

1500W, 6.8V - 200V Surface Mount Transient Voltage Suppressor

FEATURES

- AEC-Q101 qualified
- Ideal for automated placement
- Glass passivated chip junction
- Excellent clamping capability
- Meets ISO 7637-2 (Pulse 1/2a/2b/3a/3b)
- Fast response time: Typically less than 1.0ps
- Typical I_R less than $1\mu A$ above 10V
- Moisture sensitivity level: level 1, per J-STD-020
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

| KEY PARAMETERS | | |
|----------------|----------------|------|
| PARAMETER | VALUE | UNIT |
| V_{WM} | 5.5 - 171 | V |
| V_{BR} | 6.8 - 200 | V |
| P_{PK} | 1500 | W |
| T_{JMAX} | 150 | °C |
| Package | DO-214AB (SMC) | |
| Configuration | Single die | |

APPLICATIONS

- Immunization of sensitive devices in telecommunications, consumer electronics, and industrial equipment from electrostatic discharge (ESD) and transient voltages induced by load switching and lightning



DO-214AB (SMC)

MECHANICAL DATA

- Case: DO-214AB (SMC)
- Molding compound meets UL 94V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: As marked
- Weight: 0.210g (approximately)

| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ C$ unless otherwise noted) | | | |
|--|-----------|-------------|------|
| PARAMETER | SYMBOL | VALUE | UNIT |
| Peak power dissipation at $T_A = 25^\circ C$, $t_p = 1ms^{(1)}$ | P_{PK} | 1500 | W |
| Steady state power dissipation at $T_A = 25^\circ C$ | P_D | 6.5 | W |
| Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load for Unidirectional only | I_{FSM} | 200 | A |
| Forward Voltage @ $I_F = 50A$ for Unidirectional only ⁽²⁾ | V_F | 3.5 / 5.0 | V |
| Junction temperature | T_J | -55 to +150 | °C |
| Storage temperature | T_{STG} | -55 to +150 | °C |

Notes:

1. Non-repetitive current pulse per Fig.5 and derated above $T_A = 25^\circ C$ per Fig.2
2. $V_F = 3.5V$ on 1.5SMC6.8H - 1.5SMC91H and $V_F = 5.0V$ on 1.5SMC100H - 1.5SMC200H

Devices for Bipolar Applications

1. For bidirectional use CH or CAH suffix for types 1.5SMC6.8H - types 1.5SMC200AH
2. Electrical characteristics apply in both directions

| THERMAL PERFORMANCE | | | |
|--|-----------------|-----|---------------|
| PARAMETER | SYMBOL | TYP | UNIT |
| Junction-to-ambient thermal resistance | $R_{\theta JA}$ | 50 | $^{\circ}C/W$ |
| Junction-to-case thermal resistance | $R_{\theta JC}$ | 15 | $^{\circ}C/W$ |

