



## SMCJ33 SMCJ33C Bidirectional Transient Voltage Suppressor TVS SMCJ33CA Diode DO-214AB

### Our Product Introduction

#### Basic Information

- Place of Origin: Shenzhen, Guangdong, China
- Brand Name: SOCAY
- Certification: UL, REACH, RoHS, ISO
- Model Number: SMCJ33CA
- Minimum Order Quantity: 3000PCS
- Price: Negotiable
- Packaging Details: tape reel
- Delivery Time: 5-8 work days
- Supply Ability: 10000000pcs



#### Product Specification

- SMCJ33CA Name: TVS Diodes
- SMCJ33CA Package Type: DO-214AB/SMC
- SMCJ33CA V<sub>rw</sub>m: 33V
- V<sub>br</sub>@I<sub>t</sub> (Min.): 36.7V
- V<sub>br</sub>@I<sub>t</sub> (Max.): 40.60V
- SMCJ33CA I<sub>t</sub>: 1mA
- SMCJ33CA V<sub>c</sub>@I<sub>pp</sub>: 53.3V
- Storage Temperature Range: -55 To +150

## Product Description

### SMCJ33 SMCJ33C Electronic Component Bidirectional Transient Voltage Suppressor SMCJ Series TVS SMCJ33CA Diode DO-214AB

**DATASHEET:** [SMCJ\\_v2107.1 .pdf](#)

#### SMCJ Series TVS SMCJ33CA Illustration:

The SMCJ Series TVS SMCJ33CA is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

#### SMCJ Series TVS SMCJ33CA Features:

- u TVS SMCJ33CA is For surface mounted applications in order to optimize board space
- u It has Low leakage
- u It is a Bidirectional unit
- u Glass passivated junction
- u TVS SMCJ33CA has Low inductance
- u Excellent clamping capability
- u 1500W Peak power capability at 10 × 1000μs waveform Repetition rate (duty cycle):0.01%

| TVS Part Number |          | TVS Marking |     | TVS Reverse Stand-Off Voltage VRWM (V) | TVS Breakdown Voltage VBR (V) @IT |       | TVS Test Current IT (mA) | TVS Maximum Clamping Voltage VC @IPP (V) | Maximum Peak Pulse Current IPP (A) | Maximum Reverse Leakage IR @VRWM (μA) |
|-----------------|----------|-------------|-----|----------------------------------------|-----------------------------------|-------|--------------------------|------------------------------------------|------------------------------------|---------------------------------------|
| Uni             | Bi       | Uni         | Bi  |                                        | MIN                               | MAX   |                          |                                          |                                    |                                       |
| SMCJ30A         | SMCJ30CA | GFK         | BFK | 30.0                                   | 33.30                             | 36.80 | 1                        | 48.4                                     | 30.99                              | 5                                     |
| SMCJ33A         | SMCJ33CA | GFM         | BFM | 33.0                                   | 36.70                             | 40.60 | 1                        | 53.3                                     | 28.14                              | 5                                     |

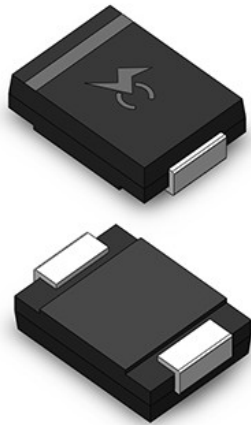
#### Electrical Characteristics (TA=25°C unless otherwise noted)

