

## Low $V_F$ High Current Density Surface-Mount Schottky Barrier Rectifiers

### eSMP® Series


**SMP (DO-220AA)**

Cathode  Anode

### FEATURES

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Low forward voltage drop, low power losses
- High efficiency
- Low thermal resistance
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### LINKS TO ADDITIONAL RESOURCES



### PRIMARY CHARACTERISTICS

|                       |                |
|-----------------------|----------------|
| $I_{F(AV)}$           | 2.0 A          |
| $V_{RRM}$             | 20 V, 30 V     |
| $I_{FSM}$             | 50 A           |
| $E_{AS}$              | 11.25 mJ       |
| $V_F$                 | 0.45 V         |
| $T_J$ max.            | 150 °C         |
| Package               | SMP (DO-220AA) |
| Circuit configuration | Single         |

### TYPICAL APPLICATIONS

For use in low voltage high frequency inverters, freewheeling, DC/DC converters, and polarity protection applications.

### MECHANICAL DATA

**Case:** SMP (DO-220AA)

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 automotive grade

**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:** color band denotes the cathode end

### MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)

| PARAMETER                                                                         | SYMBOL         | SS2P2L      | SS2P3L | UNIT       |
|-----------------------------------------------------------------------------------|----------------|-------------|--------|------------|
| Device marking code                                                               |                | 22L         | 23L    |            |
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$      | 20          | 30     | V          |
| Maximum average forward rectified current (fig. 1)                                | $I_{F(AV)}$    | 2.0         |        | A          |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 50          |        | A          |
| Non-repetitive avalanche energy at $I_{AS} = 1.5$ A, $L = 10$ mH, $T_J = 25$ °C   | $E_{AS}$       | 11.25       |        | mJ         |
| Voltage rate of change (rated $V_R$ )                                             | $dV/dt$        | 10 000      |        | V/ $\mu$ s |
| Operating junction and storage temperature range                                  | $T_J, T_{STG}$ | -55 to +150 |        | °C         |

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

| PARAMETER                              | TEST CONDITIONS    |                                     | SYMBOL      | TYP. | MAX. | UNIT          |
|----------------------------------------|--------------------|-------------------------------------|-------------|------|------|---------------|
| Maximum instantaneous forward voltage  | $I_F = 2\text{ A}$ | $T_J = 25\text{ }^{\circ}\text{C}$  | $V_F^{(1)}$ | 0.45 | 0.50 | V             |
|                                        | $I_F = 2\text{ A}$ | $T_J = 125\text{ }^{\circ}\text{C}$ |             | 0.38 | 0.45 |               |
| Maximum reverse current at rated $V_R$ |                    | $T_J = 25\text{ }^{\circ}\text{C}$  | $I_R^{(2)}$ | -    | 200  | $\mu\text{A}$ |
|                                        |                    | $T_J = 125\text{ }^{\circ}\text{C}$ |             | 9.0  | 20   | mA            |
| Typical junction capacitance           | 4.0 V, 1 MHz       |                                     | $C_J$       | 130  |      | 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                | SS2P2L | SS2P3L | UNIT |
|----------------------------|-----------------------|--------|--------|------|
| Typical thermal resistance | $R_{\theta JA}^{(1)}$ | 115    |        | °C/W |
|                            | $R_{\theta JL}^{(1)}$ | 15     |        |      |
|                            | $R_{\theta JC}^{(1)}$ | 20     |        |      |

**Note**(1) Thermal resistance from junction to ambient and junction to lead mounted on PCB with 5.0 mm x 5.0 mm copper pad areas.  $R_{\theta JL}$  is measured at the terminal of cathode band.  $R_{\theta JC}$  is measured at the top center of the body**ORDERING INFORMATION** (Example)

| PREFERRED P/N                | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
|------------------------------|-----------------|------------------------|---------------|------------------------------------|
| SS2P3L-M3/84A                | 0.024           | 84A                    | 3000          | 7" diameter plastic tape and reel  |
| SS2P3L-M3/85A                | 0.024           | 85A                    | 10 000        | 13" diameter plastic tape and reel |
| SS2P3LHM3/84A <sup>(1)</sup> | 0.024           | 84A                    | 3000          | 7" diameter plastic tape and reel  |
| SS2P3LHM3/85A <sup>(1)</sup> | 0.024           | 85A                    | 10 000        | 13" diameter plastic tape and reel |

**Note**

(1) Automotive grade

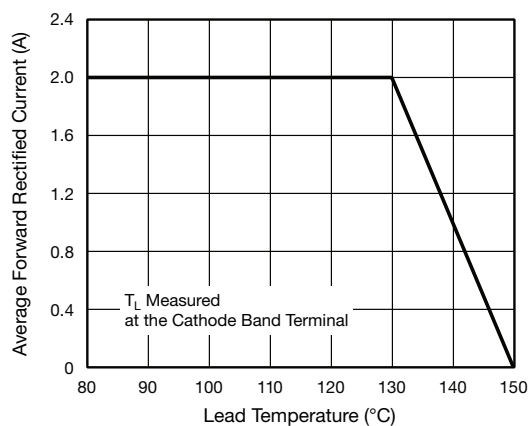
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

