

Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

Ultra Low V_F = 0.34 V at I_F = 2.5 A



DESIGN SUPPORT TOOLS



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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



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

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	D²PAK (TO-263AB)
Circuit configurations	Common cathode

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	10	A
		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, $t \leq 1$ 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 ($T_A = 25^\circ\text{C}$ unless otherwise noted)

PARAMETER	SYMBOL	VBT1045CBP	UNIT
Typical thermal resistance	per diode	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-M3/4W	1.38	4W	50/tube	Tube
TO-263AB	VBT1045CBP-M3/8W	1.38	8W	800/reel	Tape and reel

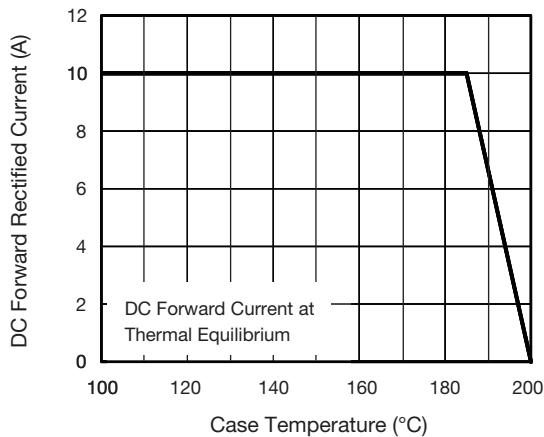
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25^\circ\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

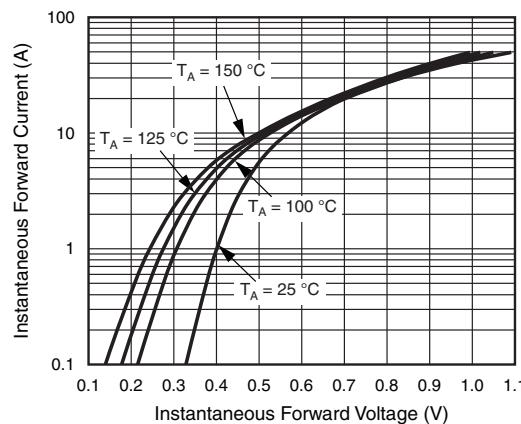


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

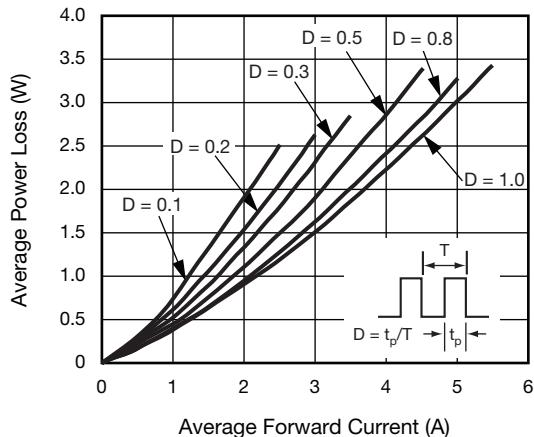


Fig. 2 - Forward Power Loss Characteristics Per Diode

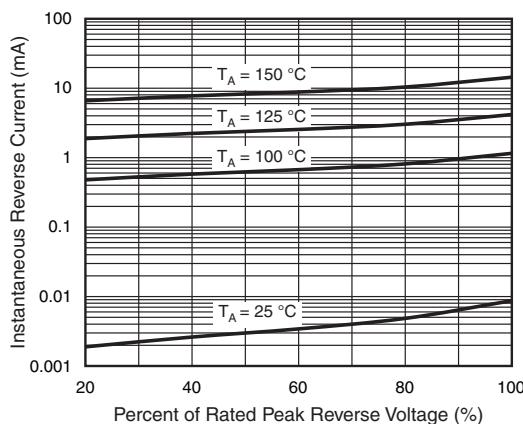


Fig. 4 - Typical Reverse Characteristics Per Diode

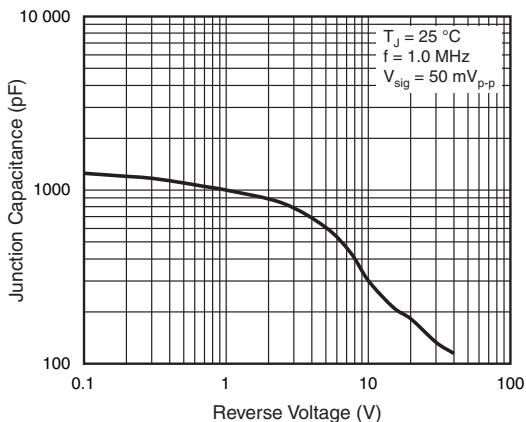


Fig. 5 - Typical Junction Capacitance Per Diode

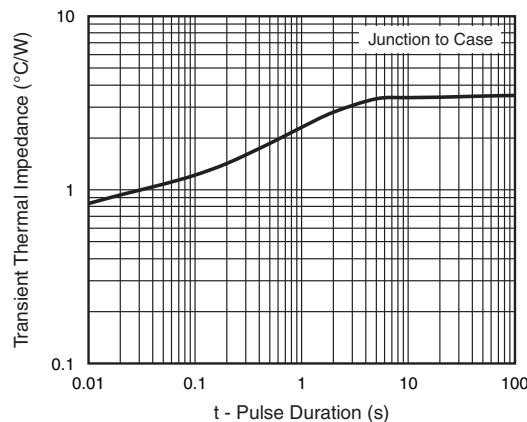
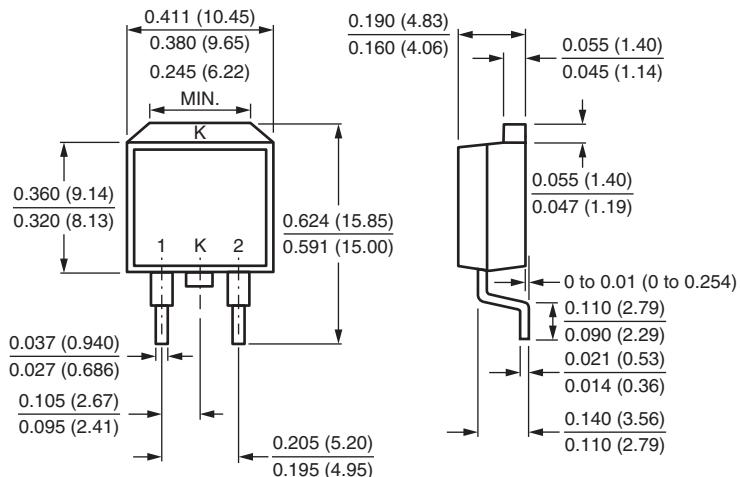


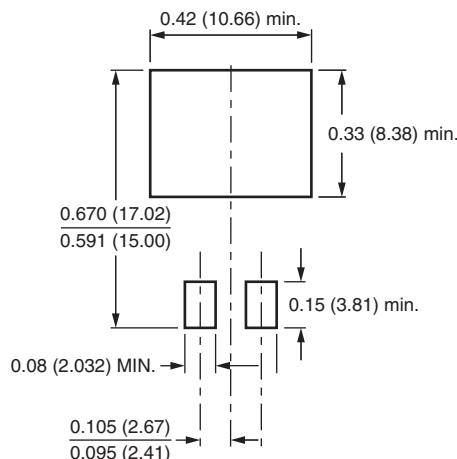
Fig. 6 - Typical Transient Thermal Impedance Per Diode

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

D²PAK (TO-263AB)



Mounting Pad Layout



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