ROHM
SEMICONDUCTOR

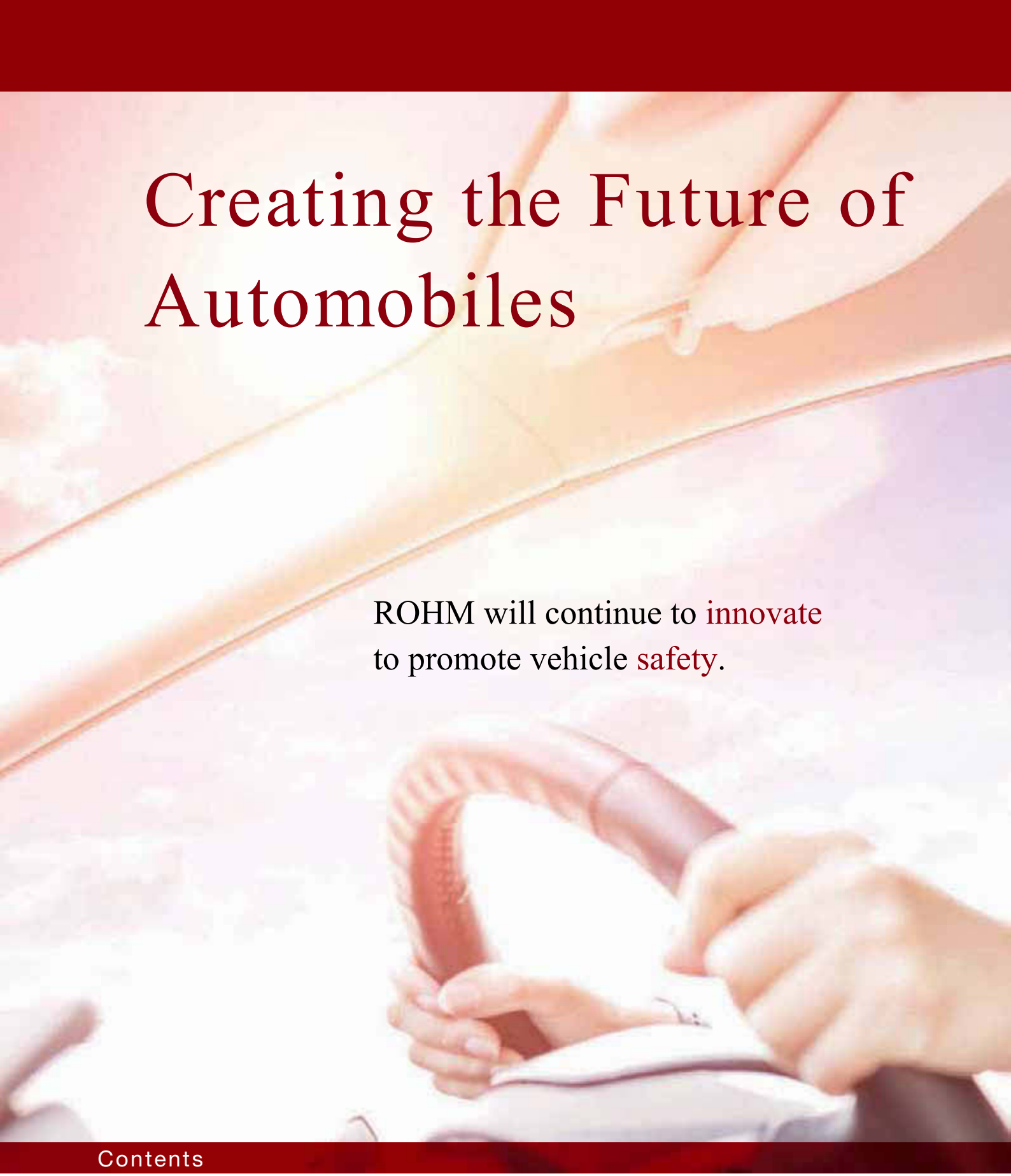
Creating the Future of Automobiles

AUTOMOTIVE

PRODUCT CATALOG **Ver.2.4**

Creating the Future of Automobiles

ROHM will continue to innovate to promote vehicle safety.



Contents

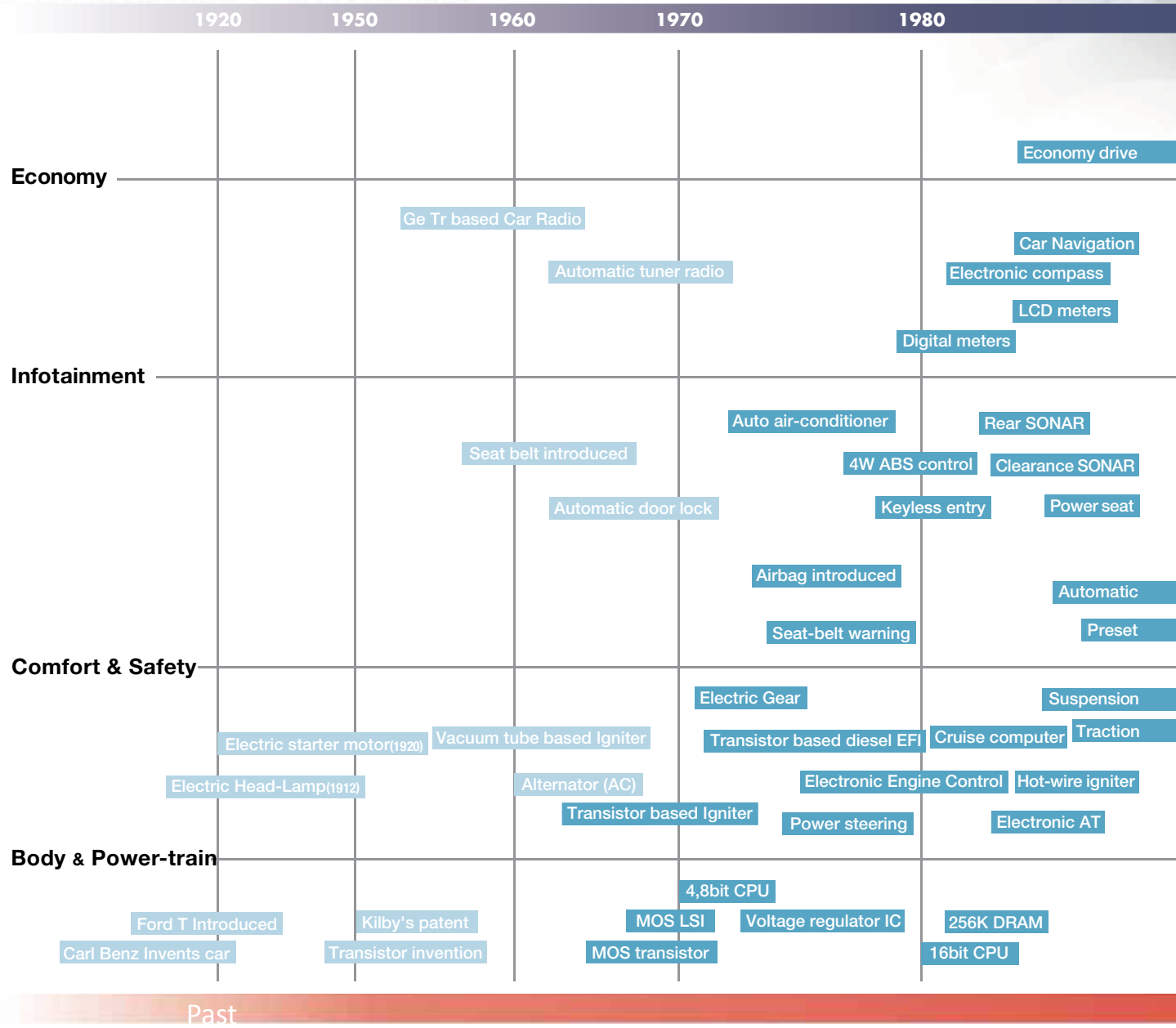
Along with evolving technologies, ROHM continues to propose optimized solutions for the automotive industry.

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

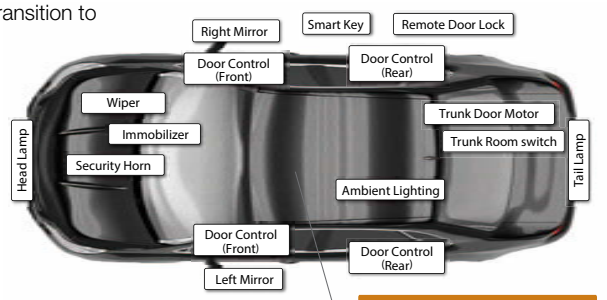
Automotive evolution

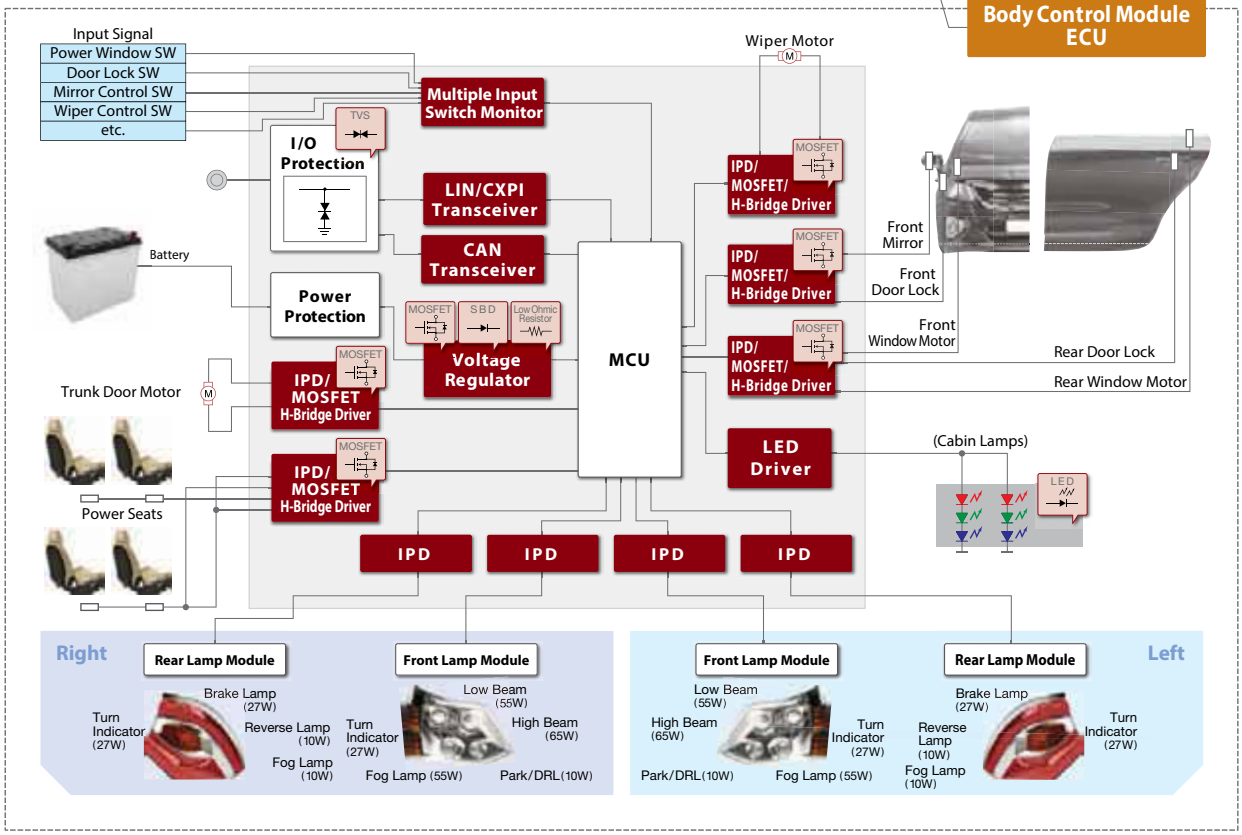


	1990	2000	2010	2020
				(ROHM Survey)
mode		Hybrid Regenerative braking Idle-stop start	48V hybrid	EV > 1000km Solar cells Vehicle wireless charging
	Holographic HUD GPS based navigation Navigation(bird view)+Voice Hands-free car phone Integrated instrumentation panel	Navigation with VICS On-demand infotainment	Automotive telematics X-by-wire Multi-color HUD Online services	Intelligent HMI Gesture interface
	Electronic suspension Radar cruise control Tire pressure monitor Drowsiness detection Side Airbag Inter-car distance warning i-SRS airbag system	AFS Front & Side monitor Power slide door Lane assistance Night vision	Stereo camera Crash detect Intelligent parking assist	V2X Autonomous driving
wiper steering	Brake assist Wireless door-lock	LIDAR based ACC	Low speed ACC	
control control	Automatic engine oil control Rack assist EPS Active exhaust system	6 speed level AT Electric parking brake 7 speed level AT	Mirror less Occupant detection	9 speed level AT
		LED Lamp		Laser head lamp Harness less

BODY CONTROL MODULE

The Body Control Module(BCM)ECU provides centralized control of all body systems, from interior/exterior lighting, HVAC, doors and mirrors, windows, and wipers.
BCM functionality is rapidly expanding as vehicle manufacturers transition to electronic systems and control to provide greater comfort, fuel economy, safety, and entertainment features.
However, with this comes increased weight due to the greater number of wiring harnesses needed.
To minimize this added weight, communications such as LIN and CAN are often adopted.





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

BODY CONTROL MODULE Products

LIN Transceiver — BD41030FJ-C

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


SOP-J8

···P.41

RGB LED Driver — BD2808MUV-M

Integrated 8-bit dimming function and 6-bit current DAC for RGB make it possible to produce a broad range of colors.


VQFN48MCV070

···P.35

MOSFET — 60V Series 100V Series

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


SOP8

···P.62 to 64

Schottky Barrier Diodes — Ultra Low IR Series Low VF Series

Select from among 4 different series to meet application requirements for V_F and I_R.


SOD-123FL

···P.71 to 78

Bi-Directional Zener Diode — RSBC6.8CS

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


SOD-923

···P.85 to 86

High Power Low Ohmic Chip Shunt Resistors — GMR series

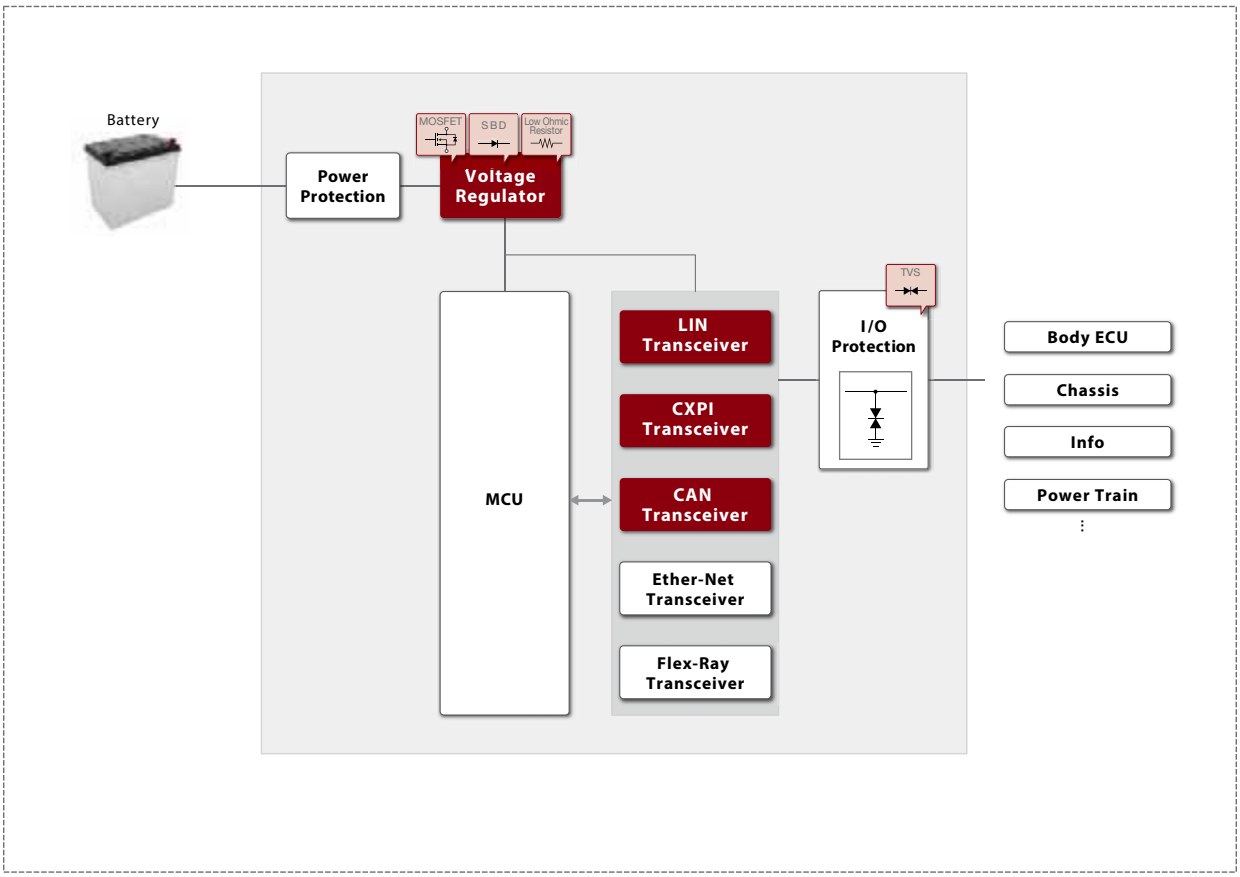
Adopting a new structure results in high heat dissipation and superior temperature characteristics. 3W rated power guaranteed in a compact 6432 size.


GMR100

···P.103

GATEWAY ECU

To meet the increasing need for electronic control for the engine, body, and other systems, cars have adopted multiple ECUs (Electronic Control Unit).
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.



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

GATEWAY ECU Products

LIN Transceiver — BD41030FJ-C

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


SOP-J8

···P.41

CXPI Transceiver — BD41000FJ-C

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


SOP-J8

···P.41

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.62 to 64

Schottky Barrier Diodes — Ultra Low I_R Series / Low V_F Series

Select from among 4 different series to meet application requirements for V_F and I_R.


SOD-123FL

···P.71 to 78

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.101 to 102

Bi-Directional Zener Diode — RSBC6.8CS

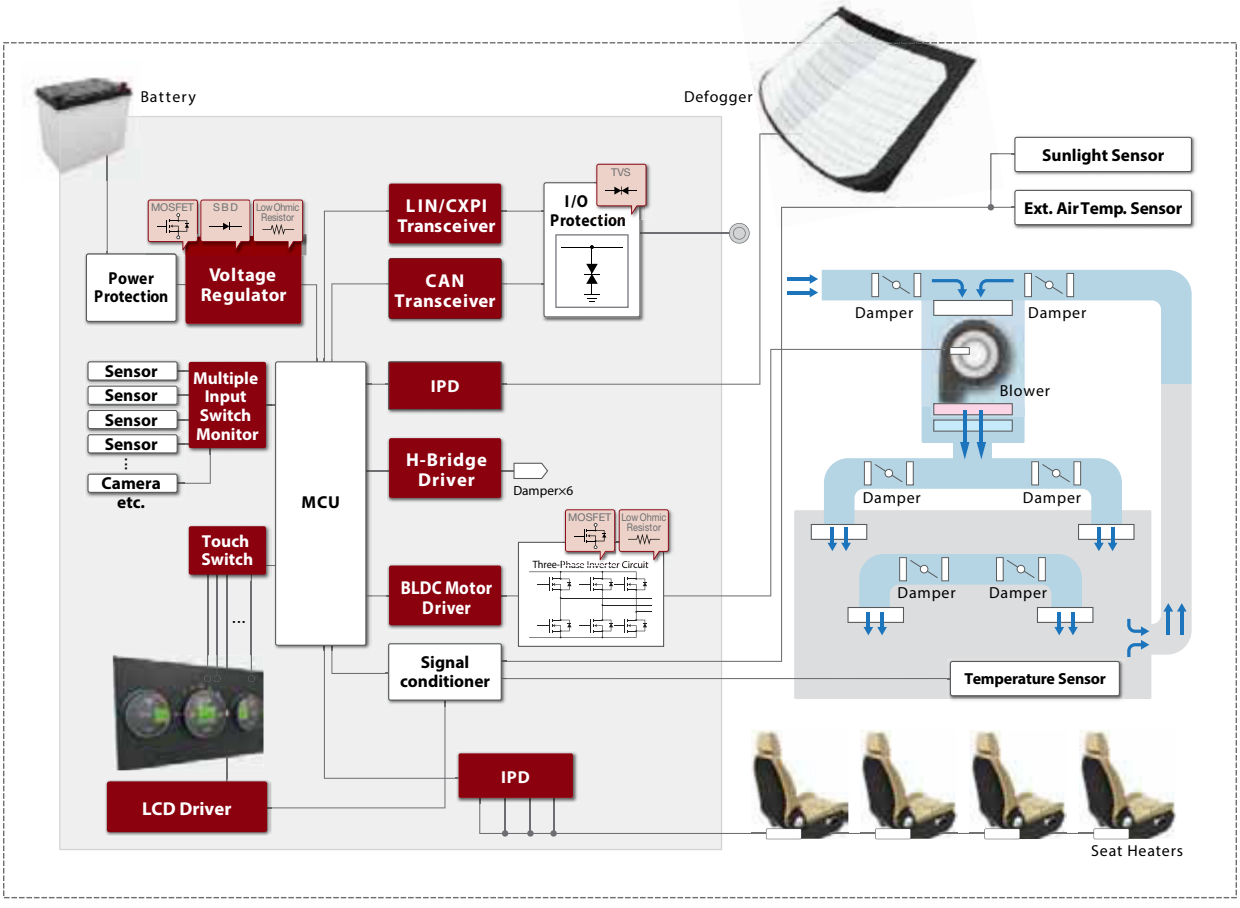
Bi-Directional Zener Diode series optimized for LIN & CAN.


SOD-923

···P.86

HVAC CONTROL MODULE

The HVAC(Heating Ventilation and Air Conditioning)system cools the interior using the refrigeration cycle using a compressor and warms by extracting the engine's waste heat from the coolant.
It often includes a manual mode for operating the fan and adjusting the percentage of warm and cold air mixture, and an automatic mode that adjusts the temperature and air flow rate based on a preset temperature.
The following figure shows the block diagram of a typical HVAC system.
Switching the power source from the gas engine in conventional vehicles to the electric motor in HEVs and EVs results in a much quieter cabin, which can make the blower noise from the AC or seat heating/cooling fan motor's noise particularly noticeable.
Therefore, to minimize this noise and improve thermal efficiency, it is customary to replace the conventional brushed DC motors used for blower and fan motors with brushless motors.



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

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

BLDC Motor Driver — BD16805FV-M

180° commutation reduces noise and improves efficiency through advance control. ···P.36


SSOP-B40

H-Bridge Driver — BD16922EFV-M

Built-in low ON resistance DMOSFET improves efficiency while reducing heat generation. ···P.36


HTSSOP-B24

MOSFET — 40V Series 60V Series

Optimized for a variety of drive circuits (i.e. motor drive). Advanced processes provide low ON resistances. ···P.62 to 64


TO-252

Schottky Barrier Diodes — Ultra Low I_R Series Low V_F Series

Select from among 4 different series to meet application requirements for V_F and I_R. ···P.71 to 78


SOD-123FL

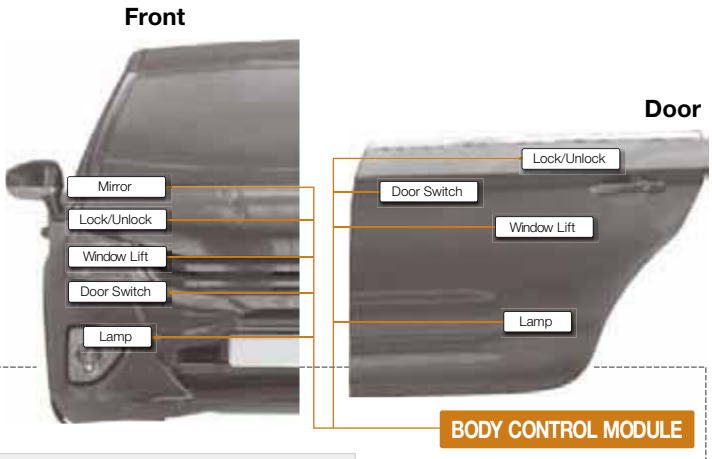
High Power Ultra Low Ohmic Chip Shunt Resistors — PSR Series

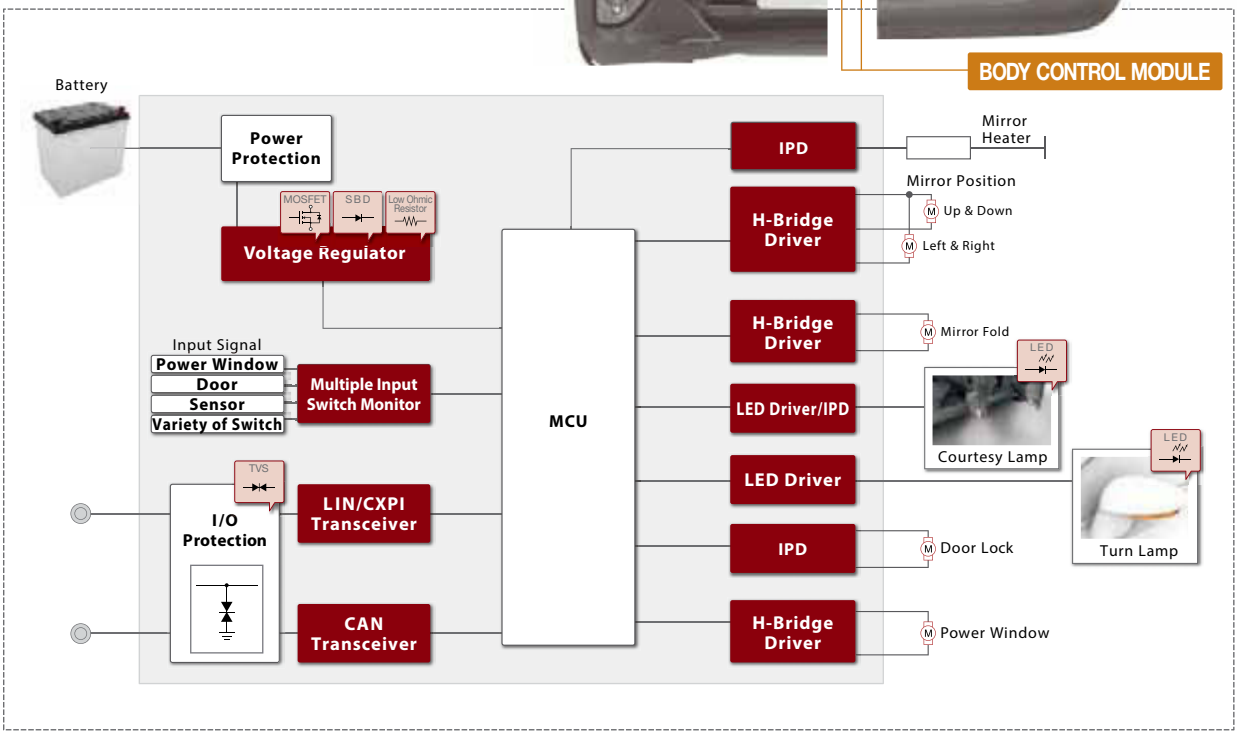
5W rated power guaranteed in the ultra-low-resistance region from 0.2mΩ. ···P.103


PSR500

DOOR & MIRROR CONTROL MODULE

This ECU is responsible for controlling the door locks and power 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.





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

DOOR & MIRROR CONTROL MODULE Products

LIN Transceiver — BD41030FJ-C

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

SOP-J8

···P.41

H-Bridge Driver — BD16922EFV-M

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

HTSSOP-B24

···P.36

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.62 to 64

Schottky Barrier Diodes — Ultra Low IR Series, Low VF Series

Select from among 4 different series to meet application requirements for V_F and I_R.

SOD-123FL

···P.71 to 78

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.101 to 102

Bi-Directional Zener Diode — RSBC6.8CS

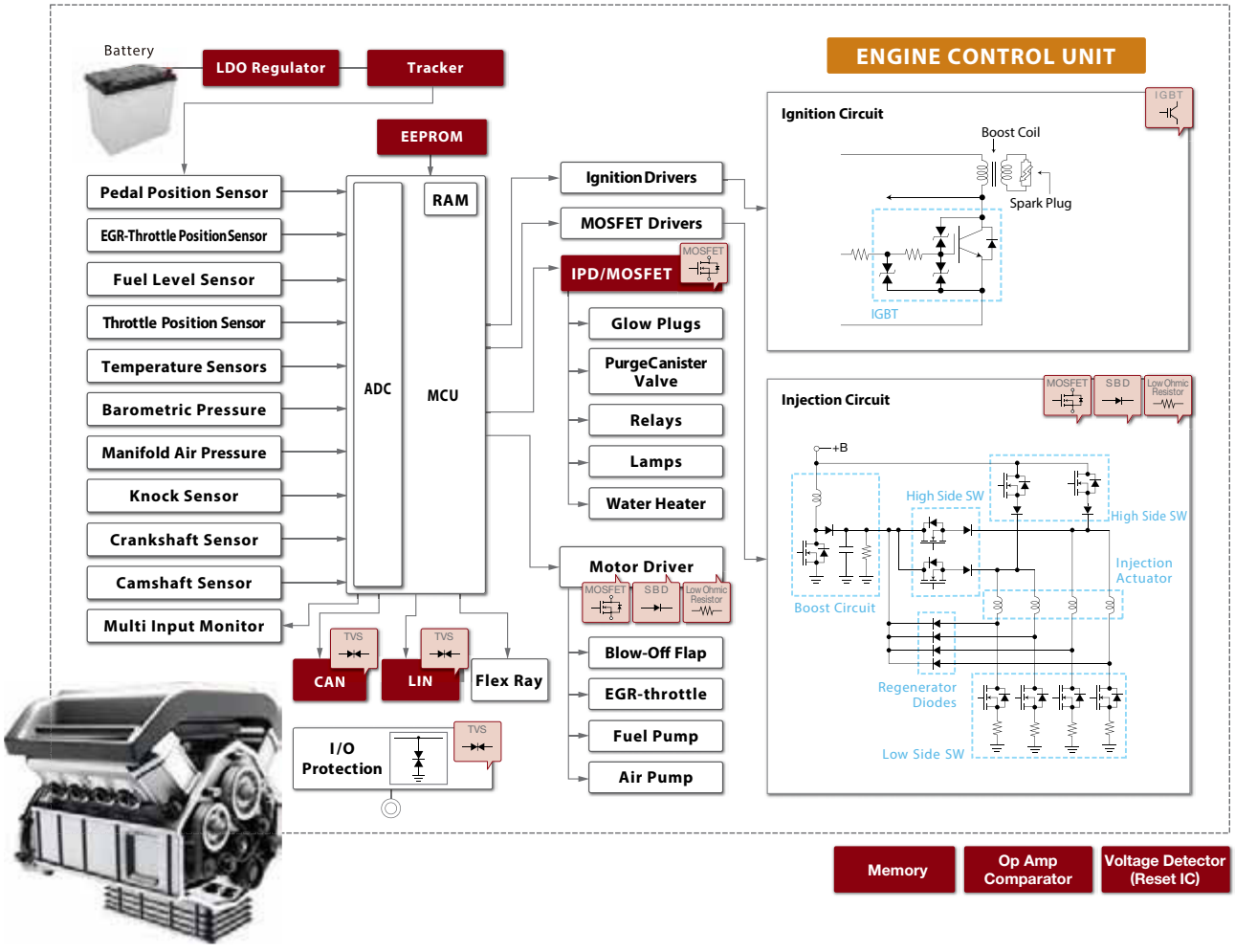
Bi-Directional Zener Diode series optimized for LIN & CAN.

SOD-923

···P.86

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

Intelligent Power Device BD1LB500EFJ-C
Developed utilizing dedicated IPD processes. Lineup extends to the low ON resistance range. HTSOP-J8
···P.37

Multi Input Monitor BD3375MUV-M
Contributes to using fewer MCU ports. Intermittent operation reduces power consumption. VQFP48
···P.41

LIN Transceiver BD41030FJ-C
Complies with the automotive local network standard LIN Ver. 2.1. SOP-J8
···P.41

TVS RESD1CAN
Ideal for the protection of CAN communication lines. SOT-23
···P.87

MOSFET 60V/100V/200V/250V Series
Supports a variety of drive circuits (i.e. actuators). Advanced processes provide low ON resistances. TO-252
···P.62 to 64

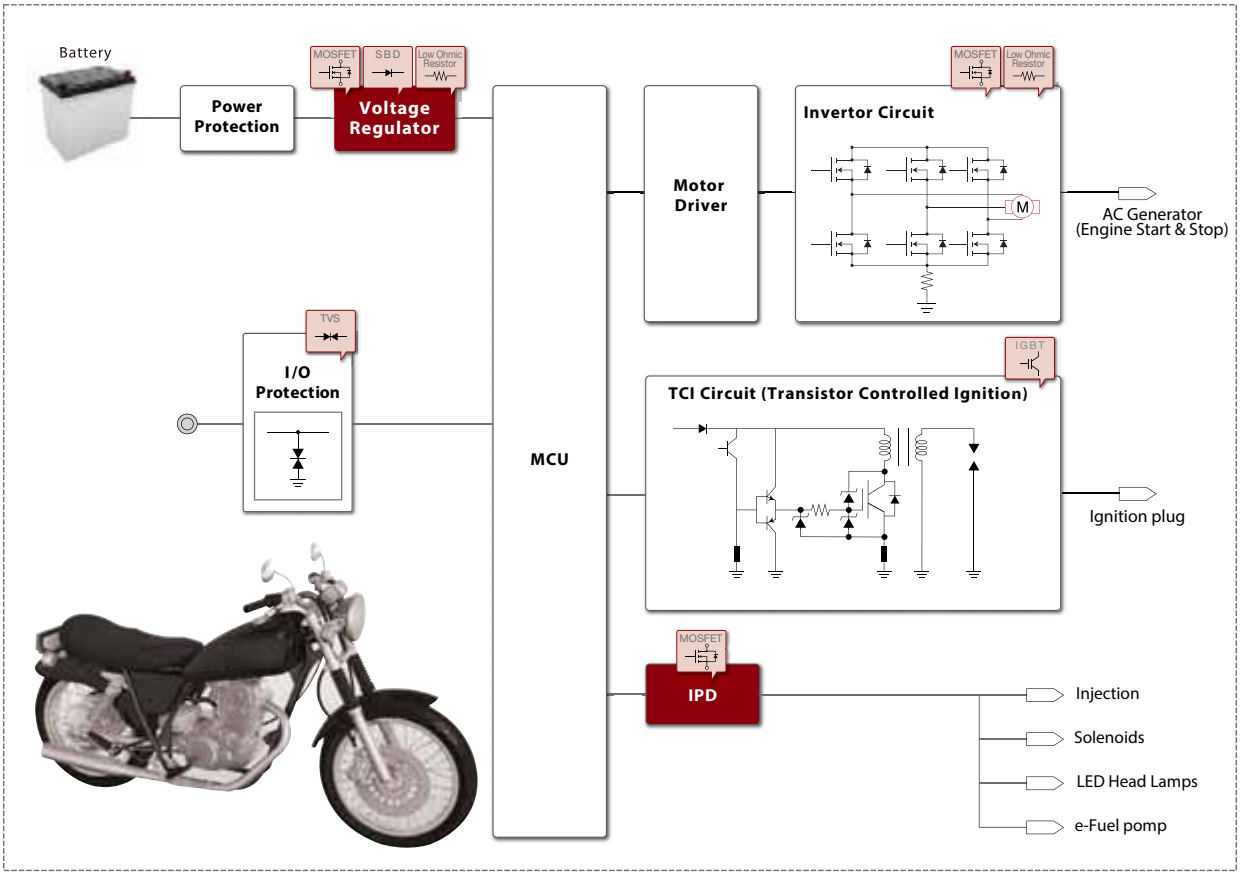
Schottky Barrier Diodes Ultra Low I_R Series / Low V_F Series
Select from among 4 different series to meet application requirements for V_F and I_R. SOD-123FL
···P.71 to 78

Anti-surge Chip Resistors SDR Series / ESR Series
Newly developed lineup features improved surge resistance, contributing to greater reliability. SDR03 / ESR03
···P.97

IGBT RGP Series
IGBT for ignition circuits features high avalanche withstand capability and low $V_{CE(sat)}$. TO-252
···P.61

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.



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

ENGINE CONTROL UNIT Products

Intelligent Power Device — BD1LB500EFJ-C

Developed utilizing dedicated IPD processes. Lineup extends to the low ON resistance range.


HTSOP-J8

···P.37

IGBT — RGP Series

IGBT for ignition circuits features high avalanche withstand capability and low $V_{CE(sat)}$.


TO-252

···P.61

MOSFET — 60V/100V/200V/250V Series

Supports a variety of drive circuits (i.e. actuators). Advanced processes provide low ON resistances.


TO-252

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Schottky Barrier Diodes — Ultra Low I_R Series / Low V_F Series

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SOD-123FL

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Anti-surge Chip Resistors — SDR Series / ESR Series

Newly developed lineup features improved surge resistance, contributing to greater reliability.


SDR03
ESR03

···P.97

TVS — RESD1CAN

Ideal for the protection of CAN communication lines.


SOT-23

···P.87

ELECTRONIC POWER STEERING(EPS)

Electronic Power Steering (EPS) has seen increased adoption over hydraulic power steering in recent years, with most new cars now being equipped with EPS. Shifting towards electrification eliminates the need for a power steering pump, reducing the weight and reducing the overall fuel consumption by around 3%.
EPS also provides better driveability and performance by adjusting the torque via software based on vehicle speed, generating active torque when needed to improve vehicle safety.
Additional driver support features such as lane and parking assist are also possible by expanding the EPS functionality.

EPS is achieved by detecting the steering position via a torque sensor, and the motor is driven using a gate driver and power transistor combination(see block diagram below).
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.
Although this represents a solution that uses a MCU, this is also possible with a gate driver that can be controlled by SPI communication.

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

ELECTRONIC POWER STEERING(EPS)Products

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.62 to 64

High Power Ultra Low Ohmic Chip Shunt Resistors — PSR Series

5W rated power guaranteed in the ultra-low-resistance region from 0.2mΩ.


PSR500

···P.103

Schottky Barrier Diodes — Ultra Low IR Series / Low VF Series

Select from among 4 different series to meet application requirements for V_F and I_R.


SOD-123FL

···P.71 to 78

TVS — RESD1CAN

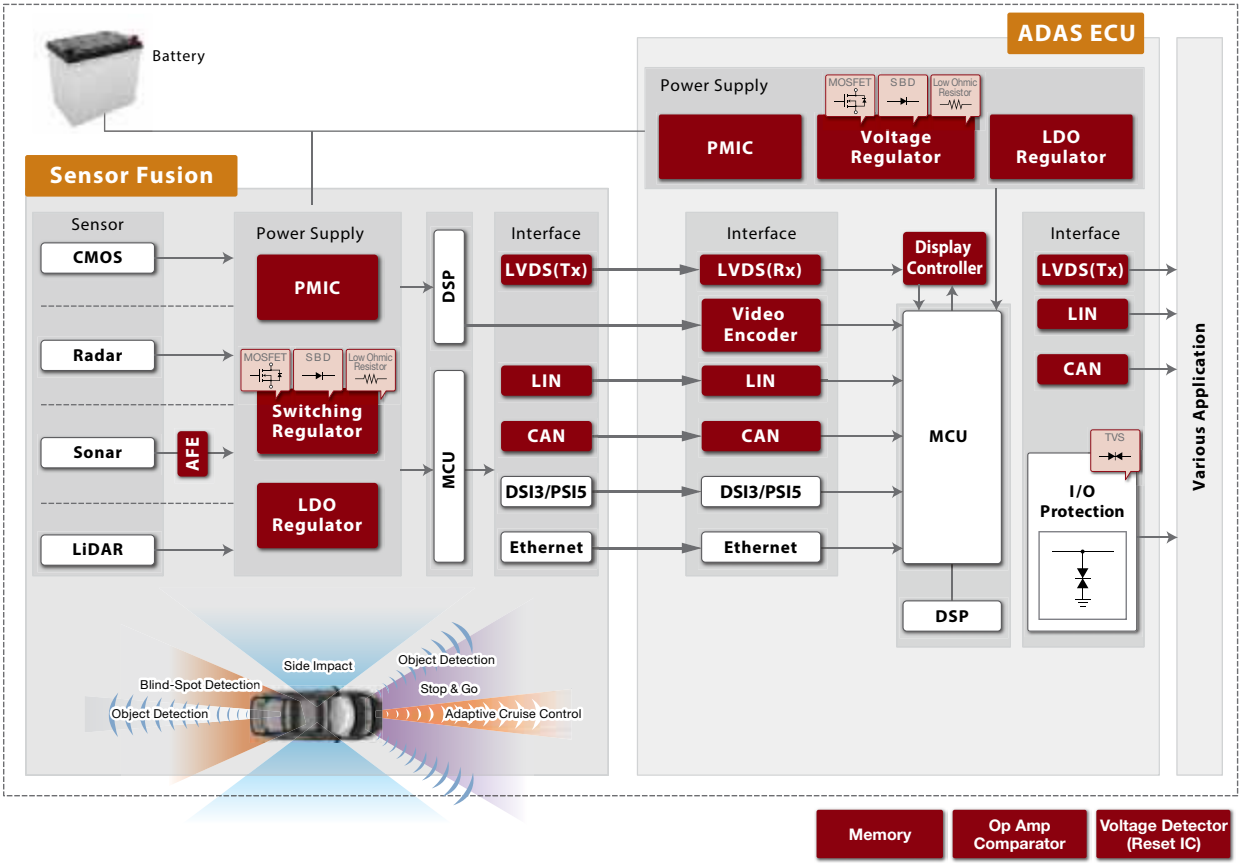
Ideal for the protection of CAN communication lines.


SOT-23

···P.87

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.



ADAS Products

Power Management IC for Automotive Camera Modules — BD868xMUV-C

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

VQFN32SV5050

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.

VSON008X2020

···P.32 to 34

LDO Regulator — BUxxJA2MNVX

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

SSON004R1010

···P.28

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

···P.101

Schottky Barrier Diodes — Ultra Low IR Series / Low VF Series

Select from among 4 different series to meet application requirements for V_F and I_R.

SOD-123FL

···P.71 to 78

MOSFET — 40V Series / 60V Series

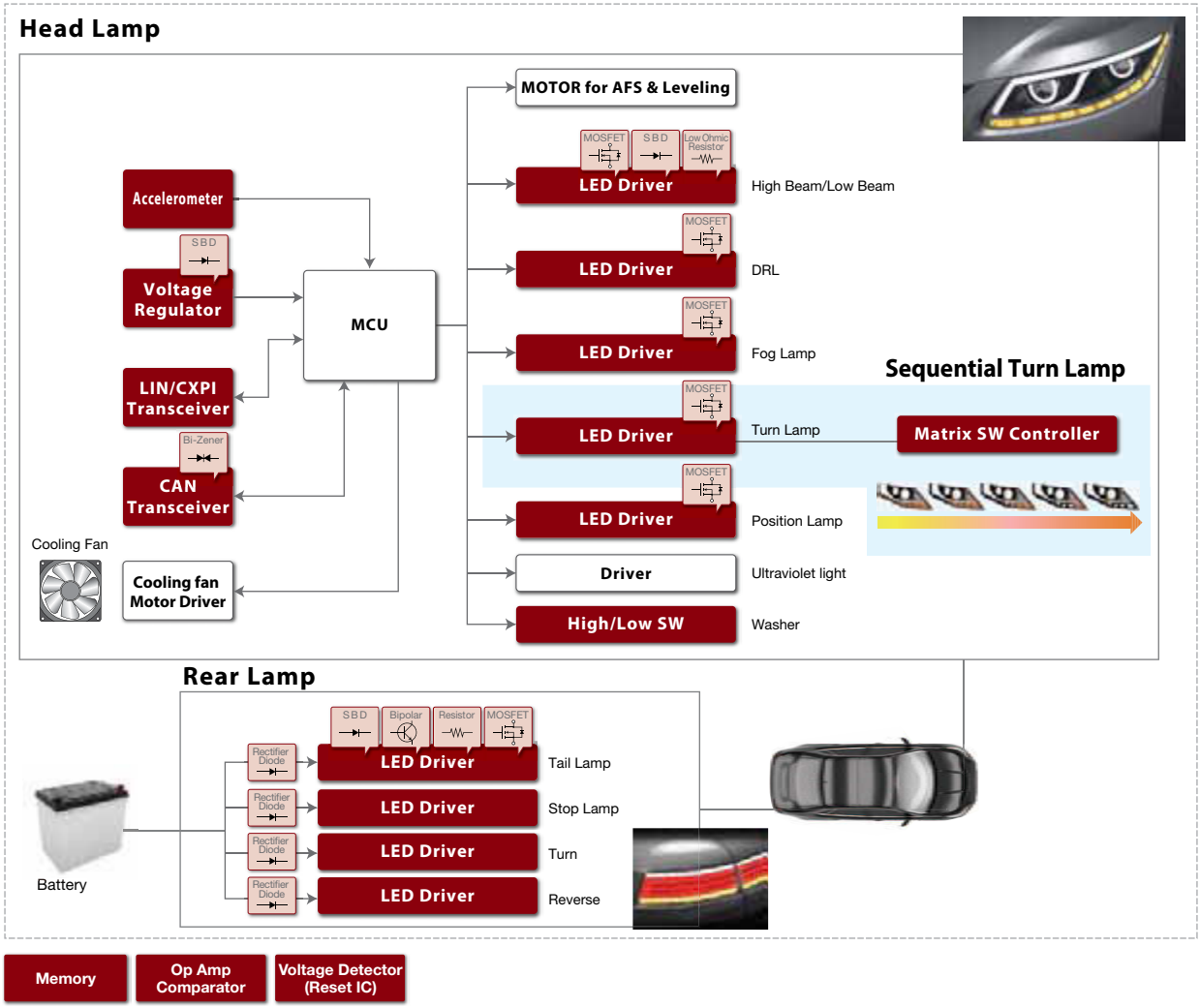
Optimized for a variety of drive circuits (i.e. switching power supply). Advanced processes provide low ON resistances.

SOP8

···P.62 to 64

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 developing controller ICs for ADB (Adaptive Driving Beam) systems that are expected to see widespread use.



LAMP MODULE Products

LED Driver (for Headlights) **BD18351EFV-M**

Boost controller with built-in CR Timer enables boost/boost-buck operation ideal for LED drive for headlight/DRL, rear lamp, and turn signal applications.

HTSSOP-B24

···P.35

LED Driver (for Rear Lamps) **BD18341FV-M**

Constant current controller capable of driving up to 10 external PNP transistors. Includes LED current derating along with LED open/short protection functions.

SSOP-B16

···P.36

Matrix SW Controller **BD18362EFV-M**

Built-in patterns facilitate sequential control without an MCU.

HTSSOP-B28

···P.35

Accelerometer **KX123-6000**

AEC-Q100 qualified compact low power 3-axis accelerometer for non-safety related vehicle systems.

LGA

···P.40

MOSFET **60V Series** **100V Series**

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

TO-252

···P.62 to 64

Schottky Barrier Diodes **Ultra Low I_R Series** **Low V_F Series**

Select from among 4 different series to meet application requirements for V_F and I_R.

SOD-123FL

···P.71 to 78

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.101 to 102

Bi-Directional Zener Diode **RSBC6.8CS**

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

SOD-923

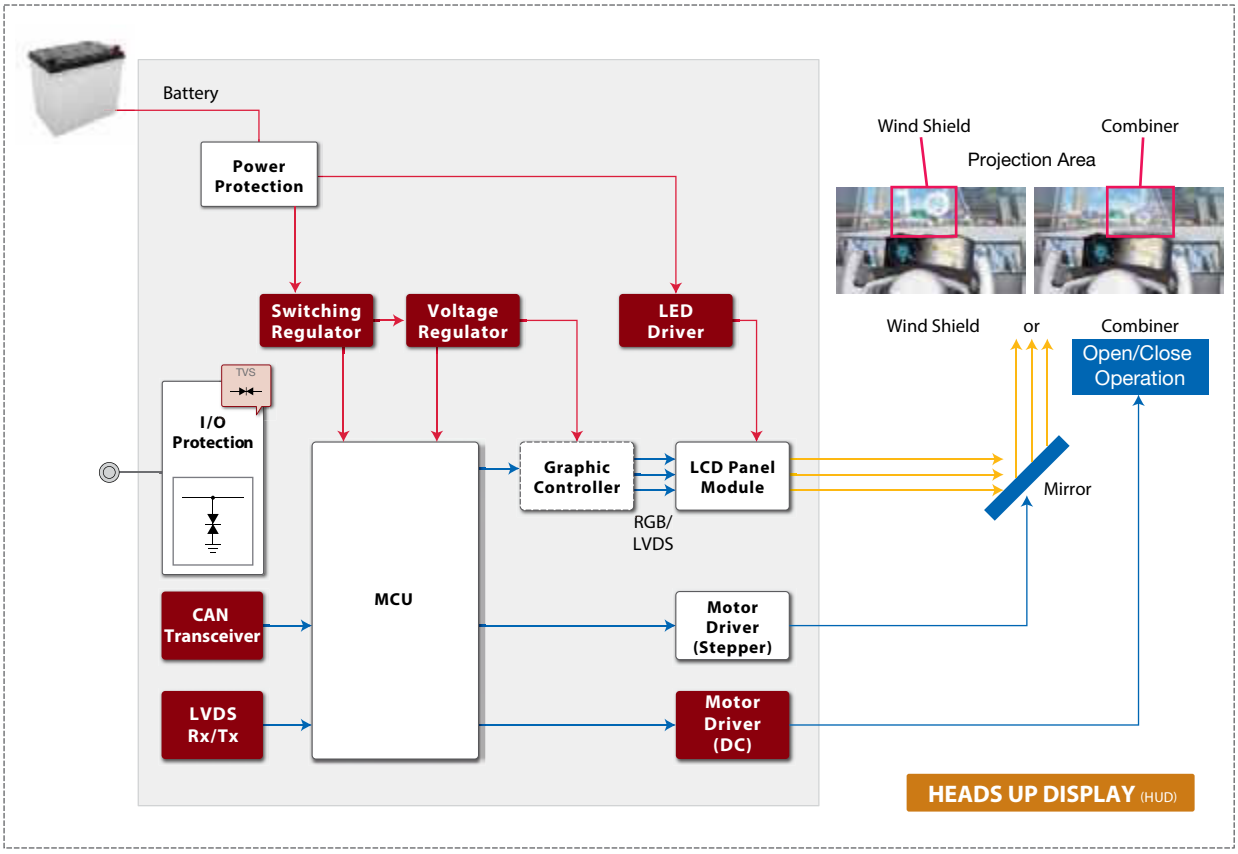
···P.86

Voltage Regulator ···P.27
LIN Transceiver ···P.41
Memory ···P.45
Operational Amplifier Comparator ···P.47
Voltage Detector (Reset IC) ···P.48
Rectifier Diodes ···P.82
High Power Chip Resistors (Wide Terminal Type) ···P.101

HEAD UP DISPLAY(HUD)

Head-Up Display (HUD) systems in cars are normally mounted on or near the windshield to present useful information to drivers.
This technology, first introduced in fighter planes, is being adopted in the automotive industry to improve safety by enabling drivers to view relevant data, such as time, vehicle speed, and navigation information, without having to take their eyes off the road.

LCDs are often used as light sources for head up displays.
Projecting data from a light source to the windshield and combiner makes it possible to display the speed, route, and other pertinent information.



