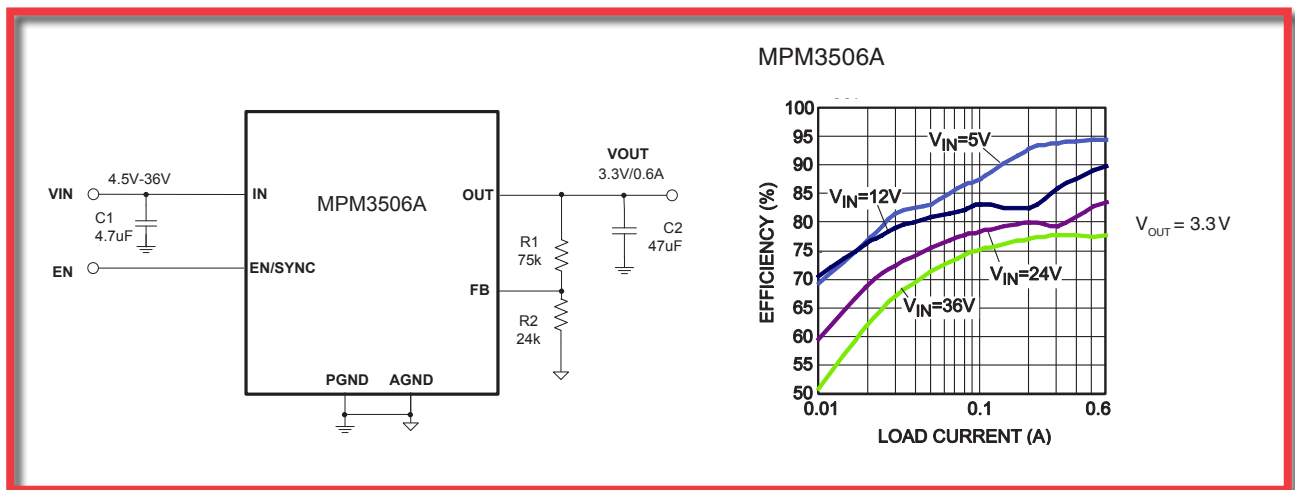


endrich news

www.endrich.com

Our Product of the Month MPM3506A/MPM3510A – DC/DC-CONVERTER MODULES



- Synchronous, rectified step-down converters with integrated MOSFETs and inductors
- Compact solution with only 4 external components
- 0.6A or 1.2A continuous output current with excellent load and line regulation over a wide supply voltage range

MPS[®]
Monolithic Power Systems

Innovative Analog IC Technology

SYNCHRONOUS STEP-DOWN CONVERTER WITH INTEGRATED INDUCTOR

The **MPM3506A/3510A** are synchronous, rectified, step-down converters with built-in power MOSFETs and inductors. They offer a compact solution with only 4 external components to achieve a 0.6A or 1.2A continuous output current with excellent load and line regulation over a wide input supply range. Both operate in a 1.15MHz switching frequency, which provides fast load transient response. Full protection features include over-current protection (OCP) and thermal shutdown (TSD).

The MPM3506A/3510A converters are available in a space-saving QFN-19 (3mm×5mm×1.6mm) package.

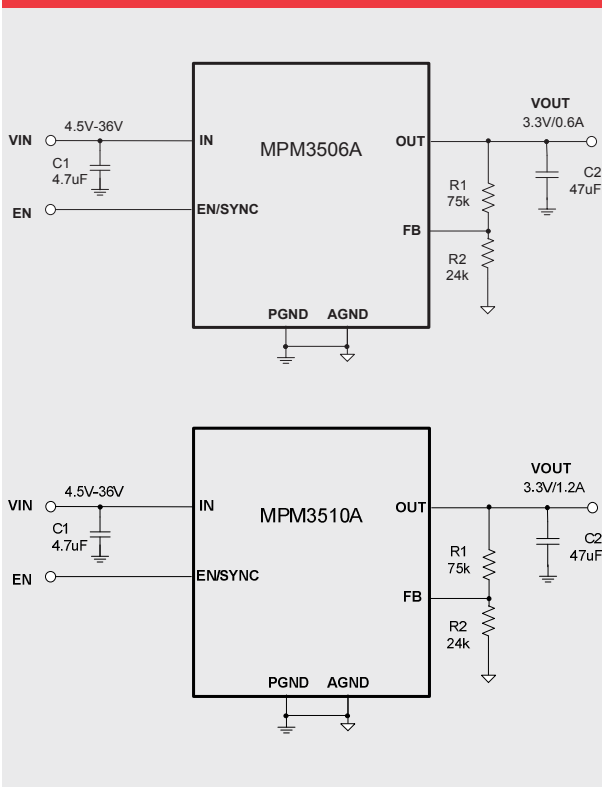
APPLICATIONS

- » Industrial Controls
- » Automotive
- » Medical and Imaging Equipment
- » Telecom Applications
- » LDO Replacement
- » Space and Resource-Limited Applications
- » Distributed Power Systems

