

# High Voltage Surface-Mount Schottky Barrier Rectifier

High Barrier Technology for Improved High Temperature Performance

## eSMP® Series



**SMP (DO-220AA)**

Cathode  Anode

## LINKS TO ADDITIONAL RESOURCES



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

## 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  
- Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

## TYPICAL APPLICATIONS

For use in 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\_X - halogen-free, RoHS-compliant, and AEC-Q101 qualified  
("X" denotes revision code e.g. A, B,.....)

**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

## PRIMARY CHARACTERISTICS

|                                           |                |
|-------------------------------------------|----------------|
| $I_{F(AV)}$                               | 2.0 A          |
| $V_{RRM}$                                 | 90 V, 100 V    |
| $I_{FSM}$                                 | 50 A           |
| $E_{AS}$                                  | 11.25 mJ       |
| $V_F$ at $I_F = 2.0$ A, $T_J = 125$ °C    | 0.62 V         |
| $I_R$ max. at rated $V_R$ , $T_J = 25$ °C | 1.0 $\mu$ A    |
| $T_J$ max.                                | 175 °C         |
| Package                                   | SMP (DO-220AA) |
| Circuit configuration                     | Single         |

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

| PARAMETER                                                                          | SYMBOL         | SS2PH9      | SS2PH10 | UNIT       |
|------------------------------------------------------------------------------------|----------------|-------------|---------|------------|
| Device marking code                                                                |                | 29          | 210     |            |
| Maximum repetitive peak reverse voltage                                            | $V_{RRM}$      | 90          | 100     | V          |
| Maximum average forward rectified current (fig. 1)                                 | $I_{F(AV)}$    | 2.0         |         | A          |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 50          |         | A          |
| Non-repetitive avalanche energy at $T_J = 25$ °C, $I_{AS} = 1.5$ A, $L = 10$ mH    | $E_{AS}$       | 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 +175 |         | °C         |

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

| PARAMETER                              | TEST CONDITIONS      | SYMBOL      | TYP. | MAX. | UNIT          |
|----------------------------------------|----------------------|-------------|------|------|---------------|
| Maximum instantaneous forward voltage  | $I_F = 2.0\text{ A}$ | $V_F^{(1)}$ | 0.77 | 0.80 | V             |
|                                        |                      |             | 0.62 | 0.66 |               |
| Maximum reverse current at rated $V_R$ |                      | $I_R^{(2)}$ | 0.1  | 1.0  | $\mu\text{A}$ |
|                                        |                      |             | 60   | 500  |               |
| Typical junction capacitance           | 4.0 V, 1 MHz         | CJ          | 65   | -    | 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                | SS2PH9 | SS2PH10 | UNIT                 |
|----------------------------|-----------------------|--------|---------|----------------------|
| Typical thermal resistance | $R_{\theta JA}^{(1)}$ | 110    |         | $^{\circ}\text{C/W}$ |
|                            | $R_{\theta JL}^{(1)}$ | 15     |         |                      |
|                            | $R_{\theta JC}^{(1)}$ | 25     |         |                      |

**Note**(1) Thermal resistance from junction to ambient and junction to lead mounted on PCB with 15 mm x 15 mm copper pad areas.  $R_{\theta JC}$  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                      |
|------------------------------|-----------------|------------------------|---------------|------------------------------------|
| SS2PH9-M3/84A                | 0.024           | 84A                    | 3000          | 7" diameter plastic tape and reel  |
| SS2PH9-M3/85A                | 0.024           | 85A                    | 10 000        | 13" diameter plastic tape and reel |
| SS2PH9HM3_A/H <sup>(1)</sup> | 0.024           | H                      | 3000          | 7" diameter plastic tape and reel  |
| SS2PH9HM3_A/I <sup>(1)</sup> | 0.024           | I                      | 10 000        | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

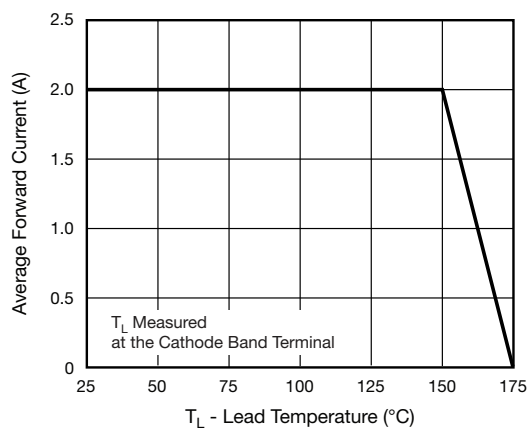
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

