

Surface Mount Ultra Fast Rectifier


SMA (DO-214AC)

RoHS
 COMPLIANT
 HALOGEN
FREE
 Available

FEATURES

- Low profile package
- Ideal for automated placement
- Glass passivated pallet chip junction
- Ultrafast reverse recovery time
- Low switching losses, high efficiency
- 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: base P/NHE3 or P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

| PRIMARY CHARACTERISTICS | |
|-------------------------|---|
| $I_{F(AV)}$ | 1.0 A |
| V_{RRM} | 50 V, 100 V, 200 V, 400 V, 600 V, 800 V, 1000 V |
| I_{FSM} | 30 A |
| t_{rr} | 50 ns, 75 ns |
| V_F at I_F | 1.0 V, 1.7 V |
| T_J max. | 150 °C |
| Package | SMA (DO-214AC) |
| Diode variations | Single |

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

| MAXIMUM RATINGS ($T_A = 25\text{ °C}$ unless otherwise noted) | | | | | | | | | |
|--|----------------|-------------|------|------|------|------|------|------|------|
| PARAMETER | SYMBOL | US1A | US1B | US1D | US1G | US1J | US1K | US1M | UNIT |
| Device marking code | | UA | UB | UD | UG | UJ | UK | UM | |
| Maximum repetitive peak reverse voltage | V_{RRM} | 50 | 100 | 200 | 400 | 600 | 800 | 1000 | V |
| Maximum RMS voltage | V_{RMS} | 35 | 70 | 140 | 280 | 420 | 560 | 700 | V |
| Maximum DC blocking voltage | V_{DC} | 50 | 100 | 200 | 400 | 600 | 800 | 1000 | V |
| Maximum average forward rectified current at $T_L = 110\text{ °C}$ | $I_{F(AV)}$ | 1.0 | | | | | | | A |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | I_{FSM} | 30 | | | | | | | A |
| Operating 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 | US1A | US1B | US1D | US1G | US1J | US1K | US1M | UNIT |
| Maximum instantaneous forward voltage | 1.0 A | $V_F^{(1)}$ | 1.0 | | | 1.7 | | | | V |
| Maximum DC reverse current at rated DC blocking voltage | $T_A = 25\text{ }^\circ\text{C}$ | I_R | 10 | | | | | | | μA |
| | $T_A = 100\text{ }^\circ\text{C}$ | | 50 | | | | | | | |
| Maximum reverse recovery time | $I_F = 0.5\text{ A}$, $I_R = 1.0\text{ A}$, $I_{rr} = 0.25\text{ A}$ | t_{rr} | 50 | | | 75 | | | ns | |
| Typical junction capacitance | 4.0 V, 1 MHz | C_J | 15 | | | 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 | US1A | US1B | US1D | US1G | US1J | US1K | US1M | UNIT | |
| Maximum thermal resistance | $R_{\theta JA}^{(1)}$ | 75 | | | | | | | $^\circ\text{C/W}$ | |
| | $R_{\theta JL}^{(1)}$ | 27 | | | | | | | | |

Note

(1) PCB mounted on 0.2" x 0.2" (5.0 mm x 5.0 mm) copper pad area

| ORDERING INFORMATION (Example) | | | | |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| US1J-E3/61T | 0.064 | 61T | 1800 | 7" diameter plastic tape and reel |
| US1J-E3/5AT | 0.064 | 5AT | 7500 | 13" diameter plastic tape and reel |
| US1JHE3_A/H (1) | 0.064 | H | 1800 | 7" diameter plastic tape and reel |
| US1JHE3_A/I (1) | 0.064 | I | 7500 | 13" diameter plastic tape and reel |
| US1J-M3/61T | 0.064 | 61T | 1800 | 7" diameter plastic tape and reel |
| US1J-M3/5AT | 0.064 | 5AT | 7500 | 13" diameter plastic tape and reel |
| US1JHM3_A/H (1) | 0.064 | H | 1800 | 7" diameter plastic tape and reel |
| US1JHM3_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)

