

Photovoltaic Solar Cell Protection Schottky Rectifier

Ultra Low $V_F = 0.29\text{ V}$ at $I_F = 5\text{ A}$



FEATURES

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

PRIMARY CHARACTERISTICS	
$I_{F(DC)}$	15 A
V_{RRM}	45 V
I_{FSM}	200 A
V_F at $I_F = 15\text{ A}$	0.41 V
T_{OP} max. (AC mode)	150 °C
T_J max. (DC forward current)	200 °C
Package	P600
Diode variation	Single die

MAXIMUM RATINGS ($T_A = 25\text{ °C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VSB15L45	UNIT
Device marking code		V15L45	
Maximum repetitive peak reverse voltage	V_{RRM}	45	V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}^{(1)}$	15	A
	$I_{F(AV)}^{(2)}$	7.0	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	I_{FSM}	200	
Operating junction temperature range (AC mode)	T_{OP}	-40 to +150	°C
Storage temperature range	T_{STG}	-40 to +175	
Junction temperature in DC forward current without reverse bias, $t \leq 1\text{ h}$ (fig. 2)	$T_J^{(3)}$	≤ 200	

Notes

(1) With heatsink

(2) Without heatsink, free air

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



ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS	SYMBOL	TYP.	MAX.	UNIT	
Instantaneous forward voltage	$I_F = 5.0\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	0.41	-	V
	$I_F = 7.5\text{ A}$			0.44	-	
	$I_F = 15\text{ A}$			0.49	0.57	
	$I_F = 5.0\text{ A}$	$T_A = 125\text{ }^\circ\text{C}$		0.29	-	
	$I_F = 7.5\text{ A}$			0.33	-	
	$I_F = 15\text{ A}$			0.41	0.50	
Reverse current	$V_R = 45\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	-	4.0	mA
		$T_A = 125\text{ }^\circ\text{C}$		17	35	
Typical junction capacitance	4.0 V, 1 MHz	C_J	1430	-	pF	

Notes

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
- (2) Pulse test: 40 ms pulse width

THERMAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VSB15L45	UNIT
Thermal resistance	$R_{\theta JA}^{(1)}$	50	$^\circ\text{C/W}$
	$R_{\theta JL}^{(1)}$	3.5	
Typical thermal resistance	$R_{\theta JL}^{(2)}$	2.5	$^\circ\text{C/W}$

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

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
VSB15L45-M3/54	1.88	54	800	13" diameter paper tape and reel
VSB15L45-M3/73	1.88	73	300	Ammo pack packaging

