



**DC COMPONENTS CO., LTD.**  
RECTIFIER SPECIALISTS

**SA5.0  
THRU  
SA220CA**

**TECHNICAL SPECIFICATIONS OF TRANSIENT VOLTAGE SUPPRESSOR**

**VOLTAGE RANGE - 5.0 to 220Volts**

**PEAK PULSE POWER - 500 Watts**

**FEATURES**

- \* Glass passivated junction
- \* 500 Watts Peak Pulse Power capability on 10/1000  $\mu$ s waveform
- \* Excellent clamping capability
- \* Low zener impedance
- \* Fast response time

**MECHANICAL DATA**

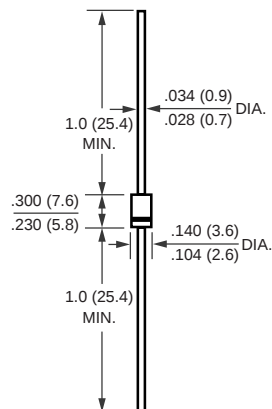
- \* Case: Molded plastic
- \* Epoxy: UL 94V-0 rate flame retardant
- \* Lead: MIL-STD-202E, Method 208 guaranteed
- \* Polarity: Color band denotes positive end (cathode) except bidirectional types
- \* Mounting position: Any
- \* Weight: 0.4 gram

**MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS**

Ratings at 25°C ambient temperature unless otherwise specified.  
Single phase, half wave, 60 Hz, resistive or inductive load,  
For capacitive load, derate current by 20%.



**DO-15**



Dimensions in inches and (millimeters)

**DEVICES FOR BIPOLAR APPLICATIONS**

For Bidirectional use C or CA suffix (e.g. SA5.0C, SA220CA).

Electrical characteristics apply in both directions

|                                                                                                           | SYMBOL                            | VALUE        | UNITS |
|-----------------------------------------------------------------------------------------------------------|-----------------------------------|--------------|-------|
| Peak Pulse Power Dissipation on 10/1000 $\mu$ s waveform (Note1,FIG.1)                                    | PPPM                              | Minimum 500  | Watts |
| Steady State Power Dissipation at T = 75°C Lead Lengths .375"(9.5mm) (Note 2)                             | P <sub>M(AV)</sub>                | 1.0          | Watts |
| Peak Forward Surge Current, 8.3ms single half sine-wave superimposed on rated load(JEDEC Method) (Note 3) | I <sub>FSM</sub>                  | 70           | Amps  |
| Maximum Instantaneous Forward Voltage at 50A for Unidirectional only                                      | V <sub>F</sub>                    | 3.5          | Volts |
| Operating and Storage Temperature Range                                                                   | T <sub>J</sub> , T <sub>STG</sub> | -55 to + 175 | °C    |

NOTES : 1. Non-repetitive current pulse, per Fig.3 and derated above TA = 25°C per Fig. 2.

2. Mounted on Copper Leaf area of 1.6 X 1.6"( 40 X 40mm ) per Fig. 5

3. 8.3ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum.

