

# STBP06I - STBP5G4

## SURFACE MOUNT BIDIRECTIONAL TRANSIENT VOLTAGE SUPPRESSOR

**V<sub>BR</sub> : 6.8 - 440 Volts**

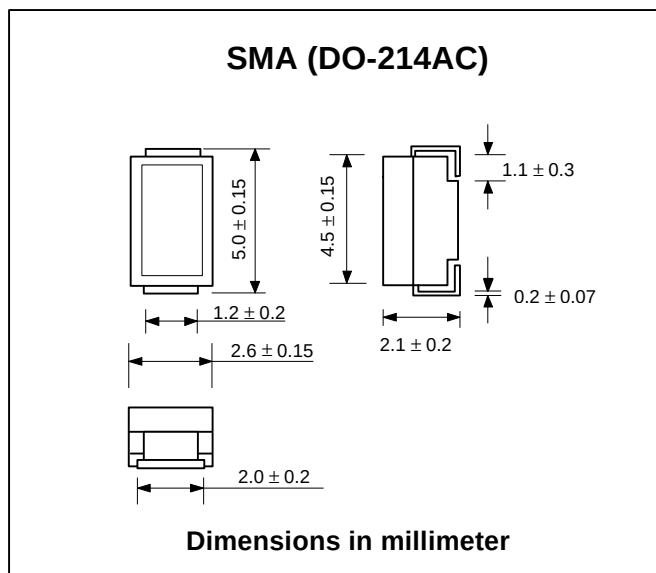
**P<sub>PK</sub> : 400 Watts**

### FEATURES :

- \* 400W 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
- \* **Pb / RoHS Free**

### MECHANICAL DATA

- \* Case : SMA Molded plastic
- \* Epoxy : UL94V-O rate flame retardant
- \* Lead : Lead Formed for Surface Mount
- \* Mounting position : Any
- \* Weight : 0.064 grams



### DEVICES FOR UNIPOLAR APPLICATIONS

For Uni-directional altered the third letter of type from "B" to be "U".  
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>                   | Minimum 400   | W    |
| Steady State Power Dissipation at T <sub>L</sub> = 75 °C | P <sub>D</sub>                    | 1.0           | W    |
| 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. 2 and derated above Ta = 25 °C per Fig. 1

