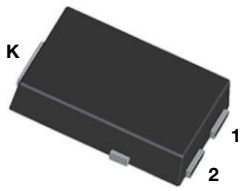
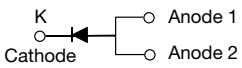
SMD Photovoltaic Solar Cell Protection TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low V_F = 0.34 V at I_F = 5 A

eSMP® Series



SMPC (TO-277A)



FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- 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: SMPC (TO-277A)
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 2 whisker test

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	10 A
V_{RRM}	45 V
I_{FSM}	180 A
V_F at I_F = 10 A	0.41 V
T_J max.	150 °C
Package	SMPC (TO-277A)
Circuit configuration	Single

LINKS TO ADDITIONAL RESOURCES

3D Models

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)			
PARAMETER	**SYMBOL**	**V10P45S**	**UNIT**
Device marking code		1045S	
Maximum repetitive peak reverse voltage	V_{RRM}	45	V
Maximum DC forward current	I_F (1)	10	A
	I_F (2)	4.4	
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I_{FSM}	180	A
Junction temperature in DC forward current without reverse bias, t ≤ 1 h	T_J (3)	≤ 200	°C
Operating junction temperature range	T_{OP}	-40 to +150	°C
Storage temperature range	T_{STG}	-40 to +175	°C

Notes
(1) Mounted on 30 mm x 30 mm aluminum PCB
(2) Free air, mounted on recommended copper pad area
(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	V_F (1)	0.42	-	V
	I_F = 10 A			0.48	0.57	
	I_F = 5.0 A	T_A = 125 °C		0.34	-	
	I_F = 10 A			0.41	0.50	
Reverse current	V_R = 45 V	T_A = 25 °C	I_R (2)	21	800	µA
		T_A = 125 °C		9	35	mA

Notes

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

(2) Pulse test: Pulse width ≤ 40 ms

THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)			
PARAMETER	SYMBOL	V10P45S	UNIT
Typical thermal resistance	$R_{\theta JA}$ (1)	75	°C/W
	$R_{\theta JM}$ (2)	4	

Notes

(1) Free air, mounted on recommended copper pad area; thermal resistance $R_{\theta JA}$ - junction-to-ambient

(2) Mounted on 30 mm x 30 mm aluminum PCB; thermal resistance $R_{\theta JM}$ - junction-to-mount

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V10P45S-M3/86A	0.10	86A	1500	7" diameter plastic tape and reel
V10P45S-M3/87A	0.10	87A	6500	13" diameter plastic tape and reel

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

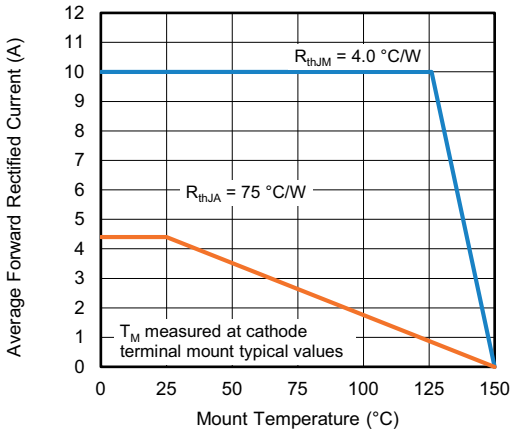

Fig. 1 - Forward Current Derating Curve

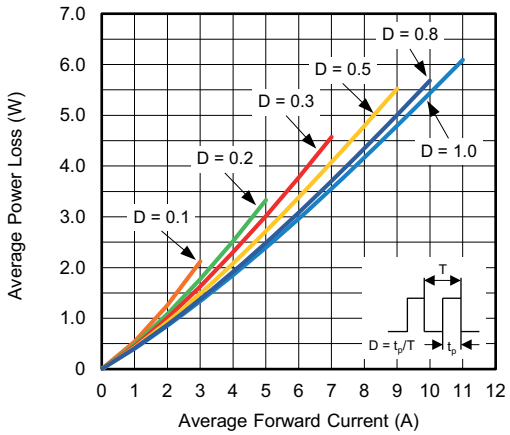

Fig. 2 - Forward Power Loss Characteristics

Notes

(1) Mounted on 30 mm x 30 mm aluminum PCB; T_M measured at the terminal of cathode band ($R_{\theta JM}$ = 4 °C/W)

(2) Free air, mounted on recommended copper pad area ($R_{\theta JA}$ = 75 °C/W)

