

SMD Photovoltaic Solar Cell Protection Schottky Rectifier



FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Guardring for overvoltage protection
- Low forward voltage drop, low power losses
- High efficiency
- 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

LINKS TO ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS | |
|-------------------------|----------------|
| $I_{F(AV)}$ | 15 A |
| V_{RRM} | 30 V |
| I_{FSM} | 280 A |
| E_{AS} | 20 mJ |
| V_F at $I_F = 15$ A | 0.42 V |
| T_J max. | 150 °C |
| Package | SMPC (TO-277A) |
| Circuit configuration | Single |

TYPICAL APPLICATIONS

For use in solar cell junction box as a bypass 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
M3 suffix meets JESD 201 class 1A whisker test

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

| PARAMETER | SYMBOL | SS15P3S | UNIT |
|--|-------------------|--------------------|------|
| Device marking code | | 153S | |
| Maximum repetitive peak reverse voltage | V_{RRM} | 30 | V |
| Maximum DC forward current (fig. 1) | I_F | 15 ⁽¹⁾ | A |
| | | 4.5 ⁽²⁾ | |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | I_{FSM} | 280 | A |
| Non-repetitive avalanche energy at $I_{AS} = 2.0$ A, $T_J = 25$ °C | E_{AS} | 20 | mJ |
| 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 with 50 mm x 25 mm x 100 mm fin heat sink
- (2) Free air, mounted on recommended copper pad area
- (3) Meets the requirements of IEC 61215 Ed. 2 bypass diode thermal test

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

| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
|-------------------------------|--------------------------------|---------------------------|-------------|------|------|---------------|
| Instantaneous forward voltage | $I_F = 7.5 \text{ A}$ | $T_A = 25^\circ\text{C}$ | $V_F^{(1)}$ | 0.43 | - | V |
| | $I_F = 15 \text{ A}$ | | | 0.50 | 0.57 | |
| | $I_F = 7.5 \text{ A}$ | | | 0.32 | - | |
| | $I_F = 15 \text{ A}$ | | | 0.42 | 0.49 | |
| Reverse current | $V_R = 30 \text{ V}$ | $T_A = 25^\circ\text{C}$ | $I_R^{(2)}$ | 150 | 1000 | μA |
| | | $T_A = 125^\circ\text{C}$ | | 59 | 120 | mA |
| Typical junction capacitance | $4.0 \text{ V}, 1 \text{ MHz}$ | | C_J | 930 | - | pF |

Notes

(1) Pulse test: 300 μs pulse width, 1 % duty cycle

(2) Pulse test: Pulse width $\leq 40 \text{ ms}$

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

| PARAMETER | SYMBOL | VALUE | UNIT |
|----------------------------|-----------------------|-------|---------------------------|
| Typical thermal resistance | $R_{\theta JA}^{(1)}$ | 100 | $^\circ\text{C}/\text{W}$ |
| | $R_{\theta JM}^{(2)}$ | 3 | |

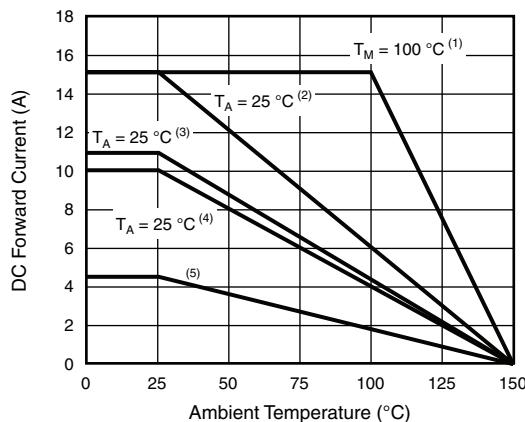
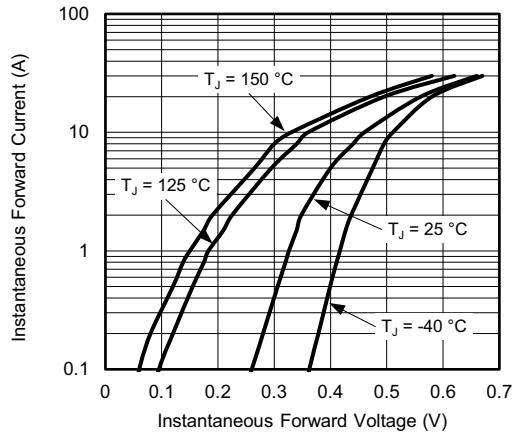
Notes

