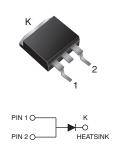


### Vishay General Semiconductor

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

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

#### **TO-263AB**



PRIMARY CHARACTERISTICS			
I <sub>F(DC)</sub>	40 A		
$V_{RRM}$	45 V		
I <sub>FSM</sub>	240 A		
V <sub>F</sub> at I <sub>F</sub> = 40 A	0.51 V		
T <sub>OP</sub> max. (AC mode)	150 °C		
T <sub>J</sub> max. (DC forward current)	200 °C		
Package	TO-263AB		
Diode variation	Single die		

#### **FEATURES**





• Low forward voltage drop, low power losses



· High efficiency operation

 Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C

RoHS COMPLIANT

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: TO-263AB

Molding compound 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

<b>MAXIMUM RATINGS</b> (T <sub>A</sub> = 25 °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 <sub>F(DC)</sub> (1)	40	А	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	I <sub>FSM</sub>	240	А	
Operating junction temperature range (AC mode)	T <sub>OP</sub>	-40 to +150	°C	
Junction temperature in DC forward current without reverse bias, $t \le 1 \ h$	T <sub>J</sub> <sup>(1)</sup>	≤ 200	°C	

#### Notes

<sup>(1)</sup> With heatsink

<sup>(2)</sup> Meets the requirements of IEC 61215 Ed. 2 bypass diode thermal test



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<b>ELECTRICAL CHARACTERISTICS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CO	ONDITIONS	SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 5 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.41	-	V
	I <sub>F</sub> = 20 A			0.50	-	
	I <sub>F</sub> = 40 A			0.57	0.67	
	I <sub>F</sub> = 5 A	T <sub>A</sub> = 125 °C		0.28	-	
	I <sub>F</sub> = 20 A			0.41	-	
	I <sub>F</sub> = 40 A			0.51	0.63	
Reverse current	V - 45 A	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	-	3000	μΑ
	$V_R = 45 \text{ A}$ $T_A = 12$	T <sub>A</sub> = 125 °C		29	85	mA

#### Notes

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

(2) Pulse test: Pulse width ≤ 40 ms

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL	VBT4045BP	UNIT	
Typical thermal resistance	$R_{\theta JC}$	0.8	°C/W	

ORDERING INFORMATION (Example)						
PACKAGE	PACKAGE PREFERRED P/N UNIT WEIGHT (g) PACKAGE CODE BASE (				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<sub>A</sub> = 25 °C unless otherwise noted)

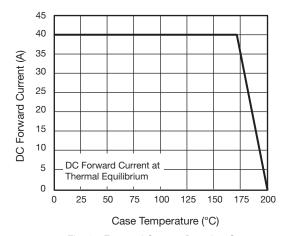


Fig. 1 - Forward Current Derating Curve

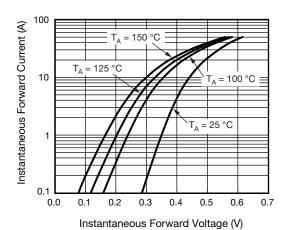
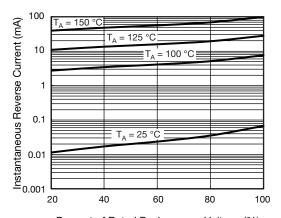


Fig. 2 - Typical Instantaneous Forward Characteristics



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Percent of Rated Peak reverse Voltage (%)

Fig. 3 - Typical Reverse Characteristics

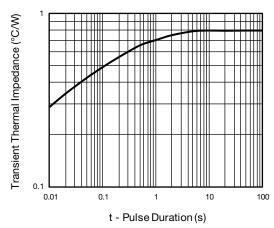


Fig. 5 - Typical Transient Thermal Impedance

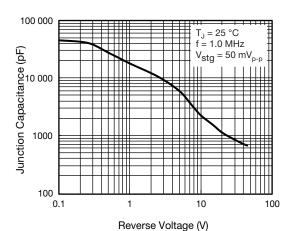
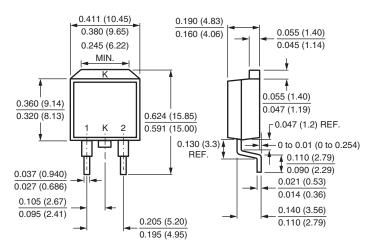
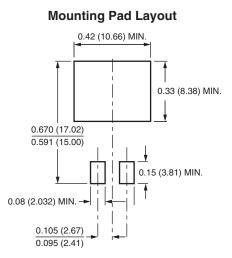


Fig. 4 - Typical Junction Capacitance

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters) TO-263AB







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