

# SA5.0~SA220CA

## GLASS PASSIVATED JUNCTION TRANSIENT VOLTAGE SUPPRESSOR POWER 500 Watt

### STAND-OFF VOLTAGE

5 to 220 Volt

### DO-15

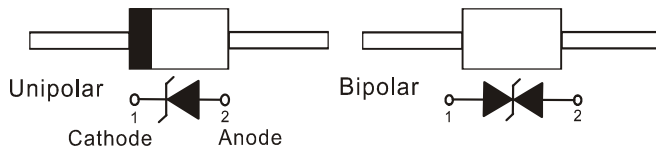
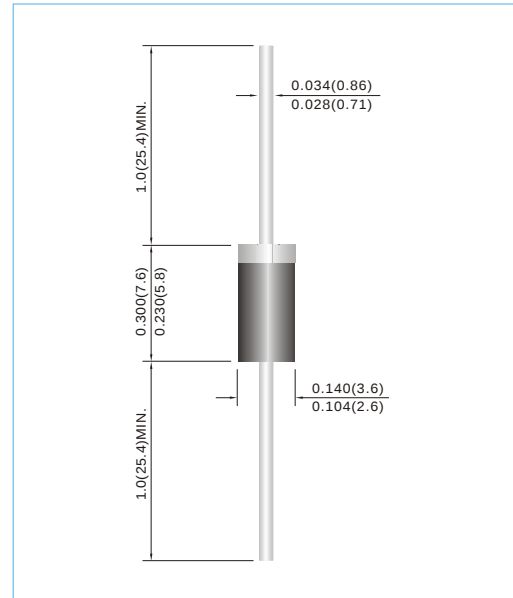
Unit : inch(mm)

### FEATURES

- Plastic package has Underwriters Laboratory Flammability Classification 94V-0
- Glass passivated chip junction in DO-15 package
- 500W surge capability at 1ms
- Excellent clamping capability
- Low zener impedance
- Fast response time: typically less than 1ps from 0 volts to BV min
- High temperature soldering guaranteed: 260°C/10 seconds/0.375" (9.5mm) lead length/5lbs., (2.3kg) tension
- ESD IEC-61000-4-2 Air  $\pm 30$ kV, Contact  $\pm 30$ kV
- Lead free in compliance with EU RoHS 2011/65/EU directive

### MECHANICAL DATA

- Case: JEDEC DO-15 molded plastic
- Terminals: Axial leads, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode end
- Weight: 0.014 ounce, 0.4 gram



### DEVICES FOR BIPOLAR APPLICATIONS

For Bidirectional use C or CA Suffix for types Electrical characteristics apply in both directions.

### MAXIMUM RATINGS AND CHARACTERISTICS

Rating at 25°C ambient temperature unless otherwise specified. Resistive or inductive load, 60Hz.  
For Capacitive load derate current by 20%.

| RATING                                                                                      | SYMBOL          | VALUE                | UNITS                       |
|---------------------------------------------------------------------------------------------|-----------------|----------------------|-----------------------------|
| Peak Pulse Power Dissipation at $T_A=25^\circ\text{C}$ , $t_p=1\text{ms}$ (Note 1, Fig.1)   | $P_{PP}$        | 500                  | Watts                       |
| Peak Pulse Current of on $t_p=10/1000\mu\text{s}$ waveform (Note 1, Fig.3)                  | $I_{PPM}$       | SEE TABLE 1          | Amps                        |
| Typical Thermal Resistance Junction to Air Lead Lengths 0.375", (9.5mm) (Note 2)            | $R_{\theta JA}$ | 50                   | $^\circ\text{C} / \text{W}$ |
| Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (Note 3) | $I_{FSM}$       | 70                   | Amps                        |
| ESD IEC-61000-4-2 (Air)<br>ESD IEC-61000-4-2 (Contact)                                      | $V_{ESD}$       | $\pm 30$<br>$\pm 30$ | kV                          |
| Operating and Storage Temperature Range                                                     | $T_J, T_{STG}$  | -65 to +175          | $^\circ\text{C}$            |

#### NOTES :

- 1.Non-repetitive current pulse, per Fig. 3 and derated above  $T_A=25^\circ\text{C}$  per Fig. 2.
- 2.Mounted on Copper Leaf area of  $1.57\text{in}^2(40\text{mm}^2)$ .
- 3.8.3ms single half sine-wave, duty cycle= 4 pulses per minutes maximum.
- 4.A transient suppressor is selected according to the working peak reverse voltage ( $V_{RWM}$ ), which should be equal to or greater than the DC or continuous peak operating voltage level.



