

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

 Ultra Low  $V_F = 0.30\text{ V}$  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.

### PRIMARY CHARACTERISTICS

|                                 |                     |
|---------------------------------|---------------------|
| $I_{F(AV)}$                     | 2 x 15 A            |
| $V_{RRM}$                       | 45 V                |
| $I_{FSM}$                       | 200 A               |
| $V_F$ at $I_F = 15\text{ A}$    | 0.39 V              |
| $T_{OP}$ max. (AC mode)         | 150 °C              |
| $T_J$ max. (DC forward current) | 200 °C              |
| Package                         | ITO-220AB           |
| Diode variation                 | Dual common cathode |

### 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

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

| PARAMETER  | SYMBOL                     | VFT3045CBP  | UNIT |
|--|----------------------------|-------------|------|
| Maximum repetitive peak reverse voltage  | $V_{RRM}$                  | 45          | V    |
| Maximum average forward rectified current (fig. 1)   | $I_{F(AV)}$ <sup>(1)</sup> | per device  | 30   |
|  |                            | per diode   | 15   |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode | $I_{FSM}$                  | 200         | 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 <sub>A</sub> = 25 °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> | 0.42 | -    | V    |
|  | I <sub>F</sub> = 7.5 A |                         |                               | 0.44 | -    |      |
|  | I <sub>F</sub> = 15 A  |                         |                               | 0.49 | 0.57 |      |
|  | I <sub>F</sub> = 5 A   | T <sub>A</sub> = 125 °C |                               | 0.30 | -    |      |
|  | I <sub>F</sub> = 7.5 A |                         |                               | 0.33 | -    |      |
|  | I <sub>F</sub> = 15 A  |                         |                               | 0.39 | 0.48 |      |
| 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 |                               | 17   | 50   | 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           | VFT3045CBP | UNIT |
| Typical thermal resistance  | per diode  | R <sub>θJC</sub> | 6.0        | °C/W |
|   | per device |                  | 4.0        |      |

| ORDERING INFORMATION (Example) |                  |                 |              |               |               |
|--------------------------------|------------------|-----------------|--------------|---------------|---------------|
| PACKAGE                        | PREFERRED P/N    | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| ITO-220AB                      | VFT3045CBP-M3/4W | 1.76            | 4W           | 50/tube       | Tube          |

