

**SA5.0
 thru
 SA170A**

**5.0 thru 170 volts
 500 Watts
 Transient Voltage
 Suppressors**

FEATURES:

- ECONOMICAL SERIES
- AVAILABLE IN BOTH UNIDIRECTIONAL AND BI-DIRECTIONAL CONSTRUCTION
- 5.0 TO 170 STAND-OFF VOLTAGE AVAILABLE
- 500 WATTS PEAK PULSE POWER DISSIPATION
- QUICK RESPONSE

DESCRIPTION:

This Transient Voltage Suppressor is an economical, molded, commercial product used to protect voltage sensitive components from destruction or partial degradation. The response time of their clamping action is virtually instantaneous (1×10^{-12} seconds) and they have a peak pulse power rating of 500 watts for 1 ms as depicted in Figure 1 and 2. Microsemi also offers a great variety of other Transient Voltage Suppressor's to meet higher and lower power demands and special applications.

MAXIMUM RATINGS:

Peak Pulse Power Dissipation at 25°C: 500 Watts

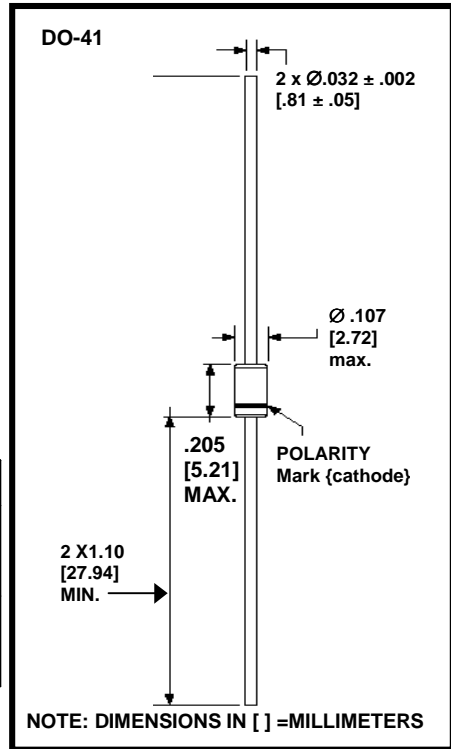
Steady State Power Dissipation: 2.5 Watts at $T_L = +75^\circ\text{C}$

3/8" Lead Length

t_{clamping} (0 volts to BV Min.):

Unidirectional $<1 \times 10^{-12}$ Seconds: Bi-directional $<5 \times 10^{-9}$ Seconds.

Operating and Storage Temperature: -55° to $+175^\circ\text{C}$



MECHANICAL CHARACTERISTICS
CASE: Void free transfer molded thermosetting plastic.
FINISH: Readily solderable.
POLARITY: Band denotes cathode. Bi-directional not marked.
WEIGHT: 0.7 gram (Appx.).
MOUNTING POSITION: Any