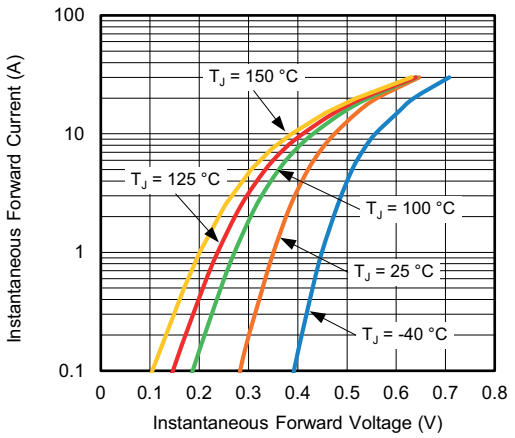

Fig. 3 - Typical Instantaneous Forward Characteristics

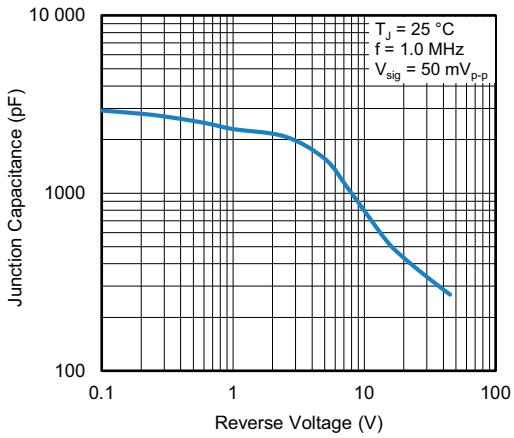

Fig. 5 - Typical Junction Capacitance

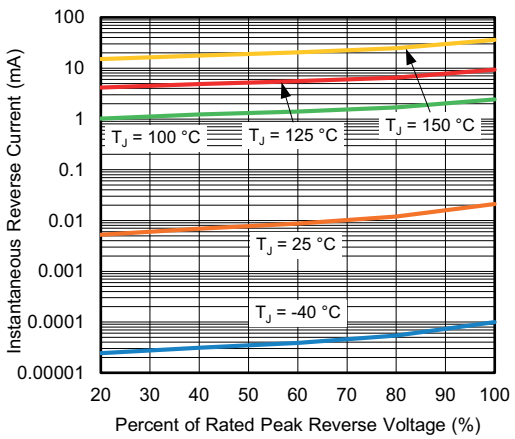

Fig. 4 - Typical Reverse Leakage Characteristics

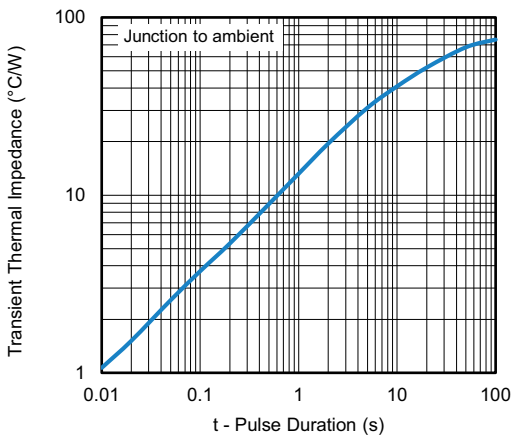

Fig. 6 - Typical Transient Thermal Impedance

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PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

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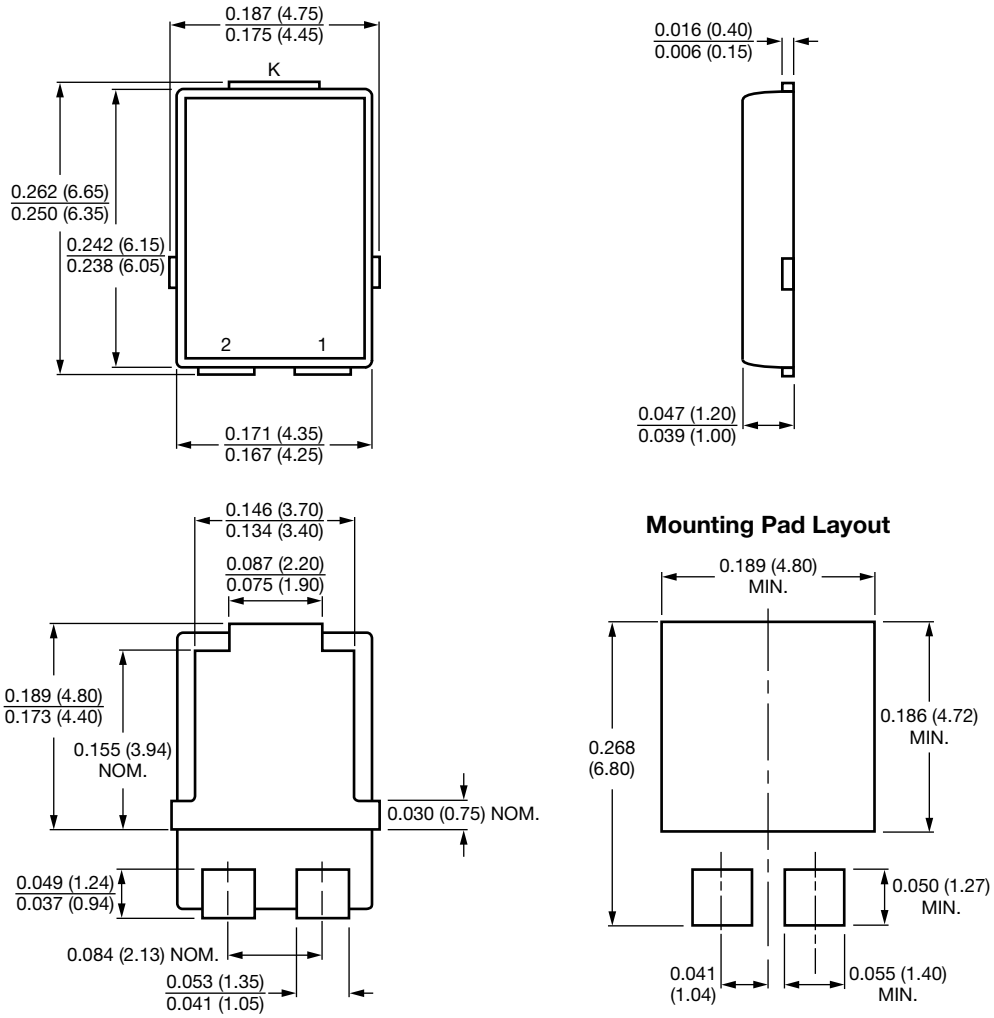

Conform to JEDEC® TO-277A

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