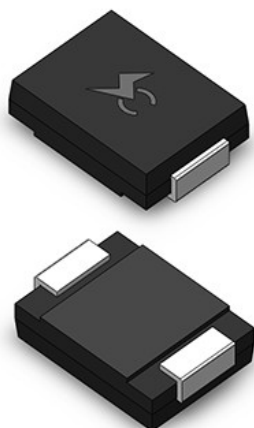
| Part Number |           | Marking |     | Reverse Stand-Off Voltage VRWM (V) | Breakdown Voltage VBR (V) @IT |       | Test Current IT (mA) | Maximum Clamping Voltage VC @IPP (V) | Maximum Peak Pulse Current IPP (A) | Maximum Reverse Leakage IR @VRWM (μA) |
|-------------|-----------|---------|-----|------------------------------------|-------------------------------|-------|----------------------|--------------------------------------|------------------------------------|---------------------------------------|
| Uni         | Bi        | Uni     | Bi  |                                    | MIN                           | MAX   |                      |                                      |                                    |                                       |
| SMCJ5.0A    | SMCJ5.0CA | GDE     | BDE | 5.0                                | 6.40                          | 7.00  | 10                   | 9.2                                  | 163.04                             | 1000                                  |
| SMCJ6.0A    | SMCJ6.0CA | GDG     | BDG | 6.0                                | 6.67                          | 7.37  | 10                   | 10.3                                 | 145.63                             | 1000                                  |
| SMCJ6.5A    | SMCJ6.5CA | GDK     | BDK | 6.5                                | 7.22                          | 7.98  | 10                   | 11.2                                 | 133.93                             | 500                                   |
| SMCJ7.0A    | SMCJ7.0CA | GDM     | BDM | 7.0                                | 7.78                          | 8.60  | 10                   | 12.0                                 | 125.00                             | 200                                   |
| SMCJ7.5A    | SMCJ7.5CA | GDP     | BDP | 7.5                                | 8.33                          | 9.21  | 1                    | 12.9                                 | 116.28                             | 100                                   |
| SMCJ8.0A    | SMCJ8.0CA | GDR     | BDR | 8.0                                | 8.89                          | 9.83  | 1                    | 13.6                                 | 110.29                             | 50                                    |
| SMCJ8.5A    | SMCJ8.5CA | GDT     | BDT | 8.5                                | 9.44                          | 10.40 | 1                    | 14.4                                 | 104.17                             | 20                                    |
| SMCJ9.0A    | SMCJ9.0CA | GDV     | BDV | 9.0                                | 10.00                         | 11.10 | 1                    | 15.4                                 | 97.40                              | 10                                    |
| SMCJ10A     | SMCJ10CA  | GDX     | BDX | 10.0                               | 11.10                         | 12.30 | 1                    | 17.0                                 | 88.24                              | 5                                     |
| SMCJ11A     | SMCJ11CA  | GDZ     | BDZ | 11.0                               | 12.20                         | 13.50 | 1                    | 18.2                                 | 82.42                              | 5                                     |
| SMCJ12A     | SMCJ12CA  | GEE     | BEE | 12.0                               | 13.30                         | 14.70 | 1                    | 19.9                                 | 75.38                              | 5                                     |
| SMCJ13A     | SMCJ13CA  | GEG     | BEG | 13.0                               | 14.40                         | 15.90 | 1                    | 21.5                                 | 69.77                              | 5                                     |
| SMCJ14A     | SMCJ14CA  | GEK     | BEK | 14.0                               | 15.60                         | 17.20 | 1                    | 23.2                                 | 64.66                              | 5                                     |
| SMCJ15A     | SMCJ15CA  | GEM     | BEM | 15.0                               | 16.70                         | 18.50 | 1                    | 24.4                                 | 61.48                              | 5                                     |
| SMCJ16A     | SMCJ16CA  | GEP     | BEP | 16.0                               | 17.80                         | 19.70 | 1                    | 26.0                                 | 57.69                              | 5                                     |
| SMCJ17A     | SMCJ17CA  | GER     | BER | 17.0                               | 18.90                         | 20.90 | 1                    | 27.6                                 | 54.35                              | 5                                     |
| SMCJ18A     | SMCJ18CA  | GET     | BET | 18.0                               | 20.00                         | 22.10 | 1                    | 29.2                                 | 51.37                              | 5                                     |
| SMCJ19A     | SMCJ19CA  | GEB     | BEB | 19.0                               | 21.10                         | 23.30 | 1                    | 30.8                                 | 48.73                              | 5                                     |
| SMCJ20A     | SMCJ20CA  | GEV     | BEV | 20.0                               | 22.20                         | 24.50 | 1                    | 32.4                                 | 46.30                              | 5                                     |
| SMCJ22A     | SMCJ22CA  | GEX     | BEX | 22.0                               | 24.40                         | 26.90 | 1                    | 35.5                                 | 42.25                              | 5                                     |
| SMCJ24A     | SMCJ24CA  | GEZ     | BEZ | 24.0                               | 26.70                         | 29.50 | 1                    | 38.9                                 | 38.56                              | 5                                     |
| SMCJ26A     | SMCJ26CA  | GFE     | BFE | 26.0                               | 28.90                         | 31.90 | 1                    | 42.1                                 | 35.63                              | 5                                     |
| SMCJ28A     | SMCJ28CA  | GFG     | BFG | 28.0                               | 31.10                         | 34.40 | 1                    | 45.4                                 | 33.04                              | 5                                     |
| SMCJ30A     | SMCJ30CA  | GFK     | BFK | 30.0                               | 33.30                         | 36.80 | 1                    | 48.4                                 | 30.99                              | 5                                     |
| SMCJ33A     | SMCJ33CA  | GFM     | BFM | 33.0                               | 36.70                         | 40.60 | 1                    | 53.3                                 | 28.14                              | 5                                     |
| SMCJ36A     | SMCJ36CA  | GFP     | BFP | 36.0                               | 40.00                         | 44.20 | 1                    | 58.1                                 | 25.82                              | 5                                     |
| SMCJ40A     | SMCJ40CA  | GFR     | BFR | 40.0                               | 44.40                         | 49.10 | 1                    | 64.5                                 | 23.26                              | 5                                     |
| SMCJ43A     | SMCJ43CA  | GFT     | BFT | 43.0                               | 47.80                         | 52.80 | 1                    | 69.4                                 | 21.61                              | 5                                     |

