

**SURFACE MOUNT  
UNIDIRECTIONAL AND BIDIRECTIONAL  
TRANSIENT VOLTAGE SUPPRESSORS**

STAND-OFF VOLTAGE - **5.0** to **170** Volts  
POWER DISSIPATION - **400** WATTS

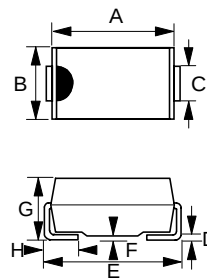
**FEATURES**

- Rating to 200V VBR
- For surface mounted applications
- Reliable low cost construction utilizing molded plastic technique
- Plastic material has UL flammability classification 94V-O
- Typical IR less than 1uA above 10V
- Fast response time: typically less than 1.0ps for Uni-direction,less than 5.0ns for Bi-direction,form 0 Volts to BV min

**MECHANICAL DATA**

- Case : Molded plastic
- Polarity : by cathode band denotes uni-directional device none cathode band denotes bi-directional device
- Weight : 0.002 ounces, 0.064 gram

**SMA**



| SMA                          |      |      |
|------------------------------|------|------|
| DIM.                         | MIN. | MAX. |
| A                            | 4.06 | 4.57 |
| B                            | 2.29 | 2.92 |
| C                            | 1.27 | 1.63 |
| D                            | 0.15 | 0.31 |
| E                            | 4.83 | 5.59 |
| F                            | 0.05 | 0.20 |
| G                            | 2.01 | 2.62 |
| H                            | 0.76 | 1.52 |
| All Dimensions in millimeter |      |      |

**MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS**

Ratings at 25°C ambient temperature unless otherwise specified.  
Single phase, half wave, 60Hz, resistive or inductive load.  
For capacitive load, derate current by 20%

