

**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

**MECHANICAL DATA**

- \* UL listed the recognized component directory (QVGQ2), file #E211196

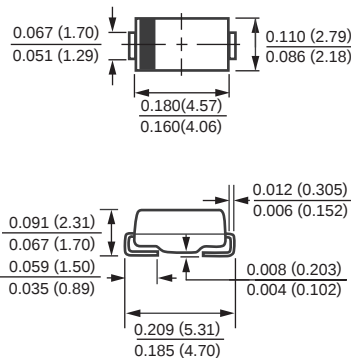
Ratings at 25 °C ambient temperature unless otherwise specified.

**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 TFMAJ5.0 thru TFMAJ170

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 3)                  | $I_{FSM}$      | 40           | Amps             |
| Maximum Instantaneous Forward Voltage at 25A (Note 4)          | $V_F$          | 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 pules per minute maximum.
  5. Peak pulse power waveform is 10/1000uS.

# RATING AND CHARACTERISTIC CURVES ( TFMAJ5.0 THRU TFMAJ170CA )

FIG. 1 - PEAK PULSE POWER RATING CURVE

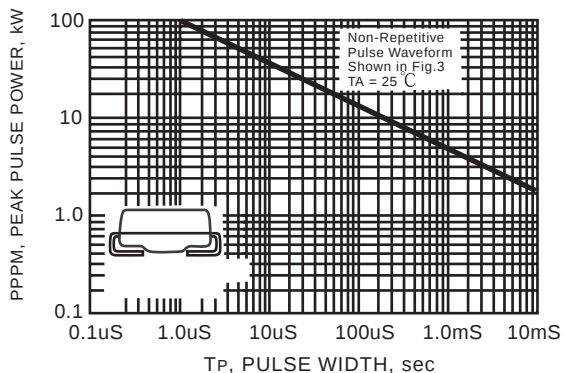


FIG. 2 - PULSE DERATING CURVE

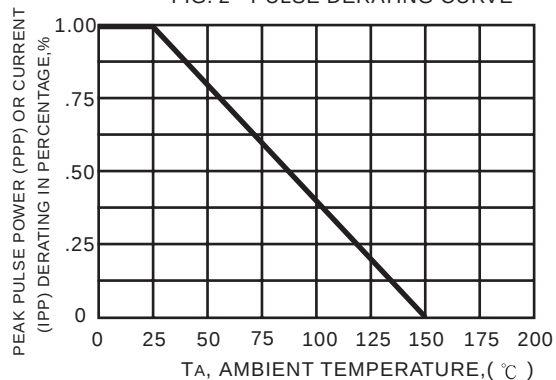


FIG. 3 - PULSE WAVEFORM

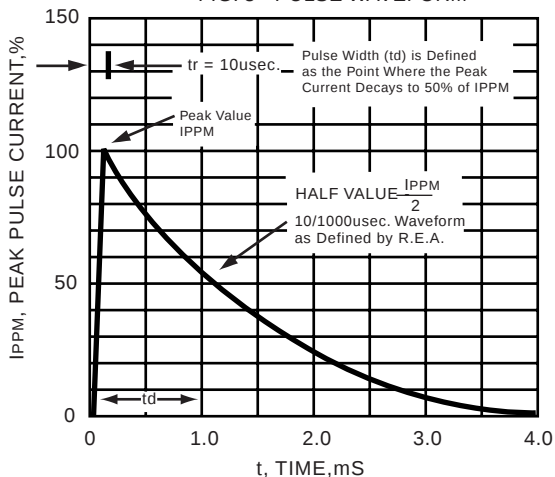


FIG. 4 - TYPICAL JUNCTION CAPACITANCE

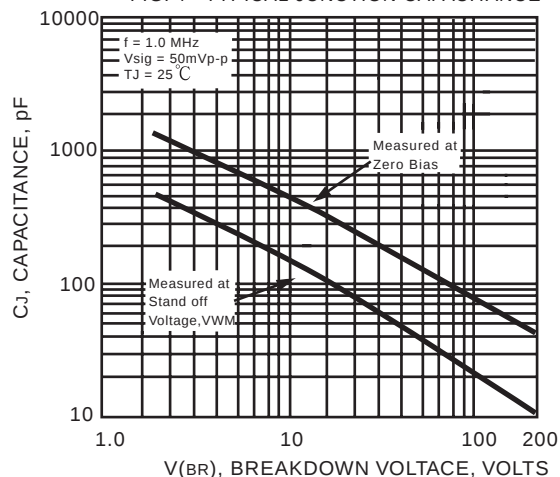
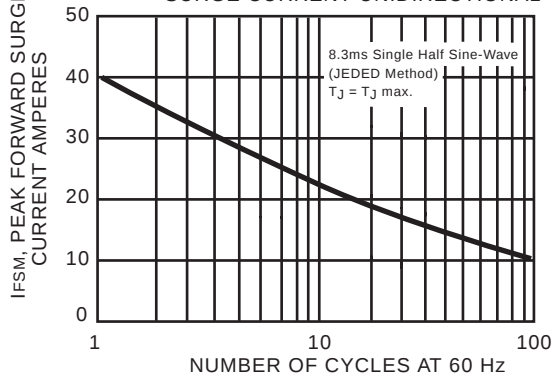


