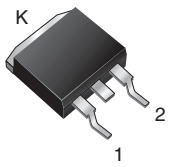
Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

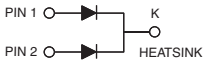
Ultra Low V_F = 0.34 V at I_F = 2.5 A

TMBS®

TO-263AB



VBT1045CBP



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

TYPICAL APPLICATIONS

For use in solar cell junction box as a bypass diode for protection, using DC forward current without reverse bias.

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2 x 5.0 A
V_{RRM}	45 V
I_{FSM}	100 A
V_F at I_F = 5.0 A	0.41 V
T_{OP} max. (AC mode)	150 °C
T_J max. (DC forward current)	200 °C
Package	TO-263AB
Diode variations	Common cathode

MECHANICAL DATA

Case: 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	VBT1045CBP	UNIT
Maximum repetitive peak reverse voltage		V_{RRM}	45	V
Maximum average forward rectified current (fig. 1)	per device	$I_{F(AV)}$ (1)	10	A
	per diode		5	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode		I_{FSM}	100	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 ≤ 1 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 per diode	I_F = 2.5 A	T_A = 25 °C	V_F (1)	0.44	-	V
	I_F = 5.0 A			0.49	0.58	
	I_F = 2.5 A	T_A = 125 °C		0.34	-	
	I_F = 5.0 A			0.41	0.50	
Reverse current per diode	V_R = 45 V	T_A = 25 °C	I_R (2)	-	500	µA
		T_A = 125 °C		5	15	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**	**VBT1045CBP**	**UNIT**
Typical thermal resistance	per diode	$R_{\theta JC}$	3.5	°C/W
	per device		2.5	

ORDERING INFORMATION (Example)					
PACKAGE	**PREFERRED P/N**	**UNIT WEIGHT (g)**	**PACKAGE CODE**	**BASE QUANTITY**	**DELIVERY MODE**
TO-263AB	VBT1045CBP-E3/4W	1.38	4W	50/tube	Tube
TO-263AB	VBT1045CBP-E3/8W	1.38	8W	800/reel	Tape and reel

