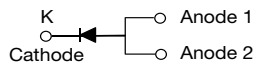


SMD Photovoltaic Solar Cell Protection Rectifier

eSMP® Series



SMPC (TO-277A)



FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Glass passivated pellet chip junction
- Low forward voltage drop
- High forward surge capability
- Low thermal resistance
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

TYPICAL APPLICATIONS

For use in solar cell panel blocking diode for protection, using DC forward current without reverse bias.

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

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

E3 suffix meets JESD 201 class 1A whisker test

LINKS TO ADDITIONAL RESOURCES



3D Models

PRIMARY CHARACTERISTICS

| | |
|------------------------|----------------|
| $I_{F(AV)}$ | 5.0 A |
| V_{RRM} | 1000 V |
| I_{FSM} | 100 A |
| I_R | 10 μ A |
| V_F at $I_F = 5.0$ A | 0.90 V |
| T_J max. | 150 °C |
| Package | SMPC (TO-277A) |
| Circuit configuration | Single |

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

| PARAMETER | SYMBOL | S5PMS | UNIT |
|--|-------------------|----------------|--------------------|
| Device marking code | | 5PMS | |
| Max. repetitive peak reverse voltage | V_{RRM} | 1000 | V |
| Max. DC forward current (fig. 1) | I_F | $T_M = 130$ °C | 5.0 ⁽¹⁾ |
| | | $T_A = 25$ °C | 1.8 ⁽²⁾ |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | I_{FSM} | 100 | A |
| Operating junction and storage temperature range | T_{OP}, T_{STG} | -55 to +150 | °C |
| Junction temperature in DC forward current without reverse bias, $t \leq 1$ h ⁽³⁾ | T_J | ≤ 200 | °C |

Notes

- ⁽¹⁾ Mounted on 30 mm x 30 mm Al PCB
- ⁽²⁾ Free air, mounted on recommended copper pad area
- ⁽³⁾ Meets the requirements of IEC 61215 Ed. 2 bypass diode thermal test



| ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | | | | |
|--|---|-----------------------------------|-------------|------|------|---------------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Instantaneous forward voltage | $I_F = 2.5\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$ | $V_F^{(1)}$ | 0.94 | - | V |
| | $I_F = 5.0\text{ A}$ | | | 0.99 | 1.15 | |
| | $I_F = 2.5\text{ A}$ | $T_A = 125\text{ }^\circ\text{C}$ | | 0.82 | - | |
| | $I_F = 5.0\text{ A}$ | | | 0.90 | 1.00 | |
| Reverse current | Rated V_R | $T_A = 25\text{ }^\circ\text{C}$ | $I_R^{(2)}$ | - | 10 | μA |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 55 | 100 | |
| Max. reverse recovery time | $I_F = 0.5\text{ A}$, $I_R = 1.0\text{ A}$, $t_{rr} = 0.25\text{ A}$ | | t_{rr} | 2.5 | - | μs |
| Typical junction capacitance | 4.0 V, 1 MHz | | C_J | 30 | - | 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 | S5PMS | UNIT |
| Typical thermal resistance | $R_{\theta JA}^{(1)}$ | 90 | $^\circ\text{C/W}$ |
| | $R_{\theta JM}^{(2)}$ | 3 | |

Notes

- (1) Free air, mounted on recommended copper pad area. Thermal resistance $R_{\theta JA}$ - junction to ambient
(2) Mounted on 30 mm x 30 mm Al PCB. Thermal resistance $R_{\theta JM}$ - junction to mount

| ORDERING INFORMATION (Example) | | | | |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| S5PMS-M3/86A | 0.10 | 86A | 1500 | 7" diameter plastic tape and reel |
| S5PMS-M3/87A | 0.10 | 87A | 6500 | 13" diameter plastic tape and reel |

