

# STUS06H - STUS5D0

## SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSOR

**V<sub>BR</sub> : 6.8 - 200 Volts**

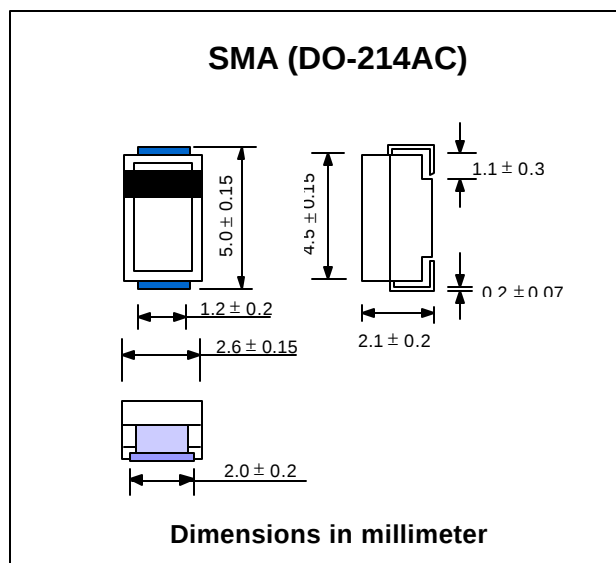
**P<sub>PK</sub> : 500 Watts**

### 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<sub>BR(min.)</sub>
- \* Typical I<sub>R</sub> less than 1μA above 10V

### MECHANICAL DATA

- \* Case : SMA Molded plastic
- \* Epoxy : UL94V-O rate flame retardant
- \* Lead : Lead Formed for Surface Mount
- \* Polarity : Color band denotes cathode end except Bipolar.
- \* Mounting position : Any
- \* Weight : 0.064 grams



### DEVICES FOR BIPOLAR APPLICATIONS

For bi-directional altered the third letter of type from "U" to be "B".  
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)                                                       | P <sub>PK</sub>                   | 500           | Watts |
| Steady State Power Dissipation at TL = 75 °C (Note 2)                                                      | P <sub>D</sub>                    | 3.0           | 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. |
| Operating and Storage Temperature Range                                                                    | T <sub>J</sub> , T <sub>STG</sub> | - 55 to + 150 | °C    |

### Note :

- (1) Non-repetitive Current pulse, per Fig. 5 and derated above Ta = 25 °C per Fig. 1
- (2) Mounted on copper Lead area at 5.0 mm<sup>2</sup> ( 0.013 mm thick ).
- (3) 8.3 ms single half sine-wave, duty cycle = 4 pulses per Minutes maximum.