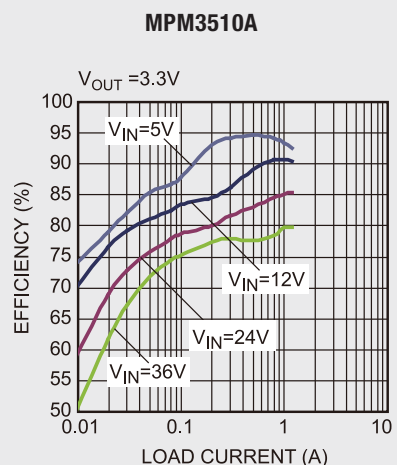
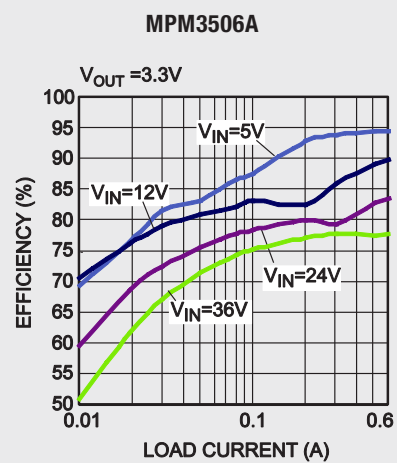
FEATURES

- » Complete Switch Mode Power Supply
- » 4.5V to 36V Wide Operating Input Range
- » 0.6A/1.2A Continuous Load Current
- » 90 mΩ/60 mΩ (MPM3506A) / 80 mΩ/50 mΩ (MPM3510A) Low $R_{DS(ON)}$ Internal Power MOSFETs
- » Fixed 1.15 MHz Switching Frequency
- » 800 kHz to 2 MHz Frequency Sync
- » Power-Save Mode for Light Load
- » Power Good Indicator
- » OCP with Valley-Current Detection and Hiccup
- » Thermal Shutdown
- » Output Adjustable from 0.8V
- » Available in a QFN-19 (3mm×5mm×1.6mm) Package
- » Total Solution Size 6.7mm×6.3mm

APPLICATION CIRCUIT



EFFICIENCY VS. LOAD CURRENT



SUPER PULSE CAPACITORS – SPC SERIES – UPDATE



The EVE design and production of the super pulse capacitor **EVE-SPC** is a momentary high-current discharge energy storage devices can be achieved within a temperature range of -40°C to +85°C pulse discharge.

The **EVE-ES** pulse power are long life lithium batteries and super pulse capacitor in parallel with the power system. It is the ideal power source for long-term standby and high-current pulse applications.

In terms of design, EVE uses a unique safety valve and sealing, to ensure power supply in the use of process safety and reliability.

KEY FEATURES

- » High and stable voltage 3.6V (optional 3.9V)
- » High pulse current capability
- » No passivation effects
- » Wide temperature range (-40°C to +85°C)
- » Very low self discharge (less than 2% per year)
- » End of life indication capability
- » Light weight
- » Safe design (Anti-explosion valve device)

APPLICATIONS

- » Utility meters
- » GPS tracking devices / GSM modems
- » Asset, Container & Cargo tracking
- » RFID transponders
- » Sonar buoys
- » Data Loggers
- » Communication equipment
- » Emergency & Medical devices

