

High Power Density Surface-Mount TRANSZORB® Transient Voltage Suppressors


SMA (DO-214AC)

LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS

| | |
|---------------------------------|-------------------------------|
| V_{BR} | 6.4 V to 49.1 V |
| V_{WM} | 5.0 V to 40 V |
| P_{PPM} | 500 W |
| I_{FSM} (unidirectional only) | 40 A |
| T_J max. | 150 °C |
| Polarity | Unidirectional, bidirectional |
| Package | SMA (DO-214AC) |

DEVICES FOR BIDIRECTION APPLICATIONS

For bidirectional devices use CA suffix (e.g. SMA5J40CA).
Electrical characteristics apply in both directions.

FEATURES

- Low profile package
- Ideal for automated placement
- Glass passivated chip junction
- Available in unidirectional and bidirectional
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- 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



RoHS
COMPLIANT
HALOGEN
FREE
Available

TYPICAL APPLICATIONS

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for consumer, computer, industrial, 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: for unidirectional types the band denotes cathode end, no marking on bidirectional types

MAXIMUM RATINGS ($T_A = 25\text{ °C}$ unless otherwise noted)

| PARAMETER | SYMBOL | VALUE | UNIT |
|--|----------------|----------------|------|
| Peak pulse power dissipation with a 10/1000 μ s waveform ⁽¹⁾⁽²⁾ (fig. 1) | P_{PPM} | 500 | W |
| Peak pulse current with a 10/1000 μ s waveform ⁽¹⁾ | I_{PPM} | See next table | A |
| Peak forward surge current 8.3 ms single half sine-wave unidirectional only ⁽²⁾ | I_{FSM} | 40 | A |
| Operating junction and storage temperature range | T_J, T_{STG} | -55 to +150 | °C |

Notes

⁽¹⁾ Non-repetitive current pulse, per fig. 3 and derated above $T_A = 25\text{ °C}$ per fig. 2

