

# SMBJ 5.0C - 170CA

**V<sub>BR</sub> : 6.8 - 200 Volts**

**P<sub>PK</sub> : 600 Watts**

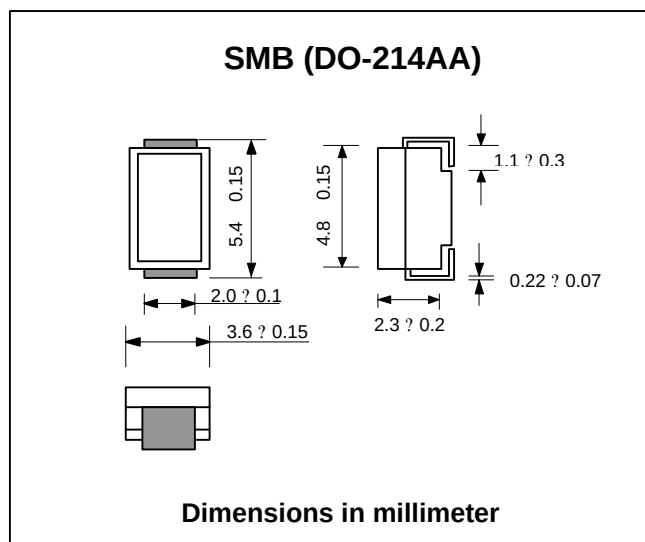
## FEATURES :

- \* 600W surge capability at 1ms
- \* Excellent clamping capability
- \* Low inductance
- \* Response Time Typically < 1ns
- \* Typical I<sub>R</sub> less then 1μA above 10V

## MECHANICAL DATA

- \* Case : SMB Molded plastic
- \* Epoxy : UL94V-O rate flame retardant
- \* Lead : Lead Formed for Surface Mount
- \* Mounting position : Any
- \* Weight : 0.109 gram

# BIDIRECTIONAL TRANSIENT VOLTAGE SUPPRESSOR



## MAXIMUM RATINGS

Rating at T<sub>a</sub> = 25 °C ambient temperature unless otherwise specified.

| Rating                                                                      | Symbol                            | Value         | Units |
|-----------------------------------------------------------------------------|-----------------------------------|---------------|-------|
| Peak Pulse Power Dissipation on 10/1000μs (1) waveform (Notes 1, 2, Fig. 4) | P <sub>PPM</sub>                  | Minimum 600   | Watts |
| Peak Pulse Current on 10/1000μs waveform (Note 1, Fig. 3)                   | I <sub>PPM</sub>                  | See Table     | Amps  |
| Operating Junction and Storage Temperature Range                            | T <sub>J</sub> , T <sub>STG</sub> | - 55 to + 150 | °C    |

## Note :

- (1) Non-repetitive Current pulse, per Fig. 3 and derated above T<sub>a</sub> = 25 °C per Fig. 1
- (2) Mounted on 5.0mm<sup>2</sup> (0.013mm) land areas.

