



**THE DATASHEET OF
3.0SMCJ45CA**



3.0SMCJ Series

Surface Mount – 3000W – DO-214AB



Agency Approvals

| Agency | Agency File Number |
|--------|--------------------|
| | E230531 |

Maximum Ratings and Thermal Characteristics

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

| Parameter | Symbol | Value | Unit |
|------------------------------------------------------------------------------------------|-----------------|------------|--------------------|
| Peak Pulse Power Dissipation by 10/1000 μs Waveform (Fig.4)(Note 1), (Note 2) | P_{PPM} | 3000 | W |
| Power dissipation on infinite heatsink at $T_C = 25^\circ\text{C}$ | P_D | 6.5 | W |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3) | I_{FSM} | 300 | A |
| Maximum Instantaneous Forward Voltage at 100A for Unidirectional Only | V_F | 3.5 | V |
| Operating Temperature Range | T_J | -65 to 150 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{STG} | -65 to 175 | $^\circ\text{C}$ |
| Typical Thermal Resistance Junction to Lead | $R_{\theta JL}$ | 15 | $^\circ\text{C/W}$ |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 75 | $^\circ\text{C/W}$ |

Notes:

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

Description

The 3.0SMCJ Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

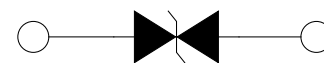
Features

- 3000W P_{PPM} peak pulse power capability at 10/1000 μs waveform, repetition rate (duty cycles):0.01%
- For surface mounted applications in order to optimize board space
- Low profile package
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ESD protection of data lines in accordance with IEC 61000-4-2,30kV(Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Built-in strain relief
- Glass passivated chip junction
- Fast response time: typically less than 1.0ps from 0V to BV min
- Excellent clamping capability
- Low incremental surge resistance
- High temperature to reflow soldering guaranteed: $260^\circ\text{C}/40\text{sec}$
- $V_{BR} @ T_J = V_{BR} @ 25^\circ\text{C} \times (1 + \alpha T) \times (T_J - 25)$ (αT : Temperature Coefficient, typical value is 0.1%)
- UL Recognized compound meeting flammability rating V-0.
- Meet MSL level1, per J-STD-020, LF maximum peak of 260°C
- Matte tin lead-free plated
- Halogen free and RoHS compliant
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD-609A.01)

Applications

TVS components are ideal for the protection of I/O Interfaces, V_{CC} bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

