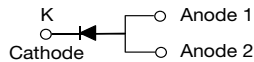


# SMD Photovoltaic Solar Cell Protection Rectifier

## 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](http://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 $\mu$ A
$V_F$ 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	5.0 <sup>(1)</sup>
		$T_A = 25$ °C	1.8 <sup>(2)</sup>
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, $t \leq 1$ h <sup>(3)</sup>	$T_J$	$\leq 200$	°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



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	$I_F = 2.5\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	0.94	-	V
	$I_F = 5.0\text{ A}$			0.99	1.15	
	$I_F = 2.5\text{ A}$	$T_A = 125\text{ }^\circ\text{C}$		0.82	-	
	$I_F = 5.0\text{ A}$			0.90	1.00	
Reverse current	Rated $V_R$	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	-	10	$\mu\text{A}$
		$T_A = 125\text{ }^\circ\text{C}$		55	100	
Max. reverse recovery time	$I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ , $t_{rr} = 0.25\text{ A}$		$t_{rr}$	2.5	-	$\mu\text{s}$
Typical junction capacitance	4.0 V, 1 MHz		$C_J$	30	-	pF

**Notes**

- (1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle  
(2) Pulse test: Pulse width  $\leq 40\text{ ms}$

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	S5PMS	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)}$	90	$^\circ\text{C/W}$
	$R_{\theta JM}^{(2)}$	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

<b>ORDERING INFORMATION</b> (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

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

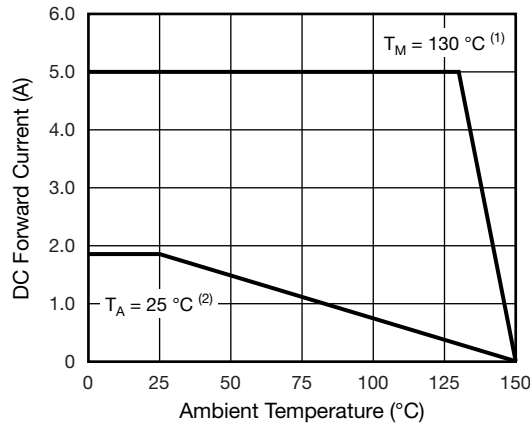


Fig. 1 - Forward Current Derating Curve

**Notes**

- (1) Mounted on 30 mm x 30 mm Al PCB  $T_M$  measured at the terminal ( $R_{\theta JM} = 3.0\text{ }^\circ\text{C/W}$ )
- (2) Free air, mounted on recommended copper pad area ( $R_{\theta JA} = 90\text{ }^\circ\text{C/W}$ )

