

# Transient Voltage Suppressor

## SMBJ5.0--SMBJ440CA

### Features

- Low incremental surge resistance, excellent clamping capability
- Low profile package with built-in strain relief for surface mounted applications
- 600W peak pulse power capability with a 10/1000μs Wave form, repetition rate (duty cycle): 0.01%
- Very fast response time
- High temperature soldering guaranteed: 250°C/10 seconds at terminals



### Mechanical Data

- Case: SMB molded plastic
- Molding compound, UL flammability classification rating 94V-0
- Polarity: Color band denotes cathode end

### Devices for Bidirectional Applications

- For bi-directional devices, use suffix C or CA (e.g. SMBJ10C, SMBJ10CA). Electrical characteristics apply in both directions.

### Maximum Ratings (@T<sub>A</sub> = 25°C unless otherwise specified)

| Parameter                                                                             | Symbol                            | Value           | Units |
|---------------------------------------------------------------------------------------|-----------------------------------|-----------------|-------|
| Peak power dissipation with a 10/1000μs waveform (NOTE 1,2, FIG.1)                    | P <sub>PPM</sub>                  | Minimum 600     | W     |
| Peak pulse current with a 10/1000μs waveform (NOTE 1)                                 | I <sub>PPM</sub>                  | See Table Below | A     |
| Typical thermal resistance, junction to ambient ( NOTE 2)                             | R <sub>θJA</sub>                  | 100             | °C/W  |
| Peak forward surge current, 8.3ms single half sine-wave uni-directional only (NOTE 3) | I <sub>FSM</sub>                  | 100             | A     |
| Typical thermal resistance, junction to lead                                          | R <sub>θJL</sub>                  | 20              | °C/W  |
| Operating junction and storage temperature range                                      | T <sub>J</sub> , T <sub>STG</sub> | -55---+150      | °C    |

#### NOTES:

1. Non-repetitive current pulses, per Fig. 3 and derated above T<sub>A</sub>=25 per Fig. 2.
2. Mounted on minimum recommended pad layout.
3. Mounted on 0.2 x 0.2" (5.0 x 5.0mm) copper pads to each terminal.

