# Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection
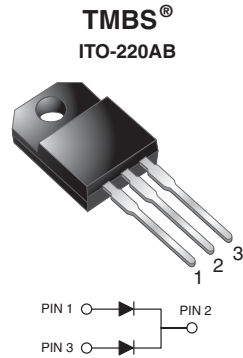
Ultra Low $V_F$ = 0.34 V at $I_F$ = 2.5 A

**TMBS®**
**ITO-220AB**



PIN 1 ○——▷|——  PIN 2
PIN 3 ○——▷|——

## 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

**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 5.0 A |
| $V_{RRM}$ | 45 V |
| $I_{FSM}$ | 100 A |
| $V_F$ at $I_F$ = 5.0 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 °C unless otherwise noted)

| PARAMETER | | SYMBOL | VFT1045CBP | UNIT |
|---|---|---|---|---|
| Maximum repetitive peak reverse voltage | | $V_{RRM}$ | 45 | V |
| Maximum average forward rectified current (fig. 1) | per device | $I_{F(AV)}$ [1] | 10 | A |
| | per diode | | 5.0 | |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode | | $I_{FSM}$ | 100 | A |
| Isolation voltage from terminal to heatsink, t = 1 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 ≤ 1 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 °C unless otherwise noted)

| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| Instantaneous forward voltage per diode | $I_F$ = 2.5 A | $T_A$ = 25 °C | $V_F$ [1] | 0.44 | - | V |
| | $I_F$ = 5.0 A | | | 0.49 | 0.58 | |
| | $I_F$ = 2.5 A | $T_A$ = 125 °C | | 0.34 | - | |
| | $I_F$ = 5.0 A | | | 0.41 | 0.50 | |
| Reverse current per diode | $V_R$ = 45 V | $T_A$ = 25 °C | $I_R$ [2] | - | 500 | μA |
| | | $T_A$ = 125 °C | | 5 | 15 | mA |

**Notes**
[1] Pulse test: 300 μs pulse width, 1 % duty cycle
[2] Pulse test: Pulse width ≤ 40 ms

## THERMAL CHARACTERISTICS ($T_A$ = 25 °C unless otherwise noted)

| PARAMETER | | SYMBOL | VFT1045CBP | UNIT |
|---|---|---|---|---|
| Typical thermal resistance | per diode | $R_{\theta JC}$ | 6.5 | °C/W |
| | per device | | 5.0 | |

## ORDERING INFORMATION (Example)

| PACKAGE | PREFERRED P/N | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
|---|---|---|---|---|---|
| ITO-220AB | VFT1045CBP-M3/4W | 1.75 | 4W | 50/tube | Tube |

## RATINGS AND CHARACTERISTICS CURVES ($T_A$ = 25 °C unless otherwise noted)
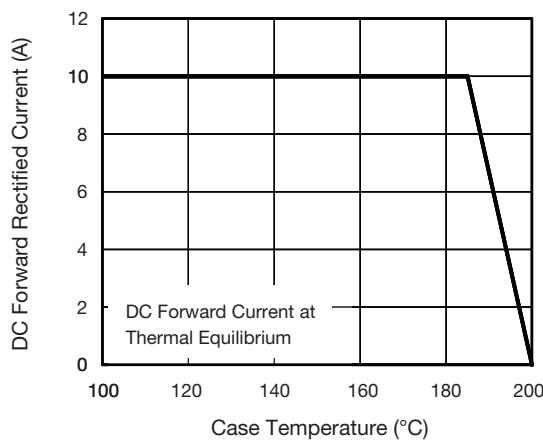
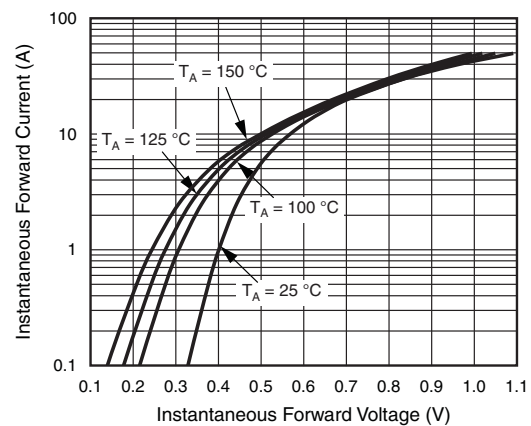Fig. 1 - Maximum Forward Current Derating Curve

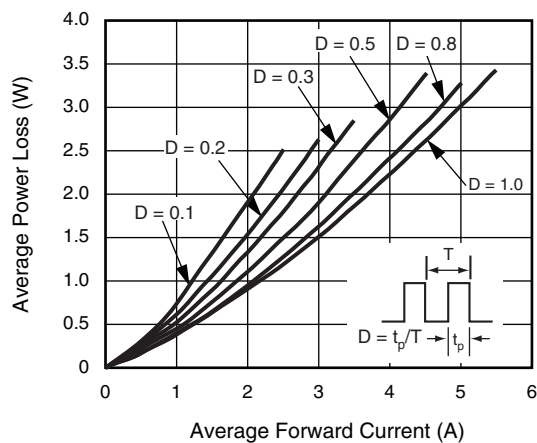Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

