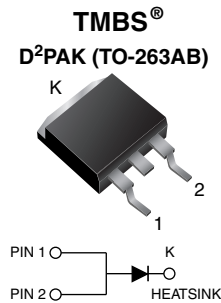


# Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

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



## LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	20 A
$V_{RRM}$	45 V
$I_{FSM}$	160 A
$V_F$ at $I_F = 20\text{ A}$	0.51 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 configuration	Single

## 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
- 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	VBT2045BP	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	45	V
Maximum DC forward bypassing current (fig. 1)	$I_{F(DC)}$ <sup>(1)</sup>	20	A
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	160	A
Operating junction temperature range (AC mode)	$T_{OP}$	-40 to +150	°C
Junction temperature in DC forward current without reverse bias, $t \leq 1\text{ h}$	$T_J$ <sup>(2)</sup>	$\leq 200$	°C

### Notes

- With heatsink
- 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	$I_F = 5\text{ A}$	$T_A = 25\text{ °C}$	$V_F$ <sup>(1)</sup>	0.44	-	V
	$I_F = 10\text{ A}$			0.49	-	
	$I_F = 20\text{ A}$			0.57	0.66	
	$I_F = 5\text{ A}$	$T_A = 125\text{ °C}$		0.33	-	
	$I_F = 10\text{ A}$			0.41	-	
	$I_F = 20\text{ A}$			0.51	0.63	
Reverse current	$V_R = 45\text{ V}$	$T_A = 25\text{ °C}$	$I_R$ <sup>(2)</sup>	-	2000	$\mu\text{A}$
		$T_A = 125\text{ °C}$		10	30	mA

### Notes

- Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle
- Pulse test: Pulse width  $\leq 40\text{ ms}$



THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)			
PARAMETER	SYMBOL	VBT2045BP	UNIT
Typical thermal resistance	R <sub>θJC</sub>	1.5	°C/W

ORDERING INFORMATION (Example)					
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
D <sup>2</sup> PAK (TO-263AB)	VBT2045BP-E3/4W	1.37	4W	50/tube	Tube
D <sup>2</sup> PAK (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)