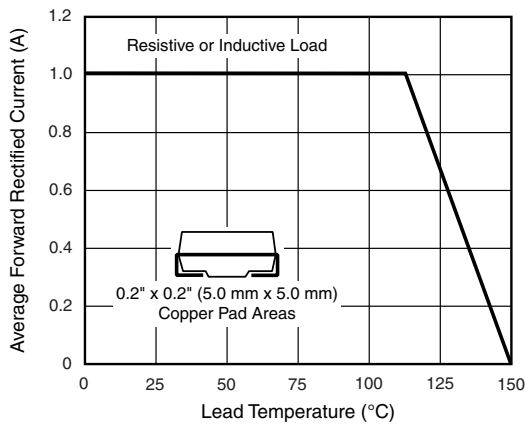


Fig. 1 - Forward Current Derating Curve

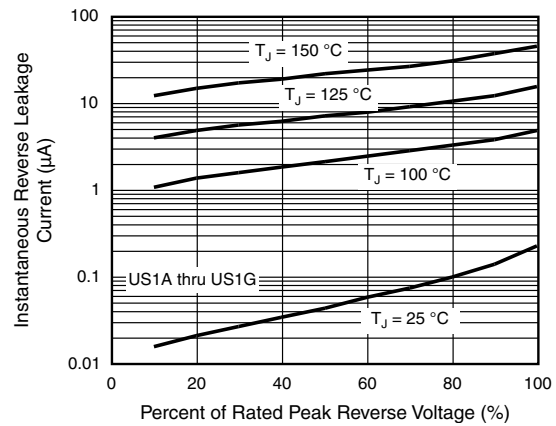


Fig. 4 - Typical Reverse Leakage Characteristics

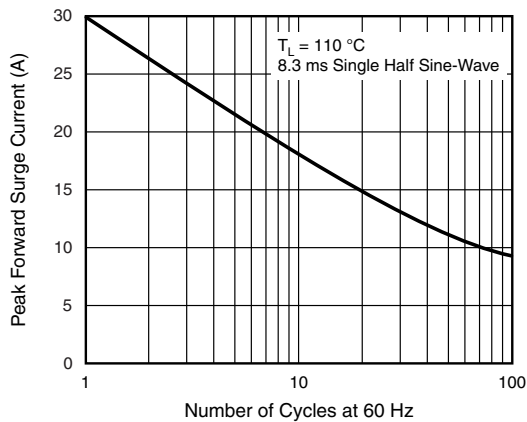


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

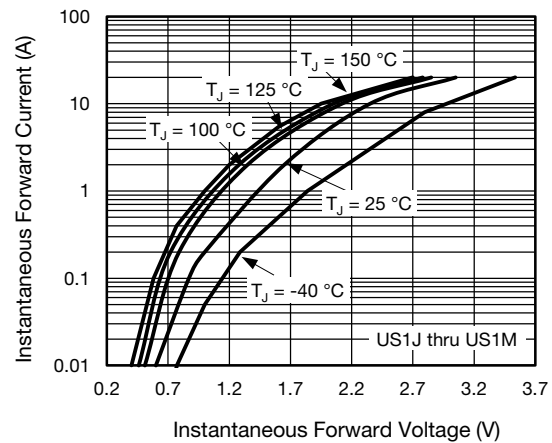


Fig. 5 - Typical Instantaneous Forward Characteristics

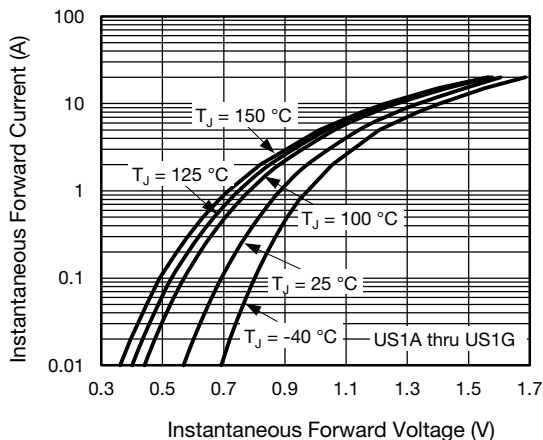


