

## SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSOR

### Features

- ◆ 5000 W peak pulse power capability with a 10/1000  $\mu$ s waveform
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Excellent clamping capability
- ◆ Very fast response time
- ◆ Meets MSL level 1

### DO-214AB/SMC



and JESD22-B102

cathode end, no marking on bi-directional types

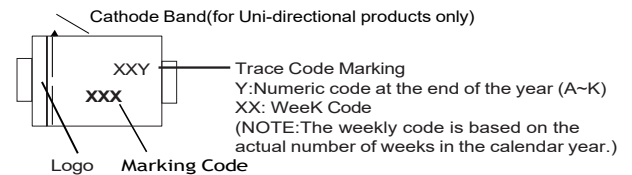
### Applications

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for consumer, computer, industrial, telecommunication.

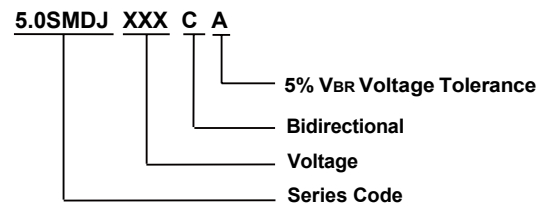
### Circuit Diagram



### Marking Code



### Part Number Code



### MAXIMUM RATINGS AND CHARACTERISTICS

|                                                                                                             |                                   |             |      |
|-------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------|------|
| Ratings at 25°C ambient temperature unless otherwise specified.                                             |                                   |             |      |
| Peak pulse power dissipation at 10/1000 $\mu$ s waveform (Note1, Note2 )                                    | P <sub>PPM</sub>                  | 5000        | W    |
| Maximum Instantaneous Forward Voltage at 100A for Unidirectional only(Note4)                                | V <sub>F</sub>                    | 3.5/5.0     | V    |
| Steady state power dissipation at T <sub>A</sub> =75°C(Note2 )                                              | P <sub>D</sub>                    | 6.5         | W    |
| Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note3 ) | I <sub>FSM</sub>                  | 300         | A    |
| Operating junction and Storage Temperature Range.                                                           | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |
| Typical thermal resistance junction to lead(Note5)                                                          | R <sub>θJL</sub>                  | 15          | °C/W |
| Typical thermal resistance junction to ambient(Note5)                                                       | R <sub>θJA</sub>                  | 75          | °C/W |

- Notes: (1) Non-repetitive current pulse, per Fig. 3 and derated above T<sub>A</sub>= 25°C per Fig.2.  
 (2) Mounted on 0.31 x 0.31" (8.0 x 8.0 mm) copper pads to each terminal  
 (3) Measured on 8.3ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum.  
 (4) V<sub>F</sub>=3.5V Max for devices of V<sub>BR</sub>≤85V, and V<sub>F</sub>=5.0V Max for devices of V<sub>BR</sub>>85V.  
 (5) Mounted on minimum recommended pad layout.

