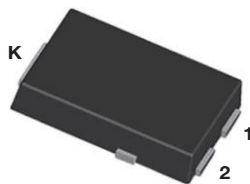
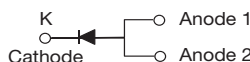


# Fast Switching Avalanche Surface Mount Rectifiers

## eSMP® Series



### SMPC (TO-277A)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## 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)

## 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

## DESIGN SUPPORT TOOLS

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PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	4.0 A
$V_{RRM}$	800 V, 1000 V
$I_{FSM}$	65 A
$t_{rr}$	120 ns
$E_{AS}$	20 mJ
$V_F$ at $I_F = 4.0$ A	1.27 V
$T_J$ max.	175 °C
Package	SMPC (TO-277A)
Circuit configuration	Single

MAXIMUM RATINGS (T <sub>A</sub> = 25 °C unless otherwise noted)					
PARAMETER		SYMBOL	AR4PK	AR4PM	UNIT
Device marking code			AR4K	AR4M	
Maximum repetitive peak reverse voltage		V <sub>RRM</sub>	800	1000	V
Maximum DC forward current (fig. 1)		I <sub>F</sub> <sup>(1)</sup>	4.0		A
		I <sub>F</sub> <sup>(2)</sup>	1.8		
Peak forward surge current 10 ms single half sine-wave superimposed on rated load		I <sub>FSM</sub>	65		A
Non-repetitive avalanche energy at T <sub>J</sub> = 25 °C	I <sub>AS</sub> = 2.5 A max.	E <sub>AS</sub>	20		mJ
	I <sub>AS</sub> = 1.0 A typ.		30		
Operating junction and storage temperature range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +175		°C

## Notes

(1) Mounted on 30 mm x 30 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> = 4.0 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	1.66	1.9	V
		T <sub>A</sub> = 125 °C		1.27	1.6	
Reverse current	Rated V <sub>R</sub>	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	0.42	10	μA
		T <sub>A</sub> = 125 °C		96.3	500	
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>	79	120	ns
Typical junction capacitance per diode	Rated V <sub>R</sub> = 4.0 V, 1 MHz		C <sub>J</sub>	55	-	pF

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

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL	AR4PK	AR4PM	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  $R_{\theta JA}$  - junction to ambient(2) Units mounted on PCB with 30 mm x 30 mm copper pad areas;  $R_{\theta JM}$  - junction to mount

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
AR4PM-M3/86A	0.10	86A	1500	7" diameter plastic tape and reel
AR4PM-M3/87A	0.10	87A	6500	13" diameter plastic tape and reel
AR4PMHM3_A/H <sup>(1)</sup>	0.10	H	1500	7" diameter plastic tape and reel
AR4PMHM3_A/I <sup>(1)</sup>	0.10	I	6500	13" diameter plastic tape and reel

**Note**

(1) AEC-Q101 qualified

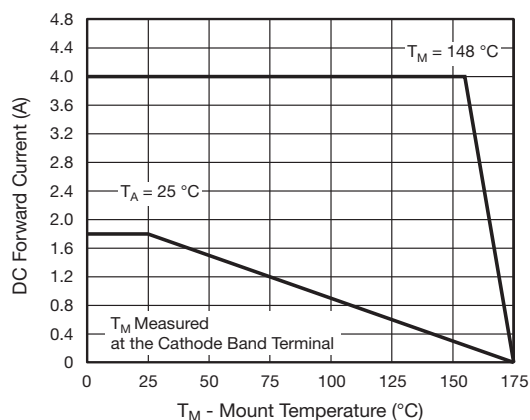
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum DC Forward Current Derating Curve

