

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

FEATURES

- Ideal for automated placement
- Glass passivated junction
- Excellent clamping capability
- Fast response time: Typically less than 1.0ps from 0 V to BV min
- Typical I_R less than 1 μ A above 10V
- Moisture sensitivity level: level 1, per J-STD-020
- AEC-Q101 qualified available: ordering code with suffix "H"
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC

| KEY PARAMETERS | | |
|----------------|----------------|------|
| PARAMETER | VALUE | UNIT |
| V_{WM} | 5 - 170 | V |
| V_{BR} | 6.4 - 231 | V |
| P_{PK} | 1500 | W |
| T_{JMAX} | 150 | °C |
| Package | DO-214AB (SMC) | |
| Configuration | Single die | |



APPLICATIONS

- Immunization of sensitive devices in automotive, 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 : 0.21 g (approximately)

| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted) | | | |
|---|-----------|-------------|------|
| PARAMETER | SYMBOL | VALUE | UNIT |
| Peak power dissipation at $T_A=25^\circ\text{C}$, $t_p=1\text{ms}^{(1)}$ | P_{PK} | 1500 | W |
| Steady state power dissipation at $T_A=25^\circ\text{C}$ | P_D | 5 | W |
| Peak forward surge current, 8.3 ms single half sine-wave superimposed on rated load | I_{FSM} | 200 | A |
| Forward Voltage @ $I_F=100\text{A}$ 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. 3 and derated above $T_A=25^\circ\text{C}$ per Fig. 2
2. $V_F=3.5\text{V}$ on SMCJ5.0 - SMCJ90 devices and $V_F=5.0\text{V}$ on SMCJ100 - SMCJ170 devices

Devices for bipolar applications

1. For bidirectional use C or CA suffix for types SMCJ5.0 - types SMCJ170
2. Electrical characteristics apply in both directions

