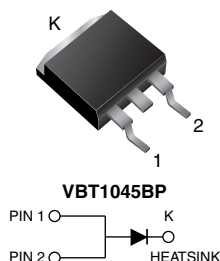


# **TMBS® (Trench MOS Barrier Schottky) Rectifier for PV Solar Cell Bypass Protection**

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

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



## **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](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.

## **LINKS TO ADDITIONAL RESOURCES**



3D Models

## **PRIMARY CHARACTERISTICS**

$I_{F(DC)}$	10 A
$V_{RRM}$	45 V
$I_{FSM}$	100 A
$V_F$ at $I_F = 10\text{ A}$	0.52 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 configuration	Single

## **MECHANICAL DATA**

**Case:** D<sup>2</sup>PAK (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	VBT1045BP	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	45	V
Maximum DC forward bypassing current (fig. 1)	$I_{F(DC)}^{(1)}$	10	A
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	100	A
Operating junction temperature range (AC mode)	$T_{OP}$	-40 to +150	°C
Junction temperature in DC forward current without reverse bias, $t \leq 1\text{ h}$	$T_J^{(2)}$	$\leq 200$	°C

## **Notes**

(1) With heatsink

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

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

PARAMETER	TEST CONDITIONS	SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	$I_F = 5\text{ A}$	$T_A = 25\text{ }^{\circ}\text{C}$	0.50	-	V
	$I_F = 10\text{ A}$		0.57	0.68	
	$I_F = 5\text{ A}$	$T_A = 125\text{ }^{\circ}\text{C}$	0.41	-	
	$I_F = 10\text{ A}$		0.52	0.64	
Reverse current	$V_R = 45\text{ V}$	$T_A = 25\text{ }^{\circ}\text{C}$	-	500	$\mu\text{A}$
		$T_A = 125\text{ }^{\circ}\text{C}$	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	VBT1045BP	UNIT
Typical thermal resistance	$R_{\theta JC}$	3.0	$^{\circ}\text{C/W}$

**ORDERING INFORMATION** (Example)

PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
D <sup>2</sup> PAK (TO-263AB)	VBT1045BP-M3/4W	1.37	4W	50/tube	Tube
D <sup>2</sup> PAK (TO-263AB)	VBT1045BP-M3/8W	1.37	8W	800/reel	Tape and reel

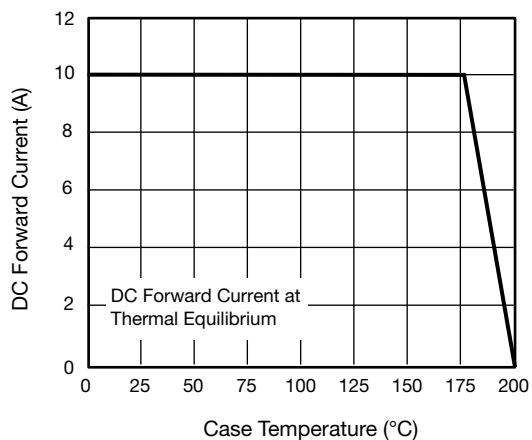
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

