

**SURFACE MOUNT GPP  
GPP TRANSIENT VOLTAGE SUPPRESSOR  
400 WATT PEAK POWER 1.0 WATT STEADY STATE**

**FEATURES**

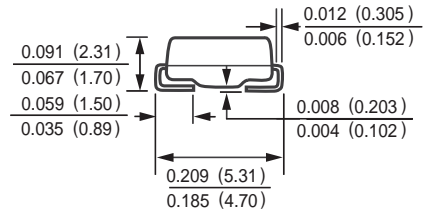
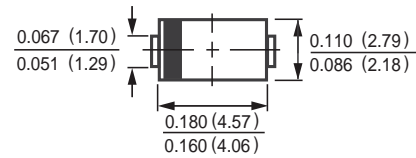
- \* Plastic package has underwriters laboratory
- \* Glass passivated chip construction
- \* 400 watt surge capability at 1ms
- \* Excellent clamping capability
- \* Low zener impedance
- \* Fast response time
- \* P/N suffix V means AEC-Q101 qualified, e.g:SMAJ5.0V
- \* P/N suffix V means Halogen-free

**MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS**

Ratings at 25 °C ambient temperature unless otherwise specified.



**DO-214AC**



Dimensions in inches and (millimeters)

**DEVICES FOR BIPOLAR APPLICATIONS**

**For Bidirectional use C or CA suffix for types SMAJ5.0 thru SMAJ440**

**Electrical characteristics apply in both direction**

**MAXIMUM RATINGS** (At  $T_A = 25^\circ\text{C}$  unless otherwise noted)

| RATINGS  | SYMBOL         | VALUE        | UNITS                  |
|--|----------------|--------------|------------------------|
| Peak Power Dissipation with a 10/1000uS (Note 1,2,5 Fig.1)     | PPPM           | Minimum 400  | Watts                  |
| Peak Pulse Current with a 10/1000uS waveform ( Note 1, Fig.2 ) | IPPM           | SEE TABLE 1  | Amps                   |
| Steady State Power Dissipation (Note 3)                        | $P_{M(AV)}$    | 1.0          | Watts                  |
| Peak Forward Surge Current per Fig.5 (Note 4)                  | $I_{FSM}$      | 40           | Amps                   |
| Typical Current Squared Time                                   | $i^2t$         | 6.64         | $\text{A}^2\text{Sec}$ |
| Maximum Instantaneous Forward Voltage at 25A (Note 5)          | $V_F$          | 3.5          | Volts                  |
| Operating and Storage Temperature Range                        | $T_J, T_{STG}$ | -55 to + 150 | $^\circ\text{C}$       |

- NOTES : 1. Non-repetitive current pulse, per Fig.3 and derated above  $T_A = 25^\circ\text{C}$  per Fig.2.  
 2. Mounted on 0.2 X 0.2" ( 5.0 X 5.0mm ) copper pad to each terminal.  
 3. Lead temperature at  $T_L = 25^\circ\text{C}$   
 4. Measured on 8.3mS single half sine-wave duty cycle = 4 pulses per minute maximum.  
 5. Peak pulse power waveform is 10/1000uS.

