



THE DATASHEET OF SMF90A-TP



Features

- Uni and Bi-directional Type Available (Suffix "C" means Bi-directional)
- Surface Mount
- Low Clamping Voltage
- Small, High Thermal Efficiency
- Halogen Free Available Upon Request By Adding Suffix "-HF"
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant (Note1) ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

- Operating Junction Temperature Range: -65°C to +175°C
- Storage Temperature Range: -65°C to +175°C
- Typical Thermal Resistance: 26°C/W Junction to Lead
- Typical Thermal Resistance: 300°C/W Junction to Ambient

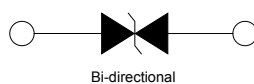
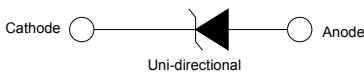
Electrical Characteristics @ 25°C Unless Otherwise Specified

| | | | |
|--|-----------|-------|---|
| Peak Pulse Power Dissipation with a 10/1000µs Waveform | P_{PP} | 200W | - |
| ESD Voltage(HBM) | V_{ESD} | >16KV | - |
| Peak forward surge current, 8.3 ms single half sine-wave | I_{FSM} | 30A | - |

Note:

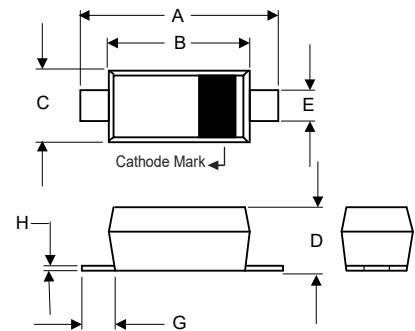
1. High Temperature Solder Exemption Applied, see EU Directive Annex 7a.

Pin Configuration:



**200 Watt TVS
5.0 to 170 Volts**

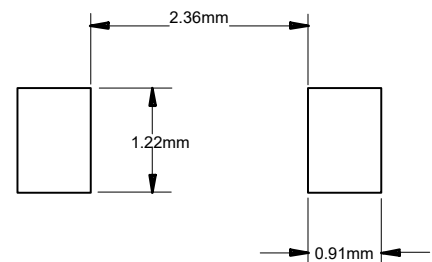
SOD-123FL



DIMENSIONS

| DIM | INCHES | | MM | | NOTE |
|-----|--------|-------|------|------|------|
| | MIN | MAX | MIN | MAX | |
| A | 0.130 | 0.152 | 3.30 | 3.85 | |
| B | 0.100 | 0.122 | 2.55 | 3.10 | |
| C | 0.055 | 0.075 | 1.40 | 1.90 | |
| D | 0.035 | 0.053 | 0.90 | 1.35 | |
| E | 0.020 | 0.041 | 0.50 | 1.05 | |
| G | 0.010 | ---- | 0.25 | ---- | |
| H | ---- | 0.010 | ---- | 0.25 | |

