2.2B                                                                                | 2.20 to 2.45        | 40                                  | YES |
|                                      | 2.4B                                                                              | 2.40 to 2.70        | 40                                  | YES | 62                                                                                | 58 to 66            | 2                                   | YES | 2.4B                                                                                | 2.40 to 2.70        | 40                                  | YES |
|                                      | 2.7B                                                                              | 2.70 to 3.10        | 40                                  | YES | 68                                                                                | 64 to 72            | 2                                   | YES | 2.7B                                                                                | 2.70 to 3.10        | 40                                  | YES |
|                                      | 3.0B                                                                              | 3.00 to 3.40        | 40                                  | YES | 75                                                                                | 70 to 79            | 2                                   | YES | 3.0B                                                                                | 3.00 to 3.40        | 40                                  | YES |
|                                      | 3.3B                                                                              | 3.30 to 3.70        | 40                                  | YES | 82                                                                                | 77 to 87            | 2                                   | YES | 3.3B                                                                                | 3.30 to 3.70        | 40                                  | YES |
|                                      | 3.6B                                                                              | 3.60 to 4.00        | 40                                  | YES | 91                                                                                | 85 to 96            | 2                                   | YES | 3.6B                                                                                | 3.60 to 4.00        | 40                                  | YES |
|                                      | 3.9B                                                                              | 3.90 to 4.40        | 40                                  | YES | 100                                                                               | 94 to 106           | 2                                   | YES | 3.9B                                                                                | 3.90 to 4.40        | 40                                  | YES |
|                                      | 4.3B                                                                              | 4.30 to 4.80        | 40                                  | YES | 110                                                                               | 104 to 116          | 2                                   | YES | 4.3B                                                                                | 4.30 to 4.80        | 40                                  | YES |
|                                      | 4.7B                                                                              | 4.70 to 5.20        | 40                                  | YES | 120                                                                               | 114 to 126          | 2                                   | YES | 4.7B                                                                                | 4.70 to 5.20        | 40                                  | YES |
|                                      | 5.1B                                                                              | 5.10 to 5.70        | 40                                  | YES | 130                                                                               | 122 to 138          | 2                                   | YES | 5.1B                                                                                | 5.10 to 5.70        | 40                                  | YES |
|                                      | 5.6B                                                                              | 5.60 to 6.30        | 40                                  | YES | 150                                                                               | 140 to 160          | 2                                   | YES | 5.6B                                                                                | 5.60 to 6.30        | 40                                  | YES |
|                                      | 6.2B                                                                              | 6.20 to 7.00        | 40                                  | YES | —                                                                                 | —                   | —                                   | —   | 6.2B                                                                                | 6.20 to 7.00        | 40                                  | YES |
|                                      | 6.8B                                                                              | 6.80 to 7.70        | 40                                  | YES | —                                                                                 | —                   | —                                   | —   | 6.8B                                                                                | 6.80 to 7.70        | 40                                  | YES |
|                                      | 7.5B                                                                              | 7.50 to 8.40        | 40                                  | YES | —                                                                                 | —                   | —                                   | —   | 7.5B                                                                                | 7.50 to 8.40        | 40                                  | YES |
|                                      | 8.2B                                                                              | 8.20 to 9.30        | 40                                  | YES | —                                                                                 | —                   | —                                   | —   | 8.2B                                                                                | 8.20 to 9.30        | 40                                  | YES |
|                                      | 9.1B                                                                              | 9.10 to 10.20       | 40                                  | YES | —                                                                                 | —                   | —                                   | —   | 9.1B                                                                                | 9.10 to 10.20       | 40                                  | YES |
|                                      | 10B                                                                               | 10.00 to 11.20      | 40                                  | YES | —                                                                                 | —                   | —                                   | —   | 10B                                                                                 | 10.00 to 11.20      | 40                                  | YES |
|                                      | 11B                                                                               | 11.00 to 12.30      | 20                                  | YES | —                                                                                 | —                   | —                                   | —   | 11B                                                                                 | 11.00 to 12.30      | 20                                  | YES |
|                                      | 12B                                                                               | 12.00 to 13.50      | 20                                  | YES | —                                                                                 | —                   | —                                   | —   | 12B                                                                                 | 12.00 to 13.50      | 20                                  | YES |
|                                      | 13B                                                                               | 13.30 to 15.00      | 20                                  | YES | —                                                                                 | —                   | —                                   | —   | 13B                                                                                 | 13.30 to 15.00      | 20                                  | YES |
|                                      | 15B                                                                               | 14.70 to 16.50      | 20                                  | YES | —                                                                                 | —                   | —                                   | —   | 15B                                                                                 | 14.70 to 16.50      | 20                                  | YES |
|                                      | 16B                                                                               | 16.20 to 18.30      | 20                                  | YES | —                                                                                 | —                   | —                                   | —   | 16B                                                                                 | 16.20 to 18.30      | 20                                  | YES |
|                                      | 18B                                                                               | 18.00 to 20.30      | 20                                  | YES | —                                                                                 | —                   | —                                   | —   | 18B                                                                                 | 18.00 to 20.30      | 20                                  | YES |
|                                      | 20B                                                                               | 20.00 to 22.40      | 20                                  | YES | —                                                                                 | —                   | —                                   | —   | 20B                                                                                 | 20.00 to 22.40      | 20                                  | YES |
|                                      | 22B                                                                               | 22.00 to 24.50      | 10                                  | YES | —                                                                                 | —                   | —                                   | —   | 22B                                                                                 | 22.00 to 24.50      | 10                                  | YES |
|                                      | 24B                                                                               | 24.00 to 27.60      | 10                                  | YES | —                                                                                 | —                   | —                                   | —   | 24B                                                                                 | 24.00 to 27.60      | 10                                  | YES |
|                                      | 27B                                                                               | 27.00 to 30.80      | 10                                  | YES | —                                                                                 | —                   | —                                   | —   | 27B                                                                                 | 27.00 to 30.80      | 10                                  | YES |
|                                      | 30B                                                                               | 30.00 to 34.00      | 10                                  | YES | —                                                                                 | —                   | —                                   | —   | 30B                                                                                 | 30.00 to 34.00      | 10                                  | YES |
|                                      | 33B                                                                               | 33.00 to 37.00      | 10                                  | YES | —                                                                                 | —                   | —                                   | —   | 33B                                                                                 | 33.00 to 37.00      | 10                                  | YES |
|                                      | 36B                                                                               | 36.00 to 40.00      | 10                                  | YES | —                                                                                 | —                   | —                                   | —   | 36B                                                                                 | 36.00 to 40.00      | 10                                  | YES |

Note: This table shows available voltages.

Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.

\* : Only Automotive Grade

# Zener Diodes for ESD Protection

## ● Quick Reference for Protection Devices [2 to 4 Elements]

| V <sub>Z</sub><br>(V) | Package                                                                           |
|-----------------------|-----------------------------------------------------------------------------------|
|                       | 2120 size                                                                         |
|                       |  |
|                       | SOT-323FL<br>(UMD3F)                                                              |
| 5.1                   | UMZ5.1NUM                                                                         |
| 6.8                   | UMZ6.8NUM                                                                         |
| 8.2                   | UMZ8.2NUM                                                                         |
| 12                    | UMZ12NUM                                                                          |
| 16                    | UMZ16NUM                                                                          |
| 18                    | UMZ18NUM                                                                          |
| 27                    | UMZ27NUM                                                                          |
| 30                    | UMZ30NUM                                                                          |
| 36                    | UMZ36NUM                                                                          |

Note: Package is JEDEC code. ( ) : ROHM Package.

## ● Quick Reference for Low Capacitance Protection Devices

| V <sub>Z</sub><br>(V) | Package                                                                             |
|-----------------------|-------------------------------------------------------------------------------------|
|                       | 1608 size                                                                           |
|                       |  |
|                       | SOD-523<br>(EMD2)                                                                   |
| 6.8                   | EDZCV6.8B                                                                           |

Note: Package is JEDEC code. ( ) : ROHM Package.

## ● Quick Reference for ESD Protection Devices

| V <sub>Z</sub><br>(V) | Package                                                                           |                                                                                   |
|-----------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|                       | 3516 size                                                                         | 5026 size                                                                         |
|                       |  |  |
|                       | SOD-123FL<br>(PMDU)                                                               | DO-214AC(PMDS)<br>[SMA]                                                           |
| 6.7                   | ☆RSA5MM                                                                           | RSA5L                                                                             |
| 14                    | ☆RSA12MM                                                                          | RSA12L                                                                            |
| 30                    |                                                                                   | RSA30L                                                                            |

Note: Package is JEDEC code. ( ) : ROHM Package, [ ] : GENERAL Code. ☆ : Under Development

## ● Quick Reference for Bi-Directional Zener Diodes

| V <sub>Z</sub><br>(V) | Package                                                                             |
|-----------------------|-------------------------------------------------------------------------------------|
|                       | 1616 size                                                                           |
|                       |  |
|                       | SOT-416FL<br>(EMD3F)                                                                |
| 12                    | RSB12WM                                                                             |

Note: Package is JEDEC code. ( ) : ROHM Package.

# Zener Diodes for ESD Protection

Zener Diodes for ESD Protection

Example: **UMZ5.1NUM FH TL**  
Part No. Grade Code Taping Code

| Protection Devices [2 to 4 Elements] |            |             |                                    |                                      |                                           |                                                     |                       |                                                                                       |                                     |                                                                                       |                                     |                                                                                       |     |
|--------------------------------------|------------|-------------|------------------------------------|--------------------------------------|-------------------------------------------|-----------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|-----|
| Type                                 |            |             | Absolute Maximum Ratings (Ta=25°C) | Electrical Characteristics (Ta=25°C) |                                           | Remarks                                             | Package               | Equivalent Circuit Diagram                                                            | Automotive Grade Available AEC-Q101 |                                                                                       |                                     |                                                                                       |     |
| Part No.                             | Grade Code | Taping Code |                                    | P <sub>O</sub> (mW)                  | V <sub>Z</sub> (V)<br>I <sub>Z</sub> (mA) |                                                     |                       |                                                                                       |                                     |                                                                                       |                                     |                                                                                       |     |
| UMZ5.1NUM                            | FH         | TL          | 200                                | 4.84 to 5.37                         | 5                                         | IEC61000-4-2, 150pF, 330Ω , Contact: 8kV, Air: 15kV | SOT-323FL (UMD3F)     |  | YES                                 |                                                                                       |                                     |                                                                                       |     |
| UMZ6.8NUM                            | FH         | TL          | 200                                | 6.47 to 7.14                         | 5                                         |                                                     |                       |                                                                                       | YES                                 |                                                                                       |                                     |                                                                                       |     |
| UMZ8.2NUM                            | FH         | TL          | 200                                | 7.76 to 8.64                         | 5                                         |                                                     |                       |                                                                                       | YES                                 |                                                                                       |                                     |                                                                                       |     |
| UMZ12NUM                             | FH         | TL          | 200                                | 11.00 to 13.00                       | 5                                         |                                                     |                       |                                                                                       | YES                                 |                                                                                       |                                     |                                                                                       |     |
| UMZ16NUM                             | FH         | TL          | 200                                | 15.85 to 16.51                       | 5                                         |                                                     |                       |                                                                                       | YES                                 |                                                                                       |                                     |                                                                                       |     |
| UMZ18NUM                             | FH         | TL          | 200                                | 17.56 to 18.53                       | 5                                         |                                                     |                       |                                                                                       | YES                                 |                                                                                       |                                     |                                                                                       |     |
| UMZ27NUM                             | FH         | TL          | 200                                | 26.19 to 27.35                       | 5                                         |                                                     |                       |                                                                                       | YES                                 |                                                                                       |                                     |                                                                                       |     |
| UMZ30NUM                             | FH         | TL          | 200                                | 29.19 to 30.69                       | 5                                         |                                                     |                       |                                                                                       | YES                                 |                                                                                       |                                     |                                                                                       |     |
| UMZ36NUM                             | FH         | TL          | 200                                | 35.07 to 36.87                       | 5                                         |                                                     |                       |                                                                                       | YES                                 |                                                                                       |                                     |                                                                                       |     |
| Low Capacitance Protection Devices   |            |             |                                    |                                      |                                           |                                                     |                       |                                                                                       |                                     |                                                                                       |                                     |                                                                                       |     |
| Type                                 |            |             | Absolute Maximum Ratings (Ta=25°C) | Electrical Characteristics (Ta=25°C) |                                           |                                                     |                       |                                                                                       | Package                             | Equivalent Circuit Diagram                                                            | Automotive Grade Available AEC-Q101 |                                                                                       |     |
| Part No.                             | Grade Code | Taping Code |                                    | P <sub>O</sub> (mW)                  | V <sub>Z</sub> (V)<br>I <sub>Z</sub> (mA) | Ct(pF) (Typ.)                                       | f(MHz)                | V <sub>R</sub> (V)                                                                    |                                     |                                                                                       |                                     |                                                                                       |     |
| EDZCV6.8B                            | FH         | T2R         | 150                                | 6.65 to 6.93                         | 5                                         | 3                                                   | 1                     | 0                                                                                     | SOD-523 (EMD2)                      |  | YES                                 |                                                                                       |     |
| ESD Protection Devices               |            |             |                                    |                                      |                                           |                                                     |                       |                                                                                       |                                     |                                                                                       |                                     |                                                                                       |     |
| Type                                 |            |             | Absolute Maximum Ratings (Ta=25°C) | Electrical Characteristics (Ta=25°C) |                                           | Peak Pulse Power (W) (tp=10×1,000μs)                | Package               | Equivalent Circuit Diagram                                                            | Automotive Grade Available AEC-Q101 |                                                                                       |                                     |                                                                                       |     |
| Part No.                             | Grade Code | Taping Code |                                    | P <sub>O</sub> (mW)                  | V <sub>Z</sub> (V)<br>I <sub>Z</sub> (mA) |                                                     |                       |                                                                                       |                                     |                                                                                       |                                     |                                                                                       |     |
| ☆RSA5MM                              | TF         | TR          | 1,000                              | 6.4 to 7.0                           | 10                                        | 200                                                 | SOD-123FL (PMDU)      |  | YES                                 |                                                                                       |                                     |                                                                                       |     |
| ☆RSA12MM                             | TF         | TR          | 1,000                              | 13.3 to 14.7                         | 1                                         | 200                                                 |                       |                                                                                       | YES                                 |                                                                                       |                                     |                                                                                       |     |
| RSA5L                                | TF         | TE25        | 1,000                              | 6.45 to 7.14                         | 10                                        | 600                                                 | DO-214AC (PMDS) [SMA] |                                                                                       | YES                                 |                                                                                       |                                     |                                                                                       |     |
| RSA12L                               | TF         | TE25        | 1,000                              | 13.3 to 14.7                         | 1                                         | 600                                                 |                       |                                                                                       | YES                                 |                                                                                       |                                     |                                                                                       |     |
| RSA30L                               | TF         | TE25        | 1,000                              | 28.5 to 31.5                         | 1                                         | 600                                                 |                       |                                                                                       | YES                                 |                                                                                       |                                     |                                                                                       |     |
|                                      |            |             |                                    |                                      |                                           |                                                     |                       |                                                                                       |                                     |                                                                                       |                                     |                                                                                       |     |
| Bi-Directional Zener Diodes          |            |             |                                    |                                      |                                           |                                                     |                       |                                                                                       |                                     |                                                                                       |                                     |                                                                                       |     |
| Type                                 |            |             | Absolute Maximum Ratings (Ta=25°C) | Electrical Characteristics (Ta=25°C) |                                           | Peak Pulse Power (W) (tp=10×1,000μs)                | Ct(pF) (Typ.)         |                                                                                       | Remarks                             | Package                                                                               | Equivalent Circuit Diagram          | Automotive Grade Available AEC-Q101                                                   |     |
| Part No.                             | Grade Code | Taping Code |                                    | P <sub>O</sub> (mW)                  | V <sub>Z</sub> (V)<br>I <sub>Z</sub> (mA) |                                                     | f (MHz)               | V <sub>R</sub> (V)                                                                    |                                     |                                                                                       |                                     |                                                                                       |     |
| RSB12WM                              | FH         | TL          | 150                                | 9.6 to 14.4                          | 5                                         | —                                                   | 1                     | 1                                                                                     | 0                                   | IEC 61000-4-2, 150pF, 330Ω , Contact: 8kV, Air: 15kV                                  | SOT-416FL (EMD3F)                   |  | YES |

\*1: (3)pin must be open when using.

Note: Package is JEDEC code. ( ) : ROHM Package, [ ] : GENERAL Code.

☆ : Under Development

## TVS

## ● Quick Reference for TVS

| V <sub>RWM</sub><br>(V) | 2924 size                                                                         | Package<br>3516 size                                                              | 4725 size                                                                           |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                         |  |  |  |
|                         | SOT-23<br>(SSD3)                                                                  | SOD-123FL<br>(PMDU)                                                               | SOD-128<br>(PMDTM)                                                                  |
| 3.0                     | MMBZ5V6AL                                                                         |                                                                                   |                                                                                     |
|                         | MMBZ6V2AL                                                                         |                                                                                   |                                                                                     |
| 4.5                     | MMBZ6V8AL                                                                         |                                                                                   |                                                                                     |
| 5.0                     |                                                                                   | SMF5V0                                                                            | VS5V0UA1LAM                                                                         |
| 6.0                     | MMBZ9V1AL                                                                         | SMF6V0                                                                            | VS6V0UA1LAM                                                                         |
| 6.5                     | MMBZ10VAL                                                                         | SMF6V5                                                                            |                                                                                     |
| 7.0                     |                                                                                   | SMF7V0                                                                            | VS7V0UA1LAM                                                                         |
| 7.5                     |                                                                                   | SMF7V5                                                                            |                                                                                     |
| 8.0                     |                                                                                   | SMF8V0                                                                            | VS8V0UA1LAM                                                                         |
| 8.5                     | MMBZ12VAL                                                                         |                                                                                   |                                                                                     |
| 9.0                     |                                                                                   | SMF9V0                                                                            | VS9V0UA1LAM                                                                         |
| 10.0                    |                                                                                   | SMF10V                                                                            | VS10VUA1LAM                                                                         |
| 11.0                    |                                                                                   | SMF11V                                                                            | VS11VUA1LAM                                                                         |
| 12.0                    | MMBZ15VAL                                                                         | SMF12V                                                                            | VS12VUA1LAM                                                                         |
| 13.0                    | MMBZ16VAL                                                                         | SMF13V                                                                            | VS13VUA1LAM                                                                         |
| 14.0                    |                                                                                   | SMF14V                                                                            | VS14VUA1LAM                                                                         |
| 14.5                    | MMBZ18VAL                                                                         |                                                                                   |                                                                                     |
| 15.0                    |                                                                                   | SMF15V                                                                            | VS15VUA1LAM                                                                         |
| 16.0                    |                                                                                   | SMF16V                                                                            | VS16VUA1LAM                                                                         |
| 17.0                    | MMBZ20VAL                                                                         | SMF17V                                                                            | VS17VUA1LAM                                                                         |
| 18.0                    |                                                                                   | SMF18V                                                                            | VS18VUA1LAM                                                                         |
| 20.0                    | MMBZ24VAL                                                                         | SMF20V                                                                            | VS20VUA1LAM                                                                         |
| 22.0                    | MMBZ27VAL<br>MMBZ27VCL                                                            | SMF22V                                                                            | VS22VUA1LAM                                                                         |
| 24.0                    | RES1CAN<br>MMBZ30VAL                                                              | SMF24V                                                                            | VS24VUA1LAM                                                                         |
| 26.0                    | MMBZ33VAL                                                                         | SMF26V                                                                            | VS26VUA1LAM                                                                         |
| 28.0                    |                                                                                   | SMF28V                                                                            | VS28VUA1LAM                                                                         |
| 30.0                    |                                                                                   | SMF30V                                                                            | VS30VUA1LAM                                                                         |
| 33.0                    |                                                                                   | SMF33V                                                                            |                                                                                     |

Note: Package is JEDEC code. ( ): ROHM Package.

TVS

Example: **RES****D1****CAN** **FH** **T116**

Part No. Grade Code Taping Code

| TVS       |            |                |                         |                                       |                                           |                     |                                            |                  |                                                                                       |                                              |
|-----------|------------|----------------|-------------------------|---------------------------------------|-------------------------------------------|---------------------|--------------------------------------------|------------------|---------------------------------------------------------------------------------------|----------------------------------------------|
| Type      |            |                | V <sub>RWM</sub><br>(V) | Absolute Maximum<br>Ratings (Ta=25°C) | Electrical Characteristics<br>(Ta=25°C)   |                     | Peak Pulse Power<br>(W)<br>(tp=10×1,000μs) | Package          | Equivalent Circuit<br>Diagram                                                         | Automotive<br>Grade<br>Available<br>AEC-Q101 |
| Part No.  | Grade Code | Taping<br>Code |                         | P <sub>D</sub><br>(mW)                | V <sub>Z</sub> (V) or V <sub>BR</sub> (V) | I <sub>Z</sub> (mA) |                                            |                  |                                                                                       |                                              |
|           |            |                |                         |                                       |                                           |                     | RES1CAN                                    |                  |                                                                                       |                                              |
| MMBZ27VCL | FH         | T116           | 22                      | 225                                   | 25.65 to 28.35                            | 1                   | 40                                         | SOT-23<br>(SSD3) |  | YES                                          |
| MMBZ5V6AL | FH         | T116           | 3                       | 225                                   | 5.32 to 5.88                              | 20                  | 24                                         |                  |  | YES                                          |
| MMBZ6V2AL | FH         | T116           | 3                       | 225                                   | 5.89 to 6.51                              | 1                   | 24                                         |                  |                                                                                       | YES                                          |
| MMBZ6V8AL | FH         | T116           | 4.5                     | 225                                   | 6.46 to 7.14                              | 1                   | 24                                         |                  |                                                                                       | YES                                          |
| MMBZ9V1AL | FH         | T116           | 6                       | 225                                   | 8.65 to 9.56                              | 1                   | 24                                         |                  |                                                                                       | YES                                          |
| MMBZ10VAL | FH         | T116           | 6.5                     | 225                                   | 9.50 to 10.50                             | 1                   | 24                                         |                  |                                                                                       | YES                                          |
| MMBZ12VAL | FH         | T116           | 8.5                     | 225                                   | 11.40 to 12.60                            | 1                   | 40                                         |                  |                                                                                       | YES                                          |
| MMBZ15VAL | FH         | T116           | 12                      | 225                                   | 14.25 to 15.75                            | 1                   | 40                                         |                  |                                                                                       | YES                                          |
| MMBZ16VAL | FH         | T116           | 13                      | 225                                   | 15.20 to 16.80                            | 1                   | 40                                         |                  |                                                                                       | YES                                          |
| MMBZ18VAL | FH         | T116           | 14.5                    | 225                                   | 17.10 to 18.90                            | 1                   | 40                                         |                  |                                                                                       | YES                                          |
| MMBZ20VAL | FH         | T116           | 17                      | 225                                   | 19.00 to 21.00                            | 1                   | 40                                         |                  |                                                                                       | YES                                          |
| MMBZ24VAL | FH         | T116           | 20                      | 225                                   | 22.80 to 25.20                            | 1                   | 40                                         |                  |                                                                                       | YES                                          |
| MMBZ27VAL | FH         | T116           | 22                      | 225                                   | 25.65 to 28.35                            | 1                   | 40                                         |                  |                                                                                       | YES                                          |
| MMBZ30VAL | FH         | T116           | 24                      | 225                                   | 28.50 to 31.50                            | 1                   | 40                                         |                  |                                                                                       | YES                                          |
| MMBZ33VAL | FH         | T116           | 26                      | 225                                   | 31.35 to 34.65                            | 1                   | 40                                         | YES              |                                                                                       |                                              |

Note: Package is JEDEC code. ( ): ROHM Package.