## ELECTRICAL CHARACTERISTICS

Rating at = 25 °C ambient temperature unless otherwise specified

| TYPE    | Breakdown Voltage @ It<br>( Note 1 ) |      |      | Working Peak<br>Reverse<br>Voltage | Maximum<br>Reverse Leakage<br>@ VRWM | Maximum<br>Reverse<br>Current | Maximum<br>Clamping<br>Voltage @ IRSM | Maximum<br>Voltage<br>Temperature |
|---------|--------------------------------------|------|------|------------------------------------|--------------------------------------|-------------------------------|---------------------------------------|-----------------------------------|
|         | VBR (V)                              |      | It   |                                    |                                      |                               |                                       | VRWM                              |
|         | Min.                                 | Max. | (mA) | (V)                                | (μA)                                 | (A)                           | (V)                                   | (mV / °C)                         |
|         |                                      |      |      |                                    |                                      |                               |                                       |                                   |
| STUS06H | 6.40                                 | 7.3  | 10   | 5.0                                | 600                                  | 52.0                          | 9.6                                   | 5.0                               |
| STUS56H | 6.40                                 | 7.0  | 10   | 5.0                                | 600                                  | 54.3                          | 9.2                                   | 5.0                               |
| STUS07A | 6.67                                 | 8.15 | 10   | 6.0                                | 600                                  | 43.9                          | 11.4                                  | 5.0                               |
| STUS57A | 6.67                                 | 7.37 | 10   | 6.0                                | 600                                  | 48.5                          | 10.3                                  | 5.0                               |
| STUS07G | 7.22                                 | 8.82 | 10   | 6.5                                | 400                                  | 40.7                          | 12.3                                  | 5.0                               |
| STUS57G | 7.22                                 | 7.98 | 10   | 6.5                                | 400                                  | 44.7                          | 11.2                                  | 5.0                               |
| STUS08C | 7.78                                 | 9.51 | 10   | 7.0                                | 150                                  | 37.8                          | 13.3                                  | 6.0                               |
| STUS58C | 7.78                                 | 8.60 | 10   | 7.0                                | 150                                  | 41.7                          | 12.0                                  | 6.0                               |
| STUS08I | 8.33                                 | 10.2 | 1.0  | 7.5                                | 50                                   | 35.0                          | 14.3                                  | 7.0                               |
| STUS58I | 8.33                                 | 9.21 | 1.0  | 7.5                                | 50                                   | 38.8                          | 12.9                                  | 7.0                               |
| STUS09B | 8.89                                 | 10.9 | 1.0  | 8.0                                | 25                                   | 33.3                          | 15.0                                  | 7.0                               |
| STUS59B | 8.89                                 | 9.30 | 1.0  | 8.0                                | 25                                   | 36.7                          | 13.6                                  | 7.0                               |
| STUS010 | 9.44                                 | 11.5 | 1.0  | 8.5                                | 5.0                                  | 31.4                          | 15.9                                  | 8.0                               |
| STUS510 | 9.44                                 | 10.4 | 1.0  | 8.5                                | 5.0                                  | 34.7                          | 14.4                                  | 8.0                               |
| STUS011 | 10.0                                 | 12.2 | 1.0  | 9.0                                | 1.0                                  | 29.5                          | 16.9                                  | 9.0                               |
| STUS511 | 10.0                                 | 11.1 | 1.0  | 9.0                                | 1.0                                  | 32.5                          | 15.4                                  | 9.0                               |
| STUS012 | 11.1                                 | 13.6 | 1.0  | 10.0                               | 1.0                                  | 26.6                          | 18.8                                  | 10.0                              |
| STUS512 | 11.1                                 | 12.3 | 1.0  | 10.0                               | 1.0                                  | 29.4                          | 17.0                                  | 10.0                              |
| STUS013 | 12.2                                 | 14.9 | 1.0  | 11.0                               | 1.0                                  | 24.9                          | 20.1                                  | 11.0                              |
| STUS513 | 12.2                                 | 13.5 | 1.0  | 11.0                               | 1.0                                  | 27.4                          | 18.2                                  | 11.0                              |
| STUS014 | 13.3                                 | 16.3 | 1.0  | 12.0                               | 1.0                                  | 22.7                          | 22.0                                  | 12.0                              |
