



## High Current Density Surface Mount Glass Passivated Rectifiers

### eSMP® Series



DO-220AA (SMP)

### PRIMARY CHARACTERISTICS

|             |                 |
|-------------|-----------------|
| $I_{F(AV)}$ | 1.0 A           |
| $V_{RRM}$   | 100 V to 1000 V |
| $I_R$       | 1 $\mu$ A       |
| $V_F$       | 0.95 V          |
| $T_J$ max.  | 150 °C          |

### TYPICAL APPLICATIONS

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

### FEATURES

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Glass passivated 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
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- **Halogen-free according to IEC 61249-2-21 definition**

AUTOMOTIVE  
GRADE  
Available



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

### 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   |      |
| Maximum repetitive peak reverse voltage   | $V_{RRM}$      | 100           | 200  | 400  | 600  | 800  | 1000 | V    |
| Maximum RMS voltage   | $V_{RMS}$      | 70            | 140  | 280  | 420  | 560  | 700  | V    |
| Maximum 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   |

# S1PB thru S1PM

Vishay General Semiconductor



| ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |   |                         |                               |      |      |      |      |      |          |      |
|--|---|-------------------------|-------------------------------|------|------|------|------|------|----------|------|
| PARAMETER  | TEST CONDITIONS   |                         | SYMBOL                        | S1PB | S1PD | S1PG | S1PJ | S1PK | S1PM     | UNIT |
| Maximum 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 |      |      |      |      |          |      |
| Maximum 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<br>μA |      |
|  |   | T <sub>J</sub> = 125 °C |                               | 50   |      |      | 100  |      |          |      |
| Typical reverse recovery time  | I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1.0 A,<br>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 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                          | S1PB | S1PD | S1PG | S1PJ | S1PK | S1PM | UNIT |  |
| Typical thermal resistance  | R <sub>θJA</sub> <sup>(1)</sup> | 105  |      |      |      |      | °C/W |      |  |
|   | R <sub>θJL</sub> <sup>(1)</sup> | 15   |      |      |      |      |      |      |  |
|   | R <sub>θJC</sub> <sup>(1)</sup> | 20   |      |      |      |      |      |      |  |

**Note**

(1) Thermal resistance from junction to ambient and junction to lead mounted on P.C.B. with 5.0 mm x 5.0 mm copper pad areas. R<sub>θJL</sub> is measured at the terminal of cathode band. 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                      |
| 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 (1)                | 0.024           | 84A                    | 3000          | 7" diameter plastic tape and reel  |
| S1PJHM3/85A (1)                | 0.024           | 85A                    | 10 000        | 13" diameter plastic tape and reel |

**Note**

(1) Automotive grade

## RATINGS AND CHARACTERISTICS CURVES

(T<sub>A</sub> = 25 °C unless otherwise noted)

