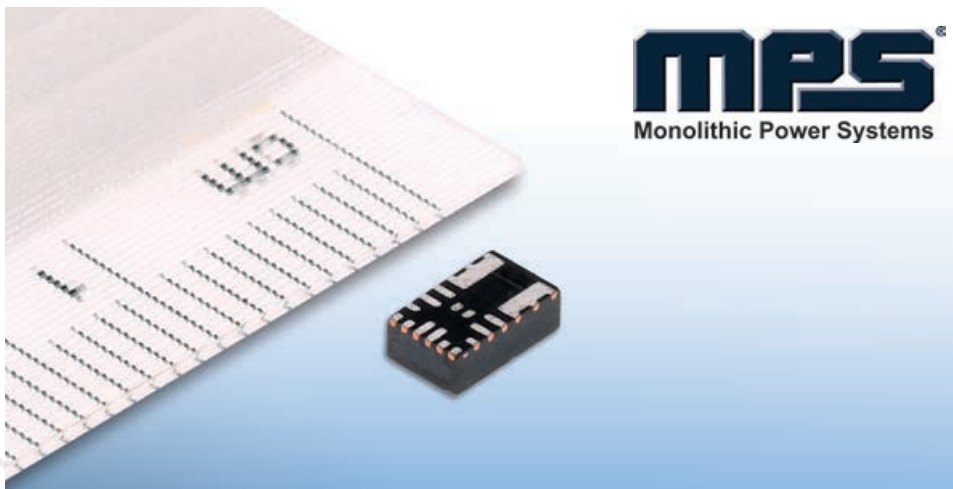


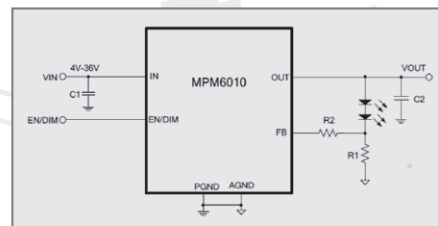
# endrich news

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## OUR PRODUCT OF THE MONTH: MPM6010



**MPM6010 36 V / 1.5 A Module**  
High-Efficiency, Synchronous,  
Step-Down LED Driver  
with Integrated Inductor  
AEC-Q100 Qualified



- Complete Switch Mode Power Supply
- Wide 4 V to 36 V Operating Input Range
- Integrated 2.2  $\mu$ H Power Inductor (AEC-Q200 Component)
- 85 m $\Omega$  / 50 m $\Omega$  Low RDS (ON) Internal Power MOSFETs
- Wide PWM Dimming 100 Hz – 2 kHz Fault Indication for LED Short, Open, and Thermal Shutdown
- Over-Current Protection (OCP) with Valley Current Detection
- Available in a Wettable Flank Package
- Package QFN-17 (3 x 5 x 1.6 mm)

## HOTSPOT PLUS LED DRIVER & EMERGENCY SYSTEM

THE POWER OF A PROGRAMMABLE LED DRIVER, THE DEPENDABILITY OF AN INTEGRATED LED BATTERY BACKUP SYSTEM



**Fulham Company Europe** launch a new European Spec All-in-One, LED driver, Emergency driver/inverter and battery backup. Complying with all relevant European standards, including Emergency Lighting and latest revisions, Fulham's new HotSpot Plus looks to take away the headache from emergency lighting.

The all-in-one solution eliminates typical wiring and installation nightmares usually associated with emergency lighting circuits. Hotspot Plus is one single case unit with a max. 45 W dimmable LED driver integrated with cable-clamp, loop-in/loop-out connectors for mains input and LED output connectors to the luminaire; it could not be more simple.

The extremely compact unit has an integrated, replaceable battery with 12 hour recharge and a discharge capacity to power a selectable 3 W/180 minutes or 6 W/90 minutes.

