AUTOMOTIVE

ROHS

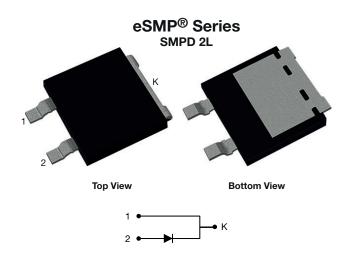
HALOGEN

FREE



### Vishay General Semiconductor

# **Surface-Mount ESD Capability Rectifiers**



#### **LINKS TO ADDITIONAL RESOURCES**



PRIMARY CHARACTERISTICS					
I <sub>F(AV)</sub>	12 A				
V <sub>RRM</sub>	400 V, 600 V				
I <sub>FSM</sub>	125 A				
$V_F$ at $I_F = 12 \text{ A } (T_J = 125 ^{\circ}\text{C})$	0.96 V				
I <sub>R</sub>	20 μΑ				
T <sub>J</sub> max.	175 °C				
Package	SMPD 2L				
Circuit configuration	Single				

#### **FEATURES**

Creepage and clearance distance 3.7 mm typical



- Ideal for automated placement
- Oxide planar chip junction
- Low forward voltage drop
- ESD capability
- AEC-Q101 qualified available
- Meets MSL level 1, per J-STD-020, LF maximum peak 260 °C
- Material categorization: for definitions of compliance please see <a href="https://www.vishav.com/doc?99912"><u>www.vishav.com/doc?99912</u></a>

#### **TYPICAL APPLICATIONS**

General purpose, power line polarity protection, in both consumer and automotive on board charger (OBC) applications.

#### **MECHANICAL DATA**

Case: SMPD 2L

Molding compound meets UL 94 V-0 flammability rating Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 2 whisker test, HM3 suffix meets JESD 201 class 2 whisker test

Polarity: as marked

MAXIMUM RATINGS (T <sub>J</sub> = 25 °C unless otherwise noted)						
PARAMETER	SYMBOL	SE12DTG	SE12DTJ	UNIT		
Device code		SE12DTG	SE12DTJ			
Maximum repetitive peak reverse voltage	$V_{RRM}$	400	600	V		
Maximum DC forward current	I <sub>F</sub> <sup>(1)</sup>	12		А		
Maximum DC forward current	I <sub>F</sub> <sup>(2)</sup>	3.2		A		
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I <sub>FSM</sub>	12	А			
Operating junction and storage temperature range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +175				

#### Notes

<sup>(1)</sup> With heatsink

<sup>(2)</sup> Free air, mounted on recommended copper pad area



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<b>ELECTRICAL CHARACTERISTICS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 6 A	– T <sub>J</sub> = 25 °C		0.95	=	V
	I <sub>F</sub> = 12 A		V <sub>F</sub> (1)	1.04	1.15	
	I <sub>F</sub> = 6 A	T <sub>J</sub> = 125 °C	<b>v</b> F ('')	0.85	=	
	I <sub>F</sub> = 12 A			0.96	1.10	
Reverse current	Data d V	T <sub>J</sub> = 25 °C	1 (2)	-	20	μΑ
	Rated V <sub>R</sub>	T <sub>J</sub> = 125 °C	I <sub>R</sub> <sup>(2)</sup>	27	150	
Typical reverse recovery time	I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1.0 A, I <sub>rr</sub> = 0.25 A		t <sub>rr</sub>	3000	=	ns
Typical junction capacitance	4.0 V, 1 MHz		CJ	90	-	pF

#### Notes

(1) Pulse test: 300 μs pulse width, 1 % duty cycle

<sup>(2)</sup> Pulse test: Pulse width  $\leq$  40 ms

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °c unless otherwise noted)					
PARAMETER	SYMBOL	TYP.	MAX.	UNIT	
Thermal registance	R <sub>θJA</sub> (1)(2)	60	75	°C/W	
Thermal resistance	R <sub>0</sub> JC (3)	1.6	2	0/44	

#### Notes

- (1) The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$
- (2) Thermal resistance junction-to-ambient to follow JEDEC® 51-2A, device mounted on FR4 PCB, 2 oz., standard footprint
- (3) Thermal resistance junction-to-mount to follow JEDEC® 51-14 transient dual interface test method (TDIM)