HEAD UP DISPLAY Products

LED Driver (For Backlighting) — BD81A44EFV-M, BD81A44MUV-M

Built-in boost-buck switching regulator ensures stable operation even during battery fluctuations. ···P.35


HTSSOP-B28


VQFN28SV5050

MOSFET — 40V Series, 60V Series

Optimized for a variety of drive circuits (i.e. switching power supply). Advanced processes provide low ON resistances. ···P.62 to 64


SOP8

Schottky Barrier Diodes — Ultra Low IR Series, Low VF Series

Select from among 4 different series to meet application requirements for V_F and I_R. ···P.71 to 78

SOD-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.101 to 102


LTR18

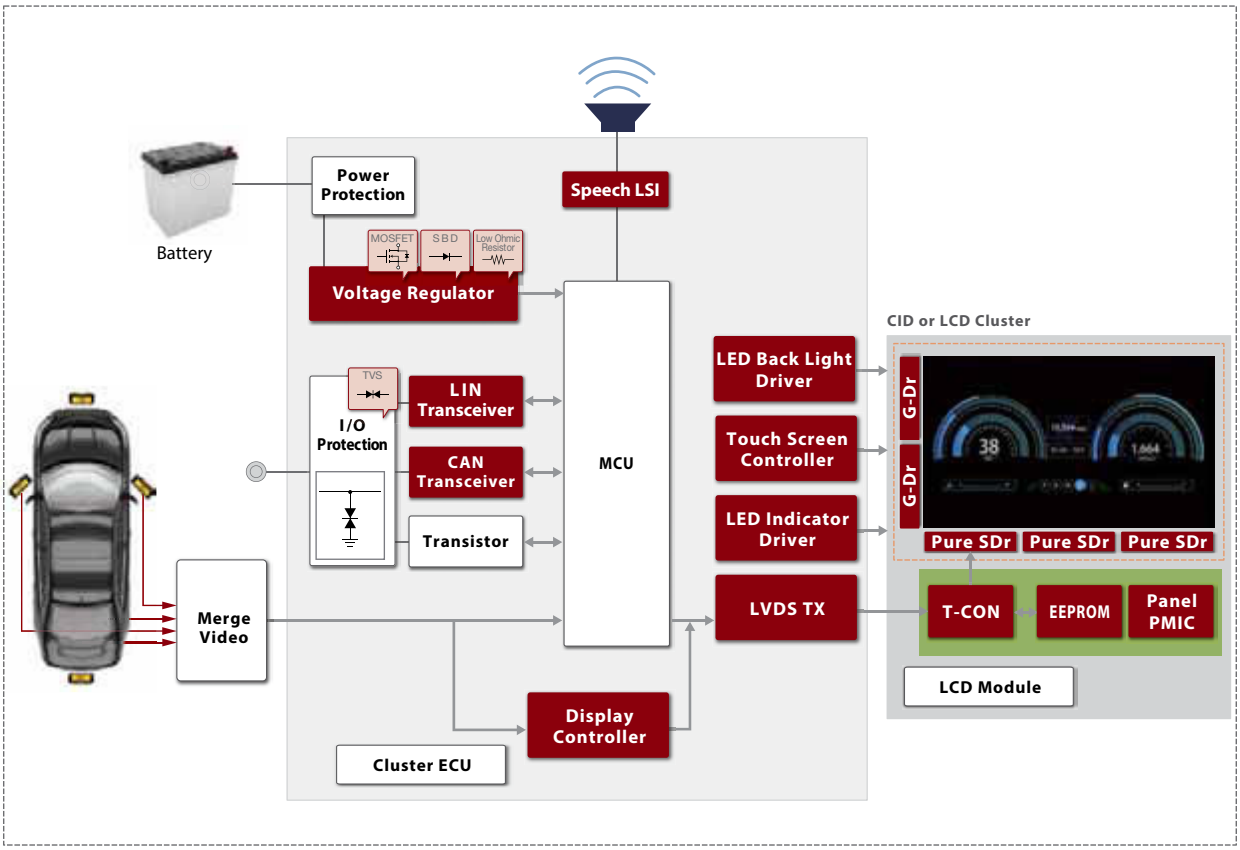
Bi-Directional Zener Diode — RSBC6.8CS

Bi-Directional Zener Diode series optimized for LIN & CAN. ···P.85 to 86


SOD-923

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.
Along with the computerization of cars and emergence of Advanced Driver Assist Systems(ADAS), conventional meters are being replaced with LCD panels for displaying detailed information using rich graphics. 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

LED Driver (For Backlighting) — BD81A44EFV-M, BD81A44MUV-M

Built-in boost-buck switching regulator ensures stable operation even during battery fluctuations. ···P.35

LVDS Interface — BU92T101-M, BU92RT82-M

Converts 24bit parallel data to OpenLDI. The reverse is also possible. ···P.41

Touch Screen Controller — BU21024FV-M

Enables 2-point touch detection in 4-wire resistive touchscreens. ···P.40

LED Driver (For Indicators) — BD8378FV-M, BD8379FV-M

Compact packages contribute to increased space savings. Supports cascade connections for efficient driving of multiple LEDs. ···P.35

Video Decoder — ML86101A, ML86V7675

Compatible with the 3 major global standards (NTSC/PAL/SECAM), making them suitable for video devices worldwide. ···P.43

Speech LSI — ML22(Q)xxx

Features include 4ch mixing, built-in speaker amp, guaranteed operation up to +105°C, and multiple fail-safe functions required by automotive applications. ···P.42

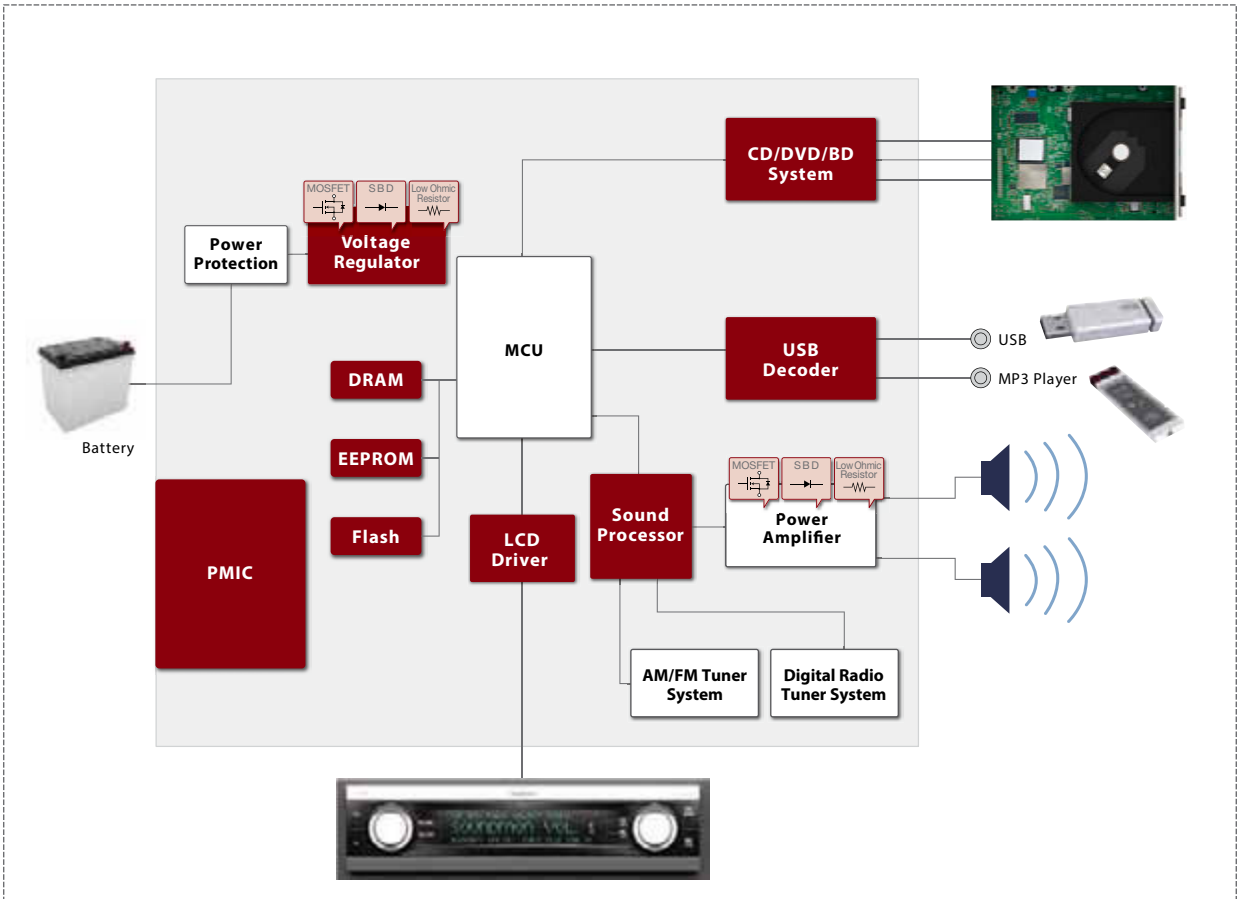
LED — SML-D15 Series

High-brightness single-rank LEDs that eliminate brightness variations offered in a standard surface-mount package. ···P.105 to 107

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.
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 Comparator | Voltage Detector (Reset IC)

CAR AUDIO Products

Sound Processor — BD37033FV, BD37034FV

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


SSOP-B28

···P.42

System Motor Driver for ODD — BD8266EFV, BD8255MUV

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


HTSSOP-B24


VQFN48SV7070

···P.36

LCD Driver — BU97530KVT-M

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


TQFP100V

···P.39

MOSFET — 40V Series, 60V Series

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


SOP8

···P.62 to 64

Schottky Barrier Diodes — Ultra Low IR Series, Low VF Series

Select from among 4 different series to meet application requirements for V_F and I_R.


SOD-123FL

···P.71 to 78

Low Ohmic Chip Resistors — UCR Series

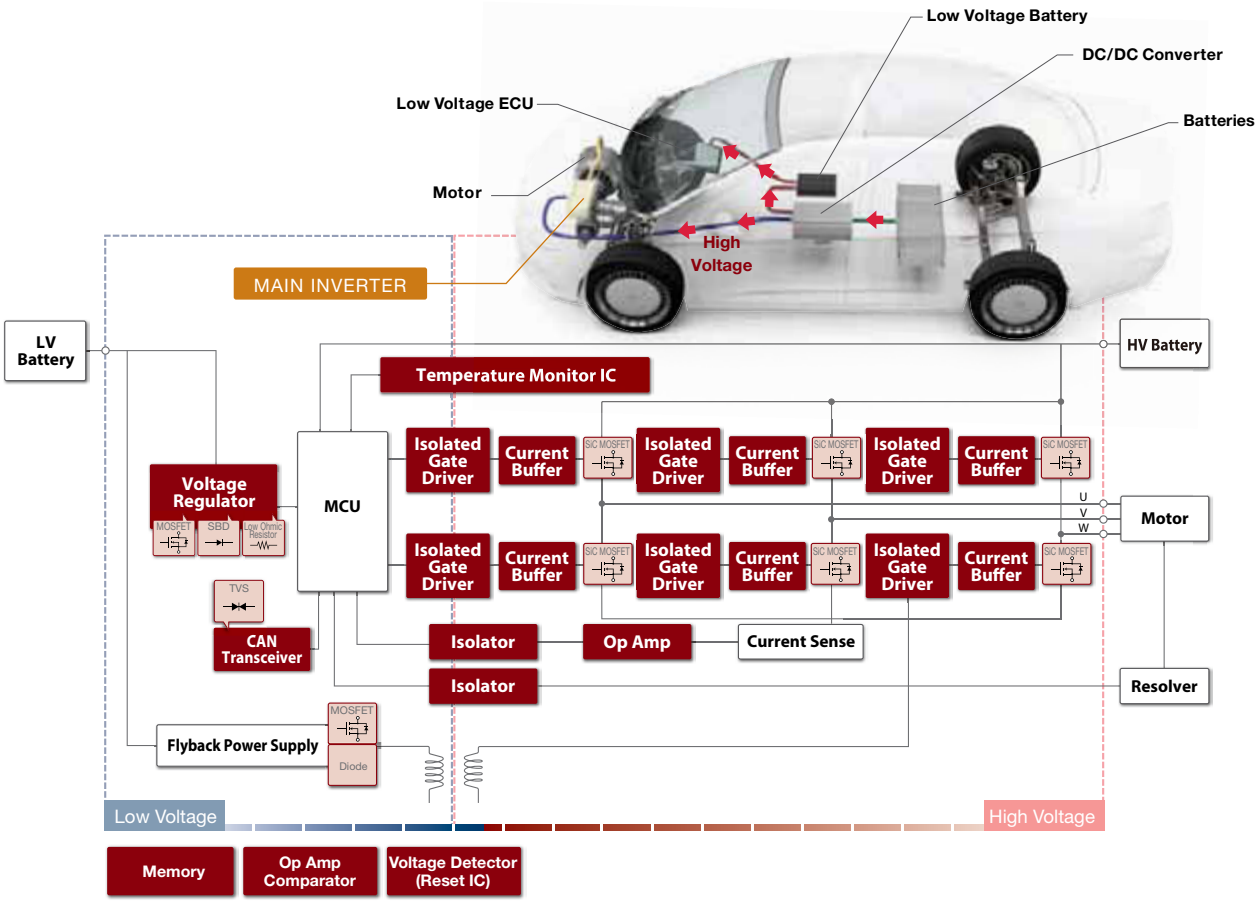
Compact, high heat resistance low-ohmic lineup delivers superior rated power in a variety of sizes, from 0603 to 3216.


UCR10

···P.101

MAIN INVERTER

The main inverter converts DC voltage supplied by the battery into 3-phase AC voltage for driving the motor. Conventional inverters typically use a combination of IGBTs and diodes, but in recent years SiC MOSFETs and SiC SBDs (Schottky Barrier Diodes) that can achieve lower resistance and switching losses are attracting increased attention. Going forward, we will work on further improving performance, such as by reducing ON resistance.



MAIN INVERTER Products

Op Amp — BA8290x Series

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

···P.47


SOP8

LDO Regulator — BD4xxMx 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 I_R Series, Low V_F Series

Select from among 4 different series to meet application requirements for V_F and I_R.

···P.71 to 78


SOD-123FL

High Power Ultra Low Ohmic Chip Shunt Resistors — PSR Series

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

···P.103


PSR100

TVS — RESD1CAN

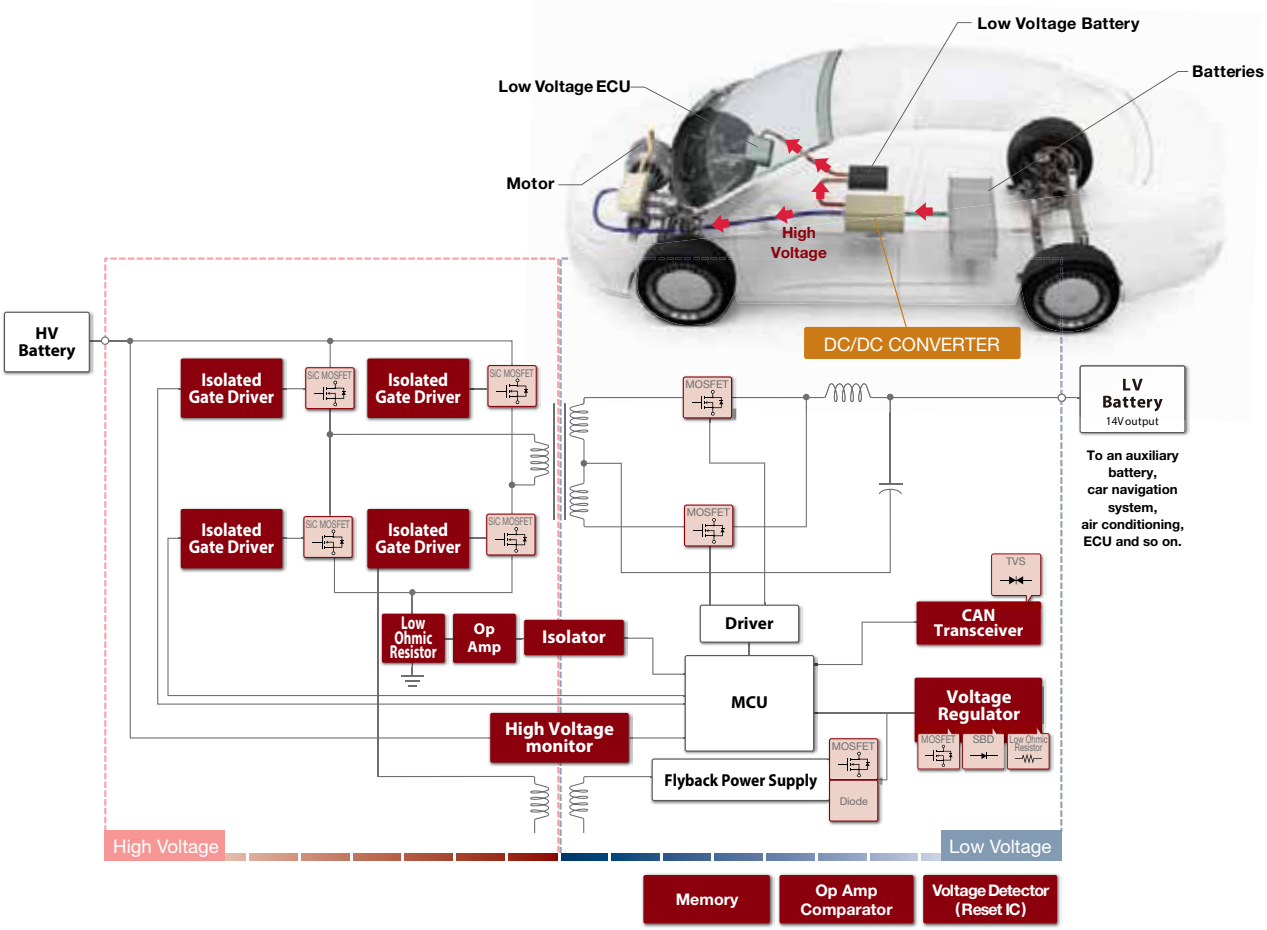
Ideal for CAN bus protection.

···P.87


SOT-23

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

LDO Regulator — BD4xxMx Series

Standard LDOs are offered in a range of packages to support a variety of applications. ···P.28


HTSOP-J8

SiC Power Device — SCT2 Series, SCS2 Series

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. ···P.59


TO-247

MOSFET — 40V Series, 60V Series

Optimized for a variety of drive circuits(i.e. motor drive).
Advanced processes provide low ON resistances. ···P.62 to 64


TO-252

High Power Ultra Low Ohmic Chip Shunt Resistors — PSR Series

5W rated power guaranteed in the ultra-low-resistance region from 0.1mΩ. ···P.103


PSR400

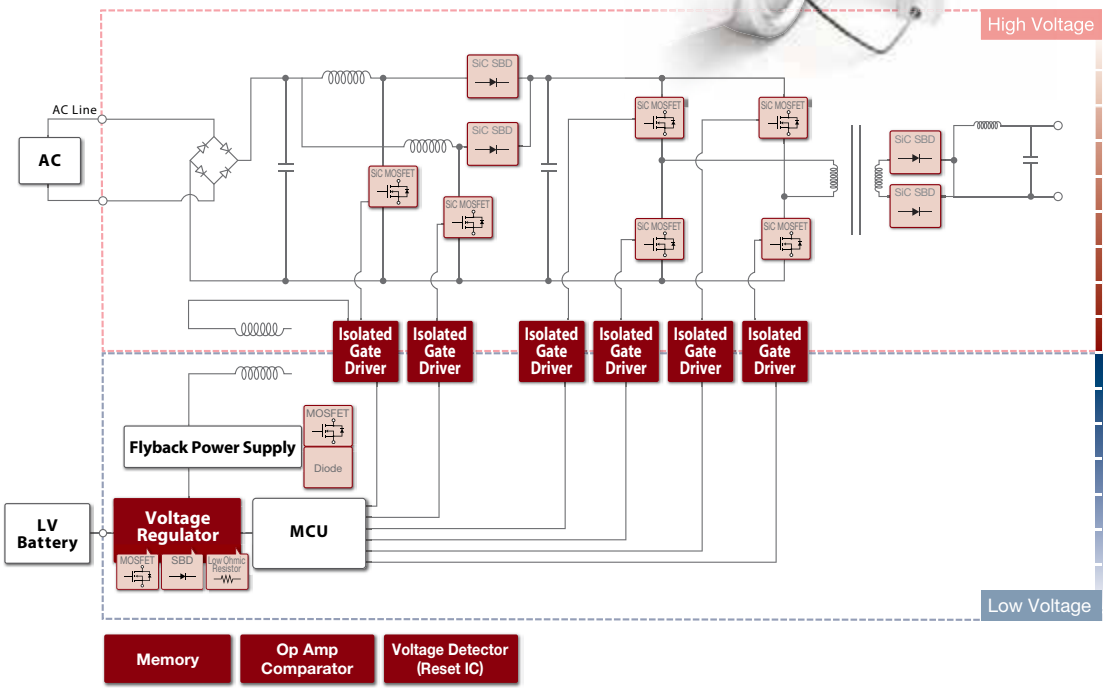
TVS — RESD1CAN

Ideal for the protection of CAN communication lines. ···P.87


SOT-23

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.



ON BOARD CHARGER Products

Op Amp — BA8290x Series

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

···P.47


SOP8

High Power Ultra Low Ohmic Chip Shunt Resistors — PSR Series

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

···P.103


PSR100

SiC MOSFET — SCT2 Series

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

···P.60


TO-247

SiC Schoteloy Barrier Diodes — SCS2 Series

Industry-low V_F* Schottky barrier diodes contribute to improved circuit efficiency.

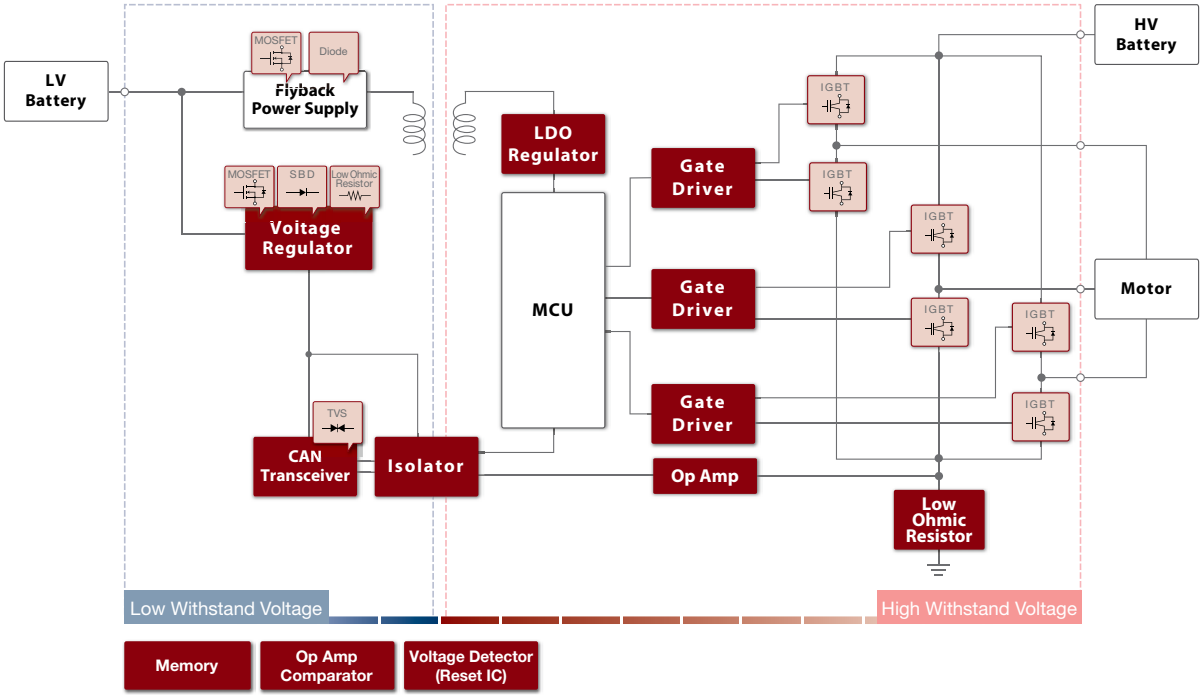
···P.59


TO-220AC <2pin>

∗ Surveyed by ROHM in December, 2017

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.


SOP-J8

···P.41

High Power Ultra Low Ohmic Chip Shunt Resistors — PSR Series

5W rated power guaranteed in the ultra-low-resistance region from 0.2mΩ.


PSR500

···P.103

LDO Regulator — BD4xxMx Series

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


HTSOP-J8

···P.28

Op Amp — BA8290x Series

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


SOP8

···P.47

IGBT RGS Series — RGS Series

A broad lineup of high voltage, large current products are offered that contribute to improved efficiency and energy savings in inverters.


TO-247N

···P.61

TVS — RESD1CAN

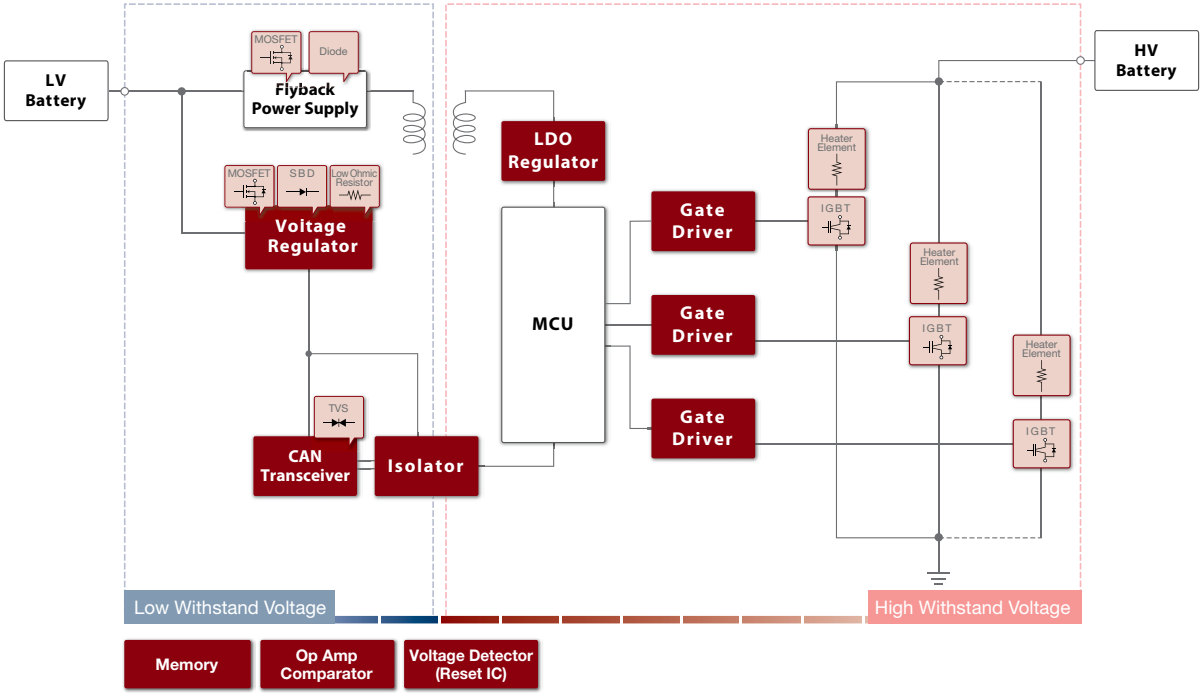
Ideal for the protection of CAN communication lines.


SOT-23

···P.87

PTC HEATER
(Positive Temperature Coefficient)

Vehicles in recent years are becoming more electronified, and unlike conventional heating systems that take advantage of waste heat from the internal combustion engine, EVs do not utilize gas-powered engines and PHEVs emit low exhaust heat, making it necessary to find a new heat source. As a result, PTC heater systems that integrate IGBTs to switch ON/OFF the PTC heater element are seeing increased adoption. ROHM offers both 650V and 1200V models that support the higher voltage batteries used in EVs/PHEVs.



PTC HEATER Products

LIN Transceiver — BD41030FJ-C

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


SOP-J8

···P.41

High Power Ultra Low Ohmic Chip Shunt Resistors — PSR Series

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PSR500

···P.103

LDO Regulator — BD4xxMx Series

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HTSOP-J8

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TO-247N

···P.61

TVS — RESD1CAN

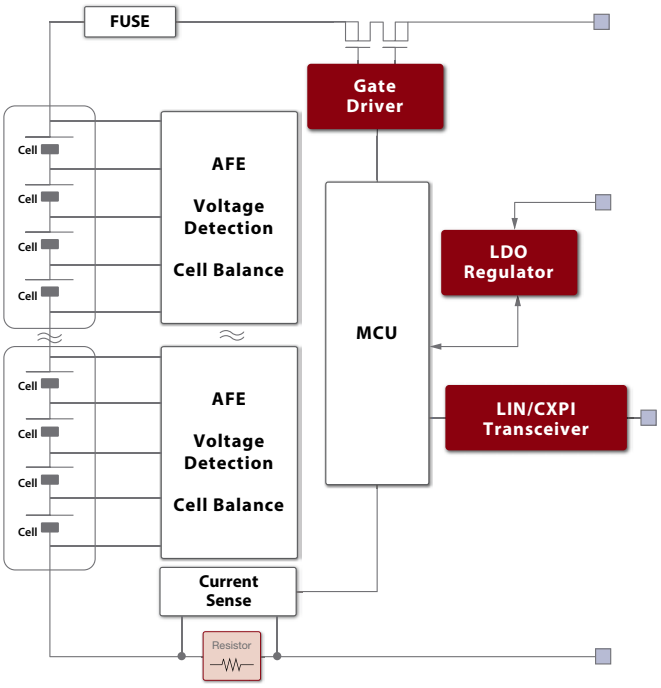
Ideal for the protection of CAN communication lines.


SOT-23

···P.87

BMS
(Battery Management System)

BMS is necessary for battery control to extend the operating range of EVs. ROHM developed a wide range of discrete products, from BMS switches (i.e. MOSFETs, SiC, IGBTs), current detection resistors, power supply ICs for battery control MCUs, and other solutions optimized for next-generation multi-cell BMS applications.



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

BMS Products

SiC MOSFET SCT2080KEAHRC
With a withstand voltage of 1,200 V, it is ideal for high side switches for high-voltage batteries.
···P.60

TO-247N

LDO Regulator BD4xxMx Series
High withstand voltage LDO series with low Iq that supplies voltage for MCUs.
···P.28

TO252-3

Isolated Power Supply Controller BD8325FVT-M
Controls the power supply for isolating the high voltage battery and internal circuits.
···P.34

TSSOP-B30

MOSFET 40V Series 60V Series
Used for high side switches of 12 V battery lines.
···P.62 to 64

SOP8

Gate Drivers ML5810
Drives the MOS gate voltage for battery protection.
···P.45

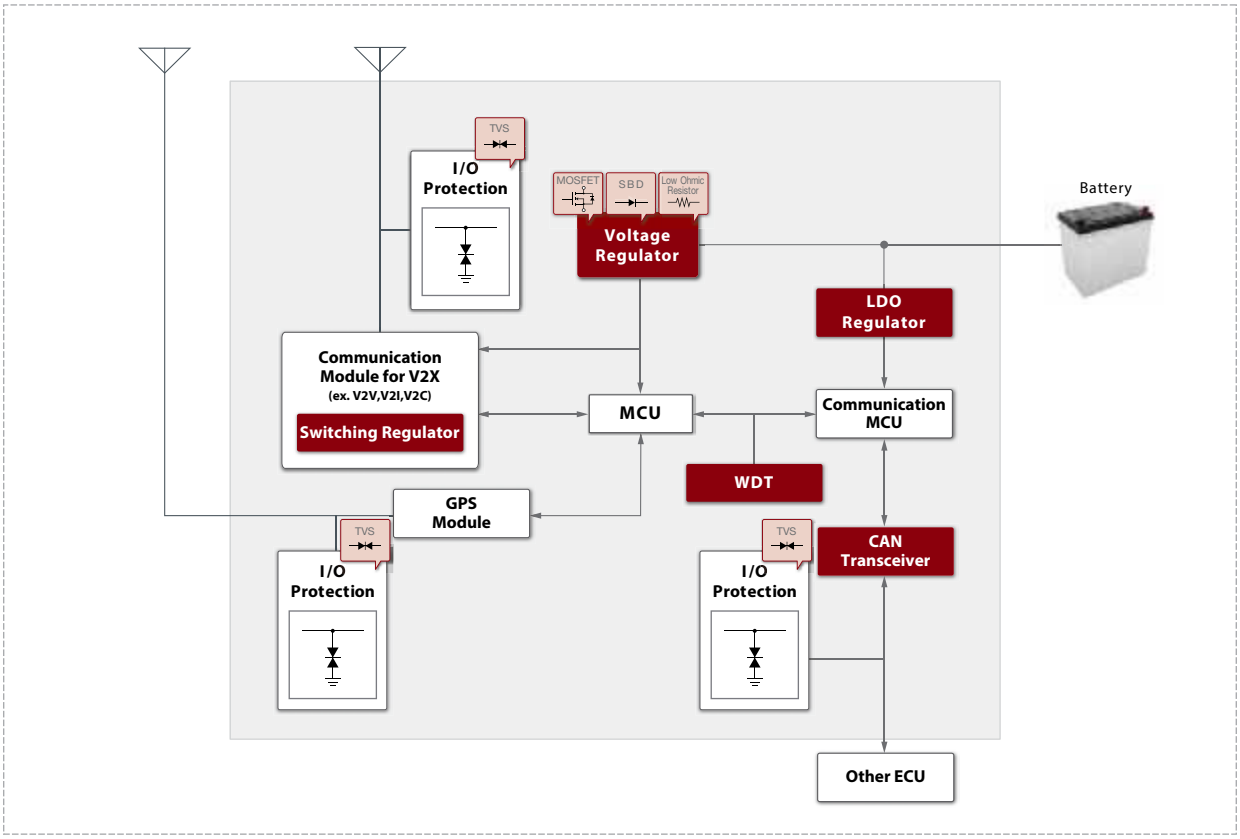
TSSOP-20

TVS RESD1CAN
Ideal for the protection of CAN signal lines.
···P.87

SOT-23

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

Switching Regulator — BD906x0EFJ-C

Power supply ICs that supply 3.3V or 5V from a 12V battery.

···P.32 to 34


HTSOP-J8

Switching Regulator — BD9Sxxx Series

Compact secondary DC/DC regulators that delivers low voltage for the core.

···P.32 to 34


VSON008X2020

LDO Regulator — BD4xxMx Series

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

···P.27


TO252-3

LDO Regulator — BUxxJA2MNVX-C

Provides low voltage in an ultra-compact package.

···P.27


SSON004R1010

TVS — RESD1CAN

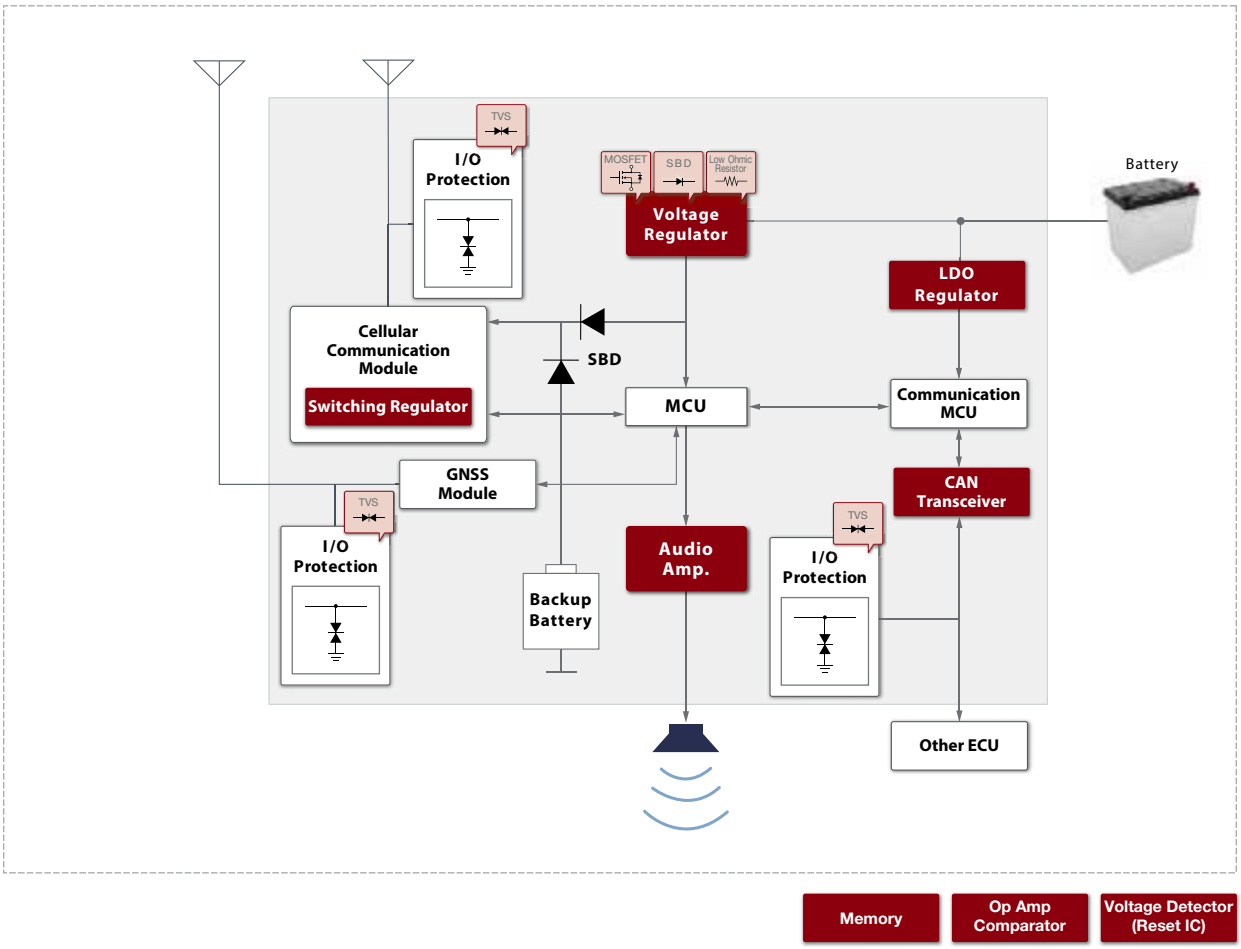
Ideal for the protection of CAN signal lines.

···P.87


SOT-23

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. First introduced in Russia in 2017, this function is scheduled to be deployed in 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.



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

eCALL Products

Switching Regulator — BD9Sxxx Series
Compact secondary DC/DC series that supplies low voltage for cores.

VSON008X2020
···P.32 to 34

LDO Regulator — BD4xxMx Series
High withstand voltage LDO series with low Iq that supplies voltage for MCUs.

TO252-3
···P.27

LDO Regulator — BUxxJA2MNVX-C
The ultra-small package realizes low voltage supply.

SSON004R1010
···P.27

Voltage Detector — BD52XXG-2C Series
Reset ICs used to accurately monitor voltage lines.

SSOP5
···P.48

Speaker Amplifier — BD7824FVM
Drives speakers for generating emergency sounds.

MSOP8
···P.42

TVS — RESD1CAN
Ideal as a protective element for CAN signal lines.

SOT-23
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Automotive

【ICs】

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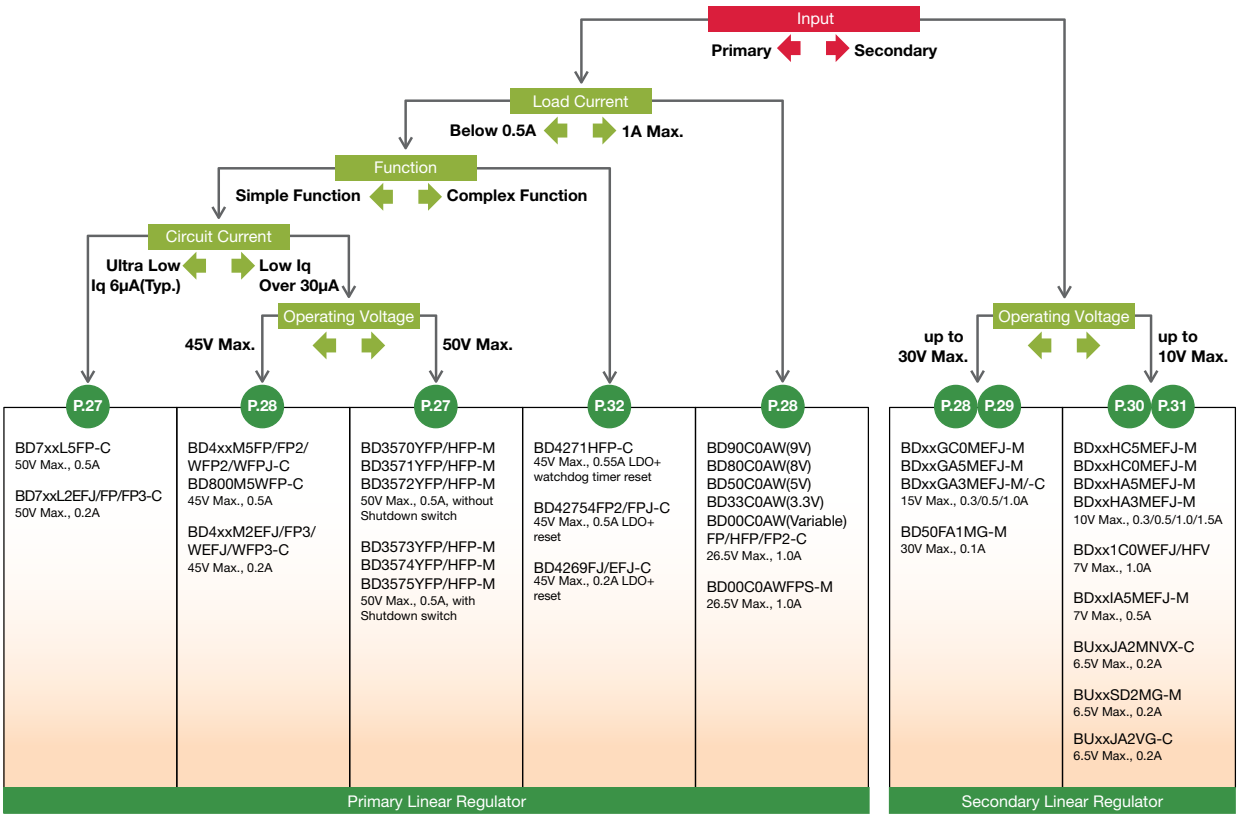
Power Management

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.

Part No.	Input Voltage (V)	Output Voltage (V)	Output Voltage Precision (%)	Output Current (A)	Saturation Voltage : Io=200mA (V)	Circuit Current (μA)	Operating Temperature (°C)	Shutdown Switch	Protection Circuit	Package	Automotive Grade Available AEC-Q100
50V Resistance Output 500mA LDO Regulators											
BD3570YFP-M	4.5 to 36.0	3.3	±2 (Ta=−40 to +125°C)	0.5	—	30	−40 to +125	—	Over-Current/ 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 (Ta=−40 to +125°C)	0.2	0.6	6.0	−40 to +125	—	Over-Current/ 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								—		SOT223-4	YES
BD750L2FP-C	5.8 to 45.0	5.0			0.4			—		TO252-3	YES
BD750L2FP3-C								—		SOT223-4	YES
50V Resistance Output Low Quiescent Current 500mA LDO Regulators											
BD733L5FP-C	4.17 to 45.0	3.3	±2 (Ta=−40 to +125°C)	0.5	0.4	6.0	−40 to +125	—	Over-Current/ 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 (Tj=−40 to +150°C)	0.5	0.25(I_O=300mA)	38	Tj= −40 to +150	—	Over-Current/ Temperature	BD433M5FP-C	BD433M5FP2-C	—	—	YES
BD450M5	5.5 to 42.0	5.0			0.2(I_O=300mA)			—		BD450M5FP-C	BD450M5FP2-C	—	—	YES
BD433M5W	4.0 to 42.0	3.3			0.25(I_O=300mA)			✓		—	—	BD433M5WFP2-C	BD433M5WFPJ-C	YES
BD450M5W	5.5 to 42.0	5.0			0.2(I_O=300mA)			✓		—	—	BD450M5WFP2-C	BD450M5WFPJ-C	YES

Part No.	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	Automotive Grade Available AEC-Q100
BD800M5WFP-C	Vout+0.9 to 42	1.2 to 16	±2 (Tj=−40 to 150°C)	0.5	0.2 (I_O=300mA)	20	Tj=−40 to +150	✓	Over-Current/ Temperature	TO252-5	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 (Tj=−40 to +150°C)	0.2	0.2(I_O=100mA)	40	Tj=−40 to +150	—	Over-Current/ Temperature	BD433M2EFJ-C	BD433M2FP3-C	YES
BD450M2	5.5 to 42.0	5.0			0.16(I_O=100mA)			—		BD450M2EFJ-C	BD450M2FP3-C	YES
BD433M2W	3.9 to 42.0	3.3			0.2(I_O=100mA)			✓		BD433M2WEFJ-C	BD433M2WFP3-C	YES
BD450M2W	5.5 to 42.0	5.0			0.16(I_O=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 (Ta=−40 to +125°C)	0.3	0.2(I_O=200mA)	0.5	−40 to +125	Over-Current/ Temperature	TO252-3	YES

35V Resistance 1A LDO Regulators

35V Voltage Resistance 1A LDO Regulators(Automotive Grade): ∗ V_O is Output voltage/Unit: V

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	
BD33C0A	4.3 to 26.5	3.3	±3.0 (Ta=−40 to +125°C)	1.0	0.5	—	55	∗ Vo×0.01 (I_O=5mA to 1A)	Over-Current/ Temperature	BD33C0AFP-C	BD33C0AHFP-C	BD33C0AFP2-C	YES
BD50C0A	6.0 to 26.5	5.0				0.3 (I_O=500mA)				BD50C0AFP-C	BD50C0AHFP-C	BD50C0AFP2-C	YES
BD80C0A	9.0 to 26.5	8.0					50			BD80C0AFP-C	BD80C0AHFP-C	BD80C0AFP2-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)	Consumption Current (mA)	Operating Temperature (°C)	Protection Circuit	Package	Automotive Grade Available AEC-Q100
BD00C0AWFPS-M	4.0 to 26.5	Variable 3.0 to 15.0	±3.0 (Ta=−40 to +105°C)	1.0	0.3(I_O=500mA)	0.5	−40 to +105	Over-Current/ 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 1.0 to 15.0	±3.0 (Ta=−40 to +125°C)	1.0	0.5	0.3 (I_O=500mA)	55	∗ Vo×0.01 (I_O=5mA to 1A)	Over-Current/ 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				0.3 (I_O=500mA)				BD50C0AWFP-C	BD50C0AWHFP-C	BD50C0AWFP2-C	YES
BD80C0AW	9.0 to 26.5	8.0					50			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_O+3 to 25	5	±1	0.1	0.5	2 (I_O=100mA)	±1.5	Over-Current/ Temperature	1	1	SSOP5	YES

∗ V_O 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.

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
15V Resistance 1A LDO Regulators with Shutdown Switch														
BD00GC0MEFJ-M	4.5 to 14.0	Variable 1.5 to 13.0	±3.0 (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	±3.0 (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	±3.0 (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
BD00GA3MEFJ-C		Variable 1.5 to 13.0	±3.0 (Ta= −40 to +125°C)										HTSOP-J8	YES
BD33GA3MEFJ-C		3.3											HTSOP-J8	YES
BD50GA3MEFJ-C		5.0											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	±3.0 (Ta= −40 to +105°C)	1.5	0.6	0.6 (I_O=1.5A)	60 (f=100Hz, 50mVpp, I_O=0A)	25 (I_O=0 to 1.5A)	1.0	1.0	✓	Over-Current/ 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 (Automotive Grade Variable 1.5 to 7.0)	±3.0 (Ta= −40 to +105°C)	1.0	0.6	0.6 (I_O=1A)	60 (f=100Hz, 50mVpp, I_O=0A)	25 (I_O=0 to 1A)	1.0	1.0	✓	Over-Current/ 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	±3.0 (Ta= −40 to +105°C)	0.5	0.6	0.6 (I_O=500mA)	60 (f=100Hz, 50mVpp, I_O=0A)	25 (I_O=0 to 500mA)	1.0	1.0	✓	Over-Current/ 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	±3.0 (Ta= −40 to +105°C)	0.3	0.6	0.6 (I_O=300mA)	60 (f=100Hz, 50mVpp, I_O=0A)	25 (I_O=0 to 300mA)	1.0	1.0	✓	Over-Current/ 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

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
BD00IC0MEFJ-M	2.4 to 5.5	Variable 0.8 to 4.5	±3.0 (Ta= −40 to +105°C)	1.0	0.3	0.4 (I_O=1A)	60 (f=100Hz, 50mVpp, I_O=0A)	25 (I_O=0 to 1A)	1.0	1.0	✓	Over-Current/ 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
BD00IA5MEFJ-M	2.4 to 5.5	Variable 0.8 to 4.5	±3.0 (Ta=−40 to +105°C)	0.5	0.25	0.4 (Io=500mA)	60 (f=100Hz, 50mVpp, Io=0A)	25 (Io=0 to 500mA)	1.0	1.0	✓	Over-Current/ Temperature	HTSOP-J8	YES
BD10IA5MEFJ-M		1.0											HTSOP-J8	YES
BD12IA5MEFJ-M		1.2											HTSOP-J8	YES
BD15IA5MEFJ-M		1.5											HTSOP-J8	YES
BD18IA5MEFJ-M		1.8											HTSOP-J8	YES
BD25IA5MEFJ-M		2.5											HTSOP-J8	YES
BD30IA5MEFJ-M		3.0											HTSOP-J8	YES
BD33IA5MEFJ-M		3.3											HTSOP-J8	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=1mA 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
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														SSON004R1010	YES
BU12JA2MNVX-C		1.2			600											SSON004R1010	YES
BU1CJA2MNVX-C		1.25														SSON004R1010	YES
BU15JA2MNVX-C		1.5			440											SSON004R1010	YES
BU18JA2MNVX-C		1.8	±2		380											SSON004R1010	YES
BU25JA2MNVX-C		2.5			280											SSON004R1010	YES
BU28JA2MNVX-C		2.8			260											SSON004R1010	YES
BU2JJA2MNVX-C		2.85														SSON004R1010	YES
BU30JA2MNVX-C		3.0			240											SSON004R1010	YES
BU33JA2MNVX-C		3.3			220											SSON004R1010	YES
BU10JA2VG-C	1.7 to 6.0	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
BU18JA2DG-C		1.8			160										✓	SSOP5	YES
BU28JA2DG-C		2.8			85											SSOP5	YES

6V Resistance 1A LDO Regulators with Shutdown Switch

Part No.	V_{CC} Input Voltage (V)	V_{IN} Input Voltage (V)	Output Voltage (V)	Output Voltage Precision (%)	Output Current (A)	Bias Current (mA)	I/O Voltage Difference (V)	Function						Package	Automotive Grade Available AEC-Q100
								Enable	Soft Start	Power Good	UVLO	Over Current Protection	Thermal Protection		
BD00JC0MNUX-M	3.0 to 5..5	0.95 to V_{CC}-1	0.65 to 2.7	±1.0 (Ta=−40 to +105°C)	1.0	0.7	0.2 (Io=1.0A)	✓	✓	✓	✓	✓	Recovery	VSON010X3030	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 Detection Precision(%)	Function				
BD4271HFP-C	5.5 to 45.0	5	±2 (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

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 (Tj=−40 to +150°C, Vcc=6.0 to 28V, Io=5mA to 400mA)	0.5	0.25 (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 (Tj=−40 to +150°C, Vcc=6.0 to 16V, Io=1mA to 100mA)	0.2	0.25 (Io=100mA)	Variable (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

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
BD3925FP-C	4.5 to 36.0	0.5	±10(Ta=−40 to +125°C, Vcc=6 to 36V, Io=5 to 200mA)	45	Ta=−40 to +125	TO252-5	—
BD3925HFP-C						HRP5	—
BD42500G-C	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
BD42540FJ-C	5.4* to 42.0	0.07	±10(Tj=−40 to +150°C, Vcc=5.5 to 26V, Io=0.1 to 60mA)			SOP-J8	YES
BD42530EFJ-C	5.6* to 42.0	0.25	±10(Tj=−40 to +150°C, Vcc=6 to 32V, Io=0.1 to 250mA)			HTSOP-J8	YES
BD42530FP2-C						TO263-5	YES
BD42530FPJ-C						TO252-J5	YES

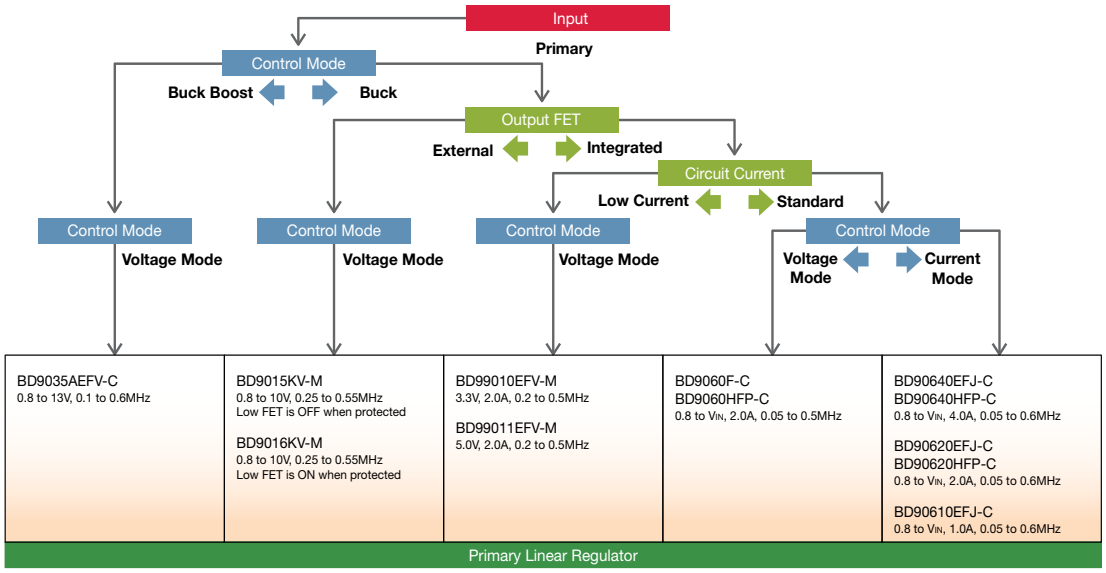
*5V setting

Linear Regulators for DDR SDRAM

Termination Regulators for DDR SDRAM

Part No.	V_{CC} Input Voltage Range (V)	$V_{TT,IN}$ Termination Input Voltage (V)	V_{DDQ} Reference Input Voltage (V)	V_{TT} Output Voltage (V)	V_{TT} Voltage Precision (mV)	V_{TT} Output Current (A)	V_{REF} Output Current (mA)	Function																Package	Automotive Grade Available AEC-Q100
								Enable	Soft Start	Power Good	UVLO	Output Ceramic Capacitor Supported	Thermal Protection	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	1.0 to 2.75	0.5 to 1.375	±13.5	±1.0	—	✓	✓	✓	✓	✓	Recovery	✓	✓	✓	—	✓	✓	—	—	—	SOP-J8	YES

Switching Regulators



Switching Regulators

Switching Regulators(Integrated Switch) Single Output 1A Output

Part No.	Input Rating (V)	Supply Voltage (V)	Output Current (A)	Output Voltage (V)	Reference Voltage Accuracy (%)	Operating Temperature (°C)	Switching Frequency (MHz)	Frequency Accuracy (%)	Oscillation Circuit	Control Mode	Package	Automotive Grade Available AEC-Q100
BD90610EFJ-C	42	3.5 to 36	1.25	0.8 to V_{IN}	±2.0	−40 to +125	0.05 to 0.6	±10	Self-oscillation/ External synchronization	PWM	HTSOP-J8	YES

Switching Regulators(Integrated Switch) Single Output 2A Output

Part No.	Input Rating (V)	Supply Voltage (V)	Output Current (A)	Output Voltage (V)	Reference Voltage Accuracy (%)	Operating Temperature (°C)	Switching Frequency (MHz)	Frequency Accuracy (%)	Oscillation Circuit	Control Mode	Package	Automotive Grade Available AEC-Q100
BD90620EFJ-C	42	3.5 to 36	2.5	0.8 to V_{IN}	±2.0	−40 to +125	0.05 to 0.6	±10	Self-oscillation/ External synchronization	PWM	HTSOP-J8	YES
BD90620HFP-C	42	3.5 to 36	2.5	0.8 to V_{IN}	±2.0	−40 to +125	0.05 to 0.6	±10	Self-oscillation/ External synchronization	PWM	HRP7	YES
BD9060F-C	36	5 to 35	2.0	0.8 to V_{IN}	±2.0	−40 to +125	0.05 to 0.5	±5	Self-oscillation/ External synchronization	PWM	SOP8	YES
BD9060HFP-C	36	5 to 35	2.0	0.8 to V_{IN}	±2.0	−40 to +125	0.05 to 0.5	±5	Self-oscillation/ External synchronization	PWM	HRP7	YES
New BD9G201EFJ-M	45	4.5 to 42	1.5	0.8 to V_{IN}	±2.0	−40 to +105	0.3	±10	Self-oscillation/ External synchronization	PWM	HTSOP-J8ES	YES

Switching Regulators(Integrated Switch) Single Output 4A Output

Part No.	Input Rating (V)	Supply Voltage (V)	Output Current (A)	Output Voltage (V)	Reference Voltage Accuracy (%)	Operating Temperature (°C)	Switching Frequency (MHz)	Frequency Accuracy (%)	Oscillation Circuit	Control Mode	Package	Automotive Grade Available AEC-Q100
BD90640EFJ-C	42	3.5 to 36	4.0	0.8 to V_{IN}	±2.0	−40 to +125	0.05 to 0.6	±10	Self-oscillation/ External synchronization	PWM	HTSOP-J8	YES
BD90640HFP-C	42	3.5 to 36	4.0	0.8 to V_{IN}	±2.0	−40 to +125	0.05 to 0.6	±10	Self-oscillation/ External synchronization	PWM	HRP7	YES
New BD9G401EFJ-M	45	4.5 to 42	3.5	0.8 to V_{IN}	±2.0	−40 to +105	0.3	±10	Self-oscillation/ External synchronization	PWM	HTSOP-J8ES	YES

Switching Regulators(Integrated Switch) Ultra Low Quiescent Current / Synchronous Rectification

Part No.	Input Rating (V)	Supply Voltage (V)	Output Current (A)	Output Voltage (V)	Reference Voltage Accuracy (%)	Operating Temperature (°C)	Switching Frequency (MHz)	Frequency Accuracy (%)	Oscillation Circuit	Control Mode	Package	Automotive Grade Available AEC-Q100
BD99010EFV-M	42	3.6 to 35	2.0	3.3	±2.0	−40 to +105	0.2 to 0.5	±20	Self-oscillation	Light load mode/PWM	HTSSOP-B24	YES
BD99011EFV-M	42	3.6 to 35	2.0	5.0	±2.0	−40 to +105	0.2 to 0.5	±20	Self-oscillation	Light load mode/PWM	HTSSOP-B24	YES

Switching Regulators(Integrated Switch) High Withstand Voltage / Synchronous Rectification

