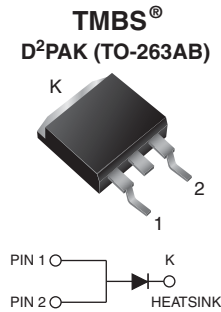


## Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

 Ultra Low  $V_F = 0.30\text{ V}$  at  $I_F = 5\text{ A}$ 


### FEATURES

- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C
- $T_J = 200\text{ °C}$  max. in solar bypass application
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### DESIGN SUPPORT TOOLS

[click logo to get started](#)
**3D**  
Models  
Available

### 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:** D<sup>2</sup>PAK (TO-263AB)

 Molding compound meets UL 94 V-0 flammability rating  
Base P/N-E3 - RoHS-compliant, commercial grade

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

E3 suffix meets JESD 201 class 1A whisker test

**Polarity:** as marked

**Mounting Torque:** 10 in-lbs maximum

| PRIMARY CHARACTERISTICS         |                               |
|---------------------------------|-------------------------------|
| $I_{F(DC)}$                     | 30 A                          |
| $V_{RRM}$                       | 45 V                          |
| $I_{FSM}$                       | 200 A                         |
| $V_F$ at $I_F = 40\text{ A}$    | 0.51 V                        |
| $T_{OP}$ max. (AC mode)         | 150 °C                        |
| $T_J$ max. (DC forward current) | 200 °C                        |
| Package                         | D <sup>2</sup> PAK (TO-263AB) |
| Circuit configurations          | Single                        |

| MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)                       |                            |             |      |
|--|----------------------------|-------------|------|
| PARAMETER  | SYMBOL                     | VBT3045BP   | UNIT |
| Maximum repetitive peak reverse voltage  | $V_{RRM}$                  | 45          | V    |
| Maximum DC forward bypassing current (fig. 1)  | $I_{F(DC)}$ <sup>(1)</sup> | 30          | A    |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load   | $I_{FSM}$                  | 200         | A    |
| Operating junction temperature range (AC mode)                                       | $T_{OP}$                   | -40 to +150 | °C   |
| Junction temperature in DC forward current without reverse bias, $t \leq 1\text{ h}$ | $T_J$ <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

| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                     |                                   |             |      |      |               |
|--|---------------------|-----------------------------------|-------------|------|------|---------------|
| PARAMETER  | TEST CONDITIONS     | SYMBOL                            | TYP.        | MAX. | UNIT |               |
| Instantaneous forward voltage  | $I_F = 5\text{ A}$  | $T_A = 25\text{ }^\circ\text{C}$  | $V_F^{(1)}$ | 0.42 | -    | V             |
|  | $I_F = 15\text{ A}$ |                                   |             | 0.49 | -    |               |
|  | $I_F = 30\text{ A}$ |                                   |             | 0.58 | 0.70 |               |
|  | $I_F = 5\text{ A}$  | $T_A = 125\text{ }^\circ\text{C}$ |             | 0.30 | -    |               |
|  | $I_F = 15\text{ A}$ |                                   |             | 0.40 | -    |               |
|  | $I_F = 30\text{ A}$ |                                   |             | 0.51 | 0.60 |               |
| Reverse current  | $V_R = 45\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$  | $I_R^{(2)}$ | -    | 2000 | $\mu\text{A}$ |
|  |                     | $T_A = 125\text{ }^\circ\text{C}$ |             | 19   | 60   | mA            |

**Notes**

 (1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

 (2) Pulse test: Pulse width  $\leq 40\text{ ms}$ 

| <b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                       |           |                    |
|---|-----------------------|-----------|--------------------|
| PARAMETER   | SYMBOL                | VBT3045BP | UNIT               |
| Typical thermal resistance  | $R_{\theta\text{JC}}$ | 1.0       | $^\circ\text{C/W}$ |

| <b>ORDERING INFORMATION</b> (Example) |                 |                 |              |               |               |
|---------------------------------------|-----------------|-----------------|--------------|---------------|---------------|
| PACKAGE                               | PREFERRED P/N   | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| TO-263AB                              | VBT3045BP-E3/4W | 1.37            | 4W           | 50/tube       | Tube          |
| TO-263AB                              | VBT3045BP-E3/8W | 1.37            | 8W           | 800/reel      | Tape and reel |

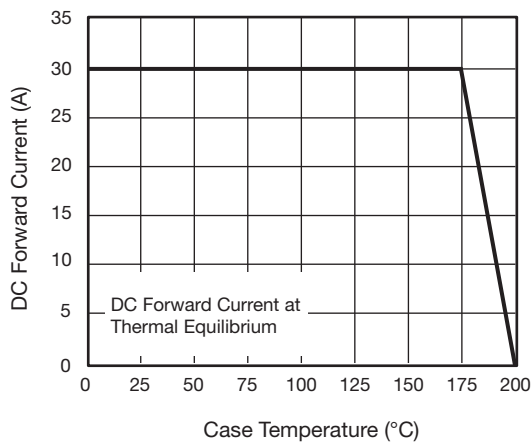
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