# RATING AND CHARACTERISTIC CURVES (SA5.0 THRU SA220CA)

FIG. 1 - PEAK PULSE POWER RATING CURVE

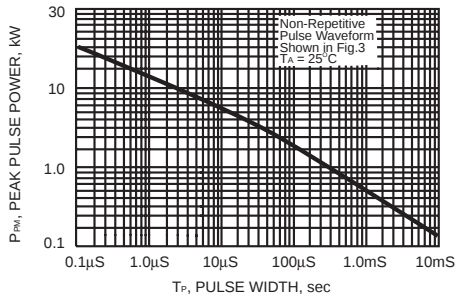


FIG. 2 - PULSE DERATING CURVE

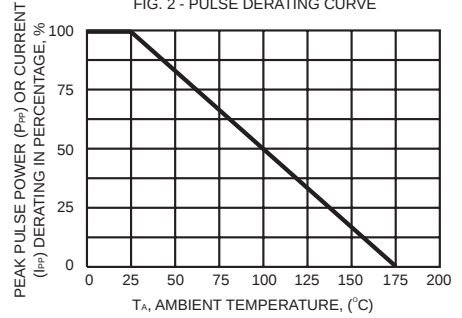


FIG. 3 - PULSE WAVEFORM

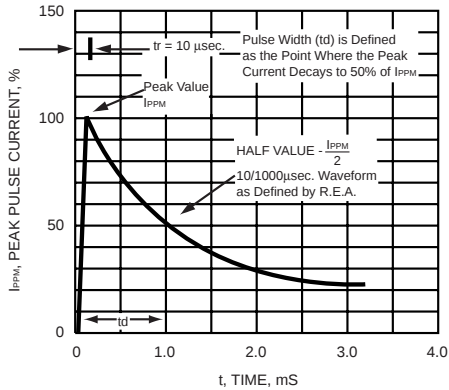


FIG. 4 - TYPICAL JUNCTION CAPACITANCE

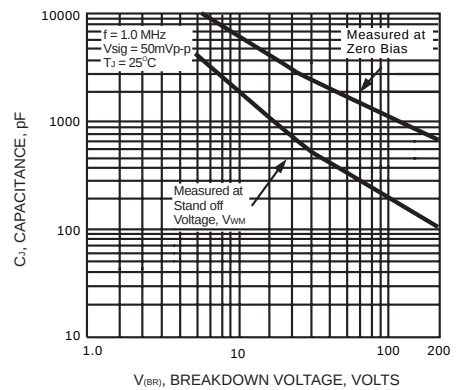


FIG. 5 - STEADY STATE POWER DERTING CURVE

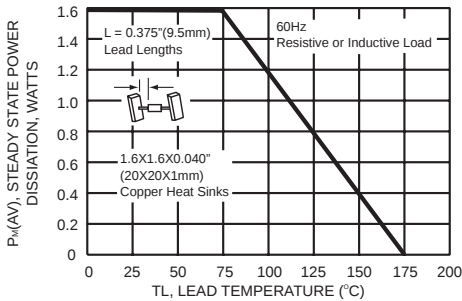


FIG. 6 - MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT UNIDIRECTIONAL

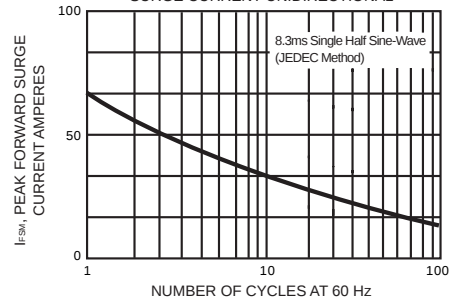
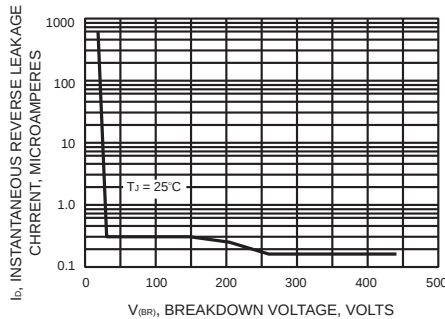


FIG. 7 - TYPICAL REVERSE LEAKAGE CHARACTERISTICS



DC COMPONENTS CO., LTD.

