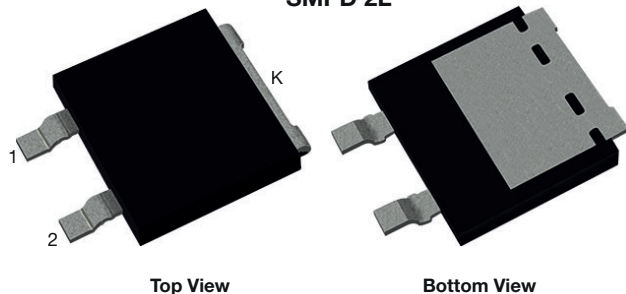


## Surface-Mount ESD Capability Rectifiers

**RoHS**  
COMPLIANT  
HALOGEN  
**FREE****eSMP® Series**  
SMPD 2L**FEATURES**

- Creepage and clearance distance 3.7 mm typical
- Very low profile - typical height of 1.7 mm
- 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 [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

**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**LINKS TO ADDITIONAL RESOURCES**

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	12 A
$V_{RRM}$	400 V, 600 V
$I_{FSM}$	125 A
$V_F$ at $I_F = 12$ A ( $T_J = 125$ °C)	0.96 V
$I_R$	20 $\mu$ A
$T_J$ max.	175 °C
Package	SMPD 2L
Circuit configuration	Single

MAXIMUM RATINGS ( $T_J = 25$ °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	$I_F^{(1)}$	12		A
	$I_F^{(2)}$	3.2		
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	125		A
Operating junction and storage temperature range	$T_J, T_{STG}$	-55 to +175		°C

**Notes**

(1) With heatsink

(2) Free air, mounted on recommended copper pad area



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	$I_F = 6\text{ A}$	$T_J = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	0.95	-	V
	$I_F = 12\text{ A}$			1.04	1.15	
	$I_F = 6\text{ A}$	$T_J = 125\text{ }^\circ\text{C}$		0.85	-	
	$I_F = 12\text{ A}$			0.96	1.10	
Reverse current	Rated $V_R$	$T_J = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	-	20	$\mu\text{A}$
		$T_J = 125\text{ }^\circ\text{C}$		27	150	
Typical reverse recovery time	$I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ , $I_{rr} = 0.25\text{ A}$		$t_{rr}$	3000	-	ns
Typical junction capacitance	4.0 V, 1 MHz		$C_J$	90	-	pF

**Notes**

- (1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle
- (2) Pulse test: Pulse width  $\leq 40\text{ ms}$

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)				
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Thermal resistance	$R_{\theta JA}^{(1)(2)}$	60	75	$^\circ\text{C/W}$
	$R_{\theta JC}^{(3)}$	1.6	2	

**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<sup>®</sup> 51-2A, device mounted on FR4 PCB, 2 oz., standard footprint
- (3) Thermal resistance junction-to-mount to follow JEDEC<sup>®</sup> 51-14 transient dual interface test method (TDIM)

<b>IMMUNITY TO ELECTRICAL STATIC DISCHARGE TO THE FOLLOWING STANDARDS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)					
STANDARD	TEST TYPE	TEST CONDITIONS	SYMBOL	CLASS	VALUE
AEC-Q101-001	Human body model (contact mode)	$C = 100\text{ pF}$ , $R = 1.5\text{ k}\Omega$	$V_C$	H3B	$> 8\text{ kV}$

<b>ORDERING INFORMATION</b> (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 <sup>(1)</sup>	0.52	I	2000 / reel	13" diameter plastic tape and reel

**Note**

- (1) AEC-Q101 qualified

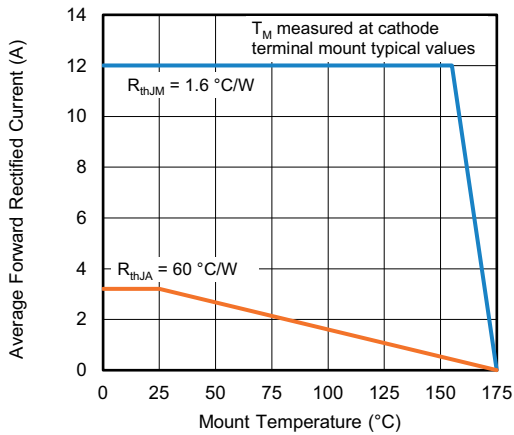
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

