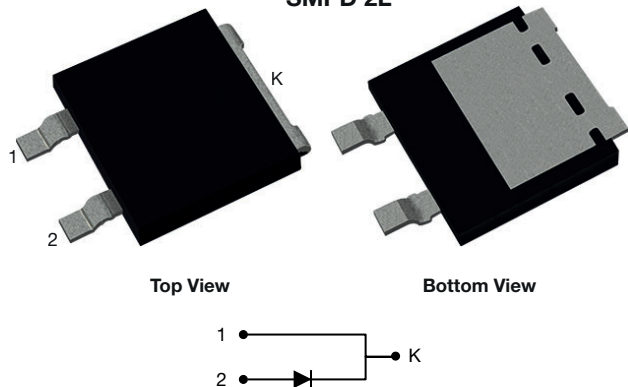


## Surface-Mount Low $V_F$ Standard Rectifiers

### eSMP® Series SMPD 2L



### LINKS TO ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS                 |              |
|-----------------------------------------|--------------|
| $I_{F(AV)}$                             | 12 A         |
| $V_{RRM}$                               | 400 V, 600 V |
| $I_{FSM}$                               | 165 A        |
| $V_F$ at $I_F = 12$ A ( $T_J = 125$ °C) | 0.83 V       |
| $T_J$ max.                              | 175 °C       |
| Package                                 | SMPD 2L      |
| Circuit configuration                   | Single       |

### FEATURES

- Creepage and clearance distance 3.7 mm typical
- Very low profile - typical height of 1.7 mm
- Low forward voltage drop
- Ideal for automated placement
- Oxide planar chip junction
- AEC-Q101 qualified available
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: for definitions of compliance please see [www.vishay.com/doc299912](http://www.vishay.com/doc299912)



**RoHS**  
COMPLIANT  
HALOGEN  
FREE

### 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 and HM3 suffix meet JESD 201 class 2 whisker test

**Polarity:** as marked

| MAXIMUM RATINGS (T <sub>A</sub> = 25 °C unless otherwise noted)                   |                                                  |             |          |      |
|-----------------------------------------------------------------------------------|--------------------------------------------------|-------------|----------|------|
| PARAMETER                                                                         | SYMBOL                                           | SE12DTLG    | SE12DTLJ | UNIT |
| Device marking code                                                               |                                                  | SE12DTLG    | SE12DTLJ |      |
| Maximum repetitive peak reverse voltage                                           | V <sub>RRM</sub>                                 | 400         | 600      | V    |
| Maximum DC forward current                                                        | I <sub>F</sub> <sup>(1)</sup>                    | 12          |          | A    |
|                                                                                   | I <sub>F</sub> <sup>(2)</sup>                    | 3.6         |          |      |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | I <sub>FSM</sub>                                 | 165         |          | A    |
| Operating junction and storage temperature range                                  | T <sub>J</sub> , T <sub>STG</sub> <sup>(3)</sup> | -55 to +175 |          | °C   |

#### Notes

(1) Mounted on infinite heatsink

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

(3) The heat generated must be less than the thermal conductivity from junction to ambient  $dP_D/dT_J < R_{thJA}$



| ELECTRICAL CHARACTERISTICS (T <sub>J</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  | V <sub>F</sub> <sup>(1)</sup> | 0.86 | -    | V    |
|                                                                            | I <sub>F</sub> = 12 A                                                    |                         |                               | 0.93 | 1    |      |
|                                                                            | I <sub>F</sub> = 6 A                                                     | T <sub>J</sub> = 125 °C |                               | 0.72 | -    |      |
|                                                                            | I <sub>F</sub> = 12 A                                                    |                         |                               | 0.83 | 0.9  |      |
| Reverse current                                                            | Rated V <sub>R</sub>                                                     | T <sub>J</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | -    | 5    | μA   |
|                                                                            |                                                                          | T <sub>J</sub> = 125 °C |                               | 12   | 70   |      |
| 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>               | 300  | -    | ns   |
| Typical junction capacitance                                               | 4.0 V, 1 MHz                                                             |                         | C <sub>J</sub>                | 96   | -    | pF   |

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

| THERMAL CHARACTERISTICS ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted) |                          |      |      |                      |
|--------------------------------------------------------------------------------------|--------------------------|------|------|----------------------|
| PARAMETER                                                                            | SYMBOL                   | TYP. | MAX. | UNIT                 |
| Typical thermal resistance                                                           | $R_{\theta JA}^{(1)(2)}$ | 57   | 71   | $^{\circ}\text{C/W}$ |
|                                                                                      | $R_{\theta JM}^{(3)}$    | 1.5  | 1.8  |                      |

