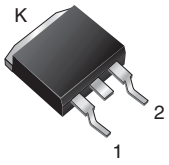
Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

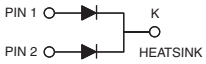
Ultra Low V_F = 0.33 V at I_F = 10 A

TMBS®

TO-263AB



VBT6045CBP



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 HALOGEN FREE

TYPICAL APPLICATIONS

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

PRIMARY CHARACTERISTICS	
Package	TO-263AB
$I_{F(AV)}$	2 x 30 A
V_{RRM}	45 V
I_{FSM}	320 A
V_F at I_F = 30 A	0.47 V
T_{OP} max. (AC mode)	150 °C
T_J max. (DC forward current)	200 °C
Diode variation	Common cathode

MECHANICAL DATA

Case: 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 °C unless otherwise noted)

PARAMETER		SYMBOL	VBT6045CBP	UNIT
Maximum repetitive peak reverse voltage		V_{RRM}	45	V
Maximum average forward rectified current (fig. 1)	per device	$I_{F(AV)}$ (1)	60	A
	per diode		30	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode		I_{FSM}	320	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

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ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage per diode	I_F = 10 A	T_A = 25 °C	V_F (1)	0.44	-	V
	I_F = 15 A			0.47	-	
	I_F = 30 A			0.54	0.64	
	I_F = 10 A	T_A = 125 °C		0.33	-	
	I_F = 15 A			0.37	-	
	I_F = 30 A			0.47	0.56	
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	VBT6045CBP	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	VBT6045CBP-M3/4W	1.38	4W	50/tube	Tube
TO-263AB	VBT6045CBP-M3/8W	1.38	8W	800/reel	Tape and reel

RATINGS AND CHARACTERISTICS CURVES

(T_A = 25 °C unless otherwise noted)

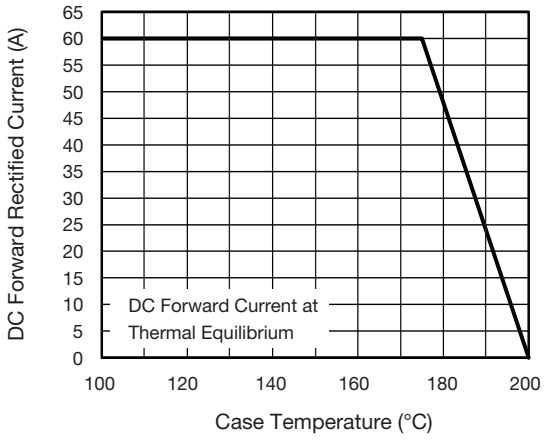

Fig. 1 - Maximum Forward Current Derating Curve

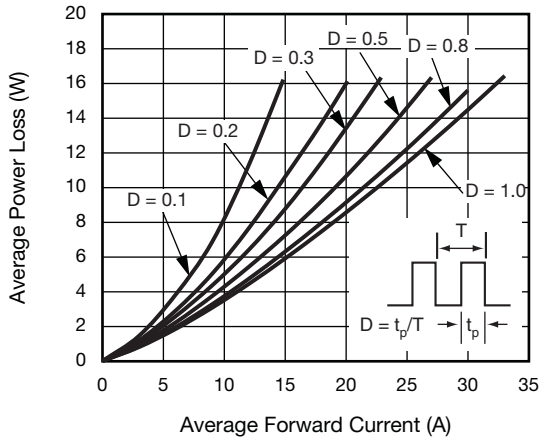

Fig. 2 - Forward Power Loss Characteristics Per Diode

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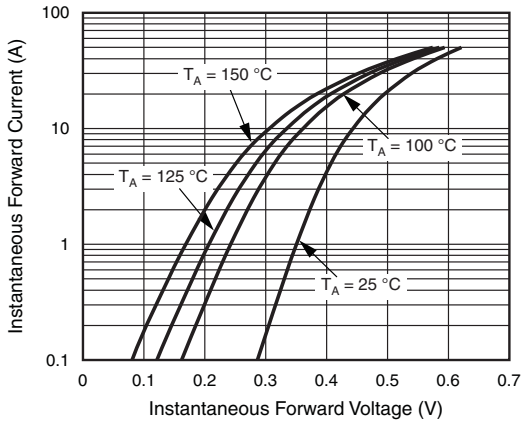


