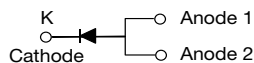


Fast Switching Avalanche Surface-Mount Rectifiers

eSMP® Series



SMPC (TO-277A)



ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS | |
|-------------------------|----------------|
| $I_{F(AV)}$ | 4.0 A |
| V_{RRM} | 800 V, 1000 V |
| I_{FSM} | 65 A |
| t_{rr} | 120 ns |
| E_{AS} | 20 mJ |
| V_F at $I_F = 4.0$ A | 1.27 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



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 | AR4PK | AR4PM | UNIT |
| Device marking code | | AR4K | AR4M | |
| Maximum repetitive peak reverse voltage | V_{RRM} | 800 | 1000 | V |
| Maximum DC forward current (fig. 1) | $I_F^{(1)}$ | 4.0 | | A |
| | $I_F^{(2)}$ | 1.8 | | |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | I_{FSM} | 65 | | A |
| Non-repetitive avalanche energy at $T_J = 25$ °C | $I_{AS} = 2.5$ A max. | 20 | | mJ |
| | $I_{AS} = 1.0$ A typ. | 30 | | |
| Operating junction and storage temperature range | T_J, T_{STG} | -55 to +175 | | °C |

Notes

(1) Mounted on 30 mm x 30 mm pad areas, 1 oz. FR4 PCB

(2) Free air, mounted on recommended pad area



| ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | | | | |
|---|---|-----------------------------------|-------------|------|------|---------------|
| PARAMETER | TEST CONDITIONS | SYMBOL | TYP. | MAX. | UNIT | |
| Instantaneous forward voltage | $I_F = 4.0\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$ | $V_F^{(1)}$ | 1.66 | 1.9 | V |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 1.27 | 1.6 | |
| Reverse current | Rated V_R | $T_A = 25\text{ }^\circ\text{C}$ | $I_R^{(2)}$ | 0.42 | 10 | μA |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 96.3 | 500 | |
| Maximum reverse recovery time | $I_F = 0.5\text{ A}$, $I_R = 1.0\text{ A}$, $I_{rr} = 0.25\text{ A}$ | t_{rr} | 79 | 120 | ns | |
| Typical junction capacitance per diode | Rated $V_R = 4.0\text{ V}$, 1 MHz | C_J | 55 | - | pF | |

Notes

- (1) Pulse test: 300 μs 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) | | | | |
|--|-----------------------|-------|-------|--------------------|
| PARAMETER | SYMBOL | AR4PK | AR4PM | 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 30 mm x 30 mm copper pad areas; $R_{\theta JM}$ - junction to mount

| ORDERING INFORMATION (Example) | | | | |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| AR4PM-M3/86A | 0.10 | 86A | 1500 | 7" diameter plastic tape and reel |
| AR4PM-M3/87A | 0.10 | 87A | 6500 | 13" diameter plastic tape and reel |
| AR4PMHM3_A/H ⁽¹⁾ | 0.10 | H | 1500 | 7" diameter plastic tape and reel |
| AR4PMHM3_A/I ⁽¹⁾ | 0.10 | I | 6500 | 13" diameter plastic tape and reel |

