



Certificate Number: Q10561

Certificate Number: E17276

SA5.0 - SA170A

V_{BR} : 6.8 - 200 Volts

PPK : 500 Watts

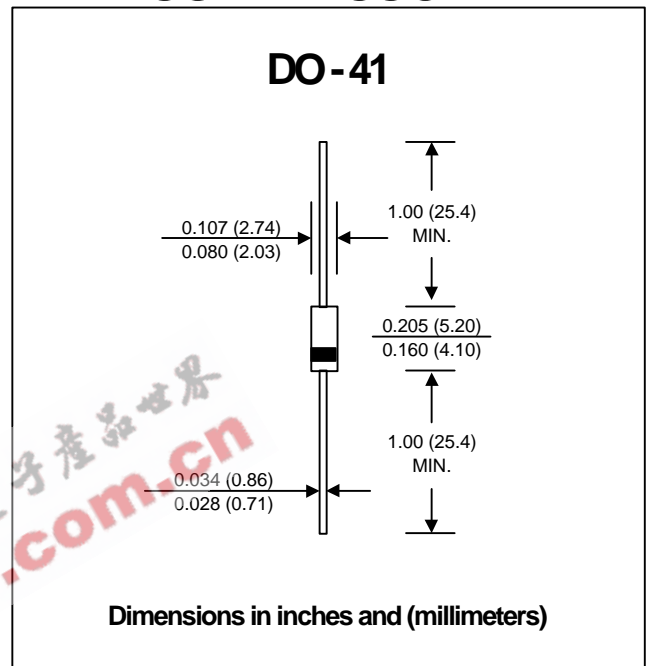
FEATURES :

- * 500W surge capability at 1ms
- * Excellent clamping capability
- * Low zener impedance
- * Fast response time : typically less than 1.0 ps from 0 volt to V_{BR(min.)}
- * Typical I_R less than 1μA above 10V

MECHANICAL DATA

- * Case : DO-41 Molded plastic
- * Epoxy : UL94V-O rate flame retardant
- * Lead : Axial lead solderable per MIL-STD-202, method 208 guaranteed
- * Polarity : Color band denotes cathode end except Bipolar.
- * Mounting position : Any
- * Weight : 0.339 gram

TRANSIENT VOLTAGE SUPPRESSOR



DEVICES FOR BIPOLAR APPLICATIONS

For bi-directional use C or CA Suffix
Electrical characteristics apply in both directions

MAXIMUM RATINGS

Rating at 25 °C ambient temperature unless otherwise specified.

| Rating | Symbol | Value | Unit |
|------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------|-------|
| Peak Power Dissipation at Ta = 25 °C, Tp=1ms (Note1) | PPK | Minimum 500 | Watts |
| Steady State Power Dissipation at TL = 75 °C Lead Lengths 0.375", (9.5mm) (Note 2) | P _D | 3.0 | Watts |
| Peak Forward Surge Current, 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} | - 65 to + 175 | °C |

Note :

- (1) Non-repetitive Current pulse, per Fig. 5 and derated above Ta = 25 °C per Fig. 1
- (2) Mounted on Copper Leaf area of 1.57 in² (40mm²).
- (3) 8.3 ms single half sine-wave, duty cycle = 4 pulses per minutes maximum.



