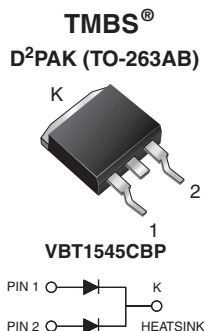


# Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

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



## DESIGN SUPPORT TOOLS

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| PRIMARY CHARACTERISTICS         |                               |
|---------------------------------|-------------------------------|
| $I_{F(AV)}$                     | 2 x 7.5 A                     |
| $V_{RRM}$                       | 45 V                          |
| $I_{FSM}$                       | 100 A                         |
| $V_F$ at $I_F = 7.5\text{ A}$   | 0.49 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          | Common cathode                |

## 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 °C max. in solar bypass mode application
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

## 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

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

| PARAMETER                                                                                    | SYMBOL                     | VB T1545CBP | UNIT |
|----------------------------------------------------------------------------------------------|----------------------------|-------------|------|
| Maximum repetitive peak reverse voltage                                                      | $V_{RRM}$                  | 45          | V    |
| Maximum average forward rectified current (fig. 1)                                           | $I_{F(AV)}$ <sup>(1)</sup> | 15<br>7.5   | A    |
| 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 (AC mode)                                   | $T_{OP}, T_{STG}$          | -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

(1) With heatsink

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

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

| PARAMETER                               | TEST CONDITIONS      |                       | SYMBOL               | TYP. | MAX. | UNIT          |
|-----------------------------------------|----------------------|-----------------------|----------------------|------|------|---------------|
| Instantaneous forward voltage per diode | $I_F = 5\text{ A}$   | $T_A = 25\text{ °C}$  | $V_F$ <sup>(1)</sup> | 0.49 | -    | V             |
|                                         | $I_F = 7.5\text{ A}$ | $T_A = 25\text{ °C}$  |                      | 0.55 | 0.63 |               |
|                                         | $I_F = 5\text{ A}$   | $T_A = 125\text{ °C}$ |                      | 0.41 | -    |               |
|                                         | $I_F = 7.5\text{ A}$ | $T_A = 125\text{ °C}$ |                      | 0.49 | 0.57 |               |
| Reverse current per diode               | $V_R = 45\text{ V}$  | $T_A = 25\text{ °C}$  | $I_R$ <sup>(2)</sup> | -    | 500  | $\mu\text{A}$ |
|                                         |                      | $T_A = 125\text{ °C}$ |                      | 5    | 15   | mA            |

### Notes

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

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

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

| PARAMETER                  |            | SYMBOL          | VBT1545CBP | UNIT                 |
|----------------------------|------------|-----------------|------------|----------------------|
| Typical thermal resistance | per diode  | $R_{\theta JC}$ | 3.5        | $^{\circ}\text{C/W}$ |
|                            | per device |                 | 2.5        |                      |

**ORDERING INFORMATION** (Example)

| PACKAGE  | PREFERRED P/N    | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
|----------|------------------|-----------------|--------------|---------------|---------------|
| TO-263AB | VBT1545CBP-E3/4W | 1.38            | 4W           | 50/tube       | Tube          |
| TO-263AB | VBT1545CBP-E3/8W | 1.38            | 8W           | 800/reel      | Tape and reel |

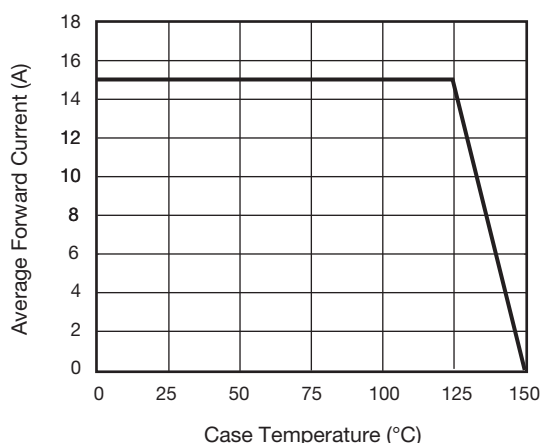
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

