

Surface Mount Ultrafast Plastic Rectifier


SMA (DO-214AC)

RoHS
 COMPLIANT
HALOGEN
FREE
 Available

FEATURES

- Low profile package
- Ideal for automated placement
- Glass passivated pellet chip junction
- Ultrafast recovery times for high efficiency
- Low forward voltage, low power losses
- High forward surge capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
- Automotive ordering code: P/NHE3 or P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

TYPICAL APPLICATIONS

For use in high frequency rectification and freewheeling application in switching mode converters and inverters for consumer, computer, automotive and telecommunication.

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} | 50 V, 100 V, 150 V, 200 V |
| I_{FSM} | 30 A |
| t_{rr} | 15 ns |
| V_F at I_F | 0.92 V |
| T_J max. | 150 °C |
| Package | SMA (DO-214AC) |
| Diode variations | Single |

| MAXIMUM RATINGS ($T_A = 25\text{ °C}$ unless otherwise noted) | | | | | | |
|--|----------------|-------------|------|------|------|------|
| PARAMETER | SYMBOL | ES1A | ES1B | ES1C | ES1D | UNIT |
| Device marking code | | EA | EB | EC | ED | |
| Maximum repetitive peak reverse voltage | V_{RRM} | 50 | 100 | 150 | 200 | V |
| Maximum RMS voltage | V_{RMS} | 35 | 70 | 105 | 140 | V |
| Maximum DC blocking voltage | V_{DC} | 50 | 100 | 150 | 200 | V |
| Maximum average forward rectified current (fig. 1) | $I_{F(AV)}$ | 1.0 | | | | A |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | I_{FSM} | 30 | | | | A |
| Operating junction and storage temperature range | T_J, T_{STG} | -55 to +150 | | | | °C |



| ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | | | | |
|--|--|--|-------------|-----------------------------------|------|---------------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | VALUE | UNIT | |
| Maximum instantaneous forward voltage | $I_F = 0.6\text{ A}$ | | $V_F^{(1)}$ | 0.865 | V | |
| | $I_F = 1.0\text{ A}$ | | V_F | 0.920 | | |
| Maximum DC reverse current at rated DC blocking voltage | | | I_R | $T_A = 25\text{ }^\circ\text{C}$ | 5.0 | μA |
| | | | | $T_A = 100\text{ }^\circ\text{C}$ | 100 | |
| Maximum reverse recovery time | $I_F = 0.5\text{ A}, I_R = 1.0\text{ A}, I_{rr} = 0.25\text{ A}$ | | t_{rr} | 15 | ns | |
| Maximum 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_{rr} | $T_J = 25\text{ }^\circ\text{C}$ | 25 | ns |
| | | | | $T_J = 100\text{ }^\circ\text{C}$ | 35 | |
| Maximum stored charge | $I_F = 0.6\text{ A}, V_R = 30\text{ V}, dI/dt = 50\text{ A}/\mu\text{s}, I_{rr} = 10\% I_{RM}$ | | Q_{rr} | $T_J = 25\text{ }^\circ\text{C}$ | 10 | nC |
| | | | | $T_J = 100\text{ }^\circ\text{C}$ | 25 | |
| Typical junction capacitance | 4.0 V, 1 MHz | | C_J | 10 | pF | |

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

| THERMAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | | | | |
|---|-----------------------|------|------|------|------|---------------------------|
| PARAMETER | SYMBOL | ES1A | ES1B | ES1C | ES1D | UNIT |
| Typical thermal resistance | $R_{\theta JA}^{(1)}$ | 85 | | | | $^\circ\text{C}/\text{W}$ |
| | $R_{\theta JL}^{(1)}$ | 35 | | | | |

Note

(1) Units mounted on PCB 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 |
| ES1D-E3/61T | 0.064 | 61T | 1800 | 7" diameter plastic tape and reel |
| ES1D-E3/5AT | 0.064 | 5AT | 7500 | 13" diameter plastic tape and reel |
| ES1DHE3_A/H ⁽¹⁾ | 0.064 | H | 1800 | 7" diameter plastic tape and reel |
| ES1DHE3_A/I ⁽¹⁾ | 0.064 | I | 7500 | 13" diameter plastic tape and reel |
| ES1D-M3/61T | 0.064 | 61T | 1800 | 7" diameter plastic tape and reel |
| ES1D-M3/5AT | 0.064 | 5AT | 7500 | 13" diameter plastic tape and reel |
| ES1DHM3_A/H ⁽¹⁾ | 0.064 | H | 1800 | 7" diameter plastic tape and reel |
| ES1DHM3_A/I ⁽¹⁾ | 0.064 | I | 7500 | 13" diameter plastic tape and reel |