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ELECTRICAL CHARACTERISTICS

Rating at = 25 °C ambient temperature unless otherwise specified

| TYPE | Breakdown Voltage @ It (Note 1) | | | Working Peak Reverse Voltage VRWM (V) | Maximum Reverse Leakage @ VRWM IR (µA) | Maximum Reverse Current IRSM (A) | Maximum Clamping Voltage @ IRSM VRSM (V) | Maximum Voltage Temperature Variation of VBR (mV / °C) |
|--------|------------------------------------|------|------------|---------------------------------------------------|----------------------------------------------------|----------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------|
| | VBR (V) | | It (mA) | | | | | |
| | Min. | Max. | | | | | | |
| SA5.0 | 6.40 | 7.3 | 10 | 5.0 | 600 | 52.0 | 9.6 | 5.0 |
| SA5.0A | 6.40 | 7.0 | 10 | 5.0 | 600 | 54.3 | 9.2 | 5.0 |
| SA6.0 | 6.67 | 8.15 | 10 | 6.0 | 600 | 43.9 | 11.4 | 5.0 |
| SA6.0A | 6.67 | 7.37 | 10 | 6.0 | 600 | 48.5 | 10.3 | 5.0 |
| SA6.5 | 7.22 | 8.82 | 10 | 6.5 | 400 | 40.7 | 12.3 | 5.0 |
| SA6.5A | 7.22 | 7.98 | 10 | 6.5 | 400 | 44.7 | 11.2 | 5.0 |
| SA7.0 | 7.78 | 9.51 | 10 | 7.0 | 150 | 37.8 | 13.3 | 6.0 |
| SA7.0A | 7.78 | 8.60 | 10 | 7.0 | 150 | 41.7 | 12.0 | 6.0 |
| SA7.5 | 8.33 | 10.2 | 1.0 | 7.5 | 50 | 35.0 | 14.3 | 7.0 |
| SA7.5A | 8.33 | 9.21 | 1.0 | 7.5 | 50 | 38.8 | 12.9 | 7.0 |
| SA8.0 | 8.89 | 10.9 | 1.0 | 8.0 | 25 | 33.3 | 15.0 | 7.0 |
| SA8.0A | 8.89 | 9.83 | 1.0 | 8.0 | 25 | 36.7 | 13.6 | 7.0 |
| SA8.5 | 9.44 | 11.5 | 1.0 | 8.5 | 5.0 | 31.4 | 15.9 | 8.0 |
| SA8.5A | 9.44 | 10.4 | 1.0 | 8.5 | 5.0 | 34.7 | 14.4 | 8.0 |
| SA9.0 | 10.0 | 12.2 | 1.0 | 9.0 | 1.0 | 29.5 | 16.9 | 9.0 |
| SA9.0A | 10.0 | 11.1 | 1.0 | 9.0 | 1.0 | 32.5 | 15.4 | 9.0 |
| SA10 | 11.1 | 13.6 | 1.0 | 10.0 | 1.0 | 26.6 | 18.8 | 10.0 |
| SA10A | 11.1 | 12.3 | 1.0 | 10.0 | 1.0 | 29.4 | 17.0 | 10.0 |
| SA11 | 12.2 | 14.9 | 1.0 | 11.0 | 1.0 | 24.9 | 20.1 | 11.0 |
