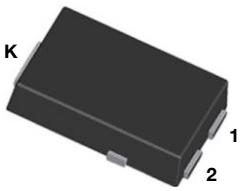
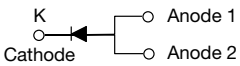
SMD Photovoltaic Solar Cell Protection Schottky Rectifier

eSMP® Series



SMPC (TO-277A)



FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Guardring for overvoltage protection
- Low forward voltage drop, low power losses
- High efficiency
- Low thermal resistance
- 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

LINKS TO ADDITIONAL RESOURCES

3D Models

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 1A whisker test

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	15 A
V_{RRM}	30 V
I_{FSM}	280 A
E_{AS}	20 mJ
V_F at I_F = 15 A	0.42 V
T_J max.	150 °C
Package	SMPC (TO-277A)
Circuit configuration	Single

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)			
PARAMETER	**SYMBOL**	**SS15P3S**	**UNIT**
Device marking code		153S	
Maximum repetitive peak reverse voltage	V_{RRM}	30	V
Maximum DC forward current (fig. 1)	I_F	15 (1)	A
		4.5 (2)	
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I_{FSM}	280	A
Non-repetitive avalanche energy at I_{AS} = 2.0 A, T_J = 25 °C	E_{AS}	20	mJ
Operating junction and storage temperature range	T_{OP}, T_{STG}	-55 to +150	°C
Junction temperature in DC forward current without reverse bias, t ≤ 1 h (3)	T_J	≤ 200	°C

Notes
(1) Mounted on 30 mm x 30 mm Al PCB with 50 mm x 25 mm x 100 mm fin heat sink
(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 = 7.5 A	T_A = 25 °C	V_F (1)	0.43	-	V
	I_F = 15 A			0.50	0.57	
	I_F = 7.5 A	T_A = 125 °C		0.32	-	
	I_F = 15 A			0.42	0.49	
Reverse current	V_R = 30 V	T_A = 25 °C	I_R (2)	150	1000	µA
		T_A = 125 °C		59	120	mA
Typical junction capacitance	4.0 V, 1 MHz		C_J	930	-	pF

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**	**VALUE**	**UNIT**
Typical thermal resistance	$R_{\theta JA}$ (1)	100	°C/W
	$R_{\theta JM}$ (2)	3	

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 Al PCB with 50 mm x 25 mm x 100 mm fin heat sink. Thermal resistance $R_{\theta JM}$ - junction to mount.

ORDERING INFORMATION (Example)				
PREFERRED P/N	**UNIT WEIGHT (g)**	**PREFERRED PACKAGE CODE**	**BASE QUANTITY**	**DELIVERY MODE**
SS15P3S-M3/86A	0.10	86A	1500	7" diameter plastic tape and reel
SS15P3S-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)

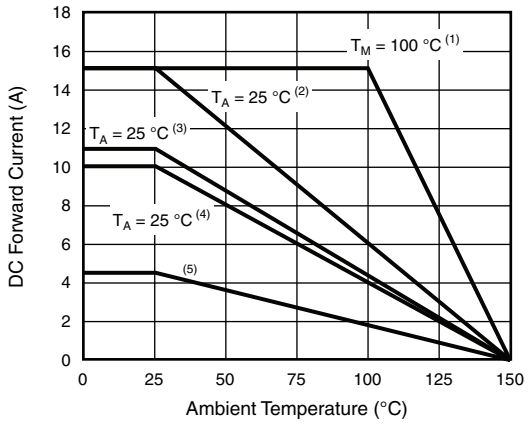


Fig. 1 - Maximum Current Derating Curve

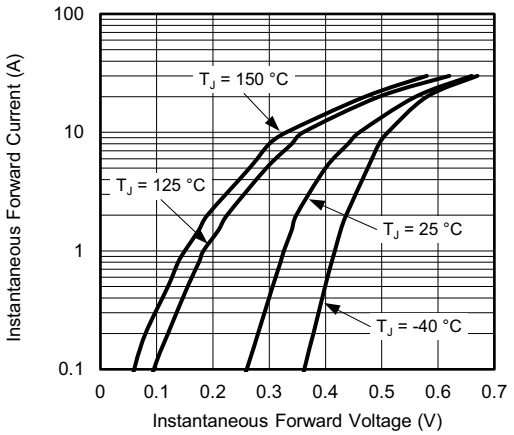


Fig. 3 - Typical Instantaneous Forward Characteristics

Notes

(1) Mounted on 30 mm x 30 mm Al PCB with 50 mm x 25 mm x 100 mm fin heat sink, T_M measured at the terminal of cathode band

(2) Mounted on 30 mm x 30 mm Al PCB ($R_{\theta JA}$ = 20 °C/W)

(3) Mounted on 30 mm x 30 mm x 2 copper pad areas FR4 PCB ($R_{\theta JA}$ = 30 °C/W)

(4) Mounted on 25 mm x 25 mm x 2 copper pad areas FR4 PCB ($R_{\theta JA}$ = 30 °C/W)

(5) Free air, mounted on recommended copper pad area ($R_{\theta JA}$ = 100 °C/W)

