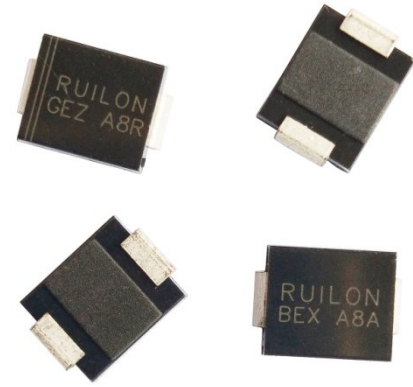


Description

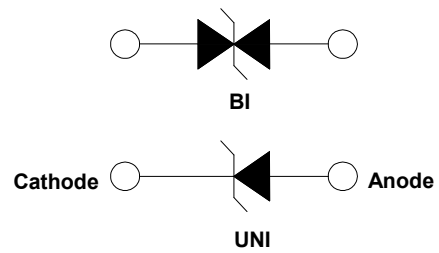
The SMCJ series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

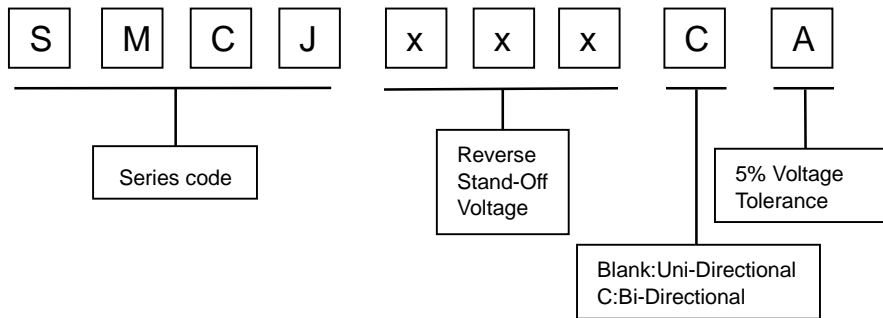
- I Low profile package
- I Very fast response time
- I Halogen free and RoHS compliant
- I Low incremental surge resistance
- I Typical IR less than 1µA above 10V
- I For surface mounted applications to optimize board space
- I Compatible with industrial standard package DO-214AB
- I 1500W peak pulse power capability with at 10/1000µs waveform, repetition rate (duty cycle): 0.01%
- I High temperature soldering:260°C/ 10 seconds at terminals



Electrical symbol



Part Number Code



Mechanical Characteristics

| Rating | Symbol | Value | Units |
|--|------------------|------------|-------|
| Peak Pulse Power Dissipation at T _A =25°C by 10/1000µs Waveform (Fig.2)(Note 1), (Note 2) | P _{PP} | 1500 | W |
| Power Dissipation on Infinite Heat Sink at T _L =75°C(Fig.6) | P _D | 5.0 | W |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3) | I _{FSM} | 200 | A |
| Operating Temperature Range | T _J | -55 to 150 | °C |
| Storage Temperature Range | T _{STG} | -55 to 150 | °C |

Notes:

1. Non-repetitive current pulse , per Fig. 4 and derated above T_A = 25°C per Fig. 3.
2. Mounted on copper pad area of 0.31x0.31” (8.0 x 8.0mm) to each terminal.
3. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum.