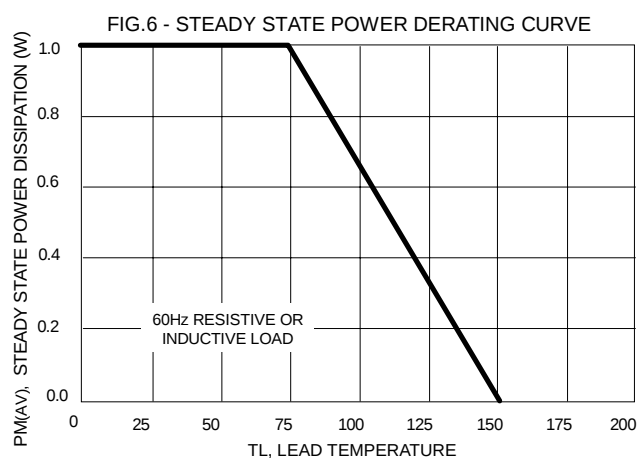
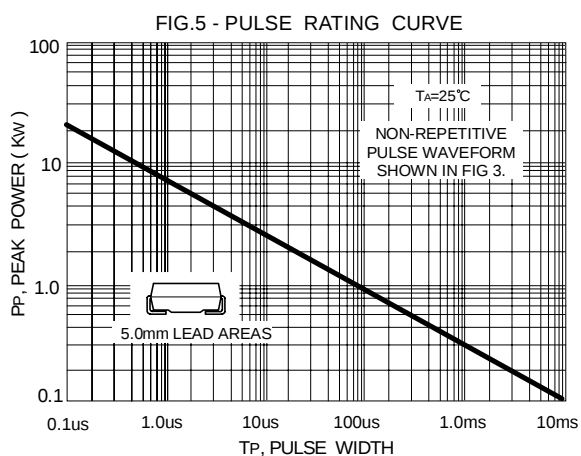
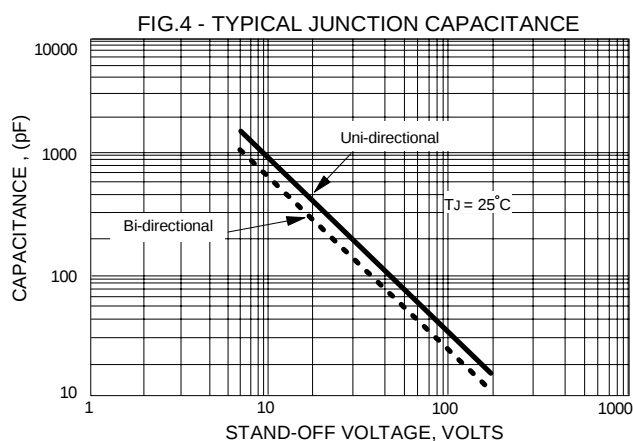
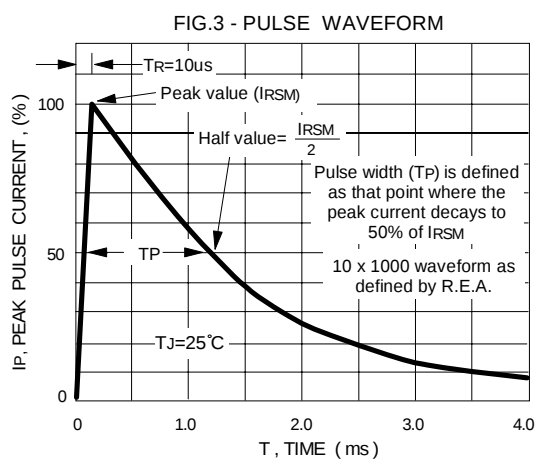
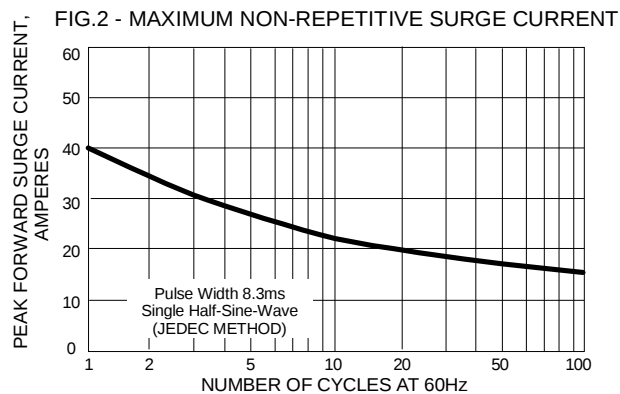
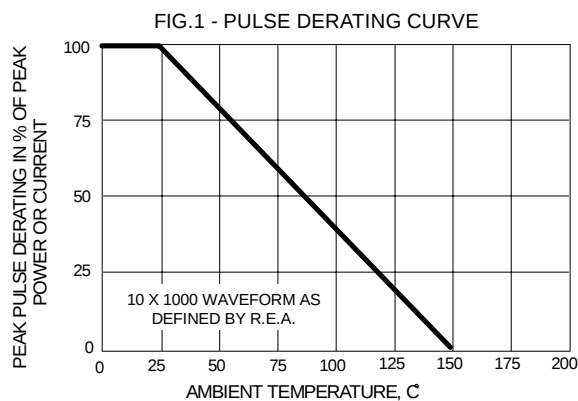
| CHARACTERISTICS                                                                                                     | SYMBOLS     | VALUE       | UNIT  |
|---------------------------------------------------------------------------------------------------------------------|-------------|-------------|-------|
| PEAK POWER DISSIPATION AT $T_A = 25^\circ\text{C}$ ,<br>$T_P = 1\text{ms}$ (Note 1,2)                               | $P_{PK}$    | Minimum 400 | WATTS |
| Peak Forward Surge Current 8.3ms<br>single half sine-wave super imposed<br>on rated load (Note 3)<br>(JEDEC METHOD) | $I_{FSM}$   | 40          | AMPS. |
| Steady State Power Dissipation at $T_L = 75^\circ\text{C}$                                                          | $P_{M(AV)}$ | 1.0         | WATTS |
| Maximum Instantaneous forward voltage<br>at 35A for unidirectional devices only (Note 3)                            | $V_F$       | 3.5         | Volts |
| Operating Temperature Range                                                                                         | $T_J$       | -55 to +150 | °C    |
| Storage Temperature Range                                                                                           | $T_{STG}$   | -55 to +175 | °C    |

NOTES : 1. Non-repetitive current pulse, per fig. 3 and derated above  $T_A = 25^\circ\text{C}$  per fig.1.

