

### Features

- Glass passivated chip
- 400W peak pulse power(10/1000us)
- Uni and Bidirectional unit
- Low clamping voltage
- Low Leakage current
- Very fast response time

### Mechanical Data

- **Case:** SMAFL (plastic package).  
RoHS compliant

### Applications

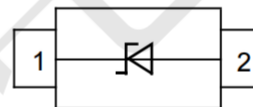
- Computers
- Telecom system
- Industrial equipments
- Consumer electronic applications
- Other VCC bus and I/O interfaces



SMAFL



Bidirectional



Unidirectional

**SMAFJ33A Marking: CM**

**Absolute Maximum Ratings**( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

| Parameter                                                                           | Symbol          | Value               | Unit                 |
|-------------------------------------------------------------------------------------|-----------------|---------------------|----------------------|
| Peak pulse power dissipation with a 10/1000us waveform <sup>(1)</sup>               | $P_{PP}$        | 400                 | W                    |
| Maximum peak reverse pulse current a 10/1000us waveform <sup>(1)</sup>              | $I_{PP}$        | See Next Table      | A                    |
| Peak forward surge current 8.3ms single half sine-wave <sup>(2)</sup>               | $I_{FSM}$       | 40                  | A                    |
| Maximum instantaneous forward voltage at 25A for unidirectional only <sup>(3)</sup> | $V_F$           | 3.5/5.0             | V                    |
| ESD Voltage per IEC6100-4-2                                                         | $V_{ESD}$       | $\pm 8$<br>$\pm 15$ | kv                   |
| Thermal resistance                                                                  | $R_{\theta JA}$ | 120                 | $^{\circ}\text{C/W}$ |
| Operating junction and storage temperature range                                    | $T_J, T_{STG}$  | -55 to +150         | $^{\circ}\text{C}$   |

