

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

FEATURES

- Ideal for automated placement
- Glass passivated junction
- Excellent clamping capability
- 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
- 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} | 5.5 - 171 | V |
| V_{BR} | 6.8 - 200 | V |
| P_{PK} | 1500 | W |
| $T_{J\ MAX}$ | 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 ($T_A = 25^\circ C$ 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, 8.3 ms single half sine-wave superimposed on rated load | 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. 3 and derated above $T_A=25^\circ C$ per Fig. 2
2. $V_F=3.5V$ on 1.5SMC6.8 - 1.5SMC91 and $V_F=5.0V$ on 1.5SMC100 - 1.5SMC200

Devices for Bipolar Applications

1. For bidirectional use C or CA suffix for types 1.5SMC6.8 - types 1.5SMC200A
2. Electrical characteristics apply in both directions

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

| ELECTRICAL SPECIFICATIONS ($T_A = 25^{\circ}\text{C}$ 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} (%/ $^{\circ}\text{C}$) |
| | | MIN. | MAX. | | | | | | |
| 1.5SMC6.8 | DDJ | 6.12 | 7.48 | 10 | 5.50 | 1000 | 145 | 10.8 | 0.057 |
| 1.5SMC6.8A | DEJ | 6.46 | 7.14 | 10 | 5.80 | 1000 | 150 | 10.5 | 0.057 |
| 1.5SMC7.5 | DFJ | 6.75 | 8.25 | 10 | 6.05 | 500 | 134 | 11.7 | 0.061 |
| 1.5SMC7.5A | DGJ | 7.13 | 7.88 | 10 | 6.40 | 500 | 139 | 11.3 | 0.061 |
| 1.5SMC8.2 | DHJ | 7.38 | 9.02 | 10 | 6.63 | 200 | 126 | 12.5 | 0.065 |
| 1.5SMC8.2A | DKJ | 7.79 | 8.61 | 10 | 7.02 | 200 | 130 | 12.1 | 0.065 |
| 1.5SMC9.1 | DLJ | 8.19 | 10.00 | 1.0 | 7.37 | 50 | 114 | 13.8 | 0.068 |
| 1.5SMC9.1A | DMJ | 8.65 | 9.55 | 1.0 | 7.78 | 50 | 117 | 13.4 | 0.068 |
| 1.5SMC10 | DNJ | 9.00 | 11.00 | 1.0 | 8.10 | 10 | 105 | 15.0 | 0.073 |
| 1.5SMC10A | DPJ | 9.50 | 10.5 | 1.0 | 8.55 | 10 | 108 | 14.5 | 0.073 |
| 1.5SMC11 | DQJ | 9.90 | 12.1 | 1.0 | 8.92 | 1 | 97 | 16.2 | 0.075 |
| 1.5SMC11A | DRJ | 10.5 | 11.6 | 1.0 | 9.40 | 1 | 100 | 15.6 | 0.075 |
| 1.5SMC12 | DSJ | 10.8 | 13.2 | 1.0 | 9.72 | 1 | 91 | 17.3 | 0.078 |
| 1.5SMC12A | DTJ | 11.4 | 12.6 | 1.0 | 10.2 | 1 | 94 | 16.7 | 0.078 |
| 1.5SMC13 | DUJ | 11.7 | 14.3 | 1.0 | 10.5 | 1 | 82 | 19.0 | 0.081 |
| 1.5SMC13A | DVJ | 12.4 | 13.7 | 1.0 | 11.1 | 1 | 86 | 18.2 | 0.081 |
| 1.5SMC15 | DWJ | 13.5 | 16.5 | 1.0 | 12.1 | 1 | 71 | 22.0 | 0.084 |
| 1.5SMC15A | DXJ | 14.3 | 15.8 | 1.0 | 12.8 | 1 | 74 | 21.2 | 0.084 |
| 1.5SMC16 | DYJ | 14.4 | 17.6 | 1.0 | 12.9 | 1 | 67 | 23.5 | 0.086 |
| 1.5SMC16A | DZJ | 15.2 | 16.8 | 1.0 | 13.6 | 1 | 70 | 22.5 | 0.086 |
| 1.5SMC18 | EDJ | 16.2 | 19.8 | 1.0 | 14.5 | 1 | 59 | 26.5 | 0.088 |
| 1.5SMC18A | EEJ | 17.1 | 18.9 | 1.0 | 15.3 | 1 | 60 | 25.5 | 0.088 |
| 1.5SMC20 | EFJ | 18.0 | 22.0 | 1.0 | 16.2 | 1 | 54 | 29.1 | 0.090 |
| 1.5SMC20A | EGJ | 19.0 | 21.0 | 1.0 | 17.1 | 1 | 56 | 27.7 | 0.090 |
| 1.5SMC22 | EHJ | 19.8 | 24.2 | 1.0 | 17.8 | 1 | 49 | 31.9 | 0.092 |
| 1.5SMC22A | EKJ | 20.9 | 23.1 | 1.0 | 18.8 | 1 | 51 | 30.6 | 0.092 |
| 1.5SMC24 | ELJ | 21.6 | 26.4 | 1.0 | 19.4 | 1 | 45 | 34.7 | 0.094 |
| 1.5SMC24A | EMJ | 22.8 | 25.2 | 1.0 | 20.5 | 1 | 47 | 33.2 | 0.094 |
| 1.5SMC27 | ENJ | 24.3 | 29.7 | 1.0 | 21.8 | 1 | 40 | 39.1 | 0.096 |
| 1.5SMC27A | EPJ | 25.7 | 28.4 | 1.0 | 23.1 | 1 | 42 | 37.5 | 0.096 |
| 1.5SMC30 | EQJ | 27.0 | 33.0 | 1.0 | 24.3 | 1 | 36 | 43.5 | 0.097 |
| 1.5SMC30A | ERJ | 28.5 | 31.5 | 1.0 | 25.6 | 1 | 38 | 41.4 | 0.097 |
| 1.5SMC33 | ESJ | 29.7 | 36.3 | 1.0 | 26.8 | 1 | 33 | 47.7 | 0.098 |
| 1.5SMC33A | ETJ | 31.4 | 34.7 | 1.0 | 28.2 | 1 | 34 | 45.7 | 0.098 |
| 1.5SMC36 | EUJ | 32.4 | 39.6 | 1.0 | 29.1 | 1 | 30 | 52.0 | 0.099 |
| 1.5SMC36A | EVJ | 34.2 | 37.8 | 1.0 | 30.8 | 1 | 31 | 49.9 | 0.099 |
| 1.5SMC39 | EWJ | 35.1 | 42.9 | 1.0 | 31.6 | 1 | 27 | 56.4 | 0.100 |
| 1.5SMC39A | EXJ | 37.1 | 41.0 | 1.0 | 33.3 | 1 | 29 | 53.9 | 0.100 |
| 1.5SMC43 | EYJ | 38.7 | 47.3 | 1.0 | 34.8 | 1 | 25 | 61.9 | 0.101 |
| 1.5SMC43A | EZJ | 40.9 | 45.2 | 1.0 | 36.8 | 1 | 26 | 59.3 | 0.101 |
| 1.5SMC47 | FDJ | 42.3 | 51.7 | 1.0 | 38.1 | 1 | 23 | 67.8 | 0.101 |
| 1.5SMC47A | FEJ | 44.7 | 49.4 | 1.0 | 40.2 | 1 | 24 | 64.8 | 0.101 |
| 1.5SMC51 | FFJ | 45.9 | 56.1 | 1.0 | 41.3 | 1 | 21 | 73.5 | 0.102 |

ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ 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. | | | | | | |
| 1.5SMC51A | FGJ | 48.5 | 53.6 | 1.0 | 43.6 | 1 | 22 | 70.1 | 0.102 |
| 1.5SMC56 | FHJ | 50.4 | 61.6 | 1.0 | 45.4 | 1 | 19 | 80.5 | 0.103 |
| 1.5SMC56A | FKJ | 53.2 | 58.8 | 1.0 | 47.8 | 1 | 20 | 77.0 | 0.103 |
| 1.5SMC62 | FLJ | 55.8 | 68.2 | 1.0 | 50.2 | 1 | 17 | 89.0 | 0.104 |
| 1.5SMC62A | FMJ | 58.9 | 65.1 | 1.0 | 53.0 | 1 | 18 | 85.0 | 0.104 |
| 1.5SMC68 | FNJ | 61.2 | 74.8 | 1.0 | 55.1 | 1 | 16 | 98.0 | 0.104 |
| 1.5SMC68A | FPJ | 64.6 | 71.4 | 1.0 | 58.1 | 1 | 17 | 92.0 | 0.104 |
| 1.5SMC75 | FQJ | 67.5 | 82.5 | 1.0 | 60.7 | 1 | 14 | 108 | 0.105 |
| 1.5SMC75A | FRJ | 71.3 | 78.8 | 1.0 | 64.1 | 1 | 15 | 103 | 0.105 |
| 1.5SMC82 | FSJ | 73.8 | 90.2 | 1.0 | 66.4 | 1 | 13 | 118 | 0.105 |
| 1.5SMC82A | FTJ | 77.9 | 86.1 | 1.0 | 70.1 | 1 | 13.9 | 113 | 0.105 |
| 1.5SMC91 | FUJ | 81.9 | 100 | 1.0 | 73.7 | 1 | 12 | 131 | 0.106 |
| 1.5SMC91A | FVJ | 86.5 | 95.5 | 1.0 | 77.8 | 1 | 12.6 | 125 | 0.106 |
| 1.5SMC100 | FWJ | 90 | 110 | 1.0 | 81.0 | 1 | 10.9 | 144 | 0.106 |
| 1.5SMC100A | FXJ | 95 | 105 | 1.0 | 85.5 | 1 | 11.4 | 137 | 0.106 |
| 1.5SMC110 | FYJ | 99 | 121 | 1.0 | 89.2 | 1 | 9.9 | 158 | 0.107 |
| 1.5SMC110A | FZJ | 105 | 116 | 1.0 | 94.0 | 1 | 10.3 | 152 | 0.107 |
| 1.5SMC120 | GDJ | 108 | 132 | 1.0 | 97.2 | 1 | 9.1 | 173 | 0.107 |
| 1.5SMC120A | GEJ | 114 | 126 | 1.0 | 102.0 | 1 | 9.5 | 165 | 0.107 |
| 1.5SMC130 | GFJ | 117 | 143 | 1.0 | 105.0 | 1 | 8.4 | 187 | 0.107 |
| 1.5SMC130A | GGJ | 124 | 137 | 1.0 | 111.0 | 1 | 8.7 | 179 | 0.107 |
| 1.5SMC150 | GHJ | 135 | 165 | 1.0 | 121.0 | 1 | 7.3 | 215 | 0.108 |
| 1.5SMC150A | GKJ | 143 | 158 | 1.0 | 128.0 | 1 | 7.6 | 207 | 0.108 |
| 1.5SMC160 | GLJ | 144 | 176 | 1.0 | 130.0 | 1 | 6.8 | 230 | 0.108 |
| 1.5SMC160A | GMJ | 152 | 168 | 1.0 | 136.0 | 1 | 7.1 | 219 | 0.108 |
| 1.5SMC170 | GNJ | 153 | 187 | 1.0 | 138.0 | 1 | 6.4 | 244 | 0.108 |
| 1.5SMC170A | GPJ | 162 | 179 | 1.0 | 145.0 | 1 | 6.7 | 234 | 0.108 |
| 1.5SMC180 | GQJ | 162 | 198 | 1.0 | 146.0 | 1 | 6.1 | 258 | 0.108 |
| 1.5SMC180A | GRJ | 171 | 189 | 1.0 | 154.0 | 1 | 6.4 | 246 | 0.108 |
| 1.5SMC200 | GSJ | 180 | 220 | 1.0 | 162.0 | 1 | 5.4 | 287 | 0.108 |
| 1.5SMC200A | 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. 3 and derate per Fig. 2
3. For bipolar types having V_{WM} of 10 V and under, the I_R limit is doubled
4. For bidirectional use C or CA suffix for types 1.5SMC6.8 - 1.5SMC200A
5. All terms and symbols are consistent with ANSI/IEEE C62.35