**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) Free air, mounted on recommended PCB, 2 oz. pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient to follow JEDEC® 51-2A(3) Mounted on infinite heatsink thermal resistance  $R_{\theta JM}$  - junction to mount to follow JEDEC® 51-14 transient dual interface test method (TDIM)

| ORDERING INFORMATION (Example) |                 |                        |               |                                    |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| SE12DTLJ-M3/I                  | 0.51            | I                      | 2000/reel     | 13" diameter plastic tape and reel |
| SE12DTLJHM3/I <sup>(1)</sup>   | 0.51            | I                      | 2000/reel     | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

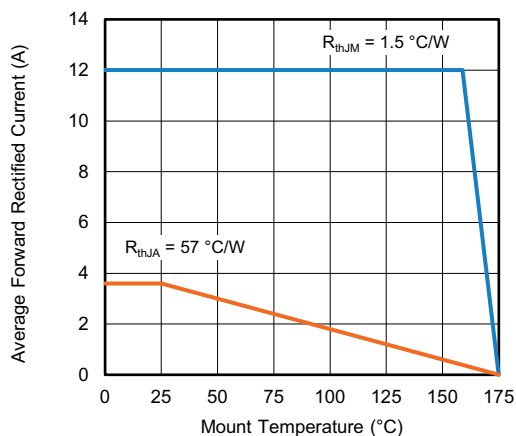
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

