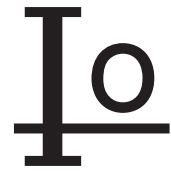


# SA5.0 THRU SA180CA

500 WATT PEAK POWER TRANSIENT VOLTAGE SUPPRESSORS



## FEATURES

- \* 500 Watts Surge Capability at 1ms
- \* Excellent clamping capability
- \* Low zener impedance
- \* Fast response time: Typically less than 1.0ps from 0 volt to BV min.
- \* Typical  $I_R$  less than  $1\mu A$  above 10V
- \* High temperature soldering guaranteed:  $260^\circ C$  / 10 seconds / .375"(9.5mm) lead length, 5lbs.(2.3kg) tension

## MECHANICAL DATA

- \* Case: Molded plastic
- \* Epoxy: UL 94V-0 rate flame retardant
- \* Lead: Axial leads, solderable per MIL-STD-202, method 208 guaranteed
- \* Polarity: Color band denotes cathode end
- \* Mounting position: Any
- \* Weight: 0.40 grams

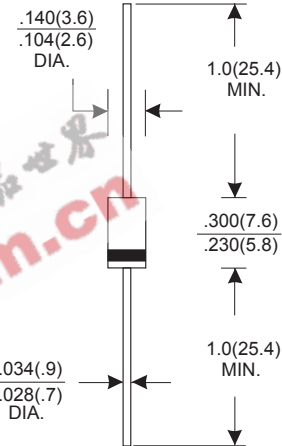
## VOLTAGE RANGE

5.0 to 180 Volts

500 Watts Peak Power

3.0 Watts Steady State

DO-15



Dimensions in inches and (millimeters)

## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Rating  $25^\circ C$  ambient temperature unless otherwise specified.  
Single phase half wave, 60Hz, resistive or inductive load.  
For capacitive load, derate current by 20%.

| RATINGS  | SYMBOL         | VALUE       | UNITS      |
|--|----------------|-------------|------------|
| Peak Power Dissipation at $T_A=25^\circ C$ , $T_P=1ms$ (NOTE 1)  | $P_{PK}$       | Minimum 500 | Watts      |
| Steady State Power Dissipation at $T_L=75^\circ C$<br>Lead Length .375"(9.5mm) (NOTE 2)                      | $P_D$          | 3.0         | Watts      |
| Peak Forward Surge Current at 8.3ms Single Half Sine-Wave superimposed on rated load (JEDEC method) (NOTE 3) | $I_{FSM}$      | 70          | Amps       |
| Operating and Storage Temperature Range  | $T_J, T_{STG}$ | -55 to +175 | $^\circ C$ |

### NOTES:

1. Non-repetitive current pulse per Fig. 3 and derated above  $T_A=25^\circ C$  per Fig. 2.
2. Mounted on Copper Pad area of  $1.6" \times 1.6"$  (40mm X 40mm) per Fig.5.
3. 8.3ms single half sine-wave, duty cycle = 4 pulses per minute maximum.

## DEVICES FOR BIPOLAR APPLICATIONS

1. For Bidirectional use C or CA Suffix for types SA5.0 thru SA180.
2. Electrical characteristics apply in both directions.