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

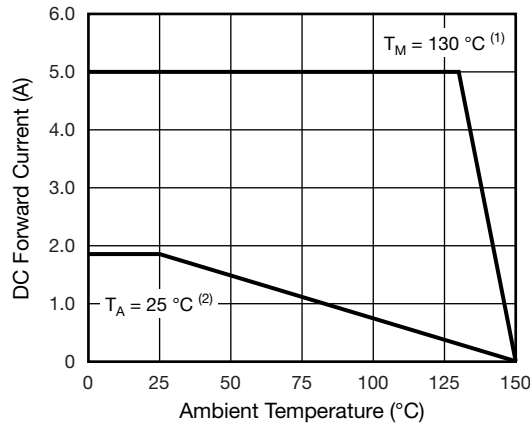


Fig. 1 - Forward Current Derating Curve

Notes

- (1) Mounted on 30 mm x 30 mm Al PCB T_M measured at the terminal ($R_{\theta JM} = 3.0\text{ }^\circ\text{C/W}$)
- (2) Free air, mounted on recommended copper pad area ($R_{\theta JA} = 90\text{ }^\circ\text{C/W}$)

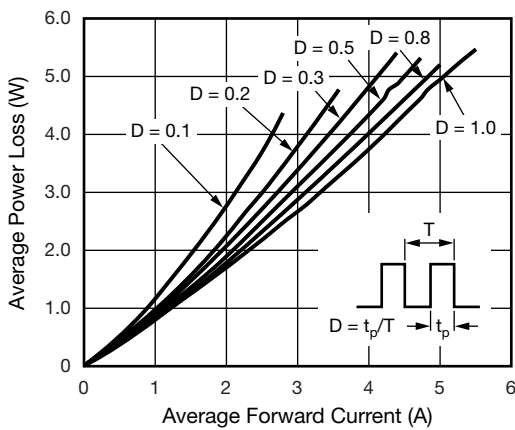


Fig. 2 - Forward Power Loss Characteristics

