

## Surface Mount Ultrafast Plastic Rectifier


**DO-214AC (SMA)**

### 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
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### 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:** 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

| 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                 | DO-214AC (SMA)      |
| Diode variations        | Single die          |

| 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 ( $T_A = 25\text{ }^{\circ}\text{C}$ 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                                                           | $I_F = 0.6\text{ A}$ , $V_R = 30\text{ V}$ ,<br>$di/dt = 50\text{ A}/\mu\text{s}$ , $I_{rr} = 10\% I_{RM}$ | $T_J = 25\text{ }^{\circ}\text{C}$  | $t_{rr}$    | 25    | ns            |
|                                                                                         |                                                                                                            | $T_J = 100\text{ }^{\circ}\text{C}$ |             | 35    |               |
| Typical stored charge                                                                   | $I_F = 0.6\text{ A}$ , $V_R = 30\text{ V}$ ,<br>$di/dt = 50\text{ A}/\mu\text{s}$ , $I_{rr} = 10\% I_{RM}$ | $T_J = 25\text{ }^{\circ}\text{C}$  | $Q_{rr}$    | 10    | nC            |
|                                                                                         |                                                                                                            | $T_J = 100\text{ }^{\circ}\text{C}$ |             | 15    |               |
| Typical junction capacitance                                                            | 4.0 V, 1 MHz                                                                                               |                                     | $C_J$       | 25    | pF            |

**Note**

<sup>(1)</sup> Pulse test: 300  $\mu\text{s}$  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**

