

# AR1PD, AR1PG, AR1PJ, AR1PK, AR1PM

Vishay General Semiconductor

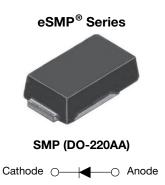
AUTOMOTIVE

RoHS

COMPLIANT

HALOGEN FREE

## **Surface Mount Fast Avalanche Rectifiers**



#### **ADDITIONAL RESOURCES**



PRIMARY CHARACTERISTICS						
I <sub>F(AV)</sub>	1.0 A					
$V_{RRM}$	200 V, 400 V, 600 V, 800 V, 1000 V					
I <sub>FSM</sub> 30 A, 25 A						
t <sub>rr</sub>	140 ns, 120 ns					
$V_{F}$	1.15 V, 1.4 V					
I <sub>R</sub>	1 μΑ					
E <sub>AS</sub>	20 mJ					
T <sub>J</sub> max.	175 °C					
Package	SMP (DO-220AA)					
Circuit configuration	Single					

#### **FEATURES**

- Very low profile typical height of 1.0 mm
- Ideal for automated placement
- · Glass passivated pellet chip junction
- Fast switching for high efficiency
- · Low reverse current
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see <a href="https://www.vishay.com/doc?99912">www.vishay.com/doc?99912</a>

## **TYPICAL APPLICATIONS**

For use in fast switching rectification of power supply, inverters, converters, and freewheeling diodes for consumer, automotive, and telecommunication.

#### **MECHANICAL DATA**

Case: SMP (DO-220AA)

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 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	AR1PD	AR1PG	AR1PJ	AR1PK	AR1PM	UNIT
Device marking code		ARD	ARG	ARJ	ARK	ARM	
Maximum repetitive peak reverse voltage	$V_{RRM}$	200	400	600	800	1000	V
Average forward current	I <sub>F(AV)</sub>	1.0					Α
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I <sub>FSM</sub>	30 25					Α
Non-repetitive avalanche energy at I <sub>AS</sub> = 1.0 A, T <sub>A</sub> = 25 °C	E <sub>AS</sub>	20					mJ
Operating junction and storage temperature range	$T_J, T_{STG}$	-55 to +175					°C

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<b>ELECTRICAL CHARACTERISTICS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)									
PARAMETER	TEST CO	ONDITIONS	SYMBOL	AR1PD AR1PG AR1PJ		AR1PK	AR1PM	UNIT	
Maximum instantaneous	I <sub>F</sub> = 1.0 A	T <sub>A</sub> = 25 °C T <sub>A</sub> = 125 °C	V <sub>F</sub> <sup>(1)</sup>	V (1) 1.25		1.6		V	
forward voltage	IF = 1.0 A	T <sub>A</sub> = 125 °C	VF \''		1.15		1.4		V
Maximum reverse current	Rated V <sub>R</sub>	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	1.0				μА	
Maximum reverse current	$T_A = 125  ^{\circ}\text{C}$		'R ' '	100					
Maximum reverse recovery time	$I_F = 0.5 A,$ $I_{rr} = 0.25 A$	$I_R = 1.0 A,$	t <sub>rr</sub>	t <sub>rr</sub> 140			120		ns
Typical junction capacitance	4.0 V, 1 MH	Нz	CJ	12.5		8.	.5	pF	

#### Notes

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

(2) Pulse test: Pulse width ≤ 40 ms

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °c unless otherwise noted)								
PARAMETER	SYMBOL	BOL AR1PD AR1PG AR1PJ AR1PK AR1PM					UNIT	
Typical thermal resistance	R <sub>θJA</sub> <sup>(1)</sup>	132					°C/W	
Typical thermal resistance	R <sub>0JM</sub> (1)	15					C/VV	

#### Note

<sup>(1)</sup> Free air, mounted on recommended copper pad area. Thermal resistance R<sub>θJA</sub> - junction to ambient, R<sub>θJM</sub> - junction to mount at the terminal cathode band