2. Thermal Resistance junction to Lead

3. 8.3ms single half-sine wave duty cycle= 4 pulses maximum per minute (unidirectional units only).

REV. 2, 01-Dec-2000, KSIA02



| Device<br>Uni-<br>directional | Device<br>Bi-<br>directional | Device<br>Marking code |      | Working<br>PeakReverse<br>Voltage | Breakdown voltage<br>VBR Volts |      |          | Maximum<br>Reverse Voltage<br>at I <sub>RS</sub> M<br>(Clamping<br>Voltage) | Maximum<br>Reverse Surge<br>Current | Maximum<br>Reverse<br>Leakage at<br>V <sub>RRM</sub> |
|-------------------------------|------------------------------|------------------------|------|-----------------------------------|--------------------------------|------|----------|-----------------------------------------------------------------------------|-------------------------------------|------------------------------------------------------|
|                               |                              | (UNI)                  | (BI) |                                   | Min.                           | Max. | @IT( mA) |                                                                             |                                     |                                                      |
| SMAJ5.0                       | SMAJ5.0C                     | HD                     | TD   | 5.0                               | 6.40                           | 7.30 | 10       | 9.6                                                                         | 41.6                                | 800 / 1600                                           |
| SMAJ5.0A                      | SMAJ5.0CA                    | HE                     | TE   | 5.0                               | 6.40                           | 7.00 | 10       | 9.2                                                                         | 43.5                                | 800 / 1600                                           |
| SMAJ6.0                       | SMAJ6.0C                     | HF                     | TF   | 6.0                               | 6.67                           | 8.15 | 10       | 11.4                                                                        | 35.1                                | 800 / 1600                                           |
| SMAJ6.0A                      | SMAJ6.0CA                    | HG                     | TG   | 6.0                               | 6.67                           | 7.37 | 10       | 10.3                                                                        | 38.8                                | 800 / 1600                                           |
| SMAJ6.5                       | SMAJ6.5C                     | HH                     | TH   | 6.5                               | 7.22                           | 8.82 | 10       | 12.3                                                                        | 32.5                                | 500 / 1000                                           |
| SMAJ6.5A                      | SMAJ6.5CA                    | HK                     | TK   | 6.5                               | 7.22                           | 7.98 | 10       | 11.2                                                                        | 35.7                                | 500 / 1000                                           |
| SMAJ7.0                       | SMAJ7.0C                     | HL                     | TL   | 7.0                               | 7.78                           | 9.51 | 10       | 13.3                                                                        | 30.1                                | 200 / 400                                            |
| SMAJ7.0A                      | SMAJ7.0CA                    | HM                     | TM   | 7.0                               | 7.78                           | 8.60 | 10       | 12.0                                                                        | 33.3                                | 200 / 400                                            |
| SMAJ7.5                       | SMAJ7.5C                     | HN                     | TN   | 7.5                               | 8.33                           | 10.3 | 1.0      | 14.3                                                                        | 28.0                                | 100 / 200                                            |
| SMAJ7.5A                      | SMAJ7.5CA                    | HP                     | TP   | 7.5                               | 8.33                           | 9.21 | 1.0      | 12.9                                                                        | 31.0                                | 100 / 200                                            |
| SMAJ8.0                       | SMAJ8.0C                     | HQ                     | TQ   | 8.0                               | 8.89                           | 10.9 | 1.0      | 15.0                                                                        | 26.5                                | 50 / 100                                             |
| SMAJ8.0A                      | SMAJ8.0CA                    | HR                     | TR   | 8.0                               | 8.89                           | 9.83 | 1.0      | 13.6                                                                        | 29.4                                | 50 / 100                                             |
| SMAJ8.5                       | SMAJ8.5C                     | HS                     | TS   | 8.5                               | 9.44                           | 11.5 | 1.0      | 15.9                                                                        | 25.1                                | 10 / 20                                              |
| SMAJ8.5A                      | SMAJ8.5CA                    | HT                     | TT   | 8.5                               | 9.44                           | 10.4 | 1.0      | 14.4                                                                        | 27.7                                | 10 / 20                                              |
