



**THE DATASHEET OF  
AR1PK-M3/84A**



## Surface Mount Fast Avalanche Rectifiers

### eSMP® Series


**SMP (DO-220AA)**

Cathode Anode

### DESIGN SUPPORT TOOLS

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### 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 [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

 AUTOMOTIVE  
GRADE  
Available

**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### TYPICAL APPLICATIONS

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

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	1.0 A
$V_{RRM}$	200 V, 400 V, 600 V, 800 V, 1000 V
$I_{FSM}$	30 A, 25 A
$t_{rr}$	140 ns, 120 ns
$V_F$	1.15 V, 1.4 V
$I_R$	1 $\mu$ A
$E_{AS}$	20 mJ
$T_J$ max.	175 °C
Package	SMP (DO-220AA)
Circuit configuration	Single

### 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

MAXIMUM RATINGS ( $T_A = 25$ °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	$I_{F(AV)}$	1.0						A
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	30			25		A	
Non-repetitive avalanche energy at $I_{AS} = 1.0$ A, $T_A = 25$ °C	$E_{AS}$	20					mJ	
Operating junction and storage temperature range	$T_J, T_{STG}$	-55 to +175					°C	



ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)								
PARAMETER	TEST CONDITIONS	SYMBOL	AR1PD	AR1PG	AR1PJ	AR1PK	AR1PM	UNIT
Maximum instantaneous forward voltage	I <sub>F</sub> = 1.0 A	T <sub>A</sub> = 25 °C	1.25			1.6		V
		T <sub>A</sub> = 125 °C	1.15			1.4		
Maximum reverse current	Rated V <sub>R</sub>	T <sub>A</sub> = 25 °C	1.0				μA	
		T <sub>A</sub> = 125 °C	100					
Maximum reverse recovery time	I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1.0 A, I <sub>rr</sub> = 0.25 A	t <sub>rr</sub>	140		120		ns	
Typical junction capacitance	4.0 V, 1 MHz	C <sub>J</sub>	12.5		8.5		pF	

**Notes**

- (1) Pulse test: 300 μs 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	AR1PD	AR1PG	AR1PJ	AR1PK	AR1PM	UNIT
Typical thermal resistance	R <sub>θJA</sub> (1)	132				°C/W	
	R <sub>θJM</sub> (1)	15					