Functional Diagram



Bi-directional




Uni-directional

3.0SMCJ Series

Surface Mount – 3000W – DO-214AB

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

| Part Number (Uni) | Part Number (Bi) | Marking | | Reverse Stand off Voltage V_R (Volts) | Breakdown Voltage V_{BR} (Volts) @ I_T | | Test Current I_T (mA) | Maximum Clamping Voltage V_C @ I_{PP} (10/1000 μs) (V) | Maximum Peak Pulse Current I_{PP} (10/1000 μs) (A) | Maximum Clamping Voltage V_C @ I_{PP} (8/20 μs) (V) | Maximum Peak Pulse Current I_{PP} (8/20 μs) (A) | Maximum Reverse Leakage I_R @ V_R (μA) | Maximum Temperature coefficient of V_{BR} (%/C) | Agency Approval  |
|-------------------|------------------|---------|------|-----------------------------------------|--------------------------------------------|-------|-------------------------|------------------------------------------------------------------------|------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| | | UNI | BI | | MIN | MAX | | | | | | | | |
| - | 3.0SMCJ5.0CA | - | 3DDE | 5.00 | 6.40 | 7.00 | 10 | 9.2 | 326.1 | 11.89 | 1630.5 | 800 | 0.041 | X |
| - | 3.0SMCJ6.0CA | - | 3DDG | 6.00 | 6.67 | 7.37 | 10 | 10.3 | 291.3 | 13.31 | 1456.5 | 800 | 0.046 | X |
| - | 3.0SMCJ6.5CA | - | 3DDK | 6.50 | 7.22 | 7.98 | 10 | 11.2 | 267.9 | 14.47 | 1339.5 | 500 | 0.052 | X |
| - | 3.0SMCJ7.0CA | - | 3DDM | 7.00 | 7.78 | 8.60 | 10 | 12.0 | 250.0 | 15.50 | 1250.0 | 200 | 0.058 | X |
| - | 3.0SMCJ7.5CA | - | 3DDP | 7.50 | 8.33 | 9.21 | 1 | 12.9 | 232.6 | 16.67 | 1163.0 | 100 | 0.061 | X |
| - | 3.0SMCJ8.0CA | - | 3DDR | 8.00 | 8.89 | 9.83 | 1 | 13.6 | 220.6 | 17.57 | 1103.0 | 50 | 0.064 | X |
| - | 3.0SMCJ8.5CA | - | 3DDT | 8.50 | 9.44 | 10.40 | 1 | 14.4 | 208.3 | 18.60 | 1041.5 | 20 | 0.066 | X |
| 3.0SMCJ9.0A | 3.0SMCJ9.0CA | 3PDV | 3DDV | 9.00 | 10.00 | 11.10 | 1 | 15.4 | 194.8 | 19.90 | 974.0 | 10 | 0.069 | X |
| 3.0SMCJ10A | 3.0SMCJ10CA | 3PDX | 3DDX | 10.00 | 11.10 | 12.30 | 1 | 17.0 | 176.5 | 21.96 | 882.5 | 5 | 0.071 | X |
| 3.0SMCJ11A | 3.0SMCJ11CA | 3PDZ | 3DDZ | 11.00 | 12.20 | 13.50 | 1 | 18.2 | 164.8 | 23.51 | 824.0 | 2 | 0.074 | X |
| 3.0SMCJ12A | 3.0SMCJ12CA | 3PEE | 3DEE | 12.00 | 13.30 | 14.70 | 1 | 19.9 | 150.8 | 25.71 | 754.0 | 2 | 0.075 | X |
| 3.0SMCJ13A | 3.0SMCJ13CA | 3PEG | 3DEG | 13.00 | 14.40 | 15.90 | 1 | 21.5 | 139.5 | 27.78 | 697.5 | 2 | 0.076 | X |
| 3.0SMCJ14A | 3.0SMCJ14CA | 3PEK | 3DEK | 14.00 | 15.60 | 17.20 | 1 | 23.2 | 129.3 | 29.97 | 646.5 | 2 | 0.080 | X |
| 3.0SMCJ15A | 3.0SMCJ15CA | 3PEM | 3DEM | 15.00 | 16.70 | 18.50 | 1 | 24.4 | 123.0 | 31.52 | 615.0 | 2 | 0.083 | X |
| 3.0SMCJ16A | 3.0SMCJ16CA | 3PEP | 3DEP | 16.00 | 17.80 | 19.70 | 1 | 26.0 | 115.4 | 33.59 | 577.0 | 2 | 0.084 | X |
| 3.0SMCJ17A | 3.0SMCJ17CA | 3PER | 3DER | 17.00 | 18.90 | 20.90 | 1 | 27.6 | 108.7 | 35.66 | 543.5 | 2 | 0.085 | X |
| 3.0SMCJ18A | 3.0SMCJ18CA | 3PET | 3DET | 18.00 | 20.00 | 22.10 | 1 | 29.2 | 102.7 | 37.73 | 513.5 | 2 | 0.088 | X |
| 3.0SMCJ20A | 3.0SMCJ20CA | 3PEV | 3DEV | 20.00 | 22.20 | 24.50 | 1 | 32.4 | 92.6 | 41.86 | 463.0 | 2 | 0.091 | X |
| 3.0SMCJ22A | 3.0SMCJ22CA | 3PEX | 3DEX | 22.00 | 24.40 | 26.90 | 1 | 35.5 | 84.5 | 45.87 | 422.5 | 2 | 0.092 | X |
| 3.0SMCJ24A | 3.0SMCJ24CA | 3PEZ | 3DEZ | 24.00 | 26.70 | 29.50 | 1 | 38.9 | 77.1 | 50.26 | 385.5 | 2 | 0.092 | X |
| 3.0SMCJ26A | 3.0SMCJ26CA | 3PFE | 3DFE | 26.00 | 28.90 | 31.90 | 1 | 42.1 | 71.3 | 54.39 | 356.5 | 2 | 0.093 | X |
| 3.0SMCJ28A | 3.0SMCJ28CA | 3PFG | 3DFG | 28.00 | 31.10 | 34.40 | 1 | 45.4 | 66.1 | 58.66 | 330.5 | 2 | 0.094 | X |
| 3.0SMCJ30A | 3.0SMCJ30CA | 3PFK | 3DFK | 30.00 | 33.30 | 36.80 | 1 | 48.4 | 62.0 | 62.53 | 310.0 | 2 | 0.096 | X |
| 3.0SMCJ33A | 3.0SMCJ33CA | 3PFM | 3DFM | 33.00 | 36.70 | 40.60 | 1 | 53.3 | 56.3 | 68.86 | 281.5 | 2 | 0.097 | X |
| 3.0SMCJ36A | 3.0SMCJ36CA | 3PFP | 3DFP | 36.00 | 40.00 | 44.20 | 1 | 58.1 | 51.6 | 75.06 | 258.0 | 2 | 0.098 | X |
| 3.0SMCJ40A | 3.0SMCJ40CA | 3PFR | 3DFR | 40.00 | 44.40 | 49.10 | 1 | 64.5 | 46.5 | 83.33 | 232.5 | 2 | 0.099 | X |
| - | 3.0SMCJ43CA | - | 3DFT | 43.00 | 47.80 | 52.80 | 1 | 69.4 | 43.2 | 89.66 | 216.0 | 2 | 0.100 | X |
| - | 3.0SMCJ45CA | - | 3DFV | 45.00 | 50.00 | 55.30 | 1 | 72.7 | 41.3 | 93.93 | 206.5 | 2 | 0.101 | X |
| - | 3.0SMCJ48CA | - | 3DFX | 48.00 | 53.30 | 58.90 | 1 | 77.4 | 38.8 | 100.00 | 194.0 | 2 | 0.101 | X |
| - | 3.0SMCJ51CA | - | 3DFZ | 51.00 | 56.70 | 62.70 | 1 | 82.4 | 36.4 | 106.46 | 182.0 | 2 | 0.101 | X |
| - | 3.0SMCJ54CA | - | 3DGE | 54.00 | 60.00 | 66.30 | 1 | 87.1 | 34.4 | 112.53 | 172.0 | 2 | 0.102 | X |
| - | 3.0SMCJ58CA | - | 3DGG | 58.00 | 64.40 | 71.20 | 1 | 93.6 | 32.1 | 120.93 | 160.5 | 2 | 0.103 | X |