| Part Number |           | Marking |     | Reverse Stand-Off Voltage $V_{RWO}$ (V) | Breakdown Voltage $V_{BR}$ (V) @ $I_r$ |        | Test Current $I_r$ (mA) | Maximum Clamping Voltage $V_C$ @ $I_{tr}$ (V) | Maximum Peak Pulse Current $I_{PP}$ (A) | Maximum Reverse Leakage $I_{R}$ @ $V_{RWO}$ ( $\mu$ A) |
|-------------|-----------|---------|-----|-----------------------------------------|----------------------------------------|--------|-------------------------|-----------------------------------------------|-----------------------------------------|--------------------------------------------------------|
| Uni         | Bi        | Uni     | Bi  |                                         | MIN                                    | MAX    |                         |                                               |                                         |                                                        |
| SMCJ45A     | SMCJ45CA  | GFV     | BFV | 45.0                                    | 50.00                                  | 55.30  | 1                       | 72.7                                          | 20.63                                   | 5                                                      |
| SMCJ48A     | SMCJ48CA  | GFX     | BFX | 48.0                                    | 53.30                                  | 58.90  | 1                       | 77.4                                          | 19.38                                   | 5                                                      |
| SMCJ51A     | SMCJ51CA  | GFZ     | BFZ | 51.0                                    | 56.70                                  | 62.70  | 1                       | 82.4                                          | 18.20                                   | 5                                                      |
| SMCJ54A     | SMCJ54CA  | GGE     | BGE | 54.0                                    | 60.00                                  | 66.30  | 1                       | 87.1                                          | 17.22                                   | 5                                                      |
| SMCJ58A     | SMCJ58CA  | GGG     | BGG | 58.0                                    | 64.40                                  | 71.20  | 1                       | 93.6                                          | 16.03                                   | 5                                                      |
| SMCJ60A     | SMCJ60CA  | GGK     | BGK | 60.0                                    | 66.70                                  | 73.70  | 1                       | 96.8                                          | 15.50                                   | 5                                                      |
| SMCJ64A     | SMCJ64CA  | GGM     | BGM | 64.0                                    | 71.10                                  | 78.60  | 1                       | 103.0                                         | 14.56                                   | 5                                                      |
| SMCJ70A     | SMCJ70CA  | GGP     | BGP | 70.0                                    | 77.80                                  | 86.00  | 1                       | 113.0                                         | 13.27                                   | 5                                                      |
| SMCJ75A     | SMCJ75CA  | GGR     | BGR | 75.0                                    | 83.30                                  | 92.10  | 1                       | 121.0                                         | 12.40                                   | 5                                                      |
| SMCJ78A     | SMCJ78CA  | GGT     | BGT | 78.0                                    | 86.70                                  | 95.80  | 1                       | 126.0                                         | 11.90                                   | 5                                                      |
| SMCJ80A     | SMCJ80CA  | GGB     | BGB | 80.0                                    | 88.80                                  | 97.60  | 1                       | 129.6                                         | 11.57                                   | 5                                                      |
| SMCJ85A     | SMCJ85CA  | GGV     | BGV | 85.0                                    | 94.40                                  | 104.00 | 1                       | 137.0                                         | 10.95                                   | 5                                                      |
| SMCJ90A     | SMCJ90CA  | GGX     | BGX | 90.0                                    | 100.00                                 | 111.00 | 1                       | 146.0                                         | 10.27                                   | 5                                                      |
| SMCJ100A    | SMCJ100CA | GGZ     | BGZ | 100.0                                   | 111.00                                 | 123.00 | 1                       | 162.0                                         | 9.26                                    | 5                                                      |