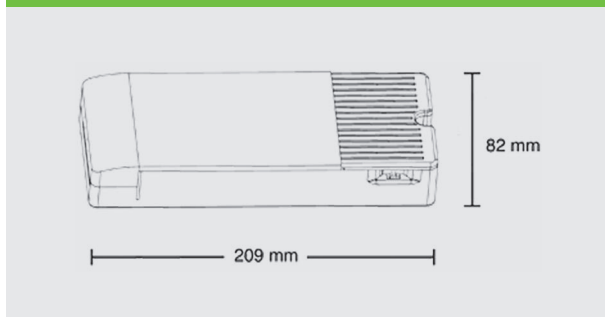
The LED driver output is programmable with a very inexpensive, quick and easy to use, hand held digital programmer. This allows you easily to select the required output current in 1 mA increments from 250 mA to 1400 mA. It means you need to keep just one single product in stock that will cover a vast number of Emergency LED requirements and will be compatible with an extensively wide range of LED luminaires.

In the event of a power outage, the un-switched/permanent live connection to the HotSpot Plus will detect the emergency and will automatically switch over to the integrated battery and emergency driver. Using a simple selector switch on the HotSpot Plus, you can pre-set the required emergency output power up to 6 W for 1.5 hours, the default being set at 3 W output for 3 hours.

### FEATURES

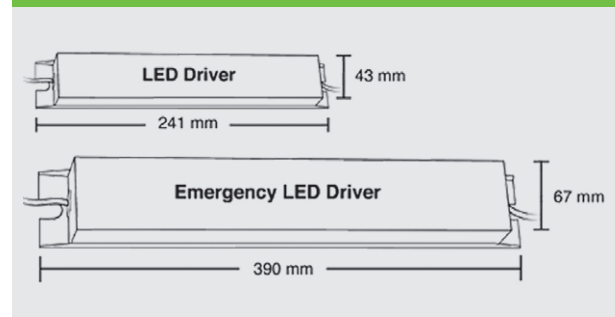
- All-in-One Unit
- 45 W Dimmable LED Driver
- Built-in Emergency Driver
- Inverter/Battery Charger
- Replaceable Integrated Battery
- Selectable Emergency Output
- Selectable Auto / Self-Test Function
- Programmable LED Driver Output
- 5 Year Warranty / 3 Year Battery Warranty

### HOTSPOT PLUS



**The Smallest complete Emergency LED System**

### TRADITIONAL EMERGENCY SYSTEM



**Standard LED Driver & Emergency Driver**

## HOTSPOT PLUS LED DRIVER & EMERGENCY SYSTEM

Automatic self-test functionality is also included; so, if required, it's available and built-in, if it is not required, simply leave it switched off. The automatic self-test functionality fully complies with the European standards for monthly and annual test requirements.

Each HotSpot Plus comes with a dual colour, green & red LED status indicator with integrated test-switch. Static green indication will show healthy and correct operation whilst the static red indication alerts of a problem. This circular indicator / test switch is supplied on a lead and is with mounting rings to enable quick and easy installation.

Additional advanced features such as programmable dimming curve, NTC input (temperature protection) and built-in "black-box" for collection of usage data (hours operated and at what temperature for example) are also included as standard.

This compact unit is so simple to use, easy to set-up and quick to install whilst powerful and feature packed, it provides a truly all-in-one Emergency LED solution.

The HotSpot Plus All-in-One is the single stock item solution that will eliminate many of the difficulties, complications and frustrations commonly related to Emergency lighting.

WATTS	OUTPUT CURRENT (MA)	OUTPUT VOLTAGE (VDC)	MODEL NUMBER	INPUT VOLTAGE (VAC)	DIMMING TYPE	CH.	DIMENSIONS (LxWxH) (MM)	CASE TYPE
45	250-1400	10-55	<b>FHSAC1-230-45CE</b>	220 - 240 (50/60)	0-10 V	1	209 x 82 x 34	Compact w/ Terminals

POWER FACTOR	THD	DIMMING RANGE	BATTERY TYPE	RECHARGE TIME	WARRANTY	ADVANCED FEATURES
>0.9	<20 %	100 - 1 %	<b>LiFeP04</b>	12 Hours	5 years	Illuminated test switch/AC power indicator, switchable self-diagnostics, user-selectable emergency power level HotSpot Plus LED Drive



### THE POWER OF PROGRAMMABILITY



The HotSpot Plus system runs on Fulham's innovative SmartSet programming platform, giving the user the power to create the right driver for almost any almost any situation. Programming is simple, using either the handheld TPSB-100EU SmartSet controller or feature-rich SmartSet PC Software. The driver does not need to be powered during programming, and an auto-program feature allows quick, one-touch programming of multiple units with confirmation. The same programmer can also be used with Fulham's WorkHorse LED drivers, with new features constantly being added.

