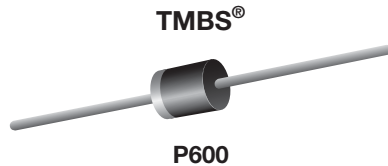


Photovoltaic Solar Cell Protection Schottky Rectifier

Ultra Low $V_F = 0.33\text{ V}$ at $I_F = 5.0\text{ A}$



FEATURES

- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- High forward surge capability
- ESD capability
- Solder dip 275 °C max. 10 s, per JESD 22-B106
- T_J 200 °C max. in solar bypass mode application
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

| PRIMARY CHARACTERISTICS | |
|---------------------------------|------------|
| $I_{F(AV)}$ | 15 A |
| V_{RRM} | 45 V |
| I_{FSM} | 200 A |
| V_F at $I_F = 15\text{ A}$ | 0.44 V |
| T_{OP} max. (AC mode) | 150 °C |
| T_J max. (DC forward current) | 200 °C |
| Package | P600 |
| Diode variation | Single die |

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: P600

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

Polarity: Color band denotes cathode end

| MAXIMUM RATINGS ($T_A = 25\text{ °C}$ unless otherwise noted) | | | |
|---|-------------------|-------------|------|
| PARAMETER | SYMBOL | VSB1545 | UNIT |
| Device marking code | | V1545 | |
| Maximum repetitive peak reverse voltage | V_{RRM} | 45 | V |
| Maximum average forward rectified current (fig. 1) | $I_{F(AV)}^{(1)}$ | 15 | A |
| | $I_{F(AV)}^{(2)}$ | 6 | |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | I_{FSM} | 200 | A |
| Operating junction temperature range | T_{OP} | -40 to +150 | °C |
| Storage temperature range | T_{STG} | -40 to +175 | °C |
| Junction temperature in DC forward current without reverse bias, $t \leq 1\text{ hp}$ | $T_J^{(3)}$ | ≤ 200 | °C |

Notes

(1) With heatsink

(2) Without heatsink, free air

(3) Meets the requirements of IEC 61215 ed. 2 bypass diode thermal test



| 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⁾ | 0.44 | - | V |
| | I _F = 7.5 A | | | 0.46 | - | |
| | I _F = 15 A | | | 0.51 | 0.59 | |
| | I _F = 5.0 A | T _A = 125 °C | | 0.33 | - | |
| | I _F = 7.5 A | | | 0.36 | - | |
| | I _F = 15 A | | | 0.44 | 0.54 | |
| Reverse current | V _R = 45 V | T _A = 25 °C | I _R ⁽²⁾ | 11.6 | 800 | μA |
| | | T _A = 125 °C | | 7.5 | 25 | mA |
| Typical junction capacitance | 4.0 V, 1 MHz | | C _J | 1290 | - | pF |

Notes

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
(2) Pulse test: 40 ms pulse width

| THERMAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted) | | | |
|---|---------------------------------|---------|------|
| PARAMETER | SYMBOL | VSB1545 | UNIT |
| Thermal resistance | R _{θJA} ⁽¹⁾ | 55 | °C/W |
| | R _{θJL} ⁽¹⁾ | 3.5 | |
| Typical thermal resistance | R _{θJL} ⁽²⁾ | 2.5 | °C/W |

Notes

- (1) Without heatsink, free air; units mounted on PCB with 2 mm x 2 mm copper pad areas at 9.5 mm lead length
(2) Leads clipped at 3 mm lead length from plastic body on 7.0 cm x 2.2 cm x 1.9 cm x 2 heatsink

| IMMUNITY TO ELECTRICAL STATIC DISCHARGE TO THE FOLLOWING STANDARDS (T _A = 25 °C unless otherwise noted) | | | | | |
|---|-----------------------------------|-----------------------|----------------|-------|---------|
| STANDARD | TEST TYPE | TEST CONDITIONS | SYMBOL | CLASS | VALUE |
| JESD22-A114 | Human body model (contact mode) | C = 150 pF, R = 1.5 Ω | V _C | 3B | > 8 kV |
| JESD22-A115 | Machine model (contact mode) | C = 200 pF, R = 0 Ω | | C | > 400 V |
| IEC 61000-4-2 ⁽²⁾ | Air discharge mode ⁽¹⁾ | C = 150 pF, R = 330 Ω | | 4 | > 15 kV |

Notes

- (1) Immunity to IEC 61000-4-2 air discharge mode has a typical performance > 25 kV
(2) System ESD standard

| ORDERING INFORMATION (Example) | | | | |
|--------------------------------|-----------------|------------------------|---------------|----------------------------------|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| VSB1545-M3/54 | 1.88 | 54 | 800 | 13" diameter paper tape and reel |
| VSB1545-M3/73 | 1.88 | 73 | 300 | Ammo pack packaging |

