



Surface Mount TRANSZORB® Transient Voltage Suppressors



SMC (DO-214AB)



RoHS
COMPLIANT
HALOGEN
FREE
Available

FEATURES

- Bidirectional
- Peak pulse power
 - 3000 W (10/1000 μ s)
 - 30 kW (8/20 μ s)
- 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
- UL recognition for safety 497B with file number E136766
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

LINKS TO ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS | |
|-------------------------|-----------------|
| V_{BR} | 11.1 V to 147 V |
| V_{WM} | 10 V to 120 V |
| P_{PPM} | 3000 W |
| T_J max. | 175 °C |
| Polarity | Bidirectional |
| Package | SMC (DO-214AB) |

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.

Meets to specification of:

ISO 7637-2:2011 Pulse 1, Pulse 2a, Pulse 3a, Pulse 3b
ISO 16750-2 Pulse b

MECHANICAL DATA

Case: SMC (DO-214AB)

Molding compound meets UL 94 V-0 flammability rating
Base P/NHM3_A - halogen-free, RoHS-compliant, and AEC-Q101 qualified

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

HM3 suffix meets JESD 201 class 2 whisker test

Polarity: no marking on bidirectional types

| MAXIMUM RATINGS ($T_A = 25$ °C unless otherwise noted) | | | |
|----------------------------------------------------------------------|-----------------|----------------|------|
| PARAMETER | SYMBOL | VALUE | UNIT |
| Peak pulse power dissipation with a 10/1000 μ s waveform (fig.1) | $P_{PPM}^{(1)}$ | 3000 | W |
| Peak pulse current with a 10/1000 μ s waveform | $I_{PPM}^{(1)}$ | See next table | A |
| Operating junction and storage temperature range | T_J, T_{STG} | -55 to +175 | °C |