Electrical Characteristics

| Type Number | | Marking | | Reverse Stand-Off Voltage | Breakdown Voltage | | Test Current | Max. Clamping Voltage 10/1000µs | Max. Peak Pulse Current 10/1000µs | Reverse Leakage |
|-------------|-----------|---------|-----|---------------------------|-------------------|------|--------------|---------------------------------|-----------------------------------|-----------------|
| | | | | | $V_{BR @ I_T}$ | | | | | |
| | | | | UNI | BI | UNI | BI | V_{RWM} | Min | Max |
| | | | | V | V | V | mA | V | A | µA |
| SMCJ5.0A | SMCJ5.0CA | GDE | BDE | 5.0 | 6.40 | 7.07 | 10 | 9.2 | 163.0 | 500 |
| SMCJ6.0A | SMCJ6.0CA | GDG | BDG | 6.0 | 6.67 | 7.37 | 10 | 10.3 | 145.6 | 500 |
| SMCJ6.5A | SMCJ6.5CA | GDK | BDK | 6.5 | 7.22 | 7.98 | 10 | 11.2 | 133.9 | 300 |
| SMCJ7.0A | SMCJ7.0CA | GDM | BDM | 7.0 | 7.78 | 8.60 | 10 | 12.0 | 125.0 | 200 |
| SMCJ7.5A | SMCJ7.5CA | GDP | BDP | 7.5 | 8.33 | 9.21 | 1 | 12.9 | 116.3 | 100 |
| SMCJ8.0A | SMCJ8.0CA | GDR | BDR | 8.0 | 8.89 | 9.83 | 1 | 13.6 | 110.3 | 50 |
| SMCJ8.5A | SMCJ8.5CA | GDT | BDT | 8.5 | 9.44 | 10.4 | 1 | 14.4 | 104.2 | 30 |
| SMCJ9.0A | SMCJ9.0CA | GDV | BDV | 9.0 | 10.0 | 11.1 | 1 | 15.4 | 97.4 | 30 |
| SMCJ10A | SMCJ10CA | GDX | BDX | 10.0 | 11.1 | 12.3 | 1 | 17.0 | 88.2 | 5 |
| SMCJ11A | SMCJ11CA | GDZ | BDZ | 11.0 | 12.2 | 13.5 | 1 | 18.2 | 82.4 | 1 |
| SMCJ12A | SMCJ12CA | GEE | BEE | 12.0 | 13.3 | 14.7 | 1 | 19.9 | 75.4 | 1 |
| SMCJ13A | SMCJ13CA | GEG | BEG | 13.0 | 14.4 | 15.9 | 1 | 21.5 | 69.8 | 1 |
| SMCJ14A | SMCJ14CA | GEK | BEK | 14.0 | 15.6 | 17.2 | 1 | 23.2 | 64.7 | 1 |
| SMCJ15A | SMCJ15CA | GEM | BEM | 15.0 | 16.7 | 18.5 | 1 | 24.4 | 61.5 | 1 |
| SMCJ16A | SMCJ16CA | GEP | BEP | 16.0 | 17.8 | 19.7 | 1 | 26.0 | 57.7 | 1 |
| SMCJ17A | SMCJ17CA | GER | BER | 17.0 | 18.9 | 20.9 | 1 | 27.6 | 54.3 | 1 |
| SMCJ18A | SMCJ18CA | GET | BET | 18.0 | 20.0 | 22.1 | 1 | 29.2 | 51.4 | 1 |
| SMCJ20A | SMCJ20CA | GEV | BEV | 20.0 | 22.2 | 24.5 | 1 | 32.4 | 46.3 | 1 |
| SMCJ22A | SMCJ22CA | GEX | BEX | 22.0 | 24.4 | 26.9 | 1 | 35.5 | 42.3 | 1 |
| SMCJ24A | SMCJ24CA | GEZ | BEZ | 24.0 | 26.7 | 29.5 | 1 | 38.9 | 38.6 | 1 |
| SMCJ26A | SMCJ26CA | GFE | BFE | 26.0 | 28.9 | 31.9 | 1 | 42.1 | 35.6 | 1 |
| SMCJ28A | SMCJ28CA | GFG | BFG | 28.0 | 31.1 | 34.4 | 1 | 45.4 | 33.0 | 1 |
| SMCJ30A | SMCJ30CA | GFK | BFK | 30.0 | 33.3 | 36.8 | 1 | 48.4 | 31.0 | 1 |
| SMCJ33A | SMCJ33CA | GFM | BFM | 33.0 | 36.7 | 40.6 | 1 | 53.3 | 28.1 | 1 |
| SMCJ36A | SMCJ36CA | GFP | BFP | 36.0 | 40.0 | 44.2 | 1 | 58.1 | 25.8 | 1 |
| SMCJ40A | SMCJ40CA | GFR | BFR | 40.0 | 44.4 | 49.1 | 1 | 64.5 | 23.3 | 1 |
| SMCJ43A | SMCJ43CA | GFT | BFT | 43.0 | 47.8 | 52.8 | 1 | 69.4 | 21.6 | 1 |
| SMCJ45A | SMCJ45CA | GFV | BFV | 45.0 | 50.0 | 55.3 | 1 | 72.7 | 20.6 | 1 |
| SMCJ48A | SMCJ48CA | GJT | BJT | 48.0 | 53.3 | 58.9 | 1 | 77.4 | 19.4 | 1 |
| SMCJ51A | SMCJ51CA | GJV | BJV | 51.0 | 56.7 | 62.7 | 1 | 82.4 | 18.2 | 1 |



