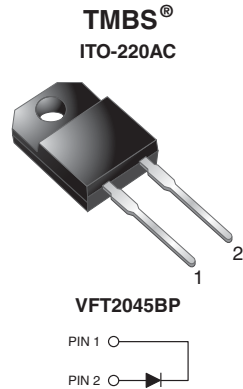


Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

 Ultra Low $V_F = 0.33\text{ V}$ at $I_F = 5\text{ A}$


FEATURES

- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- Solder bath temperature 275 °C max. 10 s, per JESD 22-B106
- Compliant to RoHS Directive 2011/65/EU
- **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: ITO-220AC

 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: As marked

Mounting Torque: 10 in-lbs maximum

| PRIMARY CHARACTERISTICS | |
|---------------------------------|--------|
| $I_{F(DC)}$ | 20 A |
| V_{RRM} | 45 V |
| I_{FSM} | 160 A |
| V_F at $I_F = 20\text{ A}$ | 0.51 V |
| T_{OP} max. (AC mode) | 150 °C |
| T_J max. (DC forward current) | 200 °C |

| MAXIMUM RATINGS ($T_A = 25\text{ °C}$ unless otherwise noted) | | | |
|--|----------------------------|---------------|------|
| PARAMETER | SYMBOL | VFT2045BP | UNIT |
| Maximum repetitive peak reverse voltage | V_{RRM} | 45 | V |
| Maximum DC forward bypassing current (fig. 1) | $I_{F(DC)}$ ⁽¹⁾ | 20 | A |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | I_{FSM} | 160 | A |
| Operating junction temperature range (AC mode) | T_{OP} | - 40 to + 150 | °C |
| Isolation voltage from terminal to heatsink $t = 1\text{ min}$ | V_{AC} | 1500 | V |
| Junction temperature in DC forward current without reverse bias, $t \leq 1\text{ h}$ | T_J ⁽²⁾ | ≤ 200 | °C |

Notes

⁽¹⁾ With heatsink

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



| ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | | | | |
|---|---------------------|-----------------------------------|-------------|------|------|---------------|
| PARAMETER | TEST CONDITIONS | SYMBOL | TYP. | MAX. | UNIT | |
| Instantaneous forward voltage | $I_F = 5\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$ | $V_F^{(1)}$ | 0.44 | - | V |
| | $I_F = 10\text{ A}$ | | | 0.49 | - | |
| | $I_F = 20\text{ A}$ | | | 0.57 | 0.66 | |
| | $I_F = 5\text{ A}$ | $T_A = 125\text{ }^\circ\text{C}$ | | 0.33 | - | |
| | $I_F = 10\text{ A}$ | | | 0.41 | - | |
| | $I_F = 20\text{ A}$ | | | 0.51 | 0.63 | |
| Reverse current | $V_R = 45\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$ | $I_R^{(2)}$ | - | 2000 | μA |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 10 | 30 | 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 | VFT2045BP | UNIT |
| Typical thermal resistance | $R_{\theta JC}$ | 4.5 | $^\circ\text{C/W}$ |

| ORDERING INFORMATION (Example) | | | | | |
|--------------------------------|-----------------|-----------------|--------------|---------------|---------------|
| PACKAGE | PREFERRED P/N | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| ITO-220AC | VFT2045BP-M3/4W | 1.75 | 4W | 50/tube | Tube |

