



**THE DATASHEET OF  
SMLJ160CA**





## Features

- RoHS compliant\*
- Surface Mount SMC package
- Standoff Voltage: 5.0 to 170 volts
- Power Dissipation: 3000 watts
- Typical temperature coefficient:  
 $\Delta V_{BR} = 0.1 \% \times V_{BR} @ 25\text{ }^{\circ}\text{C} \times \Delta T$

## Applications

- IEC 61000-4-2 ESD (Min. Level 4)
- IEC 61000-4-4 EFT
- IEC 61000-4-5 Surge

# SMLJ Transient Voltage Suppressor Diode Series

### General Information

The markets of portable communications, computing and video equipment are challenging the semiconductor industry to develop increasingly smaller electronic components.

Bourns offers Transient Voltage Suppressor Diodes for surge and ESD protection applications, in compact chip package DO-214AB (SMC) size format. The Transient Voltage Suppressor series offers a choice of Working Peak Reverse Voltage from 5 V up to 170 V and Breakdown Voltage up to 200 V. Typical fast response times are less than 1.0 ps for unidirectional devices and less than 5.0 ps for bidirectional devices from 0 V to Minimum Breakdown Voltage.

Bourns® Chip Diodes conform to JEDEC standards, are easy to handle with standard pick and place equipment and the flat configuration minimizes roll away.

### Additional Information

Click these links for more information:



### Agency Recognition

| Description |                                      |
|-------------|--------------------------------------|
| UL          | File Number: <a href="#">E153537</a> |

### Electrical Characteristics (@ T<sub>A</sub> = 25 °C Unless Otherwise Noted)

| Parameter  | Symbol             | Value       | Unit  |
|--|--------------------|-------------|-------|
| Minimum Peak Pulse Power Dissipation (T <sub>p</sub> = 1 ms) (Note 1,2)  | P <sub>PK</sub>    | 3000        | Watts |
| Peak Forward Surge Current<br>8.3 ms Single Half Sine Wave Superimposed on Rated Load<br>(JEDEC Method) (Note 3) | I <sub>FSM</sub>   | 300         | Amps  |
| Steady State Power Dissipation @ T <sub>L</sub> = 75 °C  | P <sub>M(AV)</sub> | 5.0         | Watts |
| Maximum Instantaneous Forward Voltage @ I <sub>pp</sub> = 100 A<br>(For Unidirectional Units Only)               | V <sub>F</sub>     | 3.5<br>5.0  | Volts |
| Operating Temperature Range  | T <sub>J</sub>     | -55 to +150 | °C    |
| Storage Temperature Range  | T <sub>STG</sub>   | -55 to +150 | °C    |

1. Non-repetitive current pulse, per Pulse Waveform graph and derated above T<sub>A</sub> = 25 °C per Pulse Derating Curve.
2. Thermal Resistance Junction to Lead.
3. 8.3 ms Single Sine Wave duty cycle = 4 pulses maximum per minute (unidirectional units only).



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### How to Order

|                              |  |
|------------------------------|--|
|                              | <b>SMLJ 5.0 CA - H</b>   |
| Package                      | SMLJ = SMC/DO-214AB  |
| Working Peak Reverse Voltage | 5.0 = 5.0 V <sub>RWM</sub> (Volts)   |
| Suffix                       | A = 5 % Tolerance Unidirectional Device<br>CA = 5 % Tolerance Bidirectional Device |
| Reel                         | (blank) = 13 inch reel<br>-H = 7 inch reel   |



**WARNING Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)**

\*RoHS Directive 2015/863, Mar 31, 2015 and Annex.

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# SMLJ Transient Voltage Suppressor Diode Series

