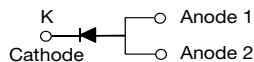


# Fast Switching Avalanche Surface-Mount Rectifiers

## eSMP® Series



### SMPC (TO-277A)



## ADDITIONAL RESOURCES


[3D Models](#)

| PRIMARY CHARACTERISTICS |                     |
|-------------------------|---------------------|
| $I_{F(AV)}$             | 3.0 A               |
| $V_{RRM}$               | 200 V, 400 V, 600 V |
| $I_{FSM}$               | 50 A                |
| $t_{rr}$                | 140 ns              |
| $E_{AS}$                | 20 mJ               |
| $V_F$ at $I_F = 3.0$ A  | 1.04 V              |
| $T_J$ max.              | 175 °C              |
| Package                 | SMPC (TO-277A)      |
| Circuit configuration   | Single              |

## FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Glass passivated pellet chip junction
- Fast reverse recovery time
- Controlled avalanche characteristics
- Low leakage current
- High forward surge capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available  
- Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



RoHS  
COMPLIANT  
HALOGEN  
FREE

## TYPICAL APPLICATIONS

For use in lighting, fast switching rectification of power supplies, inverters, converters, and freewheeling diodes for consumer, automotive, and telecommunication.

## MECHANICAL DATA

### Case: SMPC (TO-277A)

Molding compound meets UL 94 V-0 flammability rating  
Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

Base P/NHM3\_X - halogen-free, RoHS-compliant and AEC-Q101 qualified

("\_X" denotes revision code e.g. A, B,.....)

**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

| MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)                           |                |                       |       |       |      |
|-----------------------------------------------------------------------------------|----------------|-----------------------|-------|-------|------|
| PARAMETER                                                                         | SYMBOL         | AR3PD                 | AR3PG | AR3PJ | UNIT |
| Device marking code                                                               |                | AR3D                  | AR3G  | AR3J  |      |
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$      | 200                   | 400   | 600   | V    |
| Maximum DC forward current (fig. 1)                                               | $I_F^{(1)}$    | 3.0                   |       |       | A    |
|                                                                                   | $I_F^{(2)}$    | 1.8                   |       |       |      |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 50                    |       |       | A    |
| Non-repetitive avalanche energy at $T_J = 25$ °C                                  | $E_{AS}$       | $I_{AS} = 2.5$ A max. |       |       | mJ   |
|                                                                                   |                | $I_{AS} = 1.0$ A typ. |       |       |      |
| Operating junction and storage temperature range                                  | $T_J, T_{STG}$ | -55 to +175           |       |       | °C   |

## Notes

(1) Mounted on 14 mm x 14 mm pad areas, 1 oz. FR4 PCB

(2) Free air, mounted on recommended pad area



| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                                                                           |                                   |             |      |      |               |
|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------|-------------|------|------|---------------|
| PARAMETER                                                                                    | TEST CONDITIONS                                                           |                                   | SYMBOL      | TYP. | MAX. | UNIT          |
| Instantaneous forward voltage                                                                | $I_F = 3.0\text{ A}$                                                      | $T_A = 25\text{ }^\circ\text{C}$  | $V_F^{(1)}$ | 1.24 | 1.6  | V             |
|                                                                                              |                                                                           | $T_A = 125\text{ }^\circ\text{C}$ |             | 1.04 | 1.20 |               |
| Reverse current                                                                              | Rated $V_R$                                                               | $T_A = 25\text{ }^\circ\text{C}$  | $I_R^{(2)}$ | 0.33 | 10   | $\mu\text{A}$ |
|                                                                                              |                                                                           | $T_A = 125\text{ }^\circ\text{C}$ |             | 44   | 250  |               |
| Maximum reverse recovery time                                                                | $I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ ,<br>$I_{rr} = 0.25\text{ A}$ |                                   | $t_{rr}$    | 122  | 140  | ns            |
| Typical junction capacitance per diode                                                       | Rated $V_R = 4.0\text{ V}$ , 1 MHz                                        |                                   | $C_J$       | 44   | -    | 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 noted) |                       |       |       |       |                    |
|-------------------------------------------------------------------------------------------|-----------------------|-------|-------|-------|--------------------|
| PARAMETER                                                                                 | SYMBOL                | AR3PD | AR3PG | AR3PJ | UNIT               |
| Typical thermal resistance                                                                | $R_{\theta JA}^{(1)}$ | 85    |       |       | $^\circ\text{C/W}$ |
|                                                                                           | $R_{\theta JM}^{(2)}$ | 5     |       |       |                    |

