



High Power Density Surface-Mount TRANSZORB® Transient Voltage Suppressors



SMA (DO-214AC)



RoHS
COMPLIANT
HALOGEN
FREE
Available

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

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) |

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

DEVICES FOR BIDIRECTION APPLICATIONS

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

| MAXIMUM RATINGS (T _A = 25 °C unless otherwise noted) | | | |
|--|-----------------------------------|----------------|------|
| PARAMETER | SYMBOL | VALUE | UNIT |
| Peak pulse power dissipation with a 10/1000 μs waveform ⁽¹⁾⁽²⁾ (fig. 1) | P _{PPM} | 500 | W |
| Peak pulse current with a 10/1000 μs 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 °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 °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 ≤ 50 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 V at I_F = 25 A (uni-directional only)

| THERMAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted) | | | |
|---|------------------|-------|-------|
| PARAMETER | SYMBOL | VALUE | UNIT |
| Typical thermal resistance, junction to ambient ⁽¹⁾ | R _{θJA} | 80 | °C/ W |
| Typical thermal resistance, junction to lead | R _{θJL} | 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)

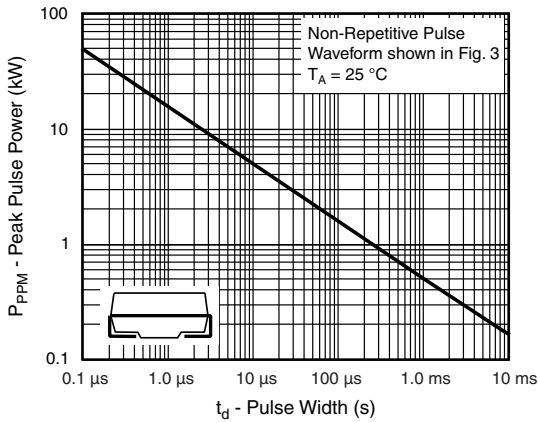


Fig. 1 - Peak Pulse Power Rating Curve

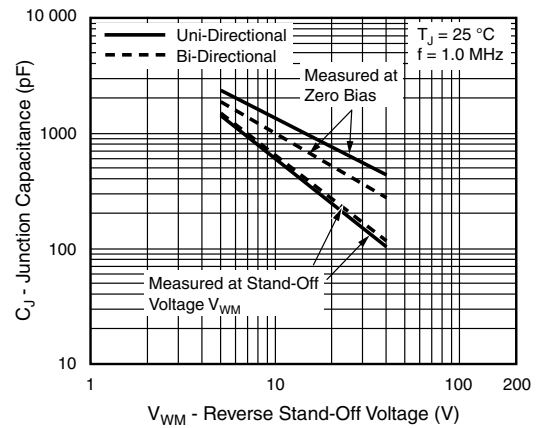


Fig. 4 - Typical Junction Capacitance

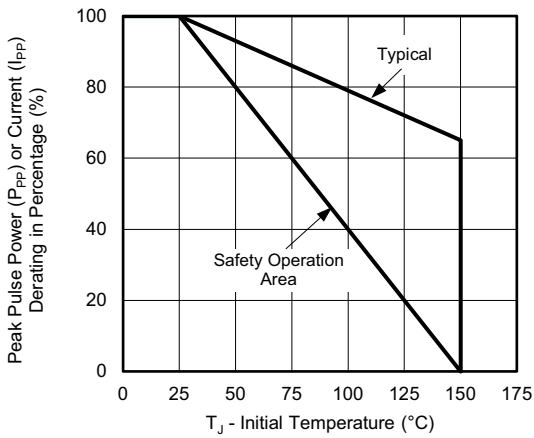


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

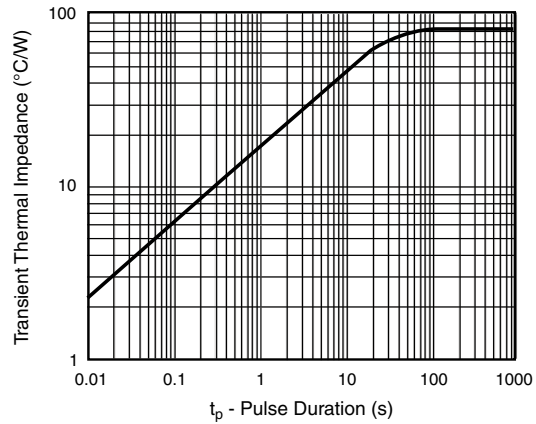


Fig. 5 - Typical Transient Thermal Impedance

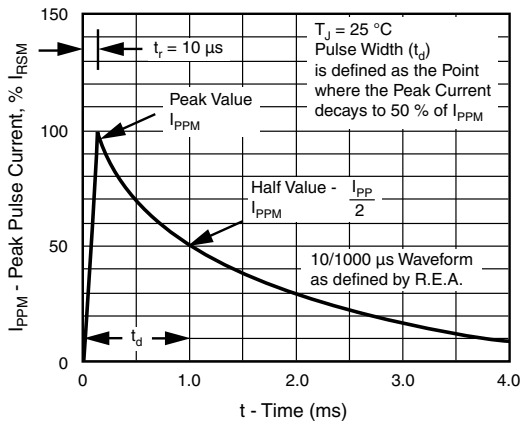


Fig. 3 - Pulse Waveform

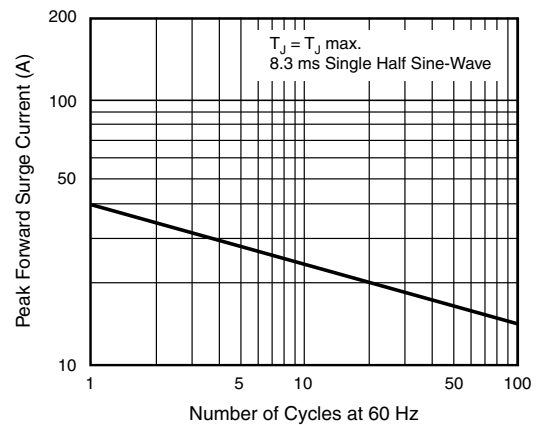
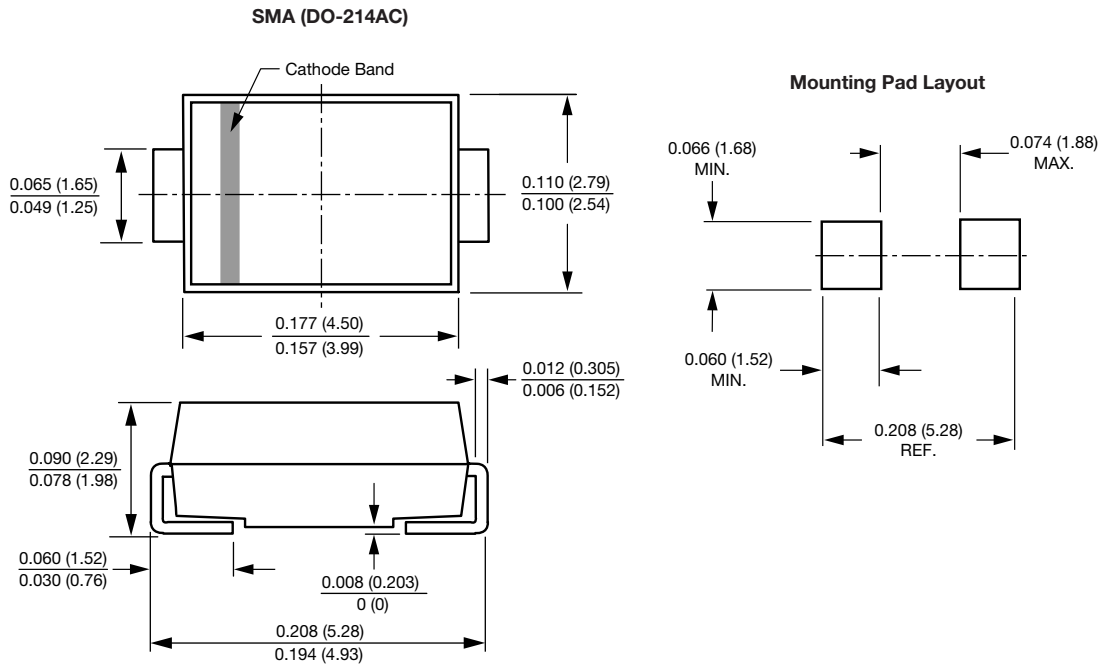


Fig. 6 - Maximum Non-Repetitive Peak Forward Surge Current Unidirectional Use Only



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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