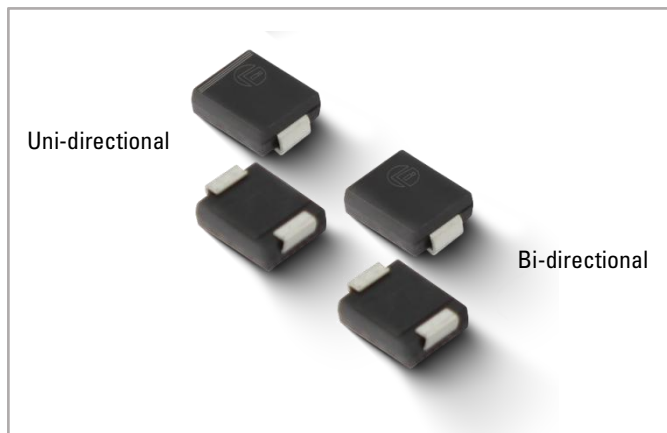


# SMDJ-Q Series

## Surface Mount – 3000W



### Additional Information



Resources



Accessories



Samples

### 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.1)(Note1)(Note2) -Single Die Parts | P <sub>PPM</sub> | 3000       | W    |
| Power Dissipation on Infinite Heat Sink at T <sub>L</sub> =50°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>   | -55 to 150 | °C   |
| Storage Temperature Range                                                                 | T <sub>STG</sub> | -55 to 150 | °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:

1. Non-repetitive current pulse, per Fig.3 and derated above T<sub>J</sub> (initial) =25°C per Fig.2.
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.

### Description

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

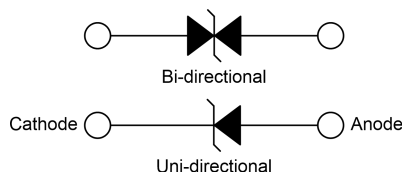
### Features

- High reliability application and automotive grade AEC-Q101 qualified
- 3000W peak pulse power capability at 10/1000μs waveform, repetition rate (duty cycles):0.01%
- Excellent clamping capability
- Low incremental surge resistance
- Typical I<sub>R</sub> less than 2μA when V<sub>B</sub> min>12V
- For surface mounted applications to optimize board space
- Low profile package
- Built-in strain relief
- 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 IEC61000-4-4
- Fast response time: typically less than 1.0ps from 0V to V<sub>B</sub> min
- Glass passivated chip junction
- High temperature to reflow soldering guaranteed: 260°C/20~40sec.
- V<sub>B</sub> @ T<sub>J</sub>= V<sub>B</sub>@25°C x (1 + α T<sub>J</sub> - 25)) (α T:Temperature Coefficient, typical value is 0.1%)
- 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 devices 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



