

## Surface Mount Ultrafast Plastic Rectifiers



DO-214AC (SMA)

### FEATURES

- Low profile package
- Ideal for automated placement
- Glass passivated chip junction
- Ultrafast recovery times for high efficiency
- Low forward voltage, low power loss
- Meets MSL level 1, per J-STD-020C, LF max peak of 260 °C
- Solder Dip 260 °C, 40 seconds
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



### TYPICAL APPLICATIONS

For use in secondary rectification and free-wheeling for ultrafast switching speeds ac-to-ac and dc-to-dc converters in high temperature conditions for both consumer and automotive applications.

### MECHANICAL DATA

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

Epoxy meets UL 94V-0 flammability rating

**Terminals:** Matte tin plated leads, solderable per J-STD-002B and JESD22-B102D

E3 suffix for commercial grade, HE3 suffix for high reliability grade (AEC Q101 qualified)

**Polarity:** Color band denotes cathode end

MAJOR RATINGS AND CHARACTERISTICS	
$I_{F(AV)}$	1 A
$V_{RRM}$	100 V, 150 V, 200 V
$t_{tr}$	25 ns
$V_F$	0.90 V
$T_j \text{ max.}$	175 °C

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



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

**Note:**

(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)					
PARAMETER	SYMBOL	ESH1B	ESH1C	ESH1D	UNIT
Typical thermal resistance <sup>(1)</sup>	$R_{\theta JA}$ $R_{\theta JL}$		85 30		$^\circ\text{C}/\text{W}$

**Note:**

(1) Units mounted on P.C.B. with  $5.0 \times 5.0\text{ mm}$  ( $0.013\text{ mm}$  thick) land areas

<b>ORDERING INFORMATION</b> (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 & Reel
ESH1D-E3/5AT	0.064	5AT	7500	13" Diameter Plastic Tape & Reel
ESH1DHE3/61T <sup>(1)</sup>	0.064	61T	1800	7" Diameter Plastic Tape & Reel
ESH1DHE3/5AT <sup>(1)</sup>	0.064	5AT	7500	13" Diameter Plastic Tape & Reel

**Note:**

(1) Automotive grade AEC Q101 qualified

## RATINGS AND CHARACTERISTICS CURVES

( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)