### Electrical Characteristics (T = 25. C unless otherwise noted)

| Part Number | Direction | Maximum Working Voltage<br>$V_{RWM}$ (V) | Maximum Reverse Current@ $V_{RWM}$<br>$I_R$ max(uA) | Breakdown Voltage@ $I_T$ |                 |            | Peak Surge Current<br>$I_{PP}$ (A) | Maximum Clamping Voltage@ $I_{PP}$<br>$V_C$ (V) |
|-------------|-----------|------------------------------------------|-----------------------------------------------------|--------------------------|-----------------|------------|------------------------------------|-------------------------------------------------|
|             |           |                                          |                                                     | $V_{BR}$ min(V)          | $V_{BR}$ max(V) | $I_T$ (mA) |                                    |                                                 |
| SMAFJ5.0A   | Uni-Dir   | 5.0                                      | 400                                                 | 6.4                      | 7.07            | 10         | 65.22                              | 9.2                                             |
| SMAFJ5.0CA  | Bi-Dir    | 5.0                                      | 800                                                 | 6.4                      | 7.07            | 10         | 65.22                              | 9.2                                             |
| SMAFJ6.0A   | Uni-Dir   | 6.0                                      | 400                                                 | 6.67                     | 7.37            | 10         | 58.25                              | 10.3                                            |
| SMAFJ6.0CA  | Bi-Dir    | 6.0                                      | 800                                                 | 6.67                     | 7.37            | 10         | 58.25                              | 10.3                                            |
| SMAFJ6.5A   | Uni-Dir   | 6.5                                      | 250                                                 | 7.22                     | 7.98            | 10         | 53.57                              | 11.2                                            |
| SMAFJ6.5CA  | Bi-Dir    | 6.5                                      | 500                                                 | 7.22                     | 7.98            | 10         | 53.57                              | 11.2                                            |
| SMAFJ7.0A   | Uni-Dir   | 7.0                                      | 100                                                 | 7.78                     | 8.60            | 10         | 50.00                              | 12.0                                            |
| SMAFJ7.0CA  | Bi-Dir    | 7.0                                      | 200                                                 | 7.78                     | 8.60            | 10         | 50.00                              | 12.0                                            |
| SMAFJ7.5A   | Uni-Dir   | 7.5                                      | 50                                                  | 8.33                     | 9.21            | 1          | 46.51                              | 12.9                                            |
| SMAFJ7.5CA  | Bi-Dir    | 7.5                                      | 100                                                 | 8.33                     | 9.21            | 1          | 46.51                              | 12.9                                            |
| SMAFJ8.0A   | Uni-Dir   | 8.0                                      | 25                                                  | 8.89                     | 9.83            | 1          | 44.12                              | 13.6                                            |
| SMAFJ8.0CA  | Bi-Dir    | 8.0                                      | 50                                                  | 8.89                     | 9.83            | 1          | 44.12                              | 13.6                                            |
| SMAFJ8.5A   | Uni-Dir   | 8.5                                      | 5                                                   | 9.44                     | 10.40           | 1          | 41.67                              | 14.4                                            |
| SMAFJ8.5CA  | Bi-Dir    | 8.5                                      | 10                                                  | 9.44                     | 10.40           | 1          | 41.67                              | 14.4                                            |
| SMAFJ9.0A   | Uni-Dir   | 9.0                                      | 5                                                   | 10.00                    | 11.10           | 1          | 38.96                              | 15.4                                            |
| SMAFJ9.0CA  | Bi-Dir    | 9.0                                      | 10                                                  | 10.00                    | 11.10           | 1          | 38.96                              | 15.4                                            |
| SMAFJ10A    | Uni-Dir   | 10.0                                     | 5                                                   | 11.10                    | 12.30           | 1          | 35.29                              | 17.0                                            |
