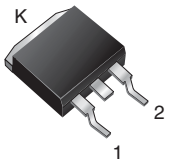
# Dual Low-Voltage Trench MOS Barrier Schottky Rectifier

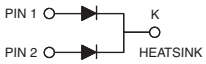
Ultra Low $V_F$ = 0.28 V at $I_F$ = 5.0 A

**TMBS®**

**D²PAK (TO-263AB)**




**VBT4045C**




## DESIGN SUPPORT TOOLS

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3D Models Available

| PRIMARY CHARACTERISTICS | |
|---|---|
| $I_{F(AV)}$ | 2 x 20 A |
| $V_{RRM}$ | 45 V |
| $I_{FSM}$ | 240 A |
| $V_F$ at $I_F$ = 20 A | 0.41 V |
| $T_J$ max. | 150 °C |
| Package | D²PAK (TO-263AB) |
| Circuit configuration | 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
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb e3 RoHS COMPLIANT

## TYPICAL APPLICATIONS

For use in high frequency DC/DC converters, switching power supplies, freewheeling diodes, OR-ing diode, and reverse battery protection.

## 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

**MAXIMUM RATINGS** ($T_A$ = 25 °C unless otherwise noted)

| PARAMETER | | SYMBOL | VBT4045C | UNIT |
|---|---|---|---|---|
| Maximum repetitive peak reverse voltage | | $V_{RRM}$ | 45 | V |
| Maximum average forward rectified current (fig. 1) | per device | $I_{F(AV)}$ | 40 | A |
| | per diode | | 20 | |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | | $I_{FSM}$ | 240 | A |
| Operating junction and storage temperature range | | $T_J$, $T_{STG}$ | -40 to +150 | °C |

| **ELECTRICAL CHARACTERISTICS** ($T_A$ = 25 °C unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITIONS** | | **SYMBOL** | **TYP.** | **MAX.** | **UNIT** |
| Instantaneous forward voltage per diode | $I_F$ = 5 A | $T_A$ = 25 °C | $V_F$ (1) | 0.41 | - | V |
| | $I_F$ = 10 A | | | 0.44 | - | |
| | $I_F$ = 20 A | | | 0.50 | 0.58 | |
| | $I_F$ = 5 A | $T_A$ = 125 °C | | 0.28 | - | |
| | $I_F$ = 10 A | | | 0.33 | - | |
| | $I_F$ = 20 A | | | 0.41 | 0.50 | |
| Reverse current per diode | $V_R$ = 45 V | $T_A$ = 25 °C | $I_R$ (2) | - | 3000 | µA |
| | | $T_A$ = 125 °C | | 18 | 50 | mA |

**Notes**

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

(2) Pulse test: Pulse width ≤ 40 ms

| **THERMAL CHARACTERISTICS** ($T_A$ = 25 °C unless otherwise noted) | | | | |
|---|---|---|---|---|
| **PARAMETER** | | **SYMBOL** | **VBT4045C** | **UNIT** |
| Typical thermal resistance | per diode | $R_{\theta JC}$ | 1.5 | °C/W |
| | per device | | 0.8 | |

| **ORDERING INFORMATION** (Example) | | | | | |
|---|---|---|---|---|---|
| **PACKAGE** | **PREFERRED P/N** | **UNIT WEIGHT (g)** | **PACKAGE CODE** | **BASE QUANTITY** | **DELIVERY MODE** |
| TO-263AB | VBT4045C-E3/4W | 1.38 | 4W | 50/tube | Tube |
| TO-263AB | VBT4045C-E3/8W | 1.38 | 8W | 800/reel | Tape and reel |

