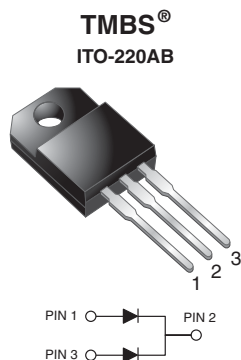


# Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

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
- 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](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-220AB

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

|                                 |                |
|---------------------------------|----------------|
| $I_{F(AV)}$                     | 2 x 10 A       |
| $V_{RRM}$                       | 45 V           |
| $I_{FSM}$                       | 160 A          |
| $V_F$ at $I_F = 10\text{ A}$    | 0.41 V         |
| $T_{OP}$ max. (AC mode)         | 150 °C         |
| $T_J$ max. (DC forward current) | 200 °C         |
| Package                         | ITO-220AB      |
| Circuit configuration           | Common cathode |

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

| PARAMETER                                                                                    | SYMBOL                     | VFT2045CBP  | UNIT |
|----------------------------------------------------------------------------------------------|----------------------------|-------------|------|
| Maximum repetitive peak reverse voltage                                                      | $V_{RRM}$                  | 45          | V    |
| Maximum average forward rectified current (fig. 1)                                           | $I_{F(AV)}$ <sup>(1)</sup> | 20          | A    |
| per device                                                                                   |                            | 10          |      |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode | $I_{FSM}$                  | 160         | A    |
| Isolation voltage from terminal to heatsink, $t = 1\text{ min}$                              | $V_{AC}$                   | 1500        | V    |
| Operating junction and storage temperature range (AC mode)                                   | $T_{OP}, T_{STG}$          | -40 to +150 | °C   |
| 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 ( $T_A = 25\text{ °C}$ unless otherwise noted)

| PARAMETER                               | TEST CONDITIONS       |                         | SYMBOL                        | TYP. | MAX. | UNIT |
|-----------------------------------------|-----------------------|-------------------------|-------------------------------|------|------|------|
| Instantaneous forward voltage per diode | I <sub>F</sub> = 5 A  | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.44 | -    | V    |
|                                         | I <sub>F</sub> = 10 A |                         |                               | 0.49 | 0.58 |      |
|                                         | I <sub>F</sub> = 5 A  | T <sub>A</sub> = 125 °C |                               | 0.33 | -    |      |
|                                         | I <sub>F</sub> = 10 A |                         |                               | 0.41 | 0.52 |      |
| Reverse current per diode               | 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 |                               | 10   | 30   | mA   |

### Notes

<sup>(1)</sup> Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

<sup>(2)</sup> Pulse test: Pulse width  $\leq 40\text{ ms}$



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

| PARAMETER                  |            | SYMBOL          | VFT2045CBP | UNIT                 |
|----------------------------|------------|-----------------|------------|----------------------|
| Typical thermal resistance | per diode  | $R_{\theta JC}$ | 6.0        | $^{\circ}\text{C/W}$ |
|                            | per device |                 | 4.5        |                      |

**ORDERING INFORMATION** (Example)

| PACKAGE   | PREFERRED P/N    | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
|-----------|------------------|-----------------|--------------|---------------|---------------|
| ITO-220AB | VFT2045CBP-M3/4W | 1.76            | 4W           | 50/tube       | Tube          |

