

»Features

- Excellent clamping capability
- Low leakage current
- Low capacitance
- High surge capability
- Glass passivated chip
- Epoxy resin package
- Built-in strain relief
- Will not fatigue
- RoHS Compliant
- Fast response time:
typically less than 1.0ps from 0 Volts to V_{BR} min



SOD-123F

»Mechanical Characteristics

- Package: SOD-123F plastic package.
- Lead Finish: Matte Tin
- Case Material: Epoxy Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020

»Applications

- Cellular phones
- Portable devices
- Business machines
- Power supplies
- Consumer applications

»Electrical Parameters

| Parameter | Definition |
|-----------|--|
| C_J | Junction Capacitance - typical capacitance measured with 0V or V_R bias |
| I_{PP} | Peak Pulse Current - maximum rated peak impulse current |
| V_C | Clamping Voltage - Peak voltage measured across the suppressor at a specified I_{ppm} (peak impulse current) |
| V_{BR} | Breakdown Voltage - Maximum voltage that flows through the TVS at a specified test current (I_T) |
| I_R | Leakage Current - maximum peak off-state current measured at V_R |
| V_R | Peak Off-state Voltage - maximum voltage that can be applied while maintaining off state |



»Summary of Packing Options

| Package | Packing Description | Packing Quantity | Industry Standard |
|----------|---------------------|------------------|-------------------|
| SOD-123F | Tape/Reel, 7" reel | 3000 | EIA-481-1 |
| | Tape/Reel, 13" reel | 10000 | EIA-481-1 |

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

| Parameter | Symbol | Value | Units | Remarks |
|--|-----------------|------------|-----------------------------|----------------|
| Peak Pulse Power Dissipation | P_{PPM} | 200 | W | (Note1)(Note2) |
| Steady State Power Dissipation | P_D | 1 | W | (Note3) |
| Peak Forward Surge Current | I_{FSM} | 20 | A | (Note4) |
| Maximum Instantaneous Forward Voltage at 10A | V_{FM} | 3.5 | V | (Note5) |
| Typical Thermal Resistance Junction to Lead | $R_{\theta JL}$ | 100 | $^{\circ}\text{C}/\text{W}$ | |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 220 | $^{\circ}\text{C}/\text{W}$ | |
| Operating Temperature Range | T_J | -55 to 150 | $^{\circ}\text{C}$ | |
| Storage Temperature Range | T_{STG} | -55 to 150 | $^{\circ}\text{C}$ | |

Notes1: Non-repetitive current pulse , 10/1000us Waveform.

Notes2: Mounted on copper pad area of 3×3mm to each terminal.

Notes3: Infinite HeatSink at $T_A=50^{\circ}\text{C}$

Notes4: Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 perminute maximum.

Notes5: For UnidirectionalOnly.

»Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

| Part Number (Uni) | Part Number (Bi) | Reverse Stand off Voltage V_R (V) | Breakdown Voltage $V_{BR} @ I_T$ (V) | | Test Current I_T (mA) | Maximum Clamping Voltage $V_C @ I_{PP}$ (V) | Maximum Peak Pulse Current I_{PP} (A) | Maximun Reverse Leakage $I_R @ V_R$ (μA) |
|-------------------|------------------|-------------------------------------|--------------------------------------|------|-------------------------|---|---|---|
| | | | Min | Max | | | | |
| SMFJ5.0A | SMFJ5.0CA | 5 | 6.4 | 7 | 10 | 9.2 | 21.7 | 400 |
| SMFJ6.0A | SMFJ6.0CA | 6 | 6.67 | 7.37 | 10 | 10.3 | 19.4 | 400 |
| SMFJ6.5A | SMFJ6.5CA | 6.5 | 7.22 | 7.98 | 10 | 11.2 | 17.9 | 250 |
| SMFJ7.0A | SMFJ7.0CA | 7 | 7.78 | 8.6 | 10 | 12 | 16.7 | 100 |
| SMFJ7.5A | SMFJ7.5CA | 7.5 | 8.33 | 9.21 | 1 | 12.9 | 15.5 | 50 |
| SMFJ8.0A | SMFJ8.0CA | 8 | 8.89 | 9.83 | 1 | 13.6 | 14.7 | 25 |
| SMFJ8.5A | SMFJ8.5CA | 8.5 | 9.44 | 10.4 | 1 | 14.4 | 13.9 | 10 |
| SMFJ9.0A | SMFJ9.0CA | 9 | 10 | 11.1 | 1 | 15.4 | 13 | 5 |
| SMFJ10A | SMFJ10CA | 10 | 11.1 | 12.3 | 1 | 17 | 11.8 | 2.5 |
| SMFJ11A | SMFJ11CA | 11 | 12.2 | 13.5 | 1 | 18.2 | 11 | 2.5 |
| SMFJ12A | SMFJ12CA | 12 | 13.3 | 14.7 | 1 | 19.9 | 10.1 | 2.5 |
| SMFJ13A | SMFJ13CA | 13 | 14.4 | 15.9 | 1 | 21.5 | 9.3 | 1 |
| SMFJ14A | SMFJ14CA | 14 | 15.6 | 17.2 | 1 | 23.2 | 8.6 | 1 |
| SMFJ15A | SMFJ15CA | 15 | 16.7 | 18.5 | 1 | 24.4 | 8.2 | 1 |
| SMFJ16A | SMFJ16CA | 16 | 17.8 | 19.7 | 1 | 26 | 7.7 | 1 |
| SMFJ17A | SMFJ17CA | 17 | 18.9 | 20.9 | 1 | 27.6 | 7.2 | 1 |
| SMFJ18A | SMFJ18CA | 18 | 20 | 22.1 | 1 | 29.2 | 6.8 | 1 |
| SMFJ20A | SMFJ20CA | 20 | 22.2 | 24.5 | 1 | 32.4 | 6.2 | 1 |
| SMFJ22A | SMFJ22CA | 22 | 24.4 | 26.9 | 1 | 35.5 | 5.6 | 1 |
| SMFJ24A | SMFJ24CA | 24 | 26.7 | 29.5 | 1 | 38.9 | 5.1 | 1 |

»Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

| Part Number (Uni) | Part Number (Bi) | Reverse Stand off Voltage V_R (V) | Breakdown Voltage $V_{BR} @ I_T$ (V) | | Test Current I_T (mA) | Maximum Clamping Voltage $V_C @ I_{PP}$ (V) | Maximum Peak Pulse Current I_{PP} (A) | Maximum Reverse Leakage $I_R @ V_R$ (μA) |
|-------------------|------------------|-------------------------------------|--------------------------------------|------|-------------------------|---|---|---|
| | | | Min | Max | | | | |
| SMFJ26A | SMFJ26CA | 26 | 28.9 | 31.9 | 1 | 42.1 | 4.8 | 1 |
| SMFJ28A | SMFJ28CA | 28 | 31.1 | 34.4 | 1 | 45.4 | 4.4 | 1 |
| SMFJ30A | SMFJ30CA | 30 | 33.3 | 36.8 | 1 | 48.4 | 4.1 | 1 |
| SMFJ33A | SMFJ33CA | 33 | 36.7 | 40.6 | 1 | 53.3 | 3.8 | 1 |
| SMFJ36A | SMFJ36CA | 36 | 40 | 44.2 | 1 | 58.1 | 3.4 | 1 |
| SMFJ40A | SMFJ40CA | 40 | 44.4 | 49.1 | 1 | 64.5 | 3.1 | 1 |
| SMFJ43A | SMFJ43CA | 43 | 47.8 | 52.8 | 1 | 69.4 | 2.9 | 1 |
| SMFJ45A | SMFJ45CA | 45 | 50 | 55.3 | 1 | 72.7 | 2.8 | 1 |
| SMFJ48A | SMFJ48CA | 48 | 53.3 | 58.9 | 1 | 77.4 | 2.6 | 1 |
| SMFJ51A | SMFJ51CA | 51 | 56.7 | 62.7 | 1 | 82.4 | 2.4 | 1 |
| SMFJ54A | SMFJ54CA | 54 | 60 | 66.3 | 1 | 87.1 | 2.3 | 1 |
| SMFJ58A | SMFJ58CA | 58 | 64.4 | 71.2 | 1 | 93.6 | 2.1 | 1 |
| SMFJ60A | SMFJ60CA | 60 | 66.7 | 73.7 | 1 | 96.8 | 1.8 | 1 |
| SMFJ64A | SMFJ64CA | 64 | 71.1 | 78.6 | 1 | 103 | 1.7 | 1 |
| SMFJ70A | SMFJ70CA | 70 | 77.8 | 86 | 1 | 113 | 1.5 | 1 |
| SMFJ75A | SMFJ75CA | 75 | 83.3 | 92.1 | 1 | 121 | 1.4 | 1 |
| SMFJ78A | SMFJ78CA | 78 | 86.7 | 95.8 | 1 | 126 | 1.4 | 1 |
| SMFJ85A | SMFJ85CA | 85 | 94.4 | 104 | 1 | 137 | 1.3 | 1 |
| SMFJ90A | SMFJ90CA | 90 | 100 | 111 | 1 | 146 | 1.2 | 1 |
| SMFJ100A | SMFJ100CA | 100 | 111 | 123 | 1 | 162 | 1.1 | 1 |
| SMFJ110A | SMFJ110CA | 110 | 122 | 135 | 1 | 177 | 1 | 1 |
| SMFJ120A | SMFJ120CA | 120 | 133 | 147 | 1 | 193 | 0.9 | 1 |
| SMFJ130A | SMFJ130CA | 130 | 144 | 159 | 1 | 209 | 0.8 | 1 |
| SMFJ150A | SMFJ150CA | 150 | 167 | 185 | 1 | 243 | 0.7 | 1 |
| SMFJ160A | SMFJ160CA | 160 | 178 | 197 | 1 | 259 | 0.7 | 1 |
| SMFJ170A | SMFJ170CA | 170 | 189 | 209 | 1 | 275 | 0.6 | 1 |
| SMFJ180A | SMFJ180CA | 180 | 201 | 222 | 1 | 292 | 0.7 | 1 |
| SMFJ190A | SMFJ190CA | 190 | 209 | 243 | 1 | 308 | 0.6 | 1 |
| SMFJ200A | SMFJ200CA | 200 | 224 | 247 | 1 | 324 | 0.6 | 1 |
| SMFJ210A | SMFJ210CA | 210 | 231 | 268 | 1 | 340 | 0.6 | 1 |
| SMFJ220A | SMFJ220CA | 220 | 246 | 272 | 1 | 356 | 0.5 | 1 |
| SMFJ250A | | 250 | 279 | 309 | 1 | 405 | 0.5 | 1 |
| SMFJ300A | | 300 | 335 | 371 | 1 | 486 | 0.4 | 1 |
| SMFJ350A | | 350 | 391 | 432 | 1 | 567 | 0.3 | 1 |
| SMFJ400A | | 400 | 447 | 494 | 1 | 648 | 0.3 | 1 |
| SMFJ440A | | 440 | 492 | 543 | 1 | 713 | 0.3 | 1 |

»Rating And Characteristic Curves ($T_A=25^\circ\text{C}$ unless otherwise noted)