## TVS

TVS

Example)



| TVS         |            |                |                         |                                       |                                           |                     |                                            |                     |                                                                                     |                                              |
|-------------|------------|----------------|-------------------------|---------------------------------------|-------------------------------------------|---------------------|--------------------------------------------|---------------------|-------------------------------------------------------------------------------------|----------------------------------------------|
| Type        |            |                | V <sub>RWM</sub><br>(V) | Absolute Maximum<br>Ratings (Ta=25°C) | Electrical Characteristics<br>(Ta=25°C)   |                     | Peak Pulse Power<br>(W)<br>(tp=10×1,000µs) | Package             | Equivalent Circuit<br>Diagram                                                       | Automotive<br>Grade<br>Available<br>AEC-Q101 |
| Part No.    | Grade Code | Taping<br>Code |                         | P <sub>D</sub><br>(mW)                | V <sub>Z</sub> (V) or V <sub>SR</sub> (V) | I <sub>Z</sub> (mA) |                                            |                     |                                                                                     |                                              |
| SMF5V0      | TF         | TR             | 5                       | 1,000                                 | 6.40 or more                              | 40                  | 200                                        | SOD-123FL<br>(PMDU) |  | YES                                          |
| SMF6V0      | TF         | TR             | 6                       | 1,000                                 | 6.67 or more                              | 40                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF6V5      | TF         | TR             | 6.5                     | 1,000                                 | 7.22 or more                              | 40                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF7V0      | TF         | TR             | 7                       | 1,000                                 | 7.78 or more                              | 40                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF7V5      | TF         | TR             | 7.5                     | 1,000                                 | 8.33 or more                              | 40                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF8V0      | TF         | TR             | 8                       | 1,000                                 | 8.89 or more                              | 40                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF9V0      | TF         | TR             | 9                       | 1,000                                 | 10.0 or more                              | 40                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF10V      | TF         | TR             | 10                      | 1,000                                 | 11.1 or more                              | 20                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF11V      | TF         | TR             | 11                      | 1,000                                 | 12.2 or more                              | 20                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF12V      | TF         | TR             | 12                      | 1,000                                 | 13.3 or more                              | 20                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF13V      | TF         | TR             | 13                      | 1,000                                 | 14.4 or more                              | 20                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF14V      | TF         | TR             | 14                      | 1,000                                 | 15.6 or more                              | 20                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF15V      | TF         | TR             | 15                      | 1,000                                 | 16.7 or more                              | 20                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF16V      | TF         | TR             | 16                      | 1,000                                 | 17.2 or more                              | 20                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF17V      | TF         | TR             | 17                      | 1,000                                 | 18.9 or more                              | 20                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF18V      | TF         | TR             | 18                      | 1,000                                 | 20.0 or more                              | 20                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF20V      | TF         | TR             | 20                      | 1,000                                 | 22.2 or more                              | 10                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF22V      | TF         | TR             | 22                      | 1,000                                 | 24.4 or more                              | 10                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF24V      | TF         | TR             | 24                      | 1,000                                 | 26.7 or more                              | 10                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF26V      | TF         | TR             | 26                      | 1,000                                 | 28.9 or more                              | 10                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF28V      | TF         | TR             | 28                      | 1,000                                 | 31.1 or more                              | 10                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF30V      | TF         | TR             | 30                      | 1,000                                 | 33.3 or more                              | 10                  | 200                                        |                     |                                                                                     | YES                                          |
| SMF33V      | TF         | TR             | 33                      | 1,000                                 | 36.7 or more                              | 10                  | 200                                        |                     |                                                                                     | YES                                          |
| VS5V0UA1LAM | TF         | TR             | 5                       | —                                     | 6.45 to 7.14                              | 10                  | 600                                        | SOD-128<br>(PMDTM)  |                                                                                     | YES                                          |
| VS6V0UA1LAM | TF         | TR             | 6                       | —                                     | 6.67 to 7.37                              | 10                  | 600                                        |                     |                                                                                     | YES                                          |
| VS7V0UA1LAM | TF         | TR             | 7                       | —                                     | 7.78 to 8.60                              | 10                  | 600                                        |                     |                                                                                     | YES                                          |
| VS8V0UA1LAM | TF         | TR             | 8                       | —                                     | 8.89 to 9.83                              | 1                   | 600                                        |                     |                                                                                     | YES                                          |
| VS9V0UA1LAM | TF         | TR             | 9                       | —                                     | 10.0 to 11.1                              | 1                   | 600                                        |                     |                                                                                     | YES                                          |
| VS10VUA1LAM | TF         | TR             | 10                      | —                                     | 11.1 to 12.3                              | 1                   | 600                                        |                     |                                                                                     | YES                                          |
| VS11VUA1LAM | TF         | TR             | 11                      | —                                     | 12.2 to 13.5                              | 1                   | 600                                        |                     |                                                                                     | YES                                          |
| VS12VUA1LAM | TF         | TR             | 12                      | —                                     | 13.3 to 14.7                              | 1                   | 600                                        |                     |                                                                                     | YES                                          |
| VS13VUA1LAM | TF         | TR             | 13                      | —                                     | 14.4 to 15.9                              | 1                   | 600                                        |                     |                                                                                     | YES                                          |
| VS14VUA1LAM | TF         | TR             | 14                      | —                                     | 15.6 to 17.2                              | 1                   | 600                                        |                     |                                                                                     | YES                                          |
| VS15VUA1LAM | TF         | TR             | 15                      | —                                     | 16.7 to 18.5                              | 1                   | 600                                        |                     |                                                                                     | YES                                          |
| VS16VUA1LAM | TF         | TR             | 16                      | —                                     | 17.8 to 19.7                              | 1                   | 600                                        |                     |                                                                                     | YES                                          |
| VS17VUA1LAM | TF         | TR             | 17                      | —                                     | 18.9 to 20.9                              | 1                   | 600                                        |                     |                                                                                     | YES                                          |
| VS18VUA1LAM | TF         | TR             | 18                      | —                                     | 20.0 to 22.1                              | 1                   | 600                                        |                     |                                                                                     | YES                                          |
| VS20VUA1LAM | TF         | TR             | 20                      | —                                     | 22.2 to 24.5                              | 1                   | 600                                        |                     |                                                                                     | YES                                          |
| VS22VUA1LAM | TF         | TR             | 22                      | —                                     | 24.4 to 26.9                              | 1                   | 600                                        |                     |                                                                                     | YES                                          |
| VS24VUA1LAM | TF         | TR             | 24                      | —                                     | 26.7 to 29.5                              | 1                   | 600                                        |                     |                                                                                     | YES                                          |
| VS26VUA1LAM | TF         | TR             | 26                      | —                                     | 28.9 to 31.9                              | 1                   | 600                                        |                     |                                                                                     | YES                                          |
| VS28VUA1LAM | TF         | TR             | 28                      | —                                     | 31.1 to 34.4                              | 1                   | 600                                        |                     |                                                                                     | YES                                          |
| VS30VUA1LAM | TF         | TR             | 30                      | —                                     | 33.3 to 36.8                              | 1                   | 600                                        |                     |                                                                                     | YES                                          |

Note: Package is JEDEC code. ( ): ROHM Package.

# Switching Diodes

## ● Quick Reference for Switching Diodes

| $V_R$<br>(V) | Surface Mount type                                                                                     |                                                                                                           |                                                                                                           |                                                                                                            |                                                                                                         |
|--------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
|              | 1608 size                                                                                              | 1616 size                                                                                                 | 2120 size                                                                                                 | 2512 size                                                                                                  | 2924 size                                                                                               |
|              | <br>SOD-523<br>(EMD2) | <br>SOT-416FL<br>(EMD3F) | <br>SOT-323FL<br>(UMD3F) | <br>SOD-323FL<br>(UMD2) | <br>SOT-23<br>(SSD3) |
| 80           | 1SS400SM                                                                                               | DAN222WM<br>DAP222WM<br>DAN217WM<br>DA228WM                                                               | DAN202UM<br>DAP202UM<br>DAN217UM<br>DA228UM<br>BAW156UM<br>BAV199UM                                       | 1SS355VM<br>1SS380VM                                                                                       | BAS16HM<br>BAV70HM<br>BAW56HM<br>BAV99HM<br>BAW156HM<br>BAV199HM<br>BAS116HM<br>BAV170HM                |
| 200          |                                                                                                        |                                                                                                           |                                                                                                           | BAS21VM                                                                                                    | BAS21HM                                                                                                 |

Note: Package is JEDEC code. ( ): ROHM Package.

Switching Diodes

|         |          |   |   |   |            |   |   |   |             |   |   |   |   |   |
|---------|----------|---|---|---|------------|---|---|---|-------------|---|---|---|---|---|
| Example | 1        | S | S | 4 | 0          | 0 | C | S | F           | H | T | 2 | R | A |
|         | Part No. |   |   |   | Grade Code |   |   |   | Taping Code |   |   |   |   |   |

| High-speed type |            |             |                                      |                    |                      |                     |                         |                                        |                     |                          |                    |                           |                    |                     |                   |                                                                                       |                                     |
|-----------------|------------|-------------|--------------------------------------|--------------------|----------------------|---------------------|-------------------------|----------------------------------------|---------------------|--------------------------|--------------------|---------------------------|--------------------|---------------------|-------------------|---------------------------------------------------------------------------------------|-------------------------------------|
| Type            |            |             | Absolute Maximum Ratings (Ta=25°C)*1 |                    |                      |                     |                         | Electrical Characteristics (Ta=25°C)*1 |                     |                          |                    |                           |                    |                     | Package           | Equivalent Circuit Diagram                                                            | Automotive Grade Available AEC-Q101 |
| Part No.        | Grade Code | Taping Code | V <sub>RM</sub> (V)                  | V <sub>R</sub> (V) | I <sub>FM</sub> (mA) | I <sub>o</sub> (mA) | I <sub>surge</sub> (mA) | V <sub>F</sub> (V) Max.                | I <sub>F</sub> (mA) | I <sub>R</sub> (μA) Max. | V <sub>R</sub> (V) | t <sub>rr</sub> (ns) Max. | V <sub>R</sub> (V) | I <sub>F</sub> (mA) |                   |                                                                                       |                                     |
| 1SS355VM        | FH         | TE-17       | 90                                   | 80                 | 225                  | 100                 | 500(1s)                 | 1.2                                    | 100                 | 0.1                      | 80                 | 4                         | 6                  | 10                  | SOD-323FL (UMD2)  |    | YES                                 |
| 1SS400SM        | FH         | T2R         | 90                                   | 80                 | 225                  | 100                 | 500(1s)                 | 1.2                                    | 100                 | 0.1                      | 80                 | 4                         | 6                  | 10                  | SOD-523 (EMD2)    |                                                                                       | YES                                 |
| BAS16HM         | FH         | T116        | 100                                  | 80                 | 500                  | 215*3               | 4,000(1μs)              | 1.25                                   | 150                 | 0.1                      | 80                 | 4                         | 10*2               | 10                  | SOT-23 (SSD3)     |    | YES                                 |
| DAN222WM        | FH         | TL          | 80                                   | 80                 | 300                  | 100                 | 4,000(1μs)              | 1.2                                    | 100                 | 0.1                      | 70                 | 4                         | 6                  | 5                   | SOT-416FL (EMD3F) |  | YES                                 |
| DAN202UM        | FH         | TL          | 80                                   | 80                 | 300                  | 100                 | 4,000(1μs)              | 1.2                                    | 100                 | 0.1                      | 70                 | 4                         | 6                  | 5                   | SOT-323FL (UMD3F) |                                                                                       | YES                                 |
| BAV70HM         | FH         | T116        | 90                                   | 80                 | 450                  | 215*3               | 4,000(1μs)              | 1.25                                   | 150                 | 0.5                      | 80                 | 4                         | 10*2               | 10                  | SOT-23 (SSD3)     |                                                                                       | YES                                 |
| DAP222WM        | FH         | TL          | 80                                   | 80                 | 300                  | 100                 | 4,000(1μs)              | 1.2                                    | 100                 | 0.1                      | 70                 | 4                         | 6                  | 5                   | SOT-416FL (EMD3F) |  | YES                                 |
| DAP202UM        | FH         | TL          | 80                                   | 80                 | 300                  | 100                 | 4,000(1μs)              | 1.2                                    | 100                 | 0.1                      | 70                 | 4                         | 6                  | 5                   | SOT-323FL (UMD3F) |                                                                                       | YES                                 |
| BAW56HM         | FH         | T116        | 100                                  | 80                 | 500                  | 215*3               | 4,000(1μs)              | 1.25                                   | 150                 | 0.1                      | 80                 | 4                         | 10*2               | 10                  | SOT-23 (SSD3)     |                                                                                       | YES                                 |
| DAN217WM        | FH         | TL          | 80                                   | 80                 | 300                  | 100                 | 4,000(1μs)              | 1.2                                    | 100                 | 0.1                      | 70                 | 4                         | 6                  | 5                   | SOT-416FL (EMD3F) |  | YES                                 |
| DAN217UM        | FH         | TL          | 80                                   | 80                 | 300                  | 100                 | 4,000(1μs)              | 1.2                                    | 100                 | 0.2                      | 70                 | 4                         | 6                  | 5                   | SOT-323FL (UMD3F) |                                                                                       | YES                                 |
| BAV99HM         | FH         | T116        | 100                                  | 80                 | 500                  | 215*3               | 4,000(1μs)              | 1.25                                   | 150                 | 0.1                      | 80                 | 4                         | 10*2               | 10                  | SOT-23 (SSD3)     |                                                                                       | YES                                 |
| BAS21HM         | FH         | T116        | 250                                  | 200                | —                    | 200*3               | 10,000(1μs)             | 1                                      | 100                 | 0.1                      | 200                | 50                        | 30*2               | 30                  | SOT-23 (SSD3)     |  | YES                                 |
| BAS21VM         | FH         | TE-17       | 250                                  | 200                | —                    | 200*3               | 10,000(1μs)             | 1                                      | 100                 | 0.1                      | 200                | 50                        | 30*2               | 30                  | SOD-323FL (UMD2)  |  | YES                                 |

Note: \*1: Value/Chip \*2: Value of  $I_R$ (mA) value and NOT  $V_R$ (V) \*3: Value of  $I_F$   
Package is JEDEC code. ( ): ROHM Package.

Switching Diodes

Switching Diodes

Example

1

S

S

4

0

0

C

S

F

H

T

2

R

A

Part No.

Grade Code

Taping Code

| Low Leak type |            |             |                                      |                    |                      |                     |             |                                        |                     |                          |                     |                           |                    |         |                            |                                                                                     |                     |
|---------------|------------|-------------|--------------------------------------|--------------------|----------------------|---------------------|-------------|----------------------------------------|---------------------|--------------------------|---------------------|---------------------------|--------------------|---------|----------------------------|-------------------------------------------------------------------------------------|---------------------|
| Type          |            |             | Absolute Maximum Ratings (Ta=25°C)*1 |                    |                      |                     |             | Electrical Characteristics (Ta=25°C)*1 |                     |                          |                     |                           |                    | Package | Equivalent Circuit Diagram | Automotive Grade Available AEC-Q101                                                 |                     |
| Part No.      | Grade Code | Taping Code | V <sub>RM</sub> (V)                  | V <sub>R</sub> (V) | I <sub>FM</sub> (mA) | I <sub>O</sub> (mA) | Isurge (mA) | V <sub>F</sub> (V) Max.                | I <sub>F</sub> (mA) | I <sub>R</sub> (μA) Max. | V <sub>RR</sub> (V) | t <sub>rr</sub> (ns) Max. | V <sub>R</sub> (V) |         |                            |                                                                                     | I <sub>F</sub> (mA) |
| 1SS380VM      | FH         | TE-17       | 80                                   | 80                 | 225                  | 100                 | 400(1s)     | 1.2                                    | 100                 | 0.01                     | 80                  | —                         | —                  | —       | SOD-323FL (UMD2)           |  | YES                 |
| BAW156HM      | FH         | T116        | 100                                  | 80                 | 500                  | 215*3               | 4,000(1μs)  | 1.25                                   | 150                 | 0.005                    | 75                  | 3,000                     | 10*2               | 10      | SOT-23 (SSD3)              |  | YES                 |
| BAW156UM      | FH         | TL          | 100                                  | 80                 | 500                  | 215*3               | 4,000(1μs)  | 1.25                                   | 150                 | 0.005                    | 75                  | 3,000                     | 10*2               | 10      | SOT-323FL (UMD3F)          |                                                                                     | YES                 |
| BAV199HM      | FH         | T116        | 100                                  | 80                 | 500                  | 215*3               | 4,000(1μs)  | 1.25                                   | 150                 | 0.005                    | 75                  | 3,000                     | 10*2               | 10      | SOT-23 (SSD3)              |  | YES                 |
| BAV199UM      | FH         | TL          | 100                                  | 80                 | 500                  | 215*3               | 4,000(1μs)  | 1.25                                   | 150                 | 0.005                    | 75                  | 3,000                     | 10*2               | 10      | SOT-323FL (UMD3F)          |                                                                                     | YES                 |
| DA228UM       | FH         | TL          | 80                                   | 80                 | 200                  | 100                 | 300(1μs)    | 1.2                                    | 100                 | 0.01                     | 80                  | —                         | —                  | —       | SOT-416FL (EMD3F)          |                                                                                     | YES                 |
| DA228WM       | FH         | TL          | 80                                   | 80                 | 200                  | 100                 | 4,000(1μs)  | 1.2                                    | 100                 | 0.1                      | 80                  | —                         | —                  | —       | SOT-416FL (EMD3F)          |                                                                                     | YES                 |
| BAV170HM      | FH         | T116        | 90                                   | 80                 | 500                  | 215*3               | 4,000(1μs)  | 1.25                                   | 150                 | 0.005                    | 75                  | 3,000                     | 10*2               | 10      | SOT-23 (SSD3)              |  | YES                 |
| BAS116HM      | FH         | T116        | 100                                  | 80                 | 500                  | 215*3               | 4,000(1μs)  | 1.25                                   | 150                 | 0.005                    | 75                  | 3,000                     | 10*2               | —       | SOT-23 (SSD3)              |  | YES                 |

Note: \*1: Value/Chip \*2: Value of I<sub>R</sub>(mA) value and NOT V<sub>R</sub>(V) \*3: Value of I<sub>R</sub>  
Package is JEDEC code. ( ) : ROHM Package.

High Frequency Diodes

● Quick Reference for High Frequency Diodes

|                       | V <sub>R</sub> (V) | Package        |
|-----------------------|--------------------|----------------|
|                       |                    | 1608 size      |
|                       |                    |                |
|                       |                    | SOD-523 (EMD2) |
| Band Switching Diodes | 35                 | 1SS390SM       |

Note: Package is JEDEC code. ( ) : ROHM Package.

High Frequency Diodes

Example

1

S

S

3

9

0

S

M

F

H

T

2

R

Part No.

Grade Code

Taping Code

| Band Switching Diodes |            |             |                                    |                     |                       |                                      |                    |        |            |                     |        |                |                            |                                     |
|-----------------------|------------|-------------|------------------------------------|---------------------|-----------------------|--------------------------------------|--------------------|--------|------------|---------------------|--------|----------------|----------------------------|-------------------------------------|
| Type                  |            |             | Absolute Maximum Ratings (Ta=25°C) |                     |                       | Electrical Characteristics (Ta=25°C) |                    |        |            |                     |        | Package        | Equivalent Circuit Diagram | Automotive Grade Available AEC-Q101 |
| Part No.              | Grade Code | Taping Code | V <sub>R</sub> (V)                 | T <sub>J</sub> (°C) | T <sub>stg</sub> (°C) | Ct(pF) Max.                          | V <sub>R</sub> (V) | f(MHz) | rF(Ω) Max. | I <sub>F</sub> (mA) | f(MHz) |                |                            |                                     |
| 1SS390SM              | FH         | T2R         | 35                                 | 150                 | −55 to +150           | 1.2                                  | 6                  | 1      | 0.9        | 2                   | 100    | SOD-523 (EMD2) |                            | YES                                 |

Note: Package is JEDEC code. ( ) : ROHM Package.

# Packages

## ● Dimensions (Unit: mm)

### Surface Mount type

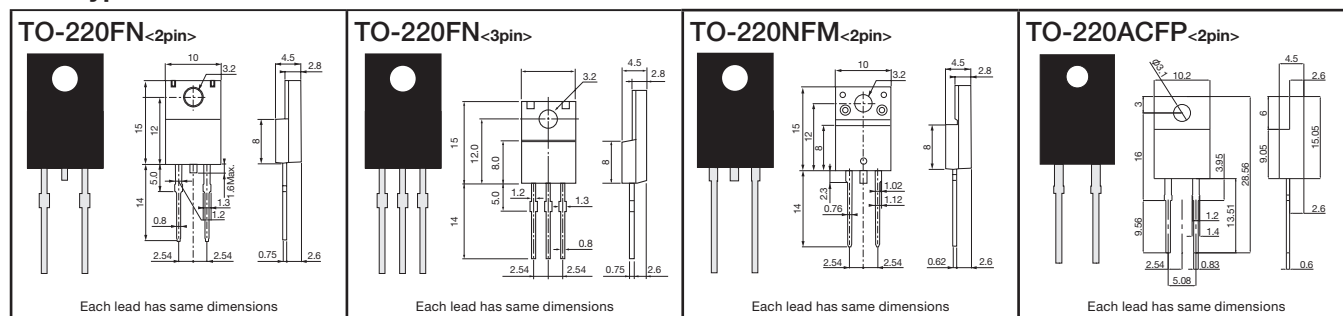
|                                                                         |                                      |                                                             |                                                                       |                                       |
|-------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------|
| <b>SOD-523 (EMD2) [SC-79]</b><br>                                       | <b>SOT-416FL (EMD3F) [SC-89]</b><br> | <b>SOD-323FL (UMD2) [SC-90A]</b><br>                        | <b>SOT-323FL (UMD3F) [SC-85]</b><br>                                  | <b>SOT-23(SSD3)</b><br>               |
| <b>SOT-457T (TSMD6) [SC-95]</b><br><p>Each lead has same dimensions</p> | <b>(TUMD2M) [SC-108B]</b><br>        | <b>(TUMD2SM)</b><br>                                        | <b>(PMDE)</b><br>                                                     | <b>SOD-123FL (PMDU) [SC-109B]</b><br> |
| <b>SOD-128(PMDTM)</b><br>                                               | <b>DO-214AC(PMDS) (SMA)</b><br>      | <b>TO-252(DPAK)</b><br><p>Each lead has same dimensions</p> | <b>TO-263S(SC-83) [D2PAK]</b><br><p>Each lead has same dimensions</p> |                                       |

Note: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code, [ ] : GENERAL Code.

# Packages

## ● Dimensions (Unit: mm)

### Lead type

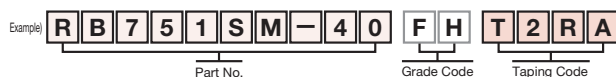


Note: Package is JEDEC code.

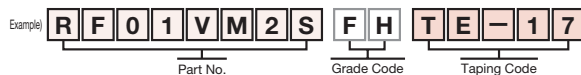
# Part No. Explanation

- When ordering, specify the part number.
- Check each code against the tables shown below.
- Fill in from the left, leaving any extra boxes empty on the right.