TYPICAL CHARACTERISTIC CURVES

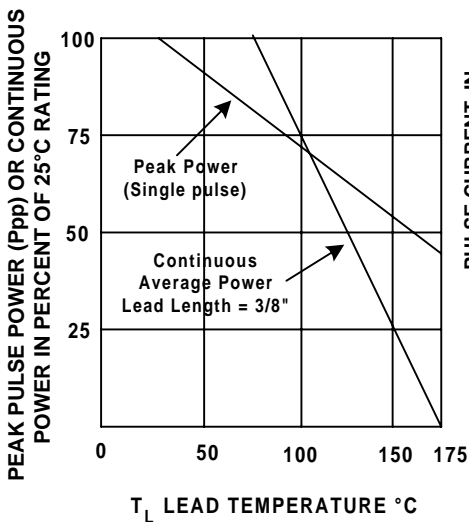


FIGURE 1

DERATING CURVE

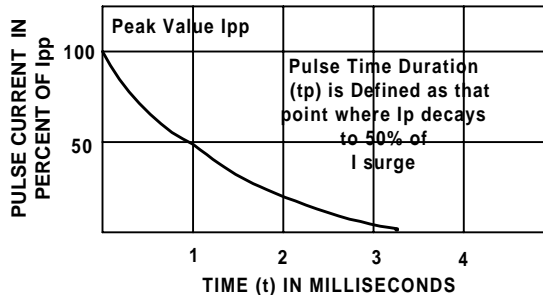


FIGURE 2

PULSE WAVEFORM FOR EXPONENTIAL SURGE

ELECTRICAL CHARACTERISTICS AT 25°C

| PART NUMBER | BREAKDOWN VOLTAGE V(BR) | | TEST CURRENT I_T | RATED STAND OFF VOLTAGE V_{WM} | MAX. REVERSE STANDBY CURRENT $I_D @ V_{WM}$ | MAX. PEAK REVERSE VOLTAGE V_C MAX. @ I_{PP} | MAX. PEAK PULSE CURRENT I_{PP} (Figure 2) | MAX. TEMP. COEFFICIENT OF V(BR) -55°C TO 175°C $\alpha_{V(BR)}$ |
|-------------|-------------------------|--------------|-----------------------|-------------------------------------|--|--|---|--|
| | MIN. VOLTS | MAX VOLTS | | | | | | |
| SA5.0 | 6.40 | 7.30 | 10 | 5.0 | 600 | 9.6 | 52 | .057 |
| SA5.0A | 6.40 | 7.00 | 10 | 5.0 | 600 | 9.2 | 54.3 | .057 |
| SA6.0 | 6.67 | 8.15 | 10 | 6.0 | 600 | 11.4 | 43.9 | .059 |
| SA6.0A | 6.67 | 7.37 | 10 | 6.0 | 600 | 10.3 | 48.5 | .059 |
| SA6.5 | 7.22 | 8.82 | 10 | 6.5 | 400 | 12.3 | 40.7 | .061 |
| SA6.5A | 7.22 | 7.98 | 10 | 6.5 | 400 | 11.2 | 44.7 | .061 |
| SA7.0 | 7.78 | 9.51 | 10 | 7.0 | 150 | 13.3 | 37.8 | .065 |
| SA7.0A | 7.78 | 8.60 | 10 | 7.0 | 150 | 12.0 | 41.7 | .065 |
| SA7.5 | 8.33 | 10.2 | 1 | 7.5 | 50 | 14.3 | 35.0 | .067 |
| SA7.5A | 8.33 | 9.21 | 1 | 7.5 | 50 | 12.9 | 38.8 | .067 |
| SA8.0 | 8.89 | 10.9 | 1 | 8.0 | 25 | 15.0 | 33.3 | .070 |
| SA8.0A | 8.89 | 9.83 | 1 | 8.0 | 25 | 13.6 | 36.7 | .070 |
| SA8.5 | 9.44 | 11.5 | 1 | 8.5 | 5 | 15.9 | 31.4 | .073 |
| SA8.5A | 9.44 | 10.4 | 1 | 8.5 | 5 | 14.4 | 34.7 | .073 |
| SA9.0 | 10.0 | 12.2 | 1 | 9.0 | 1 | 16.9 | 29.5 | .076 |
| SA9.0A | 10.0 | 11.1 | 1 | 9.0 | 1 | 15.4 | 32.5 | .076 |
| SA10 | 11.1 | 13.6 | 1 | 10 | 1 | 18.8 | 26.6 | .078 |
| SA10A | 11.1 | 12.3 | 1 | 10 | 1 | 17.0 | 29.4 | .078 |
| SA11 | 12.2 | 14.9 | 1 | 11 | 1 | 20.1 | 24.9 | .081 |
| SA11A | 12.2 | 13.5 | 1 | 11 | 1 | 18.2 | 27.4 | .081 |
| SA12 | 13.3 | 16.3 | 1 | 12 | 1 | 22.0 | 22.7 | .082 |
| SA12A | 13.3 | 14.7 | 1 | 12 | 1 | 19.9 | 25.1 | .082 |
| SA13 | 14.4 | 17.6 | 1 | 13 | 1 | 23.8 | 21.0 | .084 |
| SA13A | 14.4 | 15.9 | 1 | 13 | 1 | 21.5 | 23.2 | .084 |
| SA14 | 15.6 | 19.1 | 1 | 14 | 1 | 25.8 | 19.4 | .086 |
| SA14A | 15.6 | 17.2 | 1 | 14 | 1 | 23.2 | 21.5 | .086 |
| SA15 | 16.7 | 20.4 | 1 | 15 | 1 | 26.9 | 18.8 | .087 |
| SA15A | 16.7 | 18.5 | 1 | 15 | 1 | 24.4 | 20.6 | .087 |
| SA16 | 17.8 | 21.8 | 1 | 16 | 1 | 28.8 | 17.6 | .088 |
| SA6A | 17.8 | 19.7 | 1 | 16 | 1 | 26.0 | 19.2 | .088 |
| SA17 | 18.9 | 23.1 | 1 | 17 | 1 | 30.5 | 16.4 | .090 |
| SA17A | 18.9 | 20.9 | 1 | 17 | 1 | 27.6 | 18.1 | .090 |
| SA18 | 20.0 | 24.4 | 1 | 18 | 1 | 32.2 | 15.5 | .092 |
| SA18A | 20.0 | 22.1 | 1 | 18 | 1 | 29.2 | 17.2 | .092 |
| SA20 | 22.2 | 27.1 | 1 | 20 | 1 | 35.8 | 13.9 | .093 |
| SA20A | 22.2 | 24.5 | 1 | 20 | 1 | 32.4 | 15.4 | .093 |