## RATING AND CHARACTERISTIC CURVES ( SMAJ5.0 THRU SMAJ440CA)

FIG. 1 - PEAK PULSE POWER RATING CURVE



FIG. 2 - PULSE DERATING CURVE



FIG. 3 - PULSE WAVEFORM



FIG. 4 - TYPICAL JUNCTION CAPACITANCE



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



## TRANSIENT VOLTAGE SUPPRESSORS

400W SERIES TVS DIODES/DO-214AC ( CASE 2 ) 400W

| Rectron Industry No. | Rectron House No. | Breakdown Voltage |      |          | Reverse Stand off Voltage VWM (Volts) | Maximum Reverse Leakage at VWM ID( $\mu$ A) | Maximum Peak Pulse Current IPPM (Amps) | Maximum Clamping Voltage at IPPM VC (Volts) |
|----------------------|-------------------|-------------------|------|----------|---------------------------------------|---|--|---|
|                      |                   | VBR (Volts)       |      | @IT (mA) |                                       |   |  |   |
|                      |                   | MIN.              | MAX. |          |                                       |   |  |   |
| SMAJ5.0              | TFMAJ5.0          | 6.40              | 7.82 | 10       | 5.0                                   | 800.0                                       | 41.7                                   | 9.6   |
| SMAJ5.0A             | TFMAJ5.0A         | 6.40              | 7.07 | 10       | 5.0                                   | 800.0                                       | 43.5                                   | 9.2   |
| SMAJ6.0              | TFMAJ6.0          | 6.67              | 8.15 | 10       | 6.0                                   | 800.0                                       | 35.1                                   | 11.4  |
| SMAJ6.0A             | TFMAJ6.0A         | 6.67              | 7.37 | 10       | 6.0                                   | 800.0                                       | 38.8                                   | 10.3  |
| SMAJ6.5              | TFMAJ6.5          | 7.22              | 8.82 | 10       | 6.5                                   | 500.0                                       | 32.5                                   | 12.3  |
| SMAJ6.5A             | TFMAJ6.5A         | 7.22              | 7.98 | 10       | 6.5                                   | 500.0                                       | 35.7                                   | 11.2  |
| SMAJ7.0              | TFMAJ7.0          | 7.78              | 9.51 | 10       | 7.0                                   | 200.0                                       | 30.1                                   | 13.3  |
| SMAJ7.0A             | TFMAJ7.0A         | 7.78              | 8.60 | 10       | 7.0                                   | 200.0                                       | 33.3                                   | 12.0  |
| SMAJ7.5              | TFMAJ7.5          | 8.33              | 10.2 | 1.0      | 7.5                                   | 100.0                                       | 28.0                                   | 14.3  |
| SMAJ7.5A             | TFMAJ7.5A         | 8.33              | 9.21 | 1.0      | 7.5                                   | 100.0                                       | 31.0                                   | 12.9  |
| SMAJ8.0              | TFMAJ8.0          | 8.89              | 10.9 | 1.0      | 8.0                                   | 50.0  | 26.7                                   | 15.0  |
| SMAJ8.0A             | TFMAJ8.0A         | 8.89              | 9.83 | 1.0      | 8.0                                   | 50.0  | 29.4                                   | 13.6  |
| SMAJ8.5              | TFMAJ8.5          | 9.44              | 11.5 | 1.0      | 8.5                                   | 10.0  | 25.2                                   | 15.9  |
| SMAJ8.5A             | TFMAJ8.5A         | 9.44              | 10.4 | 1.0      | 8.5                                   | 10.0  | 27.8                                   | 14.4  |
| SMAJ9.0              | TFMAJ9.0          | 10.0              | 12.2 | 1.0      | 9.0                                   | 5.0   | 23.7                                   | 16.9  |
| SMAJ9.0A             | TFMAJ9.0A         | 10.0              | 11.1 | 1.0      | 9.0                                   | 5.0   | 26.0                                   | 15.4  |
| SMAJ10               | TFMAJ10           | 11.1              | 13.6 | 1.0      | 10.0                                  | 5.0   | 21.3                                   | 18.8  |
| SMAJ10A              | TFMAJ10A          | 11.1              | 12.3 | 1.0      | 10.0                                  | 5.0   | 23.5                                   | 17.0  |
| SMAJ11               | TFMAJ11           | 12.2              | 14.9 | 1.0      | 11.0                                  | 1.0   | 19.9                                   | 20.1  |
| SMAJ11A              | TFMAJ11A          | 12.2              | 13.5 | 1.0      | 11.0                                  | 1.0   | 22.0                                   | 18.2  |
| SMAJ12               | TFMAJ12           | 13.3              | 16.3 | 1.0      | 12.0                                  | 1.0   | 18.2                                   | 22.0  |