Part No.	Input Rating (V)	Supply Voltage (V)	Output Current (A)	Output Voltage (V)	Reference Voltage Accuracy (%)	Operating Temperature (°C)	Switching Frequency (MHz)	Frequency Accuracy (%)	Oscillation Circuit	Control Mode	Package	Automotive Grade Available AEC-Q100
New BD9V100MUF-C	70	16 to 60	1.0	0.8 to 5.5	±2.0	−40 to +125	1.9 to 2.3	±10	Self-oscillation	PWM	VQFN24FV4040	YES

Secondary Switching Regulators(Integrated Switch) Single Output 0.6A Output

Part No.	Input Rating (V)	Supply Voltage (V)	Output Current (A)	Output Voltage (V)	Reference Voltage Accuracy (%)	Operating Temperature (°C)	Switching Frequency (MHz)	Frequency Accuracy (%)	Oscillation Circuit	Control Mode	Package	Automotive Grade Available AEC-Q100
☆BD9S000NUX-C	7	2.7 to 5.5	0.6	0.8 to 5.0	±1.5	−40 to +125	2.2	±15	Self-oscillation	PWM	VSON008X2020	YES

Secondary Switching Regulators(Integrated Switch) Single Output 1A Output

Part No.	Input Rating (V)	Supply Voltage (V)	Output Current (A)	Output Voltage (V)	Reference Voltage Accuracy (%)	Operating Temperature (°C)	Switching Frequency (MHz)	Frequency Accuracy (%)	Oscillation Circuit	Control Mode	Package	Automotive Grade Available AEC-Q100
☆BD9S100NUX-C	7	2.7 to 5.5	1.0	0.8 to 5.0	±1.5	−40 to +125	2.2	±15	Self-oscillation	PWM	VSON008X2020	YES

Secondary Switching Regulators(Integrated Switch) Single Output 2A Output

Part No.	Input Rating (V)	Supply Voltage (V)	Output Current (A)	Output Voltage (V)	Reference Voltage Accuracy (%)	Operating Temperature (°C)	Switching Frequency (MHz)	Frequency Accuracy (%)	Oscillation Circuit	Control Mode	Package	Automotive Grade Available AEC-Q100
New BD9S200MUF-C	7	2.7 to 5.5	2.0	0.8 to 4.4	±1.5	−40 to +125	2.2	±10	Self-oscillation/ External synchronization	Light load mode/PWM	VQFN16FV3030	YES

Secondary Switching Regulators(Integrated Switch) Single Output 3A Output

Part No.	Input Rating (V)	Supply Voltage (V)	Output Current (A)	Output Voltage (V)	Reference Voltage Accuracy (%)	Operating Temperature (°C)	Switching Frequency (MHz)	Frequency Accuracy (%)	Oscillation Circuit	Control Mode	Package	Automotive Grade Available AEC-Q100
New BD9S300MUF-C	7	2.7 to 5.5	3.0	0.8 to 4.4	±1.5	−40 to +125	2.2	±10	Self-oscillation/ External synchronization	Light load mode/PWM	VQFN16FV3030	YES
New BD9S301MUF-C	7	2.7 to 5.5	3.0	0.8 to 4.4	±2.0	−40 to +125	1.0	±20	Self-oscillation	Light load mode/PWM	VQFN16FV3030	YES

Secondary Switching Regulators(Integrated Switch) Single Output 4A Output

Part No.	Input Rating (V)	Supply Voltage (V)	Output Current (A)	Output Voltage (V)	Reference Voltage Accuracy (%)	Operating Temperature (°C)	Switching Frequency (MHz)	Frequency Accuracy (%)	Oscillation Circuit	Control Mode	Package	Automotive Grade Available AEC-Q100
New BD9S400MUF-C	7	2.7 to 5.5	4.0	0.8 to 4.4	±1.5	−40 to +125	2.2	±10	Self-oscillation/ External synchronization	Light load mode/PWM	VQFN16FV3030	YES

Switching Controllers(External Switch) Dual Output Buck / Boost Converters

Part No.	Input Rating (V)	Supply Voltage (V)	Output Type	Reference Voltage Accuracy (%)	Operating Temperature (°C)	Switching Frequency (MHz)	OverVoltage Protection is Detected	Package	Automotive Grade Available AEC-Q100
BD9015KV-M	35	3.9 to 30	Push Pull	±1.5(−40 to +105°C)	−40 to +105	0.25 to 0.55	L-side FET OFF	VQFP48C	YES
BD9016KV-M	35	3.9 to 30	Push Pull	±1.5(−40 to +105°C)	−40 to +105	0.25 to 0.55	L-side FET ON	VQFP48C	YES

Switching Controllers(External Switch) Single Output Buck / Boost

Part No.	Input Rating (V)	Supply Voltage (V)	Output Type	Reference Voltage Accuracy (%)	Operating Temperature (°C)	Switching Frequency (MHz)	OverVoltage Protection is Detected	Package	Automotive Grade Available AEC-Q100
BD9035AEFV-C	35	3.8 to 30	Push Pull	±1.5(−40 to +125°C)	−40 to +125	0.1 to 0.6	Automatic switchover	HTSSOP-B24	YES

☆ : Under Development

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		Reference Voltage (V)	Output Current (A)	Protection Circuit		Input I/F	Package	Automotive Grade Available AEC-Q100
						Over Current	Temperature			
BD49101AEFS-M / New BD49101ARFS-M	5.5 to 25.0	Step-down DC/DC1	Controller	0.8	—	Current Limit with Short Current Protection Circuit	✓	I²C	HTSSOP-A44 / HTSSOP-A44R	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	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 0.1V step	—	0.9 to 3.4 50mV step	8.0 to 35.0 0.2V step/ −14.0 to −4.0 0.1V step	Internal	1	VQFN32SV5050	YES
BD81870EFV-M	2.5 to 5.5	−40 to +105	2.1	to 18.0	V_{DD}−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									
New BD81849MUV-C	10 to 18	2.1 to 3.6	−40 to +105	0.4	10	I²C BUS	Integrated	—	12	VQFN32SV5050	YES

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		
New BD39000EKV-C	4 to 30 (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 (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

BD39002EFV-C	4 to 30 (Rating 40V)	200 to 550	−40 to +125	✓	±2	CH1 (DC/DC)	Buck-Boost DC/DC Controller (Vout/Iout variable)	✓	✓	✓	—	WINDOW WDT	HTSSOP−B30	YES
						CH2 (DC/DC)	LDO(5V, 0.6A)				✓			
BD39012EFV-C	4 to 36 (Rating 45V)	200 to 600	−40 to +125	External Control EN1: DC/DC 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)				✓			

Isolated / Non-Isolated Power Supply

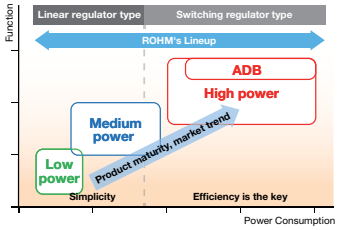
Isolated DC/DC Controller

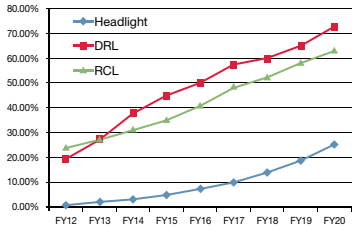
Part No.	Topology	Primary/ Secondary	Supply Voltage (V)	Switching Frequency (kHz)	Frequency Synchronization	I/F	Package	Automotive Grade Available AEC-Q100
BD8325FVT-M	Active Clamp Forward	Primary IC	9 to 18	50 to 500	✓	—	TSSOP-B30	YES

LED Drivers

LED Drivers

Exterior

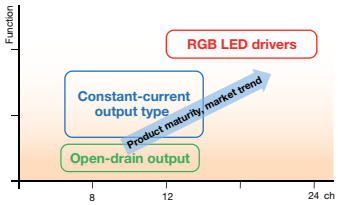




The automotive LED driver market is picking up, with DRL and CHMSL leading the way. Thanks to the design flexibility of LEDs, RCL and turn indicator lamps are also increasingly becoming LEDs. Issues with heat-dissipation have prevented LEDs from being implemented as headlights (Low/ High beams), but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

ROHM's Lineup	Linear Type		Switching Type	
	2W	4W	2W	4W
Fog/ Position/ Daytime Running Light	✓ BD8374/BD8372 BD83732/BD83733	✓	—	✓ BD8381
Front/ Side/ Rear turn Indicator	✓ BD8374/BD8372 BD83732/BD83733	✓	—	
Rear Combination Lamp (RCL)	✓ BD8374/BD8372 BD83732/BD83733	✓	—	
Center High Mounted Stop Light (CHMSL)	—	✓ BD8374/BD8372 BD83732/ BD83733	—	
Head Light (Low Beam)	✓ BD8374/BD8372 BD83732/BD83733	—	✓ BD8381	✓
Head Light (High Beam)	—		✓ BD8381	—

Interior



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 14. 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.).

	Open Drain	Const Current	RGB LED Driver
Dashboard Backlight	✓ BD8378/BD8379	✓ BD18377	✓ BD2808
Ambient Lighting	✓ BD8378/BD8379	✓ BD18377	✓ BD2808
Dome and Map Lighting	—	✓ BD18377	—
Mood Lighting	—	—	✓ BD2808
LCD Backlighting	✓ BD8378/BD8379	✓ BD18377	✓ BD2808

Buck-Boost LED Drivers

White LED Drivers

Part No.	Supply Voltage (V)	Boost FET	No. of Channels (ch)	Output Voltage (V)	Output Current (mA)	Switching Frequency (MHz)	PWM Dimming Ratio	Operating Temperature (°C)	Package	Automotive Grade Available AEC-Q100
BD8119FM-M	5.0 to 30.0	External	4	30 Max.	150 Max./ch	0.25 to 0.55	200 : 1@200Hz	−40 to +95	HSOP-M28	YES
BD81A24EFV-M	4.5 to 35.0	Internal	4	35 Max.	120 Max./ch	0.20 to 2.2	5,000 : 1@200Hz	−40 to +125	HTSSOP-B28	YES
BD81A24MUV-M	4.5 to 35.0	Internal	4	35 Max.	120 Max./ch	0.20 to 2.2	5,000 : 1@200Hz	−40 to +125	VQFN28SV5050	YES
New **BD81A24MUF-M**	4.5 to 35.0	Internal	4	35 Max.	120 Max./ch	0.20 to 2.2	5,000 : 1@200Hz	−40 to +125	VQFN28FV5050	YES
BD81A44EFV-M	4.5 to 35.0	External	4	35 Max.	120 Max./ch	0.20 to 2.2	5,000 : 1@200Hz	−40 to +125	HTSSOP-B28	YES
BD81A44MUV-M	4.5 to 35.0	External	4	35 Max.	120 Max./ch	0.20 to 2.2	5,000 : 1@200Hz	−40 to +125	VQFN28SV5050	YES
New **BD81A44MUF-M**	4.5 to 35.0	External	4	35 Max.	120 Max./ch	0.20 to 2.2	5,000 : 1@200Hz	−40 to +125	VQFN28FV5050	YES

White LED Drivers for Head Light

Part No.	Supply Voltage (V)	Application	No. of Channels (ch)	Maximum Input Voltage (V)	Output Current	Dimmer Mode	DC/DC	Operating Temperature (°C)	Package	Automotive Grade Available AEC-Q100
BD18351EFV-M	4.5 to 65.0	Head Lamp/DRL	1	65	Depends on external parts	PWM/DC	Boost	−40 to +125	HTSSOP-B24	YES
BD8381AEFV-M	5.0 to 30.0	Head Lamp/DRL	1	50	Depends on external parts	PWM/DC	Buck-Boost, Boost, Buck	−40 to +125	HTSSOP-B28	YES

Matrix LED Controllers

Matrix SW Controllers

Part No.	Supply Voltage (V)	Application	No. of Channels (ch)	Topology	Maximum Input Voltage (V)	Output Current (A)	Operating Temperature (°C)	Package	Automotive Grade Available AEC-Q100
BD18362EFV-M	5.5 to 60.0	Turn Lamp	8	Stand-alone	70	1.0	−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 Type	Max. LED Current	Each Output Format	Others	Control Method	Max. Clock Frequency (MHz)	Package	Automotive Grade Available AEC-Q100
BD8378FV-M	3.0 to 5.5	35	8	Open Drain	50mA/ch	ON/OFF	—	SPI	1.25	SSOP-B16	YES
BD8379FV-M	3.0 to 5.5	35	12	Open Drain	50mA/ch	ON/OFF	—	SPI	1.25	SSOP-B20	YES
BD8379EFV-M	3.0 to 5.5	35	12	Open Drain	50mA/ch	ON/OFF	—	SPI	1.25	HTSSOP-B20	YES
BD2808MUV-M	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	1.0	VQFN48MCV070	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
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

Motor Drivers

3-Phase Brushless Motor Drivers

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 V_{CC}=8V		PWM Frequency (kHz)	Package	Automotive Grade Available AEC-Q100
					H Level (V)	L Level (V)	Upper(V)	Lower(V)			
BD16805FV-M	60	8 to 18	−40 to +110	15.2	3.0	1.0	$2\times V_{CC}-0.5$	8	25	SSOP-B40	YES

Part No.	Maximum Input Voltage (V)	Supply Voltage (V)	Operating Temperature (°C)	Circuit Current (mA)	Input Threshold Voltage		Output ON Resistance (Ω)	PWM Frequency (kHz)	Package	Automotive Grade Available AEC-Q100
					H Level (V)	L Level (V)				
BD63035EFV-M	36	8 to 28	−40 to +105	8	2	0.8	0.6	22.7	HTSSOP-B20	YES

H-Bridge Motor Driver

H-Bridge Motor Drivers

Part No.	Maximum Input Voltage (V)	Supply Voltage (V)	Output Current (A)	No. of Channels (ch)	Output ON Resistance (Upper + Lower) (Ω Typ.)	Output Modes	Operating Temperature (°C)	Package	Automotive Grade Available AEC-Q100
New **BD16950EFV-C**	40	5.5 to 40.0	—	1 (Half 2 ch)	—	Vertical output can be turned ON/OFF for each output channel unit	−40 to +125	HTSSOP-B24	YES
BD16933EFV-C	60	7.0 to 36.0	1	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	2	2.25	Forward/Reverse/Standby/Brake	−40 to +110	HTSSOP-B24	YES
New **BD16938EFV-C**	40	6.3 to 32.0	1	4 (Half 8 ch)	1.4	Vertical output can be turned ON/OFF for each output channel unit	−40 to +125	HTSSOP-B28	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
New **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 ON Resistance [Low] → [High]	Application
SINGLE	High Side: 90mΩ, 500mΩ Low Side: 28mΩ, 45mΩ, 85mΩ, 105mΩ, 150mΩ, 300mΩ, 350mΩ	Relay, Solenoid, Interior lamp, Water heater
DUAL	High Side: Low Side: 105mΩ, 120mΩ, 150mΩ, 300mΩ	Relay, Solenoid, Interior lamp
Over QUAD	High Side: Low Side: 600mΩ, 700mΩ(8ch)	Relay, Solenoid, Stepping motor, LED etc.

:High Side :Low Side

Smart High Side Switch / Smart Low Side Switch

Part No.	Hi/Lo	Power Supply (V)	VDS (Max.)(V)	No. of Channels (ch)	Iocp (Min.)(A)	ON Resistance (Typ.)(mΩ)	TSD	Package	Automotive Grade Available AEC-Q100
New BV1HD090FJ-C	Hi	4.5 to 36.0	45.0	1	2.7	90	Self Recovery	SOP-J8	YES
BD1HC500EFJ-C		4.0 to 18.0	44.5	1	0.8	500	Off Latch	HTSOP-J8	YES
BD1HC500FVM-C		4.0 to 18.0	44.5	1	0.8	500	Off Latch	MSOP-8	YES
BD1HC500HFN-C		4.0 to 18.0	44.5	1	0.8	500	Off Latch	HSON-8	YES
BD1HD500EFJ-C		4.0 to 18.0	44.5	1	0.8	500	Self Recovery	HTSOP-J8	YES
BD1HD500FVM-C		4.0 to 18.0	44.5	1	0.8	500	Self Recovery	MSOP-8	YES
BD1HD500HFN-C		4.0 to 18.0	44.5	1	0.8	500	Self Recovery	HSON-8	YES
New BV1LB028FPJ-C	Lo	3.0 to 5.5	42.0	1	30	28	Self Recovery	TO252-J3	YES
New BV1LB045FPJ-C		3.0 to 5.5	42.0	1	18	45	Self Recovery	TO252-J3	YES
BV1LB085FJ-C		3.0 to 5.5	42.0	1	13	85	Self Recovery	SOP-J8	YES
New BV1LB085HFS-C		3.0 to 5.5	42.0	1	13	85	Self Recovery	HSON-A8	YES
New BV1LC105FJ-C		3.0 to 5.5	42.0	1	3	105	Self Recovery	SOP-J8	YES
BV1LB150FJ-C		3.0 to 5.5	42.0	1	6.5	150	Self Recovery	SOP-J8	YES
New BV1LB150HFS-C		3.0 to 5.5	42.0	1	6.5	150	Self Recovery	HSON-A8	YES
BV1LB300FJ-C		3.0 to 5.5	42.0	1	1.7	300	Self Recovery	SOP-J8	YES
New BV1LB300HFS-C		3.0 to 5.5	42.0	1	1.7	300	Self Recovery	HSON-A8	YES
BD1LB500EFJ-C		3.5 to 5.5	42.0	1	0.8	350	Self Recovery	HTSOP-J8	YES
BD1LB500FVM-C		3.5 to 5.5	42.0	1	0.8	350	Self Recovery	MSOP8	YES
New BM2LC105FJ-C		3.0 to 5.5	42.0	2	3	105	Self Recovery	SOP-J8	YES
BM2LB110FJ-C		3.0 to 5.5	42.0	2	2.5	120	Self Recovery	SOP-J8	YES
BM2LB150FJ-C		3.0 to 5.5	42.0	2	6.5	150	Self Recovery	SOP-J8	YES
BM2LB300FJ-C		3.0 to 5.5	42.0	2	1.7	300	Self Recovery	SOP-J8	YES
BD8LB600FS-C		3.0 to 5.5(Digital)/ 4.0 to 5.5(Analog)	45.0	8	1	600	Self Recovery	SSOP-A24	YES
BD8LA700EFV-C		3.0 to 5.5(Digital)/ 4.0 to 5.5(Analog)	45.0	8	0.5	700	Off Latch	HTSSOP-B24	YES
New BD8LC700EFV-C		3.0 to 5.5(Digital)/ 4.0 to 5.5(Analog)	45.0	8	0.7	700	Off Latch	HTSSOP-B24	YES

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)	OCP	Thermal Protection	Flag Output Delay/ at Over Current (ms)	Discharge Resistance (Ω)	Package	Automotive Grade Available AEC-Q100
New BD22621G-M	2.7 to 5.5	120	H Active	0.15	0.18/0.30/0.42	1.0	Recovery	Recovery	15	60	SSOP5	YES
BD2262G-M	2.7 to 5.5	120	H Active	0.2	0.2/0.3/0.4	1.0	Recovery	Recovery	15	60	SSOP5	YES
New BD22641G-M	2.7 to 5.5	120	H Active	0.5	0.57/0.76/0.96	1.0	Recovery	Recovery	15	60	SSOP5	YES
BD2264G-M	2.7 to 5.5	120	H Active	0.5	0.63/0.765/0.9	1.0	Recovery	Recovery	15	60	SSOP5	YES
BD2265G-M	2.7 to 5.5	120	L Active	0.5	0.63/0.765/0.9	1.0	Recovery	Recovery	15	60	SSOP5	YES
BD2266G-M	2.7 to 5.5	120	H Active	0.75	0.82/0.97/1.12	1.0	Recovery	Recovery	15	60	SSOP5	YES
BD2267G-M	2.7 to 5.5	120	L Active	0.75	0.82/0.97/1.12	1.0	Recovery	Recovery	15	60	SSOP5	YES
BD2268G-M	2.7 to 5.5	110	H Active	1.0	1.15/1.275/1.4	1.0	Recovery	Recovery	15	60	SSOP5	YES
BD2269G-M	2.7 to 5.5	110	L Active	1.0	1.15/1.275/1.4	1.0	Recovery	Recovery	15	60	SSOP5	YES
BD2244G-M*	2.8 to 5.5	100	H Active	1.5	0.2 to 1.7 (adjustable)	0.6	Recovery	Recovery	7	60	SSOP6	YES
BD2245G-M*	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

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)	OCP	Thermal Protection	Flag Output Delay/ at Over Current (ms)	Discharge Resistance (Ω)	Package	Automotive Grade Available AEC-Q100
BD82004FVJ-M	2.7 to 5.5	70	H Active	0.9	1.0/1.5/2.0	0.8	Recovery	Recovery	15	—	TSSOP-B8J	YES
BD82005FVJ-M	2.7 to 5.5	70	L Active	0.9	1.0/1.5/2.0	0.8	Recovery	Recovery	15	—	TSSOP-B8J	YES
BD82006FVJ-M	2.7 to 5.5	70	H Active	1.1	1.5/2.4/3.0	0.8	Recovery	Recovery	15	—	TSSOP-B8J	YES
BD82007FVJ-M	2.7 to 5.5	70	L Active	1.1	1.5/2.4/3.0	0.8	Recovery	Recovery	15	—	TSSOP-B8J	YES

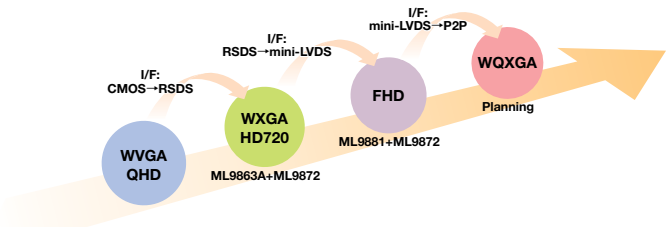
2 Channel High Side Switch ICs

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)	OCP	Thermal Protection	Flag Output Delay/ at Over Current (ms)	Discharge Resistance (Ω)	Package	Automotive Grade Available AEC-Q100
BD2068FJ-M	2.7 to 5.5	80	H Active	1.0	1.5/2.4/3.0	0.8	Recovery	Recovery	15	—	SOP-J8	YES
BD2069FJ-M	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

TFT Driver Series



Panel Resolution (Color TFT Panel)		Number of Chips		
		Source		Gate
		ML9863A(960ch)	ML9881(1440ch)	ML9872(540ch)
WVGA	800RGB×480	3	2	1
QHD	960RGB×540	3	2	1
WXGA	1280RGB×800	4	3	2
—	1280RGB×480	4	3	1
—	1440RGB×540	5	3	1
FHD	1920RGB×1080	6	4	2

Drivers for Small to Medium LCD Panels

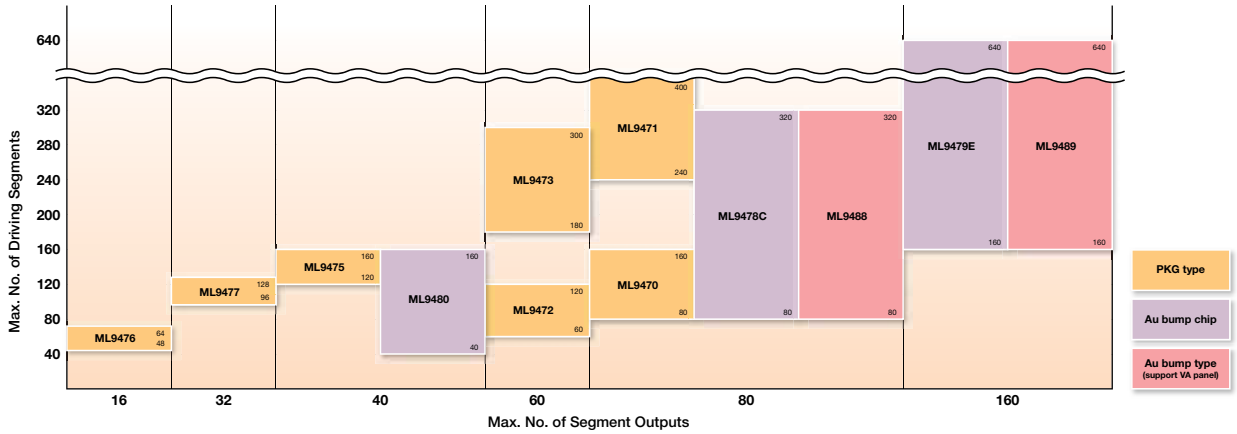
(LAPIS Semiconductor products)

TFT-LCD Driver

Part No.	Type	Logic Supply Voltage (V)	LCD Voltage (V)	No. of Driver Outputs	I/F	Operating Temperature (°C)	Package	Halogen Free Supported*1	Automotive Grade Available*2
ML9860B	Source	2.1 to 3.6	10.0 to 14.6	480	RSDS	−40 to +95	Au bump chip	✓	YES
ML9863A	Source	2.4 to 3.6	8.0 to 14.6	960/804/792/768	CMOS/RSDS	−40 to +95	Au bump chip	✓	YES
ML9881	Source	2.7 to 3.6	8.0 to 14.6	1440/1284/1278/1260/1200/ 1080/1026/1020	RSDS/mini-LVDS	−40 to +95	Au bump chip	✓	YES
ML9882	Source	2.7 to 3.6	8.0 to 14.6	1440/1284/1278/1260/1200/ 1080/1026/1020	RSDS/mini-LVDS	−40 to +95	Au bump chip	✓	YES
ML9883	Source	2.7 to 3.6	8.0 to 14.6	1440/1284/1278/1200/1080/ 1062/1026/1020	RSDS/mini-LVDS	−40 to +95	Au bump chip	✓	YES
ML9872	Gate	2.4 to 3.6	up to 40	540/480/400/384/360/300/240	CMOS	−40 to +105	Au bump chip	✓	YES
ML9873	Gate	2.4 to 3.6	up to 40	960/800/768/720/684/682/ 640/600/540/512	CMOS	−40 to +105	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.

TN/STN LCD Driver Series



TN/STN LCD Driver Series

Controller Driver for Graphic LCD

(LAPIS Semiconductor products)

LCD Controller Drivers

Part No.	Max. No. of Segment Outputs	Max. Driving Display size (dots)	Logic Supply Voltage (V)	Driver Supply Voltage (V)	Operating Temperature (°C)	Features	Package	Halogen Free Supported*1	Automotive Grade Available*2
ML9058E	132	132×65	3.7 to 5.5	6 to 18	−40 to +85	Integrated RAM/Boost circuit	Au bump chip	✓	YES
ML9059E	132	132×49	3.7 to 5.5	6 to 18	−40 to +85	Integrated RAM/Boost circuit	Au bump chip	✓	YES
ML9445	180	180×65	2.7 to 5.5	6 to 18.5	−40 to +105	Integrated RAM/Boost circuit	Au bump chip	✓	YES
ML9092-01	56	56×10	4.5 to 5.5	4.5 to 16.5	−40 to +85	Integrated RAM/Boost circuit/PWM	TQFP100	✓	YES
ML9092-02	60	60×10	4.5 to 5.5	4.5 to 16.5	−40 to +85	Integrated RAM/Boost circuit	TQFP100	✓	YES
ML9092-03						Integrated RAM	TQFP100	✓	YES
ML9092-04						Integrated RAM/PWM	TQFP100	✓	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 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*1	Automotive Grade Available*2
		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	✓	YES
ML9472	60	60	120	—	—	—	—	3.0 to 5.5 (single)		−40 to +105	Supports external clock input	P-TQFP80-1212-0.50	✓	YES
ML9473	60	—	—	180	240	300	—	3.0 to 5.5 (single)		−40 to +105	Supports external clock input	P-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 / Bias generator built in / EMS countermeasure built in	QFP56	✓	YES
ML9476	16	—	—	48	64	—	—	3V±10%/ 5V±10%	3.5 to 5.5	−40 to +105	Supports external clock input / Bias generator built in / EMS countermeasure built in	TQFP48	✓	YES
ML9477	32	—	—	96	128	—	—	3V±10%/ 5V±10%	3.5 to 5.5	−40 to +105	Supports external clock input / Bias generator built in / EMS countermeasure built in	TQFP48	✓	YES
ML9484	50	50	100	150	200	—	—	2.7 to 5.5	4.5 to 5.5	−40 to +105	Supports external clock input / Bias generator built in	TQFP64	✓	YES

LCD Controller Drivers(Gold Bump 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*1	Automotive Grade Available*2
ML9480	40	40	80	120	160	—	65/75/85/95 130/150/170/190 command switching	2.7 to 5.5	4.5 to 5.5	−40 to +105	Supports external clock input / Bias generator built in / EMS countermeasure built in / No external parts	Au bump chip	✓	YES
ML9478C	80	80	160	240	320	—	65/75/85/95 command switching	2.7 to 5.5	4.5 to 5.5	−40 to +105	Supports external clock input / Bias generator built in / EMS countermeasure built in / No external parts	Au bump chip	✓	YES
ML9479E	160	160	320	480	640	—	65/75/85/95 command switching	2.7 to 5.5	4.5 to 5.5	−40 to +105	Supports external clock input / Bias generator built in / EMS countermeasure built in / No external parts	Au bump chip	✓	YES
ML9488	80	80	160	240	320	—	130/150/170/190 command switching	2.7 to 5.5	4.5 to 5.5	−40 to +105	Supports external clock input / Bias generator built in	Au bump chip	✓	YES
ML9489	160	160	320	480	640	—	130/150/170/190 command switching	2.7 to 5.5	4.5 to 5.5	−40 to +105	Supports external clock input / 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.

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)												
New 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	4×5 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	5×6 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	5×6 Max. 30Key	TQFP100V	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	5×6 Max. 30Key	VQFP80	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	5×6 Max. 30Key	VQFP80	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	4×5 Max. 20Key	SSOP-B40	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	4×5 Max. 20Key	TSSOP-C48V	YES
BU91501KV-M	204	51	4	2.7 to 6.0	4.5 to 6.0	−40 to +105	1/4,1/3	1/3,1/2	3wire+ KEYOUT	—	4port	—	—	—	5×6 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	5×6 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	5×6 Max. 30Key	TQFP100V	YES
New BU91795MUF-M	48	12	4	2.5 to 6.0		−40 to +105	1/4	1/3	2wire	—	—	—	—	—	—	VQFN24FV4040	YES
New BU91796FS-M	80	20	4	2.5 to 6.0		−40 to +105	1/4	1/3	2wire	—	—	—	—	—	—	SSOP-A32	YES
BU91796MUF-M	80	20	4	2.5 to 6.0		−40 to +105	1/4	1/3	2wire	—	—	—	—	—	—	VQFN32FV5050	YES
BU91797MUF-M	144	36	4	2.5 to 6.0		−40 to +105	1/4	1/3	2wire	—	—	—	—	—	—	VQFN48FV7070	YES
BU91799KV-M	200	50	4	2.5 to 6.0	2.5 to 6.0	−40 to +105	1/4	1/3	2wire	✓	—	—	—	—	—	VQFP64	YES
BU91R63CH-M3BW	176	44	4	2.7 to 6.0	2.7 to 6.0	−40 to +105	1/4,1/3,1/2, Static	1/3,1/2	2wire	✓	—	—	—	—	—	Au Bump Chip	YES
New BU91797FUV-M	144	36	4	2.5 to 6.0		−40 to +105	1/4	1/3	2wire	—	—	—	—	—	—	TSSOP-C48V	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.)(mA)	No. of Digits	Package	Halogen Free Supported*1	Automotive Grade Available*2
ML9298	1/2	4.0 to 18	No need	−40 to +85	0.6	4digits×1line and col.	SSOP32	✓	YES
ML9098B	1/2, Static	3.0 to 5.5	3.0 to 5.5	−40 to +105	0.6	4digits×1line and col./ AM/PM	TQFP48	–	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*1	Automotive Grade Available*2
ML9271	48	Anode/Grid	18	Positive supply	−40 to +105	Cascade connection	QFP64-P-1414-0.80	–	YES
ML9272	40	Anode/Grid	65	Positive supply	−40 to +105	Cascade connection	SSOP60	✓	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*1	Automotive Grade Available*2
ML9286-xxGA	5 x 7 Dots	80	Positive supply	−40 to +105	Multigrid function/ 8-bit gradation/ Cascade connection	QFP80-1414-0.65	✓	YES
ML9286-xxTB	5 x 7 Dots	80	Positive supply	−40 to +105	Multigrid function/ 8-bit gradation/ Cascade connection	TQFP80-1212-0.50	✓	YES

Controller Driver 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*1	Automotive Grade Available*2
ML9212GA	64(1/2Duty) 96(1/3Duty)	18	Positive supply	−40 to +85	10-bit gradation/ Cascade connection	QFP56	✓	YES
ML9213GP	112(1/2Duty) 168(1/3Duty)	18	Positive supply	−40 to +85	10-bit gradation/ Cascade connection	P-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
BU21028FV-M	2.7 to 3.6	—	4096×4096	2 point/Single	100	0.8	I²C	−40 to +85	SSOP-B20	YES
BU21024FV-M	2.7 to 3.6	8	1024×1024	2 point/Single	60	4	I²C/SPI	−40 to +85	SSOP-B28	YES

Accelerometer

(Kionix Product)

3-Axis Accelerometer

Part No.	Axis	Full Scale Range	I/F Output	Current Consumption (μA)	Size, No. of Pins, Package Type	Features	Automotive Grade Available AEC-Q100
☆**KX123-6000**	3	User Selectable 2 g, 4 g, 8 g	Digital SPI/I²C	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.
☆: Under Development

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 (kbps)	Supply Current at Sleep Mode (μA)	Package	Automotive Grade Available AEC-Q100
BD41030FJ-C	LIN2.0, LIN2.1, LIN2.2, LIN 2.2A	5 to 27	−40 to +125	−27 to +40	20(Max.)	3(Typ.)	SOP-J8	YES
New **BD41030HFN-C**	LIN2.0, LIN2.1, LIN2.2, LIN 2.2A	5 to 27	−40 to +125	−27 to +40	20(Max.)	3(Typ.)	HSON8	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 (μA)	Package	Automotive Grade Available AEC-Q100
New **BD41000AFJ-C**	JASO_D015_3	7 to 18	−40 to +125	−27 to +40	5 to 20	3(Typ.)	SOPJ-8	YES

LVDS Interface ICs

Clockless Link Serializer/Deserializer

Part No.	Function	Input Signal Type	Output Signal Type	No. of Rx	No. of Tx	Clock Frequency (MHz)	Clockless Transfer Rates(Gbps)	Parallel Bus Width (bit)	Supply Voltage (V)	Operating Temperature (°C)	Package	Automotive Grade Available AEC-Q100
BU17101AKV-M	Serializer	LVCMOS	Clockless Link	—	1	30 to 51	1.63	24	2.3 to 3.6	−40 to +85	VQFP48	YES
BU17102AKV-M	Deserializer	Clockless Link	LVCMOS	1	—	30 to 51	1.63	24	2.3 to 3.6	−40 to +85	VQFP48	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*1	Automotive Grade Available*2
ML7174	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	WQFN64	✓	YES
ML7183	FM VICS® tuner & Filter LSI, BPF, I²C slave	3.0 to 3.6	75	−40 to +85	WQFN64	✓	YES

FM multiplexing demodulate for VICS®

ML7154	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	WQFN64	✓	YES

FM multiplexing demodulate for DARC®

MSM9563	FM multiplexing demodulate LSI for DARC®, BPF & frame memory built-in, Frames A, B, C, 8bit bus interface	3.0 to 3.6	28	−40 to +85	QFP44	✓	YES

VICS® is a registered trademark of the Vehicle Information and Communication System Center.
DARC® is a registered trademark of NHK Engineering System, Inc.
*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.

Digital Terrestrial Broadcasting Reception LSI

Japanese System(ISDB-T)

(LAPIS Semiconductor products)

RF Tuner + OFDM Demodulator for 1 Segment Digital Terrestrial Broadcasting

Part No.	Transmission Standard	Features	Supply Voltage (V)	Power Consumption	Operating Temperature (°C)	Package	Halogen Free Supported*1	Automotive Grade Available*2
ML7147	ISDB-T	Compliant to One-Seg broadcasting of ISDB-T(ARIB STD-B31) digital terrestrial television broadcasting. RF tuner, OFDM demodulate, error correction function. Serial, parallel TS output.	2.7 to 3.0 1.5 to 3.6 1.1 to 1.3	70mW [at 1seg. reception, including RF]	−40 to +90	WQFN80	✓	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.

Monitoring LSIs

Multiple Input Switch Monitor LSIs

Multiple Input Switch Monitor LSIs

Part No.	Supply Voltage (V)	Switch Input	Switch Input Voltage Range (V)	Wetting Current (mA)	Operating Current Intermittent Monitoring 50 ms(Max.)	Control I/F	Clock Frequency (MHz)	Operating Temperature (°C)	Package	Automotive Grade Available
BD3375MUV-M	8.0 to 26(VPUA/VPUB) 3.1 to 5.25(VDDI)	22	−14 to +40	1/3/5/10/15 (Pull up/Pull down)	100μA	SPI	up to 4.4	−40 to +125	VQFN48MCV070	YES
New **BD3378MUV-M**	6.0 to 26(VPUA/VPUB) 3.1 to 5.25(VDDI)	22	−14 to +40	1/3/5/10/15 (Pull up/Pull down)	100μA	SPI	up to 4.4	−40 to +125	VQFN48MCV070	YES
BD3375KV-C	8.0 to 26(VPUA/VPUB) 3.1 to 5.25(VDDI)	22	−14 to +40	1/3/5/10/15 (Pull up/Pull down)	100μA	SPI	up to 4.4	−40 to +125	VQFP48C	YES
New **BD3380MUV-M**	6.0 to 28(VPUA/VPUB) 3.1 to 5.25(VDDI)	33	−14 to +40	1/3/5/10/15 (Pull up/Pull down)	110μA	SPI	up to 4.4	−40 to +125	VQFN48MDV070	YES
New **BD3381EKV-C**	6.0 to 28(VPUA/VPUB) 3.1 to 5.25(VDDI)	33	−14 to +40	1/3/5/10/15 (Pull up/Pull down)	110μA	SPI	up to 4.4	−40 to +125	HTQFP64BV	YES
BD3376MUV-M	8.0 to 26(VPUA/VPUB) 3.1 to 5.25(VDDI)	10	−14 to +40	1/3/5/10/15 (Pull up/Pull down)	100μA	SPI	up to 4.4	−40 to +125	VQFN28SV5050	YES
BD3376EFV-C	8.0 to 26(VPUA/VPUB) 3.1 to 5.25(VDDI)	10	−14 to +40	1/3/5/10/15 (Pull up/Pull down)	100μA	SPI	up to 4.4	−40 to +125	HTSSOP-B30	YES

Audio & Video

Speech Synthesis LSI

(LAPIS Semiconductor products)

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*6	Automotive Grade Available*7
Clock Synchronization Serial Interface, 4ch Simultaneous Playback, Speaker Amplifier Built in, Support for 105°C														
ML22572	2.7 to 5.5	4.096	−40 to +105	Mask 2M	1024	98*1	Clock Synchronization Serial	1.0/AB-class	4	16	Fail safe	SSOP30	✓	YES
ML22573/ ML22Q573	2.7 to 5.5	4.096	−40 to +105	Mask/Flash 4M	1024	201*1	Clock Synchronization Serial	1.0/AB-class	4	16	Fail safe	SSOP30	✓	YES
ML22Q553	4.5 to 5.5	4.096	−40 to +105	Flash 4M	1024	201*1	Clock Synchronization Serial	1.0/AB-class	4	16	Speaker terminal short circuit detection function	SSOP30	✓	YES
Clock Synchronization Serial Interface Speaker Amplifier Built in														
ML22321/ ML22Q321	2.3 to 5.5	4.096	−40 to +85	Mask/Flash 920K	62	43*1	Clock Synchronization Serial	1.0/AB-class	1	16	Disconnection detection/ Temperature protection circuit/ Analog volume control	SSOP30	✓	YES
Clock Synchronization Serial Interface Class D Speaker Amplifier Built in														
ML22Q374	2.0 to 5.5	4.096 (Built-in)	−40 to +85	Flash 692K	30	27*2	Clock Synchronization Serial	1.0/D-class	1	—	Disconnection/ Short circuit detection built-in oscillator	SSOP16	—	YES
I²C Interface / Class D Speaker Amplifier Built in														
ML22Q394	2.0 to 5.5	4.096 (Built-in)	−40 to +85	Flash 692K	30	27*2	I²C	1.0/D-class	1	—	Disconnection/Short circuit detection built-in oscillator	SSOP16	—	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*4 External maximum 128M	1024*5 (Built-in 512, External 512)	Built-in 303sec.*1 External 109min.*3	Clock Synchronization Serial	1.0/AB-class	4	16	Speaker terminal short circuit detection function	SSOP30	✓	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.

Audio Processors

Analog Audio Processors

Part No.	Supply Voltage (V)	Current Consumption (mA)	Input Selector		Input Gain (dB)	Volume (dB)	Fader		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							
Sound Processors with Built-in 3-band Equalizer																				
BD37033FV-M	7 to 9.5	31	3/5	2/1	0 to +16	+15 to −79, −∞	+15 to −79, −∞	6	✓	✓	LPF	✓	✓	✓	—	I²C BUS	5.5	0.002	SSOP-B28	YES
BD37034FV-M	7 to 9.5 V_{CC}L to 13	36	3/5	2/1	0 to +16	+15 to −79, −∞	+15 to −79, −∞	6	✓	✓	LPF + HPF	✓	✓	✓	High Voltage Output	I²C BUS	6	0.002	SSOP-B28	YES

Sound Processors with Built-in 3-band Equalizer: BD37033FV-M and BD37034FV-M are terminal compatible.

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)							
General-Purpose Electronic Volume with Built-in Advanced Switch																
BD34602FS-M	7 to 9.5	35	—	—	—	+23 to −79, −∞ (1dB/Step)	6	3	+0 to −79, −∞ (1dB/Step)	—	—	I²C 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 (1dB/Step)	+23 to −79, −∞ (1dB/Step)	6	1	—	✓	—	I²C BUS	8	0.003	SSOP-B40	YES
BD37068FV-M	7 to 9.5 V_{CC}L to 17.8	30/7	1/2/3/4/5	5/4/3/2/1	+23 to −15 (1dB/Step)	+23 to −79, −∞ (1dB/Step)	6	1	—	✓	0/8.3	I²C BUS	23 (High-Voltage Mode)	0.003	SSOP-B40	YES
BD37069FV-M	7 to 9.5 V_{CC}L to 17.8	30/7	2/3/4/5	4/3/2/1	+23 to −15 (1dB/Step)	+23 to −79, −∞ (1dB/Step)	6	1	—	✓	2/4.6/8.3	I²C BUS	23 (High-Voltage Mode)	0.003	SSOP-B40	YES

Part No.	Supply Voltage (V)	Current Consumption (mA)	Input Selector		Input Gain(dB)	5.1 ch Volume (dB)	Fader Volume (dB)	Output Gain (dB)	Mix Car Navi. Cell Phones	Output for Spectrum Analyzer	Serial Interface	Output Noise Voltage (μVrms)	Distortion (%)	Package	Automotive Grade Available AEC-Q100
			Single Input	Monaural Differential Amplifier Input											
6ch Electronic Volume for 5.1ch Car Theater System															
BD3433K	±7.0 to ±9.5	12	5.1ch×2	1	0,6,12 (Each F,R)	+23 to −79, −∞ (1dB/Step)	+15 to −63, −∞ (1dB/step)	0, +2.5(A) 0, −4.5(B)	✓	✓	3 Wire	3	0.001	QFP44	—

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

Audio Amplifiers

Speaker Amplifiers

Part No.	Supply Voltage (V)	Power Dissipation (W)	Quiescent Current (mA)	Standby Current (μA)	Voltage Gain (dB)	Output Power (R_L=8Ω, THD=10%)		Distortion (%)	Output Residual Noise (dBV)	Package	Automotive Grade Available AEC-Q100
						V_{CC}=3.6V	V_{CC}=5.0V				
Portable Amplifiers 1.1W to 1.5W Monaural Speaker Amplifiers											
BH7824FVM	2.4 to 5.5	470	3.5	0	0 to 20	0.60W	1.1W	0.07	−94	MSOP8	—
BH7826FVM	2.6 to 5.5	470	3.5	0	0 to 20	0.60W	1.1W	0.20	−94	MSOP8	—
BD7830NUV	2.4 to 5.5	530	3.2	0	0 to 20	0.77W	1.5W	0.10	−100	VSON008V2030	—

Video Amplifiers

Isolation Amplifier

Part No.	Supply Voltage (V)	Circuit Current (mA)	Amplifier Gain (dB)	Frequency Characteristic (dB)	No. of Channels (ch)	Input Terminal Type	Video Driver	Input Register (kΩ)	CMRR (dB)	Max. Output Level (V_{P-P})	Package	Automotive Grade Available AEC-Q100
BH7673G	4.5 to 5.5	4.8	0	0 (10MHz)	1	Bias	—	150	60	3.8	SSOP5	—

Audio Converter

Audio Codec

Part No.	Supply Voltage (V)	ADC	DAC	Microphone Input	Speaker Output		Headphone Output	Filter		ALC	Package	Automotive Grade Available AEC-Q100
		No. of Channels/bit	No. of Channels/bit		Type	Monaural/ Stereo		EQ	Notch			
BU26154MUV	HV_{DD} 2.7 to 5.5 LV_{DD} 2.7 to 3.6	1ch/24bit	2ch/24bit	1	AB/D	Monaural	Stereo	✓	✓	✓	VQFN040V6060	—
BU26156RFS	HV_{DD} 2.7 to 5.5 LV_{DD} 2.7 to 3.6	2ch/24bit	2ch/24bit	2	AB/D	Stereo	Stereo	✓	✓	✓	HTSSOP-A44R	—

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_{DD} Core	V_{DD} I/O	V_{DD} LVDS								
BU1573KV	1.4 to 1.6	2.7 to 3.6	—	Supports up to WVGA + (864×480)	I^2C BUS	18bit RGB I/F BUS I/F	—	✓	—	VQFP64	—
BU1523KV	1.65 to 1.95	3.0 to 3.6	3.0 to 3.6	Supports up to WVGA + (864×480)	I^2C BUS	24bit RGB I/F 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_{DD} Core	V_{DD} I/O	AV_{DD}							
BU6521KV	1.4 to 1.6	2.7 to 3.6	2.7 to 3.6	ITU-R BT.656	I^2C BUS 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 (LVTTL)	Pixel Frequency	Crystal Oscillator Supported	Features	Operating Temperature (°C)	Package	Halogen Free Supported*1	Automotive Grade Available*2
		Terminal	Type								
ML86101A	3.3/1.5	CVBS×4 or CVBS×2 + S-video×1 or S-video×2	NTSC PAL SECAM	ITU-R BT.656 YCbCr 8bit	12.2727MHz, 13.5MHz, 14.3181MHz, 14.75MHz	✓	Simple, Small	−40 to +85	TQFP48	✓	YES
ML86V7668A	3.3/2.5	CVBS×4 or CVBS×1+ S-video×3	NTSC PAL SECAM	ITU-R BT.656 YCbCr 8/16bit RGB 18bit	12.2727MHz, 13.5MHz	—	RGB output	−40 to +85	TQFP100	✓	YES

CVBS/S-video/Component/RGB

Part No.	Supply Voltage (V)	Input(Analog)		Output (LVTTL)	Pixel Frequency	Crystal Oscillator Supported	Features	Operating Temperature (°C)	Package	Halogen Free Supported*1	Automotive Grade Available*2
		Terminal	Type								
ML86V7675	3.3/1.5	CVBS×4 +(Comp or S-video)×1 +Comp×1	NTSC PAL SECAM	ITU-R BT.656 YCbCr 8bit	7.9930MHz to 33.333MHz	✓	WVGA, EGA analog RGB supported	−40 to +85	TQFP64	✓	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 (LVTTL)	Output(Analog)		Pixel Frequency	Crystal Oscillator Supported	Features	Operating Temperature (°C)	Package	Halogen Free Supported*1	Automotive Grade Available*2
			Terminal	Type							
ML86V76580	3.3/1.8	ITU-R BT.656 YCbCr 8bit	CVBS	NTSC PAL	12.2727MHz, 13.5MHz, 14.3181MHz, 14.75MHz	—	75Ω drive	−40 to +85	TQFP48	✓	YES
New **ML86640**	3.3	ITU-R BT.656 YCbCr 8/16/24bit RGB 24bit	CVBS	NTSC PAL	13.5MHz, 27MHz, 54MHz	—	75Ω drive P/I conversion	−40 to +105	TQFP48	✓	YES

CVBS/S-video/Component/RGB

Part No.	Supply Voltage (V)	Input (LVTTL)	Output(Analog)		Pixel Frequency	Crystal Oscillator Supported	Features	Operating Temperature (°C)	Package	Halogen Free Supported*1	Automotive Grade Available*2
			Terminal	Type							
ML86V7655	3.3/2.5	ITU-R BT.656 YCbCr 8/16/24bit RGB 24bit	CVBS S-video Component	NTSC PAL	12.2727MHz, 13.5MHz, 14.3181MHz, 14.75MHz, 18MHz	—	I/P, P/I conversion	−40 to +85	TQFP100	✓	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)

LVTTL/LVDS/MIPI Video Interface

Part No.	Supply Voltage (V)	Input (LVTTL/LVDS/MIPI)	Output (LVTTL/LVDS/MIPI)	Features	Operating Temperature (°C)	Package	Halogen Free Supported*1	Automotive Grade Available*2
☆**ML86795**	1.8 to 3.3 1.5	ITU-R BT.656 Single/Dual LVDS 4ch (RGB 18/24bit) MIPI-CSI2 (RGB565/888, YUV422-8bit) 1Gbps/Lane Max.	ITU-R BT.656 YCbCr 16bit Single/Dual LVDS 4ch (RGB 18/24bit) MIPI-CSI2 (RGB565/888, YUV422-8bit) 1Gbps/Lane Max.	LVTTL/LVDS/MIPI-CSI2 I/F, LVTTL/LVDS/MIPI to LVTTL/LVDS/MIPI translate, MIPI Virtual Channel	−40 to +105	WQFN64	✓	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.

☆ : Under Development

Display Controller for Small to Medium-Sized TFT LCD

(LAPIS Semiconductor products)

T-CON, Video Decoders Included

Part No.	Supply Voltage (V)	Input(Analog) Terminal	Input(Analog) Type	Input (LVTTL/LVDS/MIPI)	Output (LVTTL/LVDS/MIPI)	Resolution	OSD	MCU	Features	Operating Temperature (°C)	Package	Halogen Free Supported*1	Automotive Grade Available*2
ML86V8201	3.3/1.5	CVBS×2 or S-video×1	NTSC PAL SECAM	ITU-R BT.656 YCbCr 8/16/24bit RGB 18/24bit	ITU-R BT.656 YCbCr 8bit RGB 18/24bit	QVGA to WVGA	Line	–	Rear camera function Image quality adjustment	–40 to +85	TQFP100	✓	YES
ML86203	3.3/1.5	CVBS×1	NTSC PAL	ITU-R BT.656 YCbCr 8/16/24bit RGB 18/24bit	ITU-R BT.656 YCbCr 8bit LVDS 4ch (RGB 18/24bit)	VGA to WXGA	–	–	WXGA panel support Rear camera function Image quality adjustment	–40 to +85	TQFP80	✓	YES
ML86207	3.3/1.5	CVBS×2	NTSC PAL	ITU-R BT.656 YCbCr 8/16/24bit RGB 18/24bit + LVDS 4ch (RGB 18/24bit)	ITU-R BT.656 YCbCr 8bit RGB 18/24bit LVDS 4ch (RGB 18/24bit)	VGA to WXGA	Text Line	–	LVTTL/LVDS I/F Digital video input×2 WXGA panel support Rear camera function Image quality adjustment OSD function	–40 to +85	TQFP100	✓	YES
ML86287	3.3/1.5	CVBS×2	NTSC PAL	ITU-R BT.656 YCbCr 8/16/24bit RGB 18/24bit + LVDS 4ch (RGB 18/24bit)	ITU-R BT.656 YCbCr 8bit RGB 18/24bit LVDS 4ch (RGB 18/24bit)	VGA to WXGA	Text Line	–	LVTTL/LVDS I/F Digital video input×2 WXGA panel support Rear camera function Picture in Picture Image quality adjustment OSD, ROM-OSD function	–40 to +85	TQFP128	✓	YES
☆**ML86209**	3.3/1.5	CVBS single×2 or differential×1	NTSC PAL	ITU-R BT.656 ITU-R BT.1120 like YCbCr 8/16bit Single/Dual LVDS 4ch (RGB 18/24bit) MIPI-CSI2 (RGB565/888, YUV422-8bit) 1Gbps/Lane Max.	ITU-R BT.656 or MIPI-CSI2 (RGB565/888, YUV422-8bit) 1Gbps/Lane Max. + Single/Dual LVDS 4ch (RGB 18/24bit)	VGA to Full HD	Text Line	–	LVTTL/LVDS MIPI-CSI2 I/F Digital video input×4 Full HD panel support Rear camera function Image quality adjustment OSD, ROM-OSD function	–40 to +85	TQFP128	✓	YES
☆**ML86289**	3.3/1.5	CVBS single×2 or differential×1	NTSC PAL	ITU-R BT.656 ITU-R BT.1120 like YCbCr 8/16bit Single/Dual LVDS 4ch (RGB 18/24bit) MIPI-CSI2 (RGB565/888, YUV422-8bit) 1Gbps/Lane Max.	ITU-R BT.656 or MIPI-CSI2 (RGB565/888, YUV422-8bit) 1Gbps/Lane Max. + Single/Dual LVDS 4ch (RGB 18/24bit)	VGA to Full HD	Text Line	–	LVTTL/LVDS MIPI-CSI2 I/F Digital video input×4 Full HD panel support Rear camera function Picture in Picture Image quality adjustment OSD, ROM-OSD function	–40 to +85	TQFP128	✓	YES
ML86V8202C	3.3/1.8	CVBS×2 +(Comp or S-video)×1 +Comp×1	NTSC PAL SECAM	ITU-R BT.656 YCbCr 8/16/24bit RGB 18/24bit	ITU-R BT.656 style YCbCr 8/16/24bit RGB 18/24bit	QVGA to WVGA	–	–	Component video support image quality adjustment	–40 to +85	TQFP100	✓	YES
ML86V8207	3.3/2.5	CVBS×4 or CVBS×3 +(Comp or S-video)×1 or CVBS×2+S-video×1 +(Comp or S-video)×1	NTSC PAL SECAM	ITU-R BT.656 YCbCr 8/16/24bit RGB 18/24bit	RGB 18/24bit	QVGA to WVGA	Text Line	–	OSD function	–40 to +85	LQFP144	✓	YES
ML86240	3.3/1.5	CVBS×4 or CVBS×2 +(Comp or S-video)×1 +Comp×1	NTSC PAL SECAM	ITU-R BT.656 YCbCr 8/16/24bit RGB 18/24bit 2ch	ITU-R BT.656 YCbCr 8bit RGB 18/24bit	QVGA to WVGA	Text Line	–	Component video support Digital video input×2 Rear camera function Image quality adjustment OSD function	–40 to +85	BGA144	–	YES
New **ML86241**	3.3/1.5 (1.8)	CVBS×4 or CVBS×2 +(Comp or S-video)×1 +Comp×1	NTSC PAL SECAM	ITU-R BT.656 YCbCr 8/16/24bit RGB 18/24bit + LVDS 4ch (RGB 18/24bit)	ITU-R BT.656 YCbCr 8/16bit + RGB 18/24bit YCbCr 16bit LVDS 4ch (RGB 18/24bit)	QVGA to WXGA	Text Line	–	Component video support LVTTL/LVDS I/F Digital video input×2 WXGA panel support Rear camera function Image quality adjustment OSD, ROM-OSD function	–40 to +85	BGA144	–	YES

TCON, Image Adjustment Functions Included

Part No.	Supply Voltage (V)	Input(Analog) Terminal	Input(Analog) Type	Input (LVTTL)	Output (LVTTL)	Resolution	OSD	MCU	Features	Operating Temperature (°C)	Package	Halogen Free Supported*1	Automotive Grade Available*2
ML86V8101	3.3	–	–	RGB 18bit	RGB 18bit	QVGA to QHD	–	–	Image quality adjustment	–40 to +85	TQFP64	✓	YES
ML86V8102	3.3	–	–	RGB 18/24bit	RGB 18/24bit	QVGA to QHD	–	–	Image quality adjustment RGB 24 bits supported	–40 to +85	TQFP80	✓	YES
☆**ML86173**	3.3/1.5	–	–	ITU-R BT.656 YCbCr 8/10bit RGB 18/24bit Single/Dual LVDS 4ch (RGB 18/24bit)	Single/Dual LVDS 4ch (RGB 18/24bit)	WVGA to H 2880(Max.) V 1080(Max.) (Pixel rate 160MHz Max.)	Text	–	LVTTL/LVDS I/F H 2880(Max.)/ V 1080(Max.) (Pixel rate 160 MHz Max.) Image quality adjustment OSD function ROM OSD function (30 windows, 2 layers) Frequency conversion function	–40 to +85	TQFP100	✓	YES

Video Decoder, 8051MCU Included

Part No.	Supply Voltage (V)	Input(Analog) Terminal	Input(Analog) Type	Input (LVTTL/LVDS/MIPI)	Output (LVTTL/LVDS/MIPI)	Resolution	OSD	MCU	Features	Operating Temperature (°C)	Package	Halogen Free Supported*1	Automotive Grade Available*2
ML86V8401	3.3/1.8	CVBS×3 or CVBS×2 +S-video×1	NTSC PAL SECAM	ITU-R BT.656 YCbCr 8/16bit RGB 18/24bit	ITU-R BT.656 RGB 18/24bit	QVGA to WVGA	Text	8051 (8bit)	System control MCU installed	–40 to +85	TQFP100	–	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.

