

## Surface Mount Uni/Bi-Directional TVS Diodes

**Peak Pulse Power - 400 W**  
**Reverse Stand Off Voltage - 5 to 440 V**

### Description

The SMAJ series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

### Features

- For surface mounted applications
- Low profile package
- 400W Peak pulse power capability at 10/1000 $\mu$ s waveform
- Excellent clamping capability
- Typical IR less than 1 $\mu$ A above 10V
- Fast response time: typically less than 1.0ps from 0 Volts to VBR min
- High temperature soldering: 260 $^{\circ}$ C/10s
- IEC 61000-4-2 (ESD) : $\pm$ 30kV(Contact) /  $\pm$ 30kV(Air)

### Mechanical Data

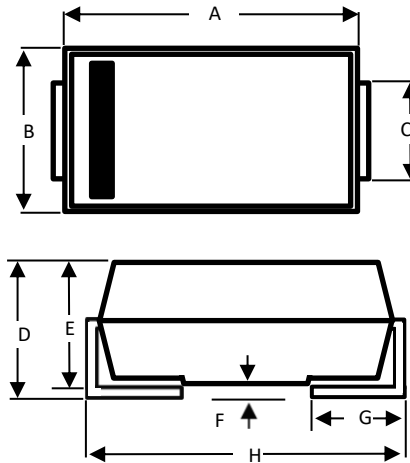
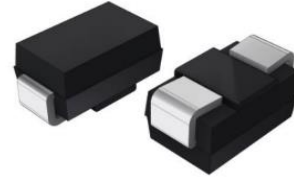
- Case:SMA(DO-214AC)package
- Case material: "green" molding compound
- UL flammability classification rating 94V-0
- Polarity : by cathode band denotes uni-directional device, none cathode band denotes bi-directional device
- Weight: 0.07grams

Note: Products with logo  or  are made by HY Electronic (Cayman) Limited

### Applications

TVS devices are ideal for the protection of I/O Interfaces, Vcc bus and other vulnerable circuits used in telecom, computer, industrial and consumer electronic applications.

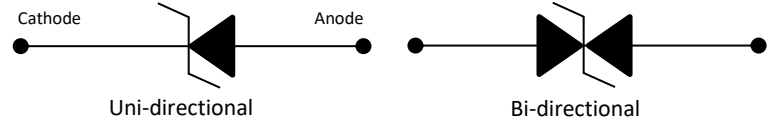
### Package Outline Dimensions



| SMA Package |      |       |
|-------------|------|-------|
| Dim         | Min  | Max   |
| A           | 3.99 | 4.50  |
| B           | 2.50 | 2.79  |
| C           | 1.20 | 1.70  |
| D           | 1.98 | 2.40  |
| E           | 1.98 | 2.20  |
| F           | -    | 0.203 |
| G           | 0.76 | 1.52  |
| H           | 4.93 | 5.28  |

All Dimensions in mm

### Device Schematic



### Ordering Information

- Package :SMA(DO-214AC)
- Reel Size :13 (inches)
- Quantity Per Reel :5Kpcs
- Quantity Per Box :10Kpcs
- Quantity Per Carton :80Kpcs

### Maximum Ratings (@TA = +25 $^{\circ}$ C, unless otherwise specified.)

#### Absolute Ratings

| Parameter   | Symbol             | Value       | Unit         |
|---|--------------------|-------------|--------------|
| Peak Pulse Power Dissipation at TA=25 $^{\circ}$ C by 10/1000us Waveform (Note 1) | P <sub>PP</sub>    | 400         | W            |
| Power Dissipation on Infinite Heat Sink at TL=50 $^{\circ}$ C                     | P <sub>M(AV)</sub> | 3.3         | W            |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 2)                  | I <sub>FSM</sub>   | 40          | A            |
| Maximum Instantaneous Forward Voltage at 30A (Note 2)                             | V <sub>F</sub>     | 5           | V            |
| Operating Temperature Range   | T <sub>j</sub>     | -55 to +150 | $^{\circ}$ C |
| Storage Temperature Range   | T <sub>STG</sub>   | -55 to +150 | $^{\circ}$ C |

