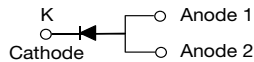


# Fast Switching Avalanche Surface-Mount Rectifiers

## eSMP® Series



### SMPC (TO-277A)



## ADDITIONAL RESOURCES


[3D Models](#)

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	3.0 A
$V_{RRM}$	200 V, 400 V, 600 V
$I_{FSM}$	50 A
$t_{rr}$	140 ns
$E_{AS}$	20 mJ
$V_F$ at $I_F = 3.0$ A	1.04 V
$T_J$ max.	175 °C
Package	SMPC (TO-277A)
Circuit configuration	Single

## FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Glass passivated pellet chip junction
- Fast reverse recovery time
- Controlled avalanche characteristics
- Low leakage current
- High forward surge capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available  
- Automotive ordering code: base P/NHM3
- 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 lighting, fast switching rectification of power supplies, inverters, converters, and freewheeling diodes for consumer, automotive, and telecommunication.

## 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

Base P/NHM3\_X - halogen-free, RoHS-compliant and AEC-Q101 qualified

("\_X" denotes revision code e.g. A, B,.....)

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 2 whisker test, HM3 suffix meets JESD 201 class 2 whisker test

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)					
PARAMETER	SYMBOL	AR3PD	AR3PG	AR3PJ	UNIT
Device marking code		AR3D	AR3G	AR3J	
Maximum repetitive peak reverse voltage	$V_{RRM}$	200	400	600	V
Maximum DC forward current (fig. 1)	$I_F^{(1)}$	3.0			A
	$I_F^{(2)}$	1.8			
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	50			A
Non-repetitive avalanche energy at $T_J = 25$ °C $I_{AS} = 2.5$ A max. $I_{AS} = 1.0$ A typ.	$E_{AS}$	20			mJ
		30			
Operating junction and storage temperature range	$T_J, T_{STG}$	-55 to +175			°C

## Notes

(1) Mounted on 14 mm x 14 mm pad areas, 1 oz. FR4 PCB

(2) Free air, mounted on recommended pad area



ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 3.0 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	1.24	1.6	V
		T <sub>A</sub> = 125 °C		1.04	1.20	
Reverse current	Rated V <sub>R</sub>	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	0.33	10	μA
		T <sub>A</sub> = 125 °C		44	250	
Maximum reverse recovery time	I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1.0 A, I <sub>rr</sub> = 0.25 A		t <sub>rr</sub>	122	140	ns
Typical junction capacitance per diode	Rated V <sub>R</sub> = 4.0 V, 1 MHz		C <sub>J</sub>	44	-	pF

**Notes**

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

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)					
PARAMETER	SYMBOL	AR3PD	AR3PG	AR3PJ	UNIT
Typical thermal resistance	R <sub>θJA</sub> <sup>(1)</sup>	85			°C/W
	R <sub>θJM</sub> <sup>(2)</sup>	5			

**Notes**

- (1) Free air, mounted on recommended PCB 1 oz. pad are; thermal resistance R<sub>θJA</sub> - junction to ambient
- (2) Units mounted on PCB with 14 mm x 14 mm copper pad areas; R<sub>θJM</sub> - junction to mount

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
AR3PJ-M3/86A	0.10	86A	1500	7" diameter plastic tape and reel
AR3PJ-M3/87A	0.10	87A	6500	13" diameter plastic tape and reel
AR3PJHM3_A/H <sup>(1)</sup>	0.10	H	1500	7" diameter plastic tape and reel
AR3PJHM3_A/I <sup>(1)</sup>	0.10	I	6500	13" diameter plastic tape and reel