SPECIFICATIONS

	MODEL	SYSTEM PACK	NOMINAL CAPACITY	NOMINAL DISCHARGE CURRENT [mA]	MAX. CHARGING CURRENT [mA]	DIMENSIONS [mm]
Super Pulse Capacitors SPC Series						
	SPC0920		30 As@3.67 V 45 As@3.90 V	150	6	9.0 × 21.0
	SPC1520		140 As	500	50	15.0 × 20.5
	SPC1530		250 As@3.67 V 380 As@3.90 V	750	50	15.1 × 26.7
	SPC1550		560 As	2000	100	15.0 × 50.5
NEW	PLM1550		1620 As	250	100	15.0 × 50.5
ES Power System Packs						
	ES141520	SPC1520+ER14xxx	2400 mAh	2		16.5 × 75.0
	ES261520	SPC1520+ER26xxx	8500 mAh	3		29.0 × 67.0
	ES341520	SPC1520+ER34xxx	19000 mAh	4		34.0 × 78.0
	ES141550	SPC1550+ER14xxx	2400 mAh	2		55.0 × 32.0 × 16.0
	ES261550	SPC1550+ER26500	8500 mAh	3		55.0 × 44.0 × 28.0
	ES341550	SPC1550+ER34615	19000 mAh	4		64.0 × 50.0 × 35.0

MEMS OSCILLATORS AND CLOCK GENERATORS – PRODUCT PORTFOLIO

INSTANT SAMPLES
 GREEN SOLUTIONS
 LIFETIME WARRANTY

32 kHz TCXO	µPower XO	Ultra-Performance XO	+125°C High Temp XO	AEC-Q100 Automotive Clocks	Clock Generator	Spread Spectrum XO	VCXO	(VC) TCXO	DCXO
SiT1552 32.768 kHz 1.5 to 3.63V ±5,10,20 PPM	SiT8021 1-26 MHz 60-280 µA	SiT8208/9 1-220 MHz	SiT1618 7.3728-48 MHz -40 to +125°C	SiT8924 1-110 MHz -40 to +125°C	SiT2001 1-110 MHz	SiT9001 1-200 MHz	SiT3807 1.5-45 MHz	SiT5000 10-45 MHz ±5 PPM	SiT3907 1-220 MHz
32 kHz XO and XTAL Replacement	Low Power XO	SiT8225 25 MHz 1/10 GbE	SiT8918/9 1-137 MHz -40 to +125°C	SiT8925 115.20-137 MHz -40 to +125°C	SiT2002 115-137 MHz	SiT9003 Low Power 1-110 MHz	SiT3808/9 1-220 MHz	SiT5001/2 1-220 MHz ±5 PPM	SiT3921/2 1-625 MHz
SiT1532 32.768 kHz 1508 CSP 1.2 to 3.63V	SiT1602 3.75-77.76 MHz 3.1-4.9 mA	SiT8256 156.25 MHz 1/10 GbE	SiT8920/1 1-137 MHz -55 to +125°C	SiT2024 1-110 MHz -40 to +125°C SOT23-5	High Temp Clock Generator	SiT9002 1-220 MHz	SiT3821/2 1-625 MHz	SiT5021/2 1-625 MHz ±2.5 to 5 PPM	Serially Configured XO
SiT1533 32.768 kHz 2012 SMD 1.2 to 3.63V	SiT8008/9 1-137 MHz 3.1-5.9 mA	SiT9120 25-212.5 MHz	SiT2025 115.20-137 MHz -40 to +125°C SOT23-5	SiT2018/9 1-137 MHz -40 to +125°C					SiT3509 1-220 MHz 9 selectable frequencies
SiT1534 1 Hz-32.768 kHz 1.2 to 3.63V	SiT8003XT 0.25mm thin 1-110 MHz 3.1-6.6 mA	SiT9121/2 1-625 MHz		SiT2020/1 1-137 MHz -55 to +125°C					Serially Configured DCXO
SiT1630 32.768 kHz Oscillator		SiT9156 156.25 MHz 10/40 GbE							SiT3519 1-220 MHz 9 selectable frequencies

■ NanoDrive™ output for lowest power
 ■ LVDS/LVPECL output
 ■ Available as field programmable for use with Time Machine II Programmer

