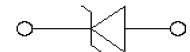
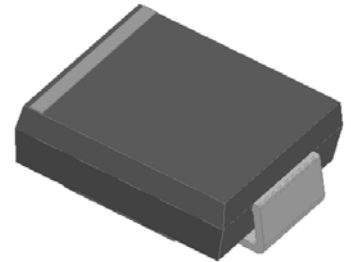


Transient Voltage Suppressors

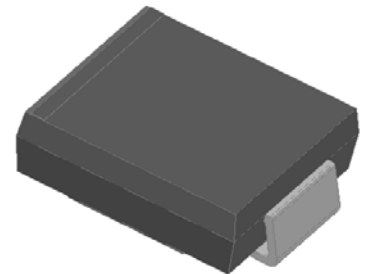
Features

- ◆ 1500W peak pulse power capability at 10/1000 μ s waveform, Repetition rate (duty cycle):0.01%
- ◆ For surface mounted applications to optimize board space
- ◆ Low incremental surge impedance
- ◆ Excellent clamping capability
- ◆ Photo Glass and LPCVD process
- ◆ Fast response time: typically less than 1ps from 0V to BV min.
- ◆ Typical I_R less than 1 μ A above 11V.
- ◆ High Temperature soldering guaranteed: 260 $^{\circ}$ C/40 seconds at terminals
- ◆ Plastic package has underwriters laboratory flammability 94V-0
- ◆ Meets MSL level 1, per J-STD-020.
- ◆ Meet Halogen free and RoHS compliant
- ◆ AEC-Q101 qualified available
- ◆ Automotive product No.: base P/N-H

Uni-directional



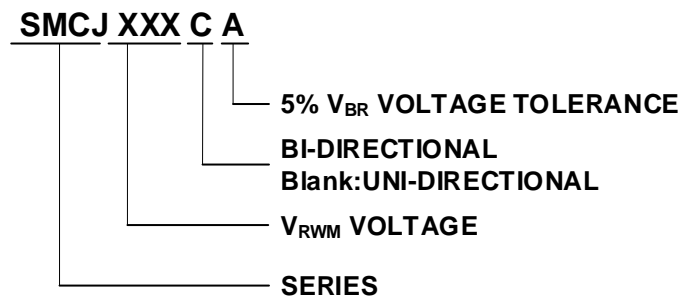
Bi-directional



Mechanical Data

- ◆ Case: JEDEC DO-214AB
- ◆ Polarity: Color band denotes positive end (cathode) except bi-directional models
- ◆ Weight: About 0.21g

Partnumber Coding System



Application

- ◆ Power Supply: DC12V MOSEFT Relay etc.

Maximum Ratings and Characteristics

Parameters at 25°C ambient temperature unless otherwise Noted.

| Rating | Symbol | Value | Units |
|---|-----------------------------------|--------------|-------|
| Peak pulse power dissipation at 10/1000μs waveform (Note1, Note2, Fig.1) | P _{PPM} | Minimum 1500 | Watts |
| Peak pulse current of at 10/1000μs waveform (Note 1, Fig.3) | I _{PPM} | See Table | Amps |
| Steady state power dissipation at T _A =50°C (Fig.5) | P _{M(AV)} | 6.5 | Watts |
| Maximum Instantaneous Forward Voltage at 100A for Unidirectional | V _F | 3.5/5.0 | V |
| ^{Only} Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note3, Fig.6) | I _{FSM} | 200 | Amps |
| Operating junction and Storage Temperature Range. | T _J , T _{STG} | -55 to +150 | °C |

Notes: 1. Non-repetitive current pulse, per Fig.3 and derated above T_A=25°C per Fig.2.

2. Mounted on 8.0mm×8.0mm copper pads to each terminal.

3. 8.3ms single half sine-wave, or equivalent square wave, duty cycle=4 pulses per minutes maximum.