IMMUNITY TO ELECTRICAL STATIC DISCHARGE TO THE FOLLOWING STANDARDS (T <sub>A</sub> = 25 $^{\circ}$ C unless otherwise noted)					
STANDARD	TEST TYPE	TEST CONDITIONS	SYMBOL	CLASS	VALUE
AEC-Q101-001	Human body model (contact mode)	C = 100  pF, R = 1.5  kΩ	$V_{C}$	НЗВ	> 8 kV

ORDERING INFORMATION (Example)					
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE	
SE12DTJ-M3/I	0.52	I	2000 / reel	13" diameter plastic tape and reel	
SE12DTJHM3/I (1)	0.52	I	2000 / reel	13" diameter plastic tape and reel	

#### Note

(1) AEC-Q101 qualified



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### **RATINGS AND CHARACTERISTICS CURVES** (T<sub>A</sub> = 25 °C unless otherwise noted)

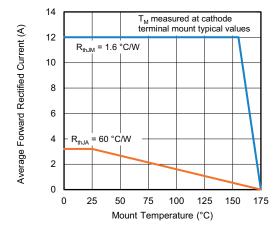


Fig. 1 - Forward Current Derating Curve

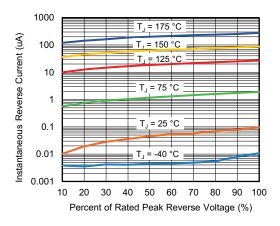


Fig. 4 - Typical Reverse Leakage Characteristics

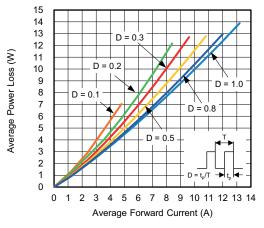


Fig. 2 - Forward Power Loss Characteristics

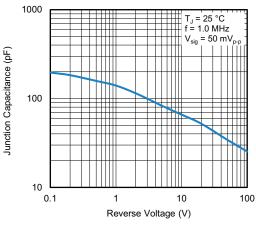


Fig. 5 - Typical Junction Capacitance

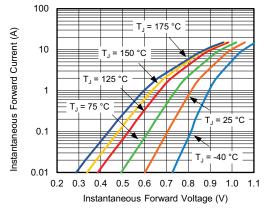


Fig. 3 - Typical Instantaneous Forward Characteristics

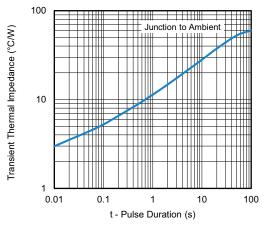


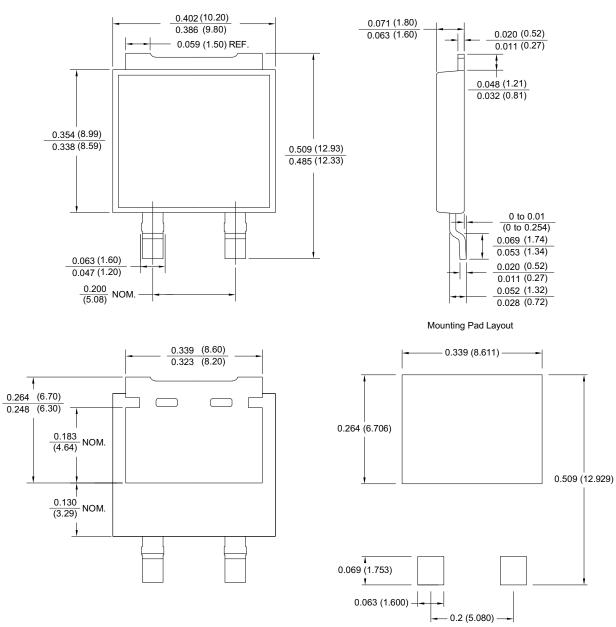
Fig. 6 - Typical Transient Thermal Impedance



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### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





#### Note

• The suggested mounting pad layout is provided for reference only, as actual pad layouts may vary depending on application



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