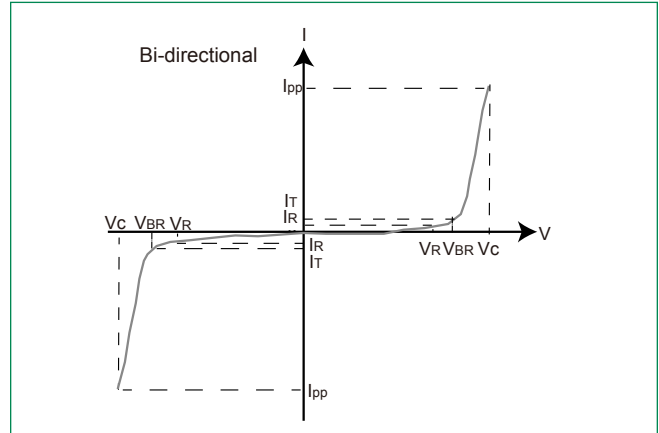
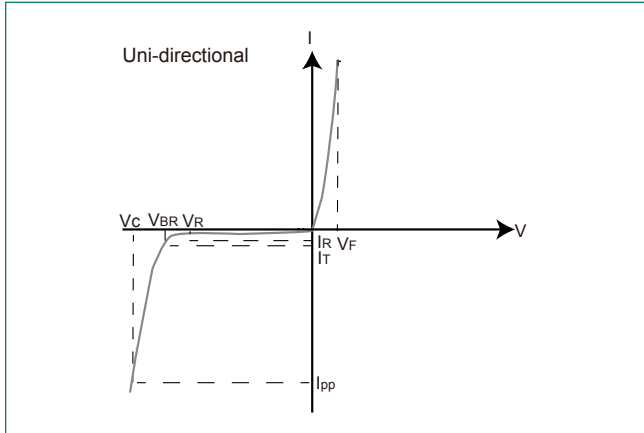
Notes:

- V_{BR} measured after I_T applied for 300 μs , I_T = square wave pulse or equivalent.
- Surge current waveform per 10 μs /1000 μs exponential wave and derated per Fig. 2
- All terms and symbols are consistent with ANSI/IEEE C62.35

3.0SMCJ Series

Surface Mount – 3000W – DO-214AB

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

Figure 1:
TVS Transients Clamping Waveform

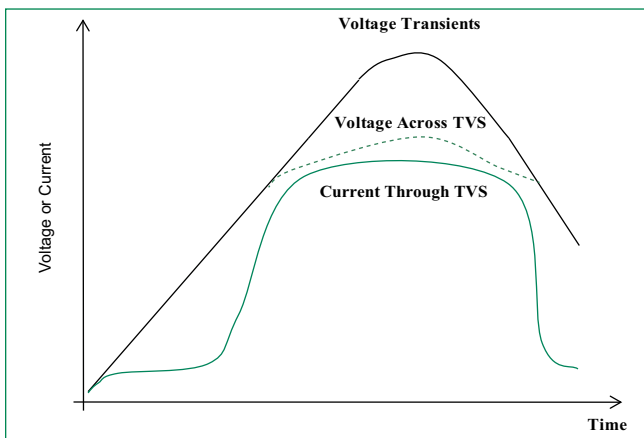
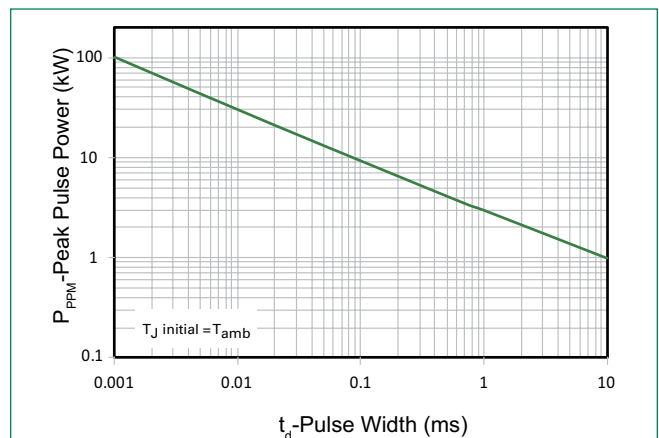