## SA5.0~SA220CA

| Part Number                       |         | Reverse Stand-off Voltage  | Breakdown Voltage                |       | Test Current   | Reverse Leakage                   |      | Max. Clamp Voltage 10/1000μs     | Peak Pulse Current 10/1000 μs | Marking Code |         |
|-----------------------------------|---------|----------------------------|----------------------------------|-------|----------------|-----------------------------------|------|----------------------------------|-------------------------------|--------------|---------|
|                                   |         | V <sub>RWM</sub> (Notes 4) | V <sub>BR</sub> @ I <sub>T</sub> |       | I <sub>T</sub> | I <sub>R</sub> @ V <sub>RWM</sub> |      | V <sub>C</sub> @ I <sub>PP</sub> | I <sub>PP</sub>               |              |         |
|                                   |         |                            | Min.                             | Max.  |                | UNI                               | BI   |                                  |                               |              |         |
| UNI                               | BI      | V                          | V                                | V     | mA             | μA                                | μA   | V                                | A                             | UNI          | BI      |
| 500W Transient Voltage Suppressor |         |                            |                                  |       |                |                                   |      |                                  |                               |              |         |
| SA5.0                             | SA5.0C  | 5                          | 6.4                              | 7.55  | 10             | 600                               | 1200 | 9.6                              | 52.3                          | SA5.0        | SA5.0C  |
| SA5.0A                            | SA5.0CA | 5                          | 6.4                              | 7.25  | 10             | 600                               | 1200 | 9.2                              | 54.3                          | SA5.0A       | SA5.0CA |
| SA6.0                             | SA6.0C  | 6                          | 6.67                             | 8.45  | 10             | 600                               | 1200 | 11.4                             | 43.9                          | SA6.0        | SA6.0C  |
| SA6.0A                            | SA6.0CA | 6                          | 6.67                             | 7.67  | 10             | 600                               | 1200 | 10.3                             | 48.5                          | SA6.0A       | SA6.0CA |
| SA6.5                             | SA6.5C  | 6.5                        | 7.22                             | 9.14  | 10             | 400                               | 800  | 12.3                             | 40.7                          | SA6.5        | SA6.5C  |
| SA6.5A                            | SA6.5CA | 6.5                        | 7.22                             | 8.3   | 10             | 400                               | 800  | 11.2                             | 44.7                          | SA6.5A       | SA6.5CA |
| SA7.0                             | SA7.0C  | 7                          | 7.78                             | 9.86  | 10             | 150                               | 300  | 13.3                             | 37.8                          | SA7.0        | SA7.0C  |
| SA7.0A                            | SA7.0CA | 7                          | 7.78                             | 8.95  | 10             | 150                               | 300  | 12                               | 41.7                          | SA7.0A       | SA7.0CA |
| SA7.5                             | SA7.5C  | 7.5                        | 8.33                             | 10.67 | 1              | 50                                | 100  | 14.3                             | 35                            | SA7.5        | SA7.5C  |
| SA7.5A                            | SA7.5CA | 7.5                        | 8.33                             | 9.58  | 1              | 50                                | 100  | 12.9                             | 38.8                          | SA7.5A       | SA7.5CA |
| SA8.0                             | SA8.0C  | 8                          | 8.89                             | 11.3  | 1              | 25                                | 50   | 15                               | 33.3                          | SA8.0        | SA8.0C  |
| SA8.0A                            | SA8.0CA | 8                          | 8.89                             | 10.23 | 1              | 25                                | 50   | 13.6                             | 36.7                          | SA8.0A       | SA8.0CA |
| SA8.5                             | SA8.5C  | 8.5                        | 9.44                             | 11.92 | 1              | 10                                | 20   | 15.9                             | 31.4                          | SA8.5        | SA8.5C  |
