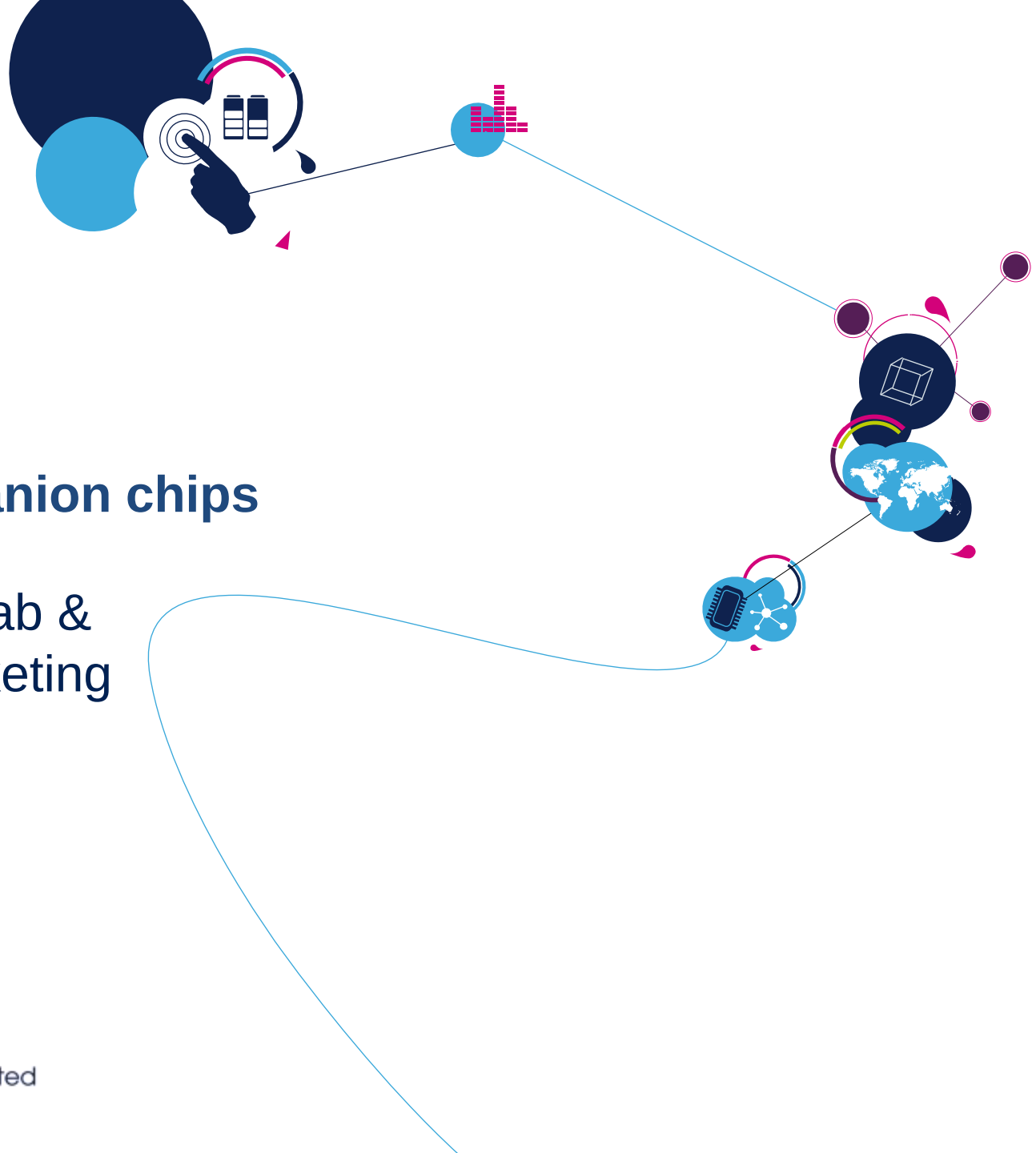


March 23th, 2012

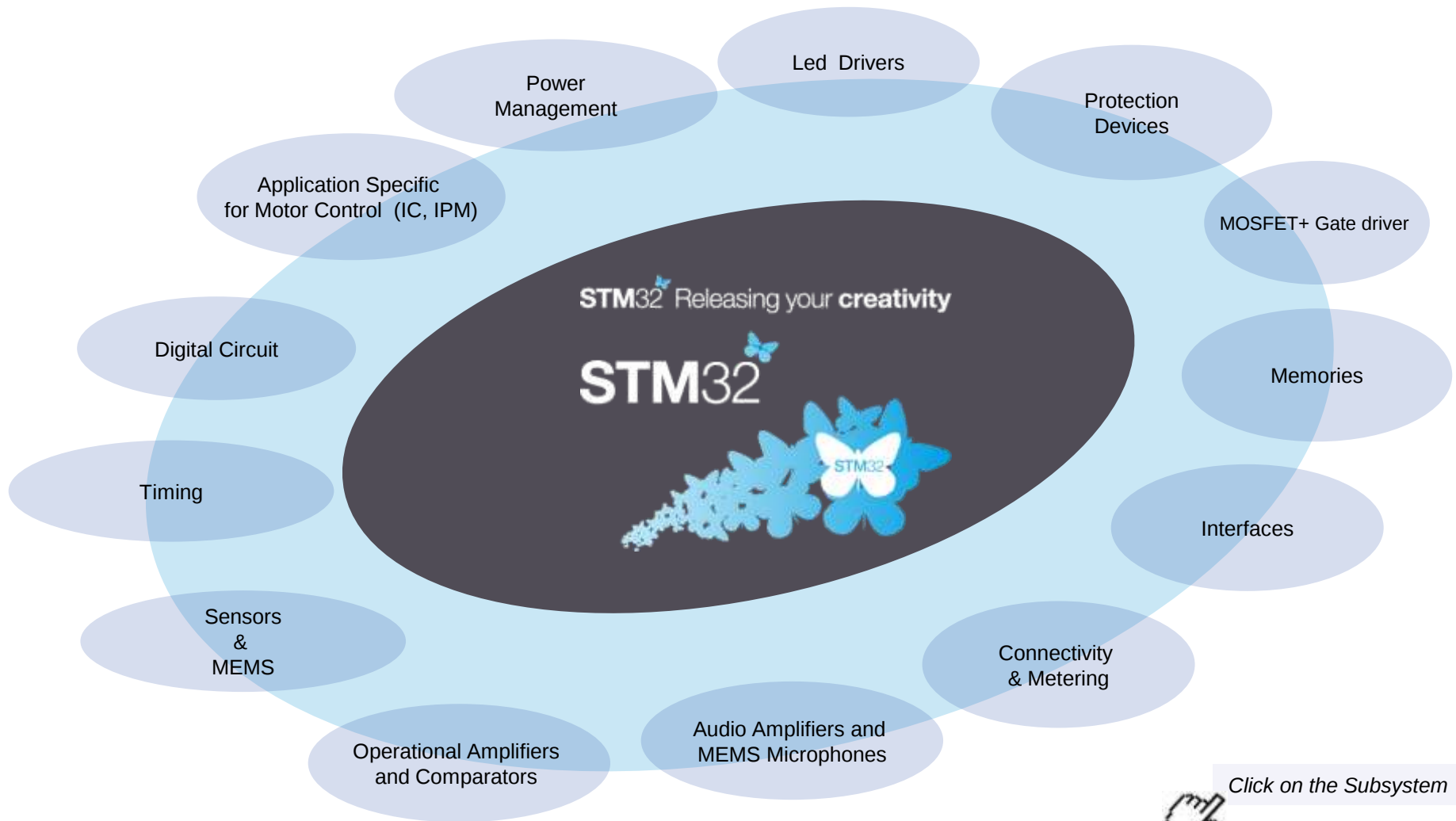
STM32 companion chips

IMS Systems lab &
Technical Marketing



STM32 companion chips

2



Click on the Subsystem



LED Drivers (1/2)

3

LED/VFD Front Panel Display Driver

STLED316S: 6-digit LED controller with key scan

STFPC311: VFD controller/Driver, 12 seg/16 Dig to 20 Seg/8 Dig, SPI protocol

STFPC320: VFD controller/Driver, 12 seg/16 Dig to 20 Seg/8 Dig, I2C protocol

STM86312: VFD controller/Driver, 11 Seg/11 Dig to 16 seg/4 Dig, SPI protocol

Linear LED drivers

STCS05A: 500mA Linear Single channel constant current LED driver

STCS1A: 1.5A Linear Single channel constant current LED driver

STCS2A: 2A Linear Single channel constant current LED driver

STLA01: 50mA linear LED driver

Switching LED drivers

STLA02: 6 white/blue LED boost power supply 20mA

STLED25*: 20 white LEDs (5x2) boost, 125mA

STLD40: 10 white LED (1x10) boost power supply, 40mA

STLD41*: 40 white LED (4x10) boost power supply, 120mA

ST1CC40*: 18V, 3A buck LED power supply

STLED5000*: 48V, 3A buck LED power supply

LED7706: LED driver with boost converter up to 60 LEDs, 6-row, Vin=4.5 to 36V, Up 30 mA

LED7707: LED driver with boost converter up to 60 LEDs, 6-row, Vin=4.5 to 36V, Up 85 mA

LED7708*: 16 Channels x 85mA LED Driver with Boost Controller and 4-wires Serial Interface

[*STM32 Home page*](#)

LED Array Drivers (2/2)

LED driver

If a great amount of external LEDs have to be driven then:

24 bit:

STP24DP05: 24-bit constant current (5-80mA) LED driver with outputs error detection

16 bit:

STP16CP05: 16-bit constant current (5-100mA) LED driver

STP16CPS05: 16-bit constant current (5-100mA) LED driver with auto power saving

