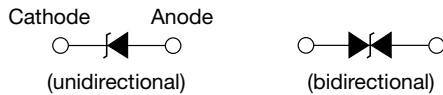


# Surface Mount TRANSZORB<sup>®</sup> Transient Voltage Suppressors


**SMC (DO-214AB)**

**LINKS TO ADDITIONAL RESOURCES**


| PRIMARY CHARACTERISTICS          |                               |
|----------------------------------|-------------------------------|
| $V_{WM}$                         | 5.8 V to 188 V                |
| $V_{BR}$ unidirectional          | 6.8 V to 220 V                |
| $V_{BR}$ bidirectional           | 6.8 V to 220 V                |
| $P_{PPM}$                        | 1500 W                        |
| $P_D$                            | 6.5 W                         |
| $I_{FSM}$ (uni-directional only) | 200 A                         |
| $T_J$ max.                       | 150 °C                        |
| Polarity                         | Unidirectional, bidirectional |
| Package                          | SMC (DO-214AB)                |

**DEVICES FOR BIDIRECTION APPLICATIONS**

For bidirectional devices use CA suffix (e.g. SM15T12CA). Electrical characteristics apply in both directions.

**APPLICATION NOTES**

A 1500 W (SMC) device is normally selected when the threat of transients is from lightning induced transients, conducted via external leads or I/O lines. It is also used to protect against switching transients induced by large coils or industrial motors. Source impedance at component level in a system is usually high enough to limit the current within the peak pulse current ( $I_{PP}$ ) rating of this series. In an overstress condition, the failure mode is a short circuit.

| MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)                             |                |                |      |
|--|----------------|----------------|------|
| PARAMETER  | SYMBOL         | VALUE          | UNIT |
| Peak power dissipation with a 10/1000 $\mu$ s waveform <sup>(1)(2)</sup> (fig. 1)          | $P_{PPM}$      | 1500           | W    |
| Peak pulse current with a 10/1000 $\mu$ s waveform <sup>(1)</sup> (fig. 3)                 | $I_{PPM}$      | See next table | A    |
| Power dissipation on infinite heatsink at $T_A = 50\text{ °C}$                             | $P_D$          | 6.5            | W    |
| Peak forward surge current 10 ms single half sine-wave uni-directional only <sup>(2)</sup> | $I_{FSM}$      | 200            | A    |
| Operating junction and storage temperature range   | $T_J, T_{STG}$ | -65 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 0.31" x 0.31" (8.0 mm x 8.0 mm) copper pads to each terminal

**FEATURES**

- Low profile package
- Ideal for automated placement
- Glass passivated chip junction
- Available in unidirectional and bidirectional
- 1500 W peak pulse power capability with a 10/1000  $\mu$ s waveform
- Excellent clamping capability
- Low inductance
- 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](http://www.vishay.com/doc?99912)


**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: SMC (DO-214AB)**

Molding compound meets UL 94 V-0 flammability rating  
 Base P/N-E3 - RoHS-compliant and 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



| ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                     |      |   |      |                                  |                                       |  |  |      |   |     |  |
|--|---------------------|------|---|------|----------------------------------|---------------------------------------|--|--|------|---|-----|--|
| TYPE (1)   | DEVICE MARKING CODE |      | BREAKDOWN VOLTAGE V <sub>BR</sub> AT I <sub>T</sub> (2) |      | TEST CURRENT I <sub>T</sub> (mA) | STAND-OFF VOLTAGE V <sub>WM</sub> (V) | MAXIMUM REVERSE LEAKAGE AT V <sub>WM</sub> I <sub>D</sub> (3) (μA) | MAXIMUM CLAMPING VOLTAGE V <sub>C</sub> AT I <sub>PPM</sub> (10/1000 μs) |      | MAXIMUM CLAMPING VOLTAGE V <sub>C</sub> AT I <sub>PPM</sub> (8/20 μs) |     | α <sub>T</sub> MAX. 10 <sup>-4</sup> /°C |
|  | UNI                 | BI   | MIN.  | MAX. |                                  |                                       |  | (V)  | (A)  | (V)   | (A) |  |
| SM15T6V8A  | GDE7                | GDE7 | 6.45  | 7.14 | 10                               | 5.80                                  | 1000   | 10.5   | 143  | 13.4  | 746 | 5.7                                      |
| SM15T7V5A  | GDK7                | BDK7 | 7.13  | 7.88 | 10                               | 6.40                                  | 500  | 11.3   | 132  | 14.5  | 690 | 6.1                                      |
| SM15T10A   | GDT7                | BDT7 | 9.50  | 10.5 | 1.0                              | 8.55                                  | 10   | 14.5   | 103  | 18.6  | 538 | 7.3                                      |
| SM15T12A   | GDX7                | BDX7 | 11.4  | 12.6 | 1.0                              | 10.2                                  | 5.0  | 16.7   | 90.0 | 21.7  | 461 | 7.8                                      |
| SM15T15A   | GEG7                | GEG7 | 14.3  | 15.8 | 1.0                              | 12.8                                  | 1.0  | 21.2   | 71.0 | 27.2  | 368 | 8.4                                      |
| SM15T18A   | GEM7                | BEM7 | 17.1  | 18.9 | 1.0                              | 15.3                                  | 1.0  | 25.2   | 59.5 | 32.5  | 308 | 8.8                                      |
| SM15T22A   | GET7                | BET7 | 20.9  | 23.1 | 1.0                              | 18.8                                  | 1.0  | 30.6   | 49.0 | 39.3  | 254 | 9.2                                      |
| SM15T24A   | GEV7                | GEV7 | 22.8  | 25.2 | 1.0                              | 20.5                                  | 1.0  | 33.2   | 45.0 | 42.8  | 234 | 9.4                                      |
| SM15T27A   | GEX7                | BEX7 | 25.7  | 28.4 | 1.0                              | 23.1                                  | 1.0  | 37.5   | 40.0 | 48.3  | 207 | 9.6                                      |
| SM15T30A   | GFE7                | BFE7 | 28.5  | 31.5 | 1.0                              | 25.6                                  | 1.0  | 41.5   | 36.0 | 53.5  | 187 | 9.7                                      |
| SM15T33A   | GFG7                | GFG7 | 31.4  | 34.7 | 1.0                              | 28.2                                  | 1.0  | 45.7   | 33.0 | 59.0  | 169 | 9.8                                      |
| SM15T36A   | GFK7                | BFK7 | 34.2  | 37.8 | 1.0                              | 30.8                                  | 1.0  | 49.9   | 30.0 | 64.3  | 156 | 9.9                                      |
| SM15T39A   | GFM7                | BFM7 | 37.1  | 41.0 | 1.0                              | 33.3                                  | 1.0  | 53.9   | 28.0 | 69.7  | 143 | 10.0                                     |
| SM15T68A   | GGG7                | GGG7 | 64.6  | 71.4 | 1.0                              | 58.1                                  | 1.0  | 92.0   | 16.3 | 121   | 83  | 10.4                                     |
| SM15T100A  | GGV7                | GGV7 | 95.0  | 105  | 1.0                              | 85.5                                  | 1.0  | 137  | 11.0 | 178   | 56  | 10.6                                     |
| SM15T150A  | GHK7                | GHK7 | 143   | 158  | 1.0                              | 128                                   | 1.0  | 207  | 7.20 | 265   | 38  | 10.8                                     |
| SM15T200A  | GHR7                | GHR7 | 190   | 210  | 1.0                              | 171                                   | 1.0  | 274  | 5.50 | 353   | 28  | 10.8                                     |
| SM15T220A  | GHR8                | GHR8 | 209   | 231  | 1.0                              | 188                                   | 1.0  | 328  | 4.60 | 388   | 26  | 10.8                                     |