☆ : Under Development

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
BM6101FV-C	4.5 to 5.5	14 to 24	−12 to 0	2,500	350	180	3	−40 to +125	Miller Clamp/Fail Output/Built-in under voltage lock out circuit/ Thermal protection/Short current protection/DESAT/ Soft turn-off function for short current protection	SSOP-B20W	YES
BM6102FV-C	4.5 to 5.5	14 to 20	—	2,500	200	100	3	−40 to +125	Miller Clamp/Fail Output/Built-in under voltage lock out circuit/ Thermal protection/Short current protection/DESAT/ Soft turn-off function for short current protection	SSOP-B20W	YES
BM6104FV-C	4.5 to 5.5	10 to 24	−12 to 0	2,500	150	90	3	−40 to +125	Miller Clamp/Fail Output/ Built-in under voltage lock out circuit/Short current protection/DESAT/ Soft turn-off function for short current protection	SSOP-B20W	YES
BM60014FV-C	4.5 to 5.5	10 to 24	—	2,500	120	70	3	−40 to +125	Miller Clamp/Fail Output/ Built-in under voltage lock out circuit	SSOP-B20W	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 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
BM60051FV-C	4.5 to 24 4.5 to 5.5	9 to 24	—	2,500	260	180	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
BM60055FV-C	4.5 to 30	9 to 24	—	2,500	250	170	5	−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

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)	Minimum Input Pulse Width (ns)	Function	No. of Channels (ch)	Operating Temperature (°C)	Package	Automotive Grade Available AEC-Q100
BM60212FV-C	10 to 24	1,200	75	3	60	Miller Clamp/Built-in under voltage lock out circuit	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*1
☆**ML5810**	6.5 to 64	10	350	70	−40 to +105	TSSOP-20	—

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

☆ : Under Development

High Voltage Monitor

Isolated High Voltage Monitor

Part No.	Supply Voltage 1 (V)	Supply Voltage 2 (V)	Isolation Voltage (Vrms)	Circuit Current 1 (mA)	Circuit Current 2 (mA)	Output Duty Accuracy (%)	Operating Temperature (°C)	Package	Automotive Grade Available AEC-Q100
BM67290FV-C	8.0 to 24.0	3.0 to 5.5	2,500	4.6	0.2	±3.5	−40 to +125	SSOP-B20W	YES

Temperature Monitor

Isolated Temperature Monitor

Part No.	Supply Voltage 1 (V)	Supply Voltage 2 (V)	Isolation Voltage (Vrms)	Circuit Current 1 (mA)	Circuit Current 2 (mA)	Input Voltage Range (V)	Output Current Accuracy (%)	Output Duty Accuracy (%)	Operating Temperature (°C)	Package	Automotive Grade Available AEC-Q100
BM66002FV-C	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(Support for 85°C)

Part No.	Data Rate Type	Supply Voltage (V)	Density (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*1	Automotive Grade Available AEC-Q100
MSM56V16161NP-xxTFEL	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
MD56V72161C-xxTAL42X			128M		4×2M×16	166		6/7/7.5/10					
MD56V82161A-xxTAL42X			256M		4×4M×16	166	8192/64	6/7/7.5/10					
☆**MD60Y1G160A-xxLAL43L**	DDR3	1.5±0.075	1G	×16	8×8M×16	800 (1600Mbps)	Average Refresh Period: 7.8 µs(T_C ≤ 85°C.), 3.9 µs(T_C > 85°C.)	1.25/1.5	—	−40 to +95	96-ball FBGA	✓	YES
☆**MD60S1G160A-xxLAL43L**	DDR3L	1.35 +0.1,−0.067	1G	×16	8×8M×16	800 (1600Mbps)	Average Refresh Period: 7.8 µs(T_C ≤ 85°C.), 3.9 µs(T_C > 85°C.)	1.25/1.5	—	−40 to +95	96-ball FBGA	✓	YES

Automotive(Support for 105°C)

Part No.	Data Rate Type	Supply Voltage (V)	Density (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*1	Automotive Grade Available AEC-Q100
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
MD56V72161C-xxTALQ2X			128M		4×2M×16	166		6/7/7.5/10					
MD56V82161A-xxTALQ2X			256M		4×4M×16	166	8192/16	6/7/7.5/10					
☆**MD60Y1G160A-xxLALQ3L**	DDR3	1.5±0.075	1G	×16	8×8M×16	800 (1600Mbps)	Average Refresh Period: 7.8 µs(T_C ≤ 85°C.), 3.9 µs(T_C > 85°C.)	1.25/1.5	—	−40 to +105	96-ball FBGA	✓	YES
☆**MD60S1G160A-xxLALQ3L**	DDR3L	1.35 +0.1,−0.067	1G	×16	8×8M×16	800 (1600Mbps)	Average Refresh Period: 7.8 µs(T_C ≤ 85°C.), 3.9 µs(T_C > 85°C.)	1.25/1.5	—	−40 to +105	96-ball FBGA	✓	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

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*1	Automotive Grade Available*2
								Operating	Standby					
MS81V26000-25TPZP3	3.3±0.3	26M	1,114,112×24	×24	40	12	25	576	18	−40 to +85	TQFP100	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 I²C 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	10^6	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 I²C BUS EEPROM(2-Wire)BR24Txx-3AM Series

Part No.	Package and Suffix			Density (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)					
New **BR24T512**	F-3AM	FJ-3AM	FVT-3AM	512K	64K×8	1.7 to 5.5	4.5	3	5	−40 to +85	10^6	40	YES
New **BR24T1M**	F-3AM	FJ-3AM	—	1M	128K×8	1.7 to 5.5	4.5	3	5				

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	10^6	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				

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

BR93A46	RF-WM	RFJ-WM	RFVT-WM	RFVM-WM	1K	64×16	2.5 to 5.5	3	2	5	−40 to +105	10^6	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				

Automotive EEPROM

Part No.	Package and Suffix				Density (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)					
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	10^6	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	10^6	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	10^6	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)

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*1	Automotive Grade Available*2
Parallel BUS FeRAM										
MR48V256C	256K	32K×8	2.7 to 3.6	t_{RC}=150ns	10^{12}	10	−40 to +85	TSOP(I)28	—	YES
I^2C BUS FeRAM MR44Vxxxx Series										
MR44V064A	64K	8K×8	2.5 to 3.6	f_{clk}=3.4MHz	10^{12}	10	−40 to +85	SOP8	✓	YES
MR44V064B	64K	8K×8	1.8 to 3.6	f_{clk}=3.4MHz					✓	
New **MR44V100A**	1M	128K×8	1.8 to 3.6	f_{clk}=3.4MHz					✓	
SPI BUS FeRAM MR45Vxxxx Series										
MR45V032A	32K	4K×8	2.7 to 3.6	f_{clk}=15MHz	10^{12}	10	−40 to +85	SOP8	✓	YES
MR45V064B	64K	8K×8	1.8 to 3.6	f_{clk}=40MHz						
MR45V256A	256K	32K×8	3.0 to 3.6	f_{clk}=15MHz						
New **MR45V100A**	1M	128K×8	1.8 to 3.6	f_{clk}=40MHz				SOP8	✓	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.

Operational Amplifiers

Standard Ground Sense Operational Amplifiers

Part No.	No. of Channels (ch)	Supply Voltage (V)	Circuit Current (mA)	Input Offset Voltage (mV)	Input Bias Current (nA)	Output Source 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
Ground Sense Operational Amplifiers																
BA2904YF-C	2	3 to 36	0.5	2.0	20	30	VEE to VCC−1.5	VEE to VCC−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	VEE to VCC−1.5	VEE to VCC−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	VEE to VCC−1.5	VEE to VCC−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	VEE to VCC−1.5	VEE to VCC−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																
New **BA82904YF-C**	2	3 to 36	0.5	2.0	20	30	VEE to VCC−1.5	VEE to VCC−1.5	100	80	100	0.2	0.5	−40 to +125	SOP8	YES
New **BA82904YFVM-C**															MSOP8	YES
New **BA82902YF-C**	4	3 to 36	0.7	2.0	20	30	VEE to VCC−1.5	VEE to VCC−1.5	100	80	100	0.2	0.5	−40 to +125	SOP14	YES
New **BA82902YFV-C**															SSOP-B14	YES

High Speed Ground Sense Operational Amplifiers

Part No.	No. of Channels (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
Ground Sense Operational Amplifiers																
BA3472YF-C	2	3 to 36	4.0	1.0	100	30	VEE to VCC−2.0	VEE+0.3 to VCC−1.0	100	97	97	10	4.0	−40 to +125	SOP8	YES
BA3472YFV-C															SSOP-B8	YES
BA3472YFVM-C															MSOP8	YES
BA3472WFV-C															SSOP-B8	YES
BA3474WFV-C	4	3 to 36	8.0	1.0	100	30	VEE to VCC−2.0	VEE+0.3 to VCC−1.0	100	97	97	10	4.0	−40 to +125	SSOP-B14	YES
BA3474YFV-C															SSOP-B14	YES

Low Current Consumption

Ground Sense 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
New BU7241YG-C	1	1.8 to 5.5	70	1.0	0.001	10	VSS to VDD	VSS+0.05 to VDD−0.05	100	70	80	0.4	1.0	−40 to +125	SSOP5	YES
New BU7242YFVM-C	2	1.8 to 5.5	180	1.0	0.001	10	VSS to VDD	VSS+0.05 to VDD−0.05	100	70	80	0.4	1.0	−40 to +125	MSOP8	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
BA4558YF-M	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
BA4558YFV-M															SSOP-B8	YES
BA4558YFVM-M															MSOP8	YES
BA4560YF-M	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
BA4560YFV-M															SSOP-B8	YES
BA4560YFVM-M															MSOP8	YES
BA4580YF-M	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
BA4580YFVM-M															MSOP8	YES
BA4584YFV-M	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)	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
BA2903YF-C	2	2 to 36	0.6	2	50	16	VEE to VCC−1.5	100	1.3	−40 to +125	SOP8	YES
BA2903YFV-C											SSOP-B8	YES
BA2903YFVM-C											MSOP8	YES
BA2901YF-C	4	2 to 36	0.8	2	50	16	VEE to VCC−1.5	100	1.3	−40 to +125	SOP14	YES
BA2901YFV-C											SSOP-B14	YES
BA2903YF-M	2	2 to 36	0.6	2	50	16	VEE to VCC−1.5	100	1.3	−40 to +125	SOP8	YES
BA2903YFV-M											SSOP-B8	YES
BA2903YFVM-M											MSOP8	YES
BA2901YF-M	4	2 to 36	0.8	2	50	16	VEE to VCC−1.5	100	1.3	−40 to +125	SOP14	YES
BA2901YFV-M											SSOP-B14	YES

Low Current Consumption

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
BU7233YF-C	2	1.8 to 5.5	10	1	0.001	7	VSS to VDD	100	1.8	−40 to +125	SOP8	YES

Voltage Detectors (Reset ICs)

Voltage Detectors

Support for 105°C

Part No.	Types	Voltage Detection Precision Ta=25°C (%)	Detection Voltage (V)	Reset Active Voltage Range (V)	Detection Step (V)	Output Method	Circuit Current(μA) ON	Circuit Current(μA) OFF	Hysteresis Voltage (V)	*'L'Output Current (mA) VDD=1.2V	*'L'Output Current (mA) VDD=2.4V	Reset Active Timeout Period (ms)	Delay Circuit Resistance (MΩ)	Manual Reset PIN	Packages	Automotive Grade Available AEC-Q100
BD48ExxG-MSeries	0.1V step 38 type	±1	2.3 to 6.0	0.95 to 10.0	0.1	Open Drain	0.60 (VS=4.8V)	0.85 (VS=4.8V)	Vs×0.05	1.0	4	—	—	Unavailable	SSOP5	YES
BD49ExxG-MSeries	0.1V step 38 type	±1	2.3 to 6.0	0.95 to 10.0	0.1	CMOS						—	—	Unavailable	SSOP5	YES
BD45Exx5G-MSeries	0.1V step 26 type	±1	2.3 to 4.8	0.95 to 10.0	0.1	Open Drain	0.80 (VDET=4.8V)	0.85 (VDET=4.8V)	VDET×0.05	1.2	5	50	—	Available	SSOP5	YES
BD45Exx1G-MSeries	0.1V step 26 type	±1	2.3 to 4.8	0.95 to 10.0	0.1							100	—	Available	SSOP5	YES
BD45Exx2G-MSeries	0.1V step 26 type	±1	2.3 to 4.8	0.95 to 10.0	0.1							200	—	Available	SSOP5	YES
BD46Exx5G-MSeries	0.1V step 26 type	±1	2.3 to 4.8	0.95 to 10.0	0.1	CMOS						50	—	Available	SSOP5	YES
BD46Exx1G-MSeries	0.1V step 26 type	±1	2.3 to 4.8	0.95 to 10.0	0.1							100	—	Available	SSOP5	YES
BD46Exx2G-MSeries	0.1V step 26 type	±1	2.3 to 4.8	0.95 to 10.0	0.1							200	—	Available	SSOP5	YES
New BD52xxG-2MSeries	0.1V step 42 type	±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 Delay Time Precision)	Unavailable	SSOP5	YES
New BD53xxG-2MSeries	0.1V step 42 type		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) ON	Circuit Current(μA) OFF	Hysteresis Voltage (V)	*'L'Output Current VDD=1.2V	*'L'Output Current VDD=2.4V	Reset Active Timeout Period (ms)	Delay Time Precision (%)	Manual Reset PIN	Packages	Automotive Grade Available AEC-Q100
BD52xxG-2CSeries	0.1V step 42 type	±3	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	±50 (Full Temperature Range)	Unavailable	SSOP5	YES
BD53xxG-2CSeries	0.1V step 42 type	±3	0.9 to 5.0	0.8 to 6.0	0.1	CMOS						Variable		Unavailable	SSOP5	YES

Voltage Detectors: Detection voltage is applied in the "xx" of part No. Ex. : In case of 2.3V detection voltage in BD48ExxG-M series, Part No. is BD48E23G-M.

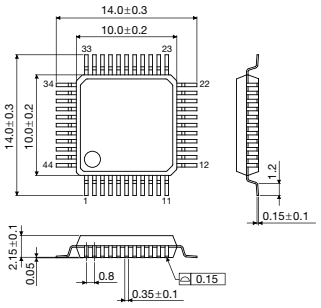
The packages on this page are ROHM product supported packages. Please refer to page 53 and onward for LAPIS Semiconductor product supported packages.

QFP Packages

(Unit: mm)

QFP <Pin Pitch: 0.8mm>

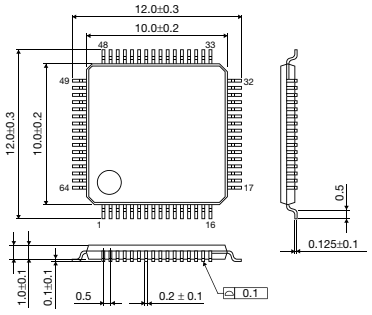
QFP44



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

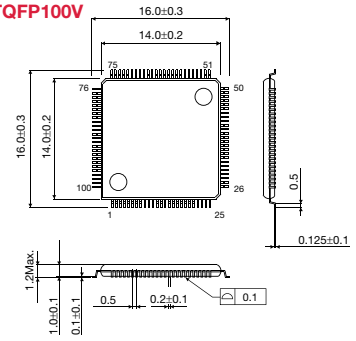
TQFPV <Pin Pitch: 0.5mm>

TQFP64V



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

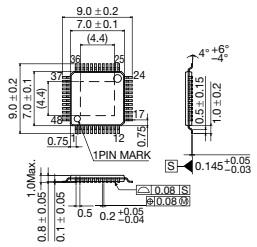
TQFP100V



Tray: 500pcs
Embossed carrier tape: 500pcs

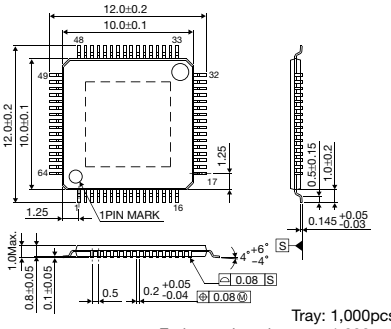
HTQFPV <Pin Pitch: 0.5mm>

HTQFP48V



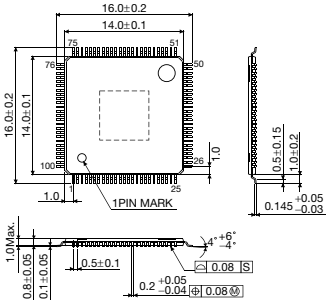
Tray: 1,000pcs
Embossed carrier tape: 1,500pcs

HTQFP64V



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

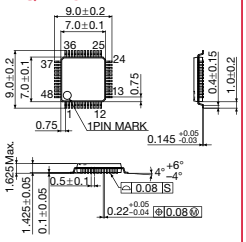
HTQFP100V



Tray: 500pcs

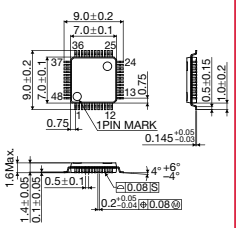
VQFP <Pin Pitch: 0.5mm>

VQFP48



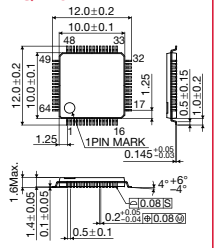
Tray: 1,000pcs
Embossed carrier tape: 1,500pcs

VQFP48C



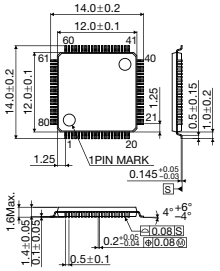
Tray: 1,000pcs
Embossed carrier tape: 1,500pcs

VQFP64



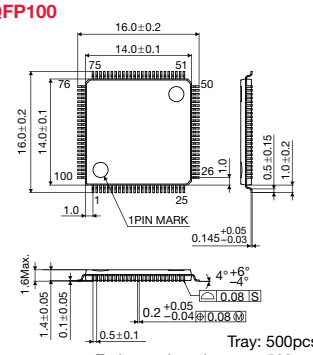
Tray: 1,000pcs
Embossed carrier tape: 1,000pcs

VQFP80



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

VQFP100



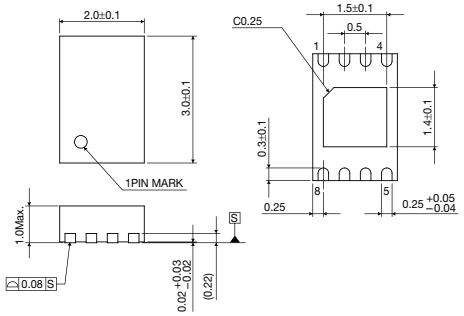
Tray: 500pcs
Embossed carrier tape: 500pcs

SON / QFN Packages

(Unit: mm)

VSON-V <Pin Pitch: 0.5mm>

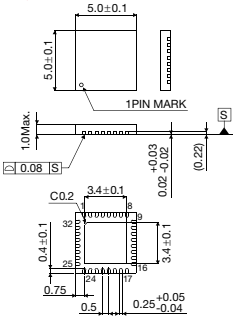
VSON008V2030



Embossed carrier tape: 3,000pcs

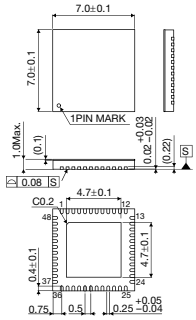
VQFN-SV <Pin Pitch: 0.5mm>

VQFN32SV5050



Embossed carrier tape: 2,500pcs

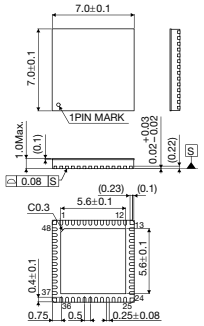
VQFN48SV7070



Embossed carrier tape: 1,500pcs

VQFN-MCV <Pin Pitch: 0.5mm>

VQFN48MCV070



Embossed carrier tape: 1,500pcs

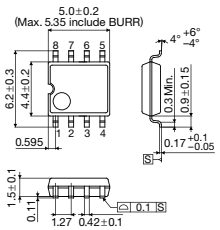
The packages on this page are ROHM product supported packages. Please refer to page 53 and onward for LAPIS Semiconductor product supported packages.

SOP Packages

(Unit: mm)

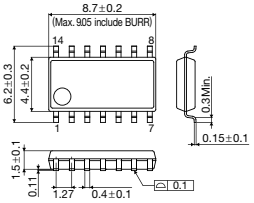
SOP <Pin Pitch: 1.27mm>

SOP8



Embossed carrier tape: 2,500pcs

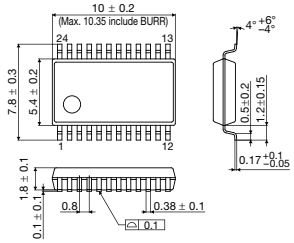
SOP14



Embossed carrier tape: 2,500pcs

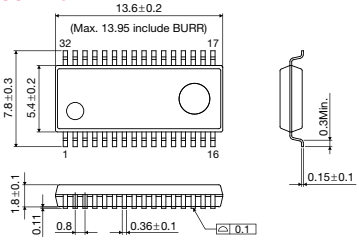
SSOP-A <Pin Pitch: 0.8mm>

SSOP-A24



Embossed carrier tape: 2,000pcs

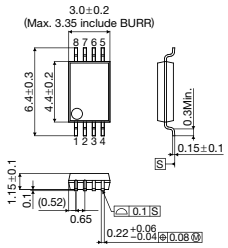
SSOP-A32



Embossed carrier tape: 2,000pcs

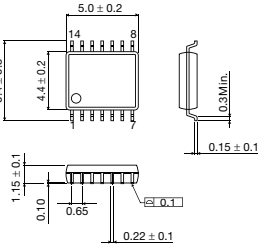
SSOP-B <Pin Pitch: 0.65mm>

SSOP-B8



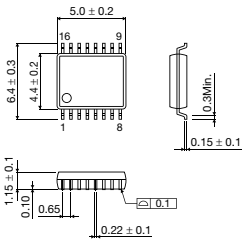
Embossed carrier tape: 2,500pcs

SSOP-B14



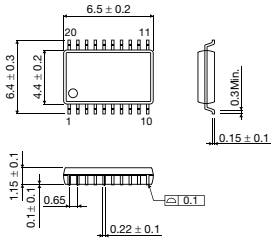
Embossed carrier tape: 2,500pcs

SSOP-B16



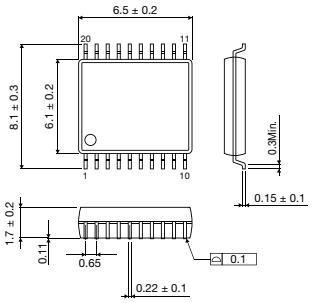
Embossed carrier tape: 2,500pcs

SSOP-B20



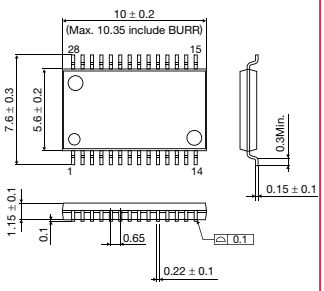
Embossed carrier tape: 2,500pcs

SSOP-B20W



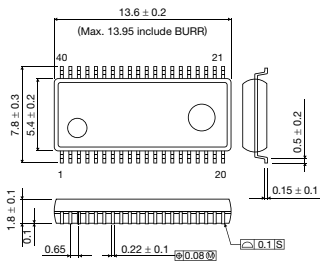
Embossed carrier tape: 2,000pcs

SSOP-B28



Embossed carrier tape: 2,000pcs

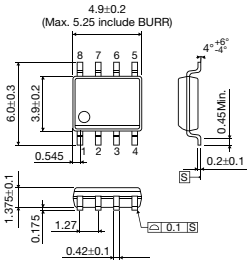
SSOP-B40



Embossed carrier tape: 2,000pcs

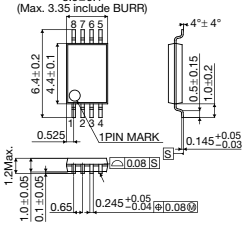
JEDEC <Pin Pitch: 1.27mm/0.65mm>

SOP-J8



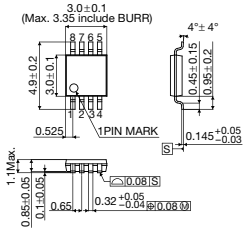
Embossed carrier tape: 2,500pcs

TSSOP-B8



Embossed carrier tape: 3,000pcs

TSSOP-B8J



Embossed carrier tape: 2,500pcs

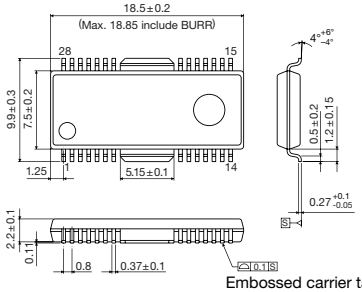
The packages on this page are ROHM product supported packages. Please refer to page 53 and onward for LAPIS Semiconductor product supported packages.

HSOP Packages

(Unit: mm)

HSOP <Pin Pitch: 0.8mm>

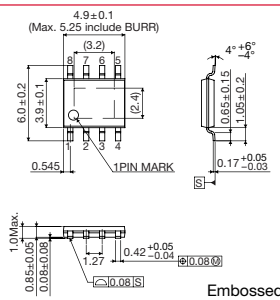
HSOP-M28



Embossed carrier tape: 1,500pcs

HTSOP-J <Pin Pitch: 1.27mm>

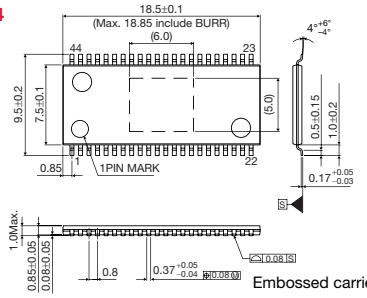
HTSOP-J8



Embossed carrier tape: 2,500pcs

HTSSOP-A <Pin Pitch: 0.8mm>

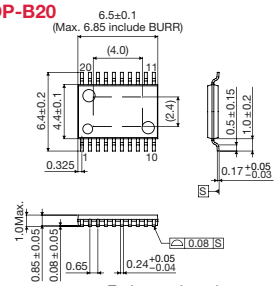
HTSSOP-A44



Embossed carrier tape: 1,500pcs

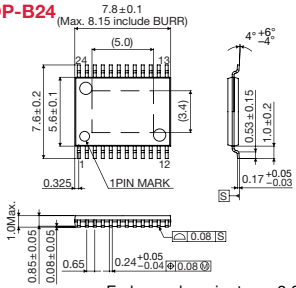
HTSSOP-B <Pin Pitch: 0.65mm>

HTSSOP-B20



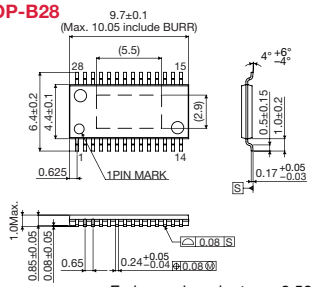
Embossed carrier tape: 2,500pcs

HTSSOP-B24



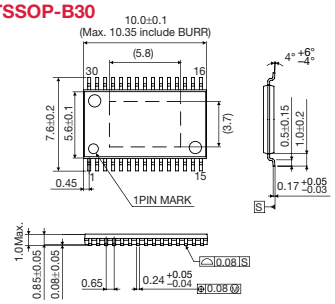
Embossed carrier tape: 2,000pcs

HTSSOP-B28



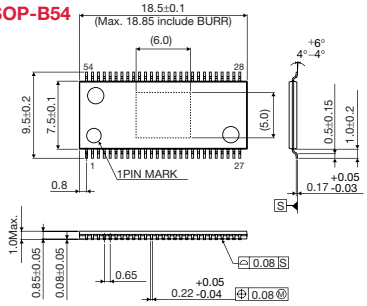
Embossed carrier tape: 2,500pcs

HTSSOP-B30



Embossed carrier tape: 2,000pcs

HTSSOP-B54



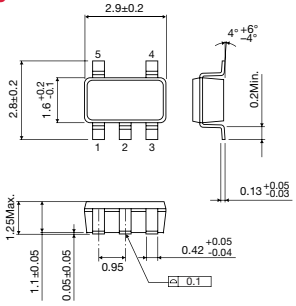
Embossed carrier tape: 1,500pcs

Small Packages

(Unit: mm)

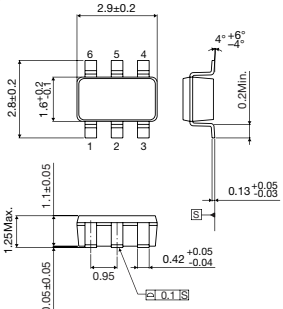
SOP Type

SSOP5



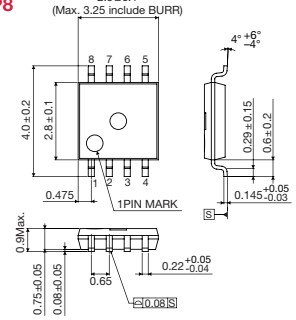
Embossed carrier tape: 3,000pcs

SSOP6



Embossed carrier tape: 3,000pcs

MSOP8



Embossed carrier tape: 3,000pcs

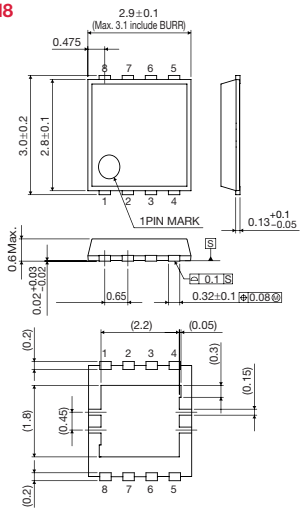
The packages on this page are ROHM product supported packages. Please refer to page 53 and onward for LAPIS Semiconductor product supported packages.

Non-Lead Package

(Unit: mm)

Non-Lead

HSON8



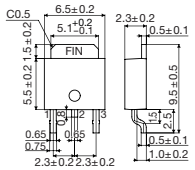
Embossed carrier tape: 3,000pcs

Power Packages

(Unit: mm)

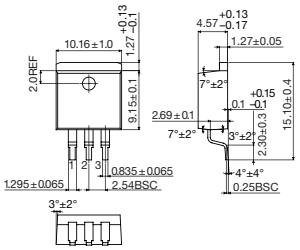
POWER-3PIN

TO252-3



Embossed carrier tape: 2,000pcs

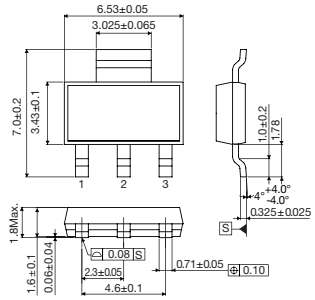
TO263-3



Embossed carrier tape: 500pcs

POWER-4PIN

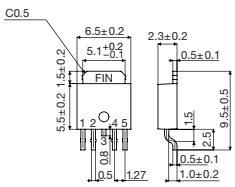
SOT223-4



Embossed carrier tape: 2,000pcs

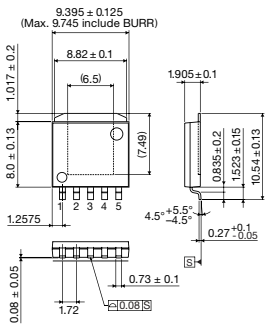
POWER-5PIN

TO252-5



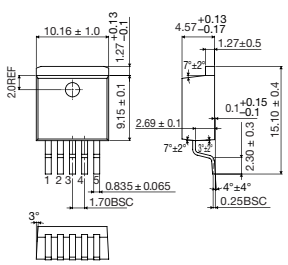
Embossed carrier tape: 2,000pcs

HRP5



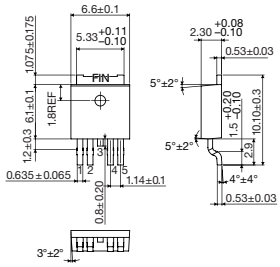
Embossed carrier tape: 2,000pcs

TO263-5



Embossed carrier tape: 500pcs

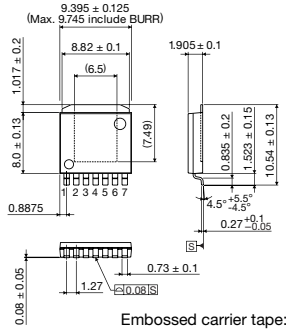
TO252-J5



Embossed carrier tape: 2,000pcs

POWER-7PIN

HRP7



Embossed carrier tape: 2,000pcs

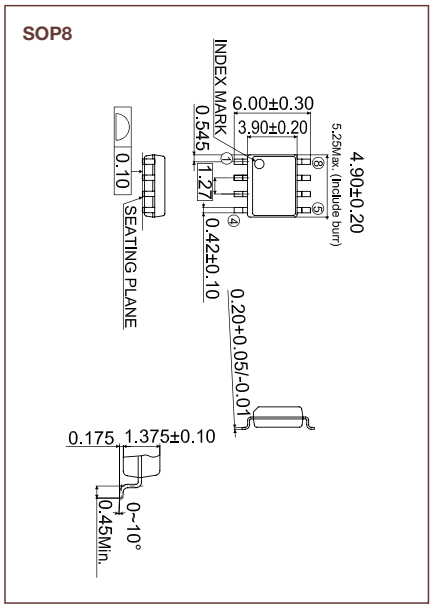
These package sizes are an example. Please contact a ROHM sales representative for details.

SOP Packages

(Unit: mm)

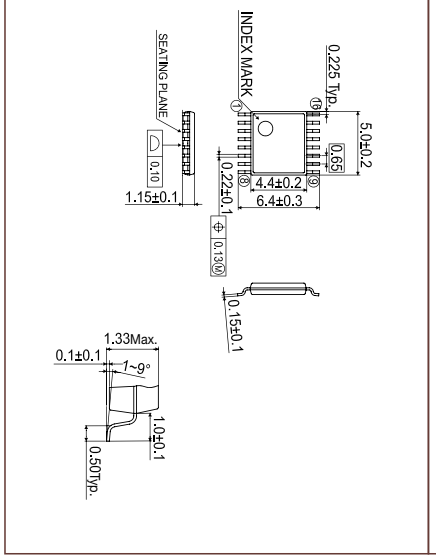
SOP

SOP8

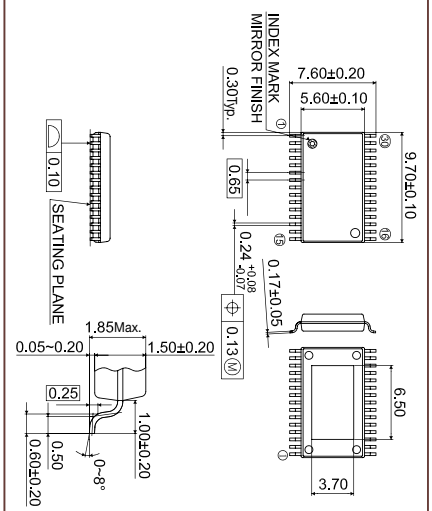


SSOP

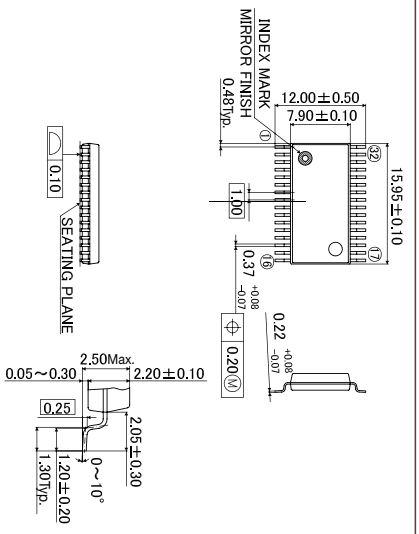
SSOP16



SSOP30



SSOP32



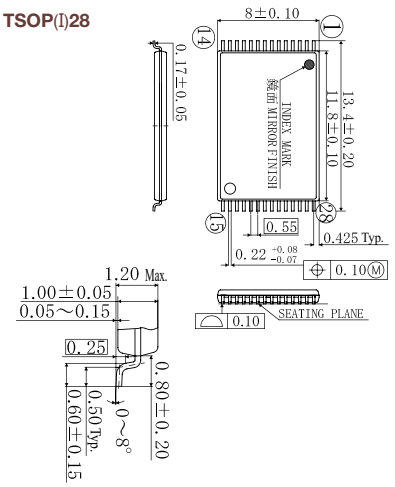
These package sizes are an example. Please contact a ROHM sales representative for details.

SOP Packages

(Unit: mm)

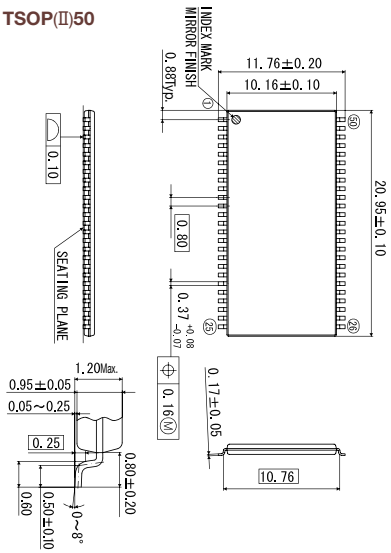
TSOP(Type Ⅰ)

TSOP(I)28

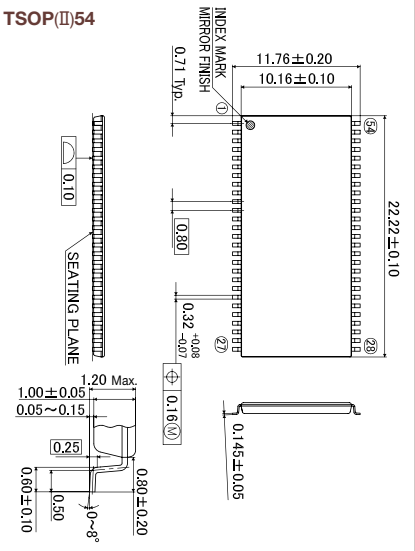


TSOP(Type Ⅱ)

TSOP(II)50



TSOP(II)54

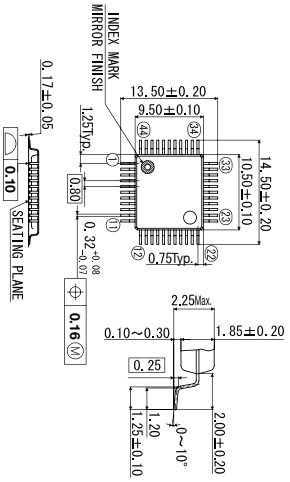


QFP Packages

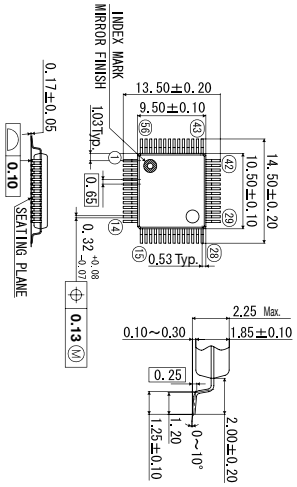
(Unit: mm)

QFP

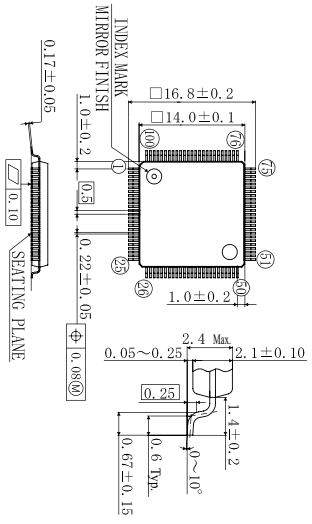
QFP44



QFP56



QFP100



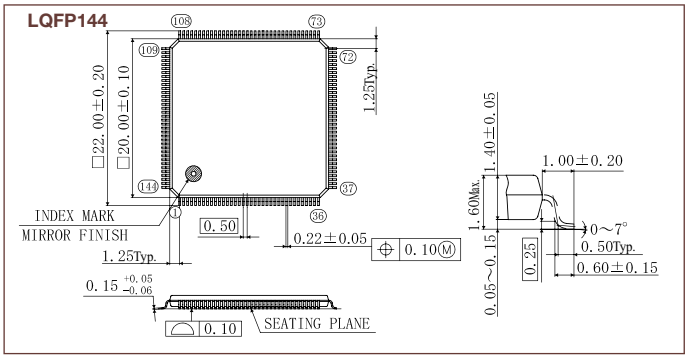
These package sizes are an example. Please contact a ROHM sales representative for details.

QFP Packages

(Unit: mm)

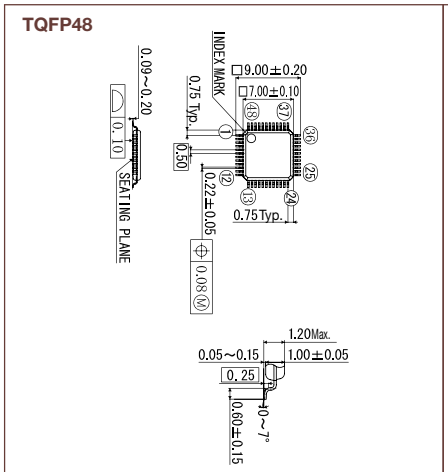
LQFP

LQFP144

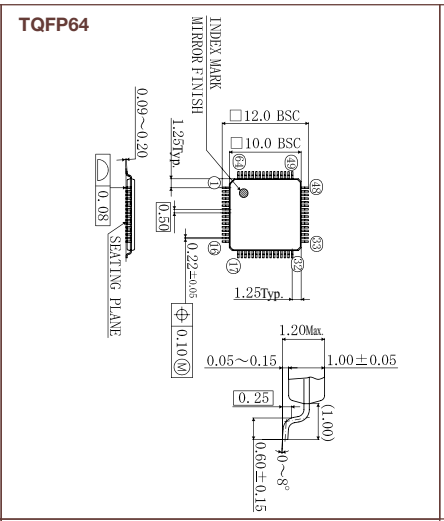


TQFP

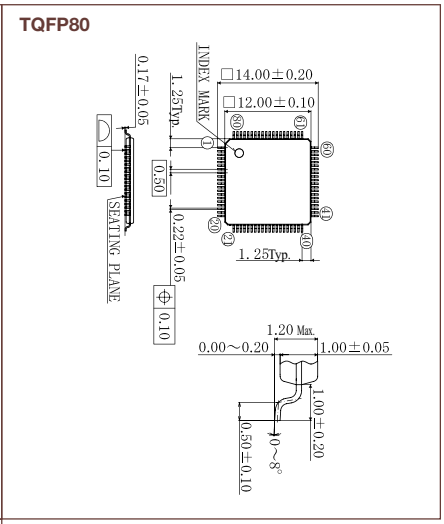
TQFP48



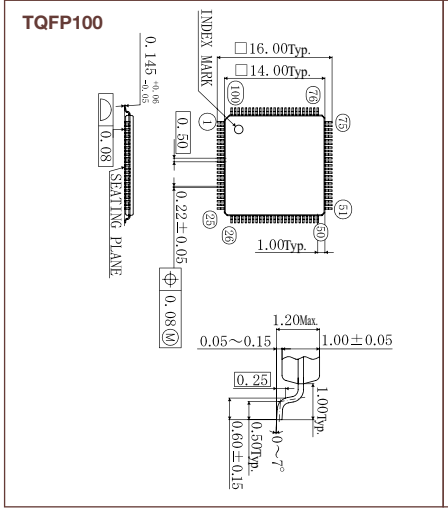
TQFP64



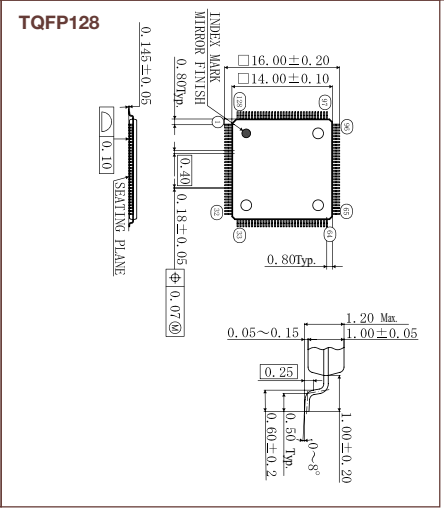
TQFP80



TQFP100



TQFP128

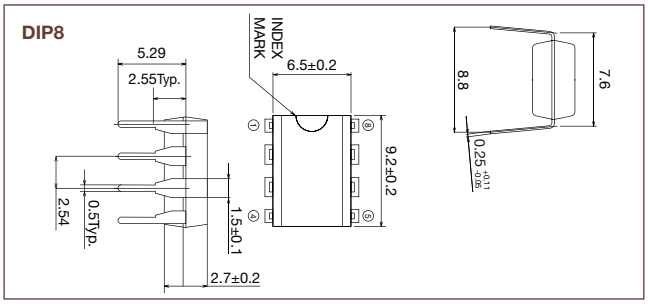


DIP Package

(Unit: mm)

DIP8

DIP8



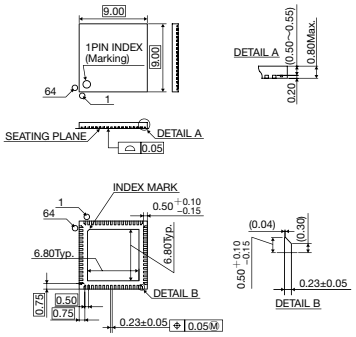
These package sizes are an example. Please contact a ROHM sales representative for details.

QFN Packages

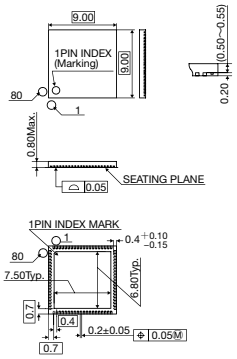
(Unit: mm)

WQFN

WQFN64



WQFN80

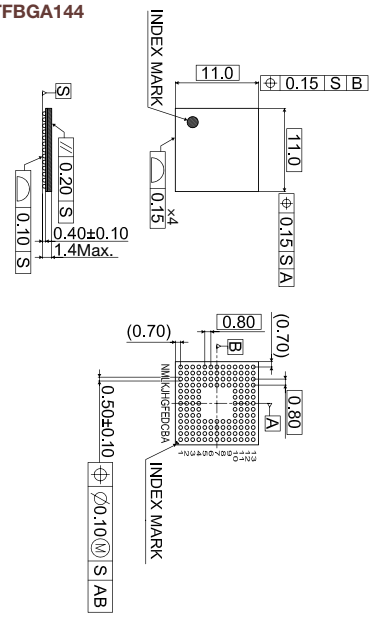


BGA Package

(Unit: mm)

TFBGA144

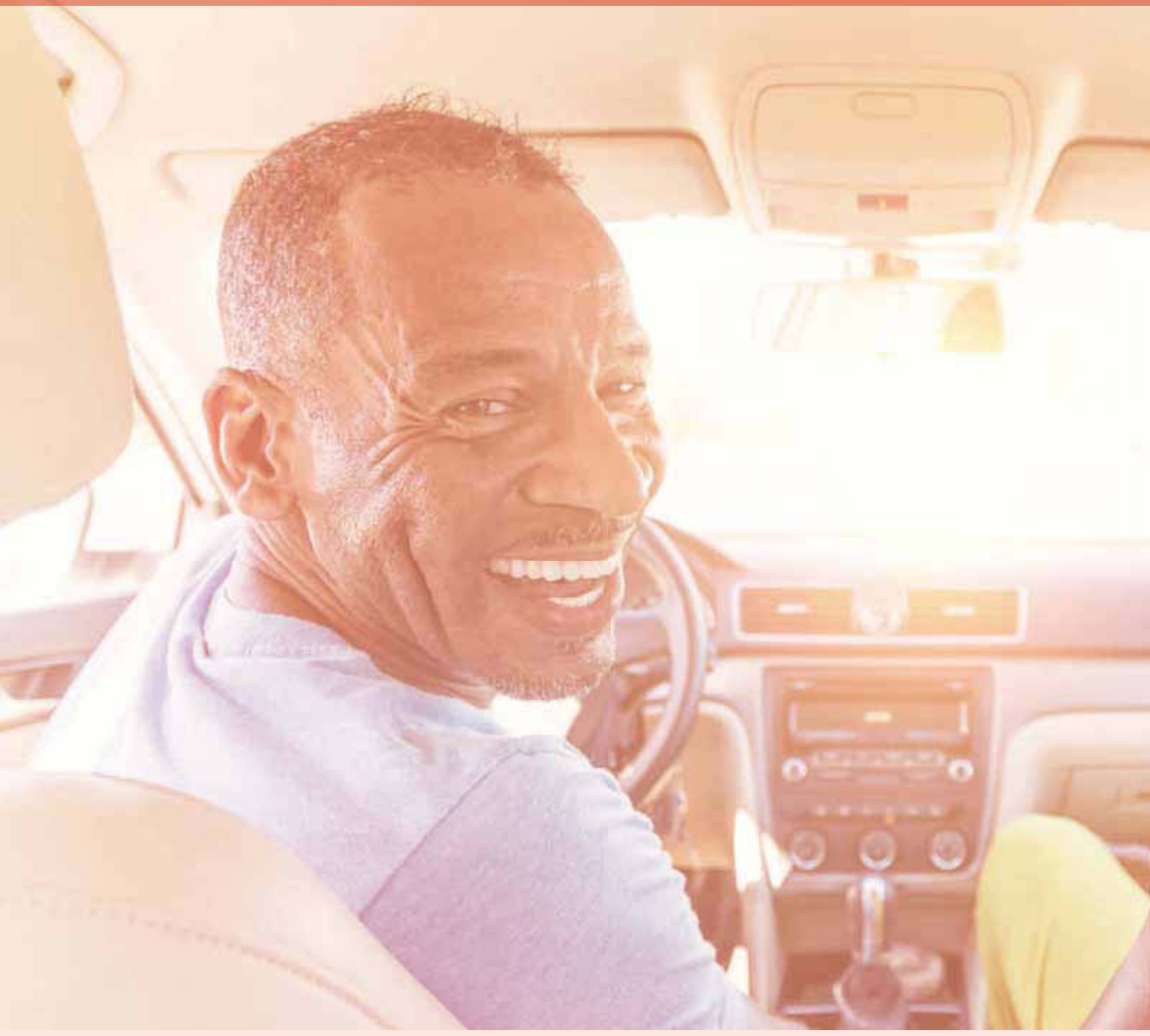
TFBGA144



SiC IGBT Tr Di R LED

Automotive

【Power Devices / Discrete Semiconductors / Passive Devices / Opto Devices】



CONTENTS

SiC Power Devices

●Quick Reference for SiC Power Devices

	V_{RM} (V)	I_F (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				
		30			SCS230KE2AHR	22				
		40			SCS240KE2AHR	23				
	V_{DSS} (V)	$R_{DS(ON)}$ (mΩ)	TO-220AC		TO-247		TO-247N		TO-263AB (LPTL)	
SiC MOSFET	650	17					☆SCT3017ALHR	24		
		22					☆SCT3022ALHR	25		
		30					☆SCT3030ALHR	26		
		60					☆SCT3060ALHR	27		
		80					☆SCT3080ALHR	28		
		120					☆SCT3120ALHR	29		
	1,200	22					☆SCT3022KLHR	30		
		30					☆SCT3030KLHR	31		
		40					☆SCT3040KLHR	32		
		80			☆SCT2080KEAHR	35	☆SCT3080KLHR	33		
		160			☆SCT2160KEAHR	36	☆SCT3160KLHR	34		
		280			☆SCT2280KEAHR	37				
		450			☆SCT2450KEAHR	38				

Note: Package is JEDEC code. ( ) : ROHM Package. ☆ : Under Development

●SiC Schottky Barrier Diodes

SiC Schottky Barrier Diodes

No.	Part No.	Absolute Maximum Ratings (Ta=25℃)				Electrical Characteristics (Ta=25℃)				Package	Equivalent Circuit Diagram	Automotive Grade Available AEC-Q101*2
		V_{RM} (V)	V_R (V)	I_F (A)	I_{FSM} (A) 50Hz.1∽	V_F(V) Typ.	I_F(A)	I_R(μA) Max.	V_R(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
22	SCS230KE2AHR	1,200	1,200	15/30*1	62/124*1	1.4	15	300	1,200			YES
23	SCS240KE2AHR	1,200	1,200	20/40*1	78/157*1	1.4	20	400	1,200			YES

Note: Package is JEDEC code. ( ) : ROHM Package. *1:(Per Leg / Device) *2: Rev.C

●SiC MOSFET

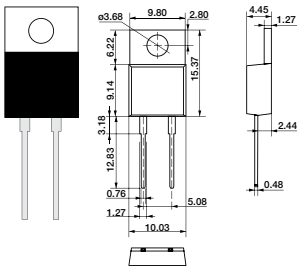
SiC MOSFET										
No.	Part No.	Polarity (ch)	V_{DSS} (V)	I_D (A)	P_D(W) (Tc=25°C)	$R_{DS(on)}$ Typ.(mΩ)	Qg Typ.(nC)		Package	Automotive Grade Available AEC-Q101
						V_{GS}=18V	V_{GS}=18V	Driving Voltage (V)		
24	☆SCT3017ALHR	N	650	118	427	17	172	18	TO-247N	YES
25	☆SCT3022ALHR	N	650	93	339	22	133	18		YES
26	☆SCT3030ALHR	N	650	70	262	30	104	18		YES
27	☆SCT3060ALHR	N	650	39	165	60	58	18		YES
28	☆SCT3080ALHR	N	650	30	134	80	48	18		YES
29	☆SCT3120ALHR	N	650	21	103	120	38	18		YES
30	☆SCT3022KLHR	N	1,200	95	427	22	178	18	TO-247N	YES
31	☆SCT3030KLHR	N	1,200	72	339	30	131	18		YES
32	☆SCT3040KLHR	N	1,200	55	262	40	107	18		YES
33	☆SCT3080KLHR	N	1,200	31	165	80	60	18		YES
34	☆SCT3160KLHR	N	1,200	17	103	160	42	18		YES
35	☆SCT2080KEAHR	N	1,200	40	262	80	106	18	TO-247	YES
36	☆SCT2160KEAHR	N	1,200	22	165	160	62	18		YES
37	☆SCT2280KEAHR	N	1,200	14	108	280	35	18		YES
38	☆SCT2450KEAHR	N	1,200	10	85	450	27	18		YES

Note: Package is JEDEC code. ☆ : Under Development

● Dimensions(Unit: mm)

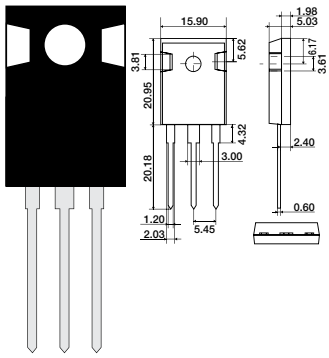
Lead Type

TO-220AC



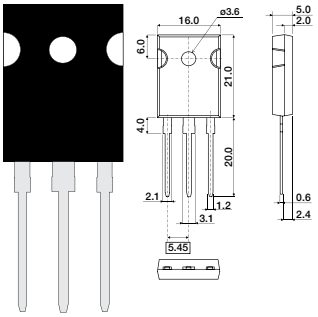
Each lead has same dimensions

TO-247



Each lead has same dimensions

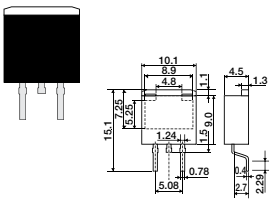
TO-247N



Each lead has same dimensions

Surface Mount Type

TO-263AB(LPTL)



Each lead has same dimensions

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

● Part No. Explanation

•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
　E → TO-247
　E2 → TO-247 (Dual chip)
⑦ Automotive-grade

•MOSFET Part No. Explanation

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

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

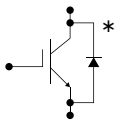
● Packaging Type

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

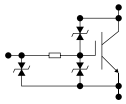
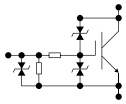
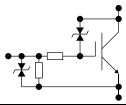
Part No.	V_{CES} (V)	I_C(A) Tc=25°C	I_C(A) Tc=100°C	P_D (W)	$V_{CE(sat)}$ Typ.(V)	I_C(A)	tsc Min. (μsec.)	$I_{F(Diode)}$(A) Tc=25°C	$I_{F(Diode)}$(A) Tc=100°C	$V_{F(Diode)}$ Typ.(V)	I_F(A)	Package	Equivalent Circuit Diagram	Automotive Grade Available AEC-Q101
RGS60TS65DHR	650	56	30	223	1.65	30	8	56	30	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
New RGS00TS65EHR	650	88	50	326	1.65	50	8	84	50	1.45	50			YES

Note: Package is JEDEC code.

