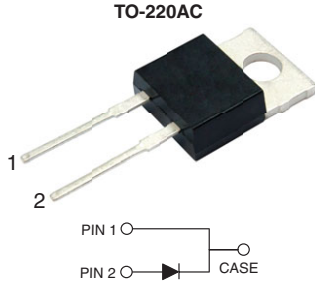


# TMBS<sup>®</sup> (Trench MOS Barrier Schottky) Rectifier for PV Solar Cell Bypass Protection

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


## FEATURES

- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- Solder dip 275 °C max. 10 s, per JESD 22-B106
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## 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

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	40 A
$V_{RRM}$	45 V
$I_{FSM}$	240 A
$V_F$ at $I_F = 40\text{ A}$	0.51 V
$T_{OP}$ max. (AC mode)	150 °C
$T_J$ max. (DC forward current)	200 °C
Package	TO-220AC
Circuit configuration	Single

MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VT4045BP	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	45	V
Maximum DC forward bypassing current (fig. 1)	$I_{F(DC)}$ <sup>(1)</sup>	40	A
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	240	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

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

<sup>(2)</sup> 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	$I_F = 5\text{ A}$ $I_F = 20\text{ A}$ $I_F = 40\text{ A}$	$V_F$ <sup>(1)</sup>	$T_A = 25\text{ °C}$	0.41	-	V
				0.50	-	
				0.57	0.67	
	$I_F = 5\text{ A}$ $I_F = 20\text{ A}$ $I_F = 40\text{ A}$		$T_A = 125\text{ °C}$	0.28	-	
				0.41	-	
				0.51	0.63	
Reverse current	$V_R = 45\text{ V}$	$I_R$ <sup>(2)</sup>	$T_A = 25\text{ °C}$	-	3000	$\mu\text{A}$
			$T_A = 125\text{ °C}$	29	85	mA

### Notes

<sup>(1)</sup> Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

<sup>(2)</sup> Pulse test: Pulse width  $\leq 40\text{ ms}$



THERMAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VT4045BP	UNIT
Typical thermal resistance	$R_{\theta JC}$	0.8	$^\circ\text{C/W}$

ORDERING INFORMATION (Example)					
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
TO-220AC	VT4045BP-M3/4W	1.87	4W	50/tube	Tube

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

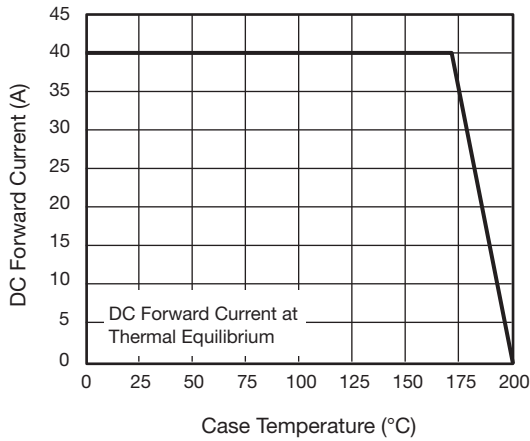


Fig. 1 - Maximum Forward Current Derating Curve

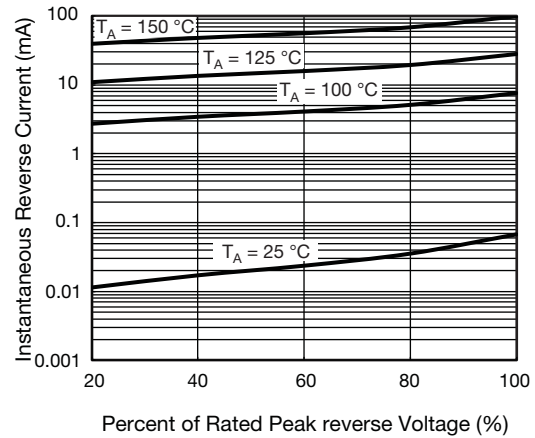


Fig. 3 - Typical Reverse Characteristics

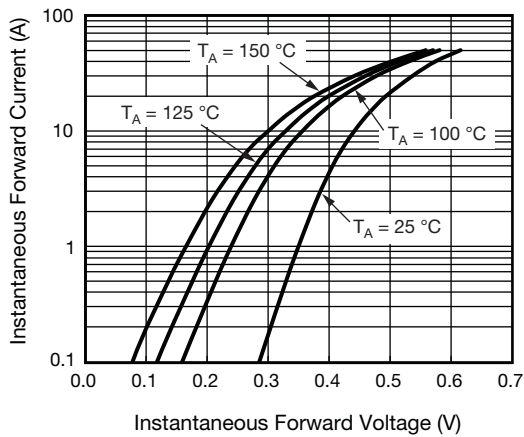


Fig. 2 - Typical Instantaneous Forward Characteristics

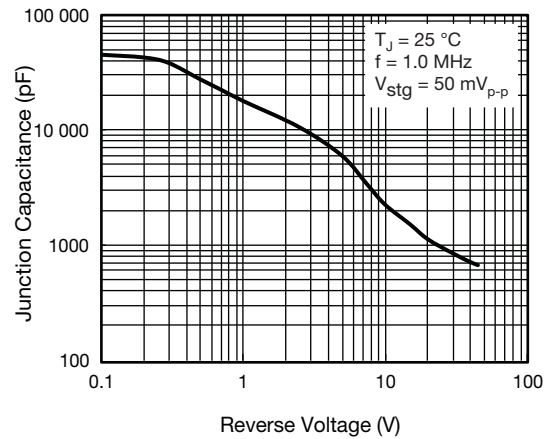


Fig. 4 - Typical Junction Capacitance

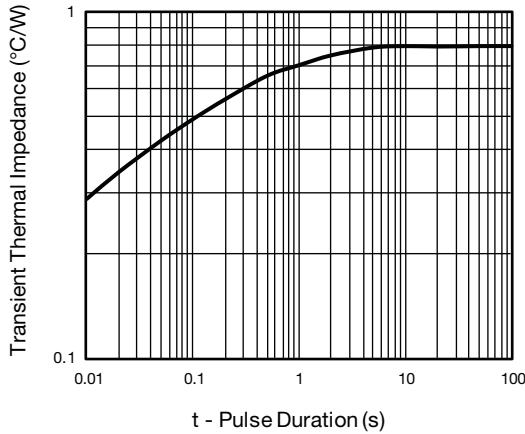
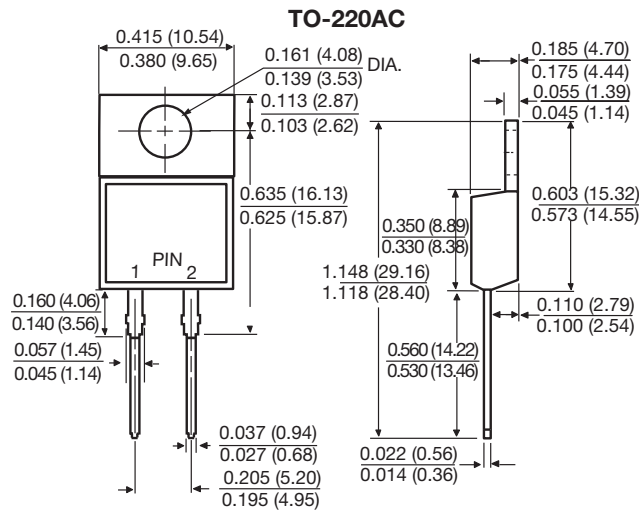


Fig. 5 - Typical Transient Thermal Impedance

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





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