

# High Current Density Surface Mount Schottky Rectifier

## eSMP® Series



DO-220AA (SMP)

AUTOMOTIVE  
GRADE  
Available



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
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

## 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

| PRIMARY CHARACTERISTICS |                |
|-------------------------|----------------|
| $I_{F(AV)}$             | 3.0 A          |
| $V_{RRM}$               | 50 V, 60 V     |
| $I_{FSM}$               | 45 A           |
| $E_{AS}$                | 11.25 mJ       |
| $V_F$ at $I_F = 3.0$ A  | 0.61 V         |
| $T_J$ max.              | 150 °C         |
| Package                 | DO-220AA (SMP) |
| Diode variations        | Single die     |

| MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)                            |                |               |       |            |
|------------------------------------------------------------------------------------|----------------|---------------|-------|------------|
| PARAMETER                                                                          | SYMBOL         | SS3P5         | SS3P6 | UNIT       |
| Device marking code                                                                |                | 35            | 36    |            |
| Maximum repetitive peak reverse voltage                                            | $V_{RRM}$      | 50            | 60    | V          |
| Maximum average forward rectified current (fig. 1)                                 | $I_{F(AV)}$    | 3.0           |       | A          |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 45            |       | 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 + 150 |       | °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> = 3 A | T <sub>J</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.71 | 0.78 | V    |
|                                                                            |                      | T <sub>J</sub> = 125 °C |                               | 0.61 | 0.65 |      |
| Maximum reverse current at rated V <sub>R</sub>                            |                      | T <sub>J</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | -    | 100  | μA   |
|                                                                            |                      | T <sub>J</sub> = 125 °C |                               | 2.0  | 10   | mA   |
| Typical junction capacitance                                               | 4.0 V, 1 MHz         |                         | C <sub>J</sub>                | 80   |      | pF   |

**Notes**

(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

(2) Pulse test: Pulse width  $\leq 40\text{ ms}$

| <b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise specified) |                       |       |                      |
|-------------------------------------------------------------------------------------------------|-----------------------|-------|----------------------|
| PARAMETER                                                                                       | SYMBOL                | SS3P4 | UNIT                 |
| Typical thermal resistance <sup>(1)</sup>                                                       | $R_{\theta JA}^{(1)}$ | 115   | $^{\circ}\text{C/W}$ |
|                                                                                                 | $R_{\theta JL}^{(1)}$ | 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

| <b>ORDERING INFORMATION</b> (Example) |                 |                        |               |                                    |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                         | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| SS3P6-M3/84A                          | 0.024           | 84A                    | 3000          | 7" diameter plastic tape and reel  |
| SS3P6-M3/85A                          | 0.024           | 85A                    | 10 000        | 13" diameter plastic tape and reel |
| SS3P6HM3/84A <sup>(1)</sup>           | 0.024           | 84A                    | 3000          | 7" diameter plastic tape and reel  |
| SS3P6HM3/85A <sup>(1)</sup>           | 0.024           | 85A                    | 10 000        | 13" diameter plastic tape and reel |

**Note**

(1) Automotive grade

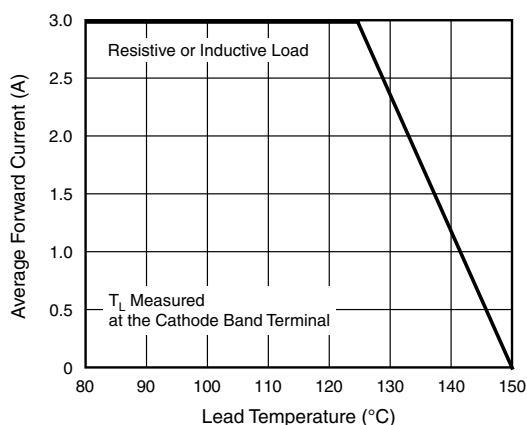
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise specified)


