HALOGEN

FREE



Vishay General Semiconductor

Photovoltaic Solar Cell Protection Schottky Rectifier

Ultra Low $V_F = 0.26 \text{ V}$ at $I_F = 5 \text{ A}$



PRIMARY CHARACTERISTICS				
I _{F(DC)}	20 A			
V_{RRM}	45 V			
I _{FSM}	250 A			
V _F at I _F = 20 A	0.40 V			
T _{OP} max. (AC mode)	150 °C			
T _{.1} max. (DC forward current)	200 °C			

FEATURES

- Trench MOS Schottky technology
- · Low forward voltage drop, low power losses
- High efficiency operation
- High forward surge capability
- ESD capability
- Solder dip 275 °C max. 10 s, per JESD 22-B106
- T_J 200 °C max. in solar by-pass mode application
- 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: P600

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: Color band denotes cathode end

MAXIMUM RATINGS (T _A = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL	VSB20L45	UNIT	
Device marking code		V20L45		
Maximum repetitive peak reverse voltage	V _{RRM}	45	V	
Maximum average forward rectified current (fig. 1)	I _{F(AV)} ⁽¹⁾	20		
	I _{F(AV)} (2)	7.5		
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	I _{FSM}	250	Α	
Operating junction temperature range (AC mode)	T _{OP}	- 40 to + 150		
Storage temperature range	T _{STG}	- 40 to + 175	°C	
Junction temperature in DC forward current without reverse bias, $t \le 1\ h$	T _J ⁽³⁾	≤ 200		

Notes

- (1) With heatsink
- (2) Without heatsink, free air
- (3) Meets the requirements of IEC 61215 ed. 2 bypass diode thermal test



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ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)							
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT	
Instantaneous forward voltage	I _F = 5.0 A	T _A = 25 °C	T _A = 25 °C V _F ⁽¹⁾	0.39	-	V	
	I _F = 10 A			0.42	-		
	I _F = 20 A			0.48	0.56		
	I _F = 5.0 A	T _A = 125 °C		0.26	=		
	I _F = 10 A		T _A = 125 °C		0.32	-	
	I _F = 20 A				0.40	0.48	
Reverse current	V _R = 45 V	T _A = 25 °C T _A = 125 °C	I _R ⁽²⁾	-	5.0	mA	
	v _R = 45 v		IR (=)	30	65	IIIA	
Typical junction capacitance	4.0 V, 1 MHz		CJ	2470	-	pF	

Notes

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

(2) Pulse test: 40 ms pulse width

THERMAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL	SYMBOL VSB20L45		
Thermal resistance	R _{θJA} ⁽¹⁾	55	°C/W	
	R _{0JL} (1)	3.5		
Typical thermal resistance	R _{0JL} (2)	2.5	°C/W	

Notes

(1) Without heatsink, free air; units mounted on PCB with 2 mm x 2 mm copper pad areas at 9.5 mm lead length

(2) Leads clipped at 3 mm lead length from plastic body on 7.0 cm x 2.2 cm x 1.9 cm x 2 heatsink

IMMUNITY TO ELECTRICAL STATIC DISCHARGE TO THE FOLLOWING STANDARDS (T _A = 25 °C unless otherwise noted)						
STANDARD	TEST TYPE	TEST CONDITIONS	SYMBOL	CLASS	VALUE	
JESD22-A114	Human body model (contact mode)	C = 150 pF, R = 1.5 Ω		3B	> 8 kV	
JESD22-A115	Machine model (contact mode)	C = 200 pF, R = 0 Ω	V_{C}	С	> 400 V	
IEC 61000-4-2 (2)	Air discharge mode (1)	C = 150 pF, R = 330 Ω		4	> 15 kV	

Notes

(1) Immunity to IEC 61000-4-2 air discharge mode has a typical performance > 25 kV

(2) System ESD standard

ORDERING INFORMATION (Example)					
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE	
VSB20L45-M3/54	1.88	54	800	13" diameter paper tape and reel	
VSB20L45-M3/73	1.88	73	300	Ammo pack packaging	



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RATINGS AND CHARACTERISTICS CURVES

(T_A = 25 °C unless otherwise noted)

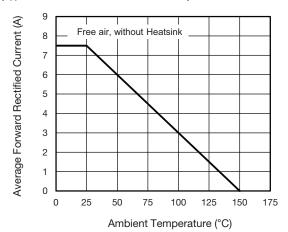


Fig. 1 - Forward Current Derating Curve

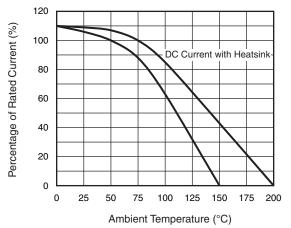


Fig. 2 - Rated Forward Current vs. Ambient Temperature

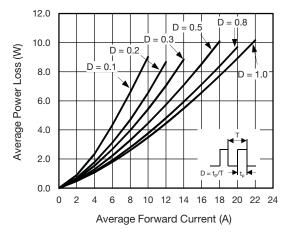


Fig. 3 - Forward Power Loss Characteristics

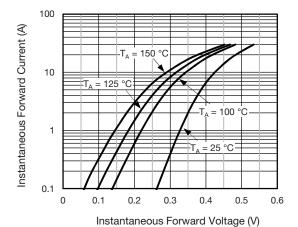


Fig. 4 - Typical Instantaneous Forward Characteristics

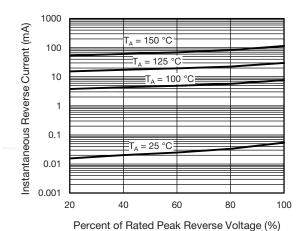


Fig. 5 - Typical Reverse Leakage Characteristics

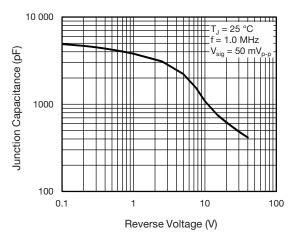
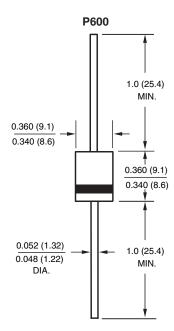


Fig. 6 - Typical Junction Capacitance

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PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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