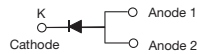


Surface Mount ESD Capability Rectifiers

eSMP® Series


TO-277A (SMPC)

 AUTOMOTIVE
GRADE
Available

RoHS
COMPLIANT
HALOGEN
FREE

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

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

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 μ 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.

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_{RRM}	100	200	400	600	V
Maximum DC forward current	$I_F^{(1)}$	4.0				A
	$I_F^{(2)}$	2.4				
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I_{FSM}	60				A
Operating junction and storage temperature range	T_J, T_{STG}	-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	$I_F = 2.0\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	0.92	-	V
	$I_F = 4.0\text{ A}$			1.00	1.05	
	$I_F = 2.0\text{ A}$	$T_A = 125\text{ }^\circ\text{C}$		0.82	-	
	$I_F = 4.0\text{ A}$			0.91	0.96	
Reverse current	rated V_R	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	0.1	10	μA
		$T_A = 125\text{ }^\circ\text{C}$		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	-	μs
Typical junction capacitance	4.0 V, 1 MHz		C_J	28	-	pF

Notes(1) Pulse test: 300 μs 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	$R_{\theta JA}^{(1)}$	70				$^\circ\text{C/W}$
	$R_{\theta JM}^{(2)}$	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					
$(T_A = 25\text{ }^\circ\text{C}, \text{ unless otherwise noted})$					
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 ⁽¹⁾	0.10	86A	1500	7" diameter plastic tape and reel
SE40PJHM3/87A ⁽¹⁾	0.10	87A	6500	13" diameter plastic tape and reel
SE40PJHM3_A/H ⁽¹⁾	0.10	H	1500	7" diameter plastic tape and reel
SE40PJHM3_A/I ⁽¹⁾	0.10	I	6500	13" diameter plastic tape and reel

