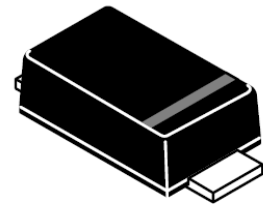




## 200W Surface Mount Transient Voltage Suppressors

### Features

- Working peak reverse voltage range – 5.0V to 190V.
- Peak power dissipation 200W @10 x 1000 us Pulse
- Low profile package.
- Excellent clamping capability.
- Glass passivated junction.
- Fast response time: typically less than 1 ns for Uni-direction.
- Typical IR less than 1uA above 10V.
- Plastic material has UL flammability classification 94V-O
- RoHS compliant in lead-free versions



SOD-123FL

### Mechanical Characteristics

CASE: Void-free, Molded Plastic over glass passivated junction..

Mounting Position: Any

Polarity: by cathode band denotes uni-directional device.

Qualified max reflow temperature: 260°C

### Maximum Ratings And Characteristics @ 25°C Ambient Temperature (unless otherwise noted)

| Parameter  | Symbol           | Value       | Units |
|--|------------------|-------------|-------|
| Peak Pulse Power Dissipation on 10/1000 us Waveform (Note 1, 2, FIG.1) | P <sub>PPM</sub> | Min 200     | W     |
| Peak Pulse Current of on 10/1000us Waveform (Note 1, FIG.3)            | I <sub>PPM</sub> | See Table 1 | Amps  |
| Operating Junction Temperature Range                                   | T <sub>J</sub>   | -55 to 150  | °C    |
| Storage Temperature Range  | T <sub>STG</sub> | -55 to 150  | °C    |
|  |                  |             |       |

Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above T<sub>A</sub>=25°C per Fig.2.