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 ($T_A = 25^\circ\text{C}$ 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. | | | | | |
| SMCJ5.0 | GDD | 6.4 | 7.3 | 10 | 5 | 1000 | 164 | 9.6 |
| SMCJ5.0A | GDE | 6.4 | 7 | 10 | 5 | 1000 | 171 | 9.2 |
| SMCJ6.0 | GDF | 6.67 | 8.15 | 10 | 6 | 1000 | 138 | 11.4 |
| SMCJ6.0A | GDG | 6.67 | 7.37 | 10 | 6 | 1000 | 152 | 10.3 |
| SMCJ6.5 | GDH | 7.22 | 8.82 | 10 | 6.5 | 500 | 128 | 12.3 |
| SMCJ6.5A | GDK | 7.22 | 7.98 | 10 | 6.5 | 500 | 140 | 11.2 |
| SMCJ7.0 | GDL | 7.78 | 9.51 | 10 | 7 | 200 | 118 | 13.3 |
| SMCJ7.0A | GDM | 7.78 | 8.6 | 10 | 7 | 200 | 131 | 12.0 |
| SMCJ7.5 | GDN | 8.33 | 10.30 | 1 | 7.5 | 100 | 110 | 14.3 |
| SMCJ7.5A | GDP | 8.33 | 9.21 | 1 | 7.5 | 100 | 122 | 12.9 |
| SMCJ8.0 | GDQ | 8.89 | 10.9 | 1 | 8 | 50 | 105 | 15.0 |
| SMCJ8.0A | GDR | 8.89 | 9.83 | 1 | 8 | 50 | 115 | 13.6 |
| SMCJ8.5 | GDS | 9.44 | 11.5 | 1 | 8.5 | 20 | 99 | 15.9 |
| SMCJ8.5A | GDT | 9.44 | 10.4 | 1 | 8.5 | 20 | 109 | 14.4 |
| SMCJ9.0 | GDU | 10 | 12.2 | 1 | 9 | 10 | 93 | 16.9 |
| SMCJ9.0A | GDV | 10 | 11.1 | 1 | 9 | 10 | 102 | 15.4 |
| SMCJ10 | GDW | 11.1 | 13.6 | 1 | 10 | 5 | 83 | 18.8 |
| SMCJ10A | GDX | 11.1 | 12.3 | 1 | 10 | 5 | 92 | 17.0 |
| SMCJ11 | GDY | 12.2 | 14.9 | 1 | 11 | 1 | 78 | 20.1 |
| SMCJ11A | GDZ | 12.2 | 13.5 | 1 | 11 | 1 | 86 | 18.2 |
| SMCJ12 | GED | 13.3 | 16.3 | 1 | 12 | 1 | 71 | 22.0 |
| SMCJ12A | GEE | 13.3 | 14.7 | 1 | 12 | 1 | 79 | 19.9 |
| SMCJ13 | GEF | 14.4 | 17.6 | 1 | 13 | 1 | 66 | 23.8 |
| SMCJ13A | GEG | 14.4 | 15.9 | 1 | 13 | 1 | 73 | 21.5 |
| SMCJ14 | GEH | 15.6 | 19.1 | 1 | 14 | 1 | 61 | 25.8 |
| SMCJ14A | GEK | 15.6 | 17.2 | 1 | 14 | 1 | 67 | 23.2 |
| SMCJ15 | GEL | 16.7 | 20.4 | 1 | 15 | 1 | 58 | 26.9 |
| SMCJ15A | GEM | 16.7 | 18.5 | 1 | 15 | 1 | 64 | 24.4 |
| SMCJ16 | GEN | 17.8 | 21.8 | 1 | 16 | 1 | 54 | 28.8 |
| SMCJ16A | GEP | 17.8 | 19.7 | 1 | 16 | 1 | 60 | 26.0 |
| SMCJ17 | GEQ | 18.9 | 23.1 | 1 | 17 | 1 | 51 | 30.5 |
| SMCJ17A | GER | 18.9 | 20.9 | 1 | 17 | 1 | 57 | 27.6 |
| SMCJ18 | GES | 20 | 24.4 | 1 | 18 | 1 | 48 | 32.2 |
| SMCJ18A | GET | 20 | 22.1 | 1 | 18 | 1 | 53 | 29.2 |
| SMCJ20 | GEU | 22.2 | 27.1 | 1 | 20 | 1 | 43 | 35.8 |
| SMCJ20A | GEV | 22.2 | 24.5 | 1 | 20 | 1 | 48 | 32.4 |
| SMCJ22 | GEW | 24.4 | 29.8 | 1 | 22 | 1 | 39 | 39.4 |
| SMCJ22A | GEX | 24.4 | 26.9 | 1 | 22 | 1 | 44 | 35.5 |
| SMCJ24 | GEY | 26.7 | 32.6 | 1 | 24 | 1 | 36 | 43.0 |
| SMCJ24A | GEZ | 26.7 | 29.5 | 1 | 24 | 1 | 40 | 38.9 |
| SMCJ26 | GFD | 28.9 | 35.3 | 1 | 26 | 1 | 33 | 46.6 |
| SMCJ26A | GFE | 28.9 | 31.9 | 1 | 26 | 1 | 37 | 42.1 |
| SMCJ28 | GFF | 31.1 | 38 | 1 | 28 | 1 | 31 | 50.0 |

| ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ 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. | | | | | |
| SMCJ28A | GFG | 31.1 | 34.4 | 1 | 28 | 1 | 34 | 45.4 |
| SMCJ30 | GFH | 33.3 | 40.7 | 1 | 30 | 1 | 29 | 53.5 |
| SMCJ30A | GFK | 33.3 | 36.8 | 1 | 30 | 1 | 32 | 48.4 |
| SMCJ33 | GFL | 36.7 | 44.9 | 1 | 33 | 1 | 26 | 59.0 |
| SMCJ33A | GFM | 36.7 | 40.6 | 1 | 33 | 1 | 29 | 53.3 |
| SMCJ36 | GFN | 40 | 48.9 | 1 | 36 | 1 | 24 | 64.3 |
| SMCJ36A | GFP | 40 | 44.2 | 1 | 36 | 1 | 27 | 58.1 |
| SMCJ40 | GFQ | 44.4 | 54.3 | 1 | 40 | 1 | 22 | 71.4 |
| SMCJ40A | GFR | 44.4 | 49.1 | 1 | 40 | 1 | 24 | 64.5 |
| SMCJ43 | GFS | 47.8 | 58.4 | 1 | 43 | 1 | 20 | 76.7 |
| SMCJ43A | GFT | 47.8 | 52.8 | 1 | 43 | 1 | 22 | 69.4 |
| SMCJ45 | GFU | 50 | 61.1 | 1 | 45 | 1 | 19 | 80.3 |
| SMCJ45A | GFV | 50 | 55.3 | 1 | 45 | 1 | 21 | 72.7 |
| SMCJ48 | GFW | 53.3 | 65.1 | 1 | 48 | 1 | 18 | 85.5 |
| SMCJ48A | GFX | 53.3 | 58.9 | 1 | 48 | 1 | 20 | 77.4 |
| SMCJ51 | GFY | 56.7 | 69.3 | 1 | 51 | 1 | 17 | 91.1 |
| SMCJ51A | GFZ | 56.7 | 62.7 | 1 | 51 | 1 | 19 | 82.4 |
| SMCJ54 | GGD | 60 | 73.3 | 1 | 54 | 1 | 16 | 96.3 |
| SMCJ54A | GGE | 60 | 66.3 | 1 | 54 | 1 | 18 | 87.1 |
| SMCJ58 | GGF | 64.4 | 78.7 | 1 | 58 | 1 | 15 | 103 |
| SMCJ58A | GGG | 64.4 | 71.2 | 1 | 58 | 1 | 16 | 93.6 |
| SMCJ60 | GGH | 66.7 | 81.5 | 1 | 60 | 1 | 14 | 107 |
| SMCJ60A | GGK | 66.7 | 73.7 | 1 | 60 | 1 | 16 | 96.8 |
| SMCJ64 | GGL | 71.1 | 86.9 | 1 | 64 | 1 | 13.8 | 114 |
| SMCJ64A | GGM | 71.1 | 78.6 | 1 | 64 | 1 | 15 | 103 |
| SMCJ70 | GGN | 77.8 | 95.1 | 1 | 70 | 1 | 12.6 | 125 |
| SMCJ70A | GGP | 77.8 | 86 | 1 | 70 | 1 | 13.9 | 113 |
| SMCJ75 | GGQ | 83.3 | 102 | 1 | 75 | 1 | 11.7 | 134 |
| SMCJ75A | GGR | 83.3 | 92.1 | 1 | 75 | 1 | 13 | 121 |
| SMCJ78 | GGS | 86.7 | 106 | 1 | 78 | 1 | 11.3 | 139 |
| SMCJ78A | GGT | 86.7 | 95.8 | 1 | 78 | 1 | 12.5 | 126 |
| SMCJ85 | GGU | 94.4 | 115 | 1 | 85 | 1 | 10.4 | 151 |
| SMCJ85A | GGV | 94.4 | 104 | 1 | 85 | 1 | 11.5 | 137 |
| SMCJ90 | GGW | 100 | 122 | 1 | 90 | 1 | 9.8 | 160 |
| SMCJ90A | GGX | 100 | 111 | 1 | 90 | 1 | 10.7 | 146 |
| SMCJ100 | GGY | 111 | 136 | 1 | 100 | 1 | 8.8 | 179 |
| SMCJ100A | GGZ | 111 | 123 | 1 | 100 | 1 | 9.7 | 162 |
| SMCJ110 | GHD | 122 | 149 | 1 | 110 | 1 | 8 | 196 |
| SMCJ110A | GHE | 122 | 135 | 1 | 110 | 1 | 8.9 | 177 |
| SMCJ120 | GHF | 133 | 163 | 1 | 120 | 1 | 7.3 | 214 |
| SMCJ120A | GHG | 133 | 147 | 1 | 120 | 1 | 8.1 | 193 |
| SMCJ130 | GHH | 144 | 176 | 1 | 130 | 1 | 6.8 | 231 |
| SMCJ130A | GHK | 144 | 159 | 1 | 130 | 1 | 7.5 | 209 |
| SMCJ150 | GHL | 167 | 204 | 1 | 150 | 1 | 5.8 | 266 |
| SMCJ150A | GHM | 167 | 185 | 1 | 150 | 1 | 6.4 | 243 |
| SMCJ160 | GHN | 178 | 218 | 1 | 160 | 1 | 5.4 | 287 |
| SMCJ160A | GHP | 178 | 197 | 1 | 160 | 1 | 6 | 259 |
| SMCJ170 | GHQ | 189 | 231 | 1 | 170 | 1 | 5.1 | 304 |
| SMCJ170A | GHR | 189 | 209 | 1 | 170 | 1 | 5.7 | 275 |