| SA8.5A                            | SA8.5CA | 8.5                        | 9.44                             | 10.82 | 1              | 10                                | 20   | 14.4                             | 34.7                          | SA8.5A       | SA8.5CA |
| SA9.0                             | SA9.0C  | 9                          | 10                               | 12.6  | 1              | 5                                 | 5    | 16.9                             | 29.5                          | SA9.0        | SA9.0C  |
| SA9.0A                            | SA9.0CA | 9                          | 10                               | 11.5  | 1              | 5                                 | 5    | 15.4                             | 32.5                          | SA9.0A       | SA9.0CA |
| SA10                              | SA10C   | 10                         | 11.1                             | 14.1  | 1              | 3                                 | 3    | 18.8                             | 26.6                          | SA10         | SA10C   |
| SA10A                             | SA10CA  | 10                         | 11.1                             | 12.8  | 1              | 3                                 | 3    | 17                               | 29.4                          | SA10A        | SA10CA  |
| SA11                              | SA11C   | 11                         | 12.2                             | 15.4  | 1              | 3                                 | 3    | 20.1                             | 24.9                          | SA11         | SA11C   |
| SA11A                             | SA11CA  | 11                         | 12.2                             | 14    | 1              | 3                                 | 3    | 18.2                             | 27.4                          | SA11A        | SA11CA  |
| SA12                              | SA12C   | 12                         | 13.3                             | 16.9  | 1              | 3                                 | 3    | 22                               | 22.7                          | SA12         | SA12C   |
| SA12A                             | SA12CA  | 12                         | 13.3                             | 15.3  | 1              | 3                                 | 3    | 19.9                             | 25.1                          | SA12A        | SA12CA  |
| SA13                              | SA13C   | 13                         | 14.4                             | 18.2  | 1              | 3                                 | 3    | 23.8                             | 21                            | SA13         | SA13C   |
| SA13A                             | SA13CA  | 13                         | 14.4                             | 16.5  | 1              | 3                                 | 3    | 21.5                             | 23.2                          | SA13A        | SA13CA  |
| SA14                              | SA14C   | 14                         | 15.6                             | 19.8  | 1              | 3                                 | 3    | 25.8                             | 19.4                          | SA14         | SA14C   |
| SA14A                             | SA14CA  | 14                         | 15.6                             | 17.9  | 1              | 3                                 | 3    | 23.2                             | 21.5                          | SA14A        | SA14CA  |
| SA15                              | SA15C   | 15                         | 16.7                             | 21.1  | 1              | 3                                 | 3    | 26.9                             | 18.8                          | SA15         | SA15C   |
| SA15A                             | SA15CA  | 15                         | 16.7                             | 19.2  | 1              | 3                                 | 3    | 24.4                             | 20.6                          | SA15A        | SA15CA  |
| SA16                              | SA16C   | 16                         | 17.8                             | 22.6  | 1              | 3                                 | 3    | 28.8                             | 17.6                          | SA16         | SA16C   |
| SA16A                             | SA16CA  | 16                         | 17.8                             | 20.5  | 1              | 3                                 | 3    | 26                               | 19.2                          | SA16A        | SA16CA  |
| SA17                              | SA17C   | 17                         | 18.9                             | 23.9  | 1              | 3                                 | 3    | 30.5                             | 16.4                          | SA17         | SA17C   |
| SA17A                             | SA17CA  | 17                         | 18.9                             | 21.7  | 1              | 3                                 | 3    | 27.6                             | 16.1                          | SA17A        | SA17CA  |
| SA18                              | SA18C   | 18                         | 20                               | 25.3  | 1              | 3                                 | 3    | 32.2                             | 15.5                          | SA18         | SA18C   |