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

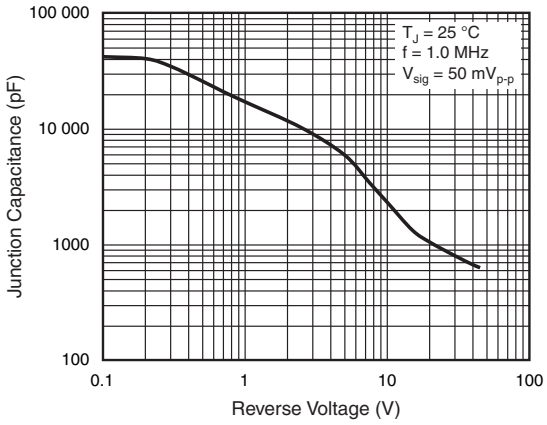


Fig. 5 - Typical Junction Capacitance Per Diode

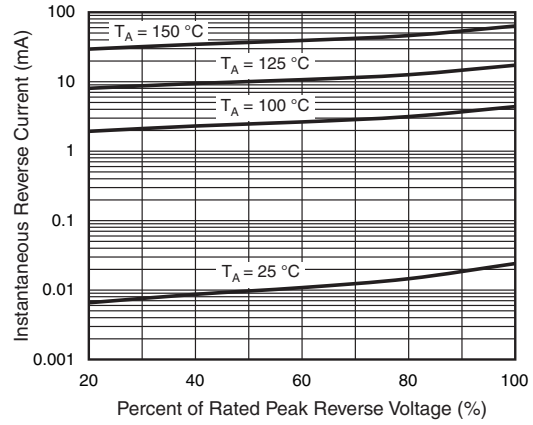


Fig. 4 - Typical Reverse Characteristics Per Diode

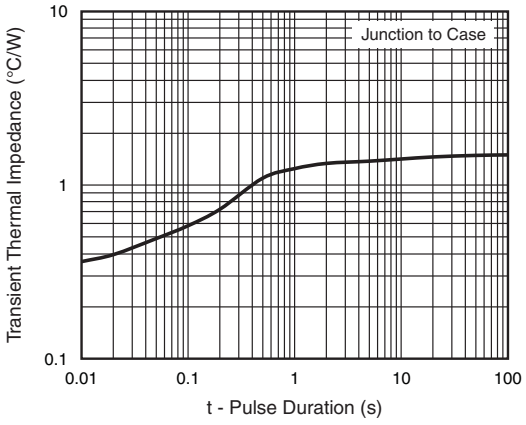
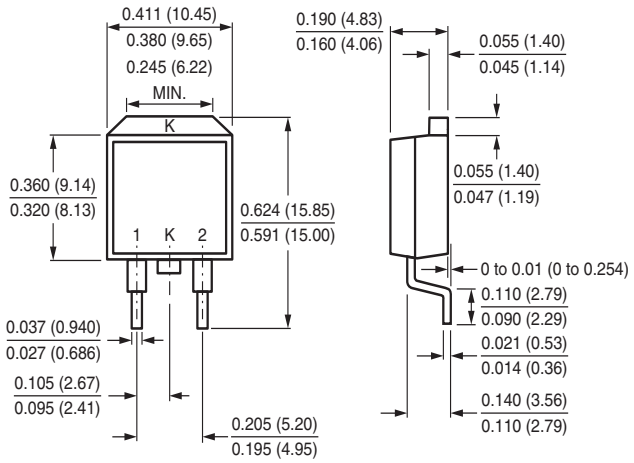


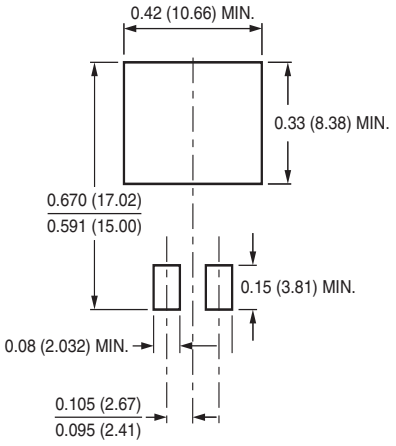
Fig. 6 - Typical Transient Thermal Impedance Per Diode

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

TO-263AB



Mounting Pad Layout



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