# 1500W, 5V - 170V Surface Mount Transient Voltage Suppressor

## FEATURES

- AEC-Q101 qualified
- Ideal for automated placement
- Glass passivated junction
- Excellent clamping capability
- Meets ISO 7637-2 (Pulse 1/2a/2b/3a/3b)
- Fast response time: Typically less than 1.0ps from 0 V to BV min
- Typical $I_R$ less than 1μA 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 - 170 | V |
| $V_{BR}$ | 6.4 - 231 | V |
| $P_{PK}$ | 1500 | W |
| $T_{J\ MAX}$ | 150 | °C |
| Package | DO-214AB (SMC) | |
| Configuration | Single die | |

Pb-Free RoHS COMPLIANT HALOGEN FREE

## 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.

## 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)

**DO-214AB (SMC)**

| **ABSOLUTE MAXIMUM RATINGS** ($T_A$ = 25°C unless otherwise noted) | | | |
|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **VALUE** | **UNIT** |
| Peak power dissipation at $T_A$ = 25°C, tp = 1ms[1] | $P_{PK}$ | 1500 | W |
| Steady state power dissipation at $T_A$ = 25°C | $P_D$ | 5 | W |
| Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load | $I_{FSM}$ | 200 | A |
| Forward Voltage @ $I_F$ = 100A 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°C per Fig.2
2. $V_F$ = 3.5V on SMCJ5.0H - SMCJ90H devices and $V_F$ = 5.0V on SMCJ100H - SMCJ170H devices

Devices for bipolar applications

1. For bidirectional use CH or CAH suffix for types SMCJ5.0H - types SMCJ170H
2. Electrical characteristics apply in both directions



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## THERMAL PERFORMANCE

| PARAMETER | SYMBOL | TYP | UNIT |
|---|---|---|---|
| Junction-to-ambient thermal resistance | $R_{\Theta JA}$ | 55 | °C/W |
| Junction-to-case thermal resistance | $R_{\Theta JC}$ | 10 | °C/W |

