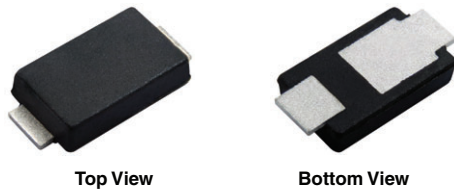


## Surface-Mount ESD Capability Rectifiers

### eSMP® Series



Top View

Bottom View

#### SMPA (DO-221BC)

Anode Cathode

### FEATURES

- Very low profile - typical height of 0.95 mm
- Ideal for automated placement
- Oxide planar chip junction
- Low forward voltage drop, low leakage current
- ESD capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Not recommended for PCB bottom side wave mounting
- 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**

### ADDITIONAL RESOURCES


[3D Models](#)

#### PRIMARY CHARACTERISTICS

$I_{F(AV)}$	2.0 A
$V_{RRM}$	100 V, 200 V, 400 V, 600 V
$I_{FSM}$	32 A
$V_F$ at $I_F = 2.0$ A ( $T_A = 125$ °C)	0.92 V
$I_R$	5 $\mu$ A
$T_J$ max.	175 °C
Package	SMPA (DO-221BC)
Circuit configuration	Single

### TYPICAL APPLICATIONS

General purpose, power line polarity protection, in both consumer and automotive applications.

### MECHANICAL DATA

#### Case: SMPA (DO-221BC)

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 AEC-Q101 qualified

**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

**Polarity:** color band denotes the cathode end

#### MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)

PARAMETER	SYMBOL	SE20PAB	SE20PAD	SE20PAG	SE20PAJ	UNIT
Device marking code		20B	20D	20G	20J	
Maximum repetitive peak reverse voltage	$V_{RRM}$	100	200	400	600	V
Maximum DC forward current	$I_F^{(1)}$	2.0				A
	$I_F^{(2)}$	1.4				
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	32				A
Operating junction and storage temperature range	$T_J, T_{STG}$	-55 to +175				°C

#### Notes

(1) Mounted on 10 mm x 10 mm pad areas, 2 oz. FR4 PCB

(2) Free air, mounted on recommended copper pad area



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	$I_F = 1.0\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	0.93	-	V
	$I_F = 2.0\text{ A}$			1.00	1.10	
	$I_F = 1.0\text{ A}$	$T_A = 125\text{ }^\circ\text{C}$		0.83	-	
	$I_F = 2.0\text{ A}$			0.92	1.00	
Reverse current	Rated $V_R$	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	-	5	$\mu\text{A}$
		$T_A = 125\text{ }^\circ\text{C}$		7	100	
Typical reverse recovery time	$I_F = 0.5\text{ A}, I_R = 1.0\text{ A}, I_{rr} = 0.25\text{ A}$		$t_{rr}$	1.3	-	$\mu\text{s}$
Typical junction capacitance	4.0 V, 1 MHz		$C_J$	13	-	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	SE20PAB	SE20PAD	SE20PAG	SE20PAJ	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)}$	120				$^\circ\text{C/W}$
	$R_{\theta JM}^{(2)}$	9				

**Notes**

- (1) Free air, mounted on recommended PCB, 2 oz. pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient
- (2) Mounted on 10 mm x 10 mm pad areas, 2 oz. FR4 PCB;  $R_{\theta JM}$  - junction to mount

<b>IMMUNITY TO ELECTRICAL STATIC DISCHARGE TO THE FOLLOWING STANDARDS</b>					
$(T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)					
STANDARD	TEST TYPE	TEST CONDITIONS	SYMBOL	CLASS	VALUE
AEC-Q101-001	Human body model (contact mode)	$C = 100\text{ pF}, R = 1.5\text{ k}\Omega$	$V_C$	H3B	$> 8\text{ kV}$