Note:

1. Non-repetitive current pulse, per Fig.4 and derated above T<sub>j</sub>(initial) =25 $^{\circ}$ C per Fig.1
2. For unidirectional units only



## Electrical Characteristics (@T<sub>A</sub> = 25°C, unless otherwise specified.)

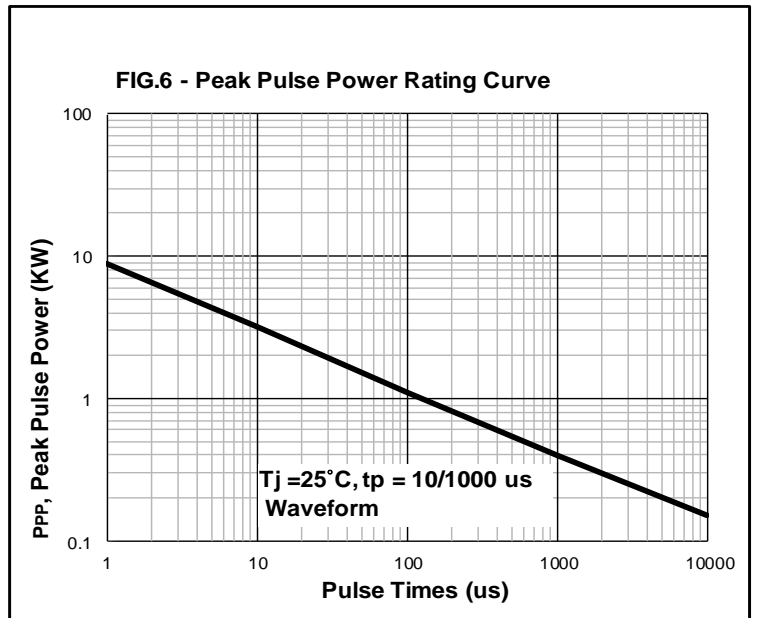
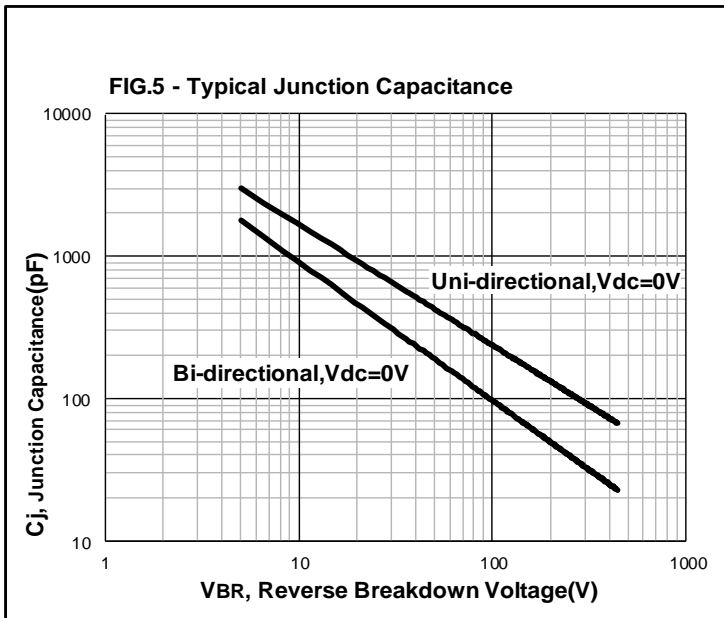
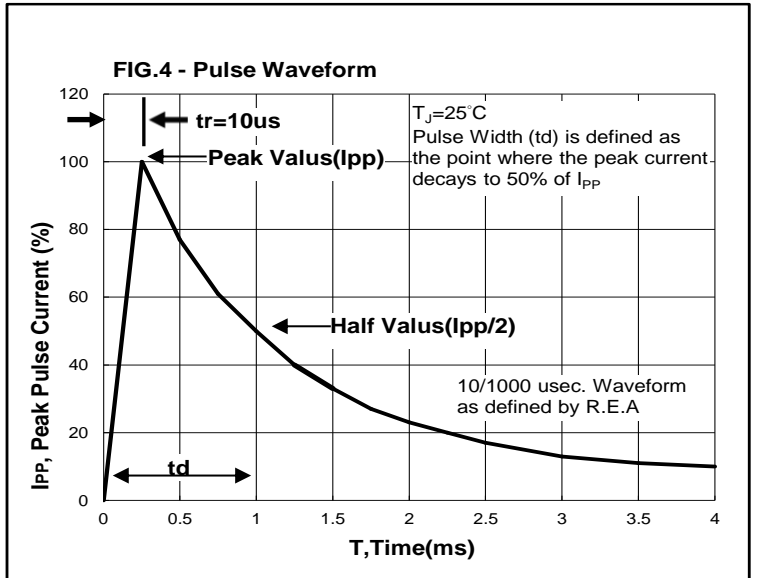
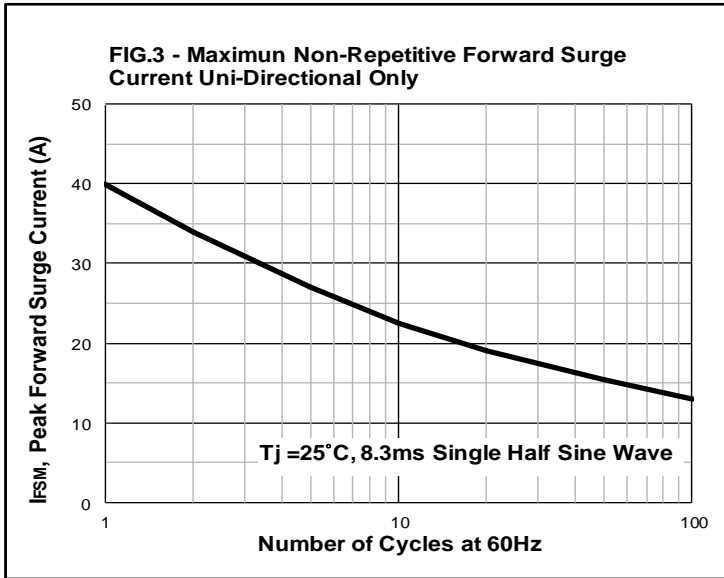
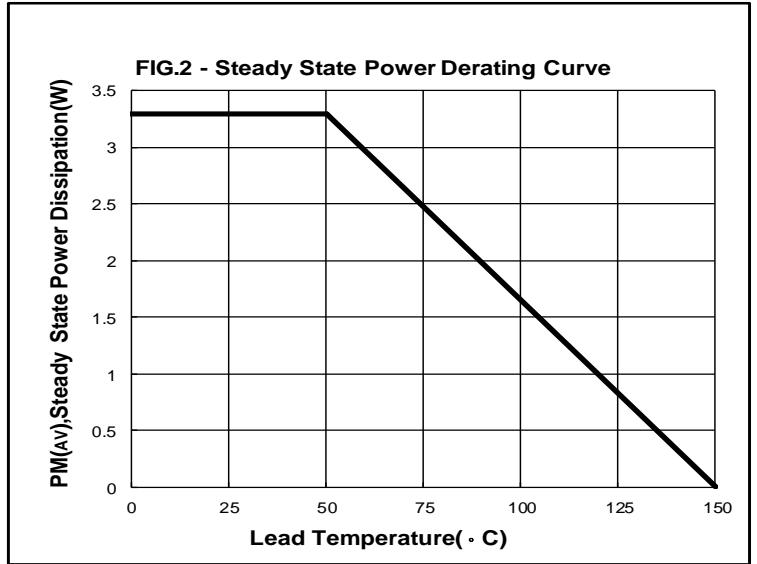
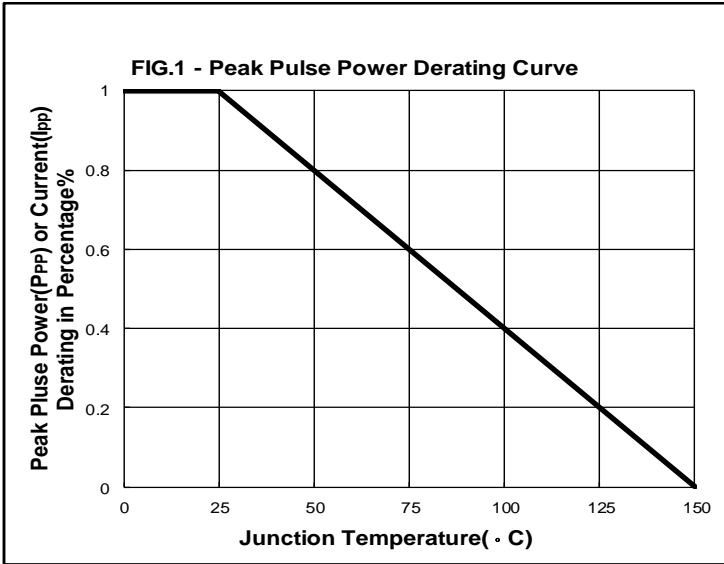
| Part Number |           | Marking Code |           | Reverse Working Voltage<br>V <sub>RWM</sub> (V) | Reverse Breakdown Voltage<br>V <sub>B</sub> (V) |       |                      | Reverse Leakage (Max)<br>I <sub>R</sub> ( $\mu$ A)<br>@V <sub>R</sub> | Reverse Clamping Voltage (Max)<br>V <sub>c</sub> (V)<br>@I <sub>PP</sub> | Peak Pulse Current (Max)<br>I <sub>PP</sub> (A) |
|-------------|-----------|--------------|-----------|---|---|-------|----------------------|---|--|---|
| Uni.        | Bi.       | Uni.         | Bi.       |   | Min.  | Max.  | @I <sub>T</sub> (mA) |   |  |   |
| SMAJ5.0A    | SMAJ5.0CA | SMAJ5.0A     | SMAJ5.0CA | 5.0   | 6.40  | 7.00  | 10                   | 800   | 9.2  | 43.5  |
| SMAJ6.0A    | SMAJ6.0CA | SMAJ6.0A     | SMAJ6.0CA | 6.0   | 6.67  | 7.37  | 10                   | 800   | 10.3   | 38.8  |
| SMAJ6.5A    | SMAJ6.5CA | SMAJ6.5A     | SMAJ6.5CA | 6.5   | 7.22  | 7.98  | 10                   | 500   | 11.2   | 35.7  |
| SMAJ7.0A    | SMAJ7.0CA | SMAJ7.0A     | SMAJ7.0CA | 7.0   | 7.78  | 8.60  | 10                   | 200   | 12.0   | 33.3  |
