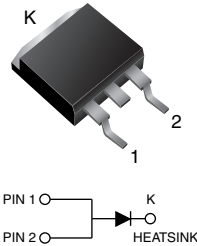


TMBS[®] (Trench MOS Barrier Schottky) Rectifier for PV Solar Cell Bypass Protection

 Ultra Low $V_F = 0.28\text{ V}$ at $I_F = 5\text{ A}$
D²PAK (TO-263AB)

RoHS
COMPLIANT

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

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

$I_{F(AV)}$	40 A
V_{RRM}	45 V
I_{FSM}	240 A
V_F at $I_F = 40\text{ A}$	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

MECHANICAL DATA
Case: D²PAK (TO-263AB)

 Molding compound meets UL 94 V-0 flammability rating
Base P/N-E3 - RoHS-compliant and 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	VBT4045BP	UNIT
Maximum repetitive peak reverse voltage	V_{RRM}	45	V
Maximum DC forward bypassing current (fig. 1)	$I_{F(DC)}^{(1)}$	40	A
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	I_{FSM}	240	A
Operating junction temperature range (AC mode)	T_{OP}	-40 to +150	°C
Junction temperature in DC forward current without reverse bias, $t \leq 1\text{ h}$	$T_J^{(1)}$	≤ 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	$I_F = 5\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	0.41	-	V
	$I_F = 20\text{ A}$			0.50	-	
	$I_F = 40\text{ A}$			0.57	0.67	
	$I_F = 5\text{ A}$	$T_A = 125\text{ }^\circ\text{C}$		0.28	-	
	$I_F = 20\text{ A}$			0.41	-	
	$I_F = 40\text{ A}$			0.51	0.63	
Reverse current	$V_R = 45\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	-	3000	μA
		$T_A = 125\text{ }^\circ\text{C}$		29	85	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	VBT4045BP	UNIT
Typical thermal resistance	$R_{\theta\text{JC}}$	0.8	$^\circ\text{C/W}$

ORDERING INFORMATION (Example)					
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
D ² PAK (TO-263AB)	VBT4045BP-E3/4W	1.37	4W	50/tube	Tube
D ² PAK (TO-263AB)	VBT4045BP-E3/8W	1.37	8W	800/reel	Tape and reel