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

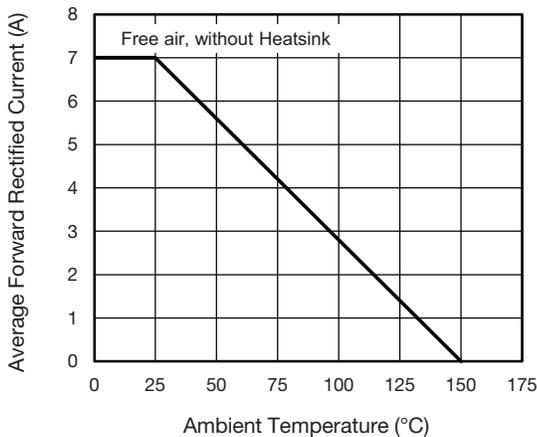


Fig. 1 - Forward Current Derating Curve

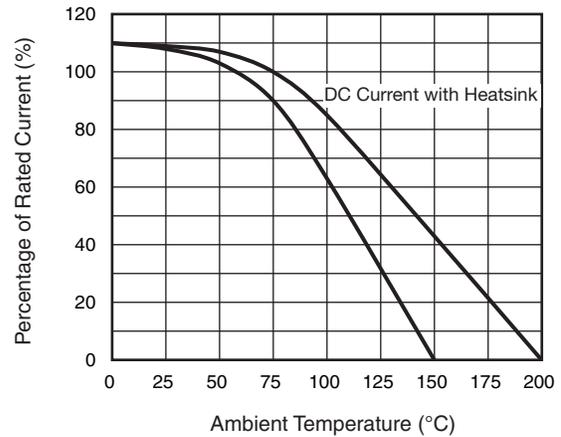


Fig. 2 - Rated Forward Current vs. Ambient Temperature

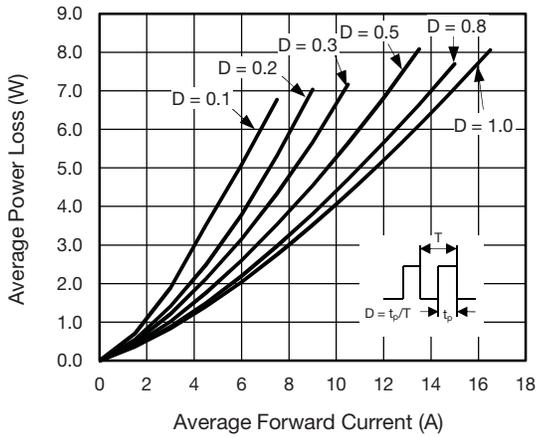


Fig. 3 - Forward Power Loss Characteristics

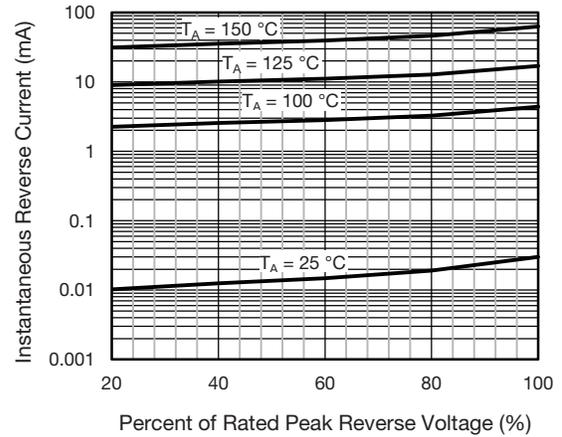


Fig. 5 - Typical Reverse Leakage Characteristics

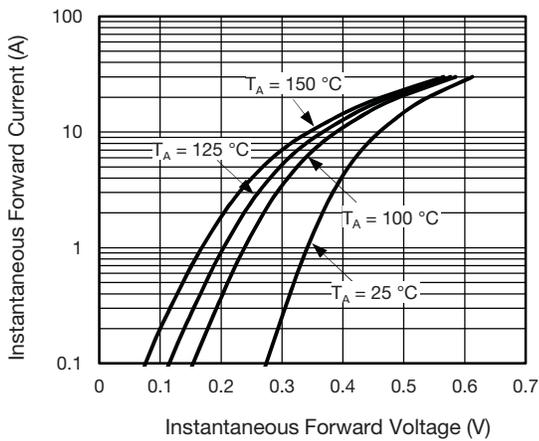


Fig. 4 - Typical Instantaneous Forward Characteristics

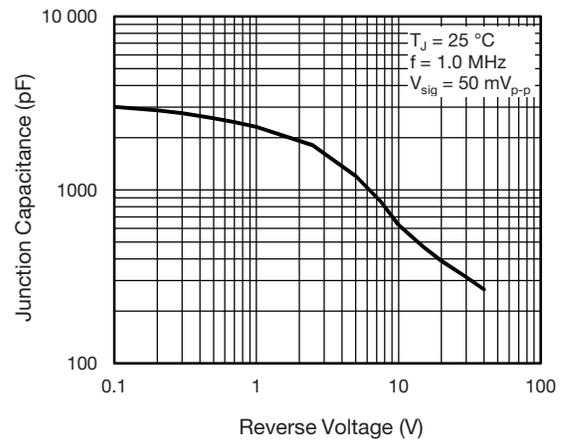
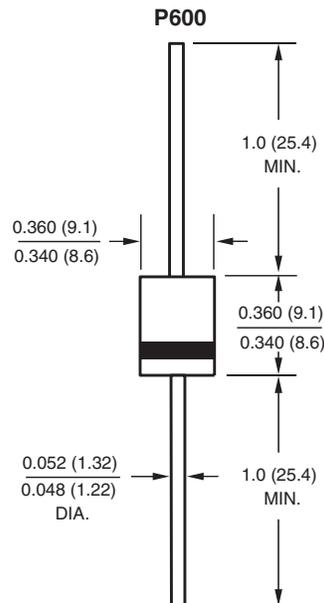


Fig. 6 - Typical Junction Capacitance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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