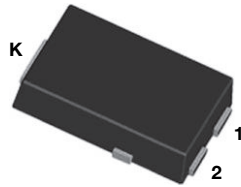
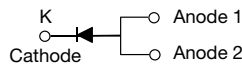


# SMD Photovoltaic Solar Cell Protection TMBS<sup>®</sup> (Trench MOS Barrier Schottky) Rectifier

 Ultra Low  $V_F = 0.34\text{ V}$  at  $I_F = 5\text{ A}$ 
**eSMP<sup>®</sup> Series**

**SMPC (TO-277A)**

**FEATURES**

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- 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](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**
**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 2 whisker test

| PRIMARY CHARACTERISTICS      |                |
|------------------------------|----------------|
| $I_{F(AV)}$                  | 10 A           |
| $V_{RRM}$                    | 45 V           |
| $I_{FSM}$                    | 180 A          |
| $V_F$ at $I_F = 10\text{ A}$ | 0.41 V         |
| $T_J$ max.                   | 150 °C         |
| Package                      | SMPC (TO-277A) |
| Circuit configuration        | Single         |

**LINKS TO ADDITIONAL RESOURCES**

[3D Models](#)

| MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)                       |             |             |      |
|--|-------------|-------------|------|
| PARAMETER  | SYMBOL      | V10P45S     | UNIT |
| Device marking code  |             | 1045S       |      |
| Maximum repetitive peak reverse voltage  | $V_{RRM}$   | 45          | V    |
| Maximum DC forward current   | $I_F^{(1)}$ | 10          | A    |
|  | $I_F^{(2)}$ | 4.4         |      |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load    | $I_{FSM}$   | 180         | A    |
| Junction temperature in DC forward current without reverse bias, $t \leq 1\text{ h}$ | $T_J^{(3)}$ | $\leq 200$  | °C   |
| Operating junction temperature range   | $T_{OP}$    | -40 to +150 | °C   |
| Storage temperature range  | $T_{STG}$   | -40 to +175 | °C   |

**Notes**

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



| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                      |                                   |             |      |      |               |
|--|----------------------|-----------------------------------|-------------|------|------|---------------|
| PARAMETER  | TEST CONDITIONS      |                                   | SYMBOL      | TYP. | MAX. | UNIT          |
| Instantaneous forward voltage  | $I_F = 5.0\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$  | $V_F^{(1)}$ | 0.42 | -    | V             |
|  | $I_F = 10\text{ A}$  |                                   |             | 0.48 | 0.57 |               |
|  | $I_F = 5.0\text{ A}$ | $T_A = 125\text{ }^\circ\text{C}$ |             | 0.34 | -    |               |
|  | $I_F = 10\text{ A}$  |                                   |             | 0.41 | 0.50 |               |
| Reverse current  | $V_R = 45\text{ V}$  | $T_A = 25\text{ }^\circ\text{C}$  | $I_R^{(2)}$ | 21   | 800  | $\mu\text{A}$ |
|  |                      | $T_A = 125\text{ }^\circ\text{C}$ |             | 9    | 35   | mA            |

**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                      | V10P45S | UNIT               |
| Typical thermal resistance  | $R_{\theta\text{JA}}^{(1)}$ | 75      | $^\circ\text{C/W}$ |
|   | $R_{\theta\text{JM}}^{(2)}$ | 4       |                    |

**Notes**

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

| <b>ORDERING INFORMATION</b> (Example) |                 |                        |               |                                    |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                         | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| V10P45S-M3/86A                        | 0.10            | 86A                    | 1500          | 7" diameter plastic tape and reel  |
| V10P45S-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)