FIG. 6 - MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT UNIDIRECTIONAL



# TRANSIENT VOLTAGE SUPPRESSORS

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

| Rectron<br>Industry No. | Rectron<br>House No. | Breakdown Voltage |      |             | Reverse<br>Stand off<br>Voltage<br>VWM<br>(Volts) | Maximum<br>Reverse<br>Leakage<br>at VWM<br>ID(uA) | Maximum<br>Peak Pulse<br>Current<br>IPPM<br>(Amps) | Maximum<br>Clamping<br>Voltage<br>at IPPM<br>VC (Volts) |
|-------------------------|----------------------|-------------------|------|-------------|---------------------------------------------------|---------------------------------------------------|----------------------------------------------------|---------------------------------------------------------|
|                         |                      | VBR<br>(Volts)    |      | @IT<br>(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                                              | 5.0                                               | 19.9                                               | 20.1                                                    |
| SMAJ11A                 | TFMAJ11A             | 12.2              | 13.5 | 1.0         | 11.0                                              | 5.0                                               | 22.0                                               | 18.2                                                    |
| SMAJ12                  | TFMAJ12              | 13.3              | 16.3 | 1.0         | 12.0                                              | 5.0                                               | 18.2                                               | 22.0                                                    |
| SMAJ12A                 | TFMAJ12A             | 13.3              | 14.7 | 1.0         | 12.0                                              | 5.0                                               | 20.1                                               | 19.9                                                    |
| SMAJ13                  | TFMAJ13              | 14.4              | 17.6 | 1.0         | 13.0                                              | 5.0                                               | 16.8                                               | 23.8                                                    |
| SMAJ13A                 | TFMAJ13A             | 14.4              | 15.9 | 1.0         | 13.0                                              | 5.0                                               | 18.6                                               | 21.5                                                    |
| SMAJ14                  | TFMAJ14              | 15.6              | 19.1 | 1.0         | 14.0                                              | 5.0                                               | 15.5                                               | 25.8                                                    |
| SMAJ14A                 | TFMAJ14A             | 15.6              | 17.2 | 1.0         | 14.0                                              | 5.0                                               | 17.2                                               | 23.2                                                    |
| SMAJ15                  | TFMAJ15              | 16.7              | 20.4 | 1.0         | 15.0                                              | 5.0                                               | 14.9                                               | 26.9                                                    |
| SMAJ15A                 | TFMAJ15A             | 16.7              | 18.5 | 1.0         | 15.0                                              | 5.0                                               | 16.4                                               | 24.4                                                    |
| SMAJ16                  | TFMAJ16              | 17.8              | 21.8 | 1.0         | 16.0                                              | 5.0                                               | 13.9                                               | 28.8                                                    |
| SMAJ16A                 | TFMAJ16A             | 17.8              | 19.7 | 1.0         | 16.0                                              | 5.0                                               | 15.4                                               | 26.0                                                    |
| SMAJ17                  | TFMAJ17              | 18.9              | 23.1 | 1.0         | 17.0                                              | 5.0                                               | 13.1                                               | 30.5                                                    |
| SMAJ17A                 | TFMAJ17A             | 18.9              | 20.9 | 1.0         | 17.0                                              | 5.0                                               | 14.5                                               | 27.6                                                    |
| SMAJ18                  | TFMAJ18              | 20.0              | 24.4 | 1.0         | 18.0                                              | 5.0                                               | 12.4                                               | 32.2                                                    |
