

## 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 <sup>(2)</sup>                                       | $V_F$     | 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  | °C/W |
| Junction-to-case thermal resistance    | $R_{\theta JC}$ | 15  | °C/W |

| ELECTRICAL SPECIFICATIONS (T <sub>A</sub> = 25°C unless otherwise noted) |              |   |       |                                  |   |   |   |   |   |
|--|--------------|---|-------|----------------------------------|---|---|---|---|---|
| Part number  | Marking code | Breakdown voltage (Note 1)<br>V <sub>BR</sub> @I <sub>T</sub> (V) |       | Test current I <sub>T</sub> (mA) | Working stand-off voltage V <sub>WM</sub> (V) | Maximum blocking leakage current I <sub>R</sub> @V <sub>WM</sub> (μA) | Maximum peak impulse current (Note 2)<br>I <sub>PPM</sub> (A) | Maximum clamping voltage V <sub>C</sub> @I <sub>PPM</sub> (V) | Maximum Temperature Coefficient of V <sub>BR</sub> (%/°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<sub>A</sub> = 25°C unless otherwise noted)

| Part number | Marking code | Breakdown voltage (Note 1)<br>V <sub>BR</sub> @I <sub>T</sub><br>(V) |      | Test current<br>I <sub>T</sub><br>(mA) | Working stand-off voltage<br>V <sub>WM</sub><br>(V) | Maximum blocking leakage current<br>I <sub>R</sub> @V <sub>WM</sub><br>(μA) | Maximum peak impulse current (Note 2)<br>I <sub>PPM</sub><br>(A) | Maximum clamping voltage<br>V <sub>C</sub> @I <sub>PPM</sub><br>(V) | Maximum Temperature Coefficient of V <sub>BR</sub><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<sub>BR</sub> measure after I<sub>T</sub> applied for 30ms, I<sub>T</sub>=square wave pulse or equivalent
2. Surge current waveform per Fig.5 and derate per Fig.2
3. For bipolar types having V<sub>WM</sub> of 10V and under, the I<sub>R</sub> 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 <sup>(1)</sup> | PACKAGE        | PACKING             |
|------------------------------|----------------|---------------------|
| 1.5SMCxH                     | DO-214AB (SMC) | 3,000 / Tape & Reel |

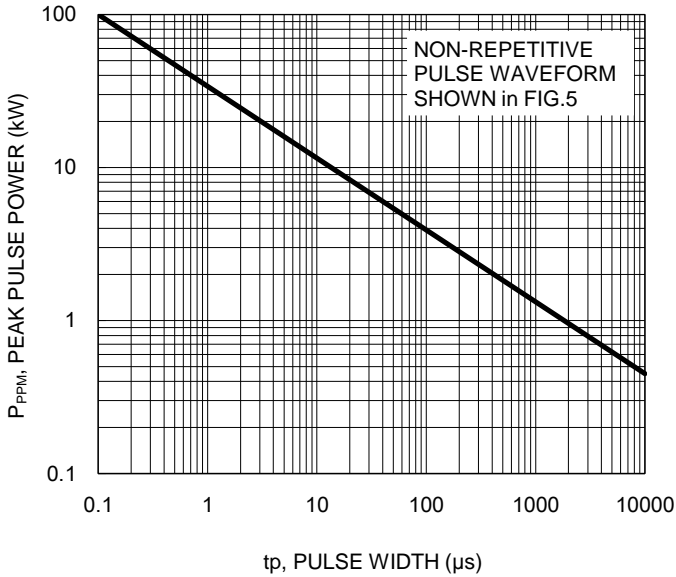
### Notes:

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

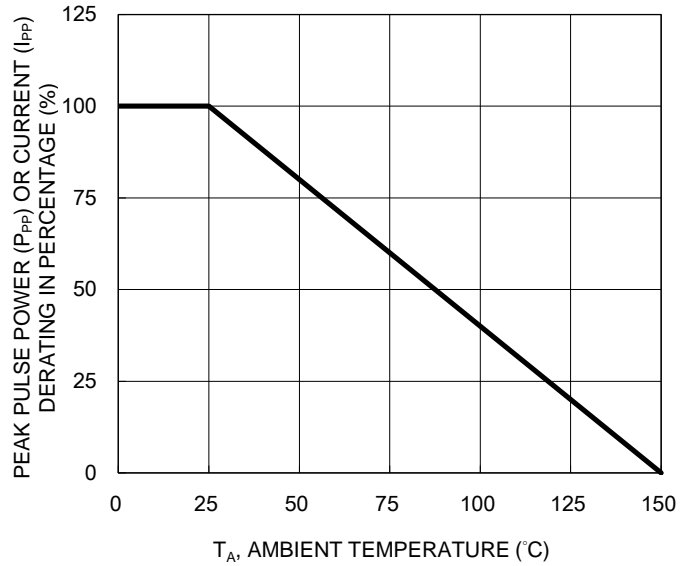
**CHARACTERISTICS CURVES**

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

**Fig.1 Peak Pulse Power Rating Curve**



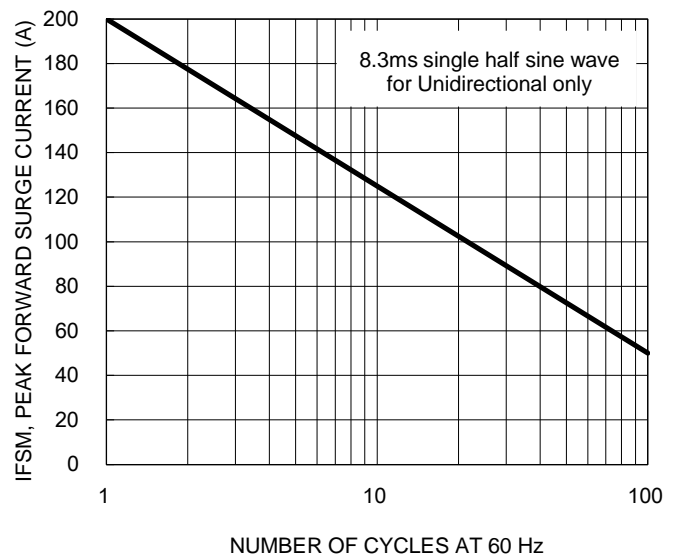
**Fig.2 Pulse Derating Curve**



**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**



Cathode band for uni-directional products only

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