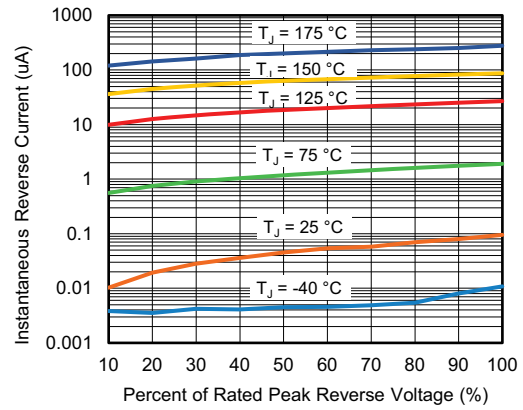


Fig. 4 - Typical Reverse Leakage Characteristics

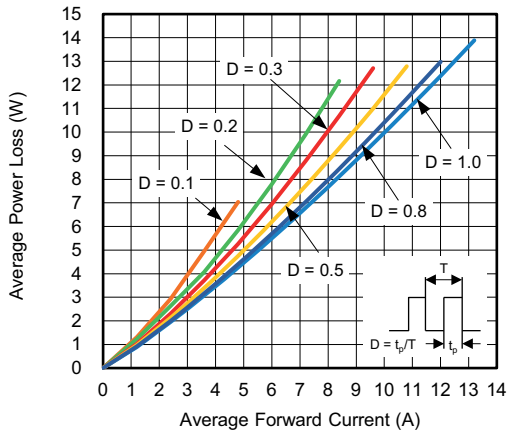


Fig. 2 - Forward Power Loss Characteristics

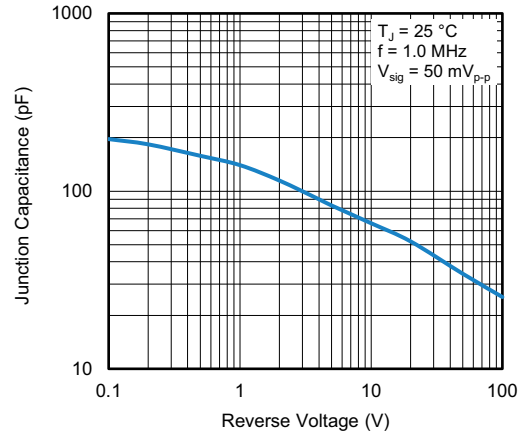


Fig. 5 - Typical Junction Capacitance

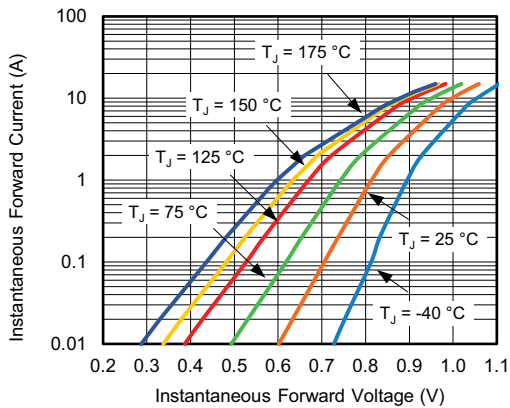


Fig. 3 - Typical Instantaneous Forward Characteristics

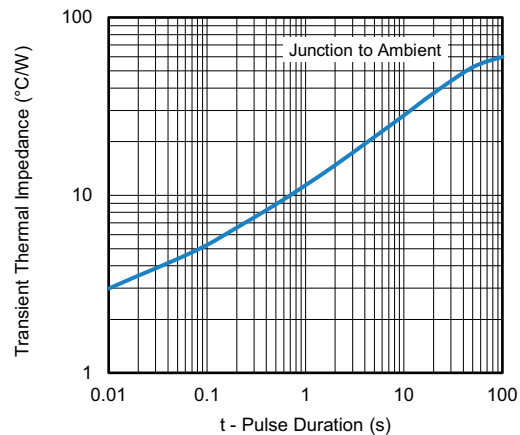