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

| Part number | Marking code | Breakdown voltage $V_{BR}@I_T$ (V) | | Test current $I_T$ (mA) | Working stand-off voltage $V_{WM}$ (V) | Maximum Reverse Leakage (Note 3) $I_R@V_{WM}$ (μA) | Maximum peak impulse current (Note 2) $I_{PPM}$ (A) | Maximum clamping voltage (Note 2) $V_C@I_{PPM}$ (V) |
|---|---|---|---|---|---|---|---|---|
| | | Min | Max | | | | | |
| SMCJ5.0H | GDD | 6.4 | 7.3 | 10 | 5 | 1000 | 164 | 9.6 |
| SMCJ5.0AH | GDE | 6.4 | 7 | 10 | 5 | 1000 | 171 | 9.2 |
| SMCJ6.0H | GDF | 6.67 | 8.15 | 10 | 6 | 1000 | 138 | 11.4 |
| SMCJ6.0AH | GDG | 6.67 | 7.37 | 10 | 6 | 1000 | 152 | 10.3 |
| SMCJ6.5H | GDH | 7.22 | 8.82 | 10 | 6.5 | 500 | 128 | 12.3 |
| SMCJ6.5AH | GDK | 7.22 | 7.98 | 10 | 6.5 | 500 | 140 | 11.2 |
| SMCJ7.0H | GDL | 7.78 | 9.51 | 10 | 7 | 200 | 118 | 13.3 |
| SMCJ7.0AH | GDM | 7.78 | 8.6 | 10 | 7 | 200 | 131 | 12.0 |
| SMCJ7.5H | GDN | 8.33 | 10.30 | 1 | 7.5 | 100 | 110 | 14.3 |
| SMCJ7.5AH | GDP | 8.33 | 9.21 | 1 | 7.5 | 100 | 122 | 12.9 |
| SMCJ8.0H | GDQ | 8.89 | 10.9 | 1 | 8 | 50 | 105 | 15.0 |
| SMCJ8.0AH | GDR | 8.89 | 9.83 | 1 | 8 | 50 | 115 | 13.6 |
| SMCJ8.5H | GDS | 9.44 | 11.5 | 1 | 8.5 | 20 | 99 | 15.9 |
| SMCJ8.5AH | GDT | 9.44 | 10.4 | 1 | 8.5 | 20 | 109 | 14.4 |
| SMCJ9.0H | GDU | 10 | 12.2 | 1 | 9 | 10 | 93 | 16.9 |
| SMCJ9.0AH | GDV | 10 | 11.1 | 1 | 9 | 10 | 102 | 15.4 |
| SMCJ10H | GDW | 11.1 | 13.6 | 1 | 10 | 5 | 83 | 18.8 |
| SMCJ10AH | GDX | 11.1 | 12.3 | 1 | 10 | 5 | 92 | 17.0 |
| SMCJ11H | GDY | 12.2 | 14.9 | 1 | 11 | 1 | 78 | 20.1 |
| SMCJ11AH | GDZ | 12.2 | 13.5 | 1 | 11 | 1 | 86 | 18.2 |
| SMCJ12H | GED | 13.3 | 16.3 | 1 | 12 | 1 | 71 | 22.0 |
| SMCJ12AH | GEE | 13.3 | 14.7 | 1 | 12 | 1 | 79 | 19.9 |
| SMCJ13H | GEF | 14.4 | 17.6 | 1 | 13 | 1 | 66 | 23.8 |
| SMCJ13AH | GEG | 14.4 | 15.9 | 1 | 13 | 1 | 73 | 21.5 |
| SMCJ14H | GEH | 15.6 | 19.1 | 1 | 14 | 1 | 61 | 25.8 |
| SMCJ14AH | GEK | 15.6 | 17.2 | 1 | 14 | 1 | 67 | 23.2 |
| SMCJ15H | GEL | 16.7 | 20.4 | 1 | 15 | 1 | 58 | 26.9 |
| SMCJ15AH | GEM | 16.7 | 18.5 | 1 | 15 | 1 | 64 | 24.4 |
| SMCJ16H | GEN | 17.8 | 21.8 | 1 | 16 | 1 | 54 | 28.8 |
| SMCJ16AH | GEP | 17.8 | 19.7 | 1 | 16 | 1 | 60 | 26.0 |
| SMCJ17H | GEQ | 18.9 | 23.1 | 1 | 17 | 1 | 51 | 30.5 |
| SMCJ17AH | GER | 18.9 | 20.9 | 1 | 17 | 1 | 57 | 27.6 |
| SMCJ18H | GES | 20 | 24.4 | 1 | 18 | 1 | 48 | 32.2 |
| SMCJ18AH | GET | 20 | 22.1 | 1 | 18 | 1 | 53 | 29.2 |
| SMCJ20H | GEU | 22.2 | 27.1 | 1 | 20 | 1 | 43 | 35.8 |
| SMCJ20AH | GEV | 22.2 | 24.5 | 1 | 20 | 1 | 48 | 32.4 |
| SMCJ22H | GEW | 24.4 | 29.8 | 1 | 22 | 1 | 39 | 39.4 |
| SMCJ22AH | GEX | 24.4 | 26.9 | 1 | 22 | 1 | 44 | 35.5 |
| SMCJ24H | GEY | 26.7 | 32.6 | 1 | 24 | 1 | 36 | 43.0 |
| SMCJ24AH | GEZ | 26.7 | 29.5 | 1 | 24 | 1 | 40 | 38.9 |
| SMCJ26H | GFD | 28.9 | 35.3 | 1 | 26 | 1 | 33 | 46.6 |
| SMCJ26AH | GFE | 28.9 | 31.9 | 1 | 26 | 1 | 37 | 42.1 |
| SMCJ28H | GFF | 31.1 | 38 | 1 | 28 | 1 | 31 | 50.0 |



