

## Surface-Mount Fast Avalanche Rectifiers

### eSMP® Series



Top view

Bottom view

**SMF (DO-219AB)**

Cathode Anode

### LINKS TO ADDITIONAL RESOURCES


[3D Models](#)

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
$t_{tr}$	140 ns, 120 ns
$I_R$	1 $\mu$ A
$V_F$ at $I_F = 1$ A	1.15 V, 1.4 V
$E_{AS}$	20 mJ
$T_J$ max.	175 °C
Package	SMF (DO-219AB)
Circuit configuration	Single

### FEATURES

- Low profile package
- Ideal for automated placement
- Glass passivated pellet chip junction
- Fast switching for high frequency
- Low reverse current
- Meets MSL level 1, per J-STD-020; LF maximum peak of 260 °C
- Wave and reflow solderable
- AEC-Q101 qualified  
- Automotive ordering code: base P/NHM3
- Compatible to SOD-123W package case outline
- 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 general purpose rectification of power supplies, inverters, converters, and freewheeling diodes for consumer, automotive, and telecommunication.

### MECHANICAL DATA

#### Case: SMF (DO-219AB)

Molding compound meets UL 94 V-0 flammability rating  
Base P/N-M3 - halogen-free, RoHS-compliant  
Base P/NHM3 - halogen-free, RoHS-compliant and AEC-Q101 qualified

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 and HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** color band denotes cathode end

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)							
PARAMETER	SYMBOL	AR1FD	AR1FG	AR1FJ	AR1FK	AR1FM	UNIT
Device marking code		ARD	ARG	ARJ	ARK	ARM	
Max. repetitive peak reverse voltage	$V_{RRM}$	200	400	600	800	1000	V
Max. DC forward current (see fig. 1)	$I_F^{(1)}$	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

#### Note

(1) Free air, mounted on recommended PCB, 2 oz. pad area



ELECTRICAL CHARACTERISTICS (T <sub>J</sub> = 25 °C unless otherwise noted)									
PARAMETER	TEST CONDITIONS		SYMBOL	AR1FD	AR1FG	AR1FJ	AR1FK	AR1FM	UNIT
Maximum instantaneous forward voltage	I <sub>F</sub> = 1.0 A	T <sub>J</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	1.25			1.6		V
		T <sub>J</sub> = 125 °C		1.15			1.4		
Maximum reverse current	Rated V <sub>R</sub>	T <sub>J</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	1.0				μA	
		T <sub>J</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>	12.6			9.3		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	AR1FD	AR1FG	AR1FJ	AR1FK	AR1FM	UNIT	
Typical thermal resistance	R <sub>θJA</sub> <sup>(1)(2)</sup>	130					°C/W	
	R <sub>θJM</sub> <sup>(1)</sup>	20						

Notes

- (1) Free air, mounted on recommended PCB, 2 oz. pad area; thermal resistance R<sub>θJA</sub> - junction to ambient; R<sub>θJM</sub> - junction to mount
- (2) The heat generated must be less than the thermal conductivity from junction-to-ambient: dP<sub>D</sub>/dT<sub>J</sub> < 1/R<sub>θJA</sub>

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
AR1FJ-M3/H	0.0145	H	3000	7" diameter plastic tape and reel
AR1FJ-M3/I	0.0145	I	10 000	13" diameter plastic tape and reel
AR1FJHM3/H <sup>(1)</sup>	0.0145	H	3000	7" diameter plastic tape and reel
AR1FJHM3/I <sup>(1)</sup>	0.0145	I	10 000	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)