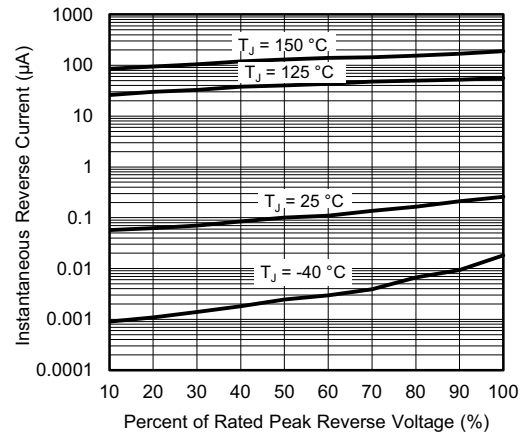


Fig. 4 - Typical Reverse Leakage Characteristics

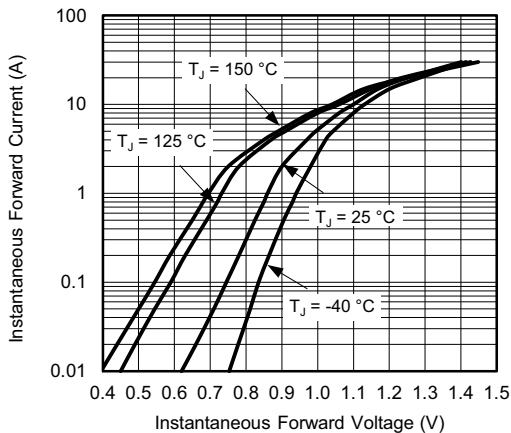


Fig. 3 - Typical Instantaneous Forward Characteristics

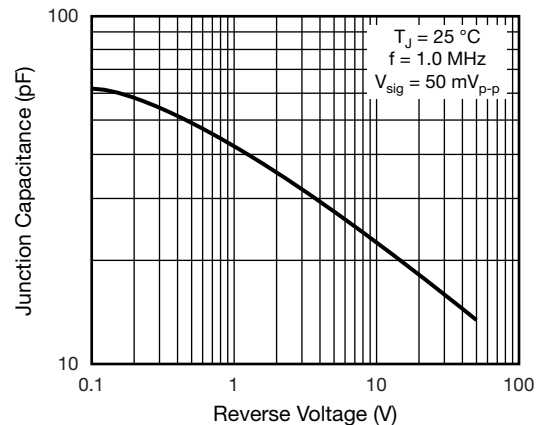
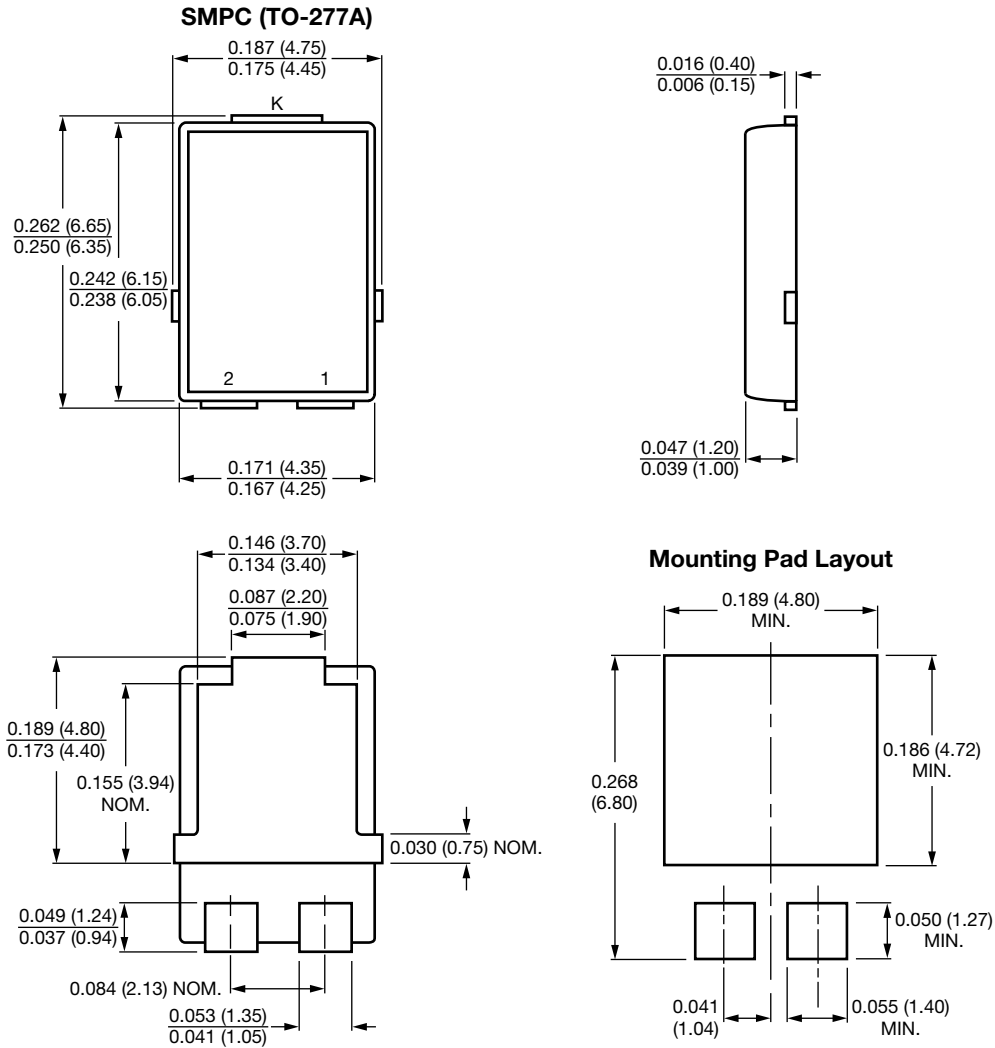


Fig. 5 - Typical Junction Capacitance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC® TO-277A



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