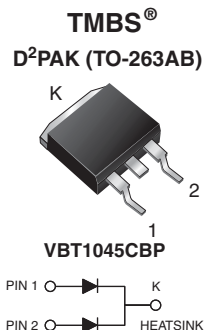


# Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

Ultra Low  $V_F = 0.34\text{ V}$  at  $I_F = 2.5\text{ A}$



## DESIGN SUPPORT TOOLS

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PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2 x 5.0 A
$V_{RRM}$	45 V
$I_{FSM}$	100 A
$V_F$ at $I_F = 5.0\text{ A}$	0.41 V
$T_{OP}$ max. (AC mode)	150 °C
$T_J$ max. (DC forward current)	200 °C
Package	D <sup>2</sup> PAK (TO-263AB)
Circuit configurations	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](http://www.vishay.com/doc?99912)



**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:** D<sup>2</sup>PAK (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 ( $T_A = 25\text{ °C}$ unless otherwise noted)

PARAMETER	SYMBOL	VBT1045CBP	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	45	V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}$ <sup>(1)</sup>	10	A
		5	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode	$I_{FSM}$	100	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, $t \leq 1\text{ h}$	$T_J$ <sup>(2)</sup>	$\leq 200$	°C

### Notes

- (1) With heatsink  
(2) Meets the requirements of IEC 61215 ed. 2 bypass diode thermal test

## ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ °C}$ unless otherwise noted)

PARAMETER	TEST CONDITIONS	SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage per diode	$I_F = 2.5\text{ A}$	$V_F$ <sup>(1)</sup>	0.44	-	V
	$I_F = 5.0\text{ A}$		0.49	0.58	
	$I_F = 2.5\text{ A}$		0.34	-	
	$I_F = 5.0\text{ A}$		0.41	0.50	
Reverse current per diode	$V_R = 45\text{ V}$	$I_R$ <sup>(2)</sup>	-	500	$\mu\text{A}$
			5	15	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 ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)				
PARAMETER		SYMBOL	VBT1045CBP	UNIT
Typical thermal resistance	per diode	$R_{\theta JC}$	3.5	$^{\circ}\text{C/W}$
	per device		2.5	

ORDERING INFORMATION (Example)					
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
TO-263AB	VBT1045CBP-E3/4W	1.38	4W	50/tube	Tube
TO-263AB	VBT1045CBP-E3/8W	1.38	8W	800/reel	Tape and reel

