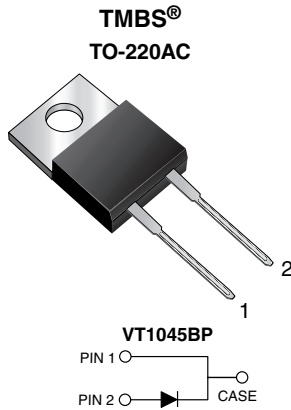


## Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

Ultra Low  $V_F = 0.41\text{ V}$  at  $I_F = 5\text{ A}$



### 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
- 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:** TO-220AC

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

|                                 |            |
|---------------------------------|------------|
| $I_{F(AV)}$                     | 10 A       |
| $V_{RRM}$                       | 45 V       |
| $I_{FSM}$                       | 100 A      |
| $V_F$ at $I_F = 10\text{ A}$    | 0.52 V     |
| $T_{OP}$ max. (AC mode)         | 150 °C     |
| $T_J$ max. (DC forward current) | 200 °C     |
| Package                         | TO-220AC   |
| Diode variation                 | Single die |

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

| PARAMETER  | SYMBOL            | VT1045BP    | UNIT |
|--|-------------------|-------------|------|
| Maximum repetitive peak reverse voltage  | $V_{RRM}$         | 45          | V    |
| Maximum DC forward bypassing current (fig. 1)  | $I_{F(DC)}^{(1)}$ | 10          | A    |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load   | $I_{FSM}$         | 100         | A    |
| Operating junction temperature range (AC mode)                                       | $T_{OP}$          | -40 to +150 | °C   |
| Junction temperature in DC forward current without reverse bias, $t \leq 1\text{ h}$ | $T_J^{(2)}$       | $\leq 200$  | °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  | I <sub>F</sub> = 5 A  | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.50 | -    | V    |
|  | I <sub>F</sub> = 10 A |                         |                               | 0.57 | 0.68 |      |
|  | I <sub>F</sub> = 5 A  | T <sub>A</sub> = 125 °C |                               | 0.41 | -    |      |
|  | I <sub>F</sub> = 10 A |                         |                               | 0.52 | 0.64 |      |
| Reverse current  | V <sub>R</sub> = 45 V | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | -    | 500  | μA   |
|  |                       | T <sub>A</sub> = 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 <sub>A</sub> = 25 °C unless otherwise noted) |                  |          |      |
|---|------------------|----------|------|
| PARAMETER   | SYMBOL           | VT1045BP | UNIT |
| Typical thermal resistance  | R <sub>θJC</sub> | 3.0      | °C/W |

| ORDERING INFORMATION (Example) |                |                 |              |               |               |
|--------------------------------|----------------|-----------------|--------------|---------------|---------------|
| PACKAGE                        | PREFERRED P/N  | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| TO-220AC                       | VT1045BP-M3/4W | 1.87            | 4W           | 50/tube       | Tube          |

