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# SMAFJ Series
# Power TVS in SMAFL

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## Features

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

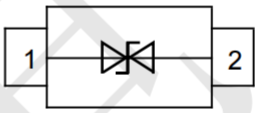
## Mechanical Data

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

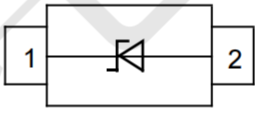
## Applications

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

SMAFL




Bidirectional




Unidirectional

## Absolute Maximum Ratings($T_A$=25。C unless otherwise noted)

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

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

| Part Number | Direction | Maximum Working Voltage $V_{RWM}$ (V) | Maximum Reverse Current@ $V_{RWM}$ $I_R$ max(uA) | Breakdown Voltage@$I_T$ | | | Peak Surge Current $I_{PP}$ (A) | Maximum Clamping Voltage@ $I_{PP}$ $V_C$ (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 |

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| Part Number | Direction | Maximum Working Voltage $V_{RWM}$ (V) | Maximum Reverse Current@ $V_{RWM}$ $I_R$ max(uA) | Breakdown Voltage@$I_T$ | | | Peak Surge Current $I_{PP}$ (A) | Maximum Clamping Voltage@$I_{PP}$ $V_C$ (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 |
| SMAFJ22CA | 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 |
| SMAFJ24CA | 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 |
| SMAFJ26CA | 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 |
| SMAFJ28CA | 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 |
| SMAFJ30CA | 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 |
| SMAFJ33CA | 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 |
| SMAFJ36CA | 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 |
| SMAFJ40CA | 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 |
| SMAFJ43CA | 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 |
| SMAFJ45CA | 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 |
| SMAFJ48CA | 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 |
| SMAFJ51CA | 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 |
| SMAFJ54CA | 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 |
| SMAFJ58CA | 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 |
| SMAFJ60CA | 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 |
| SMAFJ64CA | 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 |
| SMAFJ70CA | 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 |
| SMAFJ75CA | 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 |
| SMAFJ78CA | Bi-Dir | 78.0 | 1 | 86.70 | 95.80 | 1 | 4.76 | 126.0 |

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| Part Number | Direction | Maximum Working Voltage $V_{RWM}$ (V) | Maximum Reverse Current@ $V_{RWM}$ $I_R$ max(uA) | Breakdown Voltage@ $I_T$ | | | Peak Surge Current $I_{PP}$ (A) | Maximum Clamping Voltage@ $I_{PP}$ $V_C$ (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 (Tamb = 25 。C unless otherwise specified)