## 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>@ V <sub>RWM</sub> | Maximum<br>Reverse<br>Current | Maximum<br>Clamping<br>Voltage @ I <sub>RSM</sub> | Maximum<br>Temperature<br>Co-efficient<br>of V <sub>BR</sub><br>of V <sub>BR</sub> |
|---------|--------------------------------------|------|------|------------------------------------|--------------------------------------------------|-------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------|
|         | V <sub>BR</sub> (V)                  |      | It   |                                    |                                                  |                               |                                                   |                                                                                    |
|         | Min.                                 | Max. | (mA) | (V)                                | (μA)                                             | (A)                           | (V)                                               | (% / °C)                                                                           |
| STBP06I | 6.12                                 | 7.48 | 10   | 5.50                               | 2000                                             | 38.0                          | 10.8                                              | 0.057                                                                              |
| STBP56I | 6.45                                 | 7.14 | 10   | 5.80                               | 2000                                             | 40.0                          | 10.5                                              | 0.057                                                                              |
| STBP07F | 6.75                                 | 8.25 | 10   | 6.05                               | 1000                                             | 36.0                          | 11.7                                              | 0.061                                                                              |
| STBP57F | 7.13                                 | 7.88 | 10   | 6.40                               | 1000                                             | 37.0                          | 11.3                                              | 0.061                                                                              |
| STBP08C | 7.38                                 | 9.02 | 10   | 6.63                               | 400                                              | 33.0                          | 12.5                                              | 0.065                                                                              |
| STBP58C | 7.79                                 | 8.61 | 10   | 7.02                               | 400                                              | 35.0                          | 12.1                                              | 0.065                                                                              |
| STBP09B | 8.19                                 | 10.0 | 1.0  | 7.37                               | 100                                              | 30.0                          | 13.8                                              | 0.068                                                                              |
| STBP59B | 8.65                                 | 9.55 | 1.0  | 7.78                               | 100                                              | 31.0                          | 13.4                                              | 0.068                                                                              |
| STBP010 | 9.00                                 | 11.0 | 1.0  | 8.10                               | 20                                               | 28.0                          | 15.0                                              | 0.073                                                                              |
| STBP510 | 9.50                                 | 10.5 | 1.0  | 8.55                               | 20                                               | 29.0                          | 14.5                                              | 0.073                                                                              |
| STBP011 | 9.90                                 | 12.1 | 1.0  | 8.92                               | 10                                               | 26.0                          | 16.2                                              | 0.075                                                                              |
| STBP511 | 10.5                                 | 11.6 | 1.0  | 9.40                               | 10                                               | 27.0                          | 15.6                                              | 0.075                                                                              |
| STBP012 | 10.8                                 | 13.2 | 1.0  | 9.72                               | 5.0                                              | 24.0                          | 17.3                                              | 0.078                                                                              |
| STBP512 | 11.4                                 | 12.6 | 1.0  | 10.2                               | 5.0                                              | 25.0                          | 16.7                                              | 0.078                                                                              |
| STBP013 | 11.7                                 | 14.3 | 1.0  | 10.5                               | 5.0                                              | 22.0                          | 19.0                                              | 0.081                                                                              |
| STBP513 | 12.4                                 | 13.7 | 1.0  | 11.1                               | 5.0                                              | 23.0                          | 18.2                                              | 0.081                                                                              |
| STBP015 | 13.5                                 | 16.5 | 1.0  | 12.1                               | 5.0                                              | 19.0                          | 22.0                                              | 0.084                                                                              |
| STBP515 | 14.3                                 | 15.8 | 1.0  | 12.8                               | 5.0                                              | 20.0                          | 21.2                                              | 0.084                                                                              |
| STBP016 | 14.4                                 | 17.6 | 1.0  | 12.9                               | 5.0                                              | 18.0                          | 23.5                                              | 0.086                                                                              |
| STBP516 | 15.2                                 | 16.8 | 1.0  | 13.6                               | 5.0                                              | 19.0                          | 22.5                                              | 0.086                                                                              |
| STBP018 | 16.2                                 | 19.8 | 1.0  | 14.5                               | 5.0                                              | 16.0                          | 26.5                                              | 0.088                                                                              |