| SMCJ110A    | SMCJ110CA | GHE     | BHE | 110.0                                   | 122.00                                 | 135.00 | 1                       | 177.0                                         | 8.47                                    | 5                                                      |
| SMCJ120A    | SMCJ120CA | GHG     | BHG | 120.0                                   | 133.00                                 | 147.00 | 1                       | 193.0                                         | 7.77                                    | 5                                                      |
| SMCJ130A    | SMCJ130CA | GHK     | BHK | 130.0                                   | 144.00                                 | 159.00 | 1                       | 209.0                                         | 7.18                                    | 5                                                      |
| SMCJ140A    | SMCJ140CA | GHB     | BHB | 140.0                                   | 155.00                                 | 171.00 | 1                       | 226.8                                         | 6.61                                    | 5                                                      |
| SMCJ150A    | SMCJ150CA | GHM     | BHM | 150.0                                   | 167.00                                 | 185.00 | 1                       | 243.0                                         | 6.17                                    | 5                                                      |
| SMCJ160A    | SMCJ160CA | GHP     | BHP | 160.0                                   | 178.00                                 | 197.00 | 1                       | 259.0                                         | 5.79                                    | 5                                                      |
| SMCJ170A    | SMCJ170CA | GHR     | BHR | 170.0                                   | 189.00                                 | 209.00 | 1                       | 275.0                                         | 5.45                                    | 5                                                      |
| SMCJ180A    | SMCJ180CA | GHT     | BHT | 180.0                                   | 201.00                                 | 220.00 | 1                       | 291.6                                         | 5.14                                    | 5                                                      |
| SMCJ190A    | SMCJ190CA | GHV     | BHV | 190.0                                   | 211.00                                 | 232.00 | 1                       | 307.8                                         | 4.87                                    | 5                                                      |
| SMCJ200A    | SMCJ200CA | GHW     | BHW | 200.0                                   | 224.00                                 | 247.00 | 1                       | 324.0                                         | 4.60                                    | 5                                                      |
| SMCJ220A    | SMCJ220CA | GHX     | BHX | 220.0                                   | 246.00                                 | 272.00 | 1                       | 356.0                                         | 4.20                                    | 5                                                      |
| SMCJ250A    | SMCJ250CA | GHZ     | BHZ | 250.0                                   | 279.00                                 | 309.00 | 1                       | 405.0                                         | 3.70                                    | 5                                                      |
| SMCJ300A    | SMCJ300CA | GJE     | BJE | 300.0                                   | 335.00                                 | 371.00 | 1                       | 486.0                                         | 3.10                                    | 5                                                      |
| SMCJ350A    | SMCJ350CA | GJG     | BJG | 350.0                                   | 391.00                                 | 432.00 | 1                       | 567.0                                         | 2.60                                    | 5                                                      |
| SMCJ400A    | SMCJ400CA | GJK     | BJK | 400.0                                   | 447.00                                 | 494.00 | 1                       | 648.0                                         | 2.30                                    | 5                                                      |
| SMCJ440A    | SMCJ440CA | GJM     | BJM | 440.0                                   | 492.00                                 | 543.00 | 1                       | 713.0                                         | 2.10                                    | 5                                                      |