| SMAJ9.0                       | SMAJ9.0C                     | HU                     | TU   | 9.0                               | 10.0                           | 12.2 | 1.0      | 16.9                                                                        | 23.6                                | 5 / 10                                               |
| SMAJ9.0A                      | SMAJ9.0CA                    | HV                     | TV   | 9.0                               | 10.0                           | 11.1 | 1.0      | 15.4                                                                        | 26.0                                | 5 / 10                                               |
| SMAJ10                        | SMAJ10C                      | HW                     | TW   | 10                                | 11.1                           | 13.6 | 1.0      | 18.8                                                                        | 21.2                                | 5 / 10                                               |
| SMAJ10A                       | SMAJ10CA                     | HX                     | TX   | 10                                | 11.1                           | 12.3 | 1.0      | 17.0                                                                        | 23.5                                | 5 / 10                                               |
| SMAJ11                        | SMAJ11C                      | HY                     | TY   | 11                                | 12.2                           | 14.9 | 1.0      | 20.1                                                                        | 20.0                                | 5.0                                                  |
| SMAJ11A                       | SMAJ11CA                     | HZ                     | TZ   | 11                                | 12.2                           | 13.5 | 1.0      | 18.2                                                                        | 22.0                                | 5.0                                                  |
| SMAJ12                        | SMAJ12C                      | ID                     | UD   | 12                                | 13.3                           | 16.3 | 1.0      | 22.0                                                                        | 18.1                                | 5.0                                                  |
| SMAJ12A                       | SMAJ12CA                     | IE                     | UE   | 12                                | 13.3                           | 14.7 | 1.0      | 19.9                                                                        | 20.1                                | 5.0                                                  |
| SMAJ13                        | SMAJ13C                      | IF                     | UF   | 13                                | 14.4                           | 17.6 | 1.0      | 23.8                                                                        | 16.8                                | 5.0                                                  |
| SMAJ13A                       | SMAJ13CA                     | IG                     | UG   | 13                                | 14.4                           | 15.9 | 1.0      | 21.5                                                                        | 18.6                                | 5.0                                                  |
| SMAJ14                        | SMAJ14C                      | IH                     | UH   | 14                                | 15.6                           | 19.1 | 1.0      | 25.8                                                                        | 15.5                                | 5.0                                                  |
| SMAJ14A                       | SMAJ14CA                     | IK                     | UK   | 14                                | 15.6                           | 17.2 | 1.0      | 23.2                                                                        | 17.2                                | 5.0                                                  |
| SMAJ15                        | SMAJ15C                      | IL                     | UL   | 15                                | 16.7                           | 20.4 | 1.0      | 26.9                                                                        | 14.8                                | 5.0                                                  |
| SMAJ15A                       | SMAJ15CA                     | IM                     | UM   | 15                                | 16.7                           | 18.5 | 1.0      | 24.4                                                                        | 16.4                                | 5.0                                                  |
| SMAJ16                        | SMAJ16C                      | IN                     | UN   | 16                                | 17.8                           | 21.8 | 1.0      | 28.8                                                                        | 13.8                                | 5.0                                                  |
| SMAJ16A                       | SMAJ16CA                     | IP                     | UP   | 16                                | 17.8                           | 19.7 | 1.0      | 26.0                                                                        | 15.3                                | 5.0                                                  |
| SMAJ17                        | SMAJ17C                      | IQ                     | UQ   | 17                                | 18.9                           | 23.1 | 1.0      | 30.5                                                                        | 13.1                                | 5.0                                                  |