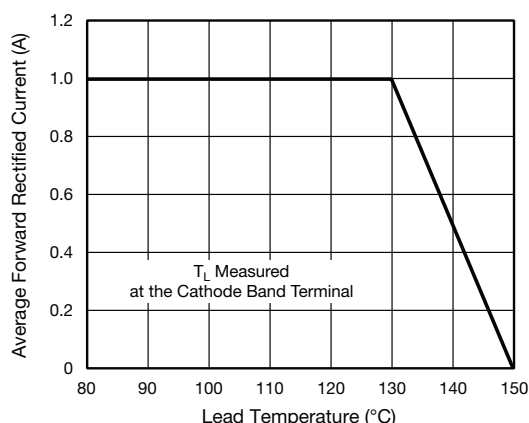


Fig. 1 - Maximum Forward Current Derating Curve

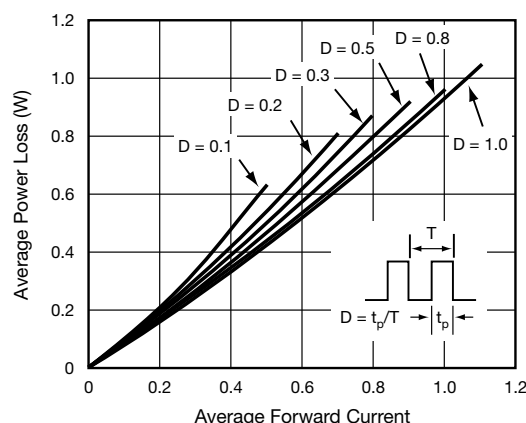


Fig. 2 - Forward Power Loss Characteristics

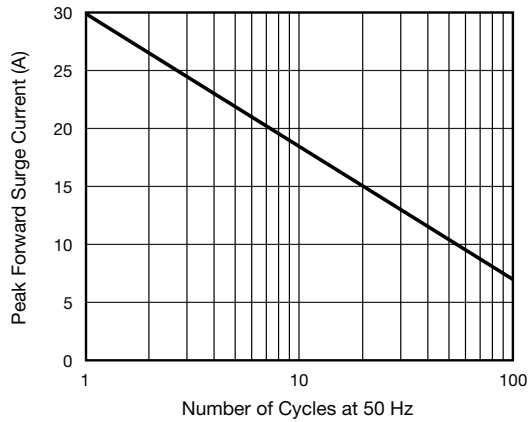


Fig. 3 - Maximum Non-Repetitive Peak Forward Surge Current

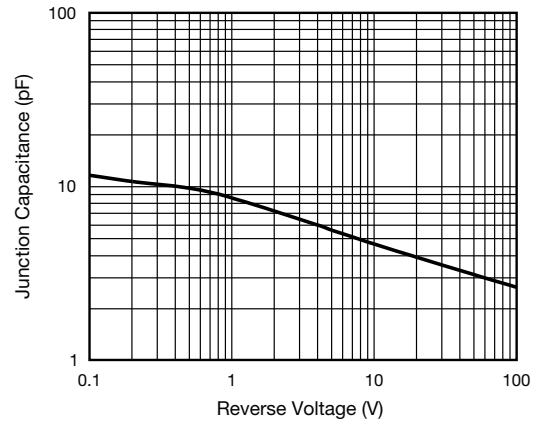


Fig. 6 - Typical Junction Capacitance

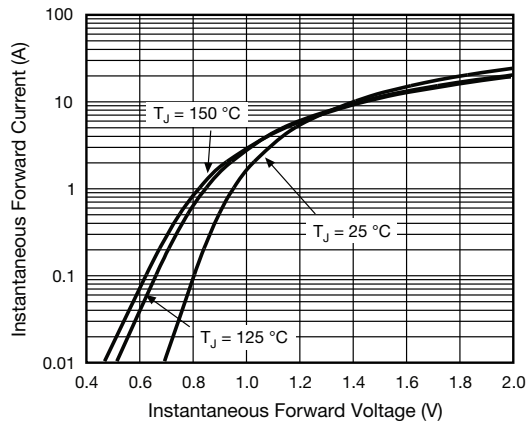


Fig. 4 - Typical Instantaneous Forward Characteristics

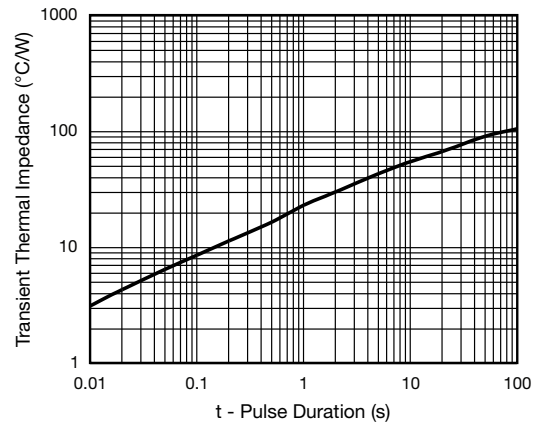


Fig. 7 - Typical Transient Thermal Impedance

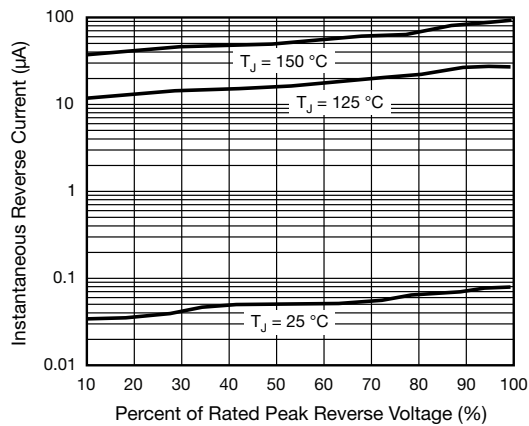


Fig. 5 - Typical Reverse Leakage Characteristics

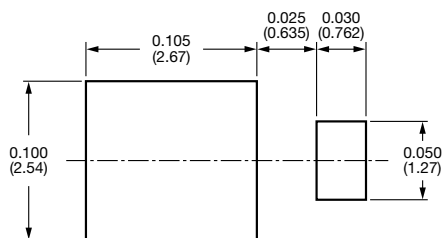
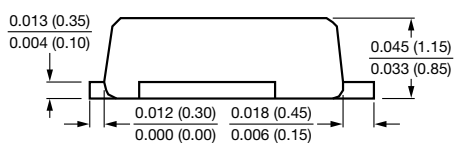
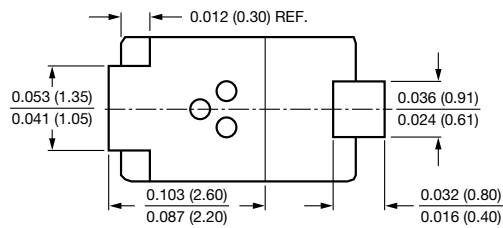
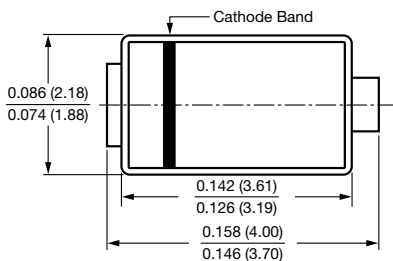
# S1PB thru S1PM

Vishay General Semiconductor



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### DO-220AA (SMP)





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