4. V_F<3.5V for V_{BR} < 200V and V_F<5.0V for V_{BR} > 201V.

Dimensions (DO-214AB/SMC)

| Symbol | Millimeters | | Inches | |
|--------|-------------|-------|--------|-------|
| | 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 | 2.06 | 2.62 | 0.079 | 0.103 |
| E | 0.76 | 1.52 | 0.030 | 0.060 |
| F | - | 0.203 | - | 0.008 |
| G | 7.75 | 8.130 | 0.305 | 0.320 |
| H | 0.152 | 0.305 | 0.006 | 0.012 |
| I | 3.30 | - | 0.129 | - |
| J | 2.40 | - | 0.094 | - |
| K | - | 4.20 | - | 0.165 |

SMCJ SERIES



Electrical Characteristics

| Part Number | | Device Marking Code | | Reverse Stand-Off Voltage | Breakdown Voltage @ I_T | Test Current | Maximum Clamping Voltage @ I_{PP} | Peak Pulse Current | Reverse Leakage @ V_{RWM} |
|----------------|---------------|---------------------|-----|---------------------------|---------------------------|--------------|-------------------------------------|--------------------|-----------------------------|
| Unidirectional | Bidirectional | UNI | BI | $V_{RWM}(V)$ | $V_{BR}(V)$ | $I_T(mA)$ | $V_C(V)$ | $I_{PP}(A)$ | $I_R(\mu A)$ |
| SMCJ5.0A | SMCJ5.0CA | GDE | BDE | 5.0 | 6.40~7.00 | 10 | 9.2 | 163.0 | 800 |
| SMCJ6.0A | SMCJ6.0CA | GDG | BDG | 6.0 | 6.67~7.37 | 10 | 10.3 | 145.7 | 800 |
| SMCJ6.5A | SMCJ6.5CA | GDK | BDK | 6.5 | 7.22~7.98 | 10 | 11.2 | 134.0 | 500 |
| 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 | 9.44~10.40 | 1 | 14.4 | 104.2 | 20 |
| SMCJ9.0A | SMCJ9.0CA | GDV | BDV | 9.0 | 10.00~11.10 | 1 | 15.4 | 97.4 | 10 |
| SMCJ10A | SMCJ10CA | GDY | BDY | 10.0 | 11.10~12.30 | 1 | 17.0 | 88.3 | 5 |
| SMCJ11A | SMCJ11CA | GDZ | BDZ | 11.0 | 12.20~13.50 | 1 | 18.2 | 82.5 | 1 |
| SMCJ12A | SMCJ12CA | GEE | BEE | 12.0 | 13.30~14.70 | 1 | 19.9 | 75.4 | 1 |
| SMCJ13A | SMCJ13CA | GEG | BEG | 13.0 | 14.40~15.90 | 1 | 21.5 | 69.8 | 1 |
| SMCJ14A | SMCJ14CA | GEK | BEK | 14.0 | 15.60~17.20 | 1 | 23.2 | 64.7 | 1 |
| SMCJ15A | SMCJ15CA | GEM | BEM | 15.0 | 16.70~18.50 | 1 | 24.4 | 61.5 | 1 |
| SMCJ16A | SMCJ16CA | GEP | BEP | 16.0 | 17.80~19.70 | 1 | 26.0 | 57.7 | 1 |
| SMCJ17A | SMCJ17CA | GER | BER | 17.0 | 18.90~20.90 | 1 | 27.6 | 54.4 | 1 |
| SMCJ18A | SMCJ18CA | GET | BET | 18.0 | 20.00~22.10 | 1 | 29.2 | 51.4 | 1 |
| SMCJ20A | SMCJ20CA | GEV | BEV | 20.0 | 22.20~24.50 | 1 | 32.4 | 46.3 | 1 |
| SMCJ22A | SMCJ22CA | GEX | BEX | 22.0 | 24.40~26.90 | 1 | 35.5 | 42.3 | 1 |
| SMCJ24A | SMCJ24CA | GEZ | BEZ | 24.0 | 26.70~29.50 | 1 | 38.9 | 38.6 | 1 |