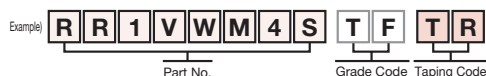
### • Schottky Barrier Diodes



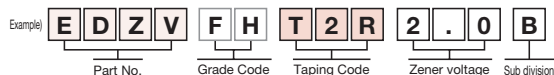
### • Fast Recovery Diodes



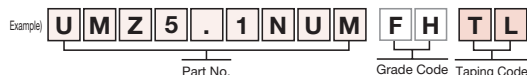
### • Rectifier Diodes



### • Zener Diodes



### • Zener Diodes for ESD Protection



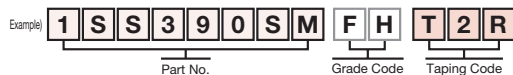
### • TVS



### • Switching Diodes



### • High Frequency Diodes



## • Packaging type

| Package            |            | Code  | ROHM Package  | Packaging type                | Direction                           | Basic Ordering Unit (pcs) |
|--------------------|------------|-------|---------------|-------------------------------|-------------------------------------|---------------------------|
| Surface Mount type | SOD-523    | TE61  | EMD2          | Embossed Tape                 | Cathode on sprocket hole side       | 3,000                     |
|                    |            | T2R   |               | Embossed Tape                 | Cathode on sprocket hole side       | 8,000                     |
|                    | SOT-416FL  | TL    | EMD3F         | Embossed Tape                 | One terminal on sprocket hole side  | 3,000                     |
|                    | SOD-323FL  | TE-17 | UMD2          | Embossed Tape                 | Cathode on sprocket hole side       | 3,000                     |
|                    |            | TW11  |               |                               |                                     |                           |
|                    | SOT-323FL  | TL    | UMD3F         | Embossed Tape                 | One terminal on sprocket hole side  | 3,000                     |
|                    | SOT-23     | T116  | SSD3          | Embossed Tape                 | One terminal on sprocket hole side  | 3,000                     |
|                    | SOT-457T   | TR    | TSMD6         | Embossed Tape                 | Terminal No.1 on sprocket hole side | 3,000                     |
|                    | SOD-323HE  | TR    | TUMD2M        | Embossed Tape                 | Cathode on sprocket hole side       | 3,000                     |
|                    |            | TR    | TUMD2SM       | Embossed Tape                 | Cathode on sprocket hole side       | 3,000                     |
|                    | —          |       | PMDE          | Embossed Tape                 | Cathode on sprocket hole side       | 3,000                     |
|                    | SOD-123FL  |       | PMDU          |                               |                                     |                           |
| SOD-128            | TR         | PMDTM | Embossed Tape | Cathode on sprocket hole side | 3,000                               |                           |
| D0-214AC[SMA]      | TE25       | PMDS  | Embossed Tape | Cathode on sprocket hole side | 1,500                               |                           |
| TO-252(DPAK)       | TL         | —     | Embossed Tape | Fin on sprocket hole side     | 2,500                               |                           |
| TO-263S(D2PAK)     | TL         | —     | Embossed Tape | Fin on sprocket hole side     | 1,000                               |                           |
| Lead type          | TO-220FN   | C9    | —             | Stick                         | Box                                 | 1,000                     |
|                    | TO-220NFM  | C9    | —             | Stick                         | Box                                 | 1,000                     |
|                    | TO-220ACFP | C9    | —             | Stick                         | Box                                 | 1,000                     |

## Quick Reference of Resistance Range

## ● Low Ohmic Resistor Lineup

Part No./inch[mm]/Page

PSR

GMR

PML

PMR

Metal Strip

UCR

LHR

LTR

MCR

Thick Film

| Power Rating (W) | Resistance(Ω) | 0.1m                          | 1m                           | 10m                            | 100m                              | 1                                 | 10    |
|------------------|---------------|-------------------------------|------------------------------|--------------------------------|-----------------------------------|-----------------------------------|-------|
| 5                | 0.1m          | PSR500/5931[15×7.75]/P.109 2m |                              | ☆GMR320/2817[7142]/P.109       | 100m                              |                                   |       |
| 4                | 0.2m          | PSR400/3921[10×5.2]/P.109 3m  |                              |                                |                                   |                                   |       |
| 3                | 0.3m          | PSR100/2512[6432]/P.109 3m    |                              | 5m GMR100/2512[6432]/P.109     | 220m                              |                                   |       |
| 2                | 0.5m          |                               | 2.2m PML100/3264[1225]/P.108 |                                |                                   |                                   |       |
|                  |               |                               |                              | 5m ☆GMR50/2010[5025]/P.109     | 200m                              |                                   |       |
|                  | 1m            |                               |                              | 1m PMR100/2512[6432]/P.108 10m |                                   | 100m LTR100/1225[3264]/P.107 910m |       |
| 1.25             | 0.5m          |                               | 2.2m PML50/2550[1020]/P.108  |                                |                                   |                                   |       |
|                  |               |                               |                              | 10m                            | LTR50/1020[2550]/P.107 910m       |                                   |       |
| 1                |               |                               |                              | 33m                            | LHR18/0612[1632]/P.107            | 1                                 |       |
|                  |               | PMR25/1210[3225]/P.108        | 1m                           | PMR50/2010[5025]/P.108 10m     |                                   |                                   |       |
|                  |               |                               | 1m                           | 5m                             |                                   | 47m MCR100/2512[6432]/P.105       | 9.1   |
|                  |               |                               | 1m                           | PMR18/1206[3216]/P.108 10m     | 10m                               | LTR18/0612[1632]/P.107            | 1     |
| 0.66             | 0.5m          |                               | 2.5m PML18/0612[1632]/P.108  | 11m 39m                        | UCR18/1206[3216]/P.106            |                                   |       |
|                  |               | PML10/0508[1220]/P.108 1m     | 2.5m                         |                                |                                   |                                   |       |
| 0.5              |               |                               |                              |                                | 47m MCR50/2010[5025]/P.105        | 9.1                               |       |
|                  |               |                               |                              |                                | 47m MCR25/1210[3225]/P.105        | 9.1                               |       |
|                  |               |                               | 2m                           | PMR10/0805[2012]/P.108 10m     | 11m UCR18/1206[3216]/P.106 100m   |                                   |       |
| 1/3              |               |                               |                              |                                | 47m LTR10/0508[1220]/P.107        | 9.1                               |       |
|                  |               |                               |                              |                                | 11m UCR10/0805[2012]/P.106 100m   |                                   |       |
| 0.25             |               |                               |                              |                                | 47m MCR18/1206[3216]/P.105        | 9.1                               |       |
|                  |               |                               |                              |                                | 47m MCR10/0805[2012]/P.105        | 9.1                               |       |
| 0.2              |               |                               |                              | PMR03/0603[1608]/P.108 10m     | 20m UCR03/0603[1608]/P.106 200m   |                                   |       |
|                  |               |                               |                              | PMR01/0402[1005]/P.108 10m     |                                   | 910m                              |       |
| 0.125            |               |                               |                              |                                | 68m UCR01/0402[1005]/P.106        | 910m                              |       |
| 0.1              |               |                               |                              |                                | 100m UCR006/0201[0603]/P.106 910m |                                   |       |
| 1/16             |               |                               |                              |                                |                                   | MCR03/0603[1608]/P.105            | 1 9.1 |
|                  |               |                               |                              |                                |                                   | MCR01/0402[1005]/P.105            | 1 9.1 |
| 0.05             |               |                               |                              |                                |                                   | MCR006/0201[0603]/P.105           | 1 9.1 |

☆ : Under Development

## ● 1Ω or more Resistor Lineup

Part No./inch[mm]/Page

ESR

SDR

KTR

LTR

MCR

SFR

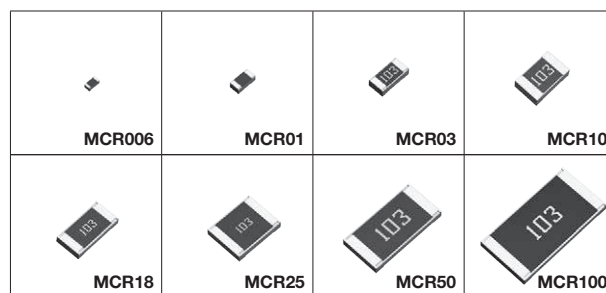
Thick Film

| Power Rating (W) | Resistance(Ω) | 1 | 10 | 100 | 1k | 10k | 100k | 1M                     | 10M | 30M |
|------------------|---------------|---|----|-----|----|-----|------|------------------------|-----|-----|
| 2                |               |   |    |     |    |     |      | 1M                     |     |     |
| 1                |               |   |    |     |    |     |      | 1M                     |     |     |
|                  |               |   |    |     |    |     |      | 100k                   |     |     |
| 0.75             |               |   |    |     |    |     |      | 1M                     |     |     |
|                  |               |   |    |     |    |     |      |                        |     |     |
| 3/2              |               |   |    |     |    |     |      | 10M                    |     |     |
| 0.5              |               |   |    |     |    |     |      | 10M                    |     |     |
|                  |               |   |    |     |    |     |      | 560k                   |     |     |
|                  |               |   |    |     |    |     |      | ESR18/1206[3216]/P.102 | 15M |     |
| 0.4              |               |   |    |     |    |     |      | 1M                     |     |     |
|                  |               |   |    |     |    |     |      | ESR10/0805[2012]/P.102 | 30M |     |
| 1/3              |               |   |    |     |    |     |      | 10M                    |     |     |
|                  |               |   |    |     |    |     |      | 10M                    |     |     |
| 0.3              |               |   |    |     |    |     |      | 10M                    |     |     |
|                  |               |   |    |     |    |     |      | 3.3M                   |     |     |
|                  |               |   |    |     |    |     |      | 10M                    |     |     |
| 0.25             |               |   |    |     |    |     |      | 15M                    |     |     |
|                  |               |   |    |     |    |     |      | 1M                     |     |     |
|                  |               |   |    |     |    |     |      | ESR03/0603[1608]/P.102 | 10M |     |
| 0.2              |               |   |    |     |    |     |      | 10M                    |     |     |
|                  |               |   |    |     |    |     |      | ESR01/0402[1005]/P.102 | 10M |     |
| 0.125            |               |   |    |     |    |     |      | 10M                    |     |     |
|                  |               |   |    |     |    |     |      | 30M                    |     |     |
|                  |               |   |    |     |    |     |      | 10M                    |     |     |
| 0.1              |               |   |    |     |    |     |      | 10M                    |     |     |
|                  |               |   |    |     |    |     |      | 10M                    |     |     |
|                  |               |   |    |     |    |     |      | 10M                    |     |     |
| 1/16             |               |   |    |     |    |     |      | 10M                    |     |     |
|                  |               |   |    |     |    |     |      | 10M                    |     |     |
| 0.05             |               |   |    |     |    |     |      | 10M                    |     |     |

# Thick Film Chip Resistors(Standard series)

## Compact Chip Resistors(MCR series <0201 to 2512>)

- High reliability chip resistors optimized for a variety of applications
- Full lineup of eight package sizes, ranging from 0201 to 2512
- Market-proven reliability



| MCR series <0201 to 2512> |                       |                       |                                    |           |                                     |                                                                                                                    |                               |                                           |
|---------------------------|-----------------------|-----------------------|------------------------------------|-----------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------------------|
| Part No.                  | Size Code<br>inch(mm) | Rated Power<br>(70°C) | Limiting Element<br>Voltage<br>(V) | Tolerance | Temperature Coefficient<br>(ppm/°C) | Resistance Range                                                                                                   | Operating Temperature<br>(°C) | Automotive Grade<br>Available<br>AEC-Q200 |
| MCR006                    | 0201<br>(0603)        | 0.05W                 | 25                                 | J(±5%)    | +600/−200<br>±200                   | 1 Ω to 9.1 Ω(E24 series)<br>10 Ω to 10M Ω(E24 series)                                                              | −55 to +125                   | YES                                       |
|                           |                       |                       |                                    | F(±1%)    | ±200                                | 10 Ω to 10M Ω(E24, E96 series)                                                                                     |                               |                                           |
|                           |                       |                       |                                    | D(±0.5%)  | ±200<br>±100                        | 10 Ω to 976 Ω(E24, E96 series)<br>1k Ω to 1M Ω(E24, E96 series)                                                    |                               |                                           |
| MCR01                     | 0402<br>(1005)        | 0.063W<br>(1/16W)     | 50                                 | J(±5%)    | +500/−250<br>±200                   | 1 Ω to 9.1 Ω(E24 series)<br>10 Ω to 10M Ω(E24 series)                                                              | −55 to +155                   | YES                                       |
|                           |                       |                       |                                    | F(±1%)    | ±100                                | 10 Ω to 2.2M Ω(E24, E96 series)                                                                                    |                               |                                           |
|                           |                       |                       |                                    | D(±0.5%)  | ±100<br>± 50                        | 10 Ω to 97.6 Ω(E24, E96 series)<br>100 Ω to 1M Ω(E24, E96 series)                                                  |                               |                                           |
| MCR03                     | 0603<br>(1608)        | 0.1W                  | 50                                 | J(±5%)    | ±400<br>±200                        | 1 Ω to 9.1 Ω(E24 series)<br>10 Ω to 10M Ω(E24 series)                                                              | −55 to +155                   | YES                                       |
|                           |                       |                       |                                    | FX(±1%)   | ±100                                | 10 Ω to 10M Ω(E24, E96 series)                                                                                     |                               |                                           |
|                           |                       |                       |                                    | D(±0.5%)  | ±100<br>± 50                        | 10 Ω to 97.6 Ω(E24, E96 series)<br>100 Ω to 1M Ω(E24, E96 series)                                                  |                               |                                           |
| MCR10                     | 0805<br>(2012)        | 0.125W                | 150                                | J(±5%)    | ±400<br>±200                        | 1 Ω to 9.1 Ω(E24 series)<br>10 Ω to 10M Ω(E24 series)                                                              | −55 to +155                   | YES                                       |
|                           |                       | 0.1W                  |                                    | F(±1%)    | ±100                                | 10 Ω to 2.2M Ω(E24, E96 series)                                                                                    |                               |                                           |
|                           |                       |                       |                                    | D(±0.5%)  | ±100<br>± 50                        | 10 Ω to 97.6 Ω(E24, E96 series)<br>100 Ω to 1M Ω(E24, E96 series)                                                  |                               |                                           |
| MCR18                     | 1206<br>(3216)        | 0.25W                 | 200                                | J(±5%)    | ±400<br>±200                        | 1 Ω to 9.1 Ω(E24 series)<br>10 Ω to 10M Ω(E24 series)                                                              | −55 to +155                   | YES                                       |
|                           |                       | 0.125W                |                                    | F(±1%)    | ±100                                | 10 Ω to 2.2M Ω(E24, E96 series)                                                                                    |                               |                                           |
|                           |                       |                       |                                    | D(±0.5%)  | ±100<br>± 50                        | 10 Ω to 97.6 Ω(E24, E96 series)<br>100 Ω to 1M Ω(E24, E96 series)                                                  |                               |                                           |
| MCR25                     | 1210<br>(3225)        | 0.25 to<br>0.5W*1     | 200                                | J(±5%)    | 500±350<br>±500<br>±200             | 1 Ω to 2 Ω(E24 series)<br>2.2 Ω to 5.1 Ω(E24 series)<br>5.6 Ω to 3.3M Ω(E24 series)                                | −55 to +155                   | YES                                       |
|                           |                       |                       |                                    | F(±1%)    | ±100                                | 10 Ω to 1.0M Ω(E24, E96 series)                                                                                    |                               |                                           |
| MCR50                     | 2010<br>(5025)        | 0.5W                  | 200                                | J(±5%)    | 500±350<br>±500<br>±200<br>±350     | 1 Ω to 2 Ω(E24 series)<br>2.2 Ω to 9.1 Ω(E24 series)<br>10 Ω to 330k Ω(E24 series)<br>360k Ω to 560k Ω(E24 series) | −55 to +125                   | YES                                       |
|                           |                       |                       |                                    | F(±1%)    | ±100                                | 10 Ω to 180k Ω(E24, E96 series)                                                                                    |                               |                                           |
| MCR100                    | 2512<br>(6432)        | 1W                    | 200                                | J(±5%)    | 500±350<br>±500<br>±350<br>±200     | 1 Ω to 2 Ω(E24 series)<br>2.2 Ω to 9.1 Ω(E24 series)<br>10 Ω to 22 Ω(E24 series)<br>24 Ω to 100k Ω(E24 series)     | −55 to +125                   | YES                                       |
|                           |                       |                       |                                    | F(±1%)    | ±100                                | 10 Ω to 82k Ω(E24, E96 series)                                                                                     |                               |                                           |

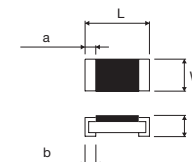
\*1: Rated power 1Ω to 9.76Ω: 0.25W, 10Ω to 9.76kΩ: 0.5W, 10kΩ to 3.3MΩ: 0.33W  
 \*E24: Standard products E96: Custom products

| Jumper type |                       |                      |            |                               |                                        |
|-------------|-----------------------|----------------------|------------|-------------------------------|----------------------------------------|
| Part No.    | Size Code<br>inch(mm) | Rated Current<br>(A) | Resistance | Operating Temperature<br>(°C) | Automotive Grade Available<br>AEC-Q200 |
| MCR006      | 0201(0603)            | 0.5                  | 50mΩ Max.  | −55 to +125                   | YES                                    |
| MCR01       | 0402(1005)            | 1                    |            | −55 to +155                   | YES                                    |
| MCR03       | 0603(1608)            | 1                    |            |                               | YES                                    |
| MCR10       | 0805(2012)            | 2                    |            |                               | YES                                    |
| MCR18       | 1206(3216)            | 2                    |            |                               | YES                                    |
| MCR25       | 1210(3225)            | 2                    |            |                               | YES                                    |
| MCR50       | 2010(5025)            | 3                    |            |                               | YES                                    |
| MCR100      | 2512(6432)            | 4                    |            | −55 to +125                   | YES                                    |

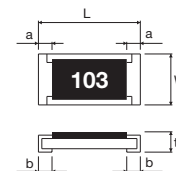
### ● Dimensions (Unit: mm)

| Part No. | Size Code<br>inch(mm) | L        | W        | t         | a        | b                              |
|----------|-----------------------|----------|----------|-----------|----------|--------------------------------|
| MCR006   | 0201(0603)            | 0.6±0.03 | 0.3±0.03 | 0.23±0.03 | 0.1±0.05 | 0.15±0.05                      |
| MCR01    | 0402(1005)            | 1.0±0.05 | 0.5±0.05 | 0.35±0.05 | 0.2±0.1  | 0.25 <sup>+0.05</sup><br>−0.10 |
| MCR03    | 0603(1608)            | 1.6±0.1  | 0.8±0.1  | 0.45±0.1  | 0.3±0.2  | 0.3±0.2                        |
| MCR10    | 0805(2012)            | 2.0±0.1  | 1.25±0.1 | 0.55±0.1  | 0.4±0.2  | 0.4±0.2                        |
| MCR18    | 1206(3216)            | 3.2±0.15 | 1.6±0.15 | 0.55±0.1  | 0.5±0.25 | 0.5±0.25                       |
| MCR25    | 1210(3225)            | 3.2±0.15 | 2.5±0.15 | 0.55±0.15 | 0.5±0.25 | 0.5±0.25                       |
| MCR50    | 2010(5025)            | 5.0±0.15 | 2.5±0.15 | 0.55±0.15 | 0.6±0.25 | 0.6±0.25                       |
| MCR100   | 2512(6432)            | 6.3±0.15 | 3.2±0.15 | 0.55±0.15 | 0.6±0.25 | 0.6±0.25                       |

- MCR006/01
- MCR03(Partially marked)



- MCR10/18/25/50/100



# Thick Film Chip Resistors(Standard series)

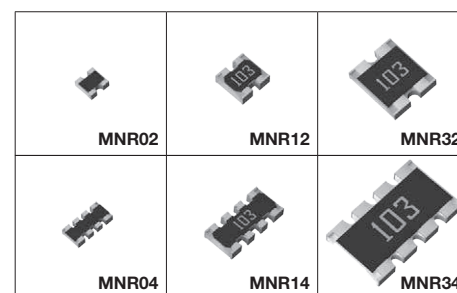
## Compact Chip Resistor Networks(MNR series <0402×2 to 1206×4>)

### • Reduces cost

Use of chip networks reduces the number of components and saves mounting space

### • Easy fillet inspection

Convex type electrodes facilitate visual inspection of fillets. Inspection can be performed with automatic inspection equipment



### MNR series <0402×2 to 1206×4>

| Part No. | Size Code<br>inch(mm) | No. of<br>Terminals | No. of<br>Elements | Rated Power<br>(70°C) | Limiting Element<br>Voltage<br>(V) | Tolerance | Temperature<br>Coefficient<br>(ppm/°C) | Resistance Range                                    | Operating Temperature<br>(°C) | Automotive Grade<br>Available<br>AEC-Q200 |
|----------|-----------------------|---------------------|--------------------|-----------------------|------------------------------------|-----------|----------------------------------------|-----------------------------------------------------|-------------------------------|-------------------------------------------|
| MNR02    | 0402(1005)×2          | 4                   | 2                  | 0.063W/Element        | 25                                 | J(±5%)    | ±200                                   | 10Ω to 1MΩ (E24 series)                             | -55 to +155                   | YES                                       |
| MNR04    | 0402(1005)×4          | 8                   | 4                  | 0.063W/Element        | 25                                 | J(±5%)    | +500/-250<br>±200                      | 1Ω to 9.1Ω (E24 series)<br>10Ω to 1MΩ (E24 series)  |                               | YES                                       |
| MNR12    | 0603(1608)×2          | 4                   | 2                  | 0.063W/Element        | 50                                 | J(±5%)    | ±200                                   | 10Ω to 1MΩ (E24 series)                             |                               | YES                                       |
| MNR14    | 0603(1608)×4          | 8                   | 4                  | 0.063W/Element        | 50                                 | F(±1%)    | ±100                                   | 2.2Ω to 6.8Ω (E6 series)<br>10Ω to 1MΩ (E24 series) |                               | YES                                       |
| MNR32    | 1206(3216)×2          | 4                   | 2                  | 0.125W/Element        | 200                                | J(±5%)    | ±200                                   | 10Ω to 1MΩ (E24 series)                             | -55 to +125                   | YES                                       |
| MNR34    | 1206(3216)×4          | 8                   | 4                  | 0.125W/Element        | 200                                | J(±5%)    | ±200                                   | 10Ω to 1MΩ (E24 series)                             |                               | YES                                       |

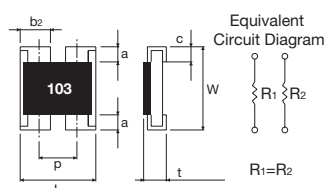
### Jumper type

| Part No. | Size Code<br>inch(mm) | Rated Current | Resistance | Operating Temperature<br>(°C) | Automotive Grade Available<br>AEC-Q200 |
|----------|-----------------------|---------------|------------|-------------------------------|----------------------------------------|
| MNR02    | 0402(1005)×2          | 1A/Element    | 50mΩ Max.  | -55 to +155                   | YES                                    |
| MNR04    | 0402(1005)×4          | 1A/Element    |            |                               | YES                                    |
| MNR12    | 0603(1608)×2          | 1A/Element    |            |                               | YES                                    |
| MNR14    | 0603(1608)×4          | 1A/Element    |            |                               | YES                                    |
| MNR32    | 1206(3216)×2          | 2A/Element    |            | -55 to +125                   | YES                                    |
| MNR34    | 1206(3216)×4          | 2A/Element    |            |                               | YES                                    |

