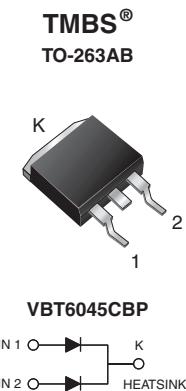


## Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

Ultra Low  $V_F = 0.33$  V at  $I_F = 10$  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
- $T_J$  200 °C max. in solar bypass mode application
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://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: 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	
Package	TO-263AB
$I_{F(AV)}$	2 x 30 A
$V_{RRM}$	45 V
$I_{FSM}$	320 A
$V_F$ at $I_F = 30$ A	0.47 V
$T_{OP}$ max. (AC mode)	150 °C
$T_J$ max. (DC forward current)	200 °C
Diode variation	Common cathode

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)			
PARAMETER	SYMBOL	VBT6045CBP	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	45	V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}$ (1)	60	A
per diode		30	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode	$I_{FSM}$	320	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 ( $T_A = 25^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	
Instantaneous forward voltage per diode	$I_F = 10 \text{ A}$	$T_A = 25^\circ\text{C}$	$V_F^{(1)}$	0.44	-	
	$I_F = 15 \text{ A}$			0.47	-	
	$I_F = 30 \text{ A}$			0.54	0.64	
	$I_F = 10 \text{ A}$	$T_A = 125^\circ\text{C}$		0.33	-	
	$I_F = 15 \text{ A}$			0.37	-	
	$I_F = 30 \text{ A}$			0.47	0.56	
Reverse current per diode	$V_R = 45 \text{ V}$	$T_A = 25^\circ\text{C}$	$I_R^{(2)}$	-	3000 $\mu\text{A}$	
		$T_A = 125^\circ\text{C}$		18	50 $\text{mA}$	

**Notes**

(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

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

THERMAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)					
PARAMETER		SYMBOL	VBT6045CBP		UNIT
Typical thermal resistance	per diode	$R_{\theta\text{JC}}$	1.5		$^\circ\text{C/W}$
	per device		0.8		

ORDERING INFORMATION (Example)					
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
TO-263AB	VBT6045CBP-M3/4W	1.38	4W	50/tube	Tube
TO-263AB	VBT6045CBP-M3/8W	1.38	8W	800/reel	Tape and reel