Note

- (1) AEC-Q101 qualified



RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

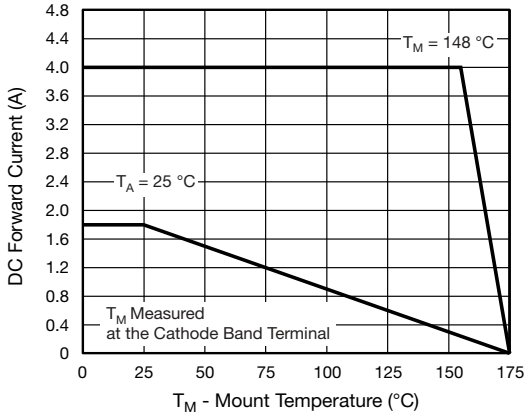


Fig. 1 - Maximum DC Forward Current Derating Curve

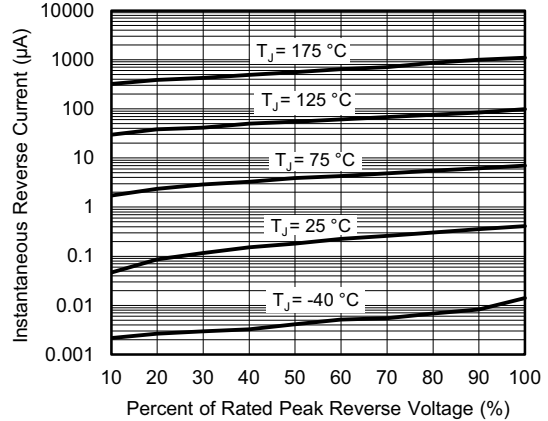


Fig. 4 - Typical Reverse Leakage Characteristics

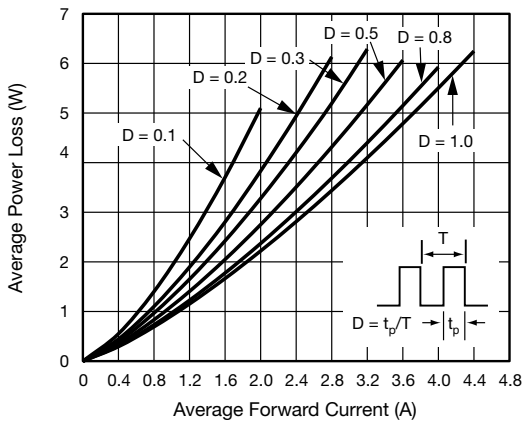


Fig. 2 - Average Power Loss Characteristics