⁽²⁾ Mounted on 0.2" x 0.2" (5.0 mm x 5.0 mm) copper pads to each terminal

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

| DEVICE TYPE | DEVICE MARKING CODE | | BREAKDOWN VOLTAGE V_{BR} (V) ⁽¹⁾ | | TEST CURRENT I_T (mA) | STAND-OFF VOLTAGE V_{WM} (V) | MAXIMUM REVERSE LEAKAGE AT V_{WM} I_D (μA) ⁽³⁾ | MAXIMUM PEAK PULSE SURGE CURRENT I_{PPM} (A) ⁽²⁾ | MAXIMUM CLAMPING VOLTAGE AT I_{PPM} V_C (V) |
|--------------------------|---------------------|-----|---|------|-------------------------|--------------------------------|--|---|---|
| | UNI | BI | MIN. | MAX. | | | | | |
| SMA5J5.0A ⁽⁵⁾ | 5AE | 5AE | 6.40 | 7.07 | 10 | 5.0 | 800 | 54.3 | 9.2 |
| SMA5J6.0A | 5AG | 5AG | 6.67 | 7.37 | 10 | 6.0 | 800 | 48.5 | 10.3 |
| SMA5J6.5A | 5AK | 5AK | 7.22 | 7.98 | 10 | 6.5 | 500 | 44.6 | 11.2 |
| SMA5J7.0A | 5AM | 5AM | 7.78 | 8.60 | 10 | 7.0 | 200 | 41.7 | 12.0 |
| SMA5J7.5A | 5AP | 5AP | 8.33 | 9.21 | 1.0 | 7.5 | 100 | 38.8 | 12.9 |
| SMA5J8.0A | 5AR | 5AR | 8.89 | 9.83 | 1.0 | 8.0 | 50 | 36.8 | 13.6 |
| SMA5J8.5A | 5AT | 5AT | 9.44 | 10.4 | 1.0 | 8.5 | 10 | 34.7 | 14.4 |
| SMA5J9.0A | 5AV | 5AV | 10.0 | 11.1 | 1.0 | 9.0 | 5.0 | 32.5 | 15.4 |
| SMA5J10A | 5AX | 5AX | 11.1 | 12.3 | 1.0 | 10 | 1.0 | 29.4 | 17.0 |
| SMA5J11A | 5AZ | 5AZ | 12.2 | 13.5 | 1.0 | 11 | 1.0 | 27.5 | 18.2 |
| SMA5J12A | 5BE | 5BE | 13.3 | 14.7 | 1.0 | 12 | 1.0 | 25.1 | 19.9 |
| SMA5J13A | 5BG | 5BG | 14.4 | 15.9 | 1.0 | 13 | 1.0 | 23.3 | 21.5 |
| SMA5J14A | 5BK | 5BK | 15.6 | 17.2 | 1.0 | 14 | 1.0 | 21.6 | 23.2 |
| SMA5J15A | 5BM | 5BM | 16.7 | 18.5 | 1.0 | 15 | 1.0 | 20.5 | 24.4 |
| SMA5J16A | 5BP | 5BP | 17.8 | 19.7 | 1.0 | 16 | 1.0 | 19.2 | 26.0 |
| SMA5J17A | 5BR | 5BR | 18.9 | 20.9 | 1.0 | 17 | 1.0 | 18.1 | 27.6 |
| SMA5J18A | 5BT | 5BT | 20.0 | 22.1 | 1.0 | 18 | 1.0 | 17.1 | 29.2 |
| SMA5J20A | 5BV | 5BV | 22.2 | 24.5 | 1.0 | 20 | 1.0 | 15.4 | 32.4 |
| SMA5J22A | 5BX | 5BX | 24.4 | 26.9 | 1.0 | 22 | 1.0 | 14.1 | 35.5 |
| SMA5J24A | 5BZ | 5BZ | 26.7 | 29.5 | 1.0 | 24 | 1.0 | 12.9 | 38.9 |
| SMA5J26A | 5CE | 5CE | 28.9 | 31.9 | 1.0 | 26 | 1.0 | 11.9 | 42.1 |
| SMA5J28A | 5CG | 5CG | 31.1 | 34.4 | 1.0 | 28 | 1.0 | 11.0 | 45.4 |
| SMA5J30A | 5CK | 5CK | 33.3 | 36.8 | 1.0 | 30 | 1.0 | 10.3 | 48.4 |
| SMA5J33A | 5CM | 5CM | 36.7 | 40.6 | 1.0 | 33 | 1.0 | 9.4 | 53.3 |
| SMA5J36A | 5CP | 5CP | 40.0 | 44.2 | 1.0 | 36 | 1.0 | 8.6 | 58.1 |
| SMA5J40A | 5CR | 5CR | 44.4 | 49.1 | 1.0 | 40 | 1.0 | 7.8 | 64.5 |

Notes

- (1) Pulse test: $t_p \leq 50\text{ ms}$
(2) Surge current waveform per fig. 3 and derate per fig. 2
(3) For bidirectional types having V_{WM} of 10 V and less, the I_D limit is doubled
(4) All terms and symbols are consistent with ANSI/IEEE C62.35
(5) For the bidirectional SMA5J5.0CA, the maximum V_{BR} is 7.25 V
(6) $V_F = 3.5\text{ V}$ at $I_F = 25\text{ A}$ (uni-directional only)

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

| PARAMETER | SYMBOL | VALUE | UNIT |
|--|-----------------|-------|---------------------------|
| Typical thermal resistance, junction to ambient ⁽¹⁾ | $R_{\theta JA}$ | 80 | $^\circ\text{C}/\text{W}$ |
| Typical thermal resistance, junction to lead | $R_{\theta JL}$ | 25 | |