# BOURNS®

## Electrical Characteristics (@ T<sub>A</sub> = 25 °C Unless Otherwise Noted)

| Unidirectional Device |              | Bidirectional Device |              | Breakdown Voltage V <sub>BR</sub> (Volts) |      |                       | Working Peak Reverse Voltage | Maximum Reverse Leakage @ V <sub>RWM</sub> | Maximum Clamping Voltage @ I <sub>pp</sub> (10/1000 μs) | Maximum Peak Pulse Current (10/1000 μs) | Maximum Clamping Voltage @ I <sub>pp</sub> (8/20 μs) | Maximum Peak Pulse Current (8/20 μs) |
|-----------------------|--------------|----------------------|--------------|---|------|-----------------------|------------------------------|--|---|---|--|--------------------------------------|
| Part Number           | Part Marking | Part Number          | Part Marking | Min.                                      | Max. | @ I <sub>T</sub> (mA) | V <sub>RWM</sub> (V)         | I <sub>R</sub> (μA)                        | V <sub>C</sub> (V)                                      | I <sub>pp</sub> (A)                     | V <sub>C</sub> (V)                                   | I <sub>pp</sub> (A)                  |
| SMLJ5.0A              | HDE          | SMLJ5.0CA            | IDE          | 6.40                                      | 7.00 | 10                    | 5                            | 1000                                       | 9.2   | 326.00                                  | 12.00  | 1630.50                              |
| SMLJ6.0A              | HDG          | SMLJ6.0CA            | IDG          | 6.67                                      | 7.37 | 10                    | 6                            | 1000                                       | 10.3  | 291.30                                  | 13.40  | 1456.50                              |
| SMLJ6.5A              | HDK          | SMLJ6.5CA            | IDK          | 7.22                                      | 7.98 | 10                    | 6.5                          | 500  | 11.2  | 267.90                                  | 14.60  | 1339.50                              |
| SMLJ7.0A              | HDM          | SMLJ7.0CA            | IDM          | 7.78                                      | 8.60 | 10                    | 7                            | 200  | 12  | 250.00                                  | 15.60  | 1250.00                              |
| SMLJ7.5A              | HDP          | SMLJ7.5CA            | IDP          | 8.33                                      | 9.21 | 1                     | 7.5                          | 100  | 12.9  | 232.60                                  | 16.80  | 1163.00                              |
| SMLJ8.0A              | HDR          | SMLJ8.0CA            | IDR          | 8.89                                      | 9.83 | 1                     | 8                            | 50   | 13.6  | 220.60                                  | 17.70  | 1103.00                              |
| SMLJ8.5A              | HDT          | SMLJ8.5CA            | IDT          | 9.44                                      | 10.4 | 1                     | 8.5                          | 25   | 14.4  | 208.40                                  | 18.70  | 1041.50                              |
| SMLJ9.0A              | HDV          | SMLJ9.0CA            | IDV          | 10.0                                      | 11.1 | 1                     | 9                            | 10   | 15.4  | 194.80                                  | 20.00  | 974.00                               |
| SMLJ10A               | HDX          | SMLJ10CA             | IDX          | 11.1                                      | 12.3 | 1                     | 10                           | 5  | 17  | 176.40                                  | 22.10  | 882.50                               |
| SMLJ11A               | HDZ          | SMLJ11CA             | IDZ          | 12.2                                      | 13.5 | 1                     | 11                           | 5  | 18.2  | 164.80                                  | 23.70  | 824.00                               |
| SMLJ12A               | HEE          | SMLJ12CA             | IEE          | 13.3                                      | 14.7 | 1                     | 12                           | 2  | 19.9  | 150.60                                  | 25.90  | 754.00                               |
| SMLJ13A               | HEG          | SMLJ13CA             | IEG          | 14.4                                      | 15.9 | 1                     | 13                           | 2  | 21.5  | 139.40                                  | 28.00  | 697.50                               |
| SMLJ14A               | HEK          | SMLJ14CA             | IEK          | 15.6                                      | 17.2 | 1                     | 14                           | 2  | 23.2  | 129.40                                  | 30.20  | 646.50                               |
| SMLJ15A               | HEM          | SMLJ15CA             | IEM          | 16.7                                      | 18.5 | 1                     | 15                           | 2  | 24.4  | 123.00                                  | 31.70  | 615.00                               |
| SMLJ16A               | HEP          | SMLJ16CA             | IEP          | 17.8                                      | 19.7 | 1                     | 16                           | 2  | 26  | 115.40                                  | 33.80  | 577.00                               |
| SMLJ17A               | HER          | SMLJ17CA             | IER          | 18.9                                      | 20.9 | 1                     | 17                           | 2  | 27.6  | 106.60                                  | 35.90  | 543.50                               |
| SMLJ18A               | HET          | SMLJ18CA             | IET          | 20.0                                      | 22.1 | 1                     | 18                           | 2  | 29.2  | 102.80                                  | 38.00  | 513.50                               |
| SMLJ20A               | HEV          | SMLJ20CA             | IEV          | 22.2                                      | 24.5 | 1                     | 20                           | 2  | 32.4  | 92.60                                   | 42.10  | 463.00                               |
| SMLJ22A               | HEX          | SMLJ22CA             | IEX          | 24.4                                      | 26.9 | 1                     | 22                           | 2  | 35.5  | 84.40                                   | 46.20  | 422.50                               |
| SMLJ24A               | HEZ          | SMLJ24CA             | IEZ          | 26.7                                      | 29.5 | 1                     | 24                           | 2  | 38.9  | 77.20                                   | 50.60  | 385.50                               |
| SMLJ26A               | HFE          | SMLJ26CA             | IFE          | 28.9                                      | 31.9 | 1                     | 26                           | 2  | 42.1  | 71.20                                   | 54.70  | 356.50                               |