# SA (500W) SERIES TRANSIENT VOLTAGE SUPPRESSORS

| TYPE   | Reverse Stand-off Voltage | Breakdown Voltage @ I <sub>T</sub> |                 | Test Current | Maximum Reverse Leakage @ V <sub>RWM</sub> |                | Maximum Clamping Voltage @ I <sub>PP</sub> | Maximum Peak Pulse Current |            |           |
|--------|---------------------------|------------------------------------|-----------------|--------------|--------------------------------------------|----------------|--------------------------------------------|----------------------------|------------|-----------|
|        |                           |                                    |                 |              |                                            |                |                                            |                            |            |           |
|        |                           | V <sub>RWM</sub>                   | V <sub>BR</sub> |              | I <sub>T</sub>                             | I <sub>R</sub> |                                            |                            |            |           |
|        |                           |                                    | Min.            |              |                                            | Max.           |                                            |                            | UNI-<br>μA | BI-<br>μA |
|        | V                         | V                                  | V               | mA           | μA                                         | μA             | V                                          | A                          |            |           |
| SA5.0  | 5.0                       | 6.40                               | 7.55            | 10           | 600                                        | 1200           | 9.6                                        | 52.3                       |            |           |
| SA5.0A | 5.0                       | 6.40                               | 7.25            | 10           | 600                                        | 1200           | 9.2                                        | 54.3                       |            |           |
| SA6.0  | 6.0                       | 6.67                               | 8.45            | 10           | 600                                        | 1200           | 11.4                                       | 43.9                       |            |           |
| SA6.0A | 6.0                       | 6.67                               | 7.67            | 10           | 600                                        | 1200           | 10.3                                       | 48.5                       |            |           |
| SA6.5  | 6.5                       | 7.22                               | 9.14            | 10           | 400                                        | 800            | 12.3                                       | 40.7                       |            |           |
| SA6.5A | 6.5                       | 7.22                               | 8.30            | 10           | 400                                        | 800            | 11.2                                       | 44.7                       |            |           |
| SA7.0  | 7.0                       | 7.78                               | 9.86            | 10           | 150                                        | 300            | 13.3                                       | 37.8                       |            |           |
| SA7.0A | 7.0                       | 7.78                               | 8.95            | 10           | 150                                        | 300            | 12.0                                       | 41.7                       |            |           |
| SA7.5  | 7.5                       | 8.33                               | 10.67           | 1            | 50                                         | 100            | 14.3                                       | 35.0                       |            |           |
| SA7.5A | 7.5                       | 8.33                               | 9.58            | 1            | 50                                         | 100            | 12.9                                       | 38.8                       |            |           |
| SA8.0  | 8.0                       | 8.89                               | 11.30           | 1            | 25                                         | 50             | 15.0                                       | 33.3                       |            |           |
| SA8.0A | 8.0                       | 8.89                               | 10.23           | 1            | 25                                         | 50             | 13.6                                       | 36.7                       |            |           |
| SA8.5  | 8.5                       | 9.44                               | 11.92           | 1            | 10                                         | 20             | 15.9                                       | 31.4                       |            |           |
| SA8.5A | 8.5                       | 9.44                               | 10.82           | 1            | 10                                         | 20             | 14.4                                       | 34.7                       |            |           |
| SA9.0  | 9.0                       | 10.0                               | 12.6            | 1            | 5                                          | 10             | 16.9                                       | 29.5                       |            |           |
| SA9.0A | 9.0                       | 10.0                               | 11.5            | 1            | 5                                          | 10             | 15.4                                       | 32.5                       |            |           |
| SA10   | 10                        | 11.1                               | 14.1            | 1            | 3                                          |                | 18.8                                       | 26.6                       |            |           |
| SA10A  | 10                        | 11.1                               | 12.8            | 1            | 3                                          |                | 17.0                                       | 29.4                       |            |           |
| SA11   | 11                        | 12.2                               | 15.4            | 1            | 3                                          |                | 20.1                                       | 24.9                       |            |           |
| SA11A  | 11                        | 12.2                               | 14.0            | 1            | 3                                          |                | 18.2                                       | 27.4                       |            |           |
| SA12   | 12                        | 13.3                               | 16.9            | 1            | 3                                          |                | 22.0                                       | 22.7                       |            |           |
| SA12A  | 12                        | 13.3                               | 15.3            | 1            | 3                                          |                | 19.9                                       | 25.1                       |            |           |
| SA13   | 13                        | 14.4                               | 18.2            | 1            | 3                                          |                | 23.8                                       | 21.0                       |            |           |
