

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 ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS	SYMBOL	TYP.	MAX.	UNIT	
Instantaneous forward voltage	$I_F = 4.0\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	1.66	1.9	V
		$T_A = 125\text{ }^\circ\text{C}$		1.27		
Reverse current	Rated V_R	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	0.42	10	μA
		$T_A = 125\text{ }^\circ\text{C}$		96.3		
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 μs 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	$R_{\theta JA}^{(1)}$	85		$^\circ\text{C/W}$
	$R_{\theta JM}^{(2)}$	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
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)

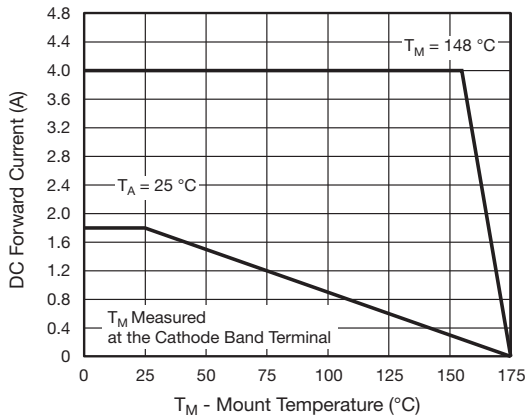


Fig. 1 - Maximum DC Forward Current Derating Curve

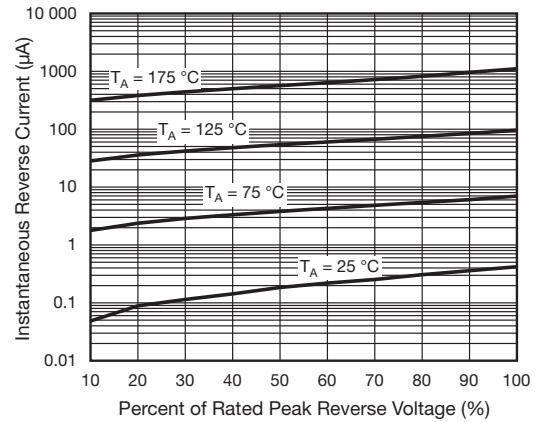


Fig. 4 - Typical Reverse Leakage Characteristics

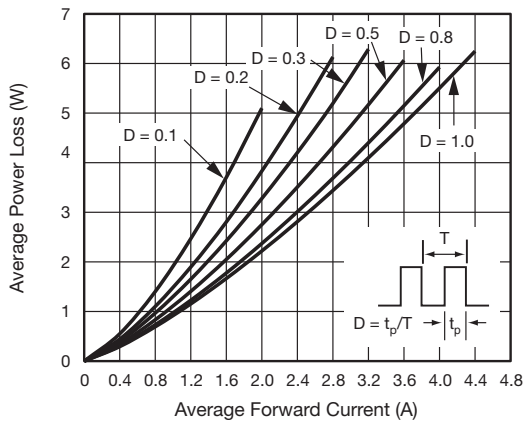


Fig. 2 - Average Power Loss Characteristics

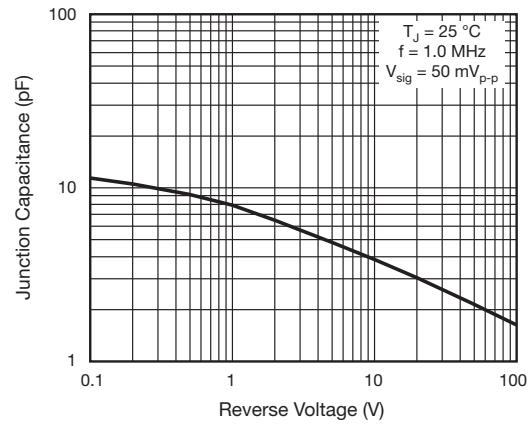


Fig. 5 - Typical Junction Capacitance

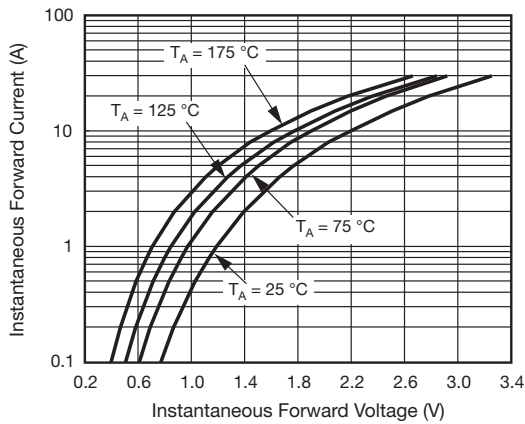


Fig. 3 - Typical Instantaneous Forward Characteristics

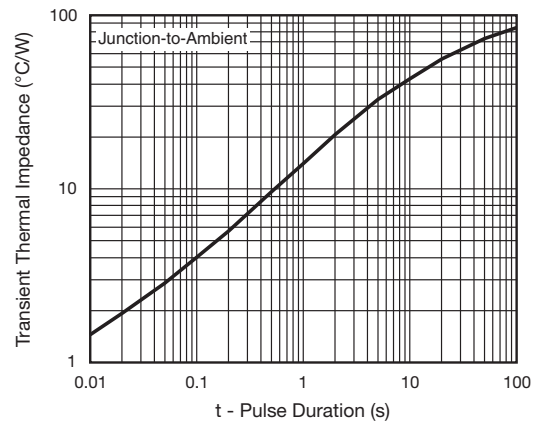
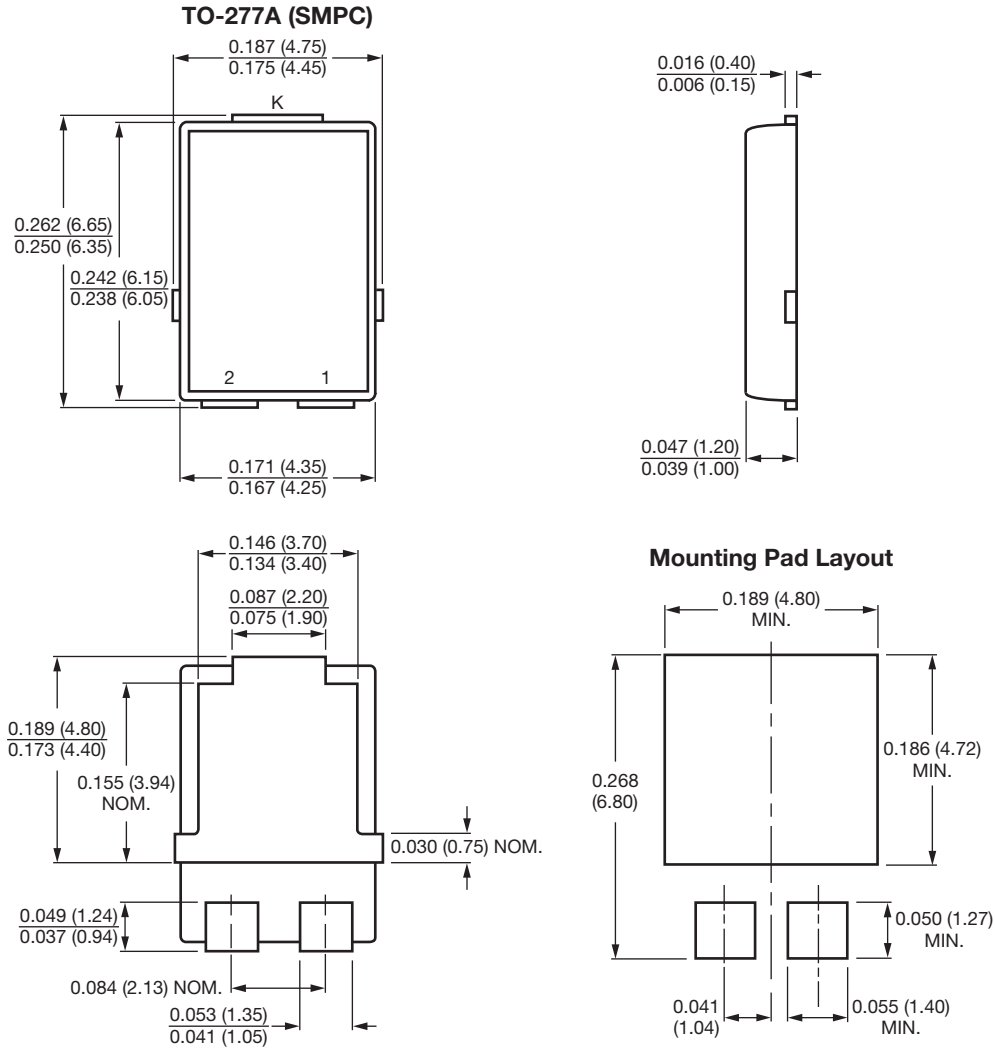


Fig. 6 - Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC® TO-277A



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