**Note**

- (1) AEC-Q101 qualified

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

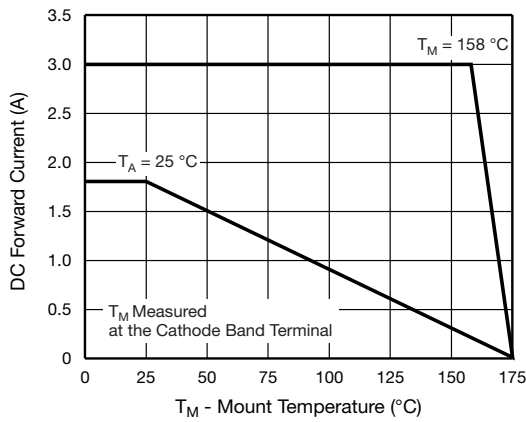


Fig. 1 - Maximum Forward Current Derating Curve

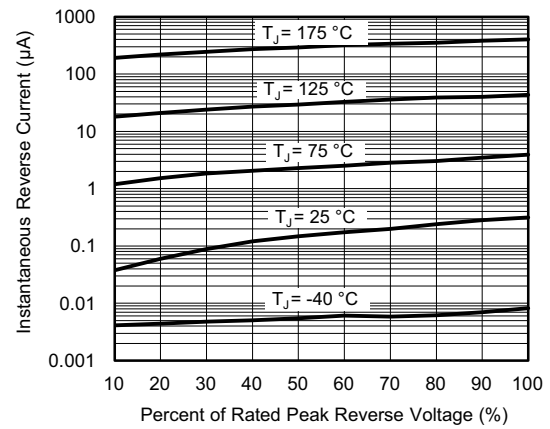


Fig. 4 - Typical Reverse Leakage Characteristics

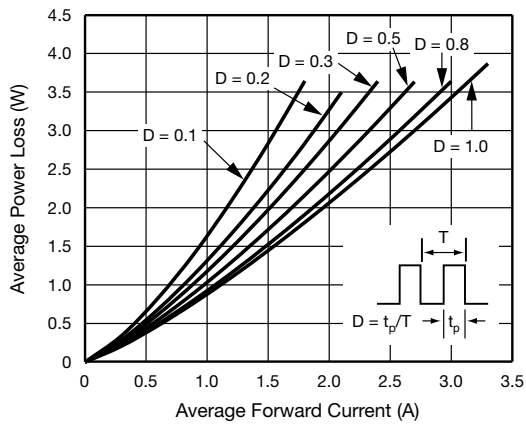


Fig. 2 - Average Power Loss Characteristics

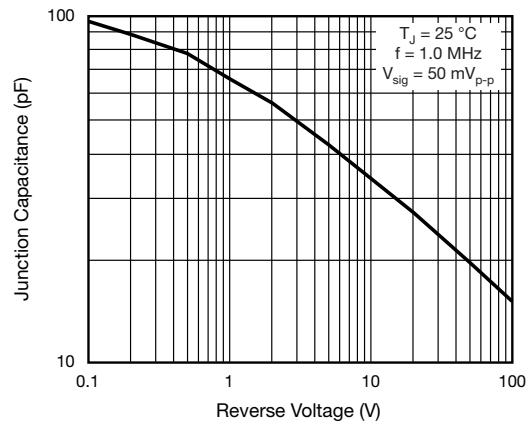