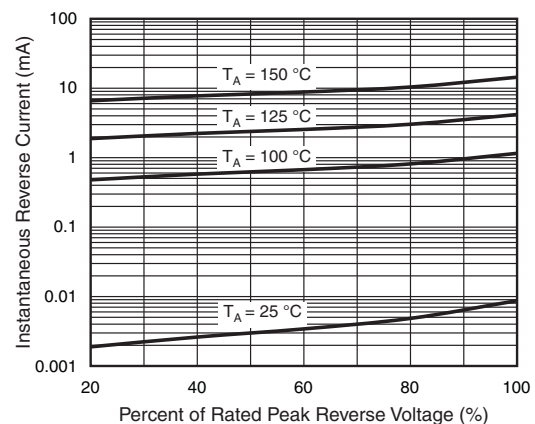Fig. 2 - Forward Power Loss Characteristics Per Diode

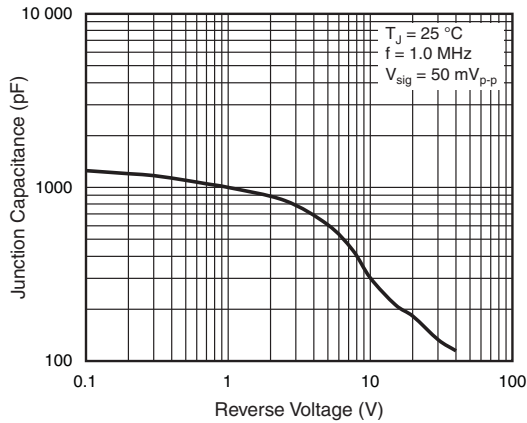Fig. 4 - Typical Reverse Characteristics Per Diode

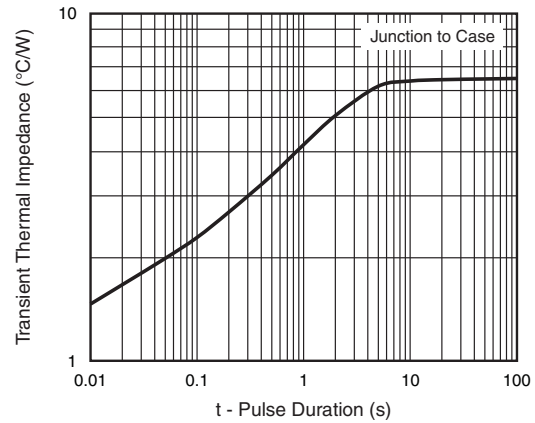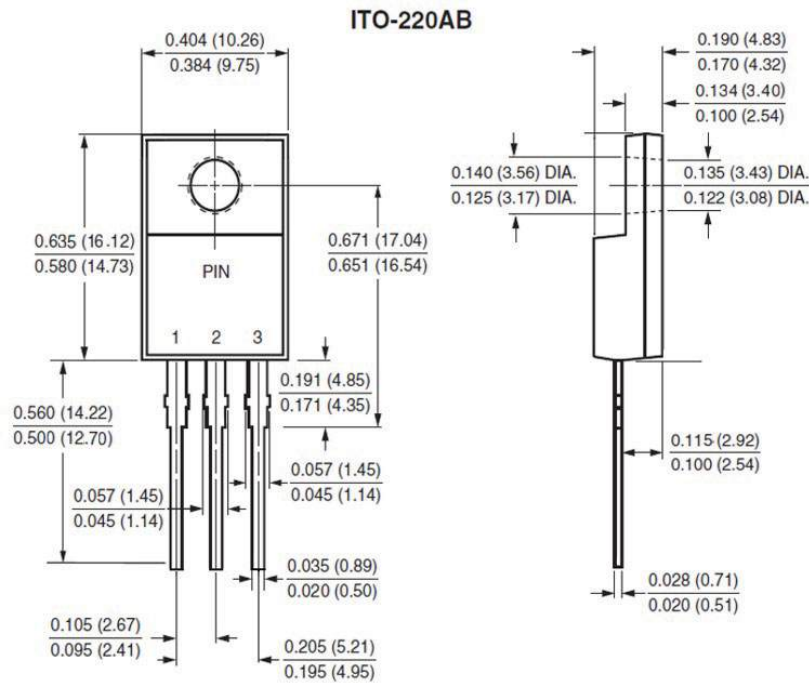Fig. 5 - Typical Junction Capacitance Per Diode



Fig. 6 - Typical Transient Thermal Impedance Per Diode

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



ITO-220AB

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