### ● Dimensions (Unit: mm)

#### • MNR02/MNR12/MNR32(Marked except MNR02)

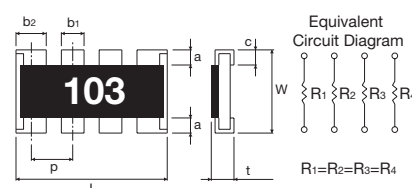
Note: Different marking system may apply to each product type.



| Part No. | L       | W       | t        | a       | b <sub>2</sub>                        | c         | p    |
|----------|---------|---------|----------|---------|---------------------------------------|-----------|------|
| MNR02    | 1.0±0.1 | 1.0±0.1 | 0.35±0.1 | 0.2±0.1 | 0.33 <sup>+0.1</sup> <sub>-0.05</sub> | 0.25±0.1  | 0.68 |
| MNR12    | 1.6±0.1 | 1.6±0.1 | 0.5±0.1  | 0.3±0.2 | 0.6±0.15                              | 0.25±0.15 | 0.8  |
| MNR32    | 2.6±0.2 | 3.1±0.2 | 0.55±0.1 | 0.5±0.3 | 1.0±0.2                               | 0.5Max.   | 1.27 |

#### • MNR04/MNR14/MNR34(Marked except MNR04)

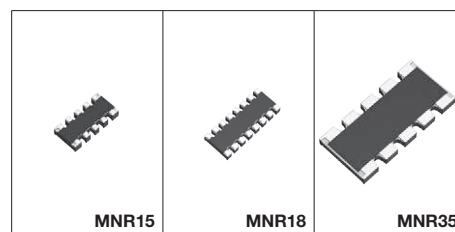
Note: Different marking system may apply to each product type.



| Part No. | L       | W       | t        | a       | b <sub>1</sub> | b <sub>2</sub> | c         | p    |
|----------|---------|---------|----------|---------|----------------|----------------|-----------|------|
| MNR04    | 2.0±0.1 | 1.0±0.1 | 0.35±0.1 | 0.2±0.1 | 0.3±0.1        | 0.4±0.1        | 0.25±0.1  | 0.5  |
| MNR14    | 3.2±0.1 | 1.6±0.1 | 0.5±0.1  | 0.3±0.2 | 0.4±0.15       | 0.6±0.15       | 0.25±0.15 | 0.8  |
| MNR34    | 5.2±0.4 | 3.1±0.2 | 0.55±0.1 | 0.5±0.3 | 0.8±0.2        | 1.0±0.2        | 0.5Max.   | 1.27 |

**Thick Film Chip Resistors(Standard series)**  
**8-element Chip Resistor Networks(MNR series <0603x5 to 1206x5>)**

- One package has 8 elements, conserving space and reducing mounting cost
- Convex type electrodes facilitate visual inspection of fillets. Inspection can be performed with automatic inspection equipment
- Suitable for pull-up resistor, damping resistor
- No direction to be mounted



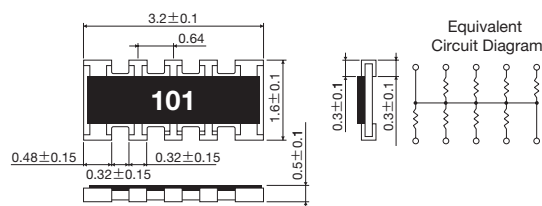
| MNR series <0603×5 to 1206×5> |                       |                     |                    |                       |                                    |           |                                        |                             |                                  |                                           |
|-------------------------------|-----------------------|---------------------|--------------------|-----------------------|------------------------------------|-----------|----------------------------------------|-----------------------------|----------------------------------|-------------------------------------------|
| Part No.                      | Size Code<br>inch(mm) | No. of<br>Terminals | No. of<br>Elements | Rated Power<br>(70°C) | Limiting Element<br>Voltage<br>(V) | Tolerance | Temperature<br>Coefficient<br>(ppm/°C) | Resistance Range            | Operating<br>Temperature<br>(°C) | Automotive Grade<br>Available<br>AEC-Q200 |
| MNR15                         | 0603(1608)×5          | 10                  | 8                  | 0.031W/Element        | 12.5                               | J(±5%)    | ±200                                   | 56 Ω to 100k Ω (E24 series) | −55 to +125                      | YES                                       |
| MNR18                         | 0602(1605)×8          | 16                  | 8                  | 0.063W/Element*       | 25                                 | J(±5%)    | ±200                                   | 10 Ω to 1M Ω (E24 series)   |                                  | YES                                       |
| MNR35                         | 1206(3216)×5          | 10                  | 8                  | 0.063W/Element        | 50                                 | J(±5%)    | ±200                                   | 56 Ω to 100k Ω (E12 series) |                                  | YES                                       |

\*It must not exceed 0.25 W

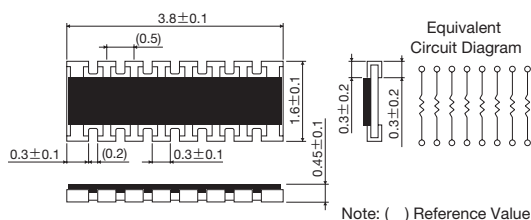
| Jumper type  |                       |               |            |                               |                                        |
|--------------|-----------------------|---------------|------------|-------------------------------|----------------------------------------|
| Part No.     | Size Code<br>inch(mm) | Rated Current | Resistance | Operating Temperature<br>(°C) | Automotive Grade Available<br>AEC-Q200 |
| <b>MNR18</b> | 0602(1605)×8          | 1A/Element    | 50mΩ Max.  | −55 to +125                   | YES                                    |

● **Dimensions** (Unit: mm)

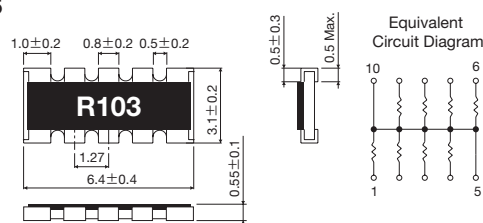
- MNR15



- MNR18



- MNR35

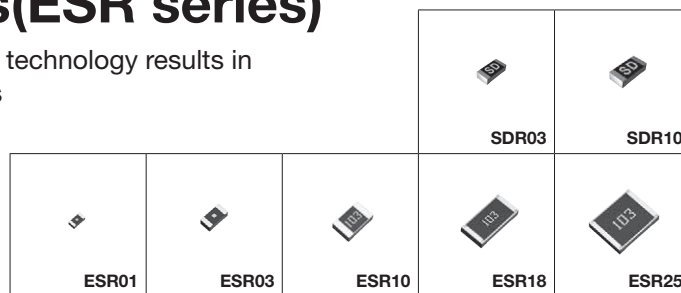


# Thick Film Chip Resistors(High Reliability series)

## High Anti-surge Chip Resistors(SDR series)

## Anti-surge Chip Resistors(ESR series)

- Exclusive resistive element pattern and laser trimming technology results in significantly improved surge resistance characteristics
- High rated power helps conserve space



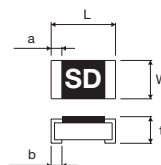
| SDR series |                       |                       |                                 |           |                                     |                                                              |                               |                                        |
|------------|-----------------------|-----------------------|---------------------------------|-----------|-------------------------------------|--------------------------------------------------------------|-------------------------------|----------------------------------------|
| Part No.   | Size Code<br>inch(mm) | Rated Power<br>(70°C) | Limiting Element Voltage<br>(V) | Tolerance | Temperature Coefficient<br>(ppm/°C) | Resistance Range                                             | Operating Temperature<br>(°C) | Automotive Grade Available<br>AEC-Q200 |
| SDR03      | 0603<br>(1608)        | 0.3W                  | 150                             | J(±5%)    | ±200                                | 1Ω to 10MΩ(E24 series)                                       | −55 to +155                   | YES                                    |
|            |                       |                       |                                 | F(±1%)    | ±200<br>±100                        | 1Ω to 9.76Ω(E24, E96 series)<br>10Ω to 10MΩ(E24, E96 series) |                               |                                        |
|            |                       |                       |                                 | D(±0.5%)  | ±100                                | 10Ω to 1MΩ(E24, E96 series)                                  |                               |                                        |
| New SDR10  | 0805<br>(2012)        | 0.5W                  | 400                             | J(±5%)    | ±200                                | 1Ω to 10MΩ(E24 series)                                       |                               | YES                                    |
|            |                       |                       |                                 | F(±1%)    | ±100                                | 1Ω to 10MΩ(E24, E96 series)                                  |                               |                                        |
|            |                       |                       |                                 | D(±0.5%)  | ±100                                | 10Ω to 1MΩ(E24, E96 series)                                  |                               |                                        |
| ESR series |                       |                       |                                 |           |                                     |                                                              |                               |                                        |
| ESR01      | 0402<br>(1005)        | 0.2W                  | 50                              | J(±5%)    | +500/−250<br>±200                   | 1Ω to 9.1Ω(E24 series)<br>10Ω to 10MΩ(E24 series)            | −55 to +155                   | YES                                    |
|            |                       |                       |                                 | F(±1%)    | ±100                                | 10Ω to 976kΩ(E24, E96 series)<br>1MΩ to 2.2MΩ(E24 series)    |                               |                                        |
| ESR03      | 0603<br>(1608)        | 0.25W                 | 150                             | J(±5%)    | ±200                                | 1Ω to 10MΩ(E24 series)                                       |                               | YES                                    |
|            |                       |                       |                                 | F(±1%)    | ±200<br>±100                        | 1Ω to 9.76Ω(E24, E96 series)<br>10Ω to 10MΩ(E24, E96 series) |                               |                                        |
|            |                       |                       |                                 | D(±0.5%)  | ±100                                | 10Ω to 1MΩ(E24, E96 series)                                  |                               |                                        |
| ESR10      | 0805<br>(2012)        | 0.4W                  | 150                             | J(±5%)    | ±200                                | 1Ω to 30MΩ(E24 series)                                       |                               | YES                                    |
|            |                       |                       |                                 | F(±1%)    | ±100                                | 1Ω to 10MΩ(E24, E96 series)                                  |                               |                                        |
|            |                       |                       |                                 | D(±0.5%)  | ±100                                | 10Ω to 1MΩ(E24, E96 series)                                  |                               |                                        |
| ESR18      | 1206<br>(3216)        | 0.5W                  | 200                             | J(±5%)    | ±200                                | 1Ω to 15MΩ(E24 series)                                       |                               | YES                                    |
|            |                       |                       |                                 | F(±1%)    | ±100                                | 1Ω to 10MΩ(E24, E96 series)                                  |                               |                                        |
|            |                       |                       |                                 | D(±0.5%)  | ±100                                | 10Ω to 1MΩ(E24, E96 series)                                  |                               |                                        |
| ESR25      | 1210<br>(3225)        | 0.66W<br>(2/3W)       | 200                             | J(±5%)    | ±200                                | 1Ω to 10MΩ(E24 series)                                       |                               | YES                                    |
|            |                       |                       |                                 | F(±1%)    | ±100                                | 1Ω to 10MΩ(E24, E96 series)                                  |                               |                                        |
|            |                       |                       |                                 | D(±0.5%)  | ±100                                | 10Ω to 1MΩ(E24, E96 series)                                  |                               |                                        |

\*E24: Standard products E96: Custom products

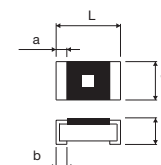
### ● Dimensions (Unit: mm)

| Part No. | Size Code<br>inch(mm) | L        | W        | t         | a        | b                                     |
|----------|-----------------------|----------|----------|-----------|----------|---------------------------------------|
| SDR03    | 0603(1608)            | 1.6±0.1  | 0.8±0.1  | 0.45±0.1  | 0.25±0.1 | 0.25±0.1                              |
| SDR10    | 0805(2012)            | 2.0±0.1  | 1.25±0.1 | 0.55±0.1  | 0.25±0.1 | 0.4±0.2                               |
| ESR01    | 0402(1005)            | 1.0±0.05 | 0.5±0.05 | 0.35±0.05 | 0.2±0.1  | 0.25 <sup>+0.05</sup> <sub>-0.1</sub> |
| ESR03    | 0603(1608)            | 1.6±0.1  | 0.8±0.1  | 0.45±0.1  | 0.3±0.2  | 0.3±0.2                               |
| ESR10    | 0805(2012)            | 2.0±0.1  | 1.25±0.1 | 0.55±0.1  | 0.3±0.2  | 0.4±0.2                               |
| ESR18    | 1206(3216)            | 3.2±0.15 | 1.6±0.15 | 0.55±0.1  | 0.3±0.25 | 0.5±0.25                              |
| ESR25    | 1210(3225)            | 3.2±0.15 | 2.5±0.15 | 0.55±0.1  | 0.3±0.25 | 0.5±0.25                              |

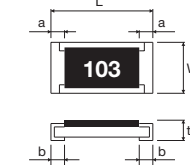
●SDR03/10



●ESR01/03



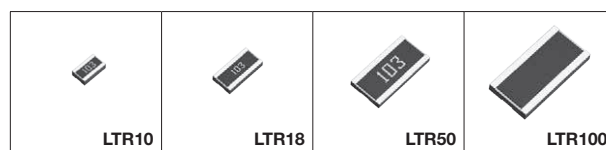
●ESR10/18/25



# Thick Film Chip Resistors(High Reliability series)

## High Power Chip Resistors <Wide Terminal type>(LTR series)

- High joint reliability with long side terminations
- High rated power helps conserve space
- Guaranteed anti-surge characteristic in all series



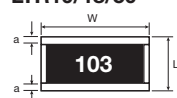
| LTR series |                       |                       |                                    |           |                                        |                              |                               |                                           |
|------------|-----------------------|-----------------------|------------------------------------|-----------|----------------------------------------|------------------------------|-------------------------------|-------------------------------------------|
| Part No.   | Size Code<br>inch(mm) | Rated Power<br>(70°C) | Limiting Element<br>Voltage<br>(V) | Tolerance | Temperature<br>Coefficient<br>(ppm/°C) | Resistance Range             | Operating Temperature<br>(°C) | Automotive Grade<br>Available<br>AEC-Q200 |
| LTR10      | 0508<br>(1220)        | 0.25W                 | 150                                | J(±5%)    | ±200                                   | 1Ω to 1MΩ (E24 series)       | -55 to +155                   | YES                                       |
|            |                       |                       |                                    | F(±1%)    | ±100                                   | 1Ω to 1MΩ (E24, E96 series)  |                               |                                           |
|            |                       |                       |                                    | D(±0.5%)  | ±100                                   | 10Ω to 1MΩ (E24, E96 series) |                               |                                           |
| LTR18      | 0612<br>(1632)        | 0.75W                 | 200                                | J(±5%)    | ±200                                   | 1Ω to 1MΩ (E24 series)       |                               | YES                                       |
|            |                       |                       |                                    | F(±1%)    | ±100                                   | 1Ω to 1MΩ (E24, E96 series)  |                               |                                           |
|            |                       |                       |                                    | D(±0.5%)  | ±100                                   | 10Ω to 1MΩ (E24, E96 series) |                               |                                           |
| LTR50      | 1020<br>(2550)        | 1W                    | 200                                | J(±5%)    | ±200                                   | 1Ω to 1MΩ (E24 series)       |                               | YES                                       |
|            |                       |                       |                                    | F(±1%)    | ±100                                   | 1Ω to 1MΩ (E24, E96 series)  |                               |                                           |
|            |                       |                       |                                    | D(±0.5%)  | ±100                                   | 10Ω to 1MΩ (E24, E96 series) |                               |                                           |
| LTR100     | 1225<br>(3264)        | 2W                    | 200                                | J(±5%)    | ±200                                   | 1Ω to 1MΩ (E24 series)       |                               | YES                                       |
|            |                       |                       |                                    | F(±1%)    | ±100                                   | 1Ω to 1MΩ (E24, E96 series)  |                               |                                           |
|            |                       |                       |                                    | D(±0.5%)  | ±100                                   | 10Ω to 1MΩ (E24, E96 series) |                               |                                           |

\*E24: Standard products E96: Custom products

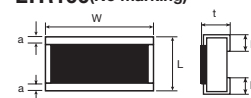
### ● Dimensions (Unit: mm)

| Part No. | Size Code<br>inch(mm) | L        | W        | t         | a        | b         |
|----------|-----------------------|----------|----------|-----------|----------|-----------|
| LTR10    | 0508(1220)            | 1.2±0.1  | 2.0±0.1  | 0.55±0.1  | 0.25±0.1 | 0.35±0.2  |
| LTR18    | 0612(1632)            | 1.6±0.15 | 3.2±0.15 | 0.55±0.1  | 0.3±0.2  | 0.5±0.2   |
| LTR50    | 1020(2550)            | 2.5±0.15 | 5.0±0.15 | 0.55±0.1  | 0.38±0.2 | 0.9±0.2   |
| LTR100   | 1225(3264)            | 3.2±0.15 | 6.4±0.15 | 0.55±0.15 | 0.4±0.25 | 1.13±0.25 |

### • LTR10/18/50



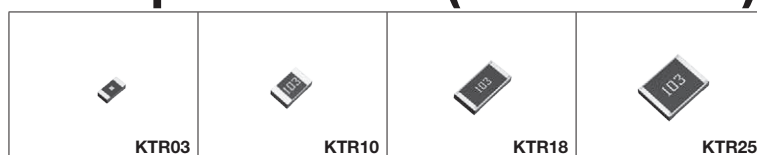
### • LTR100(No marking)



# Thick Film Chip Resistors(High Reliability series)

## High Voltage Resistance Chip Resistors(KTR series)

- Twice the rated voltage of conventional products
- Perfect for use in Camera Flash circuit, etc.



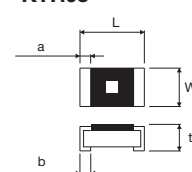
| KTR series |                       |                       |                                    |           |                                     |                              |                               |                                           |
|------------|-----------------------|-----------------------|------------------------------------|-----------|-------------------------------------|------------------------------|-------------------------------|-------------------------------------------|
| Part No.   | Size Code<br>inch(mm) | Rated Power<br>(70°C) | Limiting Element<br>Voltage<br>(V) | Tolerance | Temperature Coefficient<br>(ppm/°C) | Resistance Range             | Operating Temperature<br>(°C) | Automotive Grade<br>Available<br>AEC-Q200 |
| KTR03      | 0603<br>(1608)        | 0.1W                  | 350                                | J(±5%)    | ±200                                | 1Ω to 10MΩ (E24 series)      | -55 to +155                   | YES                                       |
|            |                       |                       |                                    | F(±1%)    | ±100                                | 1Ω to 10MΩ (E24, E96 series) |                               |                                           |
| KTR10      | 0805<br>(2012)        | 0.125W                | 400                                | J(±5%)    | ±200                                | 1Ω to 30MΩ (E24 series)      |                               | YES                                       |
|            |                       |                       |                                    | F(±1%)    | ±100                                | 1Ω to 10MΩ (E24, E96 series) |                               |                                           |
| KTR18      | 1206<br>(3216)        | 0.25W                 | 500                                | J(±5%)    | ±200                                | 1Ω to 15MΩ (E24 series)      |                               | YES                                       |
|            |                       |                       |                                    | F(±1%)    | ±100                                | 1Ω to 10MΩ (E24, E96 series) |                               |                                           |
| KTR25      | 1210<br>(3225)        | 0.33W<br>(1/3W)       | 600                                | J(±5%)    | ±200                                | 1Ω to 10MΩ (E24 series)      |                               | YES                                       |
|            |                       |                       |                                    | F(±1%)    | ±100                                | 1Ω to 10MΩ (E24, E96 series) |                               |                                           |

\*E24: Standard products E96: Custom products

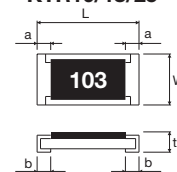
### ● Dimensions (Unit: mm)

| Part No. | Size Code<br>inch(mm) | L        | W        | t        | a        | b        |
|----------|-----------------------|----------|----------|----------|----------|----------|
| KTR03    | 0603(1608)            | 1.6±0.1  | 0.8±0.1  | 0.45±0.1 | 0.3±0.2  | 0.3±0.2  |
| KTR10    | 0805(2012)            | 2.0±0.1  | 1.25±0.1 | 0.55±0.1 | 0.3±0.2  | 0.4±0.2  |
| KTR18    | 1206(3216)            | 3.2±0.15 | 1.6±0.15 | 0.55±0.1 | 0.3±0.25 | 0.5±0.25 |
| KTR25    | 1210(3225)            | 3.2±0.15 | 2.5±0.15 | 0.55±0.1 | 0.3±0.25 | 0.5±0.25 |

### • KTR03



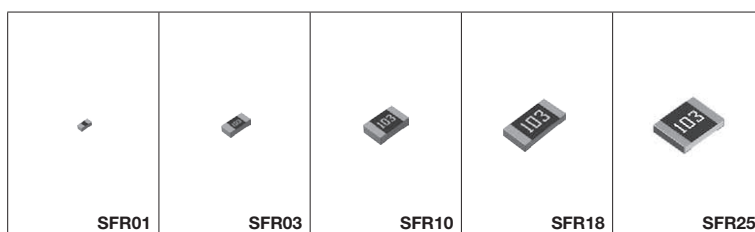
### • KTR10/18/25



# Thick Film Chip Resistors(High Reliability series)

## Tolerance for sulfurization chip resistor(SFR series)

- Improved anti-sulfur performance with ROHM original structure



| SFR series |                       |                       |                                    |           |                                        |                                                   |                               |                                           |
|------------|-----------------------|-----------------------|------------------------------------|-----------|----------------------------------------|---------------------------------------------------|-------------------------------|-------------------------------------------|
| Part No.   | Size Code<br>inch(mm) | Rated Power<br>(70°C) | Limiting Element<br>Voltage<br>(V) | Tolerance | Temperature<br>Coefficient<br>(ppm/°C) | Resistance Range                                  | Operating Temperature<br>(°C) | Automotive Grade<br>Available<br>AEC-Q200 |
| SFR01      | 0402<br>(1005)        | 0.063W<br>(1/16W)     | 50                                 | J(±5%)    | +500/-250<br>±200                      | 1Ω to 9.1Ω(E24 series)<br>10Ω to 10MΩ(E24 series) | -55 to +155                   | YES                                       |
|            |                       |                       |                                    | F(±1%)    | ±100                                   | 10Ω to 2.2MΩ(E24, E96 series)                     |                               |                                           |
| SFR03      | 0603<br>(1608)        | 0.1W                  | 50                                 | J(±5%)    | ±400<br>±200                           | 1Ω to 9.1Ω(E24 series)<br>10Ω to 10MΩ(E24 series) |                               | YES                                       |
|            |                       |                       |                                    | F(±1%)    | ±100                                   | 10Ω to 10MΩ(E24, E96 series)                      |                               |                                           |
| SFR10      | 0805<br>(2012)        | 0.125W                | 150                                | J(±5%)    | ±400<br>±200                           | 1Ω to 9.1Ω(E24 series)<br>10Ω to 10MΩ(E24 series) |                               | YES                                       |
|            |                       |                       |                                    | F(±1%)    | ±100                                   | 10Ω to 2.2MΩ(E24, E96 series)                     |                               |                                           |
| New SFR18  | 1206<br>(3216)        | 0.25W                 | 200                                | J(±5%)    | ±400<br>±200                           | 1Ω to 9.1Ω(E24 series)<br>10Ω to 10MΩ(E24 series) |                               | YES                                       |
|            |                       |                       |                                    | F(±1%)    | ±100                                   | 10Ω to 2.2MΩ(E24, E96 series)                     |                               |                                           |
| New SFR25  | 1210<br>(3225)        | 0.5W                  | 200                                | J(±5%)    | ±200                                   | 1Ω to 1MΩ(E24 series)                             |                               | YES                                       |
|            |                       |                       |                                    | F(±1%)    | ±100                                   | 10Ω to 1MΩ(E24, E96 series)                       |                               |                                           |

