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Vishay General Semiconductor

Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

Ultra Low $V_F = 0.30 \text{ V}$ at $I_F = 5.0 \text{ A}$





DESIGN SUPPORT TOOLS

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PRIMARY CHARACTERISTICS				
I _{F(AV)}	2 x 15 A			
V _{RRM}	45 V			
I _{FSM}	200 A			
V _F at I _F = 15 A	0.39 V			
T _{OP} max. (AC mode)	150 °C			
T _J max. (DC forward current)	200 °C			
Package	D ² PAK (TO-263AB)			
Circuit configuration Common cathode				

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

MAXIMUM RATINGS (T _A = 25 °C unless otherwise noted)					
PARAMETER		SYMBOL	VBT3045CBP	UNIT	
Maximum repetitive peak reverse voltage		V_{RRM}	45	V	
Maximum average forward rectified current (fig. 1)	per device	I _{F(AV)} ⁽¹⁾	30	A	
	per diode		15		
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode		I _{FSM}	200	А	
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, $t \le 1\ h$		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 = 5 A	T _A = 25 °C	V _F ⁽¹⁾	0.42	-	V
	I _F = 7.5 A			0.44	-	
	I _F = 15 A			0.49	0.57	
	I _F = 5 A	T _A = 125 °C		0.30	-	
	I _F = 7.5 A			0.33	-	
	I _F = 15 A			0.39	0.48	
Reverse current per diode	V _R = 45 V	T _A = 25 °C	I _R ⁽²⁾	-	2000	μΑ
	$V_R = 45 V$ $T_A = 1$	T _A = 125 °C	IR (=)	17	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 VBT3045CBP		UNIT
Typical thermal resistance	per diode	$R_{ heta JC}$	1.6	°C/W
	per device		0.85	- C/VV

ORDERING INFORMATION (Example)						
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE	
TO-263AB	VBT3045CBP-M3/4W	1.38	4W	50/tube	Tube	
TO-263AB	VBT3045CBP-M3/8W	1.38	8W	800/reel	Tape and reel	

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

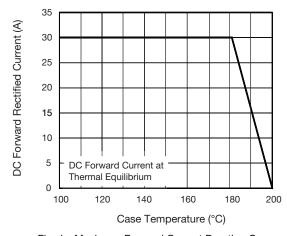


Fig. 1 - Maximum Forward Current Derating Curve

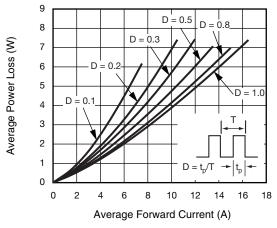


Fig. 2 - Forward Power Loss Characteristics Per Diode



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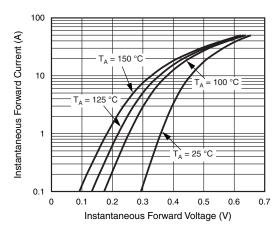


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

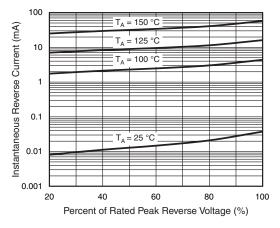


Fig. 4 - Typical Reverse Characteristics Per Diode

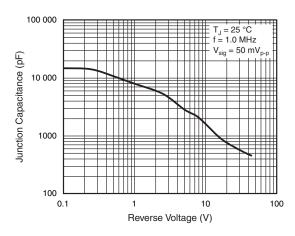


Fig. 5 - Typical Junction Capacitance Per Diode

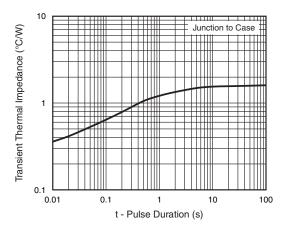
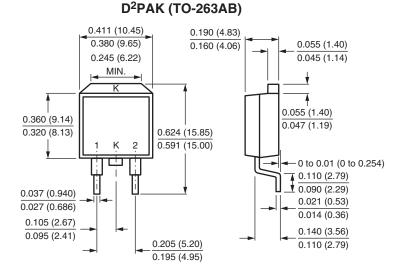
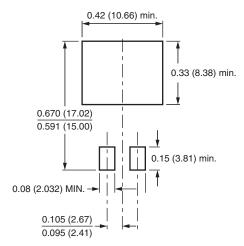


Fig. 6 - Typical Transient Thermal Impedance Per Diode

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Mounting Pad Layout





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