# RATING AND CHARACTERISTIC CURVES (SA5.0 THRU SA180CA)

FIG.1-PEAK PULSE POWER DERATING CURVE

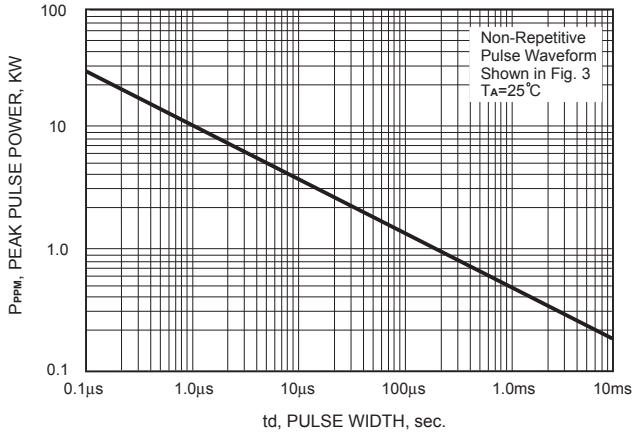


FIG.2-PULSE DERATING CURVE

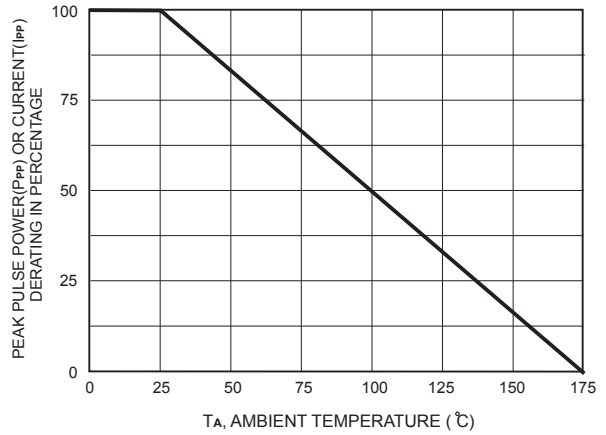


FIG.3-PULSE WAVE FORM



FIG.4-TYPICAL JUNCTION CAPACITANCE

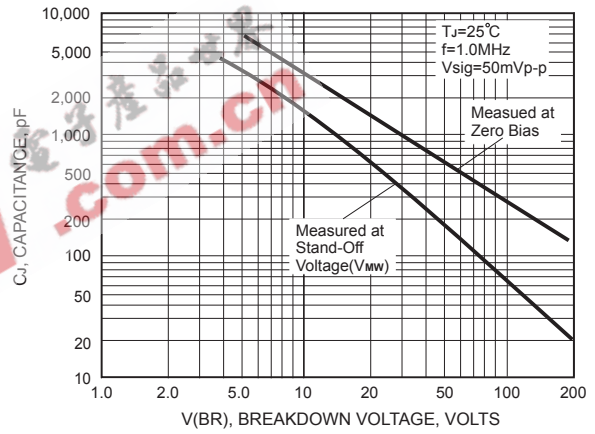


FIG.5-STEADY STATE POWER DERATING CURVE

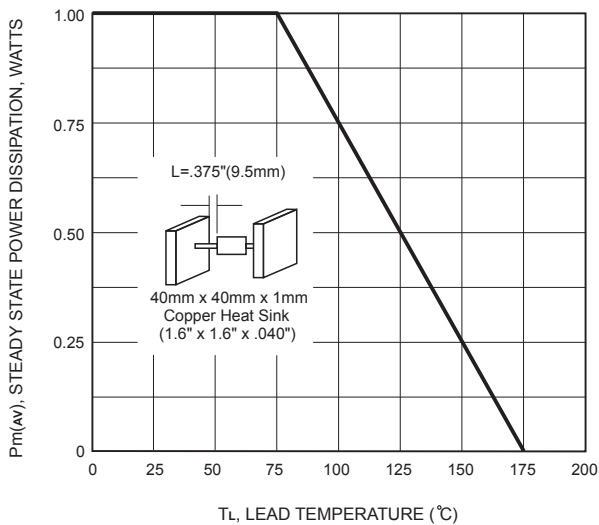
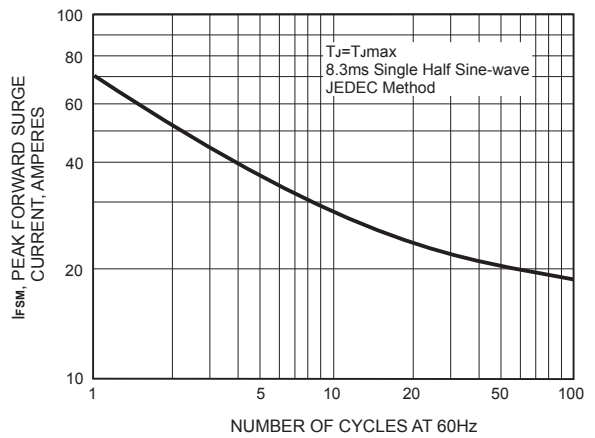


