

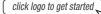
# Vishay General Semiconductor

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

Ultra Low  $V_F = 0.33 \text{ V}$  at  $I_F = 5 \text{ A}$ 



## **DESIGN SUPPORT TOOLS**

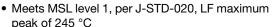




PRIMARY CHARACTERISTICS				
I <sub>F(AV)</sub>	20 A			
$V_{RRM}$	45 V			
I <sub>FSM</sub>	160 A			
$V_F$ at $I_F = 20$ A	0.51 V			
T <sub>OP</sub> max. (AC mode)	150 °C			
T <sub>J</sub> max. (DC forward current)	200 °C			
Package	D <sup>2</sup> PAK (TO-263AB)			
Circuit configurations	Single			

#### **FEATURES**

- Trench MOS Schottky technology
- · Low forward voltage drop, low power losses
- · High efficiency operation





 Material categorization: for definitions of compliance please see <a href="https://www.vishav.com/doc?99912">www.vishav.com/doc?99912</a>

#### **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 <sub>A</sub> = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL	VBT2045BP	UNIT	
Maximum repetitive peak reverse voltage	$V_{RRM}$	45	V	
Maximum DC forward bypassing current (fig. 1)		20	Α	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load		160	Α	
Operating junction temperature range (AC mode)		-40 to +150	°C	
Junction temperature in DC forward current without reverse bias, $t \le 1 \text{ h}$	T <sub>J</sub> <sup>(2)</sup>	≤ 200	°C	

#### Notes

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

ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST C	TEST CONDITIONS		TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 5 A			0.44	-	
	I <sub>F</sub> = 10 A	T <sub>A</sub> = 25 °C		0.49	-	
	I <sub>F</sub> = 20 A		V <sub>E</sub> (1)	0.57	0.66	
	I <sub>F</sub> = 5 A		'	0.33	-	
	I <sub>F</sub> = 10 A	T <sub>A</sub> = 125 °C		0.41	-	
	I <sub>F</sub> = 20 A			0.51	0.63	
Reverse current	V 45 V	T <sub>A</sub> = 25 °C	1 (2)	=	2000	μΑ
	V <sub>R</sub> = 45 V	T <sub>A</sub> = 125 °C	I <sub>R</sub> <sup>(2)</sup>	10	30	mA

### Notes

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

(2) Pulse test: Pulse width ≤ 40 ms

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



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THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL VBT2045BP			
Typical thermal resistance	$R_{ heta JC}$	1.5	°C/W	

ORDERING INFORMATION (Example)						
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE	
TO-263AB	VBT2045BP-E3/4W	1.37	4W	50/tube	Tube	
TO-263AB	VBT2045BP-E3/8W	1.37	8W	800/reel	Tape and reel	

## **RATINGS AND CHARACTERISTICS CURVES** (T<sub>A</sub> = 25 °C unless otherwise noted)

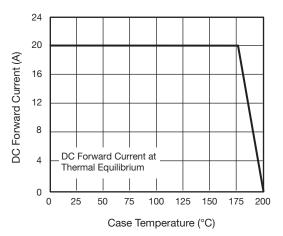


Fig. 1 - Maximum Forward Current Derating Curve

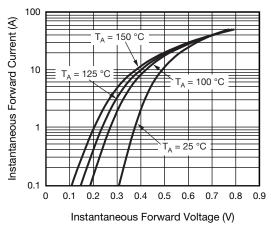
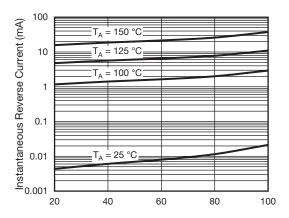


Fig. 2 - Typical Instantaneous Forward Characteristics



Percent of Rated Peak Reverse Voltage (%)

Fig. 3 - Typical Reverse Characteristics

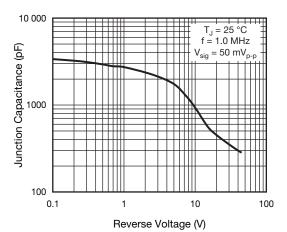


Fig. 4 - Typical Junction Capacitance



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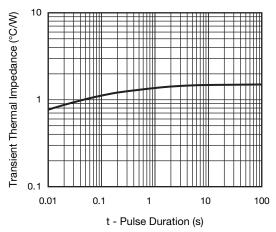
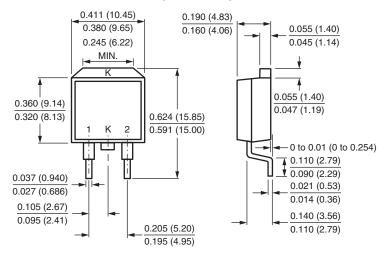


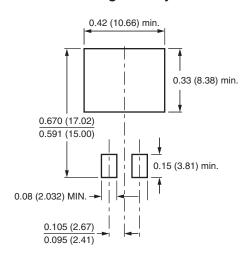
Fig. 5 - Typical Transient Thermal Impedance

## **PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

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



## **Mounting Pad Layout**





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