

## Surface Mount Ultrafast Avalanche Rectifiers

### eSMP® Series



DO-220AA (SMP)


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

### FEATURES

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Glass passivated chip junction
- Ultrafast recovery times for high frequency
- 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)

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
$t_{rr}$	75 ns
$I_R$	1 $\mu$ A
$E_{AS}$	20 mJ
$V_F$ at $I_F = 1.0$ A	1.6 V
$T_J$ max.	175 °C
Package	DO-220AA (SMP)
Diode variations	Single die

### MECHANICAL DATA

**Case:** DO-220AA (SMP)

 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

### TYPICAL APPLICATIONS

For use in secondary rectification and freewheeling for ultrafast switching speeds of AC/AC and DC/DC converters in high temperature conditions for both consumer and automotive applications.

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)							
PARAMETER	SYMBOL	AU1PD	AU1PG	AU1PJ	AU1PK	AU1PM	UNIT
Device marking code		AUD	AUG	AUJ	AUK	AUM	
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	AU1PD	AU1PG	AU1PJ	AU1PK	AU1PM	UNIT
Maximum instantaneous forward voltage	I <sub>F</sub> = 1.0 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	1.5			1.85		V
		T <sub>A</sub> = 125 °C		1.4			1.6		
Maximum reverse current	Rated V <sub>R</sub>	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	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>	75				ns	
Typical junction capacitance	4.0 V, 1 MHz		C <sub>J</sub>	11			7.5		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	AU1PD	AU1PG	AU1PJ	AU1PK	AU1PM	UNIT
Typical thermal resistance	R <sub>θJA</sub> <sup>(1)</sup>	132					°C/W
	R <sub>θJM</sub> <sup>(1)</sup>	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
AU1PJ-M3/84A	0.024	84A	3000	7" diameter plastic tape and reel
AU1PJ-M3/85A	0.024	85A	10 000	13" diameter plastic tape and reel
AU1PJHM3/84A <sup>(1)</sup>	0.024	84A	3000	7" diameter plastic tape and reel
AU1PJHM3/85A <sup>(1)</sup>	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)