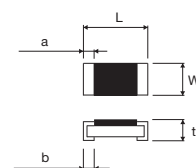
\*E24: Standard products E96: Custom products

| Jumper type |                       |               |            |                               |                                        |
|-------------|-----------------------|---------------|------------|-------------------------------|----------------------------------------|
| Part No.    | Size Code<br>inch(mm) | Rated Current | Resistance | Operating Temperature<br>(°C) | Automotive Grade Available<br>AEC-Q200 |
| SFR01       | 0402(1005)            | 1             | 50mΩ Max.  | -55 to +155                   | YES                                    |
| SFR03       | 0603(1608)            | 1             |            |                               | YES                                    |
| SFR10       | 0805(2012)            | 2             |            |                               | YES                                    |
| New SFR18   | 1206(3216)            | 2             |            |                               | YES                                    |
| New SFR25   | 1210(3225)            | 2             |            |                               | YES                                    |

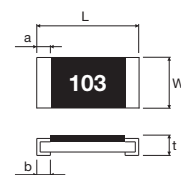
### ● Dimensions (Unit: mm)

| Part No. | Size Code<br>inch(mm) | L                                     | W        | t         | a         | b                                      |
|----------|-----------------------|---------------------------------------|----------|-----------|-----------|----------------------------------------|
| SFR01    | 0402(1005)            | 1.0±0.05                              | 0.5±0.05 | 0.35±0.05 | 0.33±0.08 | 0.25 <sup>+0.05</sup> <sub>-0.10</sub> |
| SFR03    | 0603(1608)            | 1.6±0.1                               | 0.8±0.1  | 0.45±0.1  | 0.4±0.2   | 0.3±0.2                                |
| SFR10    | 0805(2012)            | 2.0±0.1                               | 1.25±0.1 | 0.55±0.1  | 0.4±0.2   | 0.4±0.2                                |
| SFR18    | 1206(3216)            | 3.2 <sup>±0.15</sup> <sub>-0.20</sub> | 1.6±0.15 | 0.55±0.1  | 0.55±0.25 | 0.5±0.25                               |
| SFR25    | 1210(3225)            | 3.2 <sup>±0.15</sup> <sub>-0.20</sub> | 2.5±0.15 | 0.55±0.1  | 0.55±0.25 | 0.5±0.25                               |

### •SFR01



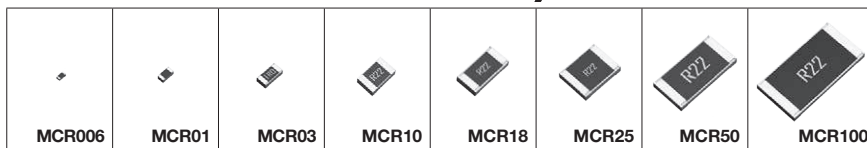
### •SFR03/10/18/25



# Chip Resistors for Current Detection(Thick Film type)

## Chip Resistors(Low Ohmic MCR series)

- Lineup with thick-film resistive element and very-low ohmic resistance from 47mΩ
- High-reliability chip resistor employing metal glaze as resistive element



| Low Ohmic MCR series |                    |                    |           |                                  |                                 |                            |                                     |
|----------------------|--------------------|--------------------|-----------|----------------------------------|---------------------------------|----------------------------|-------------------------------------|
| Part No.             | Size Code inch(mm) | Rated Power (70°C) | Tolerance | Temperature Coefficient (ppm/°C) | Resistance Range                | Operating Temperature (°C) | Automotive Grade Available AEC-Q200 |
| MCR006               | 0201 (0603)        | 0.05W              | F(±1%)    | +600/-200                        | 1 Ω to 9.1 Ω (E24 series)       | -55 to +155                | YES                                 |
| MCR01                | 0402 (1005)        | 0.063W (1/16W)     | F(±1%)    | ±400                             | 1 Ω to 9.1 Ω (E24 series)       |                            | YES                                 |
| MCR03                | 0603 (1608)        | 0.1W               | F(±1%)    | ±400                             | 1 Ω to 9.1 Ω (E24 series)       |                            | YES                                 |
| MCR10                | 0805 (2012)        | 0.25W              | J(±5%)    | *Table 1                         | 0.047 Ω to 0.91 Ω (E24 series)  |                            | YES                                 |
|                      |                    |                    | F(±1%)    | *Table 1                         | 0.047 Ω to 9.1 Ω (E24 series)   |                            |                                     |
| MCR18                | 1206 (3216)        | 0.25W              | J(±5%)    | *Table 1                         | 0.047 Ω to 0.91 Ω (E24 series)  |                            | YES                                 |
|                      |                    |                    | F(±1%)    | *Table 1                         | 0.047 Ω to 9.1 Ω (E24 series)   |                            |                                     |
| MCR25                | 1210 (3225)        | 0.5W               | J(±5%)    | 300±300                          | 0.047 Ω to 0.091 Ω (E24 series) |                            | YES                                 |
|                      |                    |                    |           | ±200                             | 0.1 Ω to 0.91 Ω (E24 series)    |                            |                                     |
|                      |                    |                    | F(±1%)    | 300±300                          | 0.047 Ω to 0.091 Ω (E24 series) |                            |                                     |
| MCR50                | 2010 (5025)        | 0.5W               | J(±5%)    | *Table 1                         | 0.047 Ω to 0.91 Ω (E24 series)  | -55 to +125                | YES                                 |
|                      |                    |                    | F(±1%)    | *Table 1                         | 0.047 Ω to 9.1 Ω (E24 series)   |                            |                                     |
| MCR100               | 2512 (6432)        | 1W                 | J(±5%)    | *Table 1                         | 0.047 Ω to 0.91 Ω (E24 series)  |                            | YES                                 |
|                      |                    |                    | F(±1%)    | *Table 1                         | 0.047 Ω to 9.1 Ω (E24 series)   |                            |                                     |

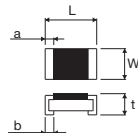
\*Table 1

| Tolerance        | Temperature Coefficient (ppm/°C) | Resistance Range                |
|------------------|----------------------------------|---------------------------------|
| J(±5%)<br>F(±1%) | 500±300                          | 0.047 Ω to 0.091 Ω (E24 series) |
|                  | 400±200                          | 0.1 Ω to 0.13 Ω (E24 series)    |
|                  | ±250                             | 0.15 Ω to 9.1 Ω (E24 series)    |

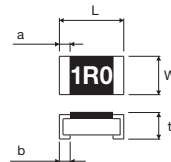
### ● Dimensions (Unit: mm)

| Part No. | Size Code inch(mm) | L        | W        | t         | a        | b                                     |
|----------|--------------------|----------|----------|-----------|----------|---------------------------------------|
| MCR006   | 0201(0603)         | 0.6±0.03 | 0.3±0.03 | 0.23±0.03 | 0.1±0.05 | 0.15±0.05                             |
| MCR01    | 0402(1005)         | 1.0±0.05 | 0.5±0.05 | 0.35±0.05 | 0.2±0.1  | 0.25 <sup>+0.05</sup> <sub>-0.1</sub> |
| MCR03    | 0603(1608)         | 1.6±0.1  | 0.8±0.1  | 0.45±0.1  | 0.3±0.2  | 0.3±0.2                               |
| MCR10    | 0805(2012)         | 2.0±0.1  | 1.25±0.1 | 0.55±0.1  | 0.4±0.2  | 0.4±0.2                               |
| MCR18    | 1206(3216)         | 3.2±0.15 | 1.6±0.15 | 0.55±0.1  | 0.5±0.25 | 0.5±0.25                              |
| MCR25    | 1210(3225)         | 3.2±0.15 | 2.5±0.15 | 0.55±0.15 | 0.5±0.25 | 0.5±0.25                              |
| MCR50    | 2010(5025)         | 5.0±0.15 | 2.5±0.15 | 0.55±0.15 | 0.6±0.25 | 0.6±0.25                              |
| MCR100   | 2512(6432)         | 6.3±0.15 | 3.2±0.15 | 0.55±0.15 | 0.6±0.25 | 0.6±0.25                              |

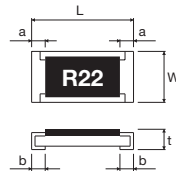
#### • MCR006/01



#### • MCR03



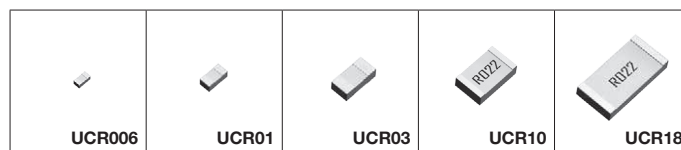
#### • MCR10/18/25/50/100



# Chip Resistors for Current Detection(Thick Film type)

## Low Ohmic Chip Resistors <Face down type> (UCR series)

- Chip resistors for current detection (11mΩ or more)
- Resistive element is located at bottom side, which reduces the resistance shift during mounting process
- ROHM's heat dissipation design achieves excellent rated power



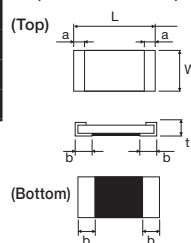
| UCR series |                       |                       |                  |                                                         |                                                                                                                                                 |                               |                                        |
|------------|-----------------------|-----------------------|------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------------------------|
| Part No.   | Size Code<br>inch(mm) | Rated Power<br>(70°C) | Tolerance        | Temperature Coefficient<br>(ppm/°C)                     | Resistance Range                                                                                                                                | Operating Temperature<br>(°C) | Automotive Grade Available<br>AEC-Q200 |
| UCR006     | 0201<br>(0603)        | 0.1W                  | J(±5%)<br>F(±1%) | 0 to 300                                                | 100mΩ to 910mΩ (E24 series)                                                                                                                     | -55 to +155                   | YES                                    |
| UCR01      | 0402<br>(1005)        | 0.125W                | J(±5%)<br>F(±1%) | 0 to 300<br>0 to 250<br>0 to 200                        | 68mΩ to 91mΩ (E24 series)<br>100mΩ to 200mΩ (E24 series)<br>220mΩ to 910mΩ (E24 series)                                                         |                               | YES                                    |
| UCR03      | 0603<br>(1608)        | 0.25W                 | J(±5%)<br>F(±1%) | 0 to 250<br>0 to 200<br>0 to 150                        | 20mΩ to 47mΩ (E24 series)<br>51mΩ to 91mΩ (E24 series)<br>100mΩ to 200mΩ (E24 series)                                                           |                               | YES*                                   |
|            |                       | 0.2W                  | J(±5%)<br>F(±1%) | 0 to 150                                                | 220mΩ to 910mΩ (E24 series)                                                                                                                     |                               | YES*                                   |
| UCR10      | 0805<br>(2012)        | 0.33W<br>(1/3W)       | J(±5%)<br>F(±1%) | 250±200<br>0 to 250<br>0 to 150<br>0 to 250<br>0 to 150 | 11mΩ to 18mΩ (E24 series)<br>20mΩ to 47mΩ (E24 series)<br>51mΩ to 100mΩ (E24 series)<br>11mΩ to 47mΩ (E24 series)<br>51mΩ to 100mΩ (E24 series) |                               | YES                                    |
|            |                       |                       |                  |                                                         |                                                                                                                                                 |                               |                                        |
| UCR18      | 1206<br>(3216)        | 0.5W                  | J(±5%)<br>F(±1%) | 0 to 350<br>0 to 200<br>0 to 150                        | 11mΩ to 18mΩ (E24 series)<br>20mΩ to 39mΩ (E24 series)<br>43mΩ to 100mΩ (E24 series)                                                            |                               | YES                                    |
|            |                       |                       |                  |                                                         |                                                                                                                                                 |                               |                                        |
|            |                       | <b>New</b> 1W         | J(±5%)<br>F(±1%) | 0 to 350<br>0 to 200                                    | 11mΩ to 18mΩ (E24 series)<br>20mΩ to 39mΩ (E24 series)                                                                                          |                               | YES                                    |
|            |                       |                       |                  |                                                         |                                                                                                                                                 |                               |                                        |

\*Limited to 100mΩ and higher.

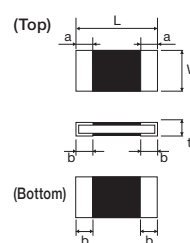
### ● Dimensions (Unit: mm)

| Part No. | Size Code<br>inch(mm) | L         | W         | t         | a        | b        |
|----------|-----------------------|-----------|-----------|-----------|----------|----------|
| UCR006   | 0201(0603)            | 0.62±0.05 | 0.32±0.05 | 0.24±0.05 | 0.18±0.1 | 0.22±0.1 |
| UCR01    | 0402(1005)            | 1.0±0.1   | 0.55±0.1  | 0.37±0.05 | 0.28±0.1 | 0.34±0.1 |
| UCR03    | 0603(1608)            | 1.6±0.1   | 0.87±0.1  | 0.5±0.1   | 0.45±0.2 | 0.45±0.2 |
| UCR10    | 0805(2012)            | 2.0±0.1   | 1.25±0.1  | 0.55±0.1  | 0.24±0.2 | 0.5±0.2  |
| UCR18    | 1206(3216)            | 3.2±0.15  | 1.6±0.15  | 0.55±0.1  | 0.3±0.2  | 0.9±0.25 |

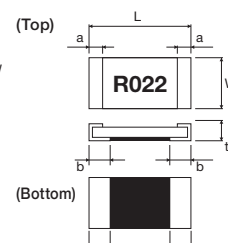
•UCR006/01  
•UCR03  
(50mΩ ≤ R ≤ 910mΩ)



•UCR03  
(20mΩ ≤ R < 50mΩ)



•UCR10/18

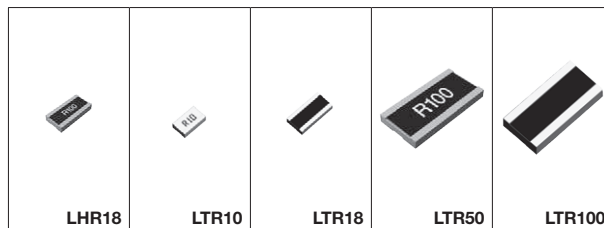


# Chip Resistors for Current Detection(Thick Film type)

## High Power Chip Resistors <Wide Terminal type (Low TCR)> (LHR series)

## High Power Chip Resistors <Wide Terminal type> (Low Ohmic LTR series)

- Chip resistors for current detection (10mΩ or more)
- High joint reliability with long side terminations
- Improvement of rated power enables replacement with smaller size resistors, conserving space



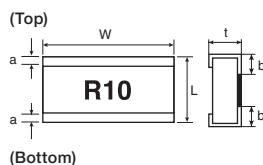
| LHR series           |                       |                       |                                      |                                                      |                                                                                                                    |                               |                                        |
|----------------------|-----------------------|-----------------------|--------------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------------------------|
| Part No.             | Size Code<br>inch(mm) | Rated Power<br>(70°C) | Tolerance                            | Temperature Coefficient<br>(ppm/°C)                  | Resistance                                                                                                         | Operating Temperature<br>(°C) | Automotive Grade Available<br>AEC-Q200 |
| <b>New</b> LHR18     | 0612<br>(1632)        | 1.25W                 | J(±5%)<br>F(±1%)                     | 0 to 125<br>0 to 100<br>0 to 75                      | 33mΩ to 39mΩ (E24 series)<br>43mΩ to 270mΩ (E24 series)<br>300mΩ to 1Ω (E24 series)                                | −55 to +155                   | YES                                    |
| Low Ohmic LTR series |                       |                       |                                      |                                                      |                                                                                                                    |                               |                                        |
| LTR10                | 0508<br>(1220)        | 0.5W                  | J(±5%)<br>F(±1%)                     | ±150                                                 | 47mΩ to 9.1Ω (E24 series)                                                                                          | −55 to +155                   | YES                                    |
| LTR18                | 0612<br>(1632)        | 1W                    | J(±5%)<br>F(±1%)                     | 0 to 300<br>0 to 200<br>0 to 150<br>±100             | 10mΩ to 18mΩ (E24 series)<br>20mΩ to 47mΩ (E24 series)<br>51mΩ to 470mΩ (E24 series)<br>510mΩ to 1Ω (E24 series)   |                               | YES                                    |
| <b>New</b> LTR50     | 1020<br>(2550)        | 2W                    | J(±5%)<br>F(±1%)                     | 0 to 300<br>0 to 200<br>0 to 150<br>±100             | 10mΩ to 18mΩ (E24 series)<br>20mΩ to 47mΩ (E24 series)<br>51mΩ to 91mΩ (E24 series)<br>100mΩ to 910mΩ (E24 series) |                               | YES                                    |
| LTR100               | 1225<br>(3264)        | 2W<br>☆3W             | J(±5%)<br>F(±1%)<br>J(±5%)<br>F(±1%) | ±200<br>0 to 150<br>0 to 300<br>0 to 200<br>0 to 150 | 100mΩ to 910mΩ (E24 series)<br>10mΩ to 18mΩ (E24 series)<br>20mΩ to 47mΩ (E24 series)<br>51mΩ to 91mΩ (E24 series) |                               | YES                                    |

☆ : Under Development

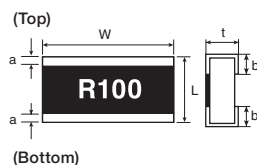
### ■ Dimensions (Unit: mm)

| Part No. | Size Code<br>inch(mm) | L        | W        | t         | a        | b         |
|----------|-----------------------|----------|----------|-----------|----------|-----------|
| LHR18    | 0612(1632)            | 1.6±0.1  | 3.2±0.1  | 0.58±0.1  | 0.3±0.2  | 0.5±0.2   |
| LTR10    | 0508(1220)            | 1.2±0.1  | 2.0±0.1  | 0.55±0.1  | 0.3±0.2  | 0.35±0.2  |
| LTR18    | 0612(1632)            | 1.6±0.1  | 3.2±0.1  | 0.58±0.1  | 0.5±0.2  | 0.5±0.2   |
| LTR50    | 1020(2550)            | 2.5±0.15 | 5.0±0.15 | 0.58±0.15 | 0.38±0.2 | 0.9±0.2   |
| LTR100   | 1225(3264)            | 3.2±0.15 | 6.4±0.15 | 0.55±0.15 | 0.4±0.25 | 1.13±0.25 |

#### • LTR10



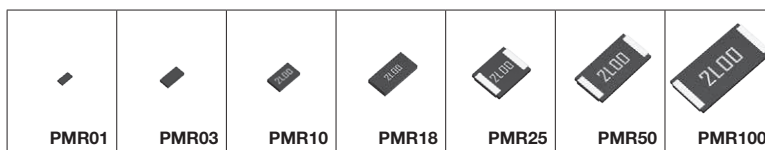
#### • LHR18/LTR50(marking) • LTR18/LTR100(No marking)



# Chip Resistors for Current Detection(Metal Plate type)

## Ultra Low Ohmic Chip Shunt Resistors(PMR series)

- Ultra low-ohmic resistance range (1mΩ up)
- Trimming-less structure helps avoid concentration of heat, reducing rises in surface temperature
- Special low resistance temperature coefficient (TCR) alloy utilized for the resistive element



| PMR series |                       |                       |                            |                                     |                                |                               |                                        |
|------------|-----------------------|-----------------------|----------------------------|-------------------------------------|--------------------------------|-------------------------------|----------------------------------------|
| Part No.   | Size Code<br>inch(mm) | Rated Power<br>(70°C) | Tolerance                  | Temperature Coefficient<br>(ppm/°C) | Resistance<br>(mΩ)             | Operating Temperature<br>(°C) | Automotive Grade Available<br>AEC-Q200 |
| PMR01      | 0402(1005)            | 0.2W<br>(1/5W)        | J(±5%)                     | 0 to 200                            | 10                             | -55 to +155                   | YES                                    |
| PMR03      | 0603(1608)            | 0.25W<br>(1/4W)       | J(±5%)<br>F(±1%)           | 0 to 150                            | 10(☆5)                         |                               | YES                                    |
| PMR10      | 0805(2012)            | 0.5W<br>(1/2W)        | J(±5%)<br>F(±1%)           | ±150                                | 2,3,4,5,6,<br>7,8,9,10         |                               | YES                                    |
| PMR18      | 1206(3216)            | 1W                    | J(±5%)<br>F(±1%)           | ±100                                | 1,2,3,4,5,6,<br>7,8,9,10       |                               | YES                                    |
| PMR25      | 1210(3225)            | 1W                    | J(±5%)<br>F(±1%)           | ±100                                | 1,2,3,4,5                      |                               | YES                                    |
| PMR50      | 2010(5025)            | 1W                    | J(±5%)<br>F(±1%)           | ±100                                | 1,2,3,4,5,<br>6,7,8,9,10       |                               | YES                                    |
| PMR100     | 2512(6432)            | 2W<br>☆3W             | J(±5%)<br>F(±1%)<br>F(±1%) | ±150<br>±100<br>±150                | 1,2<br>3,4,5,6,7,8,9,10<br>1,2 |                               | YES                                    |

☆ : Under Development

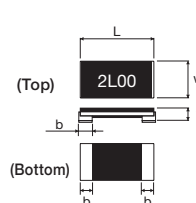
| Large current jumper type |                       |                      |            |                               |                                        |
|---------------------------|-----------------------|----------------------|------------|-------------------------------|----------------------------------------|
| Part No.                  | Size Code<br>inch(mm) | Rated Current<br>(A) | Resistance | Operating Temperature<br>(°C) | Automotive Grade Available<br>AEC-Q200 |
| PMR01                     | 0402(1005)            | 20.0                 | 0.5mΩ Max. | -55 to +155                   | YES                                    |
| PMR03                     | 0603(1608)            | 22.4                 |            |                               | YES                                    |
| PMR10                     | 0805(2012)            | 31.6                 |            |                               | YES                                    |
| PMR18                     | 1206(3216)            | 38.7                 |            |                               | YES                                    |
| PMR25                     | 1210(3225)            | 44.7                 |            |                               | YES                                    |
| PMR50                     | 2010(5025)            | 50.0                 |            |                               | YES                                    |
| PMR100                    | 2512(6432)            | 63.2                 |            |                               | YES                                    |

### ● Dimensions (Unit: mm)

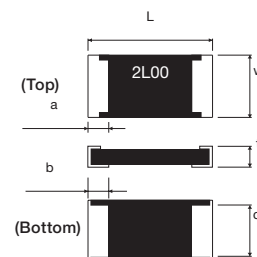
| Part No. | Size Code<br>inch(mm) | L        | W        | t                  | a        | b                  | c         |
|----------|-----------------------|----------|----------|--------------------|----------|--------------------|-----------|
| PMR01    | 0402(1005)            | 1.0±0.05 | 0.5±0.05 | 0.25±0.1           | —        | 0.30±0.10          | —         |
| PMR03    | 0603(1608)            | 1.6±0.15 | 0.8±0.15 | 0.25±0.1           | —        | 0.35±0.15          | —         |
| PMR10    | 0805(2012)            | 2.0±0.15 | 1.2±0.15 | 0.42 to 0.28*±0.15 | —        | 0.75 to 0.35*±0.25 | —         |
| PMR18    | 1206(3216)            | 3.2±0.15 | 1.6±0.15 | 0.42 to 0.28*±0.15 | —        | 1.20 to 0.5 *±0.25 | —         |
| PMR25    | 1210(3225)            | 3.2±0.2  | 2.5±0.2  | 0.52 to 0.32*±0.15 | 0.5±0.2  | 1.00 to 0.8 *±0.2  | 1.95±0.2  |
| PMR50    | 2010(5025)            | 5.0±0.2  | 2.5±0.2  | 0.52 to 0.32*±0.15 | 0.5±0.2  | 1.85 to 0.9 *±0.2  | 1.95±0.2  |
| PMR100   | 2512(6432)            | 6.4±0.25 | 3.2±0.25 | 0.52 to 0.32*±0.15 | 0.5±0.25 | 2.3 to 1.1 *±0.25  | 2.65±0.25 |

\*Each value range varies with the resistance. Please contact a ROHM sales representative for further details.