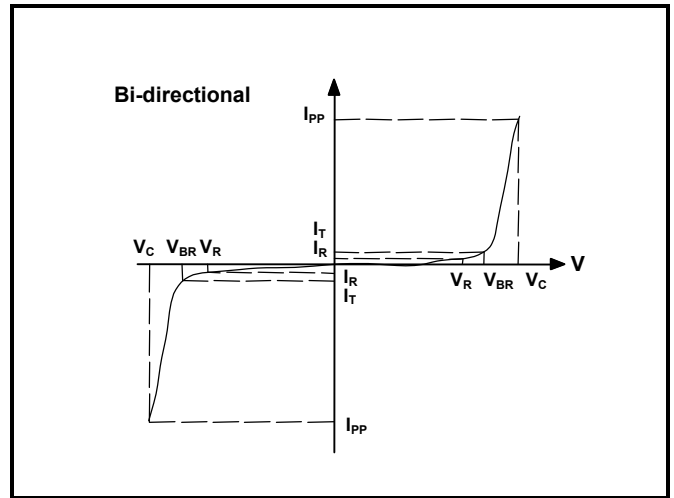
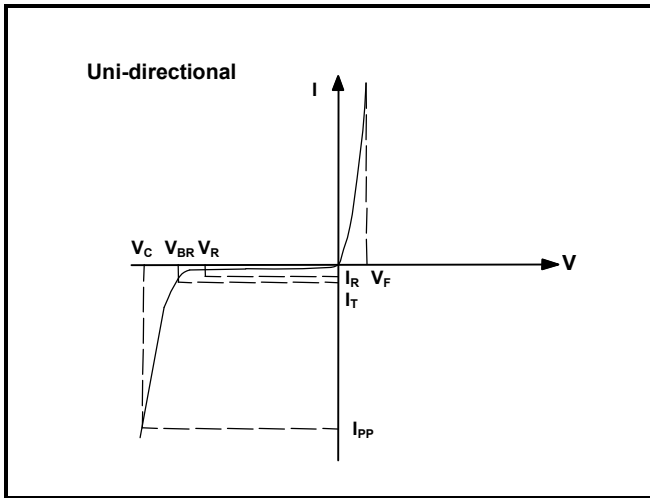
Electrical Characteristics