| SMAFJ10CA   | Bi-Dir    | 10.0                                     | 10                                                  | 11.10                    | 12.30           | 1          | 35.29                              | 17.0                                            |
| SMAFJ11A    | Uni-Dir   | 11.0                                     | 1                                                   | 12.20                    | 13.50           | 1          | 32.97                              | 18.2                                            |
| SMAFJ11CA   | Bi-Dir    | 11.0                                     | 1                                                   | 12.20                    | 13.50           | 1          | 32.97                              | 18.2                                            |
| SMAFJ12A    | Uni-Dir   | 12.0                                     | 1                                                   | 13.30                    | 14.70           | 1          | 30.15                              | 19.9                                            |
| SMAFJ12CA   | Bi-Dir    | 12.0                                     | 1                                                   | 13.30                    | 14.70           | 1          | 30.15                              | 19.9                                            |
| SMAFJ13A    | Uni-Dir   | 13.0                                     | 1                                                   | 14.40                    | 15.90           | 1          | 27.91                              | 21.5                                            |
| SMAFJ13CA   | Bi-Dir    | 13.0                                     | 1                                                   | 14.40                    | 15.90           | 1          | 27.91                              | 21.5                                            |
| SMAFJ14A    | Uni-Dir   | 14.0                                     | 1                                                   | 15.60                    | 17.20           | 1          | 25.86                              | 23.2                                            |
| SMAFJ14CA   | Bi-Dir    | 14.0                                     | 1                                                   | 15.60                    | 17.20           | 1          | 25.86                              | 23.2                                            |
| SMAFJ15A    | Uni-Dir   | 15.0                                     | 1                                                   | 16.70                    | 18.50           | 1          | 24.59                              | 24.4                                            |
| SMAFJ15CA   | Bi-Dir    | 15.0                                     | 1                                                   | 16.70                    | 18.50           | 1          | 24.59                              | 24.4                                            |
| SMAFJ16A    | Uni-Dir   | 16.0                                     | 1                                                   | 17.80                    | 19.70           | 1          | 23.08                              | 26.0                                            |
| SMAFJ16CA   | Bi-Dir    | 16.0                                     | 1                                                   | 17.80                    | 19.70           | 1          | 23.08                              | 26.0                                            |
| SMAFJ17A    | Uni-Dir   | 17.0                                     | 1                                                   | 18.90                    | 20.90           | 1          | 21.74                              | 27.6                                            |
| SMAFJ17CA   | Bi-Dir    | 17.0                                     | 1                                                   | 18.90                    | 20.90           | 1          | 21.74                              | 27.6                                            |
| SMAFJ18A    | Uni-Dir   | 18.0                                     | 1                                                   | 20.00                    | 22.10           | 1          | 20.55                              | 29.2                                            |
| SMAFJ18CA   | Bi-Dir    | 18.0                                     | 1                                                   | 20.00                    | 22.10           | 1          | 20.55                              | 29.2                                            |
| SMAFJ19A    | Uni-Dir   | 19.0                                     | 1                                                   | 21.10                    | 23.30           | 1          | 19.49                              | 30.8                                            |
| SMAFJ19CA   | Bi-Dir    | 19.0                                     | 1                                                   | 21.10                    | 23.30           | 1          | 19.49                              | 30.8                                            |
| SMAFJ20A    | Uni-Dir   | 20.0                                     | 1                                                   | 22.20                    | 24.50           | 1          | 18.52                              | 32.4                                            |
| SMAFJ20CA   | Bi-Dir    | 20.0                                     | 1                                                   | 22.20                    | 24.50           | 1          | 18.52                              | 32.4                                            |

