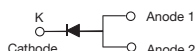


## Surface Mount ESD Capability Rectifiers

### eSMP® Series



### TO-277A (SMPC)



### FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Oxid planar chip junction
- Low forward voltage drop
- ESD capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available  
- Automotive ordering code: base P/NHM3
- 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**

### PRIMARY CHARACTERISTICS

Package	TO-277A (SMPC)
$I_{F(AV)}$	4.0 A
$V_{RRM}$	100 V to 600 V
$I_{FSM}$	60 A
$I_R$	10 $\mu$ A
$V_F$ at $I_F = 4.0$ A, (125 °C)	0.91 V
$T_J$ max.	175 °C
Diode variations	Single die

### TYPICAL APPLICATIONS

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

### MECHANICAL DATA

**Case:** TO-277A (SMPC)

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

Base P/NHM3\_X - halogen-free, RoHS-compliant and AEC-Q101 qualified

("\_X" denotes revision code e.g. A, B,.....)

**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

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

PARAMETER	SYMBOL	SE40PB	SE40PD	SE40PG	SE40PJ	UNIT
Device marking code		40B	40D	40G	40J	
Maximum repetitive peak reverse voltage	V <sub>RRM</sub>	100	200	400	600	V
Maximum DC forward current	I <sub>F</sub> <sup>(1)</sup>	4.0				A
	I <sub>F</sub> <sup>(2)</sup>	2.4				
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I <sub>FSM</sub>	60				A
Operating junction and storage temperature range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +175				°C

### Notes

(1) Mounted on 14 mm x 14 mm pad areas, 2 oz. FR4 PCB

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

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

PARAMETER	TEST CONDITIONS	SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	$I_F = 2.0\text{ A}$	$V_F^{(1)}$	0.92	-	V
	$I_F = 4.0\text{ A}$		1.00	1.05	
	$I_F = 2.0\text{ A}$		0.82	-	
	$I_F = 4.0\text{ A}$		0.91	0.96	
Reverse current	rated $V_R$	$I_R^{(2)}$	0.1	10	$\mu\text{A}$
			19	150	
Typical reverse recovery time	$I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ , $I_{rr} = 0.25\text{ A}$	$t_{rr}$	2.2	-	$\mu\text{s}$
Typical junction capacitance	4.0 V, 1 MHz	$C_J$	28	-	pF

**Notes**(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle(2) Pulse test: Pulse width  $\leq 40\text{ ms}$ **THERMAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

PARAMETER	SYMBOL	SE40PB	SE40PD	SE40PG	SE40PJ	UNIT
Typical thermal resistance	R <sub>θJA</sub> <sup>(1)</sup>	70				°C/W
	R <sub>θJM</sub> <sup>(2)</sup>	6.6				

**Notes**(1) Free air, mounted on recommended PCB 1 oz. pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient(2) Units mounted on PCB with 14 mm x 14 mm pad areas, 2 oz. FR4 PCB;  $R_{\theta JM}$  - junction to mount**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	$> 8\text{ kV}$

**ORDERING INFORMATION** (Example)

PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SE40PJ-M3/86A	0.10	86A	1500	7" diameter plastic tape and reel
SE40PJ-M3/87A	0.10	87A	6500	13" diameter plastic tape and reel
SE40PJHM3/86A <sup>(1)</sup>	0.10	86A	1500	7" diameter plastic tape and reel
SE40PJHM3/87A <sup>(1)</sup>	0.10	87A	6500	13" diameter plastic tape and reel
SE40PJHM3_A/H <sup>(1)</sup>	0.10	H	1500	7" diameter plastic tape and reel
SE40PJHM3_A/I <sup>(1)</sup>	0.10	I	6500	13" diameter plastic tape and reel

