

## 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](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: 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
$V_{RRM}$	200 V, 400 V, 600 V
$I_{FSM}$	65 A
$t_{rr}$	140 ns
$E_{AS}$	20 mJ
$V_F$ at $I_F = 4.0$ A	1.02 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	AR4PD	AR4PG	AR4PJ	UNIT
Device marking code		AR4D	AR4G	AR4J	
Maximum repetitive peak reverse voltage	$V_{RRM}$	200	400	600	V
Maximum DC forward current (fig. 1)	$I_F^{(1)}$	4.0			A
	$I_F^{(2)}$	2.0			
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



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS	SYMBOL	TYP.	MAX.	UNIT	
Instantaneous forward voltage	$I_F = 4.0\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	1.24	1.6	V
		$T_A = 125\text{ }^\circ\text{C}$		1.02	1.20	
Reverse current	Rated $V_R$	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	0.6	10	$\mu\text{A}$
		$T_A = 125\text{ }^\circ\text{C}$		60	250	
Maximum reverse recovery time	$I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ , $I_{rr} = 0.25\text{ A}$	$t_{rr}$	110	140	ns	
Typical junction capacitance per diode	Rated $V_R = 4.0\text{ V}$ , 1 MHz	$C_J$	77	-	pF	

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

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)					
PARAMETER	SYMBOL	AR4PD	AR4PG	AR4PJ	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

<b>ORDERING INFORMATION</b> (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
AR4PJ-M3/86A	0.10	86A	1500	7" diameter plastic tape and reel
AR4PJ-M3/87A	0.10	87A	6500	13" diameter plastic tape and reel
AR4PJHM3/86A <sup>(1)</sup>	0.10	86A	1500	7" diameter plastic tape and reel
AR4PJHM3/86A <sup>(1)</sup>	0.10	87A	6500	13" diameter plastic tape and reel
AR4PJHM3_A/H <sup>(1)</sup>	0.10	H	1500	7" diameter plastic tape and reel
AR4PJHM3_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)