ELECTRICAL CHARACTERISTICS AT 25°C

| PART NUMBER | BREAKDOWN VOLTAGE V(BR) | | TEST CURRENT I_T | RATED STAND OFF VOLTAGE V_{WM} | MAX. REVERSE STANDBY CURRENT $I_D @ V_{WM}$ | MAX. PEAK REVERSE VOLTAGE V_C MAX. @ I_{PP} | MAX. PEAK PULSE CURRENT I_{PP} (Figure 2) | MAX. TEMP. COEFFICIENT OF V(BR) -55°C TO 175°C $\alpha_{V(BR)}$ |
|-------------|-------------------------|-----------|-----------------------|-------------------------------------|--|--|---|--|
| | MIN. VOLTS | MAX VOLTS | | | | | | |
| SA22 | 24.4 | 29.8 | 1 | 22 | 1 | 39.4 | 12.7 | .094 |
| SA22A | 24.4 | 26.9 | 1 | 22 | 1 | 35.5 | 14.1 | .094 |
| SA24 | 26.7 | 32.6 | 1 | 24 | 1 | 43.0 | 11.6 | .096 |
| SA24A | 26.7 | 29.5 | 1 | 24 | 1 | 38.9 | 12.8 | .096 |
| SA26 | 28.9 | 35.3 | 1 | 26 | 1 | 46.6 | 10.7 | .097 |
| SA26A | 28.9 | 31.9 | 1 | 26 | 1 | 42.1 | 11.9 | .097 |
| SA28 | 31.1 | 38.0 | 1 | 28 | 1 | 50.0 | 9.9 | .098 |
| SA28A | 31.1 | 34.4 | 1 | 28 | 1 | 45.4 | 11.0 | .098 |
| SA30 | 33.3 | 40.7 | 1 | 30 | 1 | 53.5 | 9.3 | .099 |
| SA30A | 33.3 | 36.8 | 1 | 30 | 1 | 48.4 | 10.3 | .099 |
| SA33 | 36.7 | 44.9 | 1 | 33 | 1 | 59.0 | 8.5 | .100 |
| SA33A | 36.7 | 40.6 | 1 | 33 | 1 | 53.3 | 9.4 | .100 |
| SA36 | 40.0 | 48.9 | 1 | 36 | 1 | 64.3 | 7.8 | .101 |
| SA36A | 40.0 | 44.2 | 1 | 36 | 1 | 58.1 | 8.6 | .101 |
| SA40 | 44.4 | 54.3 | 1 | 40 | 1 | 71.4 | 7.0 | .101 |
| SA40A | 44.4 | 49.1 | 1 | 40 | 1 | 64.5 | 7.8 | .101 |
| SA43 | 47.8 | 58.4 | 1 | 43 | 1 | 76.7 | 6.5 | .102 |
| SA43A | 47.8 | 52.8 | 1 | 43 | 1 | 69.4 | 7.2 | .102 |
| SA45 | 50.0 | 61.1 | 1 | 45 | 1 | 80.3 | 6.2 | .102 |
| SA45A | 50.0 | 55.3 | 1 | 45 | 1 | 72.7 | 6.9 | .102 |
| SA48 | 53.3 | 65.1 | 1 | 48 | 1 | 85.5 | 5.8 | .103 |
| SA48A | 53.3 | 58.9 | 1 | 48 | 1 | 77.4 | 6.5 | .103 |
| SA51 | 56.7 | 69.3 | 1 | 51 | 1 | 91.1 | 5.5 | .103 |
| SA51A | 56.7 | 62.7 | 1 | 51 | 1 | 82.4 | 6.1 | .103 |
| SA54 | 60.0 | 73.3 | 1 | 54 | 1 | 96.3 | 5.2 | .104 |
| SA54A | 60.0 | 66.3 | 1 | 54 | 1 | 87.1 | 5.7 | .104 |
| SA58 | 64.4 | 78.7 | 1 | 58 | 1 | 103.0 | 4.9 | .104 |
| SA58A | 64.4 | 71.2 | 1 | 58 | 1 | 93.6 | 5.3 | .104 |
| SA60 | 66.7 | 81.5 | 1 | 60 | 1 | 107.0 | 4.7 | .104 |
| SA60A | 66.7 | 73.7 | 1 | 60 | 1 | 96.8 | 5.2 | .104 |
| SA64 | 71.1 | 86.9 | 1 | 64 | 1 | 114.0 | 4.4 | .105 |
| SA64A | 71.1 | 78.6 | 1 | 64 | 1 | 103.0 | 4.9 | .105 |
| SA70 | 77.8 | 95.1 | 1 | 70 | 1 | 125.0 | 4.0 | .105 |
| SA70A | 77.8 | 86.0 | 1 | 70 | 1 | 113.0 | 4.4 | .105 |
| SA75 | 83.3 | 102.0 | 1 | 75 | 1 | 134.0 | 3.7 | .105 |
| SA75A | 83.3 | 92.1 | 1 | 75 | 1 | 121.0 | 4.1 | .105 |

