



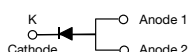
SMD Photovoltaic Solar Cell Protection Schottky Rectifier

Ultra Low $V_F = 0.34\text{ V}$ at $I_F = 5\text{ A}$

TMBS® eSMP® Series



TO-277A (SMPC)



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
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition



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: TO-277A (SMPC)

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

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 |
| $T_{OP\text{ max.}}$ | 150 °C |

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, $t \leq 1\text{ h}$ | $T_J^{(3)}$ | ≤ 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

V10P45S

Vishay General Semiconductor



| ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted) | | | | | | |
|--|------------------------|-------------------------|-------------------------------|------|------|------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Instantaneous forward voltage | I _F = 5.0 A | T _A = 25 °C | V _F ⁽¹⁾ | 0.42 | - | V |
| | I _F = 10 A | | | 0.48 | 0.57 | |
| | I _F = 5.0 A | T _A = 125 °C | | 0.34 | - | |
| | I _F = 10 A | | | 0.41 | 0.50 | |
| Reverse current | V _R = 45 V | T _A = 25 °C | I _R ⁽²⁾ | 21 | 800 | μA |
| | | T _A = 125 °C | | 9 | 35 | mA |

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

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 aluminum 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 |
| 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

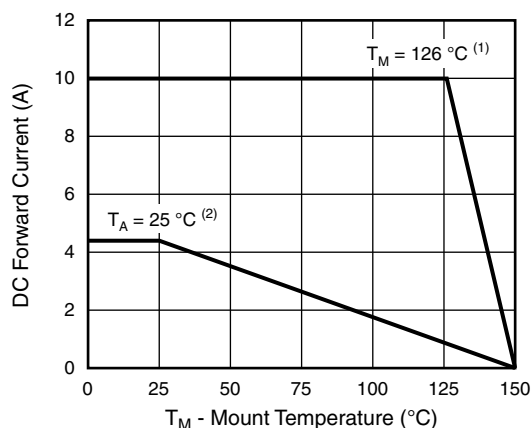
($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)

Fig. 1 - Forward Current Derating Curve

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 ($R_{\theta JA} = 75\text{ }^{\circ}\text{C/W}$)

