

# Standard Avalanche Surface Mount Rectifiers

## eSMP® Series



DO-220AA (SMP)

### PRIMARY CHARACTERISTICS

|                        |                 |
|------------------------|-----------------|
| $I_{F(AV)}$            | 1.5 A           |
| $V_{RRM}$              | 200 V to 1000 V |
| $I_{FSM}$              | 30 A            |
| $I_R$                  | 0.3 $\mu$ A     |
| $V_F$ at $I_F = 1.5$ A | 0.89 V          |
| $E_{AS}$               | 20 mJ           |
| $T_J$ max.             | 175 °C          |

### TYPICAL APPLICATIONS

For use in general purpose rectification of power supplies, inverters, converters, and freewheeling diodes for consumer, automotive, and telecommunication.

### FEATURES

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Controlled avalanche characteristics
- Low forward voltage drop
- Low leakage current
- 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 cathode end

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

| PARAMETER                                                                         | SYMBOL         | AS1PD         | AS1PG | AS1PJ | AS1PK | AS1PM | UNIT |
|-----------------------------------------------------------------------------------|----------------|---------------|-------|-------|-------|-------|------|
| Device marking code                                                               |                | ASD           | ASG   | ASJ   | ASK   | ASM   |      |
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$      | 200           | 400   | 600   | 800   | 1000  | V    |
| Maximum DC forward current (see fig. 1)                                           | $I_F^{(1)}$    | 1.5           |       |       |       |       | A    |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 30            |       |       |       |       | A    |
| Non-repetitive avalanche energy at $I_{AS} = 1.0$ A, $T_A = 25$ °C                | $E_{AS}$       | 20            |       |       |       |       | mJ   |
| Operating junction and storage temperature range                                  | $T_J, T_{STG}$ | - 55 to + 175 |       |       |       |       | °C   |

#### Note

<sup>(1)</sup> Mounted on 5 mm x 5 mm pad areas PCB

## AS1PD thru AS1PM

Vishay General Semiconductor



| ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                                                                          |                         |                               |      |      |      |
|----------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------|-------------------------------|------|------|------|
| PARAMETER                                                                  | TEST CONDITIONS                                                          |                         | SYMBOL                        | TYP. | MAX. | UNIT |
| Instantaneous forward voltage                                              | I <sub>F</sub> = 1.0 A                                                   | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.95 | -    | V    |
|                                                                            |                                                                          | T <sub>A</sub> = 125 °C |                               | 0.84 | -    |      |
|                                                                            | I <sub>F</sub> = 1.5 A                                                   | T <sub>A</sub> = 25 °C  |                               | 0.99 | 1.15 |      |
|                                                                            |                                                                          | T <sub>A</sub> = 125 °C |                               | 0.89 | 1.0  |      |
| Reverse current                                                            | Rated V <sub>R</sub>                                                     | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 0.3  | 5    | μA   |
|                                                                            |                                                                          | T <sub>A</sub> = 125 °C |                               | 35   | 100  |      |
| 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>               | 1.5  | -    | μs   |
| Typical junction capacitance                                               | 4.0 V, 1 MHz                                                             |                         | C <sub>J</sub>                | 10.4 | -    | 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 <sub>A</sub> = 25 °c unless otherwise noted) |                                 |       |       |       |       |       |      |
|-------------------------------------------------------------------------|---------------------------------|-------|-------|-------|-------|-------|------|
| PARAMETER                                                               | SYMBOL                          | AS1PD | AS1PG | AS1PJ | AS1PK | AS1PM | UNIT |
| Typical thermal resistance                                              | R <sub>θJA</sub> <sup>(1)</sup> | 115   |       |       |       |       | °C/W |
|                                                                         | R <sub>θJM</sub> <sup>(1)</sup> | 15    |       |       |       |       |      |

## Note

(1) Unit mounted on PCB with 5 mm x 5 mm copper pad areas. Thermal resistance  $R_{\theta JA}$  - junction to ambient,  $R_{\theta JM}$  - junction to mount at the terminal of cathode band

| ORDERING INFORMATION (Example) |                 |                        |               |                                    |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| AS1PJ-M3/84A                   | 0.024           | 84A                    | 3000          | 7" diameter plastic tape and reel  |
| AS1PJ-M3/85A                   | 0.024           | 85A                    | 10 000        | 13" diameter plastic tape and reel |
| AS1PJHM3/84A <sup>(1)</sup>    | 0.024           | 84A                    | 3000          | 7" diameter plastic tape and reel  |
| AS1PJHM3/85A <sup>(1)</sup>    | 0.024           | 85A                    | 10 000        | 13" diameter plastic tape and reel |

