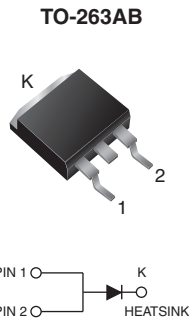


Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

 Ultra Low $V_F = 0.28\text{ V}$ at $I_F = 5\text{ A}$


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
- Compliant to RoHS Directive 2011/65/EU


RoHS
COMPLIANT

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: TO-263AB

Epoxy meets UL 94 V-0 flammability rating
Base P/N-E3 - RoHS compliant and 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

PRIMARY CHARACTERISTICS	
$I_{F(DC)}$	40 A
V_{RRM}	45 V
I_{FSM}	240 A
V_F at $I_F = 40\text{ A}$	0.51 V
T_{OP} max. (AC mode)	150 °C
T_J max. (DC forward current)	200 °C

MAXIMUM RATINGS ($T_A = 25\text{ °C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VBT4045BP	UNIT
Maximum repetitive peak reverse voltage	V_{RRM}	45	V
Maximum DC forward bypassing current (fig. 1)	$I_{F(DC)}$ ⁽¹⁾	40	A
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	I_{FSM}	240	A
Operating junction temperature range (AC mode)	T_{OP}	- 40 to + 150	°C
Junction temperature in DC forward current without reverse bias, $t \leq 1\text{ h}$	T_J ⁽¹⁾	≤ 200	°C

Notes

⁽¹⁾ With heatsink

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

ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	$I_F = 5\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	0.41	-	V
	$I_F = 20\text{ A}$			0.50	-	
	$I_F = 40\text{ A}$			0.57	0.67	
	$I_F = 5\text{ A}$	$T_A = 125\text{ }^\circ\text{C}$		0.28	-	
	$I_F = 20\text{ A}$			0.41	-	
	$I_F = 40\text{ A}$			0.51	0.63	
Reverse current	$V_R = 45\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	-	3000	μA
		$T_A = 125\text{ }^\circ\text{C}$		29	85	mA

Notes

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
 (2) Pulse test: Pulse width $\leq 40\text{ ms}$

THERMAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VBT4045BP	UNIT
Typical thermal resistance	$R_{\theta\text{JC}}$	0.8	$^\circ\text{C/W}$

ORDERING INFORMATION (Example)					
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
TO-263AB	VBT4045BP-E3/4W	1.37	4W	50/tube	Tube
TO-263AB	VBT4045BP-E3/8W	1.37	8W	800/reel	Tape and reel