• PMR01/03(No marking)  
• PMR10/18



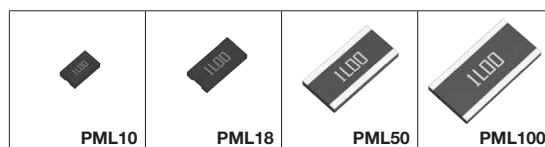
• PMR25/50/100



# Chip Resistors for Current Detection(Metal Plate type)

## Ultra Low Ohmic Chip Shunt Resistors <Wide Terminal type> (PML series)

- Ultra low resistance range(0.5mΩ or more)
- Wide terminal configuration for high joint reliability and heat dissipation
- Trimming-less structure helps avoid concentration of heat, reducing rises in surface temperature



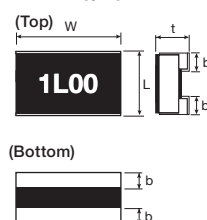
| PML series |                       |                          |                  |                                     |                           |                               |                                        |
|------------|-----------------------|--------------------------|------------------|-------------------------------------|---------------------------|-------------------------------|----------------------------------------|
| Part No.   | Size Code<br>inch(mm) | Rated Power<br>(70°C)    | Tolerance        | Temperature Coefficient<br>(ppm/°C) | Resistance<br>(mΩ)        | Operating Temperature<br>(°C) | Automotive Grade Available<br>AEC-Q200 |
| PML10      | 0508<br>(1220)        | 0.66W                    | J(±5%)<br>G(±2%) | ±200                                | 1.0, 1.5, 2.0, 2.5        | -55 to +155                   | YES                                    |
| PML18      | 0612<br>(1632)        | 1W                       | J(±5%)<br>G(±2%) | ±150                                | 0.5, 1.0, 1.5, 2.0, 2.5   |                               | YES                                    |
| PML50      | 1020<br>(2550)        | 2W                       | J(±5%)           | ±200                                | 0.5, 2.2                  |                               | YES                                    |
| PML100     | 1225<br>(3264)        | 2W<br>(3W at 25°C)<br>2W | J(±5%)           | ±100<br>±150                        | 1.0, 1.5, 2.0, 2.2<br>0.5 |                               | YES                                    |

### ● Dimensions (Unit: mm)

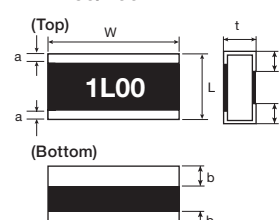
| Part No. | Size Code<br>inch(mm) | L        | W        | t                      | a         | b                    |
|----------|-----------------------|----------|----------|------------------------|-----------|----------------------|
| PML10    | 0508(1220)            | 1.2±0.15 | 2.0±0.15 | 0.42±0.15              | —         | 0.45 to 0.3*<br>±0.2 |
| PML18    | 0612(1632)            | 1.6±0.15 | 3.2±0.15 | 0.42 to 0.28*<br>±0.15 | —         | 0.55 to 0.3*<br>±0.2 |
| PML50    | 1020(2550)            | 2.5±0.2  | 5.0±0.2  | 0.5 to 0.36*<br>±0.15  | 0.4±0.2   | 0.75 to 0.7*<br>±0.2 |
| PML100   | 1225(3264)            | 3.2±0.25 | 6.4±0.25 | 0.5 to 0.36*<br>±0.15  | 0.45±0.25 | 0.9 to 0.7*<br>±0.25 |

\*Each value range varies with the resistance. Please contact a ROHM sales representative for further details.

• PML10/18



• PML50/100



# Chip Resistors for Current Detection(Metal Plate type) High Power Ultra Low Ohmic Chip Shunt Resistors(PSR series)

- High power 3W to 5W
- Ultra low resistance range (0.2mΩ or more)
- Excellent TCR characteristics
- Convex structure



| PSR series        |                       |                       |           |                                      |                          |                               |                                        |
|-------------------|-----------------------|-----------------------|-----------|--------------------------------------|--------------------------|-------------------------------|----------------------------------------|
| Part No.          | Size Code<br>inch(mm) | Rated Power<br>(70°C) | Tolerance | Temperature Coefficient*<br>(ppm/°C) | Resistance Range<br>(mΩ) | Operating Temperature<br>(°C) | Automotive Grade Available<br>AEC-Q200 |
| <b>New</b> PSR100 | 2512<br>(6432)        | 3W                    | F(±1%)    | ±150                                 | 0.3                      | -55 to +170                   | YES                                    |
|                   |                       |                       |           | ±115                                 | 0.5                      |                               |                                        |
|                   |                       |                       |           | ±100                                 | 1.0                      |                               |                                        |
|                   |                       |                       |           | ±50                                  | 2.0, 3.0                 |                               |                                        |
| PSR400            | 3921<br>(10×5.2)      | 4W                    | F(±1%)    | 125±50                               | ☆0.2                     |                               | YES                                    |
|                   |                       |                       |           | ±175                                 | 0.3, 0.5                 |                               |                                        |
|                   |                       |                       |           | ±75                                  | 1.0, 2.0, 3.0            |                               |                                        |
|                   |                       |                       |           | 200±50                               | ☆0.1                     |                               |                                        |
| PSR500            | 5931<br>(15×7.75)     | 5W                    | F(±1%)    | ±225                                 | 0.2                      |                               | YES                                    |
|                   |                       |                       |           | ±150                                 | 0.3, 0.4, 0.5            |                               |                                        |
|                   |                       |                       |           | ±75                                  | 1.0, 2.0                 |                               |                                        |
|                   |                       |                       |           |                                      |                          |                               |                                        |

\*(+20°C to +125°C)

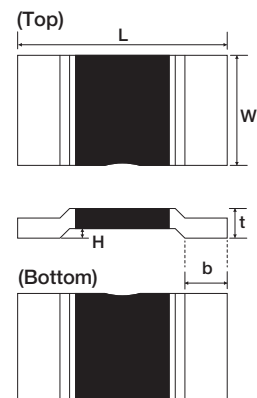
☆: Under Development

## ● Dimensions (Unit: mm)

| Part No. | Resistance | L         | W         | t         | H         | b        |
|----------|------------|-----------|-----------|-----------|-----------|----------|
| PSR100   | 0.3mΩ      | 6.35±0.15 | 3.05±0.25 | 1.45±0.15 | 0.35±0.15 | 1.12±0.3 |
|          | 0.5mΩ      |           |           | 1.15±0.15 |           |          |
|          | 1.0mΩ      |           |           | 0.75±0.15 |           |          |
|          | 2.0mΩ      |           |           | 1.00±0.15 |           |          |
|          | 3.0mΩ      |           |           | 0.75±0.15 |           |          |
|          | ☆0.2mΩ     |           |           | 1.96±0.15 |           |          |
| PSR400   | ☆0.2mΩ     | 10±0.3    | 5.2±0.3   | 1.85±0.15 | 0.5±0.15  | 2.0±0.6  |
|          | 0.3mΩ      |           |           | 1.3±0.15  |           |          |
|          | 0.5mΩ      |           |           | 0.9±0.15  |           |          |
|          | 1.0mΩ      |           |           | 1.1±0.15  |           |          |
|          | 2.0mΩ      |           |           | 0.9±0.15  |           |          |
|          | 3.0mΩ      |           |           | 1.9±0.15  |           |          |
| PSR500   | ☆0.1mΩ     | 15±0.3    | 7.75±0.3  | 1.85±0.15 | 0.5±0.15  | 4.75±0.6 |
|          | 0.2mΩ      |           |           | 1.4±0.15  |           | 4.0±0.6  |
|          | 0.3mΩ      |           |           | 1.15±0.15 |           |          |
|          | 0.4mΩ      |           |           | 1.05±0.15 |           |          |
|          | 0.5mΩ      |           |           | 1.35±0.15 |           |          |
|          | 1.0mΩ      |           |           | 0.9±0.15  |           |          |

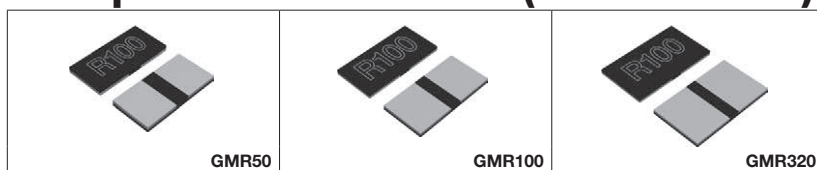
☆: Under Development

## ● PSR100/400/500



# Chip Resistors for Current Detection(Metal Plate type) High Power Low Ohmic Chip Shunt Resistors(GMR series)

- High power (2W to 5W)
- High heat dissipation
- Excellent TCR characteristics
- Low ohmic (5mΩ to 220mΩ)



| GMR series        |                       |                       |           |                                       |                               |                               |                                        |
|-------------------|-----------------------|-----------------------|-----------|---------------------------------------|-------------------------------|-------------------------------|----------------------------------------|
| Part No.          | Size Code<br>inch(mm) | Rated Power<br>(70°C) | Tolerance | Temperature Coefficient*1<br>(ppm/°C) | Resistance Range              | Operating Temperature<br>(°C) | Automotive Grade Available<br>AEC-Q200 |
| ☆GMR50            | 2010<br>(5025)        | 2W                    | F(±1%)    | 0 to +50                              | 5mΩ                           | -55 to +170                   | —                                      |
| <b>New</b> GMR100 | 2512<br>(6432)        | 3W                    | F(±1%)    | ±25                                   | 10mΩ to 200mΩ (E6 series*2*3) |                               | YES                                    |
|                   |                       |                       |           | 0 to +50                              | ☆5mΩ                          |                               |                                        |
|                   |                       |                       |           | ±20                                   | 10mΩ to 220mΩ (E6 series*2)   |                               |                                        |
| ☆GMR320           | 2817<br>(7142)        | 5W                    | F(±1%)    | 0 to +100                             | 5mΩ                           |                               | —                                      |
|                   |                       |                       |           | ±25                                   | 10mΩ to 100mΩ (E6 series*2*3) |                               |                                        |

\*1: (+20°C to +60°C)

\*2: Please contact us for other standard nominal resistance values.

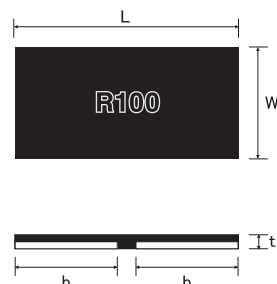
\*3: The development schedule varies for each resistance value. Please contact us.

☆: Under Development (Development schedule will vary depending on resistance value. Please contact us.)

## ● Dimensions (Unit: mm)

| Part No. | Size Code<br>inch(mm) | L         | W         | t         | b         |
|----------|-----------------------|-----------|-----------|-----------|-----------|
| GMR50    | 2010<br>(5025)        | 5.00±0.25 | 2.50±0.25 | 0.40±0.15 | 2.05±0.25 |
| GMR100   | 2512<br>(6432)        | 6.40±0.25 | 3.20±0.25 | 0.40±0.15 | 2.75±0.25 |
| GMR320   | 2817<br>(7142)        | 7.10±0.25 | 4.20±0.25 | 0.40±0.15 | 3.10±0.25 |

## ● GMR50/100/320



# Standard Nominal Resistance Values

| E3  | 10  |     |     |     | 22  |     |     |     |     |     | 47  |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| E6  | 10  |     | 15  |     | 22  |     | 33  |     | 47  |     | 68  |     |     |     |     |     |     |
| E12 | 10  | 12  | 15  | 18  | 22  | 27  | 33  | 39  | 47  | 56  | 68  | 82  |     |     |     |     |     |
| E24 | 10  | 11  | 12  | 13  | 15  | 16  | 18  | 20  | 22  | 24  | 27  | 30  | 33  | 36  | 39  | 43  | 47  |
|     | 51  | 56  | 62  | 68  | 75  | 82  | 91  |     |     |     |     |     |     |     |     |     |     |
| E96 | 100 | 102 | 105 | 107 | 110 | 113 | 115 | 118 | 121 | 124 | 127 | 130 | 133 | 137 | 140 | 143 | 147 |
|     | 150 | 154 | 158 | 162 | 165 | 169 | 174 | 178 | 182 | 187 | 191 | 196 | 200 | 205 | 210 | 215 | 221 |
|     | 226 | 232 | 237 | 243 | 249 | 255 | 261 | 267 | 274 | 280 | 287 | 294 | 301 | 309 | 316 | 324 | 332 |
|     | 340 | 348 | 357 | 365 | 374 | 383 | 392 | 402 | 412 | 422 | 432 | 442 | 453 | 464 | 475 | 487 | 499 |
|     | 511 | 523 | 536 | 549 | 562 | 576 | 590 | 604 | 619 | 634 | 649 | 665 | 681 | 698 | 715 | 732 | 750 |
|     | 768 | 787 | 806 | 825 | 845 | 866 | 887 | 909 | 931 | 953 | 976 |     |     |     |     |     |     |

## ● Nominal Resistance

Nominal resistance values for each series fall into the ranges shown in the table above.

Nominal resistance is determined by the common ratio shown on the right.

### (Resistance Coding)

For nominal resistance values, products with a resistance tolerance of  $\pm 5\%$  are indicated using 3 digits, while resistors with a tolerance of  $\pm 1\%$  are represented by 4 digits. The first 2 or 3 numbers are significant digits, with the last digit indicating the number of zeroes. If a decimal point is required, an R or L is placed instead of the decimal point.

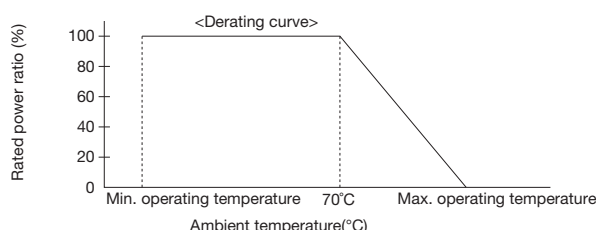
- EX1  $22\Omega \rightarrow 22 \times 10^0\Omega \rightarrow 220$  (the last digit indicates the number "0" of a multiplier)  
 EX2  $47k\Omega \rightarrow 47 \times 10^3\Omega \rightarrow 473$  (the last digit indicates the number "3" of a multiplier)  
 EX3  $1.2M\Omega \rightarrow 12 \times 10^5\Omega \rightarrow 125$  (the last digit indicates the number "5" of a multiplier)  
 EX4  $2.7\Omega \rightarrow 2R7$  (the decimal point indicates the letter R/low resistance less than  $10\Omega$ )  
 EX5  $1130\Omega \rightarrow 113 \times 10^1\Omega \rightarrow 1131$  (the last digit indicates the number "1" of a multiplier/Resistance Tolerance 1%(F)products)  
 EX6  $0.10\Omega \rightarrow R10$   
 EX7  $1m\Omega \rightarrow 1L0$

| Series | Common ratio                 | Remarks                          |
|--------|------------------------------|----------------------------------|
| E6     | $\sqrt[6]{10} \approx 1.46$  | Rounded off to a 2-digit figure. |
| E12    | $\sqrt[12]{10} \approx 1.21$ |                                  |
| E24    | $\sqrt[24]{10} \approx 1.10$ |                                  |
| E96    | $\sqrt[96]{10} \approx 1.02$ | Rounded off to a 3-digit figure. |

- For basic guidelines on using resistors, see the technical reports issued by the Japan Electronics and Information Technology Industries Association.  
**JEITA RCR-2121A. "Guideline of notabilia for fixed resistors for use in electronic equipment (Safety Application Guide for fixed resistors for use in electronic equipment)"**

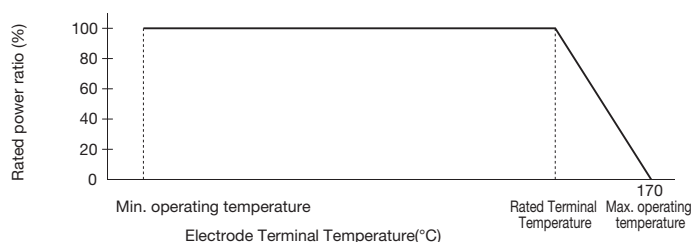
## ● Supplement of Rated Power

When the ambient temperature exceeds the rated ambient temperature, derate the load power based on the derating curve.



(PSR100、GMR100)

When the terminal temperature(PSR100: 140°C, GMR100: 110°C)exceeds the rated terminal temperature when applying voltage, reduce the load power based on the derating curve.



## ● Supplementary Notes

- \* 1 : When resistor is to be exposed to a transient load(excessive large load, such as pulse), mount the resistor on your product and check the condition and evaluate the result. Constant application of a voltage above the rated voltage will degrade the performance and reliability of the resistor. Do not apply a voltage exceeding the rated voltage across any ROHM resistors.
- \* 2 : Rated voltage(V)= $\sqrt{\text{rated power(W)} \times \text{nominal resistance}(\Omega)}$  or the limiting element voltage, whichever smaller, is the rated voltage.



## SMD LEDs

### Red (V,U) Quick Reference of Brightness

| Package Structure | Package size (mm) | Height (mm) | Luminous Intensity (mcd)<br>I <sub>v</sub> (mA) | 1.0 to 1.6 | 1.6 to 2.5 | 2.5 to 4.0 | 4.0 to 6.3 | 6.3 to 10 | 10 to 16 | 16 to 25 | 25 to 40 | 40 to 63 | 63 to 100     | 100 to 160 | 160 to 250     | 250 to 400    | 400 to 630 | 630 to 1000 | 1000 to 1600 | 1600 to 2500 | 2500 to 3120 |
|-------------------|-------------------|-------------|-------------------------------------------------|------------|------------|------------|------------|-----------|----------|----------|----------|----------|---------------|------------|----------------|---------------|------------|-------------|--------------|--------------|--------------|
| Mini-mold         | 1608              | 0.55        | 20                                              |            |            |            |            |           |          |          |          |          |               |            | SML-D15VW      |               |            |             |              |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |               |            | SML-D14VW(A)*  |               |            |             |              |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          | SML-D13VW(A)* |            |                |               |            |             |              |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          | SML-D12V8W    |            |                |               |            |             |              |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |               |            | SML-D15UW      |               |            |             |              |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |               |            | SML-D15U2W     |               |            |             |              |              |              |
| PLCC2             | 3528              | 1.9         | 20                                              |            |            |            |            |           |          |          |          |          |               |            | SML-D14U2W(A)* |               |            |             |              |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |               |            | SML-D13UW(A)*  |               |            |             |              |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |               |            | SML-D12U8W     |               |            |             |              |              |              |
| Reverse Mount     | 34125             | 1.1         | 10                                              |            |            |            |            |           |          |          |          |          |               |            |                | SML-H12V8T    |            |             |              |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |               |            |                | SML-H12U8T    |            |             |              |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |               |            |                | SML-Z14VT(A)* |            |             |              |              |              |
| Lens              | 1608              | 1.24        | 20                                              |            |            |            |            |           |          |          |          |          |               |            |                |               |            |             |              |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |               |            |                |               |            |             |              |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |               |            |                |               |            |             |              |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |               |            |                |               |            |             |              |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |               |            |                |               |            |             |              |              |              |

| Package Structure | Package size (mm) | Height (mm) | Luminous Intensity (mcd)<br>I <sub>v</sub> (mA) | 4.5 to 6 | 6 to 7 | 7 to 8 | 8 to 9 | 9 to 10 | 10 to 12 | 12 to 14 | 14 to 16 | 16 to 18 | 18 to 20 | 20 to 22 | 22 to 25 |
|-------------------|-------------------|-------------|-------------------------------------------------|----------|--------|--------|--------|---------|----------|----------|----------|----------|----------|----------|----------|
| PLCC              | 3528              | 1.9         | 200                                             |          |        |        |        |         |          |          |          |          |          |          |          |

∗: Please note that the brightness of some products may fall between ranks (half rank). ∗: Brightness on specification sheet includes tolerance of within ±10%. Note: Please be sure to refer to the specifications about the rank. ☆: Under Development

### Orange (D) Quick Reference of Brightness

| Package Structure | Package size (mm) | Height (mm) | Luminous Intensity (mcd)<br>I <sub>v</sub> (mA) | 1.0 to 1.6 | 1.6 to 2.5 | 2.5 to 4.0 | 4.0 to 6.3 | 6.3 to 10 | 10 to 16 | 16 to 25 | 25 to 40 | 40 to 63 | 63 to 100 | 100 to 160 | 160 to 250 | 250 to 400 | 400 to 630 | 630 to 1000 | 1000 to 1600 | 1600 to 2800 |
|-------------------|-------------------|-------------|-------------------------------------------------|------------|------------|------------|------------|-----------|----------|----------|----------|----------|-----------|------------|------------|------------|------------|-------------|--------------|--------------|
| Mini-mold         | 1608              | 0.55        | 20                                              |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
| PLCC2             | 3528              | 1.9         | 20                                              |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
| Reverse Mount     | 34125             | 1.1         | 10                                              |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
| Lens              | 1608              | 1.24        | 20                                              |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |

∗: Please note that the brightness of some products may fall between ranks (half rank). ∗: Brightness on specification sheet includes tolerance of within ±10%. Note: Please be sure to refer to the specifications about the rank. ☆: Under Development

### Yellow (Y,W) Quick Reference of Brightness

| Package Structure | Package size (mm) | Height (mm) | Luminous Intensity (mcd)<br>I <sub>v</sub> (mA) | 1.0 to 1.6 | 1.6 to 2.5 | 2.5 to 4.0 | 4.0 to 6.3 | 6.3 to 10 | 10 to 16 | 16 to 25 | 25 to 40 | 40 to 63 | 63 to 100 | 100 to 160 | 160 to 250 | 250 to 400 | 400 to 630 | 630 to 1000 | 1000 to 1600 | 1600 to 2800 |
|-------------------|-------------------|-------------|-------------------------------------------------|------------|------------|------------|------------|-----------|----------|----------|----------|----------|-----------|------------|------------|------------|------------|-------------|--------------|--------------|
| Mini-mold         | 1608              | 0.55        | 20                                              |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
| PLCC2             | 3528              | 1.9         | 20                                              |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
| Reverse Mount     | 34125             | 1.1         | 10                                              |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
| Lens              | 1608              | 1.24        | 20                                              |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |

∗: Please note that the brightness of some products may fall between ranks (half rank). ∗: Brightness on specification sheet includes tolerance of within ±10%. Note: Please be sure to refer to the specifications about the rank. ☆: Under Development

### Yellow Green(M), Green(P, F)Color Luminosity Chart

| Package Structure | Package size (mm) | Height (mm) | Luminous Intensity (mcd)<br>I <sub>v</sub> (mA) | 0.63 to 1.0 | 1.0 to 1.6 | 1.6 to 2.5 | 2.5 to 4.0 | 4.0 to 6.3 | 6.3 to 10 | 10 to 16 | 16 to 25 | 25 to 40 | 40 to 63 | 63 to 100 | 100 to 160 | 160 to 250 | 250 to 400 | 400 to 630 | 630 to 1000 | 1000 to 1800 | 1800 to 2500 |
|-------------------|-------------------|-------------|-------------------------------------------------|-------------|------------|------------|------------|------------|-----------|----------|----------|----------|----------|-----------|------------|------------|------------|------------|-------------|--------------|--------------|
| Mini-mold         | 1608              | 0.55        | 20                                              |             |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |             |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |             |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |             |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |             |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |             |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
| Reflector         | 20125             | 0.8         | 20                                              |             |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |             |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |             |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
| PLCC2             | 3528              | 1.9         | 20                                              |             |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |             |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |             |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
| Lens              | 1608              | 1.24        | 20                                              |             |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |             |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |             |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |             |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |
|                   |                   |             |                                                 |             |            |            |            |            |           |          |          |          |          |           |            |            |            |            |             |              |              |

∗: Please note that the brightness of some products may fall between ranks (half rank). ∗: Brightness on specification sheet includes tolerance of within ±10%. Note: Please be sure to refer to the specifications about the rank. ☆: Under Development

# SMD LEDs

## Green (E)/Blue Green (E2, E3) Quick Reference of Brightness

| Package Structure | Package size (mm) | Height (mm) | Luminous Intensity (mcd)<br>I <sub>f</sub> (mA) | 9.0 to 14 | 14 to 22 | 22 to 36 | 36 to 56 | 56 to 90       | 90 to 140 | 140 to 220 | 220 to 360 | 360 to 560 | 560 to 900 | 900 to 1400   | 1400 to 2200 | 2200 to 3600 | 3600 to 5600 |
|-------------------|-------------------|-------------|-------------------------------------------------|-----------|----------|----------|----------|----------------|-----------|------------|------------|------------|------------|---------------|--------------|--------------|--------------|
| Mini-mold         | 1608              | 0.55        | 5                                               |           |          |          |          | SMLD12EN1W     |           |            |            |            |            |               |              |              |              |
|                   |                   | 1.06        |                                                 |           |          |          |          | SMLD12E2N1W    |           |            |            |            |            |               |              |              |              |
|                   |                   |             |                                                 |           |          |          |          | SMLD12E3N1W    |           |            |            |            |            |               |              |              |              |
| Reflector         | 20125             | 0.8         | 5                                               |           |          |          |          | CSL1001ET      |           |            |            |            |            |               |              |              |              |
|                   |                   |             |                                                 |           |          |          |          | ☆SMLM22EN1T(C) |           |            |            |            |            |               |              |              |              |
|                   |                   |             |                                                 |           |          |          |          | SMLMN2ECT(C)   |           |            |            |            |            |               |              |              |              |
| PLCC2             | 3528              | 1.9         | 20                                              |           |          |          |          |                |           |            |            |            |            | SMLZ24E2N3T   |              |              |              |
| Lens              | 1608              | 1.24        | 20                                              |           |          |          |          |                |           |            | ☆CSL0901ET |            |            | SMLZ14EGT(A)* |              |              |              |
|                   |                   |             |                                                 |           |          |          |          |                |           |            |            |            | CSL0902ET  |               |              |              |              |

\*: Please note that the brightness of some products may fall between ranks (half rank). \*: Brightness on specification sheet includes tolerance of within ±10%. Note: Please be sure to refer to the specifications about the rank.