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| **ELECTRICAL SPECIFICATIONS** ($T_A$ = 25°C unless otherwise noted) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Part number** | **Marking code** | **Breakdown voltage** $V_{BR}$@$I_T$ (V) | | **Test current** $I_T$ (mA) | **Working stand-off voltage** $V_{WM}$ (V) | **Maximum Reverse Leakage** (Note 3) $I_R$@$V_{WM}$ (μA) | **Maximum peak impulse current** (Note 2) $I_{PPM}$ (A) | **Maximum clamping voltage** (Note 2) $V_C$@$I_{PPM}$ (V) |
| | | Min | Max | | | | | |
| SMCJ28AH | GFG | 31.1 | 34.4 | 1 | 28 | 1 | 34 | 45.4 |
| SMCJ30H | GFH | 33.3 | 40.7 | 1 | 30 | 1 | 29 | 53.5 |
| SMCJ30AH | GFK | 33.3 | 36.8 | 1 | 30 | 1 | 32 | 48.4 |
| SMCJ33H | GFL | 36.7 | 44.9 | 1 | 33 | 1 | 26 | 59.0 |
| SMCJ33AH | GFM | 36.7 | 40.6 | 1 | 33 | 1 | 29 | 53.3 |
| SMCJ36H | GFN | 40 | 48.9 | 1 | 36 | 1 | 24 | 64.3 |
| SMCJ36AH | GFP | 40 | 44.2 | 1 | 36 | 1 | 27 | 58.1 |
| SMCJ40H | GFQ | 44.4 | 54.3 | 1 | 40 | 1 | 22 | 71.4 |
| SMCJ40AH | GFR | 44.4 | 49.1 | 1 | 40 | 1 | 24 | 64.5 |
| SMCJ43H | GFS | 47.8 | 58.4 | 1 | 43 | 1 | 20 | 76.7 |
| SMCJ43AH | GFT | 47.8 | 52.8 | 1 | 43 | 1 | 22 | 69.4 |
| SMCJ45H | GFU | 50 | 61.1 | 1 | 45 | 1 | 19 | 80.3 |
| SMCJ45AH | GFV | 50 | 55.3 | 1 | 45 | 1 | 21 | 72.7 |
| SMCJ48H | GFW | 53.3 | 65.1 | 1 | 48 | 1 | 18 | 85.5 |
| SMCJ48AH | GFX | 53.3 | 58.9 | 1 | 48 | 1 | 20 | 77.4 |
| SMCJ51H | GFY | 56.7 | 69.3 | 1 | 51 | 1 | 17 | 91.1 |
| SMCJ51AH | GFZ | 56.7 | 62.7 | 1 | 51 | 1 | 19 | 82.4 |
| SMCJ54H | GGD | 60 | 73.3 | 1 | 54 | 1 | 16 | 96.3 |
| SMCJ54AH | GGE | 60 | 66.3 | 1 | 54 | 1 | 18 | 87.1 |
| SMCJ58H | GGF | 64.4 | 78.7 | 1 | 58 | 1 | 15 | 103 |