# SMAFJ Series

## Power TVS in SMAFL

[WWW.TECHPUBLIC.COM](http://WWW.TECHPUBLIC.COM)

| Part Number | Direction | Maximum Working Voltage<br>$V_{RWM}$ (V) | Maximum Reverse Current@ $V_{RWM}$<br>$I_R$ max(μA) | Breakdown Voltage@ $I_T$ |                 |            | Peak Surge Current<br>$I_{PP}$ (A) | Maximum Clamping Voltage@ $I_{PP}$<br>$V_C$ (V) |
|-------------|-----------|------------------------------------------|-----------------------------------------------------|--------------------------|-----------------|------------|------------------------------------|-------------------------------------------------|
|             |           |                                          |                                                     | $V_{BR}$ min(V)          | $V_{BR}$ max(V) | $I_T$ (mA) |                                    |                                                 |
| SMAFJ22A    | Uni-Dir   | 22.0                                     | 1                                                   | 24.40                    | 26.90           | 1          | 16.90                              | 35.5                                            |
| SMAFJ22 CA  | Bi-Dir    | 22.0                                     | 1                                                   | 24.40                    | 26.90           | 1          | 16.90                              | 35.5                                            |
| SMAFJ24A    | Uni-Dir   | 24.0                                     | 1                                                   | 26.70                    | 29.50           | 1          | 15.42                              | 38.9                                            |
| SMAFJ24 CA  | Bi-Dir    | 24.0                                     | 1                                                   | 26.70                    | 29.50           | 1          | 15.42                              | 38.9                                            |
| SMAFJ26A    | Uni-Dir   | 26.0                                     | 1                                                   | 28.90                    | 31.90           | 1          | 14.25                              | 42.1                                            |
| SMAFJ26 CA  | Bi-Dir    | 26.0                                     | 1                                                   | 28.90                    | 31.90           | 1          | 14.25                              | 42.1                                            |
| SMAFJ28A    | Uni-Dir   | 28.0                                     | 1                                                   | 31.10                    | 34.40           | 1          | 13.22                              | 45.4                                            |
| SMAFJ28 CA  | Bi-Dir    | 28.0                                     | 1                                                   | 31.10                    | 34.40           | 1          | 13.22                              | 45.4                                            |
| SMAFJ30A    | Uni-Dir   | 30.0                                     | 1                                                   | 33.30                    | 36.80           | 1          | 12.40                              | 48.4                                            |
| SMAFJ30 CA  | Bi-Dir    | 30.0                                     | 1                                                   | 33.30                    | 36.80           | 1          | 12.40                              | 48.4                                            |
| SMAFJ33A    | Uni-Dir   | 33.0                                     | 1                                                   | 36.70                    | 40.60           | 1          | 11.26                              | 53.3                                            |
| SMAFJ33 CA  | Bi-Dir    | 33.0                                     | 1                                                   | 36.70                    | 40.60           | 1          | 11.26                              | 53.3                                            |
| SMAFJ36A    | Uni-Dir   | 36.0                                     | 1                                                   | 40.00                    | 44.20           | 1          | 10.33                              | 58.1                                            |
| SMAFJ36 CA  | Bi-Dir    | 36.0                                     | 1                                                   | 40.00                    | 44.20           | 1          | 10.33                              | 58.1                                            |
| SMAFJ40A    | Uni-Dir   | 40.0                                     | 1                                                   | 44.40                    | 49.10           | 1          | 9.30                               | 64.5                                            |
| SMAFJ40 CA  | Bi-Dir    | 40.0                                     | 1                                                   | 44.40                    | 49.10           | 1          | 9.30                               | 64.5                                            |
| SMAFJ43A    | Uni-Dir   | 43.0                                     | 1                                                   | 47.80                    | 52.80           | 1          | 8.65                               | 69.4                                            |
