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# Vishay General Semiconductor

RoHS

HALOGEN

FREE

# **Surface Mount Ultrafast Plastic Rectifier**



**SMB (DO-214AA)** 

PRIMARY CHARACTERISTICS						
I <sub>F(AV)</sub>	2.0 A					
V <sub>RRM</sub> 50 V, 100 V, 150 V, 200						
I <sub>FSM</sub> 50 A						
t <sub>rr</sub>	20 ns					
V <sub>F</sub>	0.90 V					
T <sub>J</sub> max.	150 °C					
Package SMB (DO-214AA)						
Diode variations	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 <a href="https://www.vishav.com/doc?99912"><u>www.vishav.com/doc?99912</u></a>

### **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

ALO-Q TO T 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 <sub>A</sub> = 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			200	V	
Maximum RMS voltage	V <sub>RMS</sub>	35	70	105	140	V	
Maximum DC blocking voltage	$V_{DC}$	50 100 150 200			200	V	
Maximum average forward rectified current at $T_L = 110 ^{\circ}\text{C}$	I <sub>F(AV)</sub>	2.0					
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	I <sub>FSM</sub>	50					
Operating junction and storage temperature range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150					

# ES2A, ES2B, ES2C, ES2D

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<b>ELECTRICAL CHARACTERISTICS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)								
PARAMETER	TEST CONDITION	SYMBOL	ES2A	ES2B	ES2C	ES2D	UNIT	
Maximum instantaneous forward voltage	2.0 A		V <sub>F</sub> <sup>(1)</sup>		0.	90		٧
Maximum DC reverse current at rated DC blocking voltage		T <sub>A</sub> = 25 °C T <sub>A</sub> = 100 °C	I <sub>R</sub>	10 350				μA
Max. 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>	20			ns	
Maximum reverse recovery time	$I_F = 2.0 \text{ A}, V_R = 30 \text{ V},$	T <sub>J</sub> = 25 °C	+	30				ns
Maximum reverse recovery time	$dI/dt = 50 A/\mu s, I_r = 10 \% I_{RM}$	T <sub>J</sub> = 100 °C	t <sub>rr</sub>	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 <sub>J</sub> = 25 °C		10				nC
		T <sub>J</sub> = 100 °C	Q <sub>rr</sub>	25				
Typical junction capacitance	4.0 V, 1 MHz		CJ		1	8		pF

### Note

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

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	SYMBOL	ES2A	ES2B	ES2C	ES2D	UNIT
Typical thermal resistance	R <sub>0JA</sub> (1)	75				°C/W
Typical thermal resistance		20			C/VV	

### Note

 $<sup>^{(1)}\,</sup>$  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

<sup>(1)</sup> AEC-Q101 qualified

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## RATINGS AND CHARACTERISTICS CURVES (T<sub>A</sub> = 25 °C unless otherwise noted)

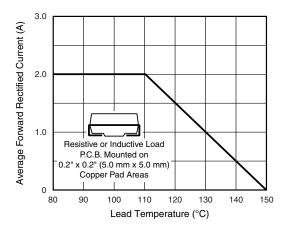


Fig. 1 - Maximum Forward Current Derating Curve

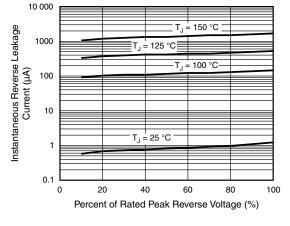


Fig. 4 - Typical Reverse Leakage Characteristics

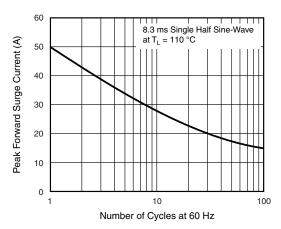


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

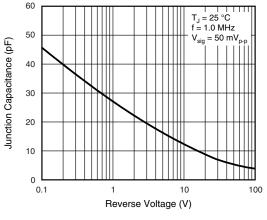


Fig. 5 - Typical Junction Capacitance

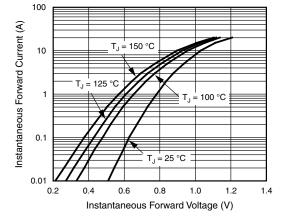


Fig. 3 - Typical Instantaneous Forward Characteristics

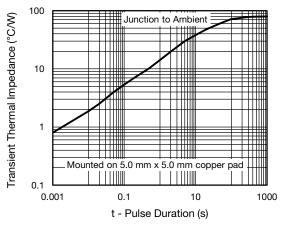


Fig. 6 - Transient Thermal Impedance



0.060 (1.52) 0.030 (0.76)

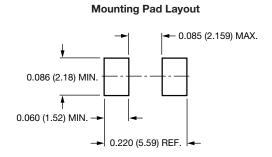
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### **PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

# O.086 (2.20) 0.077 (1.95) O.180 (4.57) 0.160 (4.06) O.096 (2.44) 0.084 (2.13) O.096 (2.44)

0.220 (5.59) 0.205 (5.21)

0.008 (0.2) 0 (0)





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