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

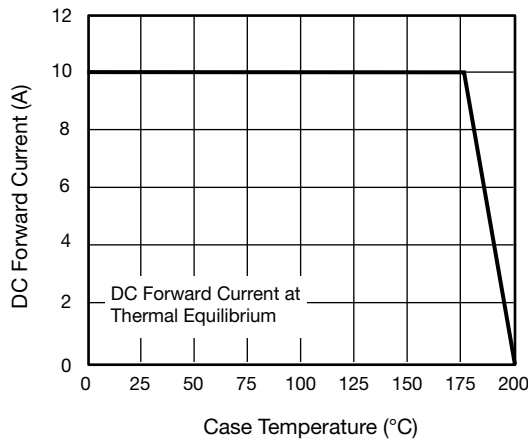


Fig. 1 - Maximum Forward Current Derating Curve

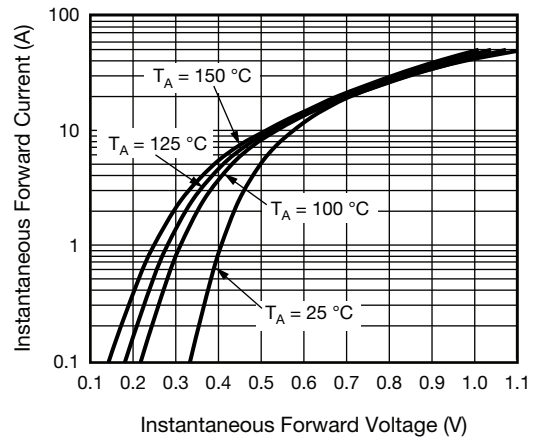
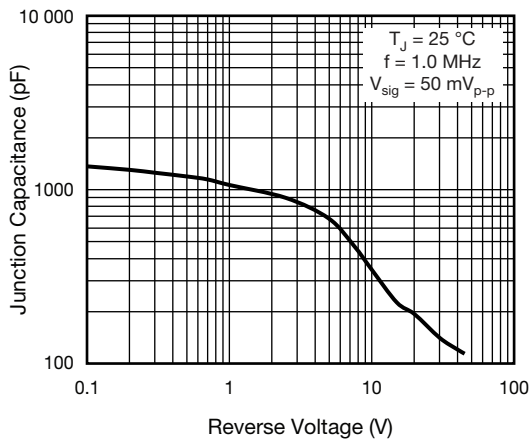
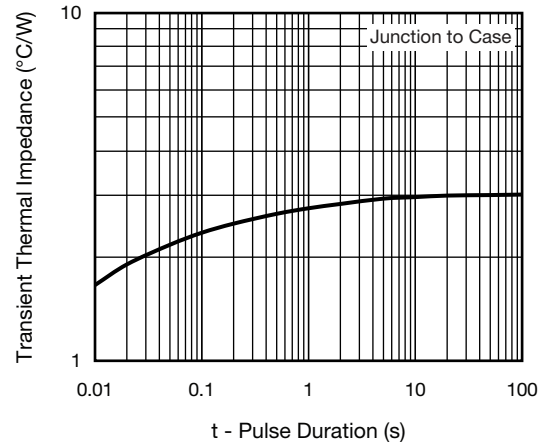
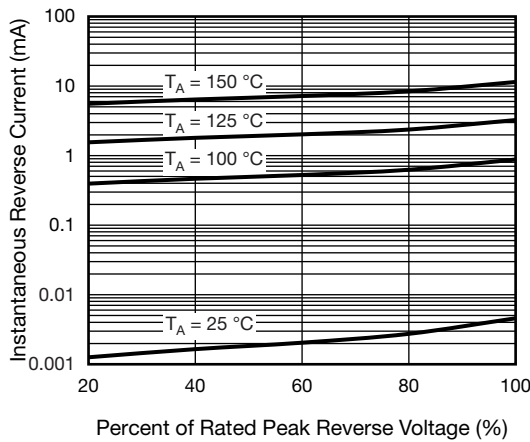
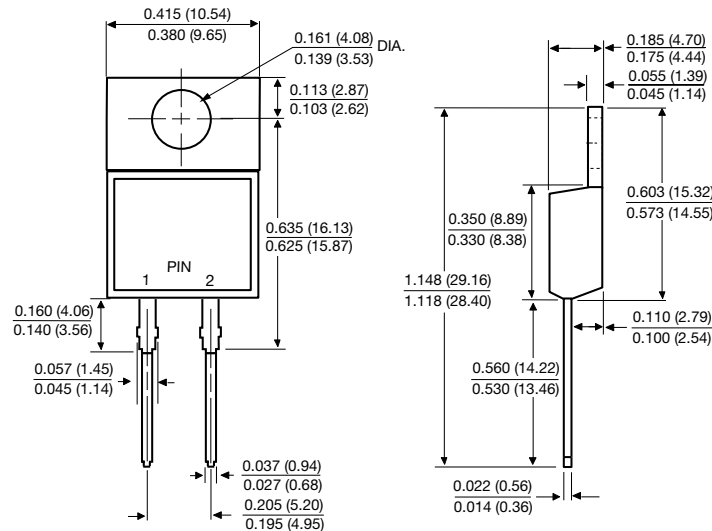


Fig. 2 - Typical Instantaneous Forward Characteristics



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

**TO-220AC**





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