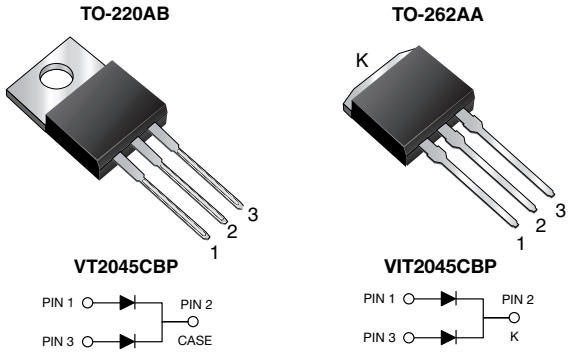
# Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

Ultra Low $V_F$ = 0.33 V at $I_F$ = 5.0 A

TMBS®




## 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.

| PRIMARY CHARACTERISTICS | |
|---|---|
| $I_{F(AV)}$ | 2 x 10 A |
| $V_{RRM}$ | 45 V |
| $I_{FSM}$ | 160 A |
| $V_F$ at $I_F$ = 10 A | 0.41 V |
| $T_{OP}$ max. (AC mode) | 150 °C |
| $T_J$ max. (DC forward current) | 200 °C |
| Package | TO-220AB, TO-262AA |
| Diode variation | Dual common cathode |

## MECHANICAL DATA

**Case:** TO-220AB, TO-262AA
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 °C unless otherwise noted) | | | | | |
|---|---|---|---|---|---|
| PARAMETER | | SYMBOL | VT2045CBP | VIT2045CBP | UNIT |
| Maximum repetitive peak reverse voltage | | $V_{RRM}$ | 45 | | V |
| Maximum average forward rectified current (fig. 1) | per device | $I_{F(AV)}$ (1) | 20 | | A |
| | per diode | | 10 | | |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode | | $I_{FSM}$ | 160 | | A |
| 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



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| **ELECTRICAL CHARACTERISTICS** ($T_A$ = 25 °C unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITIONS** | | **SYMBOL** | **TYP.** | **MAX.** | **UNIT** |
| Instantaneous forward voltage per diode | $I_F$ = 5 A | $T_A$ = 25 °C | $V_F$ (1) | 0.44 | - | V |
| | $I_F$ = 10 A | | | 0.49 | 0.58 | |
| | $I_F$ = 5 A | $T_A$ = 125 °C | | 0.33 | - | |
| | $I_F$ = 10 A | | | 0.41 | 0.52 | |
| Reverse current per diode | $V_R$ = 45 V | $T_A$ = 25 °C | $I_R$ (2) | - | 2000 | µA |
| | | $T_A$ = 125 °C | | 10 | 30 | 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** | **VT2045CBP** | **VIT2045CBP** | **UNIT** |
| Typical thermal resistance | per diode | $R_{\theta JC}$ | 3.0 | | °C/W |
| | per device | | 2.0 | | |

| **ORDERING INFORMATION** (Example) | | | | | |
|---|---|---|---|---|---|
| **PACKAGE** | **PREFERRED P/N** | **UNIT WEIGHT (g)** | **PACKAGE CODE** | **BASE QUANTITY** | **DELIVERY MODE** |
| TO-220AB | VT2045CBP-M3/4W | 1.88 | 4W | 50/tube | Tube |
| TO-2262AA | VIT2045CBP-M3/4W | 1.45 | 4W | 50/tube | Tube |


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**RATINGS AND CHARACTERISTICS CURVES** ($T_A$ = 25 °C unless otherwise noted)

