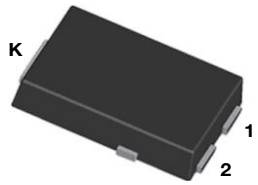
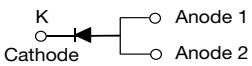
SMD Photovoltaic Solar Cell Protection Rectifier

eSMP® Series



SMPC (TO-277A)



FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Glass passivated pellet chip junction
- Low forward voltage drop
- High forward surge capability
- 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

TYPICAL APPLICATIONS

For use in solar cell panel blocking 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
E3 suffix meets JESD 201 class 1A whisker test

LINKS TO ADDITIONAL RESOURCES

3D Models

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	5.0 A
V_{RRM}	1000 V
I_{FSM}	100 A
I_R	10 µA
V_F at I_F = 5.0 A	0.90 V
T_J max.	150 °C
Package	SMPC (TO-277A)
Circuit configuration	Single

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)				
PARAMETER		SYMBOL	S5PMS	UNIT
Device marking code			5PMS	
Max. repetitive peak reverse voltage		V_{RRM}	1000	V
Max. DC forward current (fig. 1)	T_M = 130 °C	I_F	5.0 (1)	A
	T_A = 25 °C		1.8 (2)	
Peak forward surge current 10 ms single half sine-wave superimposed on rated load		I_{FSM}	100	A
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
(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 = 2.5 A	T_A = 25 °C	V_F (1)	0.94	-	V
	I_F = 5.0 A			0.99	1.15	
	I_F = 2.5 A	T_A = 125 °C		0.82	-	
	I_F = 5.0 A			0.90	1.00	
Reverse current	Rated V_R	T_A = 25 °C	I_R (2)	-	10	µA
		T_A = 125 °C		55	100	
Max. reverse recovery time	I_F = 0.5 A, I_R = 1.0 A, I_{rr} = 0.25 A		t_{rr}	2.5	-	µs
Typical junction capacitance	4.0 V, 1 MHz		C_J	30	-	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**	**S5PMS**	**UNIT**
Typical thermal resistance	$R_{\theta JA}$ (1)	90	°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. Thermal resistance $R_{\theta JM}$ - junction to mount

ORDERING INFORMATION (Example)				
PREFERRED P/N	**UNIT WEIGHT (g)**	**PREFERRED PACKAGE CODE**	**BASE QUANTITY**	**DELIVERY MODE**
S5PMS-M3/86A	0.10	86A	1500	7" diameter plastic tape and reel
S5PMS-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)

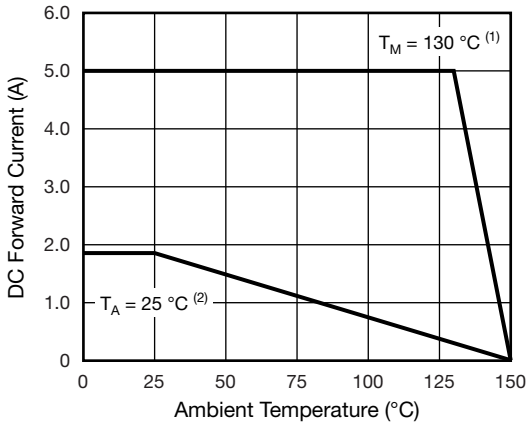

Fig. 1 - Forward Current Derating Curve

Notes

(1) Mounted on 30 mm x 30 mm Al PCB T_M measured at the terminal ($R_{\theta JM}$ = 3.0 °C/W)

(2) Free air, mounted on recommended copper pad area ($R_{\theta JA}$ = 90 °C/W)

