

Vishay General Semiconductor

Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

Ultra Low $V_F = 0.33 \text{ V}$ at $I_F = 5 \text{ A}$



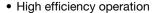
LINKS TO ADDITIONAL RESOURCES

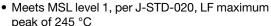


PRIMARY CHARACTERISTICS				
I _{F(AV)}	20 A			
V_{RRM}	45 V			
I _{FSM}	160 A			
V_F at $I_F = 20$ A	0.51 V			
T _{OP} max. (AC mode)	150 °C			
T _J max. (DC forward current)	200 °C			
Package	D ² PAK (TO-263AB)			
Circuit configuration	Single			

FEATURES

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





RoHS COMPLIANT

 Material categorization: for definitions of compliance please see <u>www.vishav.com/doc?99912</u>

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-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	VBT2045BP	UNIT	
Maximum repetitive peak reverse voltage	V_{RRM}	45	V	
Maximum DC forward bypassing current (fig. 1)	I _{F(DC)} (1)	20	Α	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	I _{FSM}	160	Α	
Operating junction temperature range (AC mode)	T _{OP}	-40 to +150	°C	
Junction temperature in DC forward current without reverse bias, $t \le 1\ h$	T _J ⁽²⁾	≤ 200	°C	

Notes

⁽²⁾ Meets the requirements of IEC 61215 ed.2 bypass diode thermal test

ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)						
PARAMETER	TEST C	TEST CONDITIONS		TYP.	MAX.	UNIT
Instantaneous forward voltage	I _F = 5 A		- V _F ⁽¹⁾	0.44	-	- V
	I _F = 10 A	T _A = 25 °C		0.49	-	
	I _F = 20 A			0.57	0.66	
	I _F = 5 A			0.33	-	
	I _F = 10 A	T _A = 125 °C		0.41	-	
	I _F = 20 A			0.51	0.63	
Reverse current	V _B = 45 V	T _A = 25 °C	I _R ⁽²⁾	=	2000	μA
	v _R = 45 v	T _A = 125 °C		10	30	mA

Notes

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

 $^{(2)}$ Pulse test: Pulse width \leq 40 ms

⁽¹⁾ With heatsink



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THERMAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL VBT2045BP			
Typical thermal resistance	R _{θJC}	1.5	°C/W	

ORDERING INFORMATION (Example)					
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
D ² PAK (TO-263AB)	VBT2045BP-E3/4W	1.37	4W	50/tube	Tube
D ² PAK (TO-263AB)	VBT2045BP-E3/8W	1.37	8W	800/reel	Tape and reel

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

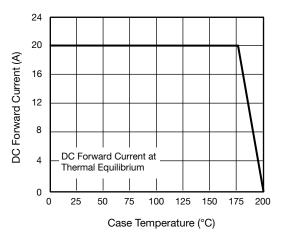


Fig. 1 - Maximum Forward Current Derating Curve

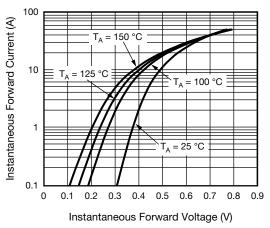
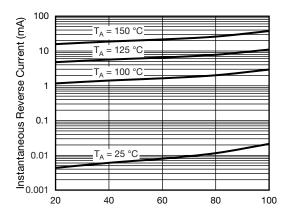


Fig. 2 - Typical Instantaneous Forward Characteristics



Percent of Rated Peak Reverse Voltage (%) Fig. 3 - Typical Reverse Characteristics

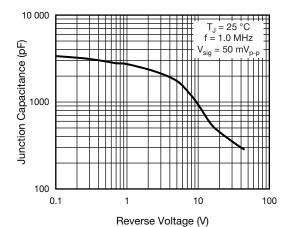


Fig. 4 - Typical Junction Capacitance



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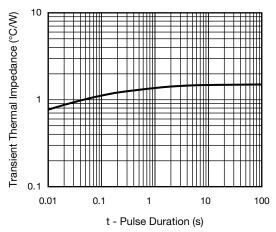
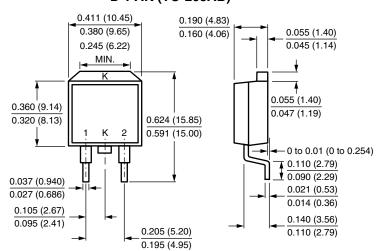


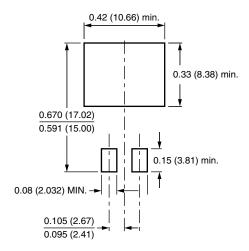
Fig. 5 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

D²PAK (TO-263AB)



Mounting Pad Layout





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