| SMAJ12A              | TFMAJ12A          | 13.3              | 14.7 | 1.0      | 12.0                                  | 1.0   | 20.1                                   | 19.9  |
| SMAJ13               | TFMAJ13           | 14.4              | 17.6 | 1.0      | 13.0                                  | 1.0   | 16.8                                   | 23.8  |
| SMAJ13A              | TFMAJ13A          | 14.4              | 15.9 | 1.0      | 13.0                                  | 1.0   | 18.6                                   | 21.5  |
| SMAJ14               | TFMAJ14           | 15.6              | 19.1 | 1.0      | 14.0                                  | 1.0   | 15.5                                   | 25.8  |
| SMAJ14A              | TFMAJ14A          | 15.6              | 17.2 | 1.0      | 14.0                                  | 1.0   | 17.2                                   | 23.2  |
| SMAJ15               | TFMAJ15           | 16.7              | 20.4 | 1.0      | 15.0                                  | 1.0   | 14.9                                   | 26.9  |
| SMAJ15A              | TFMAJ15A          | 16.7              | 18.5 | 1.0      | 15.0                                  | 1.0   | 16.4                                   | 24.4  |
| SMAJ16               | TFMAJ16           | 17.8              | 21.8 | 1.0      | 16.0                                  | 1.0   | 13.9                                   | 28.8  |
| SMAJ16A              | TFMAJ16A          | 17.8              | 19.7 | 1.0      | 16.0                                  | 1.0   | 15.4                                   | 26.0  |
| SMAJ17               | TFMAJ17           | 18.9              | 23.1 | 1.0      | 17.0                                  | 1.0   | 13.1                                   | 30.5  |
| SMAJ17A              | TFMAJ17A          | 18.9              | 20.9 | 1.0      | 17.0                                  | 1.0   | 14.5                                   | 27.6  |
| SMAJ18               | TFMAJ18           | 20.0              | 24.4 | 1.0      | 18.0                                  | 1.0   | 12.4                                   | 32.2  |
| SMAJ18A              | TFMAJ18A          | 20.0              | 22.1 | 1.0      | 18.0                                  | 1.0   | 13.7                                   | 29.2  |
| SMAJ20               | TFMAJ20           | 22.2              | 27.1 | 1.0      | 20.0                                  | 1.0   | 11.2                                   | 35.8  |
| SMAJ20A              | TFMAJ20A          | 22.2              | 24.5 | 1.0      | 20.0                                  | 1.0   | 12.3                                   | 32.4  |
| SMAJ22               | TFMAJ22           | 24.4              | 29.8 | 1.0      | 22.0                                  | 1.0   | 10.2                                   | 39.4  |
| SMAJ22A              | TFMAJ22A          | 24.4              | 26.9 | 1.0      | 22.0                                  | 1.0   | 11.3                                   | 35.5  |
| SMAJ24               | TFMAJ24           | 26.7              | 32.6 | 1.0      | 24.0                                  | 1.0   | 9.3                                    | 43.0  |
| SMAJ24A              | TFMAJ24A          | 26.7              | 29.5 | 1.0      | 24.0                                  | 1.0   | 10.3                                   | 38.9  |
| SMAJ26               | TFMAJ26           | 28.9              | 35.3 | 1.0      | 26.0                                  | 1.0   | 8.6                                    | 46.6  |
| SMAJ26A              | TFMAJ26A          | 28.9              | 31.9 | 1.0      | 26.0                                  | 1.0   | 9.5                                    | 42.1  |
| SMAJ28               | TFMAJ28           | 31.1              | 38.0 | 1.0      | 28.0                                  | 1.0   | 8.0                                    | 50.0  |
| SMAJ28A              | TFMAJ28A          | 31.1              | 34.4 | 1.0      | 28.0                                  | 1.0   | 8.8                                    | 45.4  |
| SMAJ30               | TFMAJ30           | 33.3              | 40.7 | 1.0      | 30.0                                  | 1.0   | 7.5                                    | 53.5  |
| SMAJ30A              | TFMAJ30A          | 33.3              | 36.8 | 1.0      | 30.0                                  | 1.0   | 8.3                                    | 48.4  |
| SMAJ33               | TFMAJ33           | 36.7              | 44.9 | 1.0      | 33.0                                  | 1.0   | 6.8                                    | 59.0  |
| SMAJ33A              | TFMAJ33A          | 36.7              | 40.6 | 1.0      | 33.0                                  | 1.0   | 7.5                                    | 53.3  |
| SMAJ36               | TFMAJ36           | 40.0              | 48.9 | 1.0      | 36.0                                  | 1.0   | 6.2                                    | 64.3  |
| SMAJ36A              | TFMAJ36A          | 40.0              | 44.2 | 1.0      | 36.0                                  | 1.0   | 6.9                                    | 58.1  |