| SMAJ17A                       | SMAJ17CA                     | IR                     | UR   | 17                                | 18.9                           | 20.9 | 1.0      | 27.6                                                                        | 14.5                                | 5.0                                                  |
| SMAJ18                        | SMAJ18C                      | IS                     | US   | 18                                | 20.0                           | 24.4 | 1.0      | 32.2                                                                        | 12.4                                | 5.0                                                  |
| SMAJ18A                       | SMAJ18CA                     | IT                     | UT   | 18                                | 20.0                           | 22.1 | 1.0      | 29.2                                                                        | 13.7                                | 5.0                                                  |
| SMAJ20                        | SMAJ20C                      | IU                     | UU   | 20                                | 22.2                           | 27.1 | 1.0      | 35.8                                                                        | 11.1                                | 5.0                                                  |
| SMAJ20A                       | SMAJ20CA                     | IV                     | UV   | 20                                | 22.2                           | 24.5 | 1.0      | 32.4                                                                        | 12.3                                | 5.0                                                  |
| SMAJ22                        | SMAJ22C                      | IW                     | UW   | 22                                | 24.4                           | 29.8 | 1.0      | 39.4                                                                        | 10.1                                | 5.0                                                  |
| SMAJ22A                       | SMAJ22CA                     | IX                     | UX   | 22                                | 24.4                           | 26.9 | 1.0      | 35.5                                                                        | 11.2                                | 5.0                                                  |
| SMAJ24                        | SMAJ24C                      | IY                     | UY   | 24                                | 26.7                           | 32.6 | 1.0      | 43.0                                                                        | 9.3                                 | 5.0                                                  |
| SMAJ24A                       | SMAJ24CA                     | IZ                     | UZ   | 24                                | 26.7                           | 29.5 | 1.0      | 38.9                                                                        | 10.3                                | 5.0                                                  |
| SMAJ26                        | SMAJ26C                      | JD                     | VD   | 26                                | 28.9                           | 35.3 | 1.0      | 46.6                                                                        | 8.6                                 | 5.0                                                  |
| SMAJ26A                       | SMAJ26CA                     | JE                     | VE   | 26                                | 28.9                           | 31.9 | 1.0      | 42.1                                                                        | 9.5                                 | 5.0                                                  |
| SMAJ28                        | SMAJ28C                      | JF                     | VF   | 28                                | 31.1                           | 38.0 | 1.0      | 50.0                                                                        | 8.0                                 | 5.0                                                  |
| SMAJ28A                       | SMAJ28CA                     | JG                     | VG   | 28                                | 31.1                           | 34.4 | 1.0      | 45.4                                                                        | 8.8                                 | 5.0                                                  |
| SMAJ30                        | SMAJ30C                      | JH                     | VH   | 30                                | 33.3                           | 40.7 | 1.0      | 53.5                                                                        | 7.5                                 | 5.0                                                  |
| SMAJ30A                       | SMAJ30CA                     | JK                     | VK   | 30                                | 33.3                           | 36.8 | 1.0      | 48.4                                                                        | 8.3                                 | 5.0                                                  |
| SMAJ33                        | SMAJ33C                      | JL                     | VL   | 33                                | 36.7                           | 44.9 | 1.0      | 59.0                                                                        | 6.8                                 | 5.0                                                  |
| SMAJ33A                       | SMAJ33CA                     | JM                     | VM   | 33                                | 36.7                           | 40.6 | 1.0      | 53.3                                                                        | 7.5                                 | 5.0                                                  |