| SMAJ7.5A    | SMAJ7.5CA | SMAJ7.5A     | SMAJ7.5CA | 7.5   | 8.33  | 9.21  | 1                    | 100   | 12.9   | 31.0  |
| SMAJ8.0A    | SMAJ8.0CA | SMAJ8.0A     | SMAJ8.0CA | 8.0   | 8.89  | 9.83  | 1                    | 50  | 13.6   | 29.4  |
| SMAJ8.5A    | SMAJ8.5CA | SMAJ8.5A     | SMAJ8.5CA | 8.5   | 9.44  | 10.40 | 1                    | 20  | 14.4   | 27.8  |
| SMAJ9.0A    | SMAJ9.0CA | SMAJ9.0A     | SMAJ9.0CA | 9.0   | 10.0  | 11.1  | 1                    | 10  | 15.4   | 26.0  |
| SMAJ10A     | SMAJ10CA  | SMAJ10A      | SMAJ10CA  | 10  | 11.1  | 12.3  | 1                    | 5   | 17.0   | 23.5  |
| SMAJ11A     | SMAJ11CA  | SMAJ11A      | SMAJ11CA  | 11  | 12.2  | 13.5  | 1                    | 1   | 18.2   | 22.0  |
| SMAJ12A     | SMAJ12CA  | SMAJ12A      | SMAJ12CA  | 12  | 13.3  | 14.7  | 1                    | 1   | 19.9   | 20.1  |
| SMAJ13A     | SMAJ13CA  | SMAJ13A      | SMAJ13CA  | 13  | 14.4  | 15.9  | 1                    | 1   | 21.5   | 18.6  |
| SMAJ14A     | SMAJ14CA  | SMAJ14A      | SMAJ14CA  | 14  | 15.6  | 17.2  | 1                    | 1   | 23.2   | 17.3  |
| SMAJ15A     | SMAJ15CA  | SMAJ15A      | SMAJ15CA  | 15  | 16.7  | 18.5  | 1                    | 1   | 24.4   | 16.4  |
| SMAJ16A     | SMAJ16CA  | SMAJ16A      | SMAJ16CA  | 16  | 17.8  | 19.7  | 1                    | 1   | 26.0   | 15.4  |
| SMAJ17A     | SMAJ17CA  | SMAJ17A      | SMAJ17CA  | 17  | 18.9  | 20.9  | 1                    | 1   | 27.6   | 14.5  |
| SMAJ18A     | SMAJ18CA  | SMAJ18A      | SMAJ18CA  | 18  | 20.0  | 22.1  | 1                    | 1   | 29.2   | 13.7  |
