

## Surface Mount Ultrafast Plastic Rectifier


**SMA (DO-214AC)**

### FEATURES

- Low profile package
- Ideal for automated placement
- Glass passivated pellet chip junction
- Ultrafast recovery times for high efficiency
- Low forward voltage, low power loss
- 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 [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
Available

### TYPICAL APPLICATIONS

For use in secondary rectification and freewheeling for ultrafast switching speeds AC/AC and DC/DC converters in high temperature conditions for both consumer and automotive applications.

### MECHANICAL DATA

**Case:** SMA (DO-214AC)

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/NHM3\_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

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	1.0 A
$V_{RRM}$	100 V, 150 V, 200 V
$t_{rr}$	25 ns
$V_F$ at $I_F$	0.90 V
$T_J$ max.	175 °C
Package	SMA (DO-214AC)
Diode variations	Single

MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)					
PARAMETER	SYMBOL	ESH1B	ESH1C	ESH1D	UNIT
Device marking code		EHB	EHC	EHD	
Maximum repetitive peak reverse voltage	$V_{RRM}$	100	150	200	V
Maximum RMS voltage	$V_{RMS}$	70	105	140	V
Maximum DC blocking voltage	$V_{DC}$	100	150	200	V
Maximum average forward rectified current at $T_L = 150\text{ °C}$	$I_{F(AV)}$	1.0			A
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load (JEDEC® method)	$I_{FSM}$	50			A
Operating junction and storage temperature range	$T_J, T_{STG}$	-55 to +175			°C



ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)					
PARAMETER	TEST CONDITIONS		SYMBOL	VALUE	UNIT
Maximum instantaneous forward voltage	I <sub>F</sub> = 0.7 A		V <sub>F</sub> <sup>(1)</sup>	0.87	V
	I <sub>F</sub> = 1 A		V <sub>F</sub>	0.90	
Maximum DC reverse current at rated DC blocking voltage	T <sub>A</sub> = 25 °C		I <sub>R</sub>	1.0	μA
	T <sub>A</sub> = 125 °C			25	
Maximum reverse current	V <sub>R</sub> = 20 V, T <sub>J</sub> = 150 °C		I <sub>R</sub>	50	μA
Maximum reverse recovery time	I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1 A, I <sub>rr</sub> = 0.25 A		t <sub>rr</sub>	25	ns
Typical reverse recovery time	I <sub>F</sub> = 0.6 A, V <sub>R</sub> = 30 V, di/dt = 50 A/μs, I <sub>rr</sub> = 10 % I <sub>RM</sub>	T <sub>J</sub> = 25 °C	t <sub>rr</sub>	25	ns
		T <sub>J</sub> = 100 °C		35	
Typical stored charge	I <sub>F</sub> = 0.6 A, V <sub>R</sub> = 30 V, di/dt = 50 A/μs, I <sub>rr</sub> = 10 % I <sub>RM</sub>	T <sub>J</sub> = 25 °C	Q <sub>rr</sub>	10	nC
		T <sub>J</sub> = 100 °C		15	
Typical junction capacitance	4.0 V, 1 MHz		C <sub>J</sub>	25	pF

**Note**

(1) Pulse test: 300 μs pulse width, 1 % duty cycle

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)					
PARAMETER	SYMBOL	ESH1B	ESH1C	ESH1D	UNIT
Typical thermal resistance	R <sub>θJA</sub> <sup>(1)</sup>	85			°C/W
	R <sub>θJL</sub> <sup>(1)</sup>	30			

**Note**

(1) Units mounted on PCB with 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
ESH1D-E3/61T	0.064	61T	1800	7" diameter plastic tape and reel
ESH1D-E3/5AT	0.064	5AT	7500	13" diameter plastic tape and reel
ESH1DHE3_A/H <sup>(1)</sup>	0.064	H	1800	7" diameter plastic tape and reel
ESH1DHE3_A/I <sup>(1)</sup>	0.064	I	7500	13" diameter plastic tape and reel
ESH1D-M3/61T	0.064	61T	1800	7" diameter plastic tape and reel
ESH1D-M3/5AT	0.064	5AT	7500	13" diameter plastic tape and reel
ESH1DHM3_A/H <sup>(1)</sup>	0.064	H	1800	7" diameter plastic tape and reel
ESH1DHM3_A/I <sup>(1)</sup>	0.064	I	7500	13" diameter plastic tape and reel