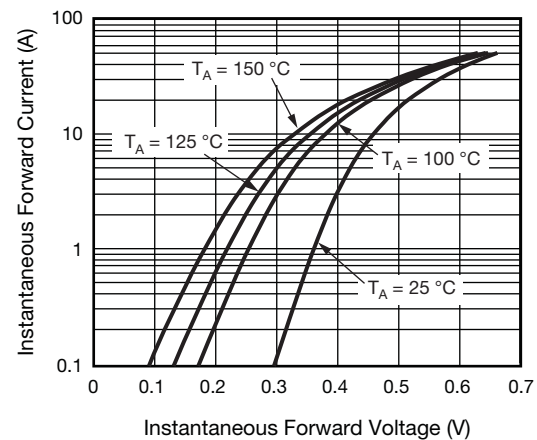


Fig. 2 - Typical Instantaneous Forward Characteristics

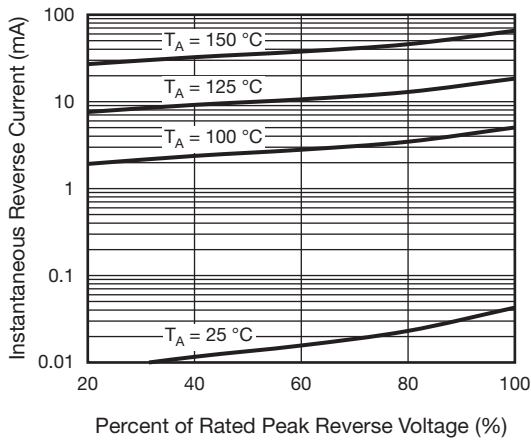


Fig. 3 - Typical Reverse Characteristics

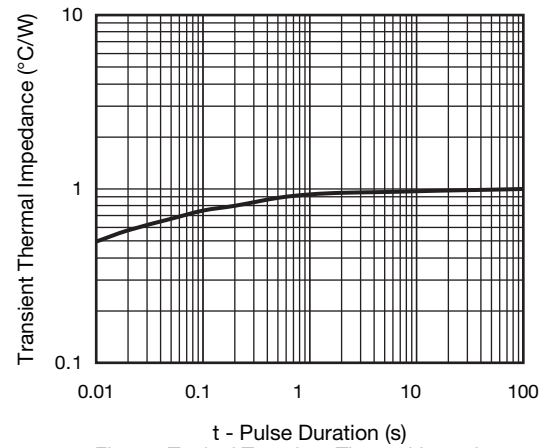


Fig. 5 - Typical Transient Thermal Impedance

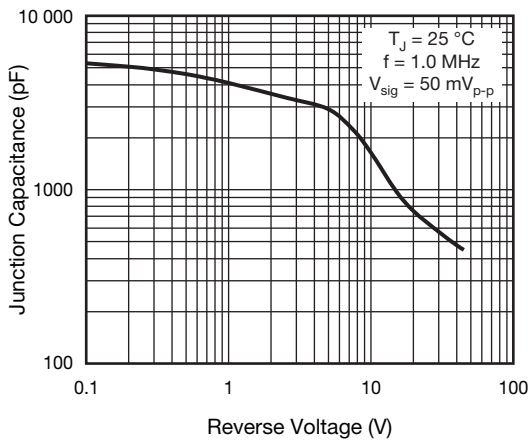
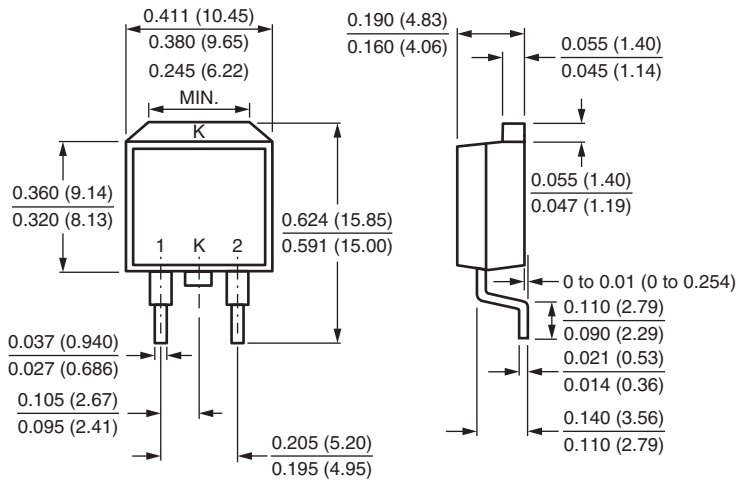


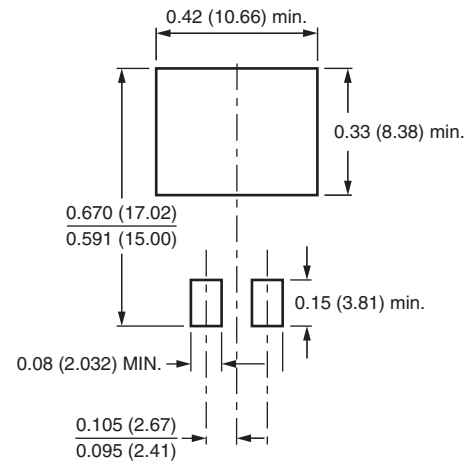
Fig. 4 - Typical Junction Capacitance

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

**D<sup>2</sup>PAK (TO-263AB)**



**Mounting Pad Layout**





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