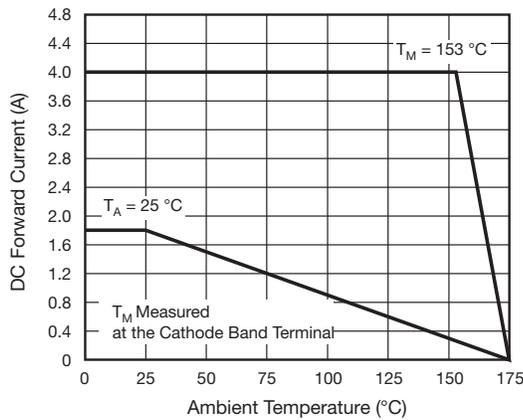


Fig. 1 - Maximum Forward Current Derating Curve

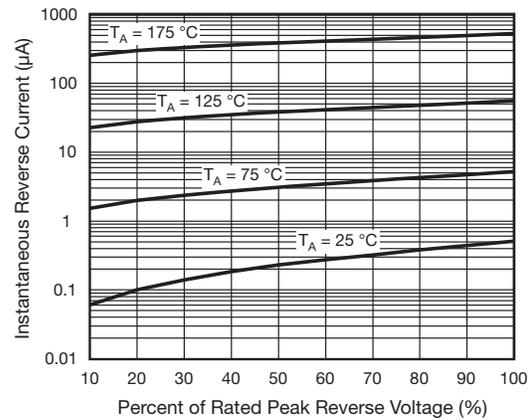


Fig. 4 - Typical Reverse Leakage Characteristics

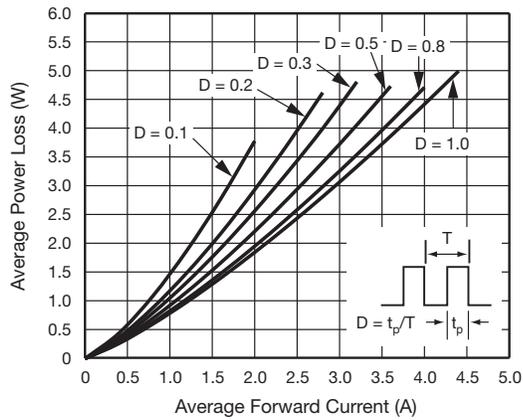


Fig. 2 - Average Power Loss Characteristics

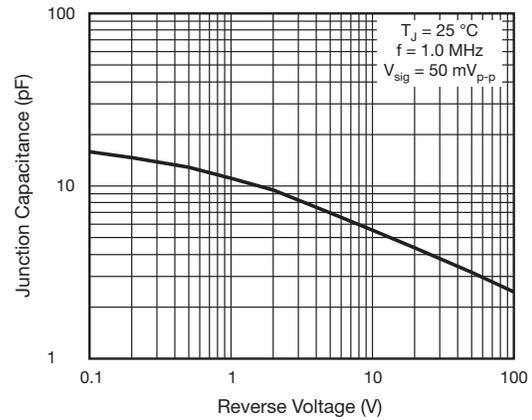


Fig. 5 - Typical Junction Capacitance

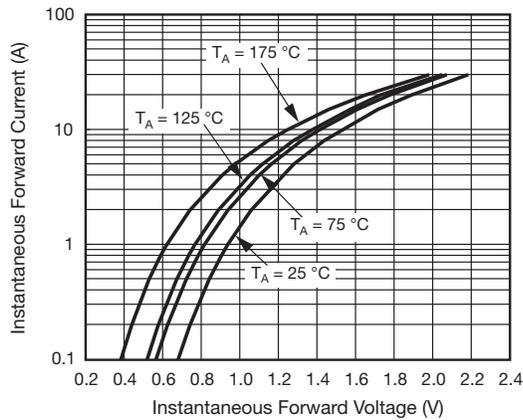


Fig. 3 - Typical Instantaneous Forward Characteristics

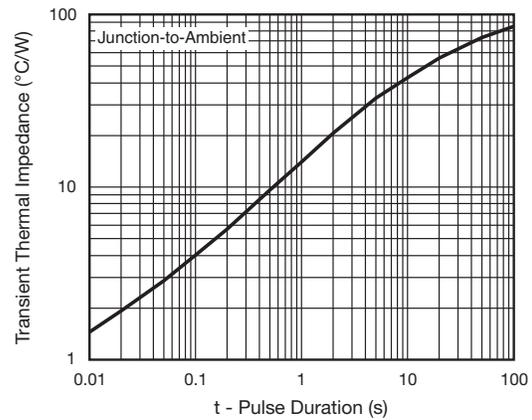
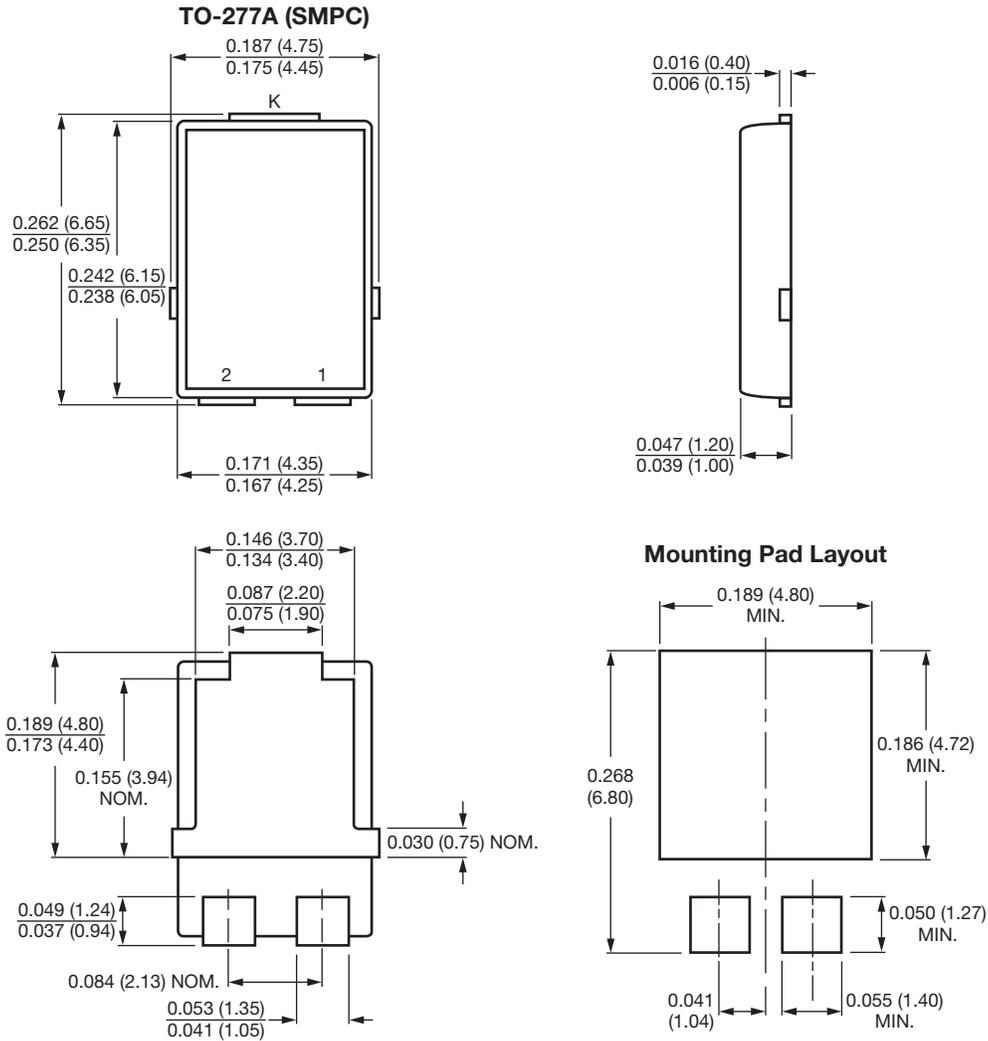


Fig. 6 - Typical Transient Thermal Impedance



### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC® TO-277A



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