■ LVCMOS output
 Pin-to-pin compatible with quartz devices

TYPE	OUTPUT FREQUENCY	FREQUENCY STABILITY [ppm]	SUPPLY VOLTAGE [V]	SUPPLY CURRENT	PACKAGE [mm]	OUTPUT LOGIC/ TM II SUPPORT	
						Logic	Support
Ultra-Small 32 kHz Solutions XTAL Replacements							
SiT1532, SiT1533	32.768 kHz	10, 20 room; 75, 100 over temp.	1.2 to 3.63	0.90 µA	1.5x0.8x0.55H (CSP), 2.0x1.2x0.6H (QFN)	NanoDrive™. LVCMOS	
SiT1534	1 Hz to 32.768 kHz	10, 20 room; 75, 100 over temp.	1.2 to 3.63	0.90 µA	1.5x0.8x0.55H (CSP), 2.0x1.2x0.6H (QFN)	NanoDrive™. LVCMOS	
SiT1552 TCXO	32.768 kHz	±5, ±10, ±20 over temp.	1.5 to 3.63	0.99 µA	1.5x0.8x0.55H (CSP)	NanoDrive™. LVCMOS	
µPower Oscillators (LVCMOS) 1 to 280 µA power consumption, ultra small size							
SiT1630	32.768 kHz	20 room; 75,100,150 over temp	1.5 to 3.63	1.00 µA	2.0x1.2x0.6H (DFN)	LVCMOS	
SiT8021	1 to 26 MHz	±100	1.8	60 to 280 µA (0.9 µA stby)	1.5x0.8x0.55H (CSP)	LVCMOS	