SMCJ SERIES



| Part Number | | Device Marking Code | | Reverse Stand-Off Voltage | Breakdown Voltage @I _T | Test Current | Maximum Clamping Voltage @I _{PP} | Peak Pulse Current | Reverse Leakage @V _{RWM} |
|---------------|--------------|---------------------|-----|---------------------------|-----------------------------------|---------------------|---|---------------------|-----------------------------------|
| Unidirectiona | Bidirectiona | UNI | BI | V _{RWM} (V) | V _{BR} (V) | I _T (mA) | V _C (V) | I _{PP} (A) | I _R (μA) |
| SMCJ26A | SMCJ26CA | GFE | BFE | 26.0 | 28.90~31.90 | 1 | 42.1 | 35.7 | 1 |
| SMCJ28A | SMCJ28CA | GFG | BFG | 28.0 | 31.10~34.40 | 1 | 45.4 | 33.1 | 1 |
| SMCJ30A | SMCJ30CA | GFK | BFK | 30.0 | 33.30~36.80 | 1 | 48.4 | 31.0 | 1 |
| SMCJ33A | SMCJ33CA | GFM | BFM | 33.0 | 36.70~40.60 | 1 | 53.3 | 28.2 | 1 |
| SMCJ36A | SMCJ36CA | GFP | BFP | 36.0 | 40.00~44.20 | 1 | 58.1 | 25.9 | 1 |
| SMCJ40A | SMCJ40CA | GFR | BFR | 40.0 | 44.40~49.10 | 1 | 64.5 | 23.3 | 1 |
| SMCJ43A | SMCJ43CA | GFT | BFT | 43.0 | 47.80~52.80 | 1 | 69.4 | 21.7 | 1 |
| SMCJ45A | SMCJ45CA | GFV | BFV | 45.0 | 50.00~55.30 | 1 | 72.7 | 20.6 | 1 |
| SMCJ48A | SMCJ48CA | GFX | BFX | 48.0 | 53.30~58.90 | 1 | 77.4 | 19.4 | 1 |
| SMCJ51A | SMCJ51CA | GFZ | BFZ | 51.0 | 56.70~62.70 | 1 | 82.4 | 18.2 | 1 |
| SMCJ54A | SMCJ54CA | GGE | BGE | 54.0 | 60.00~66.30 | 1 | 87.1 | 17.3 | 1 |
| SMCJ58A | SMCJ58CA | GGG | BGG | 58.0 | 64.40~71.20 | 1 | 93.6 | 16.1 | 1 |
| SMCJ60A | SMCJ60CA | GGK | BGK | 60.0 | 66.70~73.70 | 1 | 96.8 | 15.5 | 1 |
| SMCJ64A | SMCJ64CA | GGM | BGM | 64.0 | 71.10~78.60 | 1 | 103.0 | 14.6 | 1 |
| SMCJ70A | SMCJ70CA | GGP | BGP | 70.0 | 77.80~86.00 | 1 | 113.0 | 13.3 | 1 |