ORDERING INFORMATION (Example)								
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE				
AR1PJ-M3/84A	0.024	84A	3000	7" diameter plastic tape and reel				
AR1PJ-M3/85A	0.024	85A	10 000	13" diameter plastic tape and reel				
AR1PJHM3/84A (1)	0.024	84A	3000	7" diameter plastic tape and reel				
AR1PJHM3/85A (1)	0.024	85A	10 000	13" diameter plastic tape and reel				

#### Note

## RATINGS AND CHARACTERISTICS CURVES (T<sub>A</sub> = 25 °C unless otherwise noted)

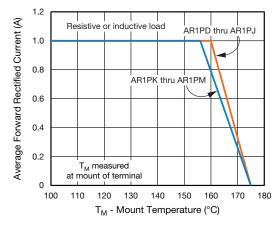


Fig. 1 - Maximum Forward Current Derating Curve

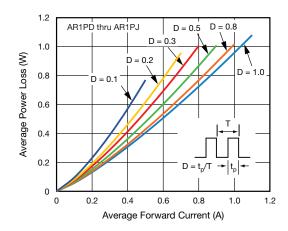


Fig. 2 - Forward Power Loss Characteristics

<sup>(1)</sup> Automotive grade





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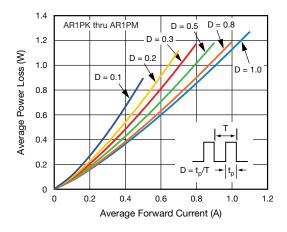


Fig. 3 - Forward Power Loss Characteristics

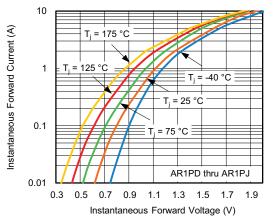


Fig. 4 - Typical Instantaneous Forward Characteristics

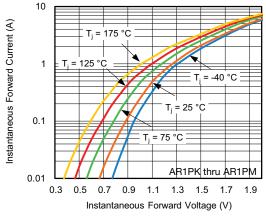


Fig. 5 - Typical Instantaneous Forward Characteristics

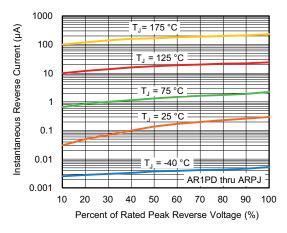


Fig. 6 - Typical Reverse Characteristics

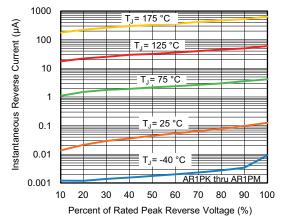


Fig. 7 - Typical Reverse Characteristics

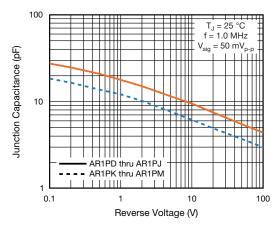


Fig. 8 - Typical Junction Capacitance



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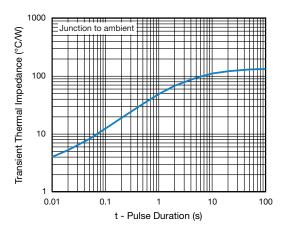
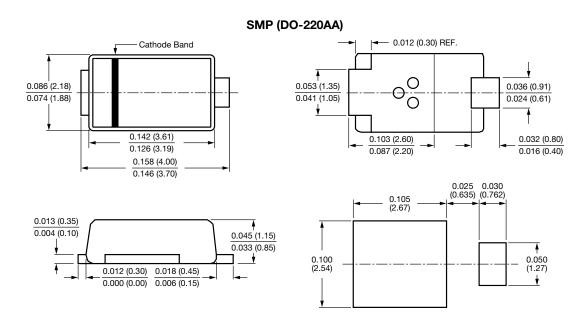


Fig. 9 - Typical Transient Thermal Impedance

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





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