| SMAJ20A     | SMAJ20CA  | SMAJ20A      | SMAJ20CA  | 20  | 22.2  | 24.5  | 1                    | 1   | 32.4   | 12.4  |
| SMAJ22A     | SMAJ22CA  | SMAJ22A      | SMAJ22CA  | 22  | 24.4  | 26.9  | 1                    | 1   | 35.5   | 11.3  |
| SMAJ24A     | SMAJ24CA  | SMAJ24A      | SMAJ24CA  | 24  | 26.7  | 29.5  | 1                    | 1   | 38.9   | 10.3  |
| SMAJ26A     | SMAJ26CA  | SMAJ26A      | SMAJ26CA  | 26  | 28.9  | 31.9  | 1                    | 1   | 42.1   | 9.5   |
| SMAJ28A     | SMAJ28CA  | SMAJ28A      | SMAJ28CA  | 28  | 31.1  | 34.4  | 1                    | 1   | 45.4   | 8.8   |
| SMAJ30A     | SMAJ30CA  | SMAJ30A      | SMAJ30CA  | 30  | 33.3  | 36.8  | 1                    | 1   | 48.4   | 8.3   |
| SMAJ33A     | SMAJ33CA  | SMAJ33A      | SMAJ33CA  | 33  | 36.7  | 40.6  | 1                    | 1   | 53.3   | 7.5   |
| SMAJ36A     | SMAJ36CA  | SMAJ36A      | SMAJ36CA  | 36  | 40.0  | 44.2  | 1                    | 1   | 58.1   | 6.9   |
| SMAJ40A     | SMAJ40CA  | SMAJ40A      | SMAJ40CA  | 40  | 44.4  | 49.1  | 1                    | 1   | 64.5   | 6.2   |
| SMAJ43A     | SMAJ43CA  | SMAJ43A      | SMAJ43CA  | 43  | 47.8  | 52.8  | 1                    | 1   | 69.4   | 5.8   |
| SMAJ45A     | SMAJ45CA  | SMAJ45A      | SMAJ45CA  | 45  | 50.0  | 55.3  | 1                    | 1   | 72.7   | 5.5   |
| SMAJ48A     | SMAJ48CA  | SMAJ48A      | SMAJ48CA  | 48  | 53.3  | 58.9  | 1                    | 1   | 77.4   | 5.2   |
| SMAJ51A     | SMAJ51CA  | SMAJ51A      | SMAJ51CA  | 51  | 56.7  | 62.7  | 1                    | 1   | 82.4   | 4.9   |