Note

(1) AEC-Q101 qualified

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

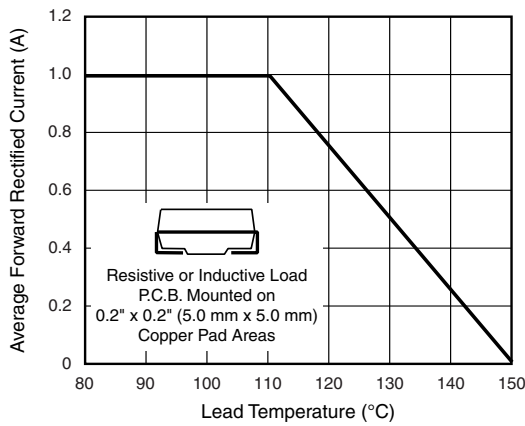


Fig. 1 - Maximum Forward Current Derating Curve

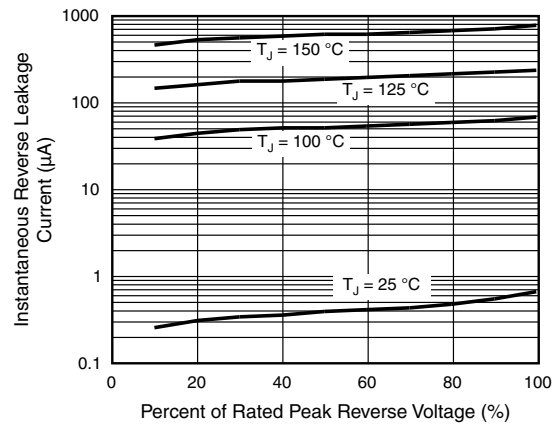


Fig. 4 - Typical Reverse Leakage Characteristics

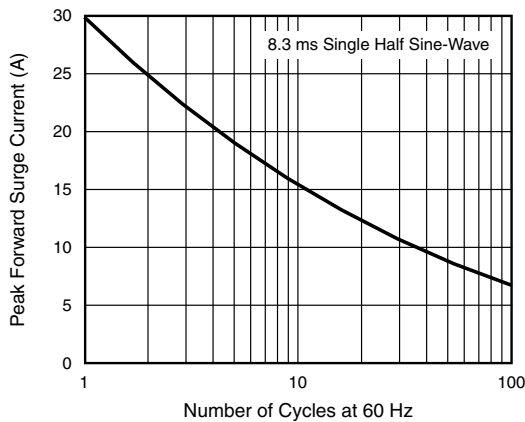


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

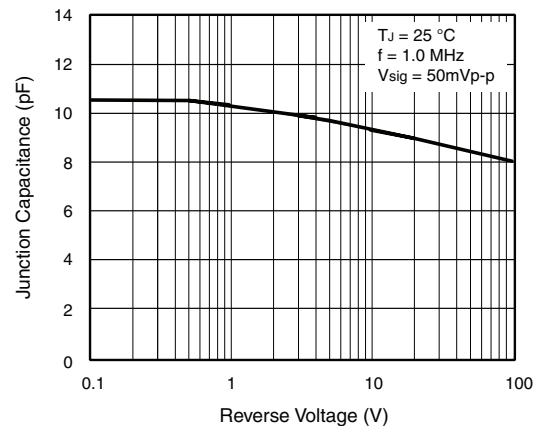


Fig. 5 - Typical Junction Capacitance

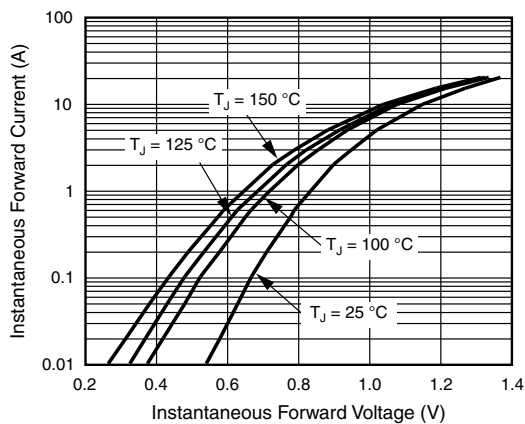


Fig. 3 - Typical Instantaneous Forward Characteristics

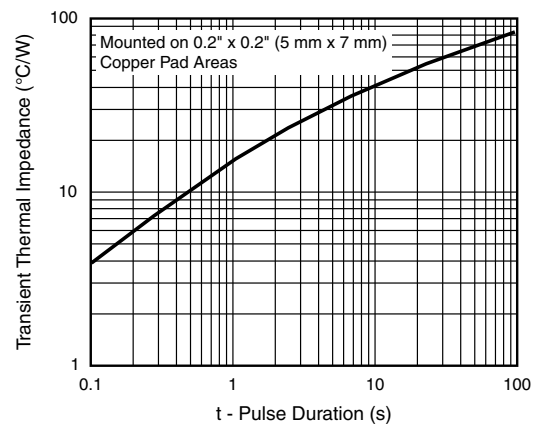
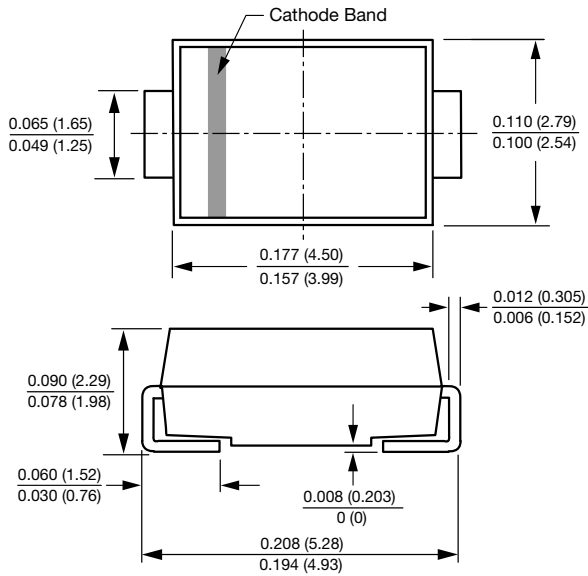


Fig. 6 - Typical Thermal Impedance

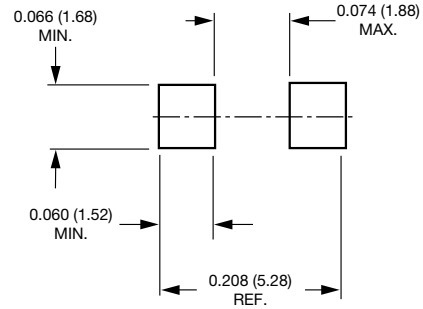


PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMA (DO-214AC)



Mounting Pad Layout





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