

## High Current Density Surface Mount Glass Passivated Rectifiers

eSMP® Series



DO-220AA (SMP)

### FEATURES

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Glass passivated pellet chip junction
- Low forward voltage drop
- 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)



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

### 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 1A whisker test, HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** Color band denotes the cathode end

### PRIMARY CHARACTERISTICS

|                  |                                              |
|------------------|----------------------------------------------|
| $I_{F(AV)}$      | 1.0 A                                        |
| $V_{RRM}$        | 100 V, 200 V, 400 V, 600 V,<br>800 V, 1000 V |
| $I_R$            | 1 $\mu$ A                                    |
| $V_F$            | 0.95 V                                       |
| $T_J$ max.       | 150 °C                                       |
| Package          | DO-220AA (SMP)                               |
| Diode variations | Single die                                   |

### TYPICAL APPLICATIONS

General purpose, polarity protection, and rail-to-rail protection in both consumer and automotive applications.

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

| PARAMETER                                                                         | SYMBOL         | S1PB        | S1PD | S1PG | S1PJ | S1PK | S1PM | UNIT |
|-----------------------------------------------------------------------------------|----------------|-------------|------|------|------|------|------|------|
| Device marking code                                                               |                | SB          | SD   | SG   | SJ   | SK   | SM   |      |
| Max. repetitive peak reverse voltage                                              | $V_{RRM}$      | 100         | 200  | 400  | 600  | 800  | 1000 | V    |
| Max. RMS voltage                                                                  | $V_{RMS}$      | 70          | 140  | 280  | 420  | 560  | 700  | V    |
| Max. DC blocking voltage                                                          | $V_{DC}$       | 100         | 200  | 400  | 600  | 800  | 1000 | V    |
| Average forward current                                                           | $I_{F(AV)}$    | 1.0         |      |      |      |      |      | A    |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 30          |      |      |      |      |      | A    |
| 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                        | S1PB | S1PD | S1PG | S1PJ | S1PK | S1PM | UNIT |
|------------------------------------|--------------------------------------------------------------------------|-------------------------|-------------------------------|------|------|------|------|------|------|------|
| Max. instantaneous forward voltage | I <sub>F</sub> = 1.0 A                                                   | T <sub>J</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 1.1  |      |      |      |      |      | V    |
|                                    | I <sub>F</sub> = 1.0 A                                                   | T <sub>J</sub> = 125 °C |                               | 0.95 |      |      |      |      |      |      |
| Max. reverse current               | Rated V <sub>R</sub>                                                     | T <sub>J</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 1.0  |      |      |      | 1.0  |      | μA   |
|                                    |                                                                          | T <sub>J</sub> = 125 °C |                               | 50   |      |      |      | 100  |      | μA   |
| Typical reverse recovery time      | I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1.0 A, I <sub>rr</sub> = 0.25 A |                         | t <sub>rr</sub>               | 1.8  |      |      |      |      |      | μs   |
| Typical junction capacitance time  | 4.0 V, 1 MHz                                                             |                         | C <sub>J</sub>                | 6.0  |      |      |      |      |      | 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)

| THERMAL CHARACTERISTICS (TA = 25 °C unless otherwise noted) |          |      |      |      |      |      |      |      |
|-------------------------------------------------------------|----------|------|------|------|------|------|------|------|
| PARAMETER                                                   | SYMBOL   | S1PB | S1PD | S1PG | S1PJ | S1PK | S1PM | UNIT |
| Typical thermal resistance                                  | RθJA (1) | 105  |      |      |      |      |      | °C/W |
|                                                             | RθJL (1) | 15   |      |      |      |      |      |      |
|                                                             | RθJC (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                      |
|----------------------------|-----------------|------------------------|---------------|------------------------------------|
| S1PJ-M3/84A                | 0.024           | 84A                    | 3000          | 7" diameter plastic tape and reel  |
| S1PJ-M3/85A                | 0.024           | 85A                    | 10 000        | 13" diameter plastic tape and reel |
| S1PJHM3/84A <sup>(1)</sup> | 0.024           | 84A                    | 3000          | 7" diameter plastic tape and reel  |
| S1PJHM3/85A <sup>(1)</sup> | 0.024           | 85A                    | 10 000        | 13" diameter plastic tape and reel |