Note

- (1) Mounted on minimum recommended pad layout

ORDERING INFORMATION (Example)

| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
|---------------------------------|-----------------|------------------------|---------------|------------------------------------|
| SMA5J5.0A-E3/61 | 0.064 | 61 | 1800 | 7" diameter plastic tape and reel |
| SMA5J5.0A-M3/61 | | | | |
| SMA5J5.0A-E3/5A | 0.064 | 5A | 7500 | 13" diameter plastic tape and reel |
| SMA5J5.0A-M3/5A | | | | |
| SMA5J5.0AHE3_A/H ⁽¹⁾ | 0.064 | H | 1800 | 7" diameter plastic tape and reel |
| SMA5J5.0AHM3_A/H ⁽¹⁾ | | | | |
| SMA5J5.0AHE3_A/I ⁽¹⁾ | 0.064 | I | 7500 | 13" diameter plastic tape and reel |
| SMA5J5.0AHM3_A/I ⁽¹⁾ | | | | |

Note

- (1) AEC-Q101 qualified

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

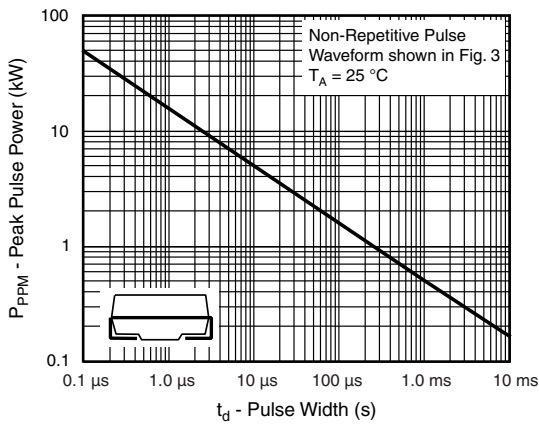


Fig. 1 - Peak Pulse Power Rating Curve

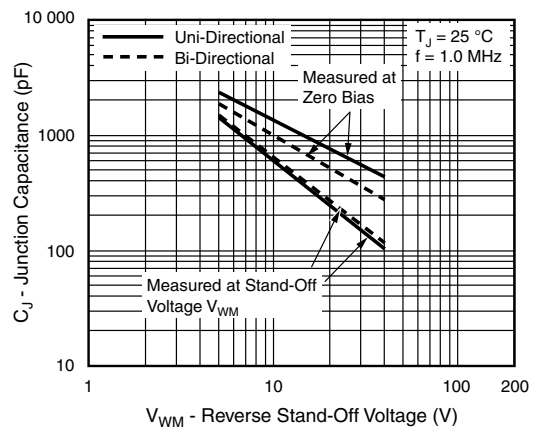


Fig. 4 - Typical Junction Capacitance

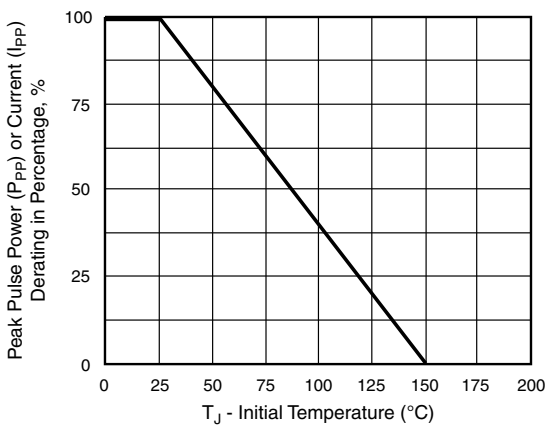


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

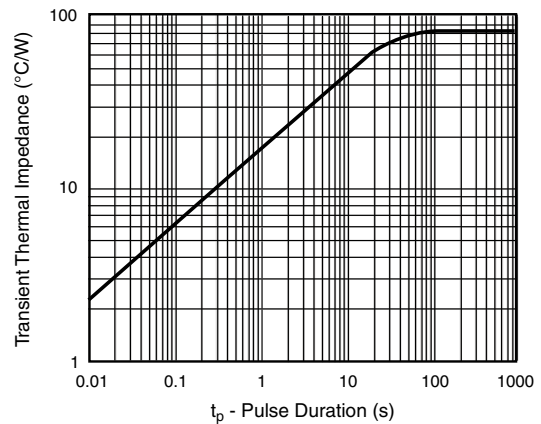


Fig. 5 - Typical Transient Thermal Impedance

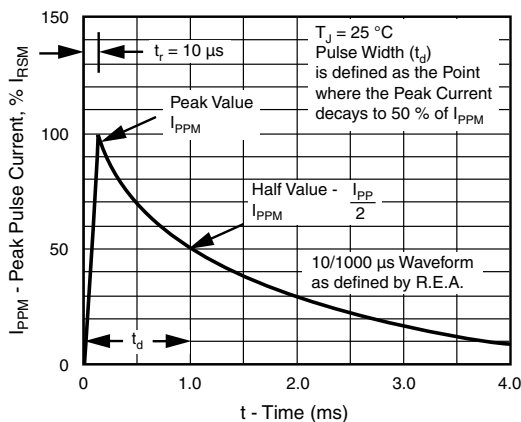


Fig. 3 - Pulse Waveform

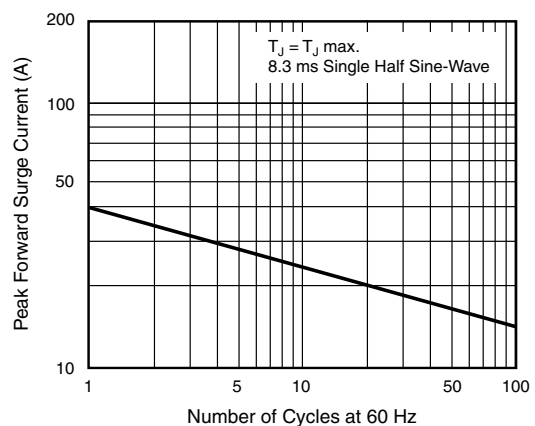
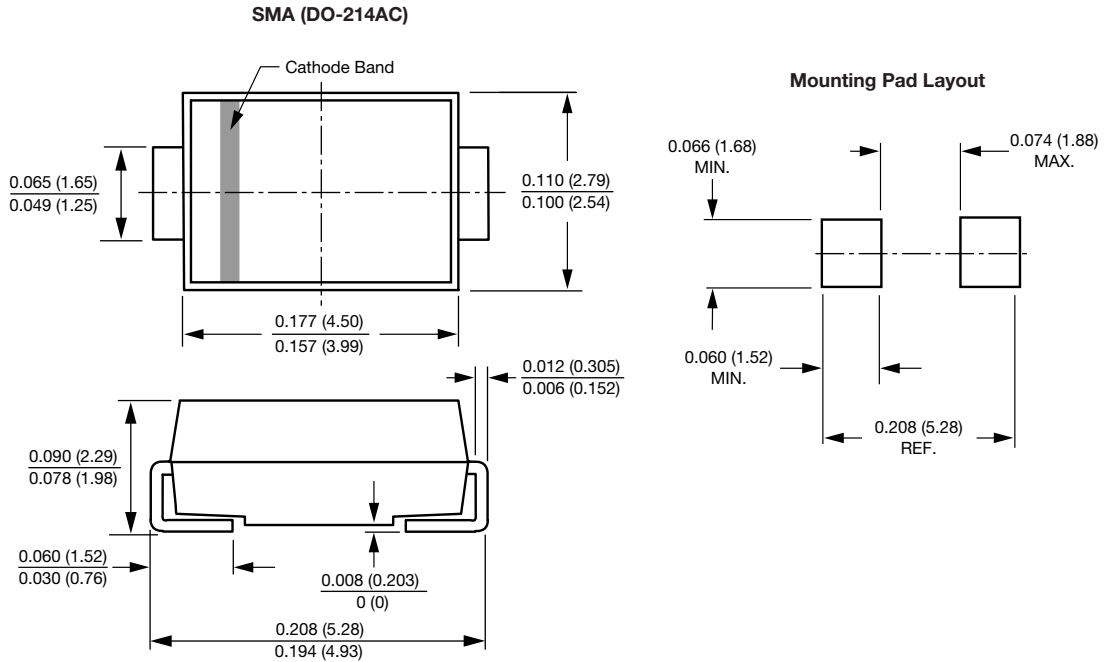


Fig. 6 - Maximum Non-Repetitive Peak Forward Surge Current Unidirectional Use Only



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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