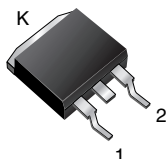


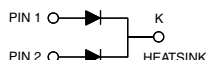
# Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

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

**TMBS®**  
**TO-263AB**



**VBT1545CBP**



## 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.

## 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                         | TO-263AB       |
| Diode variations                | Common cathode |

## MECHANICAL DATA

**Case:** 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                     | VBT1545CBP  | UNIT |
|-----------------------------------------------------------------------------------------------|----------------------------|-------------|------|
| Maximum repetitive peak reverse voltage                                                       | $V_{RRM}$                  | 45          | V    |
| Maximum average forward rectified current (fig. 1) <div>per device</div> <div>per diode</div> | $I_{F(AV)}$ <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

<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 per diode                                    | I <sub>F</sub> = 5 A   | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.49 | -    | V    |
|                                                                            | I <sub>F</sub> = 7.5 A |                         |                               | 0.55 | 0.63 |      |
|                                                                            | I <sub>F</sub> = 5 A   | T <sub>A</sub> = 125 °C |                               | 0.41 | -    |      |
|                                                                            | I <sub>F</sub> = 7.5 A |                         |                               | 0.49 | 0.57 |      |
| Reverse current per diode                                                  | 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  $\mu\text{s}$  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          | VBT1545CBP | UNIT                 |
| Typical thermal resistance                                                                  | per diode  | $R_{\theta JC}$ | 3.5        | $^{\circ}\text{C/W}$ |
|                                                                                             | per device |                 | 2.5        |                      |

| <b>ORDERING INFORMATION</b> (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 |

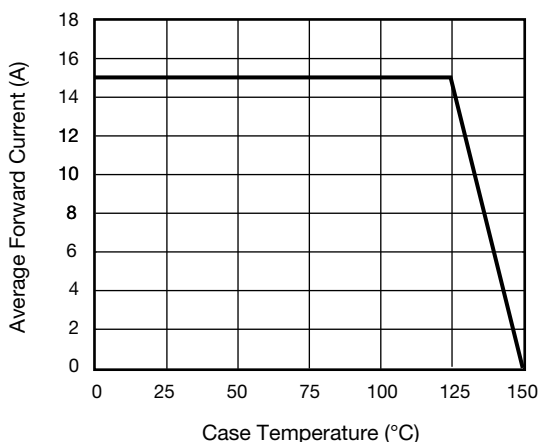
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

