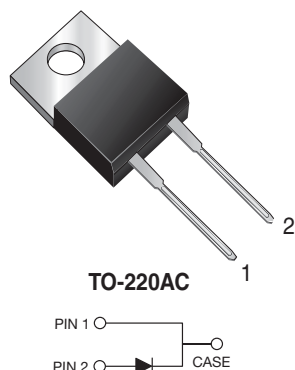


TMBS® (Trench MOS Barrier Schottky) Rectifier for PV Solar Cell Bypass Protection

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



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



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	
$I_{F(AV)}$	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	TO-220AC
Circuit configuration	Single

MAXIMUM RATINGS ($T_A = 25\text{ °C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VT2045BP	UNIT
Maximum repetitive peak reverse voltage	V_{RRM}	45	V
Maximum DC forward bypassing current (fig. 1)	$I_{F(DC)}^{(1)}$	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, $t \leq 1\text{ h}$	$T_J^{(2)}$	≤ 200	°C

Notes

(1) With heatsink

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

ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I _F = 5 A	T _A = 25 °C	V _F ⁽¹⁾	0.44	-	V
	I _F = 10 A			0.49	-	
	I _F = 20 A			0.57	0.66	
	I _F = 5 A	T _A = 125 °C		0.33	-	
	I _F = 10 A			0.41	-	
	I _F = 20 A			0.51	0.63	
Reverse current	V _R = 45 V	T _A = 25 °C	I _R ⁽²⁾	-	2000	μA
		T _A = 125 °C		10	30	mA

Notes

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

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



THERMAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)

PARAMETER	SYMBOL	VT2045BP	UNIT
Typical thermal resistance	$R_{\theta JC}$	1.5	$^{\circ}\text{C}/\text{W}$

ORDERING INFORMATION (Example)

PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
TO-220AC	VT2045BP-M3/4W	1.87	4W	50/tube	Tube

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

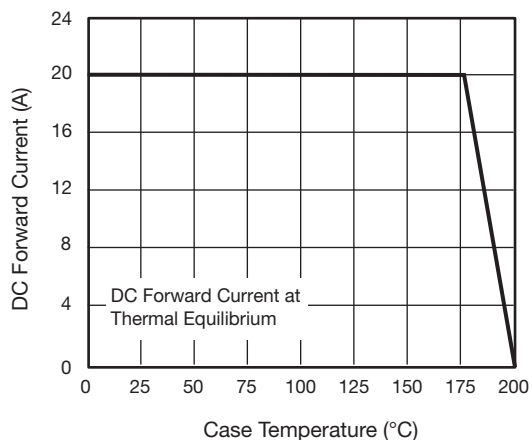


Fig. 1 - Maximum Forward Current Derating Curve

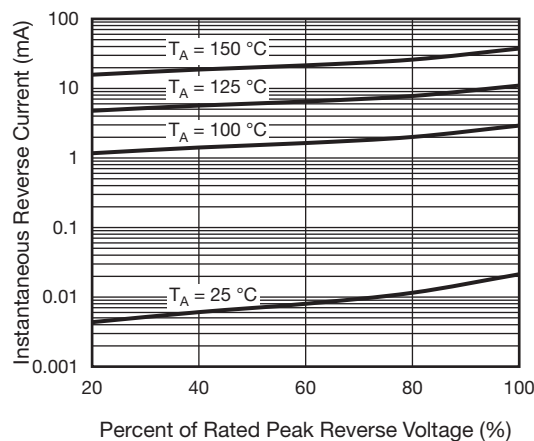


Fig. 3 - Typical Reverse Characteristics

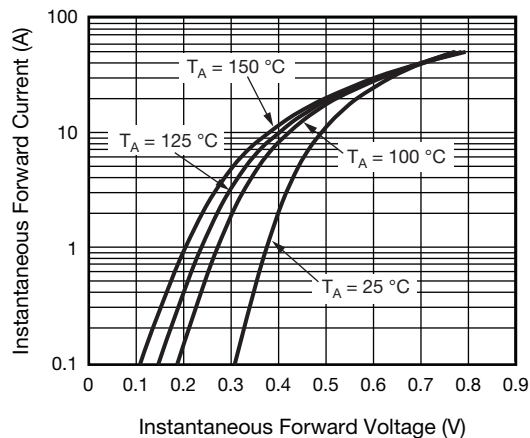


Fig. 2 - Typical Instantaneous Forward Characteristics

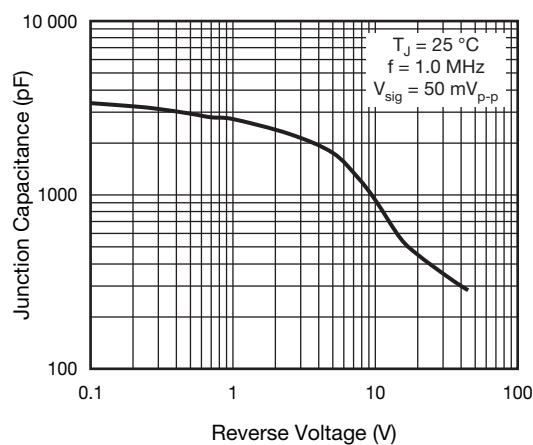


Fig. 4 - Typical Junction Capacitance

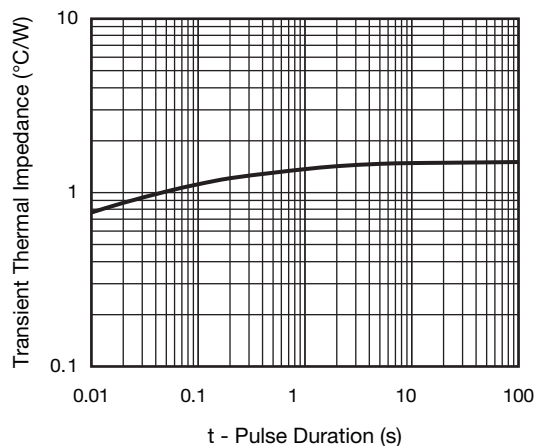
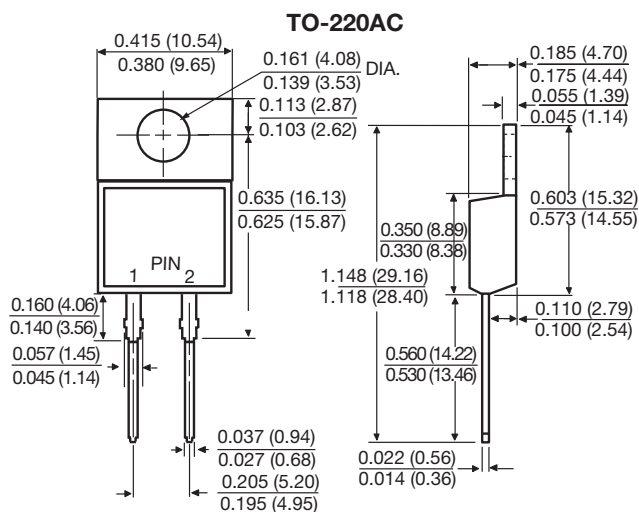


Fig. 5 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)




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