SUGGESTED SOLDER PAD LAYOUT



Electrical Characteristics @ 25°C Unless Otherwise Specified

| MCC Part Number | Reverse Stand-Off Voltage | Breakdown Voltage $V_{BR}(V)$ | | Test Current | Max. Clamping Voltage @ I_{PP} | Max. Peak Pulse Current | Max. Reverse Leakage Current @ V_{WM} | Marking Code |
|-----------------|---------------------------|-------------------------------|------|--------------|----------------------------------|-------------------------|---|--------------|
| | $V_{WM}(V)$ | Min | Max | $I_T(mA)$ | $V_C(V)$ | $I_{PP}(A)$ | $I_D(\mu A)$ | |
| SMF5.0A | 5.0 | 6.4 | 7.0 | 10 | 9.2 | 21.7 | 400 | 5.0A/KE |
| SMF6.0A | 6.0 | 6.67 | 7.37 | 10 | 10.3 | 19.4 | 400 | 6.0A/KG |
| SMF6.5A | 6.5 | 7.22 | 7.98 | 10 | 11.2 | 17.9 | 250 | 6.5A/KK |
| SMF7.0A | 7.0 | 7.78 | 8.6 | 10 | 12 | 16.7 | 100 | 7.0A/KM |
| SMF7.5A | 7.5 | 8.33 | 9.21 | 1.0 | 12.9 | 15.5 | 50 | 7.5A/KP |
| SMF8.0A | 8.0 | 8.89 | 9.83 | 1.0 | 13.6 | 14.7 | 25 | 8.0A/KR |
| SMF8.5A | 8.5 | 9.44 | 10.4 | 1.0 | 14.4 | 13.9 | 10 | 8.5A/KT |
| SMF9.0A | 9.0 | 10 | 11.1 | 1.0 | 15.4 | 13 | 5.0 | 9.0A/KV |
| SMF10A | 10 | 11.1 | 12.3 | 1.0 | 17 | 11.8 | 2.5 | 10A/KX |
| SMF11A | 11 | 12.2 | 13.5 | 1.0 | 18.2 | 11 | 2.5 | 11A/KZ |
| SMF12A | 12 | 13.3 | 14.7 | 1.0 | 19.9 | 10.1 | 2.5 | 12A/LE |
| SMF13A | 13 | 14.4 | 15.9 | 1.0 | 21.5 | 9.3 | 1.0 | 13A/LG |
| SMF14A | 14 | 15.6 | 17.2 | 1.0 | 23.2 | 8.6 | 1.0 | 14A/LK |
| SMF15A | 15 | 16.7 | 18.5 | 1.0 | 24.4 | 8.2 | 1.0 | 15A/LM |
| SMF16A | 16 | 17.8 | 19.7 | 1.0 | 26 | 7.7 | 1.0 | 16A/LP |
| SMF17A | 17 | 18.9 | 20.9 | 1.0 | 27.6 | 7.2 | 1.0 | 17A/LR |
| SMF18A | 18 | 20 | 22.1 | 1.0 | 29.2 | 6.8 | 1.0 | 18A/LT |
| SMF20A | 20 | 22.2 | 24.5 | 1.0 | 32.4 | 6.2 | 1.0 | 20A/LV |
| SMF22A | 22 | 24.4 | 26.9 | 1.0 | 35.5 | 5.6 | 1.0 | 22A/LX |
| SMF24A | 24 | 26.7 | 29.5 | 1.0 | 38.9 | 5.1 | 1.0 | 24A/LZ |
| SMF26A | 26 | 28.9 | 31.9 | 1.0 | 42.1 | 4.8 | 1.0 | 26A/ME |
| SMF28A | 28 | 31.1 | 34.4 | 1.0 | 45.4 | 4.4 | 1.0 | 28A/MG |
| SMF30A | 30 | 33.3 | 36.8 | 1.0 | 48.4 | 4.1 | 1.0 | 30A/MK |
| SMF33A | 33 | 36.7 | 40.6 | 1.0 | 53.3 | 3.8 | 1.0 | 33A/MM |
| SMF36A | 36 | 40 | 44.2 | 1.0 | 58.1 | 3.4 | 1.0 | 36A/MP |
| SMF40A | 40 | 44.4 | 49.1 | 1.0 | 64.5 | 3.1 | 1.0 | 40A/MR |
| SMF43A | 43 | 47.8 | 52.8 | 1.0 | 69.4 | 2.9 | 1.0 | 43A/MT |
| SMF45A | 45 | 50 | 55.3 | 1.0 | 72.7 | 2.8 | 1.0 | 45A/MV |
| SMF48A | 48 | 53.3 | 58.9 | 1.0 | 77.4 | 2.6 | 1.0 | 48A/MX |
| SMF51A | 51 | 56.7 | 62.7 | 1.0 | 82.4 | 2.4 | 1.0 | 51A/MZ |
| SMF54A | 54 | 60 | 66.3 | 1.0 | 87.1 | 2.3 | 1.0 | 54A/NE |
| SMF58A | 58 | 64.4 | 71.2 | 1.0 | 93.6 | 2.1 | 1.0 | 58A/NG |
| SMF60A | 60 | 66.7 | 73.7 | 1.0 | 96.8 | 1.8 | 1.0 | 60A/NK |
| SMF64A | 64 | 71.1 | 78.6 | 1.0 | 103 | 1.7 | 1.0 | 64A/NM |
| SMF70A | 70 | 77.8 | 86 | 1.0 | 113 | 1.5 | 1.0 | 70A/NP |
| SMF75A | 75 | 83.3 | 92.1 | 1.0 | 121 | 1.4 | 1.0 | 75A/NR |
| SMF78A | 78 | 86.7 | 95.8 | 1.0 | 126 | 1.4 | 1.0 | 78A/NT |
| SMF85A | 85 | 94.4 | 104 | 1.0 | 137 | 1.3 | 1.0 | 85A/NV |
| SMF90A | 90 | 100 | 111 | 1.0 | 146 | 1.2 | 1.0 | 90A/NX |
| SMF100A | 100 | 111 | 123 | 1.0 | 162 | 1.1 | 1.0 | 100/NZ |
| SMF110A | 110 | 122 | 135 | 1.0 | 177 | 1.0 | 1.0 | 110/PE |
| SMF120A | 120 | 133 | 147 | 1.0 | 193 | 0.9 | 1.0 | 120/PG |
| SMF130A | 130 | 144 | 159 | 1.0 | 209 | 0.8 | 1.0 | 130/PK |
| SMF150A | 150 | 167 | 185 | 1.0 | 243 | 0.7 | 1.0 | 150/PM |
| SMF160A | 160 | 178 | 197 | 1.0 | 259 | 0.7 | 1.0 | 160/PP |
| SMF170A | 170 | 189 | 209 | 1.0 | 275 | 0.6 | 1.0 | 170/PR |

