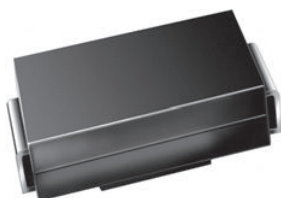


# Surface-Mount Ultrafast Plastic Rectifier


**SMA (DO-214AC)**

Cathode  Anode

## LINKS TO ADDITIONAL RESOURCES



## 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)



## 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)
Circuit configurations	Single

## MAXIMUM RATINGS ( $T_A = 25$ °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 $T_L = 150$ °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** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Maximum instantaneous forward voltage	$I_F = 0.7\text{ A}$	$V_F^{(1)}$	0.87	V
	$I_F = 1\text{ A}$	$V_F$	0.90	
Maximum DC reverse current at rated DC blocking voltage	$T_A = 25\text{ }^{\circ}\text{C}$	$I_R$	1.0	$\mu\text{A}$
	$T_A = 125\text{ }^{\circ}\text{C}$		25	
Maximum reverse current	$V_R = 20\text{ V}$ , $T_J = 150\text{ }^{\circ}\text{C}$	$I_R$	50	$\mu\text{A}$
Maximum reverse recovery time	$I_F = 0.5\text{ A}$ , $I_R = 1\text{ A}$ , $I_{rr} = 0.25\text{ A}$	$t_{rr}$	25	ns
Typical reverse recovery time	$I_F = 0.6\text{ A}$ , $V_R = 30\text{ V}$ , $di/dt = 50\text{ A}/\mu\text{s}$ , $I_{rr} = 10\% I_{RM}$	$T_J = 25\text{ }^{\circ}\text{C}$	25	ns
		$T_J = 100\text{ }^{\circ}\text{C}$	35	
Typical stored charge	$I_F = 0.6\text{ A}$ , $V_R = 30\text{ V}$ , $di/dt = 50\text{ A}/\mu\text{s}$ , $I_{rr} = 10\% I_{RM}$	$T_J = 25\text{ }^{\circ}\text{C}$	10	nC
		$T_J = 100\text{ }^{\circ}\text{C}$	15	
Typical junction capacitance	4.0 V, 1 MHz	$C_J$	25	pF

**Note**(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle**THERMAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

PARAMETER	SYMBOL	ESH1B	ESH1C	ESH1D	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)}$	85			°C/W
	$R_{\theta JL}^{(1)}$	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

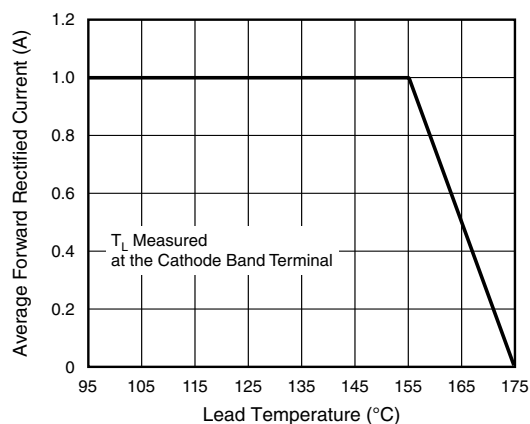
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