| SA18A                             | SA18CA  | 18                         | 20                               | 23.3  | 1              | 3                                 | 3    | 29.2                             | 17.2                          | SA18A        | SA18CA  |
| SA20                              | SA20C   | 20                         | 22.2                             | 28.1  | 1              | 3                                 | 3    | 35.8                             | 13.9                          | SA20         | SA20C   |
| SA20A                             | SA20CA  | 20                         | 22.2                             | 25.5  | 1              | 3                                 | 3    | 32.4                             | 15.4                          | SA20A        | SA20CA  |
| SA22                              | SA22C   | 22                         | 24.4                             | 30.9  | 1              | 3                                 | 3    | 39.4                             | 12.7                          | SA22         | SA22C   |
| SA22A                             | SA22CA  | 22                         | 24.4                             | 28    | 1              | 3                                 | 3    | 35.5                             | 14.1                          | SA22A        | SA22CA  |
| SA24                              | SA24C   | 24                         | 26.7                             | 33.8  | 1              | 3                                 | 3    | 43                               | 11.6                          | SA24         | SA24C   |
| SA24A                             | SA24CA  | 24                         | 26.7                             | 30.7  | 1              | 3                                 | 3    | 38.9                             | 12.8                          | SA24A        | SA24CA  |
| SA26                              | SA26C   | 26                         | 28.9                             | 36.6  | 1              | 3                                 | 3    | 46.6                             | 10.7                          | SA26         | SA26C   |
| SA26A                             | SA26CA  | 26                         | 28.9                             | 33.2  | 1              | 3                                 | 3    | 42.1                             | 11.9                          | SA26A        | SA26CA  |
| SA28                              | SA28C   | 28                         | 31.1                             | 39.4  | 1              | 3                                 | 3    | 50                               | 9.9                           | SA28         | SA28C   |
| SA28A                             | SA28CA  | 28                         | 31.1                             | 35.8  | 1              | 3                                 | 3    | 45.4                             | 11                            | SA28A        | SA28CA  |
| SA30                              | SA30C   | 30                         | 33.3                             | 42.2  | 1              | 3                                 | 3    | 53.5                             | 9.3                           | SA30         | SA30C   |
| SA30A                             | SA30CA  | 30                         | 33.3                             | 38.3  | 1              | 3                                 | 3    | 48.4                             | 10.3                          | SA30A        | SA30CA  |
| SA33                              | SA33C   | 33                         | 36.7                             | 46.5  | 1              | 3                                 | 3    | 59                               | 5.8                           | SA33         | SA33C   |
| SA33A                             | SA33CA  | 33                         | 36.7                             | 42.2  | 1              | 3                                 | 3    | 53.3                             | 9.4                           | SA33A        | SA33CA  |
| SA36                              | SA36C   | 36                         | 40                               | 50.7  | 1              | 3                                 | 3    | 64.3                             | 7.8                           | SA36         | SA36C   |
| SA36A                             | SA36CA  | 36                         | 40                               | 46    | 1              | 3                                 | 3    | 58.1                             | 8.6                           | SA36A        | SA36CA  |
| SA40                              | SA40C   | 40                         | 44.4                             | 56.3  | 1              | 3                                 | 3    | 71.4                             | 7                             | SA40         | SA40C   |
| SA40A                             | SA40CA  | 40                         | 44.4                             | 51.1  | 1              | 3                                 | 3    | 64.5                             | 7.8                           | SA40A        | SA40CA  |