# SMDJ-Q Series

## Surface Mount – 3000W

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

| Part Number |           | Type | Device Marking Code |     | Reverse Stand-Off Voltage | Breakdown Voltage @ $I_T$ |                       | Test Current | Maximum Clamping Voltage @ $I_{PP}$ | Peak Pulse Current | Reverse Leakage @ $V_R$ |
|-------------|-----------|------|---------------------|-----|---------------------------|---------------------------|-----------------------|--------------|-------------------------------------|--------------------|-------------------------|
| Uni.        | Bi.       |      | Uni.                | Bi. | $V_R(V)$                  | $V_B \text{ Min.}(V)$     | $V_B \text{ Max.}(V)$ | $I_T(mA)$    | $V_C(V)$                            | $I_{PP}(A)$        | $I_R(\mu A)$            |
| SMDJ5.0A    | SMDJ5.0CA | Q    | RDE                 | DDE | 5.0                       | 6.40                      | 7.00                  | 10           | 9.2                                 | 326.1              | 800                     |
| SMDJ6.0A    | SMDJ6.0CA | Q    | RDG                 | DDG | 6.0                       | 6.67                      | 7.37                  | 10           | 10.3                                | 291.3              | 600                     |
| SMDJ6.5A    | SMDJ6.5CA | Q    | RDK                 | DDK | 6.5                       | 7.22                      | 7.98                  | 10           | 11.2                                | 267.9              | 300                     |
| SMDJ7.0A    | SMDJ7.0CA | Q    | PDM                 | DDM | 7.0                       | 7.78                      | 8.60                  | 10           | 12.0                                | 250.0              | 200                     |
| SMDJ7.5A    | SMDJ7.5CA | Q    | PDP                 | DDP | 7.5                       | 8.33                      | 9.21                  | 1            | 12.9                                | 232.6              | 100                     |
| SMDJ8.0A    | SMDJ8.0CA | Q    | PDR                 | DDR | 8.0                       | 8.89                      | 9.83                  | 1            | 13.6                                | 220.6              | 50                      |
| SMDJ8.5A    | SMDJ8.5CA | Q    | PDT                 | DDT | 8.5                       | 9.44                      | 10.40                 | 1            | 14.4                                | 208.3              | 20                      |
| SMDJ9.0A    | SMDJ9.0CA | Q    | PDV                 | DDV | 9.0                       | 10.00                     | 11.10                 | 1            | 15.4                                | 194.8              | 10                      |
| SMDJ10A     | SMDJ10CA  | Q    | PDX                 | DDX | 10.0                      | 11.10                     | 12.30                 | 1            | 17.0                                | 176.5              | 5                       |
| SMDJ11A     | SMDJ11CA  | Q    | PDZ                 | DDZ | 11.0                      | 12.20                     | 13.50                 | 1            | 18.2                                | 164.8              | 2                       |
| SMDJ12A     | SMDJ12CA  | Q    | PEE                 | DEE | 12.0                      | 13.30                     | 14.70                 | 1            | 19.9                                | 150.8              | 2                       |
| SMDJ13A     | SMDJ13CA  | Q    | PEG                 | DEG | 13.0                      | 14.40                     | 15.90                 | 1            | 21.5                                | 139.5              | 1                       |
| SMDJ14A     | SMDJ14CA  | Q    | PEK                 | DEK | 14.0                      | 15.60                     | 17.20                 | 1            | 23.2                                | 129.3              | 1                       |
| SMDJ15A     | SMDJ15CA  | Q    | PEM                 | DEM | 15.0                      | 16.70                     | 18.50                 | 1            | 24.4                                | 123.0              | 1                       |
| SMDJ16A     | SMDJ16CA  | Q    | PEP                 | DEP | 16.0                      | 17.80                     | 19.70                 | 1            | 26.0                                | 115.4              | 1                       |
| SMDJ17A     | SMDJ17CA  | Q    | PER                 | DER | 17.0                      | 18.90                     | 20.90                 | 1            | 27.6                                | 108.7              | 1                       |
| SMDJ18A     | SMDJ18CA  | Q    | PET                 | DET | 18.0                      | 20.00                     | 22.10                 | 1            | 29.2                                | 102.7              | 1                       |
| SMDJ20A     | SMDJ20CA  | Q    | PEV                 | DEV | 20.0                      | 22.20                     | 24.50                 | 1            | 32.4                                | 92.6               | 1                       |
| SMDJ22A     | SMDJ22CA  | Q    | PEX                 | DEX | 22.0                      | 24.40                     | 26.90                 | 1            | 35.5                                | 84.5               | 1                       |
| SMDJ24A     | SMDJ24CA  | Q    | PEZ                 | DEZ | 24.0                      | 26.70                     | 29.50                 | 1            | 38.9                                | 77.1               | 1                       |
| SMDJ26A     | SMDJ26CA  | Q    | PFE                 | DFE | 26.0                      | 28.90                     | 31.90                 | 1            | 42.1                                | 71.3               | 1                       |
| SMDJ28A     | SMDJ28CA  | Q    | PFG                 | DFG | 28.0                      | 31.10                     | 34.40                 | 1            | 45.4                                | 66.1               | 1                       |
| SMDJ30A     | SMDJ30CA  | Q    | PFK                 | DFK | 30.0                      | 33.30                     | 36.80                 | 1            | 48.4                                | 62.0               | 1                       |
| SMDJ33A     | SMDJ33CA  | Q    | PFM                 | DFM | 33.0                      | 36.70                     | 40.60                 | 1            | 53.3                                | 56.3               | 1                       |