**Note:**

1. Suffix 'A' denotes 5% tolerance device.
2. Add suffix 'CA' after part number to specify Bi-Directional devices.
3. For Bi-Directional devices having  $V_{BR}$  of 10 volts and under, the  $I_R$  limit is double.





## Description

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

## Features

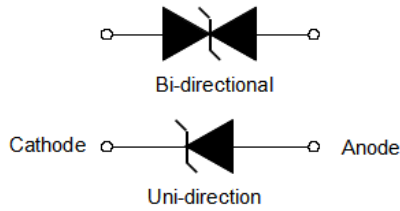
- ◆ For surface mounted applications in order to optimize board space
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Glass passivated junction
- ◆ Low inductance
- ◆ Excellent clamping capability
- ◆ 1500W Peak power capability at  $10 \times 1000\mu\text{s}$  waveform Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to  $V_{BR}$  min
- ◆ Typical  $I_R$  less than 5 $\mu\text{A}$  above 12V.
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient  $\Delta V_{BR} = 0.1\% \times V_{BR@25^\circ\text{C}} \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ 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
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)

## Applications

TVS devices 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



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

| Parameter                                                                                    | Symbol         | Value          | Unit             |
|----------------------------------------------------------------------------------------------|----------------|----------------|------------------|
| Peak Pulse Power Dissipation with a 10/1000 $\mu\text{s}$ waveform (Fig.1)(Note 1), (Note 2) | $P_{PPM}$      | 1500           | Watts            |
| Peak Pulse Current with a 10/1000 $\mu\text{s}$ waveform (Note1, Fig.3)                      | $I_{PP}$       | See Next Table | Amps             |
| Power Dissipation on Infinite Heat Sink at $T_C=75^\circ\text{C}$                            | $P_{MAV}$      | 6.5            | Watt             |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)                             | $I_{FSM}$      | 200            | Amps             |
| Maximum Instantaneous Forward Voltage at 25A for Unidirectional Only (Note 4)                | $V_F$          | 3.5/5.0        | Voltage          |
| Operating junction and Storage Temperature Range.                                            | $T_J, T_{STG}$ | -55 to +150    | $^\circ\text{C}$ |

### Notes:

1. Non-repetitive current pulse, per Fig. 3 and derated above  $T_A = 25^\circ\text{C}$  per Fig. 2.
2. Mounted on 5.0mmx5.0mm(0.03mmthick) Copper Pads to each terminal.
3. 8.3ms single half sine-wave, or equivalent square wave, Duty cycle = 4 pulses per minutes maximum.
4.  $V_F < 3.5\text{V}$  for  $V_{BR} < 200\text{V}$  and  $V_F < 6.5\text{V}$  for  $V_{BR} > 201\text{V}$ .