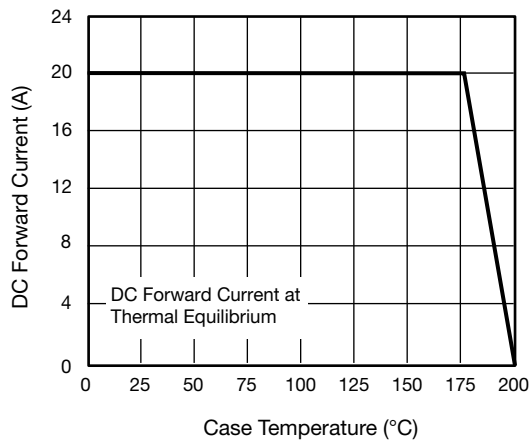


Fig. 1 - Maximum Forward Current Derating Curve

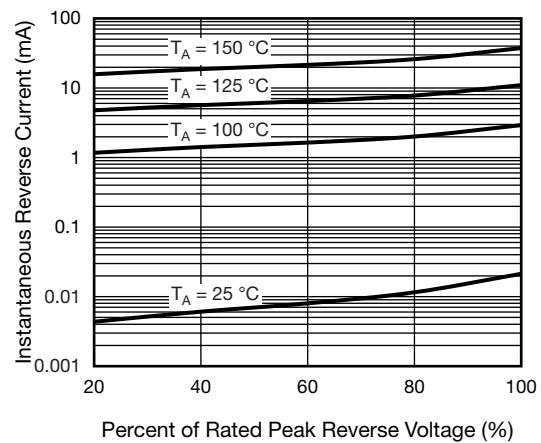


Fig. 3 - Typical Reverse Characteristics

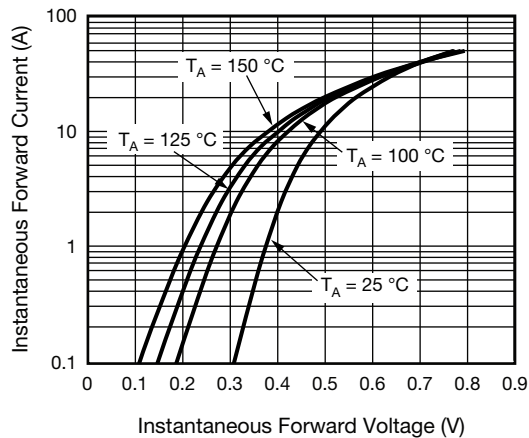


Fig. 2 - Typical Instantaneous Forward Characteristics

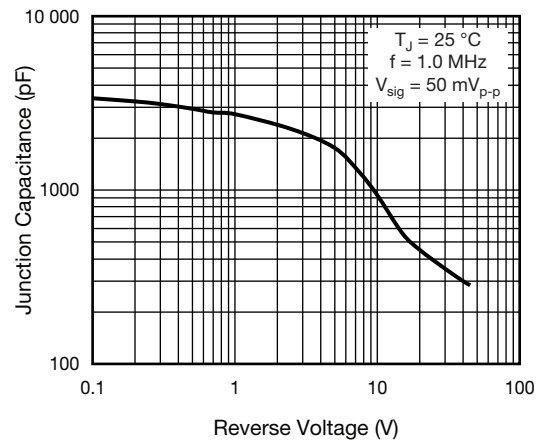


Fig. 4 - Typical Junction Capacitance

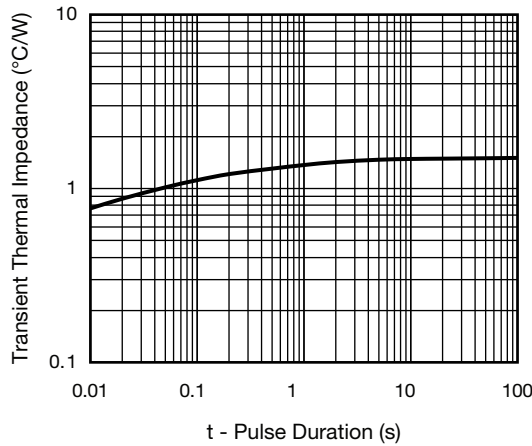
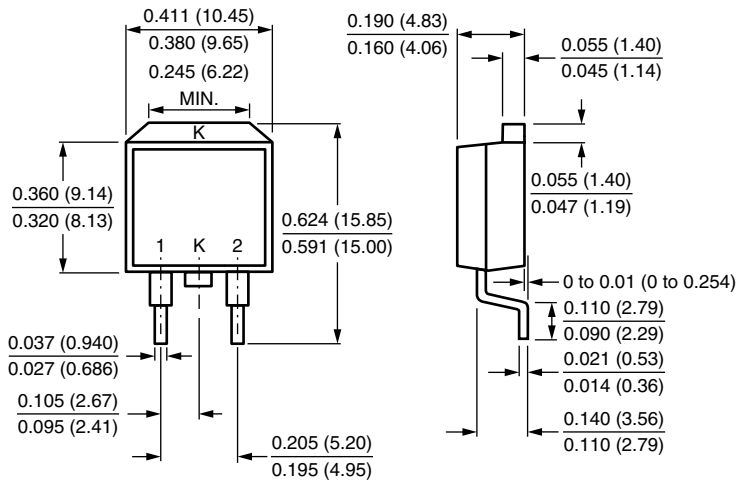


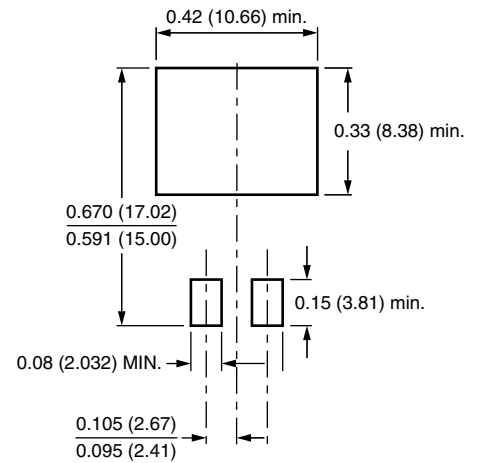
Fig. 5 - Typical Transient Thermal Impedance

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

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



**Mounting Pad Layout**





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