Fig. 1 - Maximum Forward Current Derating Curve

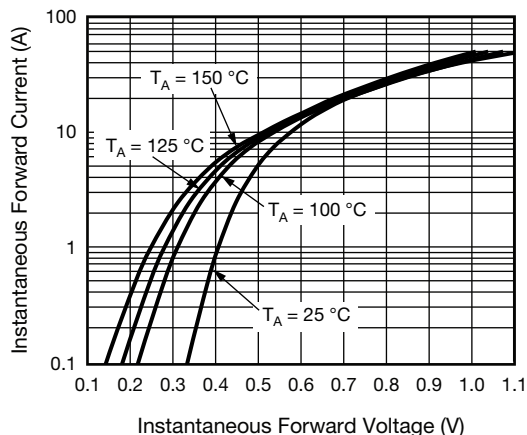


Fig. 2 - Typical Instantaneous Forward Characteristics

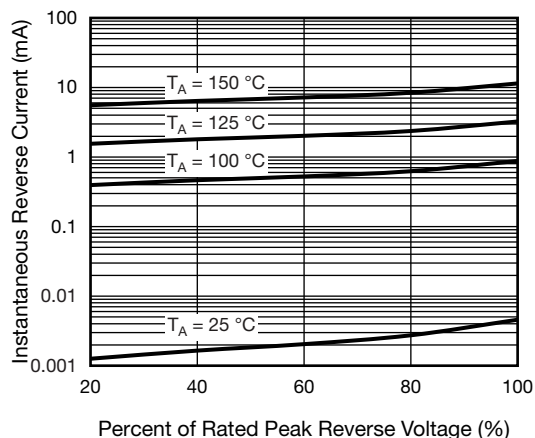


Fig. 3 - Typical Reverse Characteristics

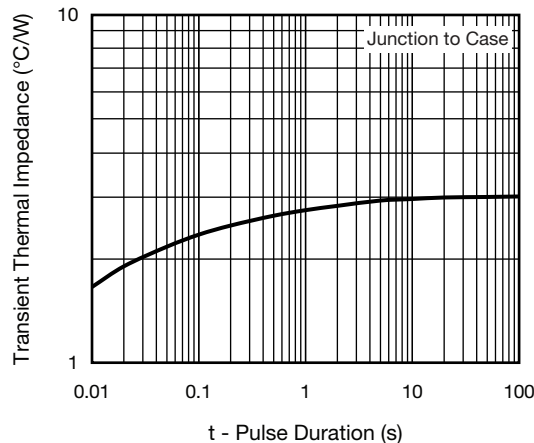


Fig. 5 - Typical Transient Thermal Impedance

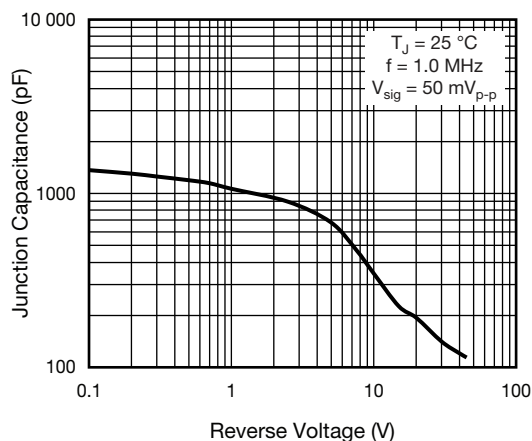
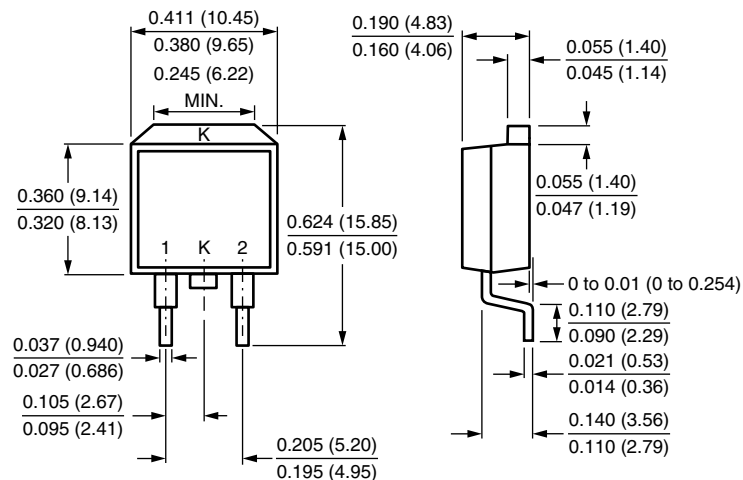


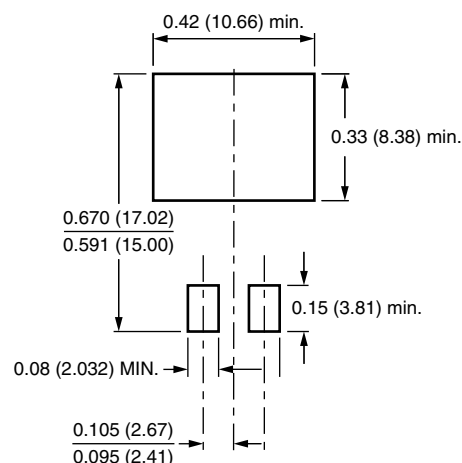
Fig. 4 - Typical Junction Capacitance

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

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



### Mounting Pad Layout





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