STP16DP05: 16-bit constant current (5-100mA) LED driver with outputs error detection

STP16DPS05: 16-bit constant current (5-100mA) LED driver with outputs error detection and auto power saving

STP16CPC05: 16-bit constant current (5-100mA) LED driver with balanced outputs

STP16CP05: 16-bit constant current (3-40mA) LED driver

STP16CPS05: 16-bit constant current (3-40mA) LED driver with auto power saving

STP16DP05: 16-bit constant current (3-40mA) LED driver with outputs error detection

STP16DPS05: 16-bit constant current (3-40mA) LED driver with outputs error detection and auto power saving

STP1612PW05: 16-channel LED driver with 16-bit PWM, 8-bit gain and full LED error detection

STP16CPC26: 16-bit constant current (5-90mA) with high noise immunity balanced outputs LED driver

8 Bit:

STP08CP05: 8-bit constant current (5-100mA) LED driver

STP08DP05: 8-bit constant current (5-100mA) LED driver with outputs error detection

STPIC6C595: 8-bit LED Driver with over-voltage protection

STPIC6D595: 8-bit LED Driver

4 bit:

STP04CM05: 4-bit constant current (80-400mA) power LED driver

Protection Devices

5

EMI Filtering & Signal Conditioning

USBUF01P6: EMI filter and line termination for USB upstream ports (low and full speed)

ECMF02-2AMX6 : Common Filter with integrated protection for USB ports (High speed)

EMIF04/06/08-1502Mx : 4, 6 or 8 line filter array for Display or User interface

ESD Suppressor

ESDAxxx-1: single line ESD/EOS protection

ESDAxxx-4: 4-line Transil™ array for ESD protection

ESDAxxx-5: 5-line Transil™ array for ESD protection

ESDA14V2BP6: Transil™ array for bidirectional ESD protection, 14.2V breakdown, RS485

ESDA25-4BP6: Transil™ array for bidirectional ESD protection, 25V breakdown, RS232

USBxxx: Very low or Ultra low capacitance for USB2.0, USB3.0, micro-USB ...