MEMS OSCILLATORS AND CLOCK GENERATORS – PRODUCT PORTFOLIO

TYPE	OUTPUT FREQUENCY	FREQUENCY STABILITY [ppm]	SUPPLY VOLTAGE [V]	SUPPLY CURRENT	PACKAGE [mm]	OUTPUT LOGIC/ TM II SUPPORT	
						Logic	Support
Low-Power Oscillators (LVCMOS) 3.1 to 5.5 mA power consumption							
SIT1602, SIT8008/9	1 to 137 MHz	±20, ±25, ±50	1.8, 2.5 to 3.3	3.1 to 5.5 mA (0.6 - 1.0 µA stby)	2.0x1.6, 2.5x2.0, 3.2x2.5, 5.0x3.2, 7.0x5.0 (DFN)	LVCMOS	✓
Ultra-Performance Oscillators 0.3 to 0.6 ps RMS integrated phase jitter							
SIT8208/9, SIT8225/56	1 to 220 MHz	±10, ±20, ±25, ±50	1.8, 2.5 to 3.3	29 to 36 mA (10 µA stby)	2.5x2.0, 3.2x2.5, 5.0x3.2, 7.0x5.0 (DFN)	LVCMOS	✓
SIT9120/21/22 SIT9156	1 to 625 MHz	±10, ±20, ±25, ±50	2.5 to 3.3	54 to 69 mA	3.2x2.5, 5.0x3.2, 7.0x5.0 (DFN)	LVPECL, LVDS	✓
High-Temperature and Automotive Oscillators +125°C operating temperature, 0.1 ppb/g (G-sensitivity)							
SIT1618, SIT8918/19 -40 to +125°C	1 to 137 MHz	±20, ±25, ±30, ±50	1.8, 2.5 to 3.3	3.6 to 5.4 mA (1.0 µA stby)	2.0x1.6, 2.5x2.0, 3.2x2.5, 5.0x3.2, 7.0x5.0 (DFN)	LVCMOS	✓
SIT8920/21 SIT8924/25 -55 to +125°C	1 to 137 MHz	±20, ±25, ±30, ±50	1.8, 2.5 to 3.3	3.6 to 5.4 mA (1.0 µA stby)	2.0x1.6, 2.5x2.0, 3.2x2.5, 5.0x3.2, 7.0x5.0 (DFN)	LVCMOS	✓
VCXO ±25 to ±1600 ppm pull range, <1% linearity, 0.6 ps RMS integrated phase jitter							
SIT3807/8/9	1 to 220 MHz	±10, ±25, ±50	1.8, 2.5 to 3.3	29 to 34 mA (10 to 70 µA stby)	2.5x2.0, 3.2x2.5, 5.0x3.2, 7.0x5.0 (DFN)	LVCMOS	✓
SIT3821/22	1 to 625 MHz	±10, ±25, ±50	2.5 to 3.3	55 to 69 mA	3.2x2.5, 5.0x3.2, 7.0x5.0 (DFN)	LVPECL, LVDS	✓
DCXO (Digitally-Controlled Oscillators) ±25 to ±1600 ppm pull range, <1% linearity, 0.5 ps RMS integrated phase jitter							
SIT3907	1 to 220 MHz	±10, ±25, ±50	1.8, 2.5 to 3.3	32 mA	3.2x2.5, 5.0x3.2, 7.0x5.0 (DFN)	LVCMOS	✓
SIT3921/22	1 to 625 MHz	±10, ±25, ±50	2.5 to 3.3	55 to 69 mA	3.2x2.5, 5.0x3.2, 7.0x5.0 (DFN)	LVPECL, LVDS	✓
SCXO (Serially-Configured Oscillators) 9 user selectable output frequencies, single-pin programmability							
SIT3509	1 to 220 MHz	±25, ±50	1.8, 2.5, 2.8, 3.3	29 to 31 mA	2.5x2.0, 3.2x2.5, 5.0x3.2, 7.0x5.0 (DFN)	LVCMOS	
SIT3519 Digital Control	1 to 220 MHz	±25, ±50	1.8, 2.5, 2.8, 3.3	29 to 31 mA	2.5x2.0, 3.2x2.5, 5.0x3.2, 7.0x5.0 (DFN)	LVCMOS	
TCXO/VCTCXO ±12.5 to ±50 ppm pull range, 0.6 ps RMS integrated phase jitter							
SIT5000/1/2	1 to 220 MHz	±2.5, ±5	1.8, 2.5, 2.8, 3.0, 3.3	29 to 34 mA (10 to 70 µA stby)	2.5x2.0, 3.2x2.5, 5.0x3.2, 7.0x5.0 (DFN)	LVCMOS	
SIT5021/22	1 to 625 MHz	±2.5, ±5	2.5, 3.3, 2.25 to 3.63	55 to 69 mA	3.2x2.5, 5.0x3.2, 7.0x5.0 (DFN)	LVPECL, LVDS	
SSXO (Spread Spectrum Oscillators) ±0.25 to ±2% center spread, -0.5% to 4.0% down spread							
SIT9001/3	1 to 200 MHz	±25, ±50, ±100	1.8, 2.5, 3.3	3.7 to 20 mA (0.4 to 30 µA stby)	2.5x2.0, 3.2x2.5, 5.0x3.2, 7.0x5.0 (DFN)	LVCMOS	✓
SIT9002	1 to 220 MHz	±25, ±50	1.8, 2.5, 3.3	48 to 75 mA	5.0x3.2, 7.0x5.0 (DFN)	LVPECL, CML LVDS, HCSL	✓
Clock Generators with Integrated Resonator Single output, low power							
SIT2001, SIT2002	1 to 137 MHz	±20, ±25, ±50	1.8, 2.5 to 3.3	3.6 to 5.4 mA (1.0 µA stby)	2.9 x 2.8 (SOT23-5)	1 x LVCMOS	✓
High-Temp and Automotive Clock Generators +125°C, integrated resonator, single output, low power, 0.1 ppb/g							
SIT2018/19 -40 to +125°C	1 to 137 MHz	±20, ±25, ±30, ±50	1.8, 2.5 to 3.3	3.6 to 5.4 mA (1.0 µA stby)	2.9 x 2.8 (SOT23-5)	1 x LVCMOS	✓
SIT2020/21, SIT2024/25 -55 to +125°C	1 to 137 MHz	±20, ±25, ±30, ±50	1.8, 2.5 to 3.3	3.6 to 5.4 mA (1.0 µA stby)	2.9 x 2.8 (SOT23-5)	1 x LVCMOS	✓

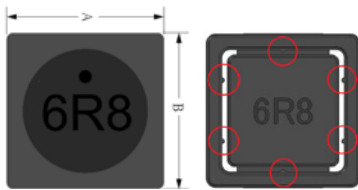
*Time Machine II Oscillator Programmer. © July 2015 SiTime Corporation, a MegaChips Company. Subject to change without notice. www.sitime.com/products

FUTURE-PROOF QS TYPE INDUCTORS



QS type is ABC's new development with regards to shielded SMD power inductors in middle size (4×4mm ~ 5×5mm later to 7×7mm). It was developed specially for automatic production in order to reduce cost. The special construction with positioning knobs helps to increase production yield and further adds to reducing cost. By using PVD instead of plating for metallization, QS type is produced in a eco-friendly, energy-saving way.