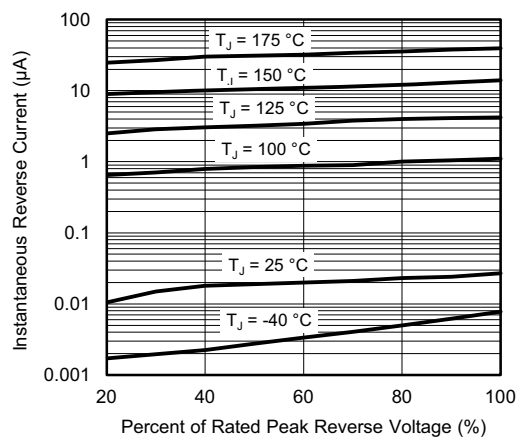


Fig. 4 - Typical Instantaneous Forward Characteristics

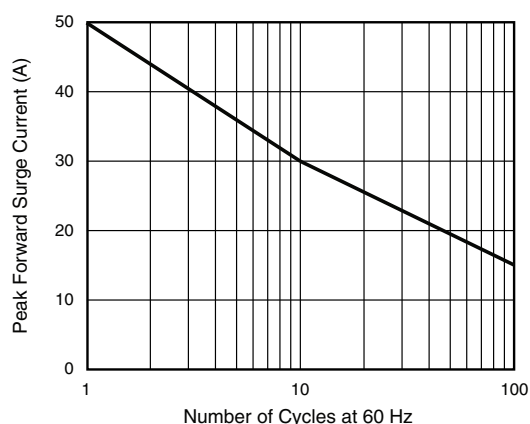


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

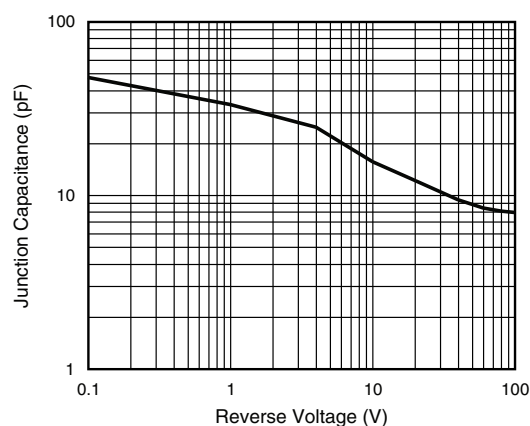


Fig. 5 - Typical Junction Capacitance

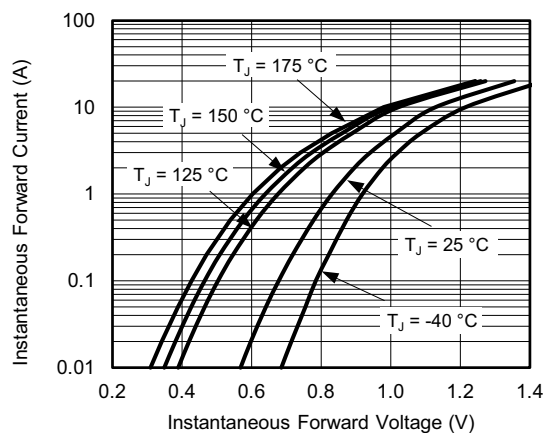


Fig. 3 - Typical Reverse Leakage Characteristics

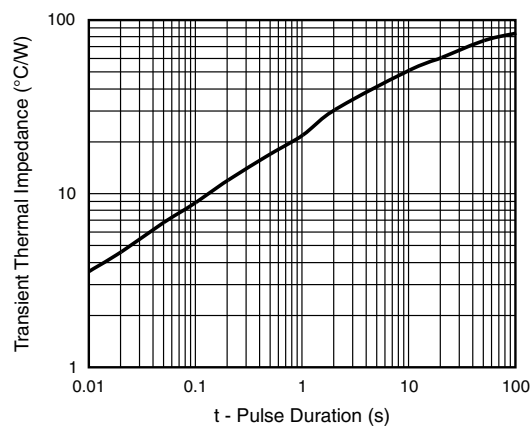
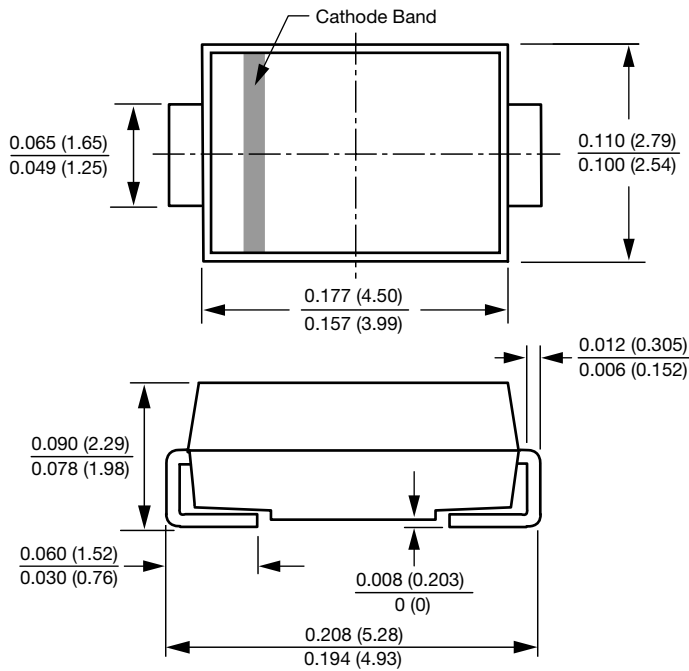


Fig. 6 - Typical Transient Thermal Impedance

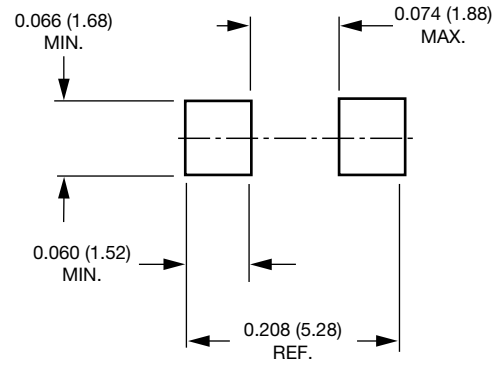


**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

**SMA (DO-214AC)**



**Mounting Pad Layout**





## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.