Fig. 3 - Typical Instantaneous Forward Characteristics

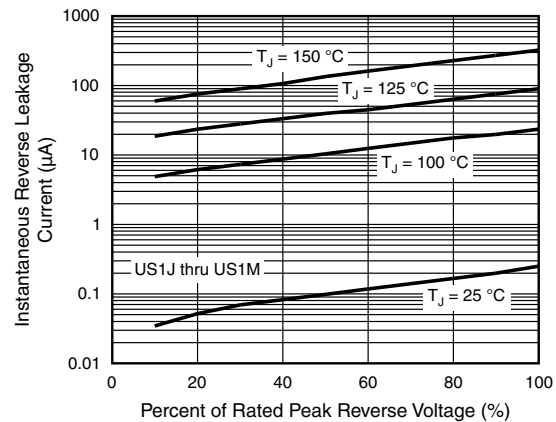


Fig. 6 - Typical Reverse Leakage Characteristics

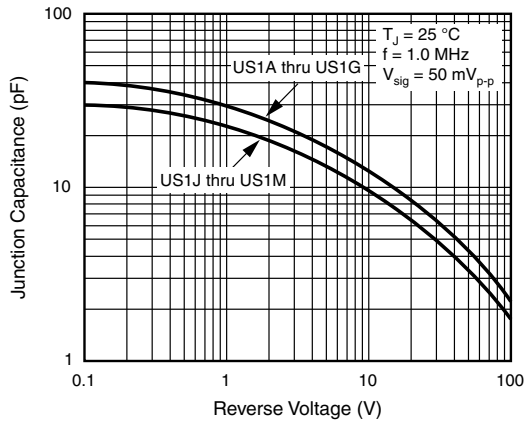


Fig. 7 - Typical Junction Capacitance

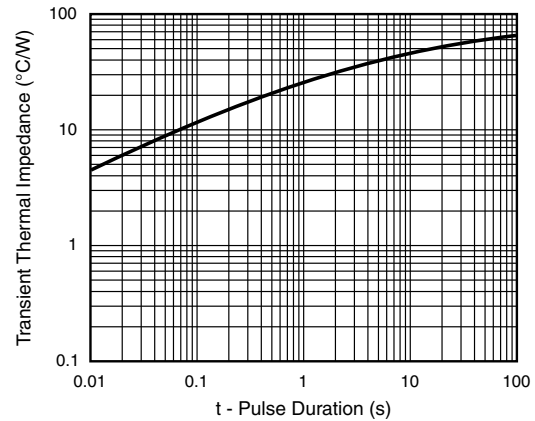
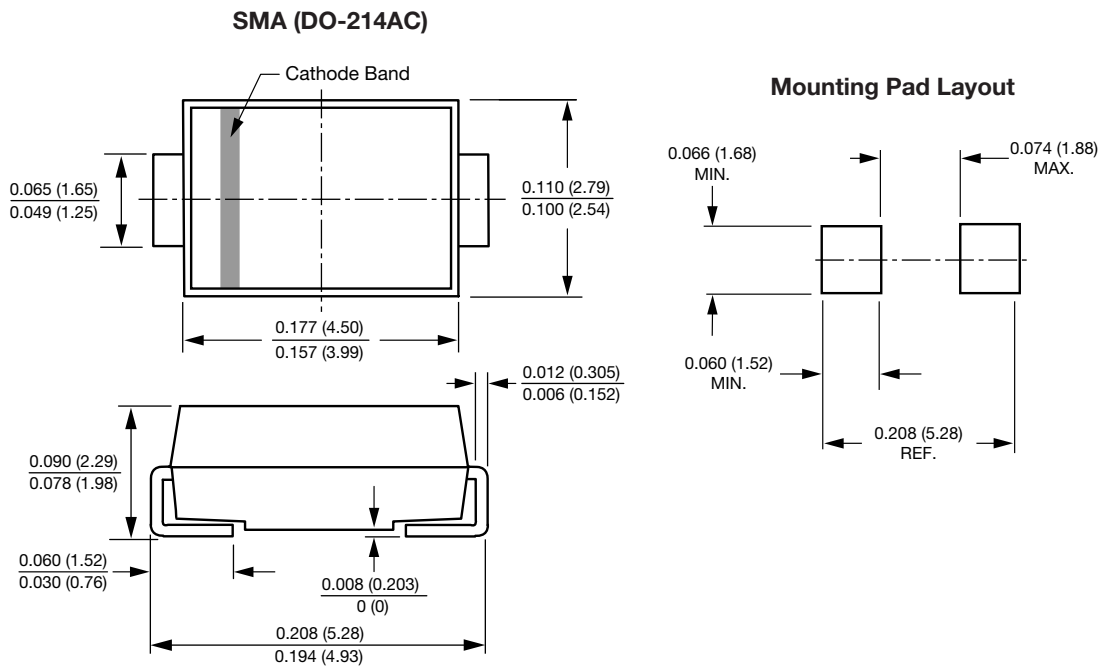


Fig. 8 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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