| Type Number | | Marking | | Reverse Stand-Off Voltage | Breakdown Voltage | | Test Current | Max. Clamping Voltage 10/1000 μ s | Max. Peak Pulse Current 10/1000 μ s | Reverse Leakage |
|-------------|-----------|---------|-----|---------------------------|-------------------|-------|--------------|--|--|-----------------|
| | | | | | $V_{BR} @ I_T$ | | | | | |
| | | | | UNI | BI | UNI | BI | V_{RWM} | Min | Max |
| | | | | V | V | V | mA | V | A | μ A |
| SMCJ54A | SMCJ54CA | GFX | BFX | 54.0 | 60.0 | 66.3 | 1 | 87.1 | 17.2 | 1 |
| SMCJ58A | SMCJ58CA | GFZ | BFZ | 58.0 | 64.4 | 71.2 | 1 | 93.6 | 16.0 | 1 |
| SMCJ60A | SMCJ60CA | GGE | BGE | 60.0 | 66.7 | 73.7 | 1 | 96.8 | 15.5 | 1 |
| SMCJ64A | SMCJ64CA | GGG | BGG | 64.0 | 71.1 | 78.6 | 1 | 103.0 | 14.6 | 1 |
| SMCJ70A | SMCJ70CA | GGK | BGK | 70.0 | 77.8 | 86.0 | 1 | 113.0 | 13.3 | 1 |
| SMCJ75A | SMCJ75CA | GGM | BGM | 75.0 | 83.3 | 92.1 | 1 | 121.0 | 12.4 | 1 |
| SMCJ78A | SMCJ78CA | GGP | BGP | 78.0 | 86.7 | 95.8 | 1 | 126.0 | 11.9 | 1 |
| SMCJ85A | SMCJ85CA | GGR | BGR | 85.0 | 94.4 | 104.0 | 1 | 137.0 | 10.9 | 1 |
| SMCJ90A | SMCJ90CA | GGT | BGT | 90.0 | 100.0 | 111.0 | 1 | 146.0 | 10.3 | 1 |
| SMCJ100A | SMCJ100CA | GGV | BGV | 100.0 | 111.0 | 123.0 | 1 | 162.0 | 9.3 | 1 |
| SMCJ110A | SMCJ110CA | GGX | BGX | 110.0 | 122.0 | 135.0 | 1 | 177.0 | 8.5 | 1 |
| SMCJ120A | SMCJ120CA | GGZ | BGZ | 120.0 | 133.0 | 147.0 | 1 | 193.0 | 7.8 | 1 |
| SMCJ130A | SMCJ130CA | GHE | BHE | 130.0 | 144.0 | 159.0 | 1 | 209.0 | 7.2 | 1 |
| SMCJ150A | SMCJ150CA | GHG | BHG | 150.0 | 167.0 | 185.0 | 1 | 243.0 | 6.2 | 1 |
| SMCJ160A | SMCJ160CA | GHK | BHK | 160.0 | 178.0 | 197.0 | 1 | 259.0 | 5.8 | 1 |
| SMCJ170A | SMCJ170CA | GHM | BHM | 170.0 | 189.0 | 209.0 | 1 | 275.0 | 5.5 | 1 |
| SMCJ180A | SMCJ180CA | GHP | BHP | 180.0 | 201.0 | 222.0 | 1 | 292.0 | 5.2 | 1 |
| SMCJ190A | SMCJ190CA | GHR | BHR | 190.0 | 209.0 | 243.0 | 1 | 308.0 | 4.8 | 1 |
| SMCJ200A | SMCJ200CA | GHX | BHX | 200.0 | 224.0 | 247.0 | 1 | 324.0 | 4.6 | 1 |
| SMCJ210A | SMCJ210CA | GHZ | BHZ | 210.0 | 231.0 | 268.0 | 1 | 340.0 | 4.4 | 1 |
| SMCJ220A | SMCJ220CA | GJE | BJE | 220.0 | 246.0 | 272.0 | 1 | 356.0 | 4.2 | 1 |
| SMCJ250A | SMCJ250CA | GJG | BJG | 250.0 | 279.0 | 309.0 | 1 | 405.0 | 3.7 | 1 |
| SMCJ300A | SMCJ300CA | GJK | BJK | 300.0 | 335.0 | 371.0 | 1 | 486.0 | 3.1 | 1 |
| SMCJ350A | SMCJ350CA | GJM | BJM | 350.0 | 391.0 | 432.0 | 1 | 567.0 | 2.6 | 1 |
| SMCJ400A | SMCJ400CA | GJP | BJP | 400.0 | 447.0 | 494.0 | 1 | 648.0 | 2.3 | 1 |
| SMCJ440A | SMCJ440CA | GJR | BJR | 440.0 | 492.0 | 543.0 | 1 | 713.0 | 2.1 | 1 |

Notes: For bidirectional type having V_R of 10V and less, the I_R limit is double.