# Transient Voltage Suppressor

## SMBJ5.0--SMBJ440CA

### Electrical Characteristics (@T<sub>A</sub> = 25°C unless otherwise specified)

| Type     | Breakdown Voltage V <sub>BR</sub> @I <sub>T</sub> |      | Test Current   | Reverse Standoff Voltage | Max. Reverse Leakage@ V <sub>RWM</sub> | Max. Peak Pulse Current | Max. Clamping Voltage @I <sub>PP</sub> |
|----------|---------------------------------------------------|------|----------------|--------------------------|----------------------------------------|-------------------------|----------------------------------------|
|          | V                                                 |      | I <sub>T</sub> | V <sub>RWM</sub>         | I <sub>R</sub>                         | I <sub>PP</sub>         | V <sub>C</sub>                         |
|          | Min                                               | Max  | m A            | V                        | u A                                    | A                       | V                                      |
| SMBJ5.0  | 6.40                                              | 7.82 | 10             | 5.0                      | 800                                    | 62.5                    | 9.6                                    |
| SMBJ5.0A | 6.40                                              | 7.07 | 10             | 5.0                      | 800                                    | 65.2                    | 9.2                                    |
| SMBJ6.0  | 6.67                                              | 8.15 | 10             | 6.0                      | 800                                    | 52.6                    | 11.4                                   |
| SMBJ6.0A | 6.67                                              | 7.37 | 10             | 6.0                      | 800                                    | 58.3                    | 10.3                                   |
| SMBJ6.5  | 7.22                                              | 8.82 | 10             | 6.5                      | 500                                    | 48.8                    | 12.3                                   |
| SMBJ6.5A | 7.22                                              | 7.98 | 10             | 6.5                      | 500                                    | 53.6                    | 11.2                                   |
| SMBJ6.8  | 7.56                                              | 9.24 | 10             | 6.8                      | 200                                    | 49.5                    | 12.1                                   |
| SMBJ6.8A | 7.56                                              | 8.35 | 10             | 6.8                      | 200                                    | 54.6                    | 11.0                                   |
| SMBJ7.0  | 7.78                                              | 9.51 | 10             | 7.0                      | 200                                    | 45.1                    | 13.3                                   |
| SMBJ7.0A | 7.78                                              | 8.60 | 10             | 7.0                      | 200                                    | 50.0                    | 12.0                                   |
| SMBJ7.5  | 8.33                                              | 10.2 | 1.0            | 7.5                      | 100                                    | 42.0                    | 14.3                                   |
| SMBJ7.5A | 8.33                                              | 9.21 | 1.0            | 7.5                      | 100                                    | 46.5                    | 12.9                                   |
| SMBJ8.0  | 8.89                                              | 10.9 | 1.0            | 8.0                      | 50                                     | 40.0                    | 15.0                                   |
| SMBJ8.0A | 8.89                                              | 9.83 | 1.0            | 8.0                      | 50                                     | 44.1                    | 13.6                                   |
| SMBJ8.5  | 9.44                                              | 11.5 | 1.0            | 8.5                      | 20                                     | 37.7                    | 15.9                                   |
| SMBJ8.5A | 9.44                                              | 10.4 | 1.0            | 8.5                      | 20                                     | 41.7                    | 14.4                                   |
| SMBJ9.0  | 10.0                                              | 12.2 | 1.0            | 9.0                      | 10                                     | 35.5                    | 16.9                                   |
| SMBJ9.0A | 10.0                                              | 11.1 | 1.0            | 9.0                      | 10                                     | 39.0                    | 15.4                                   |
| SMBJ10   | 11.1                                              | 13.6 | 1.0            | 10                       | 5.0                                    | 31.9                    | 18.8                                   |
| SMBJ10A  | 11.1                                              | 12.3 | 1.0            | 10                       | 5.0                                    | 35.3                    | 17.0                                   |
| SMBJ11   | 12.2                                              | 14.9 | 1.0            | 11                       | 5.0                                    | 29.9                    | 20.1                                   |
| SMBJ11A  | 12.2                                              | 13.5 | 1.0            | 11                       | 5.0                                    | 33.0                    | 18.2                                   |
| SMBJ12   | 13.3                                              | 16.3 | 1.0            | 12                       | 5.0                                    | 27.3                    | 22.0                                   |
| SMBJ12A  | 13.3                                              | 14.7 | 1.0            | 12                       | 5.0                                    | 30.2                    | 19.9                                   |
| SMBJ13   | 14.4                                              | 17.6 | 1.0            | 13                       | 5.0                                    | 25.2                    | 23.8                                   |
| SMBJ13A  | 14.4                                              | 15.9 | 1.0            | 13                       | 5.0                                    | 27.9                    | 21.5                                   |
| SMBJ14   | 15.6                                              | 19.1 | 1.0            | 14                       | 5.0                                    | 23.3                    | 25.8                                   |
| SMBJ14A  | 15.6                                              | 17.2 | 1.0            | 14                       | 5.0                                    | 25.9                    | 23.2                                   |
| SMBJ15   | 16.7                                              | 20.4 | 1.0            | 15                       | 5.0                                    | 22.3                    | 26.9                                   |
| SMBJ15A  | 16.7                                              | 18.5 | 1.0            | 15                       | 5.0                                    | 24.6                    | 24.4                                   |