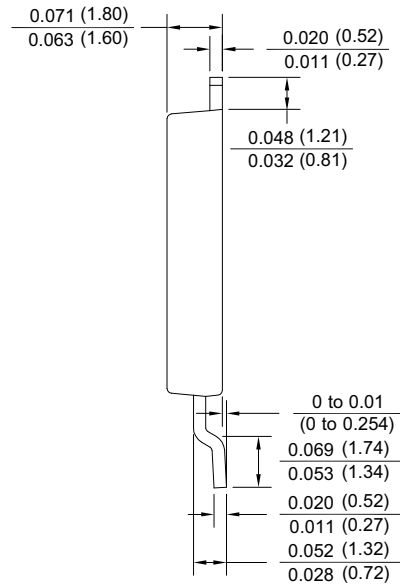
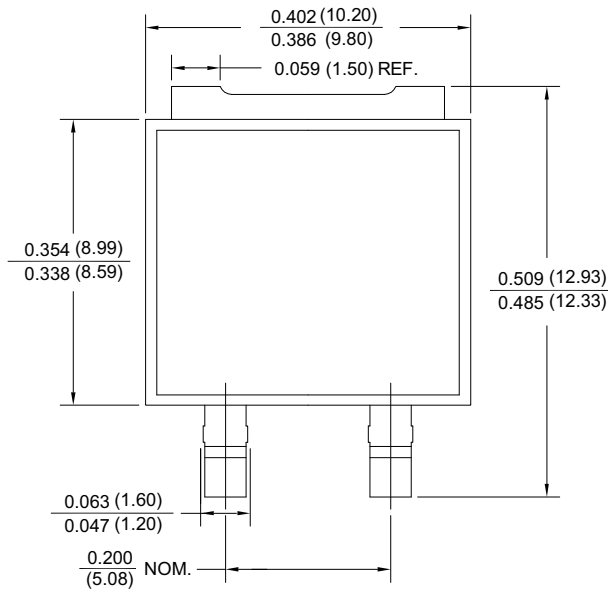


Fig. 6 - Typical Transient Thermal Impedance

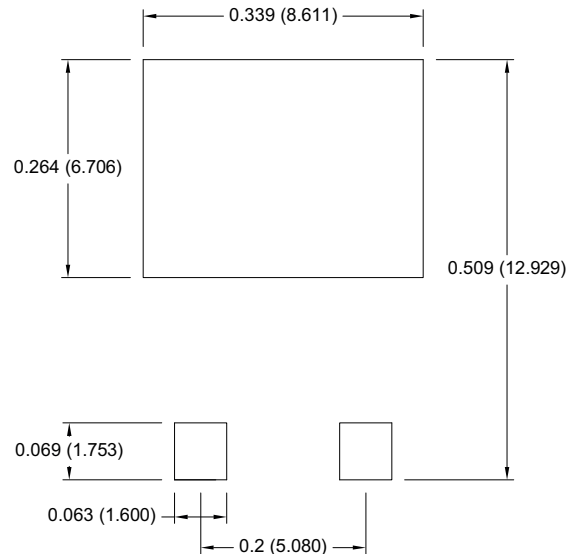
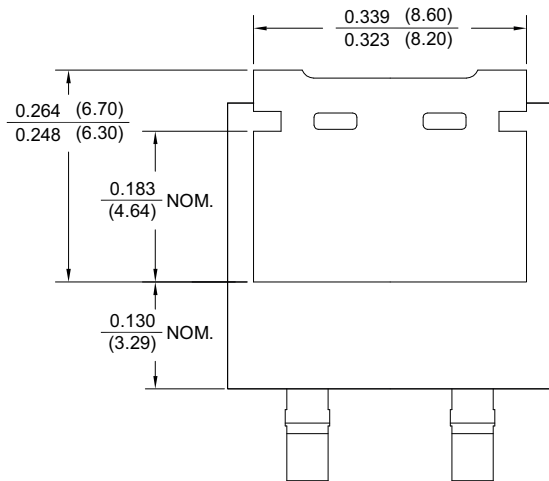


PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMPD 2L



Mounting Pad Layout



Note

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



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