☆ : Under Development

## Blue (B) Quick Reference of Brightness

| Package Structure | Package size (mm) | Height (mm) | Luminous Intensity (mcd)<br>I <sub>f</sub> (mA) | 0.9 to 1.4 | 1.4 to 2.2 | 2.2 to 3.6 | 3.6 to 5.6 | 5.6 to 9.0 | 9 to 14 | 14 to 22       | 22 to 36 | 36 to 56   | 56 to 90        | 90 to 140 | 140 to 220    | 220 to 360 | 360 to 560 | 560 to 900 | 900 to 1400 |
|-------------------|-------------------|-------------|-------------------------------------------------|------------|------------|------------|------------|------------|---------|----------------|----------|------------|-----------------|-----------|---------------|------------|------------|------------|-------------|
| Mini-mold         | 1608              | 0.55        | 5                                               |            |            |            |            |            |         |                |          | SMLD12BN1W |                 |           |               |            |            |            |             |
|                   |                   | 1.06        | 1                                               |            |            |            | CSL1001BT  |            |         |                |          |            |                 |           |               |            |            |            |             |
| Reflector         | 1608              | 0.55        | 5                                               |            |            |            |            |            |         |                |          |            | CSL1101SBAW1(C) |           |               |            |            |            |             |
|                   |                   |             |                                                 |            |            |            |            |            |         |                |          |            | SMLMN2SB1AW(C)  |           |               |            |            |            |             |
|                   | 20125             | 0.8         | 5                                               |            |            |            |            |            |         | ☆SMLM22BN1T(C) |          |            |                 |           |               |            |            |            |             |
|                   |                   |             |                                                 |            |            |            |            |            |         | SMLMN2BCT(C)   |          |            |                 |           |               |            |            |            |             |
| PLCC2             | 3528              | 1.9         | 20                                              |            |            |            |            |            |         |                |          |            |                 |           | SMLZ14BGT(A)* |            |            |            |             |
| Lens              | 1608              | 1.24        | 5                                               |            |            |            |            |            |         |                |          | ☆CSL0901BT |                 |           |               |            |            |            |             |
|                   |                   |             | 20                                              |            |            |            |            |            |         |                |          |            |                 |           | SMLZ24BN3T    |            |            |            |             |
|                   |                   |             |                                                 |            |            |            |            |            |         |                |          |            |                 |           | CSL0902BT     |            |            |            |             |

\*: Please note that the brightness of some products may fall between ranks (half rank). \*: Brightness on specification sheet includes tolerance of within ±10%. Note: Please be sure to refer to the specifications about the rank.

☆ : Under Development

## White (WB) Quick Reference of Brightness

| Package type | Package size (mm) | Height (mm) | Luminous Intensity (mcd)<br>I <sub>f</sub> (mA) | 9 to 14 | 14 to 22 | 22 to 36 | 36 to 56 | 56 to 90           | 90 to 140 | 140 to 220 | 220 to 360 | 360 to 560 | 560 to 900      | 900 to 1100 | 1100 to 1400 | 1400 to 1800 | 1800 to 2200  | 2200 to 2800 | 2800 to 3600 | 3600 to 7000 | 7000 to 8500 |
|--------------|-------------------|-------------|-------------------------------------------------|---------|----------|----------|----------|--------------------|-----------|------------|------------|------------|-----------------|-------------|--------------|--------------|---------------|--------------|--------------|--------------|--------------|
| Mini-mold    | 1608              | 0.55        | 5                                               |         |          |          |          | SMLD12WBN1W        |           |            |            |            |                 |             |              |              |               |              |              |              |              |
|              | 1608              | 0.55        | 5                                               |         |          |          |          | ☆CSL1101WBCW1(C)   |           |            |            |            |                 |             |              |              |               |              |              |              |              |
| Reflector    | 20125             | 0.8         | 5                                               |         |          |          |          | ☆SMLM22WBN1CW1T(C) |           |            |            |            | ☆SMLMN3WB2ZW(C) |             |              |              |               |              |              |              |              |
|              |                   |             |                                                 |         |          |          |          | SMLMN2WB1CW(C)     |           |            |            |            |                 |             |              |              |               |              |              |              |              |
|              | 3528              | 1.9         | 20                                              |         |          |          |          |                    |           |            |            |            |                 |             |              |              | ☆SMLZ24WBN3WT |              |              |              |              |

\*: Brightness on specification sheet includes tolerance of within ±10%. Note: Please be sure to refer to the specifications about the rank.

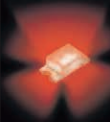
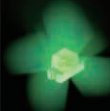
☆ : Under Development

## 3 Colors Quick Reference of Brightness

| Package Structure     | Package size (mm) | Height (mm) | I <sub>f</sub> (mA) | Luminous Intensity (mcd)<br>I <sub>f</sub> (mA) | 5.6 to 9.0 | 9.0 to 14 | 14 to 22 | 22 to 36 | 36 to 56 | 56 to 90 | 90 to 140 | 140 to 220 | 220 to 360  | 360 to 560 | 560 to 900   | 900 to 1400 | 1400 to 1800 |
|-----------------------|-------------------|-------------|---------------------|-------------------------------------------------|------------|-----------|----------|----------|----------|----------|-----------|------------|-------------|------------|--------------|-------------|--------------|
| Reflector             | 1816              | 0.5         | 20                  | Red                                             |            |           |          |          |          |          |           |            |             |            |              |             |              |
|                       |                   |             |                     | Green                                           |            |           |          |          |          |          |           |            | MSL0402RGBU |            |              |             |              |
|                       |                   |             |                     | Blue                                            |            |           |          |          |          |          |           |            |             |            |              |             |              |
|                       |                   |             |                     | Red                                             |            |           |          |          |          |          |           |            |             |            |              |             |              |
|                       | 3528              | 0.6         | 20                  | Green                                           |            |           |          |          |          |          |           |            |             |            | SMLVN6RGB1U  |             |              |
|                       |                   |             |                     | Blue                                            |            |           |          |          |          |          |           |            |             |            |              |             |              |
|                       |                   |             |                     | Red                                             |            |           |          |          |          |          |           |            |             |            |              |             |              |
|                       |                   |             |                     | Green                                           |            |           |          |          |          |          |           |            |             |            | ☆SMLVN6RGB1H |             |              |
|                       |                   |             |                     | Blue                                            |            |           |          |          |          |          |           |            |             |            |              |             |              |
|                       |                   |             |                     | Red                                             |            |           |          |          |          |          |           |            |             |            |              |             |              |
| Side View (Reflector) | 6922              | 2.15        | 20                  | Green                                           |            |           |          |          |          |          |           |            |             |            | MSL0104RGBU  |             |              |
|                       |                   |             |                     | Blue                                            |            |           |          |          |          |          |           |            |             |            |              |             |              |

☆ : Under Development

# SMD LEDs

| <Mold type(1608)>                                                                  |                 |                   |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       |                                               |       |                          |       |         |       |       |                                              |
|------------------------------------------------------------------------------------|-----------------|-------------------|------------------------------------|----------------------------------|-------------------------------------------|---------------------------------|-----------------------------------------|---------------------------------------|------------------------------------------------|----|-----------------------|-------|-----------------------------------------------|-------|--------------------------|-------|---------|-------|-------|----------------------------------------------|
| Package<br>(mm)                                                                    | Part No.        | Emitting<br>Color | Absolute Maximum Ratings(Ta=25℃)   |                                  |                                           |                                 |                                         |                                       | Electrical and Optical Characteristics(Ta=25℃) |    |                       |       |                                               |       |                          |       |         |       |       | Automotive<br>Grade<br>Available<br>AEC-Q101 |
|                                                                                    |                 |                   | Power<br>Dissipation<br>Pd<br>(mW) | Forward<br>Current<br>If<br>(mA) | Peak<br>Forward<br>Current<br>Ifp<br>(mA) | Reverse<br>Voltage<br>Vr<br>(V) | Operating<br>Temperature<br>Topr<br>(℃) | Storage<br>Temperature<br>Tstg<br>(℃) | Forward Voltage<br>Vf                          |    | Reverse Current<br>Ir |       | Dominant Wavelength λd/<br>Chromaticity(x, y) |       | Luminous Intensity<br>Iv |       |         |       |       |                                              |
|                                                                                    |                 |                   |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       |                                               |       |                          |       |         |       |       |                                              |
|    | SML-D12W8W(A)   | Yellow            | 52                                 | 20                               | 100*1                                     | 12                              | -40 to +100                             | -40 to +100                           | 2.0                                            | 2  | 10                    | 12    | 588                                           | 2     | 5                        | 7     | 9       | 2     | YES   |                                              |
|                                                                                    | SML-D12V8W      | Red               |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       | 630                                           |       | 16                       | 40    | 100     |       | YES   |                                              |
|                                                                                    | SML-D12U8W      |                   |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       | 620                                           |       | 25                       | 63    | 160     |       |       |                                              |
|                                                                                    | SML-D12D8W      | Orange            | 54                                 | 20                               |                                           |                                 | -40 to +85                              |                                       | 2.2                                            | 20 |                       |       | 605                                           | 20    | 40                       | 100   | 250     | 20    |       |                                              |
|                                                                                    | SML-D12Y8W      | Yellow            |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       | 590                                           |       | 25                       | 63    | 160     |       | YES   |                                              |
|                                                                                    | SML-D12M8W      | Yellow Green      |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       | 572                                           |       | 10                       | 25    | 63      |       |       |                                              |
|                                                                                    | SML-D12P8W      | Green             |                                    |                                  | 100*1                                     | 5                               |                                         | -40 to +100                           |                                                |    | 10                    | 5     | 560                                           |       | 3                        | 6     | 16      |       |       |                                              |
|                                                                                    | New SMLD12EN1W  |                   | 70                                 |                                  |                                           |                                 |                                         |                                       | 3.0                                            |    |                       |       | 527                                           |       |                          | 140   | 220     |       | YES   |                                              |
|                                                                                    | SMLD12E2N1W     | Blue Green        |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       | 505                                           | 5     | 56                       | 120   | 140     | 5     |       |                                              |
|                                                                                    | SMLD12E3N1W     |                   | 66                                 | 20                               |                                           |                                 | -40 to +100                             |                                       | 2.9                                            | 5  |                       |       | 496                                           |       | 85                       |       |         |       |       |                                              |
|                                                                                    | SMLD12BN1W      | Blue              |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       | 470                                           |       | 14                       | 40    | 56      |       | YES   |                                              |
|                                                                                    | New SMLD12WBN1W | White             |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       | (x, y)(0.295, 0.280)                          |       | 56                       | 120   | 220     |       |       |                                              |
|                                                                                    | SML-D13VW(A)    | Red               | 72                                 |                                  |                                           |                                 |                                         |                                       | 2.0                                            |    |                       |       | 630                                           |       | 36                       | 55    | 90      |       | YES   |                                              |
|                                                                                    | SML-D13UW(A)    |                   |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       | 620                                           |       | 56                       | 85    | 140     |       |       |                                              |
|                                                                                    | SML-D13DW(A)    | Orange            |                                    | 30                               | 100*1                                     | 5                               | -40 to +100                             | -40 to +100                           |                                                | 20 | 10                    | 5     | 605                                           | 20    | 71                       | 120   | 180     | 20    |       |                                              |
|                                                                                    | SML-D13WW(A)    | Yellow            | 75                                 |                                  |                                           |                                 |                                         |                                       | 2.1                                            |    |                       |       | 587                                           |       | 71                       | 110   |         |       | YES   |                                              |
|                                                                                    | SML-D13MW(A)    | Yellow Green      |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       | 571                                           |       | 28                       | 45    | 71      |       |       |                                              |
|                                                                                    | SML-D13FW       | Green             | 81                                 | 30                               |                                           |                                 | -40 to +85                              |                                       | 2.1                                            |    |                       |       | 565                                           |       | 18                       | 22    | 36      |       |       |                                              |
|                                                                                    | SML-D14VW(A)    | Red               | 72                                 |                                  |                                           |                                 |                                         |                                       | 2.0                                            |    |                       |       | 630                                           |       | 71                       | 100   | 180     |       | YES   |                                              |
|                                                                                    | SML-D14U2W(A)   |                   |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       | 615                                           |       | 90                       | 160   | 224     |       |       |                                              |
|                                                                                    | SML-D14DW(A)    | Orange            |                                    | 30                               | 100*1                                     | 5                               | -40 to +100                             | -40 to +100                           |                                                | 20 | 10                    | 5     | 605                                           | 20    | 112                      | 200   | 280     | 20    |       |                                              |
|                                                                                    | SML-D14YW(A)    | Yellow            | 75                                 |                                  |                                           |                                 |                                         |                                       | 2.1                                            |    |                       |       | 590                                           |       |                          |       |         |       | YES   |                                              |
|                                                                                    | SML-D14WW(A)    | Yellow            |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       | 587                                           |       | 180                      |       |         |       |       |                                              |
|                                                                                    | SML-D14MW(A)    | Yellow Green      |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       | 571                                           |       | 36                       | 60    | 90      |       |       |                                              |
| SML-D15VW                                                                          | Red             | 84                |                                    |                                  |                                           |                                 |                                         | 2.0                                   |                                                |    |                       | 630   |                                               | 71    | 90                       | 112   |         | YES   |       |                                              |
| SML-D15UW                                                                          |                 |                   |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       | 620   |                                               | 90    | 112                      | 140   |         |       |       |                                              |
| SML-D15U2W                                                                         |                 |                   | 35                                 | 100*1                            | 5                                         | -40 to +100                     | -40 to +100                             |                                       | 20                                             | 10 | 5                     | 615   | 20                                            | 112   | 140                      | 180   | 20      |       |       |                                              |
| SML-D15DW                                                                          | Orange          |                   |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       | 605   |                                               | 180   | 224                      | 280   |         | YES   |       |                                              |
| SML-D15YW                                                                          | Yellow          | 87                |                                    |                                  |                                           |                                 |                                         | 2.1                                   |                                                |    |                       | 590   |                                               |       |                          |       |         |       |       |                                              |
| SML-D15MW                                                                          | Yellow Green    |                   |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       | 571   |                                               | 56    | 71                       | 90    |         |       |       |                                              |
|  | New CSL0901VT   | Red               |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       | 630   |                                               | 112   | 180                      | 355   |         | YES   |       |                                              |
|                                                                                    | New CSL0901UT   |                   |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       | 620   |                                               | 140   | 280                      | 450   |         |       |       |                                              |
|                                                                                    | New CSL0901DT   | Orange            |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       | 605   |                                               | 224   | 400                      | 710   |         |       |       |                                              |
|                                                                                    | New CSL0901YT   | Yellow            | 62.5                               | 25                               | 100*1                                     | 12                              | -40 to +100                             | -40 to +100                           | 2.1                                            | 20 | 10                    | 12    | 590                                           | 20    | 180                      | 320   | 560     | 20    | YES   |                                              |
|                                                                                    | New CSL0901WT   |                   |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       | 587                                           |       | 280                      |       |         | (YES) |       |                                              |
|                                                                                    | New CSL0901MT   | Yellow Green      |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       | 571                                           |       | 56                       | 100   | 180     |       |       |                                              |
|                                                                                    | New CSL0901PT   |                   |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       | 560                                           |       | 14                       | 30    | 45      |       |       |                                              |
|                                                                                    | ☆ CSL0901ET     | Green             | 70                                 | 20                               |                                           | 5                               |                                         |                                       | 3.0                                            | 5  |                       | 5     | (527)                                         | 5     | (220)                    | (360) | (560)   | 5     | (YES) |                                              |
|                                                                                    | ☆ CSL0901BT     | Blue              | 68                                 |                                  |                                           |                                 |                                         |                                       | 2.9                                            |    |                       |       | (470)                                         |       | (36)                     | (56)  | (90)    |       |       |                                              |
|                                                                                    | ☆ CSL0902VT     | Red               |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       | (630)                                         |       | (140)                    | (250) | (450)   |       | (YES) |                                              |
|                                                                                    | ☆ CSL0902UT     |                   |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       | (620)                                         |       | (180)                    | (350) | (560)   |       |       |                                              |
|                                                                                    | ☆ CSL0902DT     | Orange            |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       |       | (605)                                         |       | (355)                    | (560) | (1,120) |       |       |                                              |
| ☆ CSL0902YT                                                                        | Yellow          | 87                | 35                                 | 100*1                            | 12                                        | -40 to +100                     | -40 to +100                             | 2.1                                   | 20                                             | 10 | 12                    | (590) | 20                                            | (280) | (500)                    | (900) | 20      | (YES) |       |                                              |
| ☆ CSL0902WT                                                                        |                 |                   |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       | (587) |                                               | (224) | (400)                    | (710) |         | YES   |       |                                              |
| ☆ CSL0902MT                                                                        | Yellow Green    |                   |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       | (571) |                                               | (71)  | (140)                    | (280) |         |       |       |                                              |
| ☆ CSL0902PT                                                                        | Green           |                   |                                    |                                  |                                           |                                 |                                         |                                       |                                                |    |                       | (560) |                                               | (28)  | (45)                     | (90)  |         |       |       |                                              |
| New CSL0902ET                                                                      |                 | 95                | 25                                 |                                  | 5                                         |                                 |                                         | 3.4                                   |                                                |    | 5                     | 527   |                                               | 710   | 1,100                    | 1,800 |         | YES   |       |                                              |
| New CSL0902BT                                                                      | Blue            |                   |                                    |                                  |                                           |                                 |                                         | 3.3                                   |                                                |    |                       | 470   |                                               | 220   | 360                      | 560   |         |       |       |                                              |
|  | ☆ CSL1001VT     | Red               |                                    |                                  |                                           |                                 |                                         |                                       | 2.0                                            |    |                       | 12    | 630                                           |       | (71)                     | (112) | (180)   |       | (YES) |                                              |
|                                                                                    | ☆ CSL1001YT     | Yellow            | 72                                 | 30                               | 100*1                                     | 12                              | -40 to +100                             |                                       |                                                | 20 |                       | 12    | 590                                           | 20    | (112)                    | (180) | (280)   | 20    |       |                                              |
|                                                                                    | ☆ CSL1001MT     | Yellow Green      |                                    |                                  |                                           |                                 |                                         | -40 to +100                           | 2.1                                            |    | 10                    |       | 571                                           |       | (36)                     | (56)  | (90)    |       |       |                                              |
|                                                                                    | New CSL1001ET   | Green             | 35                                 | 10                               | 50*1                                      | 5                               | -40 to +100                             |                                       | 3.0                                            | 5  |                       |       | 527                                           | 5     | 90                       | 140   | 224     | 5     | YES   |                                              |
| New CSL1001BT                                                                      | Blue            | 33                |                                    |                                  |                                           |                                 |                                         | 2.8                                   | 1                                              |    |                       | 5     | 470                                           | 1     | 4                        | 6     | 9       | 1     |       |                                              |

\*1: Duty1/10, 1kHz

\*: Brightness for white color is noted with chromaticity coordinate (x, y).