| SMAJ54A     | SMAJ54CA  | SMAJ54A      | SMAJ54CA  | 54  | 60.0  | 66.3  | 1                    | 1   | 87.1   | 4.6   |
| SMAJ58A     | SMAJ58CA  | SMAJ58A      | SMAJ58CA  | 58  | 64.4  | 71.2  | 1                    | 1   | 93.6   | 4.3   |
| SMAJ60A     | SMAJ60CA  | SMAJ60A      | SMAJ60CA  | 60  | 66.7  | 73.7  | 1                    | 1   | 96.8   | 4.1   |
| SMAJ64A     | SMAJ64CA  | SMAJ64A      | SMAJ64CA  | 64  | 71.1  | 78.6  | 1                    | 1   | 103  | 3.9   |
| SMAJ70A     | SMAJ70CA  | SMAJ70A      | SMAJ70CA  | 70  | 77.8  | 86.0  | 1                    | 1   | 113  | 3.6   |
| SMAJ75A     | SMAJ75CA  | SMAJ75A      | SMAJ75CA  | 75  | 83.3  | 92.1  | 1                    | 1   | 121  | 3.3   |
| SMAJ78A     | SMAJ78CA  | SMAJ78A      | SMAJ78CA  | 78  | 86.7  | 95.8  | 1                    | 1   | 126  | 3.2   |
| SMAJ85A     | SMAJ85CA  | SMAJ85A      | SMAJ85CA  | 85  | 94.4  | 104.0 | 1                    | 1   | 137  | 2.9   |
| SMAJ90A     | SMAJ90CA  | SMAJ90A      | SMAJ90CA  | 90  | 100   | 111   | 1                    | 1   | 146  | 2.8   |
| SMAJ100A    | SMAJ100CA | SMAJ100A     | SMAJ100CA | 100   | 111   | 123   | 1                    | 1   | 162  | 2.5   |
| SMAJ110A    | SMAJ110CA | SMAJ110A     | SMAJ110CA | 110   | 122   | 135   | 1                    | 1   | 177  | 2.3   |
| SMAJ120A    | SMAJ120CA | SMAJ120A     | SMAJ120CA | 120   | 133   | 147   | 1                    | 1   | 193  | 2.1   |
| SMAJ130A    | SMAJ130CA | SMAJ130A     | SMAJ130CA | 130   | 144   | 159   | 1                    | 1   | 209  | 1.9   |
