HALOGEN FREE



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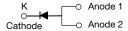
Vishay General Semiconductor

SMD Photovoltaic Solar Cell Protection TMBS® (Trench MOS Barrier Schottky) Rectifier

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



SMPC (TO-277A)



| PRIMARY CHARACTERISTICS | | | | |
|---|----------------|--|--|--|
| I _{F(AV)} | 10 A | | | |
| V _{RRM} | 45 V | | | |
| I _{FSM} | 180 A | | | |
| V _F at I _F = 10 A | 0.41 V | | | |
| T _J max. | 150 °C | | | |
| Package | SMPC (TO-277A) | | | |
| Circuit configuration | Single | | | |

LINKS TO ADDITIONAL RESOURCES



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.vishav.com/doc?99912

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

| MAXIMUM RATINGS (T _A = 25 °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 | Α | |
| | I _F ⁽²⁾ | 4.4 | | |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | I _{FSM} | 180 | А | |
| Junction temperature in DC forward current without reverse bias, $t \le 1 \text{ h}$ | T _J ⁽³⁾ | ≤ 200 | °C | |
| Operating junction temperature range | T _{OP} | T _{OP} -40 to +150 | | |
| 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



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| 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 | μΑ |
| | $V_R = 45 \text{ V}$ $T_A = 12$ | T _A = 125 °C | IR (-) | 9 | 35 | mA |

Notes

 $^{(1)}$ Pulse test: 300 μ s pulse width, 1 % duty cycle

(2) Pulse test: Pulse width \leq 40 ms

| THERMAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted) | | | | |
|---|----------------------|---------|------|--|
| PARAMETER | SYMBOL | V10P45S | UNIT | |
| Typical thermal resistance | R _{eJA} (1) | 75 | °C/W | |
| Typical thermal resistance | R _{0JM} (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 | |



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

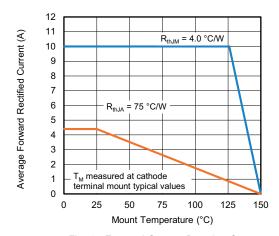


Fig. 1 - Forward Current Derating Curve

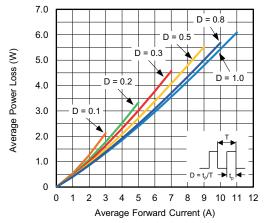


Fig. 2 - Forward Power Loss Characteristics

Notes

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

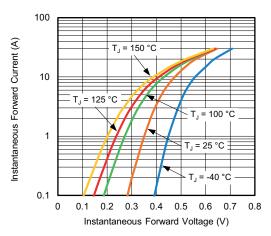


Fig. 3 - Typical Instantaneous Forward Characteristics

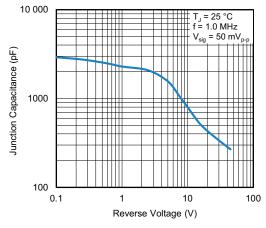


Fig. 5 - Typical Junction Capacitance

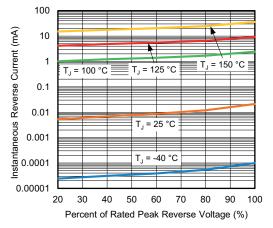


Fig. 4 - Typical Reverse Leakage Characteristics

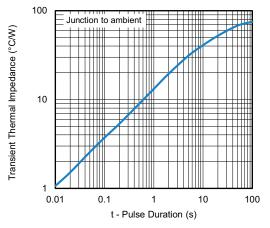
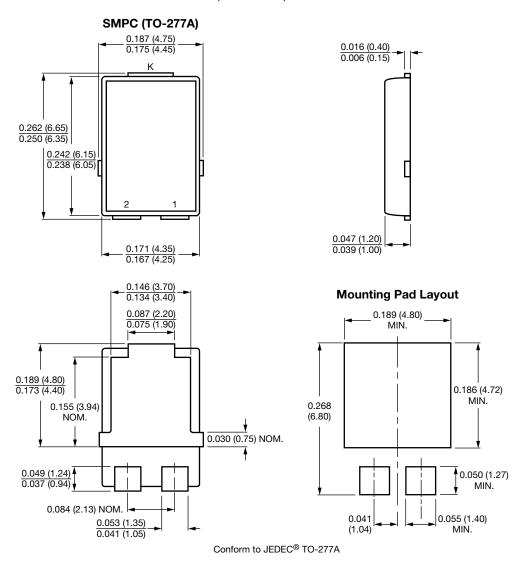


Fig. 6 - Typical Transient Thermal Impedance



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PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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