| SMCJ75A | SMCJ75CA | GGR | BGR | 75.0 | 83.30~92.10 | 1 | 121.0 | 12.4 | 1 |
| SMCJ78A | SMCJ78CA | GGT | BGT | 78.0 | 86.70~95.80 | 1 | 126.0 | 11.9 | 1 |
| SMCJ85A | SMCJ85CA | GGV | BGV | 85.0 | 94.40~104.00 | 1 | 137.0 | 11.0 | 1 |
| SMCJ90A | SMCJ90CA | GGX | BGX | 90.0 | 100.00~111.0 | 1 | 146.0 | 10.3 | 1 |
| SMCJ100A | SMCJ100CA | GGZ | BGZ | 100.0 | 111.00~123.0 | 1 | 162.0 | 9.3 | 1 |
| SMCJ110A | SMCJ110CA | GHE | BHE | 110.0 | 122.00~135.0 | 1 | 177.0 | 8.5 | 1 |
| SMCJ120A | SMCJ120CA | GHG | BHG | 120.0 | 133.00~147.0 | 1 | 193.0 | 7.8 | 1 |
| SMCJ130A | SMCJ130CA | GHK | BHK | 130.0 | 144.00~159.0 | 1 | 209.0 | 7.2 | 1 |
| SMCJ150A | SMCJ150CA | GHM | BHM | 150.0 | 167.00~185.0 | 1 | 243.0 | 6.2 | 1 |
| SMCJ160A | SMCJ160CA | GHP | BHP | 160.0 | 178.00~197.0 | 1 | 259.0 | 5.8 | 1 |
| SMCJ170A | SMCJ170CA | GHR | BHR | 170.0 | 189.00~209.0 | 1 | 275.0 | 5.5 | 1 |
| SMCJ180A | SMCJ180CA | GHT | BHT | 180.0 | 201.00~222.0 | 1 | 292.0 | 5.1 | 1 |
| SMCJ190A | SMCJ190CA | GHU | BHU | 190.0 | 211.00~233.0 | 1 | 308.0 | 4.8 | 1 |
| SMCJ200A | SMCJ200CA | GHV | BHV | 200.0 | 224.00~247.0 | 1 | 324.0 | 4.6 | 1 |
| SMCJ210A | SMCJ210CA | GHW | BHW | 210.0 | 237.00~263.0 | 1 | 340.0 | 4.4 | 1 |
| SMCJ220A | SMCJ220CA | GHX | BHX | 220.0 | 246.00~272.0 | 1 | 356.0 | 4.2 | 1 |
| SMCJ250A | SMCJ250CA | GHZ | BHZ | 250.0 | 279.00~309.0 | 1 | 405.0 | 3.7 | 1 |
| SMCJ300A | SMCJ300CA | GJE | BJE | 300.0 | 335.00~371.0 | 1 | 486.0 | 3.1 | 1 |
| SMCJ350A | SMCJ350CA | GJG | BJG | 350.0 | 391.00~432.0 | 1 | 567.0 | 2.6 | 1 |
| SMCJ400A | SMCJ400CA | GJK | BJK | 400.0 | 447.00~494.0 | 1 | 648.0 | 2.3 | 1 |
| SMCJ440A | SMCJ440CA | GJM | BJM | 440.0 | 492.00~543.0 | 1 | 713.0 | 2.1 | 1 |