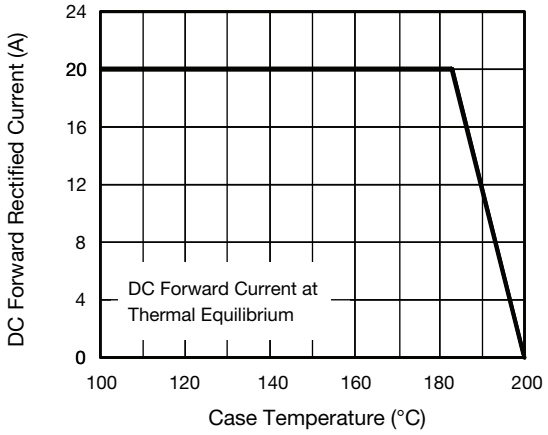



Fig. 1 - Maximum Forward Current Derating Curve

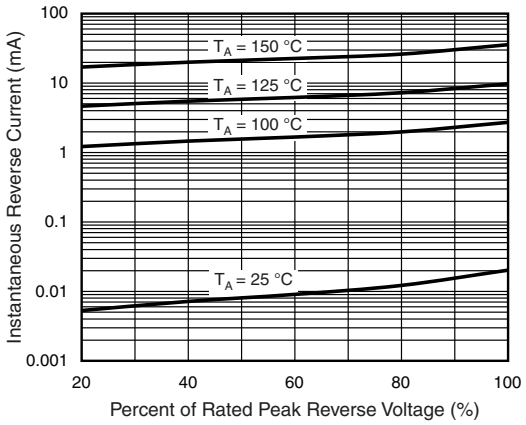



Fig. 4 - Typical Reverse Characteristics Per Diode

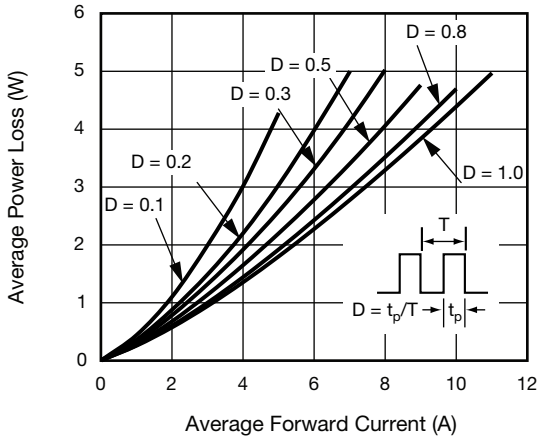



Fig. 2 - Forward Power Loss Characteristics Per Diode

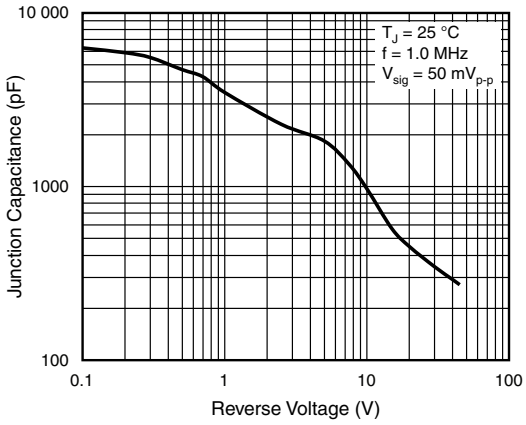



Fig. 5 - Typical Junction Capacitance Per Diode

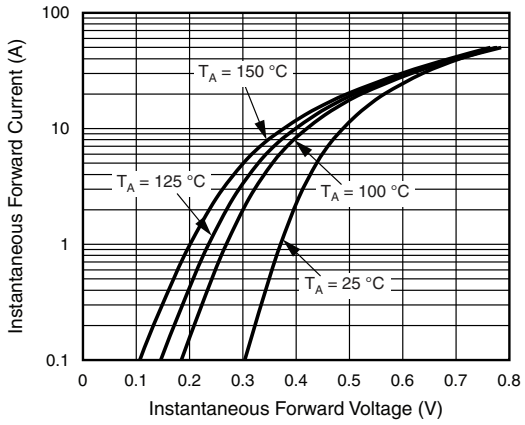



Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