## RATINGS AND CHARACTERISTICS CURVES ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)

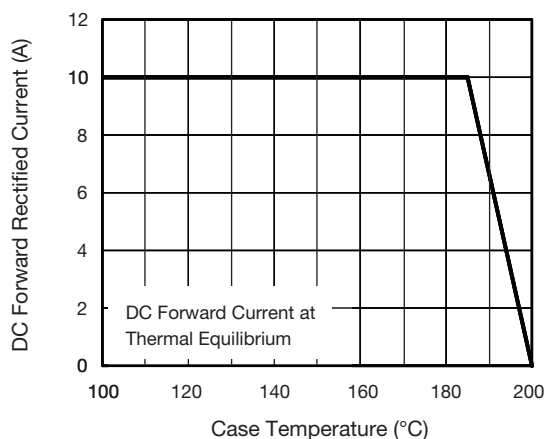


Fig. 1 - Maximum Forward Current Derating Curve

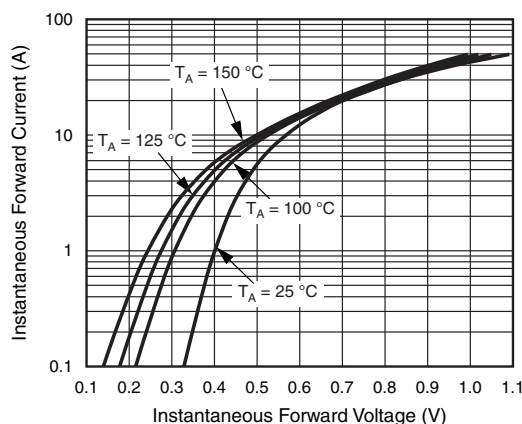


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

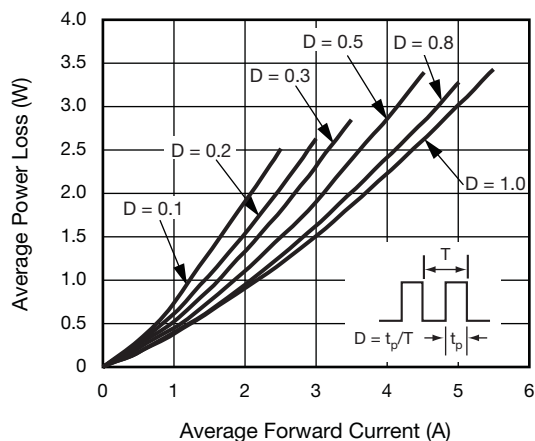


Fig. 2 - Forward Power Loss Characteristics Per Diode

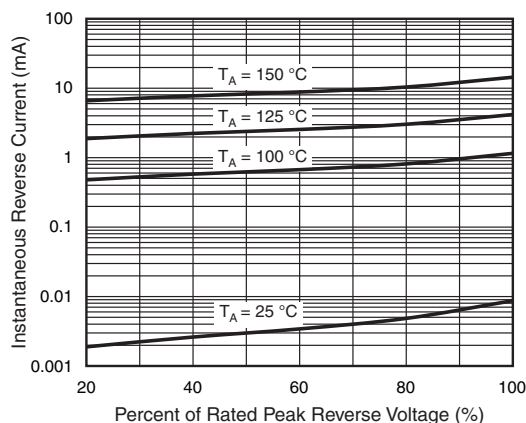


Fig. 4 - Typical Reverse Characteristics Per Diode

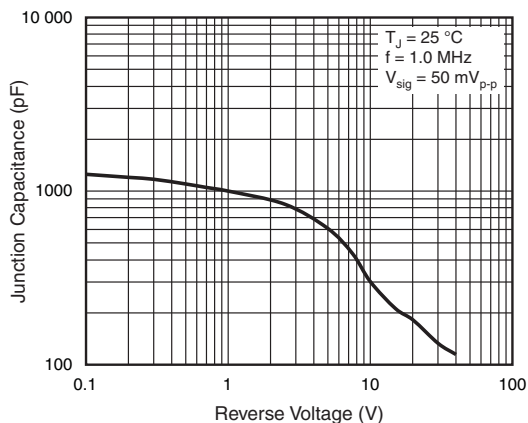


Fig. 5 - Typical Junction Capacitance Per Diode

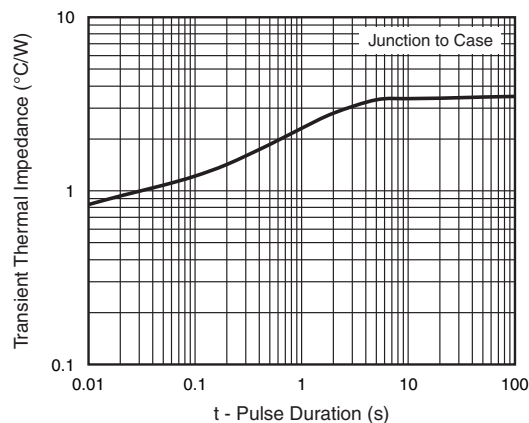
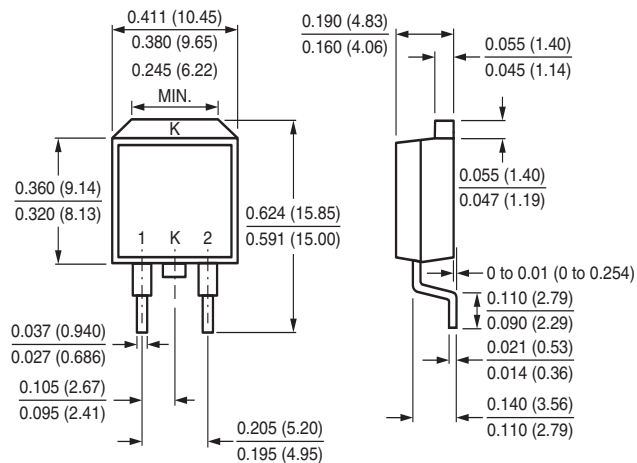


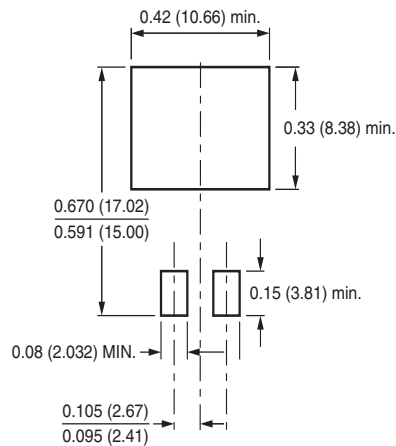
Fig. 6 - Typical Transient Thermal Impedance Per Diode

### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

#### D<sup>2</sup>PAK (TO-263AB)



#### Mounting Pad Layout





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