

High Current Density Surface Mount Schottky Barrier Rectifiers

eSMP™ Series



TO-277A (SMPC)



PRIMARY CHARACTERISTICS

$I_{F(AV)}$	2 x 6.0 A
V_{RRM}	40 V
I_{FSM}	150 A
E_{AS}	20 mJ
V_F at $I_F = 1.0$ A	0.24 V
T_J max.	125 °C

TYPICAL APPLICATIONS

For use in low voltage high frequency inverters, freewheeling, dc-to-dc converters and polarity protection applications.

FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Low forward voltage drop, low power losses
- High efficiency
- Low thermal resistance
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- **Halogen-free according to IEC 61249-2-21 definition**

AUTOMOTIVE
GRADE
AvailableRoHS
COMPLIANT
HALOGEN
FREE

MECHANICAL DATA

Case: TO-277A (SMPC)

Molding compound meets UL 94 V-0 flammability rating

Base P/N-M3 - halogen-free and RoHS compliant, commercial grade

Base P/NHM3 - halogen-free and RoHS compliant, 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

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

PARAMETER	SYMBOL	SS12P4C	UNIT
Device marking code		S124C	
Maximum repetitive peak reverse voltage	V_{RRM}	40	V
Maximum average forward rectified current (fig. 1) ⁽¹⁾ total device per diode	$I_{F(AV)}$	12 6.0	A
Maximum average forward rectified current ⁽²⁾ total device	$I_{F(AV)}$	3.5	A
Peak forward surge current 10 ms single half sine-wave superimposed on rated load per diode	I_{FSM}	150	A
Non-repetitive avalanche energy at $T_J = 25$ °C, $L = 60$ mH per diode	E_{AS}	20	mJ
Peak repetitive reverse current at $t_p = 2$ μs, 1 kHz, at $T_J = 25$ °C per diode	I_{RRM}	1.0	A
Operating junction and storage temperature range	T_J, T_{STG}	- 55 to + 125	°C

Notes

(1) Mounted on 30 mm x 30 mm Al P.C.B. with 50 mm x 25 mm x 100 mm fin heat sink

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



SS12P4C

Vishay General Semiconductor



ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage per diode ⁽¹⁾	I _F = 1 A	T _A = 25 °C	V _F	0.34	-	V
	I _F = 3 A			0.40	-	
	I _F = 6 A			0.46	0.52	
	I _F = 1 A	T _A = 100 °C		0.24	-	
	I _F = 3 A			0.31	-	
	I _F = 6 A			0.40	0.45	
Reverse current per diode per diode ⁽²⁾	Rated V _R	T _A = 25 °C	I _R	129	500	μA
		T _A = 100 °C		11.9	25	
Typical junction capacitance per diode	4.0 V, 1 MHz		C _J	400	-	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	SS12P4C	UNIT
Typical thermal resistance per device	$R_{\theta JA}$ ⁽¹⁾	100	$^{\circ}\text{C/W}$
	$R_{\theta JM}$ ⁽²⁾	3	

Notes

⁽¹⁾ Free air, mounted on recommended copper pad area. Thermal resistance $R_{\theta JA}$ - junction to ambient.⁽²⁾ Mounted on 30 mm x 30 mm Al P.C.B. with 50 mm x 25 mm x 100 mm fin heat sink. Thermal resistance $R_{\theta JM}$ - junction to mount.

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SS12P4C-M3/86A	0.10	86A	1500	7" diameter plastic tape and reel
SS12P4C-M3/87A	0.10	87A	6500	13" diameter plastic tape and reel
SS12P4CHM3/86A ⁽¹⁾	0.10	86A	1500	7" diameter plastic tape and reel
SS12P4CHM3/87A ⁽¹⁾	0.10	87A	6500	13" diameter plastic tape and reel

Note

⁽¹⁾ AEC-Q101 qualified

RATINGS AND CHARACTERISTICS CURVES

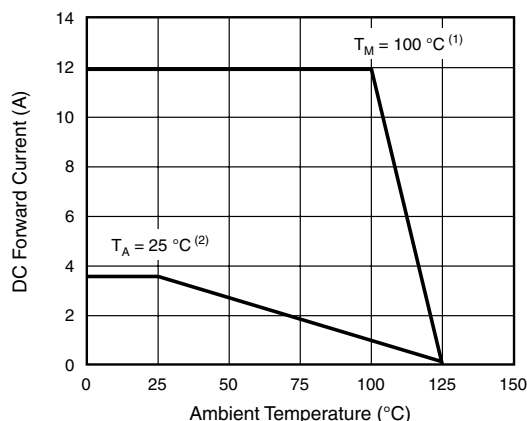
 $(T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)