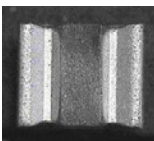
INSIDE CHANGES



In order to reach an even distribution of inductance values during manufacturing process, it is necessary to control

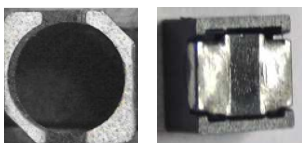
the air gap between DR core and shielding core precisely. The original design was changed from round shape to square shape. Positioning knobs in the shielding core are used to support exact alignment of cores and keep distance same all around. Besides the better production yield, this technique also enables ABC to specify their QS type coils with tighter tolerances compared to older design.

TERMINAL FORMING



For QS type, PVD (physical vapor deposition) is used to form the electrodes. The advantages are a very even and smooth surface and this method is considered eco-friendly compared with electro-plating because no chemical solvents are used.

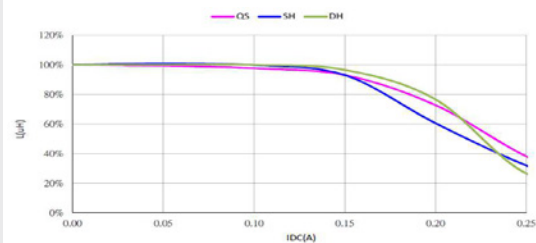
STANDARDIZED PCB PATTERN



Crescent PCB pattern is very popular by manufactures of mid sized inductors. This way of metallization is quite simple (for manual process – by dipping) and will give the coil a good solder connection on the PCB. By using PVD, ABC decided to change the PCB pattern from crescent shape to the square shape. Positive: easier for new design – compatible with crescent design (with limitation)

COMPARISON TO OTHER POPULAR TYPES

Series	QS3818	SH3018	DH3018
Value	100μH	100μH	100μH
DCR (Ω)	1,48	1,93	2.4
Isat (A)	0.20	0.18	0.20



QS coils are developed to solve all the problems that prior versions brought from technological point of view such as soldering, processability, manufacturing risk, etc and are meant to replace the older versions e.g. ABC's popular SH-; DH- or SU type that suffer from continuously cost increase due to most of their production processes being manual work. QS coils are suitable for easy pick and place, excellent soldering up to 260°C as well as RoHS and Reach compliant.

Due to automatic production process the quality will become very stable. On top of this, ABC uses auto soldering, auto marking, auto glueing and auto test & packaging. ABC set their quality goals high and add a double 100% outgoing inspection (manual and automatic) to their process. Parts are in top condition and passed successfully the AEC-Q200 tests and are therefore suggested to use in automotive applications.

ABC continues to develop new productions towards to the three directions high speed, high current, low profile. One example are coils with powder injection or amorphous core material. Regarding QS type the following items are under development to complete QS line up: QS3828 (3.8×3.8×2.8mm), QS5828 (5.8×5.8×2.8mm), QS6828 (6.8×6.8×2.8mm).

SAMPLE SETS AVAILABLE FROM Q4/2015:

- » QS3818 – 3.8×3.8×1.8 mm:
1R0/2R2/3R3/4R7/6R8/100/220/470/680/101
- » QS4818 – 4.8×4.8×1.8 mm:
1R0/2R2/3R3/4R7/6R8/100/220/470/680/101
- » QS4828 – 4.8×4.8×2.8 mm:
1R2/4R7/100/220/470/680/101/221/471/561

Please ask for availability and price!

SURGE PROTECTION MODULES FOR LED-LIGHTING



The new overvoltage protection modules of **PBSP series** of the manufacturer ProTek Devices are protection module, which are designed to protect against lightning surge currents up to 10000 ampere (PBSP-XXX-10K series) or up to 20000 ampere (PBSP-XXX-20K series). The under UL1449 type 4 recognized modules meet the ANSI

Standard C136.2 / IEEE C62.41.2 Location Category C High Exposure and are IEC61643-11 Class II / EN61643-11 type 2 compliant. In addition to the compact form factor with mounting tabs, the modules are waterproof and dustproof according IP66. The operating temperature is in a range of -40°C to +85°C.