| STUS514 | 13.3                                 | 14.7 | 1.0  | 12.0                               | 1.0                                  | 25.1                          | 19.9                                  | 12.0                              |
| STUS015 | 14.4                                 | 17.6 | 1.0  | 13.0                               | 1.0                                  | 21.0                          | 23.8                                  | 13.0                              |
| STUS515 | 14.4                                 | 15.9 | 1.0  | 13.0                               | 1.0                                  | 23.2                          | 21.5                                  | 13.0                              |
| STUS016 | 15.6                                 | 19.1 | 1.0  | 14.0                               | 1.0                                  | 19.4                          | 25.8                                  | 14.0                              |
| STUS516 | 15.6                                 | 17.2 | 1.0  | 14.0                               | 1.0                                  | 21.5                          | 23.2                                  | 14.0                              |
| STUS018 | 16.7                                 | 20.4 | 1.0  | 15.0                               | 1.0                                  | 18.8                          | 26.9                                  | 16.0                              |
| STUS518 | 16.7                                 | 18.5 | 1.0  | 15.0                               | 1.0                                  | 20.6                          | 24.4                                  | 16.0                              |
| STUS019 | 17.8                                 | 21.8 | 1.0  | 16.0                               | 1.0                                  | 17.6                          | 28.8                                  | 19.0                              |
| STUS519 | 17.8                                 | 19.7 | 1.0  | 16.0                               | 1.0                                  | 19.2                          | 26.0                                  | 17.0                              |
| STUS020 | 18.9                                 | 23.1 | 1.0  | 17.0                               | 1.0                                  | 16.4                          | 30.5                                  | 20.0                              |
| STUS520 | 18.9                                 | 20.9 | 1.0  | 17.0                               | 1.0                                  | 18.1                          | 27.6                                  | 19.0                              |
| STUS021 | 20.0                                 | 24.4 | 1.0  | 18.0                               | 1.0                                  | 15.5                          | 32.2                                  | 21.0                              |
| STUS521 | 20.0                                 | 22.1 | 1.0  | 18.0                               | 1.0                                  | 17.2                          | 29.2                                  | 20.0                              |
| STUS023 | 22.2                                 | 27.1 | 1.0  | 20.0                               | 1.0                                  | 13.9                          | 35.8                                  | 25.0                              |
| STUS523 | 22.2                                 | 24.5 | 1.0  | 20.0                               | 1.0                                  | 15.4                          | 32.4                                  | 23.0                              |
| STUS026 | 24.4                                 | 29.8 | 1.0  | 22.0                               | 1.0                                  | 12.7                          | 39.4                                  | 28.0                              |
| STUS526 | 24.4                                 | 26.9 | 1.0  | 22.0                               | 1.0                                  | 14.1                          | 35.5                                  | 25.0                              |
| STUS028 | 26.7                                 | 32.6 | 1.0  | 24.0                               | 1.0                                  | 11.6                          | 43.0                                  | 31.0                              |
| STUS528 | 26.7                                 | 29.5 | 1.0  | 24.0                               | 1.0                                  | 12.8                          | 38.9                                  | 28.0                              |
| STUS030 | 28.9                                 | 35.3 | 1.0  | 26.0                               | 1.0                                  | 10.7                          | 46.6                                  | 31.0                              |
| STUS530 | 28.9                                 | 31.9 | 1.0  | 26.0                               | 1.0                                  | 11.9                          | 42.1                                  | 30.0                              |
| STUS033 | 31.1                                 | 38.0 | 1.0  | 28.0                               | 1.0                                  | 9.9                           | 50.0                                  | 35.0                              |
| STUS533 | 31.1                                 | 34.4 | 1.0  | 28.0                               | 1.0                                  | 11.0                          | 45.4                                  | 31.0                              |
| STUS035 | 33.3                                 | 40.7 | 1.0  | 30.0                               | 1.0                                  | 9.3                           | 53.5                                  | 39.0                              |
| STUS535 | 33.3                                 | 36.8 | 1.0  | 30.0                               | 1.0                                  | 10.3                          | 48.4                                  | 36.0                              |
| STUS039 | 36.7                                 | 44.9 | 1.0  | 33.0                               | 1.0                                  | 8.5                           | 59.0                                  | 42.0                              |
| STUS539 | 36.7                                 | 40.6 | 1.0  | 33.0                               | 1.0                                  | 9.4                           | 53.3                                  | 39.0                              |

