

**ElecSuper SuperTVS – 400W Transient Voltage Suppressor**

**1. Features**

- For surface mounted applications in order to optimize board space
- Low profile package
- Built-in strain relief
- Glass passivated junction
- Low inductance
- Excellent clamping capability
- Meets MSL level 1, per J-STD-020
- 400W peak pulse power capability at 10/1000µs waveform, repetition rate (duty cycle): 0.01%
- Fast response time
- Typical IR less than 1µA above 10V
- Plastic package has underwriters laboratory flammability 94V-0
- High Temperature soldering: 260°C/10 seconds at terminals

**2. Mechanical Data**

- Case: JEDEC DO-214AC. Molded plastic over glass passivated junction
- Terminal: Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode except bi-directional models
- Standard Packaging: 12mm tape
- Weight: 0.07g

**3. Maximum Ratings and Characteristics**

Ratings at 25° ambient temperature unless otherwise specified

| Rating   | Symbol                            | Value      | Units |
|--|-----------------------------------|------------|-------|
| Peak pulse power dissipation at 10/1000us waveform(Note1,2)  | P <sub>PPM</sub>                  | 400        | W     |
| Peak pulse current of at 10/1000us waveform  | I <sub>PPM</sub>                  | See Table  | A     |
| Steady state power dissipation at TA=50°C  | P <sub>M(AV)</sub>                | 3.3        | W     |
| Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load (JEDEC Method)(Note3) | I <sub>FSM</sub>                  | 40         | A     |
| Operating junction and Storage Temperature Range   | T <sub>J</sub> , T <sub>STG</sub> | -65 to 150 | °C    |
| Typical thermal resistance junction to lead  | R <sub>θJL</sub>                  | 30         | °C/W  |
| Typical thermal resistance junction to ambient   | R <sub>θJA</sub>                  | 120        | °C/W  |

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Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above TA=25°C per Fig.2.
2. Mounted on 5.0mmx5.0mm copper pads to each terminal.
3. 8.3ms single half sine-wave, or equivalent square wave, duty cycle=4 pulses per minutes maximum.