| SMAJ150A    | SMAJ150CA | SMAJ150A     | SMAJ150CA | 150   | 167   | 185   | 1                    | 1   | 243  | 1.7   |
| SMAJ160A    | SMAJ160CA | SMAJ160A     | SMAJ160CA | 160   | 178   | 197   | 1                    | 1   | 259  | 1.6   |
| SMAJ170A    | SMAJ170CA | SMAJ170A     | SMAJ170CA | 170   | 189   | 209   | 1                    | 1   | 275  | 1.5   |
| SMAJ180A    | SMAJ180CA | SMAJ180A     | SMAJ180CA | 180   | 201   | 222   | 1                    | 1   | 292  | 1.4   |
| SMAJ200A    | SMAJ200CA | SMAJ200A     | SMAJ200CA | 200   | 224   | 247   | 1                    | 1   | 324  | 1.3   |
| SMAJ220A    | SMAJ220CA | SMAJ220A     | SMAJ220CA | 220   | 246   | 272   | 1                    | 1   | 356  | 1.1   |
| SMAJ250A    | SMAJ250CA | SMAJ250A     | SMAJ250CA | 250   | 279   | 309   | 1                    | 1   | 405  | 1.0   |
| SMAJ300A    | SMAJ300CA | SMAJ300A     | SMAJ300CA | 300   | 335   | 371   | 1                    | 1   | 486  | 0.8   |
| SMAJ350A    | SMAJ350CA | SMAJ350A     | SMAJ350CA | 350   | 391   | 432   | 1                    | 1   | 567  | 0.7   |
| SMAJ400A    | SMAJ400CA | SMAJ400A     | SMAJ400CA | 400   | 447   | 494   | 1                    | 1   | 648  | 0.6   |
| SMAJ440A    | SMAJ440CA | SMAJ440A     | SMAJ440CA | 440   | 492   | 543   | 1                    | 1   | 713  | 0.6   |

Note:

1. Suffix "A" denotes 5% tolerance device.
2. Add suffix "CA" after part number to specify bi-directional devices.
3. The IR limit is double for bi-directional devices.



## Rating and Characteristic Curves





## Disclaimer

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