## ELECTRICAL CHARACTERISTICS

Rating at = 25 °C ambient temperature unless otherwise specified

| TYPE    | Breakdown Voltage @ It<br>( Note 1 ) |      |      | Working Peak<br>Reverse<br>Voltage<br>V <sub>RWM</sub> | Maximum<br>Reverse Leakage<br>@ V <sub>RWM</sub><br>I <sub>R</sub> | Maximum<br>Reverse<br>Current<br>I <sub>RSM</sub> | Maximum<br>Clamping<br>Voltage @ I <sub>RSM</sub><br>V <sub>RSM</sub> | Maximum<br>Voltage<br>Temperature<br>Variation of V <sub>BR</sub><br>(mV / °C) |
|---------|--------------------------------------|------|------|--------------------------------------------------------|--------------------------------------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------|--------------------------------------------------------------------------------|
|         | V <sub>BR</sub> (V)                  |      | It   |                                                        |                                                                    |                                                   |                                                                       |                                                                                |
|         | Min.                                 | Max. | (mA) |                                                        |                                                                    |                                                   |                                                                       |                                                                                |
|         |                                      |      |      | (V)                                                    | (μA)                                                               | (A)                                               | (V)                                                                   |                                                                                |
| STUS042 | 40.0                                 | 48.9 | 1.0  | 36.0                                                   | 1.0                                                                | 7.8                                               | 64.3                                                                  | 46.0                                                                           |
| STUS542 | 40.0                                 | 44.2 | 1.0  | 36.0                                                   | 1.0                                                                | 8.6                                               | 58.1                                                                  | 41.0                                                                           |
| STUS047 | 44.4                                 | 54.3 | 1.0  | 40.0                                                   | 1.0                                                                | 7.0                                               | 71.4                                                                  | 51.0                                                                           |
| STUS547 | 44.4                                 | 49.1 | 1.0  | 40.0                                                   | 1.0                                                                | 7.8                                               | 64.5                                                                  | 46.0                                                                           |
| STUS050 | 47.8                                 | 58.4 | 1.0  | 43.0                                                   | 1.0                                                                | 6.5                                               | 76.7                                                                  | 55.0                                                                           |
| STUS550 | 47.8                                 | 52.8 | 1.0  | 43.0                                                   | 1.0                                                                | 7.2                                               | 69.4                                                                  | 50.0                                                                           |
| STUS053 | 50.0                                 | 61.1 | 1.0  | 45.0                                                   | 1.0                                                                | 6.2                                               | 80.3                                                                  | 58.0                                                                           |
| STUS553 | 50.0                                 | 55.3 | 1.0  | 45.0                                                   | 1.0                                                                | 6.9                                               | 72.7                                                                  | 52.0                                                                           |
| STUS056 | 53.3                                 | 65.1 | 1.0  | 48.0                                                   | 1.0                                                                | 5.8                                               | 85.5                                                                  | 63.0                                                                           |
| STUS556 | 53.3                                 | 58.9 | 1.0  | 48.0                                                   | 1.0                                                                | 6.5                                               | 77.4                                                                  | 56.0                                                                           |
| STUS060 | 56.7                                 | 69.3 | 1.0  | 51.0                                                   | 1.0                                                                | 5.5                                               | 91.1                                                                  | 66.0                                                                           |
| STUS560 | 56.7                                 | 62.7 | 1.0  | 51.0                                                   | 1.0                                                                | 6.1                                               | 82.4                                                                  | 61.0                                                                           |
| STUS063 | 60.0                                 | 73.3 | 1.0  | 54.0                                                   | 1.0                                                                | 5.2                                               | 96.3                                                                  | 71.0                                                                           |
| STUS563 | 60.0                                 | 66.3 | 1.0  | 54.0                                                   | 1.0                                                                | 5.7                                               | 87.1                                                                  | 65.0                                                                           |
| STUS068 | 64.4                                 | 78.7 | 1.0  | 58.0                                                   | 1.0                                                                | 4.9                                               | 103                                                                   | 78.0                                                                           |
| STUS568 | 64.4                                 | 71.2 | 1.0  | 58.0                                                   | 1.0                                                                | 5.3                                               | 93.6                                                                  | 70.0                                                                           |
| STUS071 | 66.7                                 | 81.5 | 1.0  | 60.0                                                   | 1.0                                                                | 4.7                                               | 107                                                                   | 80.0                                                                           |
| STUS571 | 66.7                                 | 73.7 | 1.0  | 60.0                                                   | 1.0                                                                | 5.2                                               | 96.8                                                                  | 71.0                                                                           |
| STUS075 | 71.1                                 | 86.9 | 1.0  | 64.0                                                   | 1.0                                                                | 4.4                                               | 114                                                                   | 86.0                                                                           |