**UPDATE : MAY 10, 2000**

# ELECTRICAL CHARACTERISTICS

Rating at Ta = 25 °C ambient temperature unless otherwise specified

| TYPE      | Marking Code | Breakdown Voltage @ I <sub>T</sub><br>( Note 1 ) |       |                | Reverse<br>Stand-off<br>Voltage | Maximum<br>Reverse<br>Leakage<br>@ V <sub>WM</sub> | Maximum<br>Peak Pulse<br>Surge Current<br>(See Fig. 3) | Maximum<br>Clamping<br>Voltage @ I <sub>PPM</sub> |
|-----------|--------------|--------------------------------------------------|-------|----------------|---------------------------------|----------------------------------------------------|--------------------------------------------------------|---------------------------------------------------|
|           |              | V <sub>BR</sub> (V)                              |       | I <sub>T</sub> |                                 |                                                    |                                                        |                                                   |
|           |              | Min.                                             | Max.  | (mA)           |                                 |                                                    |                                                        |                                                   |
|           |              |                                                  |       | (V)            | (μA)                            | (A)                                                | (V)                                                    |                                                   |
| SMBJ5.0C  | 606I         | 6.40                                             | 7.55  | 10             | 5.0                             | 1600                                               | 62.5                                                   | 9.6                                               |
| SMBJ5.0CA | 656I         | 6.40                                             | 7.25  | 10             | 5.0                             | 1600                                               | 65.2                                                   | 9.2                                               |
| SMBJ6.0C  | 607C         | 6.67                                             | 8.45  | 10             | 6.0                             | 1600                                               | 52.6                                                   | 11.4                                              |
| SMBJ6.0CA | 657C         | 6.67                                             | 7.67  | 10             | 6.0                             | 1600                                               | 58.3                                                   | 10.3                                              |
| SMBJ6.5C  | 607I         | 7.22                                             | 9.14  | 10             | 6.5                             | 1000                                               | 48.7                                                   | 12.3                                              |
| SMBJ6.5CA | 657I         | 7.22                                             | 8.30  | 10             | 6.5                             | 1000                                               | 53.6                                                   | 11.2                                              |
| SMBJ7.0C  | 608E         | 7.78                                             | 9.86  | 10             | 7.0                             | 400                                                | 45.1                                                   | 13.3                                              |
| SMBJ7.0CA | 658E         | 7.78                                             | 8.95  | 10             | 7.0                             | 400                                                | 50.0                                                   | 12.0                                              |
| SMBJ7.5C  | 609A         | 8.33                                             | 10.67 | 1.0            | 7.5                             | 200                                                | 42.0                                                   | 14.3                                              |
| SMBJ7.5CA | 659A         | 8.33                                             | 9.58  | 1.0            | 7.5                             | 200                                                | 46.5                                                   | 12.9                                              |
| SMBJ8.0C  | 609G         | 8.89                                             | 11.3  | 1.0            | 8.0                             | 100                                                | 40.0                                                   | 15.0                                              |
| SMBJ8.0CA | 659G         | 8.89                                             | 10.23 | 1.0            | 8.0                             | 100                                                | 44.1                                                   | 13.6                                              |
| SMBJ8.5C  | 6010         | 9.44                                             | 11.92 | 1.0            | 8.5                             | 20                                                 | 37.7                                                   | 15.9                                              |
| SMBJ8.5CA | 6510         | 9.44                                             | 10.82 | 1.0            | 8.5                             | 20                                                 | 41.7                                                   | 14.4                                              |
| SMBJ9.0C  | 6011         | 10.0                                             | 12.6  | 1.0            | 9.0                             | 10                                                 | 35.5                                                   | 16.9                                              |
| SMBJ9.0CA | 6511         | 10.0                                             | 11.5  | 1.0            | 9.0                             | 10                                                 | 39.0                                                   | 15.4                                              |
| SMBJ10C   | 6012         | 11.1                                             | 14.1  | 1.0            | 10                              | 5.0                                                | 31.9                                                   | 18.8                                              |
| SMBJ10CA  | 6512         | 11.1                                             | 12.8  | 1.0            | 10                              | 5.0                                                | 35.3                                                   | 17.0                                              |
| SMBJ11C   | 6013         | 12.2                                             | 15.4  | 1.0            | 11                              | 5.0                                                | 29.9                                                   | 20.1                                              |
| SMBJ11CA  | 6513         | 12.2                                             | 14.0  | 1.0            | 11                              | 5.0                                                | 33.0                                                   | 18.2                                              |