(1) Free air, mounted on recommended copper pad area. Thermal resistance $R_{\theta JA}$ - junction to ambient.

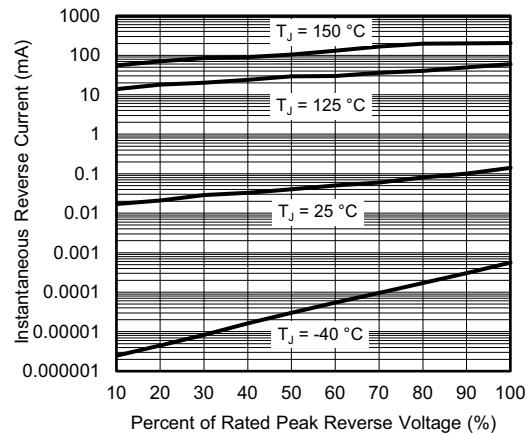
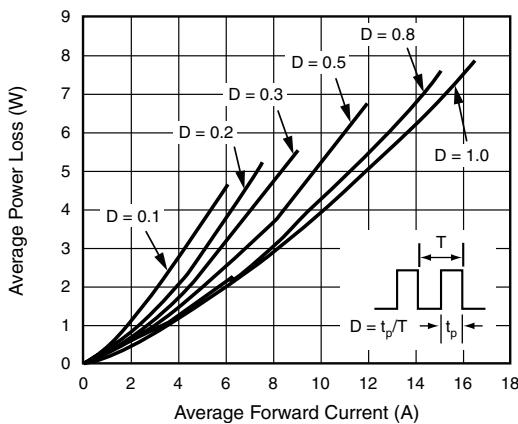
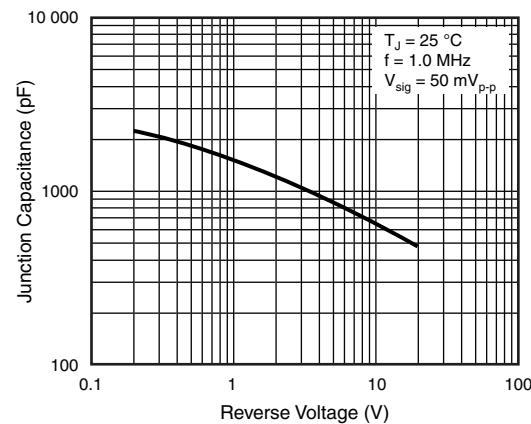
(2) Mounted on 30 mm x 30 mm Al PCB with 50 mm x 25 mm x 100 mm fin heat sink. Thermal resistance $R_{\theta JM}$ - junction to mount.