Figure 1. Maximum Forward Current Derating Curve

Notes

⁽¹⁾ Mounted on 30 mm x 30 mm Al P.C.B. with 50 mm x 25 mm x 100 mm fin heat sink, T_M measured at the terminal of cathode band ($R_{\theta JM} = 3\text{ }^{\circ}\text{C/W}$)⁽²⁾ Free air, mounted on recommended copper pad area ($R_{\theta JA} = 100\text{ }^{\circ}\text{C/W}$)

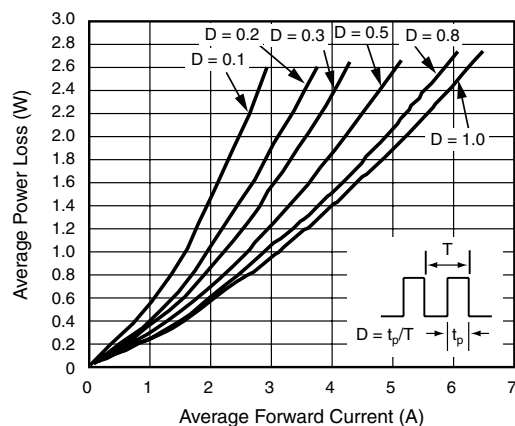


Figure 2. Forward Power Loss Characteristics Per Diode

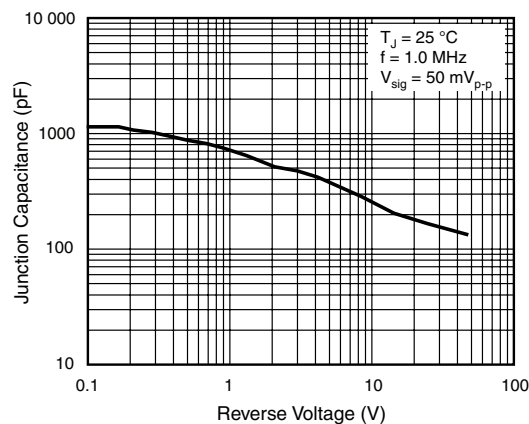


Figure 5. Typical Junction Capacitance Per Diode