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

| Part Number<br>(Uni) | Part Number<br>(Bi) | Breakdown Voltage $V_{BR}@I_T$ |         |                  | Maximum<br>Reverse<br>Leakage $I_R$<br>@ $V_{RWM}$ ( $\mu A$ ) | Working Peak<br>Reverse<br>Voltage<br>$V_{RWM}$ (V) | Maximum<br>Reverse<br>Surge<br>Current $I_{PP}^{(2)}$<br>(A) | Maximum<br>Clamping<br>Voltage $V_C$<br>@ $I_{PP}$<br>(V) |
|----------------------|---------------------|--------------------------------|---------|------------------|----------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|
|                      |                     | Min(V)                         | Max (V) | $I_T^{(1)}$ (mA) |                                                                |                                                     |                                                              |                                                           |
| 5.0SMDJ11A           | 5.0SMDJ11CA         | 12.2                           | 13.5    | 1.0              | 5.0                                                            | 11.0                                                | 274.7                                                        | 18.2                                                      |
| 5.0SMDJ12A           | 5.0SMDJ12CA         | 13.3                           | 14.7    | 1.0              | 5.0                                                            | 12.0                                                | 251.3                                                        | 19.9                                                      |
| 5.0SMDJ13A           | 5.0SMDJ13CA         | 14.4                           | 15.9    | 1.0              | 5.0                                                            | 13.0                                                | 232.6                                                        | 21.5                                                      |
| 5.0SMDJ14A           | 5.0SMDJ14CA         | 15.6                           | 17.2    | 1.0              | 5.0                                                            | 14.0                                                | 215.5                                                        | 23.2                                                      |
| 5.0SMDJ15A           | 5.0SMDJ15CA         | 16.7                           | 18.5    | 1.0              | 5.0                                                            | 15.0                                                | 204.9                                                        | 24.4                                                      |
| 5.0SMDJ16A           | 5.0SMDJ16CA         | 17.8                           | 19.7    | 1.0              | 5.0                                                            | 16.0                                                | 192.3                                                        | 26                                                        |
| 5.0SMDJ17A           | 5.0SMDJ17CA         | 18.9                           | 20.9    | 1.0              | 5.0                                                            | 17.0                                                | 181.2                                                        | 27.6                                                      |
| 5.0SMDJ18A           | 5.0SMDJ18CA         | 20.0                           | 22.1    | 1.0              | 5.0                                                            | 18.0                                                | 171.2                                                        | 29.2                                                      |
| 5.0SMDJ19A           | 5.0SMDJ19CA         | 21.1                           | 23.3    | 1.0              | 5.0                                                            | 19.0                                                | 162.3                                                        | 30.8                                                      |
| 5.0SMDJ20A           | 5.0SMDJ20CA         | 22.2                           | 24.5    | 1.0              | 5.0                                                            | 20.0                                                | 154.3                                                        | 32.4                                                      |
| 5.0SMDJ22A           | 5.0SMDJ22CA         | 24.4                           | 26.9    | 1.0              | 5.0                                                            | 22.0                                                | 140.8                                                        | 35.5                                                      |
| 5.0SMDJ24A           | 5.0SMDJ24CA         | 26.7                           | 29.5    | 1.0              | 5.0                                                            | 24.0                                                | 128.5                                                        | 38.9                                                      |
| 5.0SMDJ26A           | 5.0SMDJ26CA         | 28.9                           | 31.9    | 1.0              | 5.0                                                            | 26.0                                                | 118.8                                                        | 42.1                                                      |
| 5.0SMDJ28A           | 5.0SMDJ28CA         | 31.1                           | 34.4    | 1.0              | 5.0                                                            | 28.0                                                | 110.1                                                        | 45.4                                                      |
| 5.0SMDJ30A           | 5.0SMDJ30CA         | 33.3                           | 36.8    | 1.0              | 5.0                                                            | 30.0                                                | 103.3                                                        | 48.4                                                      |
| 5.0SMDJ33A           | 5.0SMDJ33CA         | 36.7                           | 40.6    | 1.0              | 5.0                                                            | 33.0                                                | 93.8                                                         | 53.3                                                      |
| 5.0SMDJ36A           | 5.0SMDJ36CA         | 40.0                           | 44.2    | 1.0              | 5.0                                                            | 36.0                                                | 86.1                                                         | 58.1                                                      |
| 5.0SMDJ40A           | 5.0SMDJ40CA         | 44.4                           | 49.1    | 1.0              | 5.0                                                            | 40.0                                                | 77.5                                                         | 64.5                                                      |
| 5.0SMDJ43A           | 5.0SMDJ43CA         | 47.8                           | 52.8    | 1.0              | 5.0                                                            | 43.0                                                | 72.0                                                         | 69.4                                                      |
| 5.0SMDJ45A           | 5.0SMDJ45CA         | 50.0                           | 55.3    | 1.0              | 5.0                                                            | 45.0                                                | 68.8                                                         | 72.7                                                      |
| 5.0SMDJ48A           | 5.0SMDJ48CA         | 53.3                           | 58.9    | 1.0              | 5.0                                                            | 48.0                                                | 64.6                                                         | 77.4                                                      |
| 5.0SMDJ51A           | 5.0SMDJ51CA         | 56.7                           | 62.7    | 1.0              | 5.0                                                            | 51.0                                                | 60.7                                                         | 82.4                                                      |
| 5.0SMDJ54A           | 5.0SMDJ54CA         | 60.0                           | 66.3    | 1.0              | 5.0                                                            | 54.0                                                | 57.4                                                         | 87.1                                                      |
| 5.0SMDJ58A           | 5.0SMDJ58CA         | 64.4                           | 71.2    | 1.0              | 5.0                                                            | 58.0                                                | 53.4                                                         | 93.6                                                      |
| 5.0SMDJ60A           | 5.0SMDJ60CA         | 66.7                           | 73.7    | 1.0              | 5.0                                                            | 60.0                                                | 51.7                                                         | 96.8                                                      |
| 5.0SMDJ64A           | 5.0SMDJ64CA         | 71.1                           | 78.6    | 1.0              | 5.0                                                            | 64.0                                                | 48.5                                                         | 103                                                       |
| 5.0SMDJ70A           | 5.0SMDJ70CA         | 77.8                           | 86.0    | 1.0              | 5.0                                                            | 70.0                                                | 44.2                                                         | 113                                                       |
| 5.0SMDJ75A           | 5.0SMDJ75CA         | 83.3                           | 92.1    | 1.0              | 5.0                                                            | 75.0                                                | 41.3                                                         | 121                                                       |
| 5.0SMDJ78A           | 5.0SMDJ78CA         | 86.7                           | 95.8    | 1.0              | 5.0                                                            | 78.0                                                | 39.7                                                         | 126                                                       |
| 5.0SMDJ80A           | 5.0SMDJ80CA         | 88.96                          | 97.6    | 1.0              | 5.0                                                            | 80.0                                                | 38.6                                                         | 129.6                                                     |
| 5.0SMDJ85A           | 5.0SMDJ85CA         | 94.4                           | 104.0   | 1.0              | 5.0                                                            | 85.0                                                | 36.5                                                         | 137                                                       |
| 5.0SMDJ90A           | 5.0SMDJ90CA         | 100.0                          | 111.0   | 1.0              | 5.0                                                            | 90.0                                                | 34.2                                                         | 146                                                       |
| 5.0SMDJ100A          | 5.0SMDJ100CA        | 111.0                          | 123.0   | 1.0              | 5.0                                                            | 100.0                                               | 30.9                                                         | 162                                                       |
| 5.0SMDJ110A          | 5.0SMDJ110CA        | 122.0                          | 135.0   | 1.0              | 5.0                                                            | 110.0                                               | 28.2                                                         | 177                                                       |
| 5.0SMDJ120A          | 5.0SMDJ120CA        | 133.0                          | 147.0   | 1.0              | 5.0                                                            | 120.0                                               | 25.9                                                         | 193                                                       |
| 5.0SMDJ130A          | 5.0SMDJ130CA        | 144.0                          | 159.0   | 1.0              | 5.0                                                            | 130.0                                               | 23.9                                                         | 209                                                       |
| 5.0SMDJ140A          | 5.0SMDJ140CA        | 155.0                          | 171.0   | 1.0              | 5.0                                                            | 140.0                                               | 22.0                                                         | 226.8                                                     |
| 5.0SMDJ150A          | 5.0SMDJ150CA        | 167.0                          | 185.0   | 1.0              | 5.0                                                            | 150.0                                               | 20.6                                                         | 243                                                       |
| 5.0SMDJ160A          | 5.0SMDJ160CA        | 178.0                          | 197.0   | 1.0              | 5.0                                                            | 160.0                                               | 19.3                                                         | 259                                                       |
| 5.0SMDJ170A          | 5.0SMDJ170CA        | 189.0                          | 209.0   | 1.0              | 5.0                                                            | 170.0                                               | 18.2                                                         | 275                                                       |