Figure 2:
Peak Pulse Power Rating



3.0SMCJ Series

Surface Mount – 3000W – DO-214AB

Figure 3:
Peak Pulse Power Derating Curve

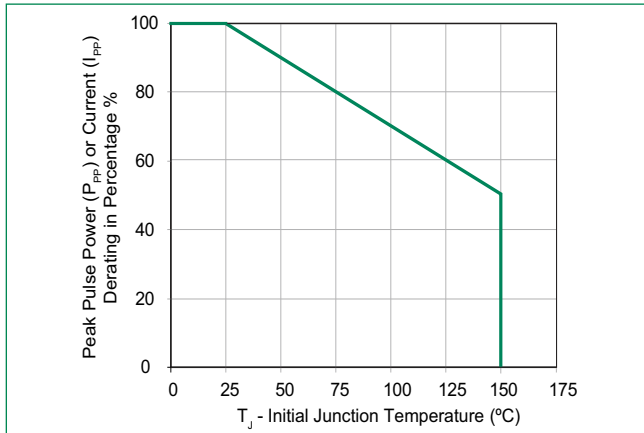


Figure 4:
Pulse Waveform

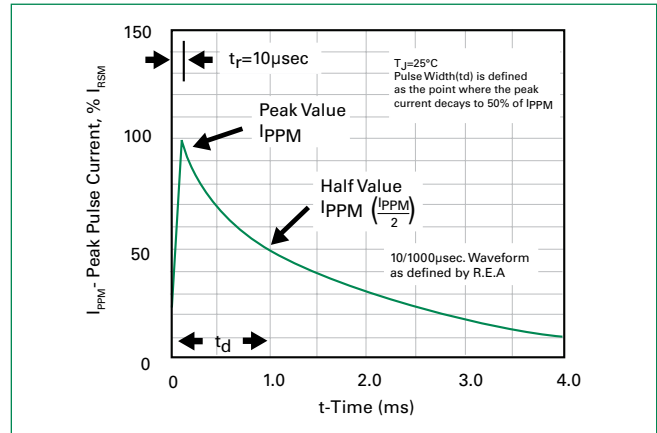


Figure 5:
Typical Junction Capacitance

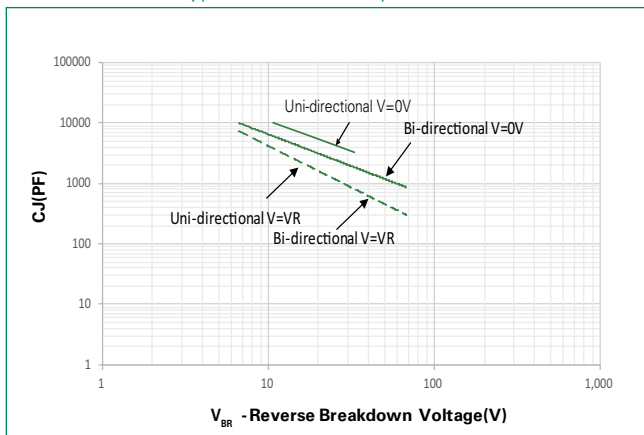


Figure 6:
Typical Transient Thermal Impedance

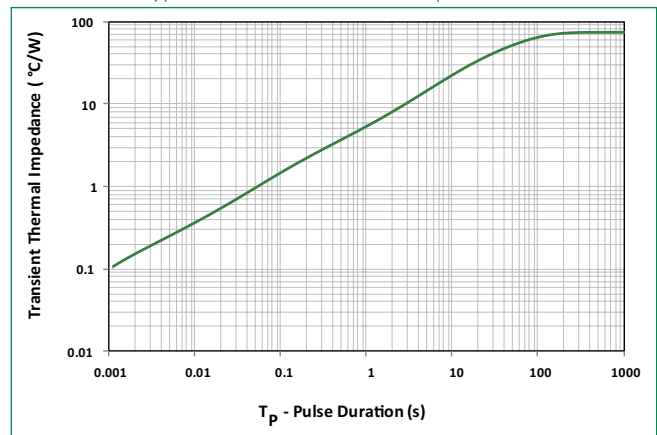


Figure 7:
Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only

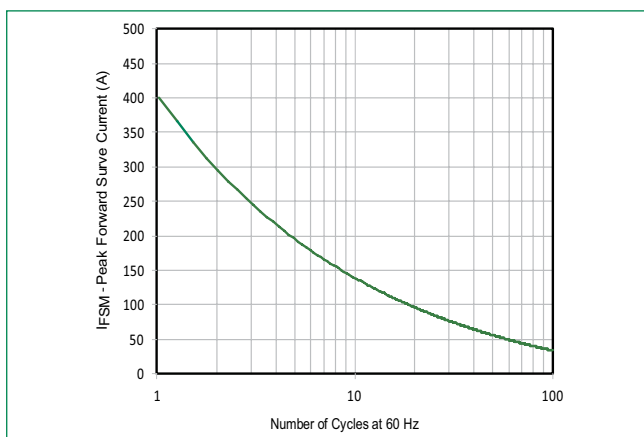
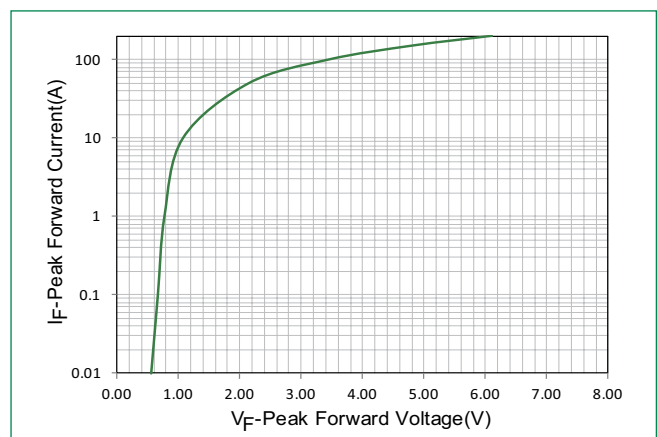


Figure 8:
Peak Forward Voltage Drop vs Peak Forward Current (Typical Values)

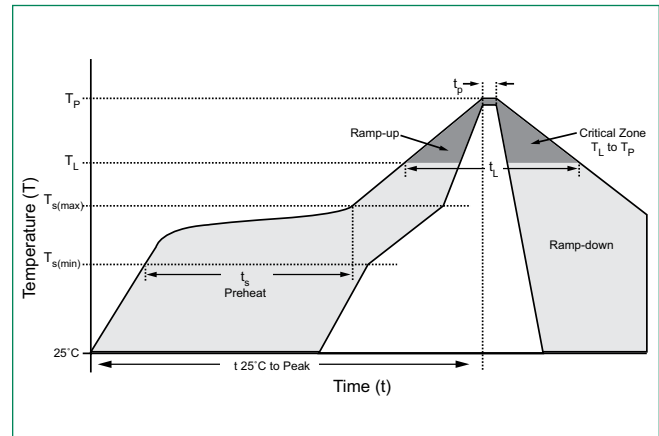