Notes:

1. V_{BR} measure after I_T applied for $300\mu\text{s}$, I_T =square wave pulse or equivalent
2. Surge current waveform per Figure. 3 and derate per Figure. 2
3. For bipolar types having V_{WM} of 10 V and under, the I_R limit is doubled
4. All terms and symbols are consistent with ANSI/IEEE C62.35

| ORDERING INFORMATION | | |
|--|----------------|--------------------------|
| ORDERING CODE (Note 1, 2, 3) | PACKAGE | PACKING |
| SMCJxxxxHR7G | SMC | 850 / 7" Plastic reel |
| SMCJxxxxHR6G | SMC | 3,000 / 13" Paper reel |
| SMCJxxxxHM6G | SMC | 3,000 / 13" Plastic reel |
| SMCJxxxx R7G | SMC | 850 / 7" Plastic reel |
| SMCJxxxx R6G | SMC | 3,000 / 13" Paper reel |
| SMCJxxxx M6G | SMC | 3,000 / 13" Plastic reel |
| SMCJxxxxHV7G | Matrix SMC | 850 / 7" Plastic reel |
| SMCJxxxxHV6G | Matrix SMC | 3,000 / 13" Plastic reel |
| SMCJxxxx V7G | Matrix SMC | 850 / 7" Plastic reel |
| SMCJxxxx V6G | Matrix SMC | 3,000 / 13" Plastic reel |
| SMCJxxxxHR7 | SMC | 850 / 7" Plastic reel |
| SMCJxxxxHR6 | SMC | 3,000 / 13" Paper reel |
| SMCJxxxxHM6 | SMC | 3,000 / 13" Plastic reel |
| SMCJxxxx R7 | SMC | 850 / 7" Plastic reel |
| SMCJxxxx R6 | SMC | 3,000 / 13" Paper reel |
| SMCJxxxx M6 | SMC | 3,000 / 13" Plastic reel |
| SMCJxxxxHV7 | Matrix SMC | 850 / 7" Plastic reel |
| SMCJxxxxHV6 | Matrix SMC | 3,000 / 13" Plastic reel |
| SMCJxxxx V7 | Matrix SMC | 850 / 7" Plastic reel |
| SMCJxxxx V6 | Matrix SMC | 3,000 / 13" Plastic reel |

Note 1:

"xxx" defines voltage from 5.0V (SMCJ5.0) to 170V (SMCJ170A)

Note 2:

"H" means AEC-Q101 qualified

Note 3:

"G" means green compound (halogen free)