I-V Curve Characteristics



P_{PPM} Peak Pulse Power Dissipation -- Max power dissipation

V_R Stand-off Voltage -- Maximum voltage that can be applied to the TVS without operation

V_{BR} Breakdown Voltage -- Maximum voltage that flows though the TVS at a specified test current (I_T)

V_C Clamping Voltage -- Peak voltage measured across the TVS at a specified I_{ppm} (peak impulse current)

I_R Reverse Leakage Current -- Current measured at V_R

V_F Forward Voltage Drop for Uni-directional

Ratings and Characteristic Curves ($T_A=25^\circ C$ unless otherwise noted)

Figure 1 - TVS Transients Clamping Waveform

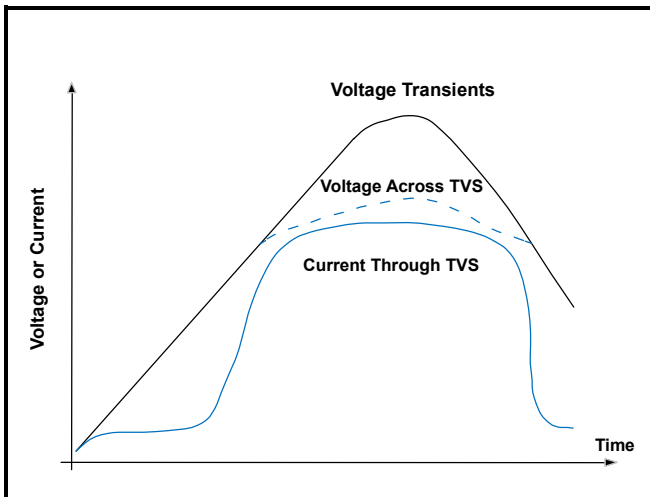
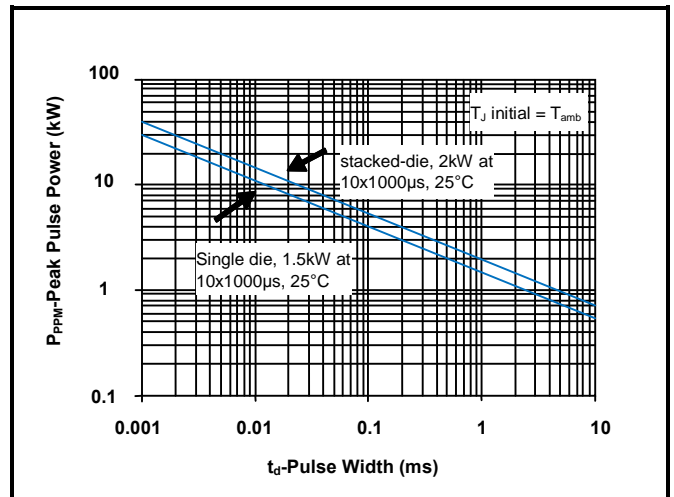


Figure 2 - Peak Pulse Power Rating Curve



Ratings and Characteristic Curves ($T_A=25^\circ\text{C}$ unless otherwise noted) (Continued)