Notes

- (1) For bidirectional devices add suffix "CA" instead of "A"
- (2) V<sub>BR</sub> measured after I<sub>T</sub> applied for 300 μs square wave pulse
- (3) For bi-polar devices with V<sub>WM</sub> = 10 V or under, the I<sub>D</sub> limit is doubled

| THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                  |       |       |
|---|------------------|-------|-------|
| PARAMETER   | SYMBOL           | VALUE | UNIT  |
| Typical thermal resistance, junction to ambient air (1)                 | R <sub>θJA</sub> | 75    | °C/ W |
| Typical thermal resistance, junction to lead                            | R <sub>θJL</sub> | 15    |       |

Note

- (1) Mounted on minimum recommended pad layout

| ORDERING INFORMATION (Example) |                 |                        |               |                                    |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| SM15T10A-E3/57T                | 0.211           | 57T                    | 850           | 7" diameter plastic tape and reel  |
| SM15T10A-M3/57T                |                 |                        |               |                                    |
| SM15T10A-E3/9AT                | 0.211           | 9AT                    | 3500          | 13" diameter plastic tape and reel |
| SM15T10A-M3/9AT                |                 |                        |               |                                    |
| SM15T10AHE3_A/H (1)            | 0.211           | H                      | 850           | 7" diameter plastic tape and reel  |
| SM15T10AHM3_A/H (1)            |                 |                        |               |                                    |
| SM15T10AHE3_AI (1)             | 0.211           | I                      | 3500          | 13" diameter plastic tape and reel |
| SM15T10AHM3_AI (1)             |                 |                        |               |                                    |

