

SMAF5.0A THRU SMAF220A-HAF

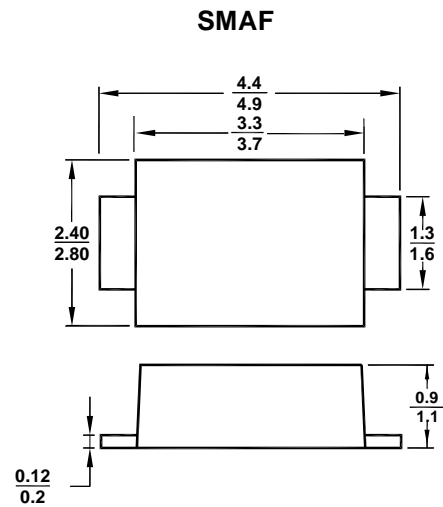
Surface Mount Transient Voltage Suppressors

Features

- For surface mounted applications in order to optimize board space.
- Low profile package
- Glass passivated junction
- Low inductance
- Plastic package has Underwriters Laboratory Flammability
- Halogen and Antimony Free(HAF), RoHS compliant

Mechanical Data

- Case: SMAF
- Terminals: Solderable per MIL-STD-750, Method 2026



All Dimensions in mm

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$ unless otherwise specified)

| Parameter | Symbol | Value | Unit |
|--|-----------------|---------------------|--------------------|
| Peak Pulse Power Dissipation on 10/1000 s waveform | P_{PPM} | Min. 200 | W |
| ESD Voltage per IEC6100-4-2 | V_{ESD} | ± 15 ± 8 | KV |
| Peak Pulse Current on 10/1000 us waveform ¹⁾ | I_{PPM} | see Table 1 | A |
| Peak Forward Surge Current, 8.3 ms Single Half Sine-wave Superimposed on Rated Load (JEDEC Method) ²⁾ | I_{FSM} | 20 | A |
| Typical Junction capacitance at $V_R = 4\text{ V}$, $f = 1\text{ MHz}$ | C_J | 390 | pF |
| Typical Thermal Resistance Junction to Ambient ²⁾ | $R_{\theta JA}$ | 150 | $^\circ\text{C/W}$ |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | - 55 to + 150 | $^\circ\text{C}$ |

¹⁾ Non-repetitive current pulse and derated above $T_a = 25^\circ\text{C}$.

²⁾ Mounted on FR-4 PCB single-sided copper, mini pad.

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ISO14001 : 2004 Certificate No. 121505007 ISO 9001 : 2008 Certificate No. 50114012 OHSAS 18001 : 2007 Certificate No. 05131508008 IECQ QC 080000 Certificate No. E2241000714182