## TRANSIENT VOLTAGE SUPPRESSORS

### 400W SERIES TVS DIODES/DO-214AC ( CASE 2 ) 400W

| Rectron Industry No. | Rectron House No. | Breakdown Voltage |       |          | Reverse Stand off Voltage VWM (Volts) | Maximum Reverse Leakage at VWM ID(uA) | Maximum Peak Pulse Current IPPM (Amps) | Maximum Clamping Voltage at IPPM VC (Volts) |
|----------------------|-------------------|-------------------|-------|----------|---------------------------------------|---------------------------------------|--|---|
|                      |                   | VBR (Volts)       |       | @IT (mA) |                                       |                                       |  |   |
|                      |                   | MIN.              | MAX.  |          |                                       |                                       |  |   |
| SMAJ40               | TFMAJ40           | 44.4              | 54.3  | 1.0      | 40                                    | 1.0                                   | 5.6                                    | 71.4  |
| SMAJ40A              | TFMAJ40A          | 44.4              | 49.1  | 1.0      | 40                                    | 1.0                                   | 6.2                                    | 64.5  |
| SMAJ43               | TFMAJ43           | 47.8              | 58.4  | 1.0      | 43                                    | 1.0                                   | 5.2                                    | 76.7  |
| SMAJ43A              | TFMAJ43A          | 47.8              | 52.8  | 1.0      | 43                                    | 1.0                                   | 5.8                                    | 69.4  |
| SMAJ45               | TFMAJ45           | 50.0              | 61.1  | 1.0      | 45                                    | 1.0                                   | 5.0                                    | 80.3  |
| SMAJ45A              | TFMAJ45A          | 50.0              | 55.3  | 1.0      | 45                                    | 1.0                                   | 5.5                                    | 72.7  |
| SMAJ48               | TFMAJ48           | 53.3              | 65.1  | 1.0      | 48                                    | 1.0                                   | 4.7                                    | 85.5  |
| SMAJ48A              | TFMAJ48A          | 53.3              | 58.9  | 1.0      | 48                                    | 1.0                                   | 5.2                                    | 77.4  |
| SMAJ51               | TFMAJ51           | 56.7              | 69.3  | 1.0      | 51                                    | 1.0                                   | 4.4                                    | 91.1  |
| SMAJ51A              | TFMAJ51A          | 56.7              | 62.7  | 1.0      | 51                                    | 1.0                                   | 4.9                                    | 82.4  |
| SMAJ54               | TFMAJ54           | 60.0              | 73.3  | 1.0      | 54                                    | 1.0                                   | 4.2                                    | 96.3  |
| SMAJ54A              | TFMAJ54A          | 60.0              | 66.3  | 1.0      | 54                                    | 1.0                                   | 4.6                                    | 87.1  |
| SMAJ58               | TFMAJ58           | 64.4              | 78.7  | 1.0      | 58                                    | 1.0                                   | 3.9                                    | 103   |
| SMAJ58A              | TFMAJ58A          | 64.4              | 71.2  | 1.0      | 58                                    | 1.0                                   | 4.3                                    | 93.6  |
| SMAJ60               | TFMAJ60           | 66.7              | 81.5  | 1.0      | 60                                    | 1.0                                   | 3.7                                    | 107   |
| SMAJ60A              | TFMAJ60A          | 66.7              | 73.7  | 1.0      | 60                                    | 1.0                                   | 4.1                                    | 96.8  |
| SMAJ64               | TFMAJ64           | 71.1              | 86.9  | 1.0      | 64                                    | 1.0                                   | 3.5                                    | 114   |
| SMAJ64A              | TFMAJ64A          | 71.1              | 78.6  | 1.0      | 64                                    | 1.0                                   | 3.9                                    | 103   |
| SMAJ70               | TFMAJ70           | 77.8              | 95.1  | 1.0      | 70                                    | 1.0                                   | 3.2                                    | 125   |
| SMAJ70A              | TFMAJ70A          | 77.8              | 86.0  | 1.0      | 70                                    | 1.0                                   | 3.5                                    | 113   |
| SMAJ75               | TFMAJ75           | 83.3              | 102   | 1.0      | 75                                    | 1.0                                   | 3.0                                    | 134   |
| SMAJ75A              | TFMAJ75A          | 83.3              | 92.1  | 1.0      | 75                                    | 1.0                                   | 3.3                                    | 121   |
| SMAJ78               | TFMAJ78           | 86.7              | 106   | 1.0      | 78                                    | 1.0                                   | 2.9                                    | 139   |
| SMAJ78A              | TFMAJ78A          | 86.7              | 95.8  | 1.0      | 78                                    | 1.0                                   | 3.2                                    | 126   |
| SMAJ85               | TFMAJ85           | 94.4              | 115   | 1.0      | 85                                    | 1.0                                   | 2.0                                    | 151   |