| ELECTRICAL SPECIFICATIONS ($T_A = 25^{\circ}C$ unless otherwise noted) | | | | | | | | | |
|---|--------------|--|-------|----------------------------|---|--|--|---|--|
| Part number | Marking code | Breakdown voltage (Note 1) $V_{BR}@I_T$ (V) | | Test current I_T (mA) | Working stand-off voltage V_{WM} (V) | Maximum blocking leakage current $I_R@V_{WM}$ (μA) | Maximum peak impulse current (Note 2) I_{PPM} (A) | Maximum clamping voltage $V_C@I_{PPM}$ (V) | Maximum Temperature Coefficient of V_{BR} ($\%/^{\circ}C$) |
| | | Min | Max | | | | | | |
| 1.5SMC6.8H | DDJ | 6.12 | 7.48 | 10 | 5.50 | 1000 | 145 | 10.8 | 0.057 |
| 1.5SMC6.8AH | DEJ | 6.46 | 7.14 | 10 | 5.80 | 1000 | 150 | 10.5 | 0.057 |
| 1.5SMC7.5H | DFJ | 6.75 | 8.25 | 10 | 6.05 | 500 | 134 | 11.7 | 0.061 |
| 1.5SMC7.5AH | DGJ | 7.13 | 7.88 | 10 | 6.40 | 500 | 139 | 11.3 | 0.061 |
| 1.5SMC8.2H | DHJ | 7.38 | 9.02 | 10 | 6.63 | 200 | 126 | 12.5 | 0.065 |
| 1.5SMC8.2AH | DKJ | 7.79 | 8.61 | 10 | 7.02 | 200 | 130 | 12.1 | 0.065 |
| 1.5SMC9.1H | DLJ | 8.19 | 10.00 | 1.0 | 7.37 | 50 | 114 | 13.8 | 0.068 |
| 1.5SMC9.1AH | DMJ | 8.65 | 9.55 | 1.0 | 7.78 | 50 | 117 | 13.4 | 0.068 |
| 1.5SMC10H | DNJ | 9.00 | 11.00 | 1.0 | 8.10 | 10 | 105 | 15.0 | 0.073 |
| 1.5SMC10AH | DPJ | 9.50 | 10.5 | 1.0 | 8.55 | 10 | 108 | 14.5 | 0.073 |
| 1.5SMC11H | DQJ | 9.90 | 12.1 | 1.0 | 8.92 | 1 | 97 | 16.2 | 0.075 |
| 1.5SMC11AH | DRJ | 10.5 | 11.6 | 1.0 | 9.40 | 1 | 100 | 15.6 | 0.075 |
| 1.5SMC12H | DSJ | 10.8 | 13.2 | 1.0 | 9.72 | 1 | 91 | 17.3 | 0.078 |
| 1.5SMC12AH | DTJ | 11.4 | 12.6 | 1.0 | 10.2 | 1 | 94 | 16.7 | 0.078 |
| 1.5SMC13H | DUJ | 11.7 | 14.3 | 1.0 | 10.5 | 1 | 82 | 19.0 | 0.081 |
| 1.5SMC13AH | DVJ | 12.4 | 13.7 | 1.0 | 11.1 | 1 | 86 | 18.2 | 0.081 |
| 1.5SMC15H | DWJ | 13.5 | 16.5 | 1.0 | 12.1 | 1 | 71 | 22.0 | 0.084 |
| 1.5SMC15AH | DXJ | 14.3 | 15.8 | 1.0 | 12.8 | 1 | 74 | 21.2 | 0.084 |
| 1.5SMC16H | DYJ | 14.4 | 17.6 | 1.0 | 12.9 | 1 | 67 | 23.5 | 0.086 |
| 1.5SMC16AH | DZJ | 15.2 | 16.8 | 1.0 | 13.6 | 1 | 70 | 22.5 | 0.086 |
| 1.5SMC18H | EDJ | 16.2 | 19.8 | 1.0 | 14.5 | 1 | 59 | 26.5 | 0.088 |
| 1.5SMC18AH | EEJ | 17.1 | 18.9 | 1.0 | 15.3 | 1 | 60 | 25.5 | 0.088 |
| 1.5SMC20H | EFJ | 18.0 | 22.0 | 1.0 | 16.2 | 1 | 54 | 29.1 | 0.090 |
| 1.5SMC20AH | EGJ | 19.0 | 21.0 | 1.0 | 17.1 | 1 | 56 | 27.7 | 0.090 |
| 1.5SMC22H | EHJ | 19.8 | 24.2 | 1.0 | 17.8 | 1 | 49 | 31.9 | 0.092 |
| 1.5SMC22AH | EKJ | 20.9 | 23.1 | 1.0 | 18.8 | 1 | 51 | 30.6 | 0.092 |
| 1.5SMC24H | ELJ | 21.6 | 26.4 | 1.0 | 19.4 | 1 | 45 | 34.7 | 0.094 |
| 1.5SMC24AH | EMJ | 22.8 | 25.2 | 1.0 | 20.5 | 1 | 47 | 33.2 | 0.094 |
| 1.5SMC27H | ENJ | 24.3 | 29.7 | 1.0 | 21.8 | 1 | 40 | 39.1 | 0.096 |
| 1.5SMC27AH | EPJ | 25.7 | 28.4 | 1.0 | 23.1 | 1 | 42 | 37.5 | 0.096 |
| 1.5SMC30H | EQJ | 27.0 | 33.0 | 1.0 | 24.3 | 1 | 36 | 43.5 | 0.097 |
| 1.5SMC30AH | ERJ | 28.5 | 31.5 | 1.0 | 25.6 | 1 | 38 | 41.4 | 0.097 |
| 1.5SMC33H | ESJ | 29.7 | 36.3 | 1.0 | 26.8 | 1 | 33 | 47.7 | 0.098 |
| 1.5SMC33AH | ETJ | 31.4 | 34.7 | 1.0 | 28.2 | 1 | 34 | 45.7 | 0.098 |
| 1.5SMC36H | EUJ | 32.4 | 39.6 | 1.0 | 29.1 | 1 | 30 | 52.0 | 0.099 |
| 1.5SMC36AH | EVJ | 34.2 | 37.8 | 1.0 | 30.8 | 1 | 31 | 49.9 | 0.099 |
| 1.5SMC39H | EWJ | 35.1 | 42.9 | 1.0 | 31.6 | 1 | 27 | 56.4 | 0.100 |
| 1.5SMC39AH | EXJ | 37.1 | 41.0 | 1.0 | 33.3 | 1 | 29 | 53.9 | 0.100 |
| 1.5SMC43H | EYJ | 38.7 | 47.3 | 1.0 | 34.8 | 1 | 25 | 61.9 | 0.101 |
| 1.5SMC43AH | EZJ | 40.9 | 45.2 | 1.0 | 36.8 | 1 | 26 | 59.3 | 0.101 |
| 1.5SMC47H | FDJ | 42.3 | 51.7 | 1.0 | 38.1 | 1 | 23 | 67.8 | 0.101 |
| 1.5SMC47AH | FEJ | 44.7 | 49.4 | 1.0 | 40.2 | 1 | 24 | 64.8 | 0.101 |
| 1.5SMC51H | FFJ | 45.9 | 56.1 | 1.0 | 41.3 | 1 | 21 | 73.5 | 0.102 |

ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise noted)

| Part number | Marking code | Breakdown voltage (Note 1) V _{BR} @I _T (V) | | Test current I _T (mA) | Working stand-off voltage V _{WM} (V) | Maximum blocking leakage current I _R @V _{WM} (μA) | Maximum peak impulse current (Note 2) I _{PPM} (A) | Maximum clamping voltage V _C @I _{PPM} (V) | Maximum Temperature Coefficient of V _{BR} (%/°C) |
|-------------|--------------|--|------|--|---|---|--|---|--|
| | | Min | Max | | | | | | |
| 1.5SMC51AH | FGJ | 48.5 | 53.6 | 1.0 | 43.6 | 1 | 22 | 70.1 | 0.102 |
| 1.5SMC56H | FHJ | 50.4 | 61.6 | 1.0 | 45.4 | 1 | 19 | 80.5 | 0.103 |
| 1.5SMC56AH | FKJ | 53.2 | 58.8 | 1.0 | 47.8 | 1 | 20 | 77.0 | 0.103 |
| 1.5SMC62H | FLJ | 55.8 | 68.2 | 1.0 | 50.2 | 1 | 17 | 89.0 | 0.104 |
| 1.5SMC62AH | FMJ | 58.9 | 65.1 | 1.0 | 53.0 | 1 | 18 | 85.0 | 0.104 |
| 1.5SMC68H | FNJ | 61.2 | 74.8 | 1.0 | 55.1 | 1 | 16 | 98.0 | 0.104 |
| 1.5SMC68AH | FPJ | 64.6 | 71.4 | 1.0 | 58.1 | 1 | 17 | 92.0 | 0.104 |
| 1.5SMC75H | FQJ | 67.5 | 82.5 | 1.0 | 60.7 | 1 | 14 | 108 | 0.105 |
| 1.5SMC75AH | FRJ | 71.3 | 78.8 | 1.0 | 64.1 | 1 | 15 | 103 | 0.105 |
| 1.5SMC82H | FSJ | 73.8 | 90.2 | 1.0 | 66.4 | 1 | 13 | 118 | 0.105 |
| 1.5SMC82AH | FTJ | 77.9 | 86.1 | 1.0 | 70.1 | 1 | 13.9 | 113 | 0.105 |
| 1.5SMC91H | FUJ | 81.9 | 100 | 1.0 | 73.7 | 1 | 12 | 131 | 0.106 |
| 1.5SMC91AH | FVJ | 86.5 | 95.5 | 1.0 | 77.8 | 1 | 12.6 | 125 | 0.106 |
| 1.5SMC100H | FWJ | 90 | 110 | 1.0 | 81.0 | 1 | 10.9 | 144 | 0.106 |
| 1.5SMC100AH | FXJ | 95 | 105 | 1.0 | 85.5 | 1 | 11.4 | 137 | 0.106 |
| 1.5SMC110H | FYJ | 99 | 121 | 1.0 | 89.2 | 1 | 9.9 | 158 | 0.107 |
| 1.5SMC110AH | FZJ | 105 | 116 | 1.0 | 94.0 | 1 | 10.3 | 152 | 0.107 |
| 1.5SMC120H | GDJ | 108 | 132 | 1.0 | 97.2 | 1 | 9.1 | 173 | 0.107 |
| 1.5SMC120AH | GEJ | 114 | 126 | 1.0 | 102.0 | 1 | 9.5 | 165 | 0.107 |
| 1.5SMC130H | GFJ | 117 | 143 | 1.0 | 105.0 | 1 | 8.4 | 187 | 0.107 |
| 1.5SMC130AH | GGJ | 124 | 137 | 1.0 | 111.0 | 1 | 8.7 | 179 | 0.107 |
| 1.5SMC150H | GHJ | 135 | 165 | 1.0 | 121.0 | 1 | 7.3 | 215 | 0.108 |
| 1.5SMC150AH | GKJ | 143 | 158 | 1.0 | 128.0 | 1 | 7.6 | 207 | 0.108 |
| 1.5SMC160H | GLJ | 144 | 176 | 1.0 | 130.0 | 1 | 6.8 | 230 | 0.108 |
| 1.5SMC160AH | GMJ | 152 | 168 | 1.0 | 136.0 | 1 | 7.1 | 219 | 0.108 |
| 1.5SMC170H | GNJ | 153 | 187 | 1.0 | 138.0 | 1 | 6.4 | 244 | 0.108 |
| 1.5SMC170AH | GPJ | 162 | 179 | 1.0 | 145.0 | 1 | 6.7 | 234 | 0.108 |
| 1.5SMC180H | GQJ | 162 | 198 | 1.0 | 146.0 | 1 | 6.1 | 258 | 0.108 |
| 1.5SMC180AH | GRJ | 171 | 189 | 1.0 | 154.0 | 1 | 6.4 | 246 | 0.108 |
| 1.5SMC200H | GSJ | 180 | 220 | 1.0 | 162.0 | 1 | 5.4 | 287 | 0.108 |
| 1.5SMC200AH | GTJ | 190 | 210 | 1.0 | 171.0 | 1 | 5.7 | 274 | 0.108 |