| SMLJ28A               | HFG          | SMLJ28CA             | IFG          | 31.1                                      | 34.4 | 1                     | 28                           | 2  | 45.4  | 66.00                                   | 59.00  | 330.50                               |
| SMLJ30A               | HFK          | SMLJ30CA             | IFK          | 33.3                                      | 36.8 | 1                     | 30                           | 2  | 48.4  | 62.00                                   | 62.90  | 310.00                               |
| SMLJ33A               | HFM          | SMLJ33CA             | IFM          | 36.7                                      | 40.6 | 1                     | 33                           | 2  | 53.3  | 56.20                                   | 69.30  | 281.50                               |
| SMLJ36A               | HFP          | SMLJ36CA             | IFP          | 40  | 44.2 | 1                     | 36                           | 2  | 58.1  | 51.60                                   | 75.50  | 258.00                               |
| SMLJ40A               | HFR          | SMLJ40CA             | IFR          | 44.4                                      | 49.1 | 1                     | 40                           | 2  | 64.5  | 46.40                                   | 83.90  | 232.50                               |
| SMLJ43A               | HFT          | SMLJ43CA             | IFT          | 47.8                                      | 52.8 | 1                     | 43                           | 2  | 69.4  | 43.20                                   | 90.20  | 216.00                               |
| SMLJ45A               | HFV          | SMLJ45CA             | IFV          | 50  | 55.3 | 1                     | 45                           | 2  | 72.7  | 41.20                                   | 94.50  | 206.50                               |
| SMLJ48A               | HFX          | SMLJ48CA             | IFX          | 53.3                                      | 58.9 | 1                     | 48                           | 2  | 77.4  | 38.80                                   | 100.60   | 194.00                               |
| SMLJ51A               | HFZ          | SMLJ51CA             | IFZ          | 56.7                                      | 62.7 | 1                     | 51                           | 2  | 82.4  | 36.40                                   | 107.10   | 182.00                               |
| SMLJ54A               | HGE          | SMLJ54CA             | IGE          | 60  | 66.3 | 1                     | 54                           | 2  | 87.1  | 34.40                                   | 113.20   | 172.00                               |
| SMLJ58A               | HGG          | SMLJ58CA             | IGG          | 64.4                                      | 71.2 | 1                     | 58                           | 2  | 93.6  | 32.00                                   | 121.70   | 160.50                               |
| SMLJ60A               | HGK          | SMLJ60CA             | IGK          | 66.7                                      | 73.7 | 1                     | 60                           | 2  | 96.8  | 31.00                                   | 125.80   | 155.00                               |
| SMLJ64A               | HGM          | SMLJ64CA             | IGM          | 71.1                                      | 78.6 | 1                     | 64                           | 2  | 103   | 29.20                                   | 133.90   | 145.50                               |
| SMLJ70A               | HGP          | SMLJ70CA             | IGP          | 77.8                                      | 86.0 | 1                     | 70                           | 2  | 113   | 26.60                                   | 146.90   | 132.50                               |
| SMLJ75A               | HGR          | SMLJ75CA             | IGR          | 83.3                                      | 92.1 | 1                     | 75                           | 2  | 121   | 24.80                                   | 157.30   | 124.00                               |
| SMLJ78A               | HGT          | SMLJ78CA             | IGT          | 86.7                                      | 95.8 | 1                     | 78                           | 2  | 126   | 22.80                                   | 163.80   | 119.00                               |
| SMLJ85A               | HGV          | SMLJ85CA             | IGV          | 94.4                                      | 104  | 1                     | 85                           | 2  | 137   | 20.80                                   | 178.10   | 109.50                               |
| SMLJ90A               | HGX          | SMLJ90CA             | IGX          | 100                                       | 111  | 1                     | 90                           | 2  | 146   | 20.60                                   | 189.80   | 102.50                               |
| SMLJ100A              | HGZ          | SMLJ100CA            | IGZ          | 111                                       | 123  | 1                     | 100                          | 2  | 162   | 18.60                                   | 210.60   | 92.50                                |
| SMLJ110A              | HHE          | SMLJ110CA            | IHE          | 122                                       | 135  | 1                     | 110                          | 2  | 177   | 16.80                                   | 230.10   | 84.50                                |
| SMLJ120A              | HHG          | SMLJ120CA            | IHG          | 133                                       | 147  | 1                     | 120                          | 2  | 193   | 15.60                                   | 250.90   | 77.50                                |
| SMLJ130A              | HHH          | SMLJ130CA            | IHH          | 144                                       | 159  | 1                     | 130                          | 2  | 209   | 14.40                                   | 271.70   | 72.00                                |
| SMLJ150A              | HHM          | SMLJ150CA            | IHM          | 167                                       | 185  | 1                     | 150                          | 2  | 243   | 12.40                                   | 315.90   | 61.50                                |
| SMLJ160A              | HHP          | SMLJ160CA            | IHP          | 178                                       | 197  | 1                     | 160                          | 2  | 259   | 11.60                                   | 336.70   | 58.00                                |
| SMLJ170A              | HHR          | SMLJ170CA            | IHR          | 189                                       | 209  | 1                     | 170                          | 2  | 275   | 11.00                                   | 357.50   | 54.50                                |