HSP06: High speed port : Ethernet, camera/display, HDMI, touchscreens ...

ESDAULCx-1 or ESDAXLCx-1: Ultra/Extra low capacitance single line for antenna, capacitive sensors, ...

EOS Suppressor

SMM4F: Power rail protection 400W in STMite flat package ...

Power MOSFETs

Enhancement Mode Field Effect Transistor

6

Suitable technologies

Low Voltage

STripFET TM V (planar), BVDSS ranging from 12V to 40V

STripFET TM VI DeepGATE (trench), BVDSS ranging from 20V to 80V

StripFET TM VII DeepGATE (trench, 2nd gen, under development) , BVDSS ranging from 30 to 150V

P-channel STripFET TM VI DeepGATE under development

Medium and High Voltage

StripFET TM II (Planar), BVDSS ranging from 200V to 300V

MDmesh TM II (superjunction), BDSS ranging from 500V to 700V

FDmesh TM II (superjunction), BDSS 600V , fast diode

MDmesh TM V (Superjunction), BVDSS ranging from 200V to 650V

SuperMESH TM (planar), BVDSS ranging from 250V to 1000V

SuperMESH3 TM (planar), BVDSS ranging from 400V to 1200V

SuperMESH 5 TM (Superjunction), BVDSS ranging from 800V (coming soon) to 950V and up to 1200V (coming soon)

PowerMESH TM (planar), BVDSS ranging from 1500V to 1700V (coming soon)

Either low and high voltage devices could be housed in a wide range of available power packages (through-the- hole, SMD or bare die option with KGD testing)

Gate Driver

L638x/L639x: HV half-bridge drivers IGBTs/ Power MOSFETs

[STM32 Home page](#)

Memories

I²C

M24xxx: Serial I²C EEPROM, 1Kbit to 2Mbit, 1.7V to 5.5V

SPI

M95xxx: Serial I²C EEPROM, 1Kbit to 2Mbit, 1.8V to 5.5V

Dual Interface EEPROM: 13.56MHz RF and I²C

M24LR64 64 Kbit EEPROM with password protection & dual interface: 400 kHz I²C serial bus & ISO 15693 RF protocol at 13.56 MHz

M24LR16E 16 Kbit EEPROM with energy harvesting, password protection & dual interface: 400 kHz I²C serial bus & ISO 15693 RF protocol at 13.56 MHz

Interfaces (1/2)

RS232 interfaces @ 3V

The STM32 ARM® Cortex™-M3 handles the RS232 protocol, but it needs an external interface to set the correct signal electrical levels:

ST3222Exx: 2 Drivers & 2 Receivers, ±15KV ESD protection

ST3232Exx: 2 Drivers & 2 Receivers, ±15KV ESD protection

ST3243Exx: 3 Drivers & 5 Receivers, ±15KV ESD protection

RS485 interfaces @ 3V

The STM32 ARM® Cortex™-M3 handles the RS485 protocol, but it needs an external interface to set the signal electrical levels:

ST3485E: 1 Transceiver, ±15KV ESD protection

ST1480A: 1 Transceiver, ±15KV ESD protection

Smart card interface

ST8004: Analog interface for asynchronous 3V and 5V smart cards.

ST8024: Analog interface for asynchronous 3V and 5V smart cards

Camera Module Interface

The STM32 ARM® Cortex™-M3 can be interfaced with serial camera modules by using a deserializer chip:

STSMIA832: 1.8 V / 2.8 V high speed dual differential line receivers, (SMIA) decoder deserializer.

Charger Detection ICs

STUSBCD01: USB charger detection interface, CSP

Interfaces (2/2)

Xpander Logic

STMPE801: 8-bit port expander, I2C

STMPE2403: 1.8V, 24-bit port expander, Keypad, PWM controller, I2C (1.8V to 3.3V)

STMPE2401: 1.8V, 24-bit port expander, Keypad, PWM controller, I2C (1.8V to 3.3V)

Connectivity & Metering (1/4)

STarGRID SoC Power Line Communication Platform

Fully integrated, cost-effective and scalable System-on-Chip solution for smart metering and smart grid evolutions:

- High-performance DSP with embedded programmable turnkey firmware for multiple-modulations management
- Programmable 8-bit core for multiple protocol standards and supervision
- Fully integrated RX and TX Analog Front End
- Embedded single-ended 14Vpp, 1Arms Power Amplifier
- 128-bit AES encryption HW block
- UART/SPI interface for host controller
- Scalable pin-to-pin compatible solutions
- CENELEC EN50065 and FCC part 15 compliant



P/N	Modulations	Max. bit rate	Main Features
<u>ST7570</u>	S-FSK	2.4 Kbps	Full IEC 61334-5-1 PHY,MAC compliant plus“Linky” features - QFN48 7x7
<u>ST7580</u>	FSK, BPSK, QPSK, 8PSK	28.8 Kbps	ST proprietary PHY and Data Link with encryption management - QFN48 7x7
<u>ST7590</u>	OFDM	128 Kbps	Full PRIME compliant stack (PHY, MAC, 4-32 Convergence Sub-layer and IEC 61334-4-32 LLC layer)- QFN48 7x7 and TQFP100 package options

Other PLC Transceivers suitable for simple and cost-effective command and control applications:

P/N	Main Features
<u>ST7538Q</u>	Up to 4.8 Kbps FSK programmable modem with integrated power line delivering up to 370 mArms ; Mains zero crossing detection and synchronization; TQFP44 package
<u>ST7540</u>	Up to 4.8 Kbps FSK programmable modem with single- ended integrated power line driver delivering up to 500 mArms ; HTSSOP28 package