| SMAFJ43 CA  | Bi-Dir    | 43.0                                     | 1                                                   | 47.80                    | 52.80           | 1          | 8.65                               | 69.4                                            |
| SMAFJ45A    | Uni-Dir   | 45.0                                     | 1                                                   | 50.00                    | 55.30           | 1          | 8.25                               | 72.7                                            |
| SMAFJ45 CA  | Bi-Dir    | 45.0                                     | 1                                                   | 50.00                    | 55.30           | 1          | 8.25                               | 72.7                                            |
| SMAFJ48A    | Uni-Dir   | 48.0                                     | 1                                                   | 53.30                    | 58.90           | 1          | 7.75                               | 77.4                                            |
| SMAFJ48 CA  | Bi-Dir    | 48.0                                     | 1                                                   | 53.30                    | 58.90           | 1          | 7.75                               | 77.4                                            |
| SMAFJ51A    | Uni-Dir   | 51.0                                     | 1                                                   | 56.70                    | 62.70           | 1          | 7.28                               | 82.4                                            |
| SMAFJ51 CA  | Bi-Dir    | 51.0                                     | 1                                                   | 56.70                    | 62.70           | 1          | 7.28                               | 82.4                                            |
| SMAFJ54A    | Uni-Dir   | 54.0                                     | 1                                                   | 60.00                    | 66.30           | 1          | 6.89                               | 87.1                                            |
| SMAFJ54 CA  | Bi-Dir    | 54.0                                     | 1                                                   | 60.00                    | 66.30           | 1          | 6.89                               | 87.1                                            |
| SMAFJ58A    | Uni-Dir   | 58.0                                     | 1                                                   | 64.40                    | 71.20           | 1          | 6.41                               | 93.6                                            |
| SMAFJ58 CA  | Bi-Dir    | 58.0                                     | 1                                                   | 64.40                    | 71.20           | 1          | 6.41                               | 93.6                                            |
| SMAFJ60A    | Uni-Dir   | 60.0                                     | 1                                                   | 66.70                    | 73.70           | 1          | 6.20                               | 96.8                                            |
| SMAFJ60 CA  | Bi-Dir    | 60.0                                     | 1                                                   | 66.70                    | 73.70           | 1          | 6.20                               | 96.8                                            |
| SMAFJ64A    | Uni-Dir   | 64.0                                     | 1                                                   | 71.10                    | 78.60           | 1          | 5.83                               | 103.0                                           |
| SMAFJ64 CA  | Bi-Dir    | 64.0                                     | 1                                                   | 71.10                    | 78.60           | 1          | 5.83                               | 103.0                                           |
| SMAFJ70A    | Uni-Dir   | 70.0                                     | 1                                                   | 77.80                    | 86.00           | 1          | 5.31                               | 113.0                                           |
| SMAFJ70 CA  | Bi-Dir    | 70.0                                     | 1                                                   | 77.80                    | 86.00           | 1          | 5.31                               | 113.0                                           |
| SMAFJ75A    | Uni-Dir   | 75.0                                     | 1                                                   | 83.30                    | 92.10           | 1          | 4.96                               | 121.0                                           |
| SMAFJ75 CA  | Bi-Dir    | 75.0                                     | 1                                                   | 83.30                    | 92.10           | 1          | 4.96                               | 121.0                                           |
| SMAFJ78A    | Uni-Dir   | 78.0                                     | 1                                                   | 86.70                    | 95.80           | 1          | 4.76                               | 126.0                                           |
| SMAFJ78 CA  | Bi-Dir    | 78.0                                     | 1                                                   | 86.70                    | 95.80           | 1          | 4.76                               | 126.0                                           |

