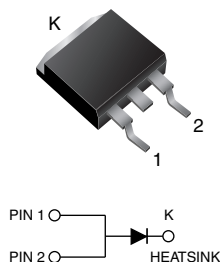


TMBS® (Trench MOS Barrier Schottky) Rectifier for PV Solar Cell Bypass Protection

Ultra Low $V_F = 0.33\text{ V}$ at $I_F = 5\text{ A}$

D²PAK (TO-263AB)



DESIGN SUPPORT TOOLS AVAILABLE



| PRIMARY CHARACTERISTICS | |
|---------------------------------|-------------------------------|
| $I_{F(DC)}$ | 20 A |
| V_{RRM} | 45 V |
| I_{FSM} | 160 A |
| V_F at $I_F = 20\text{ A}$ | 0.51 V |
| T_{OP} max. (AC mode) | 150 °C |
| T_J max. (DC forward current) | 200 °C |
| Package | D ² PAK (TO-263AB) |
| Circuit configuration | Single |

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



RoHS
COMPLIANT
HALOGEN
FREE

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-M3 - halogen-free, RoHS-compliant, and commercial grade

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

M3 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 T2045BP | UNIT |
| Maximum repetitive peak reverse voltage | V_{RRM} | 45 | V |
| Maximum DC forward bypassing current (fig. 1) | $I_{F(DC)}^{(1)}$ | 20 | A |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | I_{FSM} | 160 | A |
| Operating junction temperature range (AC mode) | T_{OP} | -40 to +150 | °C |
| Junction temperature in DC forward current without reverse bias, $t \leq 1\text{ h}$ | $T_J^{(2)}$ | ≤ 200 | °C |

Notes

(1) With heatsink

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

| ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted) | | | | | | |
|--|-----------------------|-------------------------|-------------------------------|------|------|------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Instantaneous forward voltage | I _F = 5 A | T _A = 25 °C | V _F ⁽¹⁾ | 0.44 | - | V |
| | I _F = 10 A | | | 0.49 | - | |
| | I _F = 20 A | | | 0.57 | 0.66 | |
| | I _F = 5 A | T _A = 125 °C | | 0.33 | - | |
| | I _F = 10 A | | | 0.41 | - | |
| | I _F = 20 A | | | 0.51 | 0.63 | |
| Reverse current | V _R = 45 V | T _A = 25 °C | I _R ⁽²⁾ | - | 2000 | μA |
| | | T _A = 125 °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 | VB T2045BP | UNIT |
| Typical thermal resistance | $R_{\theta\text{JC}}$ | 1.5 | $^{\circ}\text{C/W}$ |

| ORDERING INFORMATION (Example) | | | | | |
|---------------------------------------|------------------|-----------------|--------------|---------------|---------------|
| PACKAGE | PREFERRED P/N | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| D ² PAK (TO-263AB) | VB T2045BP-M3/4W | 1.37 | 4W | 50/tube | Tube |
| D ² PAK (TO-263AB) | VB T2045BP-M3/8W | 1.37 | 8W | 800/reel | Tape and reel |

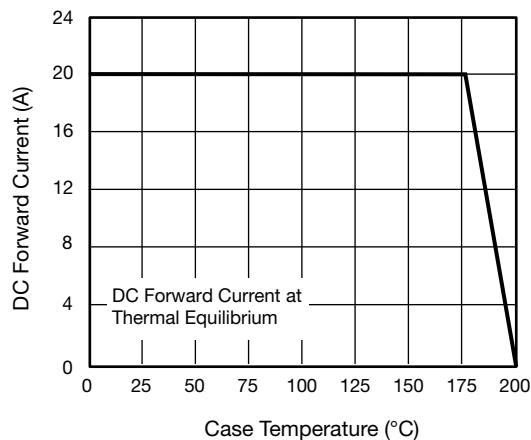
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