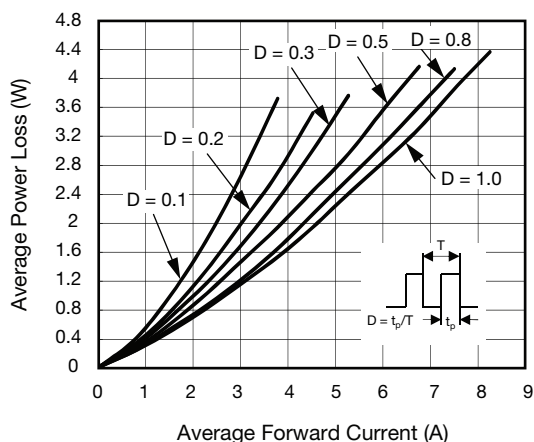


Fig. 2 - Forward Power Loss Characteristics Per Diode

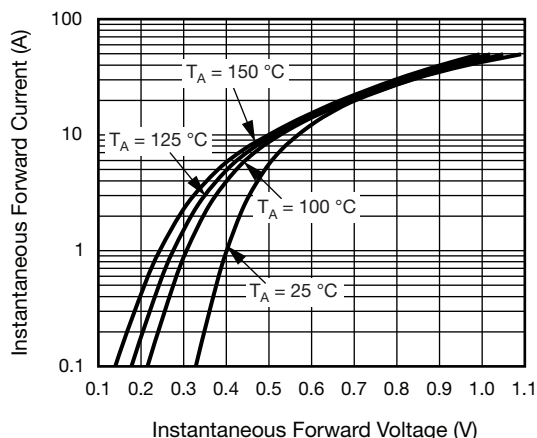


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

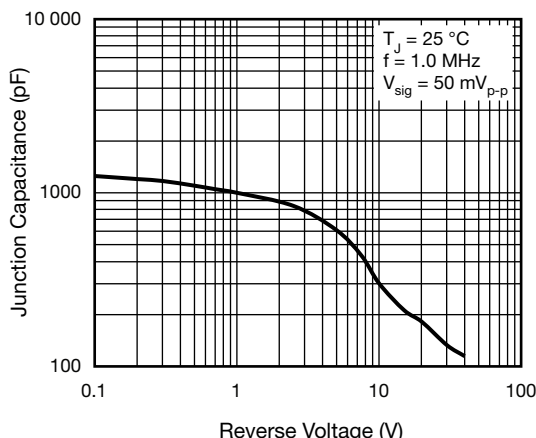


Fig. 5 - Typical Junction Capacitance Per Diode

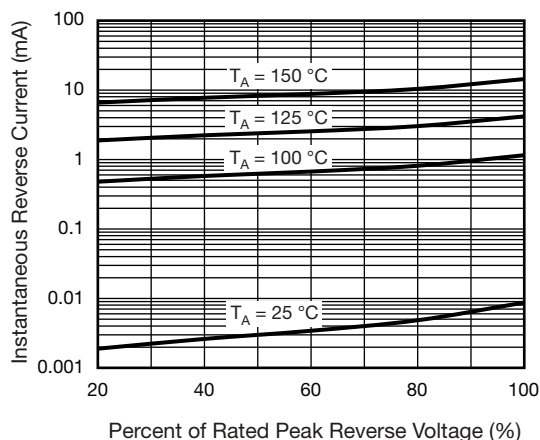


Fig. 4 - Typical Reverse Characteristics Per Diode

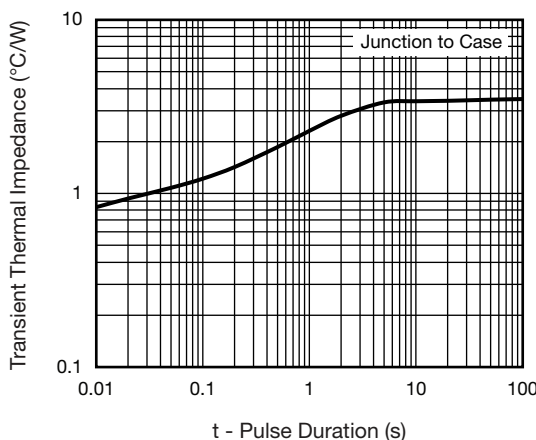
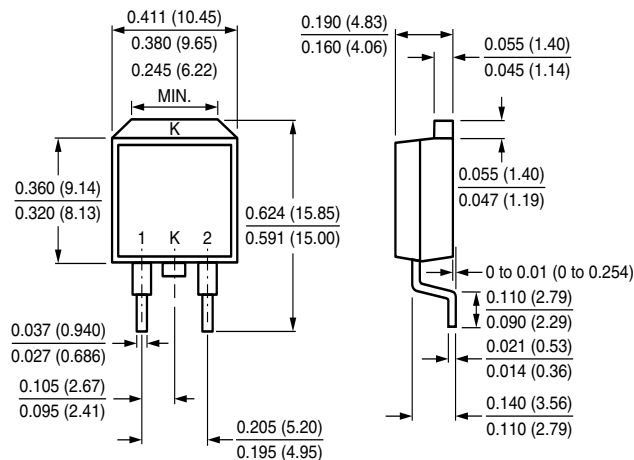


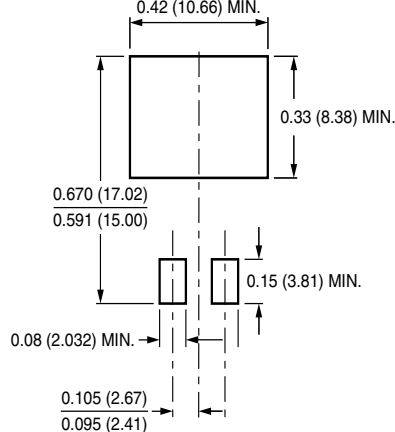
Fig. 6 - Typical Transient Thermal Impedance Per Diode

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### TO-263AB



### Mounting Pad Layout





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