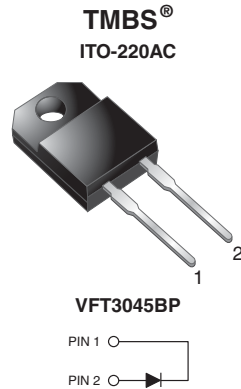


## Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

Ultra Low  $V_F = 0.30\text{ V}$  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         |        |
|---------------------------------|--------|
| $I_{F(DC)}$                     | 30 A   |
| $V_{RRM}$                       | 45 V   |
| $I_{FSM}$                       | 200 A  |
| $V_F$ at $I_F = 30\text{ A}$    | 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                     | VFT3045BP     | UNIT |
| Maximum repetitive peak reverse voltage  | $V_{RRM}$                  | 45            | V    |
| Maximum DC forward bypassing current (fig. 1)  | $I_{F(DC)}$ <sup>(1)</sup> | 30            | A    |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load   | $I_{FSM}$                  | 200           | 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, $t \leq 1\text{ h}$ | $T_J$ <sup>(2)</sup>       | $\leq 200$    | °C   |

#### Notes

<sup>(1)</sup> With heatsink

<sup>(2)</sup> Meets the requirements of IEC 61215 ed. 2 bypass diode thermal test



| ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                       |                         |                               |      |      |    |
|--|-----------------------|-------------------------|-------------------------------|------|------|----|
| PARAMETER  | TEST CONDITIONS       | SYMBOL                  | TYP.                          | MAX. | UNIT |    |
| Instantaneous forward voltage  | I <sub>F</sub> = 5 A  | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.42 | -    | V  |
|  | I <sub>F</sub> = 15 A |                         |                               | 0.49 | -    |    |
|  | I <sub>F</sub> = 30 A |                         |                               | 0.58 | 0.70 |    |
|  | I <sub>F</sub> = 5 A  | T <sub>A</sub> = 125 °C |                               | 0.30 | -    |    |
|  | I <sub>F</sub> = 15 A |                         |                               | 0.40 | -    |    |
|  | I <sub>F</sub> = 30 A |                         |                               | 0.51 | 0.60 |    |
| Reverse current  | V <sub>R</sub> = 45 V | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | -    | 2000 | μA |
|  |                       | T <sub>A</sub> = 125 °C |                               | 19   | 60   | mA |

**Notes**

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

| THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                  |           |      |
|---|------------------|-----------|------|
| PARAMETER   | SYMBOL           | VFT3045BP | UNIT |
| Typical thermal resistance  | R <sub>θJC</sub> | 4.2       | °C/W |

| ORDERING INFORMATION (Example) |                 |                 |              |               |               |
|--------------------------------|-----------------|-----------------|--------------|---------------|---------------|
| PACKAGE                        | PREFERRED P/N   | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| ITO-220AC                      | VFT3045BP-M3/4W | 1.75            | 4W           | 50/tube       | Tube          |

**RATINGS AND CHARACTERISTICS CURVES**

(T<sub>A</sub> = 25 °C unless otherwise noted)