Connectivity & Metering (2/4)

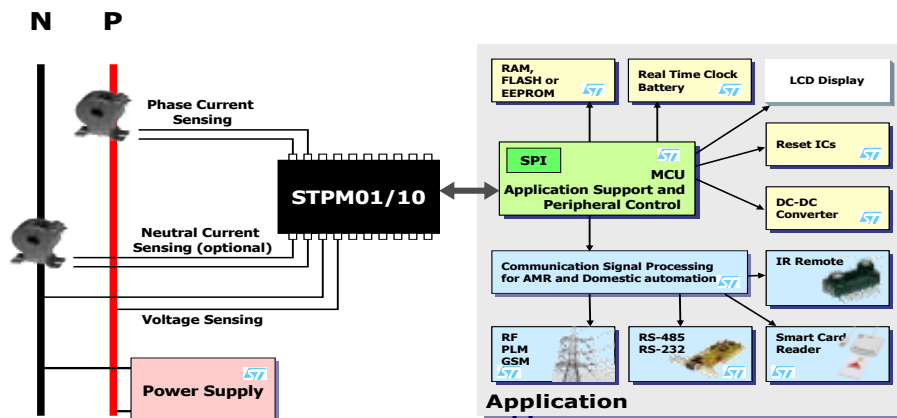
STPM01, STPM10, STPM1x:

Multiple Cost-Effective Metering ICs for Single-Phase

11

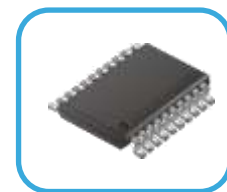
Application Specific Standard Products (ASSP) for low cost, high accuracy energy measurement in single phase power-line systems

- **MEASUREMENT**
 - Active, Reactive, Apparent Energies, Vrms, Irms, Frequency
- **SENSORS**
 - Rogowski
 - Current Transformer
 - Shunt
- **OPERATION**
 - Stepper Motor
 - MCU based
- **ACCURACY**
 - 0.1% in 1:1000 range
- **TAMPER PROOF**
 - 2 current channels available
- **SUPPORT IEC61036 AND ANSI C12.1**
- **CURRENT CHANNELS**
 - STPM01 manages itself the anti-tamper features, even without MCU



- **CALIBRATION**
 - Very short calibration time
 - No ripple in the active energy
 - Separated for voltage and current
- **OTP**
 - Prevention of tamper by changing calibration data
 - No need of loading the configuration data from
 - Perfect data retention in harsh environment

TSSOP20



P/N	Features
<u>STPM01</u>	Highest flexibility , SPI out, OTP programmable
<u>STPM10</u>	Best trade off between cost and flexibility, SPI out, no Rogosky and OTP
<u>STPM1x</u>	Lowest cost, Active Power Measurement only, Pulsed out , OTP programmable

STM32 Home page

Connectivity & Metering (3/4)

STPMC1/S2 : Modular Metering Chip Set for Poly-Phases

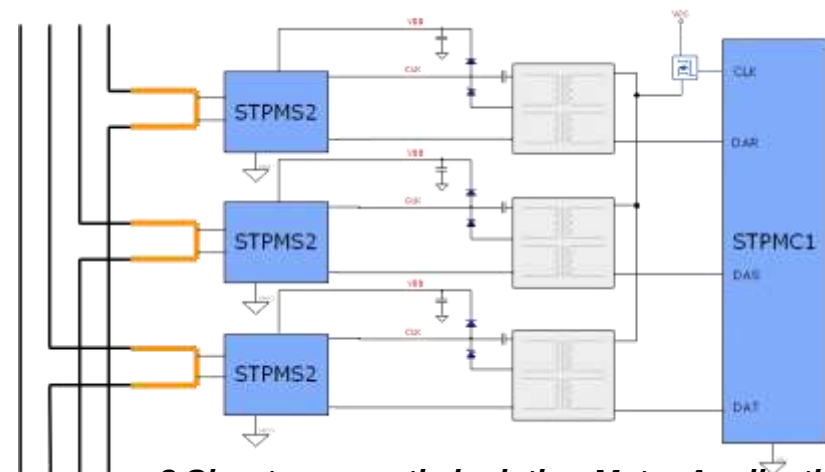
12

Flexible poly-phase chipset modular solution for metering systems based on 2 different parts: the STPMC1 and STPMS2. The STPMC1 works as an energy calculator, designed for effective energy measurement in power-line systems. Used in combination with one or more STPMS2 ICs, it implements all the functions needed in a 1-, 2- or 3-phase energy meter. Suitable for either standard current sensors or innovative low cost isolated shunts topology architecture.

P/N	Main Features
STPMS2	• 2nd order $\Delta\Sigma$ Modulators • Supports Rogowski Coil, Current Transformer, Shunt and Hall current sensors • Vcc supply range 3 – 5.5V • Exceed 50-60 Hz IEC 687/1036 spec for class1, class0.5 and class0.2 AC watt meters • Less than 0.1% error over 1:5000 range • Precision voltage reference: 1.23V and 30 ppm/°C Max (STPMS2L)

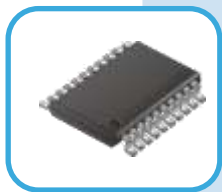


QFN164x4



3 Shunts magnetic isolation Meter Application

P/N	Main Features
STPMC1	• 4 DSPs processing up to 9 $\Delta\Sigma$ current/voltage streaming delivered by STPMS2 • Basic computational functions plus integrators, decimators, filters • Measurement of active, reactive, apparent energy, current/voltage RMS and frequency values • Exclusive ripple-free energy calculation algorithm • SPI for configuration, calibration and microcontroller interface • Neutral current, temperature, magnetic field monitoring for anti-tampering • OTP memory for digital calibration and configuration • Software calibration and mutual compensation



TSSOP20

STM32 Home page

Connectivity (4/4)

13

Ethernet PHY

ST802RT1A/B : 10/100 real-time Ethernet 3.3 V transceiver

Audio Amplifiers and MEMS Microphones

14

Low Power Amplifiers and Microphones

Low Power Amplifiers

STA529: Low Power 2 x 100 mW class-D amplifier with analog or digital input, 5x5mm in TFBGA

TS4962M: Differential class-D BTL power amplifier

TS2012: Stereo fully differential class D power amplifier

Microphones (MEMS)

MP45DT02: Top Port Digital Microphone

MP34DB01: Bottom Port Digital Microphone

MP34DT01: Top Port Digital Microphone best in class SNR=63dB.