## 4. Electrical Characteristics (TA=25°C)

| Part Number | Part Number | Marking |    | Reverse Stand off Voltage V <sub>R</sub> | Breakdown Voltage V <sub>BR</sub> (Volts) @ I <sub>T</sub> |      | Test Current I <sub>T</sub> | Maximum Clamping Voltage V <sub>C</sub> @ I <sub>pp</sub> | Maximum Peak Pulse Current I <sub>pp</sub> | Maximum Reverse Leakage I <sub>R</sub> @ V <sub>R</sub> | ROHS2.0 |
|-------------|-------------|---------|----|--|--|------|-----------------------------|---|--|---|---------|
|             |             |         |    |  | MIN  | MAX  |                             |   |  |   |         |
| UNI         | BI          | UNI     | BI | (V)                                      |  |      | (mA)                        | (V)   | (A)  | (µA)  |         |
| SMAJ5.0A    | SMAJ5.0CA   | AE      | WE | 5  | 6.4  | 7    | 10                          | 9.2   | 43.5                                       | 400   | y       |
| SMAJ6.0A    | SMAJ6.0CA   | AG      | WG | 6  | 6.67   | 7.37 | 10                          | 10.3  | 38.8                                       | 400   | y       |
| SMAJ6.5A    | SMAJ6.5CA   | AK      | WK | 6.5                                      | 7.22   | 7.98 | 10                          | 11.2  | 35.7                                       | 250   | y       |
| SMAJ7.0A    | SMAJ7.0CA   | AM      | WM | 7  | 7.78   | 8.6  | 10                          | 12  | 33.3                                       | 100   | y       |
| SMAJ7.5A    | SMAJ7.5CA   | AP      | WP | 7.5                                      | 8.33   | 9.21 | 1                           | 12.9  | 31   | 80  | y       |
| SMAJ8.0A    | SMAJ8.0CA   | AR      | WR | 8  | 8.89   | 9.83 | 1                           | 13.6  | 29.4                                       | 50  | y       |
| SMAJ8.5A    | SMAJ8.5CA   | AT      | WT | 8.5                                      | 9.44   | 10.4 | 1                           | 14.4  | 27.8                                       | 20  | y       |
| SMAJ9.0A    | SMAJ9.0CA   | AV      | WV | 9  | 10   | 11.1 | 1                           | 15.4  | 26   | 10  | y       |
| SMAJ10A     | SMAJ10CA    | AX      | WX | 10                                       | 11.1   | 12.3 | 1                           | 17  | 23.5                                       | 5   | y       |
| SMAJ11A     | SMAJ11CA    | AZ      | WZ | 11                                       | 12.2   | 13.5 | 1                           | 18.2  | 22   | 1   | y       |
| SMAJ12A     | SMAJ12CA    | BE      | XE | 12                                       | 13.3   | 14.7 | 1                           | 19.9  | 20.1                                       | 1   | y       |
| SMAJ13A     | SMAJ13CA    | BG      | XG | 13                                       | 14.4   | 15.9 | 1                           | 21.5  | 18.6                                       | 1   | y       |
| SMAJ14A     | SMAJ14CA    | BK      | XK | 14                                       | 15.6   | 17.2 | 1                           | 23.2  | 17.2                                       | 1   | y       |
| SMAJ15A     | SMAJ15CA    | BM      | XM | 15                                       | 16.7   | 18.5 | 1                           | 24.4  | 16.4                                       | 1   | y       |
| SMAJ16A     | SMAJ16CA    | BP      | XP | 16                                       | 17.8   | 19.7 | 1                           | 26  | 15.4                                       | 1   | y       |
| SMAJ17A     | SMAJ17CA    | BR      | XR | 17                                       | 18.9   | 20.9 | 1                           | 27.6  | 14.5                                       | 1   | y       |
| SMAJ18A     | SMAJ18CA    | BT      | XT | 18                                       | 20   | 22.1 | 1                           | 29.2  | 13.7                                       | 1   | y       |
| SMAJ20A     | SMAJ20CA    | BV      | XV | 20                                       | 22.2   | 24.5 | 1                           | 32.4  | 12.3                                       | 1   | y       |
| SMAJ22A     | SMAJ22CA    | BX      | XX | 22                                       | 24.4   | 26.9 | 1                           | 35.5  | 11.3                                       | 1   | y       |
| SMAJ24A     | SMAJ24CA    | BZ      | XZ | 24                                       | 26.7   | 29.5 | 1                           | 38.9  | 10.3                                       | 1   | y       |
| SMAJ26A     | SMAJ26CA    | CE      | YE | 26                                       | 28.9   | 31.9 | 1                           | 42.1  | 9.5  | 1   | y       |
| SMAJ28A     | SMAJ28CA    | CG      | YG | 28                                       | 31.1   | 34.4 | 1                           | 45.4  | 8.8  | 1   | y       |
| SMAJ30A     | SMAJ30CA    | CK      | YK | 30                                       | 33.3   | 36.8 | 1                           | 48.4  | 8.3  | 1   | y       |
| SMAJ33A     | SMAJ33CA    | CM      | YM | 33                                       | 36.7   | 40.6 | 1                           | 53.3  | 7.5  | 1   | y       |
| SMAJ36A     | SMAJ36CA    | CP      | YP | 36                                       | 40   | 44.2 | 1                           | 58.1  | 6.9  | 1   | y       |
| SMAJ40A     | SMAJ40CA    | CR      | YR | 40                                       | 44.4   | 49.1 | 1                           | 64.5  | 6.2  | 1   | y       |
| SMAJ43A     | SMAJ43CA    | CT      | YT | 43                                       | 47.8   | 52.8 | 1                           | 69.4  | 5.8  | 1   | y       |