**Note**

- (1) 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**

- (1) Automotive grade

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

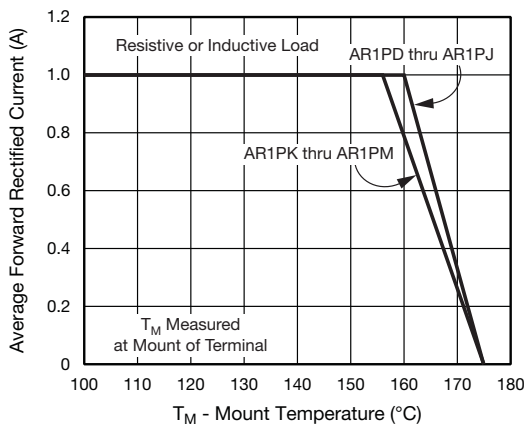


Fig. 1 - Maximum Forward Current Derating Curve

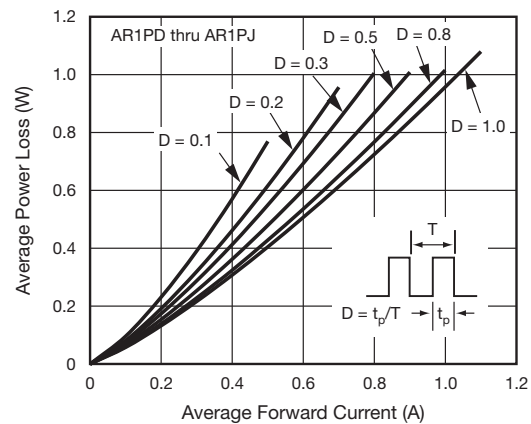


Fig. 2 - Forward Power Loss Characteristics

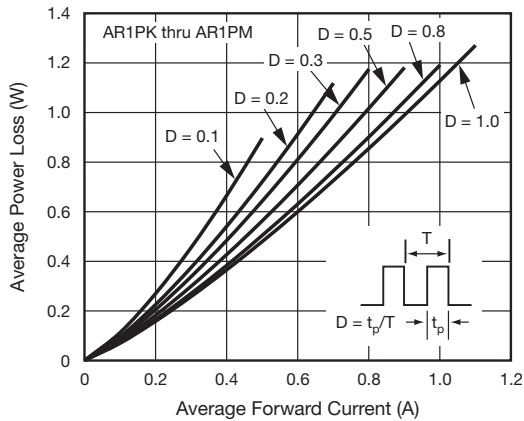


Fig. 3 - Forward Power Loss Characteristics

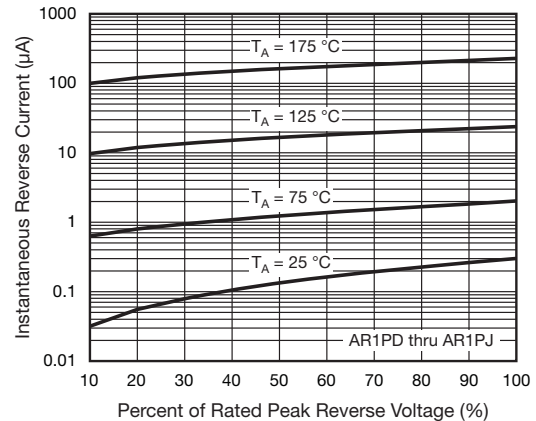


Fig. 6 - Typical Reverse Characteristics

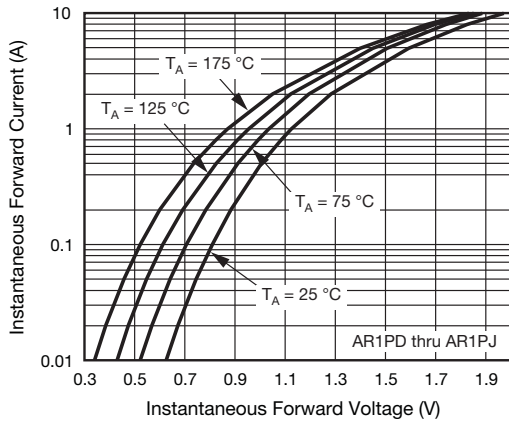