CHARACTERISTICS CURVES

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

Fig.1 Peak Pulse Power Rating Curve

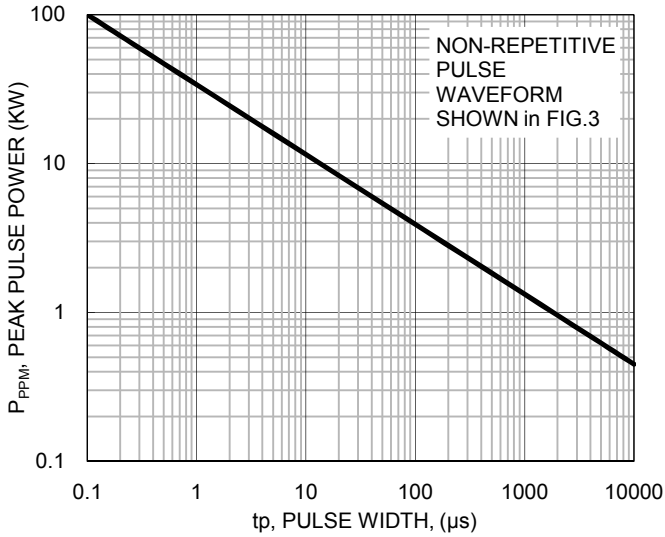


Fig.2 Pulse Derating Curve

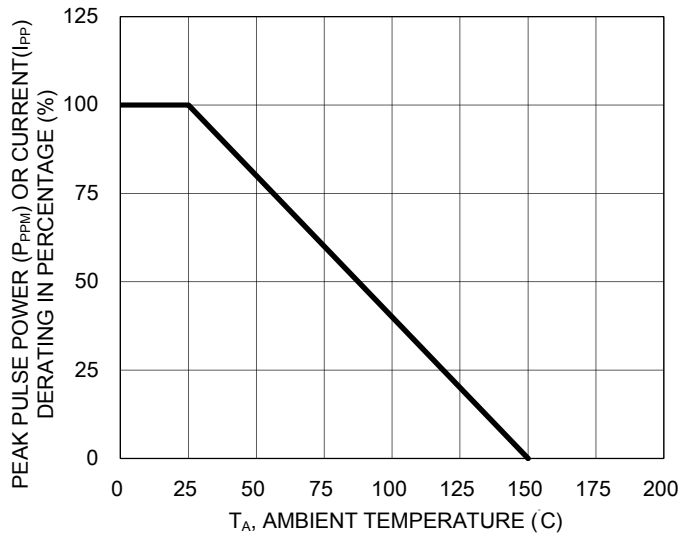


Fig.3 Clamping Power Pulse Waveform

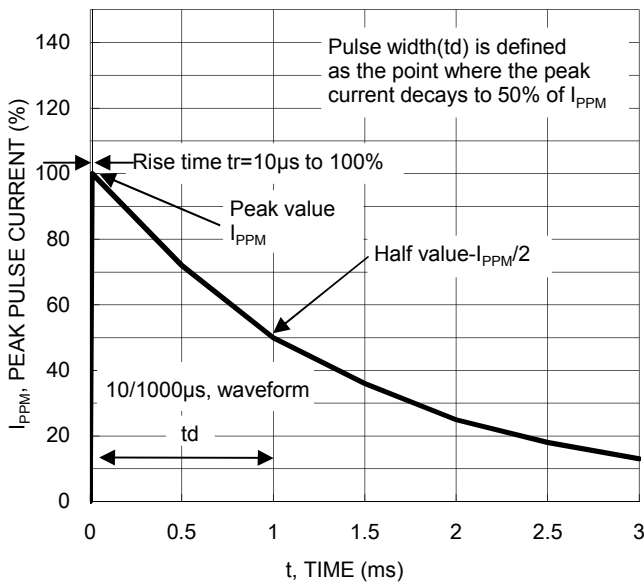
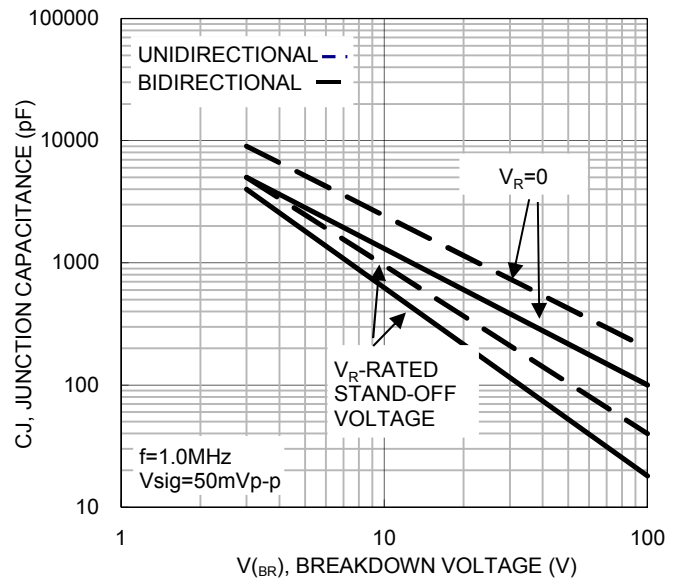


