

# 3.0SMCJ Series

## Surface Mount – 3000W – DO-214AB



### Additional Information



Resources



Accessories



Samples

### Agency Approvals

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

### Maximum Ratings and Thermal Characteristics

(T<sub>A</sub> = 25°C unless otherwise noted)

| Parameter                                                                    | Symbol           | Value      | Unit |
|------------------------------------------------------------------------------|------------------|------------|------|
| Peak Pulse Power Dissipation by 10/1000µs Waveform (Fig.4)(Note 1), (Note 2) | P <sub>PPM</sub> | 3000       | W    |
| Power dissipation on infinite heatsink at T <sub>C</sub> = 25 °C             | P <sub>D</sub>   | 6.5        | W    |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)             | I <sub>FSM</sub> | 300        | A    |
| Maximum Instantaneous Forward Voltage at 100A for Unidirectional Only        | V <sub>F</sub>   | 3.5        | V    |
| Operating Temperature Range                                                  | T <sub>J</sub>   | -65 to 150 | °C   |
| Storage Temperature Range                                                    | T <sub>STG</sub> | -65 to 175 | °C   |
| Typical Thermal Resistance Junction to Lead                                  | R <sub>θJL</sub> | 15         | °C/W |
| Typical Thermal Resistance Junction to Ambient                               | R <sub>θJA</sub> | 75         | °C/W |

#### Notes:

- Non-repetitive current pulse, per Fig. 4 and derated above T<sub>J</sub> (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.

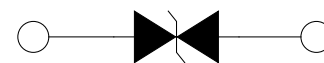
### Features & Benefits

- 3000W P<sub>PPM</sub> peak pulse power capability at 10/1000µs 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°C/40sec
- V<sub>BR</sub> @ T<sub>J</sub> = V<sub>BR</sub> @ 25°C × (1 + α T × (T<sub>J</sub> - 25)) (α T: 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<sub>CC</sub> 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<sub>A</sub>=25°C unless otherwise noted)

| Part Number (Uni) | Part Number (Bi) | Marking |      | Reverse Stand off Voltage V <sub>R</sub> (Volts) | Breakdown Voltage V <sub>BR</sub> (Volts) @ I <sub>T</sub> |       | Test Current I <sub>T</sub> (mA) | Maximum Clamping Voltage V <sub>C</sub> @ I <sub>PP</sub> (10/1000μs) (V) | Maximum Peak Pulse Current I <sub>PP</sub> (10/1000μs) (A) | Maximum Clamping Voltage V <sub>C</sub> @ I <sub>PP</sub> (8/20μs) (V) | Maximum Peak Pulse Current I <sub>PP</sub> (8/20μs) (A) | Maximum Reverse Leakage I <sub>R</sub> @ V <sub>R</sub> (μA) | Maximum Temperature coefficient of V <sub>BR</sub> (%/°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                                                                                                   |

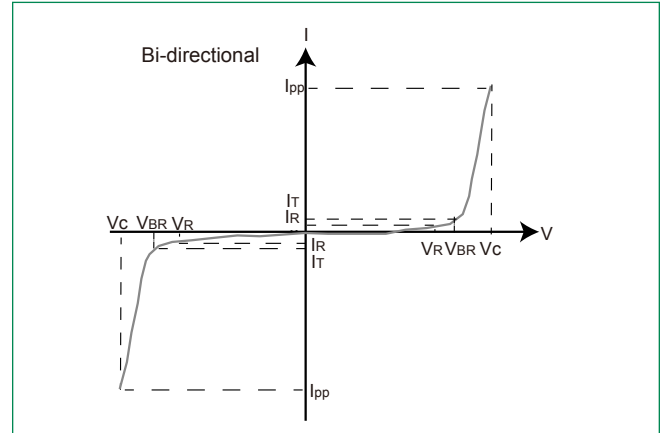
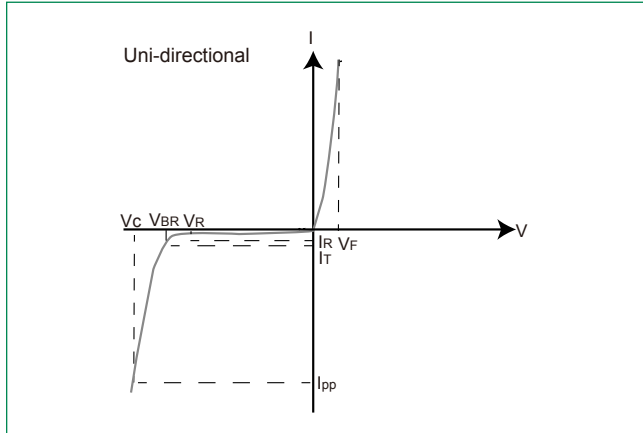
## Notes:

1. V<sub>BR</sub> measured after I<sub>T</sub> applied for 300μs, I<sub>T</sub> = square wave pulse or equivalent.
2. Surge current waveform per 10μs/1000μs exponential wave and derated per Fig. 2
3. All terms and symbols are consistent with ANSI/IEEE C62.35

# 3.0SMCJ Series

Surface Mount – 3000W – DO-214AB

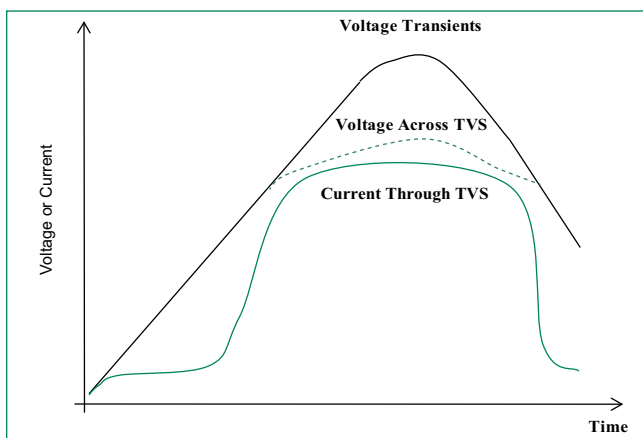
## I-V Curve Characteristics



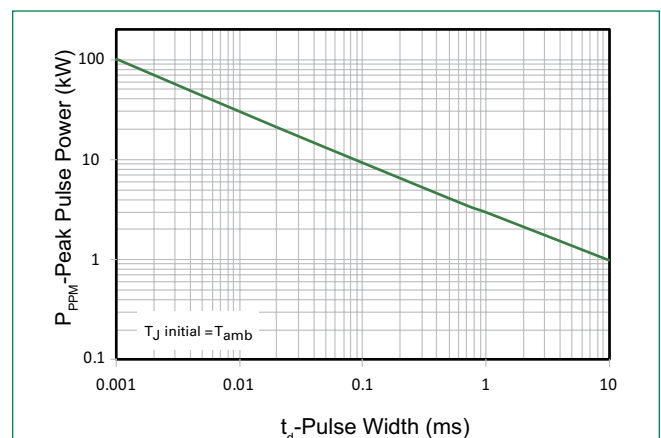
- P<sub>PPM</sub>** Peak Pulse Power Dissipation -- Max power dissipation  
**V<sub>R</sub>** Stand-off Voltage -- Maximum voltage that can be applied to the TVS without operation  
**V<sub>BR</sub>** Breakdown Voltage -- Maximum voltage that flows through the TVS at a specified test current (I<sub>T</sub>)  
**V<sub>C</sub>** Clamping Voltage -- Peak voltage measured across the TVS at a specified I<sub>PPM</sub> (peak impulse current)  
**I<sub>R</sub>** Reverse Leakage Current -- Current measured at V<sub>R</sub>  
**V<sub>F</sub>** Forward Voltage Drop for Uni-directional

