# **Fast Switching Avalanche Surface Mount Rectifiers**



Cathode

O Anode 2

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PRIMARY CHARACTERISTICS					
I <sub>F(AV)</sub>	4.0 A				
V <sub>RRM</sub>	200 V, 400 V, 600 V				
I <sub>FSM</sub>	65 A				
t <sub>rr</sub>	140 ns				
E <sub>AS</sub>	20 mJ				
V <sub>F</sub> at I <sub>F</sub> = 4.0 A	1.02 V				
T <sub>J</sub> max.	175 °C				
Package	TO-277A (SMPC)				
Diode variation	Single die				

### 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 <u>www.vishay.com/doc?99912</u>

## **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

<b>MAXIMUM RATINGS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER		SYMBOL	AR4PD	AR4PG	AR4PJ	UNIT
Device marking code			AR4D	AR4G	AR4J	
Maximum repetitive peak reverse voltage		V <sub>RRM</sub>	200	400	600	V
Maximum DC forward current (fig. 1)		I <sub>F</sub> <sup>(1)</sup>	4.0		A	
		I <sub>F</sub> <sup>(2)</sup>	2.0			
Peak forward surge current 10 ms single half sine-wave superimposed on rated load		I <sub>FSM</sub>	65		А	
Non-repetitive avalanche energy at $T_J = 25 \ ^\circ C$	I <sub>AS</sub> = 2.5 A max.	E	20 30		mJ	
	I <sub>AS</sub> = 1.0 A typ.	E <sub>AS</sub>				
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

<sup>(2)</sup> Free air, mounted on recommended pad area

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RoHS

COMPLIANT



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25 \text{ °C}$ unless otherwise noted)						
PARAMETER	TEST CC	TEST CONDITIONS		TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 4.0 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	1.24	1.6	v
	$I_{\rm F} = 4.0 \rm A$	T <sub>A</sub> = 125 °C		1.02	1.20	
Reverse current	Datad V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	0.6	10	μA
	Rated V <sub>R</sub>	T <sub>A</sub> = 125 °C		60	250	
Maximum reverse recovery time	I <sub>F</sub> = 0.5 A, I <sub>R</sub> I <sub>rr</sub> = 0.25 A	I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1.0 A, I <sub>rr</sub> = 0.25 A		110	140	ns
Typical junction capacitance per diode	Rated V <sub>R</sub> = 4	Rated V <sub>R</sub> = 4.0 V, 1 MHz		77	-	pF

#### Notes

 $^{(1)}\,$  Pulse test: 300  $\mu s$  pulse width, 1 % duty cycle

<sup>(2)</sup> Pulse test: Pulse width  $\leq$  40 ms

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25 \text{ °C}$ unless otherwise noted)						
PARAMETER	SYMBOL	AR4PD	AR4PG	AR4PJ	UNIT	
Typical thermal resistance	R <sub>0JA</sub> <sup>(1)</sup>	85			°C/W	
	R <sub>0JM</sub> <sup>(2)</sup>	5			0/10	

#### 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			
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	Н	1500	7" diameter plastic tape and reel			
AR4PJHM3_A/I <sup>(1)</sup>	0.10		6500	13" diameter plastic tape and reel			

Note

(1) AEC-Q101 qualified



## **RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25$ °C unless otherwise noted)

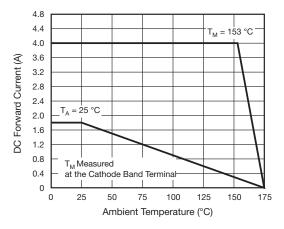


Fig. 1 - Maximum Forward Current Derating Curve

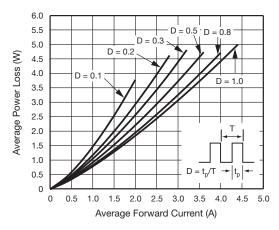


Fig. 2 - Average Power Loss Characteristics

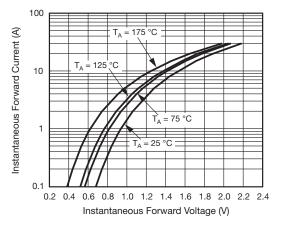


Fig. 3 - Typical Instantaneous Forward Characteristics

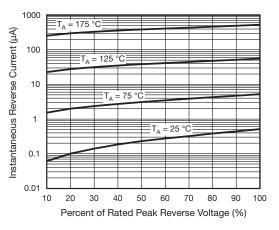


Fig. 4 - Typical Reverse Leakage Characteristics

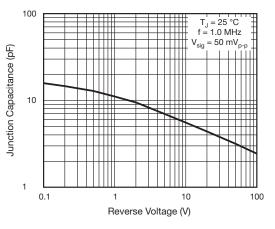


Fig. 5 - Typical Junction Capacitance

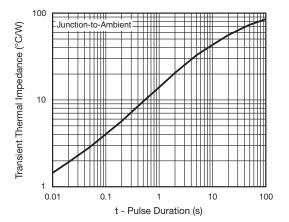


Fig. 6 - Typical Transient Thermal Impedance

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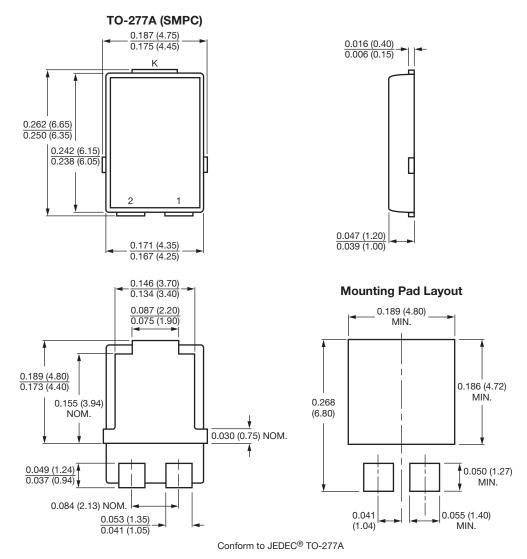
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## **PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)





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