# Surface-Mount Ultrafast Plastic Rectifier

**SMA (DO-214AC)**

Cathode ○—|◀—○ Anode

## LINKS TO ADDITIONAL RESOURCES

3D Models

| 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 |

## FEATURES

AUTOMOTIVE GRADE Available

RoHS COMPLIANT

HALOGEN FREE Available

- 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

## 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

**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 °C unless otherwise noted) | | | | | |
|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITIONS** | | **SYMBOL** | **VALUE** | **UNIT** |
| Maximum instantaneous forward voltage | $I_F$ = 0.7 A | | $V_F$ (1) | 0.87 | V |
| | $I_F$ = 1 A | | $V_F$ | 0.90 | |
| Maximum DC reverse current at rated DC blocking voltage | | $T_A$ = 25 °C | $I_R$ | 1.0 | µA |
| | | $T_A$ = 125 °C | | 25 | |
| Maximum reverse current | $V_R$ = 20 V, $T_J$ = 150 °C | | $I_R$ | 50 | µA |
| Maximum reverse recovery time | $I_F$ = 0.5 A, $I_R$ = 1 A, $I_{rr}$ = 0.25 A | | $t_{rr}$ | 25 | ns |
| Typical reverse recovery time | $I_F$ = 0.6 A, $V_R$ = 30 V, dI/dt = 50 A/µs, $I_{rr}$ = 10 % $I_{RM}$ | $T_J$ = 25 °C | $t_{rr}$ | 25 | ns |
| | | $T_J$ = 100 °C | | 35 | |
| Typical stored charge | $I_F$ = 0.6 A, $V_R$ = 30 V, dI/dt = 50 A/µs, $I_{rr}$ = 10 % $I_{RM}$ | $T_J$ = 25 °C | $Q_{rr}$ | 10 | nC |
| | | $T_J$ = 100 °C | | 15 | |
| Typical junction capacitance | 4.0 V, 1 MHz | | $C_J$ | 25 | pF |

**Note**

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

| **THERMAL CHARACTERISTICS** ($T_A$ = 25 °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 (1) | 0.064 | H | 1800 | 7" diameter plastic tape and reel |
| ESH1DHE3_A/I (1) | 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 (1) | 0.064 | H | 1800 | 7" diameter plastic tape and reel |
| ESH1DHM3_A/I (1) | 0.064 | I | 7500 | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

