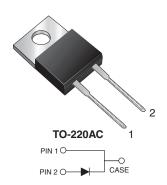


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## Vishay General Semiconductor

# TMBS® (Trench MOS Barrier Schottky) Rectifier for PV Solar Cell Bypass Protection

Ultra Low  $V_F = 0.41 \text{ V}$  at  $I_F = 5 \text{ A}$ 



PRIMARY CHARACTERISTICS				
I <sub>F(AV)</sub>	10 A			
$V_{RRM}$	45 V			
I <sub>FSM</sub>	100 A			
$V_F$ at $I_F = 10 A$	0.52 V			
T <sub>OP</sub> max. (AC mode)	150 °C			
T <sub>J</sub> max. (DC forward current)	200 °C			
Package	TO-220AC			
Circuit configuration	Single			

#### **FEATURES**

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

COMPLIANT
HALOGEN

FREE

High efficiency operation

• Solder dip 275 °C max. 10 s, per JESD 22-B106

 Material categorization: for definitions of compliance please see <a href="https://www.vishay.com/doc?99912"><u>www.vishay.com/doc?99912</u></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: TO-220AC

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

MAXIMUM RATINGS (T <sub>A</sub> = 25 °C unless otherwise noted)					
PARAMETER	SYMBOL	VT1045BP	UNIT		
Maximum repetitive peak reverse voltage	$V_{RRM}$	45	V		
Maximum DC forward bypassing current (fig. 1)	I <sub>F(DC)</sub> (1)	10	Α		
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	I <sub>FSM</sub>	100	Α		
Operating junction temperature range (AC mode)	T <sub>OP</sub>	-40 to +150	°C		
Junction temperature in DC forward current without reverse bias, $t \le 1 \text{ h}$	T <sub>J</sub> <sup>(2)</sup>	≤ 200	°C		

#### Notes

(1) With heatsink

(2) Meets the requirements of IEC 61215 ed.2 bypass diode thermal test

<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	$I_F = 5 \text{ A}$ $I_F = 10 \text{ A}$ $T_A = 25 \text{ °C}$	V <sub>F</sub> <sup>(1)</sup>	0.50	-	V
	I <sub>F</sub> = 10 A			0.57	0.68	
	I <sub>F</sub> = 5 A	T <sub>A</sub> = 125 °C		0.41	-	
	I <sub>F</sub> = 10 A			0.52	0.64	
Reverse current	V <sub>R</sub> = 45 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	=	500	μΑ
	v <sub>R</sub> = 45 v	T <sub>A</sub> = 125 °C		5	15	mA

#### Notes

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

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



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THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)					
PARAMETER	VT1045BP	UNIT			
Typical thermal resistance	$R_{ heta JC}$	3.0	°C/W		

ORDERING INFORMATION (Example)							
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE		
TO-220AC	VT1045BP-M3/4W	1.87	4W	50/tube	Tube		

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

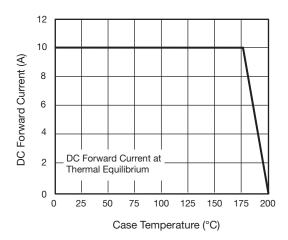


Fig. 1 - Maximum Forward Current Derating Curve

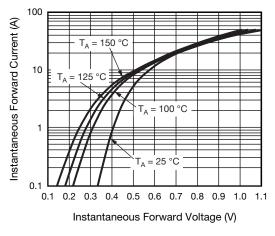
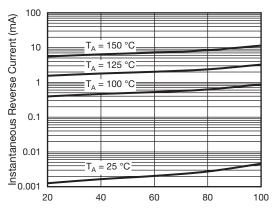


Fig. 2 - Typical Instantaneous Forward Characteristics



Percent of Rated Peak Reverse Voltage (%)

Fig. 3 - Typical Reverse Characteristics

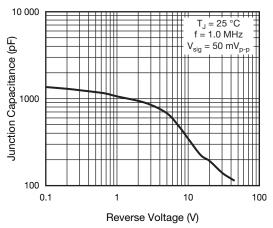


Fig. 4 - Typical Junction Capacitance



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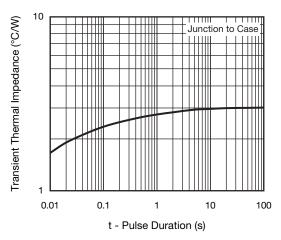
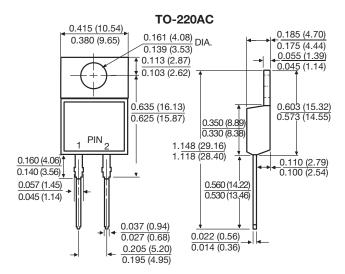


Fig. 5 - Typical Transient Thermal Impedance

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





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