| ORDERING INFORMATION | | |
|--|----------------|--------------------------|
| ORDERING CODE (Note 1, 2, 3) | PACKAGE | PACKING |
| 1.5SMCxxxxHR7G | SMC | 850 / 7" Plastic reel |
| 1.5SMCxxxxHR6G | SMC | 3,000 / 13" Paper reel |
| 1.5SMCxxxxHM6G | SMC | 3,000 / 13" Plastic reel |
| 1.5SMCxxxx R7G | SMC | 850 / 7" Plastic reel |
| 1.5SMCxxxx R6G | SMC | 3,000 / 13" Paper reel |
| 1.5SMCxxxx M6G | SMC | 3,000 / 13" Plastic reel |
| 1.5SMCxxxxHV7G | Matrix SMC | 850 / 7" Plastic reel |
| 1.5SMCxxxxHV6G | Matrix SMC | 3,000 / 13" Plastic reel |
| 1.5SMCxxxx V7G | Matrix SMC | 850 / 7" Plastic reel |
| 1.5SMCxxxx V6G | Matrix SMC | 3,000 / 13" Plastic reel |
| 1.5SMCxxxxHR7 | SMC | 850 / 7" Plastic reel |
| 1.5SMCxxxxHR6 | SMC | 3,000 / 13" Paper reel |
| 1.5SMCxxxxHM6 | SMC | 3,000 / 13" Plastic reel |
| 1.5SMCxxxx R7 | SMC | 850 / 7" Plastic reel |
| 1.5SMCxxxx R6 | SMC | 3,000 / 13" Paper reel |
| 1.5SMCxxxx M6 | SMC | 3,000 / 13" Plastic reel |