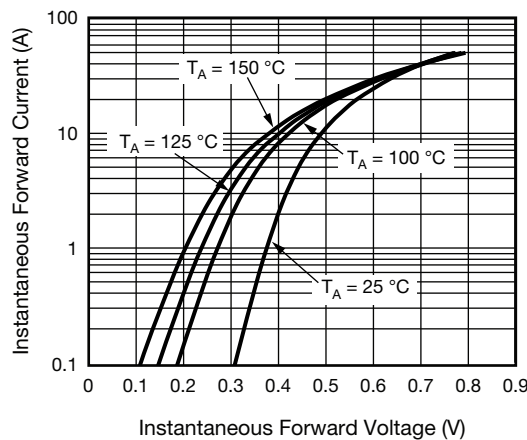


Fig. 2 - Typical Instantaneous Forward Characteristics

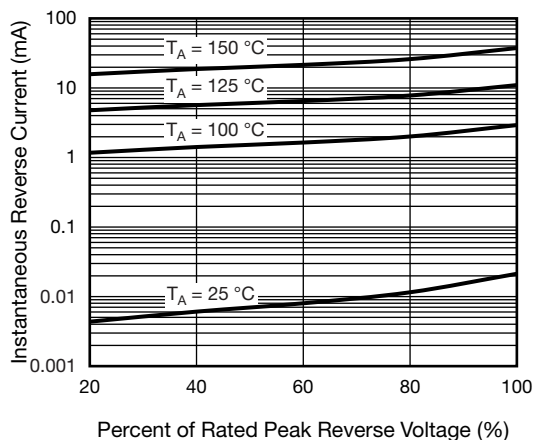


Fig. 3 - Typical Reverse Characteristics

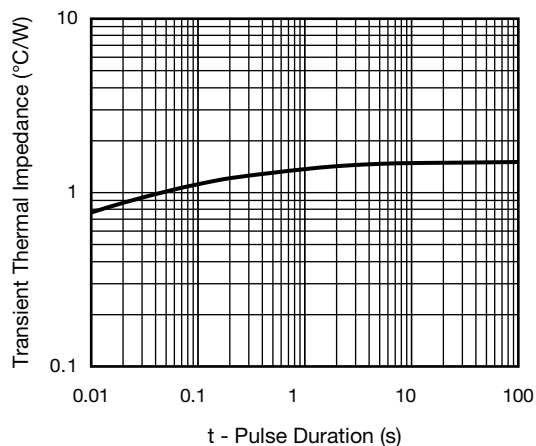


Fig. 5 - Typical Transient Thermal Impedance

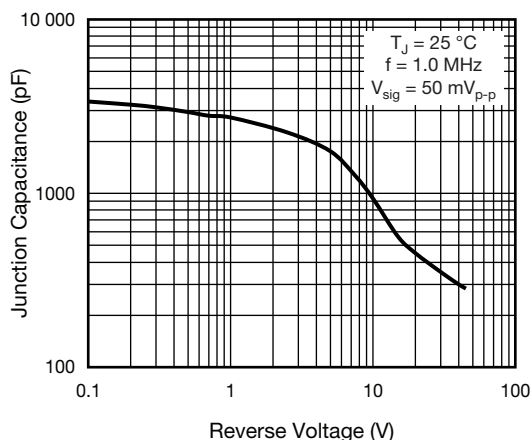
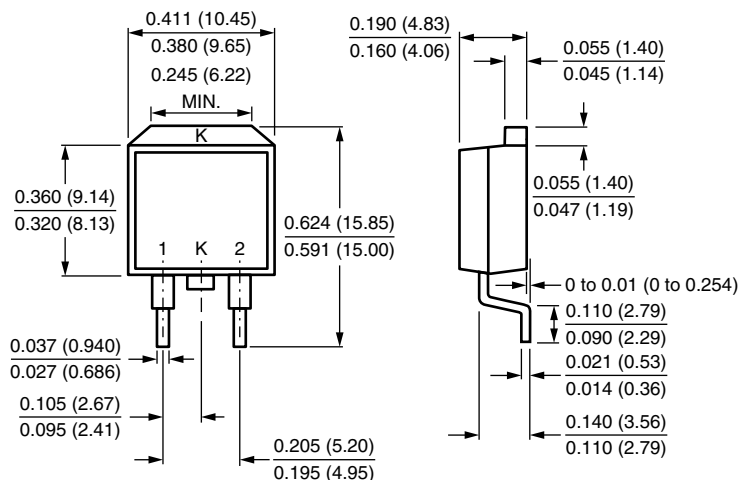


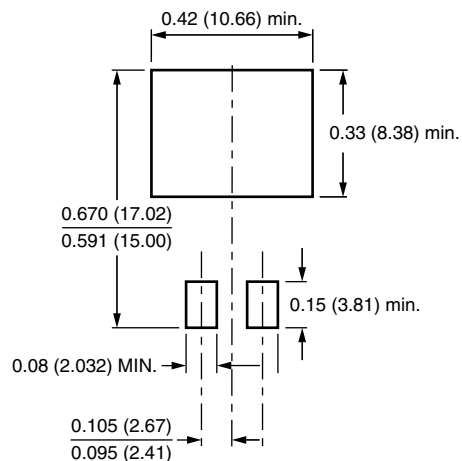
Fig. 4 - Typical Junction Capacitance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

D²PAK (TO-263AB)



Mounting Pad Layout





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