Operational Amplifiers and Comparators (1/3)

15

Offering low & micro power consumption, high speed and precision, ST Op-amps & comparators families serve applications such as portable medical equipment, instrumentation, signal-conditioning systems, sensor interfaces, and active filtering. Operating with same range of power supplies than the STM32, they can easily be used as signal conditioner to drive the ADC of the STM32.

OPERATIONAL AMPLIFIERS

Low Power	TSV9x Series	Low power Rail to Rail : $I_{cc}=1mA$ starting 8MHz to 20MHz GBW
	LMV82x Series	Standard low power: 400 μA /5.5MHz with Shutdown
Micro power	TSV6x Series	Micro-power Rail to Rail : starting 12 μA /120kHz with Shutdown
	TSV85x Series	Micro-power : 180 μA /1.3MHz with Shutdown
Precision	TSV7x Series*	High precision : V_{io} below 100 μV
	TSZx Series*	High precision : Zero Drift V_{io} below 10 μV ; 0.1 $\mu V/^{\circ}C$

COMPARATORS

Micro/Nano power	TS331	Micropower 5V,Rail to Rail : 30 μA /200ns
	TS881*	Nano Power 1.2v to 5V, Rail to Rail : 500nA/4us
High Speed	TS3021	High speed 5V,Rail to Rail PushPull : 70 μA /40ns
	TS3011	High speed 5V, Best power over Response time ratio : 500 μA /8ns

* Available Q2.2012

Operational Amplifiers and Comparators (2/3)

Mid-High power Audio Amplifiers

16

TDA7491LP: 5W Stereo Filter-free class-D audio power amplifier

TDA7491P: 10W stereo Filter-free class-D audio power amplifier

TDA7491HV: 20W stereo Filter-lite class-D audio power amplifier

TDA7492P: 25W stereo High-efficiency class-D audio power amplifier

TDA7493 Dual BTL class-D audio amplifier

STA559BW: 10W 2.0/2.1ch High-efficiency Sound Terminal with DRC/Limiter & Equalizer

STA333W: 20W stereo High-efficiency Sound Terminal with Volume Ctrl & Post Scaler.

STA369BWS: 20W 2.0/2.1ch High-efficiency Sound Terminal with MDRC/Limiter, PEQ & SpeakerSafe

STA350BW: 50W as Music power - 2.0/2.1ch High-efficiency Sound Terminal with Limiter, PEQ & SpeakerSafe

STA381BW: 20W (30VABS)-2.0/2.1ch High-efficiency Sound Terminal with limiter, Headphone out, aux F3X analog output for external drive. ST SpeakerSafe protection circuitry. VQFN48 package.

STA381BWS: 20W (26VABS) -2.0/2.1ch High-efficiency Sound Terminal with limiter, Headphone output, aux F3X analog output for external drive. ST SpeakerSafe protection circuitry. VQFN48 package

Comparators

TS7211: Single BiCMOS rail-to-rail micro-power comparator, push-pull output

TS7221: Single BiCMOS rail-to-rail micro-power comparator, open drain output

TS86x: rail to rail micro-power BiCMOS comparators family (single, dual & quad), push-pull output

TS3021/2: Rail-to-rail 1.8V high-speed comparators (single dual), push-pull output

TS331: Single rail-to-rail 1.6V micro-power comparator available in SC70-5 micro-package, open drain output

Capacitive Touch Sensor

STM8-TOUCH-LIB: STMTouch - Touch Sensing Firmware library for STM8 Standard MCUs

STM8T14x: Series of single channel touch and proximity controllers.

Resistive Touch Screen Controller

STMPE811: 4-wire resistive touch screen controller with 8-bit port expander, 12bit ADC, I2C

STMPE812A: 4-wire resistive touch screen controller with PWM and dedicated RESET pin, 12bit ADC, I2C

Capacitive Touch Screen Controller

STMT04*: S-Touch®FingerTip 4-inch capacitive multi-touch screen controller

STMT05E*: S-Touch®FingerTip 5-inch capacitive multi-touch screen controller

STMT07*: S-Touch®FingerTip 7 to 10-inch capacitive multi-touch screen controller

* Product under development. Please contact regional marketing.

Sensors & MEMS (2/5)

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Temperature sensor

The STM32 ARM® Cortex™-M3 has an internal temperature sensor, which generate a voltage proportional to the variation in temperature. The conversion range is between $2\text{ V} < V_{DDA} < 3.6\text{ V}$. The temperature sensor is internally connected to the ADC_IN16 input channel, which is used to convert the sensor output voltage into a digital value. However, in all those applications where the temperature sensor has to be remotely placed or tighter accuracy is required a stand-alone sensor must be used.

