Vishay General Semiconductor

Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

Ultra Low $V_F = 0.34$ V at $I_F = 2.5$ A



Models

Available

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	D ² PAK (TO-263AB)			
Circuit configurations	Common cathode			

FEATURES

- Trench MOS Schottky technology
- · Low forward voltage drop, low power losses
- · High efficiency operation



HALOGEN

FREE

- 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

MAXIMUM RATINGS ($T_A = 25 \text{ °C}$ unless otherwise noted)							
PARAMETER			VBT1045CBP	UNIT			
Maximum repetitive peak reverse voltage		V _{RRM}	45	V			
Maximum average forward rectified current (fig. 1)	per device	I	10	А			
Maximum average forward rectilied current (lig. 1)	per diode	I _{F(AV)} ⁽¹⁾	5				
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode			100	А			
Operating junction and storage temperature range (AC mode)			-40 to +150	°C			
Junction temperature in DC forward current without reverse bias, $t \leq 1 \ h$			≤ 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 CO	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 _B = 45 V	T _A = 25 °C T _A = 125 °C	I _R ⁽²⁾	-	500	μA		
	v _R = 43 v			5	15	mA		

Notes

 $^{(1)}\,$ Pulse test: 300 μs pulse width, 1 % duty cycle

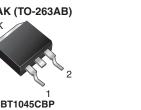
⁽²⁾ Pulse test: Pulse width \leq 40 ms

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THERMAL CHARACTERISTICS ($T_A = 25 \text{ °C}$ unless otherwise noted)						
PARAMETER		SYMBOL	SYMBOL VBT1045CBP			
Turning thermal registering	per diode	Р	3.5	°C/W		
Typical thermal resistance	per device	$R_{ extsf{ heta}JC}$	2.5	0/10		

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 °C unless otherwise noted)

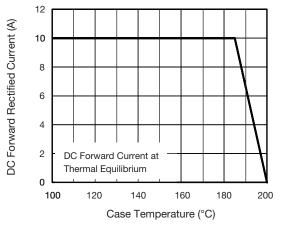


Fig. 1 - Maximum Forward Current Derating Curve

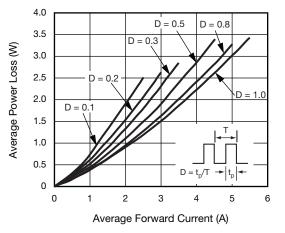
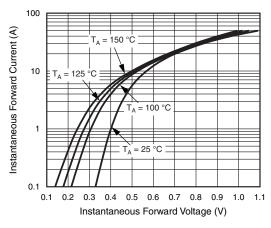


Fig. 2 - Forward Power Loss Characteristics Per Diode





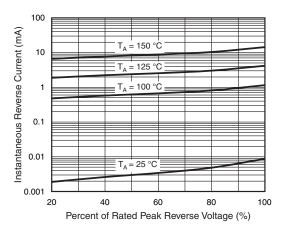
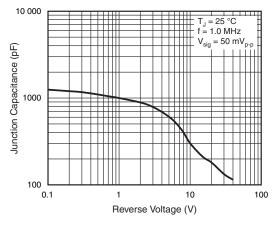


Fig. 4 - Typical Reverse Characteristics Per Diode

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Fig. 5 - Typical Junction Capacitance Per Diode

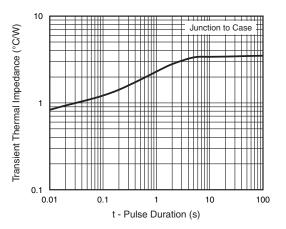
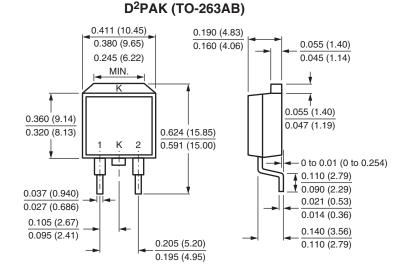
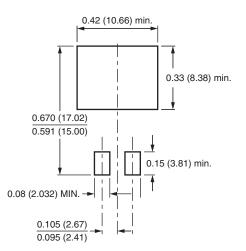


Fig. 6 - Typical Transient Thermal Impedance Per Diode

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Mounting Pad Layout





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