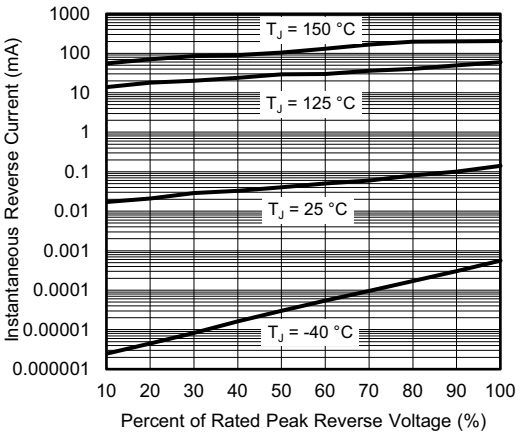


Fig. 4 - Typical Reverse Leakage Characteristics

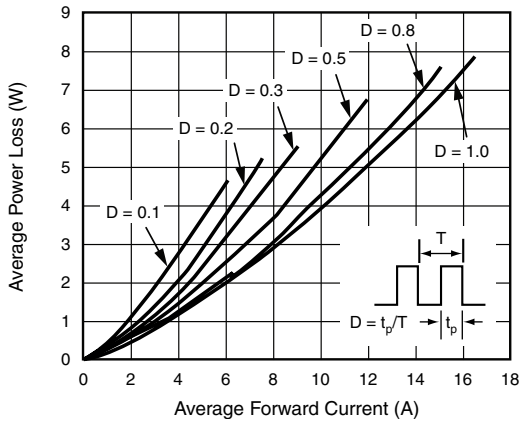


Fig. 2 - Forward Power Loss Characteristics

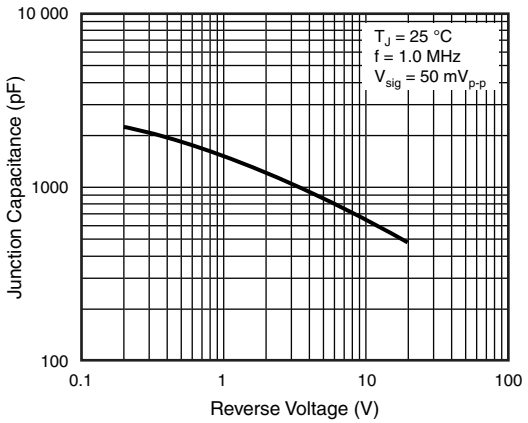
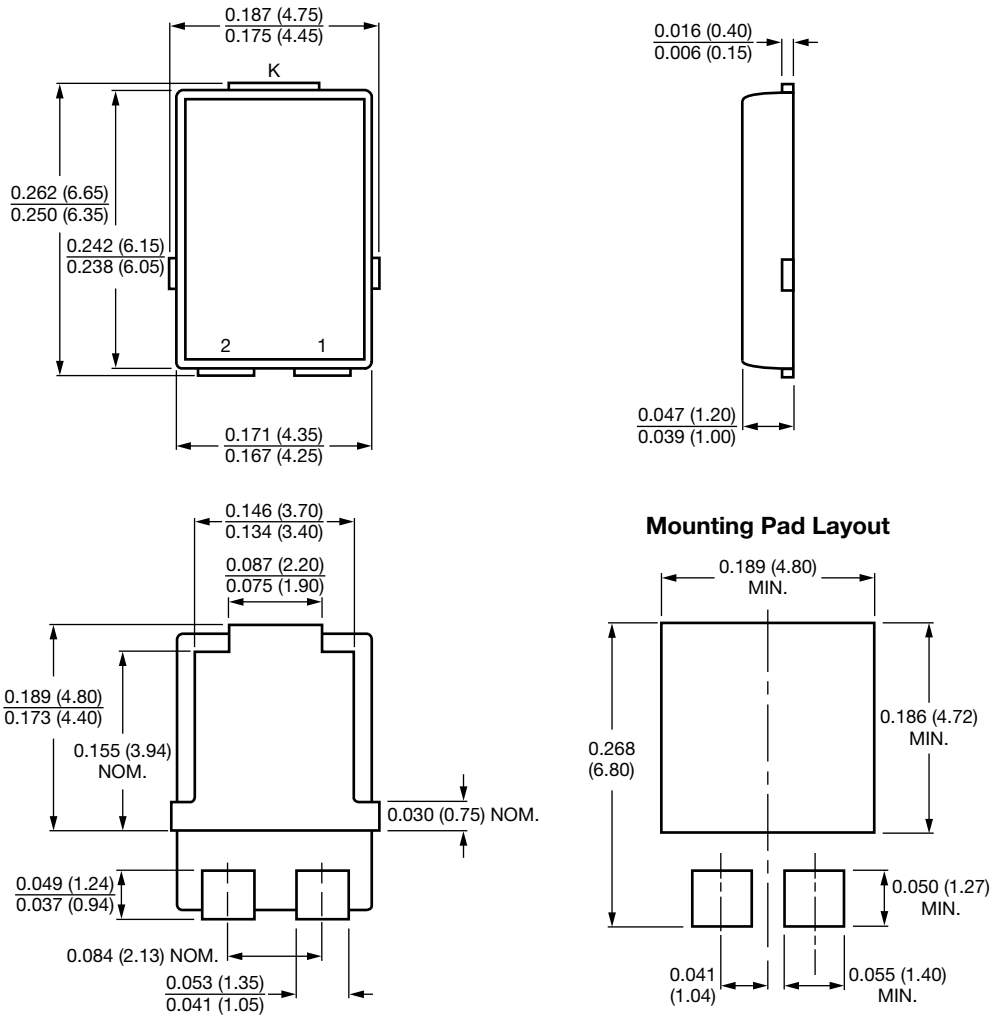


Fig. 5 - Typical Junction Capacitance

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PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMPC (TO-277A)



Conform to JEDEC® TO-277A

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