Figure 3 - Pulse Derating Curve

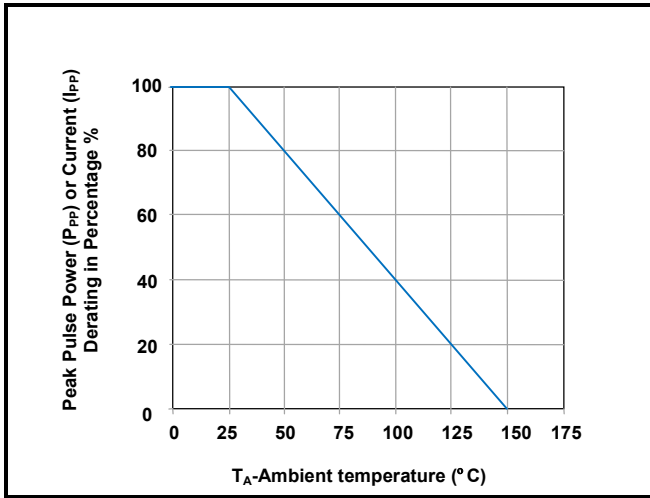


Figure 4 - Pulse Waveform

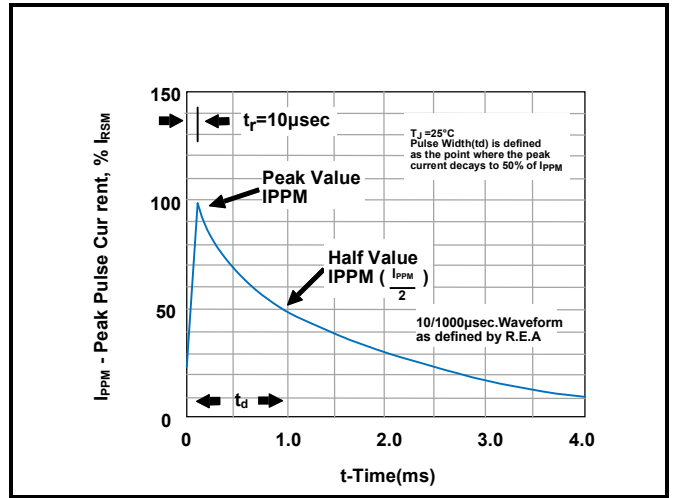


Figure 5 - Typical Junction Capacitance

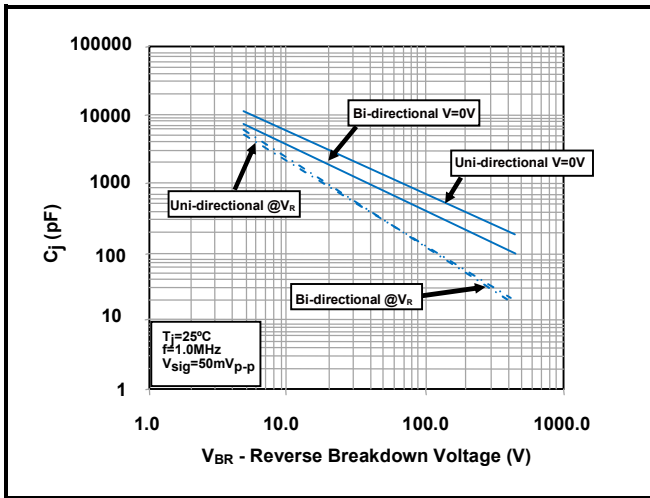


Figure 6 - Steady State Power Derating Curve

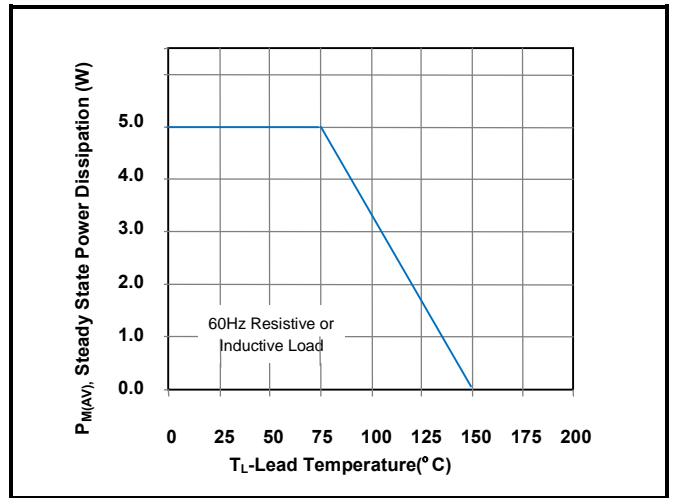
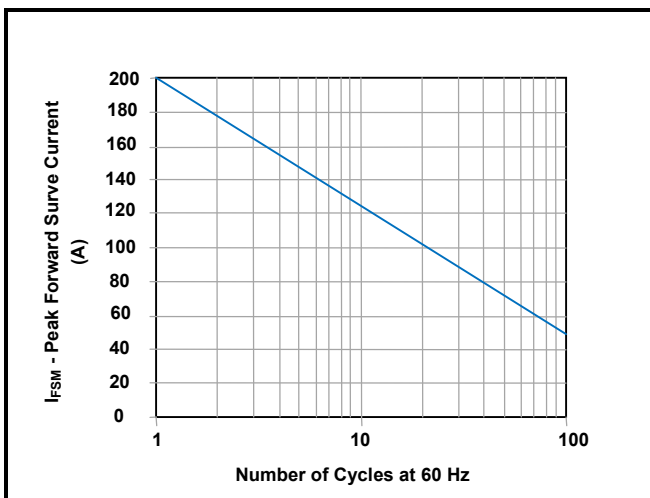
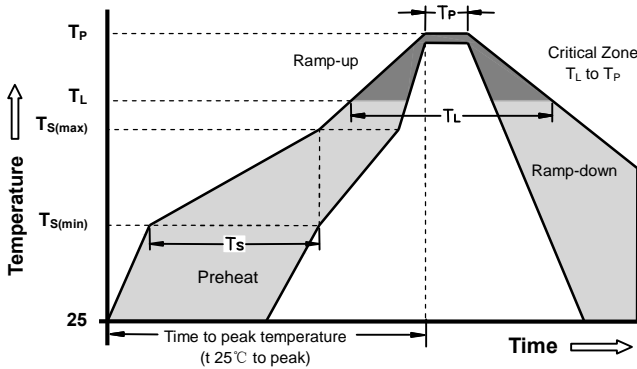


Figure 7 - Maximum Non-Repetitive Surge Current

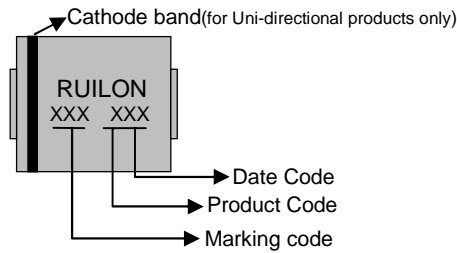


Soldering Parameters - Reflow Soldering (Surface Mount Devices)

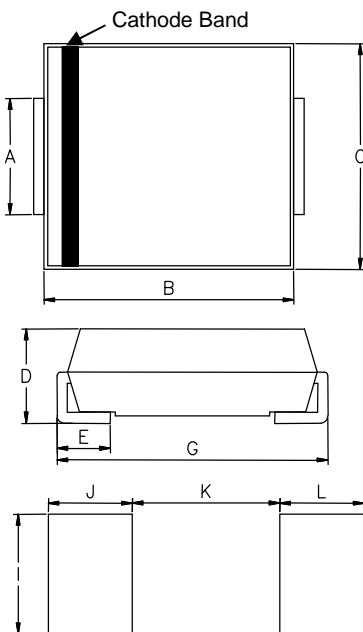


| | | |
|--|-----------------------------------|--------------------|
| Reflow Condition | | Pb - Free assembly |
| Pre Heat | -Temperature Min ($T_{s(min)}$) | 150°C |
| | -Temperature Max ($T_{s(max)}$) | 200°C |
| | - Time (min to max) (t_s) | 60 -180 Seconds |
| Average ramp up rate (Liquids Temp T_L) to peak | | 3°C/second max |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 3°C/second max |
| Reflow | - Temperature (T_L) (Liquids) | 217°C |
| | - Time (min to max) (t_s) | 60 -150 Seconds |
| Peak Temperature (T_P) | | 260 +0/-5°C |
| Time within 5°C of actual peak Temperature (t_p) | | 20 - 40 Seconds |
| Ramp-down Rate | | 6°C/second max |
| Time 25°C to peak Temperature (T_P) | | 8 minutes Max |
| Do not exceed | | 260°C |