| SMAJ18A                 | TFMAJ18A             | 20.0              | 22.1 | 1.0         | 18.0                                              | 5.0                                               | 13.7                                               | 29.2                                                    |
| SMAJ20                  | TFMAJ20              | 22.2              | 27.1 | 1.0         | 20.0                                              | 5.0                                               | 11.2                                               | 35.8                                                    |
| SMAJ20A                 | TFMAJ20A             | 22.2              | 24.5 | 1.0         | 20.0                                              | 5.0                                               | 12.3                                               | 32.4                                                    |
| SMAJ22                  | TFMAJ22              | 24.4              | 29.8 | 1.0         | 22.0                                              | 5.0                                               | 10.2                                               | 39.4                                                    |
| SMAJ22A                 | TFMAJ22A             | 24.4              | 26.9 | 1.0         | 22.0                                              | 5.0                                               | 11.3                                               | 35.5                                                    |
| SMAJ24                  | TFMAJ24              | 26.7              | 32.6 | 1.0         | 24.0                                              | 5.0                                               | 9.3                                                | 43.0                                                    |
| SMAJ24A                 | TFMAJ24A             | 26.7              | 29.5 | 1.0         | 24.0                                              | 5.0                                               | 10.3                                               | 38.9                                                    |
| SMAJ26                  | TFMAJ26              | 28.9              | 35.3 | 1.0         | 26.0                                              | 5.0                                               | 8.6                                                | 46.6                                                    |
| SMAJ26A                 | TFMAJ26A             | 28.9              | 31.9 | 1.0         | 26.0                                              | 5.0                                               | 9.5                                                | 42.1                                                    |
| SMAJ28                  | TFMAJ28              | 31.1              | 38.0 | 1.0         | 28.0                                              | 5.0                                               | 8.0                                                | 50.0                                                    |
| SMAJ28A                 | TFMAJ28A             | 31.1              | 34.4 | 1.0         | 28.0                                              | 5.0                                               | 8.8                                                | 45.4                                                    |
| SMAJ30                  | TFMAJ30              | 33.3              | 40.7 | 1.0         | 30.0                                              | 5.0                                               | 7.5                                                | 53.5                                                    |
| SMAJ30A                 | TFMAJ30A             | 33.3              | 36.8 | 1.0         | 30.0                                              | 5.0                                               | 8.3                                                | 48.4                                                    |
| SMAJ33                  | TFMAJ33              | 36.7              | 44.9 | 1.0         | 33.0                                              | 5.0                                               | 6.8                                                | 59.0                                                    |
| SMAJ33A                 | TFMAJ33A             | 36.7              | 40.6 | 1.0         | 33.0                                              | 5.0                                               | 7.5                                                | 53.3                                                    |
| SMAJ36                  | TFMAJ36              | 40.0              | 48.9 | 1.0         | 36.0                                              | 5.0                                               | 6.2                                                | 64.3                                                    |
| SMAJ36A                 | TFMAJ36A             | 40.0              | 44.2 | 1.0         | 36.0                                              | 5.0                                               | 6.9                                                | 58.1                                                    |