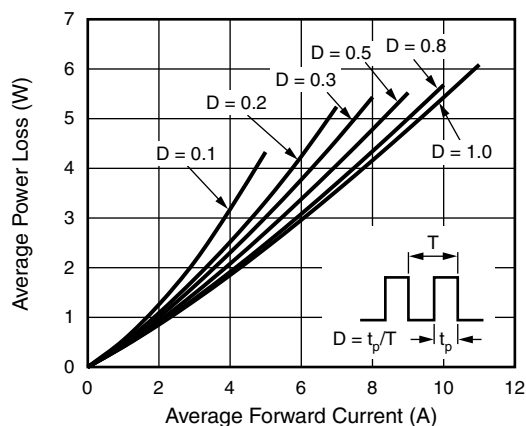


Fig. 2 - Forward Power Loss Characteristics

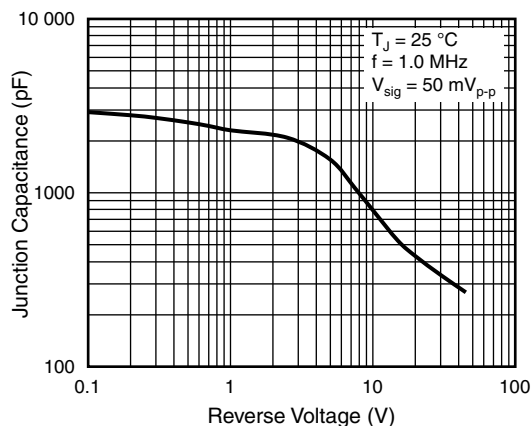


Fig. 5 - Typical Junction Capacitance

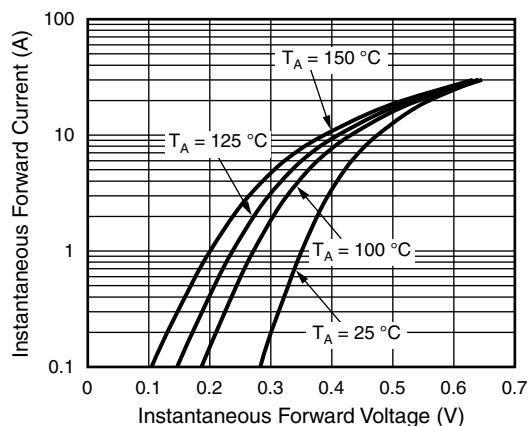


Fig. 3 - Typical Instantaneous Forward Characteristics

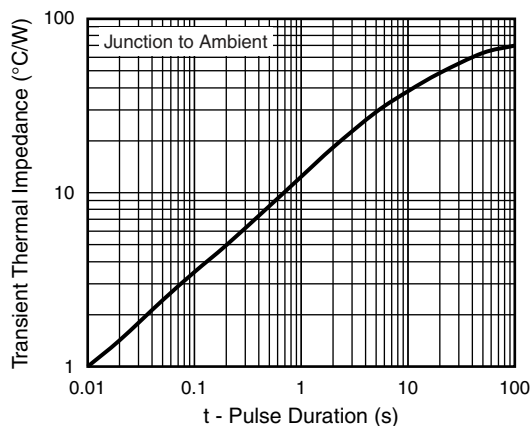


Fig. 6 - Typical Transient Thermal Impedance

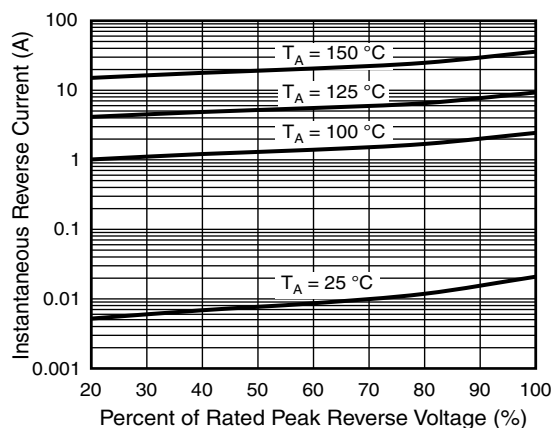
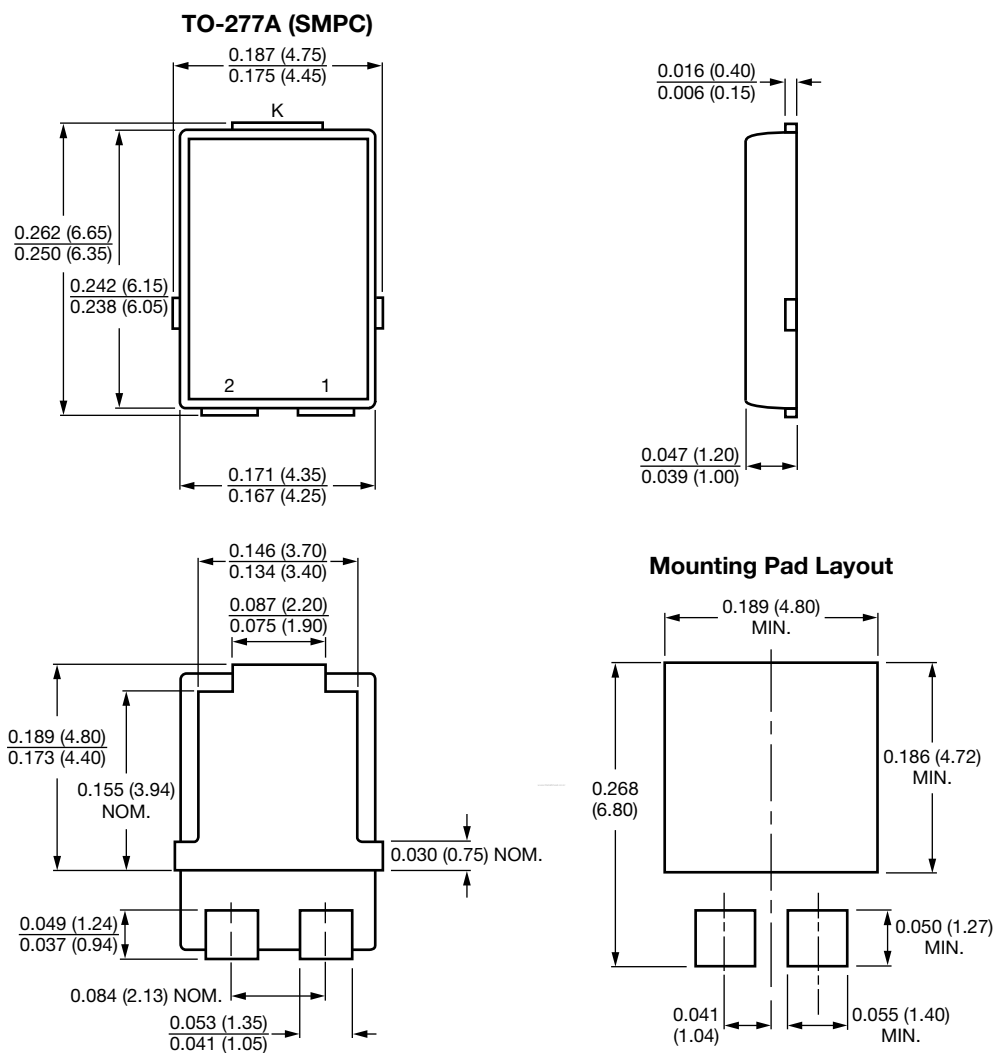


Fig. 4 - Typical Reverse Leakage Characteristics

V10P45S

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**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

Conform to JEDEC TO-277A



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