Note

(1) Non-repetitive current pulse and derated above $T_A = 25$ °C



| ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted) | | | | | | | | | | |
|----------------------------------------------------------------------------|---------------------|------------------------------------------------------------------------|------|----------------------------------|---------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------|------|-----------------------------------------------------------------|------|
| DEVICE TYPE | DEVICE MARKING CODE | BREAKDOWN VOLTAGE V _{BR} ⁽¹⁾ (V) AT I _T | | TEST CURRENT I _T (mA) | STAND-OFF VOLTAGE V _{WM} (V) | MAXIMUM REVERSE LEAKAGE AT V _{WM} I _D (µA) | MAXIMUM CLAMPING VOLTAGE V _C (V) AT I _{PPM} | | MAXIMUM CLAMPING VOLTAGE V _C (V) AT I _{PPM} | |
| | | MIN. | MAX. | | | | 10/1000 µs | | 8/20 µs | |
| | | | | | | | (V) | (A) | (V) | (A) |
| SMC3K10CAHM3_A | 3BDX | 11.1 | 12.3 | 1.0 | 10 | 10.0 | 17.0 | 176 | 24.1 | 1245 |
| SMC3K12CAHM3_A | 3BEE | 13.3 | 14.7 | 1.0 | 12 | 5.0 | 19.9 | 151 | 25.3 | 1186 |
| SMC3K13CAHM3_A | 3GEG | 14.4 | 15.9 | 1.0 | 13 | 2.0 | 21.5 | 140 | 27.2 | 1103 |
| SMC3K14CAHM3_A | 3BEK | 15.6 | 17.2 | 1.0 | 14 | 2.0 | 23.2 | 129 | 30.0 | 1000 |
| SMC3K15CAHM3_A | 3BEM | 16.7 | 18.5 | 1.0 | 15 | 2.0 | 24.4 | 123 | 32.5 | 923 |
| SMC3K16CAHM3_A | 3GEP | 17.8 | 19.7 | 1.0 | 16 | 2.0 | 26.0 | 115 | 34.4 | 872 |
| SMC3K17CAHM3_A | 3GER | 18.9 | 20.9 | 1.0 | 17 | 2.0 | 27.6 | 109 | 37.0 | 811 |
| SMC3K18CAHM3_A | 3BET | 20.0 | 22.1 | 1.0 | 18 | 2.0 | 29.2 | 103 | 39.3 | 763 |
| SMC3K20CAHM3_A | 3EEV | 22.2 | 24.5 | 1.0 | 20 | 2.0 | 32.4 | 92.6 | 42.8 | 701 |
| SMC3K22CAHM3_A | 3BEX | 24.4 | 26.9 | 1.0 | 22 | 1.0 | 35.5 | 84.5 | 48.2 | 622 |
| SMC3K24CAHM3_A | 3BEZ | 26.7 | 29.5 | 1.0 | 24 | 1.0 | 38.9 | 77.1 | 51.6 | 581 |
| SMC3K26CAHM3_A | 3BFE | 28.9 | 31.9 | 1.0 | 26 | 1.0 | 42.1 | 71.3 | 55.8 | 538 |
| SMC3K28CAHM3_A | 3BFG | 31.1 | 34.4 | 1.0 | 28 | 1.0 | 45.4 | 66.1 | 60.2 | 498 |
| SMC3K30CAHM3_A | 3BFK | 33.3 | 36.8 | 1.0 | 30 | 1.0 | 48.4 | 62.0 | 64.0 | 469 |
| SMC3K33CAHM3_A | 3BFM | 36.7 | 40.6 | 1.0 | 33 | 1.0 | 53.3 | 56.3 | 69.8 | 430 |
| SMC3K36CAHM3_A | 3BFP | 40.0 | 44.2 | 1.0 | 36 | 1.0 | 58.1 | 51.6 | 76.0 | 395 |
| SMC3K40CAHM3_A | 3BFR | 44.4 | 49.1 | 1.0 | 40 | 1.0 | 64.5 | 46.5 | 84.0 | 357 |
| SMC3K43CAHM3_A | 3BFT | 47.8 | 52.8 | 1.0 | 43 | 1.0 | 69.4 | 43.2 | 90.3 | 332 |
| SMC3K45CAHM3_A | 3GFV | 50.0 | 55.3 | 1.0 | 45 | 1.0 | 72.7 | 41.3 | 94.6 | 317 |
| SMC3K48CAHM3_A | 3GFX | 53.3 | 58.9 | 1.0 | 48 | 1.0 | 77.4 | 38.8 | 100 | 300 |
| SMC3K51CAHM3_A | 3GFZ | 56.7 | 62.7 | 1.0 | 51 | 1.0 | 82.4 | 36.4 | 107 | 280 |
| SMC3K54CAHM3_A | 3GGE | 60.0 | 66.3 | 1.0 | 54 | 1.0 | 87.1 | 34.4 | 113 | 265 |
| SMC3K58CAHM3_A | 3GGG | 64.4 | 71.2 | 1.0 | 58 | 1.0 | 93.6 | 32.1 | 121 | 248 |
| SMC3K60CAHM3_A | 3GGK | 66.7 | 73.7 | 1.0 | 60 | 1.0 | 96.8 | 31.0 | 125 | 240 |
| SMC3K64CAHM3_A | 3GGM | 71.1 | 78.6 | 1.0 | 64 | 1.0 | 103 | 29.1 | 134 | 224 |
| SMC3K70CAHM3_A | 3GGP | 77.8 | 86.0 | 1.0 | 70 | 1.0 | 113 | 26.5 | 146 | 205 |
| SMC3K75CAHM3_A | 3GGR | 83.3 | 92.1 | 1.0 | 75 | 1.0 | 121 | 24.8 | 157 | 191 |
| SMC3K78CAHM3_A | 3GGT | 86.7 | 95.8 | 1.0 | 78 | 1.0 | 126 | 23.8 | 163 | 184 |
| SMC3K85CAHM3_A | 3GGV | 94.4 | 104 | 1.0 | 85 | 1.0 | 137 | 21.9 | 177 | 169 |
| SMC3K90CAHM3_A | 3GGX | 100 | 111 | 1.0 | 90 | 1.0 | 146 | 20.5 | 189 | 159 |
| SMC3K100CAHM3_A | 3GGZ | 111 | 123 | 1.0 | 100 | 1.0 | 162 | 18.5 | 209 | 144 |
| SMC3K110CAHM3_A | 3GHE | 122 | 135 | 1.0 | 110 | 1.0 | 177 | 16.9 | 230 | 130 |
| SMC3K120CAHM3_A | 3GHG | 133 | 147 | 1.0 | 120 | 1.0 | 193 | 15.5 | 250 | 120 |

Notes

- (1) Pulse test: t_p ≤ 50 ms
- (2) All terms and symbols are consistent with ANSI/IEEE C62.35

| IMMUNITY TO STATIC ELECTRICAL DISCHARGE TO THE FOLLOWING STANDARDS (T _A = 25 °C unless otherwise noted) | | | | |
|-----------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------------|--------|-------|
| STANDARD | TEST TYPE | TEST CONDITIONS | SYMBOL | VALUE |
| IEC 61000-4-2 | Human body model (contact mode) | C = 150 pF, R = 330 Ω | ESD | 30 kV |
| | Human body model (air discharge mode) | | | 30 kV |



| THERMAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted) | | | |
|-------------------------------------------------------------------------|----------------------------------|------|------|
| PARAMETER | SYMBOL | TYP. | UNIT |
| Thermal resistance | R _{thJA} ⁽¹⁾ | 90 | °C/W |
| | R _{thJM} ⁽²⁾ | 4.0 | °C/W |