Pulse rating @ 8/20 μ s:

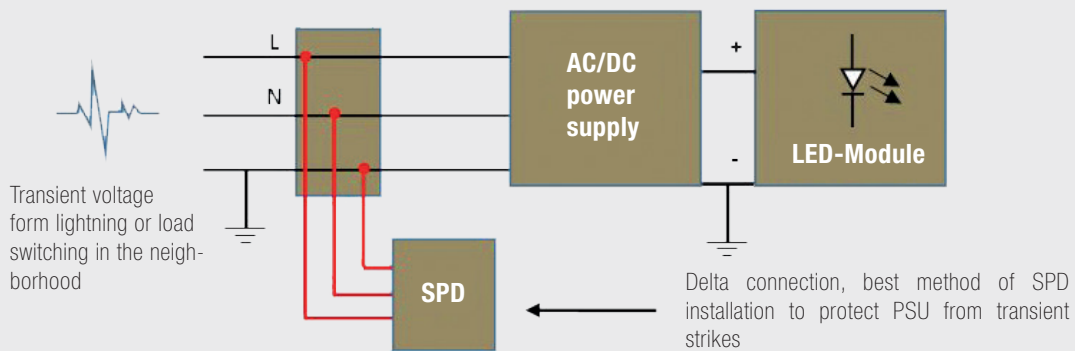
PBSP-10K series:

- 1×10000 A
- 2×6500 A
- 10×3000 A
- 1000×1500 A

PBSP-20K series:

- 1×20000 A
- 2×13000 A
- 10×6000 A
- 1000×3000 A

APPLICATION EXAMPLE/DESIGN SCHEMATIC CIRCUIT



ELECTRICAL CHARACTERISTICS PER LINE

PART NUMBER	RATED STAND-OFF VOLTAGE V_{WM} [V _{AC}]	ENERGY [J] @ 2ms 1× PULSE	MAX. PEAK PULSE CURRENT I_{PP} [A] @ 8/20 μ s	MAX. CLAMPING VOLTAGE [V] @ 8/20 μ s, $I_p=100A$	TYP. CAPACITANCE [pF] @ 0V, 1MHz
PBSP-120-10K	120	275	10000	660	1500
PBSP-220-10K	220	440	10000	1350	750
PBSP-240-10K	240	460	10000	1355	740
PBSP-277-10K	277	500	10000	1400	720
PBSP-380-10K	380	565	10000	1680	600
PBSP-120-20K	120	550	20000	650	3000
PBSP-220-20K	220	880	20000	1350	1500
PBSP-240-20K	240	920	20000	1355	1480
PBSP-277-20K	277	1100	20000	1500	1400



2 GB/4 GB DDR3 & LOW POWER SDRAM – M15F/M15T SERIES

Recently our supplier ESMT launched 2Gb and 4Gb DDR3 and Low Power DDR3.

DDR3

2Gb DDR3 (1.5V) – ESMT P/N# M15F2G16128A (2B)

4Gb DDR3 (1.5V) – ESMT P/N# M15F4G16256A

Low Power DDR3

2Gb DDR3L (1.35V) – ESMT P/N# M15T2G16128A(2B)

4Gb DDR3L (1.35V) – ESMT P/N# M15T4G16256A

They are internally configured as eight bank DRAMs and they are **JEDEC DDR3** compliant.

M15F2G16128A

– 16 M x 16 Bit x 8 Banks

M15F4G16256A

– 32 M x 16 Bit x 8 Banks

M15T2G16128A(2B)

– 16 M x 16 Bit x 8 Banks

M15T4G16256A

– 32 M x 16 Bit x 8 Banks

ORDERING INFORMATION

PRODUCT ID	AX. FREQUENCY	SUPPLY VOLTAGE V _{DD}	DATA RATE (CL-tRCD-tRP)	PACKAGE	
M15F2G16128A-DEBG2B	933 MHz	1.5V	DDR-1866 (13-13-13)	96-ball (9 mm×13 mm) BGA	Pb-free
M15F2G16128A-BDBG2B	800 MHz	1.5V	DDR-1600 (11-11-11)	96-ball (9 mm×13 mm) BGA	Pb-free
M15F4G16256A-DEBG	933 MHz	1.5V	DDR-1866 (13-13-13)	96-ball (9 mm×13 mm) BGA	Pb-free
M15F4G16256A-BDBG	800 MHz	1.5V	DDR-1600 (11-11-11)	96-ball (9 mm×13 mm) BGA	Pb-free
M15T2G16128A-BDBG2B	800 MHz	1.35V	DDR-1600 (11-11-11)	96-ball (9 mm×13 mm) BGA	Pb-free
M15T4G16256A-BDBG	800 MHz	1.35V	DDR-1600 (11-11-11)	96-ball (9 mm×13 mm) BGA	Pb-free

new

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