| STBP518 | 17.1                                 | 18.9 | 1.0  | 15.3                               | 5.0                                              | 17.0                          | 25.5                                              | 0.088                                                                              |
| STBP020 | 18.0                                 | 22.0 | 1.0  | 16.2                               | 5.0                                              | 14.0                          | 29.1                                              | 0.090                                                                              |
| STBP520 | 19.0                                 | 21.0 | 1.0  | 17.1                               | 5.0                                              | 15.0                          | 27.7                                              | 0.090                                                                              |
| STBP022 | 19.8                                 | 24.2 | 1.0  | 17.8                               | 5.0                                              | 13.0                          | 31.9                                              | 0.092                                                                              |
| STBP522 | 20.9                                 | 23.1 | 1.0  | 18.8                               | 5.0                                              | 14.0                          | 30.6                                              | 0.092                                                                              |
| STBP024 | 21.6                                 | 26.4 | 1.0  | 19.4                               | 5.0                                              | 12.0                          | 34.7                                              | 0.094                                                                              |
| STBP524 | 22.8                                 | 25.2 | 1.0  | 20.5                               | 5.0                                              | 13.0                          | 33.2                                              | 0.094                                                                              |
| STBP027 | 24.3                                 | 29.7 | 1.0  | 21.8                               | 5.0                                              | 11.0                          | 39.1                                              | 0.096                                                                              |
| STBP527 | 25.7                                 | 28.4 | 1.0  | 23.1                               | 5.0                                              | 11.2                          | 37.5                                              | 0.096                                                                              |
| STBP030 | 27.0                                 | 33.0 | 1.0  | 24.3                               | 5.0                                              | 10.0                          | 43.5                                              | 0.097                                                                              |
| STBP530 | 28.5                                 | 31.5 | 1.0  | 25.6                               | 5.0                                              | 10.0                          | 41.4                                              | 0.097                                                                              |
| STBP033 | 29.7                                 | 36.3 | 1.0  | 26.8                               | 5.0                                              | 9.0                           | 47.7                                              | 0.098                                                                              |
| STBP533 | 31.4                                 | 34.7 | 1.0  | 28.2                               | 5.0                                              | 9.0                           | 45.7                                              | 0.098                                                                              |
| STBP036 | 32.4                                 | 39.6 | 1.0  | 29.1                               | 5.0                                              | 8.0                           | 52.0                                              | 0.099                                                                              |
| STBP536 | 34.2                                 | 37.8 | 1.0  | 30.8                               | 5.0                                              | 8.4                           | 49.9                                              | 0.099                                                                              |
| STBP039 | 35.1                                 | 42.9 | 1.0  | 31.6                               | 5.0                                              | 7.4                           | 56.4                                              | 0.100                                                                              |
| STBP539 | 37.1                                 | 41.0 | 1.0  | 33.3                               | 5.0                                              | 7.8                           | 53.9                                              | 0.100                                                                              |
| STBP043 | 38.7                                 | 47.3 | 1.0  | 34.8                               | 5.0                                              | 6.8                           | 61.9                                              | 0.101                                                                              |
| STBP543 | 40.9                                 | 45.2 | 1.0  | 36.8                               | 5.0                                              | 7.1                           | 59.3                                              | 0.101                                                                              |
| STBP047 | 42.3                                 | 51.7 | 1.0  | 38.1                               | 5.0                                              | 6.2                           | 67.8                                              | 0.101                                                                              |
| STBP547 | 44.7                                 | 49.4 | 1.0  | 40.2                               | 5.0                                              | 6.5                           | 64.8                                              | 0.101                                                                              |
| STBP051 | 45.9                                 | 56.1 | 1.0  | 41.3                               | 5.0                                              | 5.7                           | 73.5                                              | 0.102                                                                              |
| STBP551 | 48.5                                 | 53.6 | 1.0  | 43.6                               | 5.0                                              | 6.0                           | 70.1                                              | 0.102                                                                              |
| STBP056 | 50.4                                 | 61.6 | 1.0  | 45.4                               | 5.0                                              | 5.2                           | 80.5                                              | 0.103                                                                              |
| STBP556 | 53.2                                 | 58.8 | 1.0  | 47.8                               | 5.0                                              | 5.5                           | 77.0                                              | 0.103                                                                              |