STCN75: Digital temperature sensor, thermal watchdog, I2C/SMBus, 0.5°C accuracy @ 25°C, Shut-down mode

STDS75: Digital temperature sensor, thermal watchdog, I2C/SMBus, 0.5°C accuracy @ 25°C, Shut-down mode

STLM20: Precision analog temperature sensor, ultra small and low power

STLM75: Digital temperature sensor, thermal watchdog, I2C/SMBus, 0.5°C accuracy @ 25°C, Shut-down mode

TTTS75: Digital temperature sensor, thermal watchdog, I2C/SMBus, 0.5°C accuracy @ 25°C, SMBus Time-out, One-Shot power saving mode

TTTS751: 2.25V low-voltage local digital temperature sensors

Current Sensing Amplifiers

TSC101: High side current sensing amplifier

TSC102: High side current sensing amplifier + signal conditioning amplifier

TSC103 / **TSC1031**: High voltage (70V) high-side current sense amplifier

TSC1021: Temperature stable high-side current sense amplifier

TSC888: Cost effective high-side current sense amplifier

Pressure sensors

LPS331AP : MEMS pressure sensor: 260 - 1260 mbar absolute digital output barometer,
I2C (HCLGA 3x3x1mm)

Accelerometers

Digital:

LIS302DL: 3-axis accelerometer, $\pm 2g/\pm 8g$, 8-bit resolution, I²C/SPI digital output interface (LGA 3x5x0.9)

LIS3DH: 3-axis accelerometer, $\pm 2g/\pm 4g/\pm 8g/\pm 16g$, 8-bit resolution, I²C/SPI digital output interface (LGA 3x3x0.9)

LIS331DLH: 3-axis accelerometer, $\pm 2/4/8g$, 12-bit resolution, low power, I²C/SPI digital output interface (LGA 3x3x0.9)

Analog:

LIS344ALH: 3-axis accelerometer, $\pm 2g/\pm 6g$, analog output, high resolution (LGA 4x4x1.5)

Sensors & MEMS (4/5)

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Gyroscope Digital

L3GD20 : ultra-stable three-axis digital output gyroscope (LGA-16 4x4x1.1 mm)

The new high-performance three-axis digital-output gyroscope housed in a 4x4x1 mm package. ST's **L3GD20** **combines** high sensing resolution with outstanding immunity to audio noise and vibrations, making motion-sensing user interfaces more realistic in mobile phones, tablets, game consoles, and other smart consumer devices.



World's smallest 3-axis digital gyroscope from ST targets motion-sensing applications in ever-sleeker smart consumer devices. The newest ST gyroscope couples high sensing accuracy and reliability with smart power-consumption management.

Sensors & MEMS (5/5)

22

E-Compass: 3D accelerometer and 3D magnetometer module

LSM303DLHC LSM303DLHC has linear acceleration full-scales of $\pm 2g$ / $\pm 4g$ / $\pm 8g$ / $\pm 16g$ and a magnetic field full-scale of ± 1.3 / ± 1.9 / ± 2.5 / ± 4.0 / ± 4.7 / ± 5.6 / ± 8.1 gauss. All full-scales available are fully selectable by the user LGA-14 (3x5x1mm)

LSM303DLM:: linear acceleration full-scale of $\pm 2g$ / $\pm 4g$ / $\pm 8g$ and a magnetic field full-scale of ± 1.3 / ± 1.9 / ± 2.5 / ± 4.0 / ± 4.7 / ± 5.6 / ± 8.1 gauss, both fully selectable by the user LGA-28L (5x5x1.0 mm)

iNEMO Inertial Module



LSM330DLC: system-in-package featuring a 3D digital accelerometer and a 3D digital gyroscope. LGA-28L (4x5x1.1 mm)

LSM330D: system-in-package featuring a 3D digital accelerometer and a 3D digital gyroscope .LGA-28L (3x5.5x1.0 mm)

Timing

23

RTC

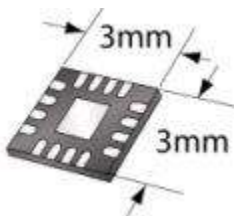
The STM32 ARM Cortex has an embedded timer to make a Real Time Clock.

A stand-alone RTC can be used to complement the STM32 and offers the following key features:

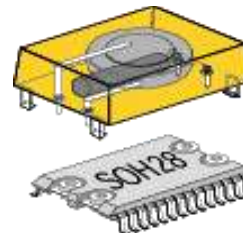
- ✓ Time data available in BCD format
- ✓ 32kHz output (a Bluetooth module can be driven)
- ✓ Back-up voltage down to 1 V
- ✓ Max. Operating Voltage up to 4.4 or 5.5 V (can be directly connected to a rechargeable lithium ion battery)
- ✓ Very low power consumption down to 350 nA (ideal for portable applications)
- ✓ Analog Calibration guarantying down to ± 5 ppm after 2 reflows (performed at ST factory for embedded crystal RTCs)
- ✓ 100th and 10th of seconds time granularity
- ✓ Allows 12.5 pF load crystal capacitance (a standard value and the cheapest in the market)
- ✓ Alarm generation capability available in back-up mode on dedicated output
- ✓ Many package options (with and without embedded crystal and battery)
- ✓ World smallest embedded crystal RTC – LCC8 3.2 x 1.5 x 0.9 mm (**M41T62LC6F**)



[M41T00S](#), [M41T81S](#), [M41T6x](#), [M41T82/83/93](#), [M41ST85W](#), [M41ST87W](#), [M41T94](#)



SOX18



LCC8 1.5 mm x 3.2 mm



The STM32 ARM® Cortex™-M3 logic inputs are 5 volt tolerant, so a level translator is not needed for a 5V input signal. Due to the input thresholds, a level translator is necessary with a 1.8V input signal. The outputs of the STM32 can be configured as open drain and, depending on the reference voltage of the external pull-up, it is possible to create a level translator, but the output current capability is low. Using a level translator increases the current capability.