Note: For the automotive compatible product(AEC-Q101), it will be the model number with(C). (YES)... To be implemented



# Part No. List

| Part No.     | Page | Part No.       | Page | Part No.           | Page | Part No.            | Page | Part No.       | Page |
|--------------|------|----------------|------|--------------------|------|---------------------|------|----------------|------|
| 1SS355VM     | 94   | BA4580YFVM-M   | 49   | BD2245G-M          | 38   | BD50C0A             | 28   | BD90G0MEFJ-M   | 29   |
| 1SS380VM     | 95   | BA4584YFV-M    | 49   | BD22621G-M         | 38   | BD50C0AW            | 28   | BD99010EFV-M   | 33   |
| 1SS390SM     | 95   | BA82901YF-C    | 49   | BD2262G-M          | 38   | BD50FA1MG-M         | 28   | BD99011EFV-M   | 33   |
| 1SS400SM     | 94   | BA82901YFV-C   | 49   | BD22641G-M         | 38   | BD50GA3MEFJ-M       | 29   | BD9P233MUF-C   | 33   |
| 2SA1036K     | 69   | BA82902YF-C    | 48   | BD2264G-M          | 38   | BD50GA5MEFJ-M       | 29   | BD9S000NUX-C   | 33   |
| 2SA1514K     | 69   | BA82902YFJ-C   | 48   | BD2265G-M          | 38   | BD50G0C0MEFJ-M      | 29   | BD9S012NUX-C   | 33   |
| 2SA1576A     | 69   | BA82902YFV-C   | 48   | BD2266G-M          | 38   | BD50HA3MEFJ-M       | 30   | BD9S100NUX-C   | 33   |
| 2SA1576U3    | 69   | BA82902YFVJ-C  | 48   | BD2267G-M          | 38   | BD50HA5MEFJ-M       | 30   | BD9S110NUX-C   | 33   |
| 2SA1576UB    | 69   | BA82903YF-C    | 49   | BD2268G-M          | 38   | BD50HC0MEFJ-M       | 30   | BD9S111NUX-C   | 33   |
| 2SA1579      | 69   | BA82903YFVM-C  | 49   | BD2269G-M          | 38   | BD50HC5MEFJ-M       | 30   | BD9S200MUF-C   | 33   |
| 2SA1579U3    | 69   | BA82904YF-C    | 48   | BD25GA3MEFJ-M      | 29   | BD52xxG-2C Series   | 50   | BD9S300MUF-C   | 33   |
| 2SA1774      | 69   | BA82904YFVM-C  | 48   | BD25GA5MEFJ-M      | 29   | BD52xxG-2M Series   | 50   | BD9S400MUF-C   | 33   |
| 2SA1774EB    | 69   | BAS116HM       | 95   | BD25G0C0MEFJ-M     | 29   | BD52xxNVX-2C Series | 50   | BD9V100MUF-C   | 33   |
| 2SA2029      | 69   | BAS16HM        | 94   | BD25HA3MEFJ-M      | 30   | BD53xxG-2C Series   | 50   | BDJ0GA3MEFJ-M  | 29   |
| 2SA2088      | 69   | BAS21HM        | 94   | BD25HA5MEFJ-M      | 30   | BD53xxG-2M Series   | 50   | BDJ0GA5MEFJ-M  | 29   |
| 2SA2088U3    | 69   | BAS21VM        | 94   | BD25HC0MEFJ-M      | 30   | BD60GA3MEFJ-M       | 29   | BDJ0G0C0MEFJ-M | 29   |
| 2SAR293P     | 70   | BAS40-04HM     | 78   | BD25HC5MEFJ-M      | 30   | BD60GA5MEFJ-M       | 29   | BDJ2GA3MEFJ-M  | 29   |
| 2SAR502EB    | 69   | BAS40-05HM     | 78   | BD25IA5MEFJ-M      | 31   | BD60G0C0MEFJ-M      | 29   | BDJ2GA5MEFJ-M  | 29   |
| 2SAR502U3    | 69   | BAS40-06HM     | 78   | BD25IC0MEFJ-M      | 30   | BD60HA3MEFJ-M       | 30   | BDJ2G0C0MEFJ-M | 29   |
| 2SAR502UB    | 69   | BAS40HM        | 78   | BD2808MUV-M        | 35   | BD60HA5MEFJ-M       | 30   | BM2LB110FJ-C   | 37   |
| 2SAR512P     | 70   | BAT54AHM       | 78   | BD3020HFP          | 32   | BD60HC0MEFJ-M       | 30   | BM2LB150FJ-C   | 37   |
| 2SAR513P     | 70   | BAT54ACHM      | 78   | BD3021HFP          | 32   | BD60HC5MEFJ-M       | 30   | BM2LB300FJ-C   | 37   |
| 2SAR514P     | 70   | BAT54HM        | 78   | BD30GA3MEFJ-M      | 29   | BD63030EKV-C        | 36   | BM2LC105FJ-C   | 37   |
| 2SAR533P     | 70   | BAT54SHM       | 78   | BD30GA5MEFJ-M      | 29   | BD63035EFV-M        | 36   | BM2LC300FJ-C   | 37   |
| 2SAR542P     | 70   | BAV170HM       | 95   | BD30G0C0MEFJ-M     | 29   | BD70GA3MEFJ-M       | 29   | BM60051FV-C    | 45   |
| 2SAR544P     | 70   | BAV199HM       | 95   | BD30HA3MEFJ-M      | 30   | BD70GA5MEFJ-M       | 29   | BM60052AFV-C   | 45   |
| 2SAR552P     | 70   | BAV199UM       | 95   | BD30HA5MEFJ-M      | 30   | BD70G0C0MEFJ-M      | 29   | BM60054AFV-C   | 45   |
| 2SAR553P     | 70   | BAV70HM        | 94   | BD30HC0MEFJ-M      | 30   | BD70HA3MEFJ-M       | 30   | BM60055FV-C    | 45   |
| 2SAR554P     | 70   | BAV99HM        | 94   | BD30HC5MEFJ-M      | 30   | BD70HA5MEFJ-M       | 30   | BM60056FV-C    | 45   |
| 2SAR572D3    | 71   | BAW156HM       | 95   | BD30IA5MEFJ-M      | 31   | BD70HC0MEFJ-M       | 30   | BM60212FV-C    | 45   |
| 2SAR573D3    | 71   | BAW156UM       | 95   | BD30IC0MEFJ-M      | 30   | BD70HC5MEFJ-M       | 30   | BM6101FV-C     | 45   |
| 2SAR574D3    | 71   | BAW56HM        | 94   | BD3375KV-C         | 41   | BD70HxxG-2C Series  | 50   | BM6102FV-C     | 45   |
| 2SAR586D3    | 71   | BC807-16       | 70   | BD3375MUV-M        | 41   | BD733L2EFJ-C        | 27   | BM6104FV-C     | 45   |
| 2SARA41C     | 69   | BC807-25       | 70   | BD3376EFV-C        | 41   | BD733L2FP3-C        | 27   | BM61M41RFV-C   | 45   |
| 2SBI197K     | 69   | BC807-40       | 70   | BD3376MUV-M        | 41   | BD733L2FP-C         | 27   | BM61S40RFV-C   | 45   |
| 2SBI198K     | 69   | BC817-16       | 70   | BD3378MUV-M        | 41   | BD733L5FP-C         | 27   | BM61S41RFV-C   | 45   |
| 2SBI694      | 69   | BC817-25       | 70   | BD3380MUV-M        | 41   | BD73HxxG-2C Series  | 50   | BM66002FV-C    | 45   |
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| RBR2LAM60A  | 80   | RFN10NS6S  | 87   | RSJ250P10     | 68   | SMF15V       | 93   | UCR006            | 106  |
| RBR2LAM60B  | 80   | RFN10NS8D  | 87   | RSJ301N10     | 68   | SMF16V       | 93   | UCR01             | 106  |
| RBR2MM30A   | 80   | RFN10T2D   | 87   | RSJ400N06     | 68   | SMF17V       | 93   | UCR03             | 106  |
| RBR2MM30B   | 80   | RFN10TB4S  | 87   | RSJ400N10     | 68   | SMF18V       | 93   | UCR10             | 106  |
| RBR2MM40A   | 80   | RFN10TF6S  | 87   | RSJ451N04     | 68   | SMF20V       | 93   | UCR18             | 106  |

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# High quality and stable supply enabled through a vertically integrated production system

## High Quality Raw Materials

Manufacturing wafers through silicon ingot pulling



Raw silicon

## In-house Photomask

Pursuing high quality through integrated quality control, from IC chip design layout to photomask production

## Photo Mask



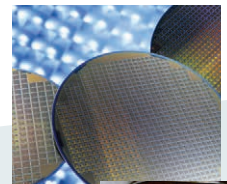
## Silicon Ingot



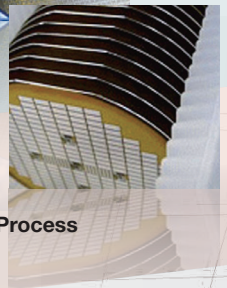
## CAD



## Wafer



## Wafer Process



Si  
Silicon

SiC  
Silicon  
carbide

**SiCrystal**

A ROHM Group Company

SiCrystal a German SiC single-crystal wafer manufacturer that joined the ROHM Group in 2009.

## High Quality

### Achieving high quality in all processes

ROHM considers 'quality first' as its company objective and unwaveringly pursues this goal. All processes, production, development, design, and wafer manufacturing to sales and services, are carried out within the group using a vertically integrated production system, and activities are implemented in each process to improve quality. This also results in excellent traceability and establishes a system that ensures worry-free use of our products.

## Stable Supply

### Fulfilling our commitment to ensure stable supply through the collective strength of the ROHM Group

ROHM supplies products that meet market demands by utilizing a vertically integrated, completely in-house production process to ensure superior quality and stable supply - unlike fabless and foundry manufacturers that are susceptible to external influences. ROHM uses a multi-base production system and a BCM(Business Continuity Management)system to maintain appropriate stock in order to ensure a stable supply to customers.

### In-house Dies and Lead Frames

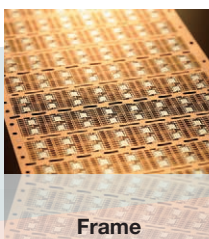
To ensure quality manufacturing, all lead frame dies for lead frame punching and molding are created in-house

### Cutting-Edge Packages

Superior assembly technology enables a wide range of package types, from CSP, BGA, and COF to IPM, high power packages, and even power modules.



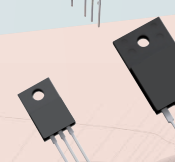
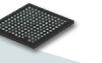
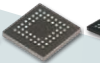
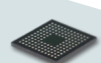
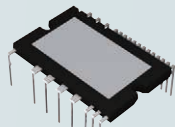
Die/Mold



Frame



Assembly Line



Packaging

Module

### In-house Production System

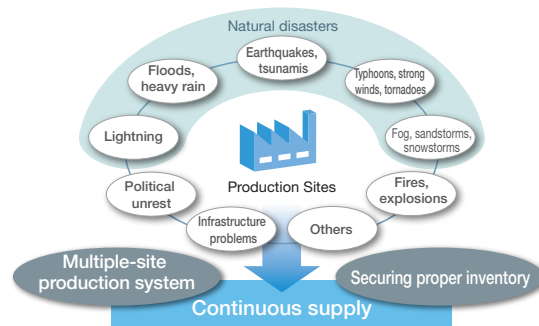
ROHM's production system is developed in-house to enable flexible, precise response to customer needs.



All production equipment is developed in-house

### BCM System

ROHM continues to strengthen its BCM system based on risk evaluations conducted at all production bases.



# ROHM Initiatives for Automotive Compatible Products

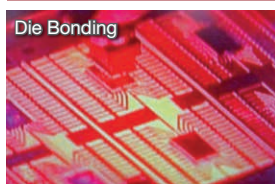
ROHM has set a corporate objective of 'Quality First' and pursues high quality, innovative manufacturing while providing greater security and peace of mind through stable, guaranteed delivery. In addition, ROHM takes on supply responsibility by utilizing a vertically integrated production system and implements a variety of initiatives to ensure superior reliability.

## Sample Initiatives

### Real-Time Quality Checks

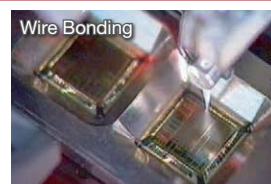
Screening methods are implemented at each process, from silicon ingot pulling and wafer production to testing, assembly, and shipment inspection in order to verify quality and workmanship.

#### Real-time verification in all processes



Workmanship verified during die bonding operation

#### Real Time Work & Check

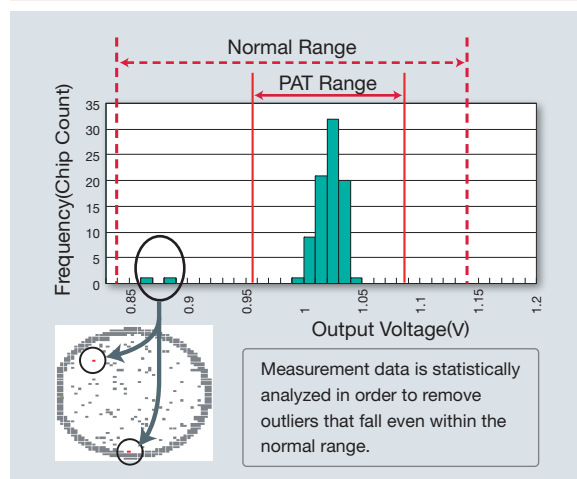


Quality check during the wire bonding process

### PAT System Implementation (AEC Compliance)

The PAT system is designed to remove outliers-even within the normal range-through statistical analysis of measurement data. As a result, even some products deemed to be good during testing and fall within the normal range but lie outside the lot distribution are removed due to potential characteristics that may cause them to fail prematurely in the future. This provides an additional measure to prevent defective products from escaping.

#### PAT System PAT:Part Average Testing (Part Average Testing)



### Dedicated Automotive Lines

All automotive products are produced and processed on dedicated lines by certified operators that have undergone extensive training and testing. Focusing on machine and man makes it possible to establish a high-reliability, automotive-grade production environment.

#### Line Differentiation and 4M

The basic elements of ROHM's approach to quality: **4M...Man Machine Material Method**  
ROHM manufactures automotive products on designated HR (High Reliability) lines, separate from standard lines used for general-purpose products.



## Overview

### Model Design

Robust design/multiple protection circuits/  
improved resistance to destruction/easier  
testability/threshold characteristics evaluation

### Model Testing Design

High/ambient/low temperature measurement (all chips)/  
100% HV stress testing/PAT system implementation

### Model Certification Standards

JEITA based/ JEDEC, AEC-Q100/AEC-Q101/AEC-Q200-compliance  
· Long-term reliability testing · Lifetime est. based on WLR data  
· Electrostatic breakdown testing

### Wafer Process Management

SPC management/real-time monitoring/  
100% chip defect inspection

### Assembly Process Management

Main processing point real-time work and check/  
workmanship guarantee (i.e. internal X-ray inspection,  
reflow screening/ 4M consolidation

### Traceability, Kept Samples, In-Process Failure Analysis, etc.

Kept samples from all lots stored for 10 years  
(for important security applications)/in-process failure  
analysis of all lots, etc.

## ROHM Group Locations (Japan)

### Sales Offices

|          |           |             |            |
|----------|-----------|-------------|------------|
| Kyoto    | Nagoya    | Nishi-Tokyo | Utsunomiya |
| Tokyo    | Matsumoto | Sendai      |            |
| Yokohama | Mito      | Takasaki    |            |

### Manufacturing Facilities

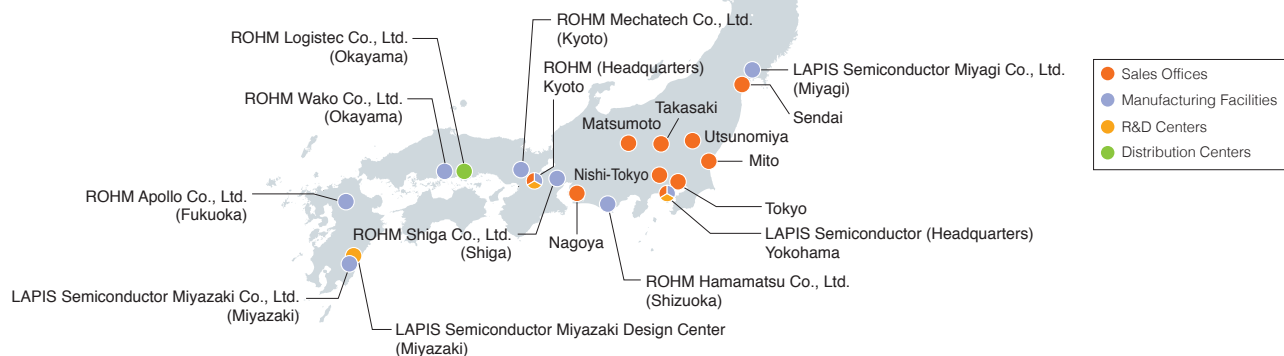
|                          |                                        |
|--------------------------|----------------------------------------|
| ROHM Co., Ltd.           | LAPIS Semiconductor Co., Ltd.          |
| ROHM Shiga Co., Ltd.     | LAPIS Semiconductor Miyagi Co., Ltd.   |
| ROHM Hamamatsu Co., Ltd. | LAPIS Semiconductor Miyazaki Co., Ltd. |
| ROHM Wako Co., Ltd.      |                                        |
| ROHM Apollo Co., Ltd.    |                                        |
| ROHM Mechatech Co., Ltd. |                                        |

### R&D Centers

|                                               |
|-----------------------------------------------|
| Kyoto Technology Center (Head Office)         |
| Kyoto Technology Center (Kyoto Ekimae)        |
| Yokohama Technology Center                    |
| LAPIS Semiconductor Co., Ltd. (Shin-Yokohama) |
| LAPIS Semiconductor Miyazaki Design Center    |

### Distribution Centers

|                         |
|-------------------------|
| ROHM Logistec Co., Ltd. |
|-------------------------|



## ROHM Group Locations (Global)

### Sales Offices

|         |                                            |
|---------|--------------------------------------------|
| ASIA    | ROHM Semiconductor Korea Corporation       |
|         | ROHM Semiconductor (Beijing) Co., Ltd.     |
|         | ROHM Semiconductor (Shanghai) Co., Ltd.    |
|         | ROHM Semiconductor (Shenzhen) Co., Ltd.    |
|         | ROHM Semiconductor Hong Kong Co., Ltd.     |
|         | ROHM Semiconductor Taiwan Co., Ltd.        |
|         | ROHM Semiconductor Singapore Pte. Ltd.     |
|         | ROHM Semiconductor Philippines Corporation |
|         | ROHM Semiconductor (Thailand) Co., Ltd.    |
|         | ROHM Semiconductor Malaysia Sdn. Bhd.      |
|         | ROHM Semiconductor India Pvt. Ltd.         |
| AMERICA | ROHM Semiconductor U.S.A., LLC             |
|         | ROHM Semiconductor do Brasil Ltda.         |
| EUROPE  | ROHM Semiconductor GmbH                    |

### Manufacturing Facilities

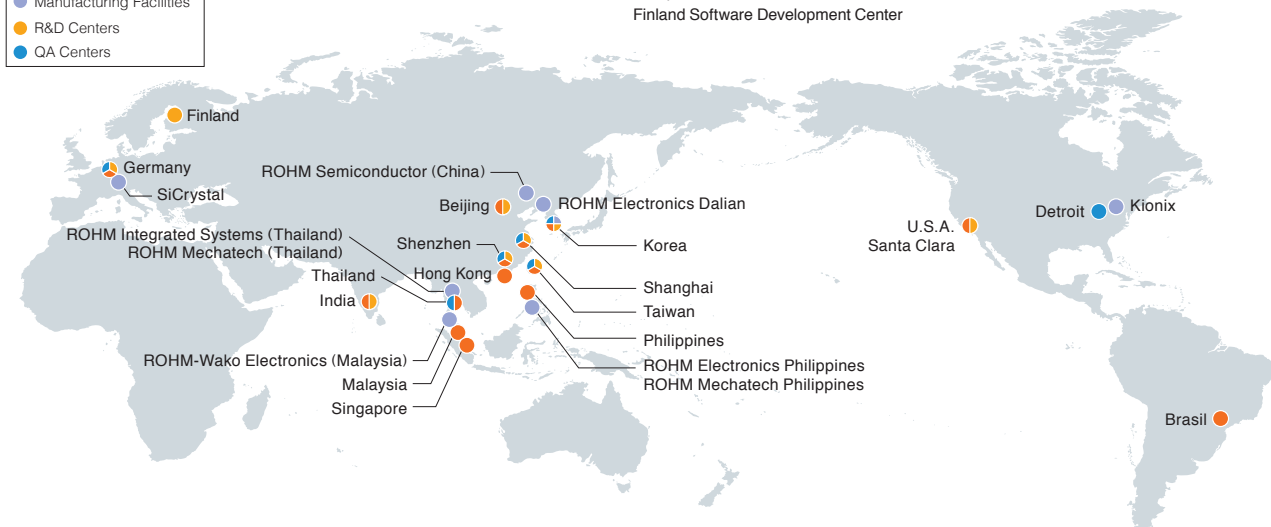
|      |                                              |         |                |
|------|----------------------------------------------|---------|----------------|
| ASIA | ROHM Korea Corporation                       | AMERICA | Kionix, Inc.   |
|      | ROHM Electronics Philippines, Inc.           | EUROPE  | SiCrystal GmbH |
|      | ROHM Integrated Systems (Thailand) Co., Ltd. |         |                |
|      | ROHM Semiconductor (China) Co., Ltd.         |         |                |
|      | ROHM Electronics Dalian Co., Ltd.            |         |                |
|      | ROHM-Wako Electronics (Malaysia) Sdn. Bhd.   |         |                |
|      | ROHM Mechatech Philippines, Inc.             |         |                |
|      | ROHM Mechatech (Thailand) Co., Ltd.          |         |                |

### R&D Centers

|         |                                            |
|---------|--------------------------------------------|
| ASIA    | Korea Technical Center                     |
|         | Beijing Technical Center                   |
|         | Shanghai Technical Center                  |
|         | Shenzhen Technical Center                  |
|         | Taiwan Technical Center                    |
|         | India Technical Center/India Design Center |
| AMERICA | Americas Technical Center (Santa Clara)    |
| EUROPE  | Europe Technical Center                    |
|         | Finland Software Development Center        |

### QA Centers

|         |                    |
|---------|--------------------|
| ASIA    | Korea QA Center    |
|         | Shanghai QA Center |
|         | Shenzhen QA Center |
|         | Taiwan QA Center   |
|         | Thailand QA Center |
| AMERICA | America QA Center  |
| EUROPE  | Europe QA Center   |



- 1) The information contained in this document is current as of March 1st, 2019.
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- 4) Examples of application circuits, circuit constants and any other information contained herein are provided only to illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.
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- 8) For use of our Products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a ROHM representative: transportation equipment (i.e. cars, ships, trains), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems.
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Contact us for further information about the products.

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| <b>Atlanta</b>     | +1-770-754-5972  | <b>Nuremberg</b>      | +49-911-810452-26     | <b>Shanghai</b>    | +86-21-6072-8612  | <b>Kyoto</b>    | +81-75-365-1077  |
| <b>Boston</b>      | +1-781-565-1138  | <b>France</b>         | +33 (0) 1 40 60 87 30 | <b>Shenzhen</b>    | +86-755-8307-3008 | <b>Yokohama</b> | +81-45-476-2121  |
| <b>Chicago</b>     | +1-847-368-1006  | <b>United Kingdom</b> | +44-1-908-272400      | <b>Hong Kong</b>   | +852-2740-6262    |                 |                  |
| <b>Detroit</b>     | +1-248-348-9920  | <b>Finland</b>        | +358-400-726 124      | <b>Taiwan</b>      | +886-2-2500-6956  |                 |                  |
| <b>San Diego</b>   | +1-858-625-3600  | <b>Spain</b>          | +34-9375-24320        | <b>Singapore</b>   | +65-6436-5100     |                 |                  |
| <b>Mexico</b>      | +52-33-3123-2001 | <b>Hungary</b>        | +36-1-950-5859        | <b>Philippines</b> | +63-2-807-6872    |                 |                  |
| <b>Brazil</b>      | +55-11-3539-6320 | <b>Italy</b>          | +39-039-5783432       | <b>Thailand</b>    | +66-2-254-4890    |                 |                  |
| <b>Germany</b>     | +49-2154-921-0   | <b>Seoul</b>          | +82-2-8182-700        | <b>Malaysia</b>    | +60-3-7931-8155   |                 |                  |

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