| SA13A  | 13                        | 14.4                               | 16.5            | 1            | 3                                          |                | 21.5                                       | 23.2                       |            |           |
| SA14   | 14                        | 15.6                               | 19.8            | 1            | 3                                          |                | 25.8                                       | 19.4                       |            |           |
| SA14A  | 14                        | 15.6                               | 17.9            | 1            | 3                                          |                | 23.2                                       | 21.5                       |            |           |
| SA15   | 15                        | 16.7                               | 21.1            | 1            | 3                                          |                | 26.9                                       | 18.8                       |            |           |
| SA15A  | 15                        | 16.7                               | 19.2            | 1            | 3                                          |                | 24.4                                       | 20.6                       |            |           |
| SA16   | 16                        | 17.8                               | 22.6            | 1            | 3                                          |                | 28.8                                       | 17.6                       |            |           |
| SA16A  | 16                        | 17.8                               | 20.5            | 1            | 3                                          |                | 26.0                                       | 19.2                       |            |           |
| SA17   | 17                        | 18.9                               | 23.9            | 1            | 3                                          |                | 30.5                                       | 16.4                       |            |           |
| SA17A  | 17                        | 18.9                               | 21.7            | 1            | 3                                          |                | 27.6                                       | 16.1                       |            |           |
| SA18   | 18                        | 20.0                               | 25.3            | 1            | 3                                          |                | 32.2                                       | 15.5                       |            |           |
| SA18A  | 18                        | 20.0                               | 23.3            | 1            | 3                                          |                | 29.2                                       | 17.2                       |            |           |
| SA20   | 20                        | 22.2                               | 28.1            | 1            | 3                                          |                | 35.8                                       | 13.9                       |            |           |
| SA20A  | 20                        | 22.2                               | 25.5            | 1            | 3                                          |                | 32.4                                       | 15.4                       |            |           |
| SA22   | 22                        | 24.4                               | 30.9            | 1            | 3                                          |                | 39.4                                       | 12.7                       |            |           |
| SA22A  | 22                        | 24.4                               | 28.0            | 1            | 3                                          |                | 35.5                                       | 14.1                       |            |           |
| SA24   | 24                        | 26.7                               | 33.8            | 1            | 3                                          |                | 43.0                                       | 11.6                       |            |           |
| SA24A  | 24                        | 26.7                               | 30.7            | 1            | 3                                          |                | 38.9                                       | 12.8                       |            |           |
| SA26   | 26                        | 28.9                               | 36.6            | 1            | 3                                          |                | 46.6                                       | 10.7                       |            |           |
| SA26A  | 26                        | 28.9                               | 33.2            | 1            | 3                                          |                | 42.1                                       | 11.9                       |            |           |
| SA28   | 28                        | 31.1                               | 39.4            | 1            | 3                                          |                | 50.0                                       | 9.9                        |            |           |
| SA28A  | 28                        | 31.1                               | 35.8            | 1            | 3                                          |                | 45.4                                       | 11.0                       |            |           |
| SA30   | 30                        | 33.3                               | 42.2            | 1            | 3                                          |                | 53.5                                       | 9.3                        |            |           |
| SA30A  | 30                        | 33.3                               | 38.3            | 1            | 3                                          |                | 48.4                                       | 10.3                       |            |           |
| SA33   | 33                        | 36.7                               | 46.5            | 1            | 3                                          |                | 59.0                                       | 5.8                        |            |           |
| SA33A  | 33                        | 36.7                               | 42.2            | 1            | 3                                          |                | 53.3                                       | 9.4                        |            |           |
| SA36   | 36                        | 40.0                               | 50.7            | 1            | 3                                          |                | 64.3                                       | 7.8                        |            |           |
| SA36A  | 36                        | 40.0                               | 46.0            | 1            | 3                                          |                | 58.1                                       | 8.6                        |            |           |
| SA40   | 40                        | 44.4                               | 56.3            | 1            | 3                                          |                | 71.4                                       | 7.0                        |            |           |
| SA40A  | 40                        | 44.4                               | 51.1            | 1            | 3                                          |                | 64.5                                       | 7.8                        |            |           |