RATINGS AND CHARACTERISTICS CURVES

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

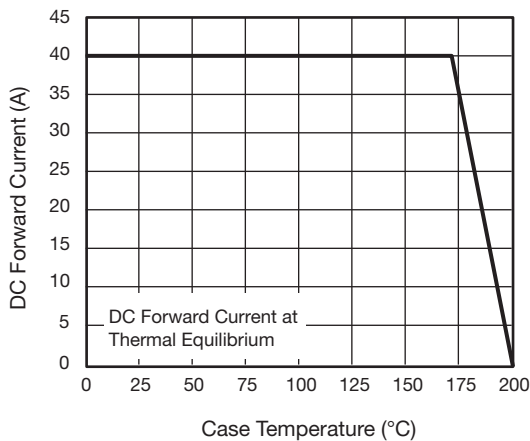


Fig. 1 - Forward Current Derating Curve

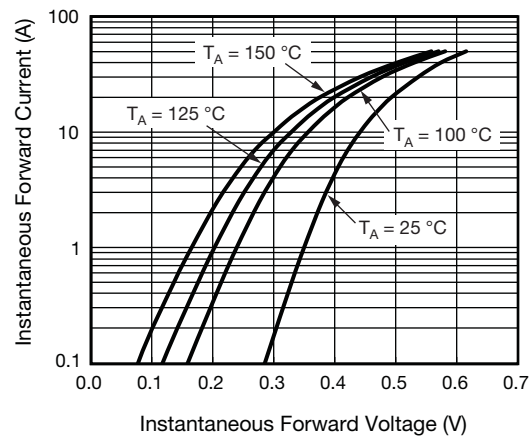


Fig. 2 - Typical Instantaneous Forward Characteristics

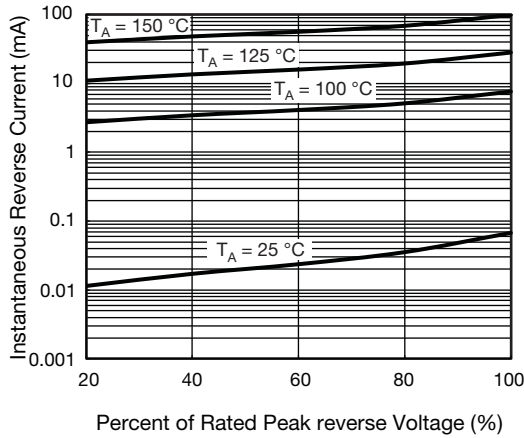


Fig. 3 - Typical Reverse Characteristics

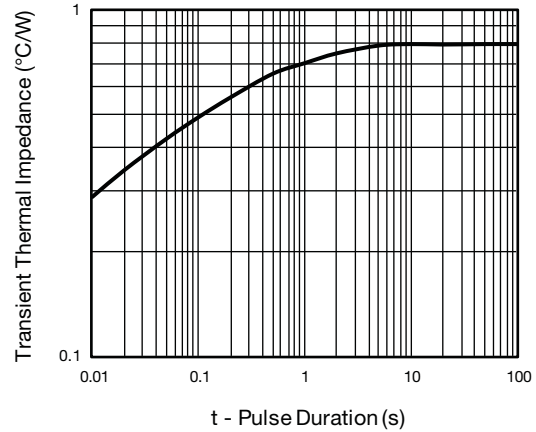


Fig. 5 - Typical Transient Thermal Impedance

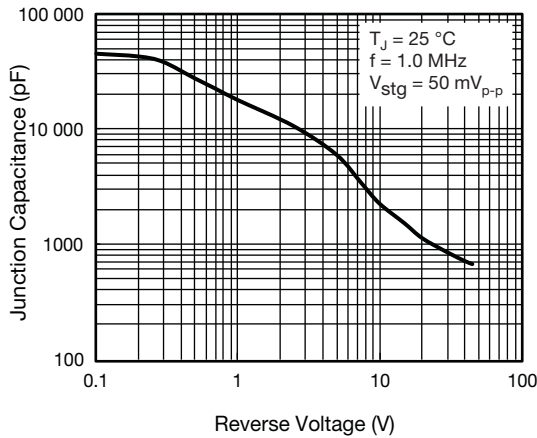
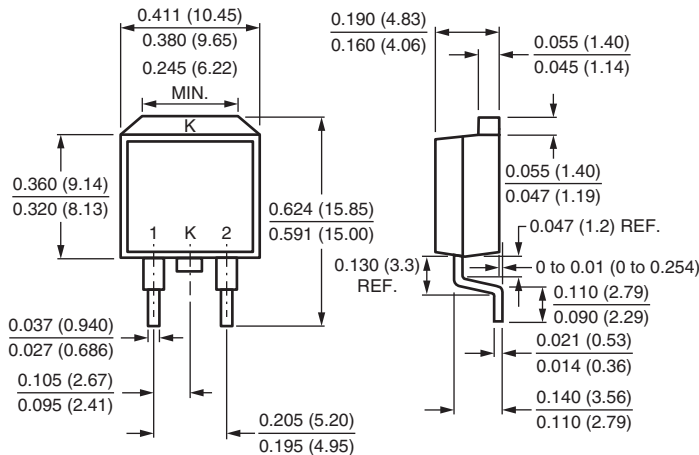


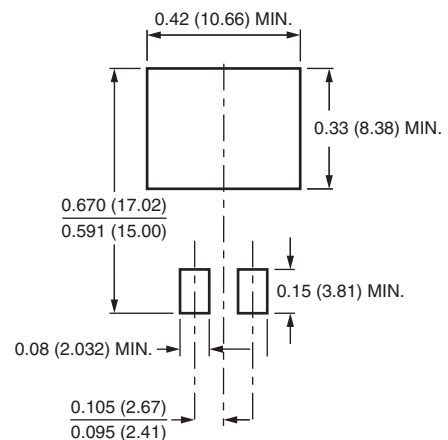
Fig. 4 - Typical Junction Capacitance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

TO-263AB



Mounting Pad Layout





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