3.0SMCJ Series

Surface Mount – 3000W – DO-214AB

Soldering 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_p) | 60 – 180 secs |
| Average ramp up rate (Liquidus Temp (T_L) to peak) | | 3°C/second max |
| $T_{s(max)}$ to T_A - 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 (T_p) | | 8 minutes Max. |
| Do not exceed | | 260°C |



Physical Specifications

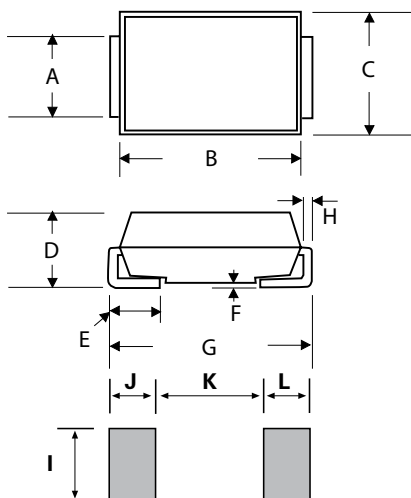
| | |
|-----------------|-------------------------------------------------------------------|
| Weight | 0.007 ounce, 0.21 grams |
| Case | JEDEC DO214AB. Molded plastic body over glass passivated junction |
| Terminal | Matte Tin-plated leads, Solderable per JESD22-B102 |

