

# 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



### 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         |

### 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)



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

### 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

### 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 <sub>A</sub> = 25 °C unless otherwise noted) |                        |                         |                               |      |      |      |
|--|------------------------|-------------------------|-------------------------------|------|------|------|
| PARAMETER  | TEST CONDITIONS        |                         | SYMBOL                        | TYP. | MAX. | UNIT |
| Maximum instantaneous forward voltage                                      | I <sub>F</sub> = 2.0 A | T <sub>J</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.77 | 0.80 | V    |
|  |                        | T <sub>J</sub> = 125 °C |                               | 0.62 | 0.66 |      |
| Maximum reverse current at rated V <sub>R</sub>                            |                        | T <sub>J</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 0.1  | 1.0  | μA   |
|  |                        | T <sub>J</sub> = 125 °C |                               | 60   | 500  |      |
| Typical junction capacitance   | 4.0 V, 1 MHz           |                         | C <sub>J</sub>                | 65   | -    | pF   |

Notes

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
- (2) Pulse test: Pulse width ≤ 40 ms

| THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                                 |        |         |      |
|---|---------------------------------|--------|---------|------|
| PARAMETER   | SYMBOL                          | SS2PH9 | SS2PH10 | UNIT |
| Typical thermal resistance  | R <sub>θJA</sub> <sup>(1)</sup> | 110    |         | °C/W |
|   | R <sub>θJL</sub> <sup>(1)</sup> | 15     |         |      |
|   | R <sub>θJC</sub> <sup>(1)</sup> | 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<sub>θJC</sub> 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<sub>A</sub> = 25 °C unless otherwise noted)