Figure 1 - Peak Pulse Power Rating Curve

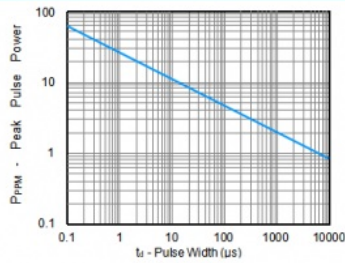


Figure 2 - Pulse Derating Curve

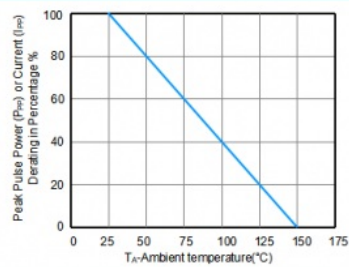


Figure 3 - Pulse Waveform

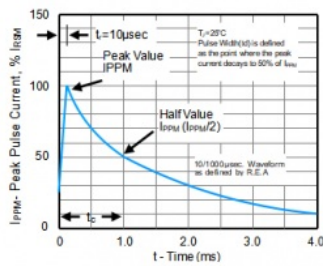


Figure 4 - Typical Junction Capacitance

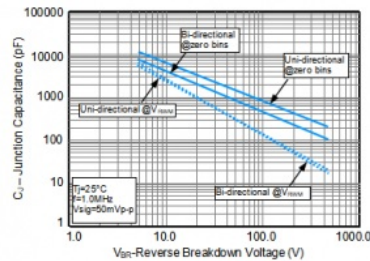


Figure 5 - Steady State Power Derating Curve

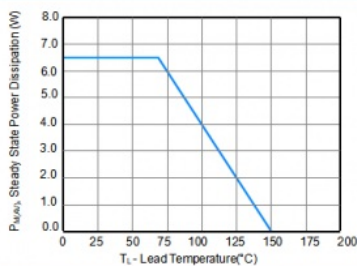
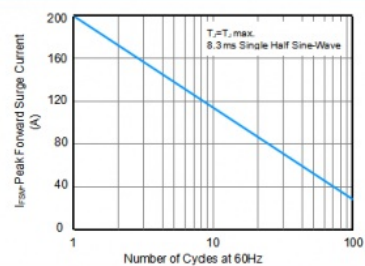
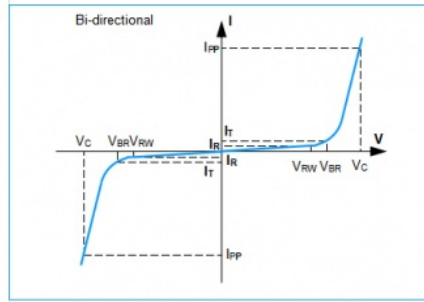
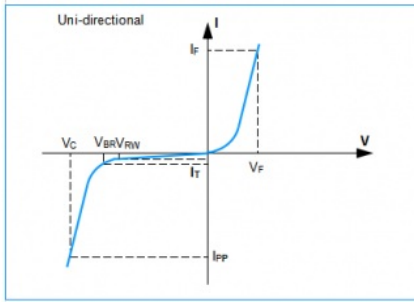


Figure 6 - Maximum Non-Repetitive Surge Current



## I-V Curve Characteristics



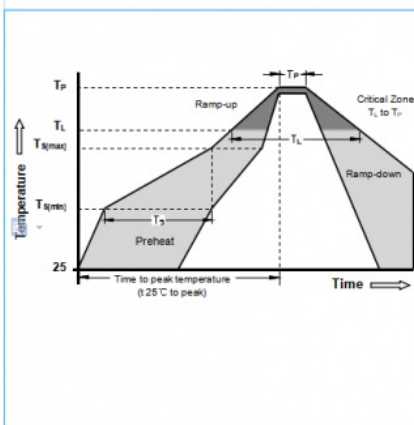
## Physical Specifications

|          |                                                              |
|----------|--------------------------------------------------------------|
| Weight   | 0.007 ounce, 0.21 gram                                       |
| Case     | JEDEC DO-214AB Molded Plastic over glass passivated junction |
| Polarity | Color band denotes cathode except Bipolar                    |
| Terminal | Matte Tin-plated leads, Solderable per JESD22-B102D          |

## Environmental Specifications

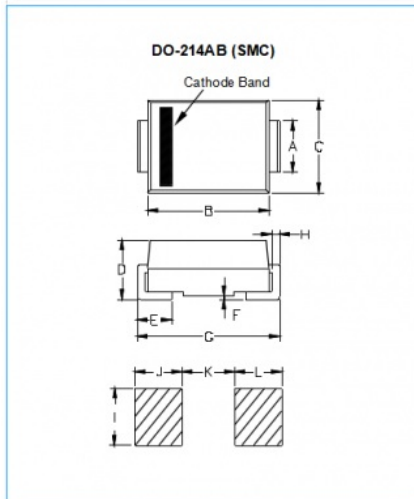
|                    |             |
|--------------------|-------------|
| Temperature Cycle  | JESD22-A104 |
| Pressure Cooker    | JESD22-A102 |
| High Temp. Storage | JESD22-A103 |
| HTRB               | JESD22-A108 |
| Thermal Shock      | JESD22-A106 |