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|--------|---------------------------|------------------------------------|--------|----------------|--------------------------------------------|-----------|--------------------------------------------|----------------------------|
|        |                           | V <sub>BR</sub>                    |        |                | I <sub>R</sub>                             |           |                                            |                            |
|        | V <sub>RWM</sub>          | Min. V                             | Max. V | I <sub>T</sub> | UNI-<br>μA                                 | BI-<br>μA | V <sub>C</sub>                             | I <sub>PP</sub>            |
|        | V                         | V                                  | V      | mA             |                                            |           | V                                          | A                          |
| SA43   | 43                        | 47.8                               | 60.5   | 1              | 3                                          |           | 76.7                                       | 6.5                        |
| SA43A  | 43                        | 47.8                               | 54.9   | 1              | 3                                          |           | 69.4                                       | 7.2                        |
| SA45   | 45                        | 50.0                               | 63.3   | 1              | 3                                          |           | 80.3                                       | 6.2                        |
| SA45A  | 45                        | 50.0                               | 57.5   | 1              | 3                                          |           | 72.7                                       | 6.9                        |
| SA48   | 48                        | 53.3                               | 67.5   | 1              | 3                                          |           | 85.5                                       | 5.8                        |
| SA48A  | 48                        | 53.3                               | 61.3   | 1              | 3                                          |           | 77.4                                       | 6.5                        |
| SA51   | 51                        | 56.7                               | 71.8   | 1              | 3                                          |           | 91.1                                       | 5.5                        |
| SA51A  | 51                        | 56.7                               | 65.2   | 1              | 3                                          |           | 82.4                                       | 6.1                        |
| SA54   | 54                        | 60.0                               | 76.0   | 1              | 3                                          |           | 96.3                                       | 5.2                        |
| SA54A  | 54                        | 60.0                               | 69.0   | 1              | 3                                          |           | 87.1                                       | 5.7                        |
| SA58   | 58                        | 64.4                               | 81.6   | 1              | 3                                          |           | 103.0                                      | 4.9                        |
| SA58A  | 58                        | 64.4                               | 74.1   | 1              | 3                                          |           | 93.6                                       | 5.3                        |
| SA60   | 60                        | 66.7                               | 84.5   | 1              | 3                                          |           | 107.0                                      | 4.7                        |
| SA60A  | 60                        | 66.7                               | 76.7   | 1              | 3                                          |           | 96.8                                       | 5.2                        |
| SA64   | 64                        | 71.1                               | 90.1   | 1              | 3                                          |           | 114                                        | 4.4                        |
| SA64A  | 64                        | 71.1                               | 81.8   | 1              | 3                                          |           | 103                                        | 4.9                        |
| SA70   | 70                        | 77.8                               | 98.6   | 1              | 3                                          |           | 125                                        | 4.0                        |
| SA70A  | 70                        | 77.8                               | 89.5   | 1              | 3                                          |           | 113                                        | 4.4                        |
| SA75   | 75                        | 83.3                               | 105.7  | 1              | 3                                          |           | 134                                        | 3.7                        |
| SA75A  | 75                        | 83.3                               | 95.8   | 1              | 3                                          |           | 121                                        | 4.1                        |
| SA78   | 78                        | 86.7                               | 109.8  | 1              | 3                                          |           | 139                                        | 3.6                        |
| SA78A  | 78                        | 86.7                               | 99.7   | 1              | 3                                          |           | 126                                        | 4.0                        |
| SA85   | 85                        | 94.4                               | 119.2  | 1              | 3                                          |           | 151                                        | 3.3                        |
| SA85A  | 85                        | 94.4                               | 108.2  | 1              | 3                                          |           | 137                                        | 3.6                        |