# Transient Voltage Suppressor

## SMBJ5.0--SMBJ440CA

| Type    | Breakdown Voltage $V_{BR}@I_T$ |      | Test Current | Reverse Standoff Voltage | Max. Reverse Leakage@ $V_{RWM}$ | Max. Peak Pulse Current | Max. Clamping Voltage @ $I_{PP}$ |
|---------|--------------------------------|------|--------------|--------------------------|---------------------------------|-------------------------|----------------------------------|
|         | V                              |      | $I_T$        | $V_{RWM}$                | $I_R$                           | $I_{PP}$                | $V_C$                            |
|         | Min                            | Max  | m A          | V                        | u A                             | A                       | V                                |
| SMBJ16  | 17.8                           | 21.8 | 1.0          | 16                       | 5.0                             | 20.8                    | 28.8                             |
| SMBJ16A | 17.8                           | 19.7 | 1.0          | 16                       | 5.0                             | 23.1                    | 26.0                             |
| SMBJ17  | 18.9                           | 23.1 | 1.0          | 17                       | 5.0                             | 19.7                    | 30.5                             |
| SMBJ17A | 18.9                           | 20.9 | 1.0          | 17                       | 5.0                             | 21.7                    | 27.6                             |
| SMBJ18  | 20.0                           | 24.4 | 1.0          | 18                       | 5.0                             | 18.6                    | 32.2                             |
| SMBJ18A | 20.0                           | 22.1 | 1.0          | 18                       | 5.0                             | 20.5                    | 29.2                             |
| SMBJ20  | 22.2                           | 27.1 | 1.0          | 20                       | 5.0                             | 16.8                    | 35.8                             |
| SMBJ20A | 22.2                           | 24.5 | 1.0          | 20                       | 5.0                             | 18.5                    | 32.4                             |
| SMBJ22  | 24.4                           | 29.8 | 1.0          | 22                       | 5.0                             | 15.2                    | 39.4                             |
| SMBJ22A | 24.4                           | 26.9 | 1.0          | 22                       | 5.0                             | 16.9                    | 35.5                             |
| SMBJ24  | 26.7                           | 32.6 | 1.0          | 24                       | 5.0                             | 14.0                    | 43.0                             |
| SMBJ24A | 26.7                           | 29.5 | 1.0          | 24                       | 5.0                             | 15.4                    | 38.9                             |
| SMBJ26  | 28.9                           | 35.3 | 1.0          | 26                       | 5.0                             | 12.9                    | 46.6                             |
| SMBJ26A | 28.9                           | 31.9 | 1.0          | 26                       | 5.0                             | 14.3                    | 42.1                             |
| SMBJ28  | 31.1                           | 38.0 | 1.0          | 28                       | 5.0                             | 12.0                    | 50.0                             |
| SMBJ28A | 31.1                           | 34.4 | 1.0          | 28                       | 5.0                             | 13.2                    | 45.4                             |
| SMBJ30  | 33.3                           | 40.7 | 1.0          | 30                       | 5.0                             | 11.2                    | 53.5                             |
| SMBJ30A | 33.3                           | 36.8 | 1.0          | 30                       | 5.0                             | 12.4                    | 48.4                             |
| SMBJ33  | 36.7                           | 44.9 | 1.0          | 33                       | 5.0                             | 10.2                    | 59.0                             |
| SMBJ33A | 36.7                           | 40.6 | 1.0          | 33                       | 5.0                             | 11.3                    | 53.3                             |
| SMBJ36  | 40.0                           | 48.9 | 1.0          | 36                       | 5.0                             | 9.3                     | 64.3                             |
| SMBJ36A | 40.0                           | 44.2 | 1.0          | 36                       | 5.0                             | 10.3                    | 58.1                             |
| SMBJ40  | 44.4                           | 54.3 | 1.0          | 40                       | 5.0                             | 8.4                     | 71.4                             |
| SMBJ40A | 44.4                           | 49.1 | 1.0          | 40                       | 5.0                             | 9.3                     | 64.5                             |
| SMBJ43  | 47.8                           | 58.4 | 1.0          | 43                       | 5.0                             | 7.8                     | 76.7                             |
| SMBJ43A | 47.8                           | 52.8 | 1.0          | 43                       | 5.0                             | 8.6                     | 69.4                             |
| SMBJ45  | 50.0                           | 61.1 | 1.0          | 45                       | 5.0                             | 7.5                     | 80.3                             |
| SMBJ45A | 50.0                           | 55.3 | 1.0          | 45                       | 5.0                             | 8.3                     | 72.7                             |
| SMBJ48  | 53.3                           | 65.1 | 1.0          | 48                       | 5.0                             | 7.0                     | 85.5                             |
| SMBJ48A | 53.3                           | 58.9 | 1.0          | 48                       | 5.0                             | 7.8                     | 77.4                             |
| SMBJ51  | 56.7                           | 69.3 | 1.0          | 51                       | 5.0                             | 6.6                     | 91.1                             |
| SMBJ51A | 56.7                           | 62.7 | 1.0          | 51                       | 5.0                             | 7.3                     | 82.4                             |