Note 1:

"xxxx" defines voltage from 6.8V
(1.5SMC6.8) to 200V (1SMC200A)

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

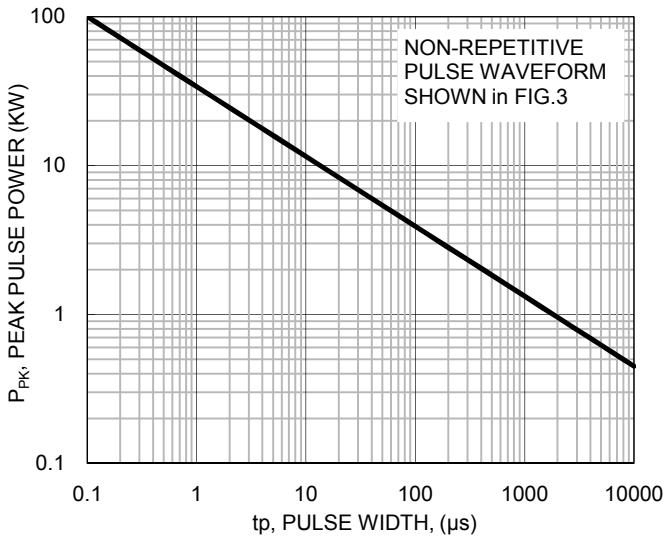


Fig.2 Pulse Derating Curve

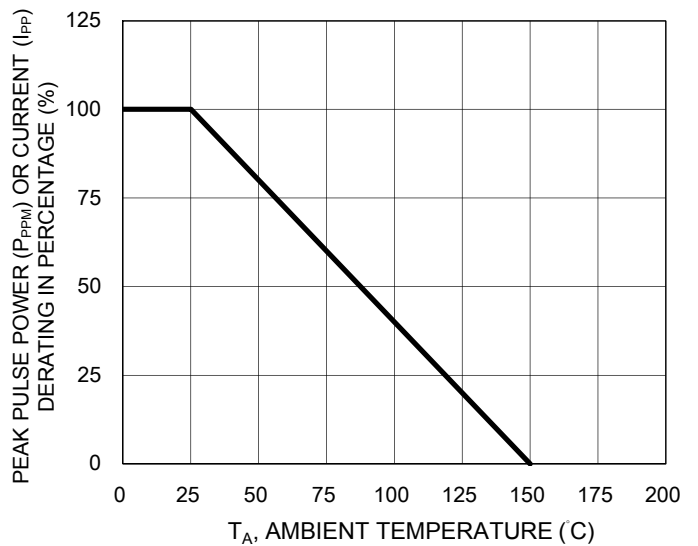


Fig.3 Clamping Power Pulse Waveform

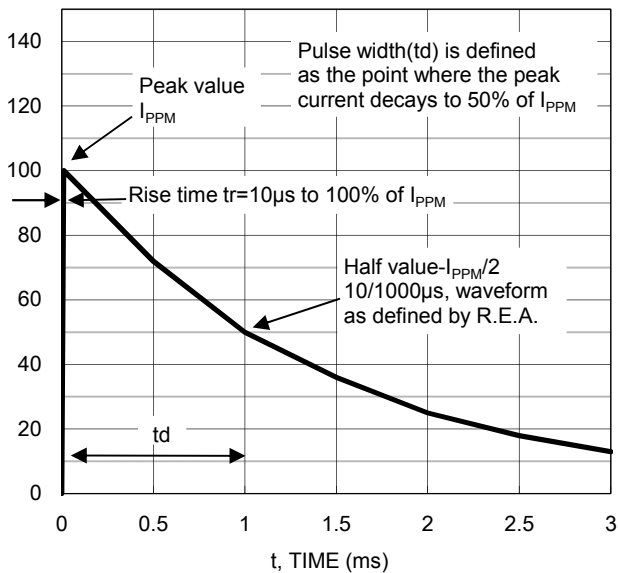
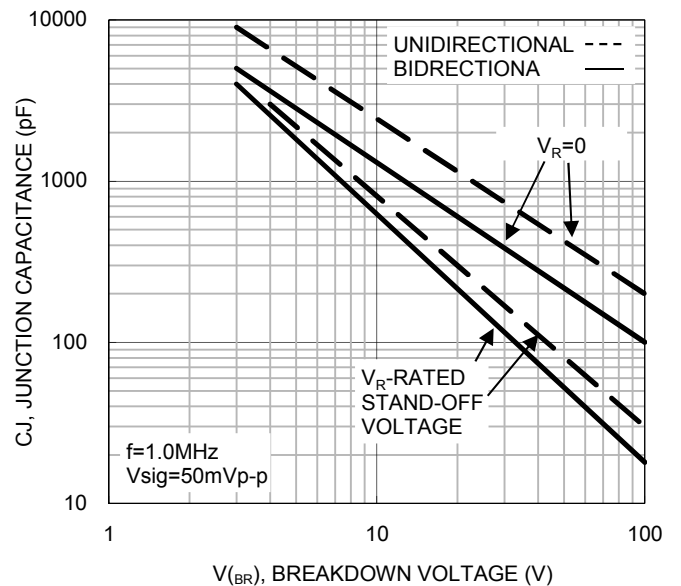