∗ Built in Fast Recovery Diodes

Ignition IGBT

Ignition IGBT

Part No.	V_{CES} (V)	V_{GES} (V)	I_C (A)	P_D (W)	E_{as} (mJ)	$V_{CE(sat)}$Typ. (V)	Package	Equivalent Circuit Diagram	Automotive Grade Available 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	45	194	500	1.6	TO-263S(LPDS)		YES

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

☆ : Under Development

● Part No. Explanation

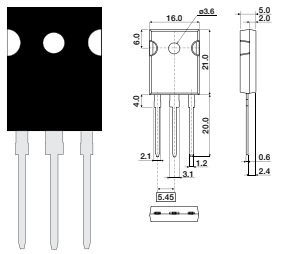
R	G	T	H	4	0	T	S	6	5	D	H	R
①		②		③		④		⑤		⑥		⑦

① IGBT
② Series Name
③ Current (I_C) <Tc=100°C>
8 → 4A　16 → 8A　30 → 15A　40 → 20A　00 → 50A
④ Package
TS → TO-247N
BM → TO-252
NS → TO-263S (LPDS)
⑤ Voltage (V_{CES})
65 → 650V
⑥ Built-in Fast Recovery Diodes
D → Built-in Fast Recovery Diodes
⑦ Automotive-grade

● Dimensions (Unit: mm)

Lead Type

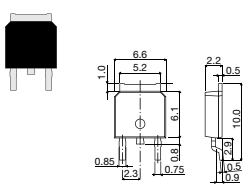
TO-247N



Each lead has same dimensions

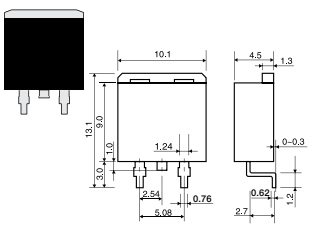
Surface Mount Type

TO-252



Each lead has same dimensions

TO-263S(LPDS)



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.

Selector Guide for Automotive MOSFETs(AEC-Q101 qualified)

Selector Guide for Automotive MOSFETs(AEC-Q101 qualified)1

Package	Type			Polarity (ch)	V_{DSS} (V)	I_D (A)	V_{GS} (V)	$R_{DS(on)}$(mΩ)												Qg Typ. (nC)	Ciss Typ. (pF)	Automotive Grade Available AEC-Q101
	Part No.	Grade Code	Taping Code					V_{GS}=10V		V_{GS}=4.5V		V_{GS}=2.5V		V_{GS}=1.8V		V_{GS}=1.5V		V_{GS}=1.2V		V_{GS}=5V	V_{DS}=10V	
								Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.			
SOT-723 (VMT3)[SC-105AA] 1212 Size	RUM002N02	FHA	T2L	N	20	0.2	±8	—	—	—	—	800	1200	—	—	1200	2400	1600	4800	—	—	YES
SOT-563 (EMT6)[SC-107C] 1616 Size	EM6K33	FHA	T2R	N+N	50	0.2	±8	—	—	—	—	1700	2400	—	—	2000	4000	2400	7200	—	—	YES
SOT-323 (UMT3)[SC-70] 2021 Size	☆BSS138BKW	HZG	T106	N	60	0.38	±20	500	700	600	840	1000	4000	—	—	—	—	—	—	—	—	YES
	☆BSS138W	HZG	T106		60	0.31	±20	1700	2400	2100	3000	3000	12000	—	—	—	—	—	—	—	—	YES
	☆BSS84W	HZG	T106	P	−60	−0.21	±20	3600	5300	4300	6400	—	—	—	—	—	—	—	—	—	—	YES
SOT-363 (UMT6)[SC-88] 2021 Size	UM6K31N	FHA	TCN	N+N	60	0.25	±20	1700	2400	2100	3000	3000	12000	—	—	—	—	—	—	—	15*3	YES
SOT-323T (TUMT3) [SC-113A] 2021 Size	RUF025N02	FRA	TL	N	20	2.5	±10	—	—	39	54	49	68	65	91	80	160	—	—	5*2	370	YES
	RTF025N03	FRA	TL		30	2.5	±12	—	—	48	67	70	98	—	—	—	—	—	—	3.7*2	270	YES
	RTF016N05	FRA	TL		45	1.6	±12	—	—	140	190	200	280	—	—	—	—	—	—	2.3*2	150	YES
	RSF015N06	FRA	TL		60	1.5	±20	210	290	240	330	—	—	—	—	—	—	—	—	2	110	YES
SOT-363T (TUMT6) [SC-113DA] 2021 Size	RUL035N02	FRA	TR	N	20	3.5	±10	—	—	31	43	38	53	—	—	66	93	—	—	5.7*2	460	YES
	RTL035N03	FRA	TR		30	3.5	±12	—	—	40	56	56	79	—	—	—	—	—	—	4.6*2	350	YES
	US6K41	FRA	TR	N+N	20	1	±8	—	—	130	190	170	240	220	310	290	410	—	—	2*2	75	YES
	RTL020P02	FRA	TR	P	−20	−2	±12	—	—	100	135	180	250	—	—	—	—	—	—	4.9*2	430	YES
	RRL035P03	FRA	TR		−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*2	80	YES
SOT-23 (SST3) 2924 Size	RUC002N05	HZG	T116	N	50	0.2	±8	—	—	1600	2200	1700	2400	—	—	2000	4000	—	—	—	25	YES
	New BSS670	HZG	T116		60	0.6	0.35*5	500	650	600	820	1000	4000	—	—	—	—	—	—	—	—	YES
	New BSS138BK	HZG	T116		60	0.4	0.35*5	500	700	600	840	1000	4000	—	—	—	—	—	—	—	—	YES
	RK7002BM	HZG	T116		60	0.25	±20	1700	2400	2100	3000	3000	12000	—	—	—	—	—	—	—	15	YES
	☆BSS123	HZG	T116		100	0.2	0.35*5	5500	7700	5900	8200	—	—	—	—	—	—	—	—	—	—	YES
	New BSS84	HZG	T116	P	−60	−0.2	0.35*5	3600	5300	4300	6400	—	—	—	—	—	—	—	—	—	—	YES
SOT-346T (TSMT3) [SC-96] 2928 Size	RUR040N02	HZG	TL	N	20	4	±10	—	—	25	35	33	46	—	—	55	110	—	—	8*2	680	YES
	RTR040N03	HZG	TL		30	4	±12	—	—	34	48	47	66	—	—	—	—	—	—	5.9*2	475	YES
	RTR025N03	HZG	TL		30	2.5	±12	—	—	66	92	95	133	—	—	—	—	—	—	3.3*2	220	YES
	RSR025N03	HZG	TL		30	2.5	±20	50	70	74	105	—	—	—	—	—	—	—	—	2.9	165	YES
	RTR030N05	HZG	TL		45	3	±12	—	—	48	67	68	95	—	—	—	—	—	—	6.2*2	510	YES
	RSR025N05	HZG	TL		45	2.5	±20	70	100	95	150	—	—	—	—	—	—	—	—	3.6	260	YES
	RTR025N05	HZG	TL		45	2.5	±12	—	—	95	130	125	175	—	—	—	—	—	—	3.2*2	250	YES
	RTR020N05	HZG	TL		45	2	±12	—	—	130	180	180	250	—	—	—	—	—	—	2.9*2	200	YES
	RSR030N06	HZG	TL		60	3	±20	60	85	70	100	—	—	—	—	—	—	—	—	5	380	YES
	RSR020N06	HZG	TL		60	2	±20	120	170	140	195	—	—	—	—	—	—	—	—	2.7	180	YES
	RSR010N10	HZG	TL		100	1	±20	370	520	400	560	—	—	—	—	—	—	—	—	3.5	140*3	YES
	RTR030P02	HZG	TL	P	−20	−3	±12	—	—	55	75	90	125	—	—	—	—	—	—	9.3*2	840	YES
	RTR025P02	HZG	TL		−20	−2.5	±12	—	—	70	95	115	160	—	—	—	—	—	—	7*2	630	YES
	RTR020P02	HZG	TL		−20	−2	±12	—	—	100	135	180	250	—	—	—	—	—	—	4.9*2	430	YES
	RRR040P03	HZG	TL		−30	−4	±20	32	45	45	63	—	—	—	—	—	—	—	—	10.5	1000	YES
	RRR030P03	HZG	TL		−30	−3	±20	55	75	85	115	—	—	—	—	—	—	—	—	5.2	480	YES
	RSR025P03	HZG	TL		−30	−2.5	±20	70	98	100	140	—	—	—	—	—	—	—	—	5.4	460	YES
	RSR020P05	HZG	TL		−45	−2	±20	130	190	180	260	—	—	—	—	—	—	—	—	4.5*2	500	YES
	RSR015P06	HZG	TL		−60	−1.5	±20	200	280	240	340	—	—	—	—	—	—	—	—	10*1	500	YES
SOT-457T (TSMT6) [SC-95] 2928 Size	RUQ050N02	HZG	TR	N	20	5	±10	—	—	22	30	27	38	—	—	40	80	—	—	12*2	900	YES
	RTQ045N03	HZG	TR		30	4.5	±12	—	—	30	43	42	60	—	—	—	—	—	—	7.6*2	540	YES
	RSQ045N03	HZG	TR		30	4.5	±20	27	38	36	51	—	—	—	—	—	—	—	—	6.8	520	YES
	RSQ035N03	HZG	TR		30	3.5	±20	44	62	60	84	—	—	—	—	—	—	—	—	5.3	290	YES
	RTQ035N03	HZG	TR		30	3.5	±12	—	—	38	54	55	77	—	—	—	—	—	—	4.6*2	285	YES
	RSQ020N03	HZG	TR		30	2	±20	96	134	148	207	—	—	—	—	—	—	—	—	2.2	110	YES
	RVQ040N05	HZG	TR		45	4	±21	38	53	47	66	—	—	—	—	—	—	—	—	6.3	530	YES
	RTQ020N05	HZG	TR		45	2	±12	—	—	140	190	200	280	—	—	—	—	—	—	2.3*2	150	YES
	RSQ035N06	HZG	TR		60	3.5	±20	50	70	58	82	—	—	—	—	—	—	—	—	6.5	430	YES
	RSQ015N06	HZG	TR		60	1.5	±20	210	290	240	330	—	—	—	—	—	—	—	—	2	110	YES
	QS6K1	HZG	TR	N+N	30	1	±12	—	—	170	238	260	364	—	—	—	—	—	—	1.7*2	77	YES
	QS6K21	HZG	TR		45	1	±12	—	—	300	420	415	585	—	—	—	—	—	—	1.5*2	95	YES
	RTQ035P02	HZG	TR	P	−20	−3.5	±12	—	—	50	65	80	100	—	—	—	—	—	—	10.5*2	1200	YES
	RTQ025P02	HZG	TR		−20	−2.5	±12	—	—	72	100	140	190	—	—	—	—	—	—	6.4*2	580	YES
	RRQ045P03	HZG	TR		−30	−4.5	±20	25	35	34	48	—	—	—	—	—	—	—	—	14	1350	YES
	RSQ035P03	HZG	TR		−30	−3.5	±20	45	65	65	90	—	—	—	—	—	—	—	—	9.2	780	YES
	RRQ030P03	HZG	TR		−30	−3	±20	55	75	85	115	—	—	—	—	—	—	—	—	5.2	480	YES
	RSQ025P03	HZG	TR		−30	−2.5	±20	80	110	120	165	—	—	—	—	—	—	—	—	4.4	320	YES
	RSQ015P10	HZG	TR		−100	−1.5	±20	350	470	380	510	—	—	—	—	—	—	—	—	17	950*3	YES
(TSMT8) 3028 Size	RQ1C075UN	FRA	TR	N	20	7.5	±10	—	—	11	16	14	20	—	—	20	40	—	—	18*2	1400	YES
	QS8K2	FRA	TR	N+N	30	3.5	±12	—	—	38	54	55	77	—	—	—	—	—	—	4.6*2	285	YES
	RQ1A070ZP	FRA	TR	P	−12	−7	±10	—	—	8	12	11	16	—	—	19	38	—	—	58*2	7400*4	YES
	RQ1E070RP	FRA	TR		−30	−7	±20	12	17	17	24	—	—	—	—	—	—	—	—	26	2700	YES
	RQ1E050RP	FRA	TR		−30	−5	±20	22	31	32	45	—	—	—	—	—	—	—	—	13	1300	YES
	QS8J4	FRA	TR	P+P	−30	−4	±20	40	56	55	77	—	—	—	—	—	—	—	—	8.4	800	YES
	QS8M51	FRA	TR	N+P	100	2	±20	240	325	250	340	—	—	—	—	—	—	—	—	4.7	290*3	YES
					−100	−1.5	±20	350	470	380	510	—	—	—	—	—	—	—	—	17	950*3	YES

Note 1: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code. Note 2: *1: V_{GS}=10V *2: V_{GS}=4.5V *3: V_{DS}=25V *4: V_{DS}=6V *5: Ta=25°C

☆: Under Development

Selector Guide for Automotive MOSFETs(AEC-Q101 qualified)

Selector Guide for Automotive MOSFETs(AEC-Q101 qualified)2

Package	Type			Polarity (ch)	V_{DSS} (V)	I_D (A)	V_{GS} (V)	$R_{DS(on)}$(mΩ)						Qg Typ.(nC)	Ciss Typ.(pF)	Automotive Grade Available AEC-Q101
	Part No.	Grade Code	Taping Code					V_{GS}=10V		V_{GS}=4.5V		V_{GS}=2.5V		V_{GS}=5V	V_{DS}=10V	
								Typ.	Max.	Typ.	Max.	Typ.	Max.			
 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
 (HSMT8AG) 3333 Size	☆AG009DGQ3	—	TB	N	40	30	±20	6	8	7.3	10	—	—	32*1	1790	YES
 (SOP8) 5060 Size	RSS130N03	FRA	TB	N	30	13	±20	5.9	8.3	7.4	10.4	—	—	25	2000	YES
	RSS100N03	FRA	TB		30	10	±20	9.5	13.3	12.5	17.5	—	—	14	1070	YES
	RSS090N03	FRA	TB		30	9	±20	11	16	15	22	—	—	11	810	YES
	RSS095N05	FRA	TB		45	9.5	±20	11	16	14	20	—	—	18.9	1830	YES
	RSS070N05	FRA	TB		45	7	±20	18	25	23	32	—	—	12	1000	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
	SP8K1	FRA	TB		30	5	±20	36	51	52	73	—	—	3.9	230	YES
	SP8K5	FRA	TB		30	3.5	±20	59	83	93	130	—	—	2.5	140	YES
	SP8K24	FRA	TB		45	6	±20	18	25	24	34	—	—	15.4	1400	YES
	SP8K23	FRA	TB		45	5	±20	26	36	33	46	—	—	8.6	700	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	8000	YES
	RRS100P03	FRA	TB		−30	−10	±20	9	12.6	12.5	17.5	—	—	39	3600	YES
	RRS090P03	FRA	TB		−30	−9	±20	11	15.4	15	21	—	—	30	3000	YES
	RRS075P03	FRA	TB		−30	−7.5	±20	15	21	22	31	—	—	21	1900	YES
	RRS050P03	FRA	TB		−30	−5	±20	36	50	52	72	—	—	9.2	850	YES
	RRS040P03	FRA	TB		−30	−4	±20	55	75	85	115	—	—	5.2	480	YES
	RSS070P05	FRA	TB		−45	−7	±20	19	27	25	35	—	—	34	4100	YES
	RSS060P05	FRA	TB		−45	−6	±20	26	36	35	49	—	—	23	2700	YES
	SP8J66	FRA	TB	P+P	−30	−9	±20	13.5	18.5	17.5	23.6	—	—	35	3000	YES
	SP8J5	FRA	TB		−30	−7	±20	20	28	25	35	—	—	25	2600	YES
	SP8M4	FRA	TB	N+P	30	9	±20	12	18	16	24	—	—	15	1190	YES
					−30	−7	±20	20	28	25	35	—	—	25	2600	YES
	SP8M10	FRA	TB		30	7	±20	17	25	23	35	—	—	8.4	600	YES
					−30	−4.5	±20	40	56	57	80	—	—	8.5	850	YES
	SP8M5	FRA	TB		30	6	±20	21	30	30	42	—	—	7.2	520	YES
					−30	−7	±20	20	28	25	35	—	—	25	2600	YES
	SP8M8	FRA	TB		30	6	±20	21	30	30	42	—	—	7.2	520	YES
					−30	−4.5	±20	40	56	57	80	—	—	8.5	850	YES
	SP8M3	FRA	TB		30	5	±20	36	51	52	73	—	—	3.9	230	YES
					−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
					−30	−3.5	±20	65	90	100	140	—	—	5.5	490	YES
	SP8M21	FRA	TB		45	6	±20	18	25	24	34	—	—	15.4	1400	YES
					−45	−4	±20	33	46	43	60	—	—	20	2400	YES
	SP8M24	FRA	TB		45	4.5	±20	33	46	41	57	—	—	6.8	550	YES
					−45	−3.5	±20	45	63	60	84	—	—	13	1700	YES
	SP8M41	FRA	TB		80	3.4	±20	90	130	110	150	—	—	6.6	600	YES
					−80	−2.6	±20	165	240	220	300	—	—	8.2	1000	YES
	SP8M51	FRA	TB		100	3	±20	120	170	130	180	—	—	8.5	610*3	YES
					−100	−2.5	±20	210	290	230	320	—	—	12.5	1550*3	YES

Note 1: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.
Note 2: ∗1: V_{GS}=10V ∗2: V_{GS}=4.0V ∗3: V_{DS}=25V

☆ : Under Development

Selector Guide for Automotive MOSFETs(AEC-Q101 qualified)3

Package	Type			Polarity (ch)	V_{DSS} (V)	I_D (A)	V_{GS} (V)	$R_{DS(on)}$(mΩ)				Qg Typ.(nC)	Ciss Typ.(pF)	Automotive Grade Available AEC-Q101
	Part No.	Grade Code	Taping Code					V_{GS}=10V		V_{GS}=4.5V		V_{GS}=10V	V_{DS}=10V	
								Typ.	Max.	Typ.	Max.			
 TO-252	☆RD3H200SN	FRA	TL	N	45	20	±20	20	28	25	35	12*1	950	YES
	☆RD3L220SN	FRA	TL		60	22	±20	18	26	21	30	30	1500	YES
	☆RD3L150SN	FRA	TL		60	15	±20	28	40	33	47	18	930	YES
	☆RD3L080SN	FRA	TL		60	8	±20	57	80	70	98	9.4	380	YES
	☆RD3L050SN	FRA	TL		60	5	±20	78	109	94	131	8	290	YES
	☆RD3P200SN	FRA	TL		100	20	±20	33	46	36*3	50*3	55	2100*2	YES
	☆RD3P175SN	FRA	TL		100	17.5	±20	75	105	80	112	24	950*2	YES
	☆RD3P100SN	FRA	TL		100	10	±20	95	133	100	140	18	700*2	YES
	☆RD3P050SN	FRA	TL		100	5	±20	135	190	142	200	14	530*2	YES
	☆RD3U080AA	FRA	TL		250	8	±30	225	300	—	—	—	1440*2	YES
	☆RD3U041AA	FRA	TL		250	4	±30	930	1300	—	—	—	350*2	YES
	☆R5205PND3	FRA	TL		525	5	±25	1300	1600	—	—	—	320*2	YES
	☆R6006PND3	FRA	TL		600	6	±30	900	1200	—	—	—	460*2	YES
	☆R6004PND3	FRA	TL		600	4	±25	1400	1800	—	—	—	280*2	YES
	☆R8002CND3	FRA	TL		800	2	±30	3300	4300	—	—	—	240*2	YES
	☆R8001CND3	FRA	TL		800	1	±30	6700	8700	—	—	—	60*2	YES
	☆RD3H160SP	FRA	TL	P	−45	−16	±20	35	50	45	63	16*1	2000	YES
	☆RD3H080SP	FRA	TL		−45	−8	±20	65	91	95	133	9*1	1000	YES
	☆RD3H045SP	FRA	TL		−45	−4.5	±20	110	155	160	225	12*1	550	YES
	☆RD3L140SP	FRA	TL		−60	−14	±20	60	84	73	103	27	1900	YES
	☆RD3P130SP	FRA	TL		−100	−13	±20	135	200	150	220	40	2400*3	YES
 TO-263S (LPTS D2PAK) [SC-83]	RSJ451N04	FRA	TL	N	40	45	±20	9.5	13.5	—	—	43	2400*2	YES
	RSJ400N06	FRA	TL		60	40	±20	11	16	—	—	52	2400	YES
	RSJ400N10	FRA	TL		100	40	±20	19	27	21*3	30*3	90	3600*2	YES
	RSJ301N10	FRA	TL		100	30	±20	33	46	36*3	50*3	60	2100*2	YES
	RJ1U330AA	FRG	TL		250	33	±30	77	105	—	—	80	4500*2	YES
	R6020PNJ	FRG	TL		600	20	±30	190	250	—	—	65	2040*2	YES
	New R8008ANJ	FRG	TL		800	8	±30	790	1030	—	—	38	1100*2	YES
	New R8005ANJ	FRG	TL		800	5	±30	1600	2100	—	—	20	500*2	YES
	New R8002ANJ	FRG	TL		800	2	±30	3300	4300	—	—	13	250*2	YES
	RSJ250P10	FRA	TL	P	−100	−25	±20	45	63	48	67	60*1	8000*2	YES

Note 1: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.
Note 2: ∗1: V_{GS}=5V ∗2: V_{DS}=25V ∗3: V_{GS}=4.0V

☆ : Under Development

Bipolar Transistors

General Purpose Amplification Bipolar Transistors(Flat Type)(AEC-Q101 qualified)

Package	SOT-723(VMT3)[SC-105AA] 1212 Size		SOT-416FL(EMT3F)[SC-89] 1616 Size		SOT-323FL(UMT3F)[SC-85] 2021 Size		V_{CEO} (V)	I_C (A)	h_{FE}*2
	 *1 P_D=0.15W		 *1 P_D=0.15W		 *1 P_D=0.2W				
Polarity / Application	PNP	NPN	PNP	NPN	PNP	NPN			
General Purpose Amplification	2SA2029FHAT2L	2SC5658FHAT2L	2SA1774EBHZGTL	2SC4617EBHZGTL	2SA1576UBHZGTL	2SC4081UBHZGTL	50	0.15	120 to 560
Driver			2SAR502EBHZGTL	2SCR502EBHZGTL	2SAR502UBHZGTL	2SCR502UBHZGTL	30	0.5	200 to 500

Note 1: ∗1 With reference land installed
Note 2: ∗2 For h_{FE}, please see the technical specifications.
Note 3: PNP(-)symbol omitted.
Note 4: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.

General Purpose Amplification Bipolar Transistors(Gull Type)(AEC-Q101 qualified)

Package	SOT-416(EMT3)[SC-75A] 1616 Size		SOT-323(UMT3)[SC-70] 2021 Size		SOT-346(SMT3)[SC-59] 2928 Size		SOT23(SST3) 2924 Size		V_{CEO} (V)	I_C (A)	h_{FE}*2
	 *1 P_D=0.15W		 *1 P_D=0.2W		 *1 P_D=0.2W		 *1 P_D=0.2W				
Application / Polarity	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN			
General Purpose Amplification			☆2SAR502U3HZGT106	☆2SCR502U3HZGT106					30	0.5	200 to 500
			☆2SA1576U3HZGT106	☆2SC4081U3HZGT106					50	0.15	120 to 560
	2SA1774FRATL	2SC4617FRATL	2SA1576AFRAT106	2SC4081FRAT106	2SA1037AKFRAT146	2SC2412KFRAT146			50	0.15	120 to 560
Low $V_{CE(sat)}$			2SB1694FRAT106	2SD2656FRAT106					30	1	270 to 680
Driver					2SA1036KFRAT146	2SC2411KFRAT146			32	0.5	120 to 390
					2SB1197KFRAT146	2SD1781KFRAT146			32	0.8	120 to 390
						2SD1484KFRAT146			50	0.5	120 to 390
					2SB1198KFRAT146	2SD1782KFRAT146			80	0.5	120 to 390
High Speed SW			☆2SA2088U3HZGT106						60	0.5	120 to 270
				☆2SC5876U3HZGT106					60	0.5	120 to 390
			2SA2088FRAT106	2SC5876FRAT106					60	0.5	120 to 270 120 to 390
High Voltage			☆2SA1579U3HZGT106	☆2SC4102U3HZGT106			☆2SARA41CHZGT116	☆2SCRC41CHZGT116	120	0.05	180 to 560
			2SA1579FRAT106	2SC4102FRAT106	2SA1514KFRAT146	2SC3906KFRAT146			120	0.05	180 to 560

Note 1: ∗1 With reference land installed
Note 2: ∗2 For h_{FE}, please see the technical specifications.
Note 3: PNP(-)symbol omitted.
Note 4: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.

☆ : Under Development

Power Bipolar Transistors(Overseas Part Number)(AEC-Q101)

Package	SOT-323(UMT3)[SC-70] 2021 Size		SOT-363(UMT6)[SC-88] 2021 Size	SOT-23(SST3) 2924 Size		V_{CEO} (V)	I_C (A)	h_{FE}*2
	 *1 P_D=0.15W		 *1 P_D=0.2W	 *1 P_D=0.2W				
Application / Polarity	PNP	NPN	PNP/NPN	PNP	NPN			
General Purpose Amplification				BC858BHZGT116	BC848BHZGT116	30	0.1	200 to 450
		☆BC847BU3HZGT106		BC857BHZGT116	BC847BHZGT116	45	0.1	200 to 450
	☆BC857BU3HZGT106					45	0.1	210 to 480
				☆BC857CHZGT116	BC847CHZGT116	45	0.15	420 to 800
			BC846PNFHATR		BC846BHZGT116	65	0.12	200 to 450
				BC856BHZGT116		65	0.1	220 to 475
				BSS63HZGT116	BSS64HZGT116	100	0.1	30 or more
Driver				BSS4130HZGT116	BSS5130HZGT116	30	1	270 or more
				BCX17HZGT116	BCX19HZGT116	45	0.5	100 to 600
				BC807-16HZGT116	BC817-16HZGT116	45	0.8	100 to 250
				BC807-25HZGT116	BC817-25HZGT116	45	0.8	160 to 400
				BC807-40HZGT116	BC817-40HZGT116	45	0.8	250 to 600
				SSTA56HZGT116	SSTA06HZGT116	80	0.5	100 or more
Switching				SST3906HZGT116	SST3904HZGT116	40	0.2	100 to 300
	☆UMT4403U3HZGT106	☆UMT4401U3HZGT106		SST4403HZGT116	SST4401HZGT116	40	0.6	100 to 300
					SST2222AHZGT116	40	0.6	100 to 300
		☆UM2222AU3HZGT106				40	0.6	100 to 300
				SST2907AHZGT116		60	0.6	100 to 300

Note 1: ∗1 With reference land installed Note 2: ∗2 For h_{FE}, please see the technical specifications. Note 3: PNP(-)symbol omitted.
Note 4: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.

☆: Under Development

Power Bipolar Transistors(AEC-Q101 qualified)

Package / Polarity / Application	SOT-89 (MPT3)[SC-62] 4540 Size		V_{CEO} (V)	I_C (A)	h_{FE}*2
	 *1 P_D=0.5W				
	PNP	NPN			
Driver	2SAR293PFRAT100	2SCR293PFRAT100	30	1	270 to 680
	2SAR512PFRAT100	2SCR512PFRAT100	30	2	200 to 500
	2SAR552PFRAT100	2SCR552PFRAT100	30	3	200 to 500
	2SAR542PFRAT100	2SCR542PFRAT100	30	5	200 to 500
	2SAR513PFRAT100	2SCR513PFRAT100	50	1	180 to 450
	2SAR553PFRAT100	2SCR553PFRAT100	50	2	180 to 450
	2SAR533PFRAT100	2SCR533PFRAT100	50	3	180 to 450
	2SAR514PFRAT100	2SCR514PFRAT100	80	0.7	120 to 390
	2SAR554PFRAT100	2SCR554PFRAT100	80	1.5	120 to 390
	2SAR544PFRAT100	2SCR544PFRAT100	80	2.5	120 to 390
		2SCR372PFRAT100	120	0.7	120 to 390
		2SCR375PFRAT100	120	1.5	120 to 390

Note 1: ∗1 With reference land installed
Note 2: ∗2 For h_{FE}, please see the technical specifications.
Note 3: PNP(-)symbol omitted.
Note 4: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.

Complex Bipolar Transistors

General Purpose Amplification Bipolar Transistors(AEC-Q101 qualified)

Configuration	Package / Item / Application	Equivalent Circuit Diagram (TOP View)	SOT-553/SOT-563 (EMT5/EMT6) [SC-107BB/SC-107C] 1616 Size	SOT-353/SOT-363 (UMT5/UMT6) [SC-88A/SC-88] 2021 Size	SOT-25/SOT-457 (SMT5/SMT6) [SC-74A/SC-74] 2928 Size	Equivalent Element Transistors	V_{CEO} (V)	I_C (A)	h_{FE}
									
			Type						
PNP × 2	Pre Amp.		EMT1FHAT2R	UMT1NFHATN	IMT1AT110*	2SA1037AK×2	−50	−0.15	120 to 560
NPN×2	Pre Amp.		EMX1FHAT2R	UMX1NFHATN	IMX1T110*	2SC2412K×2	50	0.15	120 to 560
PNP + NPN	Pre Amp.		EMZ1FHAT2R	UMZ1NFHATR	IMZ1AT108*	2SA1037AK 2SC2412K	−50 50	−0.15 0.15	120 to 560 120 to 560

Note 1: For No.1 Pin location, please see the technical specifications.
Note 2: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.
∗ is not recommended for a new design

Digital Transistors

100mA Digital Transistors(AEC-Q101 qualified)

Item / Specifications	Part No. PNP	Part No. NPN	R_1 (kΩ)	R_2 (kΩ)	Package														V_{CC} (V_{CEO}) (V)	I_O (I_C) (A)	GI (h_{FE})
					SOT-723 (VMT3) [SC-105AA] 1212 Size		SOT-416FL (EMT3F) [SC-89] 1616 Size		SOT-416 (EMT3) [SC-75A] 1616 Size		SOT-323FL (UMT3F) [SC-85] 2021 Size		SOT-323 (UMT3) [SC-70] 2021 Size		SOT-23 (SST3) 2924 Size		SOT-346 (SMT3) [SC-59] 2928 Size				
																					
					P_D=150mW*						P_D=200mW*										
					PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN	
R_1=R_2 Potential Divider Type	DTA123Ex*	DTC123Ex*	2.2	2.2	●	●	●	●	●	●	●	●	●	●	☆●	☆●	●	●	●	●	0.1 / 20 or more
	DTA143Ex*	DTC143Ex*	4.7	4.7	●	●	●	●	●	●	●	●	●	●	☆●	☆●	●	●	●	●	0.1 / 30 or more
	DTA114Ex*	DTC114Ex*	10	10	●	●	●	●	●	●	●	●	●	●	☆●	☆●	●	●	●	●	0.05 / 30 or more
	DTA124Ex*	DTC124Ex*	22	22	●	●	●	●	●	●	●	●	●	●	☆●	☆●	●	●	●	●	0.03 / 56 or more
	DTA144Ex*	DTC144Ex*	47	47	●	●	●	●	●	●	●	●	●	●	☆●	☆●	●	●	●	●	0.03 / 68 or more
	DTA115Ex*	DTC115Ex*	100	100	●	●	●	●	●	●	●	●	●	●	☆●	☆●	●	●	●	●	0.02 / 82 or more
R_1≠R_2 Leak Absorption Type	DTA113Zx*	DTC113Zx*	1	10	●	●	●	●	New ●	●	●	●	●	●	☆●	☆●	●	●	●	●	0.1 / 33 or more
	DTA123Yx*	DTC123Yx*	2.2	10	●	●	New ●	New ●	●	●	●	●	●	●	☆●	☆●	●	●	●		0.1 / 33 or more
	DTA123Jx*	DTC123Jx*	2.2	47	●	●	●	●	●	●	●	●	●	●	☆●	☆●	●	●	●	●	0.1 / 80 or more
	DTA143Xx*	DTC143Xx*	4.7	10	●	●	●	●	●	●	●	●	●	●	☆●	☆●	●	●	●	●	0.1 / 30 or more
	DTA143Zx*	DTC143Zx*	4.7	47	●	●	●	●	●	●	●	●	●	●	☆●	☆●	●	●	●	●	0.1 / 80 or more
	DTA114Wx*	DTC114Wx*	10	4.7	New ●	New ●							New ●	New ●							0.1 / 24 or more
	DTA114Yx*	DTC114Yx*	10	47	●	●	●	●	●	●	●	●	●	●	☆●	☆●	●	●	●	●	0.07 / 68 or more
	DTA124Xx*	DTC124Xx*	22	47	●	●	●	●	●	●	●	●	●	●	☆●	☆●	●	●		●	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 using R_1 alone as Input Resistor	DTA123Tx*	DTC123Tx*	2.2	—	New ●	New ●							New ●	New ●			New ●	New ●			0.1 / 100 to 600
	DTA143Tx*	DTC143Tx*	4.7	—	●	●	●	●	●	●	●	●	●	●	☆●	☆●	●	●	●	●	0.1 / 100 to 600
	DTA114Tx*	DTC114Tx*	10	—	●	●	●	●	●	●	●	●	●	●	☆●	☆●	●	●	●		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 using R_2 alone as Input Resistor	DTA114Gx*	DTC114Gx*	—	10									●	●		☆●					0.1 / 30 or more
	DTA124Gx*	DTC124Gx*	—	22										●							0.1 / 56 or more
	DTA144Gx*	DTC144Gx*	—	47									●	●							0.1 / 68 or more
	DTA115Gx*	DTC115Gx*	—	100									●	●		☆●					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: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.
∗ is not recommended for a new design

☆ : Under Development

Digital Transistors

500mA Digital Transistors(AEC-Q101 qualified)

Item / Specifications	Part No. PNP	Part No. NPN	R_1 (kΩ)	R_2 (kΩ)	Package: SOT-23 (SST3) 2924 Size, P_D=200mW*1 PNP	Package: SOT-23 (SST3) 2924 Size, P_D=200mW*1 NPN	Package: SOT-346 (SMT3) [SC-59] 2928 Size, P_D=200mW*1 PNP	Package: SOT-346 (SMT3) [SC-59] 2928 Size, P_D=200mW*1 NPN	V_{CC} (V_{CEO}) (V)	I_O (I_C) (A)	GI (h_{FE})
R_1=R_2 Potential Divider Type	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
R_1≠R_2 Leak Absorption Type	DTB113Zx*	DTD113Zx*	1	10	●	●	●	●			56 or more
	DTB123Yx*	DTD123Yx*	2.2	10	●	●	●	●			56 or more
Type using R_2 alone as Bleeder Resistor	DTB114Gx*	DTD114Gx*	—	10	●	●					56 or more
Type using R_1 alone as Input Resistor	DTB123Tx*	DTD123Tx*	2.2	—	●	●			40		100 to 600
x: Packaging designation symbol					C		K*				
∗: Specification + Packaging Symbol					HZGT116		FRAT146				

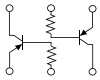
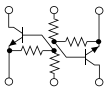
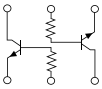
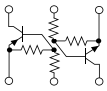
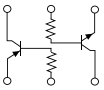
Note 1: ∗1 With reference land installed
Note 2: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.
* is not recommended for a new design

Power Digital Transistors(AEC-Q101 qualified)

Package	Type: Part No.	Type: Grade Code	Type: Taping Code	Polarity	P_D* (W)	R_1 (kΩ)	R_2 (kΩ)	V_{CC}(V_{CEO}) (V)	I_O(I_C) (A)	GI (h_{FE})	Automotive Grade Available AEC-Q101
 SOT-89 (MPT3) [SC-62] 4540 Size	DTDG23YP	FRA	T100	NPN	0.5	2.2	10	60±10	1	300 or more	YES
	DTDG14GP	FRA	T100		0.5	—	10	60±10	1	300 or more	YES

Note 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(AEC-Q101 qualified)									
Configuration	Equivalent Circuit Diagram (TOP View)	SOT-563 (EMT6) [SC-107C] 1616 Size	SOT-363 (UMT6) [SC-88] 2021 Size	SOT-457 (SMT6) [SC-74] 2928 Size	Equivalent Element Transistors	R_1 (kΩ)	R_2 (kΩ)	V_{CC} (V_{CEO}) (V)	I_O (I_C) (A)
									
		Type							
PNP×2		EMB10FHAT2R	UMB10NFHATN		DTA123J×2	2.2	47		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	IMH11AFRAT110*	DTC114E×2	10	10		0.05
		EMH9FHAT2R	UMH9NFHATN	IMH9AFRAT110*	DTC114Y×2	10	47		0.07
		EMH1FHAT2R	UMH1NFHATN		DTC124E×2	22	22		0.03
		EMH2FHAT2R	UMH2NFHATN		DTC144E×2	47	47	50	0.03
		EMH3FHAT2R	UMH3NFHATN		DTC143T×2	4.7	—		0.1
		EMH4FHAT2R	UMH4NFHATN		DTC114T×2	10	—		0.1
PNP + NPN complimentary		EMD22FHAT2R	UMD22NFHATR		DTA143Z DTC143Z	4.7 4.7	47 47		0.1
		EMD3FHAT2R	UMD3NFHATR	IMD3AFRAT108*	DTA114E DTC114E	10 10	10 10		0.05
		EMD9FHAT2R	UMD9NFHATR	IMD9AFRAT108*	DTA114Y DTC114Y	10 10	47 47		0.07
		EMD2FHAT2R	UMD2NFHATR		DTA124E DTC124E	22 22	22 22		0.03
		EMD12FHAT2R	UMD12NFHATR		DTA144E DTC144E	47 47	47 47		0.03
		EMD6FHAT2R	UMD6NFHATR		DTA143T DTC143T	4.7 4.7	— —		0.1

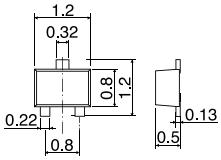
Note 1: For No.1 Pin location, please see the technical specifications.
Note 2: PNP(-)symbol omitted.
Note 3: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code.
∗ is not recommended for a new design

☆: Under Development

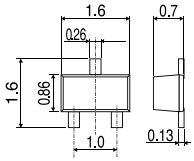
Packages

● Dimensions (Unit: mm)

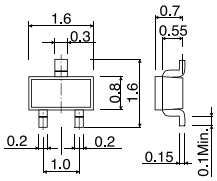
SOT-723
(VMT3)
[SC-105AA]



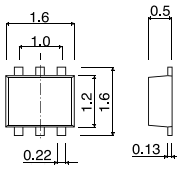
SOT-416FL
(EMT3F)
[SC-89]



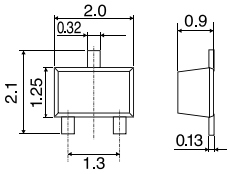
SOT-416
(EMT3)
[SC-75A]



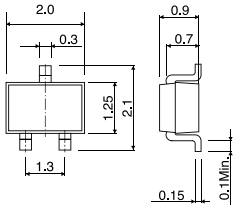
SOT-563
(EMT6)
[SC-107C]



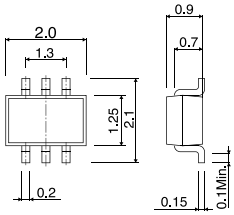
SOT-323FL
(UMT3F)
[SC-85]



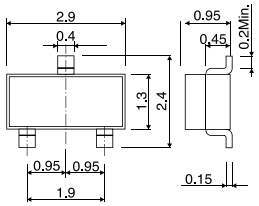
SOT-323
(UMT3)
[SC-70]



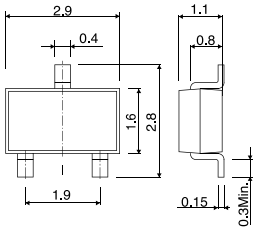
SOT-363
(UMT6)
[SC-88]



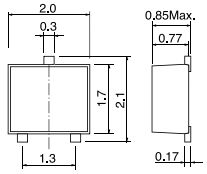
SOT-23
(SST3)



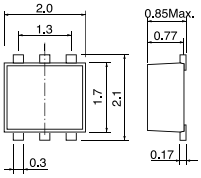
SOT-346
(SMT3)
[SC-59]



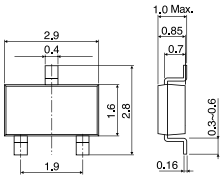
SOT-323T
(TUMT3)
[SC-113A]



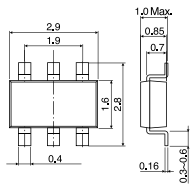
SOT-363T
(TUMT6)
[SC-113DA]



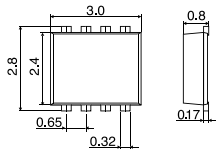
SOT-346T
(TSMT3)
[SC-96]



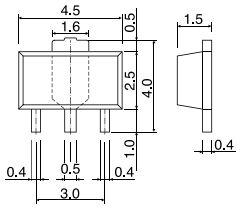
SOT-457T
(TSMT6)
[SC-95]



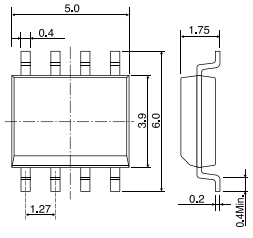
(TSMT8)



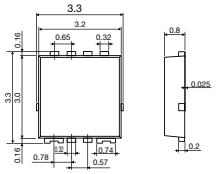
SOT-89
(MPT3)
[SC-62]



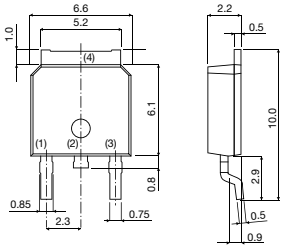
(SOP8)



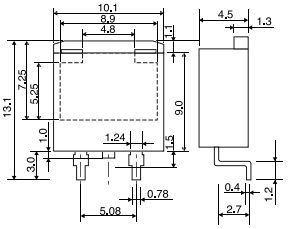
DFN3333
(HSMT8)



TO-252
(DPAK)



TO-263
(LPT)



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

Schottky Barrier Diodes

● Quick Reference for Small Signal Type Schottky Barrier Diodes(AEC-Q101 qualified)

V_R (V)	I_O (mA)	Package: 1006 Size — SOD-923 (VMN2)	
30	30	RB751CS-40	1
	100	RB520CS-30	2
		RB521CS-30	3
40	100		

V_R (V)	I_O (mA)	1608 Size — SOD-523 (EMD2)		2512 Size — SOD-323FL (UMD2)		2514 Size — (TUMD2M)		1212 Size — SOT-723 (VMD3)		1616 Size — SOT-416FL (EMD3F)		2120 Size — SOT-323FL (UMD3F)	
30	30	RB751SM-40	4	RB751VM-40	22								
	100	RB510SM-30 RB511SM-30 RB500SM-30 RB501SM-30	5 6 7 8	RB510VM-30 RB530VM-30 RB511VM-30 RB531VM-30	23 24 25 26					RB548WM RB557WM RB558WM	72 68 73		
	200	RB520SM-30 RB521SM-30 RB530SM-30 RB531SM-30	9 10 11 12	RB520VM-30 RB521VM-30 RB540VM-30 RB541VM-30	27 28 29 30								
	500			RB550VM-30	31	RSX051VYM30	45						
	700					RSX071VYM30	46						
	1,000					RB168VYM-30 RB550VYM-30 RSX101VYM30	47 48 49						
	1,500					RSX201VYM30	50						
40	30							RB715Z	60	RB706WM-40 RB715WM	74 61	RB706UM-40 RB715UM RB717UM	75 62 69
	100	RB510SM-40 RB511SM-40 RB530SM-40 RB531SM-40	13 14 15 16	RB510VM-40 RB511VM-40 RB530VM-40 RB531VM-40 RB500VM-40 RB501VM-40	32 33 34 35 36 37							RB450UM RB451UM	80 79
	200	RB540SM-40 RB541SM-40 RB520SM-40 RB521SM-40	17 18 19 20	RB540VM-40 RB541VM-40 RB520VM-40 RB521VM-40 RB550VM-40 RB551VM-40	38 39 40 41 42 43								
	500			RB560VM-40	44	RB400VYM-50	51						
	1,000					RB160VYM-40 RB168VYM-40	52 53						
60	200	RB521SM-60	21										
	1,000					RB160VYM-60 RB168VYM-60	54 55						
100	700					RB578VYM100	56						
	1,000					RB168VYM100	57						
150	500					RB558VYM150	58						
	1,000					RB168VYM150	59						

V_R (V)	I_O (mA)	2120 Size — SOT-363 (UMD6)		2924 Size — SOT-23 (SSD3)		2928 Size — SOT-346 (SMD3)		SOT-25 (SMD5)		SOT-25T (TSMD5)		SOT-457 (SMD6)	
20	500					RB411D	83						
25	400					RB495D	65						
30	100	RB530XN RB531XN RB541XN	90 91 92										
	200			BAT54HM BAT54SHM BAT54CHM BAT54AHM	81 76 63 70								
	1,000									RB552EA	88		
	1,400									RB550EA	89		
40	30	RB731XN	93			RB705D RB706D-40	66 78					RB731U	94
	100					RB420D RB421D RB425D	84 85 67	RB471E	87				
	120			BAS40HM BAS40-04HM BAS40-05HM BAS40-06HM	82 77 64 71								
	500					RB400D	86						

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

Schottky Barrier Diodes

Schottky Barrier Diodes
Example: RB751CS-40FHT2RA
Part No. / Grade Code / Taping Code

Small Signal Type Schottky Barrier Diodes(AEC-Q101 qualified)1

No.	Type			Absolute Maximum Ratings (T_C=25°C)				Electrical Characteristics(Tj=25°C)*2				Package	Equivalent Circuit Diagram	Automotive Grade Available AEC-Q101
	Part No.	Grade Code	Taping Code	V_{RM} (V)	V_R (V)	I_O*1 (mA)	I_{FSM}(A)*2 60Hz.1㌢	V_F(V) Max.	I_F(mA)	I_R(μA) Max.	V_R(V)			
1	RB751CS-40	FH	T2RA	40	30	30	0.2	0.37	1	0.5	30	SOD-923 (VMN2)		YES
2	RB520CS-30	FH	T2RA	—	30	100	0.5	0.45	10	0.5	10			YES
3	RB521CS-30	FH	T2RA	—	30	100	0.5	0.35	10	10	10			YES
4	RB751SM-40	FH	T2R	40	30	30	0.2	0.37	1	0.5	30	SOD-523 (EMD2)		YES
5	RB510SM-30	FH	T2R	30	30	100	0.5	0.46	10	0.3	10			YES
6	RB511SM-30	FH	T2R	30	30	100	0.5	0.37	10	7	10			YES
7	RB500SM-30	FH	T2R	30	30	100	1	0.45	10	0.5	10			YES
8	RB501SM-30	FH	T2R	30	30	100	1	0.35	10	10	10			YES
9	RB520SM-30	FH	T2R	—	30	200	1	0.58	200	1	10			YES
10	RB521SM-30	FH	T2R	—	30	200	1	0.47	200	30	10			YES
11	RB530SM-30	FH	T2R	30	30	200	1	0.45	10	0.5	10			YES
12	RB531SM-30	FH	T2R	30	30	200	1	0.35	10	10	10			YES
13	RB510SM-40	FH	T2R	40	40	100	0.5	0.48	10	2	40			YES
14	RB511SM-40	FH	T2R	40	40	100	0.5	0.41	10	25	40			YES
15	RB530SM-40	FH	T2R	40	40	100	1	0.71	100	15	40			YES
16	RB531SM-40	FH	T2R	40	40	100	1	0.61	100	100	40			YES
17	RB540SM-40	FH	T2R	40	40	200	1	0.71	100	15	40			YES
18	RB541SM-40	FH	T2R	40	40	200	1	0.61	100	100	40			YES
19	RB520SM-40	FH	T2R	45	40	200	1	0.55	100	10	40			YES
20	RB521SM-40	FH	T2R	45	40	200	1	0.45	100	90	40			YES
21	RB521SM-60	FH	T2R	60	60	200	1	0.6	200	100	60			YES
22	RB751VM-40	FH	TE-17	40	30	30	0.2	0.37	1	0.5	30	SOD-323FL (UMD2)		YES
23	RB510VM-30	FH	TE-17	30	30	100	0.5	0.46	10	0.3	10			YES
24	RB530VM-30	FH	TE-17	30	30	100	0.5	0.45	10	0.5	10			YES
25	RB511VM-30	FH	TE-17	30	30	100	0.5	0.37	10	7	10			YES
26	RB531VM-30	FH	TE-17	30	30	100	1	0.35	10	10	10			YES
27	RB520VM-30	FH	TE-17	30	30	200	1	0.58	200	1	10			YES
28	RB521VM-30	FH	TE-17	30	30	200	1	0.47	200	30	10			YES
29	RB540VM-30	FH	TE-17	30	30	200	1	0.45	10	0.5	10			YES
30	RB541VM-30	FH	TE-17	30	30	200	1	0.35	10	30	10			YES
31	RB550VM-30	FH	TE-17	30	30	500	1	0.59	500	35	30			YES
32	RB510VM-40	FH	TE-17	40	40	100	0.1	0.48	10	2	40			YES
33	RB511VM-40	FH	TE-17	40	40	100	0.1	0.41	10	25	40			YES
34	RB530VM-40	FH	TE-17	40	40	100	1	0.71	100	15	40			YES
35	RB531VM-40	FH	TE-17	40	40	100	1	0.61	100	100	40			YES
36	RB500VM-40	FH	TE-17	45	40	100	1	0.45	10	1	10			YES
37	RB501VM-40	FH	TE-17	45	40	100	1	0.55	100	30	10			YES
38	RB540VM-40	FH	TE-17	40	40	200	1	0.71	100	15	40			YES
39	RB541VM-40	FH	TE-17	40	40	200	1	0.61	100	100	40			YES
40	RB520VM-40	FH	TE-17	40	40	200	1	0.55	100	10	40			YES
41	RB521VM-40	FH	TE-17	40	40	200	1	0.54	200	90	40			YES
42	RB550VM-40	FH	TE-17	40	40	200	1	0.51	200	40	40			YES
43	RB551VM-40	FH	TE-17	40	40	200	1	0.43	200	300	40			YES
44	RB560VM-40	FH	TE-17	40	40	500	2	0.64	500	40	40			YES
45	RSX051VYM30	FH	TR	30	30	500	5	0.39	500	200	30	(TUMD2M)		YES
46	RSX071VYM30	FH	TR	30	30	700	5	0.42	700	200	30			YES
47	RB168VYM-30	FH	TR	30	30	1,000	5	0.73	1,000	0.3	30			YES
48	RB550VYM-30	FH	TR	30	30	1,000	3	0.52	1,000	30	10			YES
49	RSX101VYM30	FH	TR	30	30	1,000	5	0.47	1,000	200	30			YES
50	RSX201VYM30	FH	TR	30	30	1,500	8	0.46	1,500	300	30			YES
51	RB400VYM-50	FH	TR	50	40	500	3	0.55	500	50	30			YES
52	RB160VYM-40	FH	TR	40	40	1,000	5	0.55	700	50	40			YES
53	RB168VYM-40	FH	TR	40	40	1,000	5	0.79	1,000	0.5	40			YES
54	RB160VYM-60	FH	TR	60	60	1,000	3	0.67	1,000	40	60			YES
55	RB168VYM-60	FH	TR	60	60	1,000	5	0.82	1,000	1	60			YES
56	RB578VYM100	FH	TR	100	100	700	5	0.85	700	0.2	100			YES
57	RB168VYM100	FH	TR	100	100	1,000	5	0.84	1,000	0.3	100			YES
58	RB558VYM150	FH	TR	150	150	500	3	0.95	500	0.5	150			YES
59	RB168VYM150	FH	TR	150	150	1,000	5	0.89	1,000	1	150			YES

Note: ∗1: I_O: Average output current per chip. In case of 1, 2 or 3 chip diodes. I_O 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 Z F H T 2 L
Part No. / Grade Code / Taping Code