## Note

(1) Automotive grade

## RATINGS AND CHARACTERISTICS CURVES

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

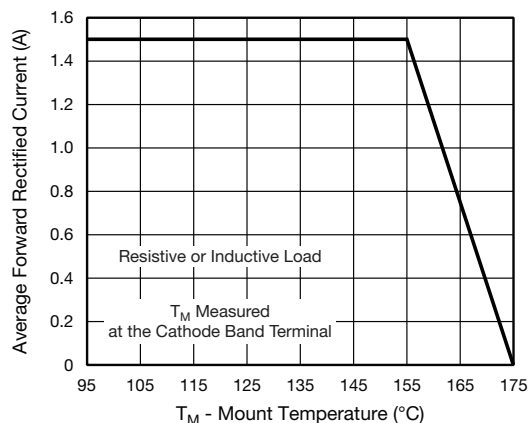


Fig. 1 - Maximum Forward Current Derating Curve

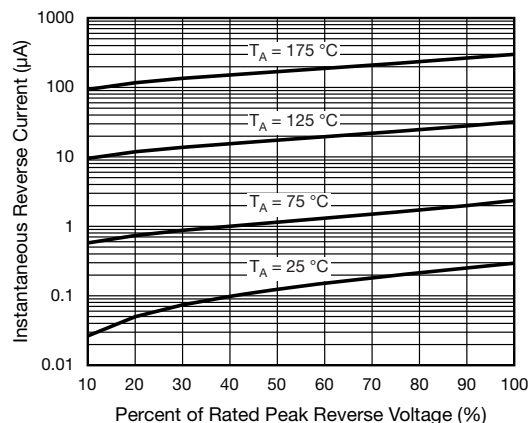


Fig. 4 - Typical Reverse Characteristics

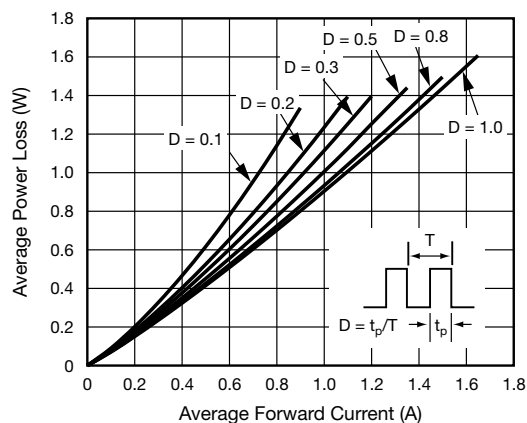


Fig. 2 - Forward Power Loss Characteristics

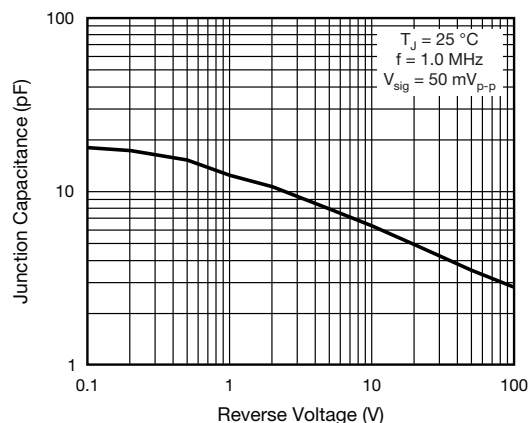


Fig. 5 - Typical Junction Capacitance

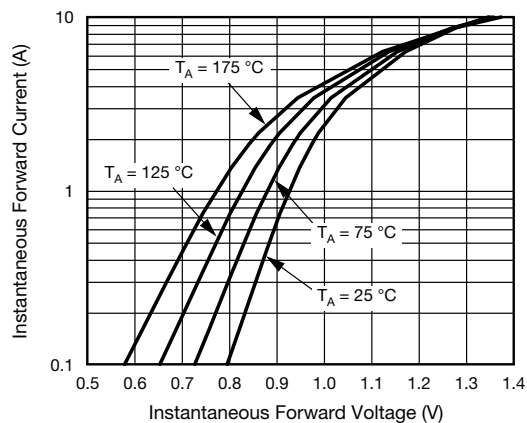


Fig. 3 - Typical Instantaneous Forward Characteristics

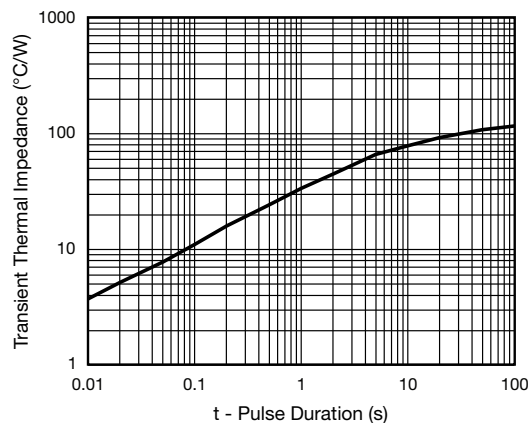
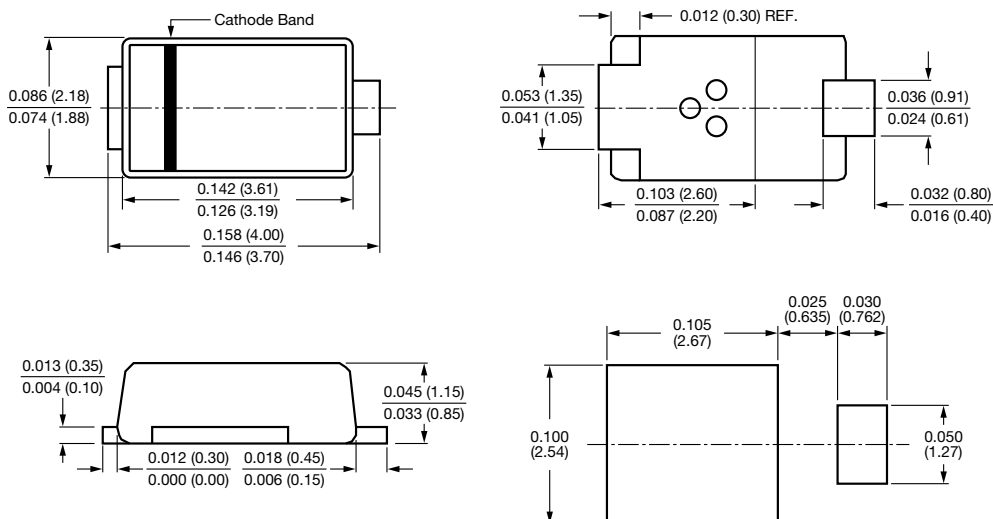


Fig. 6 - Typical Transient Thermal Impedance

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

## DO-220AA (SMP)





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