| SMDJ36A     | SMDJ36CA  | Q    | PFP                 | DFP | 36.0                      | 40.00                     | 44.20                 | 1            | 58.1                                | 51.6               | 1                       |
| SMDJ40A     | SMDJ40CA  | Q    | PFR                 | DFR | 40.0                      | 44.40                     | 49.10                 | 1            | 64.5                                | 46.5               | 1                       |
| SMDJ43A     | SMDJ43CA  | Q    | PFT                 | DFT | 43.0                      | 47.80                     | 52.80                 | 1            | 69.4                                | 43.2               | 1                       |
| SMDJ45A     | SMDJ45CA  | Q    | PFV                 | DFV | 45.0                      | 50.00                     | 55.30                 | 1            | 72.7                                | 41.3               | 1                       |
| SMDJ48A     | SMDJ48CA  | Q    | PFX                 | DFX | 48.0                      | 53.30                     | 58.90                 | 1            | 77.4                                | 38.8               | 1                       |
| SMDJ51A     | SMDJ51CA  | Q    | PFZ                 | DFZ | 51.0                      | 56.70                     | 62.70                 | 1            | 82.4                                | 36.4               | 1                       |
| SMDJ54A     | SMDJ54CA  | Q    | PGE                 | DGE | 54.0                      | 60.00                     | 66.30                 | 1            | 87.1                                | 34.4               | 1                       |
| SMDJ58A     | SMDJ58CA  | Q    | PGG                 | DGG | 58.0                      | 64.40                     | 71.20                 | 1            | 93.6                                | 32.1               | 1                       |
| SMDJ60A     | SMDJ60CA  | Q    | PGK                 | DGK | 60.0                      | 66.70                     | 73.70                 | 1            | 96.8                                | 31.0               | 1                       |
| SMDJ64A     | SMDJ64CA  | Q    | PGM                 | DGM | 64.0                      | 71.10                     | 78.60                 | 1            | 103.0                               | 29.1               | 1                       |
| SMDJ70A     | SMDJ70CA  | Q    | PGP                 | DGP | 70.0                      | 77.80                     | 86.00                 | 1            | 113.0                               | 26.5               | 1                       |
| SMDJ75A     | SMDJ75CA  | Q    | PGR                 | DGR | 75.0                      | 83.30                     | 92.10                 | 1            | 121.0                               | 24.8               | 1                       |
| SMDJ78A     | SMDJ78CA  | Q    | PGT                 | DGT | 78.0                      | 86.70                     | 95.80                 | 1            | 126.0                               | 23.8               | 1                       |
| SMDJ85A     | SMDJ85CA  | Q    | PGV                 | DGV | 85.0                      | 94.40                     | 104.00                | 1            | 137.0                               | 21.9               | 1                       |
| SMDJ90A     | SMDJ90CA  | Q    | PGX                 | DGX | 90.0                      | 100.00                    | 111.00                | 1            | 146.0                               | 20.5               | 1                       |
| SMDJ100A    | SMDJ100CA | Q    | PGZ                 | DGZ | 100.0                     | 111.00                    | 123.00                | 1            | 162.0                               | 18.5               | 1                       |
| SMDJ110A    | SMDJ110CA | Q    | PHE                 | DHE | 110.0                     | 122.00                    | 135.00                | 1            | 177.0                               | 16.9               | 1                       |
| SMDJ120A    | SMDJ120CA | Q    | PHG                 | DHG | 120.0                     | 133.00                    | 147.00                | 1            | 193.0                               | 15.5               | 1                       |
| SMDJ130A    | SMDJ130CA | Q    | PHK                 | DHK | 130.0                     | 144.00                    | 159.00                | 1            | 209.0                               | 14.4               | 1                       |
| SMDJ150A    | SMDJ150CA | Q    | PHM                 | DHM | 150.0                     | 167.00                    | 185.00                | 1            | 243.0                               | 12.3               | 2                       |
| SMDJ160A    | SMDJ160CA | Q    | PHP                 | DHP | 160.0                     | 178.00                    | 197.00                | 1            | 259.0                               | 11.6               | 2                       |
| SMDJ170A    | SMDJ170CA | Q    | PHR                 | DHR | 170.0                     | 189.00                    | 209.00                | 1            | 275.0                               | 10.9               | 2                       |
| SMDJ180A    | SMDJ180CA | Q    | PHI                 | DHI | 180.0                     | 201.00                    | 222.00                | 1            | 292.0                               | 10.3               | 2                       |
| SMDJ190A    | SMDJ190CA | Q    | HHV                 | IHV | 190.0                     | 211.00                    | 233.00                | 1            | 308.0                               | 9.7                | 2                       |
| SMDJ200A    | SMDJ200CA | Q    | HHX                 | IHX | 200.0                     | 224.00                    | 247.00                | 1            | 324.0                               | 9.3                | 2                       |
| SMDJ210A    | SMDJ210CA | Q    | HHZ                 | IHZ | 210.0                     | 237.00                    | 263.00                | 1            | 340.0                               | 8.8                | 2                       |
| SMDJ220A    | SMDJ220CA | Q    | HIE                 | IIE | 220.0                     | 246.00                    | 272.00                | 1            | 356.0                               | 8.4                | 2                       |