Notes: For bidirectional type having V_{RWM} of 10V and less, the I_R limit is double.

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

Figure 1. Peak Pulse Power Rating Curve

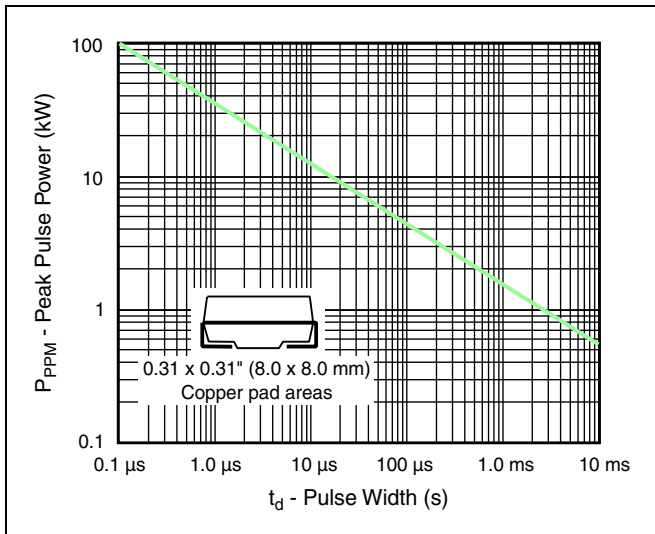


Figure 2. Pulse Derating Curve

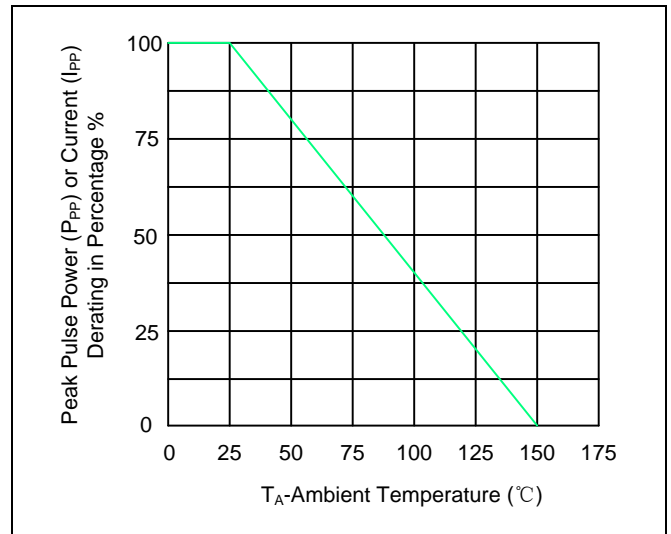


Figure 3. Pulse Waveform