# HYBRID LINE UP



**SUN Electronic Industries (SEI)** is the inventor of hybrid capacitors, sold under the brand name "EP-cap". SUN manufactures these capacitors since 2006 and is now finalizing the 4th generation. All hybrid capacitors are AEC-Q200 qualified and are manufactured according to the TS 16949 standard.

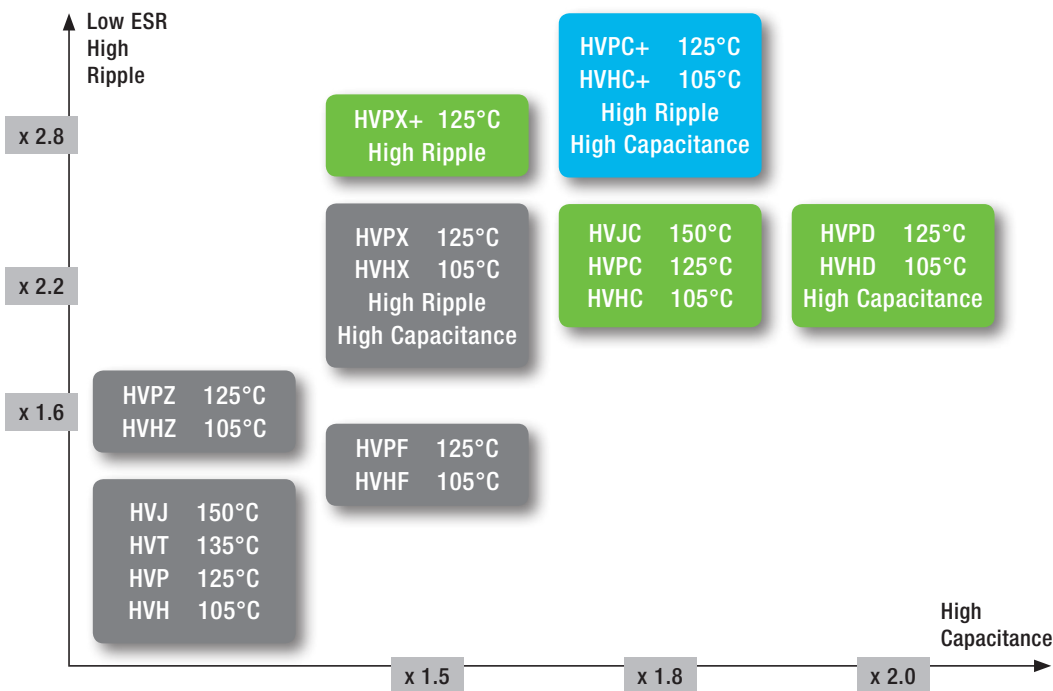
## HYBRID CAPACITORS – THE SERIES

<b>Long endurance</b>	<b>Efficiency / standby</b>	<b>Thermal robustness</b>	<b>Performance stability</b>	<b>Safe operation</b>
4000 @125°C	low ESR low leakage current	high ripple current	vs. temperature and frequency	„open“ failure mode

