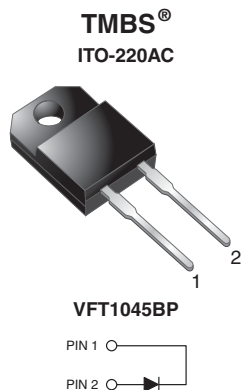


# Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

Ultra Low  $V_F = 0.41\text{ V}$  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
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**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

|                                 |           |
|---------------------------------|-----------|
| $I_{F(DC)}$                     | 10 A      |
| $V_{RRM}$                       | 45 V      |
| $I_{FSM}$                       | 100 A     |
| $V_F$ at $I_F = 10\text{ A}$    | 0.52 V    |
| $T_{OP}$ max. (AC mode)         | 150 °C    |
| $T_J$ max. (DC forward current) | 200 °C    |
| Package                         | ITO-220AC |
| Circuit configuration           | Single    |

## MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)

| PARAMETER                                                                            | SYMBOL            | VFT1045BP   | UNIT |
|--------------------------------------------------------------------------------------|-------------------|-------------|------|
| Maximum repetitive peak reverse voltage                                              | $V_{RRM}$         | 45          | V    |
| Maximum DC forward bypassing current (fig. 1)                                        | $I_{F(DC)}^{(1)}$ | 10          | A    |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load   | $I_{FSM}$         | 100         | 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, $t \leq 1\text{ h}$ | $T_J^{(2)}$       | $\leq 200$  | °C   |

### Notes

- (1) With heatsink  
(2) Meets the requirements of IEC 61215 ed. 2 bypass diode thermal test

## ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ °C}$ unless otherwise noted)

| PARAMETER                     | TEST CONDITIONS     | SYMBOL                | TYP. | MAX. | UNIT          |
|-------------------------------|---------------------|-----------------------|------|------|---------------|
| Instantaneous forward voltage | $I_F = 5\text{ A}$  | $V_F^{(1)}$           | 0.50 | -    | V             |
|                               | $I_F = 10\text{ A}$ |                       | 0.57 | 0.68 |               |
|                               | $I_F = 5\text{ A}$  |                       | 0.41 | -    |               |
|                               | $I_F = 10\text{ A}$ |                       | 0.52 | 0.64 |               |
| Reverse current               | $V_R = 45\text{ V}$ | $T_A = 25\text{ °C}$  | -    | 500  | $\mu\text{A}$ |
|                               |                     | $T_A = 125\text{ °C}$ | 5    | 15   | mA            |

### Notes

- (1) Pulse test: 300  $\mu\text{s}$  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          | VFT1045BP | UNIT                 |
|----------------------------|-----------------|-----------|----------------------|
| Typical thermal resistance | $R_{\theta JC}$ | 5.5       | $^{\circ}\text{C/W}$ |

**ORDERING INFORMATION** (Example)

| PACKAGE   | PREFERRED P/N   | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
|-----------|-----------------|-----------------|--------------|---------------|---------------|
| ITO-220AC | VFT1045BP-M3/4W | 1.75            | 4W           | 50/tube       | Tube          |