| SMBJ12C   | 6014         | 13.3                                             | 16.9  | 1.0            | 12                              | 5.0                                                | 27.3                                                   | 22.0                                              |
| SMBJ12CA  | 6514         | 13.3                                             | 15.3  | 1.0            | 12                              | 5.0                                                | 30.2                                                   | 19.9                                              |
| SMBJ13C   | 6015         | 14.4                                             | 18.2  | 1.0            | 13                              | 5.0                                                | 25.2                                                   | 23.8                                              |
| SMBJ13CA  | 6515         | 14.4                                             | 16.5  | 1.0            | 13                              | 5.0                                                | 27.9                                                   | 21.5                                              |
| SMBJ14C   | 6017         | 15.6                                             | 19.8  | 1.0            | 14                              | 5.0                                                | 23.3                                                   | 25.8                                              |
| SMBJ14CA  | 6517         | 15.6                                             | 17.9  | 1.0            | 14                              | 5.0                                                | 25.8                                                   | 23.2                                              |
| SMBJ15C   | 6018         | 16.7                                             | 21.1  | 1.0            | 15                              | 5.0                                                | 22.3                                                   | 26.9                                              |
| SMBJ15CA  | 6518         | 16.7                                             | 19.2  | 1.0            | 15                              | 5.0                                                | 24.0                                                   | 24.4                                              |
| SMBJ16C   | 6019         | 17.8                                             | 22.6  | 1.0            | 16                              | 5.0                                                | 20.8                                                   | 28.8                                              |
| SMBJ16CA  | 6519         | 17.8                                             | 20.5  | 1.0            | 16                              | 5.0                                                | 23.1                                                   | 26.0                                              |
| SMBJ17C   | 6020         | 18.9                                             | 23.9  | 1.0            | 17                              | 5.0                                                | 19.7                                                   | 30.5                                              |
| SMBJ17CA  | 6520         | 18.9                                             | 21.7  | 1.0            | 17                              | 5.0                                                | 21.7                                                   | 27.6                                              |
| SMBJ18C   | 6022         | 20.0                                             | 25.3  | 1.0            | 18                              | 5.0                                                | 18.6                                                   | 32.2                                              |
| SMBJ18CA  | 6522         | 20.0                                             | 23.3  | 1.0            | 18                              | 5.0                                                | 20.5                                                   | 29.2                                              |
| SMBJ20C   | 6024         | 22.2                                             | 28.1  | 1.0            | 20                              | 5.0                                                | 16.7                                                   | 35.8                                              |
| SMBJ20CA  | 6524         | 22.2                                             | 25.5  | 1.0            | 20                              | 5.0                                                | 18.5                                                   | 32.4                                              |
| SMBJ22C   | 6026         | 24.4                                             | 30.9  | 1.0            | 22                              | 5.0                                                | 15.2                                                   | 39.4                                              |
| SMBJ22CA  | 6526         | 24.4                                             | 28.0  | 1.0            | 22                              | 5.0                                                | 16.9                                                   | 35.5                                              |
| SMBJ24C   | 6029         | 26.7                                             | 33.8  | 1.0            | 24                              | 5.0                                                | 14.0                                                   | 43.0                                              |
| SMBJ24CA  | 6529         | 26.7                                             | 30.7  | 1.0            | 24                              | 5.0                                                | 15.4                                                   | 38.9                                              |
| SMBJ26C   | 6031         | 28.9                                             | 36.6  | 1.0            | 26                              | 5.0                                                | 12.4                                                   | 46.6                                              |
| SMBJ26CA  | 6531         | 28.9                                             | 33.2  | 1.0            | 26                              | 5.0                                                | 14.2                                                   | 42.1                                              |
| SMBJ28C   | 6033         | 31.1                                             | 39.4  | 1.0            | 28                              | 5.0                                                | 12.0                                                   | 50.0                                              |
| SMBJ28CA  | 6533         | 31.1                                             | 35.8  | 1.0            | 28                              | 5.0                                                | 13.2                                                   | 45.4                                              |
| SMBJ30C   | 6036         | 33.3                                             | 42.2  | 1.0            | 30                              | 5.0                                                | 11.2                                                   | 53.5                                              |
| SMBJ30CA  | 6536         | 33.1                                             | 38.3  | 1.0            | 30                              | 5.0                                                | 12.4                                                   | 46.6                                              |