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| Part Number | Part Number | Marking |    | Reverse Stand off Voltage $V_R$ (Volts) | Breakdown Voltage $V_{BR}$ (Volts) @ $I_r$ |      | Test Current $I_r$ (mA) | Maximum Clamping Voltage $V_C$ @ $I_{pp}$ (V) | Maximum Peak Pulse Current $I_{pp}$ (A) | Maximum Reverse Leakage $I_R$ @ $V_R$ ( $\mu A$ ) | ROHS2.0 |
|-------------|-------------|---------|----|---|--|------|-------------------------|---|---|---|---------|
|             |             |         |    |   | MIN  | MAX  |                         |   |   |   |         |
| SMAJ45A     | SMAJ45CA    | CV      | YV | 45                                      | 50   | 55.3 | 1                       | 72.7  | 5.5                                     | 1   | y       |
| SMAJ48A     | SMAJ48CA    | CX      | YX | 48                                      | 53.3                                       | 58.9 | 1                       | 77.4  | 5.2                                     | 1   | y       |
| SMAJ51A     | SMAJ51CA    | CZ      | YZ | 51                                      | 56.7                                       | 62.7 | 1                       | 82.4  | 4.9                                     | 1   | y       |
| SMAJ54A     | SMAJ54CA    | RE      | ZE | 54                                      | 60   | 66.3 | 1                       | 87.1  | 4.6                                     | 1   | y       |
| SMAJ58A     | SMAJ58CA    | RG      | ZG | 58                                      | 64.4                                       | 71.2 | 1                       | 93.6  | 4.3                                     | 1   | y       |
| SMAJ60A     | SMAJ60CA    | RK      | ZK | 60                                      | 66.7                                       | 73.7 | 1                       | 96.8  | 4.1                                     | 1   | y       |
| SMAJ64A     | SMAJ64CA    | RM      | ZM | 64                                      | 71.1                                       | 78.6 | 1                       | 103   | 3.9                                     | 1   | y       |
| SMAJ70A     | SMAJ70CA    | RP      | ZP | 70                                      | 77.8                                       | 86   | 1                       | 113   | 3.5                                     | 1   | y       |
| SMAJ75A     | SMAJ75CA    | RR      | ZR | 75                                      | 83.3                                       | 92.1 | 1                       | 121   | 3.3                                     | 1   | y       |
| SMAJ78A     | SMAJ78CA    | RT      | ZT | 78                                      | 86.7                                       | 95.8 | 1                       | 126   | 3.2                                     | 1   | y       |
| SMAJ85A     | SMAJ85CA    | RV      | ZV | 85                                      | 94.4                                       | 104  | 1                       | 137   | 2.9                                     | 1   | y       |
| SMAJ90A     | SMAJ90CA    | RX      | ZX | 90                                      | 100  | 111  | 1                       | 146   | 2.7                                     | 1   | y       |
| SMAJ100A    | SMAJ100CA   | RZ      | ZZ | 100                                     | 111  | 123  | 1                       | 162   | 2.5                                     | 1   | y       |
| SMAJ110A    | SMAJ110CA   | SE      | VE | 110                                     | 122  | 135  | 1                       | 177   | 2.3                                     | 1   | y       |
| SMAJ120A    | SMAJ120CA   | SG      | VG | 120                                     | 133  | 147  | 1                       | 193   | 2.1                                     | 1   | y       |
| SMAJ130A    | SMAJ130CA   | SK      | VK | 130                                     | 144  | 159  | 1                       | 209   | 1.9                                     | 1   | y       |
| SMAJ150A    | SMAJ150CA   | SM      | VM | 150                                     | 167  | 185  | 1                       | 243   | 1.6                                     | 1   | y       |
| SMAJ160A    | SMAJ160CA   | SP      | VP | 160                                     | 178  | 197  | 1                       | 259   | 1.5                                     | 1   | y       |
| SMAJ170A    | SMAJ170CA   | SR      | VR | 170                                     | 189  | 209  | 1                       | 275   | 1.5                                     | 1   | y       |
| SMAJ180A    | SMAJ180CA   | ST      | VT | 180                                     | 201  | 222  | 1                       | 292   | 1.4                                     | 1   | y       |
| SMAJ200A    | SMAJ200CA   | SV      | VV | 200                                     | 224  | 247  | 1                       | 324   | 1.2                                     | 1   | y       |
| SMAJ220A    | SMAJ220CA   | SX      | VX | 220                                     | 246  | 272  | 1                       | 356   | 1.1                                     | 1   | y       |
| SMAJ250A    | SMAJ250CA   | SZ      | VZ | 250                                     | 279  | 309  | 1                       | 405   | 1                                       | 1   | y       |
| SMAJ300A    | SMAJ300CA   | TE      | UE | 300                                     | 335  | 371  | 1                       | 486   | 0.8                                     | 1   | y       |
| SMAJ350A    | SMAJ350CA   | TG      | UG | 350                                     | 391  | 432  | 1                       | 567   | 0.7                                     | 1   | y       |
| SMAJ400A    | SMAJ400CA   | TK      | UK | 400                                     | 447  | 494  | 1                       | 648   | 0.6                                     | 1   | y       |
| SMAJ440A    | SMAJ440CA   | TM      | UM | 440                                     | 492  | 543  | 1                       | 713   | 0.6                                     | 1   | y       |

For bidirectional type having  $V_R$  of 10 volts and less, the  $I_R$  limit is double.