ELECTRICAL CHARACTERISTICS AT 25°C

| PART NUMBER | BREAKDOWN VOLTAGE V(BR) | | TEST CURRENT I_T | RATED STAND OFF VOLTAGE V_{WM} | MAX. REVERSE STANDBY CURRENT $I_D @ V_{WM}$ | MAX. PEAK REVERSE VOLTAGE V_C MAX. @ I_{PP} | MAX. PEAK PULSE CURRENT I_{PP} (Figure 2) | MAX. TEMP. COEFFICIENT OF V(BR) -55°C TO 175°C $\alpha_{V(BR)}$ |
|-------------|-------------------------|--------------|-----------------------|-------------------------------------|--|--|---|--|
| | MIN. VOLTS | MAX VOLTS | | | | | | |
| SA78 | 86.7 | 106.0 | 1 | 78 | 1 | 139.0 | 3.6 | .106 |
| SA78A | 86.7 | 95.8 | 1 | 78 | 1 | 126.0 | 4.0 | .106 |
| SA85 | 94.4 | 115.0 | 1 | 85 | 1 | 151.0 | 3.3 | .106 |
| SA85A | 94.4 | 104.0 | 1 | 85 | 1 | 137.0 | 3.6 | .106 |
| SA90 | 100.0 | 122.0 | 1 | 90 | 1 | 160.0 | 3.1 | .107 |
| SA90A | 100.0 | 111.0 | 1 | 90 | 1 | 146.0 | 3.4 | .107 |
| SA100 | 111.0 | 136.0 | 1 | 100 | 1 | 179.0 | 2.8 | .107 |
| SA100A | 111.0 | 123.0 | 1 | 100 | 1 | 162.0 | 3.1 | .107 |
| SA110 | 122.0 | 149.0 | 1 | 110 | 1 | 196.0 | 2.6 | .107 |
| SA110A | 122.0 | 135.0 | 1 | 110 | 1 | 177.0 | 2.8 | .107 |
| SA120 | 133.0 | 163.0 | 1 | 120 | 1 | 214.0 | 2.3 | .107 |
| SA120A | 133.0 | 147.0 | 1 | 120 | 1 | 193.0 | 2.0 | .107 |
| SA130 | 144.0 | 176.0 | 1 | 130 | 1 | 231.0 | 2.2 | .108 |
| SA130A | 144.0 | 159.0 | 1 | 130 | 1 | 209.0 | 2.4 | .108 |
| SA150 | 167.0 | 204.0 | 1 | 150 | 1 | 268.0 | 1.9 | .108 |
| SA150A | 167.0 | 185.0 | 1 | 150 | 1 | 243.0 | 2.1 | .108 |
| SA160 | 178.0 | 218.0 | 1 | 160 | 1 | 287.0 | 1.7 | .108 |
| SA160A | 178.0 | 197.0 | 1 | 160 | 1 | 259.0 | 1.9 | .108 |
| SA170 | 189.0 | 231.0 | 1 | 170 | 1 | 304.0 | 1.6 | .108 |
| SA170A | 189.0 | 209.0 | 1 | 170 | 1 | 275.0 | 1.8 | .108 |