Note

(1) AEC-Q101 qualified



RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

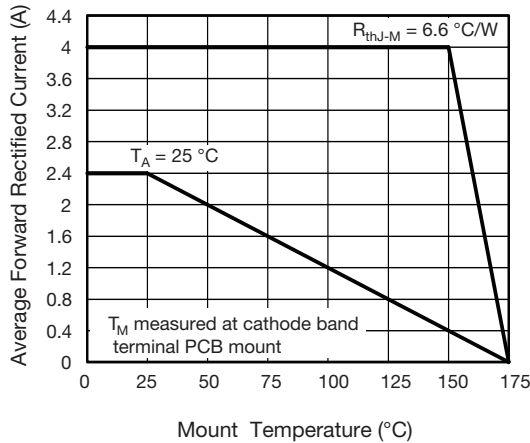


Fig. 1 - Maximum Forward Current Derating Curve

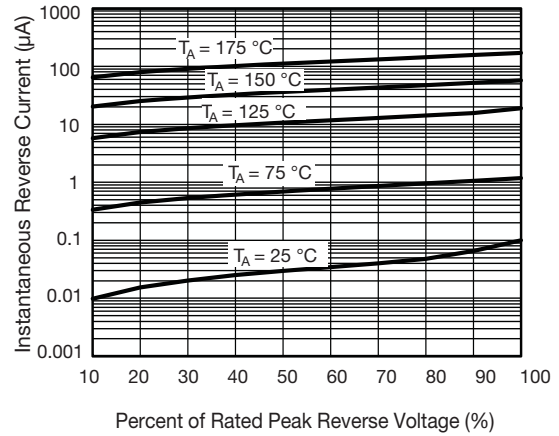


Fig. 4 - Typical Reverse Leakage Characteristics

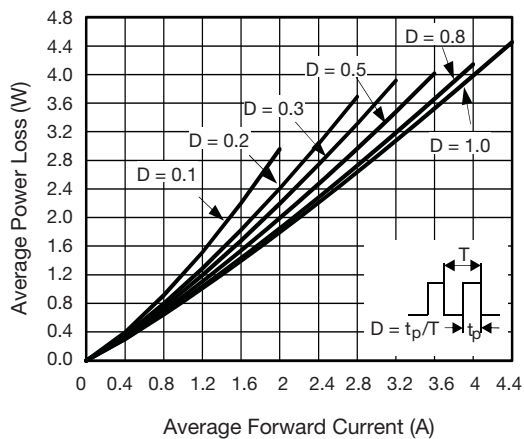


Fig. 2 - Forward Power Loss Characteristics

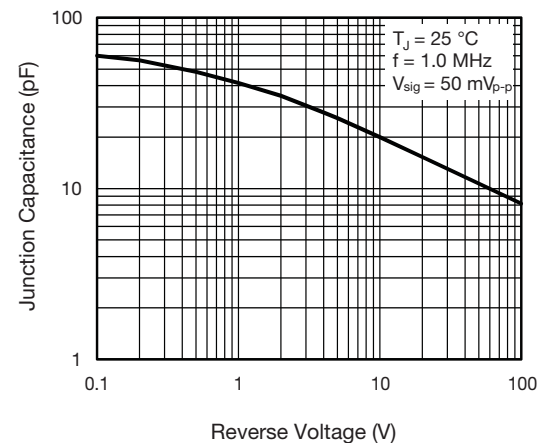


Fig. 5 - Typical Junction Capacitance

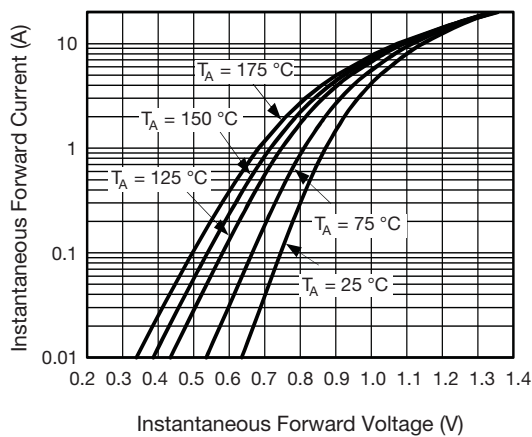


Fig. 3 - Typical Instantaneous Forward Characteristics

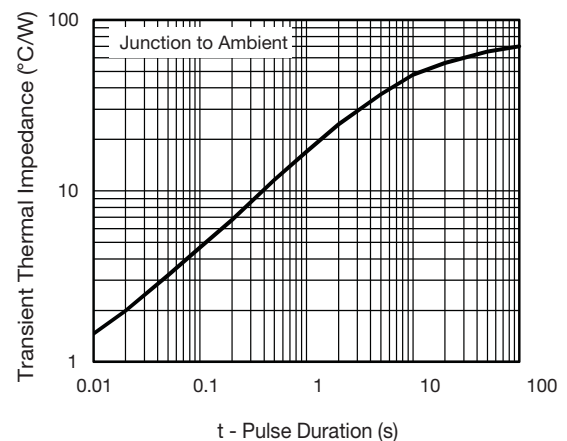
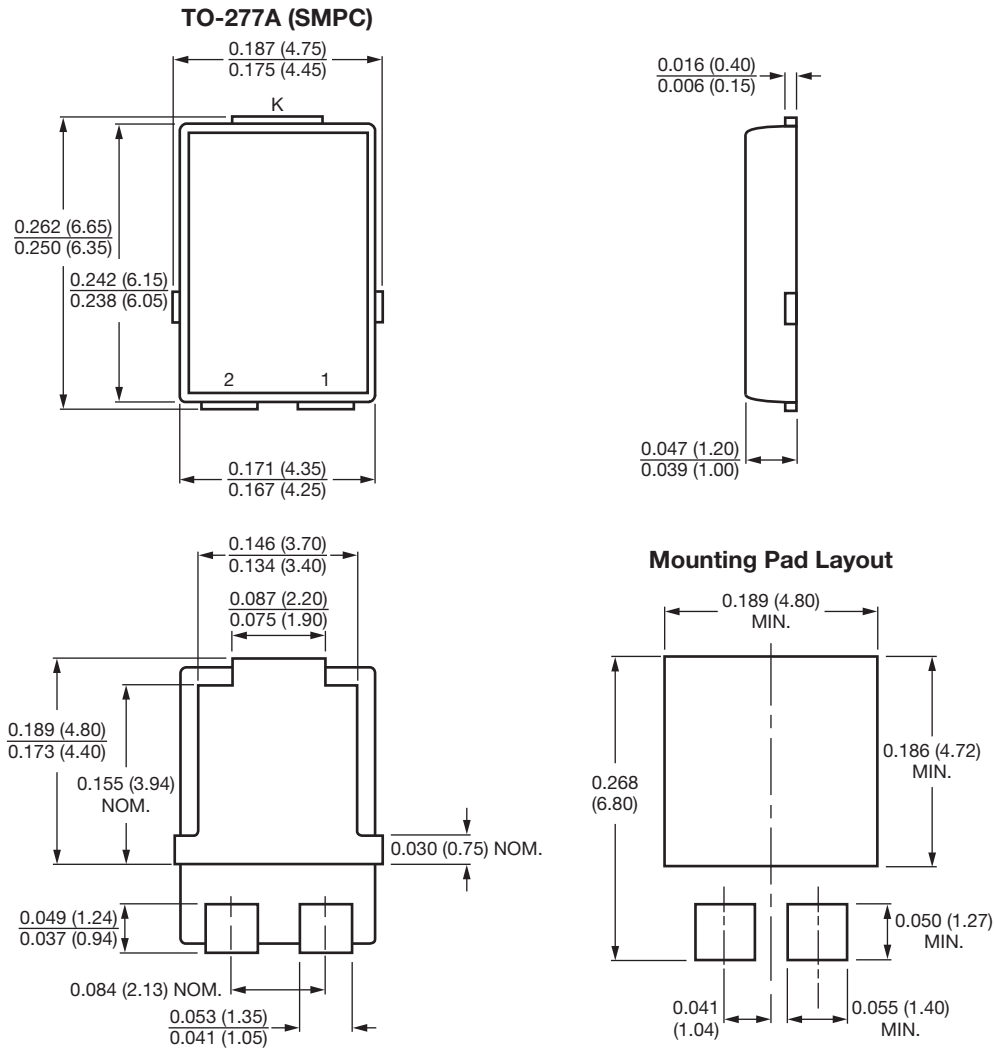


Fig. 6 - Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC® TO-277A



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