| Device<br>Uni-<br>directional | Device<br>Bi-<br>directional | Device<br>Marking code |      | Working<br>PeakReverse<br>Voltage | Breakdown voltage<br>VBR Volts |      |          | Maximum<br>Reverse Voltage<br>at IRSM<br>(Clamping<br>Voltage) | Maximum<br>Reverse Surge<br>Current | Maximum<br>Reverse<br>Leakage at<br>VRWM |
|-------------------------------|------------------------------|------------------------|------|-----------------------------------|--------------------------------|------|----------|----------------------------------------------------------------|-------------------------------------|------------------------------------------|
|                               |                              | (UNI)                  | (BI) |                                   | Min.                           | Max. | @IT( mA) |                                                                |                                     |                                          |
| SMAJ36                        | SMAJ36C                      | JN                     | VN   | 36                                | 40.0                           | 48.9 | 1.0      | 64.3                                                           | 6.2                                 | 5.0                                      |
| SMAJ36A                       | SMAJ36CA                     | JP                     | VP   | 36                                | 40.0                           | 44.2 | 1.0      | 58.1                                                           | 6.9                                 | 5.0                                      |
| SMAJ40                        | SMAJ40C                      | JQ                     | VQ   | 40                                | 44.4                           | 54.3 | 1.0      | 71.4                                                           | 5.6                                 | 5.0                                      |
| SMAJ40A                       | SMAJ40CA                     | JR                     | VR   | 40                                | 44.4                           | 49.1 | 1.0      | 64.5                                                           | 6.2                                 | 5.0                                      |
| SMAJ43                        | SMAJ43C                      | JS                     | VS   | 43                                | 47.8                           | 58.4 | 1.0      | 76.7                                                           | 5.2                                 | 5.0                                      |
| SMAJ43A                       | SMAJ43CA                     | JT                     | VT   | 43                                | 47.8                           | 52.8 | 1.0      | 69.4                                                           | 5.7                                 | 5.0                                      |
| SMAJ45                        | SMAJ45C                      | JU                     | VU   | 45                                | 50.0                           | 61.1 | 1.0      | 80.3                                                           | 5.0                                 | 5.0                                      |
| SMAJ45A                       | SMAJ45CA                     | JV                     | VV   | 45                                | 50.0                           | 55.3 | 1.0      | 72.7                                                           | 5.5                                 | 5.0                                      |
| SMAJ48                        | SMAJ48C                      | JW                     | VW   | 48                                | 53.3                           | 65.1 | 1.0      | 85.5                                                           | 4.7                                 | 5.0                                      |
| SMAJ48A                       | SMAJ48CA                     | JX                     | VX   | 48                                | 53.3                           | 58.9 | 1.0      | 77.4                                                           | 5.2                                 | 5.0                                      |
| SMAJ51                        | SMAJ51C                      | JY                     | VY   | 51                                | 56.7                           | 69.3 | 1.0      | 91.1                                                           | 4.4                                 | 5.0                                      |
| SMAJ51A                       | SMAJ51CA                     | JZ                     | VZ   | 51                                | 56.7                           | 62.7 | 1.0      | 82.4                                                           | 4.9                                 | 5.0                                      |
| SMAJ54                        | SMAJ54C                      | RD                     | WD   | 54                                | 60.0                           | 73.3 | 1.0      | 96.3                                                           | 4.2                                 | 5.0                                      |
| SMAJ54A                       | SMAJ54CA                     | RE                     | WE   | 54                                | 60.0                           | 66.3 | 1.0      | 87.1                                                           | 4.6                                 | 5.0                                      |
| SMAJ58                        | SMAJ58C                      | RF                     | WF   | 58                                | 64.4                           | 78.7 | 1.0      | 103.0                                                          | 3.9                                 | 5.0                                      |
| SMAJ58A                       | SMAJ58CA                     | RG                     | WG   | 58                                | 64.4                           | 71.2 | 1.0      | 93.6                                                           | 4.3                                 | 5.0                                      |
| SMAJ60                        | SMAJ60C                      | RH                     | WH   | 60                                | 66.7                           | 81.5 | 1.0      | 107.0                                                          | 3.7                                 | 5.0                                      |
| SMAJ60A                       | SMAJ60CA                     | RK                     | WK   | 60                                | 66.7                           | 73.7 | 1.0      | 96.8                                                           | 4.1                                 | 5.0                                      |
| SMAJ64                        | SMAJ64C                      | RL                     | WL   | 64                                | 71.1                           | 86.4 | 1.0      | 114                                                            | 3.5                                 | 5.0                                      |
| SMAJ64A                       | SMAJ64CA                     | RM                     | WM   | 64                                | 71.1                           | 78.6 | 1.0      | 103                                                            | 3.9                                 | 5.0                                      |
| SMAJ70                        | SMAJ70C                      | RN                     | WN   | 70                                | 77.8                           | 95.1 | 1.0      | 125                                                            | 3.2                                 | 5.0                                      |