# SA5.0~SA220CA

| Part Number                       |         | Reverse Stand-off Voltage  | Breakdown Voltage                |       | Test Current   | Reverse Leakage                   |    | Max. Clamp Voltage 10/1000μs     | Peak Pulse Current 10/1000 μs | Marking Code |         |
|-----------------------------------|---------|----------------------------|----------------------------------|-------|----------------|-----------------------------------|----|----------------------------------|-------------------------------|--------------|---------|
|                                   |         | V <sub>RWM</sub> (Notes 4) | V <sub>BR</sub> @ I <sub>T</sub> |       | I <sub>T</sub> | I <sub>R</sub> @ V <sub>RWM</sub> |    | V <sub>C</sub> @ I <sub>PP</sub> | I <sub>PP</sub>               |              |         |
|                                   |         |                            | Min.                             | Max.  |                | UNI                               | BI |                                  |                               |              |         |
| UNI                               | BI      | V                          | V                                | V     | mA             | uA                                | uA | V                                | A                             | UNI          | BI      |
| 500W Transient Voltage Suppressor |         |                            |                                  |       |                |                                   |    |                                  |                               |              |         |
| SA40A                             | SA40CA  | 40                         | 44.4                             | 51.1  | 1              | 1                                 | 1  | 64.5                             | 7.8                           | SA40A        | SA40CA  |
| SA43                              | SA43C   | 43                         | 47.8                             | 60.5  | 1              | 1                                 | 1  | 76.7                             | 6.5                           | SA43         | SA43C   |
| SA43A                             | SA43CA  | 43                         | 47.8                             | 54.9  | 1              | 1                                 | 1  | 69.4                             | 7.2                           | SA43A        | SA43CA  |
| SA45                              | SA45C   | 45                         | 50                               | 63.3  | 1              | 1                                 | 1  | 80.3                             | 6.2                           | SA45         | SA45C   |
| SA45A                             | SA45CA  | 45                         | 50                               | 57.5  | 1              | 1                                 | 1  | 72.7                             | 6.9                           | SA45A        | SA45CA  |
| SA48                              | SA48C   | 48                         | 53.3                             | 67.5  | 1              | 1                                 | 1  | 85.5                             | 5.8                           | SA48         | SA48C   |
| SA48A                             | SA48CA  | 48                         | 53.3                             | 61.3  | 1              | 1                                 | 1  | 77.4                             | 6.5                           | SA48A        | SA48CA  |
| SA51                              | SA51C   | 51                         | 56.7                             | 71.8  | 1              | 1                                 | 1  | 91.1                             | 5.5                           | SA51         | SA51C   |
| SA51A                             | SA51CA  | 51                         | 56.7                             | 65.2  | 1              | 1                                 | 1  | 82.4                             | 6.1                           | SA51A        | SA51CA  |
| SA54                              | SA54C   | 54                         | 60                               | 76    | 1              | 1                                 | 1  | 96.3                             | 5.2                           | SA54         | SA54C   |
| SA54A                             | SA54CA  | 54                         | 60.0                             | 69    | 1              | 1                                 | 1  | 87.1                             | 5.7                           | SA54A        | SA54CA  |
| SA58                              | SA58C   | 58                         | 64.4                             | 81.6  | 1              | 1                                 | 1  | 103                              | 4.9                           | SA58         | SA58C   |
| SA58A                             | SA58CA  | 58                         | 64.4                             | 74.1  | 1              | 1                                 | 1  | 93.6                             | 5.3                           | SA58A        | SA58CA  |
| SA60                              | SA60C   | 60                         | 66.7                             | 84.5  | 1              | 1                                 | 1  | 107                              | 4.7                           | SA60         | SA60C   |
| SA60A                             | SA60CA  | 60                         | 66.7                             | 76.7  | 1              | 1                                 | 1  | 96.8                             | 5.2                           | SA60A        | SA60CA  |
| SA64                              | SA64C   | 64                         | 71.1                             | 90.1  | 1              | 1                                 | 1  | 114                              | 4.4                           | SA64         | SA64C   |
| SA64A                             | SA64CA  | 64                         | 71.1                             | 81.8  | 1              | 1                                 | 1  | 103                              | 4.9                           | SA64A        | SA64CA  |
| SA70                              | SA70C   | 70                         | 77.8                             | 98.6  | 1              | 1                                 | 1  | 125                              | 4                             | SA70         | SA70C   |
| SA70A                             | SA70CA  | 70                         | 77.8                             | 89.5  | 1              | 1                                 | 1  | 113                              | 4.4                           | SA70A        | SA70CA  |
| SA75                              | SA75C   | 75                         | 83.3                             | 105.7 | 1              | 1                                 | 1  | 134                              | 3.7                           | SA75         | SA75C   |
| SA75A                             | SA75CA  | 75                         | 83.3                             | 95.8  | 1              | 1                                 | 1  | 121                              | 4.1                           | SA75A        | SA75CA  |
| SA78                              | SA78C   | 78                         | 86.7                             | 109.8 | 1              | 1                                 | 1  | 139                              | 3.6                           | SA78         | SA78C   |