## 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>Temperature<br>Co-efficient<br>of VBR<br>of VBR<br>(% / °C) |      |      |      |      |
|---------|--------------------------------------|------|------|------------------------------------|--------------------------------------|-------------------------------|---------------------------------------|------------------------------------------------------------------------|------|------|------|------|
|         | VBR (V)                              |      | It   |                                    |                                      |                               |                                       |                                                                        | VRWM | IR   | IRSM | VRSM |
|         | Min.                                 | Max. | (mA) |                                    |                                      |                               |                                       |                                                                        | (V)  | (μA) | (A)  | (V)  |
|         |                                      |      |      |                                    |                                      |                               |                                       |                                                                        |      |      |      |      |
| STBP062 | 55.8                                 | 68.2 | 1.0  | 50.2                               | 5.0                                  | 4.7                           | 89.0                                  | 0.104                                                                  |      |      |      |      |
| STBP562 | 58.9                                 | 65.1 | 1.0  | 53.0                               | 5.0                                  | 5.0                           | 85.0                                  | 0.104                                                                  |      |      |      |      |
| STBP068 | 61.2                                 | 74.8 | 1.0  | 55.1                               | 5.0                                  | 4.3                           | 98.0                                  | 0.104                                                                  |      |      |      |      |
| STBP568 | 64.6                                 | 71.4 | 1.0  | 58.1                               | 5.0                                  | 4.6                           | 92.0                                  | 0.104                                                                  |      |      |      |      |
| STBP075 | 67.5                                 | 82.5 | 1.0  | 60.7                               | 5.0                                  | 3.9                           | 108                                   | 0.105                                                                  |      |      |      |      |
| STBP575 | 71.3                                 | 78.8 | 1.0  | 64.1                               | 5.0                                  | 4.1                           | 103                                   | 0.105                                                                  |      |      |      |      |
| STBP082 | 73.8                                 | 90.2 | 1.0  | 66.4                               | 5.0                                  | 3.6                           | 118                                   | 0.105                                                                  |      |      |      |      |
| STBP582 | 77.9                                 | 86.1 | 1.0  | 70.1                               | 5.0                                  | 3.7                           | 113                                   | 0.105                                                                  |      |      |      |      |
| STBP091 | 81.9                                 | 100  | 1.0  | 73.7                               | 5.0                                  | 3.2                           | 131                                   | 0.106                                                                  |      |      |      |      |
| STBP591 | 86.5                                 | 95.5 | 1.0  | 77.8                               | 5.0                                  | 3.4                           | 125                                   | 0.106                                                                  |      |      |      |      |
| STBP0B0 | 90.0                                 | 110  | 1.0  | 81.0                               | 5.0                                  | 2.9                           | 144                                   | 0.106                                                                  |      |      |      |      |
| STBP5B0 | 95.0                                 | 105  | 1.0  | 85.5                               | 5.0                                  | 3.1                           | 137                                   | 0.106                                                                  |      |      |      |      |
| STBP0B1 | 99.0                                 | 121  | 1.0  | 89.2                               | 5.0                                  | 2.7                           | 158                                   | 0.107                                                                  |      |      |      |      |
| STBP5B1 | 105                                  | 116  | 1.0  | 94.0                               | 5.0                                  | 2.8                           | 152                                   | 0.107                                                                  |      |      |      |      |
| STBP0B2 | 108                                  | 132  | 1.0  | 97.2                               | 5.0                                  | 2.4                           | 173                                   | 0.107                                                                  |      |      |      |      |
| STBP5B2 | 114                                  | 126  | 1.0  | 102                                | 5.0                                  | 2.5                           | 165                                   | 0.107                                                                  |      |      |      |      |
| STBP0B3 | 117                                  | 143  | 1.0  | 105                                | 5.0                                  | 2.2                           | 187                                   | 0.107                                                                  |      |      |      |      |
| STBP5B3 | 124                                  | 137  | 1.0  | 111                                | 5.0                                  | 2.3                           | 179                                   | 0.107                                                                  |      |      |      |      |
| STBP0B5 | 135                                  | 165  | 1.0  | 121                                | 5.0                                  | 2.0                           | 215                                   | 0.108                                                                  |      |      |      |      |
| STBP5B5 | 143                                  | 158  | 1.0  | 128                                | 5.0                                  | 2.0                           | 207                                   | 0.108                                                                  |      |      |      |      |
| STBP0B6 | 144                                  | 176  | 1.0  | 130                                | 5.0                                  | 1.8                           | 230                                   | 0.108                                                                  |      |      |      |      |
| STBP5B6 | 152                                  | 168  | 1.0  | 136                                | 5.0                                  | 1.9                           | 219                                   | 0.108                                                                  |      |      |      |      |
| STBP0B7 | 153                                  | 187  | 1.0  | 138                                | 5.0                                  | 1.7                           | 244                                   | 0.108                                                                  |      |      |      |      |
| STBP5B7 | 162                                  | 179  | 1.0  | 145                                | 5.0                                  | 1.8                           | 234                                   | 0.108                                                                  |      |      |      |      |
| STBP0B8 | 162                                  | 198  | 1.0  | 146                                | 5.0                                  | 1.6                           | 258                                   | 0.108                                                                  |      |      |      |      |
| STBP5B8 | 171                                  | 189  | 1.0  | 154                                | 5.0                                  | 1.7                           | 246                                   | 0.108                                                                  |      |      |      |      |
| STBP0D0 | 180                                  | 220  | 1.0  | 162                                | 5.0                                  | 1.5                           | 287                                   | 0.108                                                                  |      |      |      |      |
| STBP5D0 | 190                                  | 210  | 1.0  | 171                                | 5.0                                  | 1.53                          | 274                                   | 0.108                                                                  |      |      |      |      |
| STBP0D2 | 198                                  | 242  | 1.0  | 175                                | 5.0                                  | 1.16                          | 344                                   | 0.108                                                                  |      |      |      |      |
| STBP5D2 | 209                                  | 231  | 1.0  | 185                                | 5.0                                  | 1.22                          | 328                                   | 0.108                                                                  |      |      |      |      |
| STBP0D5 | 225                                  | 275  | 1.0  | 202                                | 5.0                                  | 1.11                          | 360                                   | 0.110                                                                  |      |      |      |      |
| STBP5D5 | 237                                  | 263  | 1.0  | 214                                | 5.0                                  | 1.16                          | 344                                   | 0.110                                                                  |      |      |      |      |
| STBP0E0 | 270                                  | 330  | 1.0  | 243                                | 5.0                                  | 0.93                          | 430                                   | 0.110                                                                  |      |      |      |      |
| STBP5E0 | 285                                  | 315  | 1.0  | 256                                | 5.0                                  | 0.97                          | 414                                   | 0.110                                                                  |      |      |      |      |
| STBP0E5 | 315                                  | 385  | 1.0  | 284                                | 5.0                                  | 0.79                          | 504                                   | 0.110                                                                  |      |      |      |      |
| STBP5E5 | 332                                  | 368  | 1.0  | 300                                | 5.0                                  | 0.83                          | 482                                   | 0.110                                                                  |      |      |      |      |
| STBP0G0 | 360                                  | 440  | 1.0  | 324                                | 5.0                                  | 0.70                          | 574                                   | 0.110                                                                  |      |      |      |      |
| STBP5G0 | 380                                  | 420  | 1.0  | 342                                | 5.0                                  | 0.73                          | 548                                   | 0.110                                                                  |      |      |      |      |
| STBP0G4 | 396                                  | 484  | 1.0  | 356                                | 5.0                                  | 0.95                          | 631                                   | 0.110                                                                  |      |      |      |      |
| STBP5G4 | 418                                  | 462  | 1.0  | 376                                | 5.0                                  | 1.00                          | 602                                   | 0.110                                                                  |      |      |      |      |