Small Signal Type Schottky Barrier Diodes(AEC-Q101 qualified)2

No.	Type			Absolute Maximum Ratings (T_C=25°C)				Electrical Characteristics(T=25°C)*2				Package	Equivalent Circuit Diagram	Automotive Grade Available AEC-Q101
	Part No.	Grade Code	Taping Code	V_{RM} (V)	V_R (V)	I_O*1 (mA)	I_{FSM}(A)*2 60Hz.1㌢	V_F(V) Max.	I_F(mA)	I_R(μA) Max.	V_R(V)			
60	RB715Z	FH	T2L	40	40	30	0.2	0.37	1	1	10	SOT-723 (VMD3)		YES
61	RB715WM	FH	TL	40	40	30*2	0.2	0.37	1	1	10	SOT-416FL (EMD3F)		YES
62	RB715UM	FH	TL	40	40	30	0.2	0.37	1	1	10	SOT-323FL (UMD3F)		YES
63	BAT54CHM	FH	T116	30	30	200*2	0.6	0.8	100	2	25	SOT-23 (SSD3)		YES
64	BAS40-05HM	FH	T116	40	40	120*2	0.6	0.5	10	1	30			YES
65	RB495D	FH	T146	40	25	400	2	0.5	200	70	25	SOT-346 (SMD3)		YES
66	RB705D	FH	T146	40	40	30	0.2	0.37	1	1	10			YES
67	RB425D	FH	T146	40	40	100	1	0.55	100	30	10			YES
68	RB557WM	FH	TL	—	30	100*2	0.5	0.49	100	10	10	SOT-416FL (EMD3F)		YES
69	RB717UM	FH	TL	45	40	30*2	0.2	0.37	1	1	30	SOT-323FL (UMD3F)		YES
70	BAT54AHM	FH	T116	30	30	200*2	0.6	0.8	100	2	25	SOT-23 (SSD3)		YES
71	BAS40-06HM	FH	T116	40	40	120*2	0.6	0.5	10	1	30			YES
72	RB548WM	FH	TL	—	30	100*2	0.5	0.45	10	0.5	10	SOT-416FL (EMD3F)		YES
73	RB558WM	FH	TL	—	30	100*2	0.5	0.49	100	10	10			YES
74	RB706WM-40	FH	TL	45	40	30*2	0.2	0.37	1	0.5	30			YES
75	RB706UM-40	FH	TL	45	40	30*2	0.2	0.37	1	1	30	SOT-323FL (UMD3F)		YES
76	BAT54SHM	FH	T116	30	30	200*2	0.6	0.8	100	2	25	SOT-23 (SSD3)		YES
77	BAS40-04HM	FH	T116	40	40	120*2	0.6	0.5	10	1	30			YES
78	RB706D-40	FH	T146	45	40	30	0.2	0.37	1	1	10	SOT-346 (SMD3)		YES
79	RB451UM	FH	TL	40	40	100	1	0.45	100	90	40	SOT-323FL (UMD3F)		YES
80	RB450UM	FH	TL	45	40	100	1	0.55	100	10	40			YES
81	BAT54HM	FH	T116	30	30	200	0.6	0.8	100	2	25	SOT-23 (SSD3)		YES
82	BAS40HM	FH	T116	40	40	120	0.6	0.5	10	1	30			YES
83	RB411D	FH	T146	40	20	500	3	0.5	500	30	10	SOT-346 (SMD3)		YES
84	RB420D	FH	T146	40	40	100	1	0.45	10	1	10			YES
85	RB421D	FH	T146	40	40	100	1	0.55	100	30	10			YES
86	RB400D	FH	T146	40	40	500	3	0.55	500	50	30			YES
87	RB471E	FH	T148	40	40	100*2	1	0.55	100	30	10	SOT-25 (SMD5)		YES
88	RB552EA	FH	TR	30	30	1,000	7	0.59	500	8	15	SOT-25T (TSMD5)		YES
89	RB550EA	FH	TR	30	30	1,400	15	0.49	700	50	30			YES
90	RB530XN	FH	TR	—	30	100*2	1	0.53	100	1	10	SOT-363 (UMD6)		YES
91	RB531XN	FH	TR	—	30	100*2	1	0.43	100	30	10			YES
92	RB541XN	FH	TR	—	30	100	0.5	0.35	10	10	10			YES
93	RB731XN	FH	TR	40	40	30	0.2	0.37	1	1	10			YES
94	RB731U	FH	T108	40	40	30	0.2	0.37	1	1	10	SOT-457 (SMD6)		YES

Note: ∗1: I_O: Average output current per chip. In case of 1, 2 or 3 chip diodes. I_O 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)(AEC-Q101 qualified)

V_R (V)	I_O (A)	Package					
		2513 Size		3516 Size		4725 Size	
							
		(PMDE)		SOD-123FL (PMDU)		SOD-128 (PMDTM)	
		Low V_F Type		Low V_F Type		Low V_F Type	
30	1	☆RBR1VWM30A	1	RBR1MM30A	7	RBR1LAM30A	23
	2	☆RBR2VWM30A	4	RBR2MM30A RBR2MM30B	8 9	RBR2LAM30A	24
	3			RBR3MM30A	10	RBR3LAM30A RBR3LAM30B	25 26
	5					RBR5LAM30A RBR5LAM30B	27 28
40	1	☆RBR1VWM40A	2	RBR1MM40A	11	RBR1LAM40A	29
	2	☆RBR2VWM40A	5	RBR2MM40A RBR2MM40B RBR2MM40C	12 13 14	RBR2LAM40A	30
	3			RBR3MM40A RBR3MM40B	15 16	RBR3LAM40A RBR3LAM40B RBR3LAM40C	31 32 33
	5					RBR5LAM40A	34
60	1	☆RBR1VWM60A	3	RBR1MM60A	17	RBR1LAM60A	35
	2	☆RBR2VWM60A	6	RBR2MM60A RBR2MM60B RBR2MM60C	18 19 20	RBR2LAM60A RBR2LAM60B	36 37
	3			RBR3MM60B RBR3MM60A	21 22	RBR3LAM60A RBR3LAM60B	38 39
	5					RBR5LAM60A	40

Note: Package is JEDEC code. ( ):ROHM Package. ☆ : Under Development

● Quick Reference for Middle Power Schottky Barrier Diodes(Standard Type)(AEC-Q101 qualified)

V_R (V)	I_O (A)	Package															
		2513 Size				3516 Size						4725 Size					
																	
		(PMDE)				SOD-123FL(PMDU)						SOD-128(PMDTM)					
		Ultra-Low I_R Type		Ultra-Low V_F Type		Low V_F Type		Ultra-Low I_R Type		Ultra-Low V_F Type		Low V_F Type		Ultra-Low I_R Type			
30	1	☆RB168VWM-30	30	RSX101MM-30	1	RB162MM-30 RB160MM-30	5 6	RB168MM-30	33					RB168LAM-30	42		
	1.5					RB070MM-30	7										
	2					RB060MM-30	8	RB068MM-30	34	New RSX201LAM30 New RSX205LAM30	2 3			RB068LAM-30	43		
	3									New RSX301LAM30	4	New RB050LAM-30 New RB055LAM-30	17 18	RB058LAM-30	44		
	5											New RB080LAM-30	19	New RB088LAM-30	45		
40	1	☆RB168VWM-40	31			RB162MM-40 RB160MM-40 RB160MM-50	9 10 11	RB168MM-40	35			New RB160LAM-40 New RB162LAM-40	20 21	RB168LAM-40	46		
	2					RB060MM-40	12	RB068MM-40	36			New RB060LAM-40	22	RB068LAM-40	47		
	3											New RB050LAM-40 New RB055LAM-40 New RB056LAM-40	23 24 25	RB058LAM-40	48		
	5													New RB088LAM-40	49		
60	1	☆RB168VWM-60	32			RB162MM-60 RB160MM-60	13 14	RB168MM-60	37			New RB162LAM-60	26	RB168LAM-60	50		
	2					RB060MM-60	15	RB068MM-60	38					RB068LAM-60	51		
	3											New RB050LAM-60 New RB055LAM-60	27 28	RB058LAM-60	52		
	5													New RB088LAM-60	53		
90	1					RB160MM-90	16					New RB160LAM-90	29				
100	1							RB168MM100	39					RB168LAM100	54		
	2							RB068MM100	40					RB068LAM100	55		
	3													RB058LAM100	56		
	5													New RB088LAM100	57		
150	1							RB168MM150	41					RB168LAM150	58		
	2													RB068LAM150	59		
	3													RB058LAM150	60		
	5													New RB088LAM150	61		

Note: Package is JEDEC code. ( ):ROHM Package. ☆ : Under Development

Schottky Barrier Diodes

Schottky Barrier Diodes
Example: RBR1MM30A TF TR
Part No. / Grade Code / Taping Code

Middle Power Schottky Barrier Diodes(High Efficiency Type)(AEC-Q101 qualified)

No.	Type: Part No.	Grade Code	Taping Code	Absolute Maximum Ratings (Tc=25℃): VRM (V)	VR (V)	Io (A)	IFSM(A) 60Hz.1cyc	Electrical Characteristics(Tj=25℃): VF(V) Max.	IF(A)	IR(mA) Max.	VR(V)	Package	Equivalent Circuit Diagram	Automotive Grade Available AEC-Q101
Low V_F Type														
1	☆RBR1VWM30A	TF	TR	30	30	1	20	0.48	1	0.05	30	(PMDE)		YES
2	☆RBR1VWM40A	TF	TR	40	40	1	20	0.52	1	0.05	40			YES
3	☆RBR1VWM60A	TF	TR	60	60	1	20	0.53	1	0.075	60			YES
4	☆RBR2VWM30A	TF	TR	30	30	2	20	0.53	2	0.05	30			YES
5	☆RBR2VWM40A	TF	TR	40	40	2	20	0.62	2	0.05	40			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	RBR2MM40B	TF	TR	40	40	2	30	0.55	2	0.08	40			YES
14	RBR2MM40C	TF	TR	40	40	2	30	0.52	2	0.1	40			YES
15	RBR3MM40A	TF	TR	40	40	3	30	0.62	3	0.08	40			YES
16	RBR3MM40B	TF	TR	40	40	3	30	0.58	3	0.1	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

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

☆ : Under Development

Middle Power Schottky Barrier Diodes(Standard Type)(AEC-Q101 qualified)

No.	Type: Part No.	Grade Code	Taping Code	Absolute Maximum Ratings (Tc=25℃): VRM (V)	VR (V)	Io (A)	IFSM(A) 60Hz.1cyc	Electrical Characteristics(Tj=25℃): VF(V) Max.	IF(A)	IR(mA) Max.	VR(V)	Package	Equivalent Circuit Diagram	Automotive Grade Available AEC-Q101
Ultra-Low V_F Type														
1	RSX101MM-30	TF	TR	30	30	1	45	0.39	1	0.2	30	SOD-123FL (PMDU)		YES
2	New RSX201LAM30	TF	TR	30	30	2	60	0.44	2	0.15	30	SOD-128 (PMDTM)		YES
3	New RSX205LAM30	TF	TR	30	30	2	60	0.49	2	0.2	30			YES
4	New RSX301LAM30	TF	TR	30	30	3	100	0.42	3	0.2	30			YES
Low V_F Type														
5	RB162MM-30	TF	TR	30	30	1	30	0.52	1	0.1	30	SOD-123FL (PMDU)		YES
6	RB160MM-30	TF	TR	30	30	1	30	0.48	1	0.05	30			YES
7	RB070MM-30	TF	TR	30	30	1.5	30	0.49	1.5	0.05	30			YES
8	RB060MM-30	TF	TR	30	30	2	55	0.49	2	0.05	30			YES
9	RB162MM-40	TF	TR	40	40	1	30	0.55	1	0.1	40			YES
10	RB160MM-40	TF	TR	40	40	1	30	0.51	1	0.03	40			YES
11	RB160MM-50	TF	TR	50	40	1	30	0.51	1	0.03	40			YES
12	RB060MM-40	TF	TR	40	40	2	30	0.56	2	0.5	40			YES
13	RB162MM-60	TF	TR	60	60	1	20	0.65	1	0.1	60			YES
14	RB160MM-60	TF	TR	60	60	1	30	0.55	1	0.05	60			YES
15	RB060MM-60	TF	TR	60	60	2	30	0.61	2	0.05	60			YES
16	RB160MM-90	TF	TR	90	90	1	30	0.73	1	0.1	90			YES
17	New RB050LAM-30	TF	TR	30	30	3	100	0.45	3	0.15	30	SOD-128 (PMDTM)		YES
18	New RB055LAM-30	TF	TR	30	30	3	55	0.55	3	0.05	30			YES
19	New RB080LAM-30	TF	TR	30	30	5	100	0.51	5	0.15	30			YES
20	New RB160LAM-40	TF	TR	40	40	1	50	0.55	1	0.1	40			YES
21	New RB162LAM-40	TF	TR	40	40	1	40	0.55	1	0.1	40			YES
22	New RB060LAM-40	TF	TR	40	40	2	80	0.50	2	0.1	40			YES
23	New RB050LAM-40	TF	TR	40	40	3	80	0.55	3	0.1	40			YES
24	New RB055LAM-40	TF	TR	40	40	3	70	0.62	3	0.1	40			YES
25	New RB056LAM-40	TF	TR	40	40	3	50	0.67	3	0.05	40			YES
26	New RB162LAM-60	TF	TR	60	60	1	40	0.65	1	0.1	60			YES
27	New RB050LAM-60	TF	TR	60	60	3	80	0.56	3	0.1	60			YES
28	New RB055LAM-60	TF	TR	60	60	3	50	0.68	3	0.07	60			YES
29	New RB160LAM-90	TF	TR	95	90	1	50	0.73	1	0.1	90			YES
Ultra-Low I_R Type														
30	☆RB168VWM-30	TF	TR	30	30	1	20	0.69	1	0.0006	30	(PMDE)		YES
31	☆RB168VWM-40	TF	TR	40	40	1	20	0.69	1	0.0005	40			YES
32	☆RB168VWM-60	TF	TR	60	60	1	20	0.76	1	0.0005	60			YES
33	RB168MM-30	TF	TR	30	30	1	30	0.69	1	0.0006	30	SOD-123FL (PMDU)		YES
34	RB068MM-30	TF	TR	30	30	2	50	0.7	2	0.0008	30			YES
35	RB168MM-40	TF	TR	40	40	1	40	0.65	1	0.00055	40			YES
36	RB068MM-40	TF	TR	40	40	2	40	0.725	2	0.00055	40			YES
37	RB168MM-60	TF	TR	60	60	1	40	0.68	1	0.0015	60			YES
38	RB068MM-60	TF	TR	60	60	2	40	0.765	2	0.0015	60			YES
39	RB168MM100	TF	TR	100	100	1	40	0.81	1	0.0004	100			YES
40	RB068MM100	TF	TR	100	100	2	40	0.87	2	0.0004	100			YES
41	RB168MM150	TF	TR	150	150	1	35	0.84	1	0.004	150			YES

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

☆ : Under Development

Schottky Barrier Diodes

Middle Power Schottky Barrier Diodes(Standard Type)(AEC-Q101 qualified)

No.	Type: Part No.	Grade Code	Taping Code	Absolute Maximum Ratings (T_C=25℃): V_{RM} (V)	V_R (V)	I_O (A)	I_{FSM}(A) 60Hz.1㌢	Electrical Characteristics(Tj=25℃): V_F(V) Max.	I_F(A)	I_R(mA) Max.	V_R(V)	Package	Equivalent Circuit Diagram	Automotive Grade Available AEC-Q101
42	RB168LAM-30	TF	TR	30	30	1	40	0.69	1	0.0006	30	SOD-128 (PMDTM)		YES
43	RB068LAM-30	TF	TR	30	30	2	50	0.7	2	0.0008	30			YES
44	RB058LAM-30	TF	TR	30	30	3	80	0.68	3	0.0025	30			YES
45	New RB088LAM-30	TF	TR	30	30	5	80	0.69	5	0.0025	30			YES
46	RB168LAM-40	TF	TR	40	40	1	40	0.69	1	0.0005	40			YES
47	RB068LAM-40	TF	TR	40	40	2	50	0.69	2	0.001	40			YES
48	RB058LAM-40	TF	TR	40	40	3	90	0.69	3	0.005	40			YES
49	New RB088LAM-40	TF	TR	40	40	5	90	0.71	5	0.0036	40			YES
50	RB168LAM-60	TF	TR	60	60	1	40	0.68	1	0.0015	60			YES
51	RB068LAM-60	TF	TR	60	60	2	70	0.68	2	0.002	60			YES
52	RB058LAM-60	TF	TR	60	60	3	90	0.64	3	0.004	60			YES
53	New RB088LAM-60	TF	TR	60	60	5	90	0.71	5	0.004	60			YES
54	RB168LAM100	TF	TR	100	100	1	40	0.81	1	0.0004	100			YES
55	RB068LAM100	TF	TR	100	100	2	70	0.81	2	0.0015	100			YES
56	RB058LAM100	TF	TR	100	100	3	80	0.81	3	0.003	100			YES
57	New RB088LAM100	TF	TR	100	100	5	80	0.87	5	0.003	100			YES
58	RB168LAM150	TF	TR	150	150	1	50	0.84	1	0.0025	150			YES
59	RB068LAM150	TF	TR	150	150	2	70	0.81	2	0.003	150			YES
60	RB058LAM150	TF	TR	150	150	3	80	0.84	3	0.003	150			YES
61	New RB088LAM150	TF	TR	150	150	5	80	0.9	5	0.003	150			YES

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

● Quick Reference for Power Schottky Barrier Diodes(High Efficiency Type)(AEC-Q101 qualified)

V_R (V)	I_O (A)	Package: TO-252 [DPAK] Low V_F Type		Low I_R Type		TO-263S [D2PAK] Low V_F Type		Low I_R Type		TO-220FN <3pin> Low V_F Type		Low I_R Type		TO-220FN <2pin> Low I_R 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					New RBR40NS30A	13								
40/45	10	RBR10BM40A	4	RBQ10BM45A	31	RBR10NS40A	14	RBQ10NS45A	37	RBR10T40A	25	RBQ10T45A	44		
	15	RBR15BM40A	5	RBQ15BM45A	32										
	20	RBR20BM40A	6	RBQ20BM45A	33	RBR20NS40A	15	RBQ20NS45A	38	RBR20T40A	26	RBQ20T45A	45		
	30					RBR30NS40A	16	RBQ30NS45A RBQ30NS45B	39 43	RBR30T40A	27	RBQ30T45A	46	RBQ30TB45B	50
	40					New RBR40NS40A	17								
60/65	10	RBR10BM60A	7	RBQ10BM65A	34	RBR10NS60A	18	RBQ10NS65A	40	RBR10T60A	28	RBQ10T65A	47		
	15	RBR15BM60A	8	RBQ15BM65A	35										
	20	RBR20BM60A	9	RBQ20BM65A	36	RBR20NS60A	19	RBQ20NS65A	41	RBR20T60A	29	RBQ20T65A	48		
	30					RBR30NS60A	20	RBQ30NS65A	42	RBR30T60A	30	RBQ30T65A	49		
	40					RBR40NS60A	21								

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

● Quick Reference for Power Schottky Barrier Diodes(Standard Type)(AEC-Q101 qualified)

V_R (V)	Io (A)	Package: TO-252 [DPAK] Low V_F Type		Ultra-Low I_R Type		TO-263S [D2PAK] Low V_F Type		Ultra-Low I_R Type		TO-220FN <3pin> Low V_F Type		Ultra-Low I_R Type	
30	5			RB078BM30S	34								
	6	RB095BM-30	1	RB098BM-30	24								
	10	RB085BM-30	2	RB088BM-30	25			RB088NS-30	37			RB088T-30	58
	20							RB218NS-30	38			RB218T-30	59
	30							RB228NS-30	39			RB228T-30	60
	40							RB238NS-30	40			RB238T-30	61
40	5			RB075BM40S	35								
	6	RB095BM-40	3	RB098BM-40	26					RB095T-40	10		
	10	RB085BM-40	4	RB088BM-40	27			RB088NS-40	41	RB085T-40	11	RB088T-40	62
	15									RB205T-40	12		
	20							RB218NS-40	42	RB215T-40	13	RB218T-40	63
	30					RB225NS-40	9	RB228NS-40	43	RB225T-40	14	RB228T-40	64
	40							RB238NS-40	44			RB238T-40	65
60	6	RB095BM-60	5	RB098BM-60	28					RB095T-60	15		
	10	RB085BM-60	6	RB088BM-60	29			RB088NS-60	45	RB085T-60	16	RB088T-60	66
	15									RB205T-60	17		
	20							RB218NS-60	46	RB215T-60	18	RB218T-60	67
	30							RB228NS-60	47	RB225T-60	19	RB228T-60	68
	40							RB238NS-60	48			RB238T-60	69
90	6	RB095BM-90	7							RB095T-90	20		
	10	RB085BM-90	8							RB085T-90	21		
	15									RB205T-90	22		
	20									RB215T-90	23		
100	5			☆RB078BM10S	36								
	6			RB098BM100	30								
	10			RB088BM100	31			RB088NS100	49			RB088T100	70
	20							RB218NS100	50			RB218T100	71
	30							RB228NS100 RB298NS100	51 52			RB228T100 RB298T100	72 73
	40							RB238NS100	53			RB238T100	74
150	6			RB098BM150	32								
	10			RB088BM150	33			RB088NS150	54			RB088T150	75
	20							RB218NS150	55			RB218T150	76
	30							RB228NS150	56			RB228T150	77
	40							RB238NS150	57			RB238T150	78

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

☆ : Under Development

Schottky Barrier Diodes

Schottky Barrier Diodes
Example: RBR10BM30A FH TL
Part No. / Grade Code / Taping Code

Power Schottky Barrier Diodes(High Efficiency Type)(AEC-Q101 qualified)

No.	Type			Absolute Maximum Ratings (T_C=25℃)				Electrical Characteristics(Tj=25℃)				Package	Equivalent Circuit Diagram	Automotive Grade Available AEC-Q101
	Part No.	Grade Code	Taping Code	V_{RM} (V)	V_R (V)	I_O*1 (A)	I_{FSM}(A)*2 60Hz.1㎝	V_F(V) Max.	I_F(A)	I_R(mA) Max.	V_R(V)			
Low V_F 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	New 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	New 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_R 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	RBQ10NS45A	FH	TL	45	45	10	100	0.65	5	0.07	45	TO-263S [D2PAK]		YES
38	RBQ20NS45A	FH	TL	45	45	20	100	0.65	10	0.14	45			YES
39	RBQ30NS45A	FH	TL	45	45	30	100	0.65	15	0.2	45			YES
40	RBQ10NS65A	FH	TL	65	65	10	100	0.69	5	0.07	65			YES
41	RBQ20NS65A	FH	TL	65	65	20	100	0.69	10	0.14	65			YES
42	RBQ30NS65A	FH	TL	65	65	30	100	0.69	15	0.2	65			YES
43	RBQ30NS45B	FH	TL	45	45	30	100	0.59	30	0.7	45			YES
44	RBQ10T45A	HZ	C9	45	45	10	100	0.65	5	0.07	45	TO-220FN <3pin>		YES
45	RBQ20T45A	HZ	C9	45	45	20	100	0.65	10	0.14	45			YES
46	RBQ30T45A	HZ	C9	45	45	30	100	0.65	15	0.2	45			YES
47	RBQ10T65A	HZ	C9	65	65	10	100	0.69	5	0.07	65			YES
48	RBQ20T65A	HZ	C9	65	65	20	100	0.69	10	0.14	65			YES
49	RBQ30T65A	HZ	C9	65	65	30	100	0.69	15	0.2	65			YES
50	RBQ30TB45B	HZ	C9	45	45	30	100	0.59	30	0.7	45	TO-220FN <2pin>		YES

Note: ✶1: I_O:Average current per die. In case of 2 dies, I_O indicates average output current of 2 dies.
✶2: Value / Chip
Package is JEDEC code. [ ]:GENERAL Code

Schottky Barrier Diodes

Schottky Barrier Diodes
Example R B 0 9 5 B M – 3 0 F H T L
Part No. Grade Code Taping Code

Power Schottky Barrier Diodes(Standard Type)(AEC-Q101 qualified)

No.	Type			Absolute Maximum Ratings (T_C=25℃)				Electrical Characteristics(Tj=25℃)				Package	Equivalent Circuit Diagram	Automotive Grade Available AEC-Q101
	Part No.	Grade Code	Taping Code	V_{RM} (V)	V_R (V)	I_O*1 (A)	I_{FSM}(A)*2 60Hz.1㏈	V_F(V) Max.	I_F(A)	I_R(mA) Max.	V_R(V)			
Low V_F Type														
1	RB095BM-30	FH	TL	35	30	6	50	0.425	3	0.2	30	TO-252 [DPAK]		YES
2	RB085BM-30	FH	TL	35	30	10	50	0.48	4	0.3	30			YES
3	RB095BM-40	FH	TL	45	40	6	50	0.55	3	0.1	40			YES
4	RB085BM-40	FH	TL	45	40	10	50	0.55	5	0.2	40			YES
5	RB095BM-60	FH	TL	60	60	6	50	0.58	3	0.3	60			YES
6	RB085BM-60	FH	TL	60	60	10	50	0.58	5	0.3	60			YES
7	RB095BM-90	FH	TL	90	90	6	50	0.75	3	0.15	90			YES
8	RB085BM-90	FH	TL	90	90	10	50	0.83	5	0.15	90			YES
9	RB225NS-40	FH	TL	40	40	30	50	0.55	15	0.5	40	TO-263S [D2PAK]		YES
10	RB095T-40	HZ	C9	45	40	6	100	0.55	3	0.1	40	TO-220FN <3pin>		YES
11	RB085T-40	HZ	C9	45	40	10	100	0.55	5	0.2	40			YES
12	RB205T-40	HZ	C9	45	40	15	100	0.55	7.5	0.3	40			YES
13	RB215T-40	HZ	C9	45	40	20	100	0.55	10	0.5	40			YES
14	RB225T-40	HZ	C9	40	40	30	100	0.63	15	0.5	40			YES
15	RB095T-60	HZ	C9	60	60	6	100	0.58	3	0.1	60			YES
16	RB085T-60	HZ	C9	60	60	10	100	0.58	5	0.3	60			YES
17	RB205T-60	HZ	C9	60	60	15	100	0.58	7.5	0.6	60			YES
18	RB215T-60	HZ	C9	60	60	20	100	0.58	10	0.6	60			YES
19	RB225T-60	HZ	C9	60	60	30	100	0.63	15	0.6	60			YES
20	RB095T-90	HZ	C9	90	90	6	100	0.75	3	0.15	90			YES
21	RB085T-90	HZ	C9	90	90	10	100	0.83	5	0.15	90			YES
22	RB205T-90	HZ	C9	90	90	15	100	0.78	7.5	0.3	90			YES
23	RB215T-90	HZ	C9	90	90	20	100	0.75	10	0.4	90			YES
Ultra-Low I_R Type														
24	RB098BM-30	FH	TL	35	30	6	50	0.72	3	0.0015	30	TO-252 [DPAK]		YES
25	RB088BM-30	FH	TL	35	30	10	50	0.72	5	0.003	30			YES
26	RB098BM-40	FH	TL	45	40	6	50	0.77	3	0.0015	40			YES
27	RB088BM-40	FH	TL	45	40	10	50	0.77	5	0.003	40			YES
28	RB098BM-60	FH	TL	60	60	6	50	0.83	3	0.0015	60			YES
29	RB088BM-60	FH	TL	60	60	10	50	0.83	5	0.003	60			YES
30	RB098BM100	FH	TL	110	100	6	100	0.77	3	0.003	100			YES
31	RB088BM100	FH	TL	100	100	10	100	0.87	5	0.005	100			YES
32	RB098BM150	FH	TL	150	150	6	100	0.83	3	0.007	150			YES
33	RB088BM150	FH	TL	150	150	10	100	0.88	5	0.015	150			YES
34	RB078BM30S	FH	TL	35	30	5	50	0.72	5	0.005	30			YES
35	RB075BM40S	FH	TL	40	40	5	50	0.75	5	0.005	40			YES
36	☆RB078BM10S	FH	TL	110	100	5	100	0.78	5	0.006	100			YES
37	RB088NS-30	FH	TL	35	30	10	50	0.72	5	0.003	30	TO-263S [D2PAK]		YES
38	RB218NS-30	FH	TL	35	30	20	100	0.72	10	0.005	30			YES
39	RB228NS-30	FH	TL	35	30	30	100	0.72	15	0.01	30			YES
40	RB238NS-30	FH	TL	35	30	40	100	0.75	20	0.012	30			YES
41	RB088NS-40	FH	TL	45	40	10	50	0.77	5	0.003	40			YES
42	RB218NS-40	FH	TL	45	40	20	100	0.77	10	0.005	40			YES
43	RB228NS-40	FH	TL	45	40	30	100	0.77	15	0.01	40			YES
44	RB238NS-40	FH	TL	45	40	40	100	0.8	20	0.012	40			YES
45	RB088NS-60	FH	TL	60	60	10	50	0.83	5	0.003	60			YES
46	RB218NS-60	FH	TL	60	60	20	100	0.83	10	0.005	60			YES
47	RB228NS-60	FH	TL	60	60	30	100	0.83	15	0.01	60			YES
48	RB238NS-60	FH	TL	60	60	40	100	0.86	20	0.012	60			YES
49	RB088NS100	FH	TL	110	100	10	100	0.87	5	0.005	100			YES
50	RB218NS100	FH	TL	110	100	20	100	0.87	10	0.007	100			YES
51	RB228NS100	FH	TL	110	100	30	100	0.87	5	0.005	100			YES
52	RB298NS100	FH	TL	110	100	30	100	0.87	15	0.01	100			YES
53	RB238NS100	FH	TL	110	100	40	100	0.86	20	0.02	100			YES
54	RB088NS150	FH	TL	150	150	10	50	0.88	5	0.015	150			YES
55	RB218NS150	FH	TL	150	150	20	100	0.88	10	0.02	150			YES
56	RB228NS150	FH	TL	150	150	30	100	0.88	15	0.025	150			YES
57	RB238NS150	FH	TL	150	150	40	100	0.87	20	0.03	150			YES
58	RB088T-30	HZ	C9	35	30	10	50	0.72	5	0.003	30	TO-220FN <3pin>		YES
59	RB218T-30	HZ	C9	35	30	20	100	0.72	10	0.005	30			YES
60	RB228T-30	HZ	C9	35	30	30	100	0.72	15	0.01	30			YES
61	RB238T-30	HZ	C9	35	30	40	100	0.75	20	0.012	30			YES
62	RB088T-40	HZ	C9	45	40	10	50	0.77	5	0.003	40			YES
63	RB218T-40	HZ	C9	45	40	20	100	0.77	10	0.005	40			YES
64	RB228T-40	HZ	C9	45	40	30	100	0.77	15	0.01	40			YES
65	RB238T-40	HZ	C9	45	40	40	100	0.8	20	0.012	40			YES
66	RB088T-60	HZ	C9	60	60	10	50	0.83	5	0.003	60			YES
67	RB218T-60	HZ	C9	60	60	20	100	0.83	10	0.005	60			YES
68	RB228T-60	HZ	C9	60	60	30	100	0.83	15	0.01	60			YES
69	RB238T-60	HZ	C9	60	60	40	100	0.86	20	0.012	60			YES
70	RB088T100	HZ	C9	110	100	10	100	0.87	5	0.005	100			YES
71	RB218T100	HZ	C9	110	100	20	100	0.87	10	0.007	100			YES
72	RB228T100	HZ	C9	110	100	30	100	0.87	5	0.005	100			YES
73	RB298T100	HZ	C9	110	100	30	100	0.87	15	0.01	100			YES
74	RB238T100	HZ	C9	110	100	40	100	0.86	20	0.02	100			YES
75	RB088T150	HZ	C9	150	150	10	50	0.88	5	0.015	150			YES
76	RB218T150	HZ	C9	150	150	20	100	0.88	10	0.02	150			YES
77	RB228T150	HZ	C9	150	150	30	100	0.88	15	0.025	150			YES
78	RB238T150	HZ	C9	150	150	40	100	0.87	20	0.03	150			YES

Note: ✶1: I_O:Average current per die. In case of 2 dies, I_O indicates average output current of 2 dies.
✶2: Value / Chip
Package is JEDEC code. [ ]:GENERAL Code

☆ : Under Development

Fast Recovery Diodes

● Quick Reference for Small Signal / Middle Power Fast Recovery Diodes(AEC-Q101 qualified)

V_R (V)	I_O (A)	Surface Mount Type											
		2512 Size SOD-323FL (UMD2)		2514 Size (TUMD2M)		3516 Size SOD-123FL (PMDU)		2513 Size (PMDE)		4725 Size SOD-128 (PMDTM)		2928 Size SOT-457T (TSMD6)	
100	0.5			RF05VYM1S	2								
200	0.4											RF04UA2D	20
	0.5			RF05VYM2S	3	RFC02MM2S	5						
	0.7					RF071MM2S	6						
	0.8					RF081MM2S	7						
	1							☆RFN1VWM2S	4	RF101LAM2S	8		
	1.1									RF081LAM2S	9		
	2									RF201LAM2S RF202LAM2S	10 11		
	3									RF302LAM2S	12		
250	0.1	RF01VM2S	1										
400	1									New RF071LAM4S New RF101LAM4S	13 14		
	1.5									New RF201LAM4S New RFN2LAM4S	15 16		
600	0.8									RFN1LAM6S	17		
	1.5									RFN2LAM6S	18		
700	0.8									RFN1LAM7S	19		

Note: Package is JEDEC code. ( ):ROHM Package. ☆ : Under Development

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(AEC-Q101 qualified)

No.	Type			Absolute Maximum Ratings (T_C=25°C or T_l=25°C)				Electrical Characteristics(Tj=25°C)*2							Package	Equivalent Circuit Diagram	Automotive Grade Available AEC-Q101
	Part No.	Grade Code	Taping Code	V_{RM} (V)	V_R (V)	I_O (A)	I_{FSM}(A) 60Hz.1∿	V_F(V) Max.	I_F(A)	I_R(μA) Max.	V_R(V)	trr(ns) Max.	I_F(A)	I_R(A)			
1	RF01VM2S	FH	TE-17	250	250	0.1	1	1.2	0.1	10	250	50	*3		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			YES
4	☆RFN1VWM2S	TF	TR	200	200	1	10	0.95	1	1	200	25	0.5	1	(PMDE)		YES
5	RFC02MM2S	TF	TR	200	200	0.5	10	0.95	0.5	1	200	35	0.1	0.2	SOD-123FL (PMDU)		YES
6	RF071MM2S	TF	TR	200	200	0.7	15	0.85	0.7	10	200	25	0.5	1			YES
7	RF081MM2S	TF	TR	200	200	0.8	20	0.95	0.8	10	200	25	0.5	1			YES
8	RF101LAM2S	TF	TR	200	200	1	20	0.87	1	10	200	25	0.5	1	SOD-128 (PMDTM)		YES
9	RF081LAM2S	TF	TR	200	200	1.1	25	0.98	1	10	200	25	0.5	1			YES
10	RF201LAM2S	TF	TR	200	200	2	20	0.87	2	10	200	25	0.5	1			YES
11	RF202LAM2S	TF	TR	200	200	2	20	0.93	2	10	200	25	0.5	1			YES
12	RF302LAM2S	TF	TR	200	200	3	20	0.92	3	10	200	25	0.5	1			YES
13	New RF071LAM4S	TF	TR	400	400	1	15	1.25	0.7	10	400	25	0.5	1			YES
14	New RF101LAM4S	TF	TR	400	400	1	25	1.25	1	10	400	25	0.5	1			YES
15	New RF201LAM4S	TF	TR	400	400	1.5	50	1.2	1.5	1	400	30	0.5	1			YES
16	New RFN2LAM4S	TF	TR	400	400	1.5	50	1.2	1.5	1	400	30	0.5	1			YES
17	RFN1LAM6S	TF	TR	600	600	0.8	15	1.45	0.8	1	600	35	0.5	1			YES
18	RFN2LAM6S	TF	TR	600	600	1.5	40	1.55	1.5	1	600	35	0.5	1			YES
19	RFN1LAM7S	TF	TR	700	700	0.8	15	1.5	0.8	1	700	80	0.5	1			YES
20	RF04UA2D	FH	TR	200	200	0.4	1	0.98	0.2	10	200	25	0.5	1	SOT-457T (TSMD6)		YES

Note: *1: I_O: Average rectified output current per die. In case of 2 dies, I_O indicates average output current of 2 dies. *2: Value / Chip *3 : V_R=6V, I_F=10mA, I_{rr}=0.1I_R
Package is JEDEC code. ( ):ROHM Package. ☆: Under Development

● Quick Reference for Power Fast Recovery Diodes(AEC-Q101 qualified)

V_R (V)	I_O (A)	Surface Mount Type				Lead Type							
													
		TO-252 [DPAK]		TO-263S [D2PAK]		TO-220FN <2pin>		TO-220FN <3pin>		TO-220NFM <2pin>		TO-220ACFP	
200	3	RF301BM2S RFN3BM2S	17 18										
	5	RF501BM2S RFN5BM2S	19 20										
	6	RF601BM2D RFN6BM2D	1 2					RF601T2D RFN6T2D	8 9				
	10			RF1001NS2D	3			RF1001T2D RFN10T2D	10 11				
	16			RF1601NS2D	4			RF1601T2D RFN16T2D	12 13				
	20			RF2001NS2D	5			RF2001T2D RFN20T2D	14 15				
300	20			RF2001NS3D	6			RF2001T3D	16	RF1501TF3S	49		
350	5	RFN5BM3S	21										
	10	RFN10BM3S	29	RFN10NS3S	31								
	20			RFN20NS3S RFUH25NS3S RFUH20NS3S	32 33 34	RFUH25TB3S RFUH20TB3S	43 44						
430	10			RFN10NS4S RFUH10NS4S	35 36	RFN10TB4S RFUH10TB4S	45 46						
	20			RFN20NS4S RFUH20NS4S	37 38	RFN20TB4S RFUH20TB4S	47 48						
600	3	RFN3BM6S RF305BM6S	22 23										
	5	RFN5BM6S RFNL5BM6S RF505BM6S RFV5BM6S	24 25 26 27							RFN5TF6S RF505TF6S RFUH5TF6S	50 51 52	RFNL5TJ6S	59
	8	RFV8BM6S	28										
	10	RFN10BM6S	30	RFN10NS6S RFUH10NS6S	39 40					RFN10TF6S RF1005TF6S RFUH10TF6S	53 54 55	RFNL10TJ6S	60
	15											RFNL15TJ6S	61
	20			RFN20NS6S RFUH20NS6S	41 42					RFN20TF6S RFUH20TF6S	56 57	RFNL20TJ6S RFN20TJ6S RFUH20TJ6S	62 63 64
800	5									RFN5TF8S	58		
	10			RFN10NS8D	7								

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

Fast Recovery Diodes

Fast Recovery Diodes
Example: RFN6BM2D FH TL
Part No. / Grade Code / Taping Code

Power Fast Recovery Diodes(AEC-Q101 qualified)

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_{RM} (V)	V_R (V)	I_O*1 (A)	I_{FSM}(A)*2 60Hz.1cyc	V_F(V) Max.	I_F (A)	I_R(μA) Max.	V_R (V)	trr(ns)/ Max.	I_F (A)	I_R (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			YES
8	RF601T2D	HZ	C9	200	200	6	60	0.93	3	10	200	25	0.5	1	TO-220FN <3pin>		YES
9	RFN6T2D	HZ	C9	200	200	6	40	0.98	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	RFN5BM6S	FH	TL	600	600	5	30	1.55	5	10	600	50	0.5	1			YES
25	RFNL5BM6S	FH	TL	600	600	5	50	1.3	5	10	600	60	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	RFN10NS6S	FH	TL	600	600	10	100	1.55	10	10	600	50	0.5	1			YES
40	RFUH10NS6S	FH	TL	600	600	10	60	2.8	10	10	600	25	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	1.55	10	10	430	30	0.5	1			YES
46	RFUH10TB4S	HZ	C9	430	430	10	80	1.7	10	10	430	25	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-220NFM <2pin>		YES
50	RFN5TF6S	FH	C9	600	600	5	30	1.55	5	10	600	50	0.5	1			YES
51	RF505TF6S	FH	C9	600	600	5	80	1.7	5	10	600	30	0.5	1			YES
52	RFUH5TF6S	FH	C9	600	600	5	30	2.8	5	10	600	25	0.5	1			YES
53	RFN10TF6S	FH	C9	600	600	10	100	1.55	10	10	600	50	0.5	1			YES
54	RF1005TF6S	FH	C9	600	600	10	100	1.7	10	10	600	40	0.5	1			YES
55	RFUH10TF6S	FH	C9	600	600	10	60	2.8	10	10	600	25	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	RFNL5TJ6S	FHG	C9	600	600	5	50	1.3	5	10	600	60	0.5	1	TO-220ACFP		YES
60	RFNL10TJ6S	FHG	C9	600	600	10	120	1.25 1.3	8 10	10	600	65	0.5	1			YES
61	RFNL15TJ6S	FHG	C9	600	600	15	160	1.3	15	10	600	65	0.5	1			YES
62	RFNL20TJ6S	FHG	C9	600	600	20	200	1.3	20	10	600	70	0.5	1			YES
63	RFN20TJ6S	FHG	C9	600	600	20	150	1.55	20	10	600	60	0.5	1			YES
64	RFUH20TJ6S	FHG	C9	600	600	20	120	2.8	20	10	600	35	0.5	1			YES

Note: ∗1: I_O: Average rectified output current per die. In case of 2 dies, I_O indicates average output current of 2 dies. ∗2: Value / Chip
Package is JEDEC code. [ ]:GENERAL Code

Rectifier Diodes

● Quick Reference for Rectifier Diodes(AEC-Q101 qualified)

	V_R (V)	I_O (A)	Surface Mount Type													
														
			2513 Size (PMDE)		2514 Size (TUMD2SM)		3516 Size SOD-123FL (PMDU)		4725 Size SOD-128 (PMDTM)		2928 Size SOT-25T (TSMD5)		TO-252 [DPAK]	
General Purpose Rectifier Diodes	400	0.2			RRE02VTM4S	3								
		0.4									RRE04EA4D	13		
		0.7			RRE07VTM4S	4	RR264MM-400	7						
		1	RR1VWM4S	1					RR1LAM4S	9	RR274EA-400	14		
		2							RR2LAM4S	10				
	600	0.2			RRE02VTM6S	5								
		0.4									RRE04EA6D	15		
		0.7			RRE07VTM6S	6								
		1	RR1VWM6S	2			RR268MM-600	8	RR1LAM6S	11				
		2							RR2LAM6S	12				
High Speed Rectifier Diodes	400	1							RRU1LAM4S	16				
Power Rectifier Diodes	400	6											RR601BM4S	17

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

Rectifier Diodes
Example R R 1 V W M 4 S | T F (Grade Code) | T R (Taping Code)
Part No.

● Rectifier Diodes(AEC-Q101 qualified)

No.	Type			Absolute Maximum Ratings (Tc=25℃ or Tl=25℃)				Electrical Characteristics(Tj=25°C)							Package	Equivalent Circuit Diagram	Automotive Grade Available AEC-Q101
	Part No.	Grade Code	Taping Code	V_{RM} (V)	V_R (V)	I_O*1 (A)	I_{FSM}(A) 60Hz.1cyc	V_F(V) Max.	I_F(A)	I_R(μA) Max.	V_R(V)	trr(ns)/ Max.	I_F(mA)	I_R(mA)			
General Purpose Rectifier Diodes																	
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
9	RR1LAM4S	TF	TR	500	400	1	30	1.1	1	10	400	—	—	—	SOD-128 (PMDTM)		YES
10	RR2LAM4S	TF	TR	400	400	2	50	1.1	2	10	400	—	—	—			YES
11	RR1LAM6S	TF	TR	750	600	1	30	1.1	1	10	600	—	—	—			YES
12	RR2LAM6S	TF	TR	600	600	2	50	1.1	2	10	600	—	—	—			YES
13	RRE04EA4D	FH	TR	400	400	0.4	2	1.1	0.2	1	400	—	—	—	SOT-25T (TSMD5)		YES
14	RR274EA-400	FH	TR	400	400	1	8	1.1	0.5	10	400	—	—	—			YES
15	RRE04EA6D	FH	TR	600	600	0.4	2	1.1	0.2	1	600	—	—	—			YES
High-Speed Rectifier Diodes																	
16	RRU1LAM4S	TF	TR	500	400	1	20	1.3	0.8	10	400	400	10	10	SOD-128 (PMDTM)		YES
Power Rectifier Diodes																	
17	RR601BM4S	FH	TL	400	400	6	40	1.1	6	10	400	—	—	—	TO-252 [DPAK]		YES

Note: ∗1: I_O: Average rectified output current per die. In case of 2 dies, I_O indicates average output current of 2 dies.
Package is JEDEC code. ( ):ROHM Package. [ ]:GENERAL Code

Zener Diodes

Zener Diodes
Example C D Z | F H | T 2 R A | 2 . 0 | B
Part No. | Grade Code | Taping Code | Zener voltage | Sub-division

2-Terminal(Single)4-Terminal(Dual)Zener Diodes 1(AEC-Q101 qualified)

Package	Surface Mount Type															
	1006 Size SOD-923(VMN2)				1608 Size SOD-523(EMD2)				2512 Size SOD-323FL(UMD2)				2512 Size SOD-323FL(UMD2)			
Equivalent Circuit Diagram																
Series Name	CDZ Series				EDZV Series				New UFZV Series				UDZV Series			
Automotive Product	FH				FH				FH				FH			
Power (mW)	100				150				500				200			
Taping Code	T2RA				T2R				TE-17				TE-17			
Electrical Characteristics (Ta=25°C)	Vz (V)		Iz (mA)	Automotive Grade Available AEC-Q101	Vz (V)		Iz (mA)	Automotive Grade Available AEC-Q101	Vz (V)		Iz (mA)	Automotive Grade Available AEC-Q101	Vz (V)		Iz (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	—	—	—	—	2.0B	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	—	—	—	—	2.2B	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	—	—	—	—	2.4B	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	—	—	—	—	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	—	—	—	—	3.0B	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	—	—	—	—	3.3B	3.32 to 3.53	5	YES
	3.6B	3.600 to 3.845	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	3.89 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	4.17 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	4.55 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	4.98 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	5.49 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	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	6.65 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	7.28 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	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	8.85 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	9.77 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	10.76 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	11.74 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	12.91 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	14.34 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	15.85 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	2	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	2	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	2	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	2	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	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	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	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	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 (TUMD2M)				2514 Size (TUMD2M)				3516 Size SOD-123FL(PMDU)				2512 Size SOD-323FL(UMD2)			
Equivalent Circuit Diagram																
Series Name	YFZV Series				YDZV Series				KDZV Series				UDZLV Series			
Automotive Product	FH				FH				TF				FH			
Power (mW)	500				500				1,000				200			
Taping Code	TR				TR				TR				TE-17			
Electrical Characteristics (Ta=25°C)	Vz (V)		Iz (mA)	Automotive Grade Available AEC-Q101	Vz (V)		Iz (mA)	Automotive Grade Available AEC-Q101	Vz (V)		Iz (mA)	Automotive Grade Available AEC-Q101	Vz (V)		Iz (mA)	Automotive Grade Available AEC-Q101
Voltage	2.0B	2.02 to 2.20	20	YES	—	—	—	—	2.0B	2.00 to 2.24	40	YES	51	48 to 54	2	YES
	2.2B	2.22 to 2.41	20	YES	—	—	—	—	2.2B	2.20 to 2.45	40	YES	56	53 to 60	2	YES
	2.4B	2.43 to 2.63	20	YES	—	—	—	—	2.4B	2.40 to 2.70	40	YES	62	58 to 66	2	YES
	2.7B	2.69 to 2.91	20	YES	—	—	—	—	2.7B	2.70 to 3.10	40	YES	68	64 to 72	2	YES
	3.0B	3.01 to 3.22	20	YES	—	—	—	—	3.0B	3.00 to 3.40	40	YES	75	70 to 79	2	YES
	3.3B	3.32 to 3.53	20	YES	—	—	—	—	3.3B	3.30 to 3.70	40	YES	82	77 to 87	2	YES
	3.6B	3.600 to 3.845	20	YES	—	—	—	—	3.6B	3.60 to 4.00	40	YES	91	85 to 96	1	YES
	3.9B	3.89 to 4.16	20	YES	—	—	—	—	3.9B	3.90 to 4.40	40	YES	100	94 to 106	1	YES
	4.3B	4.17 to 4.43	20	YES	—	—	—	—	4.3B	4.30 to 4.80	40	YES	110	104 to 116	1	YES
	4.7B	4.55 to 4.80	20	YES	—	—	—	—	4.7B	4.70 to 5.20	40	YES	120	114 to 126	1	YES
	5.1B	4.94 to 5.20	20	YES	5.1	4.60 to 5.60	10	YES	5.1B	5.10 to 5.70	40	YES	130	122 to 138	1	YES
	5.6B	5.45 to 5.73	20	YES	5.6	5.10 to 6.10	10	YES	5.6B	5.60 to 6.30	40	YES	150	140 to 160	1	YES
	6.2B	5.96 to 6.27	20	YES	6.2	5.60 to 6.80	10	YES	6.2B	6.20 to 7.00	40	YES	—	—	—	—
	6.8B	6.49 to 6.83	20	YES	6.8	6.20 to 7.40	10	YES	6.8B	6.80 to 7.70	40	YES	—	—	—	—
	7.5B	7.07 to 7.45	20	YES	7.5	6.80 to 8.30	10	YES	7.5B	7.50 to 8.40	40	YES	—	—	—	—
	8.2B	7.78 to 8.19	20	YES	8.2	7.40 to 9.00	10	YES	8.2B	8.20 to 9.30	40	YES	—	—	—	—
	9.1B	8.57 to 9.01	20	YES	9.1	8.20 to 10.00	10	YES	9.1B	9.10 to 10.20	40	YES	—	—	—	—
	10B	9.41 to 9.90	20	YES	10	9.00 to 11.00	10	YES	10B	10.00 to 11.20	40	YES	—	—	—	—
	11B	10.50 to 11.05	10	YES	11	9.90 to 12.10	10	YES	11B	11.00 to 12.30	20	YES	—	—	—	—
	12B	11.44 to 12.03	10	YES	12	10.80 to 13.20	10	YES	12B	12.00 to 13.50	20	YES	—	—	—	—
	13B	12.55 to 13.21	10	YES	13	11.70 to 14.30	10	YES	13B	13.30 to 15.00	20	YES	—	—	—	—
	15B	13.89 to 14.62	10	YES	15	13.50 to 16.50	10	YES	15B	14.70 to 16.50	20	YES	—	—	—	—
	16B	15.25 to 16.04	10	YES	16	14.40 to 17.60	10	YES	16B	16.20 to 18.30	20	YES	—	—	—	—
	18B	16.82 to 17.70	10	YES	18	16.20 to 19.80	10	YES	18B	18.00 to 20.30	20	YES	—	—	—	—
	20B	18.63 to 19.59	10	YES	20	18.00 to 22.00	10	YES	20B	20.00 to 22.40	20	YES	—	—	—	—
	22B	20.64 to 21.71	5	YES	22	19.80 to 24.20	10	YES	22B	22.00 to 24.50	10	YES	—	—	—	—
	24B	22.61 to 23.77	5	YES	24	21.60 to 26.40	10	YES	24B	24.00 to 27.60	10	YES	—	—	—	—
	27B	24.97 to 26.26	5	YES	27	24.30 to 29.70	10	YES	27B	27.00 to 30.80	10	YES	—	—	—	—
	30B	27.70 to 29.13	5	YES	30	27.00 to 33.00	10	YES	30B	30.00 to 34.00	10	YES	—	—	—	—
	33B	30.32 to 31.88	5	YES	—	—	—	—	33B	33.00 to 37.00	10	YES	—	—	—	—
	36B	32.79 to 34.49	5	YES	—	—	—	—	36B	36.00 to 40.00	10	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 (Part No.) T F (Grade Code) T R (Taping Code) 1 0 (Zener voltage) B (Sub division)

2-Terminal(Single)4-Terminal(Dual)Zener Diodes 1(AEC-Q101 qualified)

Package	Surface Mount Type															
	2924 Size SOT-23(SSD3)				2924 Size SOT-23(SSD3)				3516 Size SOD-123FL(PMDU)				4725 Size SOD-128(PMDTM)			
Equivalent Circuit Diagram																
Series Name	New BZX84B Series				BZX84C Series				KDZLV Series				New PDZV Series			
Automotive Product	FH				FH				TF				TF			
Power (mW)	250				250				1,000				1,000			
Taping Code	T116				T116				TR				TR			
Electrical Characteristics (Ta=25°C)	Vz (V)		Iz (mA)	Automotive Grade Available AEC-Q101	Vz (V)		Iz (mA)	Automotive Grade Available AEC-Q101	Vz (V)		Iz (mA)	Automotive Grade Available AEC-Q101	Vz (V)		Iz (mA)	Automotive Grade Available AEC-Q101
Voltage	—	—	—	—	2V4L	2.2 to 2.6	5	YES	51	48 to 54	2	YES	2.0B	2.00 to 2.24	40	YES
	—	—	—	—	2V7L	2.5 to 2.9	5	YES	56	53 to 60	2	YES	2.2B	2.20 to 2.45	40	YES
	—	—	—	—	3V0L	2.8 to 3.2	5	YES	62	58 to 66	2	YES	2.4B	2.40 to 2.70	40	YES
	—	—	—	—	3V3L	3.1 to 3.5	5	YES	68	64 to 72	2	YES	2.7B	2.70 to 3.10	40	YES
	—	—	—	—	3V6L	3.4 to 3.8	5	YES	75	70 to 79	2	YES	3.0B	3.00 to 3.40	40	YES
	—	—	—	—	3V9L	3.7 to 4.1	5	YES	82	77 to 87	2	YES	3.3B	3.30 to 3.70	40	YES
	—	—	—	—	4V3L	4.0 to 4.6	5	YES	91	85 to 96	2	YES	3.6B	3.60 to 4.00	40	YES
	—	—	—	—	4V7L	4.4 to 5.0	5	YES	100	94 to 106	2	YES	3.9B	3.90 to 4.40	40	YES
	5V1L	5.00 to 5.20	5	YES	5V1L	4.8 to 5.4	5	YES	110	104 to 116	2	YES	4.3B	4.30 to 4.80	40	YES
	5V6L	5.49 to 5.71	5	YES	5V6L	5.2 to 6.0	5	YES	120	114 to 126	2	YES	4.7B	4.70 to 5.20	40	YES
	6V2L	6.08 to 6.32	5	YES	6V2L	5.8 to 6.6	5	YES	130	122 to 138	2	YES	5.1B	5.10 to 5.70	40	YES
	6V8L	6.66 to 6.94	5	YES	6V8L	6.4 to 7.2	5	YES	150	140 to 160	2	YES	5.6B	5.60 to 6.30	40	YES
	7V5L	7.35 to 7.65	5	YES	7V5L	7.0 to 7.9	5	YES	—	—	—	—	6.2B	6.20 to 7.00	40	YES
	8V2L	8.04 to 8.36	5	YES	8V2L	7.7 to 8.7	5	YES	—	—	—	—	6.8B	6.80 to 7.70	40	YES
	9V1L	8.92 to 9.28	5	YES	9V1L	8.5 to 9.6	5	YES	—	—	—	—	7.5B	7.50 to 8.40	40	YES
	10VL	9.80 to 10.20	5	YES	10VL	9.4 to 10.6	5	YES	—	—	—	—	8.2B	8.20 to 9.30	40	YES
	11VL	10.80 to 11.20	5	YES	11VL	10.4 to 11.6	5	YES	—	—	—	—	9.1B	9.10 to 10.20	40	YES
	12VL	11.80 to 12.20	5	YES	12VL	11.4 to 12.7	5	YES	—	—	—	—	10B	10.00 to 11.20	40	YES
	13VL	12.70 to 13.30	5	YES	13VL	12.4 to 14.1	5	YES	—	—	—	—	11B	11.00 to 12.30	20	YES
	15VL	14.70 to 15.30	5	YES	15VL	13.8 to 15.6	5	YES	—	—	—	—	12B	12.00 to 13.50	20	YES
	16VL	15.70 to 16.30	5	YES	16VL	15.3 to 17.1	5	YES	—	—	—	—	13B	13.30 to 15.00	20	YES
	18VL	17.60 to 18.40	5	YES	18VL	16.8 to 19.1	5	YES	—	—	—	—	15B	14.70 to 16.50	20	YES
	20VL	19.60 to 20.40	5	YES	20VL	18.8 to 21.2	5	YES	—	—	—	—	16B	16.20 to 18.30	20	YES
	22VL	21.60 to 22.40	5	YES	22VL	20.8 to 23.3	5	YES	—	—	—	—	18B	18.00 to 20.30	20	YES
	24VL	23.50 to 24.50	5	YES	24VL	22.8 to 25.6	5	YES	—	—	—	—	20B	20.00 to 22.40	20	YES
	27VL	26.50 to 27.50	2	YES	27VL	25.1 to 28.9	2	YES	—	—	—	—	22B	22.00 to 24.50	10	YES
	30VL	29.40 to 30.60	2	YES	30VL	28.0 to 32.0	2	YES	—	—	—	—	24B	24.00 to 27.60	10	YES
	33VL	32.30 to 33.70	2	YES	33VL	31.0 to 35.0	2	YES	—	—	—	—	27B	27.00 to 30.80	10	YES
	36VL	35.30 to 36.70	2	YES	36VL	34.0 to 38.0	2	YES	—	—	—	—	30B	30.00 to 34.00	10	YES
	—	—	—	—	—	—	—	—	—	—	—	—	33B	33.00 to 37.00	10	YES
	—	—	—	—	—	—	—	—	—	—	—	—	36B	36.00 to 40.00	10	YES