**Note**

(1) Automotive grade

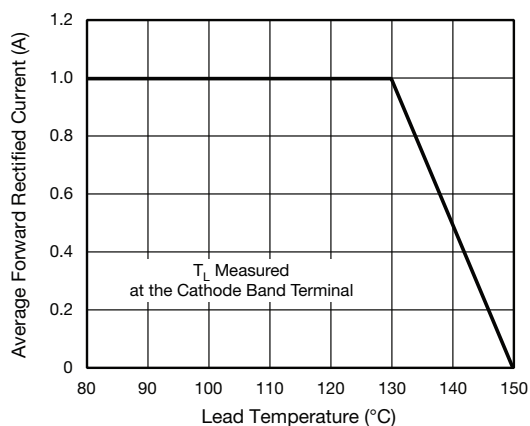
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

Fig. 1 - Max. Forward Current Derating Curve

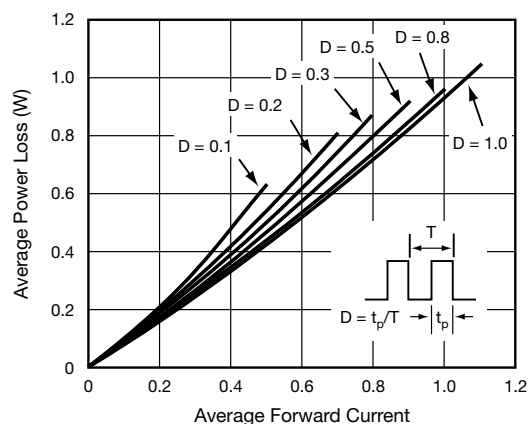


Fig. 2 - Forward Power Loss Characteristics

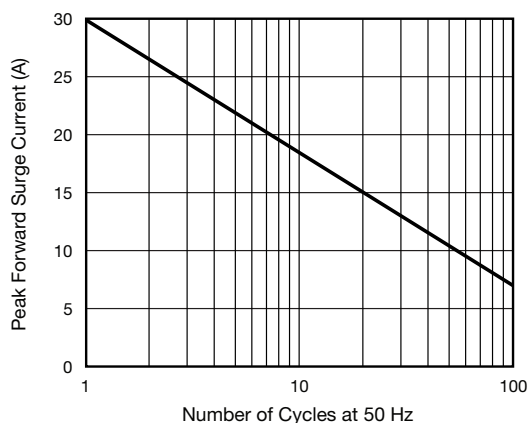


Fig. 3 - Max. Non-Repetitive Peak Forward Surge Current

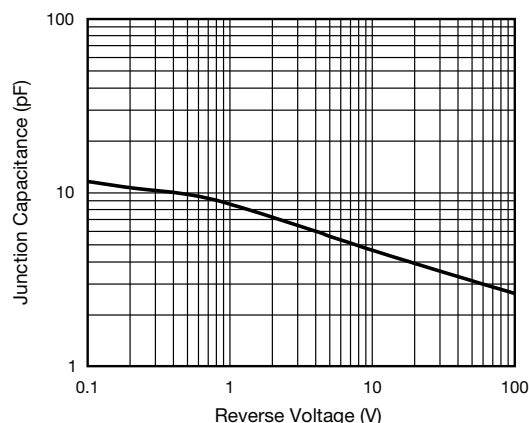


Fig. 6 - Typical Junction Capacitance

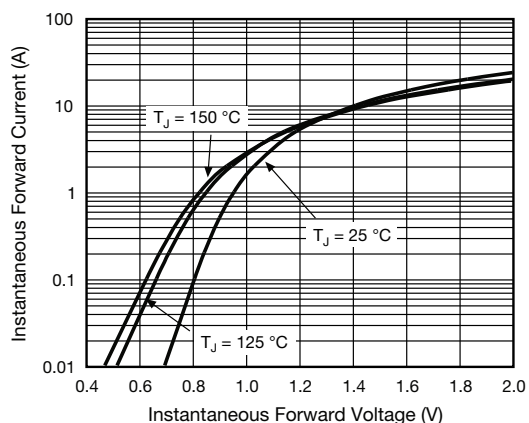