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

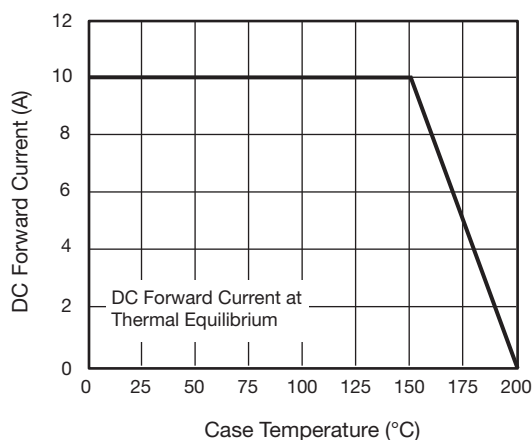


Fig. 1 - Maximum Forward Current Derating Curve

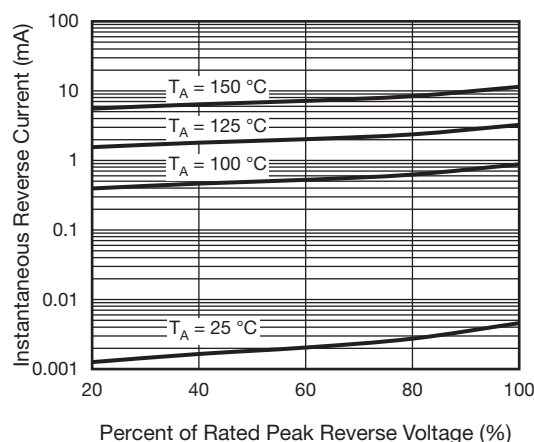


Fig. 3 - Typical Reverse Characteristics

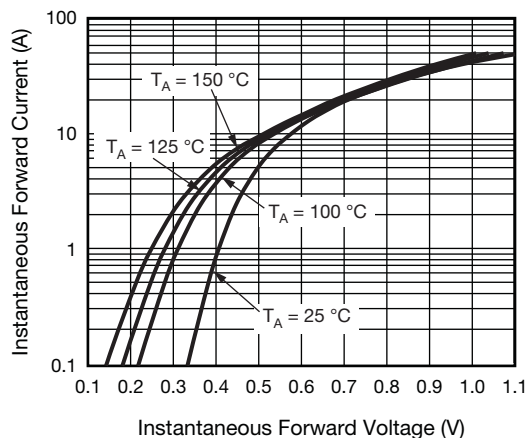


Fig. 2 - Typical Instantaneous Forward Characteristics

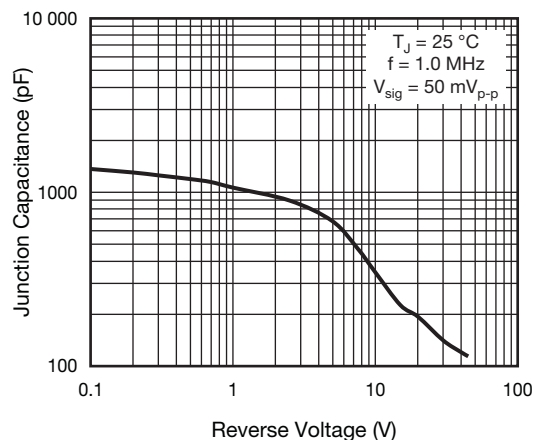


Fig. 4 - Typical Junction Capacitance

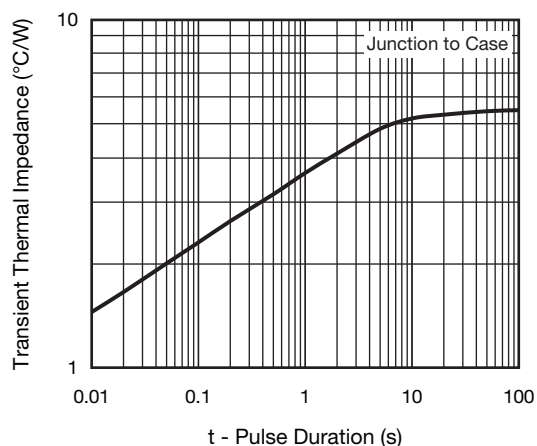
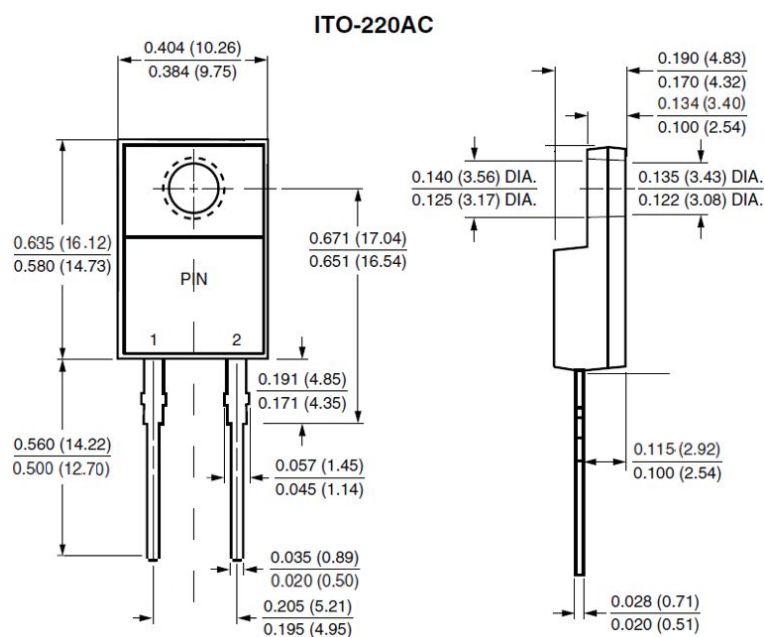


Fig. 5 - Typical Transient Thermal Impedance

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




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