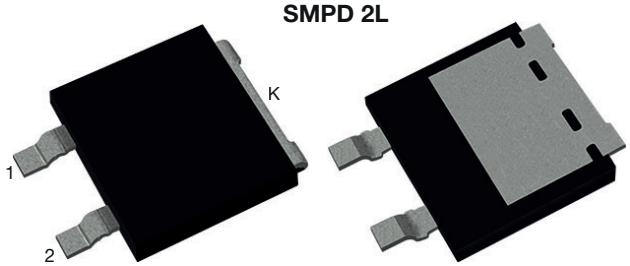
# Surface-Mount ESD Capability Rectifiers

**eSMP® Series**
**SMPD 2L**




**Top View** **Bottom View**

## LINKS TO ADDITIONAL RESOURCES

Ultra Librarian EDA / CAD

| 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 µA |
| $T_J$ max. | 175 °C |
| Package | SMPD 2L |
| Circuit configuration | Single |

## FEATURES

AUTOMOTIVE GRADE Available

RoHS COMPLIANT HALOGEN FREE

- Creepage and clearance distance 3.6 mm minimum
- 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

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

**Notes**

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

(2) Pulse test: Pulse width ≤ 40 ms

| **THERMAL CHARACTERISTICS** ($T_A$ = 25 °c unless otherwise noted) | | | | |
|---|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **TYP.** | **MAX.** | **UNIT** |
| Thermal resistance | $R_{\theta JA}$ (1)(2) | 60 | 75 | °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® 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** ($T_A$ = 25 °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 | $V_C$ | H3B | > 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** ($T_A$ = 25 °C unless otherwise noted)