Fig. 1 - Maximum Forward Current Derating Curve

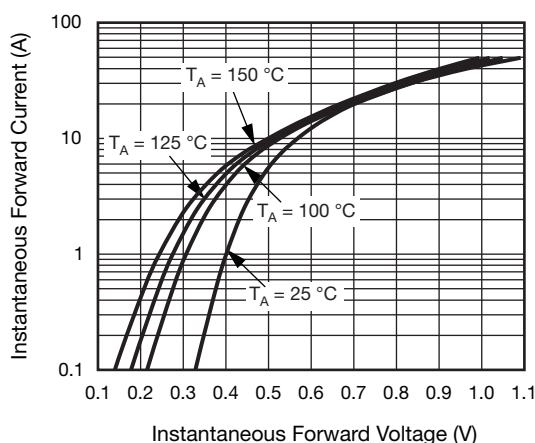


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

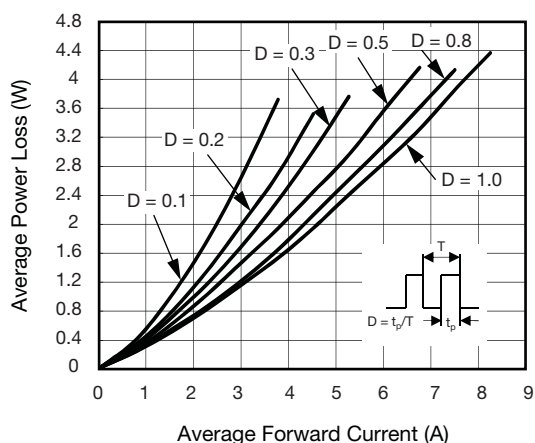


Fig. 2 - Forward Power Loss Characteristics Per Diode

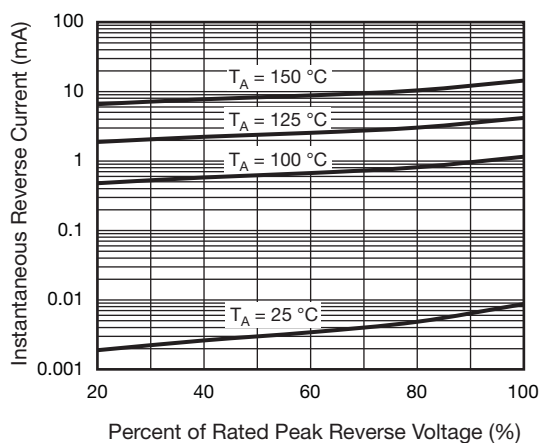


Fig. 4 - Typical Reverse Characteristics Per Diode

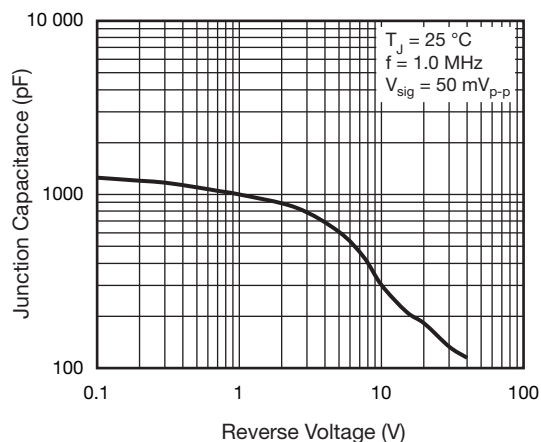


Fig. 5 - Typical Junction Capacitance Per Diode

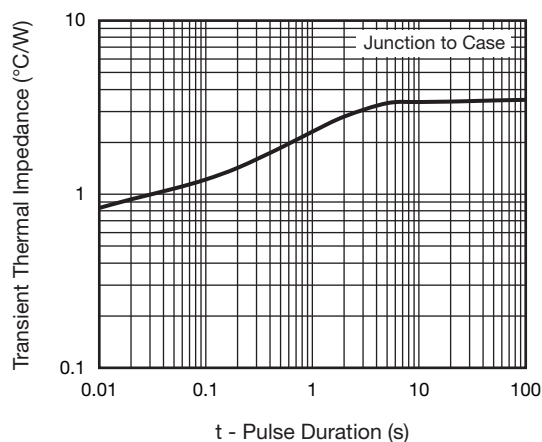
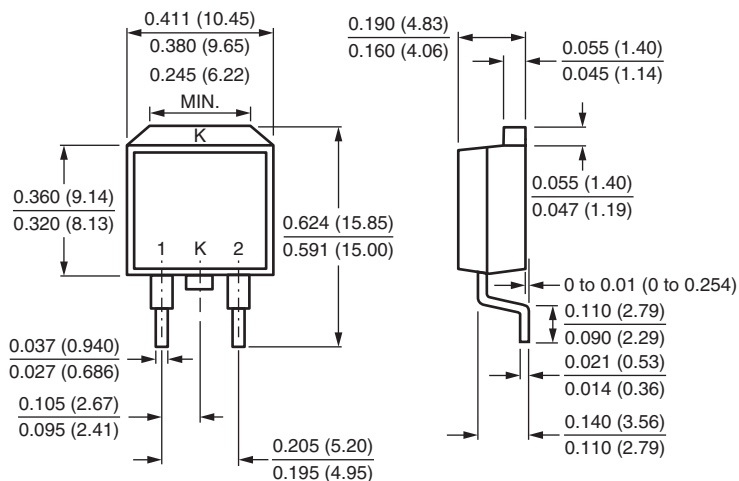


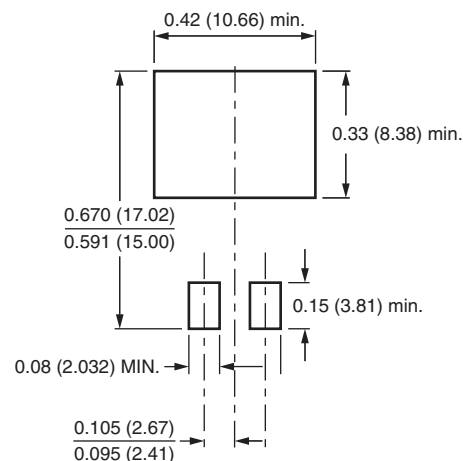
Fig. 6 - Typical Transient Thermal Impedance Per Diode

### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

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



#### Mounting Pad Layout





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