| SA78A                             | SA78CA  | 78                         | 86.7                             | 99.7  | 1              | 1                                 | 1  | 126                              | 4                             | SA78A        | SA78CA  |
| SA85                              | SA85C   | 85                         | 94.4                             | 119.2 | 1              | 1                                 | 1  | 151                              | 3.3                           | SA85         | SA85C   |
| SA85A                             | SA85CA  | 85                         | 94.4                             | 108.2 | 1              | 1                                 | 1  | 137                              | 3.6                           | SA85A        | SA85CA  |
| SA90                              | SA90C   | 90                         | 100                              | 126.5 | 1              | 1                                 | 1  | 160                              | 3.1                           | SA90         | SA90C   |
| SA90A                             | SA90CA  | 90                         | 100                              | 115.5 | 1              | 1                                 | 1  | 146                              | 3.4                           | SA90A        | SA90CA  |
| SA100                             | SA100C  | 100                        | 111                              | 141   | 1              | 1                                 | 1  | 179                              | 2.8                           | SA100        | SA100C  |
| SA100A                            | SA100CA | 100                        | 111                              | 128   | 1              | 1                                 | 1  | 162                              | 3.1                           | SA100A       | SA100CA |
| SA110                             | SA110C  | 110                        | 122                              | 154.5 | 1              | 1                                 | 1  | 196                              | 2.6                           | SA110        | SA110C  |
| SA110A                            | SA110CA | 110                        | 122                              | 140.5 | 1              | 1                                 | 1  | 177                              | 2.8                           | SA110A       | SA110CA |
| SA120                             | SA120C  | 120                        | 133                              | 169   | 1              | 1                                 | 1  | 214                              | 2.3                           | SA120        | SA120C  |
| SA120A                            | SA120CA | 120                        | 133                              | 153   | 1              | 1                                 | 1  | 193                              | 2                             | SA120A       | SA120CA |
| SA130                             | SA130C  | 130                        | 144                              | 182.5 | 1              | 1                                 | 1  | 231                              | 2.2                           | SA130        | SA130C  |
| SA130A                            | SA130CA | 130                        | 144                              | 165.5 | 1              | 1                                 | 1  | 209                              | 2.4                           | SA130A       | SA130CA |
| SA150                             | SA150C  | 150                        | 167                              | 211.5 | 1              | 1                                 | 1  | 268                              | 1.9                           | SA150        | SA150C  |
| SA150A                            | SA150CA | 150                        | 167                              | 192.5 | 1              | 1                                 | 1  | 243                              | 2.1                           | SA150A       | SA150CA |
| SA160                             | SA160C  | 160                        | 178                              | 226   | 1              | 1                                 | 1  | 287                              | 1.7                           | SA160        | SA160C  |
| SA160A                            | SA160CA | 160                        | 178                              | 205   | 1              | 1                                 | 1  | 259                              | 1.9                           | SA160A       | SA160CA |
| SA170                             | SA170C  | 170                        | 189                              | 239.5 | 1              | 1                                 | 1  | 304                              | 1.6                           | SA170        | SA170C  |
| SA170A                            | SA170CA | 170                        | 189                              | 217.5 | 1              | 1                                 | 1  | 275                              | 1.8                           | SA170A       | SA170CA |
| SA180                             | SA180C  | 180                        | 198                              | 253.8 | 1              | 1                                 | 1  | 322                              | 1.6                           | SA180        | SA180C  |
| SA180A                            | SA180CA | 180                        | 198                              | 230.4 | 1              | 1                                 | 1  | 292                              | 1.7                           | SA180A       | SA180CA |
| SA190                             | SA190C  | 190                        | 209                              | 267.9 | 1              | 1                                 | 1  | 340                              | 1.5                           | SA190        | SA190C  |
| SA190A                            | SA190CA | 190                        | 209                              | 243.2 | 1              | 1                                 | 1  | 308                              | 1.6                           | SA190A       | SA190CA |
| SA200                             | SA200C  | 200                        | 220                              | 282   | 1              | 1                                 | 1  | 358                              | 1.4                           | SA200        | SA200C  |
| SA200A                            | SA200CA | 200                        | 220                              | 256   | 1              | 1                                 | 1  | 324                              | 1.5                           | SA200A       | SA200CA |
| SA210                             | SA210C  | 210                        | 231                              | 296.1 | 1              | 1                                 | 1  | 376                              | 1.3                           | SA210        | SA210C  |
| SA210A                            | SA210CA | 210                        | 231                              | 268.8 | 1              | 1                                 | 1  | 340                              | 1.5                           | SA210A       | SA210CA |
| SA220                             | SA220C  | 220                        | 242                              | 310.2 | 1              | 1                                 | 1  | 394                              | 1.3                           | SA220        | SA220C  |
| SA220A                            | SA220CA | 220                        | 242                              | 281.6 | 1              | 1                                 | 1  | 356                              | 1.4                           | SA220A       | SA220CA |