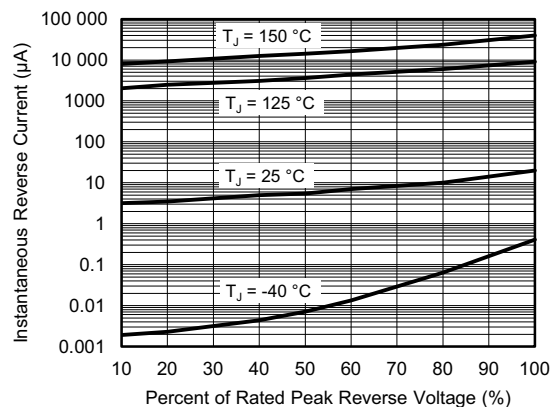


Fig. 4 - Typical Reverse Leakage Characteristics

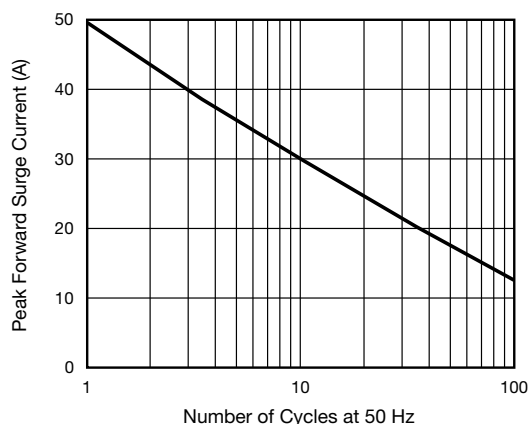


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

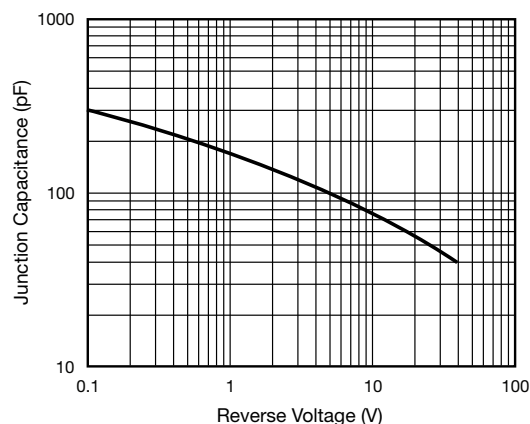


Fig. 5 - Typical Junction Capacitance

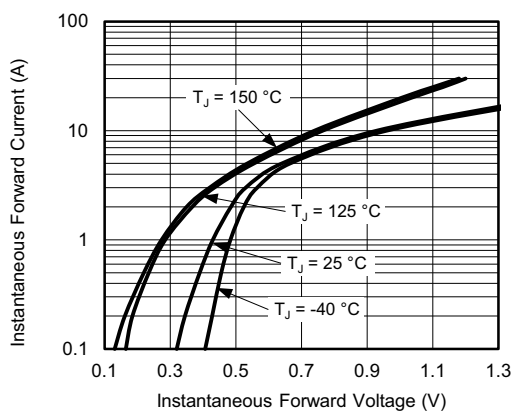


Fig. 3 - Typical Instantaneous Forward Characteristics

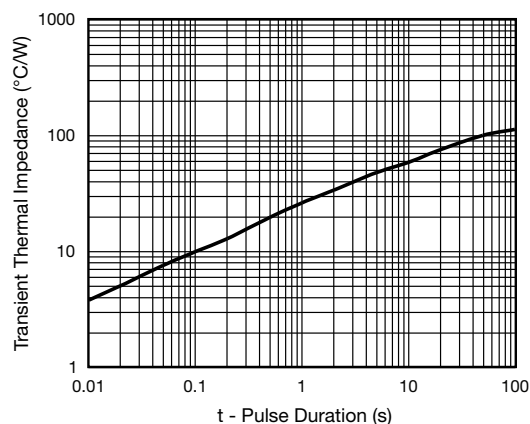
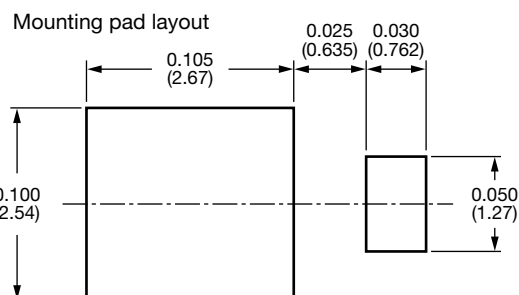
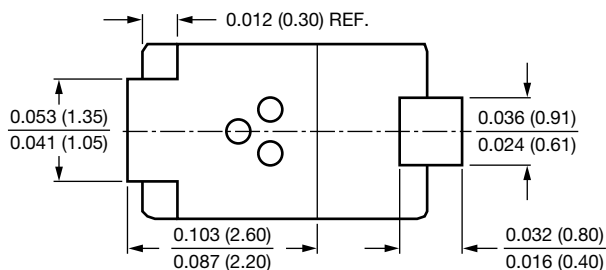
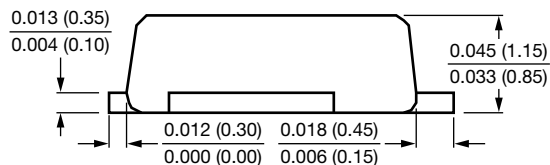
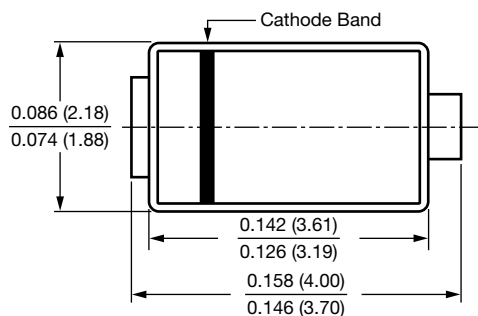


Fig. 6 - Typical Transient Thermal Impedance



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

**SMP (DO-220AA)**





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