| SA11A | 12.2 | 13.5 | 1.0 | 11.0 | 1.0 | 27.4 | 18.2 | 11.0 |
| SA12 | 13.3 | 16.3 | 1.0 | 12.0 | 1.0 | 22.7 | 22.0 | 12.0 |
| SA12A | 13.3 | 14.7 | 1.0 | 12.0 | 1.0 | 25.1 | 19.9 | 12.0 |
| SA13 | 14.4 | 17.6 | 1.0 | 13.0 | 1.0 | 21.0 | 23.8 | 13.0 |
| SA13A | 14.4 | 15.9 | 1.0 | 13.0 | 1.0 | 23.2 | 21.5 | 13.0 |
| SA14 | 15.6 | 19.1 | 1.0 | 14.0 | 1.0 | 19.4 | 25.8 | 14.0 |
| SA14A | 15.6 | 17.2 | 1.0 | 14.0 | 1.0 | 21.5 | 23.2 | 14.0 |
| SA15 | 16.7 | 20.4 | 1.0 | 15.0 | 1.0 | 18.8 | 26.9 | 16.0 |
| SA15A | 16.7 | 18.5 | 1.0 | 15.0 | 1.0 | 20.6 | 24.4 | 16.0 |
| SA16 | 17.8 | 21.8 | 1.0 | 16.0 | 1.0 | 17.6 | 28.8 | 19.0 |
| SA16A | 17.8 | 19.7 | 1.0 | 16.0 | 1.0 | 19.2 | 26.0 | 17.0 |
| SA17 | 18.9 | 23.1 | 1.0 | 17.0 | 1.0 | 16.4 | 30.5 | 20.0 |
| SA17A | 18.9 | 20.9 | 1.0 | 17.0 | 1.0 | 18.1 | 27.6 | 19.0 |
| SA18 | 20.0 | 24.4 | 1.0 | 18.0 | 1.0 | 15.5 | 32.2 | 21.0 |
| SA18A | 20.0 | 22.1 | 1.0 | 18.0 | 1.0 | 17.2 | 29.2 | 20.0 |
| SA20 | 22.2 | 27.1 | 1.0 | 20.0 | 1.0 | 13.9 | 35.8 | 25.0 |
| SA20A | 22.2 | 24.5 | 1.0 | 20.0 | 1.0 | 15.4 | 32.4 | 23.0 |
| SA22 | 24.4 | 29.8 | 1.0 | 22.0 | 1.0 | 12.7 | 39.4 | 28.0 |
| SA22A | 24.4 | 26.9 | 1.0 | 22.0 | 1.0 | 14.1 | 35.5 | 25.0 |
| SA24 | 26.7 | 32.6 | 1.0 | 24.0 | 1.0 | 11.6 | 43.0 | 31.0 |
| SA24A | 26.7 | 29.5 | 1.0 | 24.0 | 1.0 | 12.8 | 38.9 | 28.0 |
| SA26 | 28.9 | 35.3 | 1.0 | 26.0 | 1.0 | 10.7 | 46.6 | 31.0 |
| SA26A | 28.9 | 31.9 | 1.0 | 26.0 | 1.0 | 11.9 | 42.1 | 30.0 |
| SA28 | 31.1 | 38.0 | 1.0 | 28.0 | 1.0 | 9.9 | 50.0 | 35.0 |
| SA28A | 31.1 | 34.4 | 1.0 | 28.0 | 1.0 | 11.0 | 45.4 | 31.0 |
| SA30 | 33.3 | 40.7 | 1.0 | 30.0 | 1.0 | 9.3 | 53.5 | 39.0 |
| SA30A | 33.3 | 36.8 | 1.0 | 30.0 | 1.0 | 10.3 | 48.4 | 36.0 |
| SA33 | 36.7 | 44.9 | 1.0 | 33.0 | 1.0 | 8.5 | 59.0 | 42.0 |
| SA33A | 36.7 | 40.6 | 1.0 | 33.0 | 1.0 | 9.4 | 53.3 | 39.0 |