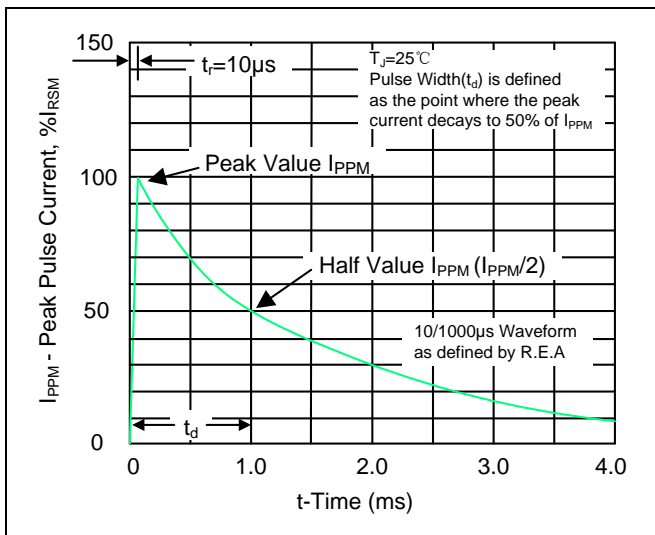


Figure 4. Typical Junction Capacitance

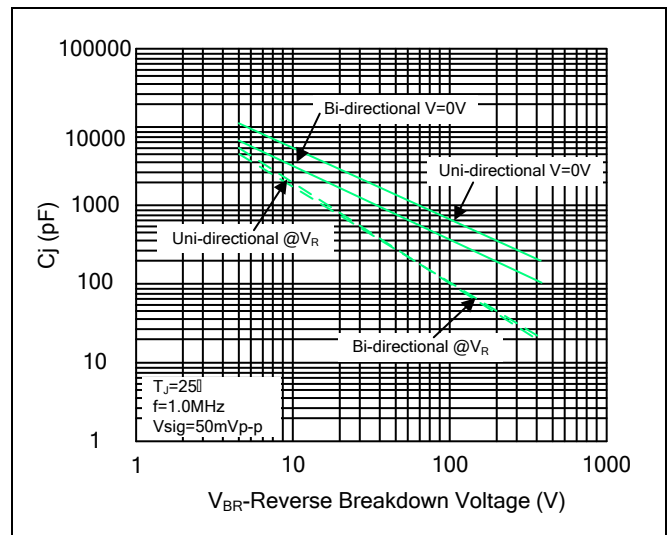


Figure 5. Steady State Power Dissipation Derating Curve

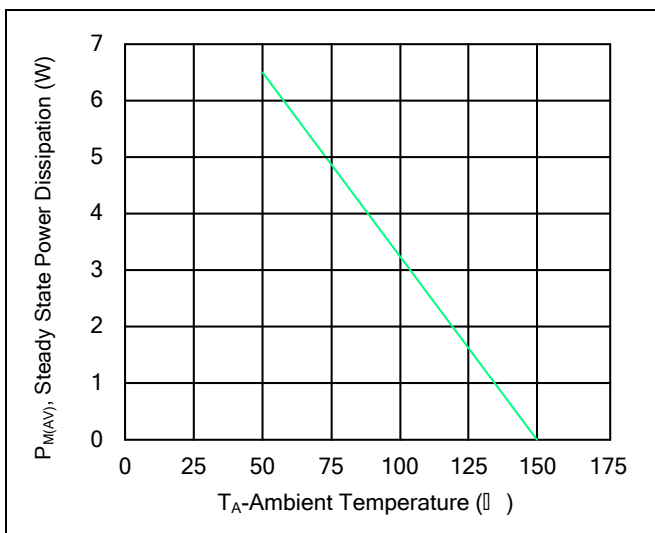
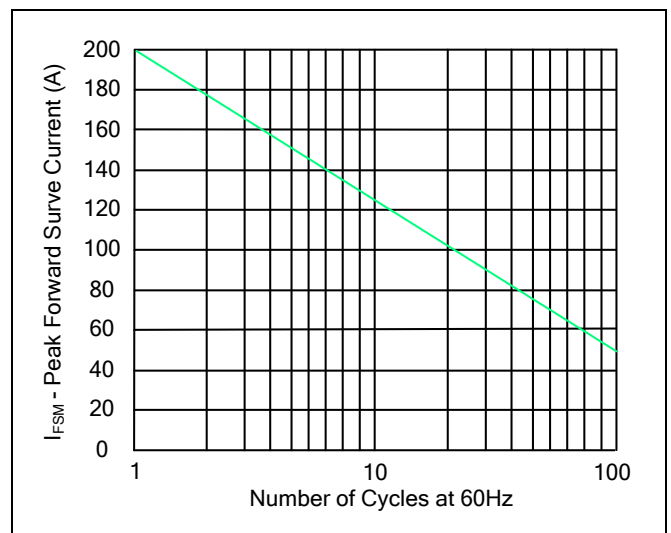
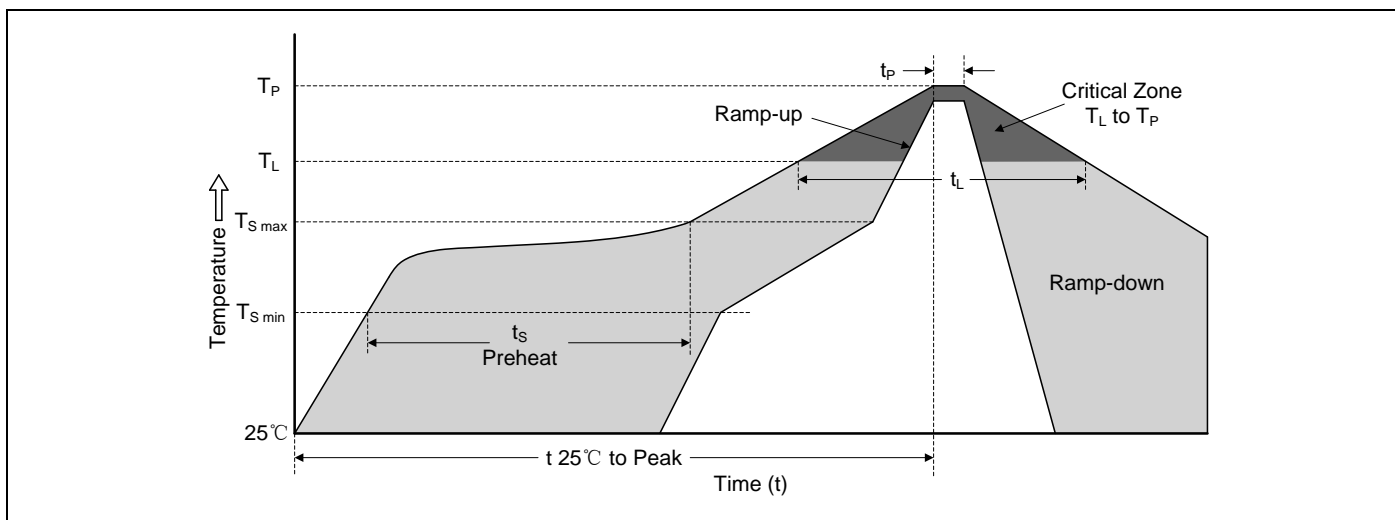