**Note**<sup>(1)</sup> AEC-Q101 qualified



**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

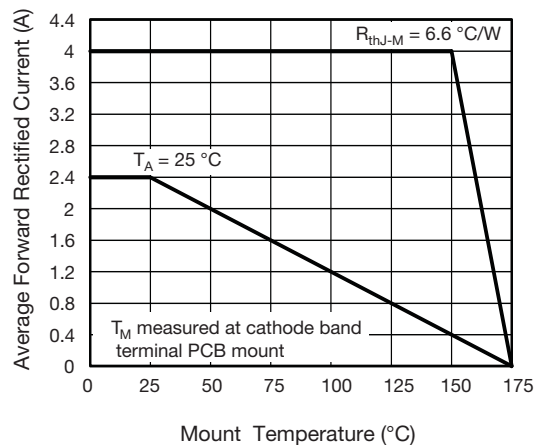


Fig. 1 - Maximum Forward Current Derating Curve

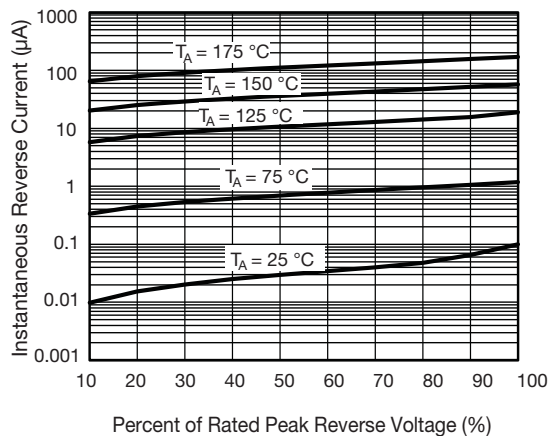


Fig. 4 - Typical Reverse Leakage Characteristics

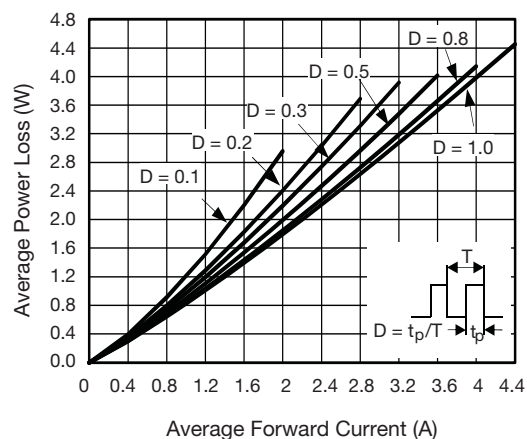


Fig. 2 - Forward Power Loss Characteristics

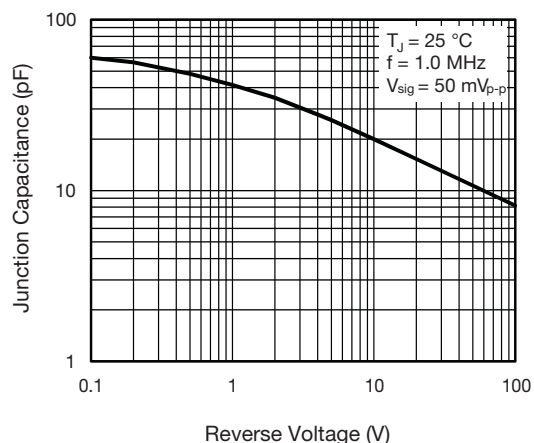