| TYPE      | Marking Code | Breakdown Voltage @ $I_T$<br>( Note 1 ) |       |       | Reverse<br>Stand-off<br>Voltage | Maximum<br>Reverse<br>Leakage<br>@ $V_{WM}$ | Maximum<br>Peak Pulse<br>Surge Current<br>(See Fig. 3) | Maximum<br>Clamping<br>Voltage @ $I_{PPM}$ |
|-----------|--------------|-----------------------------------------|-------|-------|---------------------------------|---------------------------------------------|--------------------------------------------------------|--------------------------------------------|
|           |              | $V_{BR}$ (V)                            |       | $I_T$ | $V_{WM}$                        | $I_D$                                       | $I_{PPM}$                                              | $V_C$                                      |
|           |              | Min.                                    | Max.  | (mA)  | (V)                             | ( $\mu A$ )                                 | (A)                                                    | (V)                                        |
| SMBJ33C   | 6040         | 36.7                                    | 46.5  | 1.0   | 33                              | 5.0                                         | 10.2                                                   | 59.0                                       |
| SMBJ33CA  | 6540         | 36.7                                    | 42.2  | 1.0   | 33                              | 5.0                                         | 11.3                                                   | 53.3                                       |
| SMBJ36C   | 6043         | 40.0                                    | 50.7  | 1.0   | 36                              | 5.0                                         | 9.3                                                    | 64.3                                       |
| SMBJ36CA  | 6543         | 40.0                                    | 46.0  | 1.0   | 36                              | 5.0                                         | 10.3                                                   | 58.1                                       |
| SMBJ40C   | 6048         | 44.4                                    | 56.3  | 1.0   | 40                              | 5.0                                         | 8.4                                                    | 71.4                                       |
| SMBJ40CA  | 6548         | 44.4                                    | 51.1  | 1.0   | 40                              | 5.0                                         | 9.3                                                    | 64.5                                       |
| SMBJ43C   | 6051         | 47.8                                    | 60.5  | 1.0   | 43                              | 5.0                                         | 7.8                                                    | 76.7                                       |
| SMBJ43CA  | 6551         | 47.8                                    | 54.9  | 1.0   | 43                              | 5.0                                         | 8.6                                                    | 69.4                                       |
| SMBJ45C   | 6054         | 50.0                                    | 63.3  | 1.0   | 45                              | 5.0                                         | 7.5                                                    | 80.3                                       |
| SMBJ45CA  | 6554         | 50.0                                    | 57.5  | 1.0   | 45                              | 5.0                                         | 8.3                                                    | 72.7                                       |
| SMBJ48C   | 6057         | 53.3                                    | 67.5  | 1.0   | 48                              | 5.0                                         | 7.0                                                    | 85.5                                       |
| SMBJ48CA  | 6557         | 53.3                                    | 61.3  | 1.0   | 48                              | 5.0                                         | 7.7                                                    | 77.4                                       |
| SMBJ51C   | 6061         | 56.7                                    | 71.8  | 1.0   | 51                              | 5.0                                         | 6.6                                                    | 91.1                                       |
| SMBJ51CA  | 6561         | 56.7                                    | 65.2  | 1.0   | 51                              | 5.0                                         | 7.3                                                    | 82.4                                       |
| SMBJ54C   | 6065         | 60.0                                    | 76.0  | 1.0   | 54                              | 5.0                                         | 6.2                                                    | 96.3                                       |
| SMBJ54CA  | 6565         | 60.0                                    | 69.0  | 1.0   | 54                              | 5.0                                         | 6.9                                                    | 87.1                                       |
| SMBJ58C   | 6070         | 64.4                                    | 81.6  | 1.0   | 58                              | 5.0                                         | 5.8                                                    | 103.0                                      |
| SMBJ58CA  | 6570         | 64.4                                    | 74.1  | 1.0   | 58                              | 5.0                                         | 6.4                                                    | 93.6                                       |
| SMBJ60C   | 6072         | 66.7                                    | 84.5  | 1.0   | 60                              | 5.0                                         | 5.6                                                    | 107                                        |
| SMBJ60CA  | 6572         | 66.7                                    | 76.7  | 1.0   | 60                              | 5.0                                         | 6.2                                                    | 96.8                                       |
| SMBJ64C   | 6076         | 71.1                                    | 90.1  | 1.0   | 64                              | 5.0                                         | 5.3                                                    | 114                                        |