## RATINGS AND CHARACTERISTICS CURVES ($T_A$ = 25 °C unless otherwise noted)

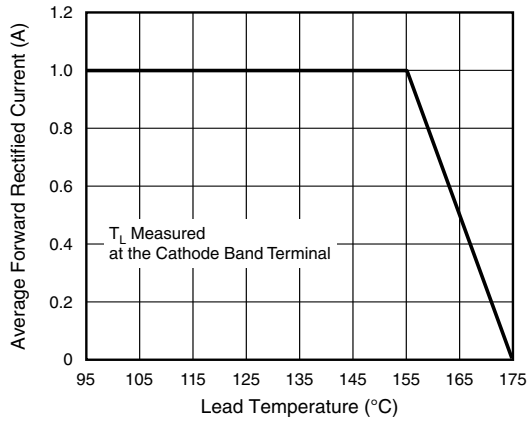



Fig. 1 - Maximum Forward Current Derating Curve

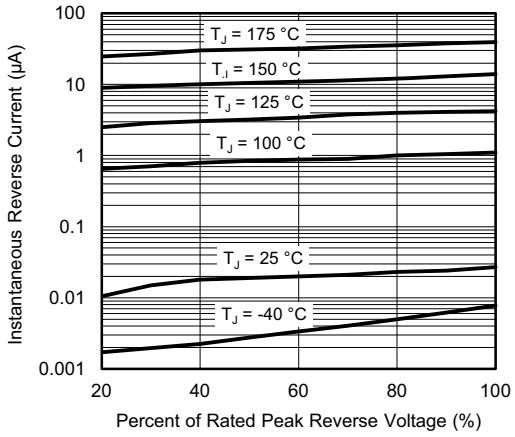



Fig. 4 - Typical Instantaneous Forward Characteristics

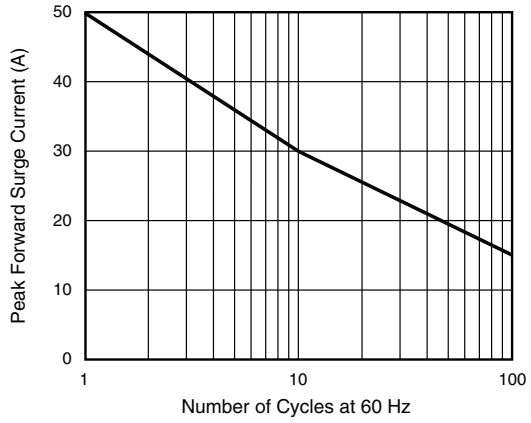



Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

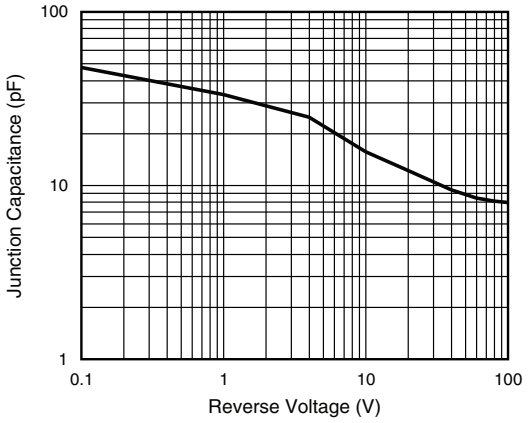



Fig. 5 - Typical Junction Capacitance

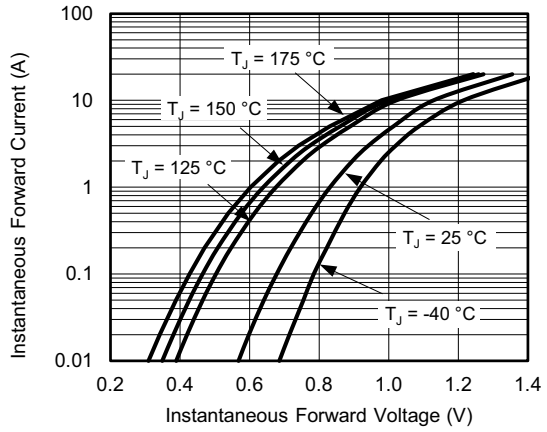



Fig. 3 - Typical Reverse Leakage Characteristics

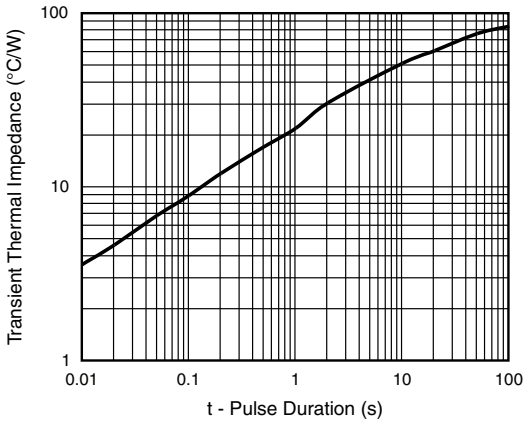
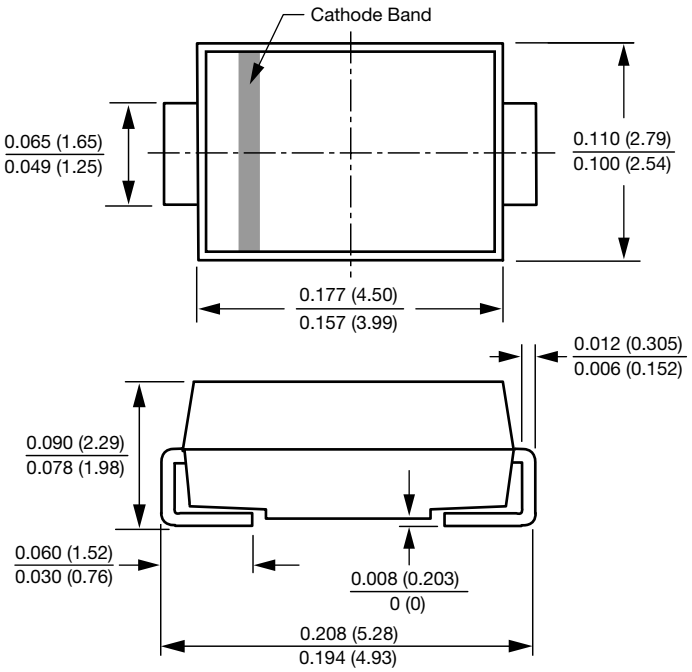


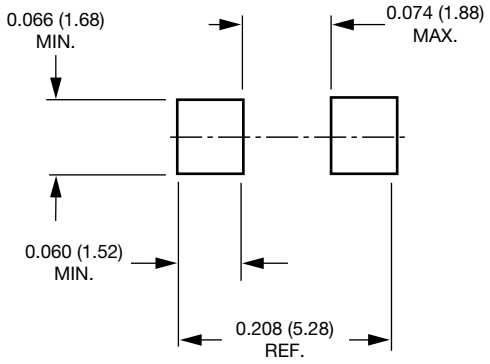

Fig. 6 - Typical Transient Thermal Impedance

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

**SMA (DO-214AC)**




**Mounting Pad Layout**



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