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

Zener Diodes for ESD Protection

● Quick Reference for Protection Devices(TVS)[2-4 Elements](AEC-Q101 qualified)

V_Z (V)	Package							
	1212 Size	1616 Size		2120 Size			2928 Size	
	SOT-723 (VMD3)	SOT-416 (EMD3)	SOT-553 (EMD5)	SOT-323 (UMD3)	SOT-323FL (UMD3F)	SOT-353 (UMD5)	SOT-346 (SMD3)	SOT-25 (SMD5)
4.3								FTZ4.3E
5.1					New UMZ5.1NUM			
5.6							STZ5.6N	FTZ5.6E
6.2							STZ6.2N	
6.8	VMZ6.8N	EMZ6.8N	EMZ6.8E	UMZ6.8N		UMZ6.8EN	STZ6.8T STZ6.8N	FTZ6.8E
8.2					New UMZ8.2NUM			
12					New UMZ12NUM			
16					New UMZ16NUM			
18					New UMZ18NUM			
27					New UMZ27NUM			
30					New UMZ30NUM			FTZ30E
36					New UMZ36NUM			

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

● Quick Reference for Low Capacitance Protection Devices (TVS)(AEC-Q101 qualified)

V_Z (V)	Package				
	1006 Size	1608 Size	1616 Size		2928 Size
	SOD-923 (VMN2)	SOD-523 (EMD2)	SOT-553 (EMD5)	SOT-563 (EMD6)	SOT-25 (SMD5)
6.2					FTZU6.2E
6.8	CDZC6.8B	EDZCV6.8B	EMZT6.8E		
12				RSB12JS2	

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

● Quick Reference for ESD Protection Devices (TVS)(AEC-Q101 qualified)

V_Z (V)	Package		
	1616 Size	2120 Size	2928 Size
	SOT-553 (EMD5)	SOT-353 (UMD5)	SOT-457 (SMD6)
6	RSA6.1J4	RSA6.1EN	RSA6.1U5

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

● Quick Reference for Bi-Directional Zener Diodes

Vz (V)	Package						
	1006 Size	1616 Size	2512 Size	2513 Size	2120 Size		
	SOD-923 (VMN2)	SOT-416FL (EMD3F)	SOD-323FL (UMD2)	(TUMD2)	SOT-323 (UMD3)	SOT-323FL (UMD3F)	SOT-363 (UMD6)
6.8	RSB6.8CS				RSB6.8F2		
12		New RSB12WM	RSB12V				
16			RSB16V	RSB16VA	RSB16F2		RSB16X3N
18			RSB18V	RSB18VA		New RSB18UM2	
27			RSB27V	RSB27VA		RSB27UM2	
33			RSB33V		RSB33F2		
36			RSB36V		RSB36F2		
39			RSB39V		RSB39F2		

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

● Quick Reference for Ultra Low Capacitance Bi-Directional Zener Diodes (AEC-Q101 qualified)

V_Z (V)	Package
	1006 Size
	SOD-923 (VMN2)
6.8	RSBC6.8CS

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

Protection Devices (TVS) [2-4 Elements](AEC-Q101 qualified)

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_D (mW)	Vz (V)	Iz(mA)				
STZ6.8T	FH	T146	200	6.47 to 7.14	5	IEC 61000-4-2, 150 pF, 330 Ω, Contact: 8 kV, Air: 15 kV	SOT-346 (SMD3)		YES
VMZ6.8N	FH	T2L	150	6.47 to 7.14	5		SOT-723 (VMD3)		YES
EMZ6.8N	FH	TL	150	6.47 to 7.14	5		SOT-416 (EMD3)		YES
UMZ6.8N	FH	T106	200	6.47 to 7.14	5		SOT-323 (UMD3)		YES
New UMZ5.1NUM	FH	TL	200	4.84 to 5.37	5		SOT-323FL (UMD3F)		YES
New UMZ8.2NUM	FH	TL	200	7.76 to 8.64	5				YES
New UMZ12NUM	FH	TL	200	11.00 to 13.00	5				YES
New UMZ16NUM	FH	TL	200	15.85 to 16.51	5				YES
New UMZ18NUM	FH	TL	200	17.56 to 18.53	5				YES
New UMZ27NUM	FH	TL	200	26.19 to 27.35	5				YES
New UMZ30NUM	FH	TL	200	29.19 to 30.69	5				YES
New UMZ36NUM	FH	TL	200	35.07 to 36.87	5				YES
STZ5.6N	FH	T146	200	5.31 to 5.92	5		SOT-346 (SMD3)		YES
STZ6.2N	FH	T146	200	5.81 to 6.40	5				YES
STZ6.8N	FH	T146	200	6.47 to 7.14	5				YES

Zener Diodes for ESD Protection

Zener Diodes for ESD Protection
Example FTZU6.2EFHT148
Part No. / Grade Code / Taping Code

Protection Devices (TVS) [2-4 Elements](AEC-Q101 qualified)

Part No.	Grade Code	Taping Code	Absolute Maximum Ratings(Ta=25°C) P_D (mW)	Electrical Characteristics (Ta=25°C) Vz (V)	Iz(mA)	Remarks	Package	Equivalent Circuit Diagram	Automotive Grade Available AEC-Q101
EMZ6.8E	FH	T2R	150	6.47 to 7.14	5	IEC 61000-4-2, 150 pF, 330 Ω, Contact: 8 kV, Air: 15 kV	SOT-553 (EMD5)		YES
UMZ6.8EN	FH	TR	200	6.47 to 7.14	5		SOT-353 (UMD5)		YES
FTZ4.3E	FH	T148	200	4.04 to 4.57	5		SOT-25 (SMD5)		YES
FTZ5.6E	FH	T148	200	5.31 to 5.92	5				YES
FTZ6.8E	FH	T148	200	6.47 to 7.14	5				YES
FTZ30E	FH	T148	200	29.19 to 30.09	5				YES

Low Capacitance Protection Devices(TVS)(AEC-Q101 qualified)

Part No.	Grade Code	Taping Code	Absolute Maximum Ratings(Ta=25°C) P_D (mW)	Electrical Characteristics (Ta=25°C) Vz (V)	Iz(mA)	Ct(pF) (Typ.)	f(MHz)	V_R(V)	Package	Equivalent Circuit Diagram	Automotive Grade Available AEC-Q101
FTZU6.2E	FH	T148	200	5.90 to 6.50	5	8	1	0	SOT-25 (SMD5)		YES
CDZC6.8B	FH	T2RA	100	6.65 to 6.93	5	3	1	0	SOD-923 (VMN2)		YES
EDZCV6.8B	FH	T2R	150	6.65 to 6.93	5	3	1	0	SOD-523 (EMD2)		YES
EMZT6.8E	FH	T2R	150	6.47 to 7.14	5	7	1	0	SOT-553 (EMD5)		YES
RSB12JS2	FH	T2R	150	9.60 to 14.40	5	1	1	0	SOT-563 (EMD6)	 *1	YES

ESD Protection Devices(AEC-Q101 qualified)

Part No.	Grade Code	Taping Code	Absolute Maximum Ratings(Ta=25°C) P_D (mW)	Electrical Characteristics (Ta=25°C) Vz (V)	Iz(mA)	Peak Pulse Power(W) (tp=10×100μs)	Package	Equivalent Circuit Diagram	Automotive Grade Available AEC-Q101
RSA6.1J4	FH	T2R	150	6.10 to 7.20	1	10	SOT-553 (EMD5)		YES
RSA6.1EN	FH	TR	200	6.10 to 7.20	1	30	SOT-353 (UMD5)		YES
RSA6.1U5	FH	T108	200	6.10 to 7.20	1	30	SOT-457 (SMD6)		YES

Bi-Directional Zener Diodes(AEC-Q101 qualified)

Part No.	Grade Code	Taping Code	Absolute Maximum Ratings (Ta=25°C) P_D (mW)	Electrical Characteristics (Ta=25°C) Vz (V)	Iz(mA)	Peak Pulse Power (W)(tp=10×1000μs)	Ct(pF) (Typ.)	f (MHz)	V_R (V)	Remarks	Package	Equivalent Circuit Diagram	Automotive Grade Available AEC-Q101
RSB6.8CS	FH	T2RA	100	5.78 to 7.82	1	10	15	1	0	IEC 61000-4-2, 150 pF, 330 Ω, Contact: 8 kV, Air: 15 kV	SOD-923 (VMN2)		YES
RSB12V	FH	TE-17	200	10.8 to 13.2	1	—	30	1	0		SOD-323FL (UMD2)		YES
RSB16V	FH	TE-17	200	14.4 to 17.6	1	—	30	1	0				YES
RSB18V	FH	TE-17	200	16.2 to 19.8	1	—	30	1	0				YES
RSB27V	FH	TE-17	200	26.2 to 32.0	1	—	30	1	0				YES
RSB33V	FH	TE-17	200	29.7 to 36.3	1	—	30	1	0				YES
RSB36V	FH	TE-17	200	32.4 to 39.6	1	—	30	1	0				YES
RSB39V	FH	TE-17	200	35.1 to 42.9	1	—	30	1	0				YES
RSB16VA	FH	TR	500	14.4 to 17.6	1	—	—	—	—		(TUMD2)		YES
RSB18VA	FH	TR	500	16.2 to 19.8	1	—	—	—	—				YES
RSB27VA	FH	TR	500	26.2 to 32.0	1	—	—	—	—				YES
RSB6.8F2	FH	T106	200	5.78 to 7.82	1	—	30	1	0		SOT-323 (UMD3)		YES
RSB16F2	FH	T106	200	14.4 to 17.6	1	—	30	1	0				YES
RSB33F2	FH	T106	200	29.7 to 36.3	1	—	30	1	0				YES
RSB36F2	FH	T106	200	32.4 to 39.6	1	—	30	1	0				YES
RSB39F2	FH	T106	200	35.1 to 42.9	1	—	30	1	0				YES
New RSB18UM2	FH	TL	200	16.2 to 19.8	1	—	30	1	0		SOT-323FL (UMD3F)		YES
RSB27UM2	FH	TL	200	26.2 to 32.0	1	—	30	1	0				YES
RSB16X3N	FH	TR	200	14.4 to 17.6	1	—	30	1	0		SOT-363 (UMD6)		YES
New RSB12WM	FH	TL	150	9.60 to 14.40	5	—	1	1	0		SOT-416FL (EMD3F)		YES

Ultra Low Capacitance Bi-Directional Zener Diodes(AEC-Q101 qualified)

Part No.	Grade Code	Taping Code	Absolute Maximum Ratings(Ta=25°C) P_D (mW)	Electrical Characteristics (Ta=25°C) Vz (V)	Iz(mA)	Ct(pF) (Typ.)	f (MHz)	V_R (V)	Package	Equivalent Circuit Diagram	Automotive Grade Available AEC-Q101
RSBC6.8CS	FH	T2RA	100	6.62 to 7.24	5	1	1	0	SOD-923 (VMN2)		YES

*1:(3),(6)pin must be open when using.
Note: Package is JEDEC code. ( ):ROHM Package.

TVS

TVS
Example V S 5 V 0 U A 1 L A M T F T R
Part No. Grade Code Taping Code

● Quick Reference for TVS(AEC-Q101 qualified)

V_{RWM} (V)	Package		
	2924 Size	3516 Size	4725 Size
	SOT-23 (SSD3)	SOD-123FL (PMDU)	SOD-128 (PMDTM)
3.0	MMBZ5V6AL MMBZ6V2AL		
4.5	MMBZ6V8AL		
5.0		New SMF5V0	New VS5V0UA1LAM
6.0	MMBZ9V1AL	New SMF6V0	New VS6V0UA1LAM
6.5	MMBZ10VAL	New SMF6V5	
7.0		New SMF7V0	New VS7V0UA1LAM
7.5		New SMF7V5	
8.0		New SMF8V0	New VS8V0UA1LAM
8.5	MMBZ12VAL		
9.0		New SMF9V0	New VS9V0UA1LAM
10.0		New SMF10V	New VS10VUA1LAM
11.0		New SMF11V	New VS11VUA1LAM
12.0	MMBZ15VAL	New SMF12V	New VS12VUA1LAM
13.0	MMBZ16VAL	New SMF13V	New VS13VUA1LAM
14.0		New SMF14V	New VS14VUA1LAM
14.5	MMBZ18VAL		
15.0		New SMF15V	New VS15VUA1LAM
16.0		New SMF16V	New VS16VUA1LAM
17.0	MMBZ20VAL		New VS17VUA1LAM
18.0		New SMF18V	New VS18VUA1LAM
20.0	MMBZ24VAL	New SMF20V	New VS20VUA1LAM
22.0	MMBZ27VCL MMBZ27VAL	New SMF22V	New VS22VUA1LAM
24.0	New RESD1CAN MMBZ30VAL	New SMF24V	New VS24VUA1LAM
26.0	MMBZ33VAL	New SMF26V	New VS26VUA1LAM
28.0		New SMF28V	New VS28VUA1LAM
30.0		New SMF30V	New VS30VUA1LAM
33.0		New SMF33V	

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

TVS(AEC-Q101 qualified)

Type			V_{RWM} (V)	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_D (mW)	Vz(V) or V_{BR}(V)	Iz(mA)				
New RESD1CAN	FH	T116	24	225	26.2 to 32.0	1	350(8/20μs)	SOT-23 (SSD3)		YES
MMBZ27VCL	FH	T116	22	225	25.65 to 28.35	1	40			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	9.5 to 10.5	1	24			YES
MMBZ12VAL	FH	T116	8.5	225	11.4 to 12.6	1	40			YES
MMBZ15VAL	FH	T116	12	225	14.25 to 15.75	1	40			YES
MMBZ16VAL	FH	T116	13	225	15.2 to 16.8	1	40			YES
MMBZ18VAL	FH	T116	14.5	225	17.1 to 18.9	1	40			YES
MMBZ20VAL	FH	T116	17	225	19.0 to 21.0	1	40			YES
MMBZ24VAL	FH	T116	20	225	22.8 to 25.2	1	40			YES
MMBZ27VAL	FH	T116	22	225	25.65 to 28.35	1	40			YES
MMBZ30VAL	FH	T116	24	225	28.5 to 31.5	1	40			YES
MMBZ33VAL	FH	T116	26	225	31.35 to 34.65	1	40			YES
New SMF5V0	TF	TR	5	1,000	6.40 to	40	200	SOD-123FL (PMDU)		YES
New SMF6V0	TF	TR	6	1,000	6.67 to	40	200			YES
New SMF6V5	TF	TR	6.5	1,000	7.22 to	40	200			YES
New SMF7V0	TF	TR	7	1,000	7.78 to	40	200			YES
New SMF7V5	TF	TR	7.5	1,000	8.33 to	40	200			YES
New SMF8V0	TF	TR	8	1,000	8.89 to	40	200			YES
New SMF9V0	TF	TR	9	1,000	10.0 to	40	200			YES
New SMF10V	TF	TR	10	1,000	11.1 to	20	200			YES
New SMF11V	TF	TR	11	1,000	12.2 to	20	200			YES
New SMF12V	TF	TR	12	1,000	13.3 to	20	200			YES
New SMF13V	TF	TR	13	1,000	14.4 to	20	200			YES
New SMF14V	TF	TR	14	1,000	15.6 to	20	200			YES
New SMF15V	TF	TR	15	1,000	16.7 to	20	200			YES
New SMF16V	TF	TR	16	1,000	17.2 to	20	200			YES
New SMF18V	TF	TR	18	1,000	20.0 to	20	200			YES
New SMF20V	TF	TR	20	1,000	22.2 to	10	200			YES
New SMF22V	TF	TR	22	1,000	24.4 to	10	200			YES
New SMF24V	TF	TR	24	1,000	26.7 to	10	200			YES
New SMF26V	TF	TR	26	1,000	28.9 to	10	200			YES
New SMF28V	TF	TR	28	1,000	31.1 to	10	200			YES
New SMF30V	TF	TR	30	1,000	33.3 to	10	200			YES
New SMF33V	TF	TR	33	1,000	36.7 to	10	200			YES

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

TVS

TVS(AEC-Q101 qualified)										
Type			V_{RWM} (V)	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_D (mW)	Vz(V) or V_{BR}(V)	Iz(mA)				
New VS5V0UA1LAM	TF	TR	5	—	6.45 to 7.14	10	600	SOD-128 (PMDTM)		YES
New VS6V0UA1LAM	TF	TR	6	—	6.67 to 7.37	10	600			YES
New VS7V0UA1LAM	TF	TR	7	—	7.78 to 8.60	10	600			YES
New VS8V0UA1LAM	TF	TR	8	—	8.89 to 9.83	1	600			YES
New VS9V0UA1LAM	TF	TR	9	—	10.0 to 11.1	1	600			YES
New VS10VUA1LAM	TF	TR	10	—	11.1 to 12.3	1	600			YES
New VS11VUA1LAM	TF	TR	11	—	12.2 to 13.5	1	600			YES
New VS12VUA1LAM	TF	TR	12	—	13.3 to 14.7	1	600			YES
New VS13VUA1LAM	TF	TR	13	—	14.4 to 15.9	1	600			YES
New VS14VUA1LAM	TF	TR	14	—	15.6 to 17.2	1	600			YES
New VS15VUA1LAM	TF	TR	15	—	16.7 to 18.5	1	600			YES
New VS16VUA1LAM	TF	TR	16	—	17.8 to 19.7	1	600			YES
New VS17VUA1LAM	TF	TR	17	—	18.9 to 20.9	1	600			YES
New VS18VUA1LAM	TF	TR	18	—	20.0 to 22.1	1	600			YES
New VS20VUA1LAM	TF	TR	20	—	22.2 to 24.5	1	600			YES
New VS22VUA1LAM	TF	TR	22	—	24.4 to 26.9	1	600			YES
New VS24VUA1LAM	TF	TR	24	—	26.7 to 29.5	1	600			YES
New VS26VUA1LAM	TF	TR	26	—	28.9 to 31.9	1	600			YES
New VS28VUA1LAM	TF	TR	28	—	31.1 to 34.4	1	600			YES
New 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 (V)	Package				
	1006 Size	1212 Size	1608 Size	1616 Size	
					
	SOD-923 (VMN2)	SOT-723 (VMD3)	SOD-523 (EMD2)	SOT-416FL (EMD3F)	SOT-416 (EMD3)
20		DA221M			DA221
80	1SS400CS	DAN222M DAP222M	1SS400SM	DAN222WM DAP222WM DAN217WM New DA228WM	

V_R (V)	Package		
	2120 Size		
			
	SOT-323FL (UMD3F)	SOT-353 (UMD5)	SOT-363 (UMD6)
80	DAN202UM DAP202UM DAN217UM New DA228UM New BAW156UM New BAV199UM	UMN1N	UMN10N UMN20N UMR12N

V_R (V)	Package			
	2512 Size	2924 Size	2928 Size	
				
	SOD-323FL (UMD2)	SOT-23 (SSD3)	SOT-346 (SMD3)	SOT-457 (SMD6)
20			DA204K	
35	New 1SS380VM			
80	1SS355VM	BAS16HM BAV70HM BAW56HM BAV99HM BAW156HM BAV199HM New BAS116HM New BAV170HM	DAN202K DAP202K DAN217 DA228K	IMN10
200	New BAS21VM	BAS21HM		

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

Switching Diodes

Switching Diodes
Example 1SS400CS FH T2RA
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_{RM} (V)	V_R (V)	I_{FM} (mA)	Io (mA)	Isurge (mA)	V_F(V) Max.	I_F(mA)	I_R(μA) Max.	V_R(V)	trr(ns) Max.	V_R(V)	I_F(mA)			
1SS400CS	FH	T2RA	90	80	—	100	500(1s)	1.2	100	0.1	80	4	6	10	SOD-923 (VMN2)		YES
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
DAN222M	FH	T2L	80	80	300	100	4,000(1μs)	1.2	100	0.1	70	4	6	5	SOT-723(VMD3)		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	0.1	80	4	10*2	10	SOT-23(SSD3)		YES
DAN202K	FH	T146	80	80	300	100	4,000(1μs)	1.2	100	0.1	70	4	6	5	SOT-346(SMD3)		YES
DAP222M	FH	T2L	80	80	300	100	4,000(1μs)	1.2	100	0.1	70	4	6	5	SOT-723(VMD3)		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
DAP202K	FH	T146	80	80	300	100	4,000(1μs)	1.2	100	0.1	70	4	6	5	SOT-346(SMD3)		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
DAN217	FH	T146	80	80	300	100	4,000(1μs)	1.2	100	0.1	70	4	6	5	SOT-346(SMD3)		YES
UMN1N	FH	TR	80	80	80	25	250(1μs)	0.9	5	0.1	70	4	6	5	SOT-353 (UMD5)		YES
UMN10N	FH	TR	80	80	300	100	4,000(1μs)	1.2	100	0.1	70	4	6	5	SOT-363(UMD6)		YES
IMN10	FH	T108	80	80	300	100	4,000(1μs)	1.2	100	0.1	70	4	6	5	SOT-457(SMD6)		YES
BAS21HM	FH	T116	250	200	—	215*3	10,000(1μs)	1	100	0.1	200	50	30*2	30	SOT-23 (SSD3)		YES
New BAS21VM	FH	TE-17	250	200	—	215*3	10,000(1μs)	1	100	0.1	200	50	30*2	30	SOD-323FL (UMD2)		YES

Low Leak type

New 1SS380VM	FH	TE-17	40	35	225	100	400(1s)	1.2	100	0.01	20	—	—	—	SOD-323FL (UMD2)		YES
UMN20N	FH	TR	80	80	225	100	400(1s)	1.2	100	0.01	20	—	—	—	SOT-363 (UMD6)		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
New 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
DA221M	FH	T2L	20	20	200	100	300(1μs)	1	10	0.1	15	—	—	—	SOT-723 (VMD3)		YES
DA221	FH	TL	20	20	200	100	300(1μs)	1	10	0.1	15	—	—	—	SOT-416 (EMD3)		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
New 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
New DA228WM	FH	TL	80	80	200	100	4,000(1μs)	1.2	100	0.1	80	—	—	—	SOT-416FL (EMD3F)		YES
New DA228UM	FH	TL	80	80	200	100	300(1μs)	1.2	100	0.01	80	—	—	—	SOT-323FL (UMD3F)		YES
DA228K	FH	T146	80	80	200	100	300(1μs)	1.2	100	0.1	80	—	—	—	SOT-346 (SMD3)		YES
DA204K	FH	T146	20	20	200	100	300(1μs)	1	10	0.1	15	—	—	—	SOT-346(SMD3)		YES
New BAV170HM	FH	T116	90	80	500	215*3	4,000(1μs)	1.25	150	0.005	75	—	—	—	SOT-23(SSD3)		YES
New BAS116HM	FH	T116	100	80	500	215*3	4,000(1μs)	1.25	150	0.005	75	—	—	—	SOT-23 (SSD3)		YES
UMR12N	FH	TN	80	80	200	100	300(1μs)	1.2	100	0.1	80	—	—	—	SOT-363(UMD6)		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.

High Frequency Diodes

● Quick Reference for High Frequency Diodes(AEC-Q101 qualified)

	V_R (V)	Package			
		1608 Size	2512 Size	2120 Size	2928 Size
					
		SOD-523 (EMD2)	SOD-323FL (UMD2)	SOT-323 (UMD3)	SOT-346 (SMD3)
Band Switching Diodes	35	New 1SS390SM	1SS356		
PIN Diodes	50		RN731V RN771V	RN739F RN779F	RN779D

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(AEC-Q101 qualified)

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_R (V)	Tj (°C)	Tstg (°C)	Ct(pF) Max.	V_R(V)	f(MHz)	rF(Ω) Max.	I_F(mA)	f(MHz)			
New 1SS390SM	FH	T2R	35	150	−55 to +150	1.2	6	1	0.9	2	100	SOD-523(EMD2)		YES
1SS356	FH	TW11	35	125	−55 to +125	1.2	6	1	0.9	2	100	SOD-323FL (UMD2)		YES

PIN Diodes

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_R (V)	I_F (mA)	Tj (°C)	Tstg (°C)	Ct(pF) Max.	V_R(V)	f(MHz)	rF(Ω) Max.	I_F(mA)	f(MHz)			
RN731V	FH	TE-17	50	50	125	−55 to +150	0.4	35	1	7	10	100	SOD-323FL (UMD2)		YES
RN771V	FH	TE-17	50	50	150	−55 to +150	0.9	35	1	7	10	100			YES
RN739F	FH	T106	50	50	125	−55 to +150	0.4	35	1	7	10	100	SOT-323 (UMD3)		YES
RN779F	FH	T106	50	50	150	−55 to +150	0.9	35	1	7	10	100			YES
RN779D	FH	T146	50	50	150	−55 to +150	0.9	35	1	7	10	100	SOT-346(SMD3)		YES

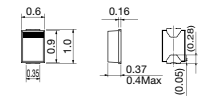
Note: ∗1 Value / Chip
Package is JEDEC code. ( ):ROHM Package.

Packages

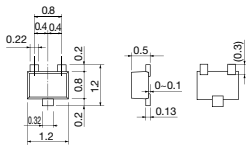
● Dimensions(Unit: mm)

Surface Mount Type

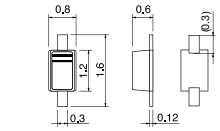
SOD-923(VMN2)



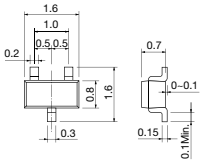
SOT-723(VMD3)[SC-105AA]



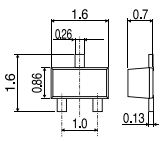
SOD-523(EMD2)[SC-79]



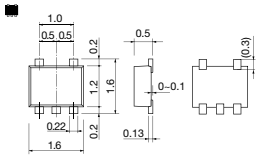
SOT-416(EMD3)[SC-75A]



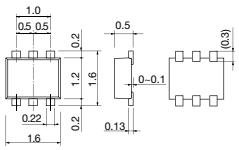
SOT-416FL(EMD3F)[SC-89]



SOT-553(EMD5)[SC-107BB]

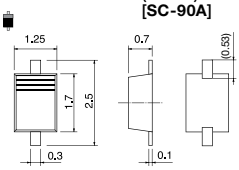


SOT-563(EMD6)[SC-107C]

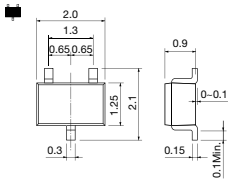


Each lead has same dimensions

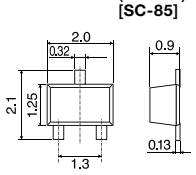
SOD-323FL(UMD2)[SC-90A]



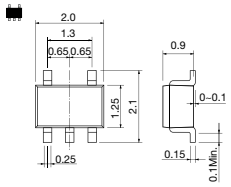
SOT-323(UMD3)[SC-70]



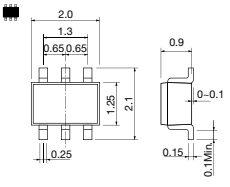
SOT-323FL(UMD3F)[SC-85]



SOT-353(UMD5)[SC-88A]

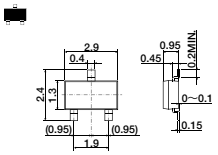


SOT-363(UMD6)[SC-88]

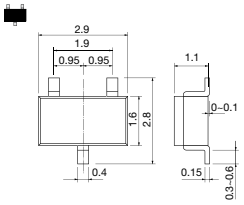


Each lead has same dimensions

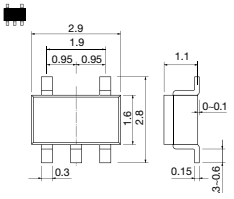
SOT-23(SSD3)



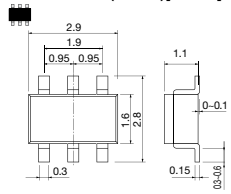
SOT-346(SMD3)[SC-59]



SOT-25(SMD5)[SC-74A]

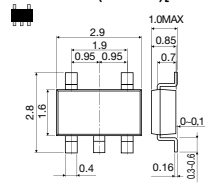


SOT-457(SMD6)[SC-74]

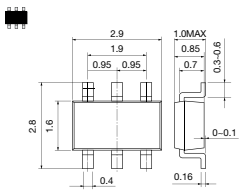


Each lead has same dimensions

SOT-25T(TSMD5)[SC-95]

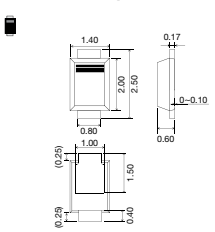


SOT-457T(TSMD6)[SC-95]

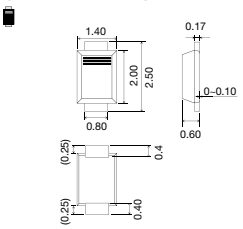


Each lead has same dimensions

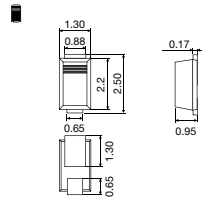
(TUMD2M)[SC-108B]



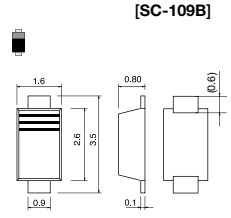
(TUMD2SM)



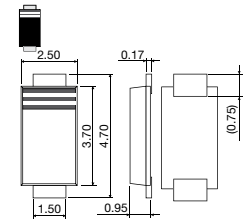
(PMDE)



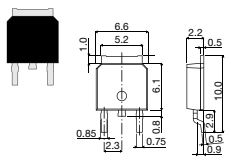
SOD-123FL(PMDU)[SC-109B]



SOD-128(PMDTM)

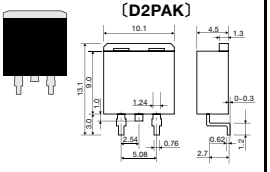


TO-252〔DPAK〕



Each lead has same dimensions

TO-263S [SC-83]〔D2PAK〕



Each lead has same dimensions

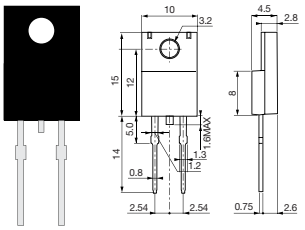
Note: Package is JEDEC code. ( ) : ROHM Package, [ ] : JEITA Code, 〔 〕: GENERAL Code.

Packages

● Dimensions(Unit: mm)

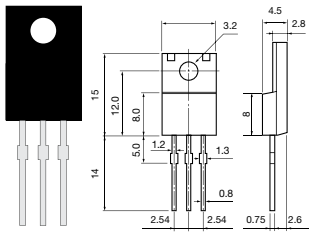
Lead Type

TO-220FN<2pin>



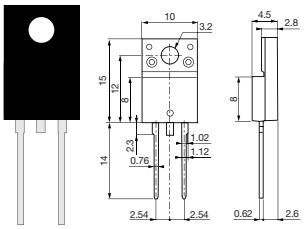
Each lead has same dimensions

TO-220FN<3pin>



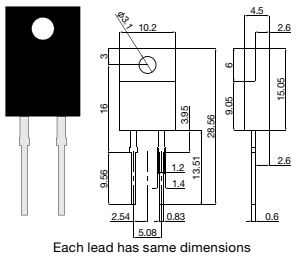
Each lead has same dimensions

TO-220NFM<2pin>



Each lead has same dimensions

TO-220ACFP<2pin>



Each lead has same dimensions

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

Example)

R	B	7	5	1	C	S		4	0	F	H	T	2	R	A
Part No.										Grade Code		Taping 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				

• Rectifier Diodes

Example)

R	R	1	V	W	M	4	S	T	F	T	R
Part No.								Grade Code		Taping Code	

• Zener Diodes

Example)

C	D	Z	F	H	T	2	R	A	2	.	0	B
Part No.			Grade Code		Taping Code				Zener voltage			Sub division

• Zener Diodes for ESD Protection

Example)

F	T	Z	V	6	.	2	E	F	H	T	1	4	8
Part No.								Grade Code		Taping Code			

• TVS

Example)

V	S	5	V	0	V	A	1	L	A	M	T	F	T	R
Part No.											Grade Code		Taping Code	

• Switching Diodes

Example)

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

• High Frequency Diodes

Example)

1	S	S	3	9	0	S	M	F	H	T	2	R
Part No.								Grade Code		Taping Code		

• Packaging Type

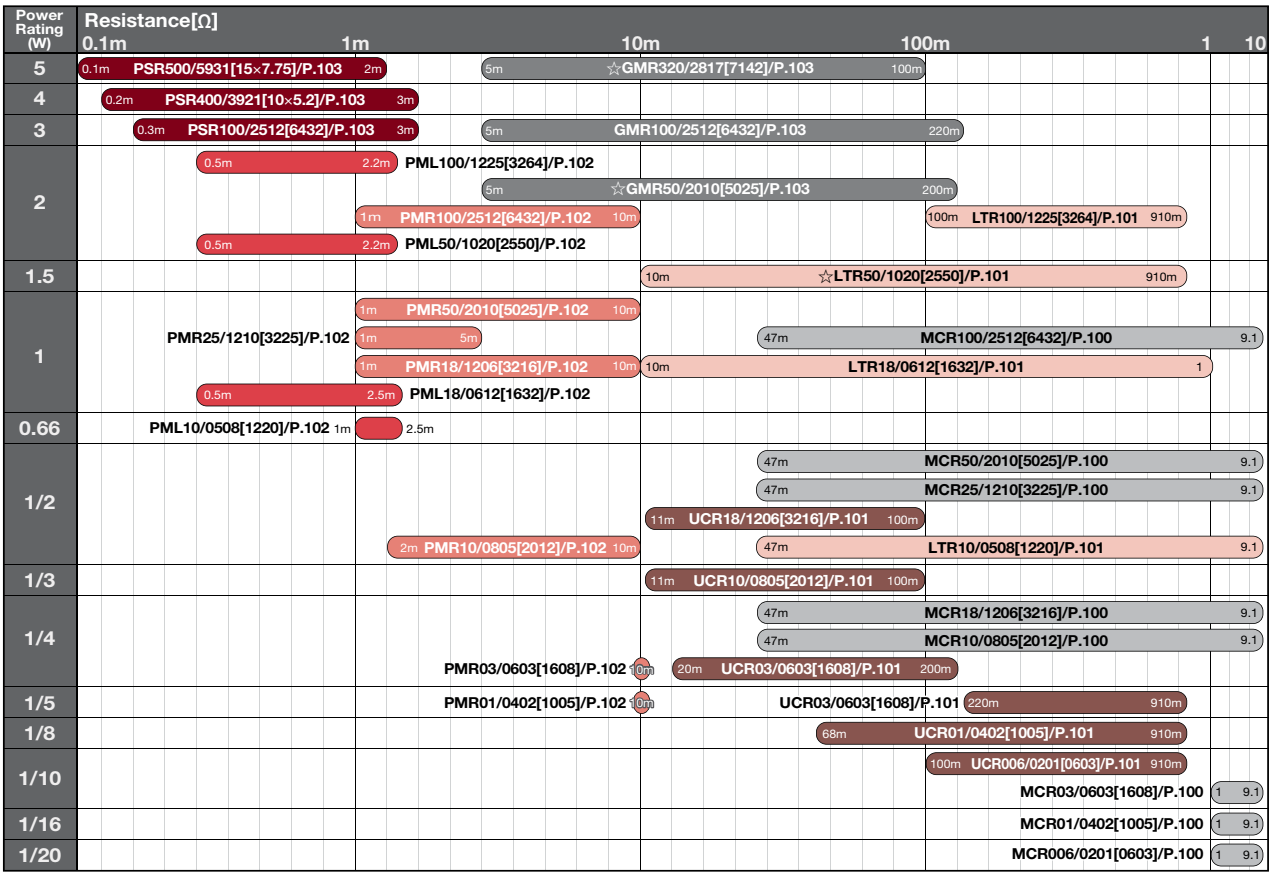
Package		Code	ROHM Package	Packaging Type	Direction	Basic Ordering Unit (pcs)
Surface Mount Type	SOD-923	T2RA	VMN2	Embossed Tape	Cathode on sprocket hole side	8,000
	SOT-723	T2L	VMD3	Embossed Tape	One terminal on sprocket hole side	8,000
	SOD-523	TE61	EMD2	Embossed Tape	Cathode on sprocket hole side	3,000
		T2R		Embossed Tape	Cathode on sprocket hole side	8,000
	SOT-416	TL	EMD3	Embossed Tape	One terminal on sprocket hole side	3,000
	SOT-416FL	TL	EMD3F	Embossed Tape	One terminal on sprocket hole side	3,000
	SOT-553	T2R	EMD5	Embossed Tape	Cathode on sprocket hole side	8,000
	SOT-563	T2R	EMD6	Embossed Tape	Cathode on sprocket hole side	8,000
	SOD-323FL	TE-17	UMD2	Embossed Tape	Cathode on sprocket hole side	3,000
		TW11				
	SOT-323	T106	UMD3	Embossed Tape	One terminal on sprocket hole side	3,000
	SOT-323FL	TL	UMD3F	Embossed Tape	One terminal on sprocket hole side	3,000
	SOT-353	TR	UMD5	Embossed Tape	Three terminals on sprocket hole side	3,000
	SOT-363	TN	UMD6	Embossed Tape	Non-direction	3,000
		TR			Cathode on sprocket hole side	
	SOT-23	T116	SSD3	Embossed Tape	One terminal on sprocket hole side	3,000
	SOT-346	T146	SMD3	Embossed Tape	One terminal on sprocket hole side	3,000
	SOT-25	T148	SMD5	Embossed Tape	Three terminals on sprocket hole side	3,000
	SOT-457	T108	SMD6	Embossed Tape	Anode on sprocket hole side	3,000
	SOT-25T	TR	TSMD5	Embossed Tape	Terminal No.1 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
	—	TR	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
	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 LTR MCR Thick Film

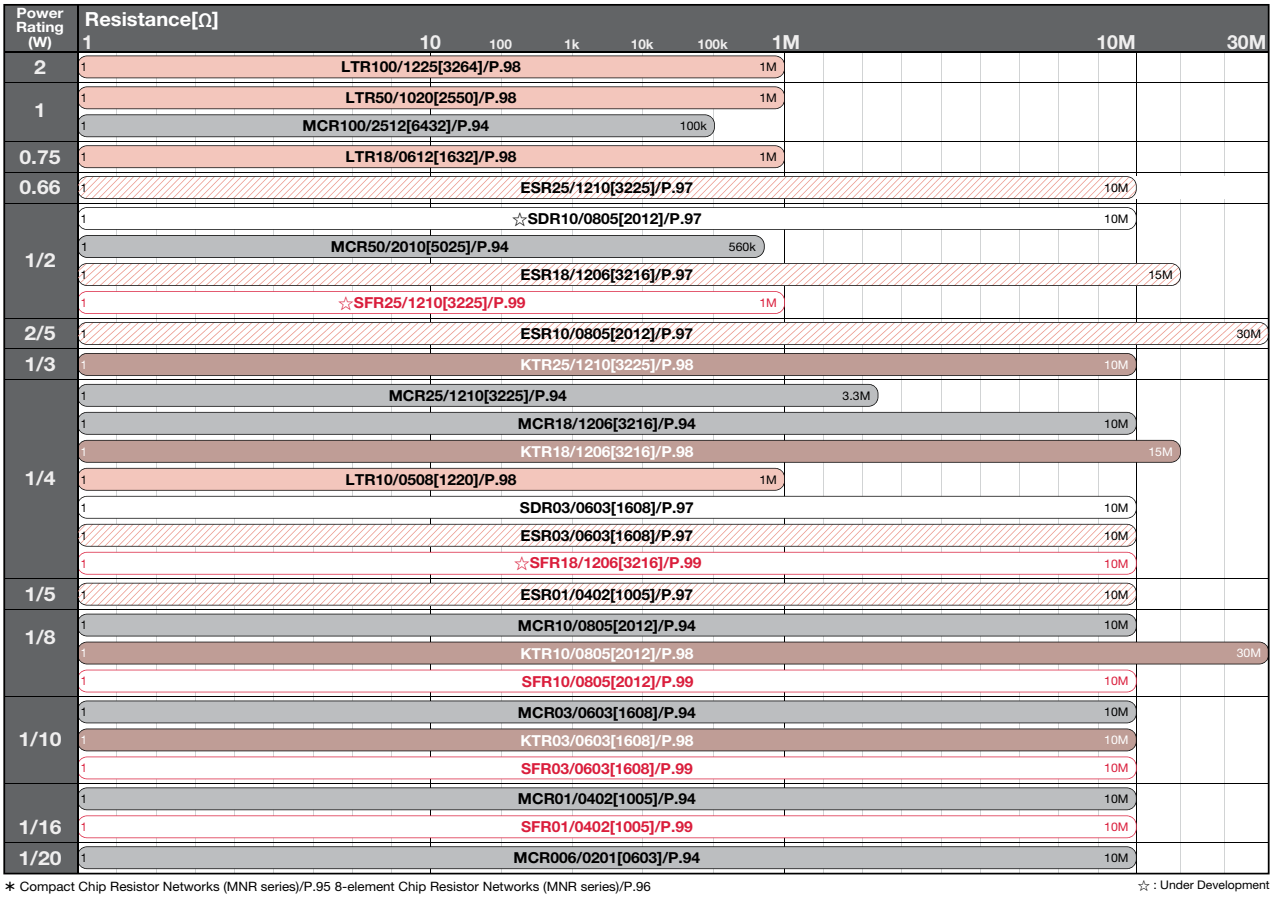


☆ : Under Development

● 1Ω or more Resistor Lineup

Part No. / inch[mm] / Page

ESR SDR KTR LTR MCR SFR Thick Film

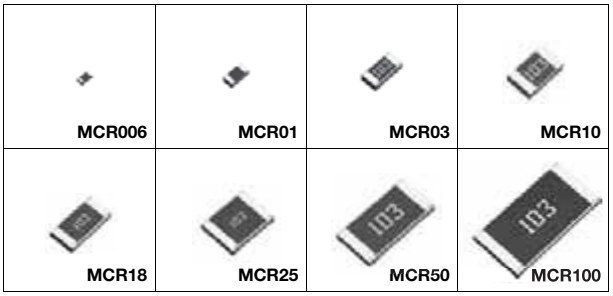


∗ Compact Chip Resistor Networks (MNR series)/P.95 8-element Chip Resistor Networks (MNR series)/P.96

☆ : Under Development

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 inch(mm)	Rated Power (70°C)	Limiting Element Voltage (V)	Tolerance	Temperature Coefficient (ppm/°C)	Resistance Range	Operating Temperature (°C)	Automotive Grade Available AEC-Q200
MCR006	0201 (0603)	0.05W (1/20W)	25	J(±5%)	+600/−200 ±200	1Ω to 9.1Ω(E24 Series) 10Ω to 10MΩ(E24 Series)	−55 to +155	YES
				F(±1%)	±200	10Ω to 10MΩ(E24, E96 Series)		
				D(±0.5%)	±200 ±100	10Ω to 976Ω(E24, E96 Series) 1kΩ to 1MΩ(E24, E96 Series)		
MCR01	0402 (1005)	0.063W*1 (1/16W)	50	J(±5%)	+500/−250 ±200	1Ω to 9.1Ω(E24 Series) 10Ω to 10MΩ(E24 Series)		YES
				F(±1%)	±100	10Ω to 2.2MΩ(E24, E96 Series)		
		0.063W (1/16W)		D(±0.5%)	±100 ±50	10Ω to 97.6Ω(E24, E96 Series) 100Ω to 1MΩ(E24, E96 Series)		
MCR03	0603 (1608)	0.1W*1 (1/10W)	50	J(±5%)	±400 ±200	1Ω to 9.1Ω(E24 Series) 10Ω to 10MΩ(E24 Series)		YES
				FX(±1%)	±100	10Ω to 10MΩ(E24, E96 Series)		
		0.1W (1/10W)		D(±0.5%)	±100 ±50	10Ω to 97.6Ω(E24, E96 Series) 100Ω to 1MΩ(E24, E96 Series)		
MCR10	0805 (2012)	0.125W*1 (1/8W)	150	J(±5%)	±400 ±200	1Ω to 9.1Ω(E24 Series) 10Ω to 10MΩ(E24 Series)		YES
				F(±1%)	±100	10Ω to 2.2MΩ(E24, E96 Series)		
		0.1W (1/10W)		D(±0.5%)	±100 ±50	10Ω to 97.6Ω(E24, E96 Series) 100Ω to 1MΩ(E24, E96 Series)		
MCR18	1206 (3216)	0.25W (1/4W)	200	J(±5%)	±400 ±200	1Ω to 9.1Ω(E24 Series) 10Ω to 10MΩ(E24 Series)		YES
				F(±1%)	±100	10Ω to 2.2MΩ(E24, E96 Series)		
		0.125W (1/8W)		D(±0.5%)	±100 ± 50	10Ω to 97.6Ω(E24, E96 Series) 100Ω to 1MΩ(E24, E96 Series)		
MCR25	1210 (3225)	0.25 to 0.5W*2 (1/4 to 1/2W)	200	J(±5%)	500±350 ±500 ±200	1Ω to 2Ω(E24 Series) 2.2Ω to 5.1Ω(E24 Series) 5.6Ω to 3.3MΩ(E24 Series)		YES
				F(±1%)	±100	10Ω to 1.0MΩ(E24, E96 Series)		
MCR50	2010 (5025)	0.5W (1/2W)	200	J(±5%)	500±350 ±500 ±200 ±350	1Ω to 2Ω(E24 Series) 2.2Ω to 9.1Ω(E24 Series) 10Ω to 330kΩ(E24 Series) 360kΩ to 560kΩ(E24 Series)		YES
				F(±1%)	±100	10Ω to 180kΩ(E24, E96 Series)		
MCR100	2512 (6432)	1W	200	J(±5%)	500±350 ±500 ±350 ±200	1Ω to 2Ω(E24 Series) 2.2Ω to 9.1Ω(E24 Series) 10Ω to 22Ω(E24 Series) 24Ω to 100kΩ(E24 Series)	−55 to +125	YES
				F(±1%)	±100	10Ω to 82kΩ(E24, E96 Series)		

*1: Please contact us for higher rated power.
*2: 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

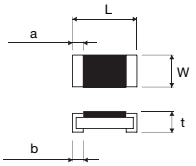
Jumper type

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

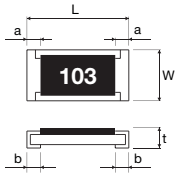
● Dimensions(Unit: mm)

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	$0.25^{+0.05}_{-0.10}$
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)

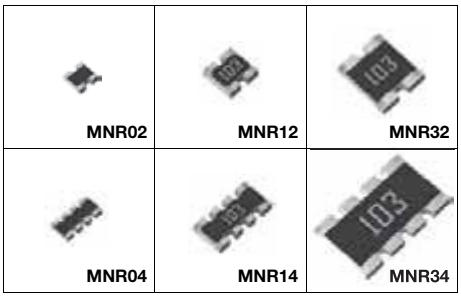


- MCR10/18/25/50/100



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 inch(mm)	No. of Terminals	No. of Elements	Rated Power (70°C)	Limiting Element Voltage (V)	Tolerance	Temperature Coefficient (ppm/°C)	Resistance Range	Operating Temperature (°C)	Automotive Grade Available 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 ±200	1Ω to 9.1Ω(E24 Series) 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
						F(±1%)	±100			
MNR14	0603(1608)×4	8	4	0.063W/Element	50	J(±5%)	±500 ±200	2.2Ω to 6.8Ω(E6 Series) 10Ω to 1MΩ(E24 Series)		YES
						F(±1%)	±100	10Ω to 1MΩ(E24 Series)		
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

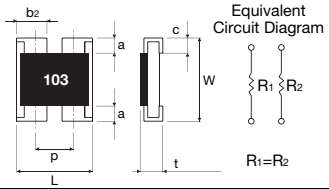
Jumper type

Part No.	Size Code inch(mm)	Rated Current	Resistance	Operating Temperature (°C)	Automotive Grade Available 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)

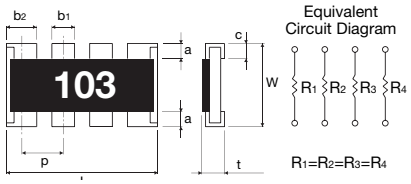
∗ Different marking system may apply to each product type.



Part No.	L	W	t	a	b2	c	p
MNR02	1.0±0.1	1.0±0.1	0.35±0.1	0.2±0.1	$0.33^{+0.1}_{-0.05}$	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)

∗ Different marking system may apply to each product type.