| STUS575 | 71.1                                 | 78.6 | 1.0  | 64.0                                                   | 1.0                                                                | 4.9                                               | 103                                                                   | 76.0                                                                           |
| STUS082 | 77.8                                 | 95.1 | 1.0  | 70.0                                                   | 1.0                                                                | 4.0                                               | 125                                                                   | 94.0                                                                           |
| STUS582 | 77.8                                 | 86.0 | 1.0  | 70.0                                                   | 1.0                                                                | 4.4                                               | 113                                                                   | 85.0                                                                           |
| STUS088 | 83.3                                 | 102  | 1.0  | 75.0                                                   | 1.0                                                                | 3.7                                               | 134                                                                   | 101                                                                            |
| STUS588 | 83.3                                 | 92.1 | 1.0  | 75.0                                                   | 1.0                                                                | 4.1                                               | 121                                                                   | 91.0                                                                           |
| STUS091 | 86.7                                 | 106  | 1.0  | 78.0                                                   | 1.0                                                                | 3.6                                               | 139                                                                   | 105                                                                            |
| STUS591 | 86.7                                 | 95.8 | 1.0  | 78.0                                                   | 1.0                                                                | 4.0                                               | 126                                                                   | 95.0                                                                           |
| STUS099 | 94.4                                 | 115  | 1.0  | 85.0                                                   | 1.0                                                                | 3.3                                               | 151                                                                   | 114                                                                            |
| STUS599 | 94.4                                 | 104  | 1.0  | 85.0                                                   | 1.0                                                                | 3.6                                               | 137                                                                   | 103                                                                            |
| STUS0B1 | 100                                  | 122  | 1.0  | 90.0                                                   | 1.0                                                                | 3.1                                               | 160                                                                   | 121                                                                            |
| STUS5B1 | 100                                  | 111  | 1.0  | 90.0                                                   | 1.0                                                                | 3.4                                               | 146                                                                   | 110                                                                            |
| STUS0B2 | 111                                  | 136  | 1.0  | 100                                                    | 1.0                                                                | 2.8                                               | 179                                                                   | 135                                                                            |
| STUS5B2 | 111                                  | 123  | 1.0  | 100                                                    | 1.0                                                                | 3.1                                               | 162                                                                   | 123                                                                            |
| STUS0B3 | 122                                  | 149  | 1.0  | 110                                                    | 1.0                                                                | 2.6                                               | 196                                                                   | 148                                                                            |
| STUS5B3 | 122                                  | 135  | 1.0  | 110                                                    | 1.0                                                                | 2.8                                               | 177                                                                   | 133                                                                            |
| STUS0B4 | 133                                  | 163  | 1.0  | 120                                                    | 1.0                                                                | 2.3                                               | 214                                                                   | 162                                                                            |
| STUS5B4 | 133                                  | 147  | 1.0  | 120                                                    | 1.0                                                                | 2                                                 | 193                                                                   | 146                                                                            |
| STUS0B5 | 144                                  | 176  | 1.0  | 130                                                    | 1.0                                                                | 2.2                                               | 231                                                                   | 175                                                                            |
| STUS5B5 | 144                                  | 159  | 1.0  | 130                                                    | 1.0                                                                | 2.4                                               | 209                                                                   | 158                                                                            |
| STUS0B8 | 167                                  | 204  | 1.0  | 150                                                    | 1.0                                                                | 1.9                                               | 268                                                                   | 203                                                                            |
| STUS5B8 | 167                                  | 185  | 1.0  | 150                                                    | 1.0                                                                | 2.1                                               | 243                                                                   | 184                                                                            |
| STUS0B9 | 178                                  | 218  | 1.0  | 160                                                    | 1.0                                                                | 1.7                                               | 287                                                                   | 217                                                                            |
| STUS5B9 | 178                                  | 197  | 1.0  | 160                                                    | 1.0                                                                | 1.9                                               | 259                                                                   | 196                                                                            |
| STUS0D0 | 189                                  | 231  | 1.0  | 170                                                    | 1.0                                                                | 1.6                                               | 304                                                                   | 230                                                                            |
| STUS5D0 | 189                                  | 209  | 1.0  | 170                                                    | 1.0                                                                | 1.8                                               | 275                                                                   | 208                                                                            |