| SMCJ58AH | GGG | 64.4 | 71.2 | 1 | 58 | 1 | 16 | 93.6 |
| SMCJ60H | GGH | 66.7 | 81.5 | 1 | 60 | 1 | 14 | 107 |
| SMCJ60AH | GGK | 66.7 | 73.7 | 1 | 60 | 1 | 16 | 96.8 |
| SMCJ64H | GGL | 71.1 | 86.9 | 1 | 64 | 1 | 13.8 | 114 |
| SMCJ64AH | GGM | 71.1 | 78.6 | 1 | 64 | 1 | 15 | 103 |
| SMCJ70H | GGN | 77.8 | 95.1 | 1 | 70 | 1 | 12.6 | 125 |
| SMCJ70AH | GGP | 77.8 | 86 | 1 | 70 | 1 | 13.9 | 113 |
| SMCJ75H | GGQ | 83.3 | 102 | 1 | 75 | 1 | 11.7 | 134 |
| SMCJ75AH | GGR | 83.3 | 92.1 | 1 | 75 | 1 | 13 | 121 |
| SMCJ78H | GGS | 86.7 | 106 | 1 | 78 | 1 | 11.3 | 139 |
| SMCJ78AH | GGT | 86.7 | 95.8 | 1 | 78 | 1 | 12.5 | 126 |
| SMCJ85H | GGU | 94.4 | 115 | 1 | 85 | 1 | 10.4 | 151 |
| SMCJ85AH | GGV | 94.4 | 104 | 1 | 85 | 1 | 11.5 | 137 |
| SMCJ90H | GGW | 100 | 122 | 1 | 90 | 1 | 9.8 | 160 |
| SMCJ90AH | GGX | 100 | 111 | 1 | 90 | 1 | 10.7 | 146 |
| SMCJ100H | GGY | 111 | 136 | 1 | 100 | 1 | 8.8 | 179 |
| SMCJ100AH | GGZ | 111 | 123 | 1 | 100 | 1 | 9.7 | 162 |
| SMCJ110H | GHD | 122 | 149 | 1 | 110 | 1 | 8 | 196 |
| SMCJ110AH | GHE | 122 | 135 | 1 | 110 | 1 | 8.9 | 177 |
| SMCJ120H | GHF | 133 | 163 | 1 | 120 | 1 | 7.3 | 214 |
| SMCJ120AH | GHG | 133 | 147 | 1 | 120 | 1 | 8.1 | 193 |
| SMCJ130H | GHH | 144 | 176 | 1 | 130 | 1 | 6.8 | 231 |
| SMCJ130AH | GHK | 144 | 159 | 1 | 130 | 1 | 7.5 | 209 |
| SMCJ150H | GHL | 167 | 204 | 1 | 150 | 1 | 5.8 | 266 |
| SMCJ150AH | GHM | 167 | 185 | 1 | 150 | 1 | 6.4 | 243 |
| SMCJ160H | GHN | 178 | 218 | 1 | 160 | 1 | 5.4 | 287 |
| SMCJ160AH | GHP | 178 | 197 | 1 | 160 | 1 | 6 | 259 |
| SMCJ170H | GHQ | 189 | 231 | 1 | 170 | 1 | 5.1 | 304 |
| SMCJ170AH | GHR | 189 | 209 | 1 | 170 | 1 | 5.7 | 275 |