<b>ORDERING INFORMATION</b> (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SE20PAJ-M3/I	0.033	I	14 000	13" diameter plastic tape and reel
SE20PAJHM3/I <sup>(1)</sup>	0.033	I	14 000	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)

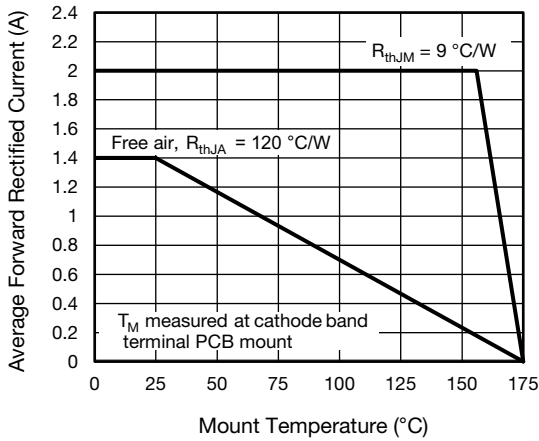


Fig. 1 - Maximum Forward Current Derating Curve

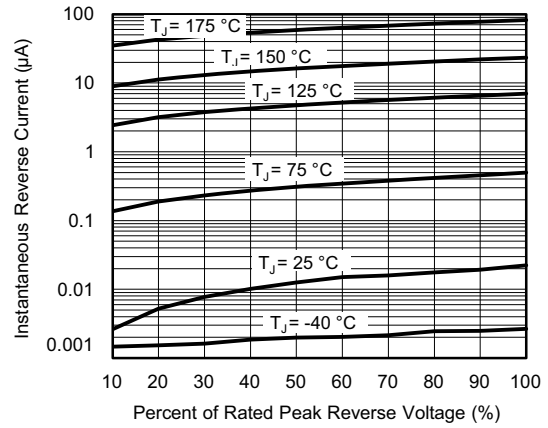


Fig. 4 - Typical Reverse Leakage Characteristics

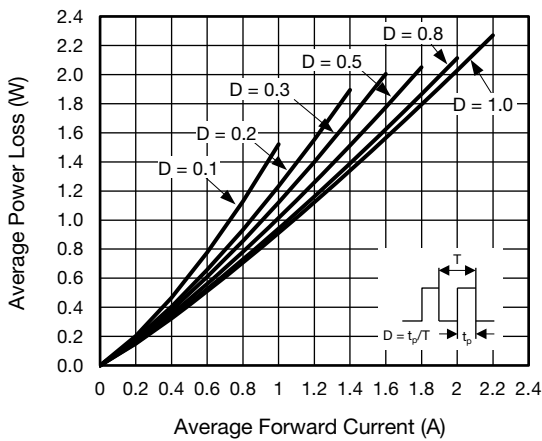


Fig. 2 - Forward Power Loss Characteristics

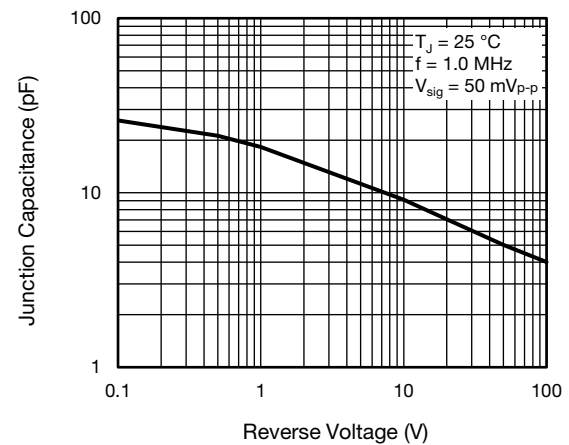