Notes

- (1) Thermal resistance junction-to-ambient to follow JEDEC® 51-2A, device mounted on FR4 PCB, 2 oz. standard footprint
- (2) Thermal resistance junction-to-mount to follow JEDEC® 51-14 using Transient Dual Interface Test Method (TDIM)

| ORDERING INFORMATION (Example) | | | | |
|---------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| SMC3K10CAHM3_A/H ⁽¹⁾ | 0.257 | H | 850 | 7" diameter plastic tape and reel |
| SMC3K10CAHM3_A/I ⁽¹⁾ | 0.257 | I | 3500 | 13" diameter plastic tape and reel |

Note

(1) AEC-Q101

qualified

RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

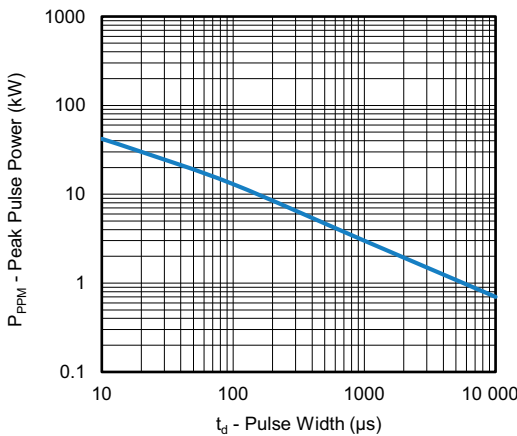


Fig. 1 - Peak Pulse Power Derating Curve

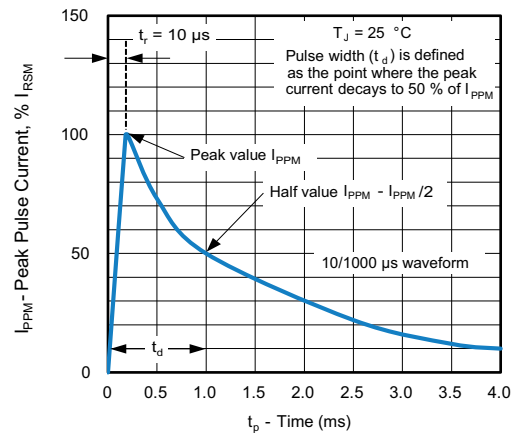


Fig. 3 - 10/1000 µs Pulse Waveform

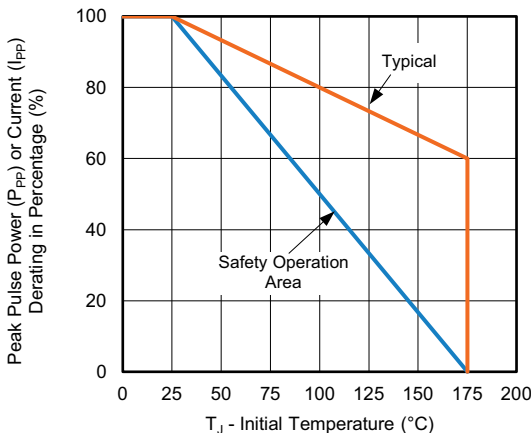


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

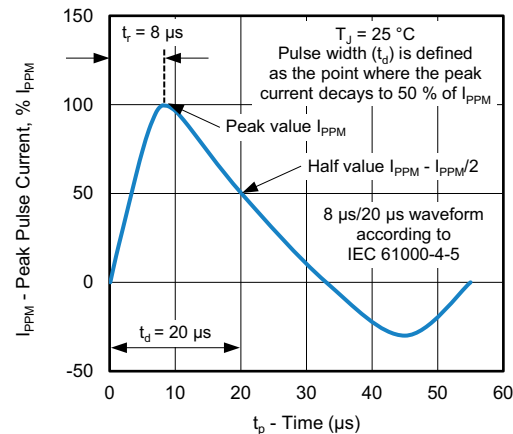


Fig. 4 - 8/20 µs Pulse Waveform

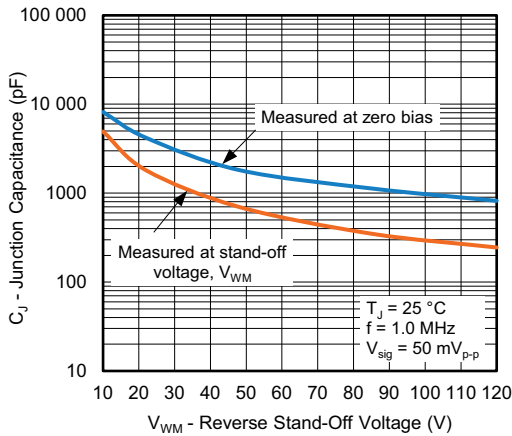


Fig. 5 - Typical Junction Capacitance

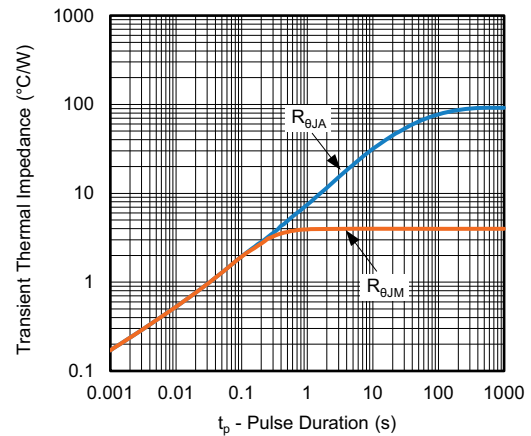


Fig. 6 - Typical Transient Thermal Impedance

Notes