#### Notes:

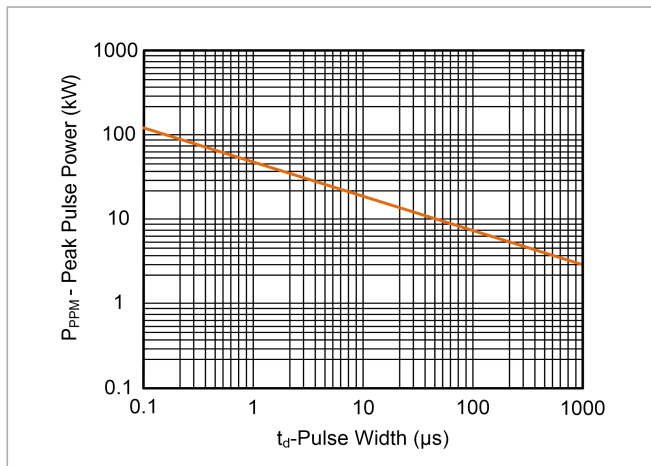
For bidirectional type having  $V_R$  of 10 volts and less, the  $I_R$  limit is double.

# SMDJ-Q Series

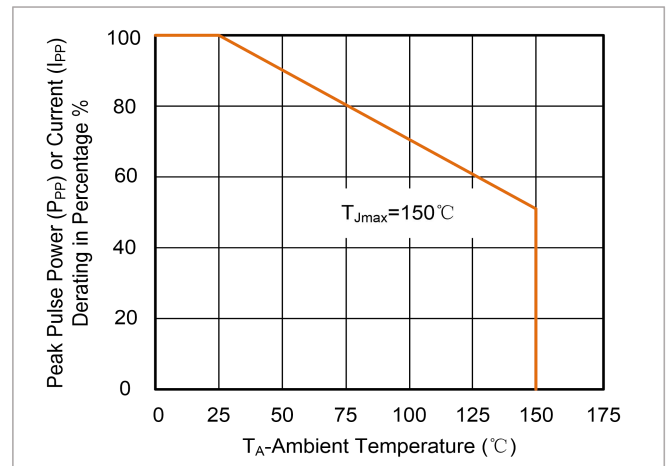
## Surface Mount – 3000W

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

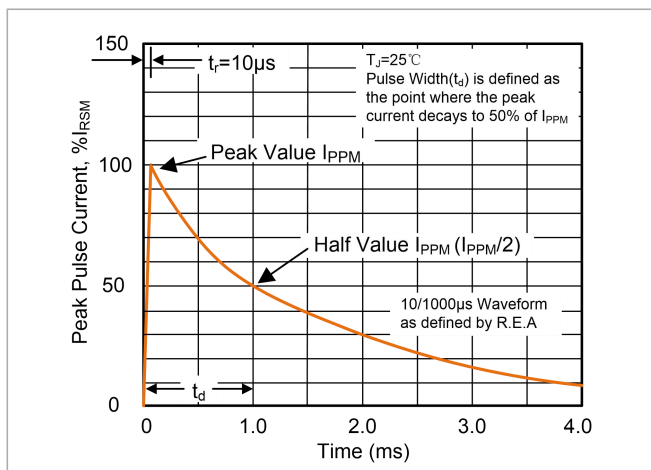
**Figure 1:**  
Peak Pulse Power Rating Curve