**Note:**

- (1)  $V_{BR}$  measured after  $I_t$  applied for 300  $\mu$ s.,  $I_t$  = square wave pulse or equivalent.
- (2) "STB" will be omitted in marking on the diode.

## RATING AND CHARACTERISTIC CURVES ( STBP06I - STBP5G4 )

FIG.1 - PULSE DERATING CURVE

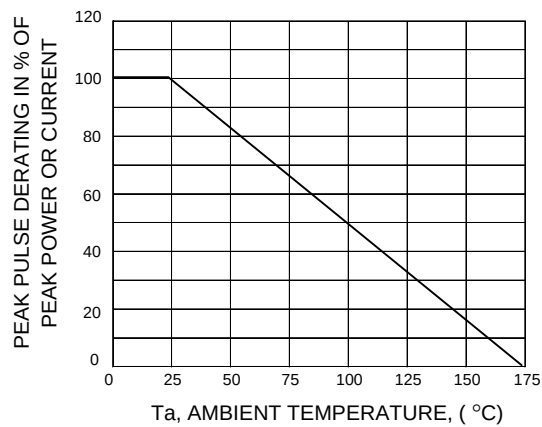


FIG.2 - PULSE WAVEFORM

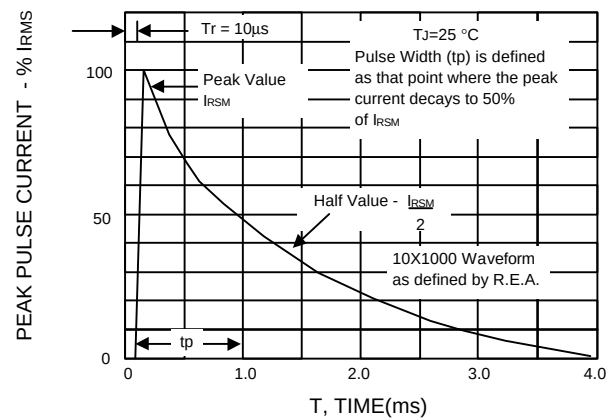


FIG.3 - STEADY STATE POWER DERATING

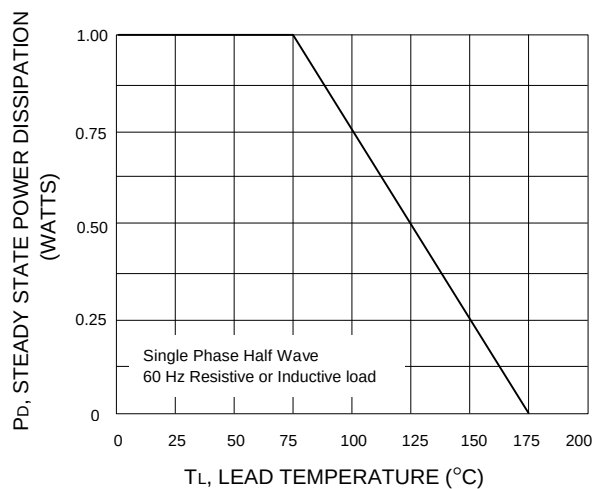


FIG.4 - PULSE RATING CURVE