# MMF5.0A/CA --- MMF190A/CA

## Electrical Specification @ Tamb 25°C

| Type Number |          | Marking |       | Reverse Stand-Off Voltage | Breakdown Voltage Min. @I <sub>T</sub> | Breakdown Voltage Max. @ I <sub>T</sub> | Test Current        | Maximum Clamping Voltage @I <sub>PP</sub> | Peak Pulse Current  | Reverse Leakage @V <sub>RMW</sub> |
|-------------|----------|---------|-------|---------------------------|--|---|---------------------|---|---------------------|-----------------------------------|
| Uni         | Bi       | Uni     | Bi    | V <sub>RMW</sub> (V)      | V <sub>BR MIN</sub> (V)                | V <sub>BR MAX</sub> (V)                 | I <sub>T</sub> (mA) | V <sub>C</sub> (V)                        | I <sub>PP</sub> (A) | I <sub>R</sub> ( $\mu$ A)         |
| MMF5.0A     | MMF5.0CA | 5.0A    | 5.0CA | 5.0                       | 6.40                                   | 7.25                                    | 10                  | 9.2                                       | 21.7                | 400.0                             |
| MMF6.0A     | MMF6.0CA | 6.0A    | 6.0CA | 6.0                       | 6.67                                   | 7.67                                    | 10                  | 10.3                                      | 19.4                | 400.0                             |
| MMF6.5A     | MMF6.5CA | 6.5A    | 6.5CA | 6.5                       | 7.22                                   | 8.30                                    | 10                  | 11.2                                      | 17.9                | 250.0                             |
| MMF7.0A     | MMF7.0CA | 7.0A    | 7.0CA | 7.0                       | 7.78                                   | 8.95                                    | 10                  | 12  | 16.7                | 100.0                             |
| MMF7.5A     | MMF7.5CA | 7.5A    | 7.5CA | 7.5                       | 8.33                                   | 9.58                                    | 1.0                 | 12.9                                      | 15.5                | 50.0                              |
| MMF8.0A     | MMF8.0CA | 8.0A    | 8.0CA | 8.0                       | 8.89                                   | 10.23                                   | 1.0                 | 13.6                                      | 14.7                | 25.0                              |
| MMF8.5A     | MMF8.5CA | 8.5A    | 8.5CA | 8.5                       | 9.44                                   | 10.82                                   | 1.0                 | 14.4                                      | 13.9                | 10.0                              |
| MMF9.0A     | MMF9.0CA | 9.0A    | 9.0CA | 9.0                       | 10.0                                   | 11.5                                    | 1.0                 | 15.4                                      | 13                  | 5.0                               |
| MMF10A      | MMF10CA  | 10A     | 10CA  | 10                        | 11.1                                   | 12.8                                    | 1.0                 | 17  | 11.8                | 2.5                               |
| MMF11A      | MMF11CA  | 11A     | 11CA  | 11                        | 12.2                                   | 14.0                                    | 1.0                 | 18.2                                      | 11                  | 2.5                               |
| MMF12A      | MMF12CA  | 12A     | 12CA  | 12                        | 13.3                                   | 15.3                                    | 1.0                 | 19.9                                      | 10.1                | 2.5                               |
| MMF13A      | MMF13CA  | 13A     | 13CA  | 13                        | 14.4                                   | 16.5                                    | 1.0                 | 21.5                                      | 9.3                 | 1.0                               |
| MMF14A      | MMF14CA  | 14A     | 14CA  | 14                        | 15.6                                   | 17.9                                    | 1.0                 | 23.2                                      | 8.6                 | 1.0                               |
| MMF15A      | MMF15CA  | 15A     | 15CA  | 15                        | 16.7                                   | 19.2                                    | 1.0                 | 24.4                                      | 8.2                 | 1.0                               |
| MMF16A      | MMF16CA  | 16A     | 16CA  | 16                        | 17.8                                   | 20.5                                    | 1.0                 | 26  | 7.7                 | 1.0                               |
| MMF17A      | MMF17CA  | 17A     | 17CA  | 17                        | 18.9                                   | 21.7                                    | 1.0                 | 27.6                                      | 7.2                 | 1.0                               |
| MMF18A      | MMF18CA  | 18A     | 18CA  | 18                        | 20.0                                   | 23.3                                    | 1.0                 | 29.2                                      | 6.8                 | 1.0                               |
| MMF20A      | MMF20CA  | 20A     | 20CA  | 20                        | 22.2                                   | 25.5                                    | 1.0                 | 32.4                                      | 6.2                 | 1.0                               |
| MMF22A      | MMF22CA  | 22A     | 22CA  | 22                        | 24.4                                   | 28.0                                    | 1.0                 | 35.5                                      | 5.6                 | 1.0                               |
| MMF24A      | MMF24CA  | 24A     | 24CA  | 24                        | 26.7                                   | 30.7                                    | 1.0                 | 38.9                                      | 5.1                 | 1.0                               |
| MMF26A      | MMF26CA  | 26A     | 26CA  | 26                        | 28.9                                   | 33.2                                    | 1.0                 | 42.1                                      | 4.8                 | 1.0                               |
| MMF28A      | MMF28CA  | 28A     | 28CA  | 28                        | 31.1                                   | 35.8                                    | 1.0                 | 45.4                                      | 4.4                 | 1.0                               |
| MMF30A      | MMF30CA  | 30A     | 30CA  | 30                        | 33.3                                   | 38.3                                    | 1.0                 | 48.4                                      | 4.1                 | 1.0                               |
| MMF33A      | MMF33CA  | 33A     | 33CA  | 33                        | 36.7                                   | 42.2                                    | 1.0                 | 53.3                                      | 3.8                 | 1.0                               |
| MMF36A      | MMF36CA  | 36A     | 36CA  | 36                        | 40.0                                   | 46.0                                    | 1.0                 | 58.1                                      | 3.4                 | 1.0                               |
| MMF40A      | MMF40CA  | 40A     | 40CA  | 40                        | 44.4                                   | 51.1                                    | 1.0                 | 64.5                                      | 3.1                 | 1.0                               |
| MMF43A      | MMF43CA  | 43A     | 43CA  | 43                        | 47.8                                   | 54.9                                    | 1.0                 | 69.4                                      | 2.9                 | 1.0                               |
| MMF45A      | MMF45CA  | 45A     | 45CA  | 45                        | 50.0                                   | 57.5                                    | 1.0                 | 72.7                                      | 2.8                 | 1.0                               |
| MMF48A      | MMF48CA  | 48A     | 48CA  | 48                        | 53.3                                   | 61.3                                    | 1.0                 | 77.4                                      | 2.6                 | 1.0                               |
| MMF51A      | MMF51CA  | 51A     | 51CA  | 51                        | 56.7                                   | 65.2                                    | 1.0                 | 82.4                                      | 2.4                 | 1.0                               |
| MMF54A      | MMF54CA  | 54A     | 54CA  | 54                        | 60.0                                   | 69.0                                    | 1.0                 | 87.1                                      | 2.3                 | 1.0                               |
| MMF58A      | MMF58CA  | 58A     | 58CA  | 58                        | 64.4                                   | 74.1                                    | 1.0                 | 93.6                                      | 2.1                 | 1.0                               |
| MMF60A      | MMF60CA  | 60A     | 60CA  | 60                        | 66.7                                   | 76.7                                    | 1.0                 | 96.8                                      | 1.8                 | 1.0                               |
| MMF64A      | MMF64CA  | 64A     | 64CA  | 64                        | 71.1                                   | 81.8                                    | 1.0                 | 103                                       | 1.7                 | 1.0                               |
| MMF70A      | MMF70CA  | 70A     | 70CA  | 70                        | 77.8                                   | 89.5                                    | 1.0                 | 113                                       | 1.5                 | 1.0                               |
| MMF75A      | MMF75CA  | 75A     | 75CA  | 75                        | 83.3                                   | 95.8                                    | 1.0                 | 121                                       | 1.4                 | 1.0                               |
| MMF78A      | MMF78CA  | 78A     | 78CA  | 78                        | 86.7                                   | 99.7                                    | 1.0                 | 126                                       | 1.4                 | 1.0                               |