Level Translators

- 1.8V to 5.0V

ST2129 : 2-bits, dual supply, auto directional, tri-state, 84 Mbps

ST2149 : 4-bits, dual supply, auto directional, tri-state, 84 Mbps

ST2378E: 8-bits, dual supply, auto directional, tri-state, 13 Mbps, 15kV ESD protection

- 1.5V to 3.3V

ST1G3234: 1-bit, dual supply, uni directional, 380Mbps, Flip Chip

ST2G3236: 2-bits, dual supply, bi directional, 380Mbps, tri-state

ST4G3234: 4-bits, dual supply, uni directional, 380Mbps, Flip Chip

- Application specific

ST2329: I2C, 2-bits, 1.8V to 5V, auto directional, tri-state

ST2349: UART, 4-bits, 1.8V to 5V, auto directional,

ST6G3244: SD3.0, 6-bits, 1.8V to 5.0V, 100Mbps, EMI filtering, Integrated LDO 1.8V/2.9V, 15kV ESD protection

ST16C32245: camera, 14+2 bits (data+I2C), 1.8V to 3.3V

Single gates

74V1Gxx

Application Specific for Motor control (1/3)

25

Motion Control is a key function in a broad range of systems. ST's global system solution approach greatly simplifies the design of flexible motor controllers. Ideal for driving Brush DC , Bipolar Stepper and permanent magnet three phase brushless motors, ST's motor control solutions offer an open, scalable and integrated answer to the market's most demanding motion control performances.

L6470: DMOS microstepping driver with motion engine

L6474: DMOS microstepping driver with SPI & Diagnostic

L6208/28: DMOS driver for bipolar stepper motor

L6206/26: DMOS dual full bridge driver

L6235/29: DMOS driver for three-phase brushless dc motor

L6230: FOC optimized BLDC motor driver

L638x/L639x: HV half-bridge drivers IGBTs/ Power MOSFETs

T1235H : High Tj TRIAC for universal motor control

T1010H: sensitive High Tj for small appliances

STCC08: TRIAC driver and monitoring for major appliances

SLLIMM™, small low-loss intelligent molded module (2/3)

26

These intelligent power modules provide a compact, high performance AC motor drive for a simple and rugged design. Combining ST proprietary control ICs with the most advanced short-circuit-rugged IGBT system technology, these smart devices are ideal for 3-phase inverters in applications such as home appliances and air conditioners.

SLLIMM Series:

[STGIPS10K60A](#) / [STGIPS10K60T](#): 10A, 600V, 25 leads

[STGIPS14K60](#) / [STGIPS14K60T](#) : 14A, 600V, 25 leads

[STGIPL14K60](#): 15A, 600V, 38 leads (full features)

[STGIPS20K60](#): 18A, 600V, 25 leads

[STGIPL20K60](#): 20A, 600V, 38 leads (full features)

SLLIMM-nano Series:

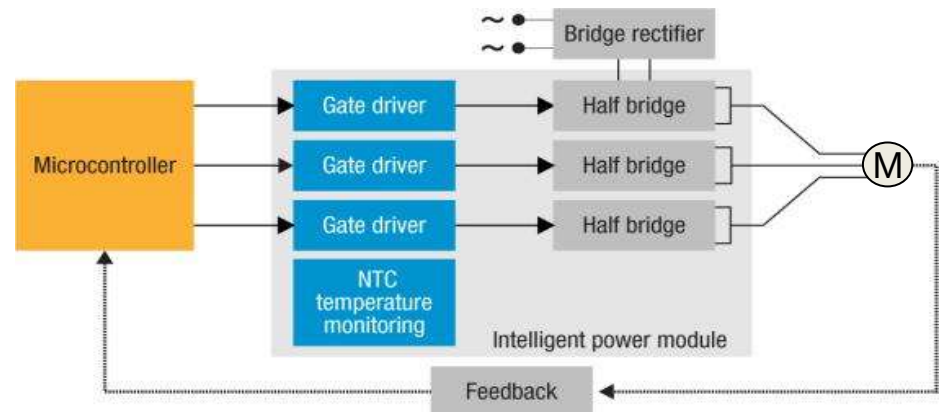
[STGIPN3H60A](#) / [STGIPN3H60](#): 3A, 600V, 26 leads

SLLIMM™, small low-loss intelligent molded module (3/3)

27

Features

- ❖ IPM, 3-phase IGBT inverter bridge including control ICs for gate driving and freewheeling diodes
- ❖ Short-circuit rugged IGBTs
- ❖ VCE(sat) negative temperature coefficient
- ❖ 3.3 V, 5 V, 15 V CMOS/TTL inputs comparators with hysteresis and pull down/pull up resistors
- ❖ Undervoltage lockout
- ❖ Internal bootstrap diode
- ❖ Interlocking function
- ❖ Smart shutdown function
- ❖ Comparator for fault protection against overtemperature and overcurrent
- ❖ Op-amps for advanced current sensing
- ❖ DBC substrate leading to low thermal resistance
- ❖ Isolation rating of 2500 Vrms/min
- ❖ 5 kΩ NTC for temperature control



Power Management (1/4)

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The voltage regulator is probably the device that is used with the majority of applications. The STM32 ARM® Cortex™-M3 requires a 2.0-3.6V operating voltage supply (VDD), with a total current up to 150mA (included the I/O current). Depending on the application requirements, it is possible to use either a linear or a switching voltage regulator. The following are just a few of the many voltage regulators ST offers:

Linear Regulators

LD3985: 150mA, En, SOT23-5L, TSOT23-5L, CSP

LD39015: 150mA, low Iq, En, SOT666, SOT23-5L, CSP

LD39115J: 150mA, low Iq, En, Low noise, 0.8x0.8 CSP

LD59015: 150mA, Low Noise, Low Iq, High PSRR, En, SOT323-5L

LDCL015: 150mA, Ultra low Drop, Capacitor less, En, SOT23-5L

LDLN015*: 150mA Ultra Low Noise, High PSRR, En, DFN2x2-6L

STLQ015: 150mA, Very low Iq, En, SOT666

LDK120*: 200mA, Very Low Drop, En, SOT23-5L, SOT323-5L

LDS3985: 300mA, En, DFN3x3-6L, SOT23-5L

LD39030SJXX12: 300 mA low quiescent soft-start,
0.8x0.8mm CSP

LD39130S*: 300mA, Low Iq, Low noise, Green Mode,
En, 0.69x0.69mm CSP and 1.2x1.3mm DFN-6L