Notes:

1. V_{BR} measure after I_T applied for 30ms, I_T=square wave pulse or equivalent
2. Surge current waveform per Fig.5 and derate per Fig.2
3. For bipolar types having V_{WM} of 10V and under, the I_R limit is doubled
4. For bidirectional use CH or CAH suffix for types 1.5SMC6.8H - 1.5SMC200AH
5. All terms and symbols are consistent with ANSI/IEEE C62.35

ORDERING INFORMATION

| ORDERING CODE ⁽¹⁾ | PACKAGE | PACKING |
|------------------------------|----------------|---------------------|
| 1.5SMCxH | DO-214AB (SMC) | 3,000 / Tape & Reel |

Notes:

1. "x" defines voltage from 6.8V(1.5SMC6.8H) to 200V(1.5SMC200H)

CHARACTERISTICS CURVES

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

Fig.1 Peak Pulse Power Rating Curve



Fig.2 Pulse Derating Curve



Fig.3 Typical Junction Capacitance



Fig.4 Maximum Non-repetitive Forward Surge Current



CHARACTERISTICS CURVES

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

Fig.5 Clamping Power Pulse Waveform



PACKAGE OUTLINE DIMENSIONS

DO-214AB (SMC)



| DIM. | Unit (mm) | | Unit (inch) | |
|------|-----------|------|-------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 2.00 | 2.62 | 0.079 | 0.103 |
| A1 | 0.10 | 0.20 | 0.004 | 0.008 |
| b | 2.90 | 3.20 | 0.114 | 0.126 |
| c | 0.15 | 0.31 | 0.006 | 0.012 |
| D | 5.59 | 6.22 | 0.220 | 0.245 |
| E | 7.75 | 8.13 | 0.305 | 0.320 |
| E1 | 6.60 | 7.11 | 0.260 | 0.280 |
| L | 1.00 | 1.60 | 0.039 | 0.063 |

SUGGESTED PAD LAYOUT



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A | 3.30 | 0.130 |
| B | 2.50 | 0.098 |
| C | 6.90 | 0.272 |
| D | 4.40 | 0.173 |
| E | 9.40 | 0.370 |

MARKING DIAGRAM



- P/N = Marking Code
- G = Green Compound
- YW = Date Code
- F = Factory Code

Cathode band for uni-directional products only