Fig. 4 - Typical Instantaneous Forward Characteristics

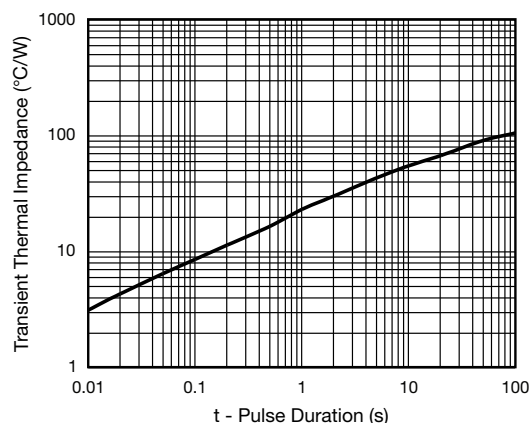


Fig. 7 - Typical Transient Thermal Impedance

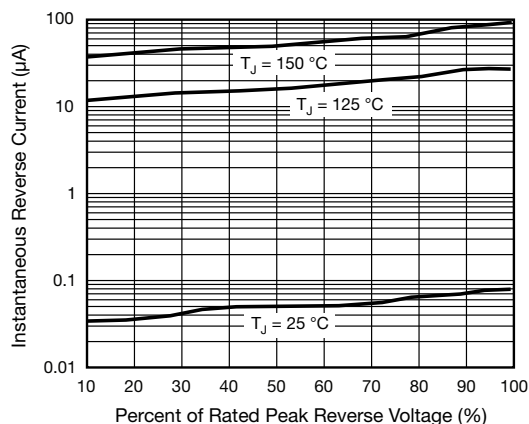
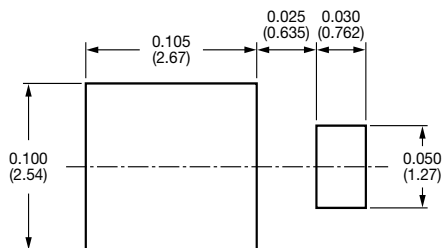
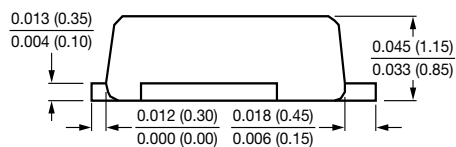
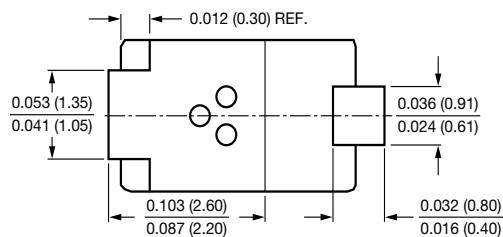
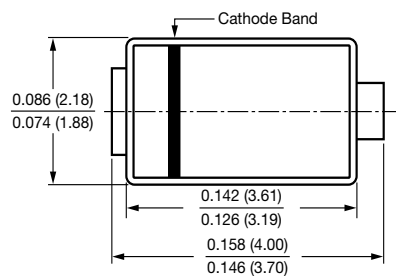


Fig. 5 - Typical Reverse Leakage Characteristics



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### DO-220AA (SMP)





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