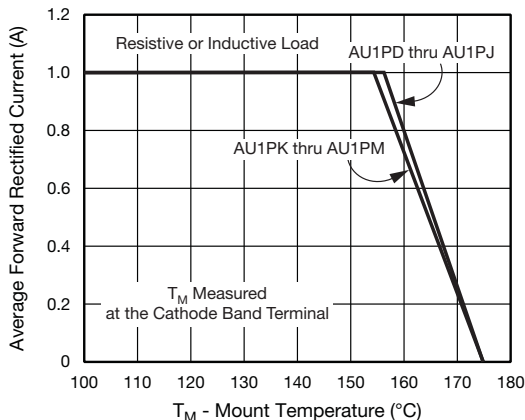


Fig. 1 - Maximum Forward Current Derating Curve

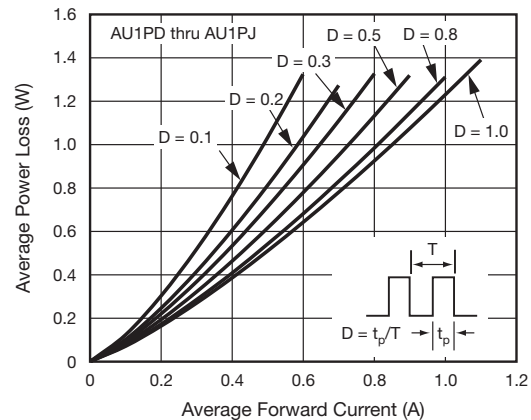


Fig. 2 - Forward Power Loss Characteristics

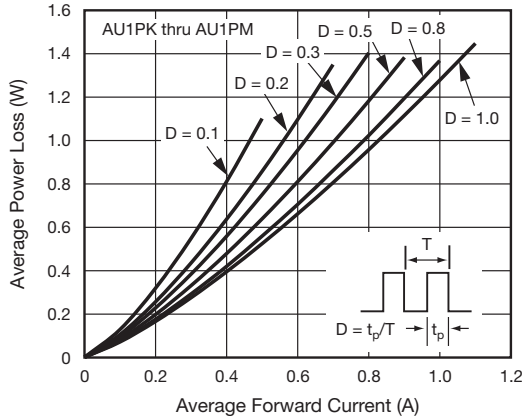


Fig. 3 - Forward Power Loss Characteristics

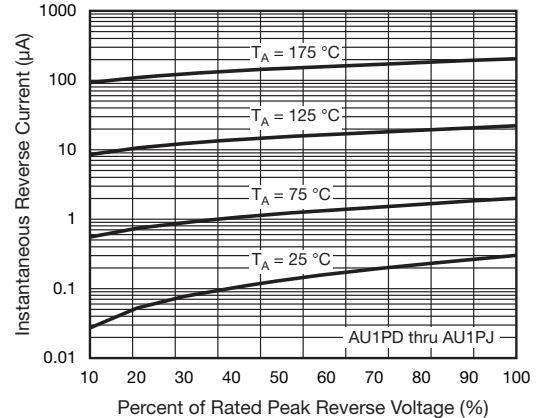


Fig. 6 - Typical Reverse Characteristics

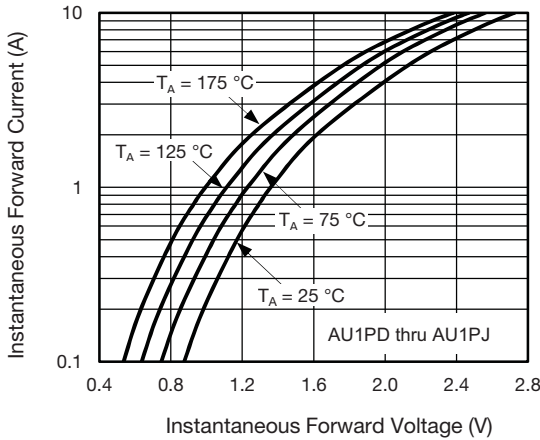


Fig. 4 - Typical Instantaneous Forward Characteristics

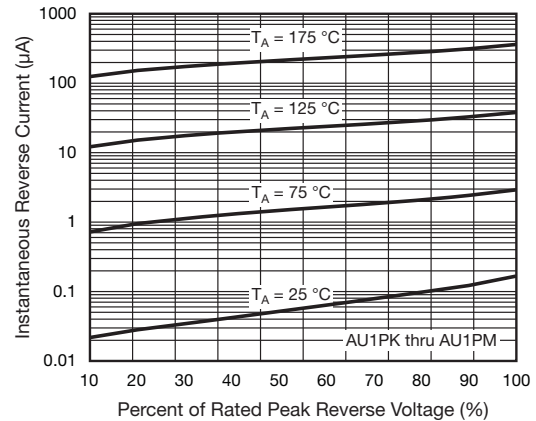


Fig. 7 - Typical Reverse Characteristics

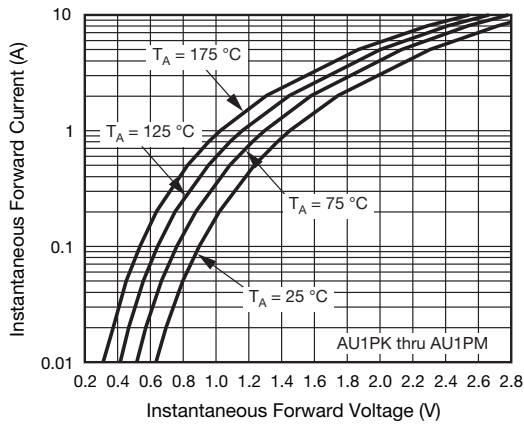


Fig. 5 - Typical Instantaneous Forward Characteristics

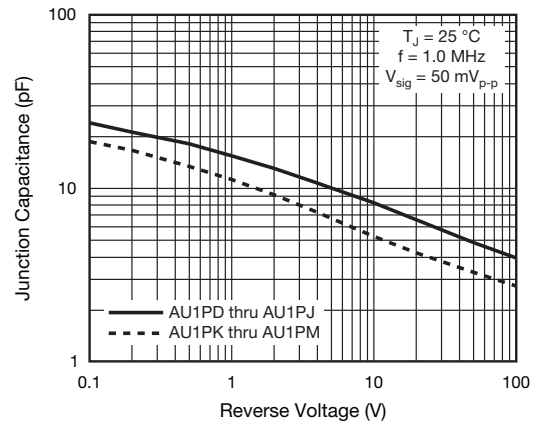


Fig. 8 - Typical Junction Capacitance

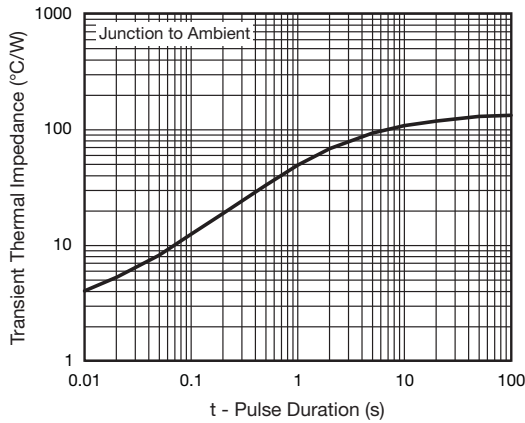
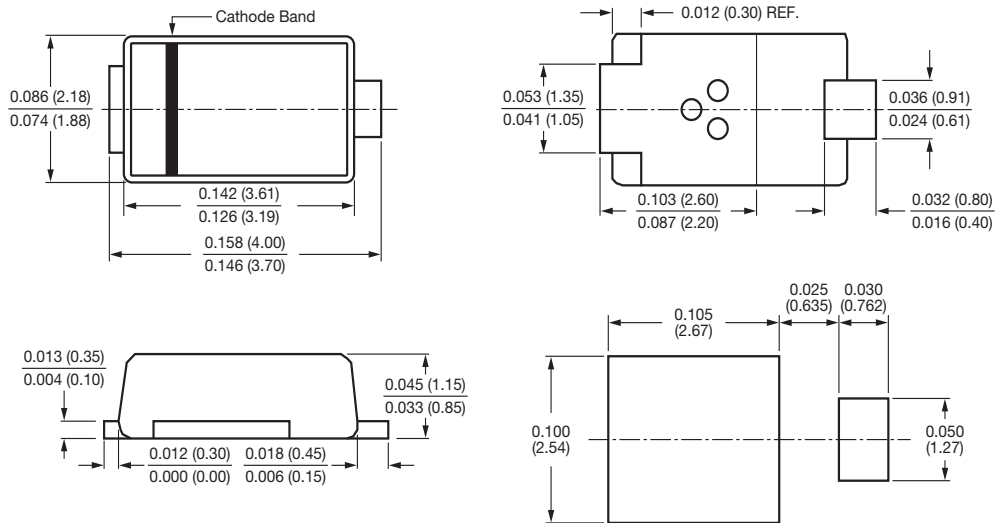


Fig. 9 - Typical Transient Thermal Impedance

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### DO-220AA (SMP)





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