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

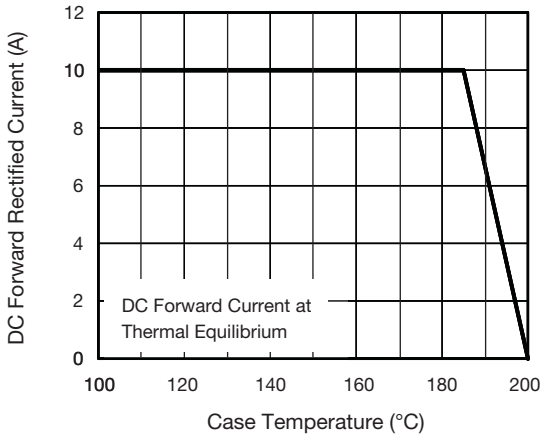


Fig. 1 - Maximum Forward Current Derating Curve

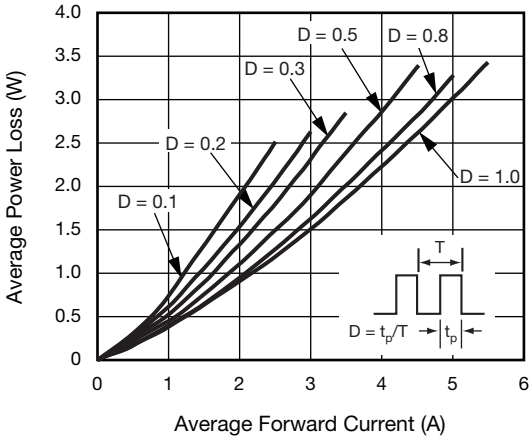


Fig. 2 - Forward Power Loss Characteristics Per Diode

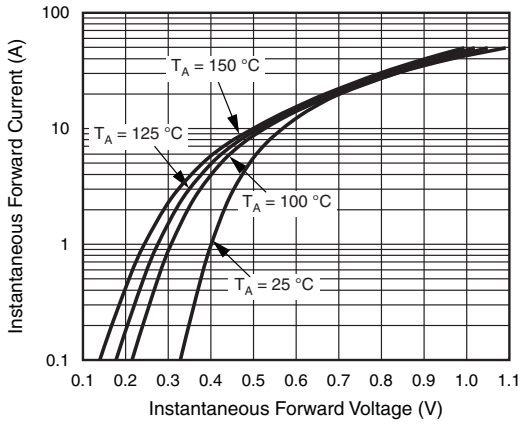


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

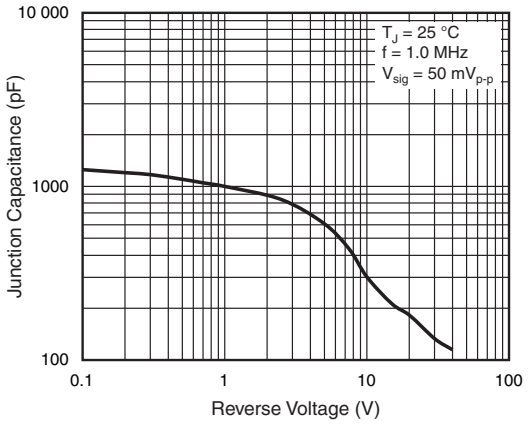


Fig. 5 - Typical Junction Capacitance Per Diode

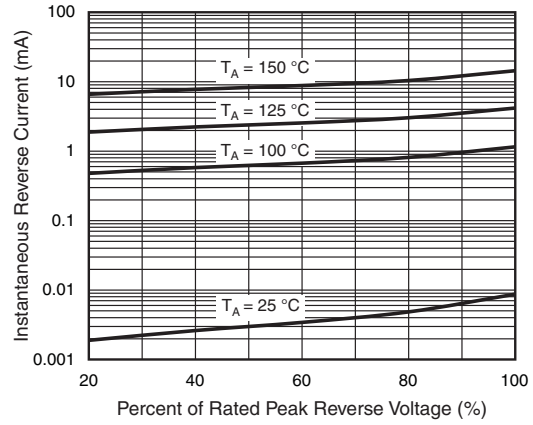


Fig. 4 - Typical Reverse Characteristics Per Diode

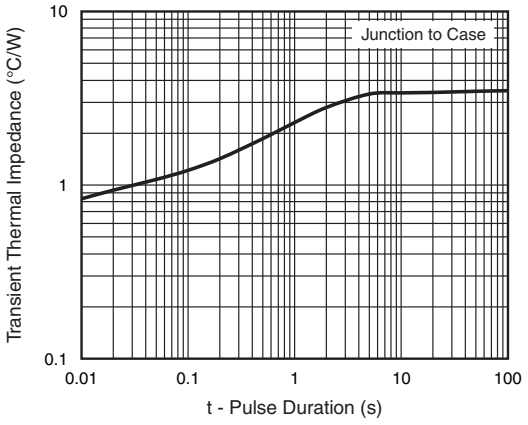
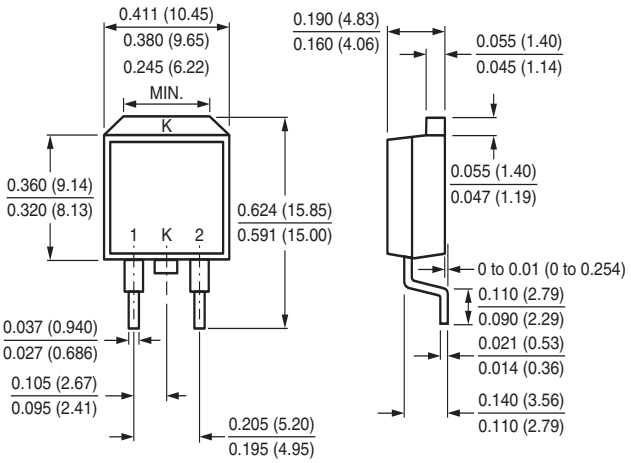


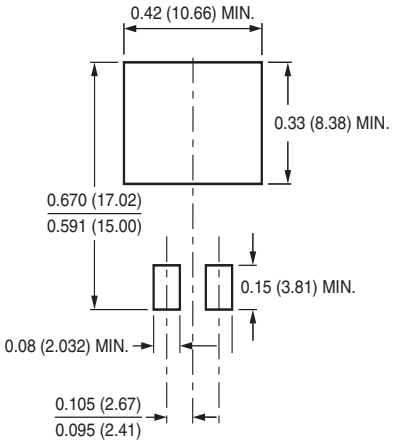
Fig. 6 - Typical Transient Thermal Impedance Per Diode

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

TO-263AB



Mounting Pad Layout



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