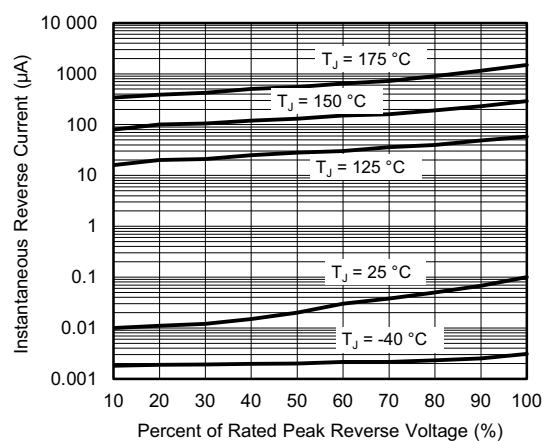


Fig. 4 - Typical Reverse Leakage Characteristics

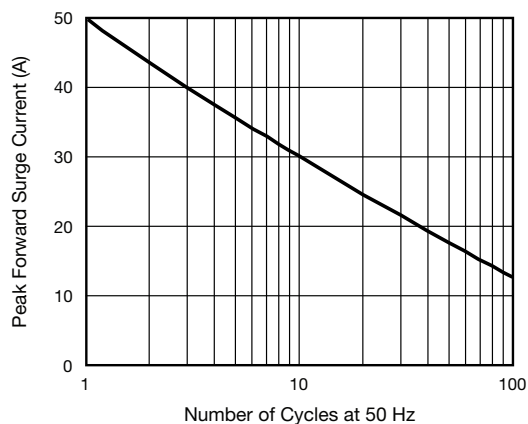


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

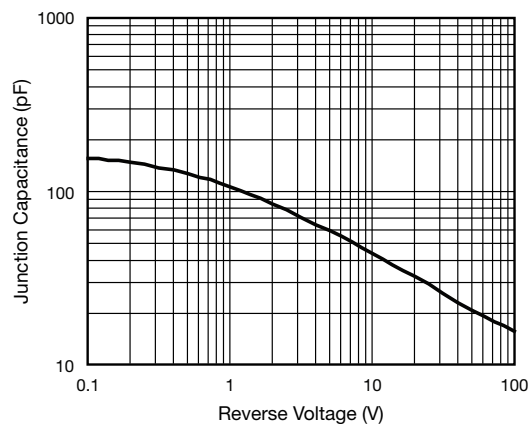


Fig. 5 - Typical Junction Capacitance

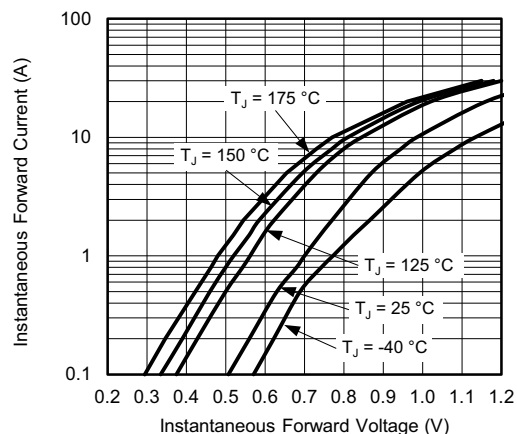


Fig. 3 - Typical Instantaneous Forward Characteristics

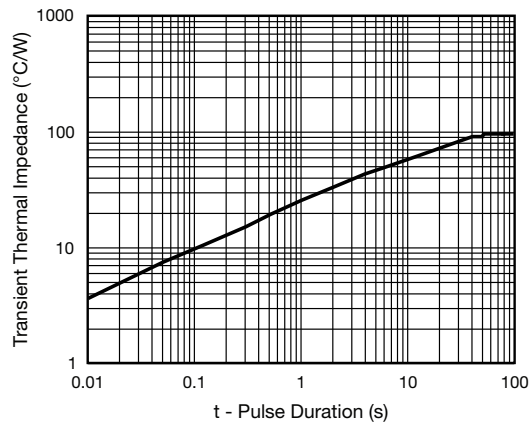
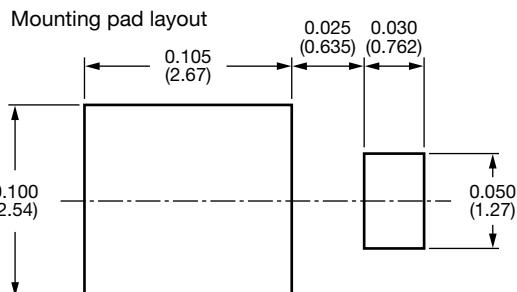
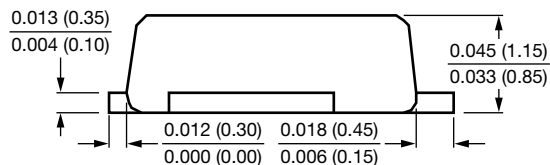
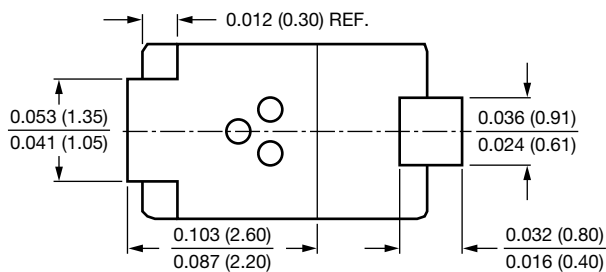
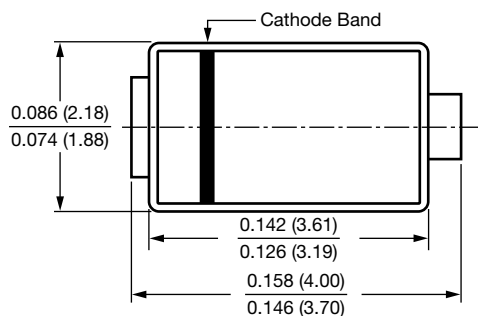


Fig. 6 - Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMP (DO-220AA)





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