### Note:

- ( 1 ) V<sub>BR</sub> measured after I<sub>t</sub> applied for 300 μs., I<sub>t</sub> = square wave pulse or equivalent.
- ( 2 ) V<sub>F</sub> = 3.5 V<sub>max.</sub>, I<sub>F</sub> = 35 Amps. ( 6.8 Volts thru 91 Volts )  
V<sub>F</sub> = 5.0 V<sub>max.</sub>, I<sub>F</sub> = 35 Amps. ( 150 Volts thru 200 Volts ) per 1/2 square or equivalent sine wave.  
PW = 8.3 ms. dutv cycle = 4 pulses per minute maximum.
- ( 3 ) "STU" or "STB" will be omitted in marking on the diode.

## RATING AND CHARACTERISTIC CURVES ( STUS06H - STUS5D0 )

FIG.1 - PULSE DERATING CURVE

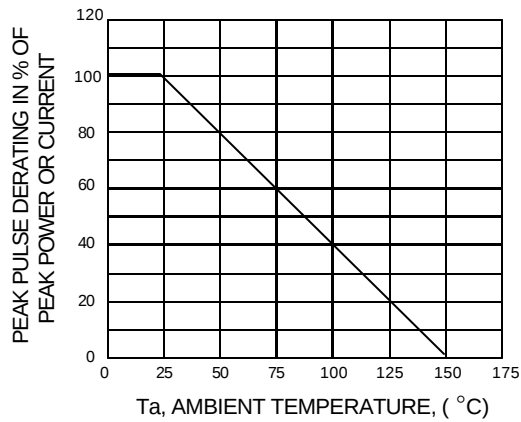


FIG.2 - MAXIMUM NON-REPETITIVE SURGE CURRENT

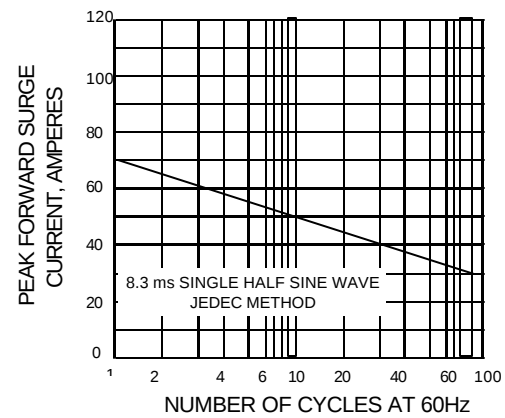


FIG.3 - STEADY STATE POWER DERATING

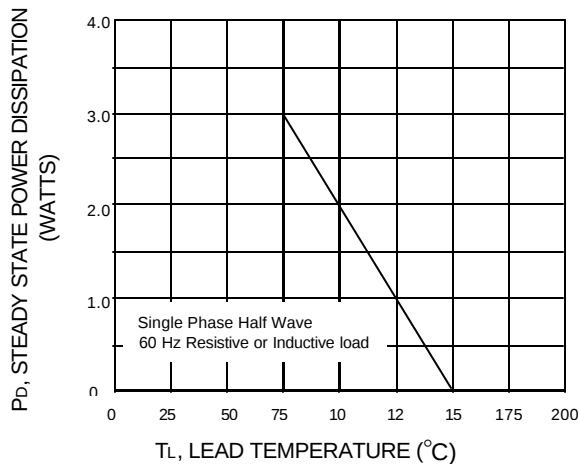


FIG.4 - PULSE RATING CURVE

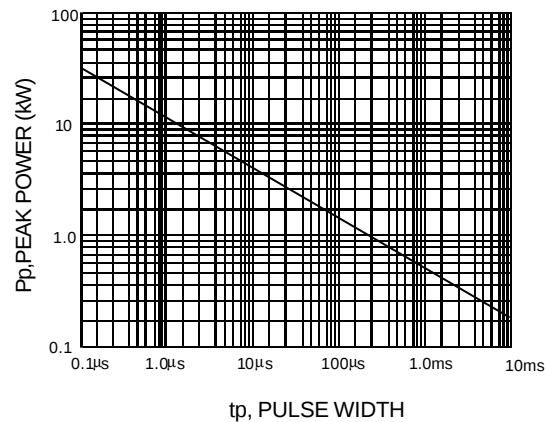


FIG.5 - PULSE WAVEFORM