| SMAJ85A              | TFMAJ85A          | 94.4              | 104   | 1.0      | 85                                    | 1.0                                   | 2.2                                    | 137   |
| SMAJ90               | TFMAJ90           | 100               | 122   | 1.0      | 90                                    | 1.0                                   | 1.9                                    | 160   |
| SMAJ90A              | TFMAJ90A          | 100               | 111   | 1.0      | 90                                    | 1.0                                   | 2.1                                    | 146   |
| SMAJ100              | TFMAJ100          | 111               | 136   | 1.0      | 100                                   | 1.0                                   | 1.7                                    | 179   |
| SMAJ100A             | TFMAJ100A         | 111               | 123   | 1.0      | 100                                   | 1.0                                   | 1.9                                    | 162   |
| SMAJ110              | TFMAJ110          | 122               | 149   | 1.0      | 110                                   | 1.0                                   | 1.5                                    | 196   |
| SMAJ110A             | TFMAJ110A         | 122               | 135   | 1.0      | 110                                   | 1.0                                   | 1.7                                    | 177   |
| SMAJ120              | TFMAJ120          | 133               | 163   | 1.0      | 120                                   | 1.0                                   | 1.4                                    | 214   |
| SMAJ120A             | TFMAJ120A         | 133               | 147   | 1.0      | 120                                   | 1.0                                   | 1.6                                    | 193   |
| SMAJ130              | TFMAJ130          | 144               | 176   | 1.0      | 130                                   | 1.0                                   | 1.3                                    | 231   |
| SMAJ130A             | TFMAJ130A         | 144               | 159   | 1.0      | 130                                   | 1.0                                   | 1.4                                    | 209   |
| SMAJ150              | TFMAJ150          | 167               | 204   | 1.0      | 150                                   | 1.0                                   | 1.1                                    | 268   |
| SMAJ150A             | TFMAJ150A         | 167               | 185   | 1.0      | 150                                   | 1.0                                   | 1.2                                    | 243   |
| SMAJ160              | TFMAJ160          | 178               | 218   | 1.0      | 160                                   | 1.0                                   | 1.0                                    | 287   |
| SMAJ160A             | TFMAJ160A         | 178               | 197   | 1.0      | 160                                   | 1.0                                   | 1.2                                    | 259   |
| SMAJ170              | TFMAJ170          | 189               | 231   | 1.0      | 170                                   | 1.0                                   | 0.99                                   | 304   |
| SMAJ170A             | TFMAJ170A         | 189               | 209   | 1.0      | 170                                   | 1.0                                   | 1.09                                   | 275   |
| SMAJ180              | TFMAJ180          | 200.16            | 244.8 | 1.0      | 180                                   | 1.0                                   | 1.24                                   | 322.2                                       |
| SMAJ180A             | TFMAJ180A         | 200               | 220   | 1.0      | 180                                   | 1.0                                   | 1.37                                   | 291.6                                       |
| SMAJ190              | TFMAJ190          | 211.28            | 258.4 | 1.0      | 190                                   | 1.0                                   | 1.18                                   | 340.1                                       |
| SMAJ190A             | TFMAJ190A         | 211               | 232   | 1.0      | 190                                   | 1.0                                   | 1.3                                    | 307.8                                       |
| SMAJ200A             | TFMAJ200A         | 224               | 247   | 1.0      | 200                                   | 1.0                                   | 1.23                                   | 324   |
| SMAJ220A             | TFMAJ220A         | 246               | 272   | 1.0      | 220                                   | 1.0                                   | 1.12                                   | 356   |
| SMAJ250A             | TFMAJ250A         | 279               | 309   | 1.0      | 250                                   | 1.0                                   | 0.99                                   | 405   |
| SMAJ300A             | TFMAJ300A         | 335               | 371   | 1.0      | 300                                   | 1.0                                   | 0.82                                   | 486   |
| SMAJ350A             | TFMAJ350A         | 391               | 432   | 1.0      | 350                                   | 1.0                                   | 0.71                                   | 567   |
| SMAJ400A             | TFMAJ400A         | 447               | 494   | 1.0      | 400                                   | 1.0                                   | 0.62                                   | 648   |
| SMAJ440A             | TFMAJ440A         | 492               | 543   | 1.0      | 440                                   | 1.0                                   | 0.56                                   | 713   |