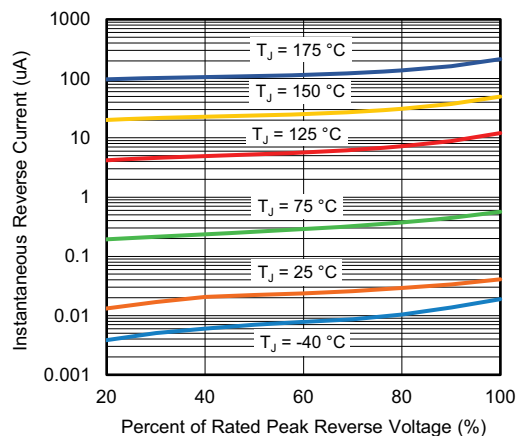


Fig. 4 - Typical Reverse Leakage Characteristics

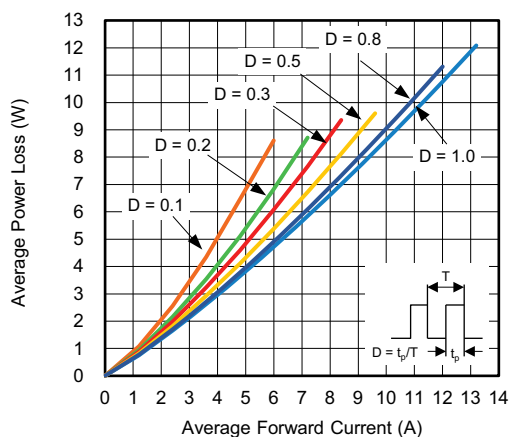


Fig. 2 - Forward Power Loss Characteristics

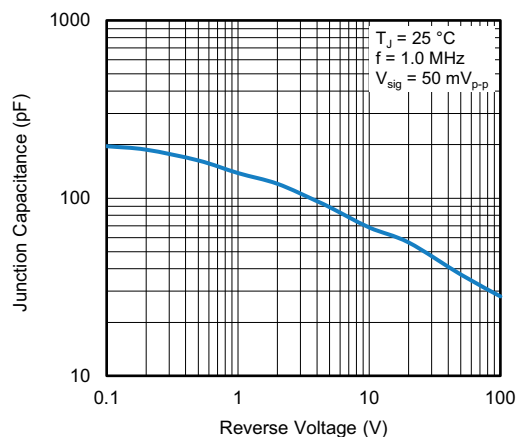


Fig. 5 - Typical Junction Capacitance

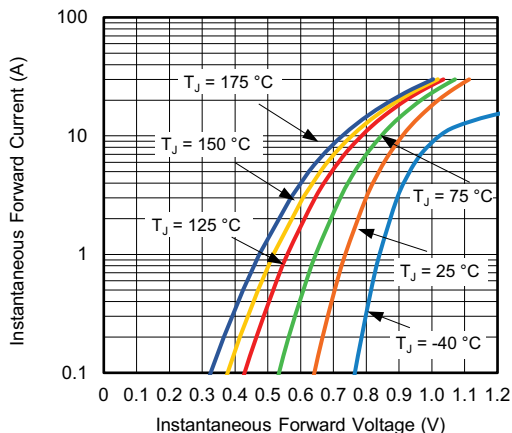


Fig. 3 - Typical Instantaneous Forward Characteristics

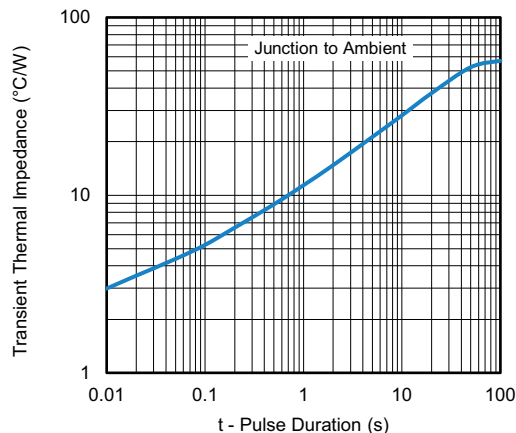
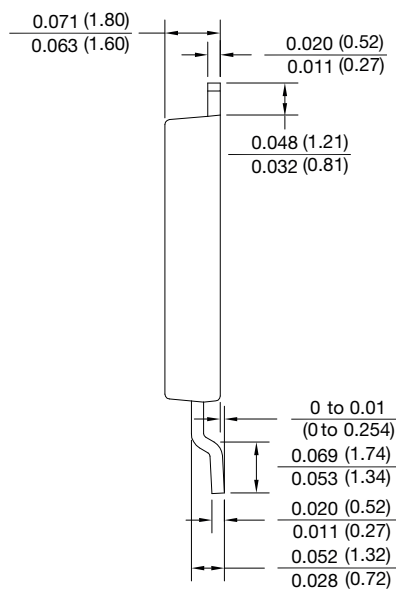
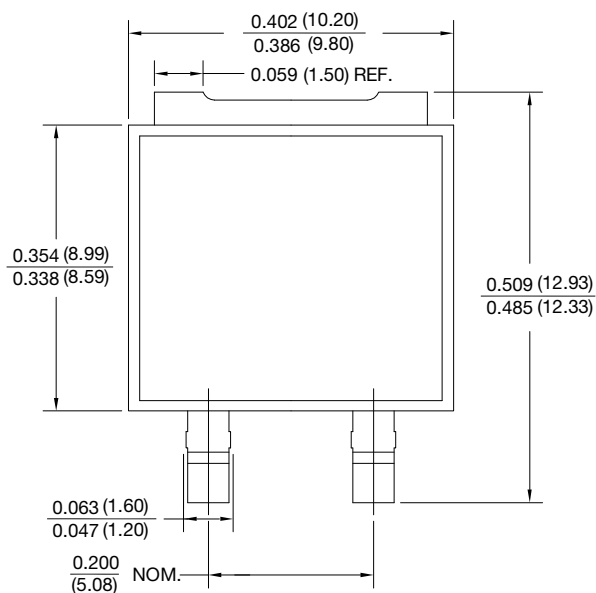


Fig. 6 - Typical Transient Thermal Impedance

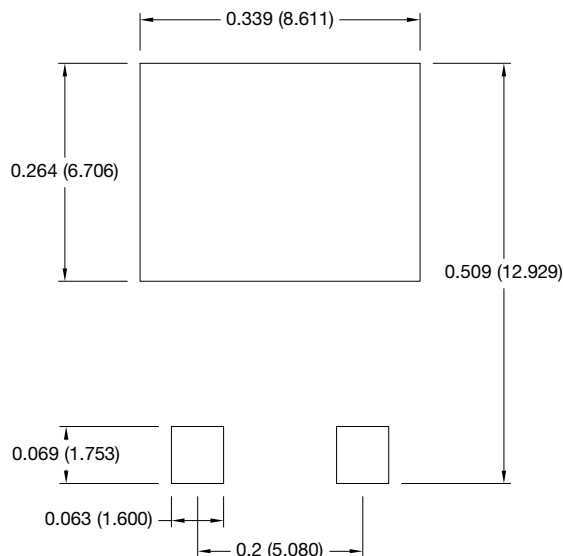
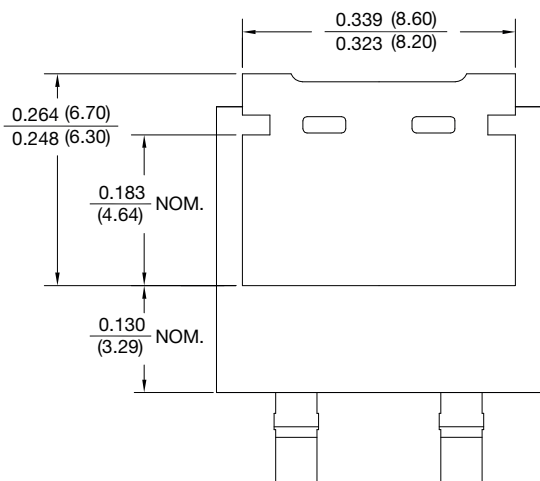


## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

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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