## Ratings and Characteristic Curves (T<sub>A</sub>=25°C unless otherwise noted)

**Figure 1:**  
TVS Transients Clamping Waveform



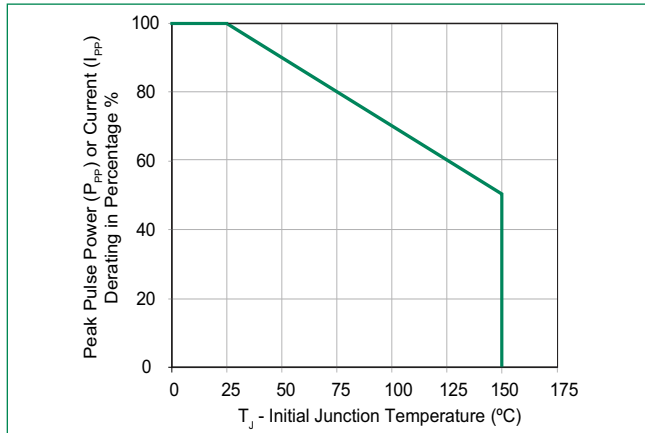
**Figure 2:**  
Peak Pulse Power Rating



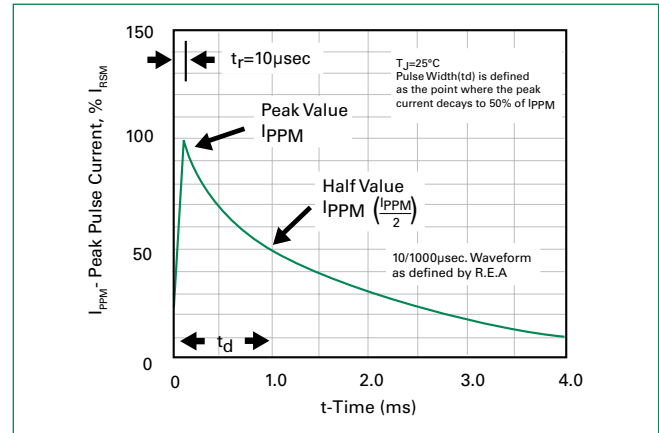
# 3.0SMCJ Series

## Surface Mount – 3000W – DO-214AB

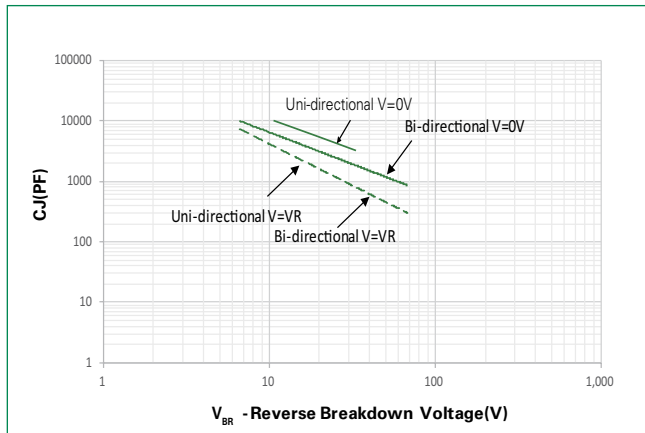
**Figure 3:**  
Peak Pulse Power Derating Curve



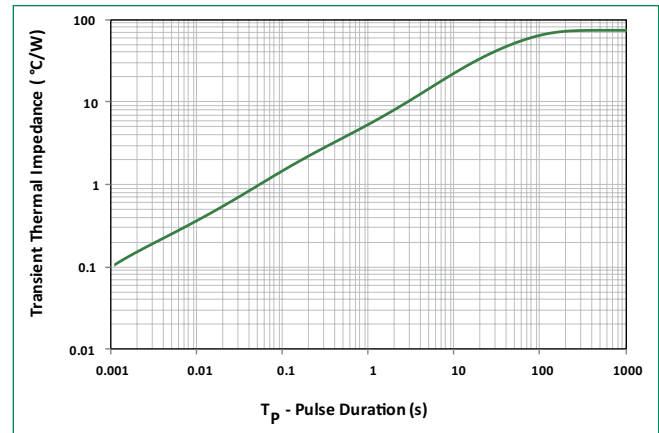
**Figure 4:**  
Pulse Waveform



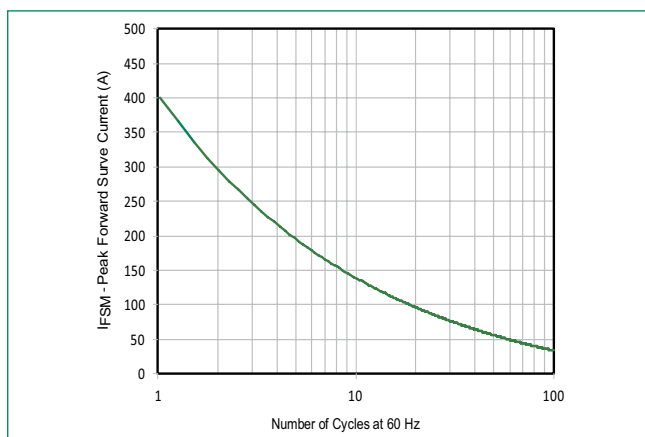
**Figure 5:**  
Typical Junction Capacitance