**RATINGS AND CHARACTERISTICS CURVES (T<sub>A</sub> = 25 °C unless otherwise noted)**

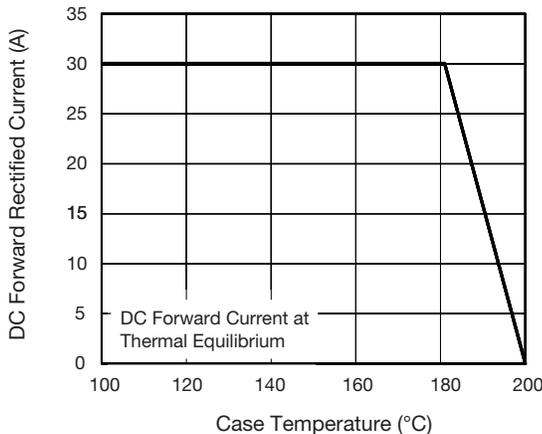


Fig. 1 - Maximum Forward Current Derating Curve

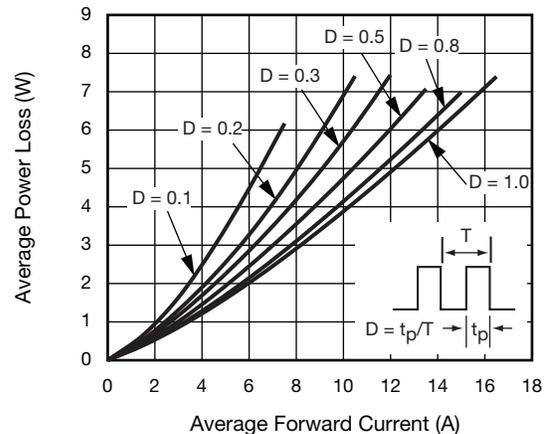


Fig. 2 - Forward Power Loss Characteristics Per Diode

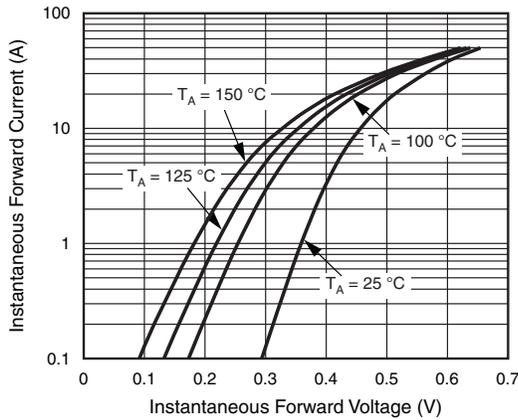


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

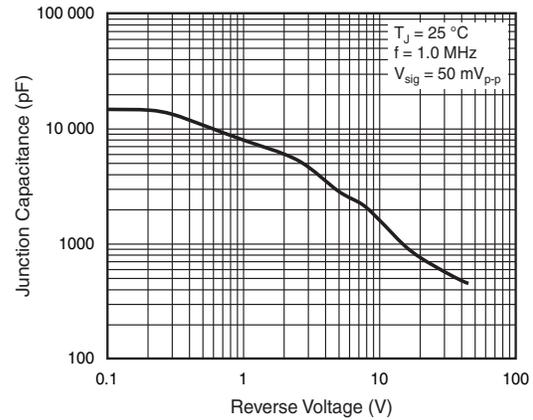


Fig. 5 - Typical Junction Capacitance Per Diode

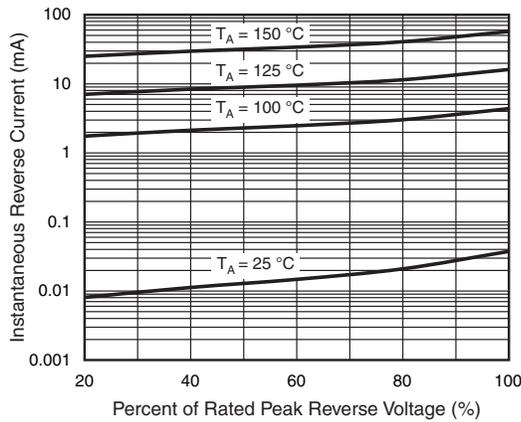


Fig. 4 - Typical Reverse Characteristics Per Diode

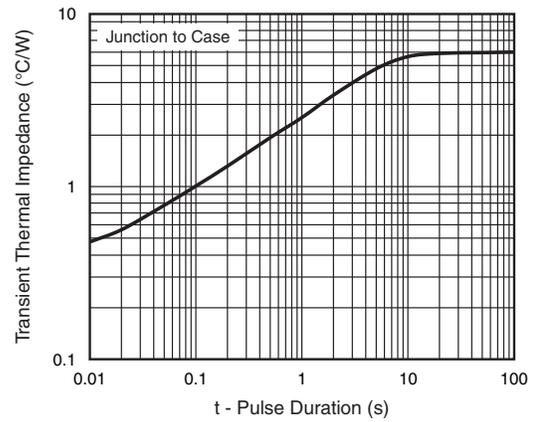
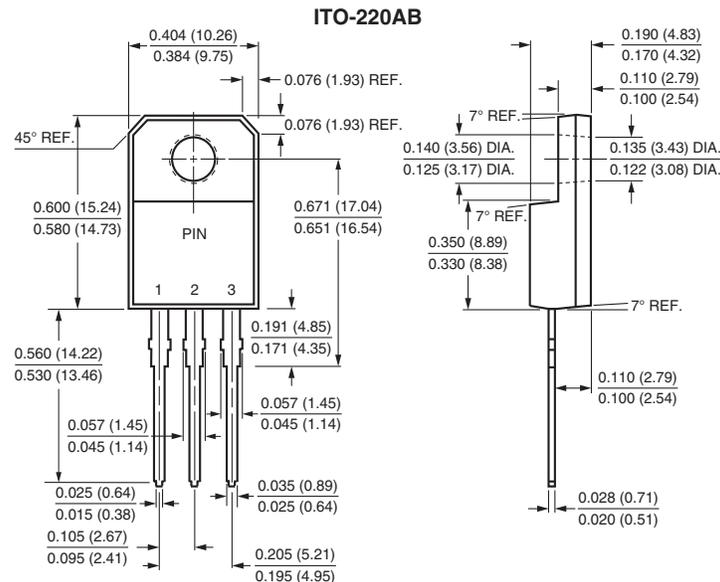


Fig. 6 - Typical Transient Thermal Impedance Per Diode

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





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