<sup>(1)</sup> 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 |

**Note**

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



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

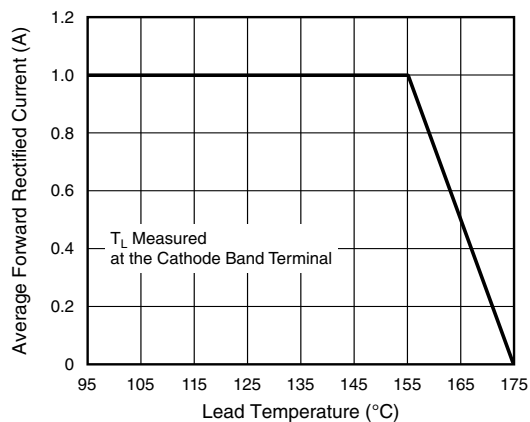


Fig. 1 - Maximum Forward Current Derating Curve

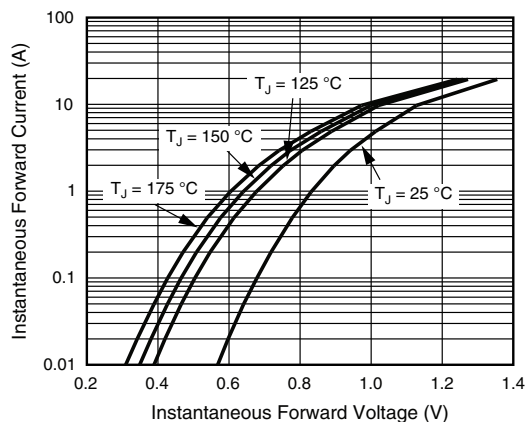


Fig. 4 - Typical Instantaneous Forward Characteristics

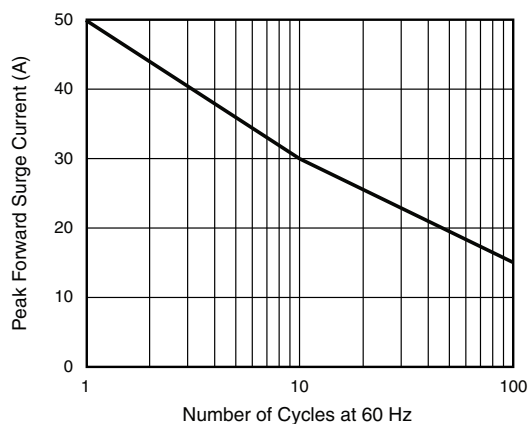


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

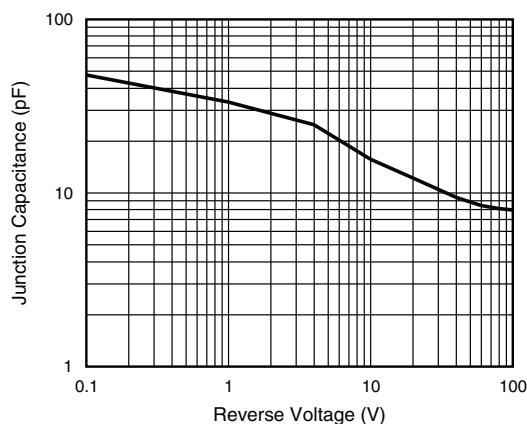


Fig. 5 - Typical Junction Capacitance

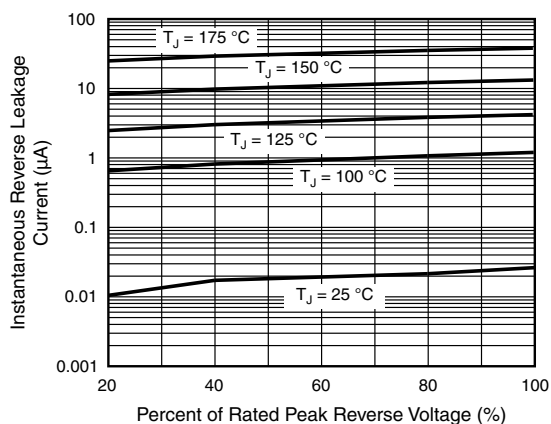


Fig. 3 - Typical Reverse Leakage Characteristics

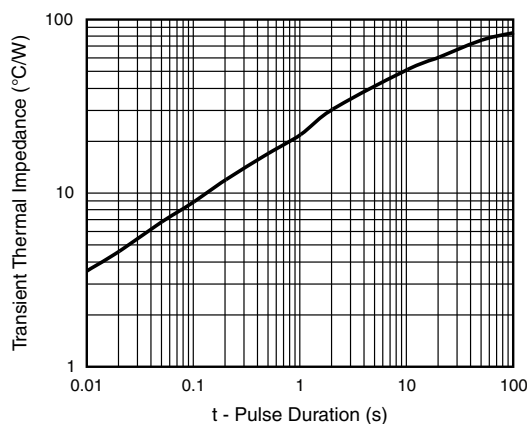
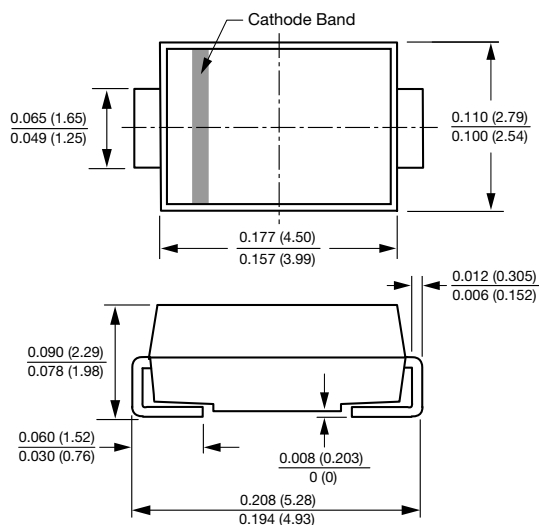


Fig. 6 - Typical Transient Thermal Impedance

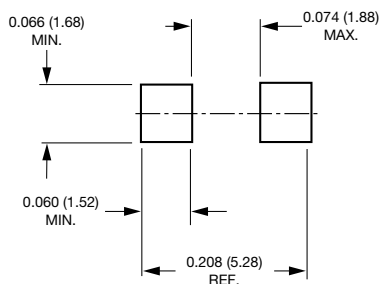


## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### DO-214AC (SMA)



### Mounting Pad Layout





## Disclaimer

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