Fig. 4 - Typical Instantaneous Forward Characteristics

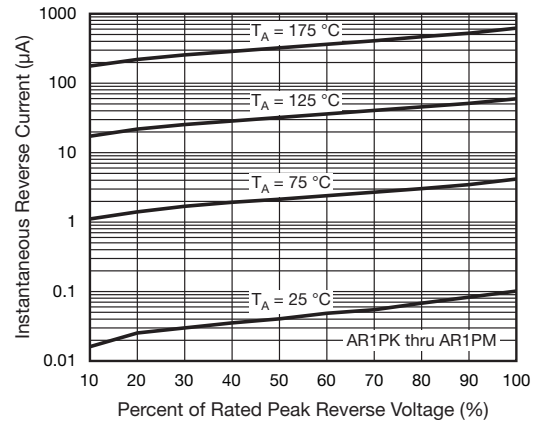


Fig. 7 - Typical Reverse Characteristics

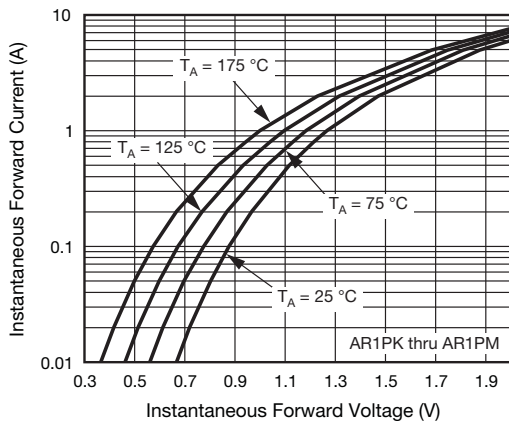


Fig. 5 - Typical Instantaneous Forward Characteristics

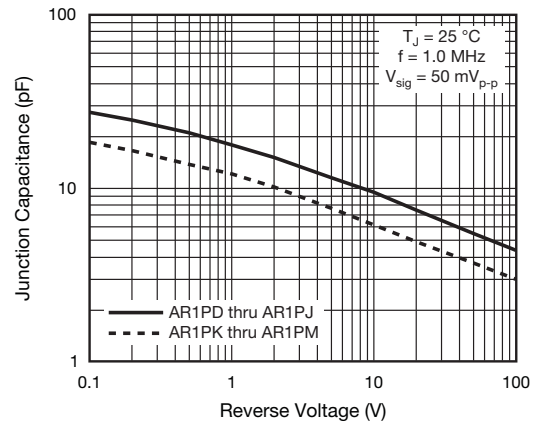


Fig. 8 - Typical Junction Capacitance

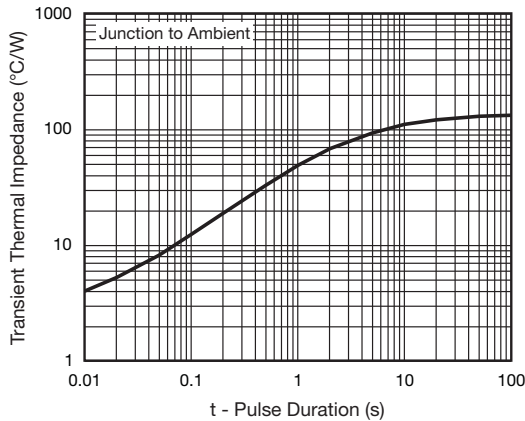
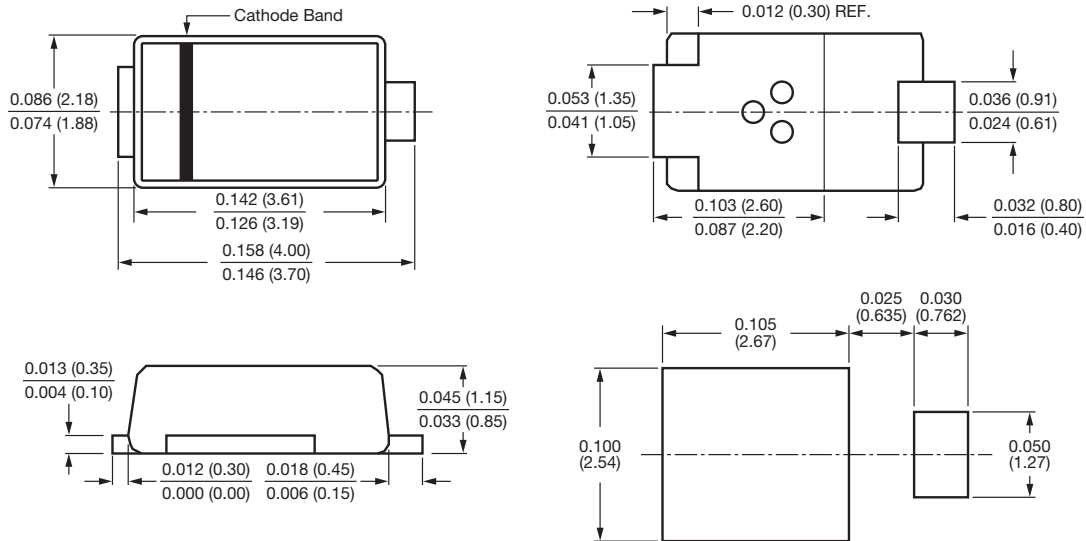


Fig. 9 - Typical Transient Thermal Impedance

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### SMP (DO-220AA)





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