# Transient Voltage Suppressor

## SMBJ5.0--SMBJ440CA

| Type     | Breakdown Voltage $V_{BR}@I_T$ |      | Test Current | Reverse Standoff Voltage | Max. Reverse Leakage@ $V_{RWM}$ | Max. Peak Pulse Current | Max. Clamping Voltage @ $I_{PP}$ |
|----------|--------------------------------|------|--------------|--------------------------|---------------------------------|-------------------------|----------------------------------|
|          | V                              |      | $I_T$        | $V_{RWM}$                | $I_R$                           | $I_{PP}$                | $V_C$                            |
|          | Min                            | Max  | m A          | V                        | u A                             | A                       | V                                |
| SMBJ54   | 60.0                           | 73.3 | 1.0          | 54                       | 5.0                             | 6.2                     | 96.3                             |
| SMBJ54A  | 60.0                           | 66.3 | 1.0          | 54                       | 5.0                             | 6.9                     | 87.1                             |
| SMBJ58   | 64.4                           | 78.7 | 1.0          | 58                       | 5.0                             | 5.8                     | 103                              |
| SMBJ58A  | 64.4                           | 71.2 | 1.0          | 58                       | 5.0                             | 6.4                     | 93.6                             |
| SMBJ60   | 66.7                           | 81.5 | 1.0          | 60                       | 5.0                             | 5.6                     | 107                              |
| SMBJ60A  | 66.7                           | 73.7 | 1.0          | 60                       | 5.0                             | 6.2                     | 96.8                             |
| SMBJ64   | 71.1                           | 86.9 | 1.0          | 64                       | 5.0                             | 5.3                     | 114                              |
| SMBJ64A  | 71.1                           | 78.6 | 1.0          | 64                       | 5.0                             | 5.8                     | 103                              |
| SMBJ68   | 75.5                           | 92.3 | 1            | 68                       | 5.0                             | 5.0                     | 121                              |
| SMBJ68A  | 75.5                           | 83.5 | 1            | 68                       | 5.0                             | 5.5                     | 109                              |
| SMBJ70   | 77.8                           | 95.1 | 1.0          | 70                       | 5.0                             | 4.8                     | 125                              |
| SMBJ70A  | 77.8                           | 86.0 | 1.0          | 75                       | 5.0                             | 5.3                     | 113                              |
| SMBJ75   | 83.3                           | 102  | 1.0          | 75                       | 5.0                             | 4.5                     | 134                              |
| SMBJ75A  | 83.3                           | 92.1 | 1.0          | 78                       | 5.0                             | 5.0                     | 121                              |
| SMBJ78   | 86.7                           | 106  | 1.0          | 78                       | 5.0                             | 4.3                     | 139                              |
| SMBJ78A  | 86.7                           | 95.8 | 1.0          | 78                       | 5.0                             | 4.8                     | 126                              |
| SMBJ85   | 94.4                           | 115  | 1.0          | 85                       | 5.0                             | 4.0                     | 151                              |
| SMBJ85A  | 94.4                           | 104  | 1.0          | 85                       | 5.0                             | 4.4                     | 137                              |
| SMBJ90   | 100                            | 122  | 1.0          | 90                       | 5.0                             | 3.8                     | 160                              |
| SMBJ90A  | 100                            | 111  | 1.0          | 90                       | 5.0                             | 4.1                     | 146                              |
| SMBJ100  | 111                            | 136  | 1.0          | 100                      | 5.0                             | 3.4                     | 179                              |
| SMBJ100A | 111                            | 123  | 1.0          | 100                      | 5.0                             | 3.7                     | 162                              |
| SMBJ110  | 122                            | 149  | 1.0          | 110                      | 5.0                             | 3.1                     | 196                              |
| SMBJ110A | 122                            | 135  | 1.0          | 110                      | 5.0                             | 3.4                     | 177                              |
| SMBJ120  | 133                            | 163  | 1.0          | 120                      | 5.0                             | 2.8                     | 214                              |
| SMBJ120A | 133                            | 147  | 1.0          | 120                      | 5.0                             | 3.1                     | 193                              |
| SMBJ130  | 144                            | 176  | 1.0          | 130                      | 5.0                             | 2.6                     | 231                              |
| SMBJ130A | 144                            | 159  | 1.0          | 130                      | 5.0                             | 2.9                     | 209                              |
| SMBJ150  | 167                            | 204  | 1.0          | 150                      | 5.0                             | 2.2                     | 268                              |
| SMBJ150A | 167                            | 185  | 1.0          | 150                      | 5.0                             | 2.5                     | 243                              |
| SMBJ160  | 178                            | 218  | 1.0          | 160                      | 5.0                             | 2.1                     | 287                              |
| SMBJ160A | 178                            | 197  | 1.0          | 160                      | 5.0                             | 2.3                     | 259                              |