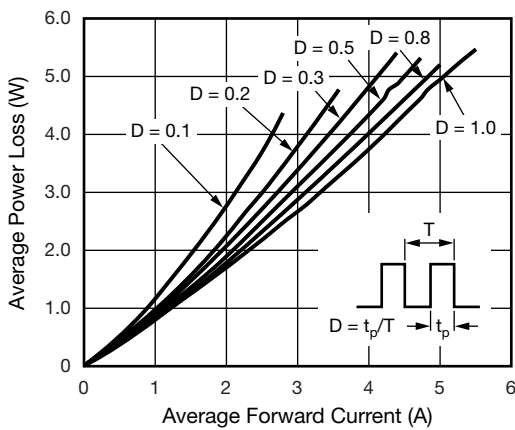


Fig. 2 - Forward Power Loss Characteristics

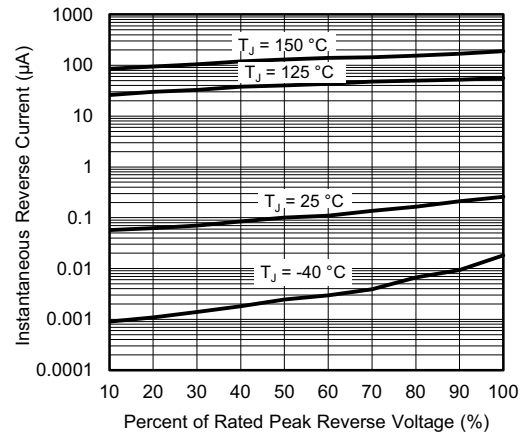


Fig. 4 - Typical Reverse Leakage Characteristics

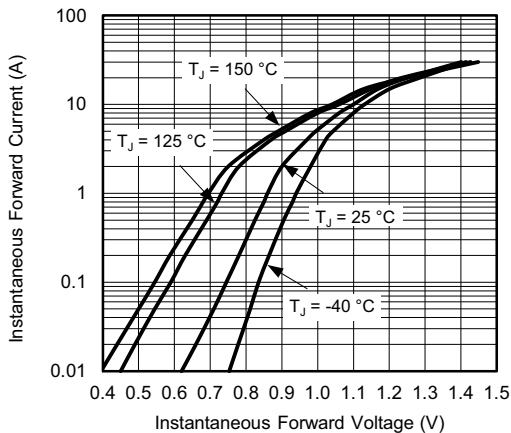


Fig. 3 - Typical Instantaneous Forward Characteristics

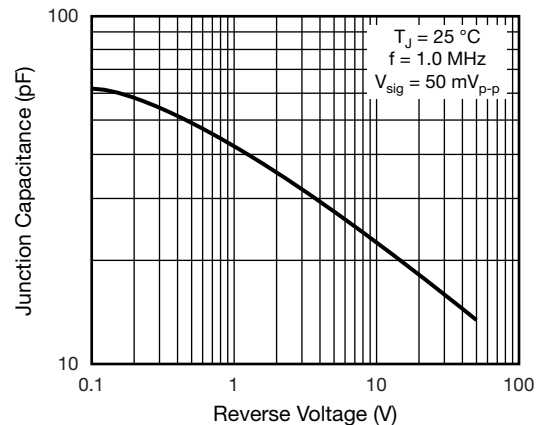
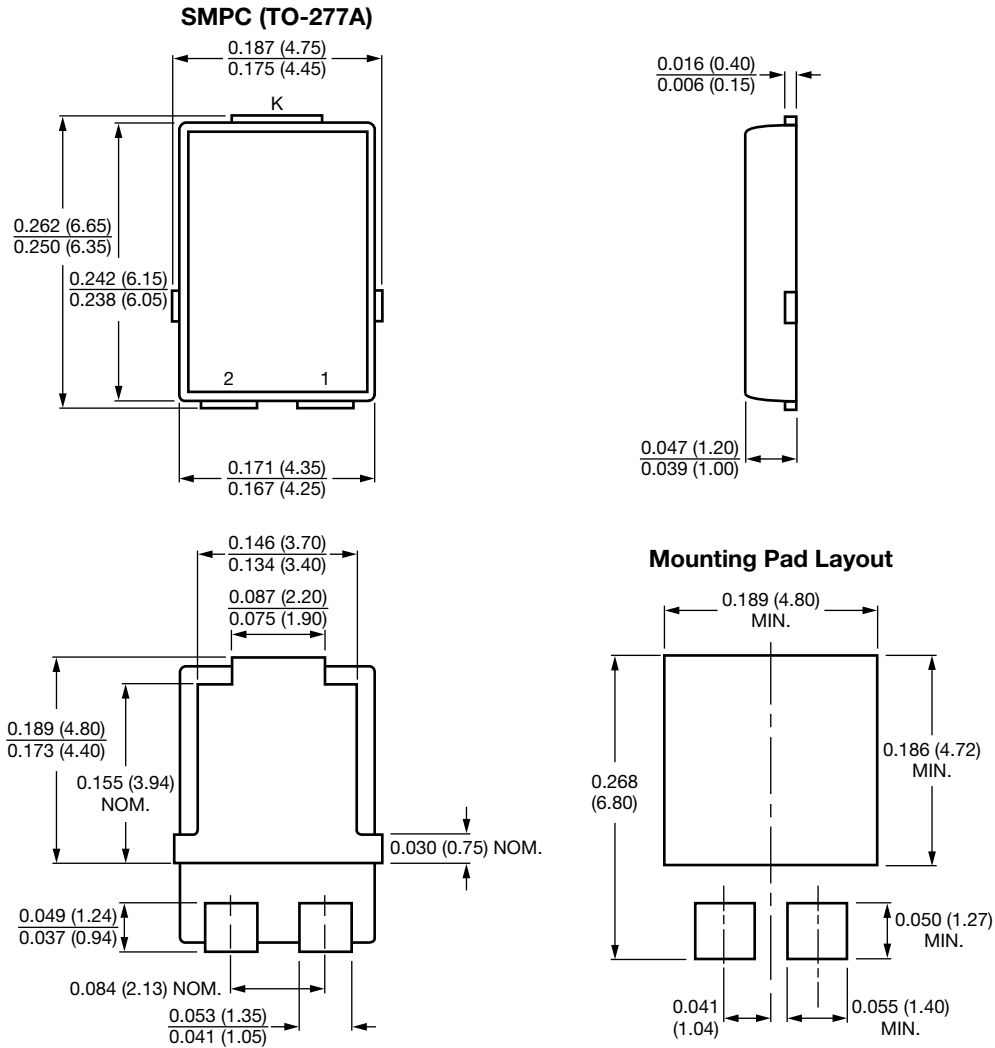


Fig. 5 - Typical Junction Capacitance



**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)



Conform to JEDEC® TO-277A



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