SMAF5.0A THRU SMAF220A-HAF

Electrical Characteristics $T_a = 25^\circ\text{C}$

| Type | Marking | Working Peak Reverse Voltage | Breakdown Voltage | | | Maximum Clamping Voltage | | Maximum Reverse Current |
|----------|---------|------------------------------|-------------------|----------|----------|--------------------------|--------------|-------------------------|
| | | | V_{BR} | | at I_T | V_C | at I_{PPM} | I_R at V_{RWM} |
| | | | V_{RWM} (V) | Min. (V) | Max. (V) | (mA) | Max. (V) | (A) |
| SMAF5.0 | 5.0V | 5 | 6.4 | 7.82 | 10 | 9.6 | 41.7 | 800 |
| SMAF5.0A | 5.0A | 5 | 6.4 | 7.07 | 10 | 9.2 | 43.85 | 800 |
| SMAF6.0 | 6.0V | 6 | 6.67 | 8.15 | 10 | 11.4 | 35.1 | 800 |
| SMAF6.0A | 6.0A | 6 | 6.67 | 7.37 | 10 | 10.3 | 38.8 | 800 |
| SMAF6.5 | 6.5V | 6.5 | 7.22 | 8.82 | 10 | 12.3 | 32.5 | 500 |
| SMAF6.5A | 6.5A | 6.5 | 7.22 | 7.98 | 10 | 11.2 | 35.7 | 500 |
| SMAF7.0 | 7.0V | 7 | 7.78 | 9.51 | 10 | 13.3 | 30.1 | 200 |
| SMAF7.0A | 7.0A | 7 | 7.78 | 8.6 | 10 | 12 | 33.3 | 200 |
| SMAF7.5 | 7.5V | 7.5 | 8.33 | 10.02 | 1 | 14.3 | 28 | 100 |
| SMAF7.5A | 7.5A | 7.5 | 8.33 | 9.21 | 1 | 12.9 | 31 | 100 |
| SMAF8.0 | 8.0V | 8 | 8.89 | 10.09 | 1 | 15 | 26.7 | 50 |
| SMAF8.0A | 8.0A | 8 | 8.89 | 9.83 | 1 | 13.6 | 29.4 | 50 |
| SMAF8.5 | 8.5V | 8.5 | 9.44 | 11.5 | 1 | 15.9 | 25.2 | 10 |
| SMAF8.5A | 8.5A | 8.5 | 9.44 | 10.4 | 1 | 14.4 | 27.8 | 10 |
| SMAF9.0 | 9.0V | 9 | 10 | 12.2 | 1 | 16.9 | 23.7 | 5 |
| SMAF9.0A | 9.0A | 9 | 10 | 11.1 | 1 | 15.4 | 26 | 5 |
| SMAF10 | 10V | 10 | 11.1 | 13.6 | 1 | 18.8 | 21.3 | 5 |
| SMAF10A | 10A | 10 | 11.1 | 12.3 | 1 | 17 | 23.5 | 5 |
| SMAF11 | 11V | 11 | 12.2 | 14.9 | 1 | 20.1 | 19.9 | 5 |
| SMAF11A | 11A | 11 | 12.2 | 13.5 | 1 | 18.2 | 22 | 5 |
| SMAF12 | 12V | 12 | 13.3 | 16.3 | 1 | 22 | 18.2 | 5 |
| SMAF12A | 12A | 12 | 13.3 | 14.7 | 1 | 19.9 | 20.1 | 5 |
| SMAF13 | 13V | 13 | 14.4 | 17.6 | 1 | 23.8 | 16.8 | 5 |
| SMAF13A | 13A | 13 | 14.4 | 15.9 | 1 | 21.5 | 18.6 | 5 |
| SMAF14 | 14V | 14 | 15.6 | 19.1 | 1 | 25.8 | 15.5 | 5 |
| SMAF14A | 14A | 14 | 15.6 | 17.2 | 1 | 23.2 | 17.2 | 5 |
| SMAF15 | 15V | 15 | 16.7 | 20.4 | 1 | 26.9 | 14.9 | 5 |
| SMAF15A | 15A | 15 | 16.7 | 18.5 | 1 | 24.4 | 16.4 | 5 |
| SMAF16 | 16V | 16 | 17.8 | 21.8 | 1 | 28.8 | 13.9 | 5 |
| SMAF16A | 16A | 16 | 17.8 | 19.7 | 1 | 26 | 15.4 | 5 |
| SMAF17 | 17V | 17 | 18.9 | 23.1 | 1 | 30.5 | 13.1 | 5 |
| SMAF17A | 17A | 17 | 18.9 | 20.9 | 1 | 27.6 | 14.5 | 5 |
| SMAF18 | 18V | 18 | 20 | 24.4 | 1 | 32.2 | 12.4 | 5 |
| SMAF18A | 18A | 18 | 20 | 22.1 | 1 | 29.2 | 13.7 | 5 |
| SMAF20 | 20V | 20 | 22.2 | 27.1 | 1 | 35.8 | 11.2 | 5 |
| SMAF20A | 20A | 20 | 22.2 | 24.5 | 1 | 32.4 | 12.3 | 5 |
| SMAF22 | 22V | 22 | 24.4 | 29.8 | 1 | 39.4 | 10.2 | 5 |
| SMAF22A | 22A | 22 | 24.4 | 26.9 | 1 | 35.5 | 11.3 | 5 |
| SMAF24 | 24V | 24 | 26.7 | 32.6 | 1 | 43 | 9.3 | 5 |
| SMAF24A | 24A | 24 | 26.7 | 29.5 | 1 | 38.9 | 10.3 | 5 |
| SMAF26 | 26V | 26 | 28.9 | 35.3 | 1 | 46.6 | 8.6 | 5 |
| SMAF26A | 26A | 26 | 28.9 | 31.9 | 1 | 42.1 | 9.5 | 5 |
| SMAF28 | 28V | 28 | 31.1 | 38 | 1 | 50 | 8 | 5 |
| SMAF28A | 28A | 28 | 31.1 | 34.4 | 1 | 45.4 | 8.8 | 5 |
| SMAF30 | 30V | 30 | 33.3 | 40.7 | 1 | 53.5 | 7.5 | 5 |
| SMAF30A | 30A | 30 | 33.3 | 36.8 | 1 | 48.4 | 8.3 | 5 |

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Dated : 26/07/2016 JD Rev: 02