# Transient Voltage Suppressor

## SMBJ5.0--SMBJ440CA

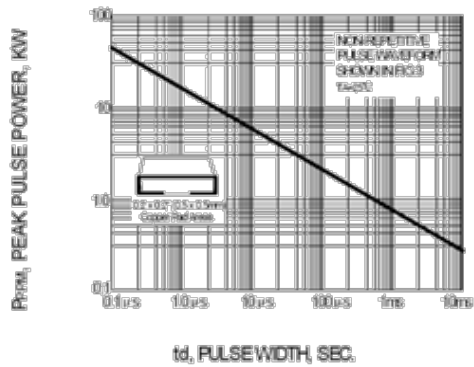
| Type     | Breakdown Voltage $V_{BR}@I_T$ |     | Test Current | Reverse Standoff Voltage | Max. Reverse Leakage@ $V_{RWM}$ | Max. Peak Pulse Current | Max. Clamping Voltage @ $I_{PP}$ |
|----------|--------------------------------|-----|--------------|--------------------------|---------------------------------|-------------------------|----------------------------------|
|          | V                              |     | $I_T$        | $V_{RWM}$                | $I_R$                           | $I_{PP}$                | $V_C$                            |
|          | Min                            | Max | m A          | V                        | $\mu A$                         | A                       | V                                |
| SMBJ170  | 189                            | 231 | 1.0          | 170                      | 5.0                             | 2.0                     | 304                              |
| SMBJ170A | 189                            | 209 | 1.0          | 170                      | 5.0                             | 2.2                     | 275                              |
| SMBJ180  | 200                            | 245 | 1.0          | 180                      | 5.0                             | 1.9                     | 321                              |
| SMBJ180A | 200                            | 221 | 1.0          | 180                      | 5.0                             | 2.1                     | 291                              |
| SMBJ188  | 209                            | 255 | 1.0          | 188                      | 5.0                             | 1.7                     | 344                              |
| SMBJ188A | 209                            | 231 | 1.0          | 188                      | 5.0                             | 2.0                     | 328                              |
| SMBJ200  | 222                            | 272 | 1.0          | 200                      | 5.0                             | 1.7                     | 356                              |
| SMBJ200A | 222                            | 246 | 1.0          | 200                      | 5.0                             | 1.9                     | 323                              |
| SMBJ220  | 245                            | 299 | 1.0          | 220                      | 5.0                             | 1.5                     | 392                              |
| SMBJ220A | 245                            | 270 | 1.0          | 220                      | 5.0                             | 1.7                     | 355                              |
| SMBJ240  | 267                            | 326 | 1.0          | 240                      | 5.0                             | 1.4                     | 428                              |
| SMBJ240A | 267                            | 295 | 1.0          | 240                      | 5.0                             | 1.5                     | 388                              |
| SMBJ250  | 278                            | 340 | 1.0          | 250                      | 5.0                             | 1.3                     | 446                              |
| SMBJ250A | 278                            | 307 | 1.0          | 250                      | 5.0                             | 1.5                     | 404                              |
| SMBJ300  | 333                            | 408 | 1.0          | 300                      | 5.0                             | 1.1                     | 535                              |
| SMBJ300A | 333                            | 368 | 1.0          | 300                      | 5.0                             | 1.2                     | 485                              |
| SMBJ350  | 389                            | 476 | 1.0          | 350                      | 5.0                             | 1.0                     | 624                              |
| SMBJ350A | 389                            | 430 | 1.0          | 350                      | 5.0                             | 1.1                     | 565                              |
| SMBJ360  | 400                            | 489 | 1.0          | 360                      | 5.0                             | 0.9                     | 642                              |
| SMBJ360A | 400                            | 442 | 1.0          | 360                      | 5.0                             | 1.0                     | 582                              |
| SMBJ380  | 422                            | 517 | 1.0          | 380                      | 5.0                             | 0.9                     | 678                              |
| SMBJ380A | 422                            | 467 | 1.0          | 380                      | 5.0                             | 1.0                     | 614                              |
| SMBJ400  | 445                            | 544 | 1.0          | 400                      | 5.0                             | 0.8                     | 713                              |
| SMBJ400A | 445                            | 491 | 1.0          | 400                      | 5.0                             | 0.9                     | 646                              |
| SMBJ440  | 489                            | 598 | 1.0          | 440                      | 5.0                             | 0.8                     | 784                              |
| SMBJ440A | 489                            | 540 | 1.0          | 440                      | 5.0                             | 0.8                     | 711                              |