## FEATURES

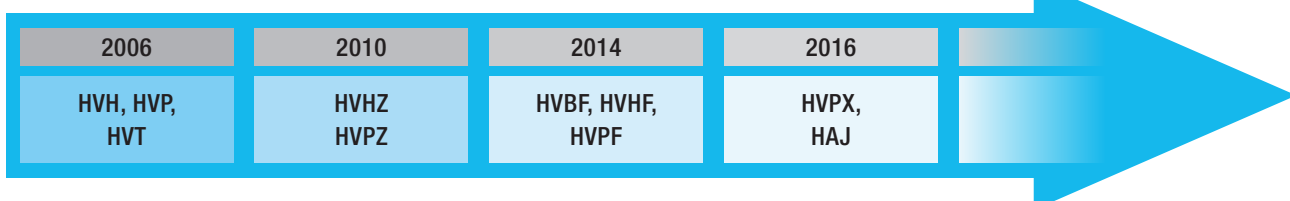
- Line up for SMD technology and radial from 6 V to 125 V
- Max. ripple @100 kHz / 105 °C – 4.340 mArms
- Life time @105°C – up to 10.000h
- Low ESR down to 14 mOhm

## LINE UP / ROADMAP



### Legend:

- MP 2018
- MP 2017 (Q4)
- Now MP



# HYBRID CONDUCTIVE POLYMER TYPE / SURFACE MOUNT TYPE



## HVPX SERIES

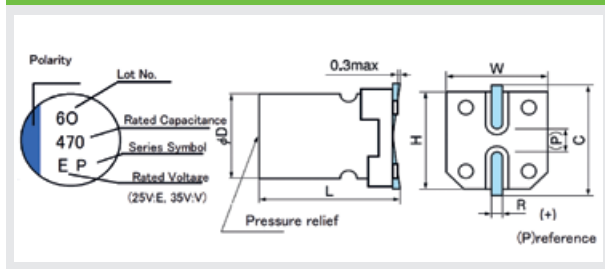
## 125 °C HIGH RIPPLE CURRENT

- 125 °C 4,000 hours
- Solvent proof (within 2 minutes)



ITEMS	CONDITION	SPECIFICATIONS	
<b>SPECIFICATIONS</b>			
Rated voltage (V)	–	25	35
Surge voltage (V)	Room temperature	32	44
Category temperature range (°C)	–	-55 ~ +125	
Capacitance tolerance (%)	120 Hz/20 °C	M:±20	
Dissipation Factor (tan δ)	tan δ (max) 120 Hz/20 °C	0.14	0.12
Leakage current (LC)	µA/after 2 minutes (max)	0.01 CV	
Endurance	125 °C rated voltage applied (With the rated ripple current)	Test	4,000 hours
		ΔC/C	Within ±30 % of the initial value
		tan δ	Less than 200 % of the specified value
		ESR	Less than 200 % of the specified value
		LC	Less than the specified value

## MARKING, DIMENSIONS



	D +0.5MAX.	L ±0.3	W ±0.2	H ±0.2	C ±0.2	R	P
<b>SPECIFICATIONS (Unit: mm)</b>							
8	10.5	8.3	8.3	9.0	0.7 ~ 1.0	3.2	
10	10.5	10.3	10.3	11.0	1.0 ~ 1.4	4.6	
10	12.5	10.3	10.3	11.0	1.0 ~ 1.4	4.6	

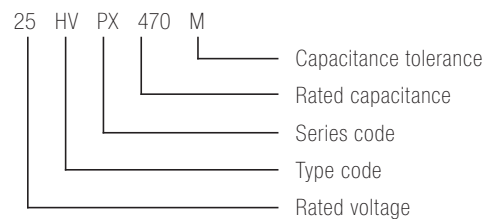
	µF / V	25	35	SIZE, ESR, RATED RIPPLE CURRENT		
150				8 × 10.5	27	2900
220	8 × 10.5	27	2900			
270				10 × 10.5	20	3300
330	10 × 10.5	20	3300	10 × 12.5	17	3800
470	10 × 12.5	16	3800			

ESR (mΩ)  
MAX. at 100 kHz, 20 °C

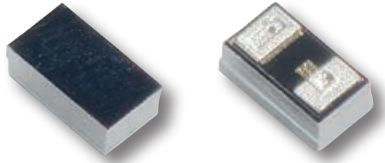
Rated ripple current  
mA r.m.s. (100 kHz, 125 °C)

Case size; Ø D × L (mm)

## PART NUMBER



# INDUSTRY FIRST UNIDIRECTIONAL ESD PROTECTION IN A 01005 TYPE PACKAGE



**SP3145 represents an industry first:** unidirectional ESD protection in a 01005 type package. Unidirectional protection should be favored over bi directional performance, particularly on logic and data lines, which typically do not transit zero volts during standard operation.