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ELECTRICAL CHARACTERISTICS

Rating at = 25 °C ambient temperature unless otherwise specified

| TYPE | Breakdown Voltage @ It (Note 1) | | Working Peak Reverse Voltage | Maximum Reverse Leakage @ VRWM | Maximum Reverse Current | Maximum Clamping Voltage @ IRSM | Maximum Voltage Temperature Variation of VBR | |
|--------|--------------------------------------|------|------------------------------------|--------------------------------------|-------------------------------|---------------------------------------|-------------------------------------------------------|-----------|
| | VBR (V) | | | | | | | VRWM |
| | Min. | Max. | (mA) | (V) | (µA) | (A) | (V) | (mV / °C) |
| SA36 | 40.0 | 48.9 | 1.0 | 36.0 | 1.0 | 7.8 | 64.3 | 46.0 |
| SA36A | 40.0 | 44.2 | 1.0 | 36.0 | 1.0 | 8.6 | 58.1 | 41.0 |
| SA40 | 44.4 | 54.3 | 1.0 | 40.0 | 1.0 | 7.0 | 71.4 | 51.0 |
| SA40A | 44.4 | 49.1 | 1.0 | 40.0 | 1.0 | 7.8 | 64.5 | 46.0 |
| SA43 | 47.8 | 58.4 | 1.0 | 43.0 | 1.0 | 6.5 | 76.7 | 55.0 |
| SA43A | 47.8 | 52.8 | 1.0 | 43.0 | 1.0 | 7.2 | 69.4 | 50.0 |
| SA45 | 50.0 | 61.1 | 1.0 | 45.0 | 1.0 | 6.2 | 80.3 | 58.0 |
| SA45A | 50.0 | 55.3 | 1.0 | 45.0 | 1.0 | 6.9 | 72.7 | 52.0 |
| SA48 | 53.3 | 65.1 | 1.0 | 48.0 | 1.0 | 5.8 | 85.5 | 63.0 |
| SA48A | 53.3 | 58.9 | 1.0 | 48.0 | 1.0 | 6.5 | 77.4 | 56.0 |
| SA51 | 56.7 | 69.3 | 1.0 | 51.0 | 1.0 | 5.5 | 91.1 | 66.0 |
| SA51A | 56.7 | 62.7 | 1.0 | 51.0 | 1.0 | 6.1 | 82.4 | 61.0 |
| SA54 | 60.0 | 73.3 | 1.0 | 54.0 | 1.0 | 5.2 | 96.3 | 71.0 |
| SA54A | 60.0 | 66.3 | 1.0 | 54.0 | 1.0 | 5.7 | 87.1 | 65.0 |
| SA58 | 64.4 | 78.7 | 1.0 | 58.0 | 1.0 | 4.9 | 103 | 78.0 |
| SA58A | 64.4 | 71.2 | 1.0 | 58.0 | 1.0 | 5.3 | 93.6 | 70.0 |
| SA60 | 66.7 | 81.5 | 1.0 | 60.0 | 1.0 | 4.7 | 107 | 80.0 |
| SA60A | 66.7 | 73.7 | 1.0 | 60.0 | 1.0 | 5.2 | 96.8 | 71.0 |
| SA64 | 71.1 | 86.9 | 1.0 | 64.0 | 1.0 | 4.4 | 114 | 86.0 |
| SA64A | 71.1 | 78.6 | 1.0 | 64.0 | 1.0 | 4.9 | 103 | 76.0 |
| SA70 | 77.8 | 95.1 | 1.0 | 70.0 | 1.0 | 4.0 | 125 | 94.0 |
| SA70A | 77.8 | 86.0 | 1.0 | 70.0 | 1.0 | 4.4 | 113 | 85.0 |
| SA75 | 83.3 | 102 | 1.0 | 75.0 | 1.0 | 3.7 | 134 | 101 |
| SA75A | 83.3 | 92.1 | 1.0 | 75.0 | 1.0 | 4.1 | 121 | 91.0 |
| SA78 | 86.7 | 106 | 1.0 | 78.0 | 1.0 | 3.6 | 139 | 105 |
| SA78A | 86.7 | 95.8 | 1.0 | 78.0 | 1.0 | 4.0 | 126 | 95.0 |
| SA85 | 94.4 | 115 | 1.0 | 85.0 | 1.0 | 3.3 | 151 | 114 |
| SA85A | 94.4 | 104 | 1.0 | 85.0 | 1.0 | 3.6 | 137 | 103 |
| SA90 | 100 | 122 | 1.0 | 90.0 | 1.0 | 3.1 | 160 | 121 |
| SA90A | 100 | 111 | 1.0 | 90.0 | 1.0 | 3.4 | 146 | 110 |
| SA100 | 111 | 136 | 1.0 | 100 | 1.0 | 2.8 | 179 | 135 |
| SA100A | 111 | 123 | 1.0 | 100 | 1.0 | 3.1 | 162 | 123 |
| SA110 | 122 | 149 | 1.0 | 110 | 1.0 | 2.6 | 196 | 148 |
| SA110A | 122 | 135 | 1.0 | 110 | 1.0 | 2.8 | 177 | 133 |
| SA120 | 133 | 163 | 1.0 | 120 | 1.0 | 2.3 | 214 | 162 |
| SA120A | 133 | 147 | 1.0 | 120 | 1.0 | 2 | 193 | 146 |
| SA130 | 144 | 176 | 1.0 | 130 | 1.0 | 2.2 | 231 | 175 |
| SA130A | 144 | 159 | 1.0 | 130 | 1.0 | 2.4 | 209 | 158 |
| SA150 | 167 | 204 | 1.0 | 150 | 1.0 | 1.9 | 268 | 203 |
| SA150A | 167 | 185 | 1.0 | 150 | 1.0 | 2.1 | 243 | 184 |
| SA160 | 178 | 218 | 1.0 | 160 | 1.0 | 1.7 | 287 | 217 |
| SA160A | 178 | 197 | 1.0 | 160 | 1.0 | 1.9 | 259 | 196 |
| SA170 | 189 | 231 | 1.0 | 170 | 1.0 | 1.6 | 304 | 230 |
| SA170A | 189 | 209 | 1.0 | 170 | 1.0 | 1.8 | 275 | 208 |

Note:

- (1) VBR measured after It applied for 300 µs., It = square wave pulse or equivalent.
- (2) VF = 3.5 Vmax., IF = 35 Amps. (6.8 Volts thru 91 Volts)
 VF = 5.0 Vmax., IF = 35 Amps. (150 Volts thru 200 Volts) per 1/2 square or equivalent sine wave.
 PW = 8.3 ms, duty cycle = 4 pulses per minute maximum.