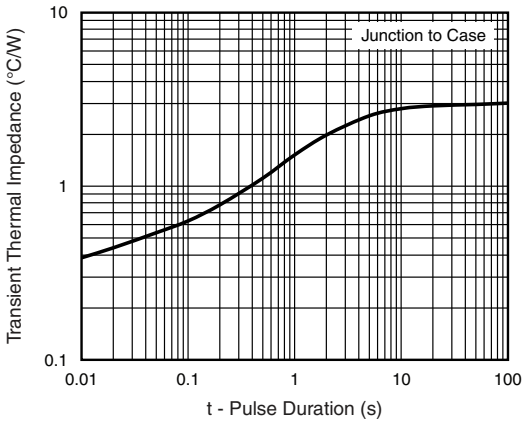



Fig. 6 - Typical Transient Thermal Impedance Per Diode

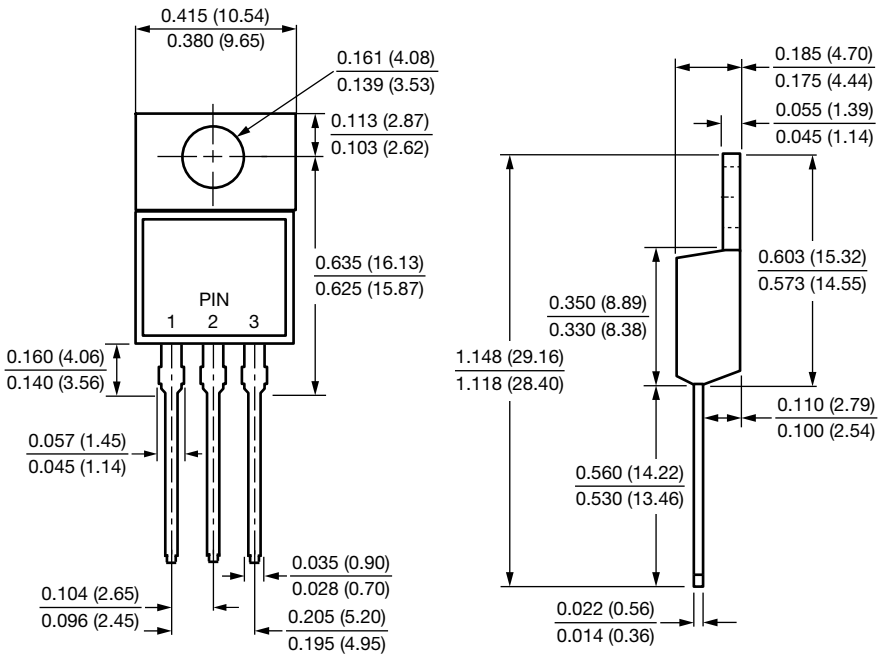


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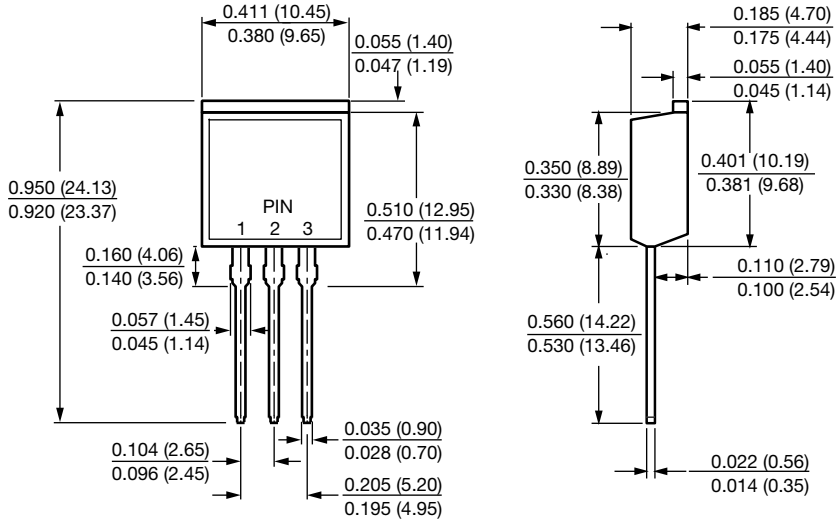
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**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

**TO-220AB**




**TO-262AA**






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