

## Surface Mount ESD Capability Rectifiers

**eSMP® Series**

**DO-220AA (SMP)**

**FEATURES**

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Oxide planar chip junction
- Low forward voltage drop
- Typical  $I_R$  less than 0.1  $\mu$ A
- ESD capability
- 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)

**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 1A whisker test, HM3 suffix meets JESD 201 class 2 whisker test

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	1.0 A
$V_{RRM}$	100 V to 600 V
$I_R$	5 $\mu$ A
$V_F$ at $I_F = 1.0$ A	0.86 V
$T_J$ max.	175 °C

**TYPICAL APPLICATIONS**

General purpose, polarity protection, and rail-to-rail protection in both consumer and automotive applications.

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)						
PARAMETER	SYMBOL	SE10PB	SE10PD	SE10PG	SE10PJ	UNIT
Device marking code		10B	10D	10G	10J	
Maximum repetitive peak reverse voltage	$V_{RRM}$	100	200	400	600	V
Average forward current	$I_{F(AV)}$	1.0				A
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	25				A
Operating junction and storage temperature range	$T_J, T_{STG}$	- 55 to + 175				°C

ELECTRICAL CHARACTERISTICS ( $T_A = 25$ °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS	SYMBOL	TYP.	MAX.	UNIT	
Maximum instantaneous forward voltage	$I_F = 1.0$ A	$V_F$ <sup>(1)</sup>	$T_A = 25$ °C	0.960	1.05	V
			$T_A = 125$ °C	0.860	0.95	
Maximum reverse current	Rated $V_R$	$I_R$ <sup>(2)</sup>	$T_A = 25$ °C	-	5.0	$\mu$ A
			$T_A = 125$ °C	4.8	50	
Maximum reverse recovery time	$I_F = 0.5$ A, $I_R = 1.0$ A, $t_{rr} = 0.25$ A	$t_{rr}$	780	-	ns	
Typical junction capacitance	4.0 V, 1 MHz	$C_J$	7.0	-	pF	

**Notes**

<sup>(1)</sup> Pulse test: 300  $\mu$ s pulse width, 1 % duty cycle

<sup>(2)</sup> Pulse test: Pulse width  $\leq$  40 ms



THERMAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	SYMBOL	SE10PB	SE10PD	SE10PG	SE10PJ	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)}$	105				$^\circ\text{C/W}$
	$R_{\theta JL}^{(1)}$	25				
	$R_{\theta JC}^{(1)}$	30				

**Note**

(1) Thermal resistance from junction to ambient and junction to lead mounted on PCB with 5.0 mm x 5.0 mm copper pad areas.  $R_{\theta JL}$  is measured at the terminal of cathode band.  $R_{\theta JC}$  is measured at the top center of the body.

IMMUNITY TO ELECTRICAL STATIC DISCHARGE TO THE FOLLOWING STANDARDS ( $T_A = 25\text{ }^\circ\text{C}$ 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	$> 8\text{ kV}$
AEC-Q101-002	Machine model (contact mode)	$C = 200\text{ pF}$ , $R = 0\text{ }\Omega$		M4	$> 400\text{ V}$
JESD22-A114	Human body model (contact mode)	$C = 150\text{ pF}$ , $R = 1.5\text{ k}\Omega$		3B	$> 8\text{ kV}$
JESD22-A115	Machine model (contact mode)	$C = 200\text{ pF}$ , $R = 0\text{ }\Omega$		C	$> 400\text{ V}$
IEC 61000-4-2 (2)	Human body model (contact mode)	$C = 150\text{ pF}$ , $R = 150\text{ }\Omega$		4	$> 8\text{ kV}$
	Human body model (air-discharge mode) (1)	$C = 150\text{ pF}$ , $R = 150\text{ }\Omega$		4	$> 15\text{ kV}$

**Notes**

(1) Immunity to IEC 61000-4-2 air discharge mode has a typical performance  $> 30\text{ kV}$

(2) System ESD standard

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SE10PJ-M3/84A	0.024	84A	3000	7" diameter plastic tape and reel
SE10PJ-M3/85A	0.024	85A	10 000	13" diameter plastic tape and reel
SE10PJHM3/84A (1)	0.024	84A	3000	7" diameter plastic tape and reel
SE10PJHM3/85A (1)	0.024	85A	10 000	13" diameter plastic tape and reel

**Note**

(1) Automotive grade

**RATINGS AND CHARACTERISTICS CURVES**

( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)