SMAF5.0A THRU SMAF220A-HAF

Electrical Characteristics $T_a = 25^\circ\text{C}$

| Type | Marking | Working Peak Reverse Voltage V_{RWM} (V) | Breakdown Voltage | | | Maximum Clamping Voltage | | Maximum Reverse Current |
|----------|---------|---|-------------------|----------|----------|--------------------------|--------------|-------------------------|
| | | | V_{BR} | | at I_T | V_C | at I_{PPM} | I_R at V_{RWM} |
| | | | Min. (V) | Max. (V) | (mA) | Max. (V) | (A) | Max. (μA) |
| SMAF33 | 33V | 33 | 36.7 | 44.9 | 1 | 59 | 6.8 | 5 |
| SMAF33A | 33A | 33 | 36.7 | 40.6 | 1 | 53.3 | 7.5 | 5 |
| SMAF36 | 36V | 36 | 40 | 48.9 | 1 | 64.3 | 6.2 | 5 |
| SMAF36A | 36A | 36 | 40 | 44.2 | 1 | 58.1 | 6.9 | 5 |
| SMAF40 | 40V | 40 | 44.4 | 54.3 | 1 | 71.4 | 5.6 | 5 |
| SMAF40A | 40A | 40 | 44.4 | 49.1 | 1 | 64.5 | 6.2 | 5 |
| SMAF43 | 43V | 43 | 47.8 | 58.4 | 1 | 76.7 | 5.2 | 5 |
| SMAF43A | 43A | 43 | 47.8 | 52.8 | 1 | 69.4 | 5.8 | 5 |
| SMAF45 | 45V | 45 | 50 | 61.1 | 1 | 80.3 | 5 | 5 |
| SMAF45A | 45A | 45 | 50 | 55.3 | 1 | 72.7 | 5.5 | 5 |
| SMAF48 | 48V | 48 | 53.3 | 65.1 | 1 | 85.5 | 4.7 | 5 |
| SMAF48A | 48A | 48 | 53.3 | 58.9 | 1 | 77.4 | 5.2 | 5 |
| SMAF51 | 51V | 51 | 56.7 | 69.3 | 1 | 91.1 | 4.4 | 5 |
| SMAF51A | 51A | 51 | 56.7 | 62.7 | 1 | 82.4 | 4.9 | 5 |
| SMAF54 | 54V | 54 | 60 | 73.3 | 1 | 96.3 | 4.2 | 5 |
| SMAF54A | 54A | 54 | 60 | 66.3 | 1 | 87.1 | 4.6 | 5 |
| SMAF58 | 58V | 58 | 64.4 | 78.7 | 1 | 103 | 3.9 | 5 |
| SMAF58A | 58A | 58 | 64.4 | 71.2 | 1 | 93.6 | 4.3 | 5 |
| SMAF60 | 60V | 60 | 66.7 | 81.5 | 1 | 107 | 3.7 | 5 |
| SMAF60A | 60A | 60 | 66.7 | 73.7 | 1 | 96.8 | 4.1 | 5 |
| SMAF64 | 64V | 64 | 71.1 | 86.9 | 1 | 114 | 3.5 | 5 |
| SMAF64A | 64A | 64 | 71.1 | 78.6 | 1 | 103 | 3.9 | 5 |
| SMAF70 | 70V | 70 | 77.8 | 95.1 | 1 | 125 | 3.2 | 5 |
| SMAF70A | 70A | 70 | 77.8 | 86 | 1 | 113 | 3.5 | 5 |
| SMAF75 | 75V | 75 | 83.3 | 102 | 1 | 134 | 3 | 5 |
| SMAF75A | 75A | 75 | 83.3 | 92.1 | 1 | 121 | 3 | 5 |
| SMAF78 | 78V | 78 | 86.7 | 106 | 1 | 139 | 2.9 | 5 |
| SMAF78A | 78A | 78 | 86.7 | 95.8 | 1 | 126 | 3.2 | 5 |
| SMAF85 | 85V | 85 | 94.4 | 115 | 1 | 151 | 2 | 5 |
| SMAF85A | 85A | 85 | 94.4 | 104 | 1 | 137 | 2.2 | 5 |
| SMAF90 | 90V | 90 | 100 | 122 | 1 | 160 | 1.9 | 5 |
| SMAF90A | 90A | 90 | 100 | 111 | 1 | 146 | 2.1 | 5 |
| SMAF100 | 100V | 100 | 111 | 136 | 1 | 179 | 1.7 | 5 |
| SMAF100A | 100A | 100 | 111 | 123 | 1 | 162 | 1.9 | 5 |
| SMAF110 | 110V | 110 | 122 | 149 | 1 | 196 | 1.5 | 5 |
| SMAF110A | 110A | 110 | 122 | 135 | 1 | 177 | 1.7 | 5 |
| SMAF120 | 120V | 120 | 133 | 163 | 1 | 214 | 1.4 | 5 |
| SMAF120A | 120A | 120 | 133 | 147 | 1 | 193 | 1.6 | 5 |
| SMAF130 | 130V | 130 | 144 | 176 | 1 | 231 | 1.3 | 5 |
| SMAF130A | 130A | 130 | 144 | 159 | 1 | 209 | 1.4 | 5 |
| SMAF150 | 150V | 150 | 167 | 204 | 1 | 268 | 1.1 | 5 |
| SMAF150A | 150A | 150 | 167 | 185 | 1 | 243 | 1.2 | 5 |
| SMAF160 | 160V | 160 | 178 | 218 | 1 | 287 | 1.1 | 5 |
| SMAF160A | 160A | 160 | 178 | 197 | 1 | 259 | 1.2 | 5 |
| SMAF170 | 170V | 170 | 189 | 231 | 1 | 304 | 1.1 | 5 |
| SMAF170A | 170A | 170 | 189 | 209 | 1 | 275 | 1.1 | 5 |