### Notes:

1. Suffix 'A' denotes a 5 % tolerance unidirectional device.
2. Suffix 'CA' denotes a 5 % tolerance bidirectional device.
3. For bidirectional devices with a V<sub>R</sub> of 10 volts or less, the I<sub>R</sub> limit is double.

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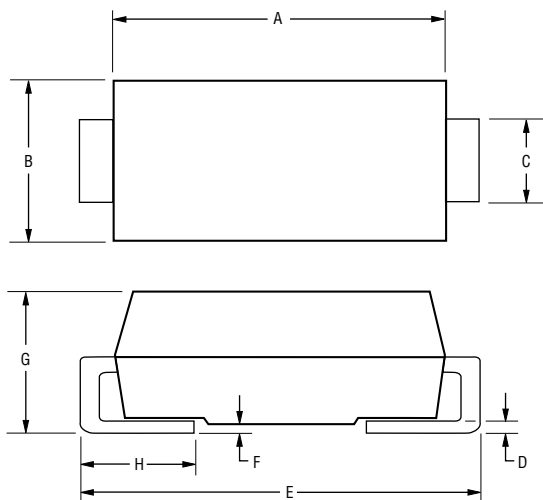
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# SMLJ Transient Voltage Suppressor Diode Series



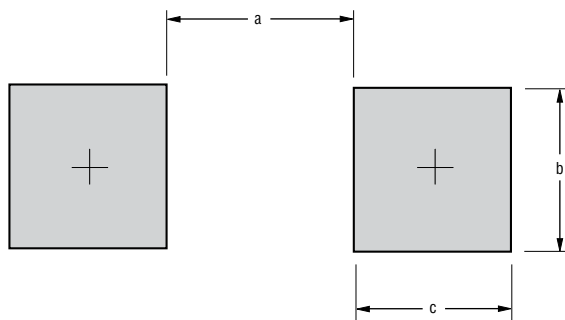
## Product Dimensions



| Dimension | SMC (DO-214AB)                        |
|-----------|---------------------------------------|
| A         | $\frac{6.60 - 7.11}{(0.260 - 0.280)}$ |
| B         | $\frac{5.59 - 6.22}{(0.220 - 0.245)}$ |
| C         | $\frac{2.90 - 3.20}{(0.114 - 0.126)}$ |
| D         | $\frac{0.15 - 0.31}{(0.006 - 0.012)}$ |
| E         | $\frac{7.75 - 8.13}{(0.305 - 0.320)}$ |
| F         | $\frac{0.05 - 0.20}{(0.002 - 0.008)}$ |
| G         | $\frac{2.00 - 2.62}{(0.079 - 0.103)}$ |
| H         | $\frac{0.76 - 1.52}{(0.030 - 0.060)}$ |

DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

## Recommended Footprint



| Dimension | SMC (DO-214AB)         |
|-----------|------------------------|
| a (Max.)  | $\frac{4.69}{(0.185)}$ |
| b (Min.)  | $\frac{3.07}{(0.121)}$ |
| c (Min.)  | $\frac{1.52}{(0.060)}$ |

DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

## Physical Specifications

Case ..... Molded plastic per UL Class 94V-0  
 Polarity.....Cathode band indicates unidirectional device  
 No cathode band indicates bidirectional device

# SMLJ Transient Voltage Suppressor Diode Series



## Rating & Characteristic Curves

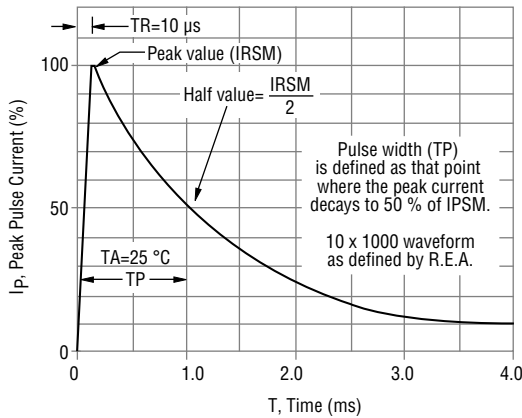
### Pulse Derating Curve



### Maximum Non-Repetitive Surge Current



### Pulse Waveform



### Typical Junction Capacitance



### Pulse Rating Curve



### Steady State Power Derating Curve



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# SMLJ Transient Voltage Suppressor Diode Series

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## Packaging Information

The product will be dispensed in tape and reel format (see diagram below).



DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

Devices are packed in accordance with EIA standard RS-481-A and specifications shown here.

| Item                   | Symbol         | SMC (DO-214AB)                                     |                        |
|------------------------|----------------|--|------------------------|
|                        |                | 7 Inch Reel  | 13 Inch Reel           |
| Carrier Width          | A              | $\frac{6.0 \pm 2.0}{(0.236 - 0.079)}$              |                        |
| Carrier Length         | B              | $\frac{8.3 \pm 0.20}{(0.327 \pm 0.008)}$           |                        |
| Carrier Depth          | C              | $\frac{2.5 \pm 0.20}{(0.098 \pm 0.008)}$           |                        |
| Sprocket Hole          | d              | $\frac{1.50 \pm 0.10}{(0.059 \pm 0.004)}$          |                        |
| Reel Outside Diameter  | D              | $\frac{178}{(7.008)}$                              | $\frac{330}{(12.992)}$ |
| Reel Inner Diameter    | D <sub>1</sub> | $\frac{50.0}{(1.969)}$ MIN.                        |                        |
| Feed Hole Diameter     | D <sub>2</sub> | $\frac{13.0 + 0.50/-0.20}{(0.512 + 0.020/-0.008)}$ |                        |
| Sprocket Hole Position | E              | $\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$          |                        |
| Punch Hole Position    | F              | $\frac{7.50 \pm 0.10}{(0.295 \pm 0.004)}$          |                        |
| Punch Hole Pitch       | P              | $\frac{8.00 \pm 0.10}{(0.315 \pm 0.004)}$          |                        |
| Sprocket Hole Pitch    | P <sub>0</sub> | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$          |                        |
| Embossment Center      | P <sub>1</sub> | $\frac{2.00 \pm 0.10}{(0.079 \pm 0.004)}$          |                        |
| Overall Tape Thickness | T              | $\frac{0.30 \pm 0.10}{(0.012 \pm 0.004)}$          |                        |
| Tape Width             | W              | $\frac{16.00 \pm 0.30}{(0.630 \pm 0.012)}$         |                        |
| Reel Width             | W <sub>1</sub> | $\frac{22.4}{(0.882)}$ MAX.                        |                        |
| Quantity per Reel      | --             | 500  | 3,000                  |

REV. 02/21

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