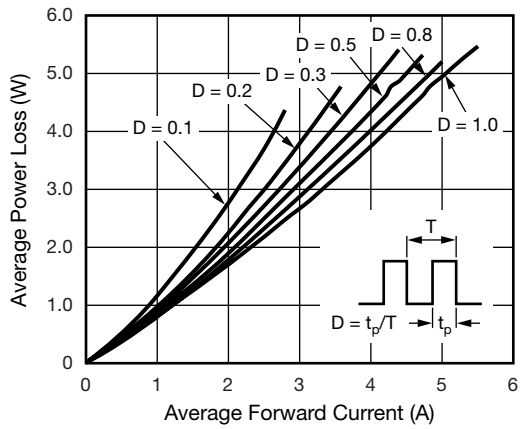

Fig. 2 - Forward Power Loss Characteristics

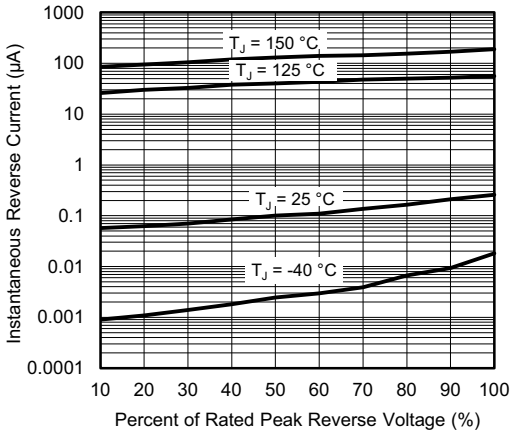

Fig. 4 - Typical Reverse Leakage Characteristics

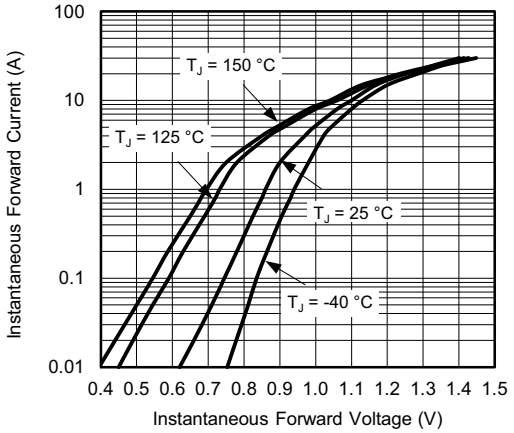

Fig. 3 - Typical Instantaneous Forward Characteristics

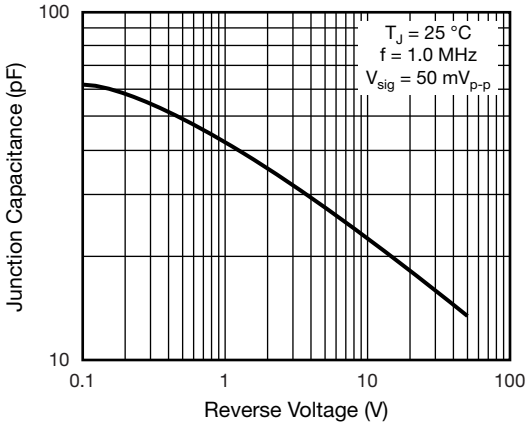

Fig. 5 - Typical Junction Capacitance

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PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

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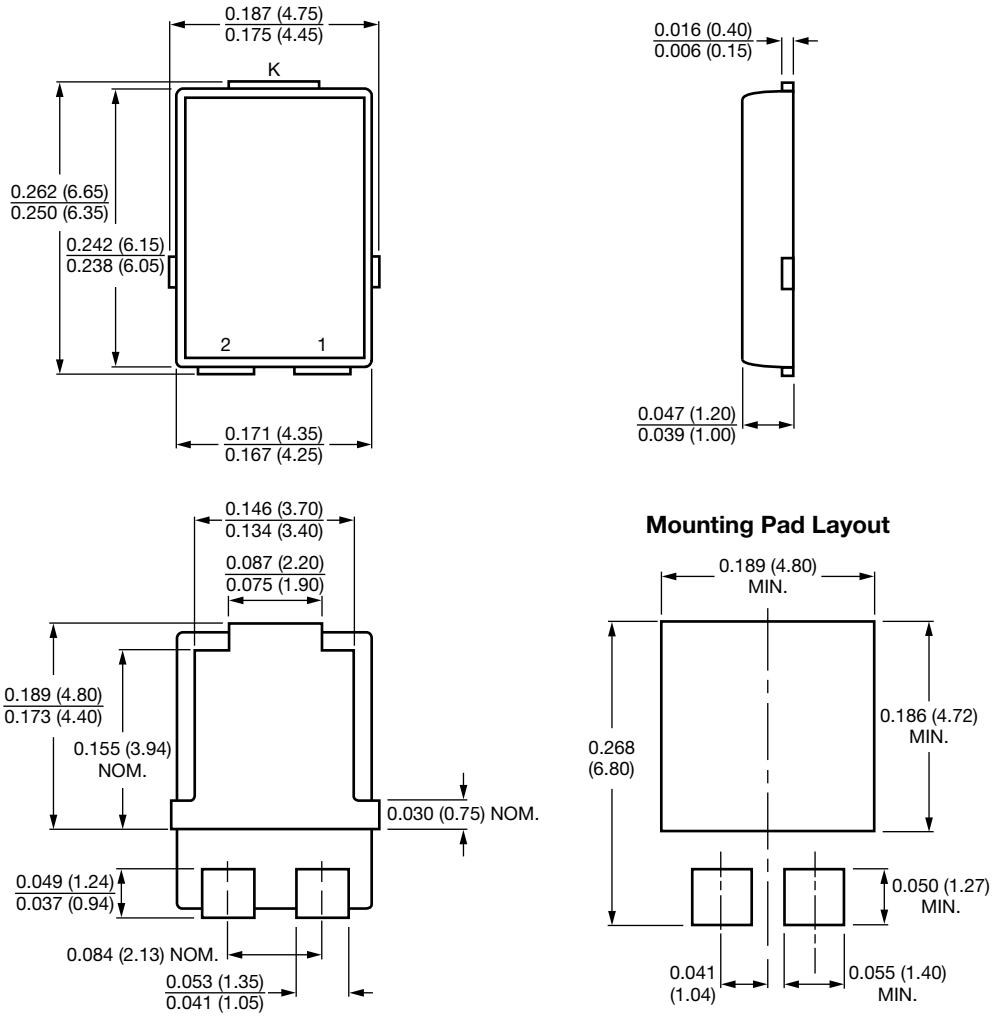

Mounting Pad Layout

Conform to JEDEC® TO-277A

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