- Notes :
1.  $V_{BR}$  measured after  $I_T$  applied for 300ms.  $I_T$  = square pulse or equivalent.
  2. For bidirectional use C or CA suffixes for all types (ex. SMAJ5.0C, SMAJ440CA) electrical characteristics apply in both directions.
  3. For bidirectional types having  $V_{WM}$  of 10 volts and less, the  $I_D$  limit is doubled.

## Mounting Pad Layout



Dimensions in inches and (millimeters)

## 1. Internal Circuit



## 2. Marking on the body

### SMAJxx/SMAJxxA



### SMAJxxCA



## PACKAGING OF DIODE AND BRIDGE RECTIFIERS

### REEL PACK

| PACKAGE | PACKING CODE | EA PER REEL | EA PER INNER BOX | COMPONENT SPACE (mm) | TAPE SPACE (mm) | REEL DIA (mm) | CARTON SIZE (mm) | EA PER CARTON | GROSS WEIGHT(Kg) |
|---------|--------------|-------------|------------------|----------------------|-----------------|---------------|------------------|---------------|------------------|
| SMA     | -W           | 7,500       | 15,000           | ---                  | ---             | 330           | 360*355*360      | 120,000       | 15.2             |

| PACKAGE | PACKING CODE | EA PER REEL | EA PER INNER BOX | COMPONENT SPACE (mm) | TAPE SPACE (mm) | REEL DIA (mm) | CARTON SIZE (mm) | EA PER CARTON | GROSS WEIGHT(Kg) |
|---------|--------------|-------------|------------------|----------------------|-----------------|---------------|------------------|---------------|------------------|
| SMA     | -T           | 2,000       | 8,000            | ---                  | ---             | 178           | 390*205*310      | 64,000        | 7.8              |