# SMAFJ Series

## Power TVS in SMAFL

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| Part Number | Direction | Maximum Working Voltage<br>$V_{RWM}$ (V) | Maximum Reverse Current@ $V_{RWM}$<br>$I_R$ max(uA) | Breakdown Voltage@ $I_T$ |                 |            | Peak Surge Current<br>$I_{PP}$ (A) | Maximum Clamping Voltage@ $I_{PP}$<br>$V_C$ (V) |
|-------------|-----------|------------------------------------------|-----------------------------------------------------|--------------------------|-----------------|------------|------------------------------------|-------------------------------------------------|
|             |           |                                          |                                                     | $V_{BR}$ min(V)          | $V_{BR}$ max(V) | $I_T$ (mA) |                                    |                                                 |
| SMAFJ80A    | Uni-Dir   | 80.0                                     | 1                                                   | 88.80                    | 97.60           | 1          | 4.63                               | 129.6                                           |
| SMAFJ80CA   | Bi-Dir    | 80.0                                     | 1                                                   | 88.80                    | 97.60           | 1          | 4.63                               | 129.6                                           |
| SMAFJ85A    | Uni-Dir   | 85.0                                     | 1                                                   | 94.40                    | 104.00          | 1          | 4.38                               | 137.0                                           |
| SMAFJ85CA   | Bi-Dir    | 85.0                                     | 1                                                   | 94.40                    | 104.00          | 1          | 4.38                               | 137.0                                           |
| SMAFJ90A    | Uni-Dir   | 90.0                                     | 1                                                   | 100.00                   | 111.00          | 1          | 4.11                               | 146.0                                           |
| SMAFJ90CA   | Bi-Dir    | 90.0                                     | 1                                                   | 100.00                   | 111.00          | 1          | 4.11                               | 146.0                                           |
| SMAFJ100A   | Uni-Dir   | 100.0                                    | 1                                                   | 111.00                   | 123.00          | 1          | 3.70                               | 162.0                                           |
| SMAFJ100CA  | Bi-Dir    | 100.0                                    | 1                                                   | 111.00                   | 123.00          | 1          | 3.70                               | 162.0                                           |
| SMAFJ110A   | Uni-Dir   | 110.0                                    | 1                                                   | 122.00                   | 135.00          | 1          | 3.39                               | 177.0                                           |
| SMAFJ110CA  | Bi-Dir    | 110.0                                    | 1                                                   | 122.00                   | 135.00          | 1          | 3.39                               | 177.0                                           |
| SMAFJ120A   | Uni-Dir   | 120.0                                    | 1                                                   | 133.00                   | 147.00          | 1          | 3.11                               | 193.0                                           |
| SMAFJ120CA  | Bi-Dir    | 120.0                                    | 1                                                   | 133.00                   | 147.00          | 1          | 3.11                               | 193.0                                           |
| SMAFJ130A   | Uni-Dir   | 130.0                                    | 1                                                   | 144.00                   | 159.00          | 1          | 2.87                               | 209.0                                           |
| SMAFJ130CA  | Bi-Dir    | 130.0                                    | 1                                                   | 144.00                   | 159.00          | 1          | 2.87                               | 209.0                                           |
| SMAFJ140A   | Uni-Dir   | 140.0                                    | 1                                                   | 155.00                   | 171.00          | 1          | 2.65                               | 226.8                                           |
| SMAFJ140CA  | Bi-Dir    | 140.0                                    | 1                                                   | 155.00                   | 171.00          | 1          | 2.65                               | 226.8                                           |
| SMAFJ150A   | Uni-Dir   | 150.0                                    | 1                                                   | 167.00                   | 185.00          | 1          | 2.47                               | 243.0                                           |
| SMAFJ150CA  | Bi-Dir    | 150.0                                    | 1                                                   | 167.00                   | 185.00          | 1          | 2.47                               | 243.0                                           |
| SMAFJ160A   | Uni-Dir   | 160.0                                    | 1                                                   | 178.00                   | 197.00          | 1          | 2.32                               | 259.0                                           |
| SMAFJ160CA  | Bi-Dir    | 160.0                                    | 1                                                   | 178.00                   | 197.00          | 1          | 2.32                               | 259.0                                           |
| SMAFJ170A   | Uni-Dir   | 170.0                                    | 1                                                   | 189.00                   | 209.00          | 1          | 2.18                               | 275.0                                           |
| SMAFJ170CA  | Bi-Dir    | 170.0                                    | 1                                                   | 189.00                   | 209.00          | 1          | 2.18                               | 275.0                                           |
| SMAFJ180A   | Uni-Dir   | 180.0                                    | 1                                                   | 200.00                   | 220.00          | 1          | 2.06                               | 291.6                                           |
| SMAFJ180CA  | Bi-Dir    | 180.0                                    | 1                                                   | 200.00                   | 220.00          | 1          | 2.06                               | 291.6                                           |
| SMAFJ190A   | Uni-Dir   | 190.0                                    | 1                                                   | 211.00                   | 232.00          | 1          | 1.95                               | 307.8                                           |
| SMAFJ190CA  | Bi-Dir    | 190.0                                    | 1                                                   | 211.00                   | 232.00          | 1          | 1.95                               | 307.8                                           |
| SMAFJ200A   | Uni-Dir   | 200.0                                    | 1                                                   | 224.00                   | 247.00          | 1          | 1.85                               | 324.0                                           |
| SMAFJ200CA  | Bi-Dir    | 200.0                                    | 1                                                   | 224.00                   | 247.00          | 1          | 1.85                               | 324.0                                           |

