

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

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
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition



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 1A 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 _{RRM}	800	1000	V
Maximum DC forward current (fig. 1)		I _F ⁽¹⁾	4.0		A
		I _F ⁽²⁾	1.8		
Peak forward surge current 10 ms single half sine-wave superimposed on rated load		I _{FSM}	65		A
Non-repetitive avalance energy at T _J = 25 °C	I _{AS} = 2.5 A max.	E _{AS}	20		mJ
	I _{AS} = 1.0 A typ.		30		
Operating junction and storage temperature range		T _J , T _{STG}	- 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

AR4PK, AR4PM

Vishay General Semiconductor



ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I _F = 4.0 A	T _A = 25 °C	V _F ⁽¹⁾	1.66	1.9	V
		T _A = 125 °C		1.27	1.6	
Reverse current	Rated V _R	T _A = 25 °C	I _R ⁽²⁾	0.42	10	μA
		T _A = 125 °C		96.3	500	
Maximum reverse recovery time	I _F = 0.5 A, I _R = 1.0 A, I _{rr} = 0.25 A		t _{rr}	79	120	ns
Typical junction capacitance per diode	Rated V _R = 4.0 V, 1 MHz		C _J	55	-	pF

Notes

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

THERMAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL	AR4PK	AR4PM	UNIT
Typical thermal resistance	R _{θJA} ⁽¹⁾	85		°C/W
	R _{θJM} ⁽²⁾	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 ⁽¹⁾	0.10	86A	1500	7" diameter plastic tape and reel
AR4PMHM3/86A ⁽¹⁾	0.10	87A	6500	13" diameter plastic tape and reel

Note

(1) AEC-Q101 qualified

RATINGS AND CHARACTERISTICS CURVES

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

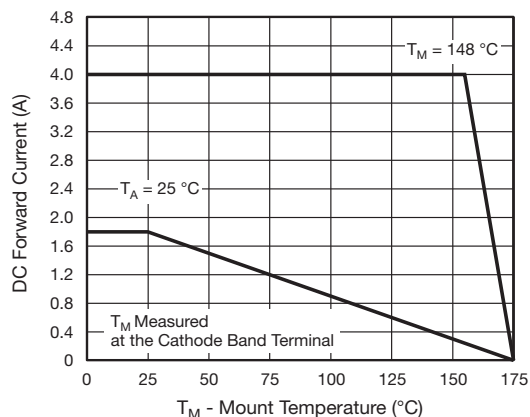


Fig. 1 - Maximum DC Forward Current Derating Curve

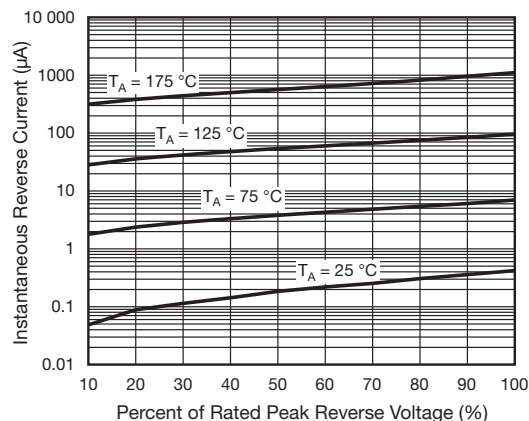


Fig. 4 - Typical Reverse Leakage Characteristics

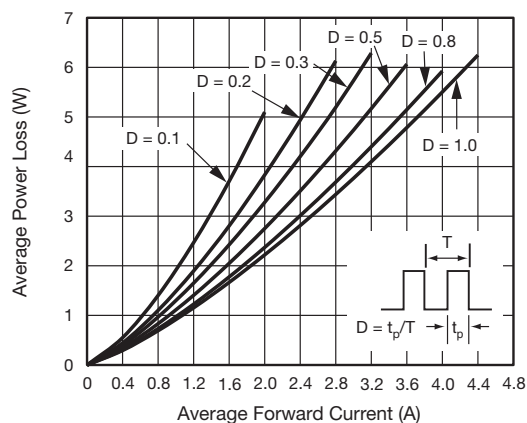


Fig. 2 - Average Power Loss Characteristics

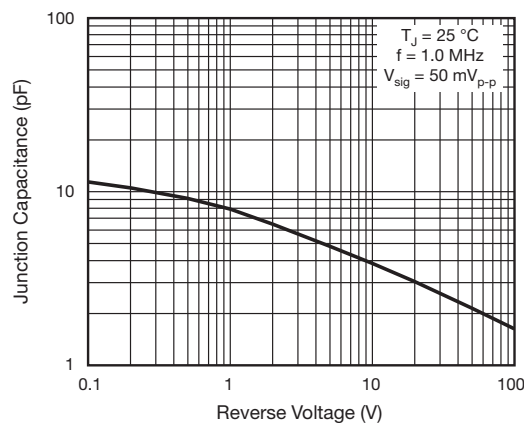


Fig. 5 - Typical Junction Capacitance

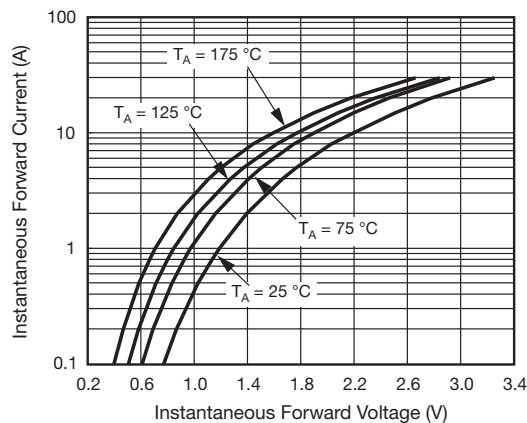


Fig. 3 - Typical Instantaneous Forward Characteristics

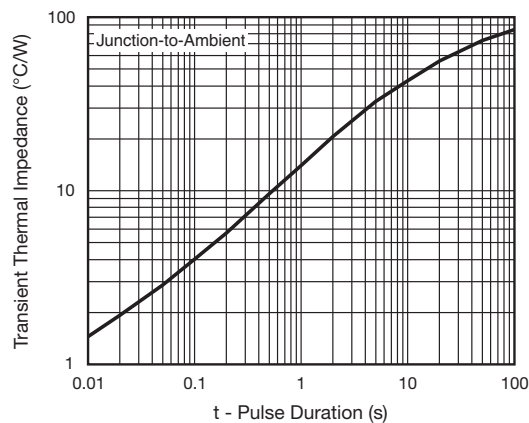


Fig. 6 - Typical Transient Thermal Impedance

AR4PK, AR4PM

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

Conform to JEDEC TO-277A



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