| SMBJ64CA  | 6576         | 71.1                                    | 81.8  | 1.0   | 64                              | 5.0                                         | 5.8                                                    | 103                                        |
| SMBJ70C   | 6084         | 77.8                                    | 98.6  | 1.0   | 70                              | 5.0                                         | 4.8                                                    | 125                                        |
| SMBJ70CA  | 6584         | 77.8                                    | 89.5  | 1.0   | 70                              | 5.0                                         | 5.3                                                    | 113                                        |
| SMBJ75C   | 6090         | 83.3                                    | 105.7 | 1.0   | 75                              | 5.0                                         | 4.5                                                    | 134                                        |
| SMBJ75CA  | 6590         | 83.3                                    | 95.8  | 1.0   | 75                              | 5.0                                         | 4.9                                                    | 121                                        |
| SMBJ78C   | 6093         | 86.7                                    | 109.8 | 1.0   | 78                              | 5.0                                         | 4.3                                                    | 139                                        |
| SMBJ78CA  | 6593         | 86.7                                    | 99.7  | 1.0   | 78                              | 5.0                                         | 4.7                                                    | 126                                        |
| SMBJ85C   | 60B0         | 94.4                                    | 119.2 | 1.0   | 85                              | 5.0                                         | 3.9                                                    | 151                                        |
| SMBJ85CA  | 65B0         | 94.4                                    | 108.2 | 1.0   | 85                              | 5.0                                         | 4.4                                                    | 137                                        |
| SMBJ90C   | 60B1         | 100                                     | 126.5 | 1.0   | 90                              | 5.0                                         | 3.8                                                    | 160                                        |
| SMBJ90CA  | 65B1         | 100                                     | 115.5 | 1.0   | 90                              | 5.0                                         | 4.1                                                    | 146                                        |
| SMBJ100C  | 60B2         | 111                                     | 141.0 | 1.0   | 100                             | 5.0                                         | 3.4                                                    | 179                                        |
| SMBJ100CA | 65B2         | 111                                     | 128.0 | 1.0   | 100                             | 5.0                                         | 3.7                                                    | 162                                        |
| SMBJ110C  | 60B3         | 122                                     | 154.5 | 1.0   | 110                             | 5.0                                         | 3.0                                                    | 196                                        |
| SMBJ110CA | 65B3         | 122                                     | 140.5 | 1.0   | 110                             | 5.0                                         | 3.4                                                    | 177                                        |
| SMBJ120C  | 60B4         | 133                                     | 169.0 | 1.0   | 120                             | 5.0                                         | 2.8                                                    | 214                                        |
| SMBJ120CA | 65B4         | 133                                     | 153.0 | 1.0   | 120                             | 5.0                                         | 3.1                                                    | 193                                        |
| SMBJ130C  | 60B5         | 144                                     | 182.5 | 1.0   | 130                             | 5.0                                         | 2.6                                                    | 231                                        |
| SMBJ130CA | 65B5         | 144                                     | 165.5 | 1.0   | 130                             | 5.0                                         | 2.9                                                    | 209                                        |
| SMBJ150C  | 60B8         | 167                                     | 211.5 | 1.0   | 150                             | 5.0                                         | 2.2                                                    | 268                                        |
| SMBJ150CA | 65B8         | 167                                     | 192.5 | 1.0   | 150                             | 5.0                                         | 2.5                                                    | 243                                        |
| SMBJ160C  | 60B9         | 178                                     | 226.0 | 1.0   | 160                             | 5.0                                         | 2.1                                                    | 287                                        |
| SMBJ160CA | 65B9         | 178                                     | 205.0 | 1.0   | 160                             | 5.0                                         | 2.3                                                    | 259                                        |
| SMBJ170C  | 60D0         | 189                                     | 239.5 | 1.0   | 170                             | 5.0                                         | 2.0                                                    | 304                                        |
| SMBJ170CA | 65D0         | 189                                     | 217.5 | 1.0   | 170                             | 5.0                                         | 2.2                                                    | 275                                        |

