

Vishay General Semiconductor

Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

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



PRIMARY CHARACTERISTICS				
I _{F(DC)}	40 A			
V_{RRM}	45 V			
I _{FSM}	240 A			
V_F at $I_F = 40 A$	0.51 V			
T _{OP} max. (AC mode)	150 °C			
T _J max. (DC forward current)	200 °C			
Package	ITO-220AC			
Circuit configuration	Single			

FEATURES

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

High efficiency operation

 Solder bath temperature 275 °C max. 10 s, per JESD 22-B106

FREE

 Material categorization: for definitions of compliance please see <u>www.vishav.com/doc?99912</u>

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: ITO-220AC

Molding compound meets UL 94 V-0 flammability rating Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

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 _A = 25 °C unless otherwise noted)					
PARAMETER	SYMBOL	VFT4045BP	UNIT		
Maximum repetitive peak reverse voltage	V_{RRM}	45	V		
Maximum DC forward bypassing current (fig. 1)	I _{F(DC)} (1)	40	Α		
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load		240	Α		
Operating junction temperature range (AC mode)	T _{OP}	-40 to +150	°C		
Isolation voltage from thermal to heatsink t = 1 min	V _{AC}	1500	V		
Junction temperature in DC forward current without reverse bias, t ≤ 1 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 CO	NDITIONS	SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I _F = 5 A	T _A = 25 °C	V _F ⁽¹⁾	0.41	-	
	I _F = 20 A			0.50	-	
	I _F = 40 A			0.57	0.67	
	I _F = 5 A	T _A = 125 °C		0.28	-	
	I _F = 20 A			0.41	=	
	I _F = 40 A			0.51	0.63	
Reverse current	V _R = 45 V	T _A = 25 °C	I _R ⁽²⁾	-	3000	μΑ
	v _R = 45 v	T _A = 125 °C		29	85	mA

Notes

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

(2) Pulse test: Pulse width ≤ 40 ms



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THERMAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL VFT4045BP		UNIT	
Typical thermal resistance	$R_{ heta JC}$	4.0	°C/W	

ORDERING INFORMATION (Example)							
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE		
ITO-220AC	VFT4045BP-M3/4W	1.75	4W	50/tube	Tube		

RATINGS AND CHARACTERISTICS CURVES ($T_A = 25$ °C unless otherwise noted)

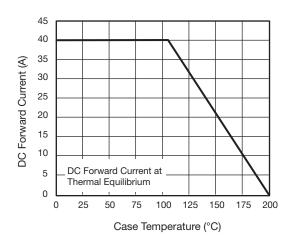


Fig. 1 - Maximum Forward Current Derating Curve

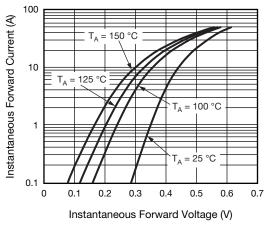
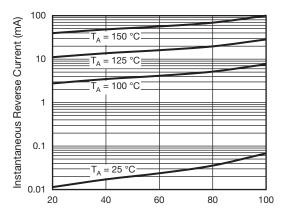


Fig. 2 - Typical Instantaneous Forward Characteristics



Percent of Rated Peak Reverse Voltage (%)

Fig. 3 - Typical Reverse Characteristics

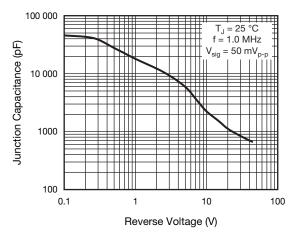


Fig. 4 - Typical Junction Capacitance

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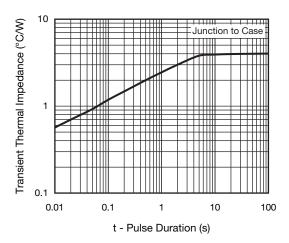
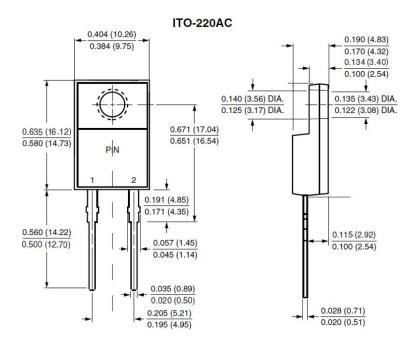


Fig. 5 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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