### Typical Characteristics ( $T_{amb} = 25^\circ\text{C}$ unless otherwise specified)

Fig. 1 - Peak Pulse Power Rating Curve

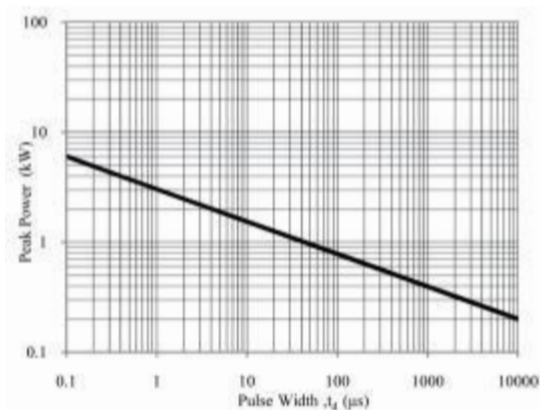


Fig. 2 - Pulse Derating Curve

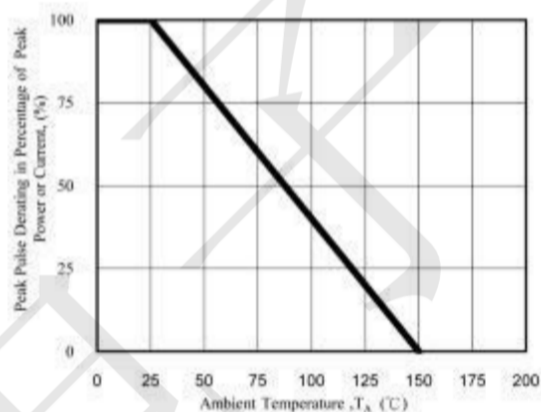


Fig. 3 - Pulse Waveform

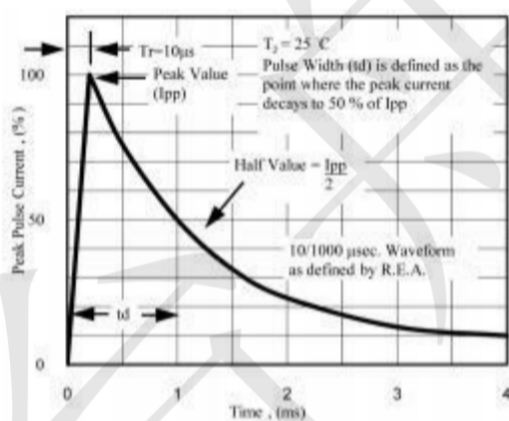
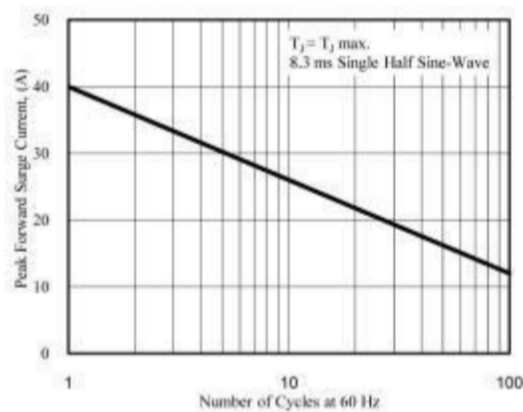
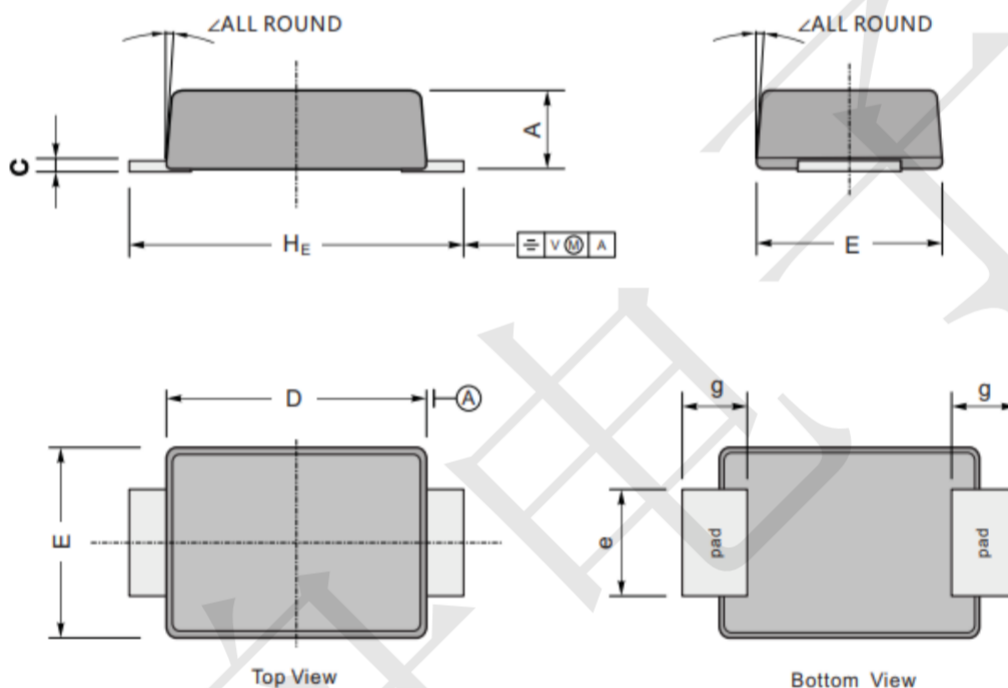


Fig. 4- Maximum Non-Repetitive Surge Current



Plastic surface mounted package

SMAF



| UNIT |     | A   | C    | D   | E   | e   | g   | H <sub>E</sub> | ∠  |
|------|-----|-----|------|-----|-----|-----|-----|----------------|----|
| mm   | max | 1.1 | 0.20 | 3.7 | 2.7 | 1.6 | 1.2 | 4.9            | 7° |
|      | min | 0.9 | 0.12 | 3.3 | 2.4 | 1.3 | 0.8 | 4.4            |    |
| mil  | max | 43  | 7.9  | 146 | 106 | 63  | 47  | 193            |    |
|      | min | 35  | 4.7  | 130 | 94  | 51  | 31  | 173            |    |