Fast-acting, semiconductor based technology can withstand multiple ESD events, without wear-out or degradation. Low nominal capacitance makes this product meaningful for interfaces running at high data rates, approaching 5 GHz clock speeds.

SP1043 and SP1044 are devices using a proprietary silicon avalanche technology to protect each I/O pin to provide a high level of protection for electronic equipment that may experience destructive electrostatic discharges (ESD). These robust diodes can safely absorb repetitive ESD strikes at  $\pm 12$  kV (contact discharge, IEC 61000-4-2) without performance degradation.

## FEATURES

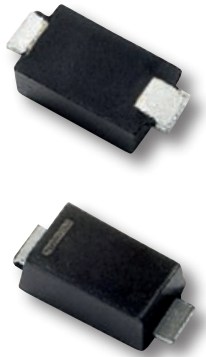
- Unidirectional protection device in industry's smallest footprint. Low capacitance offers good data integrity performance.
- Promotes high ESD immunity and superior protection
- Low dynamic resistance
- Permits low standoff

## APPLICATIONS

- Unidirectional protection should be favored over bi directional performance, particularly on logic and data lines, which typically do not transit zero volts during standard operation. Also 0.230 mm x 0.430 mm footprint helps save PCB area /cost
- ESD protection beyond the maximum rating in the IEC61000-4-2 standard gives customers more design margin and higher end product reliability in the field
- Supports low clamping voltage needed for protecting modern electronics filled with small geometry ICs
- Standoff voltages enable protection of 95 % of all interfaces

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
<b>ELECTRICAL CHARACTERISTICS (T<sub>op</sub>=25°C)</b>						
<b>Reverse Standoff Voltage</b>	V <sub>RWM</sub>				3.3	V
<b>Breakdown Voltage</b>	V <sub>BR</sub>	I <sub>R</sub> =1mA	7.5			V
<b>Forward Voltage</b>	V <sub>F</sub>	I <sub>T</sub> =1mA	0.5	0.7	1.0	V
<b>Leakage Current<sup>1</sup></b>	I <sub>LEAK</sub>	V <sub>R</sub> =1.5V with 1 pin at GND	<1		5	nA
		V <sub>R</sub> =-2.8V with 1 pin at GND	2.0		20	
<b>Clamp Voltage<sup>1</sup></b>	V <sub>C</sub>	I <sub>pp</sub> =1A, t <sub>p</sub> =8/20μs, Fwd	11.5			V
<b>Dynamic Resistance<sup>2</sup></b>	R <sub>DYN</sub>	TLP, t <sub>p</sub> =100ns, 1/0 to GND	3.5			Ω
<b>ESD Withstand Voltage<sup>1</sup></b>	V <sub>ESD</sub>	IEC 61000-4-2 (Contact Discharge)	±20			kV
		IEC 61000-4-2 (Air Discharge)	±25			kV
<b>Diode Capacitance<sup>1</sup></b>	C <sub>D</sub>	Reverse Bias=0V	0.35	0.65		pF