## RATINGS AND CHARACTERISTICS CURVES ($T_A$ = 25 °C unless otherwise noted)

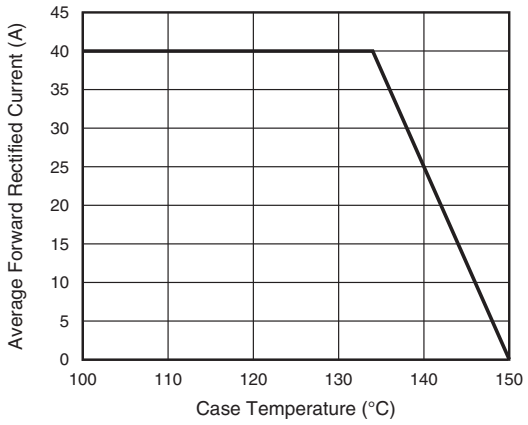



Fig. 1 - Maximum Forward Current Derating Curve

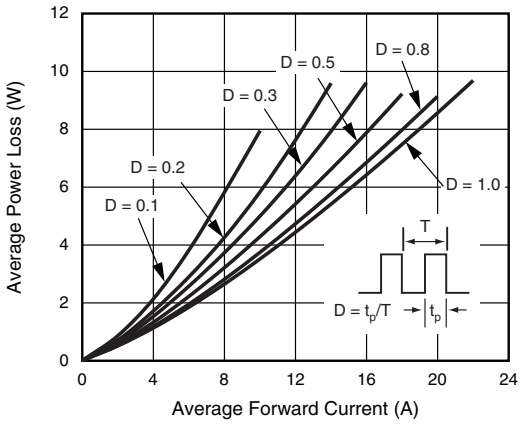



Fig. 2 - Forward Power Loss Characteristics Per Diode

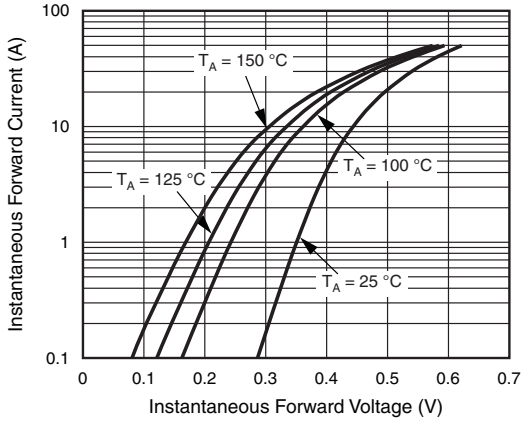



Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

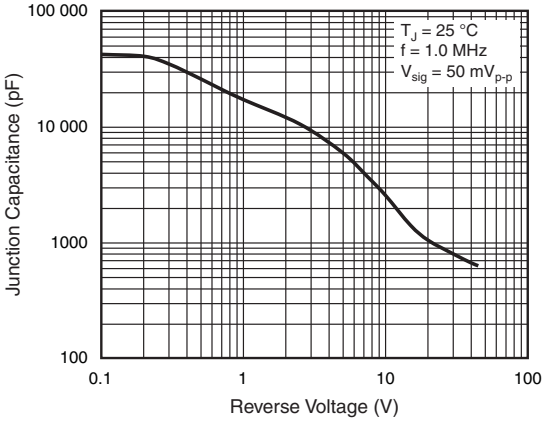



Fig. 5 - Typical Junction Capacitance Per Diode

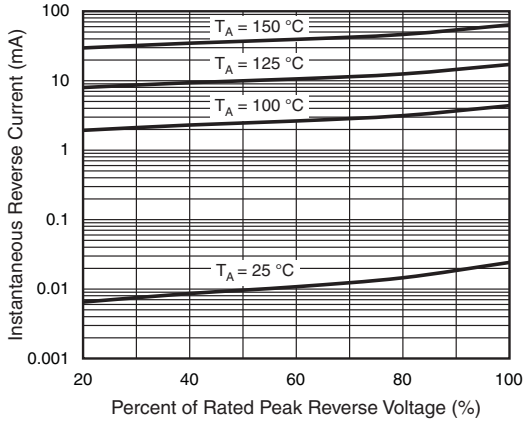



Fig. 4 - Typical Reverse Characteristics Per Diode

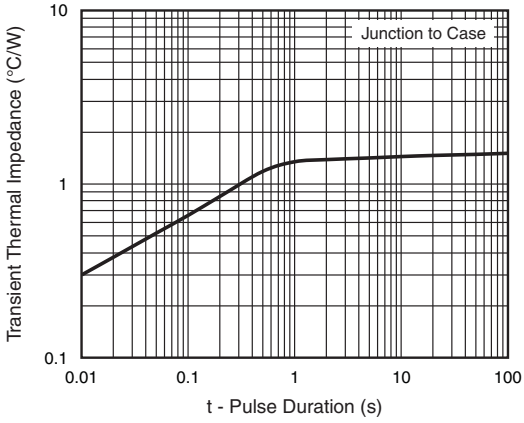
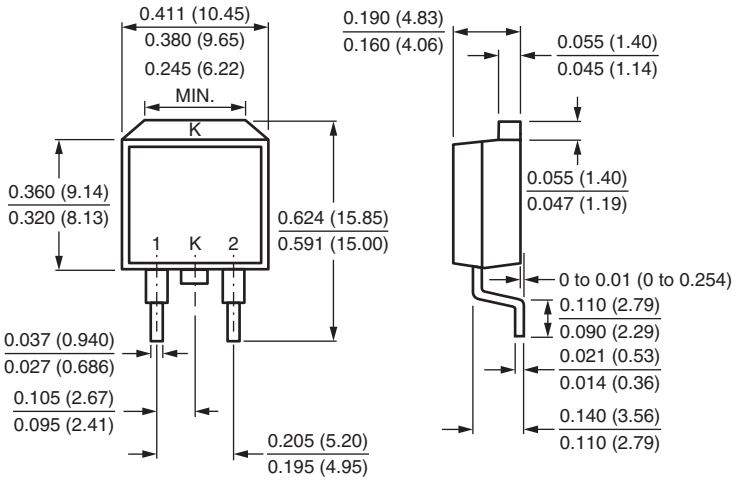


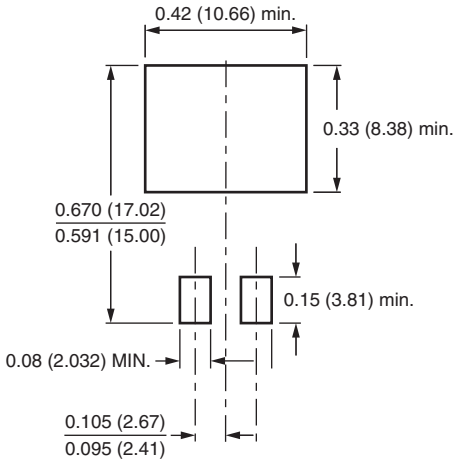

Fig. 6 - Typical Transient Thermal Impedance Per Diode

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

### D²PAK (TO-263AB)




### Mounting Pad Layout



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