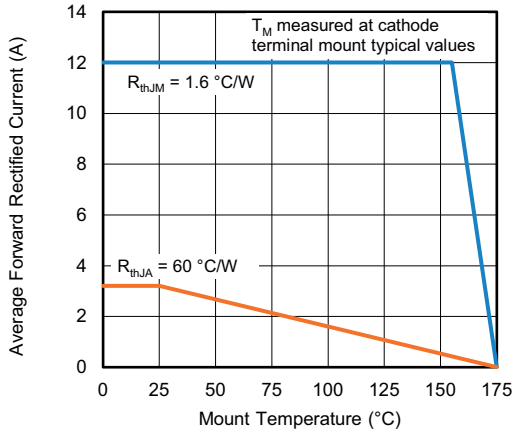


Fig. 1 - Forward Current Derating Curve

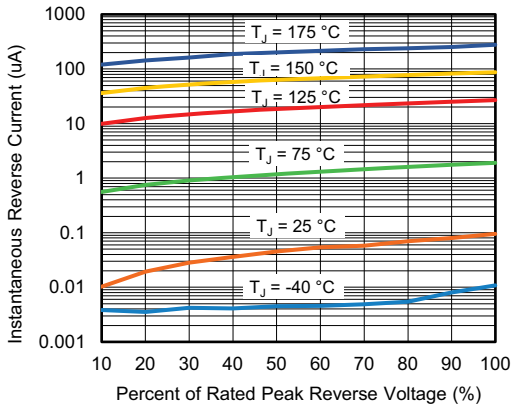


Fig. 4 - Typical Reverse Leakage Characteristics

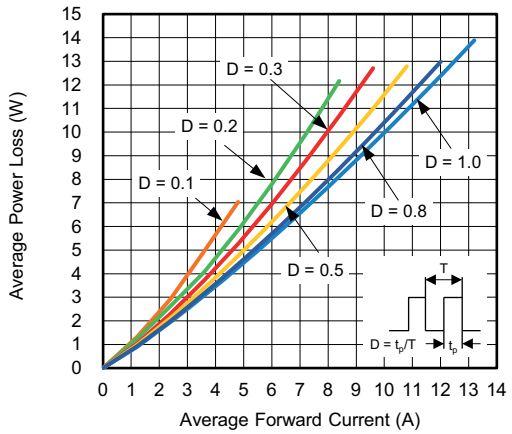


Fig. 2 - Forward Power Loss Characteristics

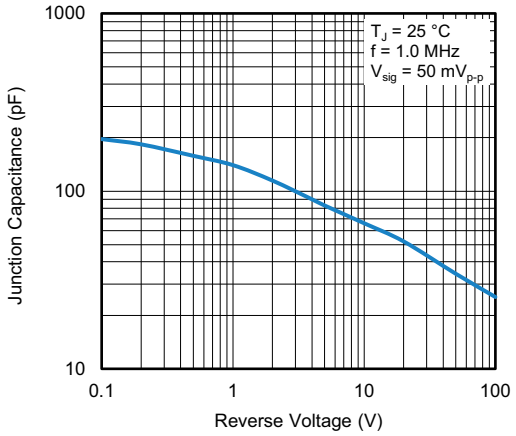


Fig. 5 - Typical Junction Capacitance

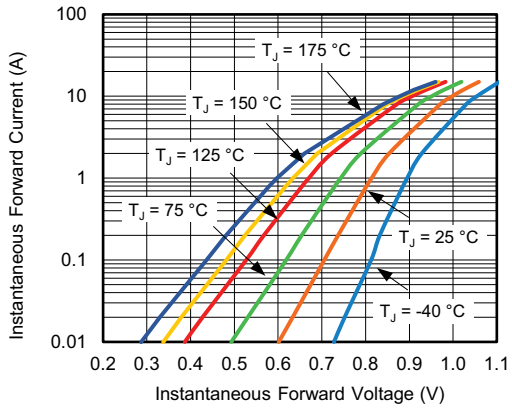


Fig. 3 - Typical Instantaneous Forward Characteristics

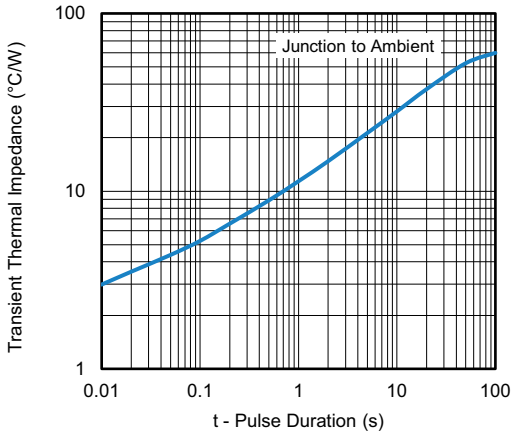


Fig. 6 - Typical Transient Thermal Impedance


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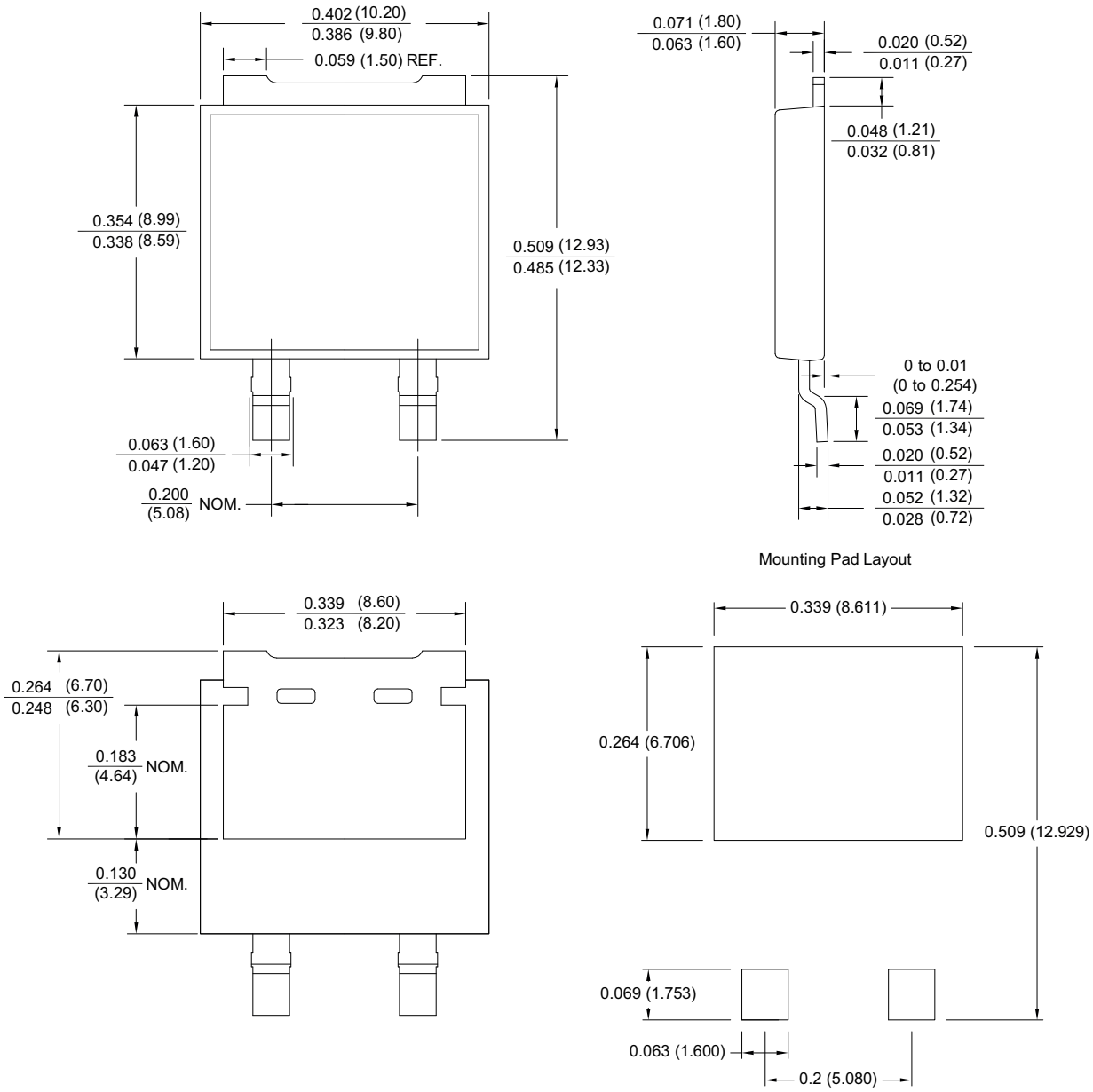
**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

**SMPD 2L**




**Note**

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