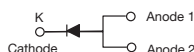


# Fast Switching Avalanche Surface Mount Rectifiers

## eSMP® Series



TO-277A (SMPC)



## 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	TO-277A (SMPC)
Diode variation	Single die

## TYPICAL APPLICATIONS

For use in lighting, fast switching rectification of power supplies, inverters, converters, and freewheeling diodes for consumer, automotive, and telecommunication.

## FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Glass passivated 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
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



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

## MECHANICAL DATA

**Case:** TO-277A (SMPC)

Molding compound meets UL 94 V-0 flammability rating

Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

Base P/NHM3 - halogen-free, RoHS-compliant, and automotive grade

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

PARAMETER	TEST CONDITIONS	SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	$I_F = 4.0\text{ A}$	$V_F^{(1)}$	1.66	1.9	V
			1.27	1.6	
Reverse current	Rated $V_R$	$I_R^{(2)}$	0.42	10	$\mu\text{A}$
			96.3	500	
Maximum reverse recovery time	$I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ , $t_{rr} = 0.25\text{ A}$	$t_{rr}$	79	120	ns
Typical junction capacitance per diode	Rated $V_R = 4.0\text{ V}$ , 1 MHz	$C_J$	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** ( $T_A = 25\text{ }^{\circ}\text{C}$  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
AR4PMHM3/86A <sup>(1)</sup>	0.10	86A	1500	7" diameter plastic tape and reel
AR4PMHM3/86A <sup>(1)</sup>	0.10	87A	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)