Electrical Characteristics @ 25°C Unless Otherwise Specified

| MCC Part Number | Reverse Stand-Off Voltage | Breakdown Voltage $V_{BR}(V)$ | | Test Current | Max. Clamping Voltage @ I_{PP} | Max. Peak Pulse Current | Max. Reverse Leakage Current @ V_{WM} | Marking Code |
|-----------------|---------------------------|-------------------------------|------|--------------|----------------------------------|-------------------------|---|--------------|
| | $V_{WM}(V)$ | Min | Max | $I_T(mA)$ | $V_C(V)$ | $I_{PP}(A)$ | $I_D(\mu A)$ | |
| SMF5.0CA | 5.0 | 6.4 | 7.0 | 10 | 9.2 | 21.7 | 400 | 5.0CA/AE |
| SMF6.0CA | 6.0 | 6.67 | 7.37 | 10 | 10.3 | 19.4 | 400 | 6.0CA/AG |
| SMF6.5CA | 6.5 | 7.22 | 7.98 | 10 | 11.2 | 17.9 | 250 | 6.5CA/AK |
| SMF7.0CA | 7.0 | 7.78 | 8.6 | 10 | 12 | 16.7 | 100 | 7.0CA/AM |
| SMF7.5CA | 7.5 | 8.33 | 9.21 | 1.0 | 12.9 | 15.5 | 50 | 7.5CA/AP |
| SMF8.0CA | 8.0 | 8.89 | 9.83 | 1.0 | 13.6 | 14.7 | 25 | 8.0CA/AR |
| SMF8.5CA | 8.5 | 9.44 | 10.4 | 1.0 | 14.4 | 13.9 | 10 | 8.5CA/AT |
| SMF9.0CA | 9.0 | 10 | 11.1 | 1.0 | 15.4 | 13 | 5.0 | 9.0CA/AV |
| SMF10CA | 10 | 11.1 | 12.3 | 1.0 | 17 | 11.8 | 2.5 | 10CA/AX |
| SMF11CA | 11 | 12.2 | 13.5 | 1.0 | 18.2 | 11 | 2.5 | 11CA/AZ |
| SMF12CA | 12 | 13.3 | 14.7 | 1.0 | 19.9 | 10.1 | 2.5 | 12CA/BE |
| SMF13CA | 13 | 14.4 | 15.9 | 1.0 | 21.5 | 9.3 | 1.0 | 13CA/BG |
| SMF14CA | 14 | 15.6 | 17.2 | 1.0 | 23.2 | 8.6 | 1.0 | 14CA/BK |
| SMF15CA | 15 | 16.7 | 18.5 | 1.0 | 24.4 | 8.2 | 1.0 | 15CA/BM |
| SMF16CA | 16 | 17.8 | 19.7 | 1.0 | 26 | 7.7 | 1.0 | 16CA/BP |
| SMF17CA | 17 | 18.9 | 20.9 | 1.0 | 27.6 | 7.2 | 1.0 | 17CA/BR |
| SMF18CA | 18 | 20 | 22.1 | 1.0 | 29.2 | 6.8 | 1.0 | 18CA/BT |
| SMF20CA | 20 | 22.2 | 24.5 | 1.0 | 32.4 | 6.2 | 1.0 | 20CA/BV |
| SMF22CA | 22 | 24.4 | 26.9 | 1.0 | 35.5 | 5.6 | 1.0 | 22CA/BX |
| SMF24CA | 24 | 26.7 | 29.5 | 1.0 | 38.9 | 5.1 | 1.0 | 24CA/BZ |
| SMF26CA | 26 | 28.9 | 31.9 | 1.0 | 42.1 | 4.8 | 1.0 | 26CA/CE |
| SMF28CA | 28 | 31.1 | 34.4 | 1.0 | 45.4 | 4.4 | 1.0 | 28CA/CG |