RATING AND CHARACTERISTIC CURVES (SA5.0 - SA170A)

FIG.1 - PULSE DERATING CURVE

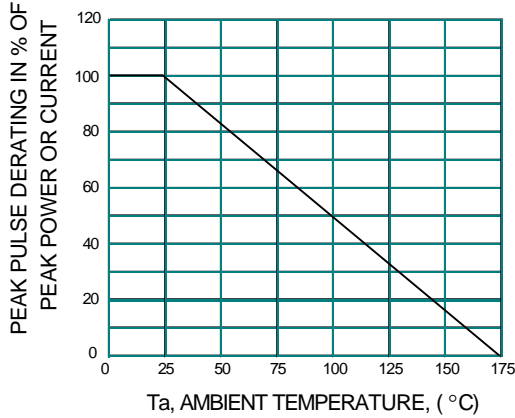


FIG.2 - MAXIMUM NON-REPETITIVE SURGE CURRENT

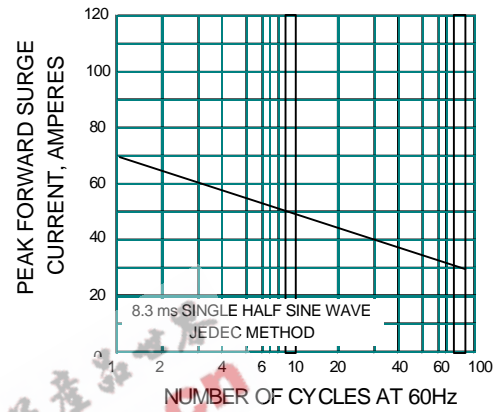


FIG.3 - STEADY STATE POWER DERATING

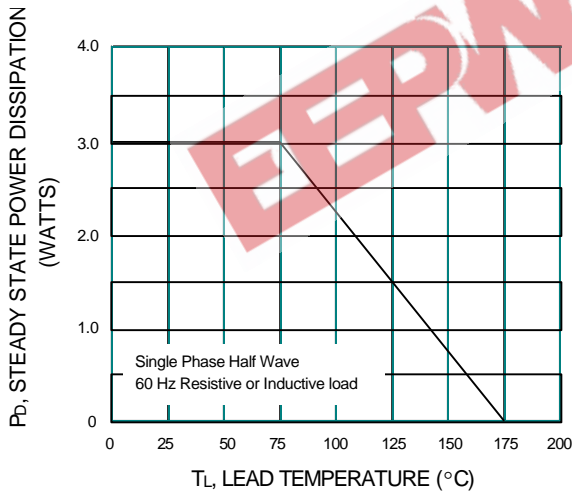


FIG.4 - PULSE RATING CURVE

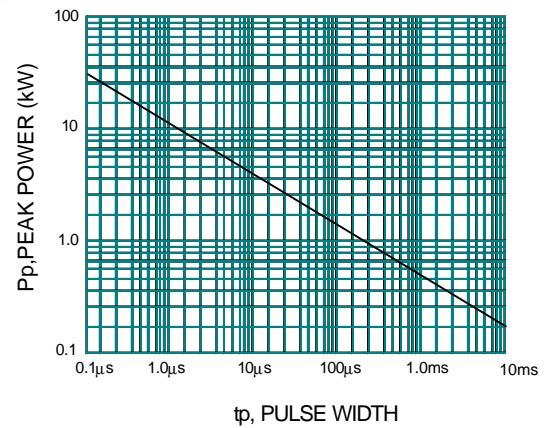


FIG.5 - PULSE WAVEFORM