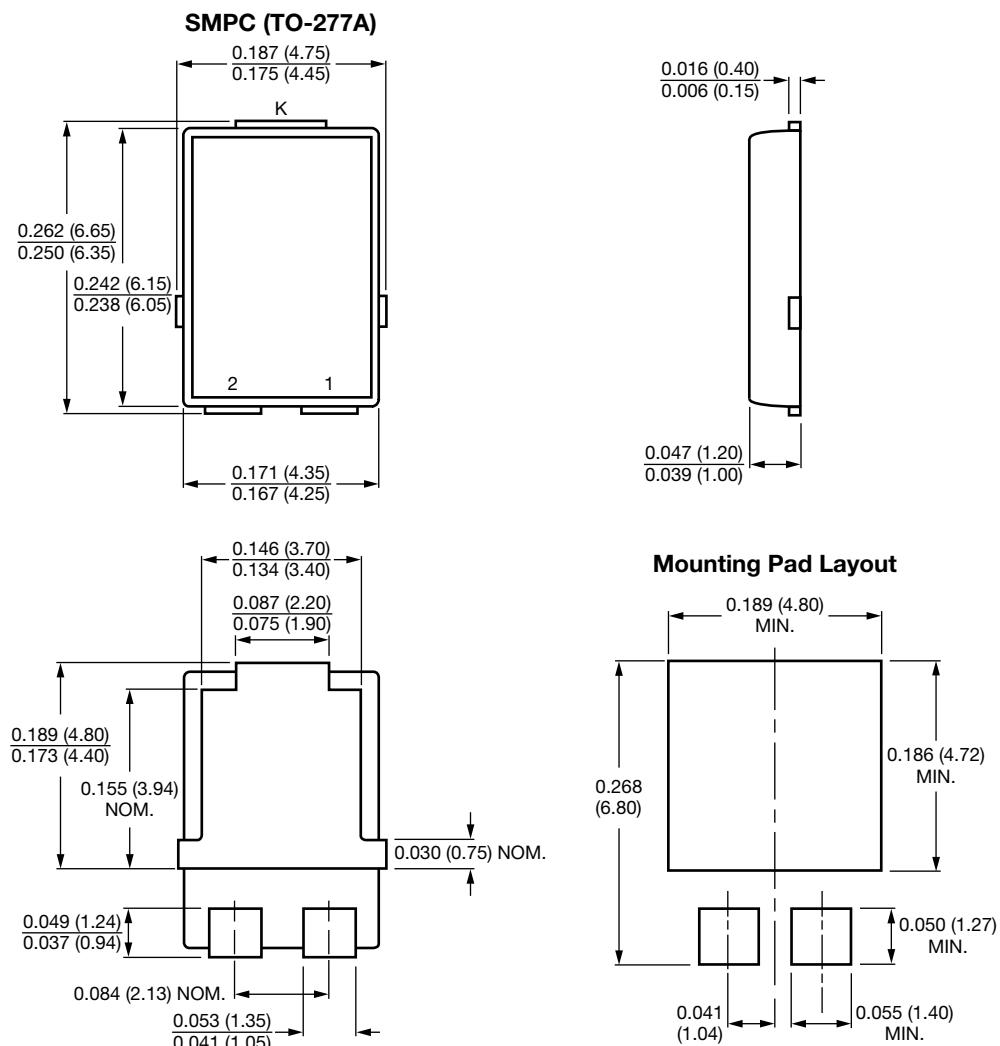
ORDERING INFORMATION (Example)

| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
|----------------|-----------------|------------------------|---------------|------------------------------------|
| SS15P3S-M3/86A | 0.10 | 86A | 1500 | 7" diameter plastic tape and reel |
| SS15P3S-M3/87A | 0.10 | 87A | 6500 | 13" diameter plastic tape and reel |

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

Fig. 1 - Maximum Current Derating Curve

Fig. 3 - Typical Instantaneous Forward Characteristics
Notes

- (1) Mounted on 30 mm x 30 mm Al PCB with 50 mm x 25 mm x 100 mm fin heat sink, T_M measured at the terminal of cathode band
- (2) Mounted on 30 mm x 30 mm Al PCB ($R_{\theta JA} = 20^\circ\text{C}/\text{W}$)
- (3) Mounted on 30 mm x 30 mm x 2 copper pad areas FR4 PCB ($R_{\theta JA} = 30^\circ\text{C}/\text{W}$)
- (4) Mounted on 25 mm x 25 mm x 2 copper pad areas FR4 PCB ($R_{\theta JA} = 30^\circ\text{C}/\text{W}$)
- (5) Free air, mounted on recommended copper pad area ($R_{\theta JA} = 100^\circ\text{C}/\text{W}$)


Fig. 4 - Typical Reverse Leakage Characteristics

Fig. 2 - Forward Power Loss Characteristics

Fig. 5 - Typical Junction Capacitance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)


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