## SE12DB, SE12DD, SE12DG, SE12DJ

Vishay General Semiconductor

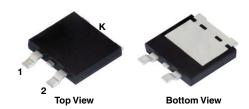
AUTOMOTIVE

COMPLIANT

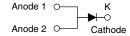
HALOGEN FREE

# **Surface-Mount ESD Capability Rectifiers**

### eSMP® Series SMPD (TO-263AC)



#### SE12DX



#### ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS					
I <sub>F(AV)</sub>	12 A				
$V_{RRM}$	100 V, 200 V, 400 V, 600 V				
I <sub>FSM</sub>	125 A				
$V_F$ at $I_F = 12 \text{ A } (T_A = 125 \text{ °C})$	0.96 V				
I <sub>R</sub>	20 μΑ				
T <sub>J</sub> 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.vishav.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

M3 suffix meets JESD 201 class 2 whisker test, HM3 suffix meets JESD 201 class 2 whisker test

Polarity: as marked

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

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



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

#### Notes

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

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

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °c unless otherwise noted)							
PARAMETER	SYMBOL SE12DB SE12DD SE12DG SE12DJ UNIT						
Typical thermal resistance	R <sub>0</sub> JA (1)(2)		°C/W				
Typical thermal resistance	R <sub>0</sub> 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 <sub>C</sub>	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 <sup>(1)</sup>	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<sub>A</sub> = 25 °C unless otherwise noted)

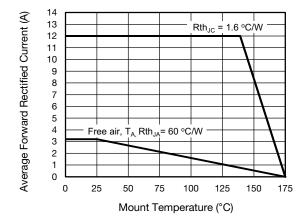


Fig. 1 - Forward Current Derating Curve

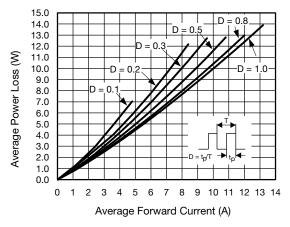


Fig. 2 - Forward Power Loss Characteristics

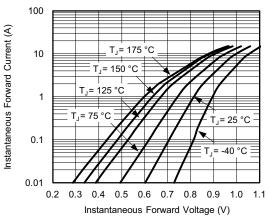


Fig. 3 - Typical Instantaneous Forward Characteristics

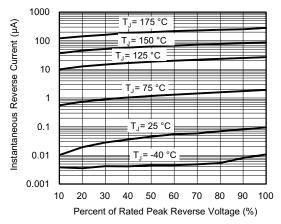


Fig. 4 - Typical Reverse Leakage Characteristics

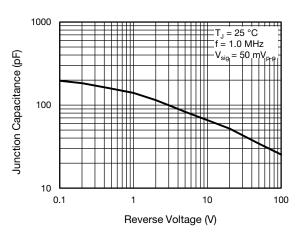


Fig. 5 - Typical Junction Capacitance

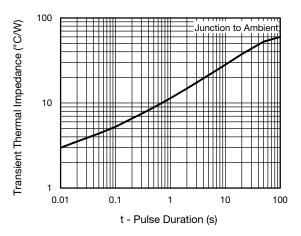
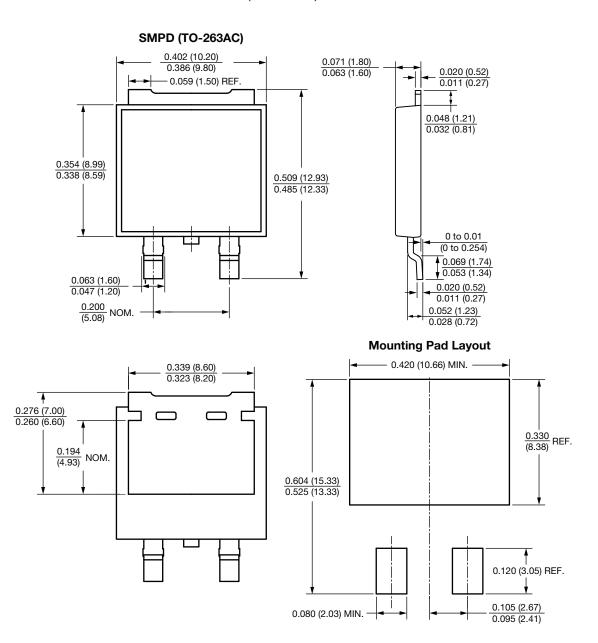


Fig. 6 - Typical Transient Thermal Impedance

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



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