| SA90   | 90                        | 100                                | 126.5  | 1              | 3                                          |           | 160                                        | 3.1                        |
| SA90A  | 90                        | 100                                | 115.5  | 1              | 3                                          |           | 146                                        | 3.4                        |
| SA100  | 100                       | 111                                | 141.0  | 1              | 3                                          |           | 179                                        | 2.8                        |
| SA100A | 100                       | 111                                | 128.0  | 1              | 3                                          |           | 162                                        | 3.1                        |
| SA110  | 110                       | 122                                | 154.5  | 1              | 3                                          |           | 196                                        | 2.6                        |
| SA110A | 110                       | 122                                | 140.5  | 1              | 3                                          |           | 177                                        | 2.8                        |
| SA120  | 120                       | 133                                | 169.0  | 1              | 3                                          |           | 214                                        | 2.3                        |
| SA120A | 120                       | 133                                | 153.0  | 1              | 3                                          |           | 193                                        | 2.0                        |
| SA130  | 130                       | 144                                | 182.5  | 1              | 3                                          |           | 231                                        | 2.2                        |
| SA130A | 130                       | 144                                | 165.5  | 1              | 3                                          |           | 209                                        | 2.4                        |
| SA150  | 150                       | 167                                | 211.5  | 1              | 3                                          |           | 268                                        | 1.9                        |
| SA150A | 150                       | 167                                | 192.5  | 1              | 3                                          |           | 243                                        | 2.1                        |
| SA160  | 160                       | 178                                | 226.0  | 1              | 3                                          |           | 287                                        | 1.7                        |
| SA160A | 160                       | 178                                | 205.0  | 1              | 3                                          |           | 259                                        | 1.9                        |
| SA170  | 170                       | 189                                | 239.5  | 1              | 3                                          |           | 304                                        | 1.6                        |
| SA170A | 170                       | 189                                | 217.5  | 1              | 3                                          |           | 275                                        | 1.8                        |
| SA180  | 180                       | 198                                | 253.8  | 1              | 3                                          |           | 322                                        | 1.6                        |
| SA180A | 180                       | 198                                | 230.4  | 1              | 3                                          |           | 292                                        | 1.7                        |
| SA190  | 190                       | 209                                | 267.9  | 1              | 3                                          |           | 340                                        | 1.5                        |
| SA190A | 190                       | 209                                | 243.2  | 1              | 3                                          |           | 308                                        | 1.6                        |
| SA200  | 200                       | 220                                | 282.0  | 1              | 3                                          |           | 358                                        | 1.4                        |
| SA200A | 200                       | 220                                | 256.0  | 1              | 3                                          |           | 324                                        | 1.5                        |
| SA210  | 210                       | 231                                | 296.1  | 1              | 3                                          |           | 376                                        | 1.3                        |
| SA210A | 210                       | 231                                | 268.8  | 1              | 3                                          |           | 340                                        | 1.5                        |
| SA220  | 220                       | 242                                | 310.2  | 1              | 3                                          |           | 394                                        | 1.3                        |
| SA220A | 220                       | 242                                | 281.6  | 1              | 3                                          |           | 356                                        | 1.4                        |

NOTES:1.  $V_{BR}$  measured after  $I_T$  applied for 300 $\mu s$ .  $I_T$ = Square Wave Pulse or equivalent.

2. For Bidirectional use "C" or "CA" Suffix for all types (e.g.: SA5.0C, SA5.0CA, SA220C, SA220CA).  
Electrical characteristics apply in both directions.

3. For bidirectional types having  $V_{RWM}$  of 10 volts and less, the  $I_o$  limit is doubled.



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