FIG.6-MAXIMUM NON-REPETITIVE PEAK FORWARD SURGE CURRENT, UNIDIRECTIONAL



# 500 Watt Axial Lead TVS

| UNI DIRECTIONAL PART NUMBER | REVERSE STAND-OFF VOLTAGE VRWM (V) | BREAKDOWN VOLTAGE VBR (V) MIN. @IT | BREAKDOWN VOLTAGE VRB (V) MAX. @IT | TEST CURRENT IT (mA) | MAXIMUM CLAMPING VOLTAGE @Ipp Vc (V) | PEAK PULSE CURRENT Ipp (A) | REVERSE LEAKAGE @ VRWM IR(μA) |
|-----------------------------|------------------------------------|------------------------------------|------------------------------------|----------------------|--------------------------------------|----------------------------|-------------------------------|
| SA5.0                       | 5.00                               | 6.40                               | 7.30                               | 10                   | 9.6                                  | 53.1                       | 600                           |
| SA5.0A                      | 5.00                               | 6.40                               | 7.00                               | 10                   | 9.2                                  | 55.4                       | 600                           |
| SA6.0                       | 6.00                               | 6.67                               | 8.15                               | 10                   | 11.4                                 | 44.7                       | 600                           |
| SA6.0A                      | 6.00                               | 6.67                               | 7.37                               | 10                   | 10.3                                 | 49.5                       | 600                           |
| SA6.5                       | 6.50                               | 7.22                               | 8.82                               | 10                   | 12.3                                 | 41.5                       | 400                           |
| SA6.5A                      | 6.50                               | 7.22                               | 7.98                               | 10                   | 11.2                                 | 45.5                       | 400                           |
| SA7.0                       | 7.00                               | 7.78                               | 9.51                               | 10                   | 13.3                                 | 38.3                       | 150                           |
| SA7.0A                      | 7.00                               | 7.78                               | 8.60                               | 10                   | 12.0                                 | 42.5                       | 150                           |
| SA7.5                       | 7.50                               | 8.33                               | 10.20                              | 1                    | 14.3                                 | 35.7                       | 50                            |
| SA7.5A                      | 7.50                               | 8.33                               | 9.21                               | 1                    | 12.9                                 | 39.5                       | 50                            |
| SA8.0                       | 8.00                               | 8.89                               | 10.90                              | 1                    | 15.0                                 | 34.0                       | 25                            |
| SA8.0A                      | 8.00                               | 8.89                               | 9.83                               | 1                    | 13.6                                 | 37.5                       | 25                            |
| SA8.5                       | 8.50                               | 9.44                               | 11.50                              | 1                    | 15.9                                 | 32.1                       | 10                            |
| SA8.5A                      | 8.50                               | 9.44                               | 10.40                              | 1                    | 14.4                                 | 35.4                       | 10                            |
| SA9.0                       | 9.00                               | 10.00                              | 12.20                              | 1                    | 16.9                                 | 30.2                       | 5                             |
| SA9.0A                      | 9.00                               | 10.00                              | 11.10                              | 1                    | 15.4                                 | 33.1                       | 5                             |
| SA10                        | 10.00                              | 11.10                              | 13.60                              | 1                    | 18.8                                 | 27.1                       | 3                             |
| SA10A                       | 10.00                              | 11.10                              | 12.30                              | 1                    | 17.0                                 | 30.0                       | 3                             |
| SA11                        | 11.00                              | 12.20                              | 14.90                              | 1                    | 20.1                                 | 25.4                       | 3                             |
| SA11A                       | 11.00                              | 12.20                              | 13.50                              | 1                    | 18.2                                 | 28.0                       | 3                             |
| SA12                        | 12.00                              | 13.30                              | 16.30                              | 1                    | 22.0                                 | 23.2                       | 3                             |
| SA12A                       | 12.00                              | 13.30                              | 14.70                              | 1                    | 19.9                                 | 25.6                       | 3                             |
| SA13                        | 13.00                              | 14.40                              | 17.60                              | 1                    | 23.8                                 | 21.4                       | 3                             |
| SA13A                       | 13.00                              | 14.40                              | 15.90                              | 1                    | 21.5                                 | 23.7                       | 3                             |
| SA14                        | 14.00                              | 15.60                              | 19.10                              | 1                    | 25.8                                 | 19.8                       | 3                             |