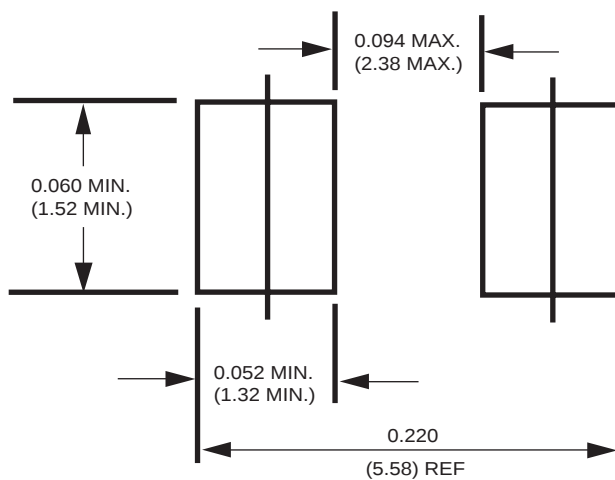
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| Rectron<br>Industry No. | Rectron<br>House No. | Breakdown Voltage |      |             | Reverse<br>Stand off<br>Voltage<br>VWM<br>(Volts) | Maximum<br>Reverse<br>Leakage<br>at VWM<br>ID(uA) | Maximum<br>Peak Pulse<br>Current<br>IPPM<br>(Amps) | Maximum<br>Clamping<br>Voltage<br>at IPPM<br>VC (Volts) |
|-------------------------|----------------------|-------------------|------|-------------|---------------------------------------------------|---------------------------------------------------|----------------------------------------------------|---------------------------------------------------------|
|                         |                      | VBR<br>(Volts)    |      | @IT<br>(mA) |                                                   |                                                   |                                                    |                                                         |
|                         |                      | MIN.              | MAX. |             |                                                   |                                                   |                                                    |                                                         |
| SMAJ40                  | TFMAJ40              | 44.4              | 54.3 | 1.0         | 40                                                | 5.0                                               | 5.6                                                | 71.4                                                    |
| SMAJ40A                 | TFMAJ40A             | 44.4              | 49.1 | 1.0         | 40                                                | 5.0                                               | 6.2                                                | 64.5                                                    |
| SMAJ43                  | TFMAJ43              | 47.8              | 58.4 | 1.0         | 43                                                | 5.0                                               | 5.2                                                | 76.7                                                    |
| SMAJ43A                 | TFMAJ43A             | 47.8              | 52.8 | 1.0         | 43                                                | 5.0                                               | 5.8                                                | 69.4                                                    |
| SMAJ45                  | TFMAJ45              | 50.0              | 61.1 | 1.0         | 45                                                | 5.0                                               | 5.0                                                | 80.3                                                    |
| SMAJ45A                 | TFMAJ45A             | 50.0              | 55.3 | 1.0         | 45                                                | 5.0                                               | 5.5                                                | 72.7                                                    |
| SMAJ48                  | TFMAJ48              | 53.3              | 65.1 | 1.0         | 48                                                | 5.0                                               | 4.7                                                | 85.5                                                    |
| SMAJ48A                 | TFMAJ48A             | 53.3              | 58.9 | 1.0         | 48                                                | 5.0                                               | 5.2                                                | 77.4                                                    |
| SMAJ51                  | TFMAJ51              | 56.7              | 69.3 | 1.0         | 51                                                | 5.0                                               | 4.4                                                | 91.1                                                    |
| SMAJ51A                 | TFMAJ51A             | 56.7              | 62.7 | 1.0         | 51                                                | 5.0                                               | 4.9                                                | 82.4                                                    |
| SMAJ54                  | TFMAJ54              | 60.0              | 73.3 | 1.0         | 54                                                | 5.0                                               | 4.2                                                | 96.3                                                    |
| SMAJ54A                 | TFMAJ54A             | 60.0              | 66.3 | 1.0         | 54                                                | 5.0                                               | 4.6                                                | 87.1                                                    |
| SMAJ58                  | TFMAJ58              | 64.4              | 78.7 | 1.0         | 58                                                | 5.0                                               | 3.9                                                | 103                                                     |
| SMAJ58A                 | TFMAJ58A             | 64.4              | 71.2 | 1.0         | 58                                                | 5.0                                               | 4.3                                                | 93.6                                                    |
| SMAJ60                  | TFMAJ60              | 66.7              | 81.5 | 1.0         | 60                                                | 5.0                                               | 3.7                                                | 107                                                     |
| SMAJ60A                 | TFMAJ60A             | 66.7              | 73.7 | 1.0         | 60                                                | 5.0                                               | 4.1                                                | 96.8                                                    |
| SMAJ64                  | TFMAJ64              | 71.1              | 86.9 | 1.0         | 64                                                | 5.0                                               | 3.5                                                | 114                                                     |
| SMAJ64A                 | TFMAJ64A             | 71.1              | 78.6 | 1.0         | 64                                                | 5.0                                               | 3.9                                                | 103                                                     |
| SMAJ70                  | TFMAJ70              | 77.8              | 95.1 | 1.0         | 70                                                | 5.0                                               | 3.2                                                | 125                                                     |
