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Vishay General Semiconductor

AUTOMOTIVE

RoHS

COMPLIANT

HALOGEN FREE

Surface-Mount Ultrafast Plastic Rectifier



SMB (DO-214AA)



LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS						
I _{F(AV)}	2.0 A					
V _{RRM} 50 V, 100 V, 150 V, 20						
I _{FSM}	50 A					
t _{rr}	20 ns					
V _F	0.90 V					
T _J max.	150 °C					
Package	SMB (DO-214AA)					
Circuit configuration	Single					

FEATURES

- Glass passivated pellet chip junction
- · Ideal for automated placement
- · Ultrafast recovery times for high efficiency
- Low forward voltage, low power losses
- · High forward surge capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
 - Automotive ordering code: base P/NHE3 or P/NHM3
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

TYPICAL APPLICATIONS

For use in high frequency rectification and freewheeling application in switching mode converters and inverters for consumer, computer, automotive, and telecommunication.

MECHANICAL DATA

Case: SMB (DO-214AA)

Molding compound meets UL 94 V-0 flammability rating Base P/N-E3 - RoHS-compliant, commercial grade

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

Base P/NHE3_X - RoHS-compliant and AEC-Q101 qualified Base P/NHME3_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

E3, M3, HE3, and HM3 suffix meets JESD 201 class 2 whisker test

Polarity: color band denotes cathode end

MAXIMUM RATINGS (T _A = 25 °C unless otherwise noted)							
PARAMETER	SYMBOL	ES2A	ES2B	ES2C	ES2D	UNIT	
Device marking code		EA	EB	EC	ED		
Maximum repetitive peak reverse voltage V _{RRM} 50 100 150					200	V	
Maximum RMS voltage	V _{RMS}	35	70	105	140	V	
Maximum DC blocking voltage	V_{DC}	50 100 150 200			200	V	
Maximum average forward rectified current at $T_L = 110$ °C	I _{F(AV)}	2.0					
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	I _{FSM}	50				А	
Operating junction and storage temperature range	T _J , T _{STG}	-55 to +150				°C	

ES2A, ES2B, ES2C, ES2D

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ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)								
PARAMETER	TEST CONDITION	SYMBOL	ES2A	ES2B	ES2C	ES2D	UNIT	
Maximum instantaneous forward voltage	2.0 A		V _F ⁽¹⁾	0.90			V	
Maximum DC reverse current at rated DC blocking voltage		T _A = 25 °C T _A = 100 °C	I _R	10 350			μA	
Max. reverse recovery time	I _F = 0.5 A, I _R = 1.0 A, I _{rr} = 0.25 A		t _{rr}	20		ns		
Maximum reverse recovery time	$I_F = 2.0 \text{ A}, V_R = 30 \text{ V},$	T _J = 25 °C	+	30				ns
Waxiindiii reverse recovery time	$dI/dt = 50 A/\mu s, I_r = 10 \% I_{RM}$	T _J = 100 °C	t _{rr}	50				
Maximum stored charge	$I_F = 2.0 \text{ A}, V_R = 30 \text{ V},$ $dI/dt = 50 \text{ A/}\mu\text{s}, I_r = 10 \% I_{RM}$	T _J = 25 °C	0	10				nC
Maximum stored charge		T _J = 100 °C	Q_{rr}	25				
Typical junction capacitance	4.0 V, 1 MHz		CJ		1	8		pF

Note

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

THERMAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)						
PARAMETER	SYMBOL	ES2A	ES2B	ES2C	ES2D	UNIT
Typical thermal resistance		75				°C/W
		20				C/VV

Note

 $^{^{(1)}\,}$ Units mounted on PCB 5.0 mm x 5.0 mm (0.013 mm thick) land areas

ORDERING INFORMATION (Example)							
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE			
ES2D-E3/52T	0.096	52T	750	7" diameter plastic tape and reel			
ES2D-E3/5BT	0.096	5BT	3200	13" diameter plastic tape and reel			
ES2DHE3_A/H (1)	0.096	Н	750	7" diameter plastic tape and reel			
ES2DHE3_A/I (1)	0.096	I	3200	13" diameter plastic tape and reel			
ES2D-M3/52T	0.096	52T	750	7" diameter plastic tape and reel			
ES2D-M3/5BT	0.096	5BT	3200	13" diameter plastic tape and reel			
ES2DHM3_A/H (1)	0.096	Н	750	7" diameter plastic tape and reel			
ES2DHM3_A/I (1)	0.096	I	3200	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)

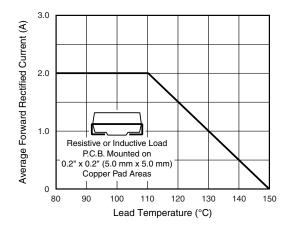


Fig. 1 - Maximum Forward Current Derating Curve

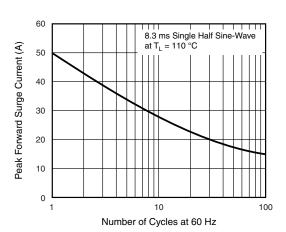


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

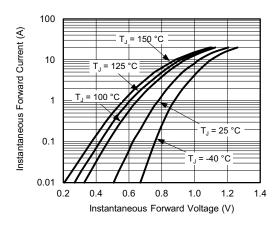


Fig. 3 - Typical Instantaneous Forward Characteristics

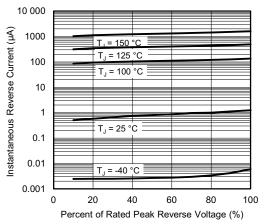


Fig. 4 - Typical Reverse Leakage Characteristics

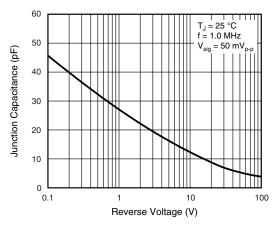


Fig. 5 - Typical Junction Capacitance

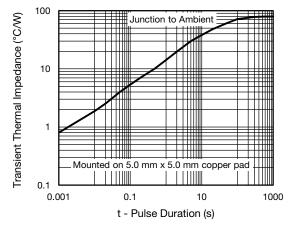


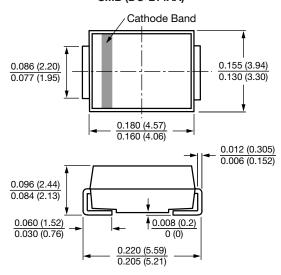
Fig. 6 - Transient Thermal Impedance



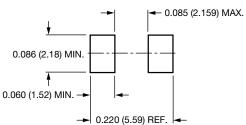
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PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMB (DO-214AA)



Mounting Pad Layout





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