SE12DB, SE12DD, SE12DG, SE12DJ

Vishay General Semiconductor

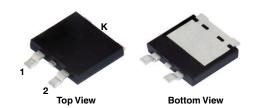
AUTOMOTIVE

COMPLIANT

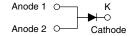
HALOGEN

Surface-Mount ESD Capability Rectifiers

eSMP® Series SMPD (TO-263AC)



SE12DX



ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS					
I _{F(AV)}	12 A				
V _{RRM}	100 V, 200 V, 400 V, 600 V				
I _{FSM}	125 A				
V_F at $I_F = 12 \text{ A } (T_A = 125 \text{ °C})$	0.96 V				
I _R	20 μΑ				
T _J max.	175 °C				
Package	SMPD (TO-263AC)				
Circuit configuration	Single				

FEATURES

- Very low profile typical height of 1.7 mm
- · Ideal for automated placement
- Oxide planar chip junction
- · Low forward voltage drop
- ESD capability
- AEC-Q101 qualified
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

TYPICAL APPLICATIONS

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

MECHANICAL DATA

Case: SMPD (TO-263AC)

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

 $\mbox{M3}$ suffix meets JESD 201 class 2 whisker test, HM3 suffix meets JESD 201 class 2 whisker test

Polarity: as marked

MAXIMUM RATINGS (T _A = 25 °C unless otherwise noted)							
PARAMETER	SYMBOL	SE12DB	SE12DD	SE12DG	SE12DJ	UNIT	
Maximum repetitive peak reverse voltage	V_{RRM}	100	200	400	600	V	
Maximum DC forward current	I _F ⁽¹⁾	12				А	
Maximum DC forward current	I _F ⁽²⁾	3.2					
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I _{FSM}	125			А		
Operating junction and storage temperature range	T _J , T _{STG}	-55 to +175				°C	

Notes

- (1) With heatsink
- (2) Free air, mounted on recommended copper pad area



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ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I _F = 6 A	T _A = 25 °C		0.95	-	V
	I _F = 12 A		V _F ⁽¹⁾	1.04	1.15	
	I _F = 6 A	T _A = 125 °C	V _F (')	0.85	-	
	I _F = 12 A			0.96	1.10	
Reverse current	Dated V	T _A = 25 °C	I _R ⁽²⁾	-	20	- μΑ
	Rated V _R	T _A = 125 °C	T _A = 125 °C	27	150	
Typical reverse recovery time	I _F = 0.5 A, I _R = 1.0 A, I _{rr} = 0.25 A		t _{rr}	3000	-	ns
Typical junction capacitance	4.0 V, 1 MHz		CJ	90	-	pF

Notes

 $^{(1)}$ Pulse test: 300 μs pulse width, 1 % duty cycle

 $^{(2)}$ Pulse test: Pulse width \leq 40 ms

THERMAL CHARACTERISTICS (T _A = 25 °c unless otherwise noted)							
PARAMETER	SYMBOL SE12DB SE12DD SE12DG SE12DJ UNIT						
Typical thermal resistance	R ₀ JA (1)(2)		°C/W				
Typical thermal resistance	R ₀ JC (3)		C/VV				

Notes

- $^{(1)}$ The heat generated must be less than the thermal conductivity from junction-to-ambient: $dP_D/dT_J < 1/R_{\theta JA}$
- $^{(2)}$ Free air, mounted on recommended PCB, 2 oz. pad area; thermal resistance $R_{\theta JA}$ junction to ambient
- (3) With infinite heatsink

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

ORDERING INFORMATION (Example)						
STANDARD	PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE	
SMPD (TO-263AC)	SE12DJ-M3/I	0.54	1	2000/reel	13" diameter plastic tape and reel	
SMPD (TO-263AC)	SE12DJHM3/I ⁽¹⁾	0.54	I	2000/reel	13" diameter plastic tape and reel	

Note

(1) AEC-Q101 qualified



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

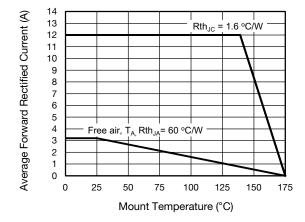


Fig. 1 - Forward Current Derating Curve

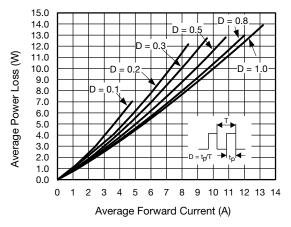


Fig. 2 - Forward Power Loss Characteristics

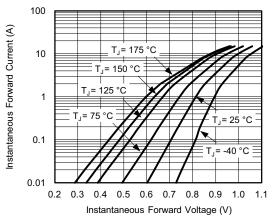


Fig. 3 - Typical Instantaneous Forward Characteristics

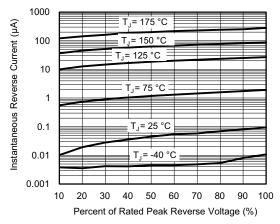


Fig. 4 - Typical Reverse Leakage Characteristics

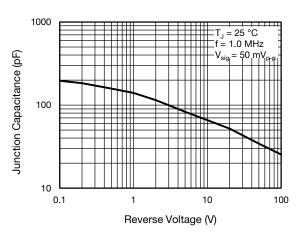


Fig. 5 - Typical Junction Capacitance

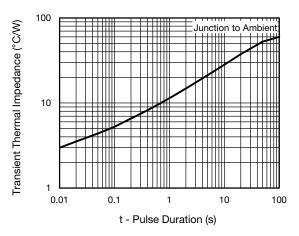


Fig. 6 - Typical Transient Thermal Impedance

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PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMPD (TO-263AC) 0.402 (10.20) 0.386 (9.80) 0.071 (1.80) 0.020 (0.52) 0.063 (1.60) 0.059 (1.50) REF 0.011 (0.27) 0.048 (1.21) 0.032 (0.81) 0.354 (8.99) 0.338 (8.59) 0.509 (12.93) 0.485 (12.33) 0 to 0.01 (0 to 0.254) 0.069 (1.74) 0.053 (1.34) 0.063 (1.60) 0.020 (0.52) 0.047 (1.20) 0.011 (0.27) 0.200 0.052 (1.23) NOM. (5.08) 0.028 (0.72) **Mounting Pad Layout** 0.420 (10.66) MIN. -0.339 (8.60) 0.323 (8.20) 0.276 (7.00) 0.260 (6.60) $\frac{0.330}{(8.38)}$ REF. 0.194 (4.93) NOM. 0.604 (15.33) 0.525 (13.33) 0.120 (3.05) REF. 0.105 (2.67) 0.080 (2.03) MIN. 0.095 (2.41)



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