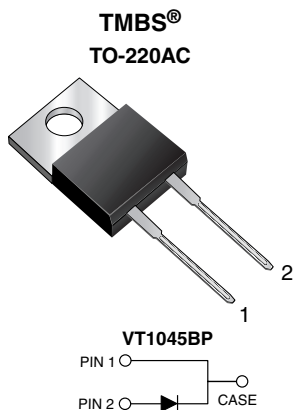


# Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

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



## 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

$I_{F(AV)}$	10 A
$V_{RRM}$	45 V
$I_{FSM}$	100 A
$V_F$ at $I_F = 10\text{ A}$	0.52 V
$T_{OP\text{ max. (AC mode)}}$	150 °C
$T_J\text{ max. (DC forward current)}$	200 °C
Package	TO-220AC
Diode variation	Single die

## MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)

PARAMETER	SYMBOL	VT1045BP	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	45	V
Maximum DC forward bypassing current (fig. 1)	$I_{F(DC)}^{(1)}$	10	A
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	100	A
Operating junction temperature range (AC mode)	$T_{OP}$	-40 to +150	°C
Junction temperature in DC forward current without reverse bias, $t \leq 1\text{ h}$	$T_J^{(2)}$	$\leq 200$	°C

### Notes

(1) With heatsink

(2) 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 CONDITIONS		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>	0.50	-	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	μA
		T <sub>A</sub> = 125 °C		5	15	mA

**Notes**

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

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

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VT1045BP	UNIT
Typical thermal resistance	$R_{\theta\text{JC}}$	3.0	$^{\circ}\text{C/W}$

<b>ORDERING INFORMATION</b> (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

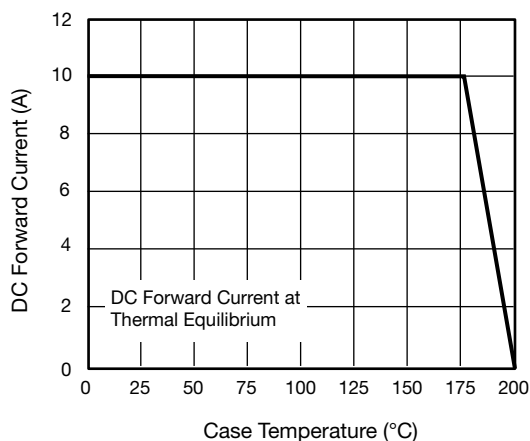
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

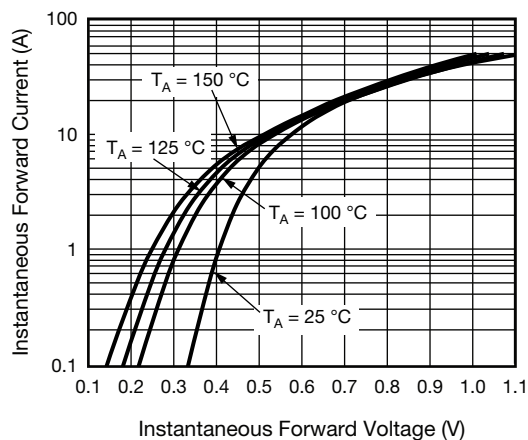
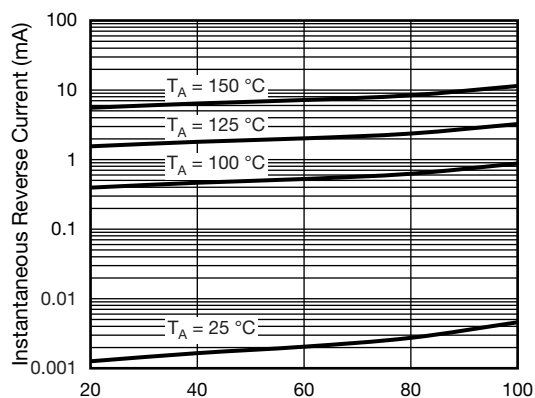
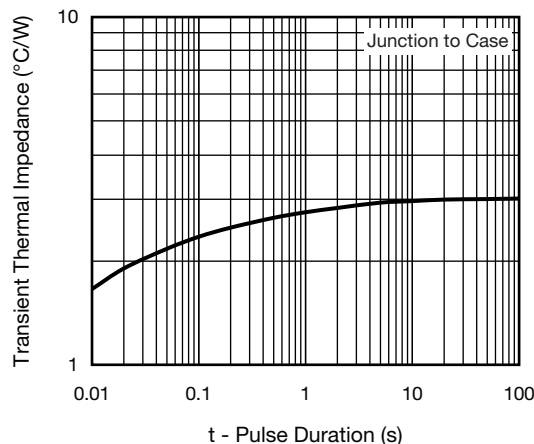


Fig. 2 - Typical Instantaneous Forward Characteristics



Percent of Rated Peak Reverse Voltage (%)  
Fig. 3 - Typical Reverse Characteristics



t - Pulse Duration (s)  
Fig. 5 - Typical Transient Thermal Impedance

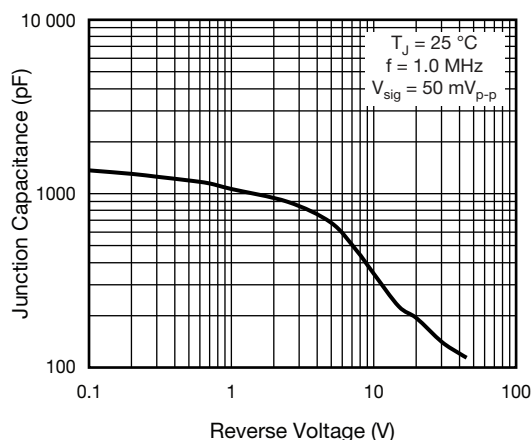
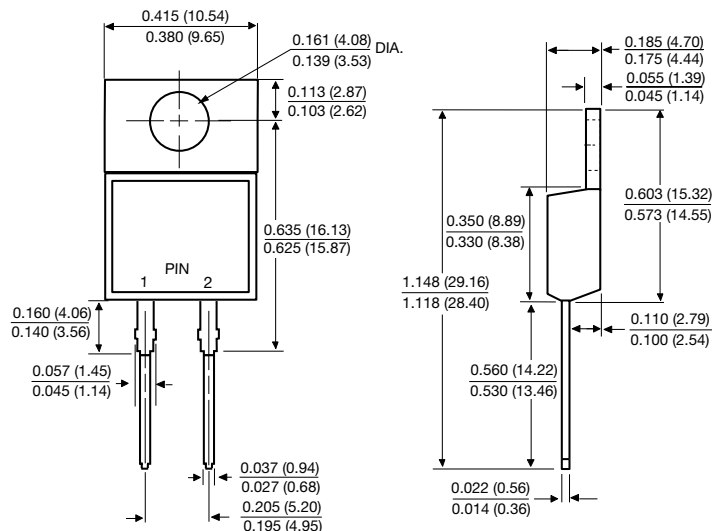


Fig. 4 - Typical Junction Capacitance

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### TO-220AC





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