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

| Part Number<br>(Uni) | Part Number<br>(Bi) | Breakdown Voltage $V_{BR}@I_T$ |         |                  | Maximum<br>Reverse<br>Leakage $I_R$<br>@ $V_{RWM}$ ( $\mu\text{A}$ ) | Working Peak<br>Reverse<br>Voltage<br>$V_{RWM}$ (V) | Maximum<br>Reverse<br>Surge<br>Current $I_{PP}^{(2)}$<br>(A) | Maximum<br>Clamping<br>Voltage $V_C$<br>@ $I_{PP}$<br>(V) |
|----------------------|---------------------|--------------------------------|---------|------------------|----------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|
|                      |                     | Min(V)                         | Max (V) | $I_T^{(1)}$ (mA) |                                                                      |                                                     |                                                              |                                                           |
| 5.0SMDJ180A          | 5.0SMDJ180CA        | 200.2                          | 220.0   | 1.0              | 5.0                                                                  | 180.0                                               | 17.1                                                         | 291.6                                                     |
| 5.0SMDJ190A          | 5.0SMDJ190CA        | 211.0                          | 232.0   | 1.0              | 5.0                                                                  | 190.0                                               | 16.2                                                         | 307.8                                                     |
| 5.0SMDJ200A          | 5.0SMDJ200CA        | 224.0                          | 247.0   | 1.0              | 5.0                                                                  | 200.0                                               | 15.4                                                         | 324                                                       |
| 5.0SMDJ220A          | 5.0SMDJ220CA        | 246.0                          | 272.0   | 1.0              | 5.0                                                                  | 220.0                                               | 14.0                                                         | 356                                                       |
| 5.0SMDJ250A          | 5.0SMDJ250CA        | 279.0                          | 309.0   | 1.0              | 5.0                                                                  | 250.0                                               | 12.3                                                         | 405                                                       |
| 5.0SMDJ300A          | 5.0SMDJ300CA        | 335.0                          | 371.0   | 1.0              | 5.0                                                                  | 300.0                                               | 10.3                                                         | 486                                                       |
| 5.0SMDJ350A          | 5.0SMDJ350CA        | 391.0                          | 432.0   | 1.0              | 5.0                                                                  | 350.0                                               | 8.8                                                          | 567                                                       |
| 5.0SMDJ400A          | 5.0SMDJ400CA        | 447.0                          | 494.0   | 1.0              | 5.0                                                                  | 400.0                                               | 7.7                                                          | 648                                                       |
| 5.0SMDJ440A          | 5.0SMDJ440CA        | 492.0                          | 543.0   | 1.0              | 5.0                                                                  | 440.0                                               | 7.0                                                          | 713                                                       |