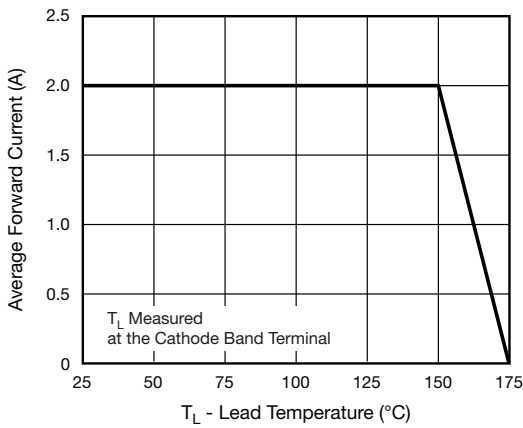


Fig. 1 - Forward Current Derating Curve

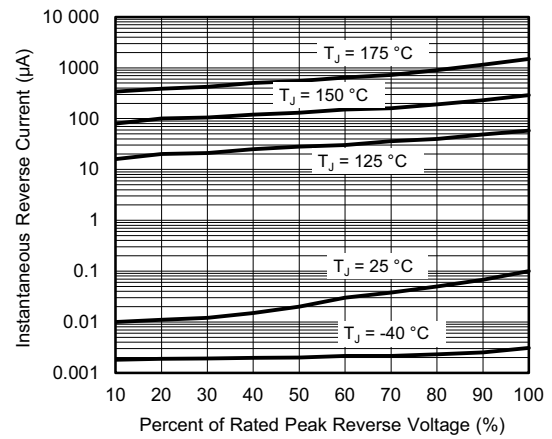


Fig. 4 - Typical Reverse Leakage Characteristics

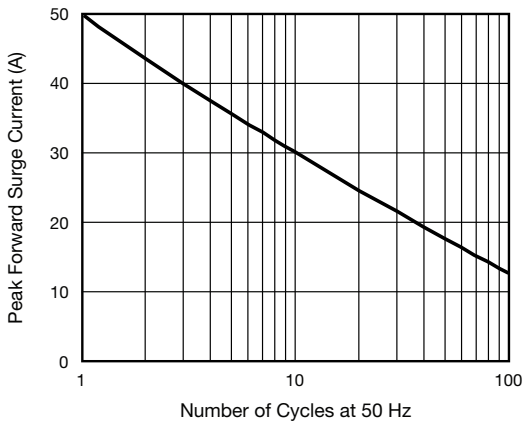


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

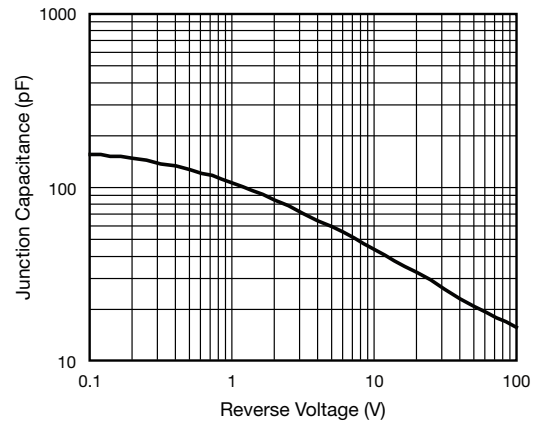


Fig. 5 - Typical Junction Capacitance

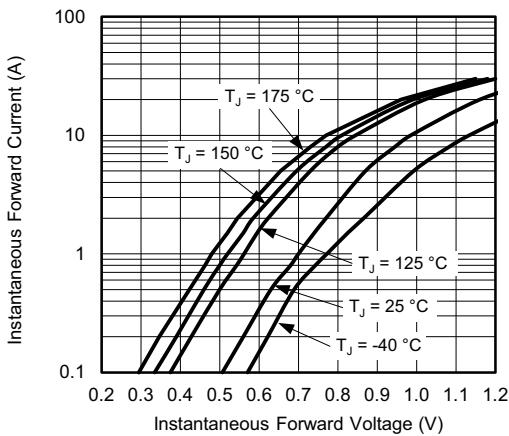


Fig. 3 - Typical Instantaneous Forward Characteristics

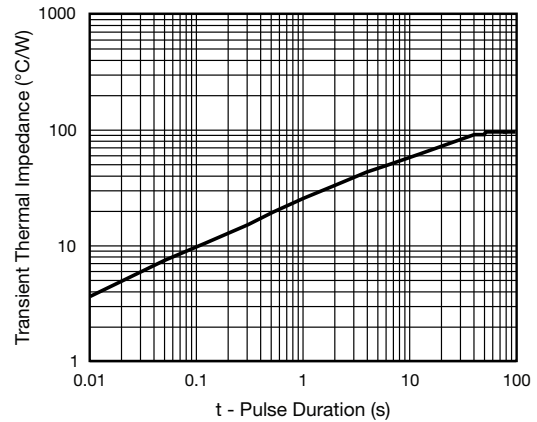
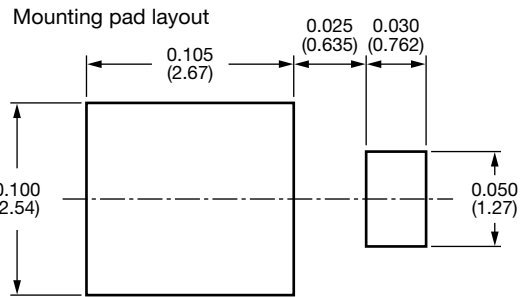
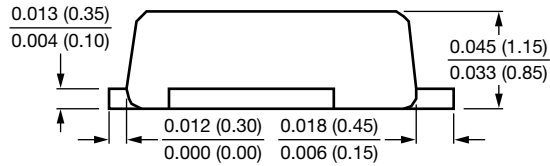
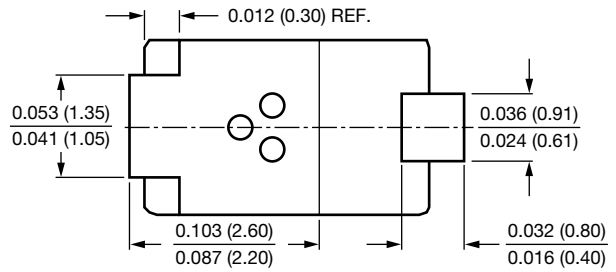
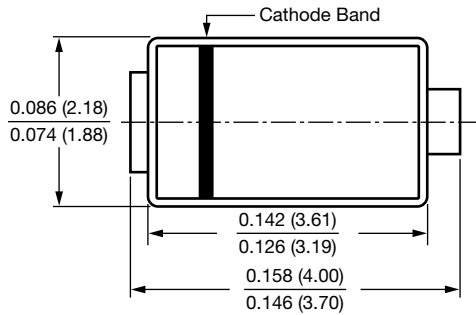


Fig. 6 - Typical Transient Thermal Impedance



### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

#### SMP (DO-220AA)





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