

# Vishay General Semiconductor

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

Ultra Low  $V_F = 0.30 \text{ V}$  at  $I_F = 5 \text{ A}$ 



FEATURES	5
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- 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

- Compliant to RoHS Directive 2011/65/EU
- Halogen-free according to IEC 61249-2-21 definition

#### **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

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 <sub>F(DC)</sub>	30 A		
$V_{RRM}$	45 V		
I <sub>FSM</sub>	200 A		
$V_F$ at $I_F = 30 \text{ A}$	0.51 V		
T <sub>OP</sub> max. (AC mode)	150 °C		
T <sub>J</sub> max. (DC forward current)	200 °C		

MAXIMUM RATINGS (T <sub>A</sub> = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL	VFT3045BP	UNIT	
Maximum repetitive peak reverse voltage	V <sub>RRM</sub>	45	V	
Maximum DC forward bypassing current (fig. 1)	I <sub>F(DC)</sub> (1)	30	Α	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	I <sub>FSM</sub>	200	А	
Operating junction temperature range (AC mode)	T <sub>OP</sub>	- 40 to + 150	°C	
Isolation voltage from termal to heatsink t = 1 min	V <sub>AC</sub>	1500	V	
Junction temperature in DC forward current without reverse bias, $t \le 1\ h$	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



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<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	T <sub>A</sub> = 25 °C		0.42	-		
	I <sub>F</sub> = 15 A			0.49	-		
	I <sub>F</sub> = 30 A		V <sub>E</sub> (1)	0.58	0.70	V	
	I <sub>F</sub> = 5 A	T <sub>A</sub> = 125 °C	V <sub>F</sub> ('')	0.30	-	ľ	
	I <sub>F</sub> = 15 A		T <sub>A</sub> = 125 °C		0.40	-	I
	I <sub>F</sub> = 30 A			0.51	0.60	1	
Reverse current	V <sub>R</sub> = 45 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	=	2000	μΑ	
	v <sub>R</sub> = 45 v	T <sub>A</sub> = 125 °C	IR (=)	19	60	mA	

#### Notes

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

(2) Pulse test: Pulse width ≤ 40 ms

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL VFT3045BP			
Typical thermal resistance	$R_{\theta JC}$	4.2	°C/W	

ORDERING INFORMATION (Example)						
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE	
ITO-220AC	VFT3045BP-M3/4W	1.75	4W	50/tube	Tube	

#### **RATINGS AND CHARACTERISTICS CURVES**

(T<sub>A</sub> = 25 °C unless otherwise noted)

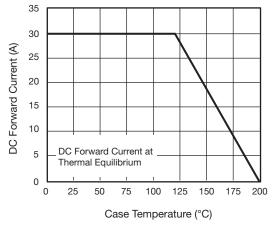


Fig. 1 - Maximum Forward Current Derating Curve

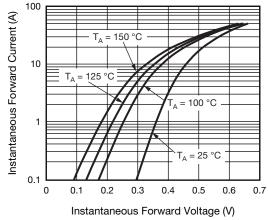
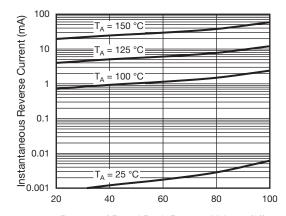


Fig. 2 - Typical Instantaneous Forward Characteristics



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

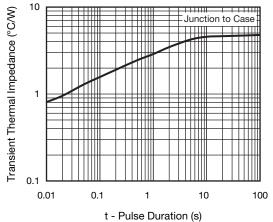


Fig. 5 - Typical Transient Thermal Impedance

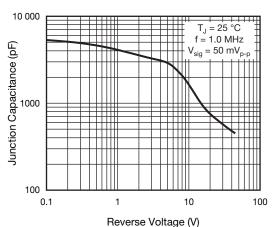
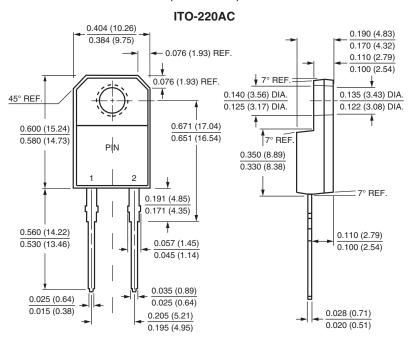


Fig. 4 - Typical Junction Capacitance

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





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