# MMF5.0A/CA---MMF190ACA

| Type Number |          | Marking |      | Reverse Stand-Off Voltage | Breakdown Voltage Min. @I <sub>T</sub> | Breakdown Voltage Max. @ I <sub>T</sub> | Test Current        | Maximum Clamping Voltage @I <sub>PP</sub> | Peak Pulse Current  | Reverse Leakage @V <sub>RMW</sub> |
|-------------|----------|---------|------|---------------------------|--|---|---------------------|---|---------------------|-----------------------------------|
| Uni         | Bi       | Uni     | Bi   | V <sub>RMW</sub> (V)      | V <sub>BR MIN</sub> (V)                | V <sub>BR MAX</sub> (V)                 | I <sub>T</sub> (mA) | V <sub>C</sub> (V)                        | I <sub>PP</sub> (A) | I <sub>R</sub> (uA)               |
| MMF85A      | MMF85CA  | 85A     | 85CA | 85                        | 94.4                                   | 108.2                                   | 1.0                 | 137                                       | 1.3                 | 1.0                               |
| MMF90A      | MMF90CA  | 90A     | 90CA | 90                        | 100.0                                  | 115.5                                   | 1.0                 | 146                                       | 1.2                 | 1.0                               |
| MMF100A     | MMF100CA | 100     | 100C | 100                       | 111.0                                  | 128.0                                   | 1.0                 | 162                                       | 1.1                 | 1.0                               |
| MMF110A     | MMF110CA | 110     | 110C | 110                       | 122.0                                  | 140.5                                   | 1.0                 | 177                                       | 1.0                 | 1.0                               |
| MMF120A     | MMF120CA | 120     | 120C | 120                       | 133.0                                  | 153.0                                   | 1.0                 | 193                                       | 0.9                 | 1.0                               |
| MMF130A     | MMF130CA | 130     | 130C | 130                       | 144.0                                  | 165.5                                   | 1.0                 | 209                                       | 0.8                 | 1.0                               |
| MMF150A     | MMF150CA | 150     | 150C | 150                       | 167.0                                  | 192.5                                   | 1.0                 | 243                                       | 0.7                 | 1.0                               |
| MMF160A     | MMF160CA | 160     | 160C | 160                       | 178.0                                  | 205.0                                   | 1.0                 | 259                                       | 0.7                 | 1.0                               |
| MMF170A     | MMF170CA | 170     | 170C | 170                       | 189.0                                  | 217.5                                   | 1.0                 | 275                                       | 0.6                 | 1.0                               |
| MMF180A     | MMF180CA | 180     | 180C | 180                       | 198.0                                  | 230.4                                   | 1.0                 | 292                                       | 0.6                 | 1.0                               |
| MMF190A     | MMF190CA | 190     | 190C | 190                       | 209.0                                  | 243.2                                   | 1.0                 | 308                                       | 0.5                 | 1.0                               |