Note: For Bi-directional construction, indicate a C or CA suffix after the part number, i.e. SA5.0CA

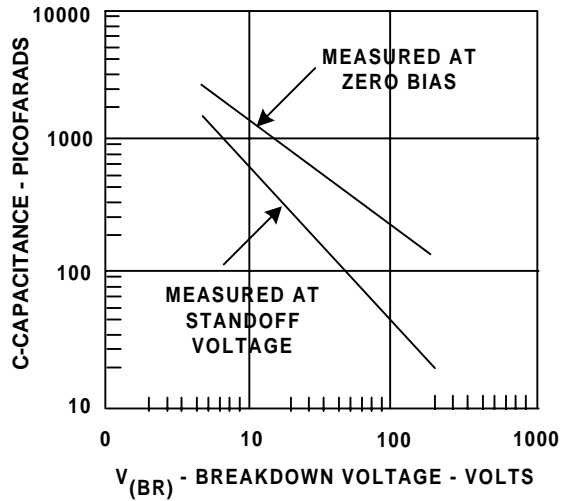


FIGURE 3
TYPICAL CAPACITANCE VS
BREAKDOWN VOLTAGE

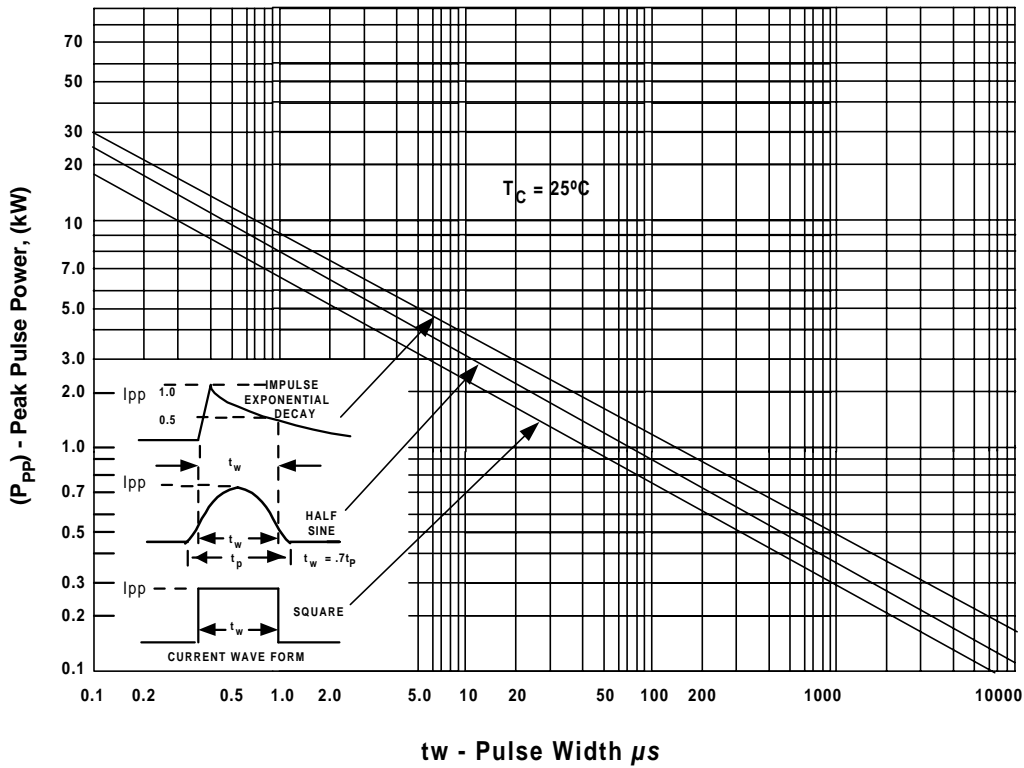


FIGURE 4
PEAK PULSE POWER VS. PULSE TIME