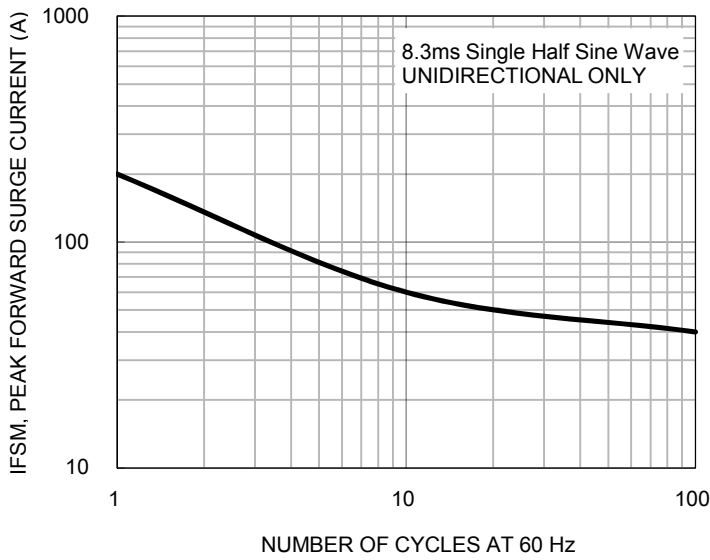
Fig.4 Typical Junction Capacitance



CHARACTERISTICS CURVES

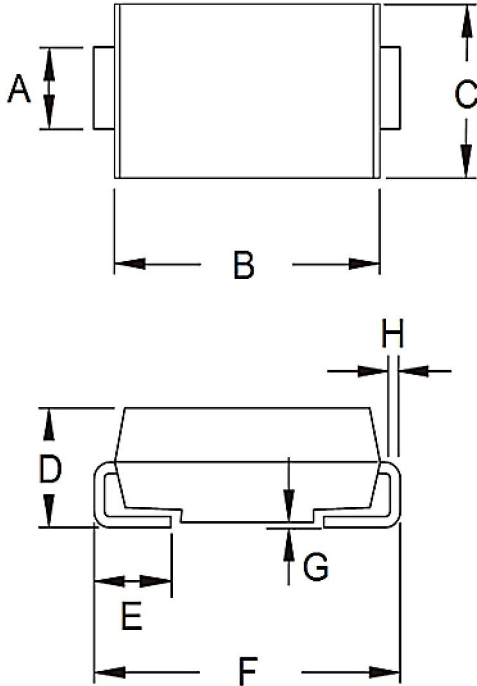
(T_A = 25°C unless otherwise noted)

Fig.5 Maximum Non-repetitive Forward Surge Current



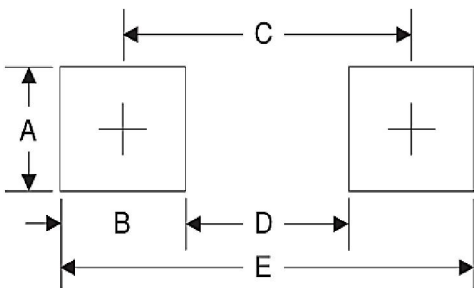
PACKAGE OUTLINE DIMENSIONS

DO-214AB (SMC)



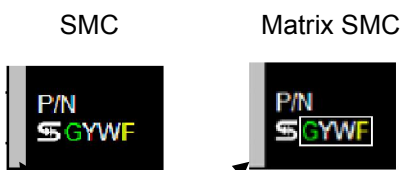
| DIM. | Unit (mm) | | Unit (inch) | |
|------|-----------|------|-------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 2.90 | 3.20 | 0.114 | 0.126 |
| B | 6.60 | 7.11 | 0.260 | 0.280 |
| C | 5.59 | 6.22 | 0.220 | 0.245 |
| D | 2.00 | 2.62 | 0.079 | 0.103 |
| E | 1.00 | 1.60 | 0.039 | 0.063 |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

SUGGESTED PAD LAYOUT



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A | 3.30 | 0.130 |
| B | 2.50 | 0.098 |
| C | 6.80 | 0.268 |
| 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

Note: Cathode band for unidirectional products only

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