**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. All terms and symbols are consistent with ANSI/IEEE C62.35



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| ORDERING INFORMATION | | |
|---|---|---|
| **ORDERING CODE[1]** | **PACKAGE** | **PACKING** |
| SMCJxH | DO-214AB (SMC) | 3,000 / Tape & Reel |

**Notes:**

1. "x" defines voltage from 5V(SMCJ5.0H) to 170V(SMCJ170H)



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## CHARACTERISTICS CURVES

($T_A$ = 25°C unless otherwise noted)

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

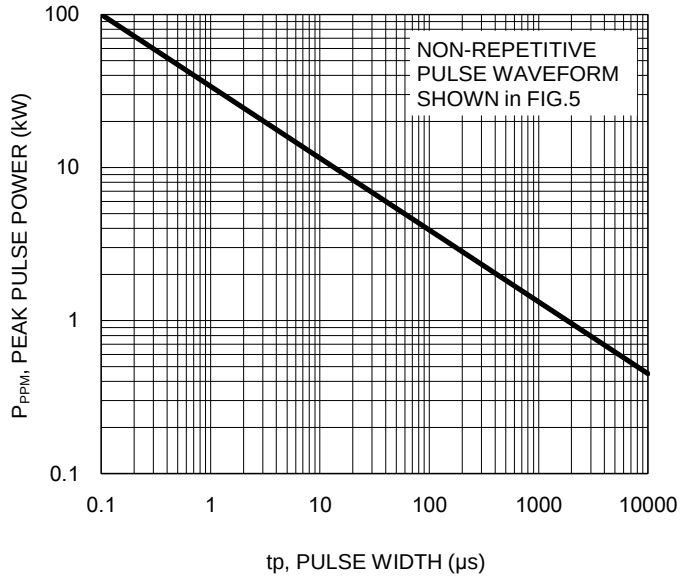



**Fig.2 Pulse Derating Curve**

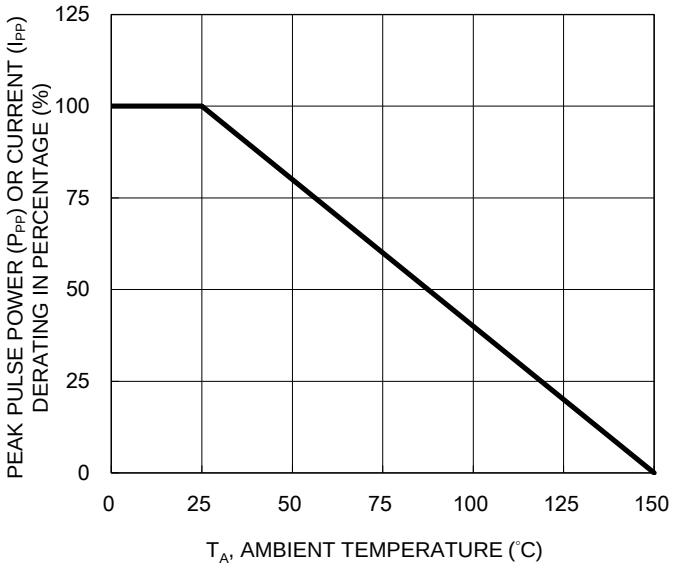



**Fig.3 Typical Junction Capacitance**

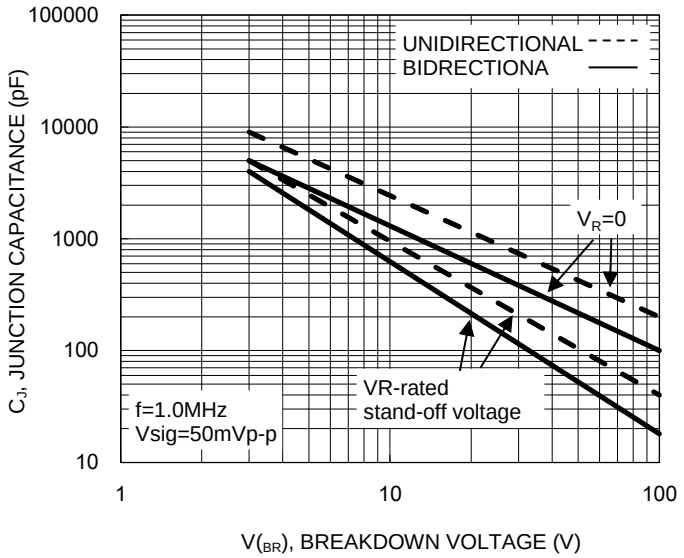
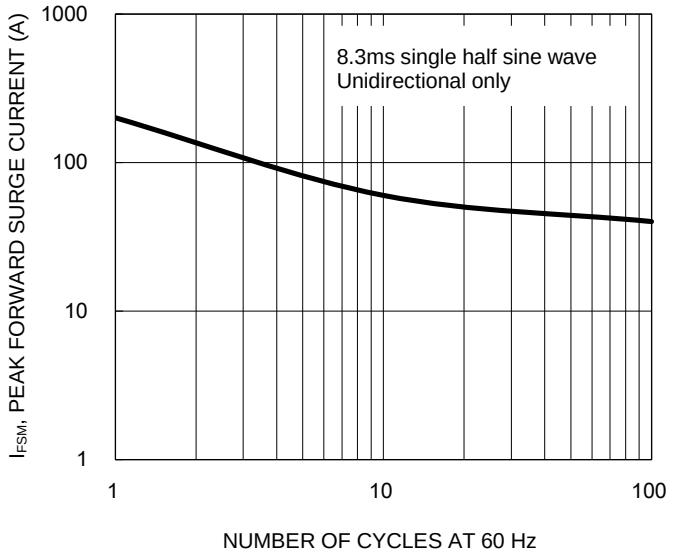