## SA5.0~SA220CA

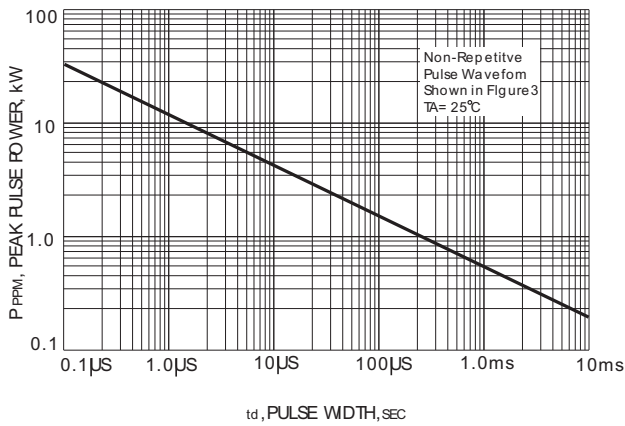


FIGURE 1-PEAK PULSE POWER RATING VERSUS PULSE TIME CURVE

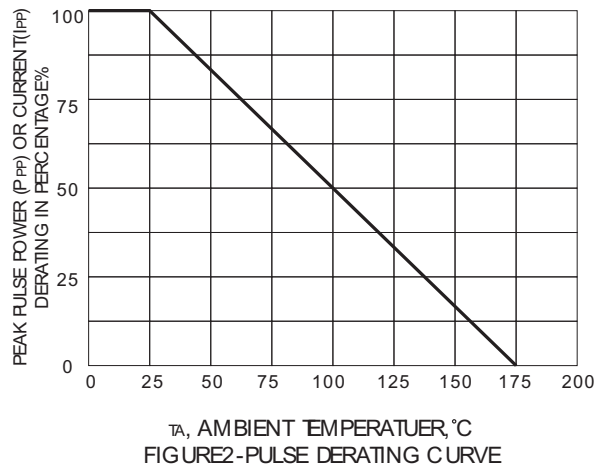


FIGURE 2-PULSE DERATING CURVE

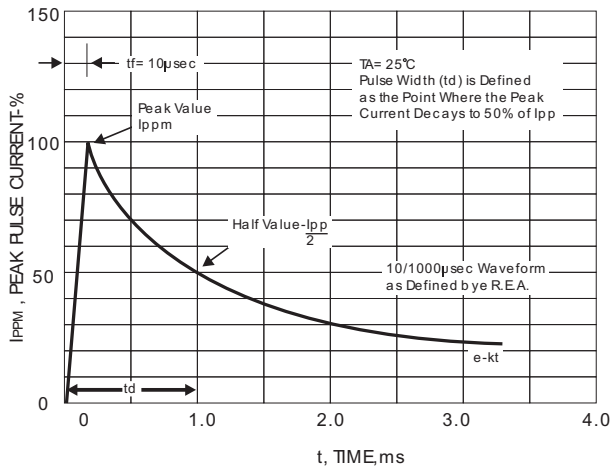


FIGURE 3-PULSE WAVEFORM

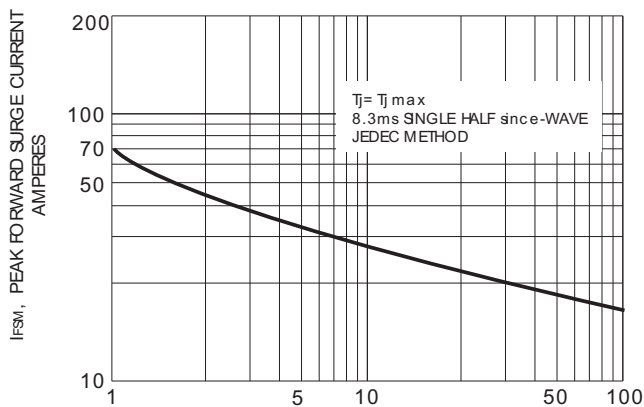


FIG. 5-MAXIMUM NON-REPETITIVE PEAK FORWARD SURGE CURRENT UNIDIRECTIONAL

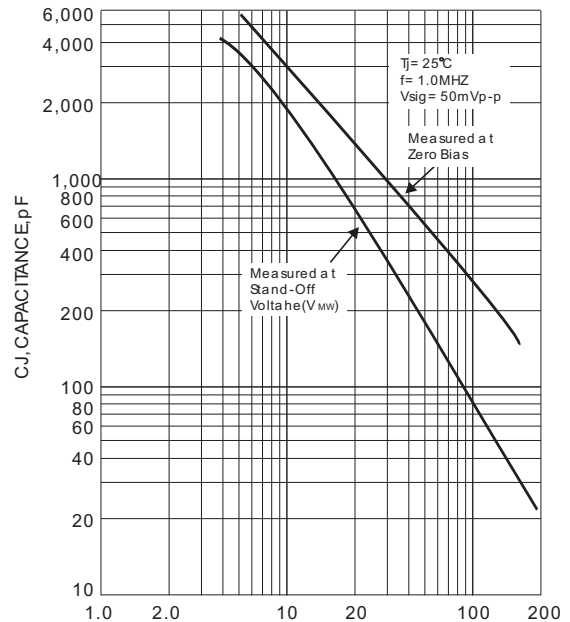


FIG. 4-TYPICAL JUNCTION CAPACITANCE UNIDIRECTIONAL

## SA5.0~SA220CA

### Part No\_packing code\_Version

SA5.0\_AY\_00001

SA5.0\_AY\_10001

SA5.0\_B0\_00001

SA5.0\_B0\_10001

SA5.0\_R2\_00001

SA5.0\_R2\_10001

For example :

RB500V-40\_R2\_00001



| Packing Code XX                      |                      |                                  |                      | Version Code XXXXX |                      |                                       |
|--------------------------------------|----------------------|----------------------------------|----------------------|--------------------|----------------------|---------------------------------------|
| Packing type                         | 1 <sup>st</sup> Code | Packing size code                | 2 <sup>nd</sup> Code | HF or RoHS         | 1 <sup>st</sup> Code | 2 <sup>nd</sup> ~5 <sup>th</sup> Code |
| Tape and Ammunition Box (T/B)        | A                    | N/A                              | 0                    | HF                 | 0                    | serial number                         |
| Tape and Reel (T/R)                  | R                    | 7"                               | 1                    | RoHS               | 1                    | serial number                         |
| Bulk Packing (B/P)                   | B                    | 13"                              | 2                    |                    |                      |                                       |
| Tube Packing (T/P)                   | T                    | 26mm                             | X                    |                    |                      |                                       |
| Tape and Reel (Right Oriented) (TRR) | S                    | 52mm                             | Y                    |                    |                      |                                       |
| Tape and Reel (Left Oriented) (TRL)  | L                    | PANASERT T/B CATHODE UP (PBCU)   | U                    |                    |                      |                                       |
| FORMING                              | F                    | PANASERT T/B CATHODE DOWN (PBCD) | D                    |                    |                      |                                       |



## SA5.0~SA220CA

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