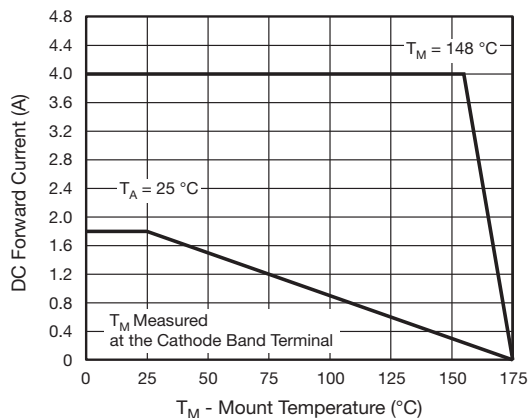


Fig. 1 - Maximum DC Forward Current Derating Curve

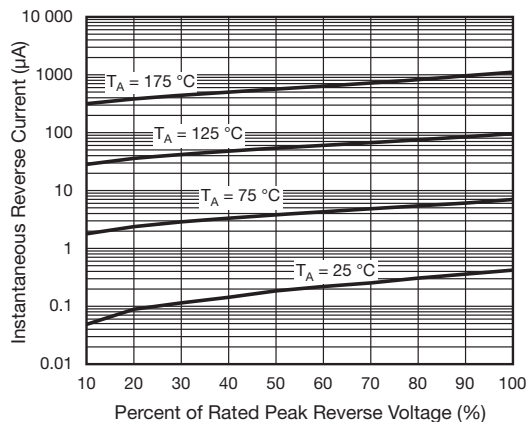


Fig. 4 - Typical Reverse Leakage Characteristics

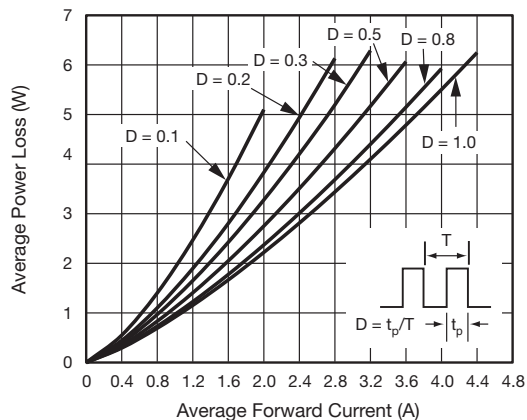


Fig. 2 - Average Power Loss Characteristics

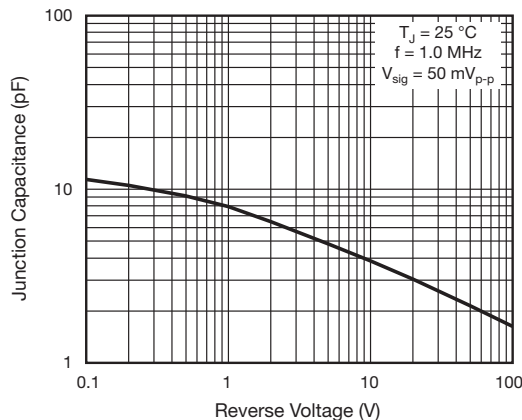


Fig. 5 - Typical Junction Capacitance

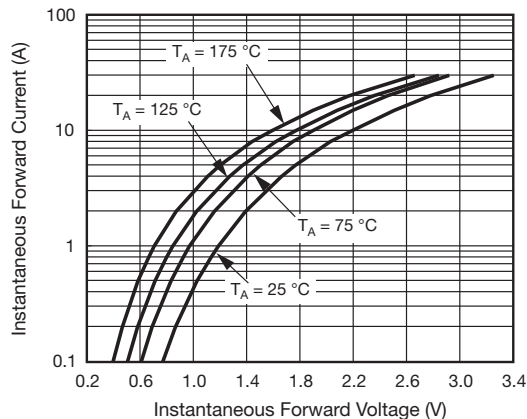


Fig. 3 - Typical Instantaneous Forward Characteristics

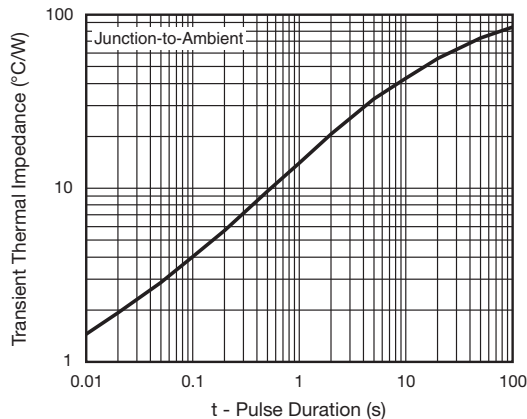
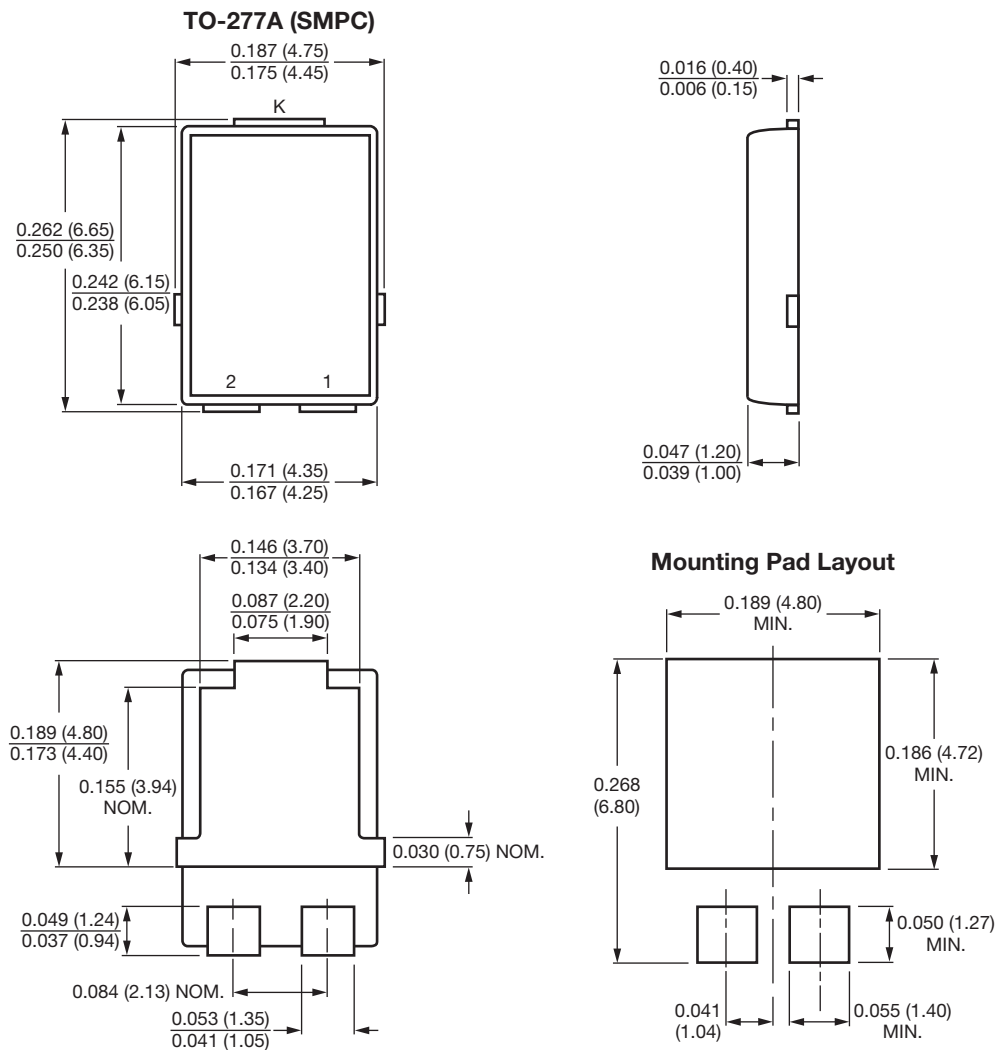


Fig. 6 - Typical Transient Thermal Impedance



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



Conform to JEDEC TO-277A



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