## Ratings and Characteristic Curves T<sub>A</sub>=25°C unless otherwise noted

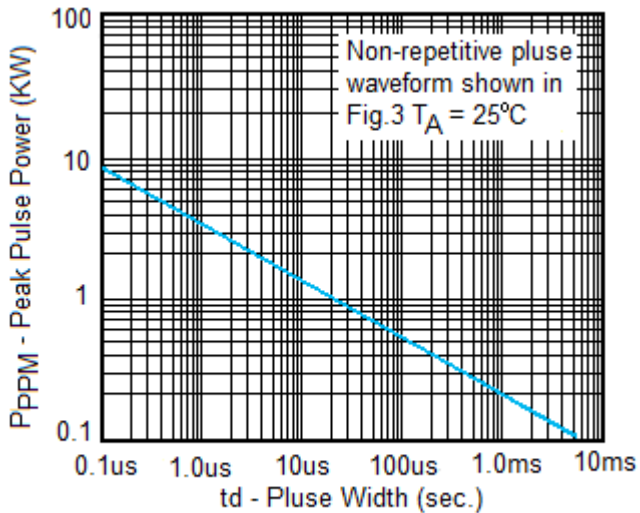


Fig. 1 Peak Pulse Power Rating

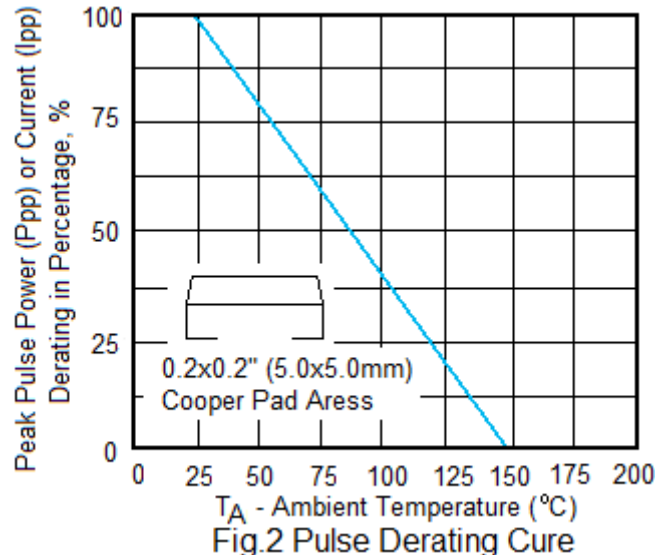


Fig.2 Pulse Derating Cure

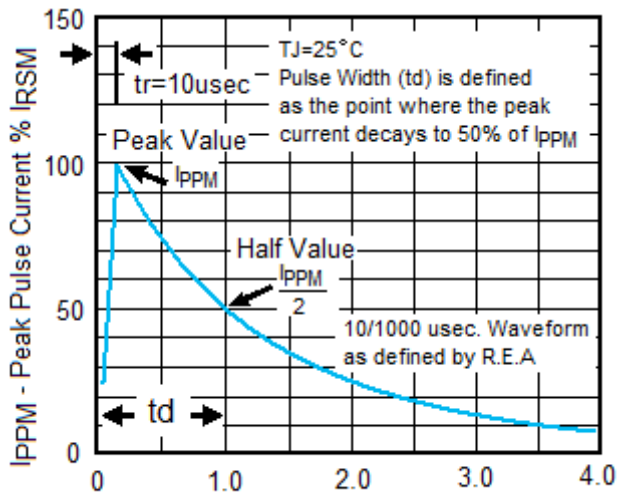
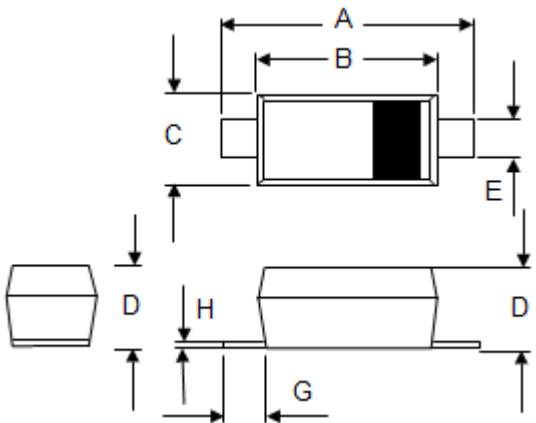


Fig.3 Pulse Waveform

## Package Outline Dimensions and Pad Layouts

### SOD-123FL



| Dim | Millimeters |       | Inches |       |
|-----|-------------|-------|--------|-------|
|     | Min         | Max   | Min    | Max   |
| A   | 3.40        | 3.85  | 0.142  | 0.150 |
| B   | 2.50        | 2.90  | 0.098  | 0.114 |
| C   | 1.40        | 1.80  | 0.055  | 0.071 |
| D   | 0.90        | 1.35  | 0.035  | 0.053 |
| E   | 0.50        | 1.10  | 0.020  | 0.043 |
| G   | 0.25        | ----- | 0.010  | ----  |
| H   | -----       | 0.20  | ----   | 0.008 |