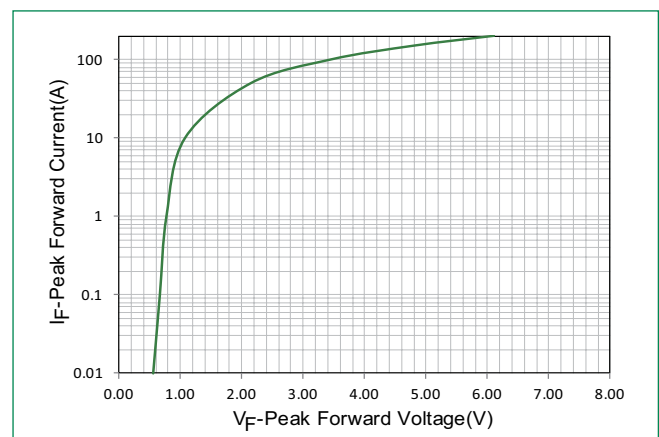
**Figure 6:**  
Typical Transient Thermal Impedance



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



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

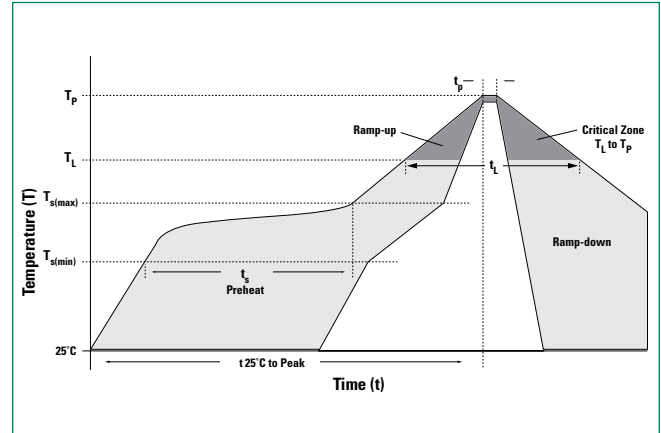


# 3.0SMCJ Series

## 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) ( $t_s$ )      | 60-120 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 <sup>+0/-5</sup> °C |
| Time within 5°C of actual peak Temperature ( $t_p$ )  |                                    | 30 seconds              |
| Ramp-down Rate                                        |                                    | 6°C/second max          |
| Time 25°C to peak Temperature ( $T_p$ )               |                                    | 8 minutes Max.          |
| Do not exceed                                         |                                    | 260°C                   |



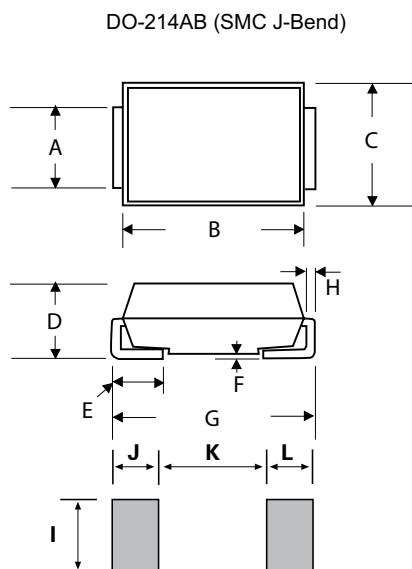
### Physical Specifications

|          |                                                                   |
|----------|-------------------------------------------------------------------|
| 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



| 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       | -     |

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Surface Mount – 3000W – DO-214AB

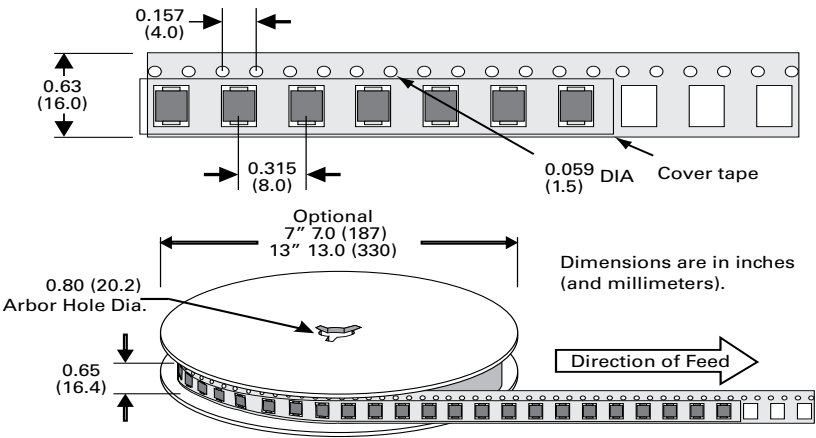
## Part Marking System



## 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



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