## Soldering Parameters



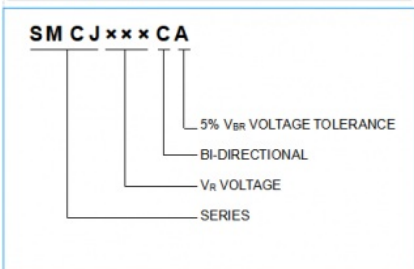
| Reflow Condition                                     |                                    | Lead-free assembly |
|------------------------------------------------------|------------------------------------|--------------------|
| Pre Heat                                             | -Temperature Min ( $T_{s(min)}$ )  | 150°C              |
|                                                      | -Temperature Max ( $T_{s(max)}$ )  | 200°C              |
|                                                      | -Time (min to max) ( $T_s$ )       | 60 - 180 Seconds   |
| 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 ±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              |

## Dimensions

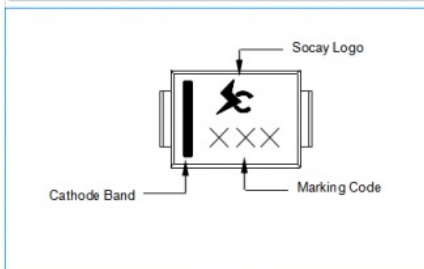


| Dimensions | Inches |       | Millimeters |       |
|------------|--------|-------|-------------|-------|
|            | Min    | Max   | Min         | Max   |
| A          | 0.108  | 0.126 | 2.750       | 3.200 |
| B          | 0.260  | 0.280 | 6.520       | 7.110 |
| C          | 0.217  | 0.244 | 5.520       | 6.220 |
| D          | 0.080  | 0.112 | 2.050       | 2.850 |
| E          | 0.030  | 0.060 | 0.750       | 1.520 |
| F          | -      | 0.008 | -           | 0.203 |
| G          | 0.305  | 0.320 | 7.640       | 8.130 |
| H          | 0.006  | 0.012 | 0.150       | 0.310 |
| I          | 0.121  | -     | 3.070       | -     |
| J          | 0.068  | -     | 1.715       | -     |
| K          | -      | 0.185 | -           | 4.690 |
| L          | 0.068  | -     | 1.715       | -     |

## Part Numbering



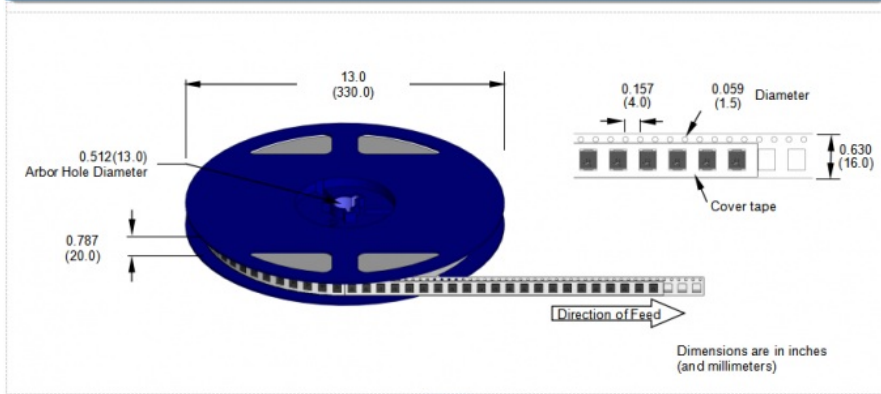
## Part Marking



### Packaging

| Part Number | Component Package | Reel (pcs) | Per Carton (pcs) | Packaging Option           | Reel Diameters (mm) |
|-------------|-------------------|------------|------------------|----------------------------|---------------------|
| SMCJXXXX    | DO-214AB (SMC)    | 3000       | 48000            | Tape & Reel - 20mm/13"tape | 330.0               |

### Tape and Reel Specifications



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