



## Surface-Mount Fast Avalanche Rectifiers

### eSMP® Series



Top view Bottom view

SMF (DO-219AB)



### LINKS TO ADDITIONAL RESOURCES



### 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)



### 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

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

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



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_J = 25\text{ }^\circ\text{C}$ unless otherwise noted)								
PARAMETER	TEST CONDITIONS	SYMBOL	AR1FD	AR1FG	AR1FJ	AR1FK	AR1FM	UNIT
Maximum instantaneous forward voltage	$I_F = 1.0\text{ A}$	$T_J = 25\text{ }^\circ\text{C}$	1.25			1.6		V
		$T_J = 125\text{ }^\circ\text{C}$	1.15			1.4		
Maximum reverse current	Rated $V_R$	$T_J = 25\text{ }^\circ\text{C}$	1.0				$\mu\text{A}$	
		$T_J = 125\text{ }^\circ\text{C}$	100					
Maximum reverse recovery time	$I_F = 0.5\text{ A}, I_R = 1.0\text{ A}, I_{rr} = 0.25\text{ A}$	$t_{rr}$	140			120		ns
Typical junction capacitance	4.0 V, 1 MHz	$C_J$	12.6			9.3		pF

**Notes**(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle(2) Pulse test: Pulse width  $\leq 40\text{ ms}$ 

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)								
PARAMETER	SYMBOL	AR1FD	AR1FG	AR1FJ	AR1FK	AR1FM	UNIT	
Typical thermal resistance	$R_{\theta JA}^{(1)(2)}$	130						$^\circ\text{C/W}$
	$R_{\theta JM}^{(1)}$	20						

**Notes**(1) Free air, mounted on recommended PCB, 2 oz. pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient;  $R_{\theta JM}$  - junction to mount(2) The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$ 

<b>ORDERING INFORMATION</b> (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)

