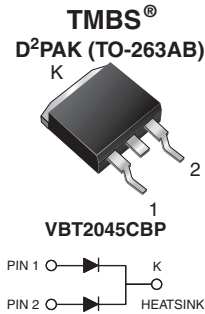


Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

 Ultra Low $V_F = 0.33\text{ V}$ at $I_F = 5.0\text{ A}$


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 °C max. in solar bypass mode application
- Material categorization: for definitions of compliance please see 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: D²PAK (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 | |
|---------------------------------|-------------------------------|
| $I_{F(AV)}$ | 2 x 10 A |
| V_{RRM} | 45 V |
| I_{FSM} | 160 A |
| V_F at $I_F = 10\text{ A}$ | 0.41 V |
| T_{OP} max. (AC mode) | 150 °C |
| T_J max. (DC forward current) | 200 °C |
| Package | D ² PAK (TO-263AB) |
| Circuit configuration | Common cathode |

| MAXIMUM RATINGS ($T_A = 25\text{ °C}$ unless otherwise noted) | | | |
|----------------------------------------------------------------------------------------------|----------------------------|-------------|------|
| PARAMETER | SYMBOL | VBT2045CBP | UNIT |
| Maximum repetitive peak reverse voltage | V_{RRM} | 45 | V |
| Maximum average forward rectified current (fig. 1) | $I_{F(AV)}$ ⁽¹⁾ | per device | 20 |
| | | per diode | 10 |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode | I_{FSM} | 160 | 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 ⁽²⁾ | ≤ 200 | °C |

Notes

⁽¹⁾ With heatsink

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

| ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | | | | |
|----------------------------------------------------------------------------------------------|---------------------|-----------------------------------|-------------|------|------|---------------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Instantaneous forward voltage per diode | $I_F = 5\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$ | $V_F^{(1)}$ | 0.44 | - | V |
| | $I_F = 10\text{ A}$ | | | 0.49 | 0.58 | |
| | $I_F = 5\text{ A}$ | $T_A = 125\text{ }^\circ\text{C}$ | | 0.33 | - | |
| | $I_F = 10\text{ A}$ | | | 0.41 | 0.52 | |
| Reverse current per diode | $V_R = 45\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$ | $I_R^{(2)}$ | - | 2000 | μA |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 10 | 30 | mA |

Notes

 (1) Pulse test: 300 μs 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 | VBT2045CBP | UNIT |
| Typical thermal resistance | per diode | | $R_{\theta JC}$ | 3.0 | $^\circ\text{C/W}$ |
| | per device | | | 2.0 | |

| ORDERING INFORMATION (Example) | | | | | |
|---------------------------------------|------------------|-----------------|--------------|---------------|---------------|
| PACKAGE | PREFERRED P/N | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| TO-263AB | VBT2045CBP-E3/4W | 1.38 | 4W | 50/tube | Tube |
| TO-263AB | VBT2045CBP-E3/8W | 1.38 | 8W | 800/reel | Tape and reel |

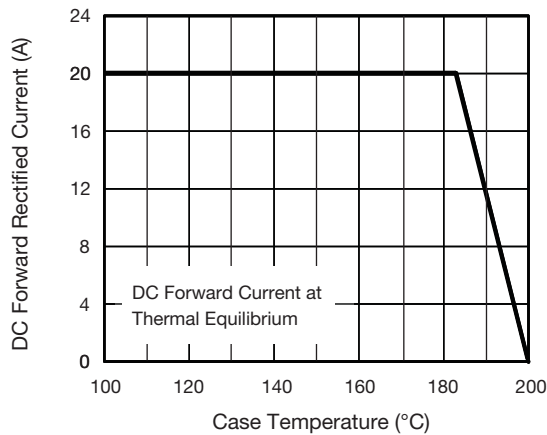
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