**Note:**

- ( 1 )  $V_{BR}$  measured after  $I_T$  applied for 300  $\mu s$ .,  $I_T$  = square wave pulse or equivalent.
- ( 2 ) Surge Current Waveform per Fig. 3 and Derate per Fig. 1.
- ( 3 ) A TransZorb TVS is normally selected according to the reverse "Stand Off Voltage" ( $V_{WM}$ ) which should be equal to or greater than the DC or continuous peak operating voltage level.

RATING AND CHARACTERISTIC CURVES ( SMBJ5.0C - SMBJ170CA )

FIG.1 - PULSE DERATING CURVE

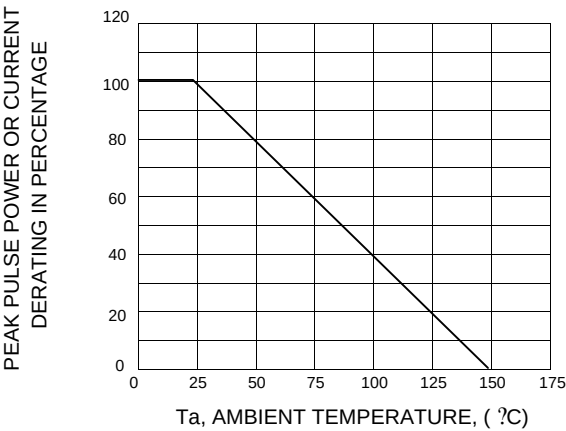


FIG.2 - TYPICAL JUNCTION CAPACITANCE

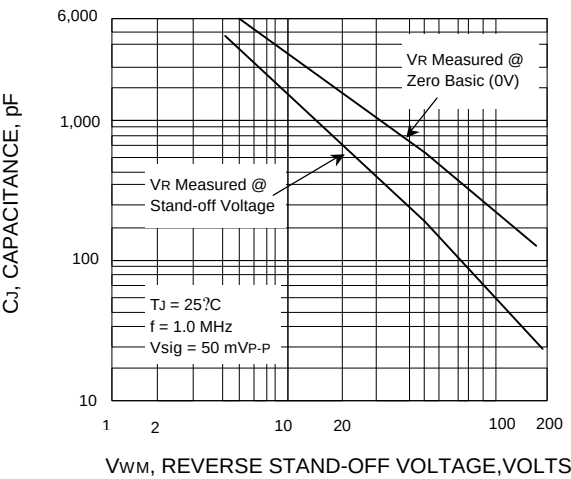


FIG.3 - PULSE WAVEFORM

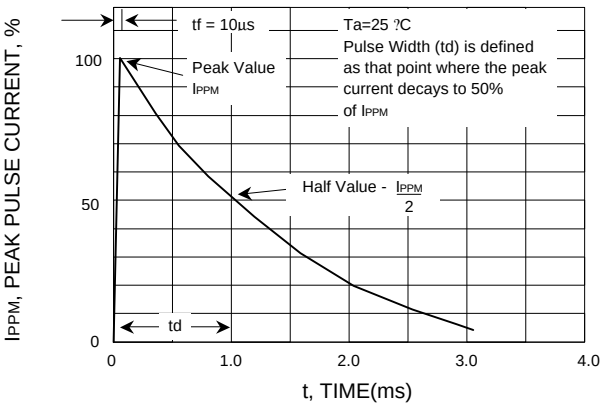


FIG.4 - PEAK PULSE POWER RATING CURVE

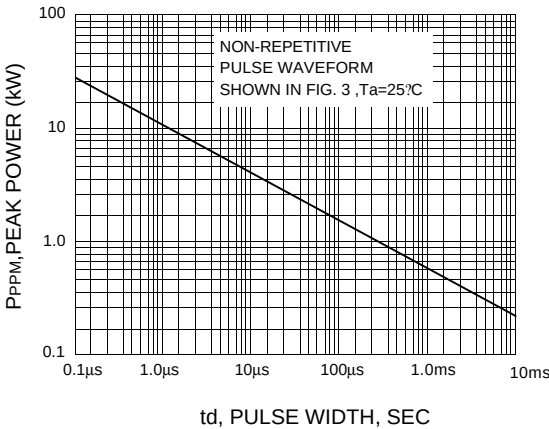


FIG.5 - MAXIMUM NON-REPETITIVE PEAK FORWARD SURGE CURRENT

