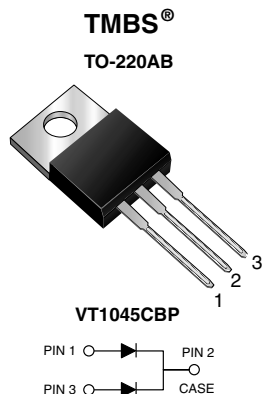


Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

Ultra Low $V_F = 0.34\text{ V}$ at $I_F = 2.5\text{ A}$



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
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition



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: TO-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 $I_F = 5.0\text{ A}$ | 0.41 V |
| $T_{OP\ max.}$ | 150 °C |

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

| PARAMETER | SYMBOL | VT1045CBP | UNIT |
|--|----------------------------|---------------|------|
| Maximum repetitive peak reverse voltage | V_{RRM} | 45 | V |
| Maximum average forward rectified current (fig. 1) | $I_{F(AV)}$ ⁽¹⁾ | per device | 10 |
| | | 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 |
| Operating junction and storage temperature range | T_{OP}, T_{STG} | - 40 to + 150 | °C |
| Junction temperature in DC forward current without reverse bias, $t \leq 1\text{ h}$ | T_J ⁽²⁾ | ≤ 200 | °C |

Notes

⁽¹⁾ With heatsink

⁽²⁾ Meets the requirements of IEC 61215 ed. 2 bypass diode thermal test

VT1045CBP

Vishay General Semiconductor



| 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

⁽³⁾ Pulse test: 300 μs pulse width, 1 % duty cycle

⁽⁴⁾ Pulse test: Pulse width ≤ 40 ms

| THERMAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted) | | | | |
|---|------------|------------------|-----------|------|
| PARAMETER | | SYMBOL | VT1045CBP | UNIT |
| Typical thermal resistance | per diode | R _{θJC} | 3.5 | °C/W |
| | per device | | 2.5 | |

| ORDERING INFORMATION (Example) | | | | | |
|--------------------------------|-----------------|-----------------|--------------|---------------|---------------|
| PACKAGE | PREFERRED P/N | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| TO-220AB | VT1045CBP-M3/4W | 1.87 | 4W | 50/tube | Tube |

RATINGS AND CHARACTERISTICS CURVES

(T_A = 25 °C unless otherwise noted)