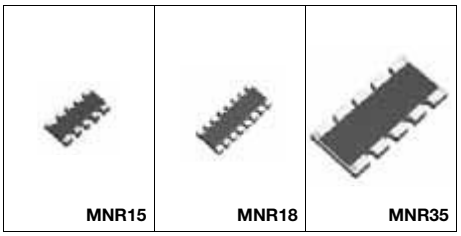


Part No.	L	W	t	a	b1	b2	c	p
MNR04	2.0±0.1	1.0±0.1	0.35±0.1	0.2±0.1	0.3±0.1	0.4±0.1	0.25±0.1	0.5
MNR14	3.2±0.1	1.6±0.1	0.5±0.1	0.3±0.2	0.4±0.15	0.6±0.15	0.25±0.15	0.8
MNR34	5.2±0.4	3.1±0.2	0.55±0.1	0.5±0.3	0.8±0.2	1.0±0.2	0.5Max.	1.27

Thick Film Chip Resistors(Standard series)

8-element Chip Resistor Networks(MNR series <0603×5 to 1206×5>)

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

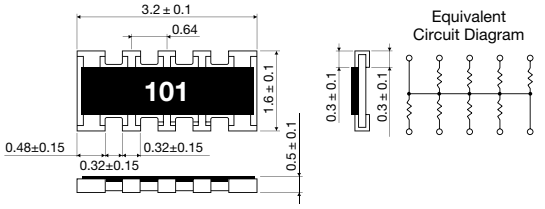
*It must not exceed 0.25 W

Jumper type

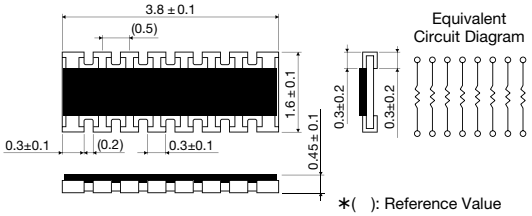
Part No.	Size Code inch(mm)	Rated Current	Resistance	Operating Temperature (°C)	Automotive Grade Available AEC-Q200
MNR18	0602(1605)×8	1A/Element	50mΩ Max.	−55 to +125	YES

● Dimensions(Unit: mm)

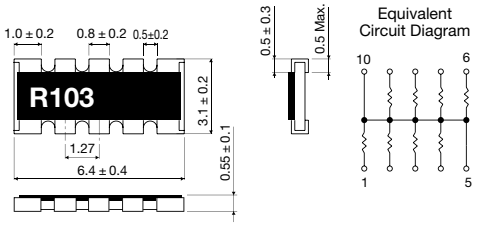
•MNR15



•MNR18

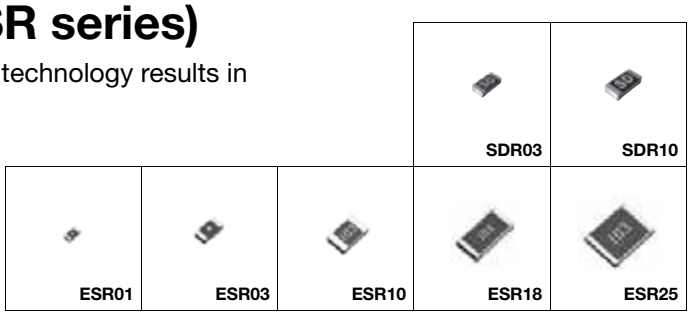


•MNR35



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



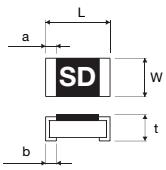
SDR series								
Part No.	Size Code inch(mm)	Rated Power (70°C)	Limiting Element Voltage (V)	Tolerance	Temperature Coefficient (ppm/°C)	Resistance Range	Operating Temperature (°C)	Automotive Grade Available AEC-Q200
SDR03	0603 (1608)	0.30W	150	J(±5%)	±200	1Ω to 10MΩ(E24 Series)	−55 to +155	YES
				F(±1%)	±200 ±100	1Ω to 9.76Ω(E24, E96 Series) 10Ω to 10MΩ(E24, E96 Series)		
				D(±0.5%)	±100	10Ω to 1MΩ(E24, E96 Series)		
☆SDR10	0805 (2012)	0.50W	200	J(±5%)	±200	1Ω to 10MΩ(E24 Series)		—
				F(±1%)	±100	1Ω to 10MΩ(E24, E96 Series)		
				D(±0.5%)	±100	10Ω to 1MΩ(E24, E96 Series)		
ESR series								
ESR01	0402 (1005)	0.2W (1/5W)	50	J(±5%)	+500/−250 ±200	1Ω to 9.1Ω(E24 Series) 10Ω to 10MΩ(E24 Series)	−55 to +155	YES
				F(±1%)	±100	10Ω to 976kΩ(E24, E96 Series) 1MΩ to 2.2MΩ(E24 Series)		
ESR03	0603 (1608)	0.25W (1/4W)	150	J(±5%)	±200	1Ω to 10MΩ(E24 Series)		YES
				F(±1%)	±200 ±100	1Ω to 9.76Ω(E24, E96 Series) 10Ω to 10MΩ(E24, E96 Series)		
				D(±0.5%)	±100	10Ω to 1MΩ(E24, E96 Series)		
ESR10	0805 (2012)	0.4W (2/5W)	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 (3216)	0.5W (1/2W)	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 (3225)	0.66W (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)		

☆ : Under Development
∗E24: Standard products E96: Custom products

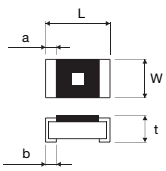
● Dimensions(Unit: mm)

Part No.	Size Code 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	$0.25^{+0.05}_{-0.1}$
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

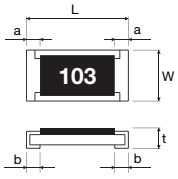
•SDR03/10



•ESR01/03

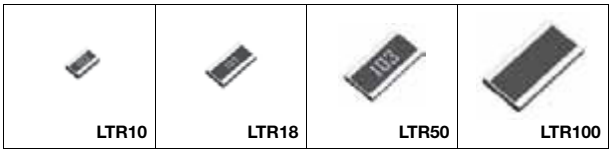


•ESR10/18/25



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

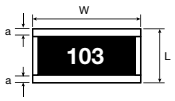
Part No.	Size Code inch(mm)	Rated Power (70°C)	Limiting Element Voltage (V)	Tolerance	Temperature Coefficient (ppm/°C)	Resistance Range	Operating Temperature (°C)	Automotive Grade Available AEC-Q200
LTR10	0508 (1220)	0.25W (1/4W)	150	J(±5%)	±200	1Ω to 1MΩ(E24 Series)	−55 to +155	YES
				F(±1%)	±100	1Ω to 1MΩ(E24, E96 Series)		
				D(±0.5%)	±100	10Ω to 1MΩ(E24, E96 Series)		
LTR18	0612 (1632)	0.75W (3/4W)	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 (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 (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

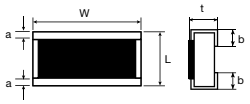
● Dimensions(Unit: mm)

Part No.	Size Code 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

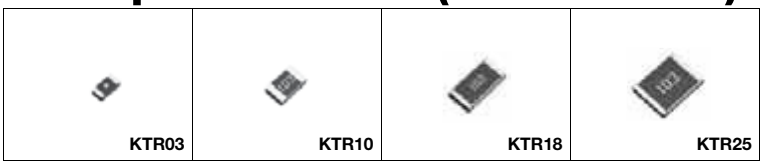


●LTR100



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

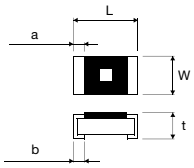
Part No.	Size Code inch(mm)	Rated Power (70°C)	Limiting Element Voltage (V)	Tolerance	Temperature Coefficient (ppm/°C)	Resistance Range	Operating Temperature (°C)	Automotive Grade Available AEC-Q200
KTR03	0603 (1608)	0.1W (1/10W)	350	J(±5%)	±200	1Ω to 10MΩ(E24 Series)	−55 to +155	YES
				F(±1%)	±100	1Ω to 10MΩ(E24, E96 Series)		
KTR10	0805 (2012)	0.125W (1/8W)	400	J(±5%)	±200	1Ω to 30MΩ(E24 Series)		YES
				F(±1%)	±100	1Ω to 10MΩ(E24, E96 Series)		
KTR18	1206 (3216)	0.25W (1/4W)	500	J(±5%)	±200	1Ω to 15MΩ(E24 Series)		YES
				F(±1%)	±100	1Ω to 10MΩ(E24, E96 Series)		
KTR25	1210 (3225)	0.33W (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

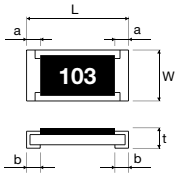
● Dimensions(Unit: mm)

Part No.	Size Code 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

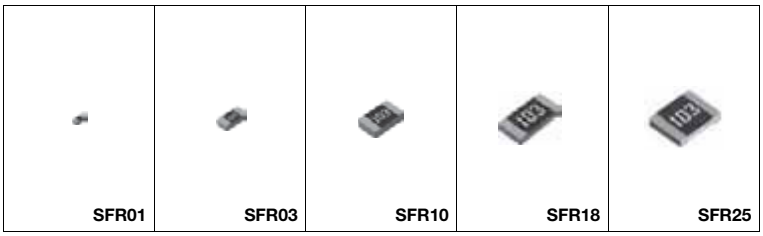


●KTR10/18/25



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 inch(mm)	Rated Power (70°C)	Limiting Element Voltage (V)	Tolerance	Temperature Coefficient (ppm/°C)	Resistance Range	Operating Temperature (°C)	Automotive Grade Available AEC-Q200
New SFR01	0402 (1005)	0.063W (1/16W)	50	J(±5%)	+500/−250 ±200	1Ω to 9.1Ω(E24 Series) 10Ω to 10MΩ(E24 Series)	−55 to +155	YES
				F(±1%)	±100	10Ω to 2.2MΩ(E24, E96 Series)		
New SFR03	0603 (1608)	0.1W (1/10W)	50	J(±5%)	±400 ±200	1Ω to 9.1Ω(E24 Series) 10Ω to 10MΩ(E24 Series)		YES
				F(±1%)	±100	10Ω to 10MΩ(E24, E96 Series)		
New SFR10	0805 (2012)	0.125W (1/8W)	150	J(±5%)	±400 ±200	1Ω to 9.1Ω(E24 Series) 10Ω to 10MΩ(E24 Series)		YES
				F(±1%)	±100	10Ω to 2.2MΩ(E24, E96 Series)		
☆SFR18	1206 (3216)	0.25W (1/4W)	200	J(±5%)	±400 ±200	1Ω to 9.1Ω(E24 Series) 10Ω to 10MΩ(E24 Series)		—
				F(±1%)	±100	10Ω to 2.2MΩ(E24, E96 Series)		
☆SFR25	1210 (3225)	0.5W (1/2W)	200	J(±5%)	±200	1Ω to 1MΩ(E24 Series)		—
				F(±1%)	±100	10Ω to 1MΩ(E24, E96 Series)		

☆ : Under Development
∗E24: Standard products E96: Custom products

Jumper type

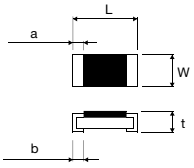
Part No.	Size Code inch(mm)	Rated Current	Resistance	Operating Temperature (°C)	Automotive Grade Available AEC-Q200
New SFR01	0402(1005)	1A	50mΩ Max.	−55 to +155	YES
New SFR03	0603(1608)	1A			YES
New SFR10	0805(2012)	2A			YES
☆SFR18	1206(3216)	2A			—
☆SFR25	1210(3225)	2A			—

☆ : Under Development

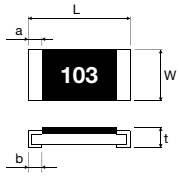
● Dimensions(Unit: mm)

Part No.	Size Code 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 +0.05 −0.10
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 +0.15 −0.20	1.6±0.15	0.55±0.1	0.55±0.25	0.5±0.25
SFR25	1210(3225)	3.2 +0.15 −0.20	2.5±0.15	0.55±0.1	0.55±0.25	0.5±0.25

•SFR01

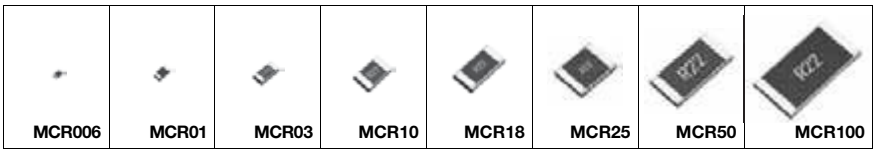


•SFR03/10/18/25



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 (1/20W)	F(±1%)	+600/−200	1Ω to 9.1Ω(E24 Series)	−55 to +155	YES
MCR01	0402 (1005)	0.063W (1/16W)	F(±1%)	±400	1Ω to 9.1Ω(E24 Series)		YES
MCR03	0603 (1608)	0.1W (1/10W)	F(±1%)	±400	1Ω to 9.1Ω(E24 Series)		YES
MCR10	0805 (2012)	0.25W (1/4W)	J(±5%)	*Table 1	0.047Ω to 0.91Ω(E24 Series)		YES
			F(±1%)	*Table 1	0.047Ω to 9.1Ω(E24 Series)		
MCR18	1206 (3216)	0.25W (1/4W)	J(±5%)	*Table 1	0.047Ω to 0.91Ω(E24 Series)		YES
			F(±1%)	*Table 1	0.047Ω to 9.1Ω(E24 Series)		
MCR25	1210 (3225)	0.5W (1/2W)	J(±5%)	300±300	0.047Ω to 0.091Ω(E24 Series)		YES
				±200	0.1Ω to 0.91Ω(E24 Series)		
			F(±1%)	300±300	0.047Ω to 0.091Ω(E24 Series)		
				±200	0.1Ω to 9.1Ω(E24 Series)		
MCR50	2010 (5025)	0.5W (1/2W)	J(±5%)	*Table 1	0.047Ω to 0.91Ω(E24 Series)		YES
			F(±1%)	*Table 1	0.047Ω to 9.1Ω(E24 Series)		
MCR100	2512 (6432)	1W	J(±5%)	*Table 1	0.047Ω to 0.91Ω(E24 Series)	−55 to +125	YES
			F(±1%)	*Table 1	0.047Ω to 9.1Ω(E24 Series)		

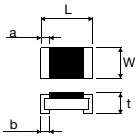
*Table 1

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

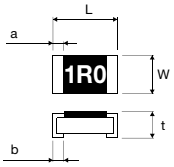
● Dimensions(Unit: mm)

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	$0.25^{+0.05}_{-0.1}$
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

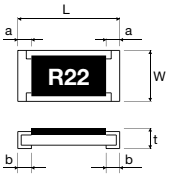
●MCR006/01



●MCR03

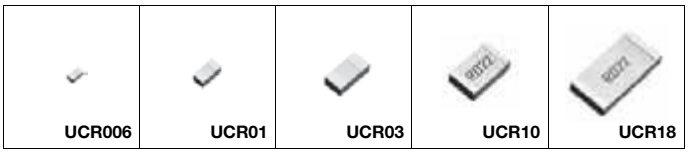


●MCR10/18/25/50/100



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 inch(mm)	Rated Power (70°C)	Tolerance	Temperature Coefficient (ppm/°C)	Resistance Range	Operating Temperature (°C)	Automotive Grade Available AEC-Q200
UCR006	0201 (0603)	0.1W (1/10W)	J(±5%)	0 to 300	100mΩ to 910mΩ(E24 Series)	−55 to +155	YES
			F(±1%)				
UCR01	0402 (1005)	0.125W (1/8W)	J(±5%)	0 to 300	68mΩ to 91mΩ(E24 Series)		YES
			F(±1%)	0 to 250 0 to 200	100mΩ to 200mΩ(E24 Series) 220mΩ to 910mΩ(E24 Series)		
UCR03	0603 (1608)	0.25W (1/4W)	J(±5%)	0 to 250	20mΩ to 47mΩ(E24 Series)		YES*
			F(±1%)	0 to 200 0 to 150	51mΩ to 91mΩ(E24 Series) 100mΩ to 200mΩ(E24 Series)		
		0.2W (1/5W)	J(±5%)	0 to 150	220mΩ to 910mΩ(E24 Series)		
			F(±1%)				
UCR10	0805 (2012)	0.33W (1/3W)	J(±5%)	250±200 0 to 250 0 to 150	11mΩ to 18mΩ(E24 Series) 20mΩ to 47mΩ(E24 Series) 51mΩ to 100mΩ(E24 Series)		YES
			F(±1%)	0 to 250 0 to 150	11mΩ to 47mΩ(E24 Series) 51mΩ to 100mΩ(E24 Series)		
UCR18	1206 (3216)	0.5W (1/2W)	J(±5%)	0 to 350 0 to 200 0 to 150	11mΩ to 18mΩ(E24 Series) 20mΩ to 39mΩ(E24 Series) 43mΩ to 100mΩ(E24 Series)		YES
			F(±1%)				
		☆1.0W	J(±5%)	0 to 350 0 to 200	11mΩ to 18mΩ(E24 Series) 20mΩ to 39mΩ(E24 Series)		YES
			F(±1%)				

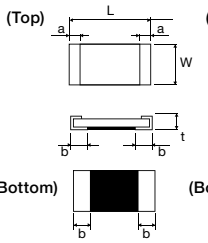
∗ Limited to 100mΩ and higher.

☆: Under Development

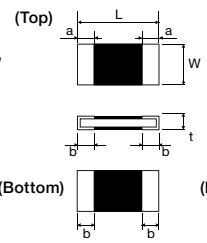
● Dimensions(Unit: mm)

Part No.	Size Code 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

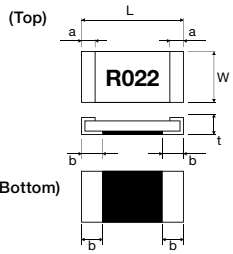
•UCR006/01
•UCR03
(50mΩ≤R≤910mΩ)



•UCR03
(20mΩ≤R<50mΩ)

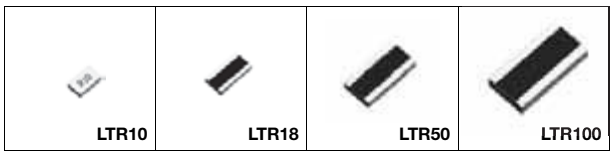


•UCR10/18



Chip Resistors for Current Detection(Thick Film type)
High Power Chip Resistors <Wide Terminal type> (Low 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



Low Ohmic LTR series

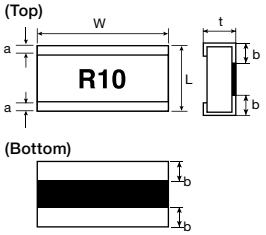
Part No.	Size Code inch(mm)	Rated Power (70°C)	Tolerance	Temperature Coefficient (ppm/°C)	Resistance Range	Operating Temperature (°C)	Automotive Grade Available AEC-Q200
LTR10	0508 (1220)	0.5W (1/2W)	J(±5%)	±150	47mΩ to 9.1Ω(E24 Series)	−55 to +155	YES
			F(±1%)				
LTR18	0612 (1632)	1W	J(±5%)	0 to 300 0 to 200 0 to 150 ±100	10mΩ to 18mΩ(E24 Series) 20mΩ to 47mΩ(E24 Series) 51mΩ to 470mΩ(E24 Series) 510mΩ to 1Ω(E24 Series)		YES
			F(±1%)				
☆LTR50	1020 (2550)	1.5W	J(±5%)	0 to 300 0 to 200 0 to 150 ±100	10mΩ to 18mΩ(E24 Series) 20mΩ to 47mΩ(E24 Series) 51mΩ to 91mΩ(E24 Series) 100mΩ to 910mΩ(E24 Series)		—
			F(±1%)				
LTR100	1225 (3264)	2W	J(±5%)	±200	100mΩ to 910mΩ(E24 Series)		YES
			F(±1%)	0 to 150	100mΩ to 910mΩ(E24 Series)		

☆ : Under Development

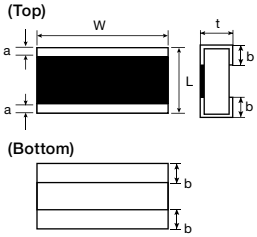
● Dimensions(Unit: mm)

Part No.	Size Code inch(mm)	L	W	t	a	b
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	0.55±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

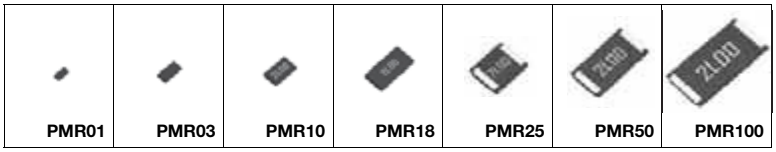


•LTR18/50/100(No marking)



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 inch(mm)	Rated Power (70°C)	Tolerance	Temperature Coefficient (ppm/°C)	Resistance (mΩ)	Operating Temperature (°C)	Automotive Grade Available AEC-Q200
PMR01	0402(1005)	0.2W (1/5W)	J(±5%)	0 to 200	10	−55 to +155	YES
PMR03	0603(1608)	0.25W (1/4W)	J(±5%) F(±1%)	0 to 150	10(☆5)		YES
PMR10	0805(2012)	0.5W (1/2W)	J(±5%) F(±1%)	±150	2,3,4,5,6, 7,8,9,10		YES
PMR18	1206(3216)	1W	J(±5%) F(±1%)	±100	1,2,3,4,5,6, 7,8,9,10		YES
PMR25	1210(3225)	1W	J(±5%) F(±1%)	±100	1,2,3,4,5		YES
PMR50	2010(5025)	1W	J(±5%) F(±1%)	±100	1,2,3,4,5, 6,7,8,9,10		YES
PMR100	2512(6432)	2W	J(±5%) F(±1%)	±150	1,2		YES
				±100	3,4,5,6,7,8,9,10		
		☆3W	J(±5%) F(±1%)	±150	1,2		

☆ : Under Development

Large current jumper type

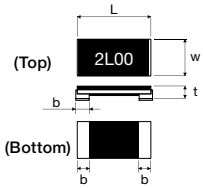
Part No.	Size Code inch(mm)	Rated Current	Resistance	Operating Temperature (°C)	Automotive Grade Available AEC-Q200
PMR01	0402(1005)	20.0A	0.5mΩ Max.	−55 to +155	YES
PMR03	0603(1608)	22.4A			YES
PMR10	0805(2012)	31.6A			YES
PMR18	1206(3216)	38.7A			YES
PMR25	1210(3225)	44.7A			YES
PMR50	2010(5025)	50.0A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

● Dimensions(Unit: mm)

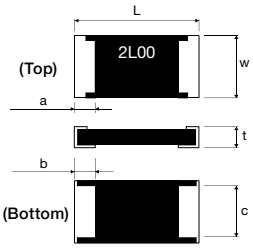
Part No.	Size Code inch(mm)	L	W	t	a	b	c
PMR01	0402(1005)	1.0±0.05	0.5±0.05	0.25±0.1	—	0.30±0.10	—
PMR03	0603(1608)	1.6±0.15	0.8±0.15	0.25±0.1	—	0.35±0.15	—
PMR10	0805(2012)	2.0±0.15	1.2±0.15	0.42 to 0.28*±0.15	—	0.75 to 0.35*±0.25	—
PMR18	1206(3216)	3.2±0.15	1.6±0.15	0.42 to 0.28*±0.15	—	1.20 to 0.5 *±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

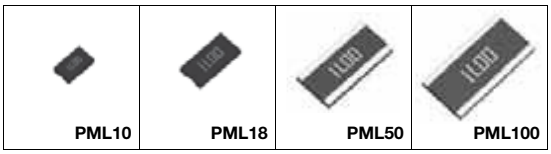


●PMR25/50/100



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 up)
- 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

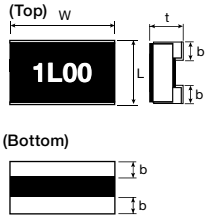
Part No.	Size Code inch(mm)	Rated Power (70°C)	Tolerance	Temperature Coefficient (ppm/°C)	Resistance (mΩ)	Operating Temperature (°C)	Automotive Grade Available AEC-Q200
PML10	0508 (1220)	0.66W	J(±5%) G(±2%)	±200	1.0, 1.5, 2.0, 2.5	−55 to +155	YES
PML18	0612 (1632)	1W	J(±5%) G(±2%)	±150	0.5, 1.0, 1.5,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

● Dimensions(Unit: mm)

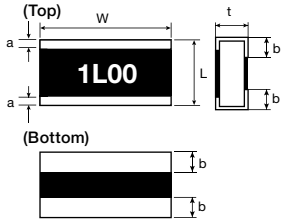
Part No.	Size Code inch(mm)	L	W	t	a	b
PML10	0508(1220)	1.2±0.15	2.0±0.15	0.42±0.15	—	0.45 to 0.3* ±0.2
PML18	0612(1632)	1.6±0.15	3.2±0.15	0.42 to 0.28* ±0.15	—	0.55 to 0.3* ±0.2
PML50	1020(2550)	2.5±0.2	5.0±0.2	0.5 to 0.36* ±0.15	0.4±0.2	0.75 to 0.7* ±0.2
PML100	1225(3264)	3.2±0.25	6.4±0.25	0.5 to 0.36* ±0.15	0.45±0.25	0.9 to 0.7* ±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 inch(mm)	Rated Power (70°C)	Tolerance	Temperature Coefficient* (ppm/°C)	Resistance Range (mΩ)	Operating Temperature (°C)	Automotive Grade Available AEC-Q200
New PSR100	2512 (6432)	3W	F(±1%)	±150	0.3	−55 to +170	YES
				±115	0.5		
				±100	1.0		
				±50	2.0, 3.0		
PSR400	3921 (10×5.2)	4W	F(±1%)	125±50	☆0.2		YES
				±175	0.3, 0.5		
				±75	1.0, 2.0, 3.0		
PSR500	5931 (15×7.75)	5W	F(±1%)	200±50	☆0.1		YES
				±225	0.2		
				±150	0.3, 0.4, 0.5		
				±75	1.0, 2.0		

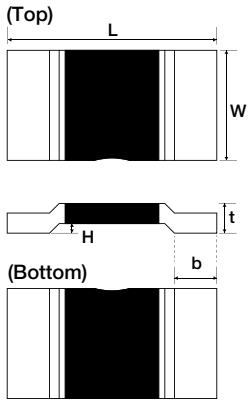
*(+20°C to +125°C)
☆: Under Development

● 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		
PSR400	☆0.2mΩ	10±0.3	5.2±0.3	1.96±0.15	0.5±0.15	2.0±0.6
	0.3mΩ			1.85±0.15		
	0.5mΩ			1.3±0.15		
	1.0mΩ			0.9±0.15		
	2.0mΩ			1.1±0.15		
	3.0mΩ			0.9±0.15		
PSR500	☆0.1mΩ	15±0.3	7.75±0.3	1.9±0.15	0.5±0.15	4.75±0.6
	0.2mΩ			1.85±0.15		4.0±0.6
	0.3mΩ			1.4±0.15		
	0.4mΩ			1.15±0.15		
	0.5mΩ			1.05±0.15		
	1.0mΩ			1.35±0.15		
	2.0mΩ			0.9±0.15		

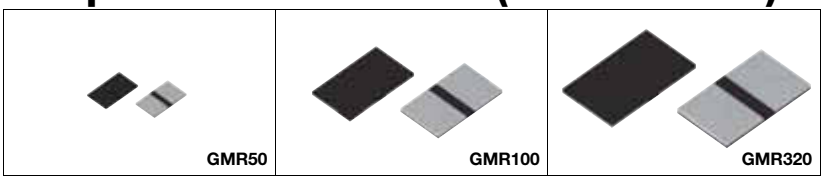
☆ : Under Development

• 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

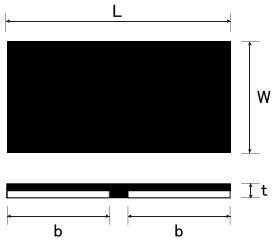
Part No.	Size Code inch(mm)	Rated Power (70°C)	Tolerance	Temperature Coefficient*1 (ppm/°C)	Resistance Range	Operating Temperature (°C)	Automotive Grade Available AEC-Q200
☆GMR50	2010 (5025)	2W	F(±1%)	0 to +50	5mΩ	−55 to +170	—
				±25	10mΩ to 200mΩ (E6 Series *2*3)		
New GMR100	2512 (6432)	3W	F(±1%)	0 to +50	☆5mΩ		YES
				±20	10mΩ to 220mΩ (E6 Series*2)		
☆GMR320	2817 (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 inch(mm)	L	W	t	b
GMR50	2010 (5025)	5.00±0.25	2.50±0.25	0.40±0.15	2.05±0.25
GMR100	2512 (6432)	6.40±0.25	3.20±0.25	0.40±0.15	2.75±0.25
GMR320	2817 (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.

Series	Common ratio	Remarks
E6	$\sqrt[6]{10}\approx1.46$	Rounded off to a 2-digit figure.
E12	$\sqrt[12]{10}\approx1.21$	
E24	$\sqrt[24]{10}\approx1.10$	
E96	$\sqrt[96]{10}\approx1.02$	Rounded off to a 3-digit figure.

(Resistance Coding)

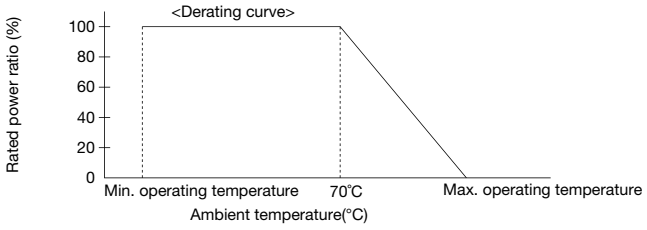
For nominal resistance values, products with a resistance tolerance of ±5% are indicated using 3 digits, while resistors with a tolerance of ±1% are represented by 4 digits. The first 2 or 3 numbers are significant digits, with the last digit indicating the number of zeroes. If a decimal point is required,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

EX1 22Ω→22×10⁰Ω→ 220 (the last digit indicates the number "0" of a multiplier)
EX2 47kΩ→47×10³Ω→ 473 (the last digit indicates the number "3" of a multiplier)
EX3 1.2MΩ→12×10⁵Ω→ 125 (the last digit indicates the number "5" of a multiplier)
EX4 2.7Ω→2R7(the decimal point indicates the letter R / low resistance less than 10Ω)
EX5 1130Ω→113×10¹Ω→ 1131(the last digit indicates the number "1" of a multiplier / Resistance Tolerance 1%(F)products)
EX6 0.10Ω→R10
EX7 1mΩ→1L0

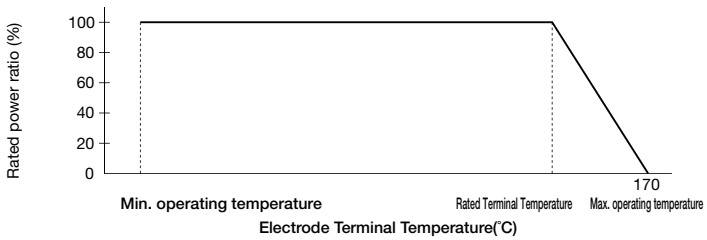
●For basic guidelines on using resistors, see the technical reports issued by the Japan Electronics and Information Technology Industries Association. JEITA RCR-2121A. "Guideline of notabilia for fixed resistors for use in electronic equipment (Safety Application Guide for fixed resistors for use in 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) / I_F(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(C)*								
												SML-D13VW(C)*									
										SML-D12V8W											
														SML-D15UW							
															SML-D15U2W						
													SML-D14U2W(C)*								
												SML-D13UW(C)*									
											SML-D12U8W										
	20125	0.8	20							SML-H12V8T											
											SML-H12U8T										
PLCC2	3528	1.9	20										SML-Z14VT(C)*								
														SML-Z14UT(C)*							
Reverse Mount	34125	1.1	10						SML-811VT(C)*												
									SML-811UT(C)*												
Lens	1608	1.06	20										☆CSL1001VT								
		1.24	20											☆CSL0901VT							
															☆CSL0901UT						
															☆CSL0902VT						
																☆CSL0902UT					

* : 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) / I_F(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													SML-D15DW				
															SML-D14DW(C)*					
														SML-D13DW(C)*						
													SML-D12D8W							
	20125	0.8	20										SML-H12D8T							
PLCC2	3528	1.9	20												SML-Z14DT(C)*					
Reverse Mount	34125	1.1	10							SML-811DT(C)*										
Lens	1608	1.24	20													☆CSL0901DT				
																☆CSL0902DT				

* : 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) / I_F(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	2																	
			20													SML-D15YW				
															SML-D14YW(C)*					
															SML-D14WW(C)*					
														SML-D13WW(C)*						
											SML-D12Y8W									
	20125	0.8	20									SML-H12Y8T								
PLCC2	3528	1.9	20												SML-Z14YT(C)*					
Reverse Mount	34125	1.1	10							SML-811WT(C)*										
Lens	1608	1.06	20													☆CSL1001YT				
		1.24														☆CSL0901YT				
																☆CSL0901WT				
																☆CSL0902WT				

* : 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) / I_F(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												SML-D15MW						
														SML-D14MW(C)*							
													SML-D13MW(C)*								
												SML-D13FW(C)									
								SML-D12P8W													
												SML-D12M8W									
	20125	0.8	20									SML-H12M8T									
								SML-H12P8T													
PLLC2	3528	1.9	20											SML-Z14MT(C)*							
												SML-Z14PT(C)*									
													SML-Z14FT(C)*								
Lens	1608	1.06	20											☆CSL1001MT							
		1.24													☆CSL0901MT						
													☆CSL0901PT								
															☆CSL0902MT						
														☆CSL0902PT							

* : 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

Green (E) /Blue Green (E2) Quick Reference of Brightness

Package Structure	Package Size (mm)	Height (mm)	Luminous Intensity (mcd) / I_F(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									
								☆SMLD12E2N1W									
								☆SMLD12E3N1W									
		1.06						☆CSL1001ET									
Reflector	20125	0.8	5					SMLMN2ECT(C)									
PLCC2	3528	1.9	20											SMLZ14EGT(C)*			
Lens	1608	1.24	20								☆CSL0901ET						
													☆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

SMD LEDs

Blue (B) Quick Reference of Brightness

Package Structure	Package Size (mm)	Height (mm)	Luminous Intensity (mcd) / I_F(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							☆CSL1001BT										
Reflector	20125	0.8	5							SMLMN2BCT(C)									
PLCC2	3528	1.9	20												SMLZ14BGT(C)∗				
Lens	1608	1.24	5									☆CSL0901BT							
			20													☆CSL0902BT			

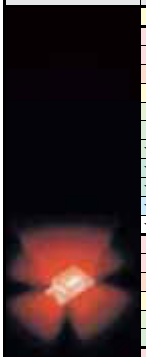
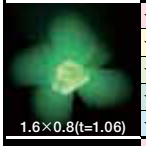
∗ : Brightness on specification sheet includes tolerance of within ±10%. Note: Please be sure to refer to the specifications about the rank. ☆ : Under Development

White (WB) Quick Reference of Brightness

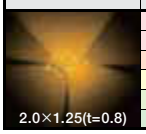
Package Structure	Package Size (mm)	Height (mm)	Luminous Intensity (mcd) / I_F(mA)	9 to 14	14 to 22	22 to 36	36 to 56	56 to 90	90 to 140	140 to 220	220 to 360	360 to 560	560 to 900	900 to 1100	1100 to 1400	1400 to 1800	1800 to 2200	2200 to 2800	2800 to 3600	3600 to 7000	7000 to 8500
Mini-mold	1608	0.55	5					☆SMLD12WBN1W													
Reflector	20125	0.8	5					SMLMN2WB1CW(C)													

∗ : Brightness on specification sheet includes tolerance of within ±10%. Note: Please be sure to refer to the specifications about the rank. ☆ : Under Development

<Mold Type(1608)>

Package (mm)	Part No.	Emitting Color	Absolute Maximum Ratings(Ta=25°C) Power Dissipation P_D (mW)	Forward Current I_F (mA)	Peak Forward Current I_{FP} (mA)	Reverse Voltage V_R (V)	Operating Temperature Topr (°C)	Storage Temperature Tstg (°C)	Electrical and Optical Characteristics(Ta=25°C) Forward Voltage V_F Typ. (V)	I_F (mA)	Reverse Current I_R Max. (μA)	V_R (V)	Dominant Wavelength λ_D / Chromaticity(x, y) Typ.* (nm)	I_F (mA)	Luminous Intensity I_V Min. (mcd)	Typ. (mcd)	I_F (mA)	Automotive Grade Available AEC-Q101
 1.6×0.8(t=0.55)	SML-D12W8W(C)	Yellow	52	20	100*1	12	−40 to +100	−40 to +100	2.0	2	10	12	588	2	5	7	2	YES
	SML-D12V8W	Red	54	20	100*1	5	−40 to +85	−40 to +100	2.2	20	10	5	630	20	16	40	20	YES
	SML-D12U8W												620		25	63		
	SML-D12D8W	Orange											605		40	100		
	SML-D12Y8W	Yellow											590		25	63		
	SML-D12M8W	Yellow Green											572		10	25		
	SML-D12P8W	Green											560		3	6		
	☆SMLD12EN1W	Blue Green	66				−40 to +100		3.0	5		5	527	5	56	140	5	(YES)
	☆SMLD12E2N1W						−40 to +85		2.9				505		(56)	120		
	☆SMLD12E3N1W												496		56	85		
	☆SMLD12BN1W	Blue					−40 to +100						470		(14)	40		
	☆SMLD12WBN1W	White											(x,y)(0.295,0.280)		56	120		
	SML-D13VW(C)	Red	72	30	100*1	5	−40 to +100	−40 to +100	2.0	20	10	5	630	20	36	55	20	YES
	SML-D13UW(C)												620		56	85		
	SML-D13DW(C)	Orange											605		71	120		
	SML-D13WW(C)	Yellow	75						2.1				587			110		
	SML-D13MW(C)	Yellow Green											571		28	45		
	SML-D13FW(C)	Green	81										565		18	22		
	SML-D14VW(C)	Red	72	30	100*1	5	−40 to +100	−40 to +100	2.0	20	10	5	630	20	71	100	20	YES
	SML-D14U2W(C)		75										615		90	160		
	SML-D14DW(C)	Orange											605		112	200		
	SML-D14YW(C)	Yellow											590					
	SML-D14WW(C)								2.1				587			180		
	SML-D14MW(C)	Yellow Green											571		36	60		
	SML-D15VW	Red	84	35	100*1	5	−40 to +100	−40 to +100	2.0	20	(10)	5	630	20	71	90	20	YES
	SML-D15UW												620		90	112		
	SML-D15U2W												615		112	140		
	SML-D15DW	Orange											605		180	224		
	SML-D15YW	Yellow	87						2.1				590					
	SML-D15MW	Yellow Green											571		56	71		
 1.6×0.8(t=1.06)	☆CSL1001VT	Red	72	30	100	12	−40 to +100	−40 to +100	(1.8)	20	10	12	630	20	(71)	(112)	20	(YES)
	☆CSL1001YT	Yellow							2.0				590		(112)	(180)		
	☆CSL1001MT	Yellow Green							2.1				571		(36)	(56)		
	☆CSL1001ET	Green	74	20	100*1	5	−40 to +85		2.9	5		5	(527)	5	(56)	(110)	5	
	☆CSL1001BT	Blue	17	5	10*1								470		(9)	(18)		
 1.6×0.8(t=1.24)	☆CSL0901VT	Red	50	20	100*1	12	−40 to +100	−40 to +100	2.0	20	10	12	630	20	(112)	174	20	(YES)
	☆CSL0901UT												620		140	300		
	☆CSL0901DT	Orange											605		(224)	400		
	☆CSL0901YT	Yellow											590		(180)	320		
	☆CSL0901WT												587			300		
	☆CSL0901MT	Yellow Green											572		(56)	100		
	☆CSL0901PT	Green											560		(18)	30		
	☆CSL0901ET		70			5			3.0	5		5	(527)	5	(220)	(360)	5	
	☆CSL0901BT	Blue	34	10	50		−40 to +85		2.9				(470)		(36)	(56)		
	☆CSL0902VT	Red	84	35	100*1	12	−40 to +100	−40 to +100	2.0	20	10	12	(630)	20	(140)	(250)	20	(YES)
	☆CSL0902UT												(620)		(180)	(350)		
	☆CSL0902DT	Orange											(605)		(224)	(500)		
	☆CSL0902YT	Yellow							2.1				(590)					
	☆CSL0902WT												(587)			(400)		
	☆CSL0902MT	Yellow Green											(572)		(71)	(140)		
	☆CSL0902PT	Green											(560)		(28)	(45)		
	☆CSL0902ET		95	25		5	−40 to +85		3.4			5	(527)		(710)	(1,100)		
	☆CSL0902BT	Blue							3.3				(470)		(220)	(360)		

<Mold Type(20125)>

Package (mm)	Part No.	Emitting Color	Absolute Maximum Ratings(Ta=25°C) Power Dissipation P_D (mW)	Forward Current I_F (mA)	Peak Forward Current I_{FP} (mA)	Reverse Voltage V_R (V)	Operating Temperature Topr (°C)	Storage Temperature Tstg (°C)	Electrical and Optical Characteristics(Ta=25°C) Forward Voltage V_F Typ. (V)	I_F (mA)	Reverse Current I_R Max. (μA)	V_R (V)	Dominant Wavelength λ_D / Chromaticity(x, y) Typ.* (nm)	I_F (mA)	Luminous Intensity I_V Min. (mcd)	Typ. (mcd)	I_F (mA)	Automotive Grade Available AEC-Q101
 2.0×1.25(t=0.8)	SML-H12V8T	Red	54	20	100*1	5	−40 to +85	−40 to +100	2.2	20	10	5	630	20	16	25	20	YES
	SML-H12U8T												620		25	40		
	SML-H12D8T	Orange											605		40	63		
	SML-H12Y8T	Yellow											590					
	SML-H12M8T	Yellow Green											572		10	25		
	SML-H12P8T	Green											560		3	4		

∗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

SMD LEDs

<Reflector Type>

Package (mm)	Part No.	Emitting Color	Absolute Maximum Ratings(Ta=25°C) Power Dissipation P_D (mW)	Forward Current I_F (mA)	Peak Forward Current I_{FP} (mA)	Reverse Voltage V_R (V)	Operating Temperature Topr (°C)	Storage Temperature Tstg (°C)	Electrical and Optical Characteristics(Ta=25°C) Forward Voltage V_F Typ. (V)	I_F (mA)	Reverse Current I_R Max. (μA)	V_R (V)	Dominant Wavelength λ_D / Chromaticity(x, y) Typ.* (nm)	I_F (mA)	Luminous Intensity I_V Min. (mcd)	Typ. (mcd)	I_F (mA)	Automotive Grade Available AEC-Q101
2.0×1.25(t=0.8)	SMLMN2ECT(C)	Green	70	20	100*1	12	−40 to +100	−40 to +100	3.0	5	10	12	527	5	56	140	5	YES
	SMLMN2BCT(C)	Blue	68						2.9				470		14	36		
	SMLMN2WB1CW(C)	White											(x,y)(0.30,0.28)		56	140		
PLCC2 3.5×2.8(t=1.9)	SML-Z14VT(C)	Red	168	70	200*1	12	−40 to +100	−40 to +100	1.9	20	10	12	630	20	56	112	20	YES
	SML-Z14UT(C)												620		112	224		
	SML-Z14DT(C)	Orange											605		140	280		
	SML-Z14YT(C)	Yellow											589					
	SML-Z14MT(C)	Yellow Green	175						2.0				571		45	90		
	SML-Z14FT(C)	Green											564		22	45		
	SML-Z14PT(C)												560		11	22		
	SMLZ14EGT(C)		120	30		5			3.4			5	528		710	1,100		
	SMLZ14BGT(C)	Blue	114						3.3				470		140	280		

<Reverse mount available>

Package (mm)	Part No.	Emitting Color	Absolute Maximum Ratings (Ta=25°C) Power Dissipation P_D (mW)	Forward Current I_F (mA)	Peak Forward Current I_{FP} (mA)	Reverse Voltage V_R (V)	Operating Temperature Topr (°C)	Storage Temperature Tstg (°C)	Electrical and Optical Characteristics(Ta=25°C) Forward Voltage V_F Typ. (V)	I_F (mA)	Reverse Current I_R Max. (μA)	V_R (V)	Dominant Wavelength λ_D Typ.* (nm)	I_F (mA)	Luminous Intensity I_V Min. (mcd)	Typ. (mcd)	I_F (mA)	Automotive Grade Available AEC-Q101
Mold Type 3.4×1.25(t=1.1)	SML-811VT(C)	Red	62	25	100*1	5	−40 to +85	−40 to +100	2.0	10	100	5	630	10	11	22	10	YES
	SML-811UT(C)												620					
	SML-811DT(C)	Orange											605					
	SML-811WT(C)	Yellow											590		14	28		

<Surface mount Circular Type>

Package (mm)	Part No.	Emitting Color	Absolute Maximum Ratings (Ta=25°C) Power Dissipation P_D (mW)	Forward Current I_F (mA)	Peak Forward Current I_{FP} (mA)	Reverse Voltage V_R (V)	Operating Temperature Topr (°C)	Storage Temperature Tstg (°C)	Electrical and Optical Characteristics(Ta=25°C) Forward Voltage V_F Typ. (V)	I_F (mA)	Reverse Current I_R Max. (μA)	V_R (V)	Dominant Wavelength λ_D Typ.* (nm)	I_F (mA)	Luminous Intensity I_V Min. (mcd)	Typ. (mcd)	I_F (mA)	Automotive Grade Available AEC-Q101
1.6×0.8(t=1.24)	☆CSL0901VT	Red	50	20	100*1	12	−40 to +100		2.0	20		12	630	20	(112)	174	20	
	☆CSL0901UT												620		140	300		
	☆CSL0901DT	Orange											605		(224)	400		
	☆CSL0901YT	Yellow											590		(180)	320		
	☆CSL0901WT												587			300		
	☆CSL0901MT	Yellow Green											572		56	100		
	☆CSL0901PT	Green											560		(18)	30		
	☆CSL0901ET		70			5			3.0	5		5	(527)	5	(220)	(360)	5	
	☆CSL0901BT	Blue	34	10	50		−40 to +85	−40 to +100	2.9		10		(470)		(36)	(56)		(YES)
	☆CSL0902VT	Red	84	35	100*1	12	−40 to +100		2.0	20		12	(630)	20	(140)	(250)	20	
	☆CSL0902UT												(620)		(180)	(350)		
	☆CSL0902DT	Orange											(605)		(224)	(500)		
	☆CSL0902YT	Yellow											(590)					
	☆CSL0902WT								2.1				(587)			(400)		
	☆CSL0902MT	Yellow Green											(572)		(71)	(140)		
	☆CSL0902PT	Green											(560)		(28)	(45)		
	☆CSL0902ET		95	25		5	−40 to +85		3.4			5	(527)		(710)	(1,100)		
	☆CSL0902BT	Blue							3.3				(470)		(220)	(360)		

∗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

( ): Reference Value ☆: Under Development

Part No. List

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

High Quality Raw Materials

Manufacturing wafers through silicon ingot pulling

Raw silicon

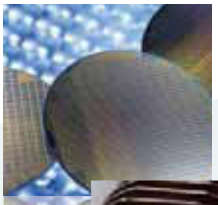
In-house Photomask

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

Silicon Ingot

CAD

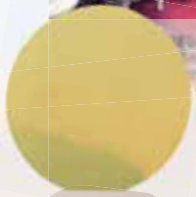
Photo Mask



Wafer Process

Si Silicon

SiC Silicon Carbide



Wafer

SiCrystal AG is 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

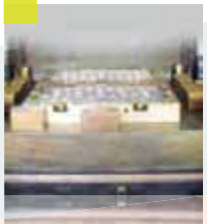
ROHM supplies products that meet market demands by utilizing a vertically integrated, completely in-house production process to ensure superior quality and stable supply - unlike fabless and foundry manufacturers that are susceptible to external influences.
ROHM uses a multi-base production system and 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

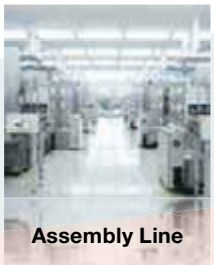
To ensure quality manufacturing, all lead frame dies for lead frame punching and molding are created in-house

State-of-the-art Packages

Utilizing the latest assembly technology for CSP, BGA, COC, COF and stacked packages

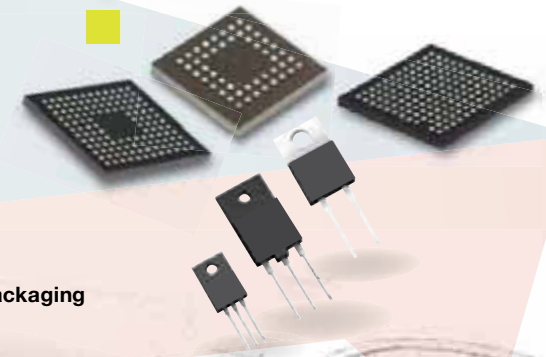


Frame & Dies



Assembly Line

Packaging



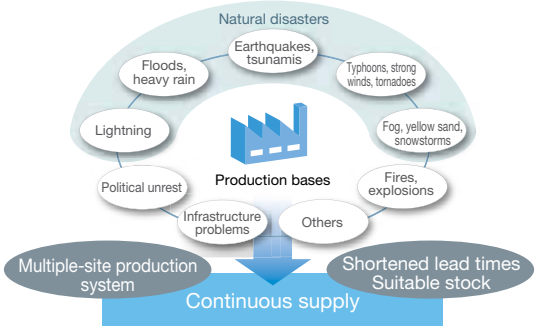
In-house Production System

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 Real Time Work & Check

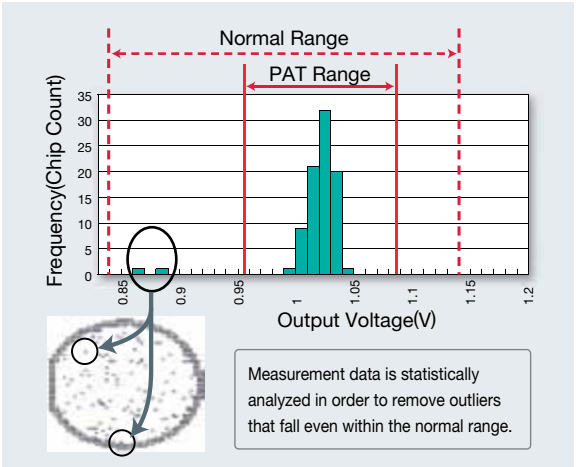
Workmanship verified during die bonding operation

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



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**...**M**an **M**achine **M**aterial **M**ethod

ROHM manufactures automotive products on designated HR (High Reliability) lines, separate from standard lines used for general-purpose products.

Certification Armband AUTOMOTIVE LINE

Overview

Model Design	Model Testing Design	Model Certification Standards
Robust design/multiple protection circuits/ improved resistance to destruction/easier testability/threshold characteristics evaluation	High/ambient/low temperature measurement (all chips)/ 100% HV stress testing/PAT system implementation	JEITA based/JEDEC/AEC-Q100/AEC-Q101/AEC-Q200-compliant · Long-term reliability testing · Lifetime est. based on WLR data · ESD testing
Wafer Process Management	**Assembly Process Management**	**Traceability, Kept Samples, In-Process Failure Analysis, etc.**
SPC management/real-time monitoring/ 100% chip defect inspection	Main processing point real-time work and check/ workmanship guarantee (i.e. internal X-ray inspection, reflow screening)/4M consolidation	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	Matsumoto	Sendai
Tokyo	Fukuoka	Mito	Takasaki
Yokohama		Nishi-Tokyo	Utsunomiya

Manufacturing Facilities

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

Design Centers

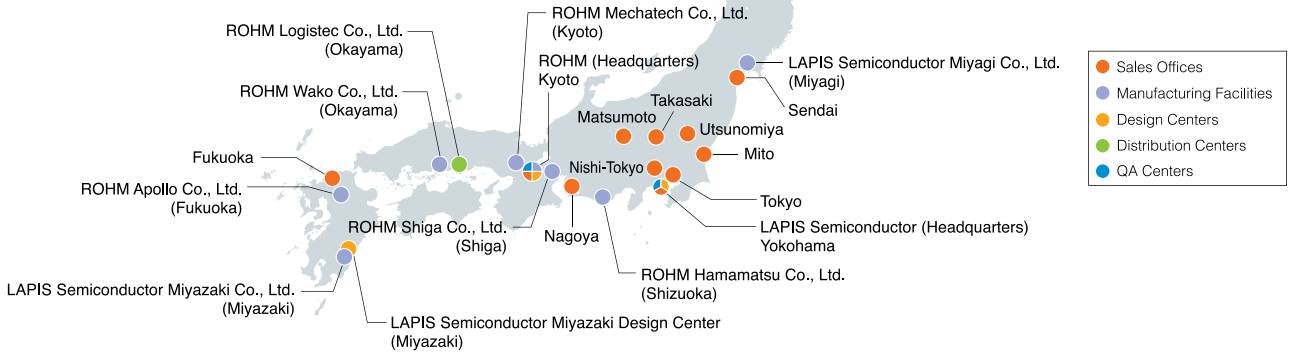
Kyoto Technology Center (Head Office)
Kyoto Technology Center (Kyoto Ekimae)
Yokohama Technology Center
LAPIS Semiconductor Co., Ltd.(Shin-Yokohama)
LAPIS Semiconductor Miyazaki Design Center

Distribution Centers

ROHM Logistec Co., Ltd.

QA Centers

Kyoto QA Center
Yokohama QA Center



ROHM Group Locations (Global)

Sales Offices

ASIA	ROHM Semiconductor Korea Corporation
	ROHM Semiconductor Trading (Dalian) 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

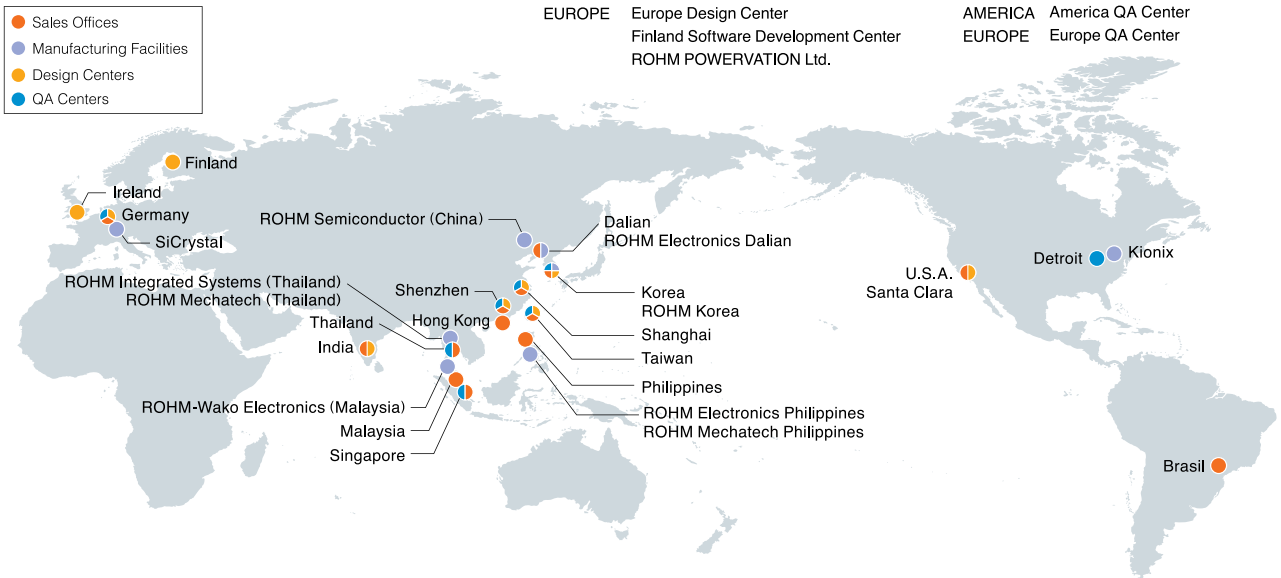
ASIA	ROHM Korea Corporation
	ROHM Electronics Philippines, Inc.
	ROHM Integrated Systems (Thailand) Co., Ltd.
	ROHM Semiconductor (China) Co., Ltd.
	ROHM Electronics Dalian Co., Ltd.
	ROHM-Wako Electronics (Malaysia) Sdn. Bhd.
	ROHM Mechatech Philippines, Inc.
	ROHM Mechatech (Thailand) Co., Ltd.
AMERICA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

Design Centers

ASIA	Korea Design Center
	Shanghai Design Center
	Shenzhen Design Center
	Taiwan Design Center
	India Design Center
AMERICA	America Design Center (Santa Clara)
EUROPE	Europe Design Center
	Finland Software Development Center
	ROHM POWERVATION Ltd.

QA Centers

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



SiC Power Devices Adopted in Inverters for Formula E, the World's Premiere Racing Class for Electric Cars

Achieving innovation in electric vehicles with SiC power devices

As an official technology partner of Formula E team Venturi, which competes in FIA's Formula E championship, ROHM contributes to improving the efficiency of power electronics systems in state-of-the-art electric racing vehicles.

ROHM SiC technology contributes to improved machine performance

In battery-driven Formula E, how to most effectively utilize power can spell the difference between victory and defeat. Season 3 (2016-17) saw the use of SiC Schottky barrier diodes (SBDs), but for Season 4 (2017-18) ROHM full SiC power modules that integrate SiC SBDs and SiC MOSFETs will be adopted to further reduce energy loss.

Utilizing full SiC power modules decreases inverter size and weight

Season 2 Conventional Inverter
(Weight: 15kg)

Season 4 Inverter Equipped with ROHM's Full SiC Power Module
(Weight: 9 kg)

Weight **6kg down**

Volume **43% down**

Venturi Formula E Team Driver

Maro Engel

With the fast speeds of Formula E, precisely controlling energy expenditure is of extreme importance. ROHM's SiC power device technology reduces heat generated during power conversion, increasing motor power while minimizing lap times.

FIA Formula E Championship
(FIA Formula E Championship)

From 2014, FIA (Federation Internationale de l'Automobile), which sponsors the Formula 1 (F1) World Championships - the highest class of auto racing - along with the World Rally Championships (WRC), began hosting the Formula E electric car racing series. As a test site for the research and development of electric vehicles, our goal is to increase interest in electric cars. Achieving all-electric drive virtually eliminates driving noise compared with existing motor sports utilizing gas engines along with exhaust gases. Due to these characteristics, all races are held on public roads in downtown areas.

Photo:Venturi Formula E Team

Season 4 Race Schedule

2017.12 - 2018.7

Opening round	Hong Kong
Round 2	Hong Kong
Round 3	Marrakech
Round 4	Santiago
Round 5	Mexico City
Round 6	Punta del Este
Round 7	Rome
Round 8	Paris
Round 9	Berlin
Round 10	Zurich
Round 11	New York
Round 12	New York
Round 13	Montreal
Final round	Montreal

＊Schedule as of December 25, 2017.
Subject to change without notice.

ROHM Formula E Special Site

ROHM Formula E 検索

1) The information contained in this document is current as of January 1st, 2018.
2) The information contained herein is subject to change without notice. Before you use our Products, please contact our sales representative (as listed below) and verify the latest specifications.
3) Although "ROHM group" (It is said here in after refers to ROHM) is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors.
Therefore, in order to prevent personal injury or fire arising from failure, please take safety measures such as complying with the derating characteristics, implementing redundant and fire prevention designs, and utilizing backups and fail-safe procedures. ROHM shall have no responsibility for any damages arising out of the use of our Products beyond the rating specified by ROHM.
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.
5) The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM are not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM or any other parties. ROHM shall have no responsibility whatsoever for any dispute arising out of the use of such technical information.
6) The Products are intended for use in general electronic equipment (i.e. AV/OA devices, communication, consumer systems, gaming/entertainment sets) as well as the applications indicated in this document.
7) The Products specified in this document are not designed to be radiation tolerant.
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.
9) Do not use our Products in applications requiring extremely high reliability, such as aerospace equipment, nuclear power control systems, and submarine repeaters.
10) ROHM shall have no responsibility for any damages or injury arising from non-compliance with the recommended usage conditions and specifications contained herein.
11) ROHM have used reasonable care to ensure the accuracy of the information contained in this document. However, ROHM are not warrant that such information is error-free and ROHM shall have no responsibility for any damages arising from any inaccuracy or misprint of such information.
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13) When providing our Products and technologies contained in this document to other countries, you must abide by the procedures and provisions stipulated in all applicable export laws and regulations, including without limitation the US Export Administration Regulations and the Foreign Exchange and Foreign Trade Act.
14) This document, in part or in whole, may not be reprinted or reproduced without prior consent of ROHM.

ROHM Sales Offices

Contact us for further information about the products.

Santa Clara	+1-408-720-1900	**Germany**	+49-2154-921-0	**Dalian**	+86-411-8230-8549	**India**	+91-80-4125-0811
Atlanta	+1-770-754-5972	**Stuttgart**	+49-711-7272370	**Shanghai**	+86-21-6072-8612	**Kyoto**	+81-75-365-1077
Boston	+1-978-371-0382	**France**	+33 (0) 1 40 60 87 30	**Shenzhen**	+86-755-8307-3008	**Yokohama**	+81-45-476-2121
Chicago	+1-847-368-1006	**United Kingdom**	+44-1-908-272400	**Hong Kong**	+852-2740-6262		
Denver	+1-303-708-0908	**Oulu**	+358-400-726124	**Taiwan**	+886-2-2500-6956		
Detroit	+1-248-348-9920	**Spain**	+34-9375-24320	**Singapore**	+65-6436-5100		
San Diego	+1-858-625-3600	**Hungary**	+36-1-950-5859	**Philippines**	+63-2-807-6872		
Mexico	+52-33-3123-2001	**Russia**	+74 95 739 4174	**Thailand**	+66-2-254-4890		
Brazil	+55-11-3539-6320	**Seoul**	+82-2-8182-700	**Malaysia**	+60-3-7931-8155		

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