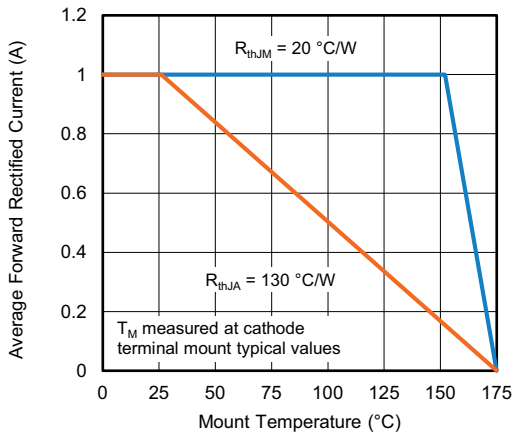


Fig. 1 - Max. Forward Current Derating Curve

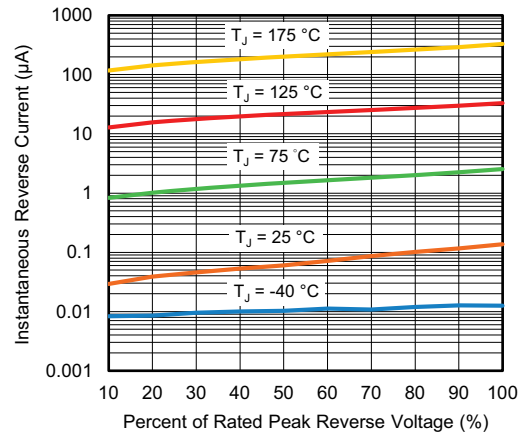


Fig. 4 - Typical Reverse Characteristics

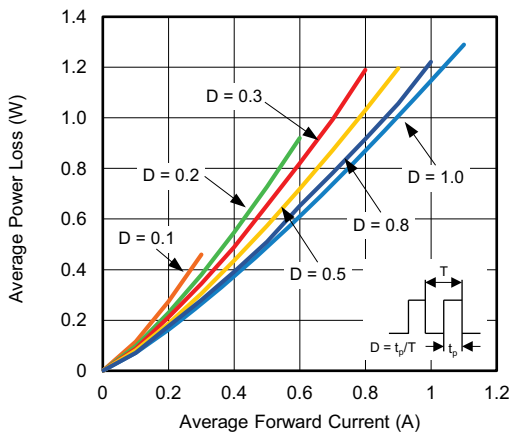


Fig. 2 - Forward Power Loss Characteristics

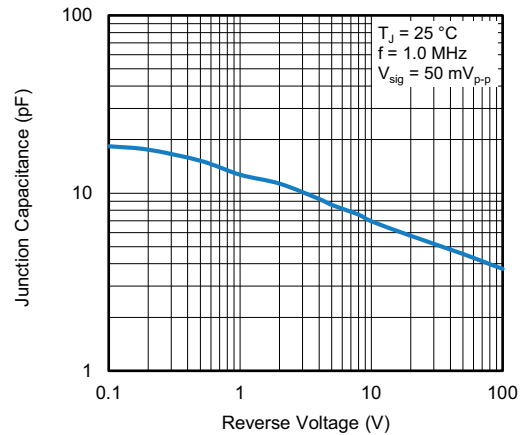


Fig. 5 - Typical Junction Capacitance

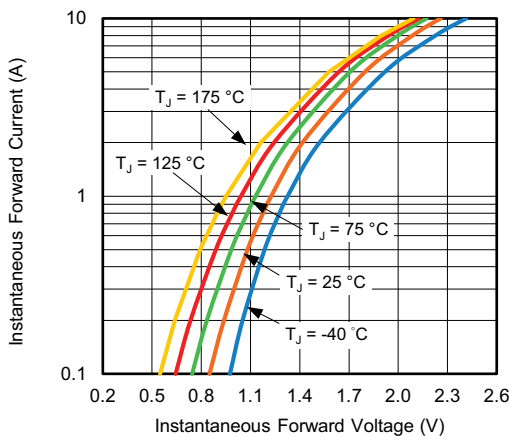


Fig. 3 - Typical Instantaneous Forward Characteristics

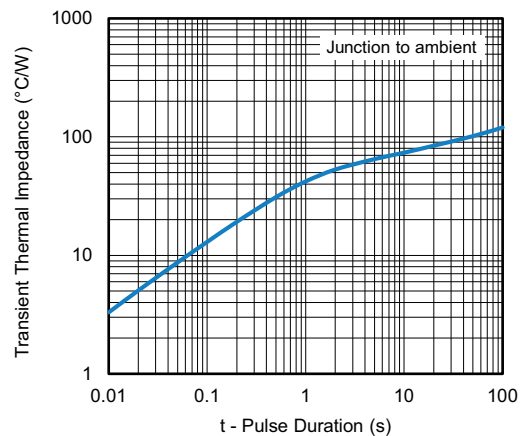
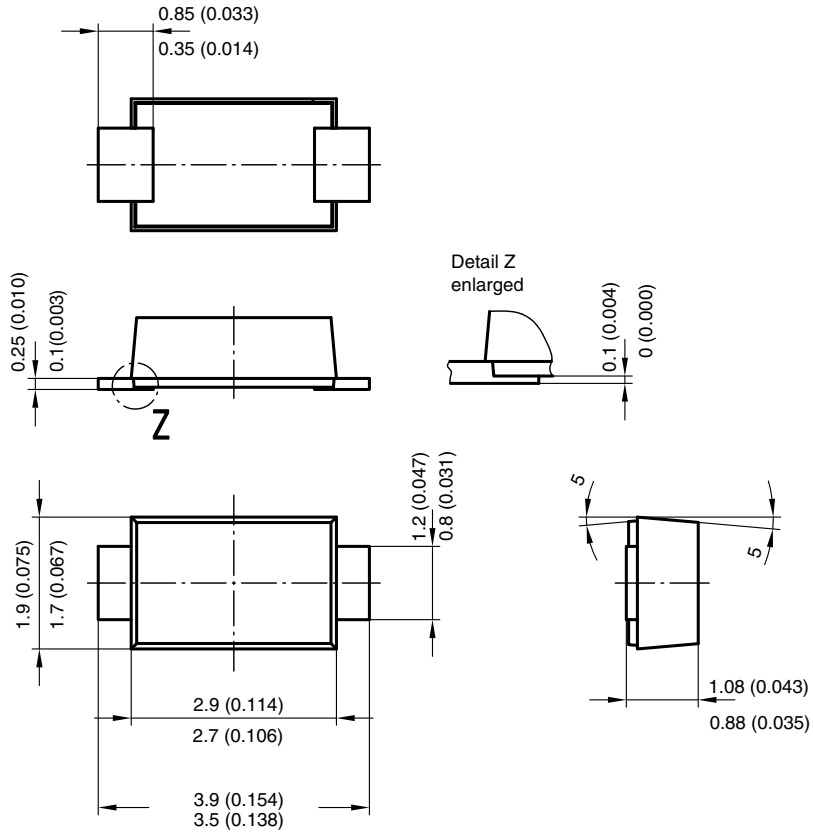


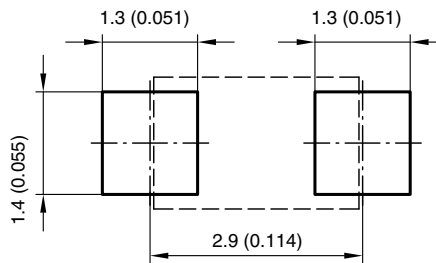
Fig. 6 - Typical Transient Thermal Impedance



## PACKAGE OUTLINE DIMENSIONS in millimeters (inches)



Foot print recommendation:



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17247



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