- (1) Fig. 1 - Power calculation is based on I_{PPM} times defined maximum clamping voltage by pulse width
- (2) Fig. 1 - 10 000 μs P_{PPM} is actual test for $V_{WM} \leq 60$ V types, over 60 V types 10 000 P_{PPM} is curve extensional value

| TYPICAL CLAMPING VOLTAGE AT ISO7637-2 WITH 12 V BATTERY SYSTEM ($T_A = 25^\circ C$) | | | | |
|---------------------------------------------------------------------------------------|---------|-------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------|
| CONDITION | PULSE 1 | PULSE 2a | PULSE 3a | PULSE 3b |
| | | -150 V U_S , 2 ms, 10 Ω 0.5 s Interval 5000 pulses | 112 V U_S , 50 μs , 2 Ω 0.2 s Interval 5000 pulses | -220 V U_S , 150 ns, 50 Ω 100 μs Interval (10 kHz) 1 h |
| Device type | | | | |
| SMC3K24CAHM3_A | -33 V | 33 V | -30 V | 35 V |
| SMC3K26CAHM3_A | -35 V | 35 V | -32 V | 37 V |
| SMC3K28CAHM3_A | -38 V | 38 V | -34 V | 40 V |
| SMC3K30CAHM3_A | -40 V | 40 V | -36 V | 42 V |
| SMC3K33CAHM3_A | -43 V | 43 V | -39 V | 45 V |

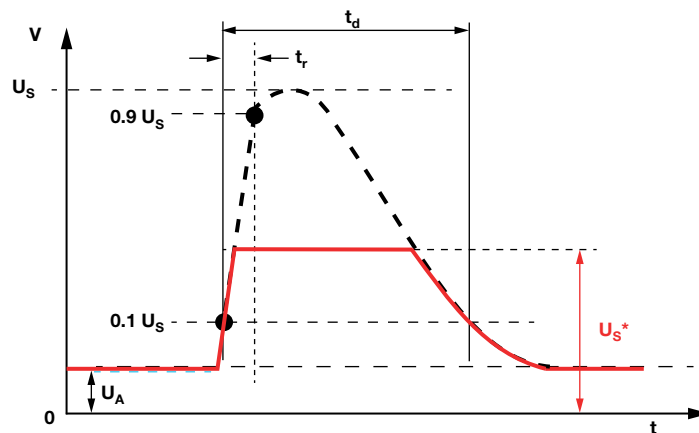
TYPICAL LOAD DUMP CAPABILITY AT ISO 16750-2 PULSE B WITH 12 V BATTERY SYSTEM ($T_A = 25^\circ C$)