LD39050: 500mA, low Iq, En, PG, DFN3x3-6L

LD39080: 800mA, En, PPAK, DFN8

LD39100: 1A, low Iq, En, PG, DFN3x3-6L

ST1L05: 1.3A, En, PG, DFN3x3-6L

En=Enable Pin, PG=Power Good pin

Step-Down Converters

ST1S12: 5V, 700mA, Synchronous, TSOT23-5L

L598x: 0.7 to 4A, 18V VFQFPN8

L6928: 5V, 800mA, MSOP8

ST1S06/ST1S09: 5V, 1.5A/2A, Synchronous, DFN3x3-6L

ST2S06A33: Dual Output, 5V, 500mA, 3.3V + ADJ

ST1S40/ST1S41: 18V, 3/4A synchronous SO8, DFN8 & HSOP8

ST1S31/ST1S32*: 5V, 3/4A synchronous SO8, DFN8

PM6644: 25V, 350mA, synchr. 3.3V VRef

L7985/L7986: 38V, 2/3A, non-synchr.

Step-Up Converters

L6920D: 1V start up, 5V out, 500mA, MSOP8 synchr

ST8R: from 6 to 12V, at 1A, synchr.

STOD2540: from 3-5V to 25V at 40mA, non-synchr.

STOD1812: from 2-5V to 20V at 120mA, synchr.

Buck-Boost Converters

STBB1: 1A synchronous, DFN3x3-10L

STBB2*: 800mA, 3MHz, synchronous, CSP

STBB3*: 2A, 2MHz, DFN3x3, synchronous

Power Management (2/4)

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The STM32 ARM Cortex has an embedded reset but some applications need to be independent on micro hardware to ensure more robustness and reliability to the system. Moreover a tighter accuracy on voltage reference than the one offered by the STM32 can be required ($\pm 5\%$ accuracy). ST offers a comprehensive family of reset, voltage detectors and supervisors.

Microprocessor Supervisor & Reset ICs

STM1061 : low power voltage detectors $\pm 2\%$ accuracy

STM809: Push-Pull Reset with Manual Reset Input

STM810/11/12 : Push-Pull Reset with Manual Reset Input

STM1001 : Active Low open drain Reset

STM181x : Reset with open drain, push-pull output and Manual Reset Input

STM63xx, **STM68xx**, **STM70x**, **STM69x**, **STM8xx** : Supervisor with Reset Output, Watchdog, Switch Over and PFI/PFO

STM1831: Voltage detector with sense input and external delay capacitor, 1.6V to 5.7V voltage detection thresholds.

Voltage Reference, Low Power Shunt

An external low power voltage reference can be used to maintain ADC accuracy independent of V_{cc} variation such as in battery-powered applications.

TS431: adjustable shunt reference from 1.24V to 6V, SOT23-5, TO-92

TS432: adjustable shunt reference from 1.24 to 10V, SOT23-3

LM4041: fixed high precision shunt reference at 1.225V, SOT23-3L and SC70-5L

Power Management (3/4)

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Battery Management

L6924D/U: 1A Wall/USB Battery Charger System for Li-Ion / Li-Polymer, VFQFPN16

STBC08: 800mA Standalone linear Li-Ion Battery charger with thermal regulation, DFN6

STC4054: 800mA Standalone linear Li-Ion Battery charger with thermal regulation, TSOT23-5L

STBC21* - 1.2A Linear battery charger with Battery Temperature Control

ST4078* –950mA , 30V tolerant Linear prog. Dual input (Wall adapter& USB) Li-Ion battery charger, DFN3x3-10L

External battery management circuits can be used to charge and monitor a Li-Ion battery in portable applications.

These devices are driven by a standard I²C link:

STw4102: Dual USB/wall adapter Li-ion battery charger with gas gauge

STC3100: Battery monitor IC with Coulomb counter/gas gauge

STC3105: Battery monitor IC with Coulomb counter/gas gauge (Most compact Solution in DFN 2x3mm)

* Product under development. Contact Division

Power Management (4/4)

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Power over Ethernet

PM8800A: Integrated IEEE 802.3af compliant PoE-PD controller

PM8803: Integrated IEEE 802.3af/at compliant PoE-PD controller

Single phase, single output DC/DC controllers for 12V bus

L6726A: 270KHz, OTA, SO8

L6727: 300KHz, Voltage Mode, SO8

L6728D: 300KHz, DFN10, PGOOD

L6728AH: 600KHz, DFN10, PGOOD

L6738: ADJ up to 600MHz, QFN16, Green Mode

Single phase, multi output DC/DC controllers

PM6675S: 28V Vin, 1 SW + 1 LDO, QFN 4x4

PM6675AS: 36V Vin, 1 SW + 1 LDO, QFN 4x4

PM6680: 28V Vin, 2 SW + 1 LDO, QFN 5x5

PM6680A: 36V Vin, 2 SW + 1 LDO, QFN 5x5

PM6685: 28V Vin, 2 SW + 2 LDO, QFN 5x5

OLED Display Power Supply

STOD1812: PMOLED (Passive Matrix OLED) display power supply

STOD2540: PMOLED (Passive Matrix OLED) display power supply

STOD02: AMOLED (Active Matrix OLED) 2.5" - 3" display power supply

STOD03: AMOLED (Active Matrix OLED) 3" - 4" display power supply

STOD13x: AMOLED (Active Matrix OLED) 4" - 5" display power supply

STOD04*: AMOLED (Active Matrix OLED) 5" - 7" display power supply

STOD14.*: AMOLED (Active Matrix OLED) 7" - 9" display power supply