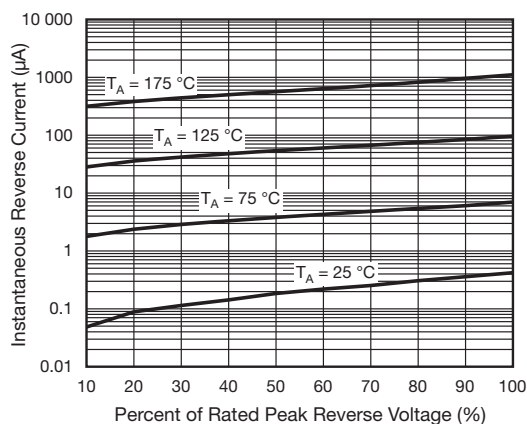


Fig. 4 - Typical Reverse Leakage Characteristics

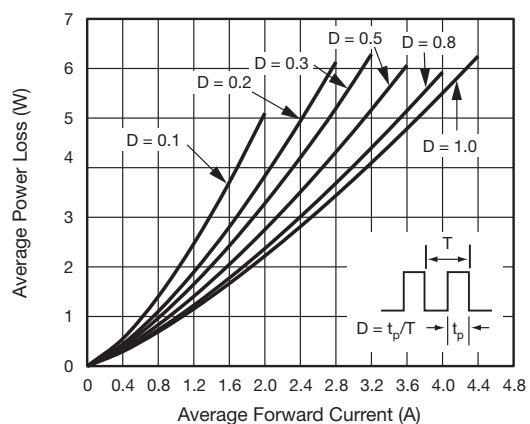


Fig. 2 - Average Power Loss Characteristics

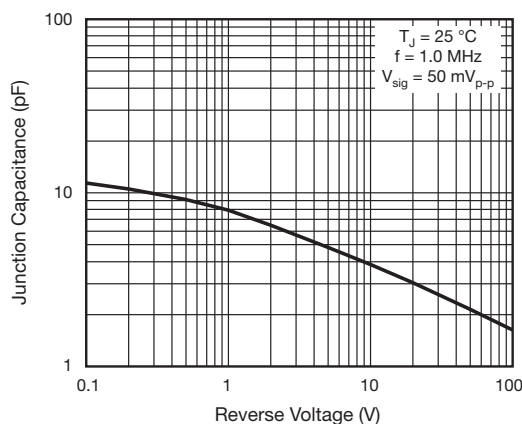


Fig. 5 - Typical Junction Capacitance

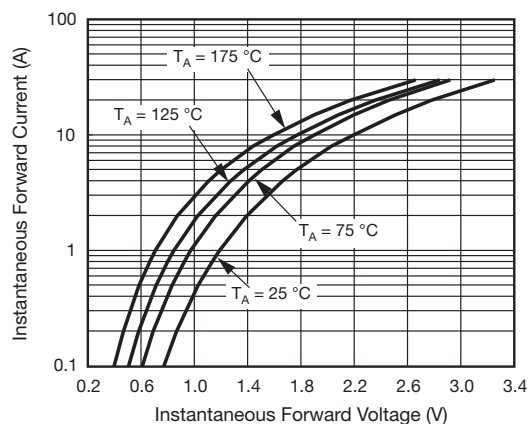


Fig. 3 - Typical Instantaneous Forward Characteristics

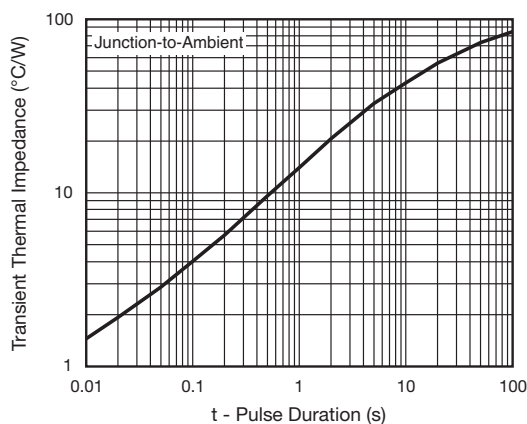
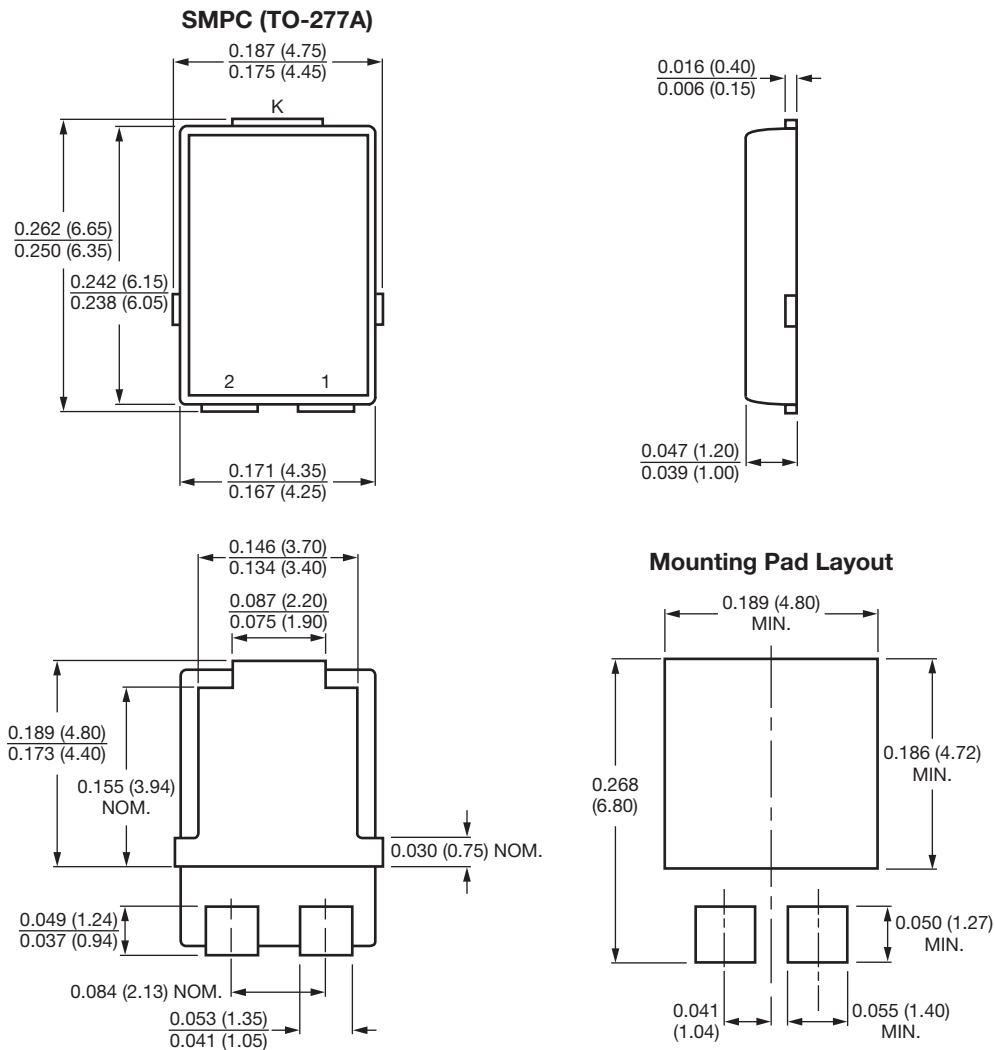


Fig. 6 - Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC® TO-277A



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