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

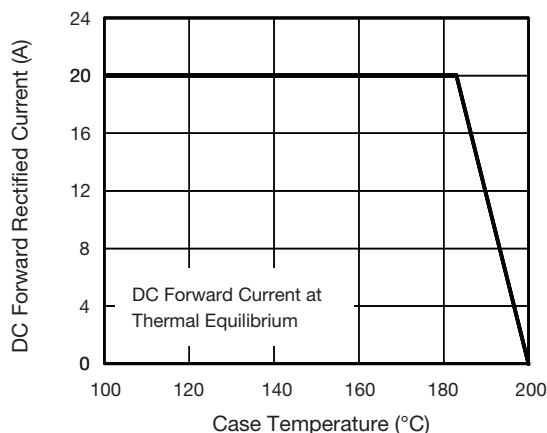


Fig. 1 - Maximum Forward Current Derating Curve

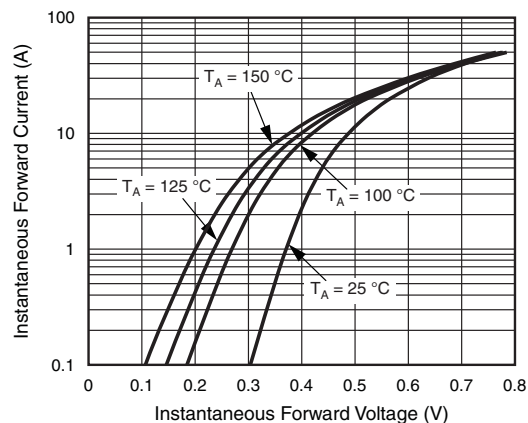


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

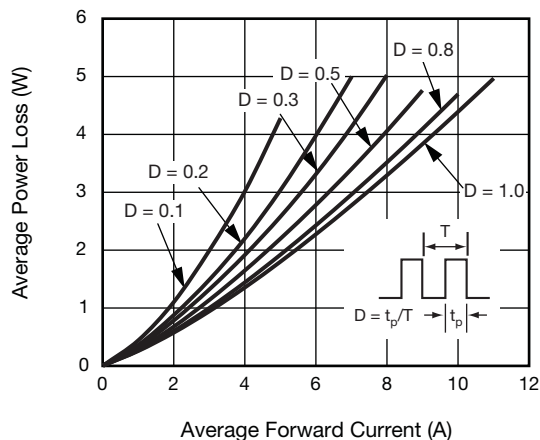


Fig. 2 - Forward Power Loss Characteristics Per Diode

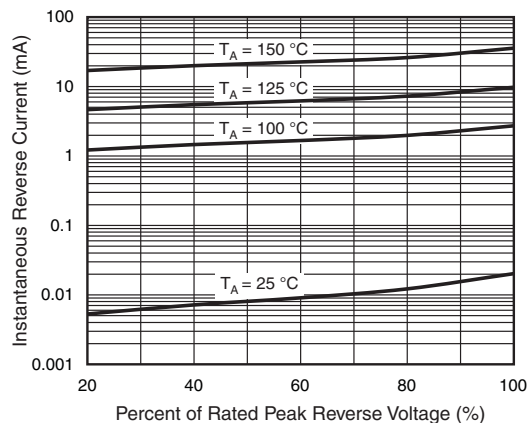


Fig. 4 - Typical Reverse Characteristics Per Diode

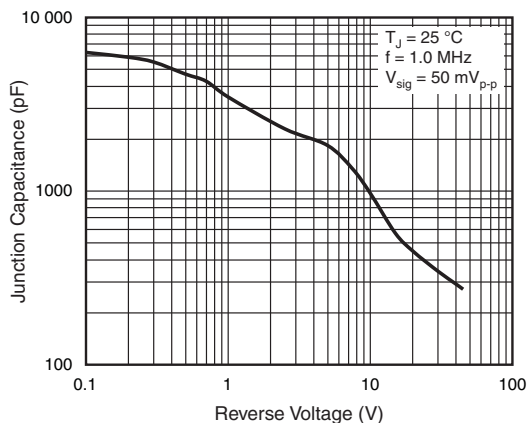


Fig. 5 - Typical Junction Capacitance Per Diode

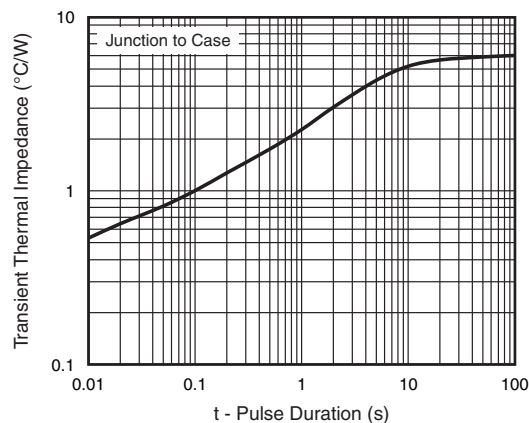
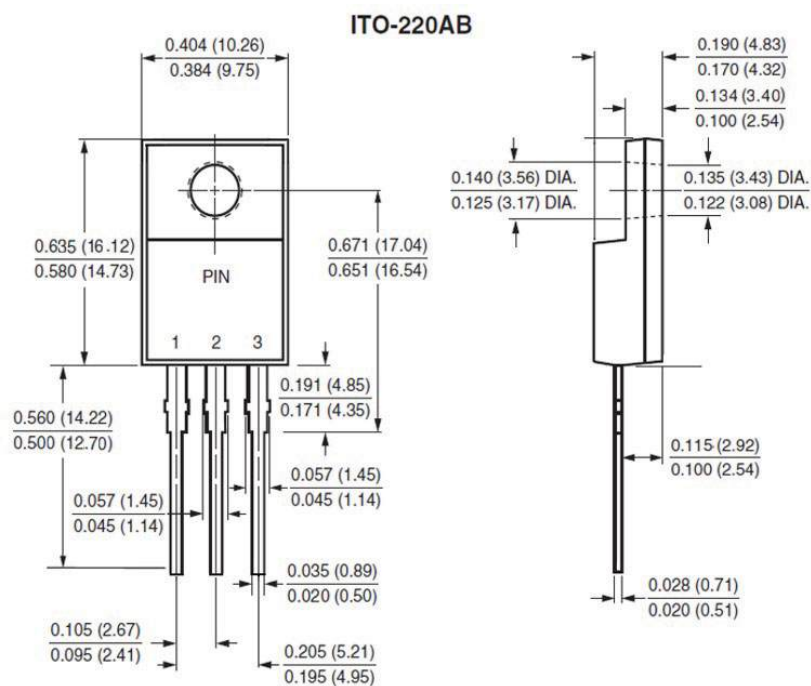


Fig. 6 - Typical Transient Thermal Impedance Per Diode

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




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