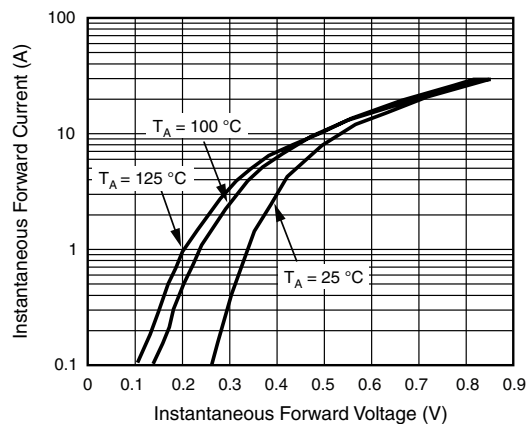


Figure 3. Typical Instantaneous Forward Characteristics Per Diode

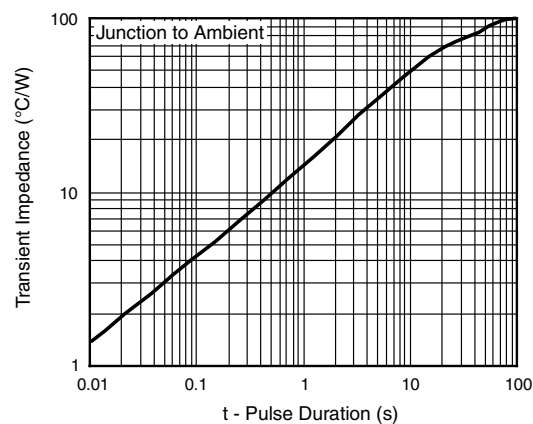


Figure 6. Typical Transient Thermal Impedance Per Device

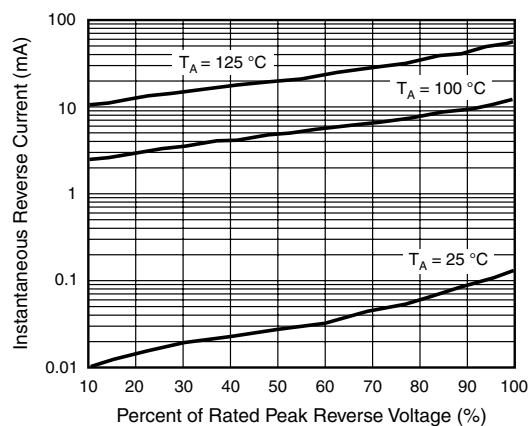
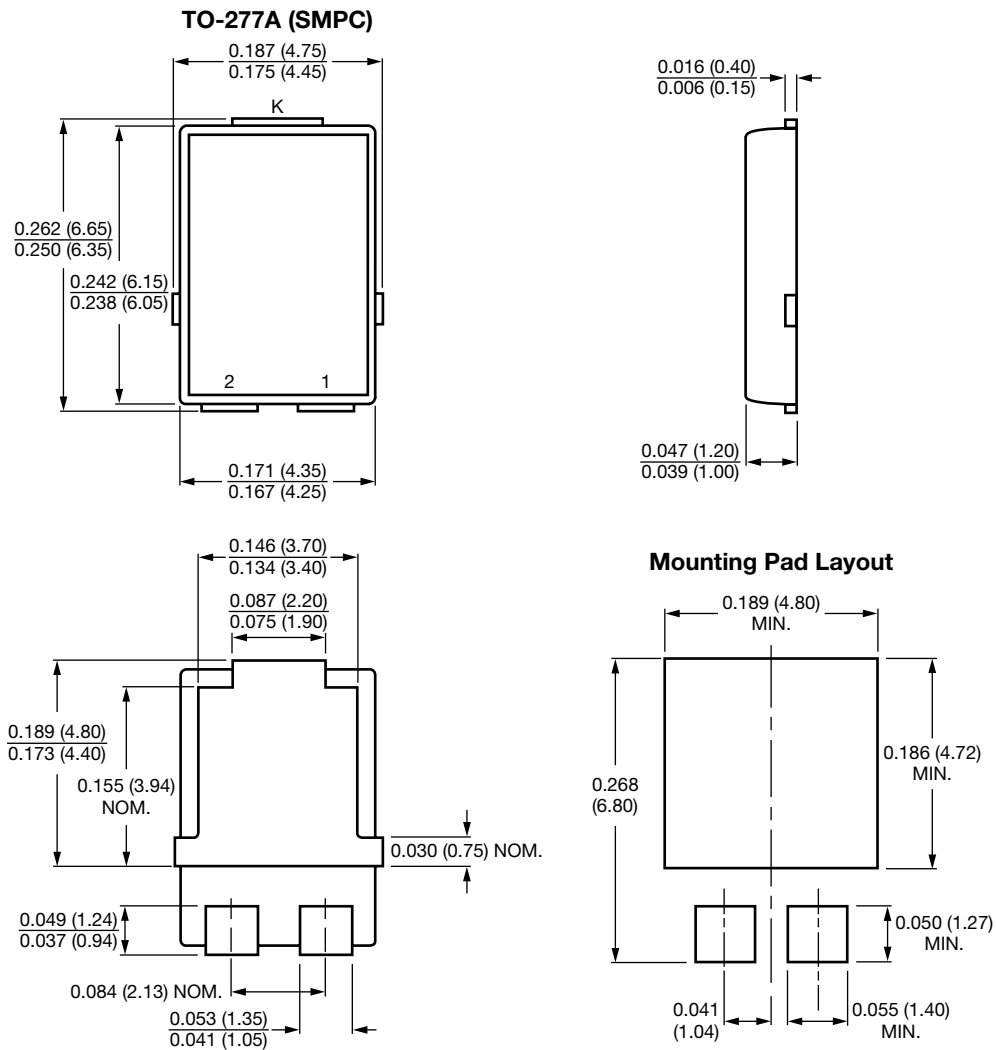


Figure 4. Typical Reverse Leakage Characteristics Per Diode

SS12P4C

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

Conform to JEDEC TO-277A

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