| SA14A                       | 14.00                              | 15.60                              | 17.20                              | 1                    | 23.2                                 | 22.0                       | 3                             |
| SA15                        | 15.00                              | 16.70                              | 20.40                              | 1                    | 26.9                                 | 19.0                       | 3                             |
| SA15A                       | 15.00                              | 16.70                              | 18.50                              | 1                    | 24.4                                 | 20.9                       | 3                             |
| SA16                        | 16.00                              | 17.80                              | 21.80                              | 1                    | 28.8                                 | 17.7                       | 3                             |
| SA16A                       | 16.00                              | 17.80                              | 19.70                              | 1                    | 26.0                                 | 19.6                       | 3                             |
| SA17                        | 17.00                              | 18.90                              | 23.10                              | 1                    | 30.5                                 | 16.7                       | 3                             |
| SA17A                       | 17.00                              | 18.90                              | 20.90                              | 1                    | 27.6                                 | 18.5                       | 3                             |
| SA18                        | 18.00                              | 20.00                              | 24.40                              | 1                    | 32.2                                 | 15.8                       | 3                             |
| SA18A                       | 18.00                              | 20.00                              | 22.10                              | 1                    | 29.2                                 | 17.5                       | 3                             |
| SA20                        | 20.00                              | 22.20                              | 27.10                              | 1                    | 35.8                                 | 14.2                       | 3                             |
| SA20A                       | 20.00                              | 22.20                              | 24.50                              | 1                    | 32.4                                 | 15.7                       | 3                             |
| SA22                        | 22.00                              | 24.40                              | 29.80                              | 1                    | 39.4                                 | 12.9                       | 3                             |
| SA22A                       | 22.00                              | 24.40                              | 26.90                              | 1                    | 35.5                                 | 14.4                       | 3                             |
| SA24                        | 24.00                              | 26.70                              | 32.60                              | 1                    | 43.0                                 | 11.9                       | 3                             |
| SA24A                       | 24.00                              | 26.70                              | 29.50                              | 1                    | 38.9                                 | 13.1                       | 3                             |
| SA26                        | 26.00                              | 28.90                              | 35.30                              | 1                    | 46.6                                 | 10.9                       | 3                             |
| SA26A                       | 26.00                              | 28.90                              | 31.90                              | 1                    | 42.1                                 | 12.1                       | 3                             |
| SA28                        | 28.00                              | 31.10                              | 38.00                              | 1                    | 50.1                                 | 10.2                       | 3                             |
| SA28A                       | 28.00                              | 31.10                              | 34.40                              | 1                    | 45.4                                 | 11.2                       | 3                             |
| SA30                        | 30.00                              | 33.30                              | 40.70                              | 1                    | 53.5                                 | 9.5                        | 3                             |
| SA30A                       | 30.00                              | 33.30                              | 36.80                              | 1                    | 48.4                                 | 10.5                       | 3                             |
| SA33                        | 33.00                              | 36.70                              | 44.90                              | 1                    | 59.0                                 | 8.6                        | 3                             |
| SA33A                       | 33.00                              | 36.70                              | 40.60                              | 1                    | 53.3                                 | 9.6                        | 3                             |
| SA36                        | 36.00                              | 40.00                              | 48.90                              | 1                    | 64.3                                 | 7.9                        | 3                             |
| SA36A                       | 36.00                              | 40.00                              | 44.20                              | 1                    | 58.1                                 | 8.8                        | 3                             |
| SA40                        | 40.00                              | 44.40                              | 54.30                              | 1                    | 71.4                                 | 7.1                        | 3                             |
| SA40A                       | 40.00                              | 44.40                              | 49.10                              | 1                    | 64.5                                 | 7.9                        | 3                             |