Environmental Specifications

| | |
|----------------------------|--------------------------|
| High Temp. Storage | JESD22-A103 |
| HTRB | JESD22-A108 |
| Temperature Cycling | JESD22-A104 |
| MSL | JEDEC-J-STD-020, LEVEL 1 |
| H3TRB | JESD22-A101 |
| RSH | JESD22-A111 |

Dimensions

DO-214AB (SMC J-Bend)

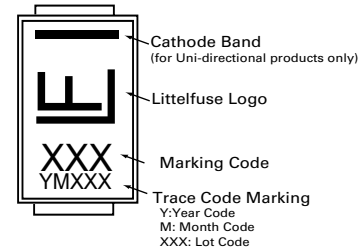
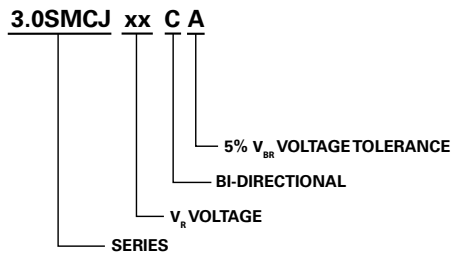


| Dimensions | Inches | | Millimeters | |
|------------|--------|-------|-------------|-------|
| | Min | Max | Min | Max |
| A | 0.114 | 0.126 | 2.900 | 3.200 |
| B | 0.260 | 0.280 | 6.600 | 7.110 |
| C | 0.220 | 0.245 | 5.590 | 6.220 |
| D | 0.079 | 0.103 | 2.060 | 2.620 |
| E | 0.030 | 0.060 | 0.760 | 1.520 |
| F | - | 0.008 | - | 0.203 |
| G | 0.305 | 0.320 | 7.750 | 8.130 |
| H | 0.006 | 0.012 | 0.152 | 0.305 |
| I | 0.129 | - | 3.300 | - |
| J | 0.094 | - | 2.400 | - |
| K | - | 0.165 | - | 4.200 |
| L | 0.094 | - | 2.400 | - |

3.0SMCJ Series

Surface Mount – 3000W – DO-214AB

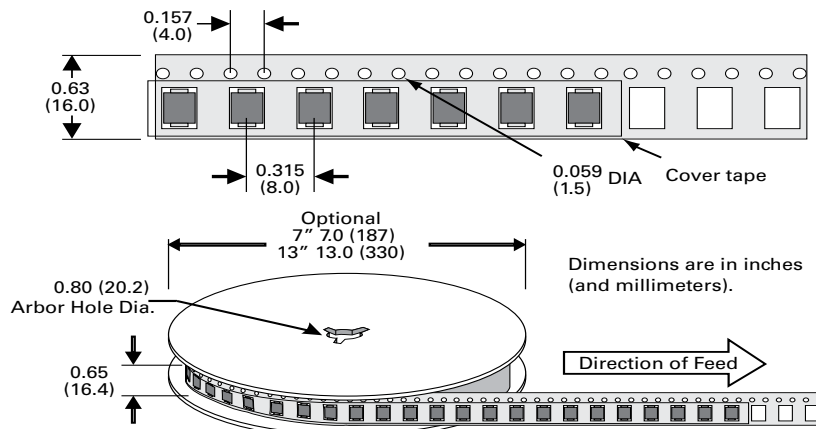
Part Marking System



Packing Options

| Part Number | Component Package | Quantity | Packaging Option | Packaging Specification |
|-------------|-------------------|----------|----------------------------------|-------------------------|
| 3.0SMCJxxXX | DO-214AB | 3000 | Tape & Reel - 16mm tape/13" reel | EIA-481 |

Tape and Reel Specification



Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at <http://www.littelfuse.com/disclaimer-electronics>.

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

 [View 3.0SMCJ45CA](#) on WIN SOURCE

 [Littelfuse Inc.](#) Information

Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management