Fig. 1 - Peak Pulse Power Rating Curve

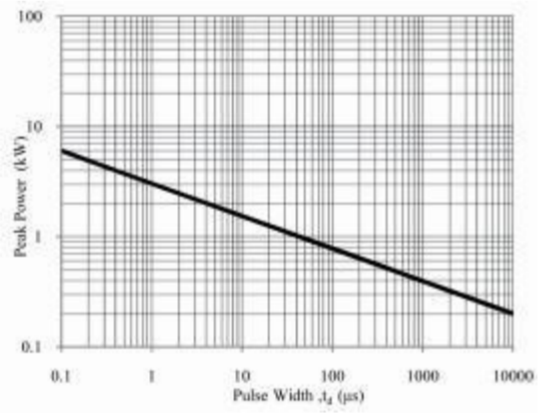



Fig. 2 - Pulse Derating Curve

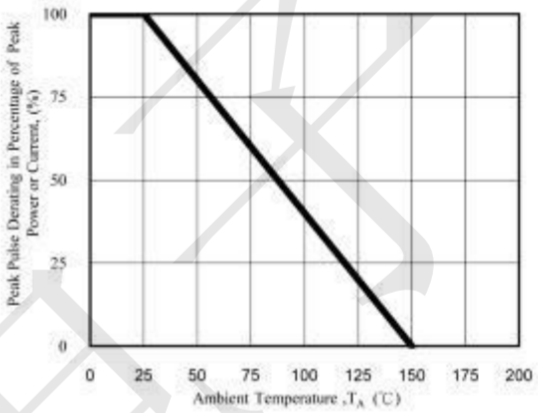



Fig. 3 - Pulse Waveform

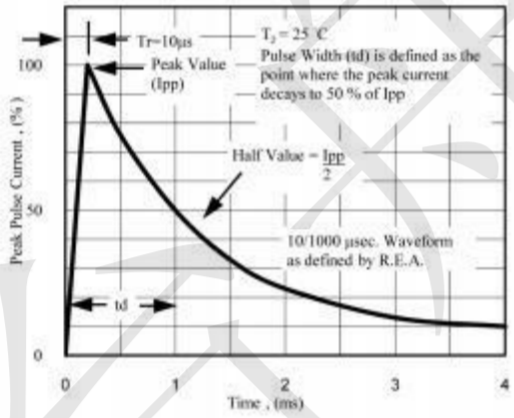
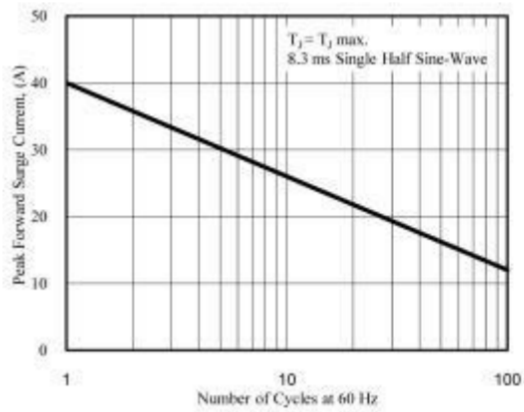
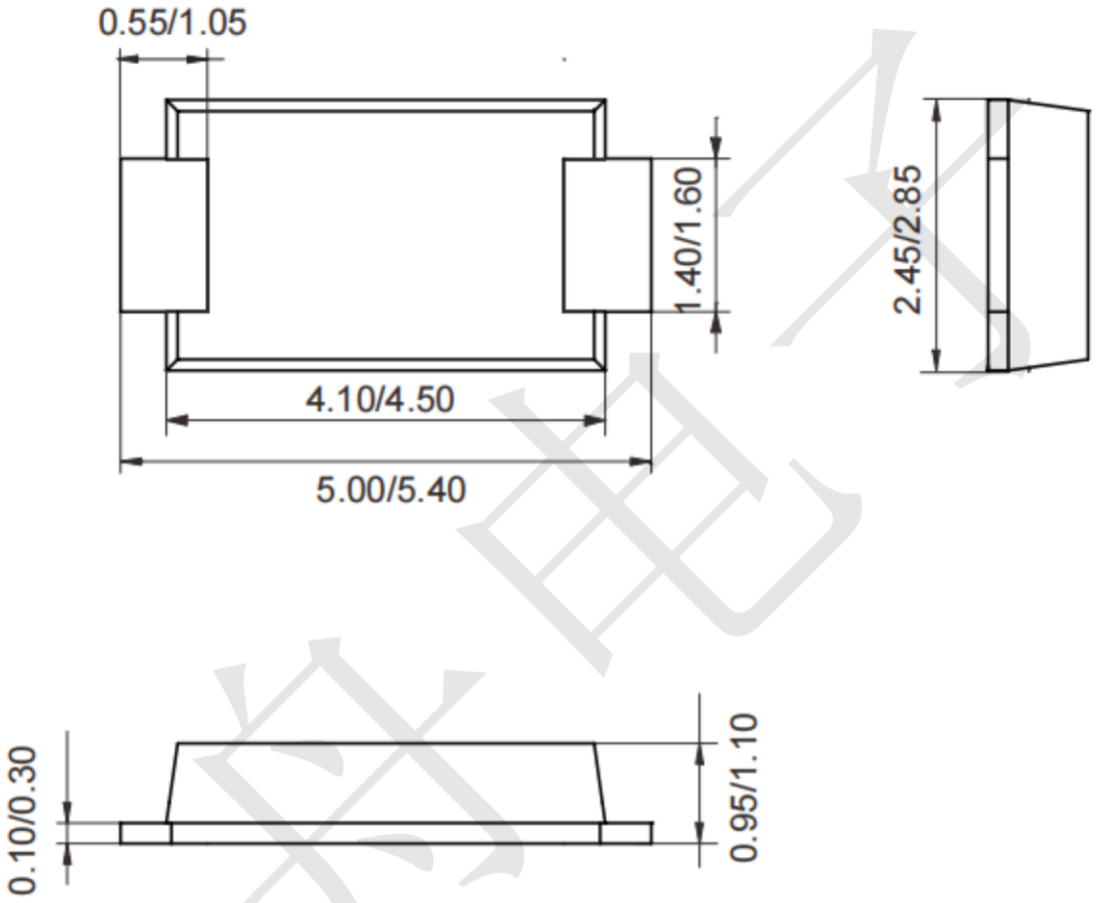
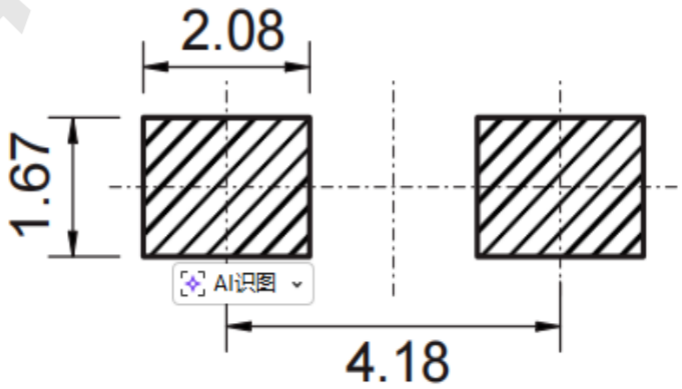



Fig. 4- Maximum Non-Repetitive Surge Current



## Outline Drawing - SMAFL(Unit: mm)




## Mounting Pad Layout-SMAFL(Unit: mm)