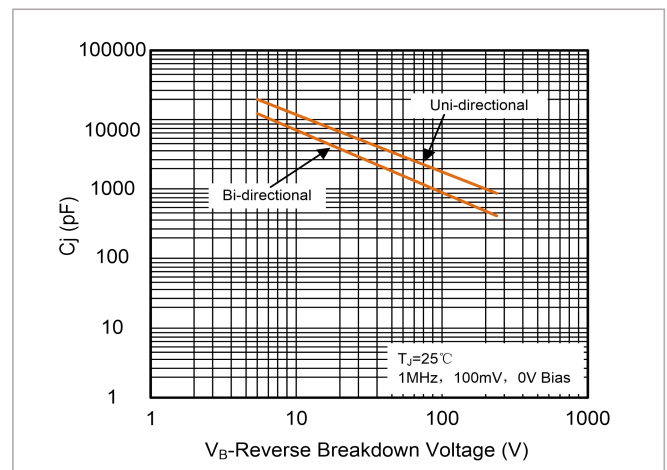
**Figure 2:**  
Pulse Derating Curve



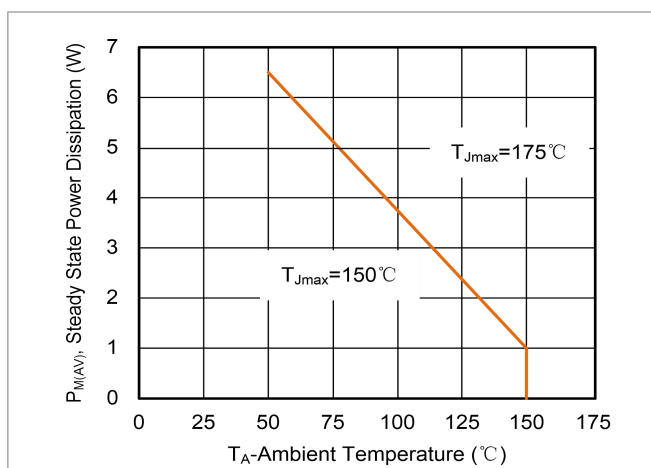
**Figure 3:**  
Pulse Waveform



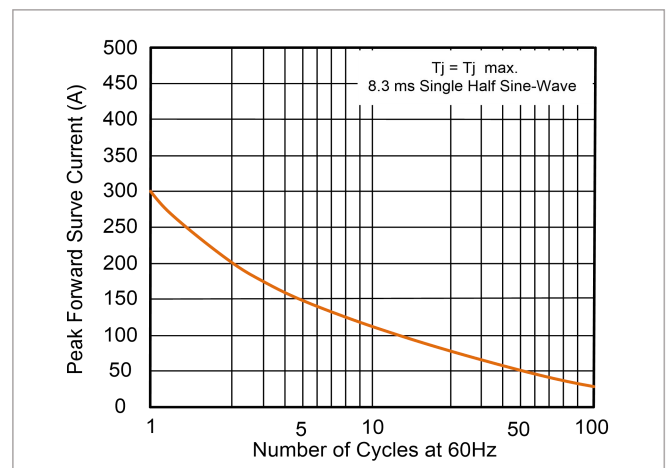
**Figure 4:**  
Typical Junction Capacitance



**Figure 5:**  
Steady State Power Dissipation Derating Curve



**Figure 6:**  
Maximum Non-Repetitive Forward Surge Current Uni-Directional

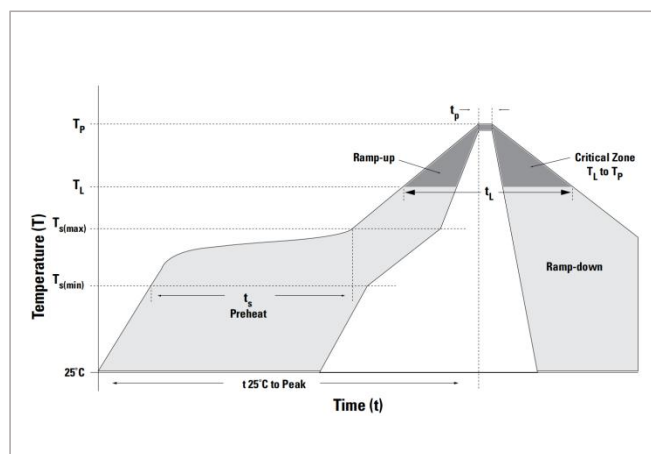


# SMDJ-Q Series

## Surface Mount – 3000W

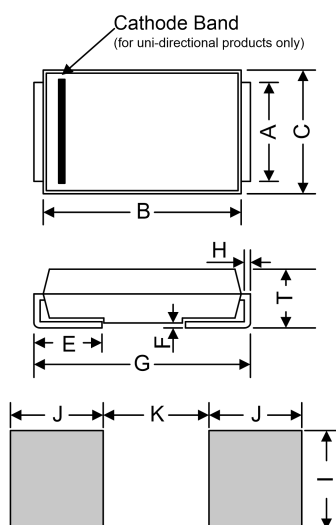
### Soldering Parameters

|                                                      |                                   |                    |
|------------------------------------------------------|-----------------------------------|--------------------|
| 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 – 180 secs      |
| Average ramp-up rate(Liquidus Temp ( $T_L$ ) to peak |                                   | 3°C/second max.    |
| $T_{S\ (max)}$ to $T_L$ -Ramp-up Rate                |                                   | 3°C/second max.    |
| Reflow                                               | -Temperature ( $T_L$ ) (Liquidus) | 217°C              |
|                                                      | -Time (min to max) ( $t_L$ )      | 60-150 seconds     |
| Peak Temperature ( $T_P$ )                           |                                   | 260°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                                        |                                   | 260°C              |