## PLED OPEN LED PROTECTORS – PLEDXN SERIES

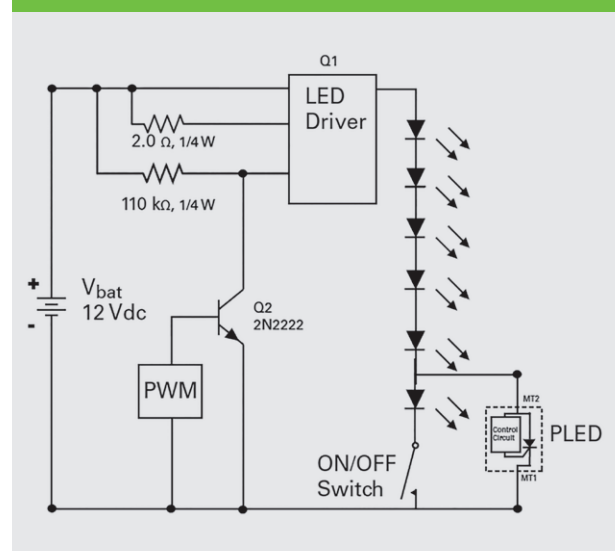


**The open LED protector provides** a switching electronic shunt path when a single LED in an LED string fails as an open circuit. This ensures that the entire LED string will continue to function even if a single LED in the string does not. This provides higher reliable lighting functions in applications such as headlights, aircraft lights, airport runway lighting, roadside warning lights, etc. This component is compatible with one watt rated LEDs with a nominal 350 mA current at 3V. The SOD-123FL package is one of the lowest height profiles (1.1 mm) packages offered in the industry.

### FEATURES & BENEFITS

- Fast switching
- Automatically resets after power cycle
- Compatible with industrial standard package SOD-123FL
- Compatible with industrial lighting environments
- IEC-61000-4-2 ESD 30 kV (Air), 30 kV (Contact)
- ESD protection of data lines in accordance with IEC 61000-4-2 (IEC 801-2)
- Low profile: maximum height of 1.1 mm
- RoHS compliant and halogen-free
- MSL: Level 1 – unlimited

### LED INTERFACE TEST CIRCUIT / APPLICATION EXAMPLE



ELECTRICAL CHARACTERISTICS (ALL PARAMETERS ARE MEASURED AT TA=25°C UNLESS OTHERWISE NOTED)										
PLED6N	P6N	Volts		uA	mA	mA	A	V	V	pF
		Min	Max	Max	Max	Max	Max	Max	Max	Max
		5.5	7.5	250	12	70	1.0 <sup>1,2</sup>	1.2	250	24

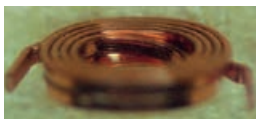
Notes: 1) Standard FR-4 PCB with Copper Pads (2mm x 2mm/pad) 2) Aluminum PCB Pads (2mm x 3mm/pad)

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# HIGHLY COMPACT CHIP INDUCTORS – DP SERIES



**ABC's DP Series are inductors in chip size.** Externally they look like chip ferrite beads or multilayer chip inductors. The internal construction however, consists of an enamelled flat copper wire wound in  $\alpha$  style which helps to reduce the DC losses (DCR) to a minimum. The core material consists of a partly amorphous metal alloy powder which helps to reduce the AC losses (core loss) to a minimum.



Enamelled flat copper wire wound in  $\alpha$  style

## FEATURES

- Compact shape – optimal ratio of performance / space enables to reduce space for same performance requirement
- Low losses – low DCR by applying enamelled flat copper wire wound in  $\alpha$  style and low AC losses by applying amorphous metal alloy powder

## APPLICATIONS

- Portable devices such as:  
Data Logger, HMI, Operating Terminals, Laboratory Devices, Measurement, Headphones, Monitoring/ Surveillance, Scanner, Alcotester, Blood Analyse Devices ...
- General purpose of Industrial Electronics such as:  
Controls, Measures, Testers ...
- Toys such as Model Trains
- Multimedia applications such as:  
Tablet, Cell Phone, Computers, Navigation, Trackers, Cameras, Pet Trackers ...

DWG NO.	INDUCTANCE ( $\mu$ H)	RDC (m $\Omega$ ) MAX.	Isat (A)		I <sub>rms</sub> (A)	
			max.	typ.	max.	typ.
<b>DP2016R47MS B-DE2</b>	0.47 $\pm$ 20 %	40	4.00	4.50	3.10	3.60
<b>DP20161R0MS B-DE2</b>	1.00 $\pm$ 20 %	70	3.10	3.40	2.20	2.60
<b>DP20161R5MS B-DE2</b>	1.50 $\pm$ 20 %	110	2.50	2.80	1.80	2.10
<b>DP20162R2MS B-DE2</b>	2.20 $\pm$ 20 %	168	2.00	2.20	1.40	1.60

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