Fig. 5 - Typical Junction Capacitance

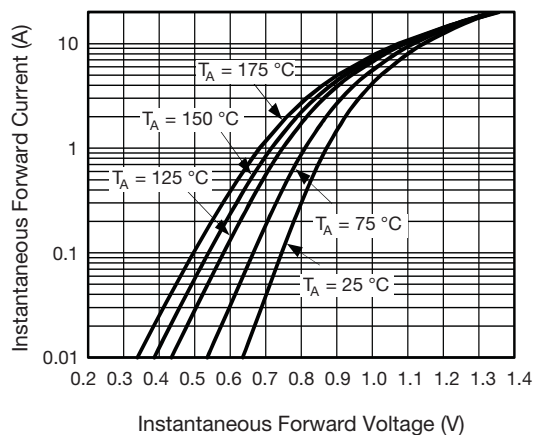


Fig. 3 - Typical Instantaneous Forward Characteristics

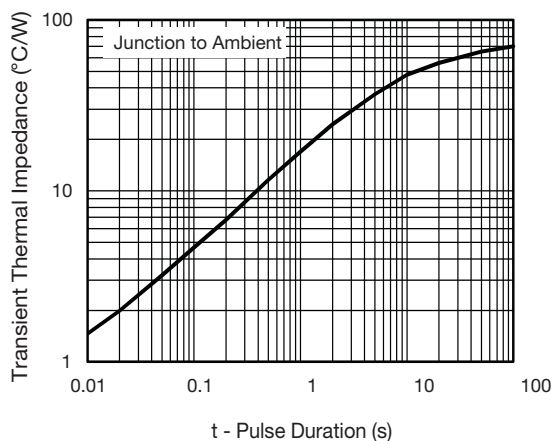
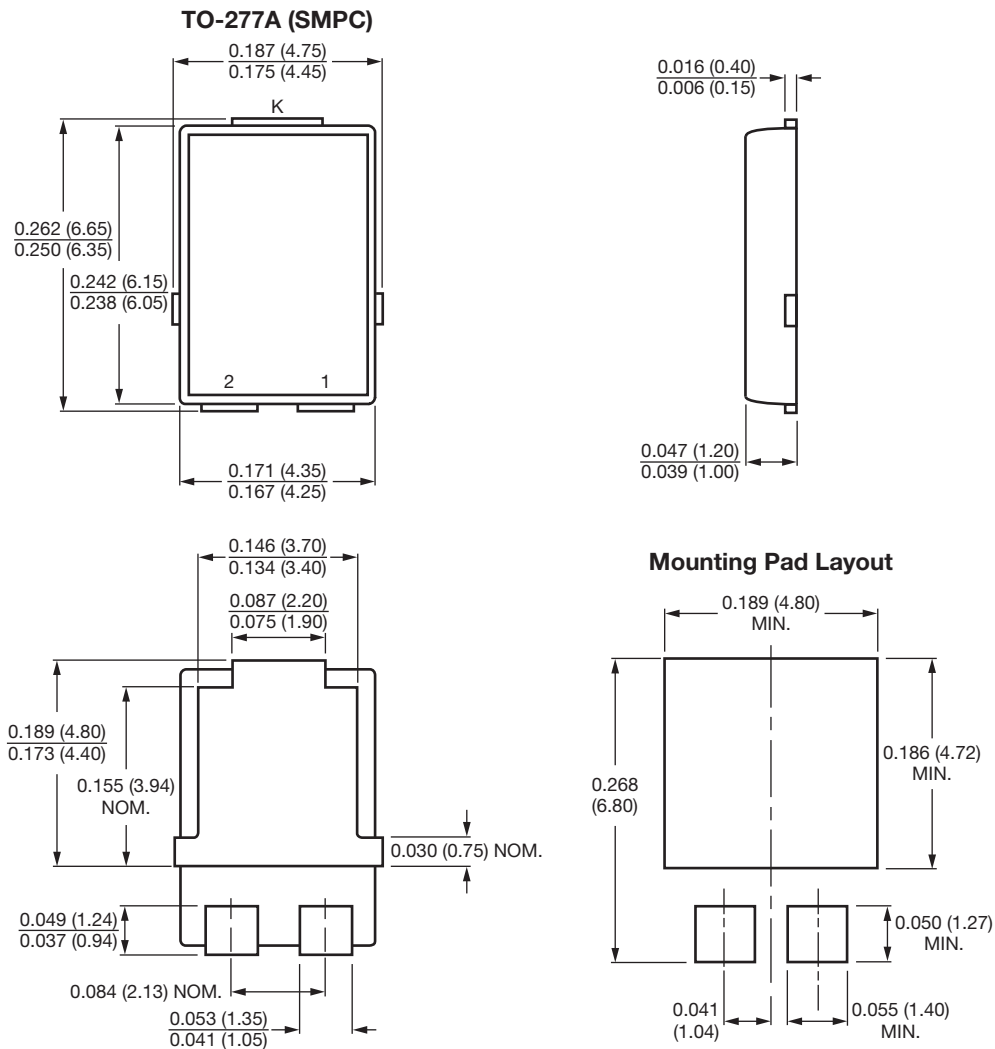


Fig. 6 - Typical Transient Thermal Impedance



**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)





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