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

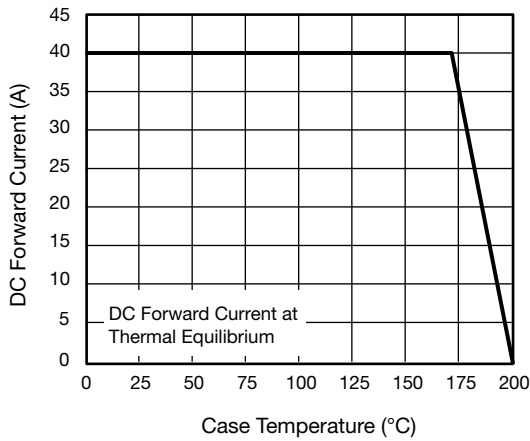


Fig. 1 - Forward Current Derating Curve

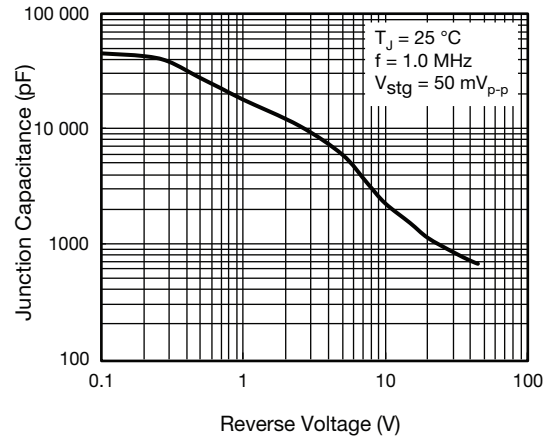


Fig. 4 - Typical Junction Capacitance

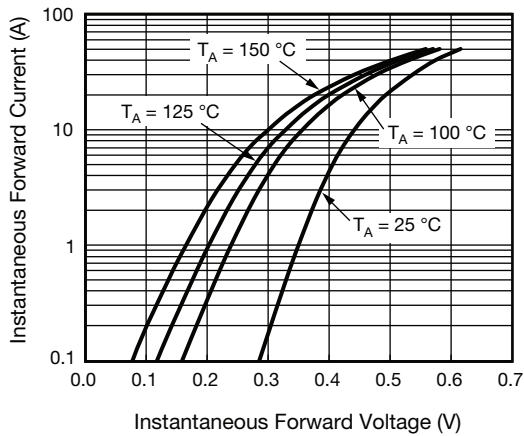


Fig. 2 - Typical Instantaneous Forward Characteristics

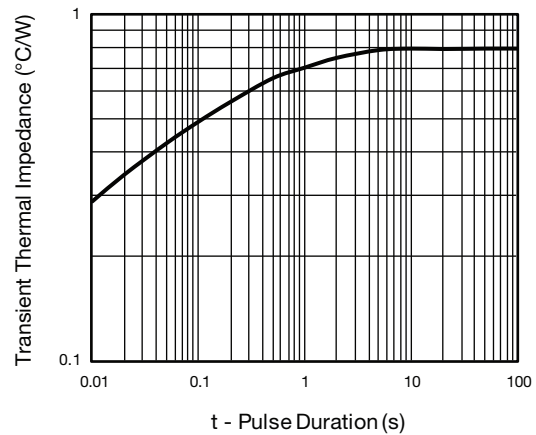


Fig. 5 - Typical Transient Thermal Impedance

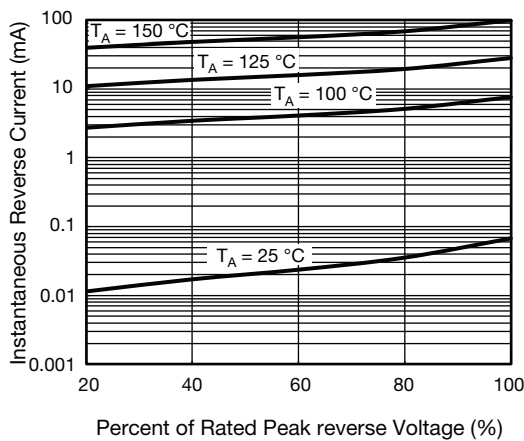
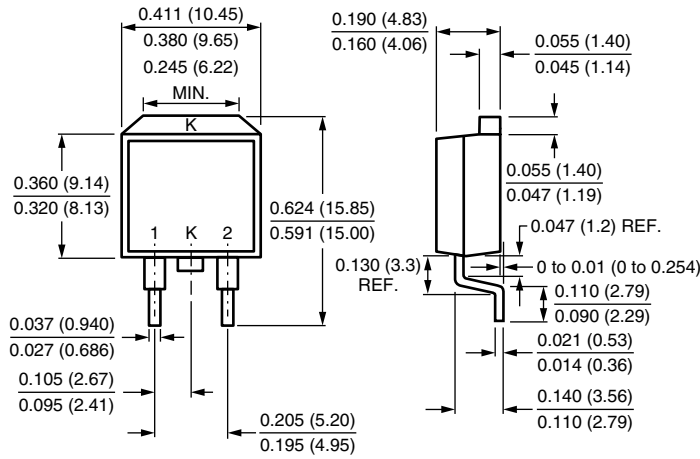


Fig. 3 - Typical Reverse Characteristics

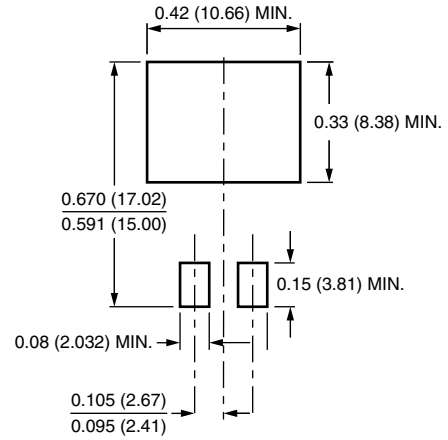


PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

D²PAK (TO-263AB)



Mounting Pad Layout





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