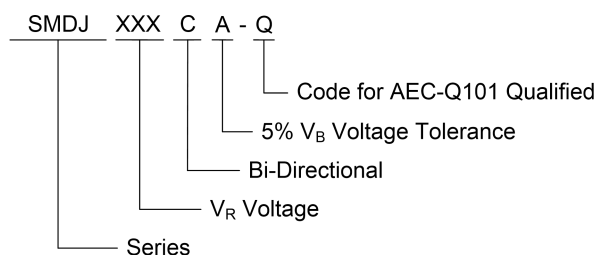
### Dimensions

DO-214AB (SMC)

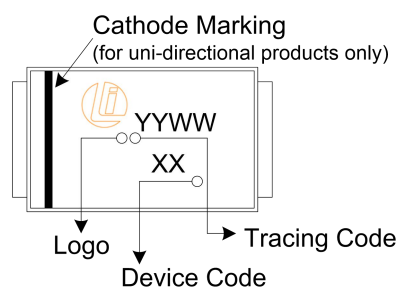


| Symbol | Millimeters |       | Inches |       |
|--------|-------------|-------|--------|-------|
|        | Min.        | Max.  | Min.   | Max.  |
| A      | 2.900       | 3.200 | 0.114  | 0.126 |
| B      | 6.600       | 7.110 | 0.260  | 0.280 |
| C      | 5.590       | 6.220 | 0.220  | 0.245 |
| E      | 0.760       | 1.520 | 0.030  | 0.060 |
| F      | -           | 0.203 | -      | 0.008 |
| G      | 7.750       | 8.130 | 0.305  | 0.320 |
| H      | 0.152       | 0.305 | 0.006  | 0.012 |
| T      | 2.200       | 2.750 | 0.087  | 0.108 |
| I      | 3.300       | -     | 0.129  | -     |
| J      | 2.400       | -     | 0.094  | -     |
| K      | -           | 4.200 | -      | 0.165 |

### Part Numbering System



### Part Marking System



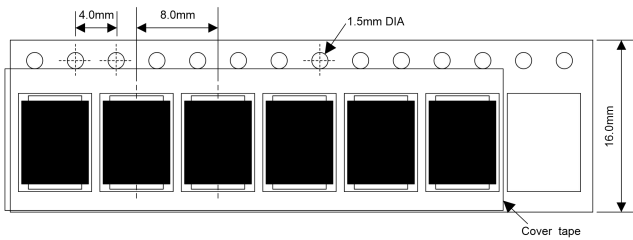
**SMDJ-Q Series**  
Surface Mount – 3000W

**Packaging**

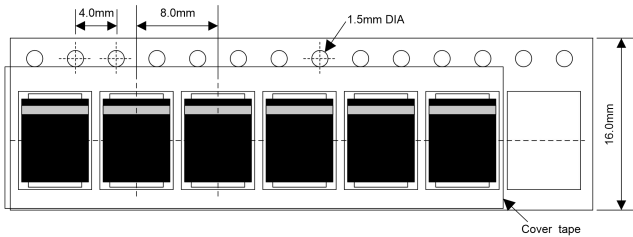
| Part number | Component Package | Quantity | Packaging Option                 | Packaging Specification |
|-------------|-------------------|----------|----------------------------------|-------------------------|
| SMDJxxxXX-Q | DO-214AB          | 3000     | Tape & Reel - 16mm tape/13" reel | EIA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

**Tape and Reel Specification**

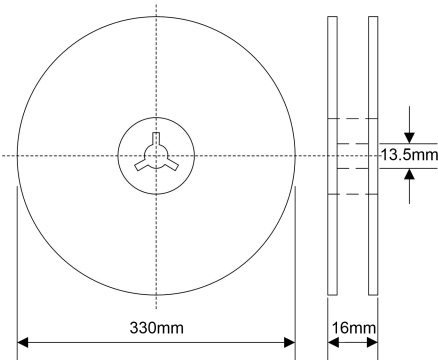
Tape



For Uni-Devices



13 Inches Reel



Quantity: 3000pcs/reel

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