

## High Current Density Surface Mount Schottky Barrier Rectifier

eSMP® Series



DO-220AA (SMP)

### PRIMARY CHARACTERISTICS

|                  |                  |
|------------------|------------------|
| $I_{F(AV)}$      | 2.0 A            |
| $V_{RRM}$        | 20 V, 30 V, 40 V |
| $I_{FSM}$        | 50 A             |
| $E_{AS}$         | 11.25 mJ         |
| $V_F$            | 0.50 V           |
| $T_J$ max.       | 150 °C           |
| Package          | DO-220AA (SMP)   |
| Diode variations | 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
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

AUTOMOTIVE  
GRADE  
Available

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

### TYPICAL APPLICATIONS

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

### MECHANICAL DATA

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

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 cathode end

### MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)

| PARAMETER                                                                                              | SYMBOL         | SS2P2         | SS2P3 | SS2P4 | UNIT       |
|--------------------------------------------------------------------------------------------------------|----------------|---------------|-------|-------|------------|
| Device marking code                                                                                    |                | 22            | 23    | 24    |            |
| Maximum repetitive peak reverse voltage                                                                | $V_{RRM}$      | 20            | 30    | 40    | 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 $I_{AS} = 1.5\text{ A}$ , $L = 10\text{ mH}$ , $T_J = 25\text{ °C}$ | $E_{AS}$       | 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          | $I_F = 2\text{ A}$ | $T_J = 25\text{ }^{\circ}\text{C}$  | $V_F^{(1)}$ | 0.50 | 0.55 | V             |
|                                                | $I_F = 2\text{ A}$ | $T_J = 125\text{ }^{\circ}\text{C}$ |             | 0.43 | 0.50 |               |
| Maximum reverse current at rated $V_R$ voltage |                    | $T_J = 25\text{ }^{\circ}\text{C}$  | $I_R^{(2)}$ | -    | 150  | $\mu\text{A}$ |
|                                                |                    | $T_J = 125\text{ }^{\circ}\text{C}$ |             | 8    | 15   | mA            |
| Typical junction capacitance                   | 4.0 V, 1 MHz       |                                     | $C_J$       | 110  |      | 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                | SS2P2 | SS2P3 | SS2P4 | 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 6.0 mm x 6.0 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                      |
|-----------------------------|-----------------|------------------------|---------------|------------------------------------|
| SS2P4-M3/84A                | 0.024           | 84A                    | 3000          | 7" diameter plastic tape and reel  |
| SS2P4-M3/85A                | 0.024           | 85A                    | 10 000        | 13" diameter plastic tape and reel |
| SS2P4HM3/84A <sup>(1)</sup> | 0.024           | 84A                    | 3000          | 7" diameter plastic tape and reel  |
| SS2P4HM3/85A <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)