TOP DYNAMIC



Dated : 26/07/2016 JD Rev: 02

SMAF5.0A THRU SMAF220A-HAF

Electrical Characteristics at $T_a = 25^\circ\text{C}$

| Type | Marking | Working Peak Reverse Voltage | Breakdown Voltage | | | Maximum Clamping Voltage | | Maximum Reverse Current |
|----------|---------|------------------------------|-------------------|----------|----------|--------------------------|--------------|-------------------------|
| | | | V_{BR} | | at I_T | V_C | at I_{PPM} | I_R at V_{RWM} |
| | | | V_{RWM} (V) | Min. (V) | Max. (V) | (mA) | Max. (V) | (A) |
| SMAF180 | 180V | 180 | 200 | 243 | 1 | 323 | 1.1 | 5 |
| SMAF180A | 180A | 180 | 200 | 220 | 1 | 291 | 1.1 | 5 |
| SMAF190 | 190V | 190 | 211 | 254 | 1 | 341 | 1.1 | 5 |
| SMAF190A | 190A | 190 | 211 | 230 | 1 | 307 | 1.1 | 5 |
| SMAF200 | 200V | 200 | 222 | 264 | 1 | 361 | 1.1 | 5 |
| SMAF200A | 200A | 200 | 222 | 239 | 1 | 323 | 1.1 | 5 |
| SMAF220 | 220V | 220 | 243 | 282 | 1 | 386 | 1.1 | 5 |
| SMAF220A | 220A | 220 | 243 | 255 | 1 | 356 | 1.1 | 5 |

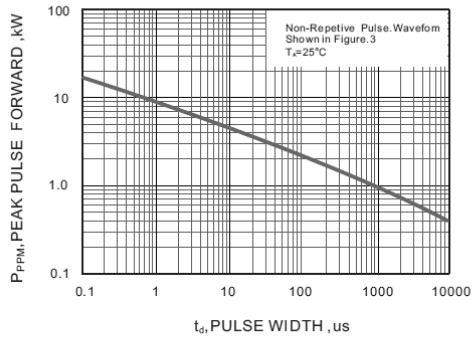
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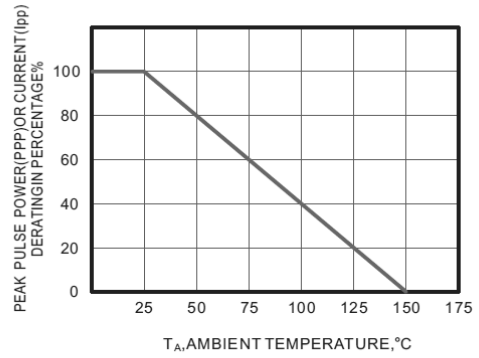
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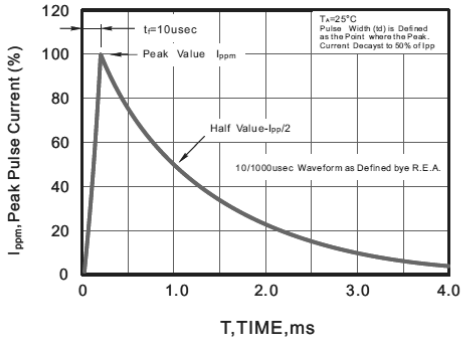
Peak Pulse Power Rating Curve



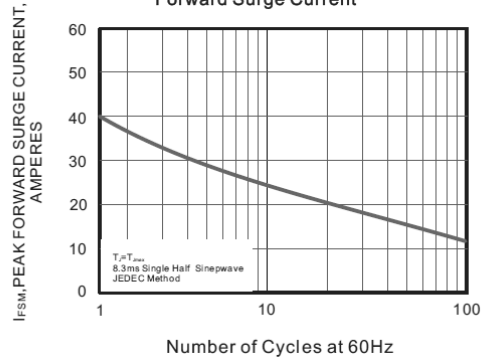
Forward Current Derating Curve



Pulse Waveform



Maximum Non-Repetitive Peak Forward Surge Current



TOP DYNAMIC



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