**Fig.4 Maximum Non-repetitive Forward Surge Current**



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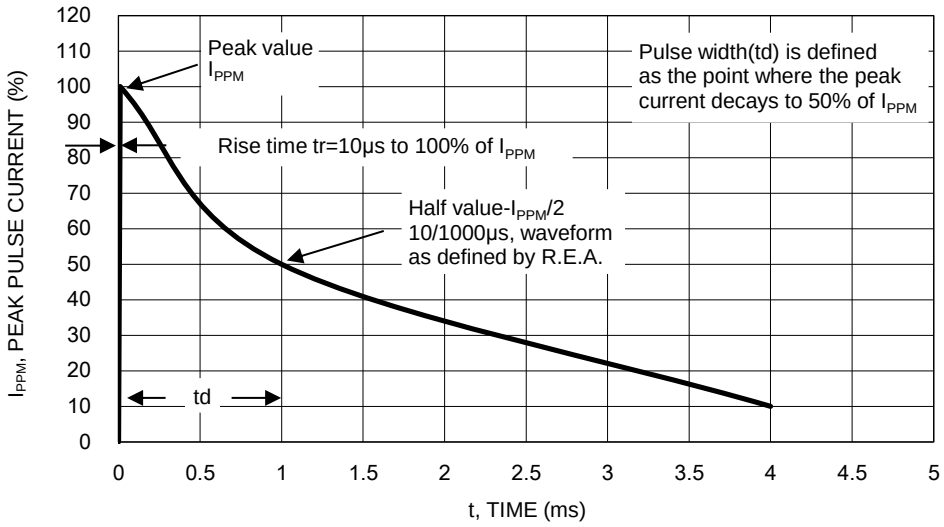
## CHARACTERISTICS CURVES

($T_A$ = 25°C unless otherwise noted)

**Fig.5 Clamping Power Pulse Waveform**



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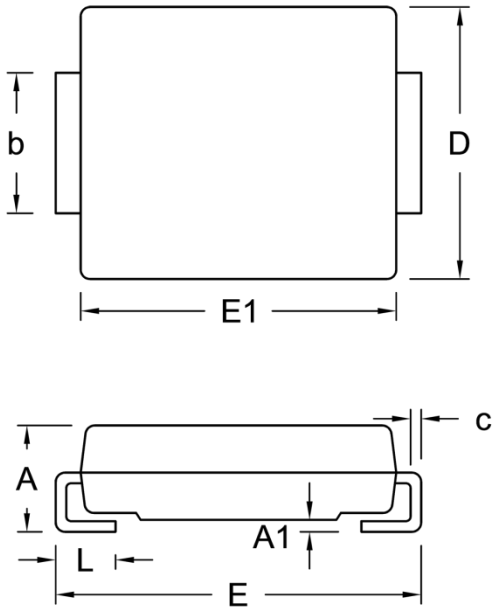
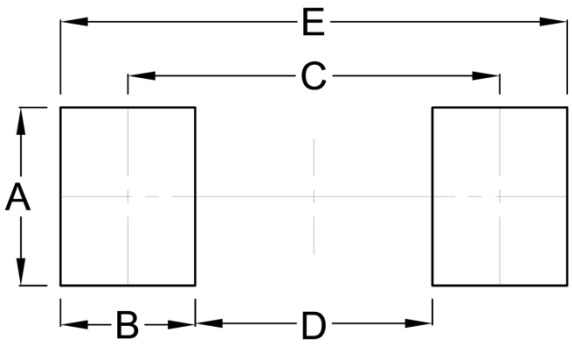
## PACKAGE OUTLINE DIMENSIONS

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



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