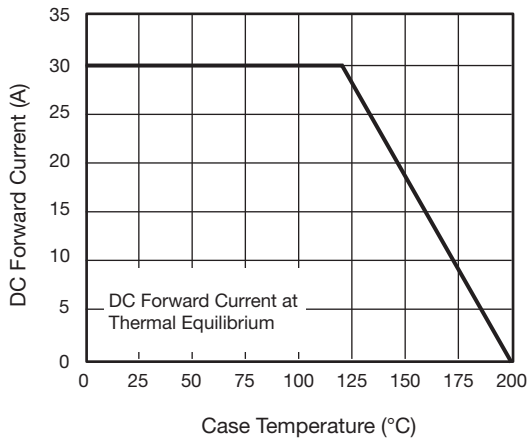


Fig. 1 - Maximum Forward Current Derating Curve

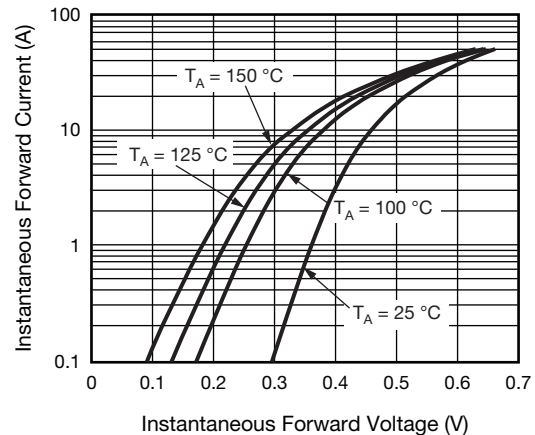


Fig. 2 - Typical Instantaneous Forward Characteristics

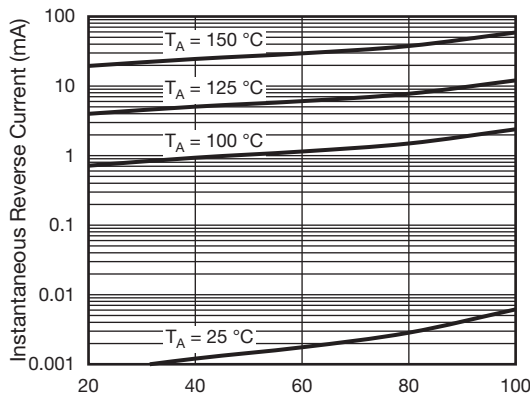


Fig. 3 - Typical Reverse Characteristics

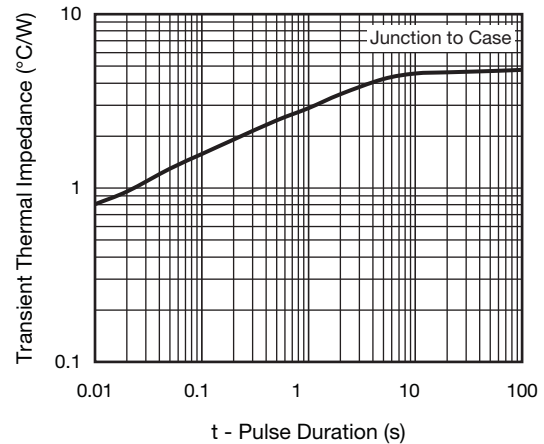


Fig. 5 - Typical Transient Thermal Impedance

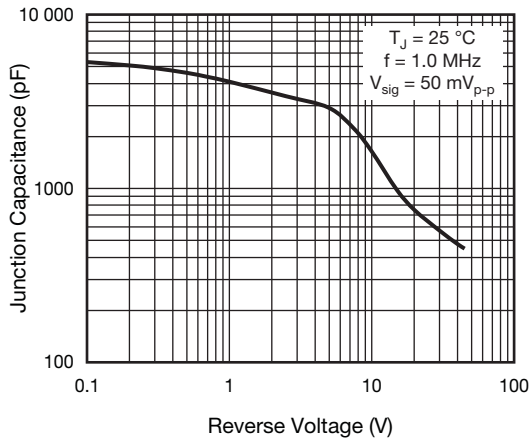
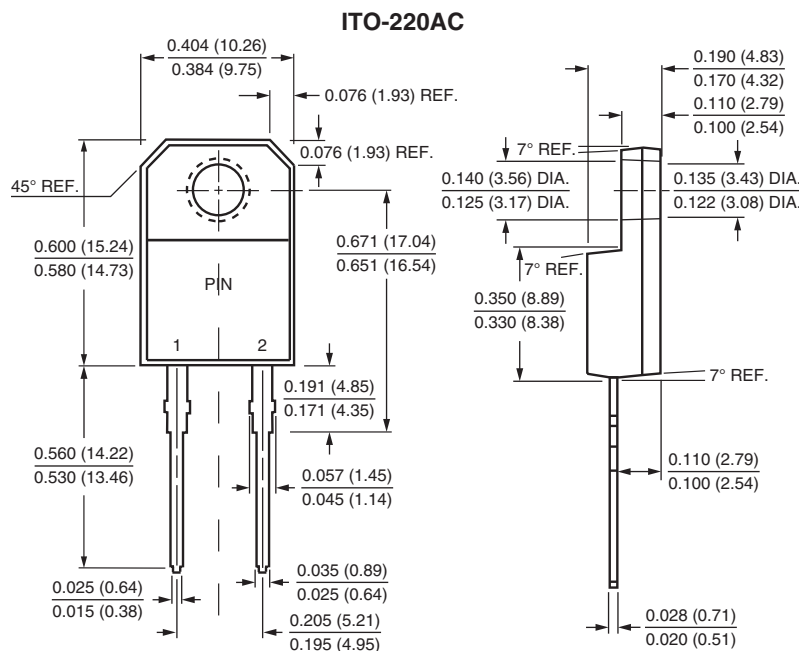


Fig. 4 - Typical Junction Capacitance

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





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