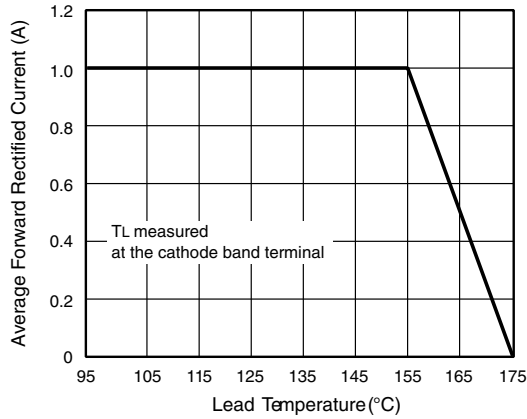


Figure 1. Maximum Forward Current Derating Curve

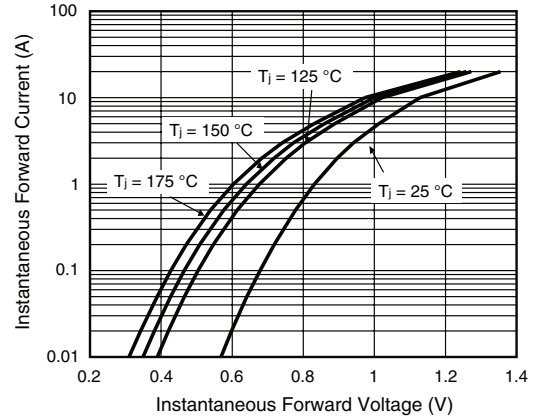


Figure 4. Typical Instantaneous Forward Characteristics

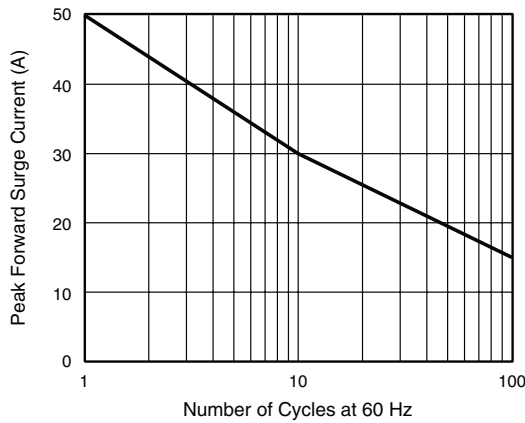


Figure 2. Maximum Non-Repetitive Peak Forward Surge Current

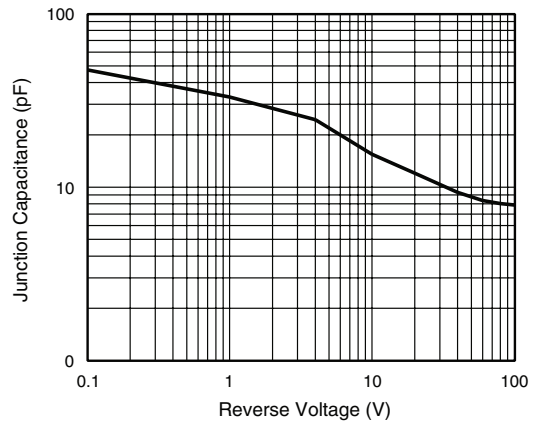


Figure 5. Typical Junction Capacitance

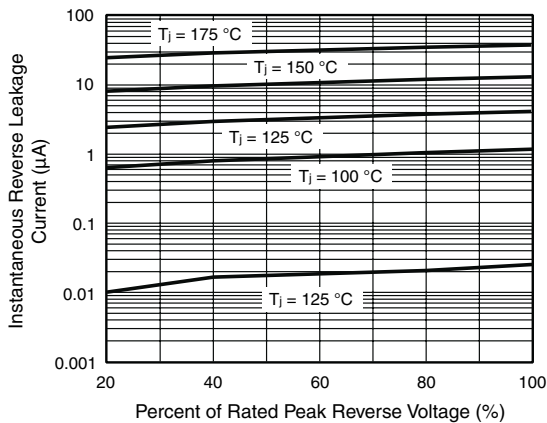


Figure 3. Typical Reverse Leakage Characteristics

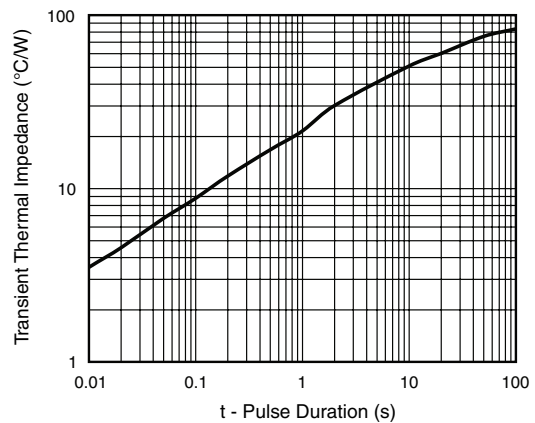
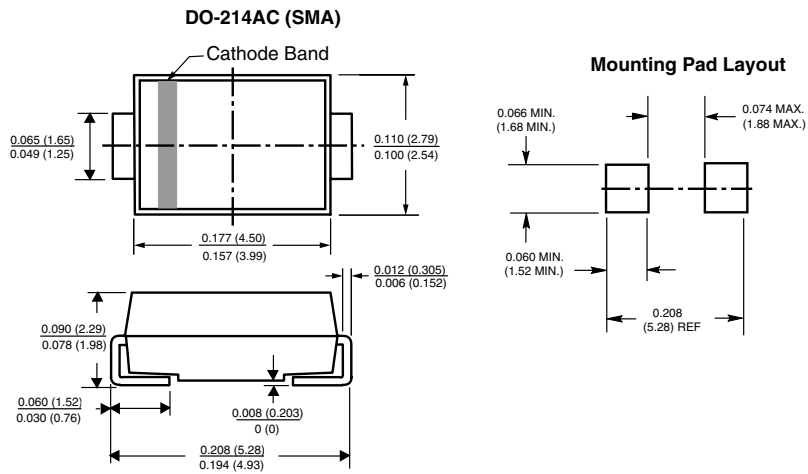


Figure 6. Typical Transient Thermal Impedance

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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