Fig. 1 - Forward Current Derating Curve

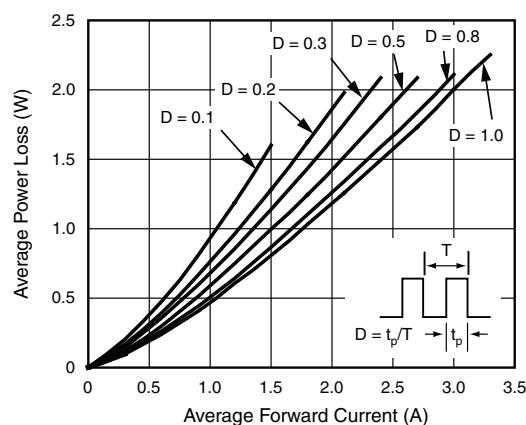


Fig. 2 - Forward Power Loss Characteristics

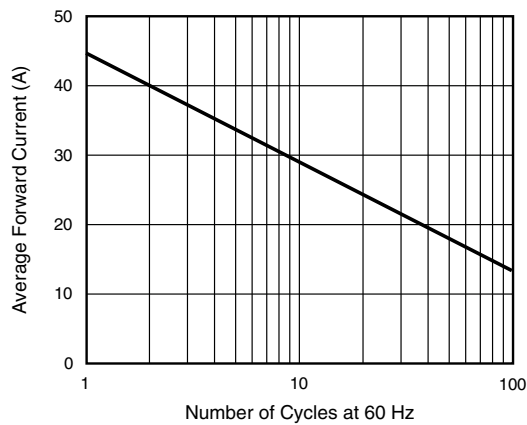


Fig. 3 - Maximum Non-Repetitive Peak Forward Surge Current

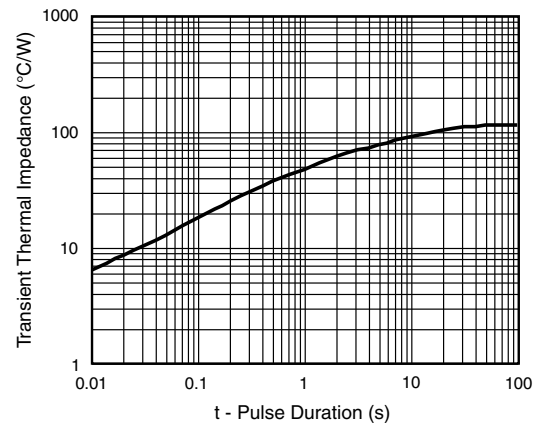


Fig. 6 - Typical Transient Thermal Impedance

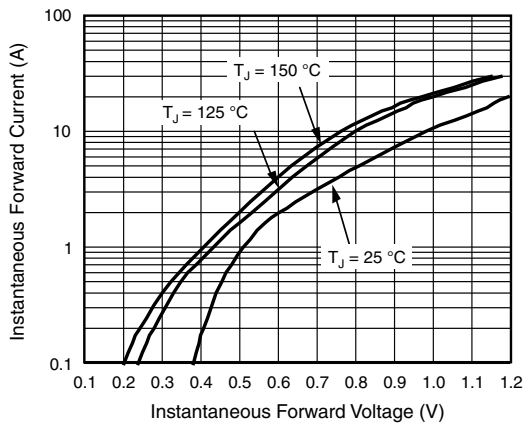


Fig. 4 - Typical Instantaneous Forward Characteristics

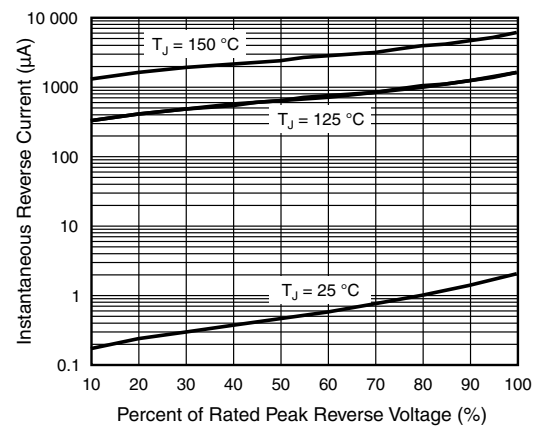


Fig. 7 - Typical Reverse Leakage Characteristics

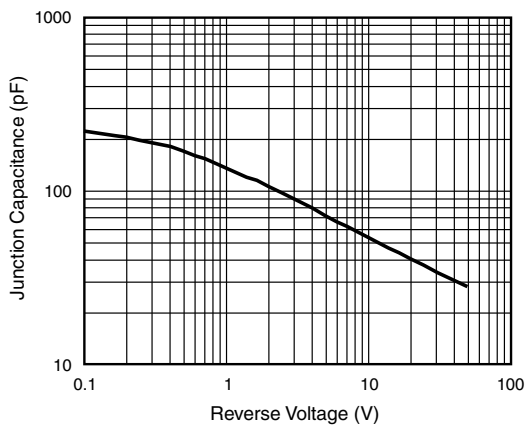
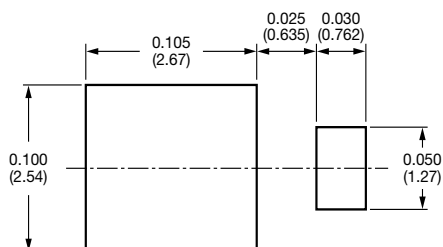
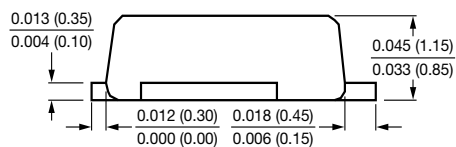
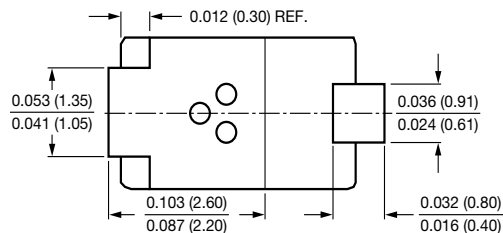
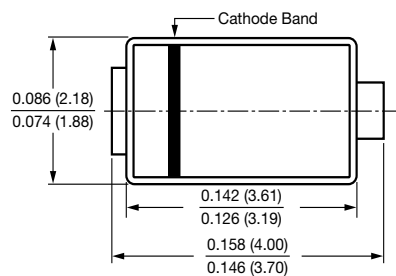


Fig. 5 - Typical Junction Capacitance

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

## DO-220AA (SMP)





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