| SMAJ70A                 | TFMAJ70A             | 77.8              | 86.0 | 1.0         | 70                                                | 5.0                                               | 3.5                                                | 113                                                     |
| SMAJ75                  | TFMAJ75              | 83.3              | 102  | 1.0         | 75                                                | 5.0                                               | 3.0                                                | 134                                                     |
| SMAJ75A                 | TFMAJ75A             | 83.3              | 92.1 | 1.0         | 75                                                | 5.0                                               | 3.3                                                | 121                                                     |
| SMAJ78                  | TFMAJ78              | 86.7              | 106  | 1.0         | 78                                                | 5.0                                               | 2.9                                                | 139                                                     |
| SMAJ78A                 | TFMAJ78A             | 86.7              | 95.8 | 1.0         | 78                                                | 5.0                                               | 3.2                                                | 126                                                     |
| SMAJ85                  | TFMAJ85              | 94.4              | 115  | 1.0         | 85                                                | 5.0                                               | 2.0                                                | 151                                                     |
| SMAJ85A                 | TFMAJ85A             | 94.4              | 104  | 1.0         | 85                                                | 5.0                                               | 2.2                                                | 137                                                     |
| SMAJ90                  | TFMAJ90              | 100               | 122  | 1.0         | 90                                                | 5.0                                               | 1.9                                                | 160                                                     |
| SMAJ90A                 | TFMAJ90A             | 100               | 111  | 1.0         | 90                                                | 5.0                                               | 2.1                                                | 146                                                     |
| SMAJ100                 | TFMAJ100             | 111               | 136  | 1.0         | 100                                               | 5.0                                               | 1.7                                                | 179                                                     |
| SMAJ100A                | TFMAJ100A            | 111               | 123  | 1.0         | 100                                               | 5.0                                               | 1.9                                                | 162                                                     |
| SMAJ110                 | TFMAJ110             | 122               | 149  | 1.0         | 110                                               | 5.0                                               | 1.5                                                | 196                                                     |
| SMAJ110A                | TFMAJ110A            | 122               | 135  | 1.0         | 110                                               | 5.0                                               | 1.7                                                | 177                                                     |
| SMAJ120                 | TFMAJ120             | 133               | 163  | 1.0         | 120                                               | 5.0                                               | 1.4                                                | 214                                                     |
| SMAJ120A                | TFMAJ120A            | 133               | 147  | 1.0         | 120                                               | 5.0                                               | 1.6                                                | 193                                                     |
| SMAJ130                 | TFMAJ130             | 144               | 176  | 1.0         | 130                                               | 5.0                                               | 1.3                                                | 231                                                     |
| SMAJ130A                | TFMAJ130A            | 144               | 159  | 1.0         | 130                                               | 5.0                                               | 1.4                                                | 209                                                     |
| SMAJ150                 | TFMAJ150             | 167               | 204  | 1.0         | 150                                               | 5.0                                               | 1.1                                                | 268                                                     |
| SMAJ150A                | TFMAJ150A            | 167               | 185  | 1.0         | 150                                               | 5.0                                               | 1.2                                                | 243                                                     |
| SMAJ160                 | TFMAJ160             | 178               | 218  | 1.0         | 160                                               | 5.0                                               | 1.0                                                | 287                                                     |
| SMAJ160A                | TFMAJ160A            | 178               | 197  | 1.0         | 160                                               | 5.0                                               | 1.2                                                | 259                                                     |
| SMAJ170                 | TFMAJ170             | 189               | 231  | 1.0         | 170                                               | 5.0                                               | 0.99                                               | 304                                                     |
| SMAJ170A                | TFMAJ170A            | 189               | 209  | 1.0         | 170                                               | 5.0                                               | 1.09                                               | 275                                                     |

- Notes :
1.  $V_{BR}$  measured after  $I_T$  applied for 300ms.  $I_T$  = square pulse or equivalent.
  2. For bidirectional use C or CA suffixs for all types (ex. SMAJ5.0C,SMAJ170CA)  
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)