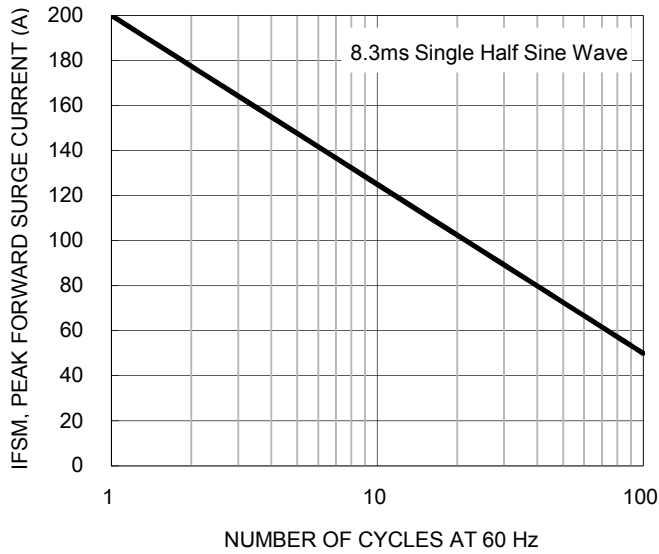
Fig.4 Typical Junction Capacitance



CHARACTERISTICS CURVES

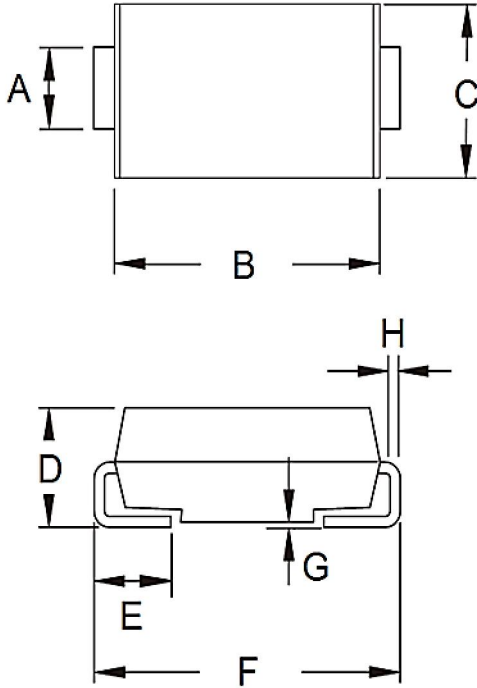
(T_A = 25°C unless otherwise noted)

Fig.5 Maximum Non-repetitive Forward Surge Current Unidirectional Only



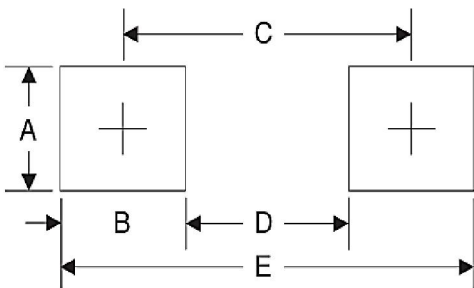
PACKAGE OUTLINE DIMENSIONS

DO-214AB (SMC)



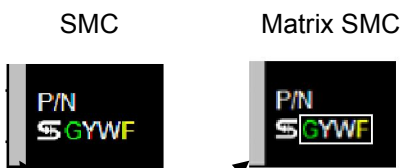
| DIM. | Unit (mm) | | Unit (inch) | |
|------|-----------|------|-------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 2.90 | 3.20 | 0.114 | 0.126 |
| B | 6.60 | 7.11 | 0.260 | 0.280 |
| C | 5.59 | 6.22 | 0.220 | 0.245 |
| D | 2.00 | 2.62 | 0.079 | 0.103 |
| E | 1.00 | 1.60 | 0.039 | 0.063 |
| 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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