Fig. 5 - Typical Junction Capacitance

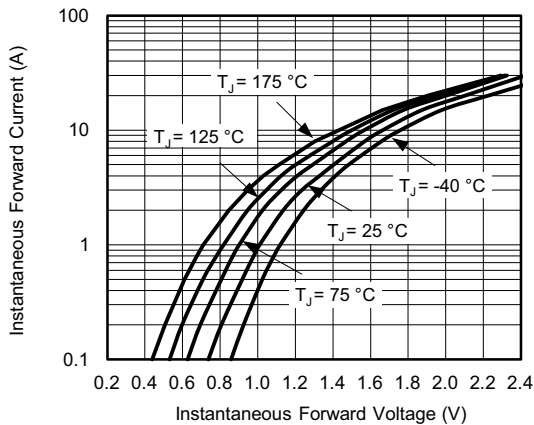


Fig. 3 - Typical Instantaneous Forward Characteristics

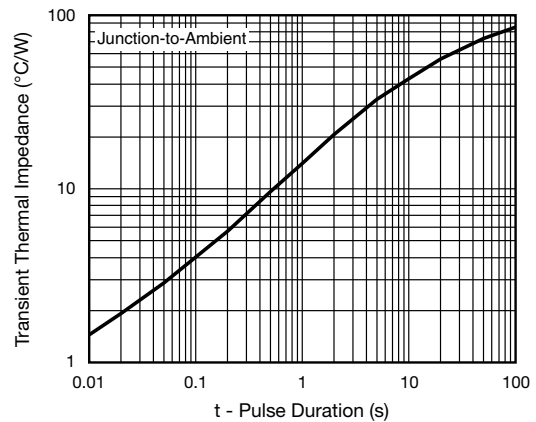
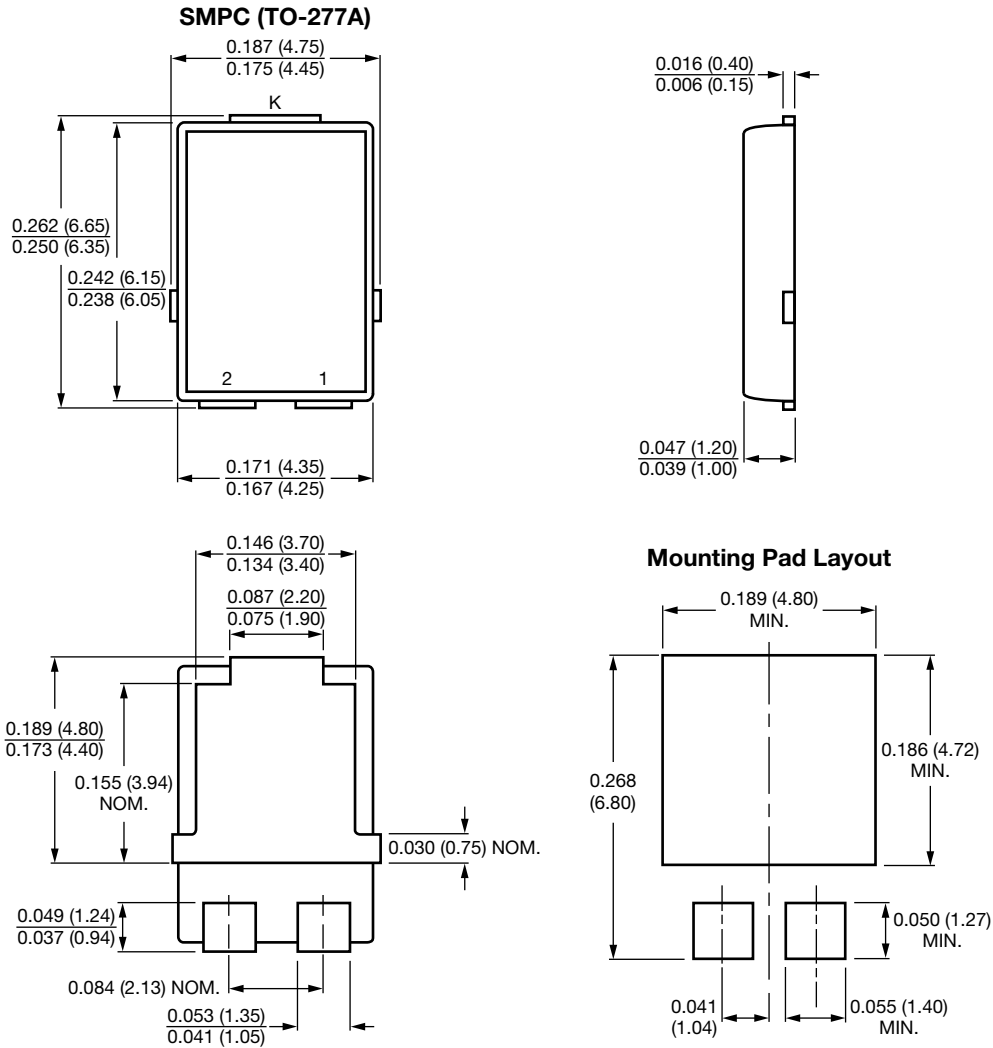


Fig. 6 - Typical Transient Thermal Impedance



### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC® TO-277A



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