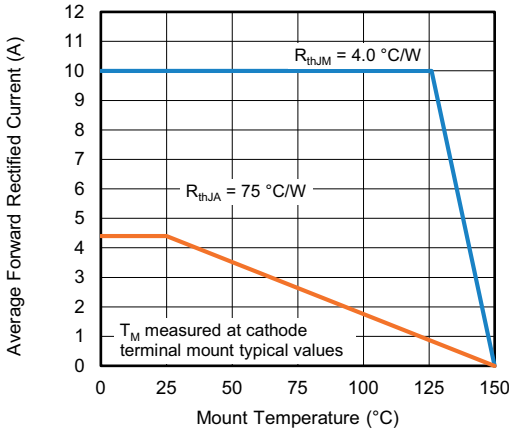


Fig. 1 - Forward Current Derating Curve

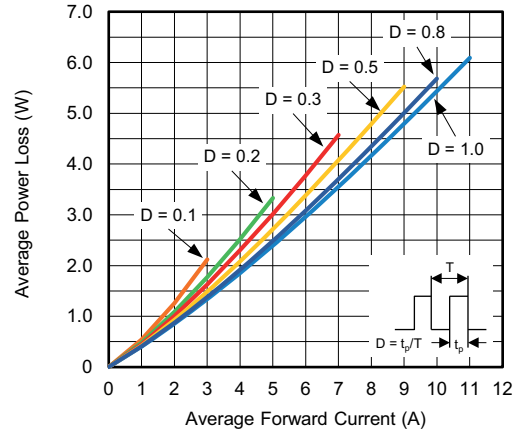


Fig. 2 - Forward Power Loss Characteristics

**Notes**

- (1) Mounted on 30 mm x 30 mm aluminum PCB;  $T_M$  measured at the terminal of cathode band ( $R_{\theta JM} = 4\text{ }^\circ\text{C/W}$ )
- (2) Free air, mounted on recommended copper pad area ( $R_{\theta JA} = 75\text{ }^\circ\text{C/W}$ )

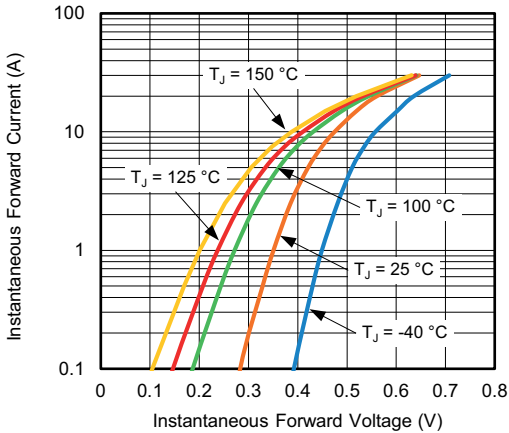


Fig. 3 - Typical Instantaneous Forward Characteristics

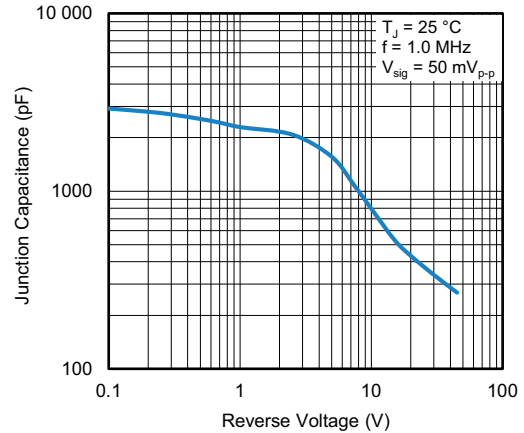


Fig. 5 - Typical Junction Capacitance

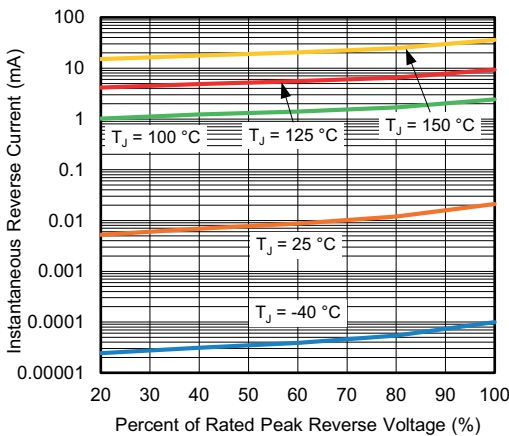


Fig. 4 - Typical Reverse Leakage Characteristics

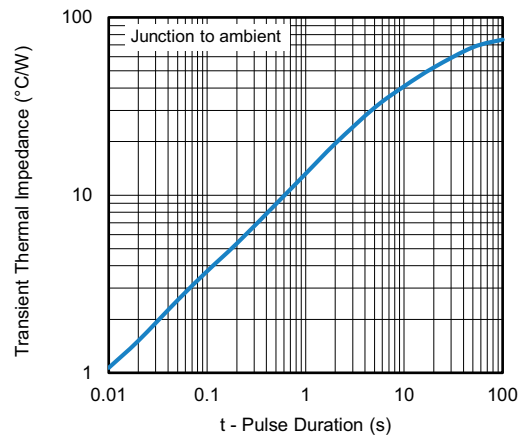


Fig. 6 - Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC® TO-277A



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