**RATINGS AND CHARACTERISTICS CURVES**

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

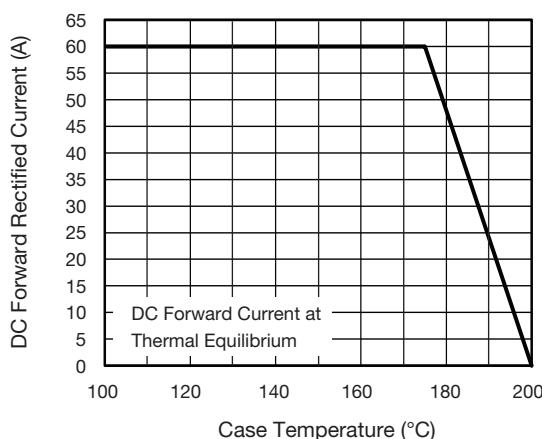


Fig. 1 - Maximum Forward Current Derating Curve

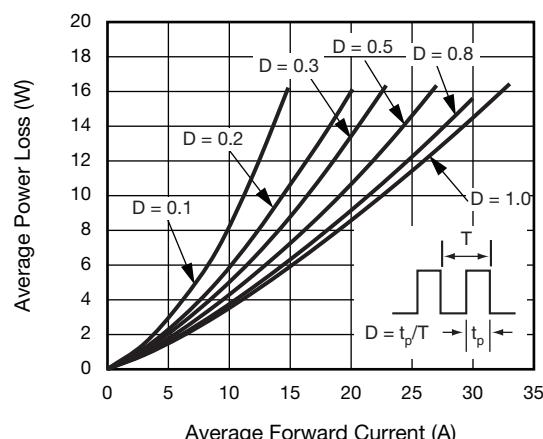


Fig. 2 - Forward Power Loss Characteristics Per Diode

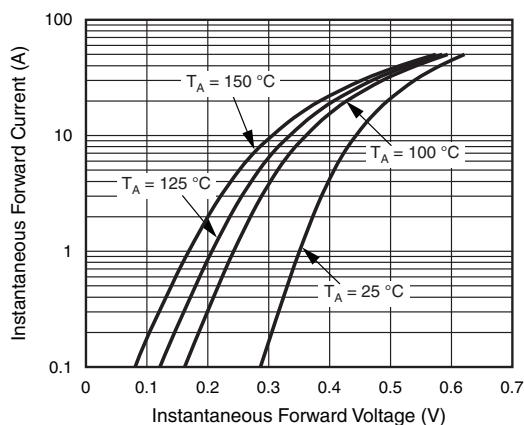


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

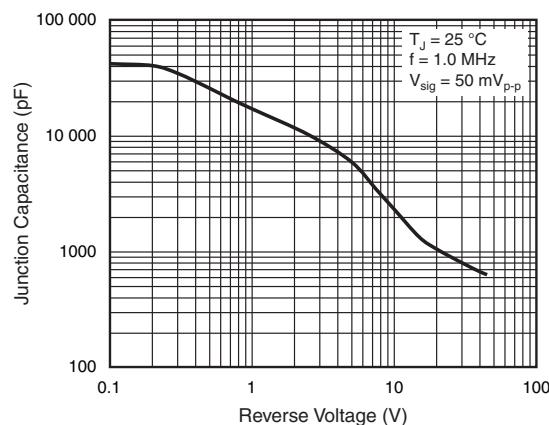


Fig. 5 - Typical Junction Capacitance Per Diode

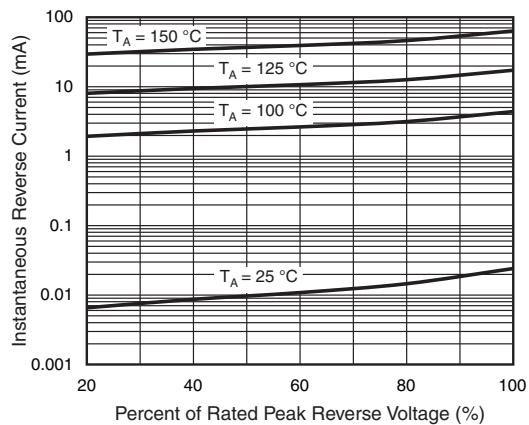


Fig. 4 - Typical Reverse Characteristics Per Diode

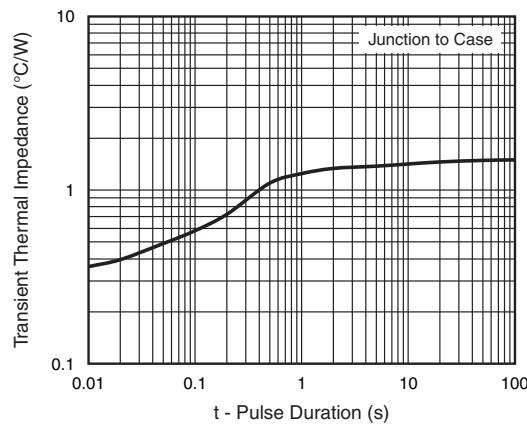
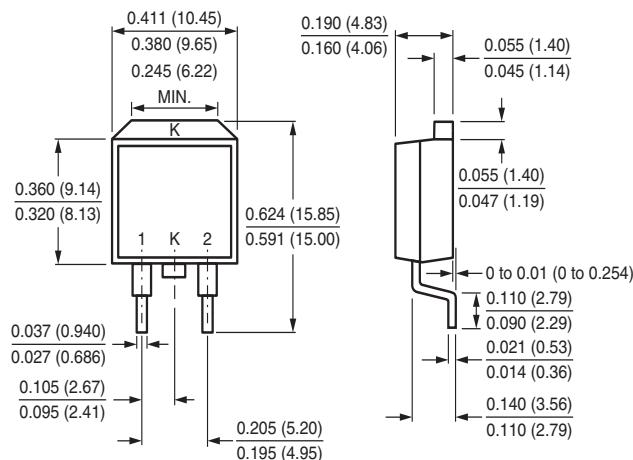


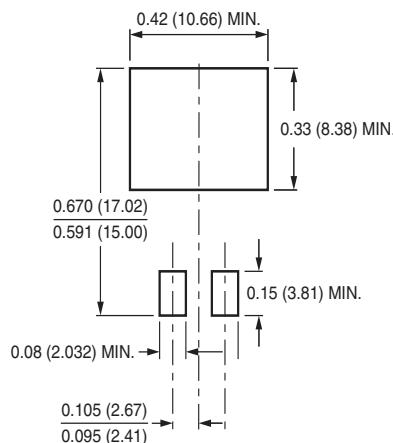
Fig. 6 - Typical Transient Thermal Impedance Per Diode

### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

TO-263AB



Mounting Pad Layout



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