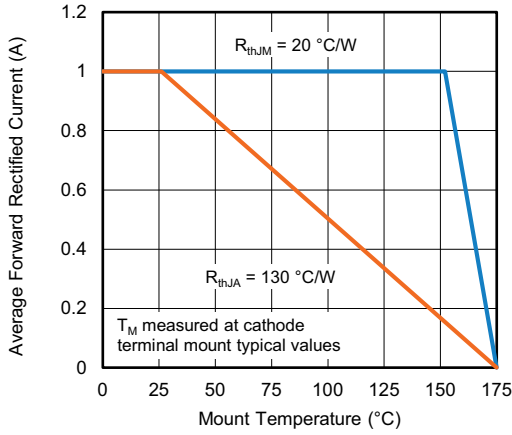


Fig. 1 - Max. Forward Current Derating Curve

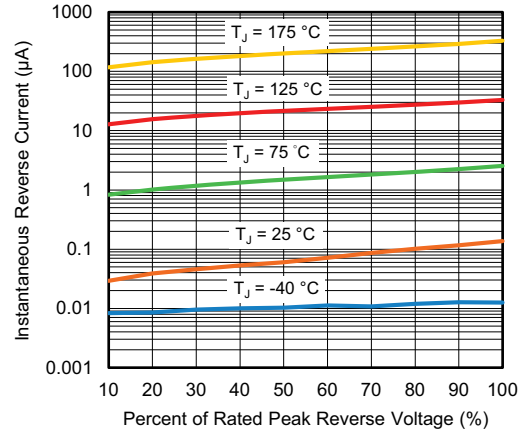


Fig. 4 - Typical Reverse Characteristics

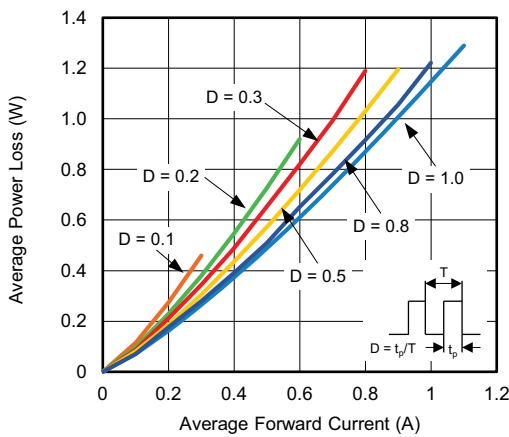


Fig. 2 - Forward Power Loss Characteristics

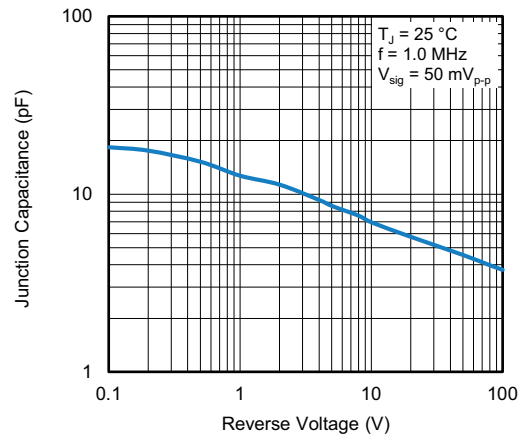


Fig. 5 - Typical Junction Capacitance

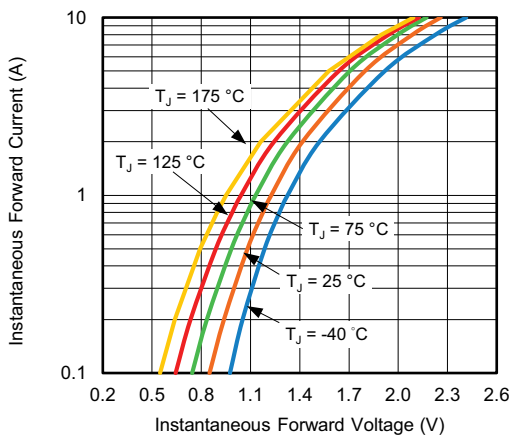


Fig. 3 - Typical Instantaneous Forward Characteristics

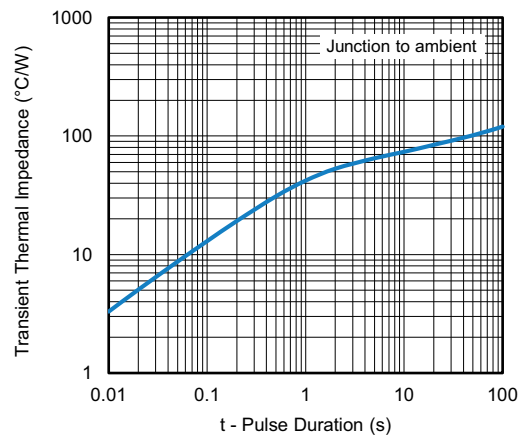
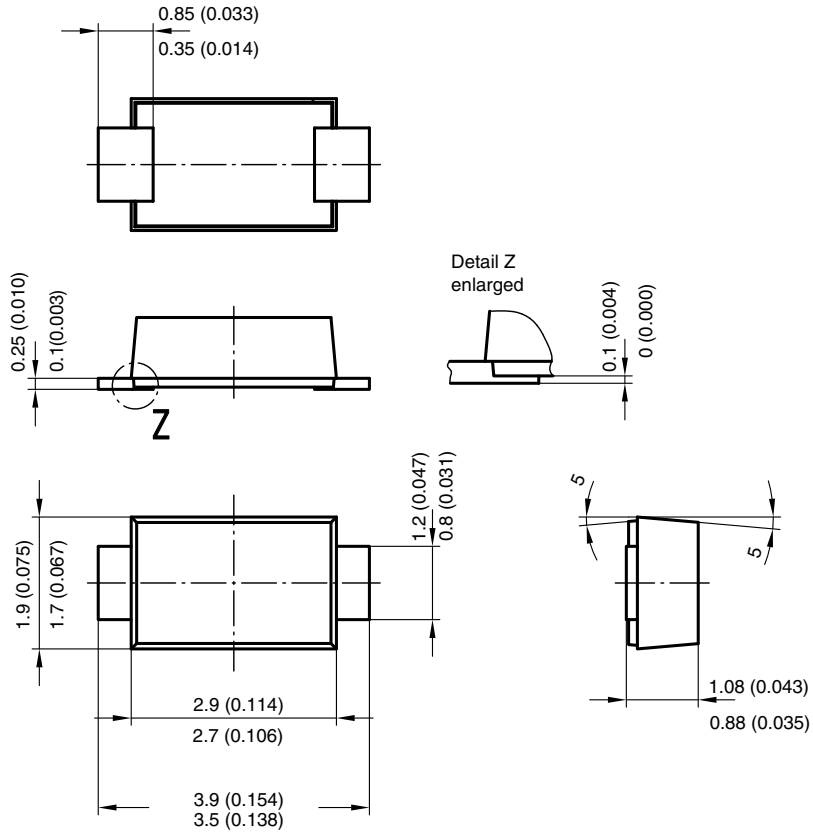


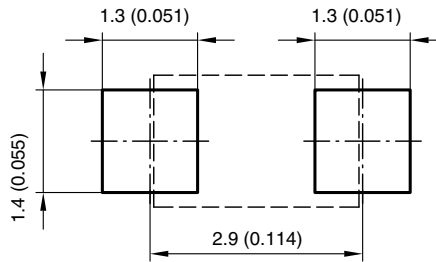
Fig. 6 - Typical Transient Thermal Impedance



## PACKAGE OUTLINE DIMENSIONS in millimeters (inches)



### Foot print recommendation:



Created - Date: 15. February 2005  
 Rev. 3 - Date: 13. March 2007  
 Document no.: S8-V-3915.01-001 (4)  
 17247



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