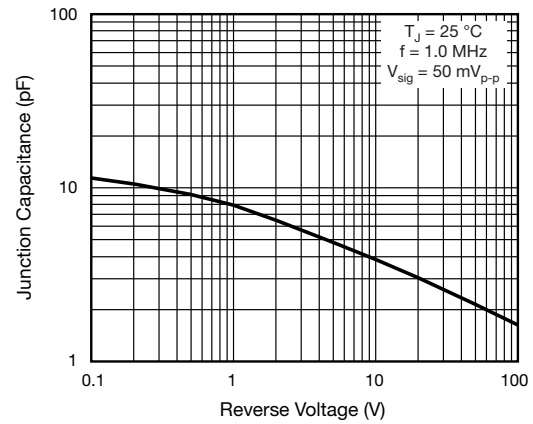


Fig. 5 - Typical Junction Capacitance

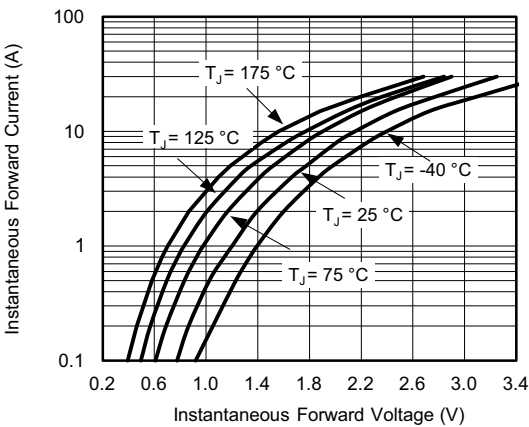


Fig. 3 - Typical Instantaneous Forward Characteristics

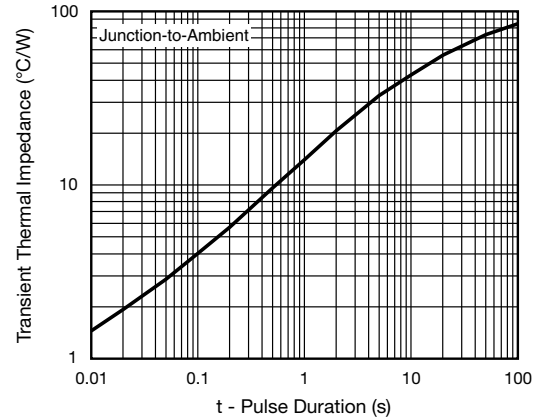
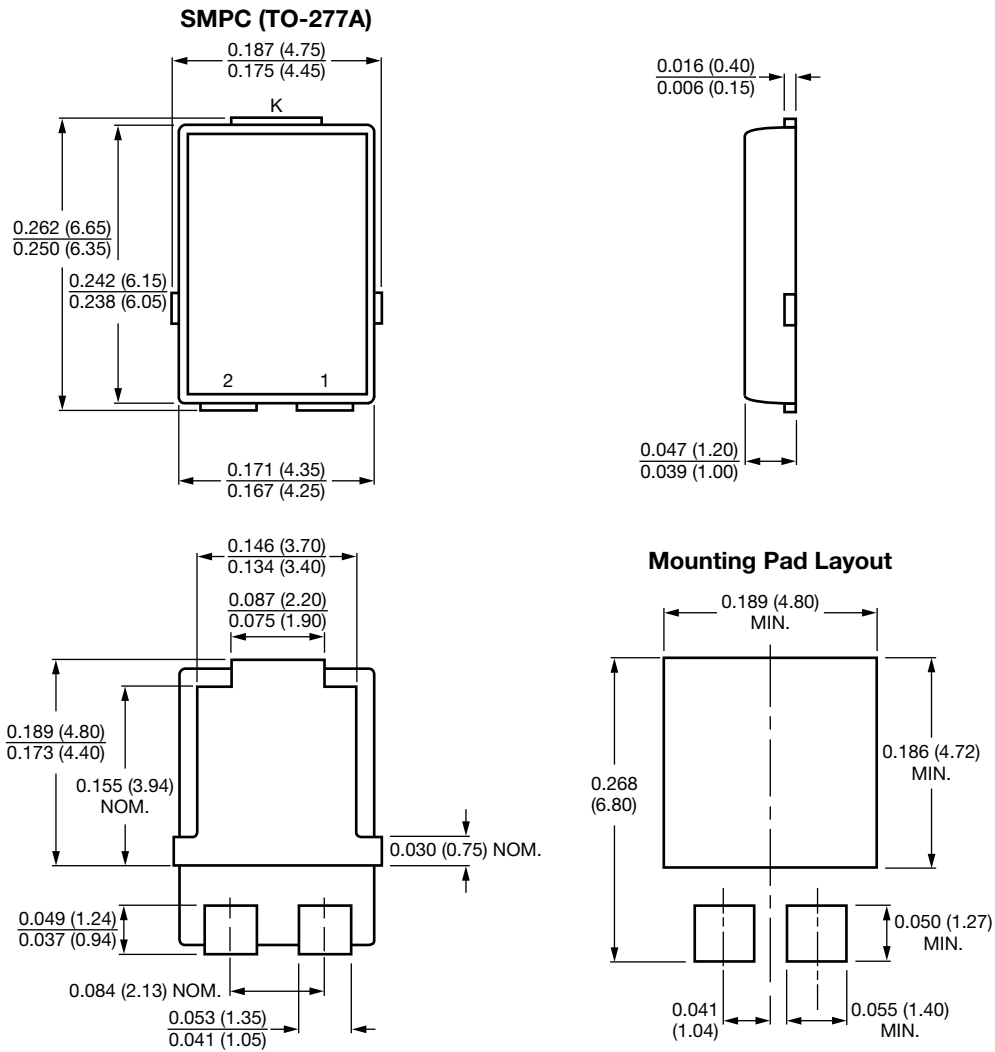


Fig. 6 - Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC® TO-277A



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