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

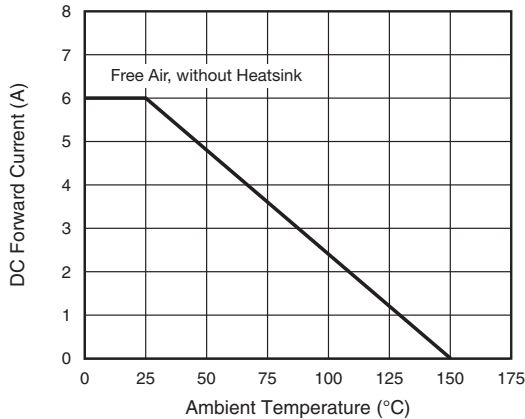


Fig. 1 - Forward Current Derating Curve

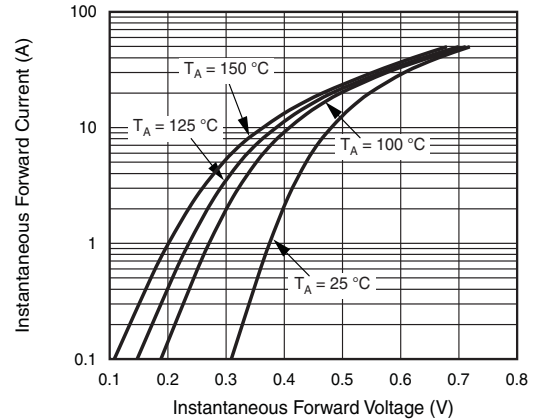


Fig. 4 - Typical Instantaneous Forward Characteristics

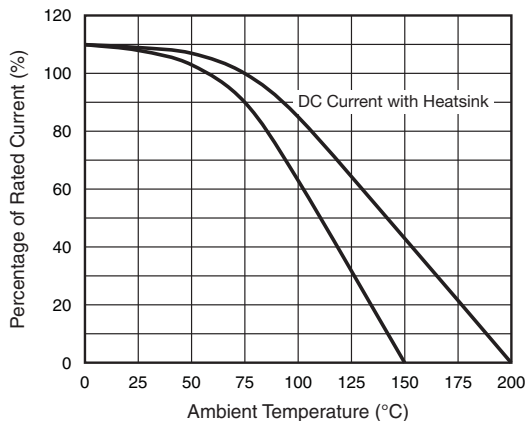


Fig. 2 - Rated Forward Current vs. Ambient Temperature

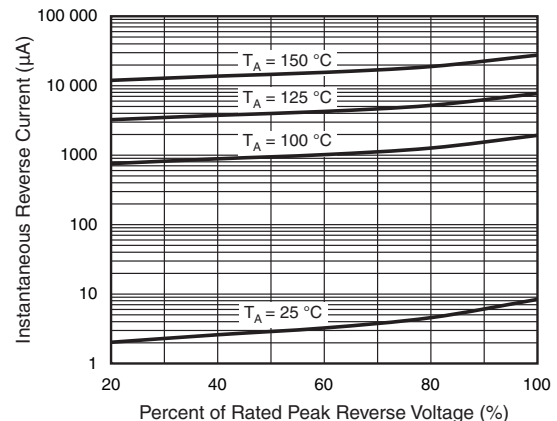


Fig. 5 - Typical Reverse Leakage Characteristics

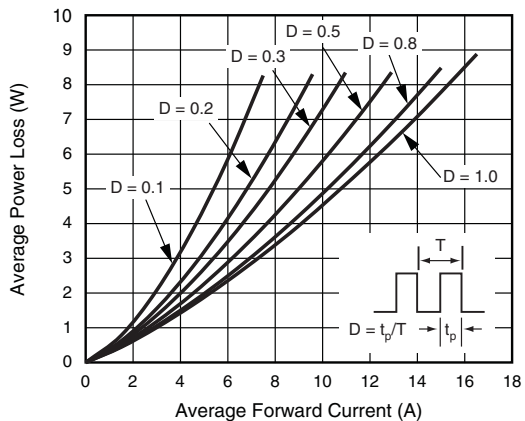


Fig. 3 - Forward Power Loss Characteristics

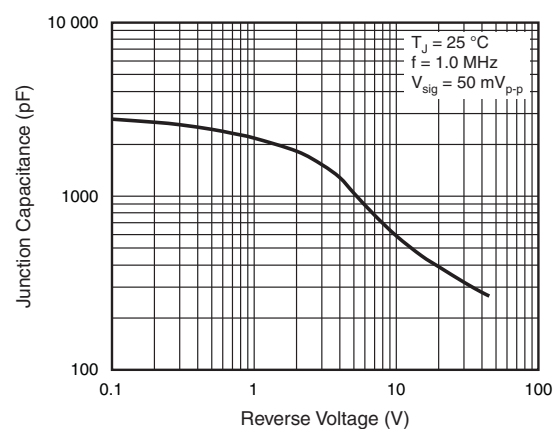
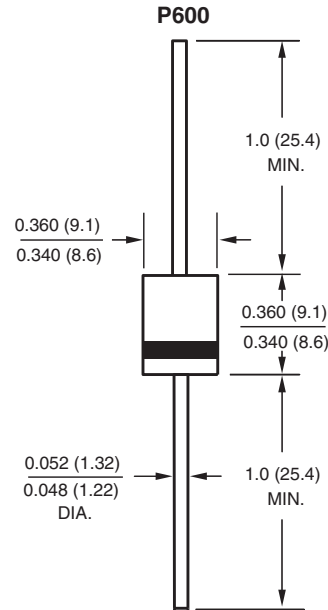


Fig. 6 - Typical Junction Capacitance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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