**Note**

(1) AEC-Q101 qualified



### RATINGS AND CHARACTERISTICS CURVES ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)

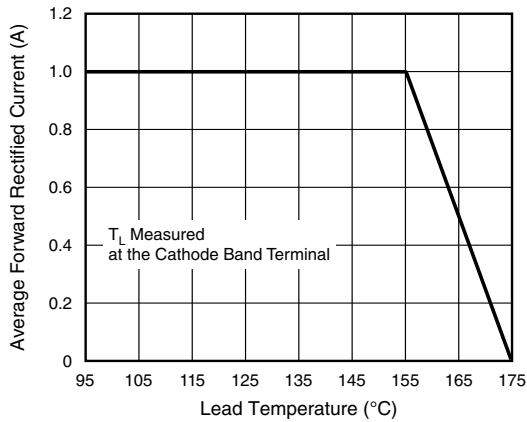


Fig. 1 - Maximum Forward Current Derating Curve

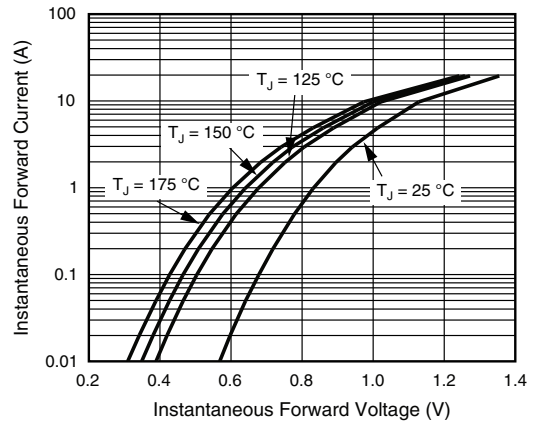


Fig. 4 - Typical Instantaneous Forward Characteristics

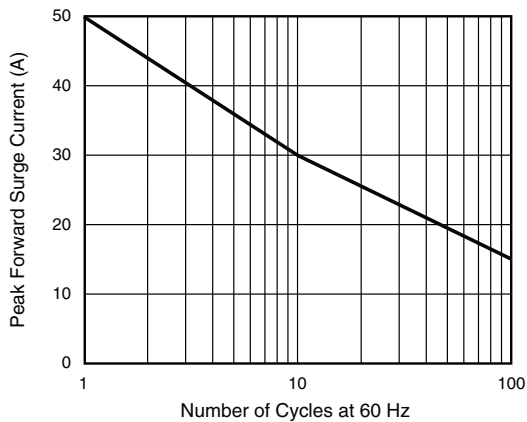


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

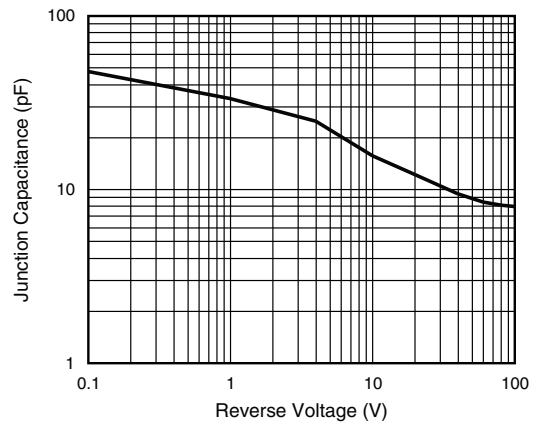


Fig. 5 - Typical Junction Capacitance

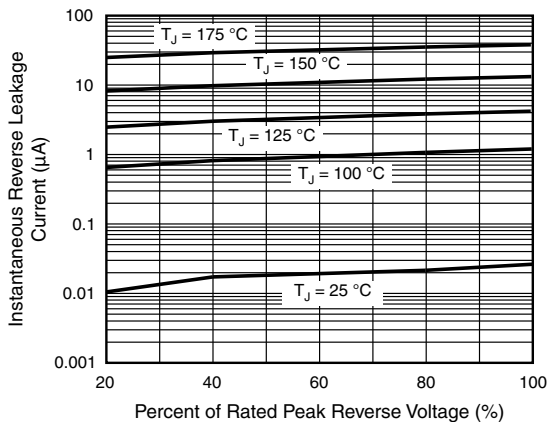


Fig. 3 - Typical Reverse Leakage Characteristics

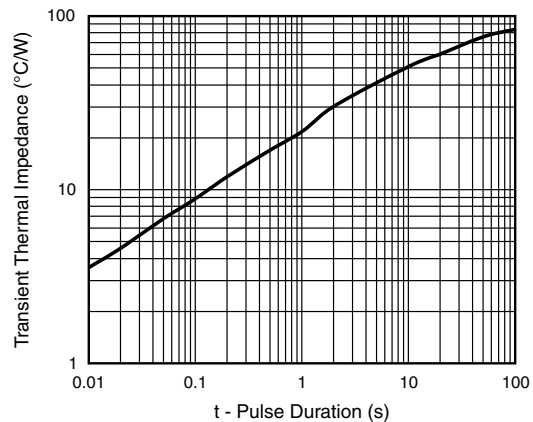
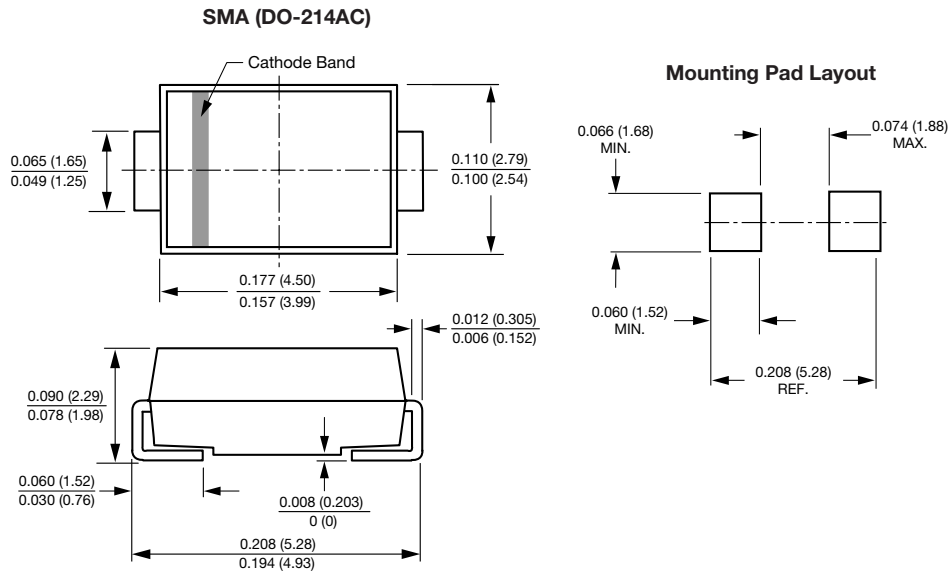


Fig. 6 - Typical Transient Thermal Impedance



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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