Fig. 5 - Typical Junction Capacitance

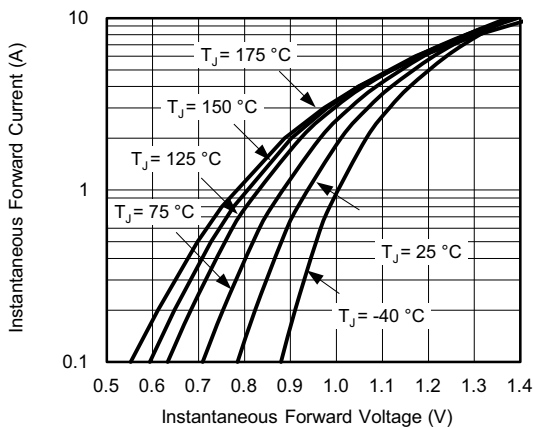


Fig. 3 - Typical Instantaneous Forward Characteristics

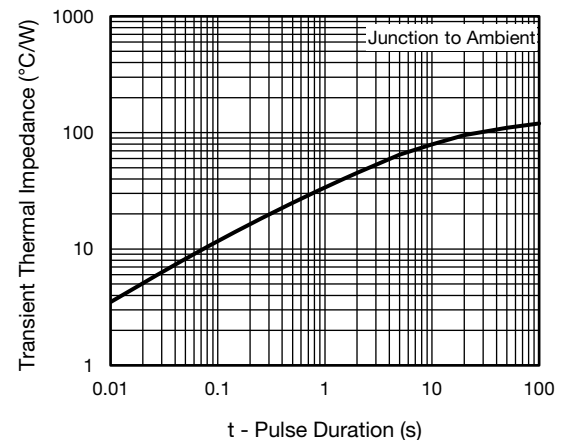
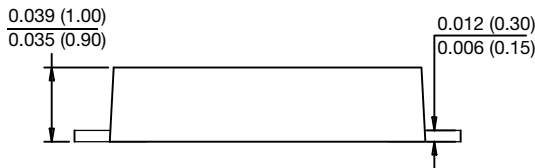
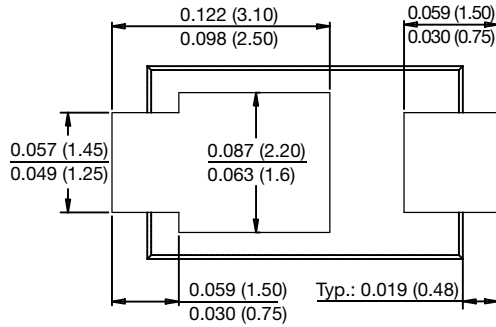
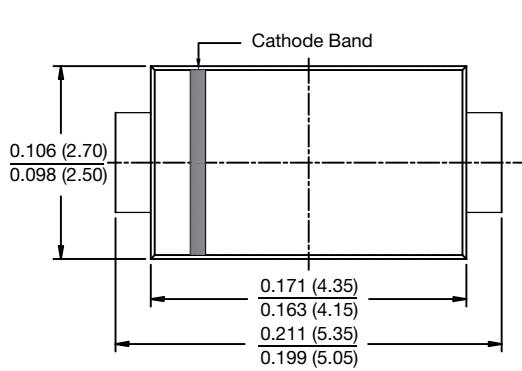


Fig. 6 - Typical Transient Thermal Impedance

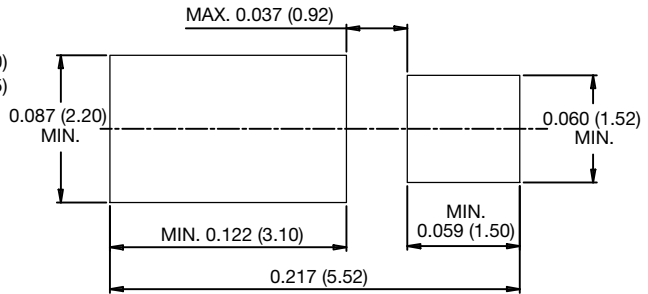


### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

#### SMPA (DO-221BC)



#### Mounting Pad Layout





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