# Transient Voltage Suppressor

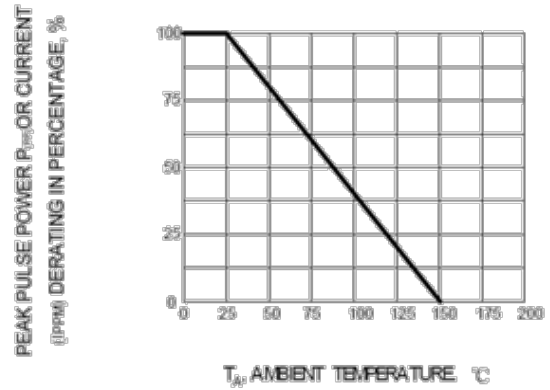
## SMBJ5.0--SMBJ440CA

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

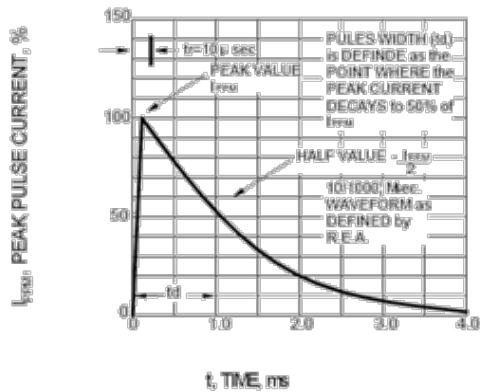
**FIG.1 – PEAK PULSE POWER RATING CURVE**



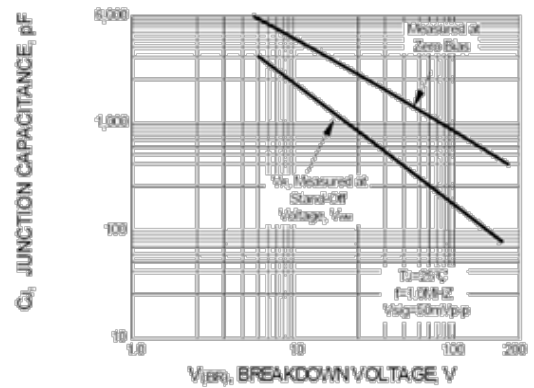
**FIG.2 – PULSE DERATING CURVE**



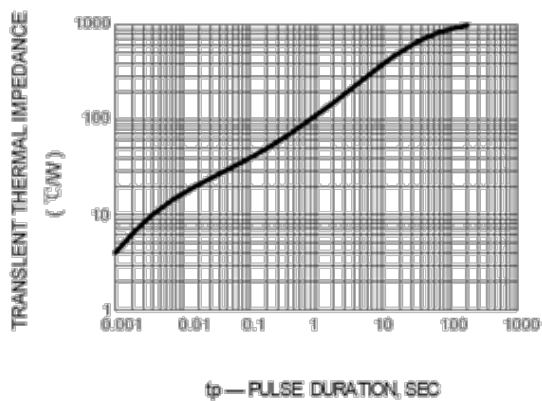
**FIG.3 – PULSE WAVEFORM**



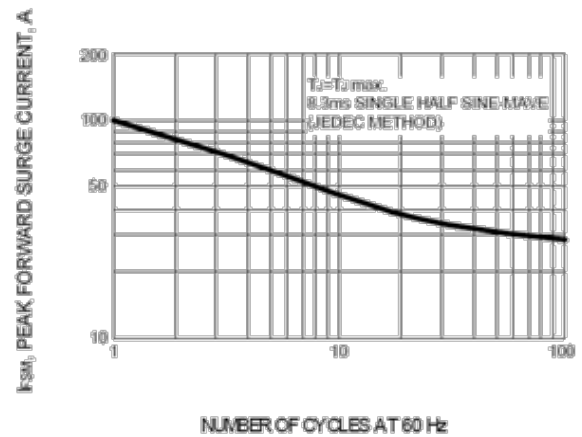
**FIG.4 – TYPICAL JUNCTION CAPACITANCE UNIDIRECTIONAL**