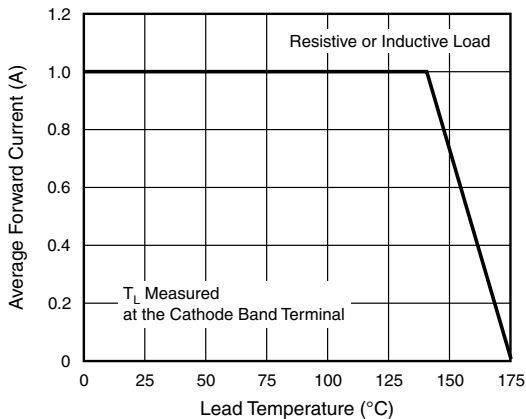


Fig. 1 - Maximum Forward Current Derating Curve

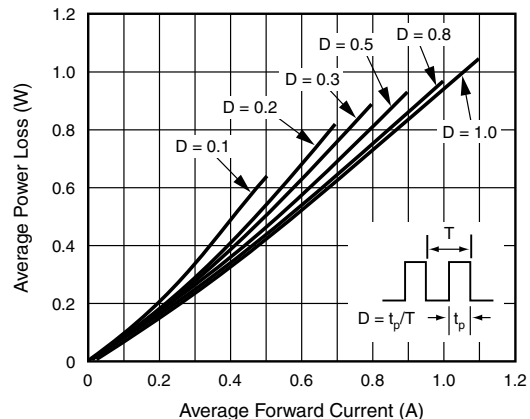


Fig. 2 - Forward Power Loss Characteristics

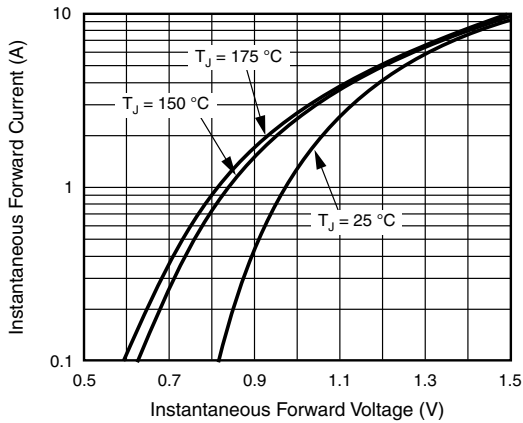


Fig. 3 - Forward Power Loss Characteristics

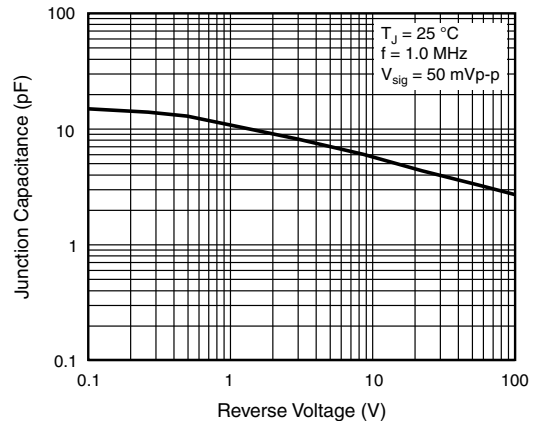


Fig. 5 - Typical Instantaneous Forward Characteristics

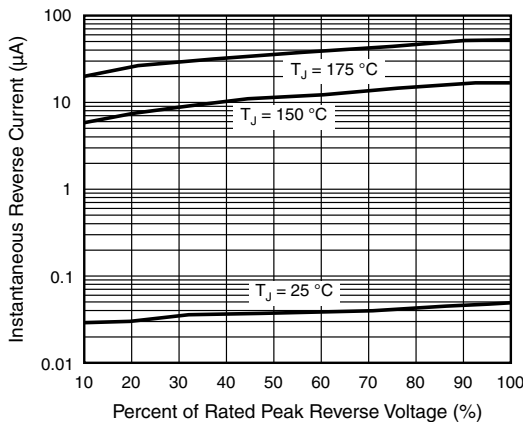
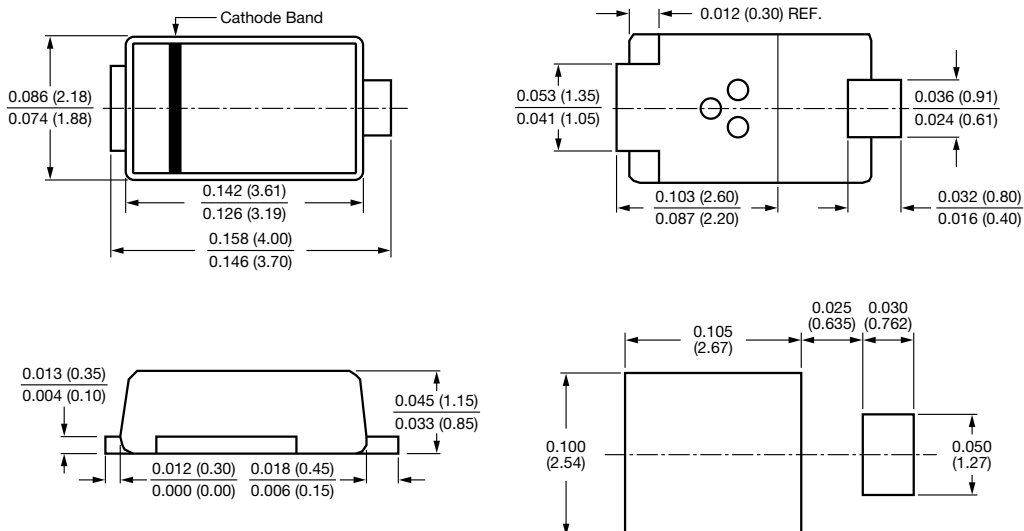


Fig. 4 - Typical Instantaneous Forward Characteristics

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### DO-220AA (SMP)





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### Наши контакты:

**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331