## Characteristics(Typical)

FIG1: Peak Pulse Power Rating Curve

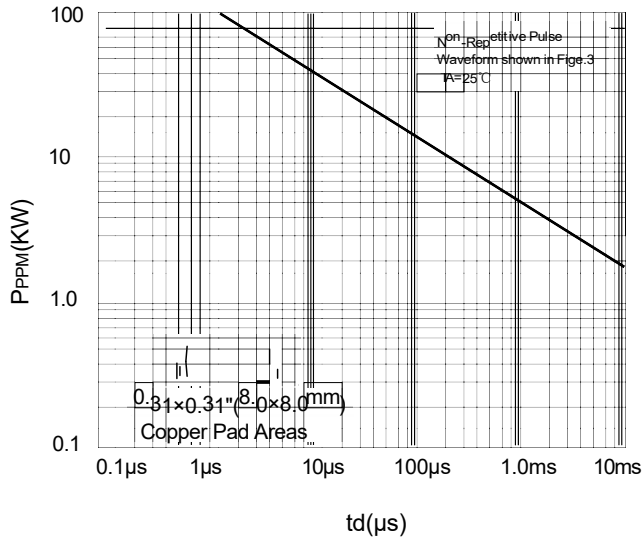


FIG2: Pulse Power or Current vs. Initial Junction Temperature

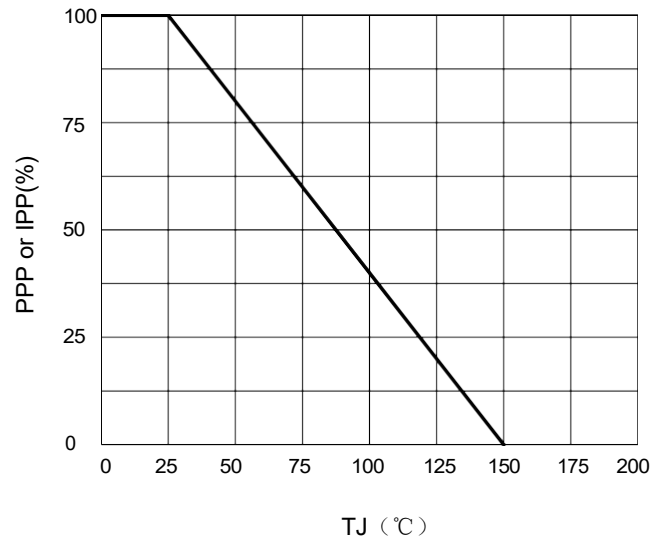


FIG3: Pulse Waveform



FIG4: Typical Transient Thermal Impedance

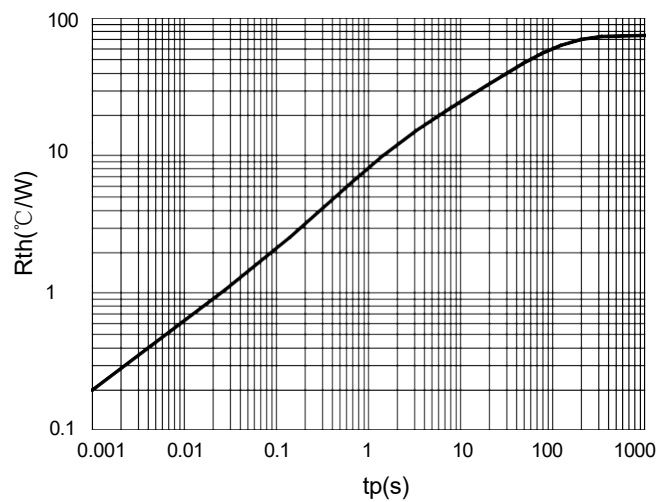


FIG5: Maximum Non-Repetitive Surge Current



FIG6: Steady State Power Dissipation