Part Marking System



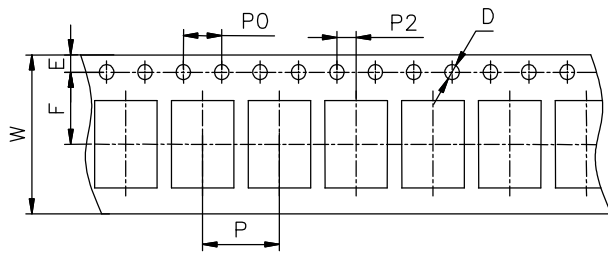
Dimensions



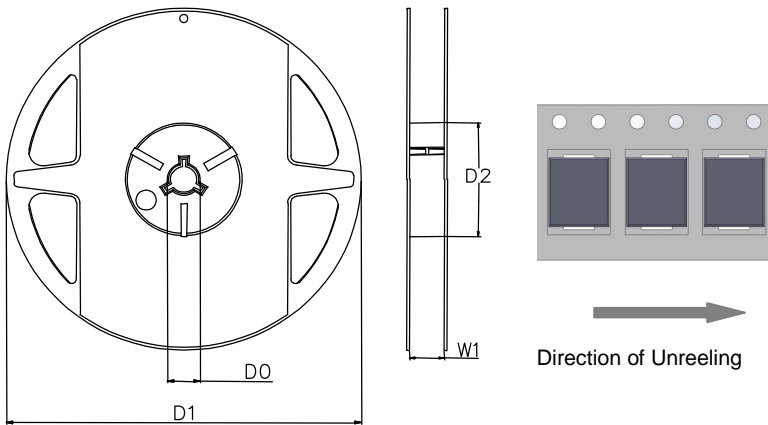
| DIM | Millimeters | | Inches | |
|-----|-------------|-------|--------|-------|
| | Min | Max | Min | Max |
| A | 2.75 | 3.25 | 0.108 | 0.128 |
| B | 6.50 | 7.11 | 0.260 | 0.280 |
| C | 5.50 | 6.22 | 0.217 | 0.246 |
| D | 2.06 | 2.70 | 0.079 | 0.106 |
| E | 0.76 | 1.52 | 0.030 | 0.060 |
| G | 7.40 | 8.40 | 0.291 | 0.331 |
| I | 3.300 | - | 0.129 | - |
| J | 2.400 | - | 0.094 | - |
| K | - | 4.200 | - | 0.165 |
| L | 2.400 | - | 0.094 | - |



Taping and Reel Specifications



| Symbol | Millimeters | Inches |
|--------|--------------|--------------------|
| W | 16±0.3 | 0.630±0.012 |
| P | 8±0.1 | 0.315±0.004 |
| F | 7.25±0.1 | 0.285±0.004 |
| E | 1.75±0.1 | 0.069±0.004 |
| D | 1.5+0.1/-0.0 | 0.059+0.004/-0.0 |
| P0 | 4±0.1 | 0.157±0.004 |
| P2 | 2±0.1 | 0.079±0.004 |
| D0 | 16.7±0.15 | 0.657±0.006 |
| D1 | 178±2 | 7.007±0.079 |
| D2 | 59.6+1/-2 | 2.346+0.039/-0.079 |
| W1 | 17.2±0.4 | 0.677±0.016 |



| Part Number | Component package | Quantity | Packaging option | Packaging specification |
|-------------|-------------------|----------|-----------------------|-------------------------|
| SMCJXXXA/CA | DO-214AB(SMC) | 500 | Tape&Reel-16mm/7"tape | EIA STD RS-481 |