**FIG.5 – TYPICAL TRANSIENT THERMAL IMPEDANCE**



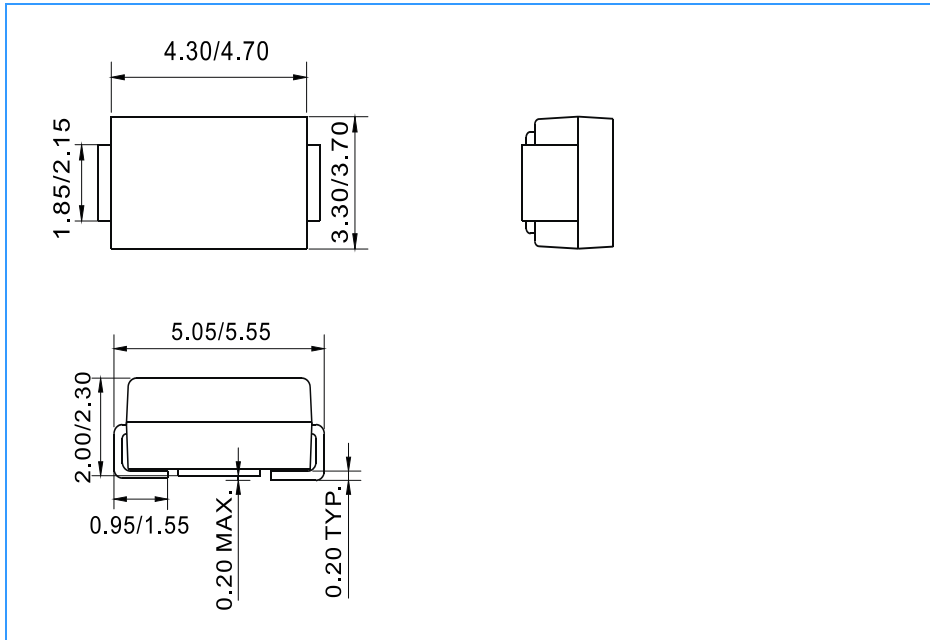
**FIG.6 – MAXIMUM NON-REPETITIVE PEAK FORWARD SURGE CURRENT**



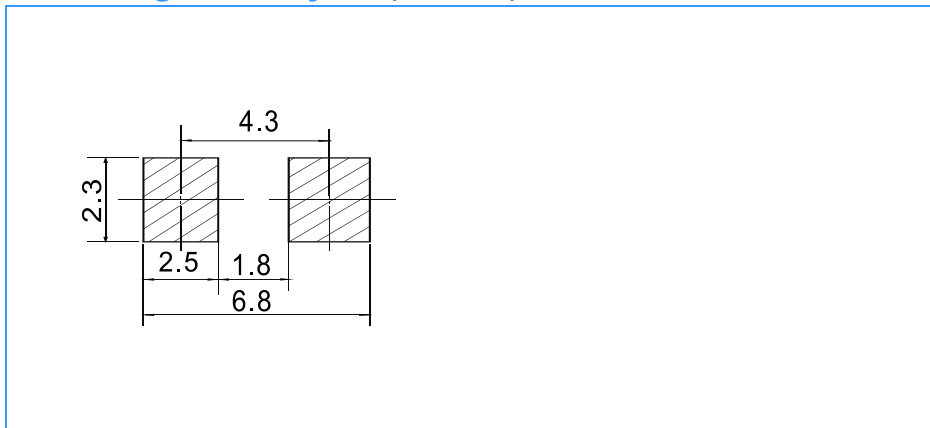
# Transient Voltage Suppressor

**SMBJ5.0--SMBJ440CA**

## Package Outline Dimensions(unit:mm)



## Mounting Pad Layout(unit:mm)



## Ordering Information

| Part No.          | Package | Shipping        |
|-------------------|---------|-----------------|
| SMBJ5.0-SMBJ440CA | SMB     | 3000 /Tape&Reel |