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Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



Fast Switching Avalanche Surface Mount Rectifiers



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



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: 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 AEC-Q101 qualified

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

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

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 avalanche energy at $T_J = 25$ °C	$I_{AS} = 2.5$ A max.	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



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	1.66	1.9	V
		T _A = 125 °C	1.27	1.6	
Reverse current	Rated V _R	T _A = 25 °C	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 ≤ 40 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_{θJA} - junction to ambient
- (2) Units mounted on PCB with 30 mm x 30 mm copper pad areas; R_{θJM} - 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
AR4PMHM3_A/H (1)	0.10	H	1500	7" diameter plastic tape and reel
AR4PMHM3_A/I (1)	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)

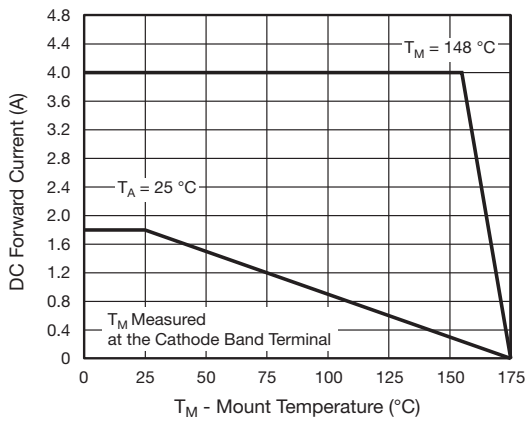


Fig. 1 - Maximum DC Forward Current Derating Curve

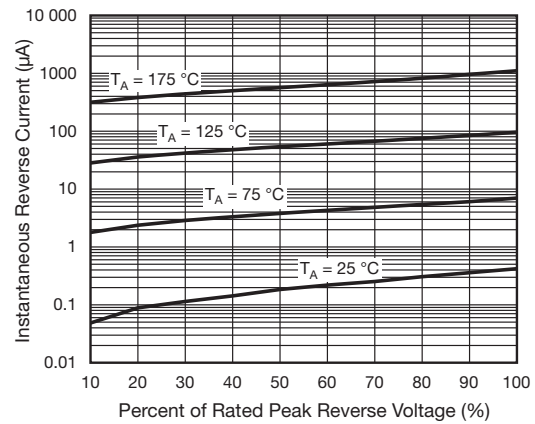


Fig. 4 - Typical Reverse Leakage Characteristics

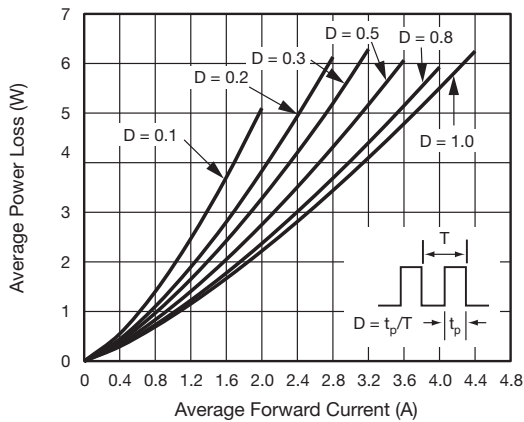


Fig. 2 - Average Power Loss Characteristics

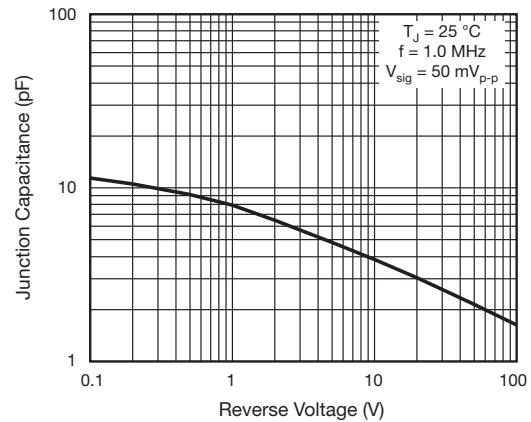


Fig. 5 - Typical Junction Capacitance

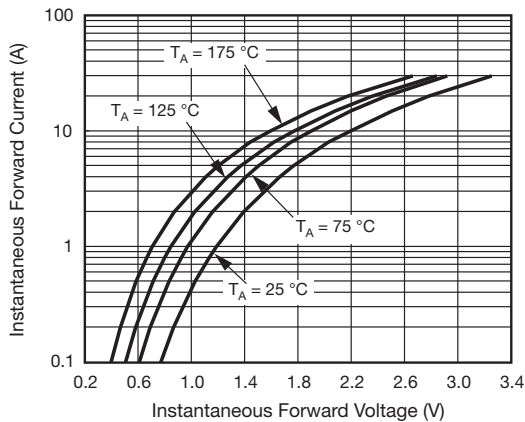


Fig. 3 - Typical Instantaneous Forward Characteristics

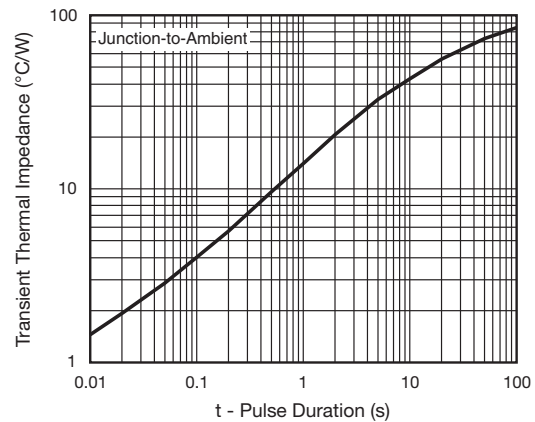
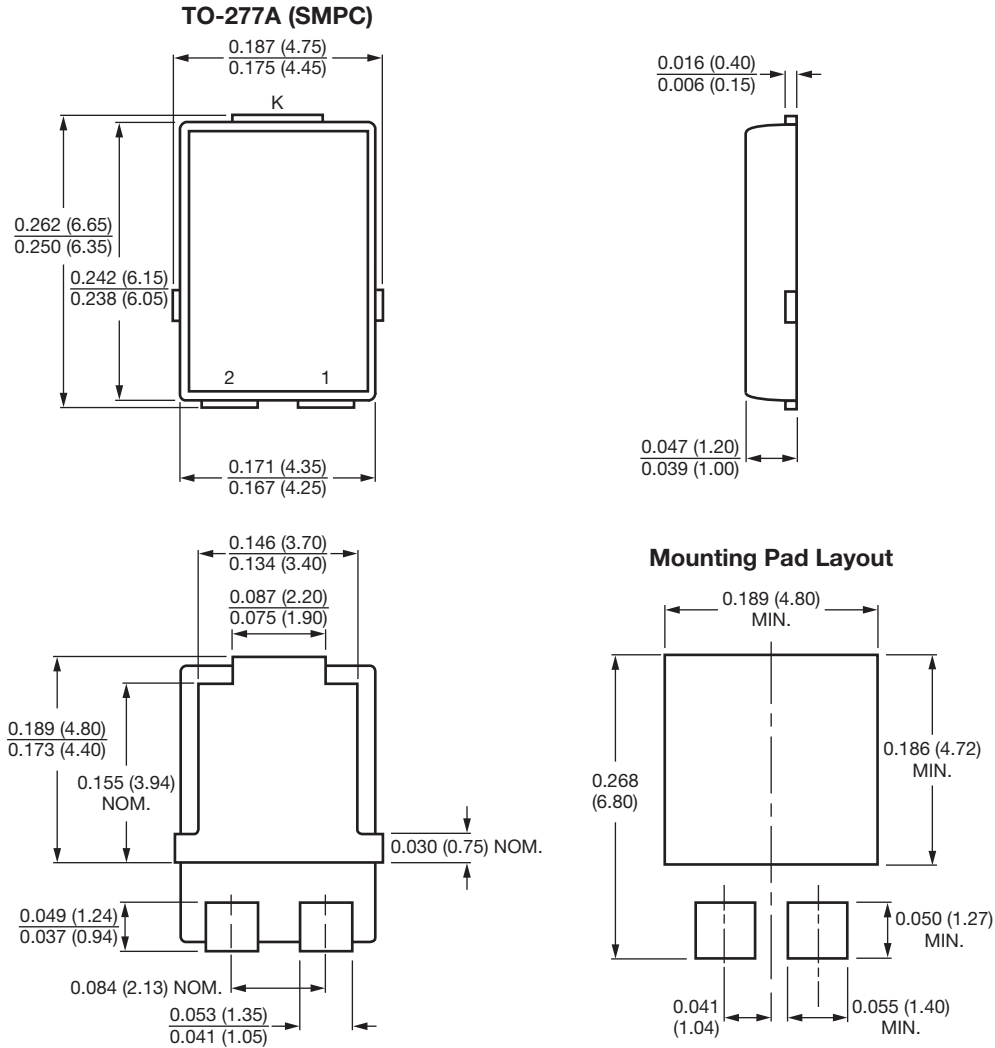


Fig. 6 - Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC® TO-277A



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