# 500 Watt Axial Lead TVS

| UNI DIRECTIONAL PART NUMBER | REVERSE STAND-OFF VOLTAGE VRWM (V) | BREAKDOWN VOLTAGE VBR (V) MIN. @IT | BREAKDOWN VOLTAGE VRB (V) MAX. @IT | TEST CURRENT IT (mA) | MAXIMUM CLAMPING VOLTAGE @Ipp Vc (V) | PEAK PULSE CURRENT Ipp (A) | REVERSE LEAKAGE @ VRWM IR(μA) |
|-----------------------------|------------------------------------|------------------------------------|------------------------------------|----------------------|--------------------------------------|----------------------------|-------------------------------|
| SA43                        | 43.00                              | 47.80                              | 58.40                              | 1                    | 76.7                                 | 6.6                        | 3                             |
| SA43A                       | 43.00                              | 47.80                              | 52.80                              | 1                    | 69.4                                 | 7.3                        | 3                             |
| SA45                        | 45.00                              | 50.00                              | 61.10                              | 1                    | 80.3                                 | 6.4                        | 3                             |
| SA45A                       | 45.00                              | 50.00                              | 55.30                              | 1                    | 72.7                                 | 7.0                        | 3                             |
| SA48                        | 48.00                              | 53.30                              | 65.20                              | 1                    | 85.5                                 | 6.0                        | 3                             |
| SA48A                       | 48.00                              | 53.30                              | 58.90                              | 1                    | 77.4                                 | 6.6                        | 3                             |
| SA51                        | 51.00                              | 56.70                              | 69.30                              | 1                    | 91.1                                 | 5.6                        | 3                             |
| SA51A                       | 51.00                              | 56.70                              | 62.70                              | 1                    | 82.4                                 | 6.2                        | 3                             |
| SA54                        | 54.00                              | 60.00                              | 73.30                              | 1                    | 96.3                                 | 5.3                        | 3                             |
| SA54A                       | 54.00                              | 60.00                              | 66.30                              | 1                    | 87.1                                 | 5.9                        | 3                             |
| SA58                        | 58.00                              | 64.40                              | 78.70                              | 1                    | 103.0                                | 5.0                        | 3                             |
| SA58A                       | 58.00                              | 64.40                              | 71.20                              | 1                    | 93.6                                 | 5.4                        | 3                             |
| SA60                        | 60.00                              | 66.70                              | 81.50                              | 1                    | 107.0                                | 4.8                        | 3                             |
| SA60A                       | 60.00                              | 66.70                              | 73.70                              | 1                    | 96.8                                 | 5.3                        | 3                             |
| SA64                        | 64.00                              | 71.10                              | 86.90                              | 1                    | 114.0                                | 4.5                        | 3                             |
| SA64A                       | 64.00                              | 71.10                              | 78.60                              | 1                    | 103.0                                | 5.0                        | 3                             |
| SA70                        | 70.00                              | 77.80                              | 95.10                              | 1                    | 125.0                                | 4.1                        | 3                             |
| SA70A                       | 70.00                              | 77.80                              | 86.00                              | 1                    | 113.0                                | 4.5                        | 3                             |
| SA75                        | 75.00                              | 83.30                              | 102.00                             | 1                    | 134.0                                | 3.8                        | 3                             |
| SA75A                       | 75.00                              | 83.30                              | 92.10                              | 1                    | 121.0                                | 4.2                        | 3                             |
| SA78                        | 78.00                              | 86.70                              | 106.00                             | 1                    | 139.0                                | 3.7                        | 3                             |
| SA78A                       | 78.00                              | 86.70                              | 95.80                              | 1                    | 126.0                                | 4.0                        | 3                             |
| SA85                        | 85.00                              | 94.40                              | 115.00                             | 1                    | 151.0                                | 3.4                        | 3                             |
| SA85A                       | 85.00                              | 94.40                              | 104.00                             | 1                    | 137.0                                | 3.7                        | 3                             |
| SA90                        | 90.00                              | 100.00                             | 122.00                             | 1                    | 160.0                                | 3.2                        | 3                             |
| SA90A                       | 90.00                              | 100.00                             | 111.00                             | 1                    | 146.0                                | 3.5                        | 3                             |
| SA100                       | 100.00                             | 111.00                             | 136.00                             | 1                    | 179.0                                | 2.8                        | 3                             |
| SA100A                      | 100.00                             | 111.00                             | 123.00                             | 1                    | 162.0                                | 3.1                        | 3                             |
| SA110                       | 110.00                             | 122.00                             | 149.00                             | 1                    | 196.0                                | 2.6                        | 3                             |
| SA110A                      | 110.00                             | 122.00                             | 135.00                             | 1                    | 177.0                                | 2.9                        | 3                             |
| SA120                       | 120.00                             | 133.00                             | 163.00                             | 1                    | 214.0                                | 2.4                        | 3                             |
| SA120A                      | 120.00                             | 133.00                             | 147.00                             | 1                    | 193.0                                | 2.6                        | 3                             |
| SA130                       | 130.00                             | 144.00                             | 176.00                             | 1                    | 230.0                                | 2.2                        | 3                             |
| SA130A                      | 130.00                             | 144.00                             | 159.00                             | 1                    | 209.0                                | 2.4                        | 3                             |
| SA150                       | 150.00                             | 167.00                             | 204.00                             | 1                    | 268.0                                | 1.9                        | 3                             |
| SA150A                      | 150.00                             | 167.00                             | 185.00                             | 1                    | 243.0                                | 2.1                        | 3                             |
| SA160                       | 160.00                             | 178.00                             | 218.00                             | 1                    | 287.0                                | 1.7                        | 3                             |
| SA160A                      | 160.00                             | 178.00                             | 197.00                             | 1                    | 259.0                                | 2.0                        | 3                             |
| SA170                       | 170.00                             | 189.00                             | 231.00                             | 1                    | 304.0                                | 1.7                        | 3                             |
| SA170A                      | 170.00                             | 189.00                             | 209.00                             | 1                    | 275.0                                | 1.9                        | 3                             |
| SA180                       | 180.00                             | 200.00                             | 244.00                             | 1                    | 320.0                                | 1.6                        | 3                             |
| SA180A                      | 180.00                             | 200.00                             | 233.00                             | 1                    | 289.0                                | 1.7                        | 3                             |