| SMF30CA | 30 | 33.3 | 36.8 | 1.0 | 48.4 | 4.1 | 1.0 | 30CA/CK |
| SMF33CA | 33 | 36.7 | 40.6 | 1.0 | 53.3 | 3.8 | 1.0 | 33CA/CM |
| SMF36CA | 36 | 40 | 44.2 | 1.0 | 58.1 | 3.4 | 1.0 | 36CA/CP |
| SMF40CA | 40 | 44.4 | 49.1 | 1.0 | 64.5 | 3.1 | 1.0 | 40CA/CR |
| SMF43CA | 43 | 47.8 | 52.8 | 1.0 | 69.4 | 2.9 | 1.0 | 43CA/CT |
| SMF45CA | 45 | 50 | 55.3 | 1.0 | 72.7 | 2.8 | 1.0 | 45CA/CV |
| SMF48CA | 48 | 53.3 | 58.9 | 1.0 | 77.4 | 2.6 | 1.0 | 48CA/CX |
| SMF51CA | 51 | 56.7 | 62.7 | 1.0 | 82.4 | 2.4 | 1.0 | 51CA/CZ |
| SMF54CA | 54 | 60 | 66.3 | 1.0 | 87.1 | 2.3 | 1.0 | 54CA/DE |
| SMF58CA | 58 | 64.4 | 71.2 | 1.0 | 93.6 | 2.1 | 1.0 | 58CA/DG |
| SMF60CA | 60 | 66.7 | 73.7 | 1.0 | 96.8 | 1.8 | 1.0 | 60CA/DK |
| SMF64CA | 64 | 71.1 | 78.6 | 1.0 | 103 | 1.7 | 1.0 | 64CA/DM |
| SMF70CA | 70 | 77.8 | 86 | 1.0 | 113 | 1.5 | 1.0 | 70CA/DP |
| SMF75CA | 75 | 83.3 | 92.1 | 1.0 | 121 | 1.4 | 1.0 | 75CA/DR |
| SMF78CA | 78 | 86.7 | 95.8 | 1.0 | 126 | 1.4 | 1.0 | 78CA/DT |
| SMF85CA | 85 | 94.4 | 104 | 1.0 | 137 | 1.3 | 1.0 | 85CA/DV |
| SMF90CA | 90 | 100 | 111 | 1.0 | 146 | 1.2 | 1.0 | 90CA/DX |
| SMF100CA | 100 | 111 | 123 | 1.0 | 162 | 1.1 | 1.0 | 100C/DZ |
| SMF110CA | 110 | 122 | 135 | 1.0 | 177 | 1.0 | 1.0 | 110C/EE |
| SMF120CA | 120 | 133 | 147 | 1.0 | 193 | 0.9 | 1.0 | 120C/EG |
| SMF130CA | 130 | 144 | 159 | 1.0 | 209 | 0.8 | 1.0 | 130C/EK |
| SMF150CA | 150 | 167 | 185 | 1.0 | 243 | 0.7 | 1.0 | 150C/EM |
| SMF160CA | 160 | 178 | 197 | 1.0 | 259 | 0.7 | 1.0 | 160C/EP |
| SMF170CA | 170 | 189 | 209 | 1.0 | 275 | 0.6 | 1.0 | 170C/ER |

Curve Characteristics

Fig. 1 - Peak Pulse Power Rating Curve



Fig. 2 - Typical Junction Capacitance



Fig. 3 - Pulse Waveform



Fig. 4 - Pulse Derating Curve



Ordering Information

| Device | Packing |
|----------------|------------------------|
| Part Number-TP | Tape&Reel:2.5Kpcs/Reel |

Note : Adding "-HF" Suffix For Halogen Free, eg. Part Number-TP-HF

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