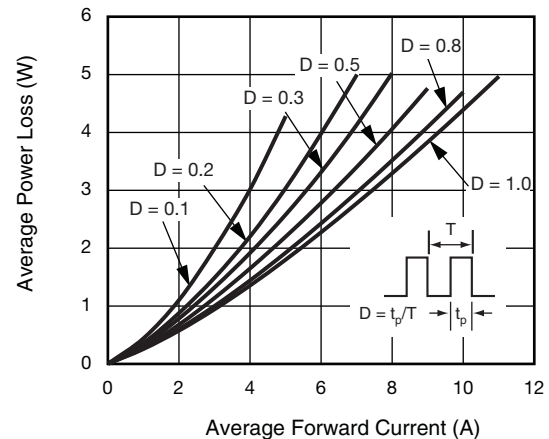


Fig. 2 - Forward Power Loss Characteristics Per Diode

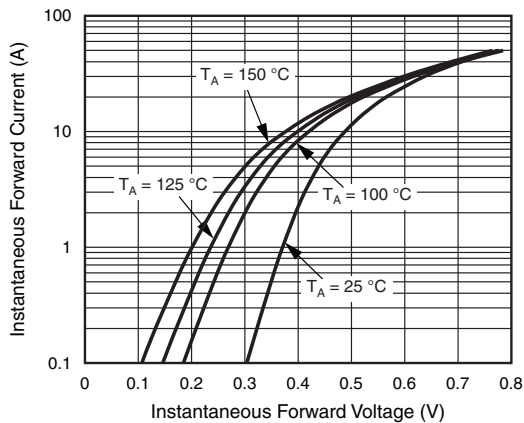


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

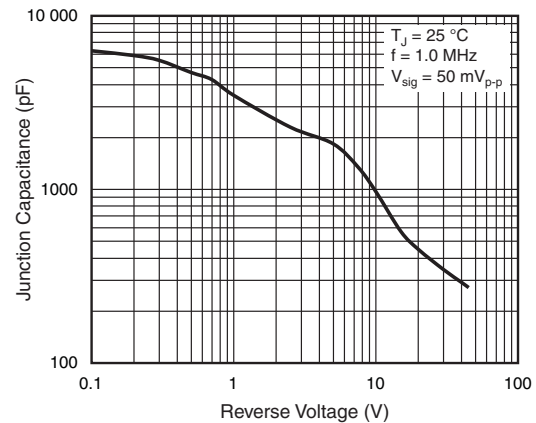


Fig. 5 - Typical Junction Capacitance Per Diode

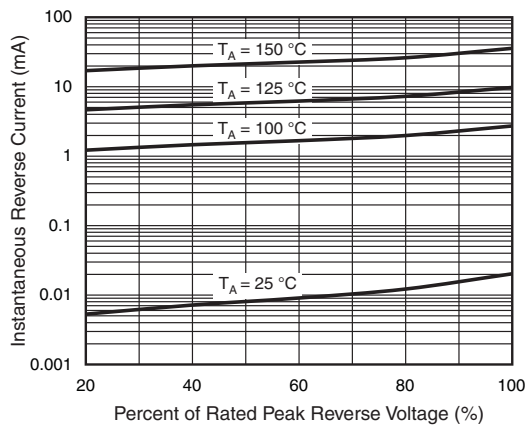


Fig. 4 - Typical Reverse Characteristics Per Diode

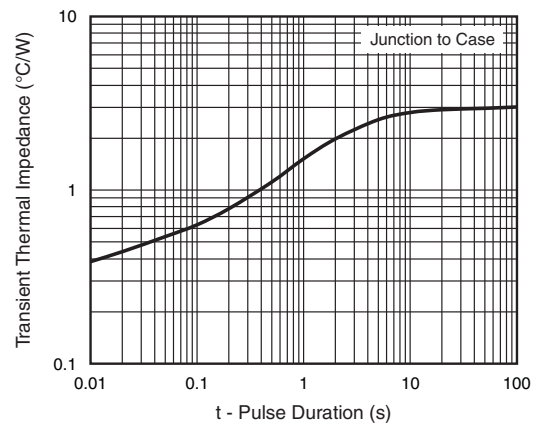
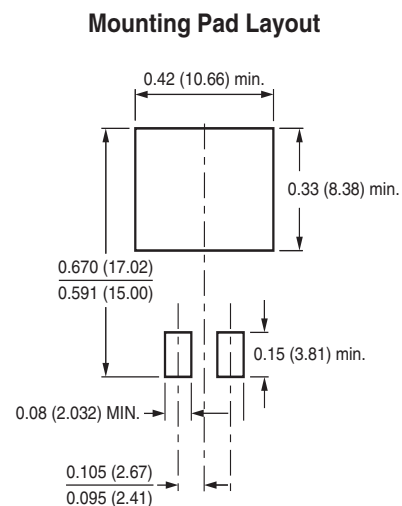
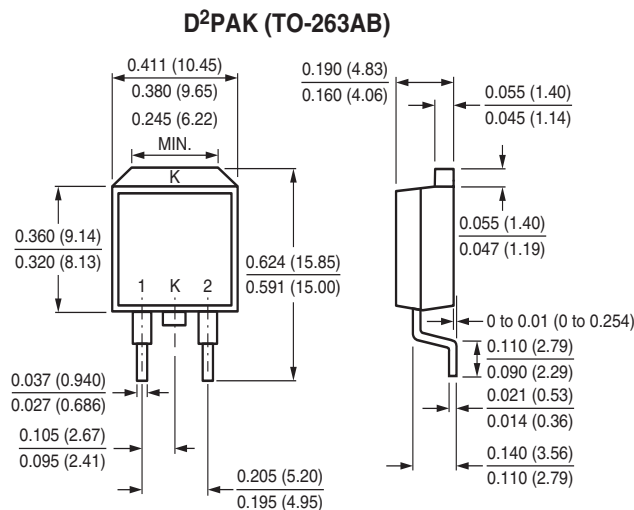


Fig. 6 - Typical Transient Thermal Impedance Per Diode

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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