

## Vishay General Semiconductor

RoHS

## **Surface Mount Ultrafast Plastic Rectifier**



**DO-214AC (SMA)** 

PRIMARY CHARACTERISTICS						
I <sub>F(AV)</sub>	1.0 A					
$V_{RRM}$	50 V, 100 V, 150 V, 200 V					
I <sub>FSM</sub>	30 A					
t <sub>rr</sub>	15 ns					
V <sub>F</sub> at I <sub>F</sub>	0.92 V					
T <sub>J</sub> max.	150 °C					
Package	DO-214AC (SMA)					
Diode variations	Single die					

#### **FEATURES**

- Low profile package
- · Ideal for automated placement
- · Glass passivated pellet chip junction
- 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
- Material categorization: for definitions of compliance please see <a href="https://www.vishay.com/doc?99912"><u>www.vishay.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: DO-214AC (SMA)

Molding compound meets UL 94 V-0 flammability rating Base P/N-E3 - RoHS-compliant, commercial grade Base P/NHE3\_X - 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 suffix meets JESD 201 class 2 whisker test, HE3 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	ES1A	ES1B	ES1C	ES1D	UNIT
Device marking code		EA	EB	EC	ED	
Maximum repetitive peak reverse voltage	$V_{RRM}$	50	100	150	200	V
Maximum RMS voltage	V <sub>RMS</sub>	35	70	105	140	V
Maximum DC blocking voltage	$V_{DC}$	50	100	150	200	V
Maximum average forward rectified current (fig. 1)	I <sub>F(AV)</sub>	1.0				Α
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	I <sub>FSM</sub>	30				Α
Operating junction and storage temperature range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150				°C

# ES1A, ES1B, ES1C, ES1D

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<b>ELECTRICAL CHARACTERISTICS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT		
Maximum instantaneous forward voltage			V <sub>F</sub> <sup>(1)</sup>	0.865 V		
waximum instantaneous forward voitage	I <sub>F</sub> = 1.0 A		$V_{F}$	0.920	V	
Maximum DC reverse current at rated DC		T <sub>A</sub> = 25 °C	1_	5.0		
blocking voltage	T <sub>A</sub> = 100 °C		I <sub>R</sub>	100	μΑ	
Maximum reverse recovery time	$I_F = 0.5 \text{ A}, I_R = 1.0 \text{ A}, I_{rr} = 0.25 \text{ A}$		t <sub>rr</sub>	15	ns	
Maximum reverse recovery time	$I_F = 0.6 \text{ A}, V_R = 30 \text{ V}, dI/dt = 50 \text{ A/}\mu\text{s},$	T <sub>J</sub> = 25 °C	- t <sub>rr</sub>	25	- ns	
	I <sub>rr</sub> = 10 % I <sub>RM</sub>	T <sub>J</sub> = 100 °C		35		
Maximum stored charge	$I_F = 0.6 \text{ A}, V_R = 30 \text{ V}, dI/dt = 50 \text{ A/}\mu\text{s},$	T <sub>J</sub> = 25 °C	Q <sub>rr</sub>	10	nC	
	I <sub>rr</sub> = 10 % I <sub>RM</sub>	T <sub>J</sub> = 100 °C		25		
Typical junction capacitance	4.0 V, 1 MHz		CJ	10	pF	

#### Note

<sup>(1)</sup> Pulse test: 300 µs pulse width, 1 % duty cycle

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	SYMBOL	ES1A	ES1B	ES1C	ES1D	UNIT
Typical thormal registeres	$R_{\theta JA}$ <sup>(1)</sup>	85				°C/W
Typical thermal resistance	R <sub>0</sub> JL (1)	35				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			
ES1D-E3/61T	0.064	61T	1800	7" diameter plastic tape and reel			
ES1D-E3/5AT	0.064	5AT	7500	13" diameter plastic tape and reel			
ES1DHE3_A/H (1)	0.064	Н	1800	7" diameter plastic tape and reel			
ES1DHE3_A/I (1)	0.064	I	7500	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)

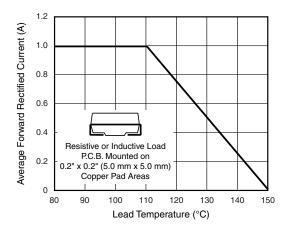
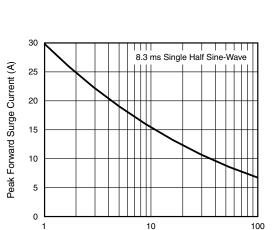


Fig. 1 - Maximum Forward Current Derating Curve



Number of Cycles at 60 Hz

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

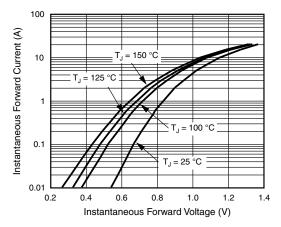


Fig. 3 - Typical Instantaneous Forward Characteristics

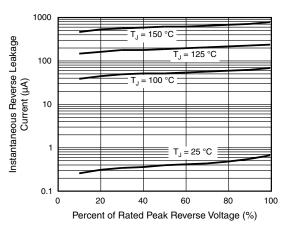


Fig. 4 - Typical Reverse Leakage Characteristics

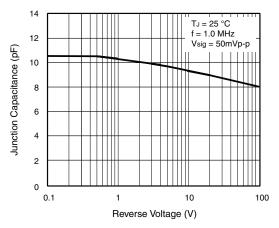


Fig. 5 - Typical Junction Capacitance

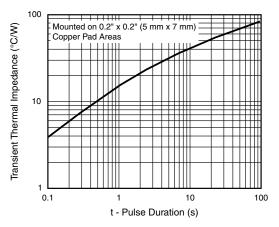


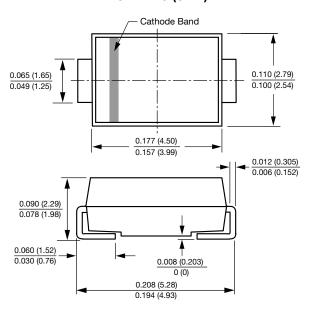
Fig. 6 - Typical Thermal Impedance



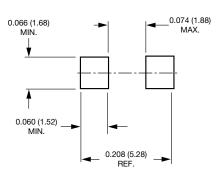
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### **PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

#### **DO-214AC (SMA)**



#### **Mounting Pad Layout**





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