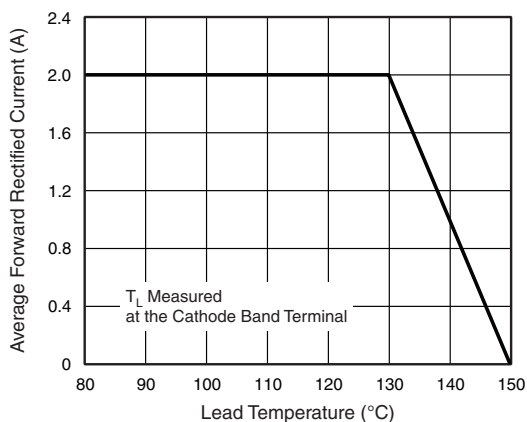


Fig. 1 - Forward Current Derating Curve

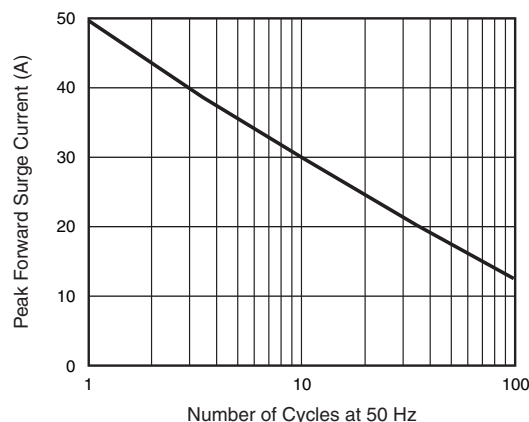


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

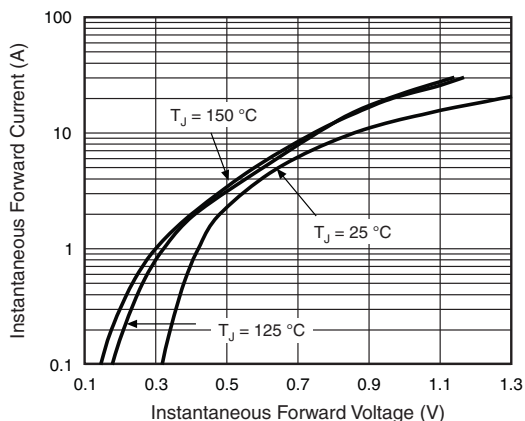


Fig. 3 - Typical Instantaneous Forward Characteristics

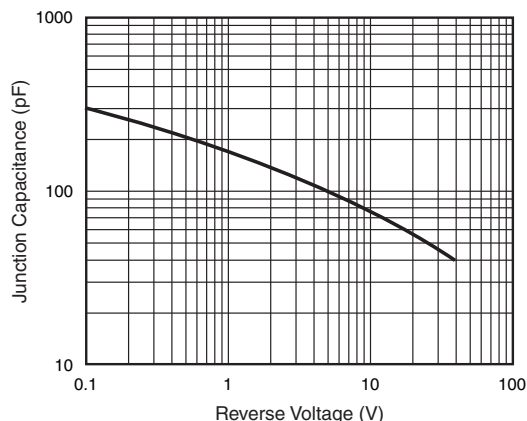


Fig. 5 - Typical Junction Capacitance

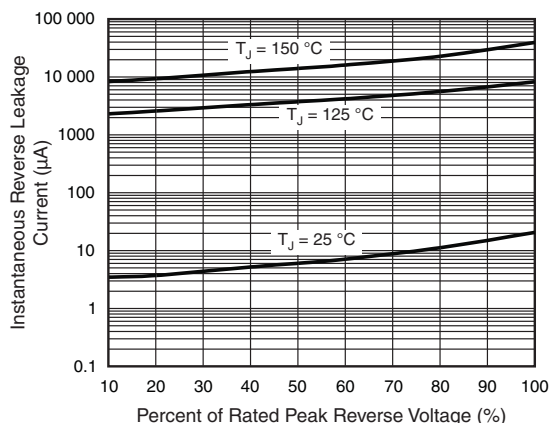


Fig. 4 - Typical Reverse Leakage Characteristics

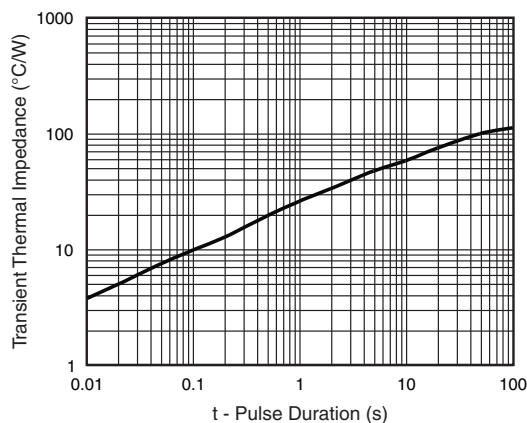
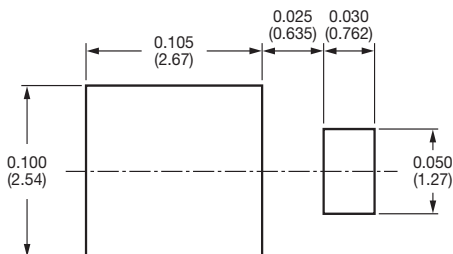
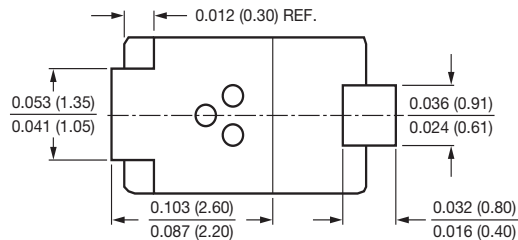
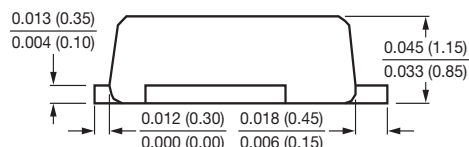
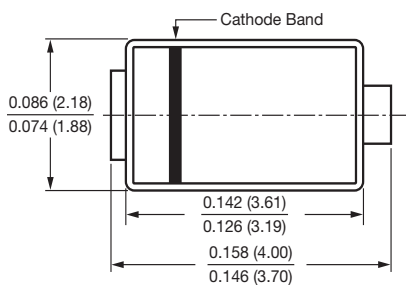


Fig. 6 - Typical Transient Thermal Impedance

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### DO-220AA (SMP)





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