5. Ratings and Characteristic Curves ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Figure 1. Peak Pulse Power Rating Curve

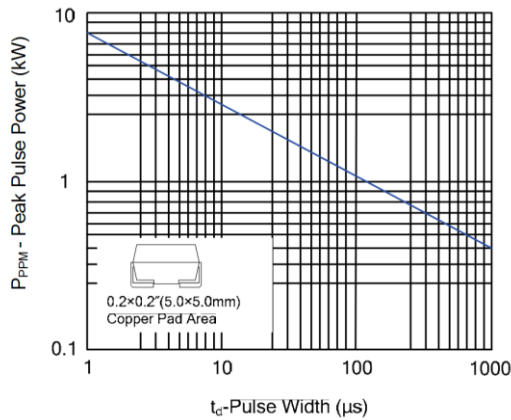


Figure 2 Pulse Derating Curve

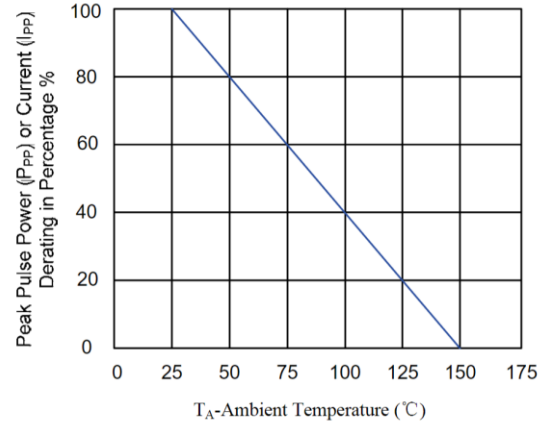


Figure 3 Pulse Waveform

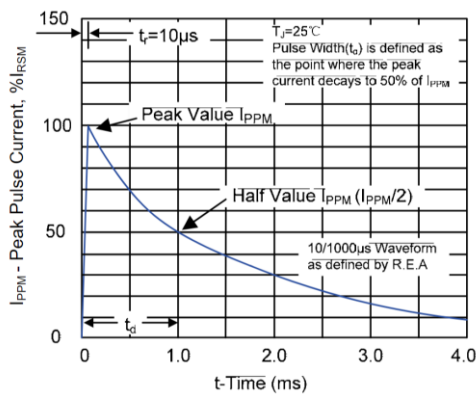


Figure 4 Typical Junction Capacitance

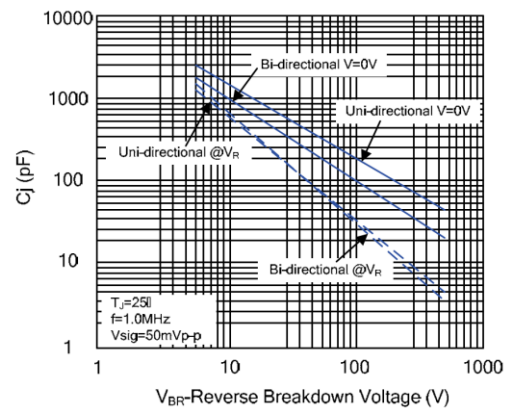


Figure 5 Steady State Power Dissipation Derating Curve

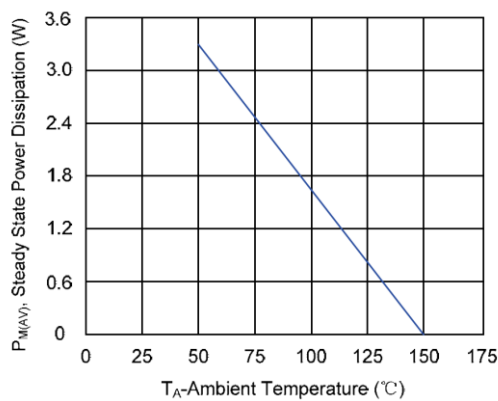
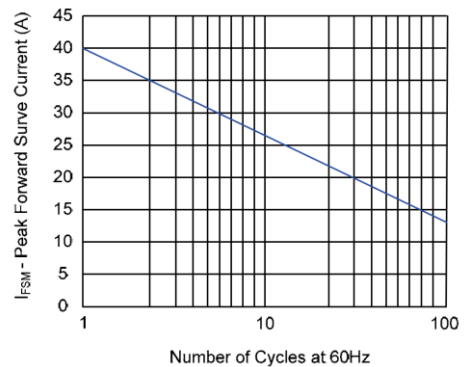
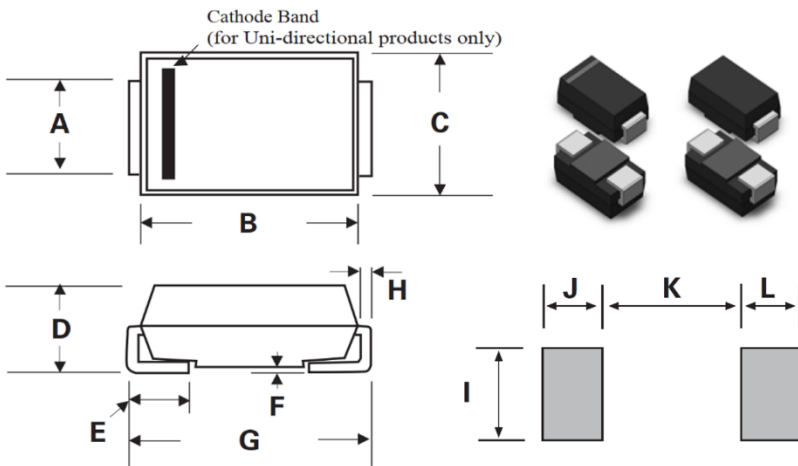


Figure 6 Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



**6. Dimension (SMA/DO-214AC)**



| Dimensions | Inches |       | Millimeters |       |
|------------|--------|-------|-------------|-------|
|            | Min    | Max   | Min         | Max   |
| A          | 0.049  | 0.065 | 1.25        | 1.65  |
| B          | 0.157  | 0.177 | 3.99        | 4.5   |
| C          | 0.1    | 0.11  | 2.54        | 2.79  |
| D          | 0.078  | 0.09  | 1.98        | 2.29  |
| E          | 0.03   | 0.06  | 0.78        | 1.52  |
| F          | -      | 0.008 | -           | 0.203 |
| G          | 0.194  | 0.208 | 4.93        | 5.28  |
| H          | 0.006  | 0.012 | 0.152       | 0.305 |
| I          | 0.07   | -     | 1.8         | -     |
| J          | 0.082  | -     | 2.1         | -     |
| K          | -      | 0.09  | -           | 2.3   |
| L          | 0.082  | -     | 2.1         | -     |

**7. Packaging**

|                   |                   |                |
|-------------------|-------------------|----------------|
| <p>Tape</p>       | Symbol            | Dimension (mm) |
|                   | W                 | 12.00±0.20     |
|                   | P0                | 4.00±0.10      |
|                   | P1                | 4.00±0.10      |
|                   | P2                | 2.00±0.10      |
|                   | D0                | Φ1.5±0.10      |
|                   | D1                | Φ1.5±0.10      |
|                   | E                 | 1.75±0.10      |
|                   | F                 | 5.50±0.05      |
|                   | A0                | 2.79±0.10      |
|                   | B0                | 5.33±0.10      |
|                   | K0                | 2.55±0.15      |
|                   | T                 | 0.25±0.05      |
|                   | <p>7" Reel</p>    | D2             |
| D3                |                   | Φ50.0Min.      |
| D4                |                   | Φ13.0±0.5      |
| W1                |                   | 16.0±2.0       |
| Quantity: 1000PCS |                   |                |
| <p>13" Reel</p>   | D5                | Φ330.0±2.0     |
|                   | D6                | Φ13.5±0.5      |
|                   | H                 | 2.5±1.0        |
|                   | W2                | 16.0±2.0       |
|                   | Quantity: 5000PCS |                |

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