**Notes**

- (1) Free air, mounted on recommended PCB 1 oz. pad are; thermal resistance  $R_{\theta JA}$  - junction to ambient  
 (2) Units mounted on PCB with 14 mm x 14 mm copper pad areas;  $R_{\theta JM}$  - junction to mount

| <b>ORDERING INFORMATION</b> (Example) |                 |                        |               |                                    |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                         | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| AR3PJ-M3/86A                          | 0.10            | 86A                    | 1500          | 7" diameter plastic tape and reel  |
| AR3PJ-M3/87A                          | 0.10            | 87A                    | 6500          | 13" diameter plastic tape and reel |
| AR3PJHM3_A/H <sup>(1)</sup>           | 0.10            | H                      | 1500          | 7" diameter plastic tape and reel  |
| AR3PJHM3_A/I <sup>(1)</sup>           | 0.10            | I                      | 6500          | 13" diameter plastic tape and reel |

**Note**

- (1) AEC-Q101 qualified

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

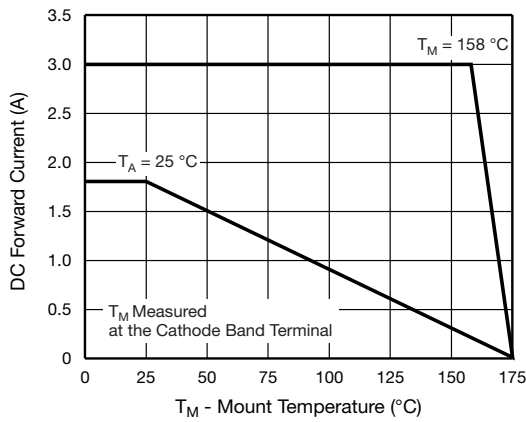


Fig. 1 - Maximum Forward Current Derating Curve

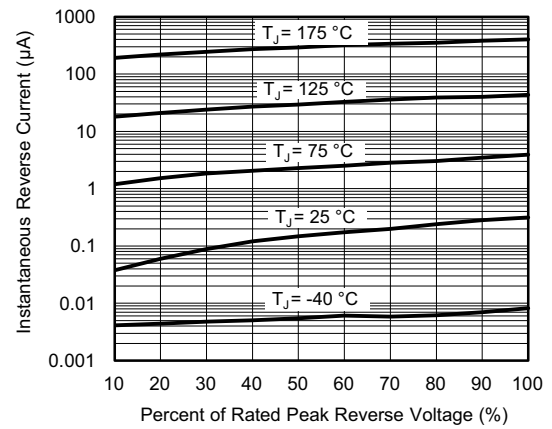


Fig. 4 - Typical Reverse Leakage Characteristics

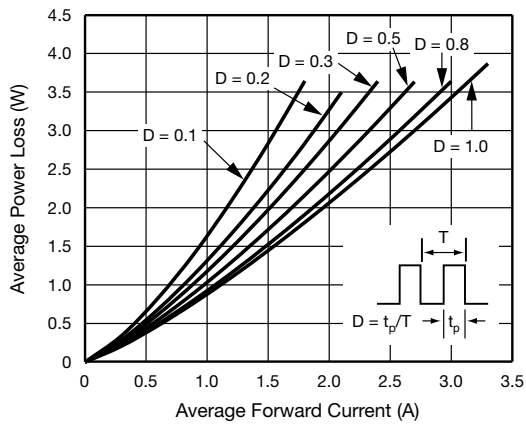


Fig. 2 - Average Power Loss Characteristics

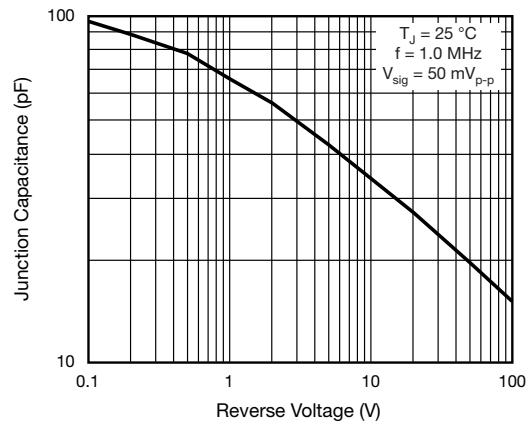


Fig. 5 - Typical Junction Capacitance

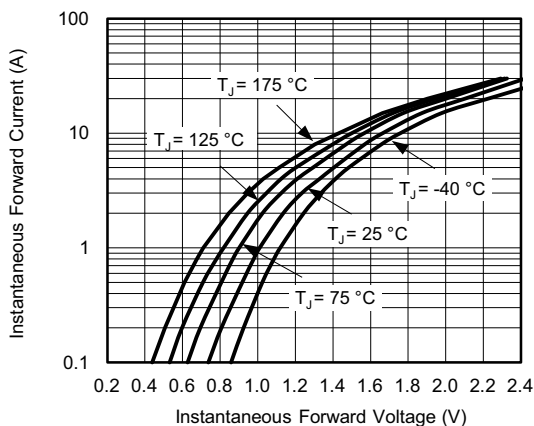


Fig. 3 - Typical Instantaneous Forward Characteristics

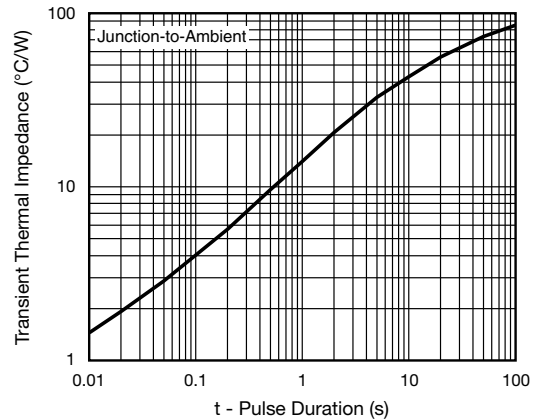
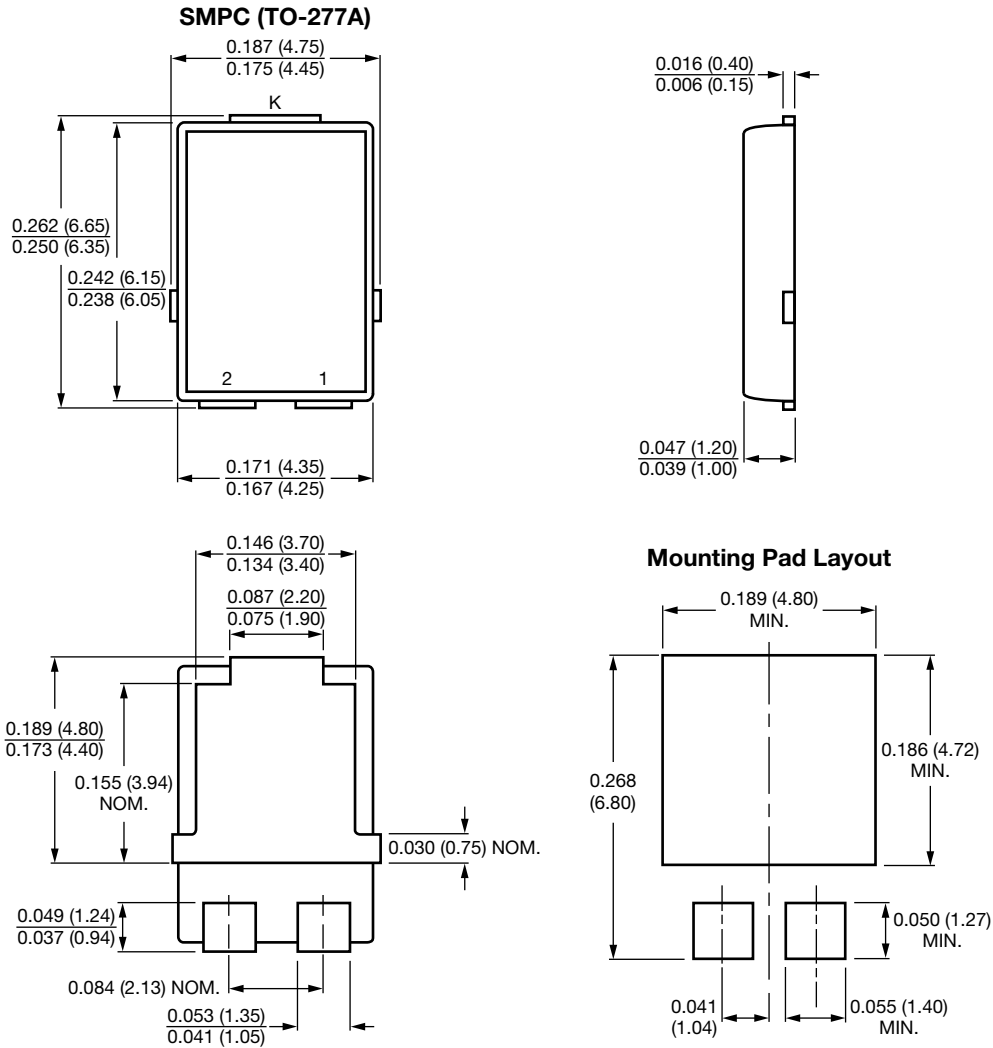


Fig. 6 - Typical Transient Thermal Impedance



### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC® TO-277A



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