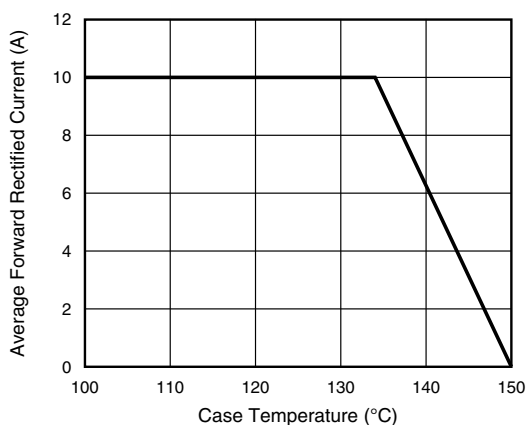


Fig. 1 - Maximum Forward Current Derating Curve

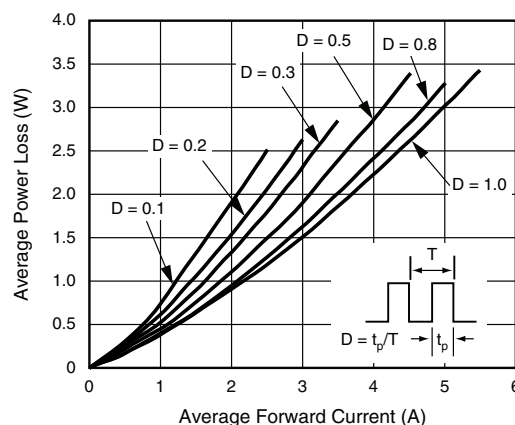


Fig. 2 - Forward Power Loss Characteristics Per Diode

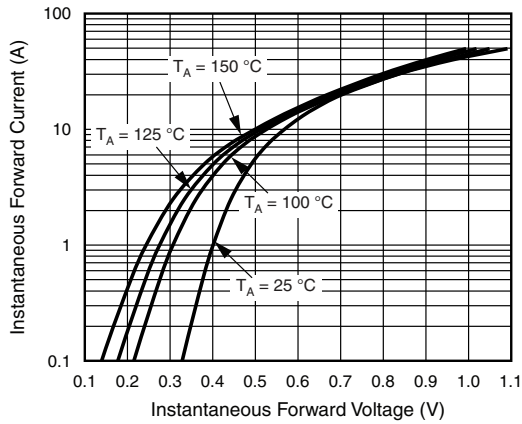


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

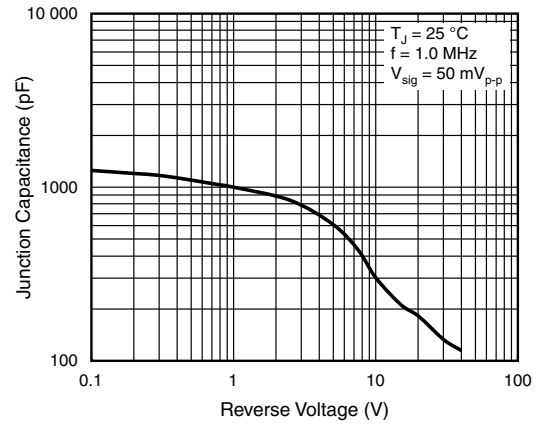


Fig. 5 - Typical Junction Capacitance Per Diode

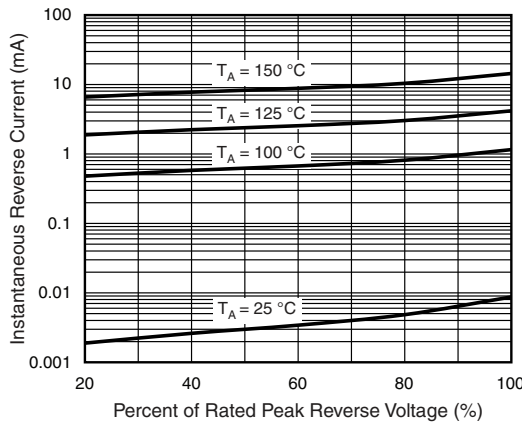


Fig. 4 - Typical Reverse Characteristics Per Diode

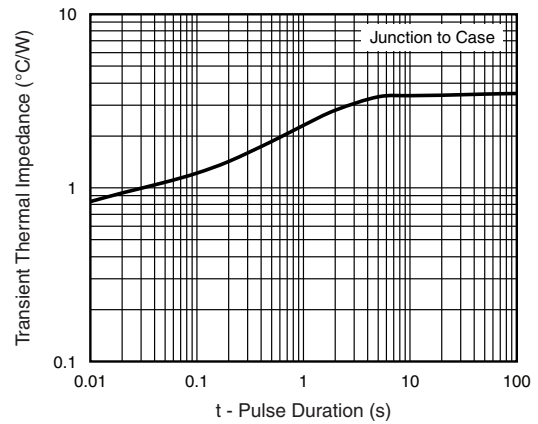
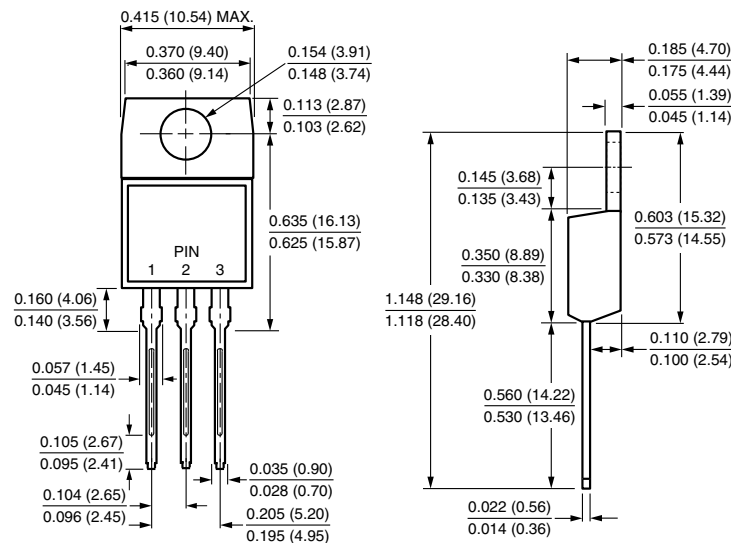


Fig. 6 - Typical Transient Thermal Impedance Per Diode

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

TO-220AB





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