Figure 6. Maximum Non-Repetitive Forward Surge Current



ReflowSoldering Parameters



| | | |
|--|-----------------------------------|--------------------|
| Reflow Condition | | Lead-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 (T_L to T_P) | | 3°C/second max. |
| $T_{S\ max}$ to T_L -Ramp-up Rate | | 3°C/second max. |
| Reflow | -Temperature (T_L) (Liquidus) | 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 | | 8 minutes max. |
| Do not exceed | | 280°C |

Reliability

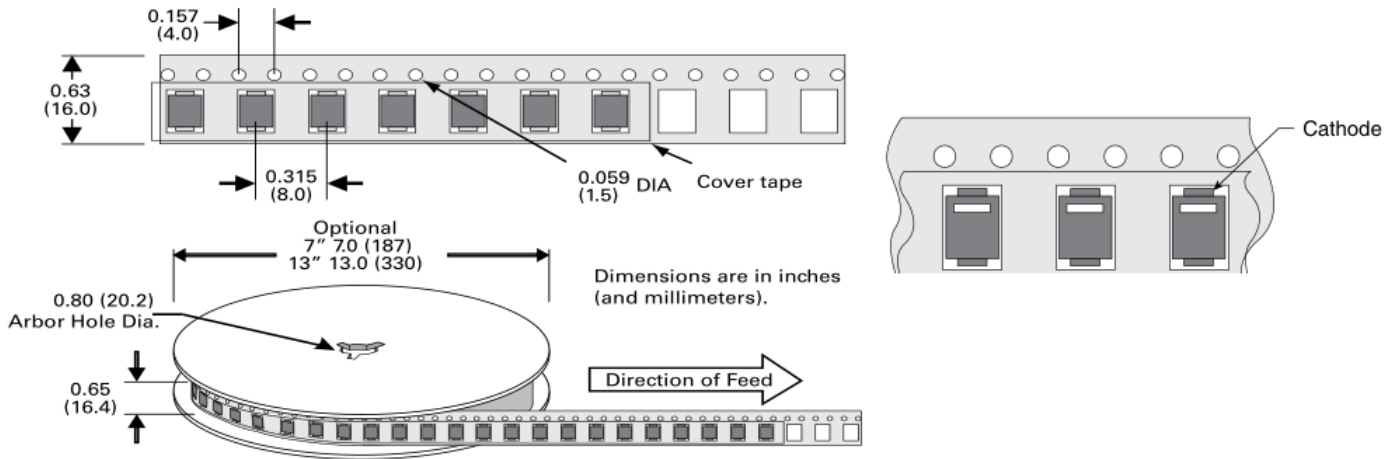
| Items | Standards |
|-------------------------------------|-------------------------|
| Terminal strength | MIL-STD-750 Method 2036 |
| Mechanical shock | JESD22-B104 |
| Vibration | JESD22-B103 |
| High Temp. Storage | JESD22-A103 |
| High Temp Reverse Bias | JESD22-A108 |
| Temperature Cycling | JESD22-A104 |
| High Temp High humidityReverse Bias | JESD22-A101 |
| Resistance to solder heat | JESD22-B106 |

SMCJ SERIES

Packaging

| Part number | Component Package | Quantity | Packaging Option | Packaging Specification |
|--------------|-------------------|----------|--------------------------------|-------------------------|
| SMCJxxxXX | DO-214AB | 3000 | Tape & Reel-16mm tape/13" reel | EIA STD RS-481 |
| SMCJxxxXX-T7 | DO-214AB | 500 | Tape & Reel-16mm tape/7" reel | EIA STD RS-481 |

Tape and Reel Specification



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[P6KE13CA](#) [P6KE43CA](#) [P6KE6.8CA](#) [P6KE8.2](#) [P6SMBJ20CA](#) [JANTX1N6072A](#) [SR2835ESKG](#) [SA90CA](#)