Fig. 7

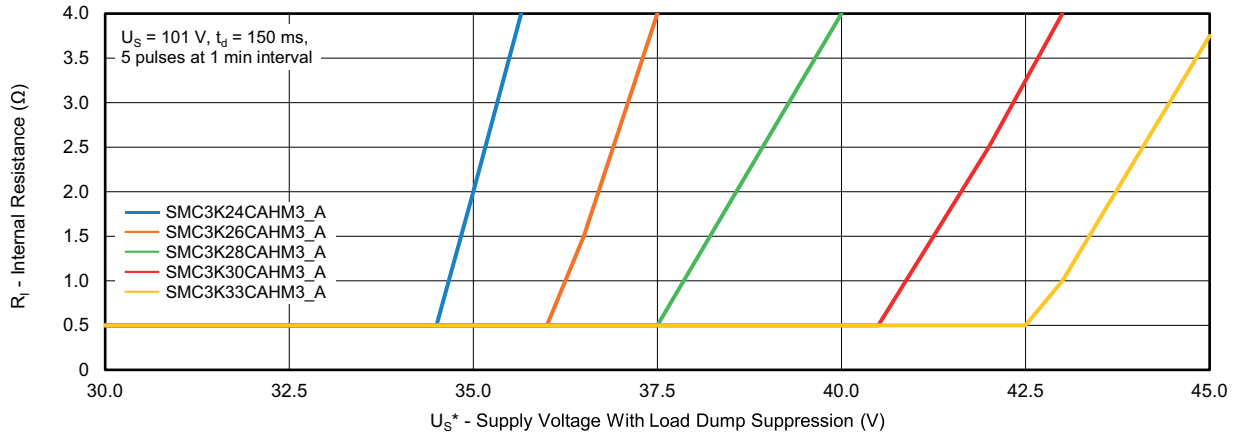


Fig. 8

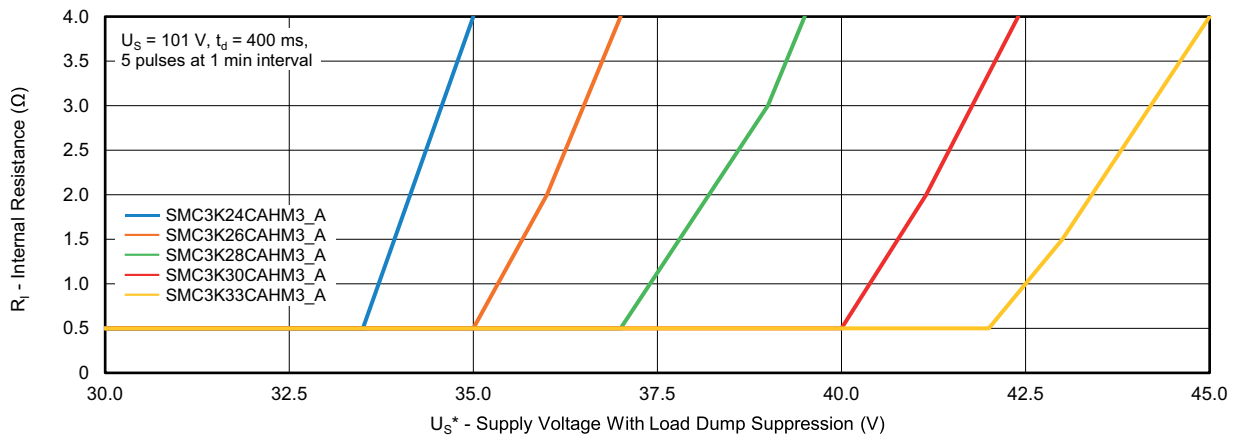
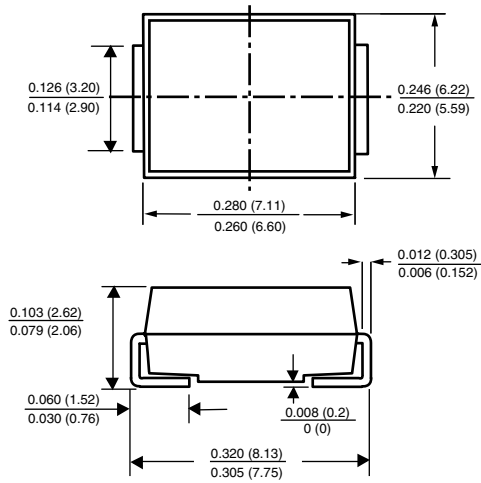


Fig. 9

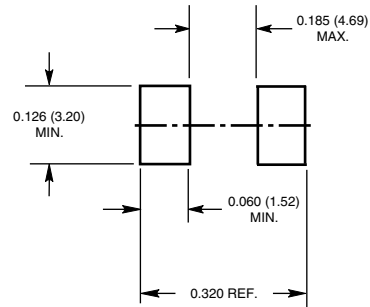


PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMC (DO-214AB)



Mounting Pad Layout





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