Note

- (1) AEC-Q101 qualified

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

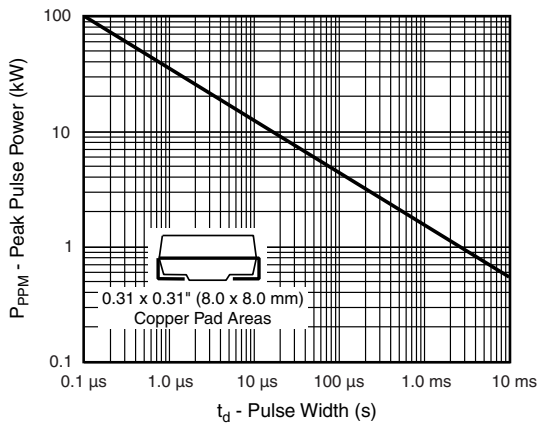


Fig. 1 - Peak Pulse Power Rating Curve

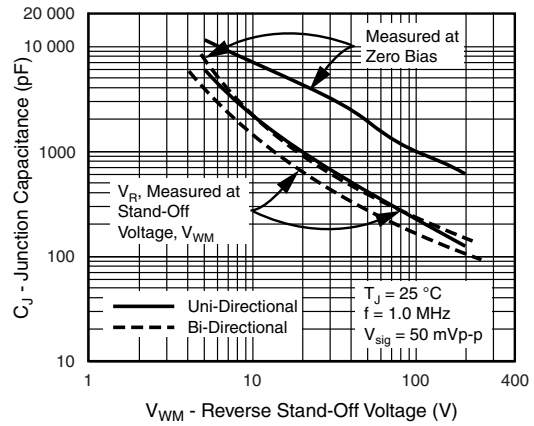


Fig. 4 - Typical Junction Capacitance Uni-Directional

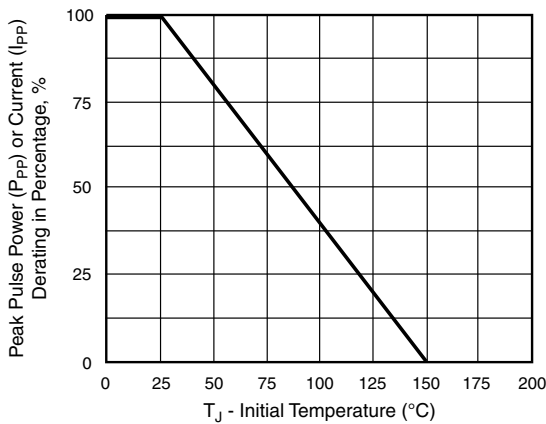


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

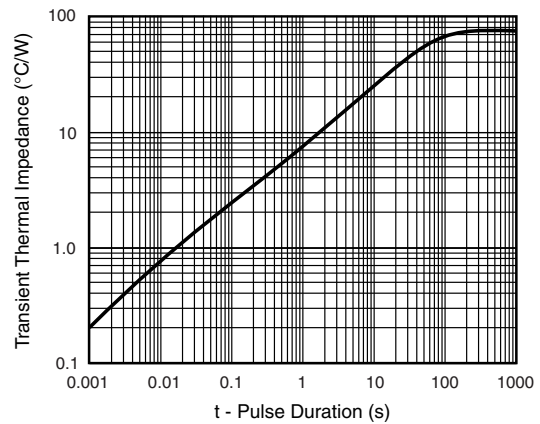


Fig. 5 - Typical Transient Thermal Impedance

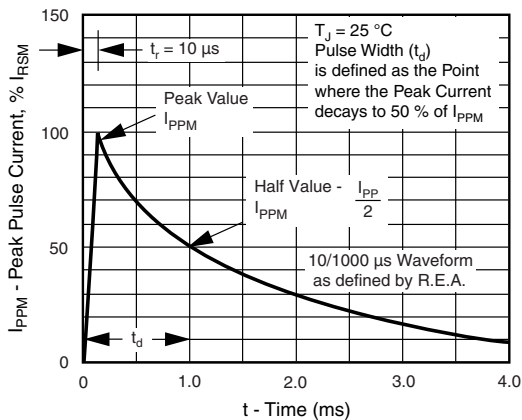


Fig. 3 - Pulse Waveform

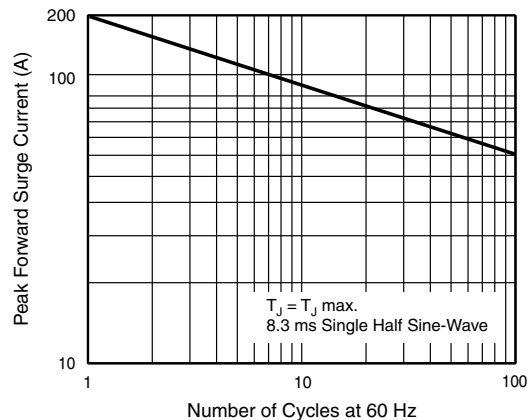
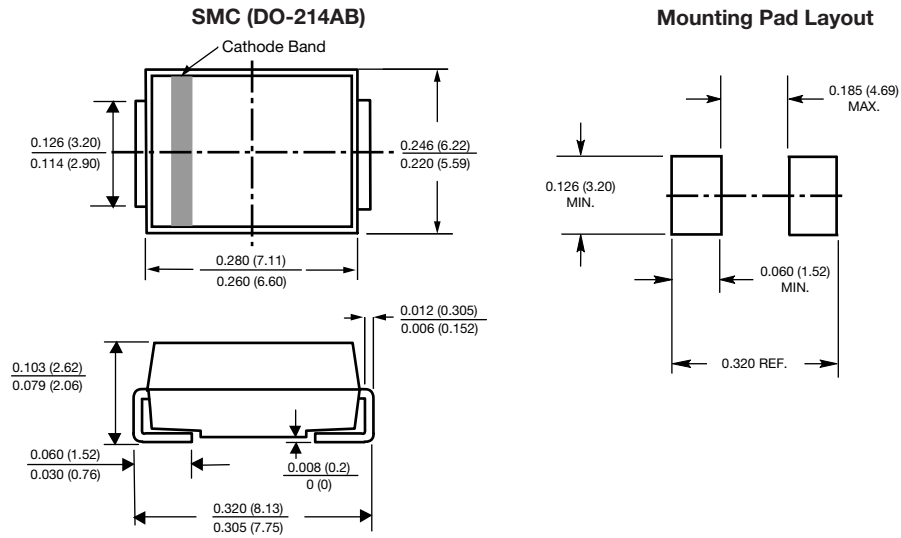


Fig. 6 - Maximum Non-Repetitive Forward Surge Current Unidirectional Use Only



### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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