| SMAJ70A                       | SMAJ70CA                     | RP                     | WP   | 70                                | 77.8                           | 86.0 | 1.0      | 113                                                            | 3.5                                 | 5.0                                      |
| SMAJ75                        | SMAJ75C                      | RQ                     | WQ   | 75                                | 83.3                           | 102  | 1.0      | 134                                                            | 3.0                                 | 5.0                                      |
| SMAJ75A                       | SMAJ75CA                     | RR                     | WR   | 75                                | 83.3                           | 92.1 | 1.0      | 121                                                            | 3.3                                 | 5.0                                      |
| SMAJ78                        | SMAJ78C                      | RS                     | WS   | 78                                | 86.7                           | 106  | 1.0      | 139                                                            | 2.9                                 | 5.0                                      |
| SMAJ78A                       | SMAJ78CA                     | RT                     | WT   | 78                                | 86.7                           | 95.8 | 1.0      | 126                                                            | 2.2                                 | 5.0                                      |
| SMAJ85                        | SMAJ85C                      | RU                     | WU   | 85                                | 94.4                           | 115  | 1.0      | 151                                                            | 2.6                                 | 5.0                                      |
| SMAJ85A                       | SMAJ85CA                     | RV                     | WV   | 85                                | 94.4                           | 104  | 1.0      | 137                                                            | 2.9                                 | 5.0                                      |
| SMAJ90                        | SMAJ90C                      | RW                     | WW   | 90                                | 100                            | 122  | 1.0      | 160                                                            | 2.5                                 | 5.0                                      |
| SMAJ90A                       | SMAJ90CA                     | RX                     | WX   | 90                                | 100                            | 111  | 1.0      | 146                                                            | 2.7                                 | 5.0                                      |
| SMAJ100                       | SMAJ100C                     | RY                     | WY   | 100                               | 111                            | 136  | 1.0      | 179                                                            | 2.2                                 | 5.0                                      |
| SMAJ100A                      | SMAJ100CA                    | RZ                     | WZ   | 100                               | 111                            | 123  | 1.0      | 162                                                            | 2.5                                 | 5.0                                      |
| SMAJ110                       | SMAJ110C                     | SD                     | XD   | 110                               | 122                            | 149  | 1.0      | 196                                                            | 2.0                                 | 5.0                                      |
| SMAJ110A                      | SMAJ110CA                    | SE                     | XE   | 110                               | 122                            | 135  | 1.0      | 177                                                            | 2.3                                 | 5.0                                      |
| SMAJ120                       | SMAJ120C                     | SF                     | XF   | 120                               | 133                            | 163  | 1.0      | 214                                                            | 1.9                                 | 5.0                                      |
| SMAJ120A                      | SMAJ120CA                    | SG                     | XG   | 120                               | 133                            | 147  | 1.0      | 193                                                            | 2.0                                 | 5.0                                      |
| SMAJ130                       | SMAJ130C                     | SH                     | XH   | 130                               | 144                            | 176  | 1.0      | 231                                                            | 1.7                                 | 5.0                                      |
| SMAJ130A                      | SMAJ130CA                    | SK                     | XK   | 130                               | 144                            | 159  | 1.0      | 209                                                            | 1.9                                 | 5.0                                      |
| SMAJ150                       | SMAJ150C                     | SL                     | XL   | 150                               | 167                            | 204  | 1.0      | 268                                                            | 1.5                                 | 5.0                                      |
| SMAJ150A                      | SMAJ150CA                    | SM                     | XM   | 150                               | 167                            | 185  | 1.0      | 243                                                            | 1.6                                 | 5.0                                      |
| SMAJ160                       | SMAJ160C                     | SN                     | XN   | 160                               | 178                            | 218  | 1.0      | 287                                                            | 1.4                                 | 5.0                                      |
| SMAJ160A                      | SMAJ160CA                    | SP                     | XP   | 160                               | 178                            | 197  | 1.0      | 259                                                            | 1.5                                 | 5.0                                      |
| SMAJ170                       | SMAJ170C                     | SQ                     | XQ   | 170                               | 189                            | 231  | 1.0      | 304                                                            | 1.3                                 | 5.0                                      |
| SMAJ170A                      | SMAJ170CA                    | SR                     | XR   | 170                               | 189                            | 209  | 1.0      | 275                                                            | 1.4                                 | 5.0                                      |

## NOTE :

- 1) Suffix 'A ' denotes 5% tolerance device,no suffix denotes 10 % tolerance device.
- 2) Add suffix 'C 'or ' CA ' after part number to specify Bi-directional devices.
- 3) For Bi-Directional devices having VR of 10 volts and under, the IR limit is double .
- 4) For Uni-directional devices VF max=3.5v at if=35 A ,0.5 sine wave of 8.3 msec .pulse width.