RATINGS AND CHARACTERISTICS CURVES

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

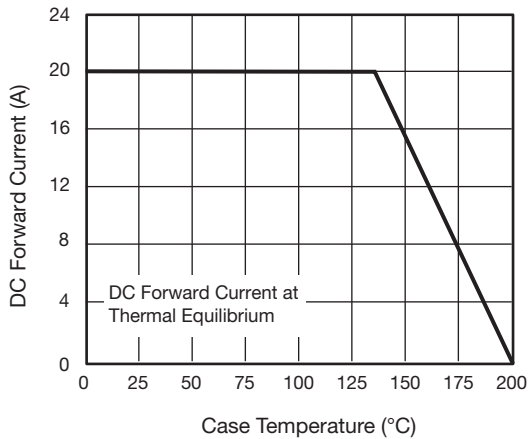


Fig. 1 - Maximum Forward Current Derating Curve

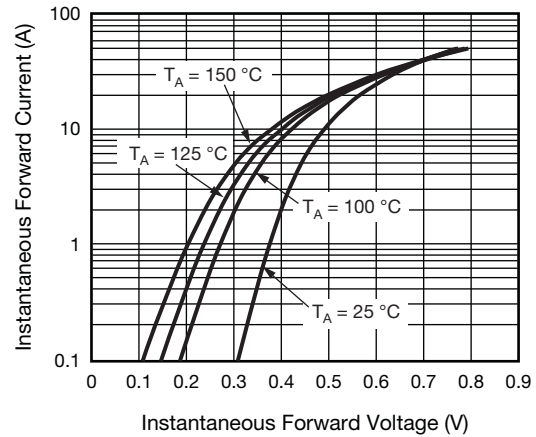


Fig. 2 - Typical Instantaneous Forward Characteristics

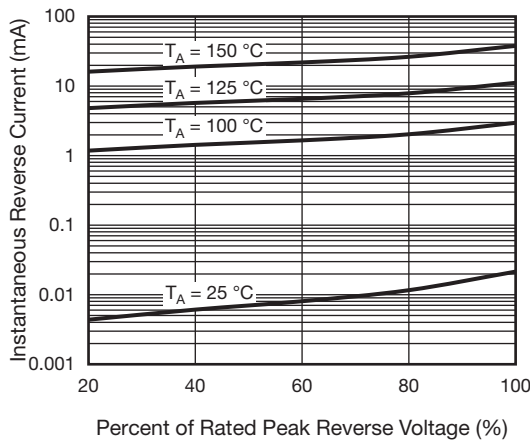


Fig. 3 - Typical Reverse Characteristics

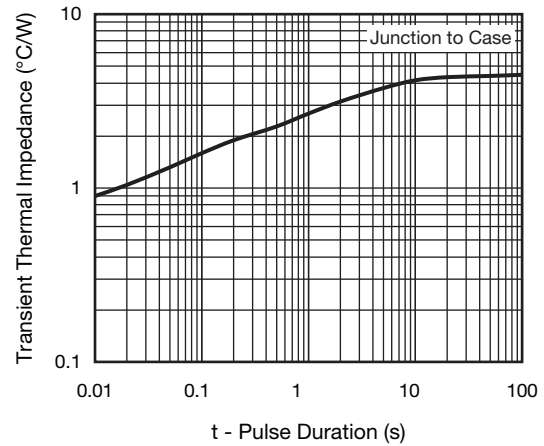


Fig. 5 - Typical Transient Thermal Impedance

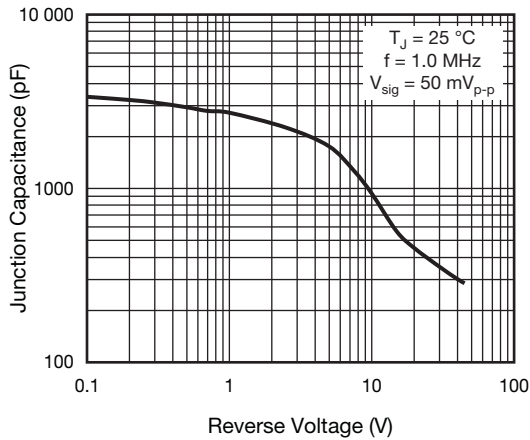
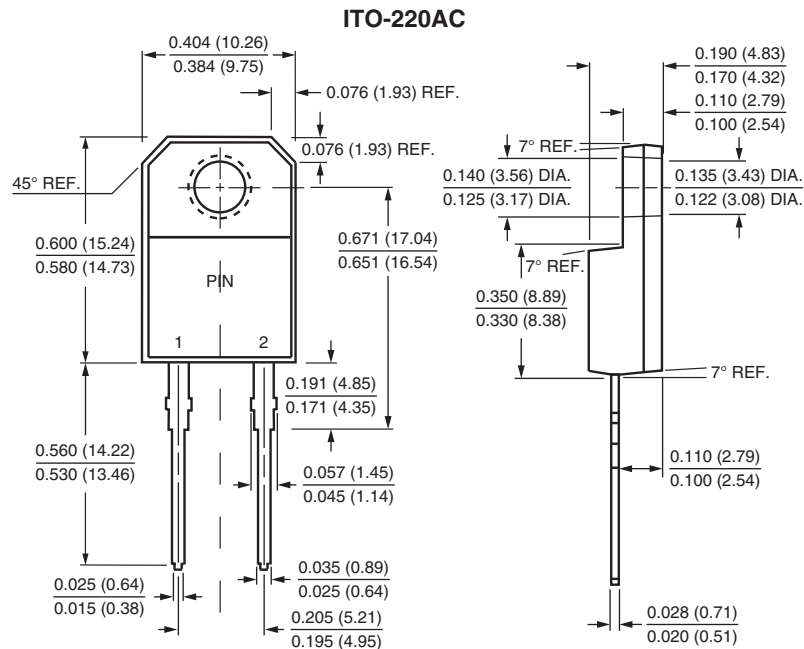


Fig. 4 - Typical Junction Capacitance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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