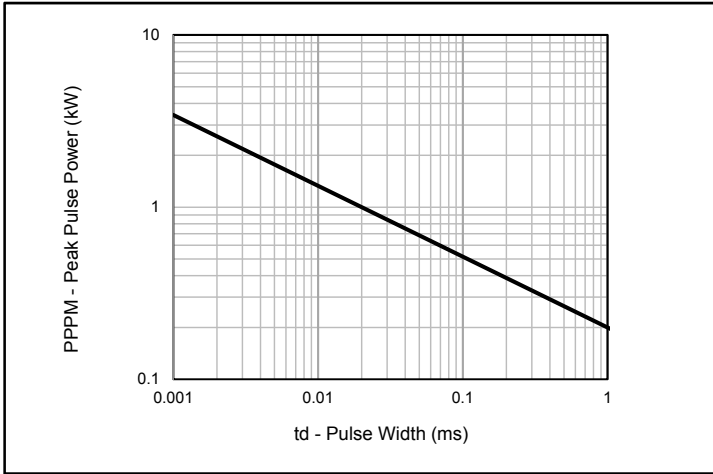


Fig.1 - Peak Pulse Power Rating

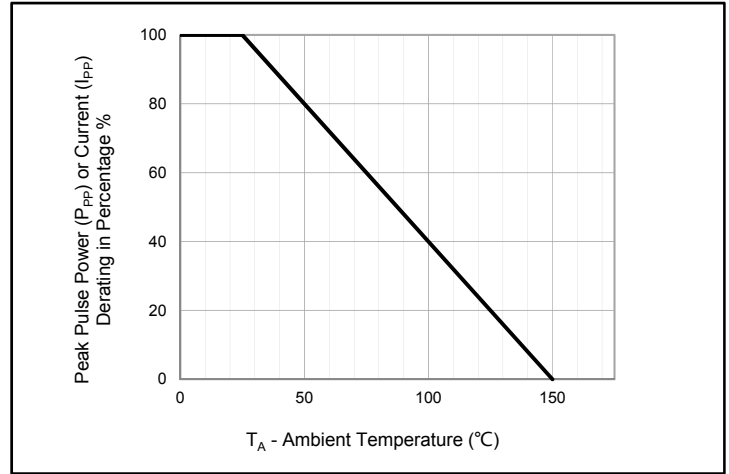


Fig.2 - Pulse Derating Curve

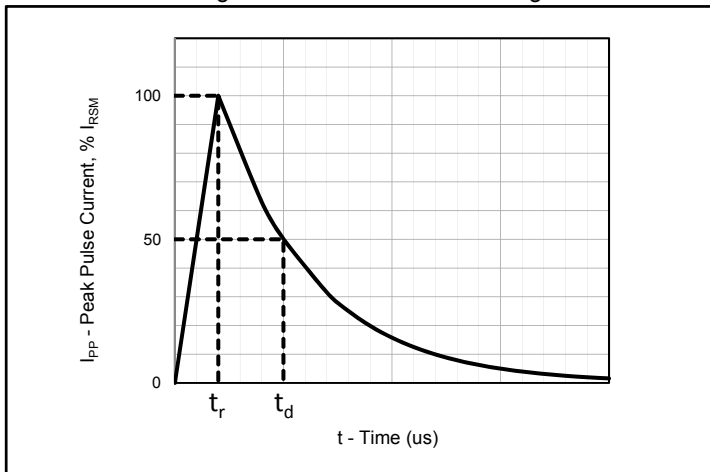


Fig.3 - Pulse Waveform

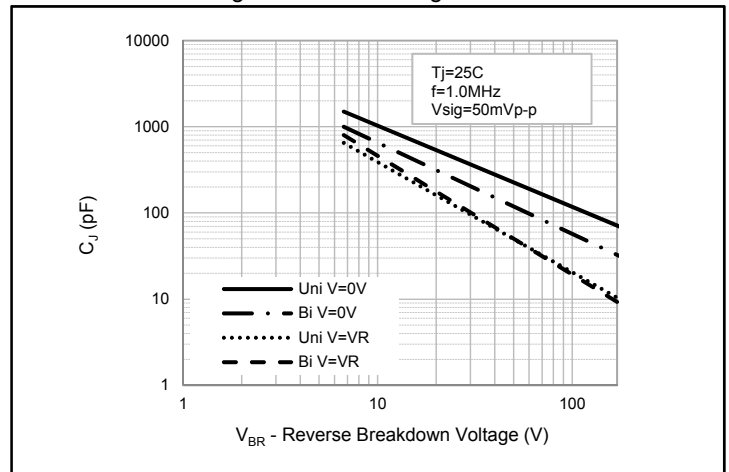


Fig.4 - Typical Junction Capacitance

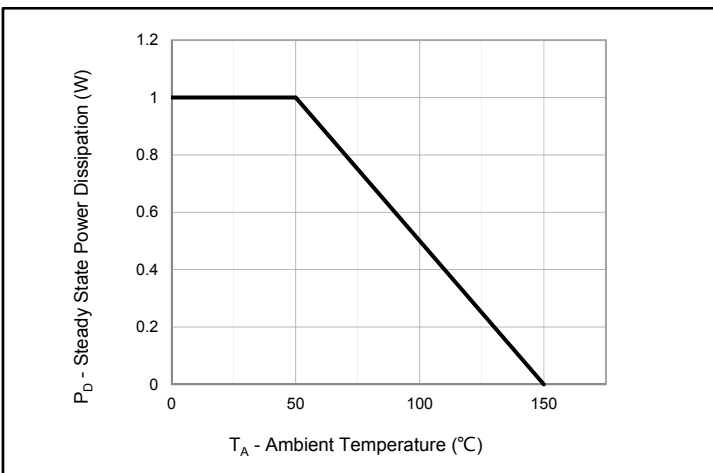


Fig.5 - Steady State Power Dissipation Derating Curve

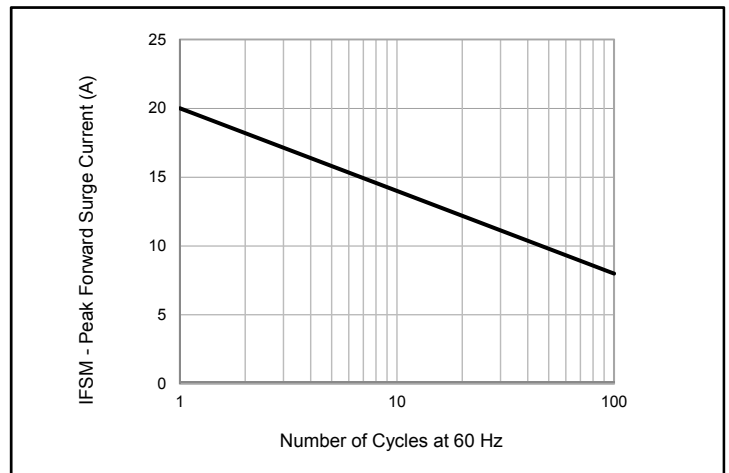
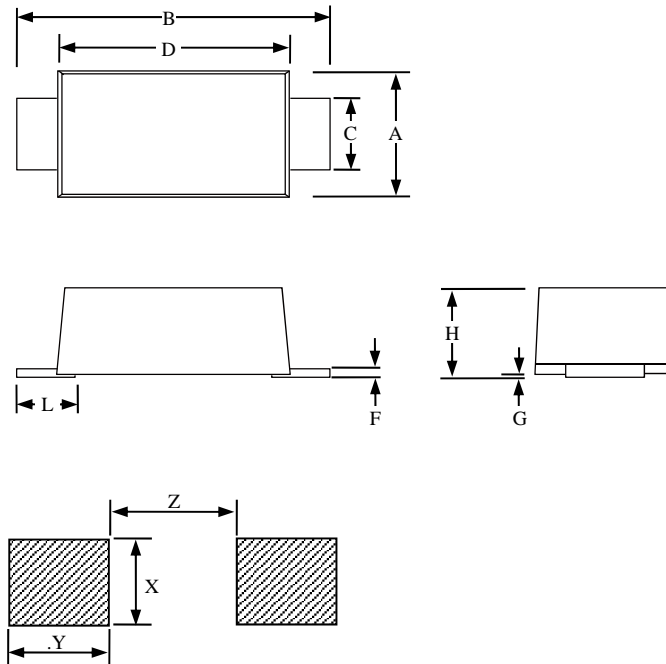


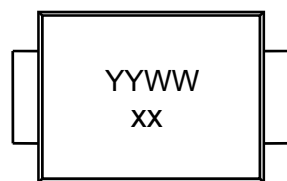
Fig.6 - Maximum Non-Repetitive Peak Forward Surge Current
Uni-Directional Only

»Package Dimensions

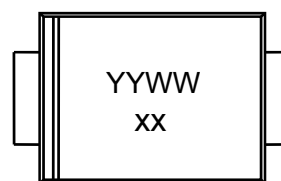


| SOD-123F | | | | | | |
|-----------|--------|-------|-------|-------------|-----|------|
| Dimension | Inches | | | Millimeters | | |
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.059 | | 0.079 | 1.5 | | 2 |
| B | 0.134 | | 0.154 | 3.4 | | 3.9 |
| C | 0.028 | | 0.047 | 0.7 | | 1.2 |
| D | 0.098 | | 0.114 | 2.5 | | 2.9 |
| F | 0.002 | | 0.01 | 0.05 | | 0.26 |
| G | - | | 0.004 | - | | 0.1 |
| H | 0.037 | | 0.053 | 0.95 | | 1.35 |
| L | 0.014 | | 0.035 | 0.35 | | 0.9 |
| X | | 0.055 | | | 1.4 | |
| Y | | 0.051 | | | 1.3 | |
| Z | | 0.063 | | | 1.6 | |

»Marking Information



YYWW = Date Code
xx = Type Code



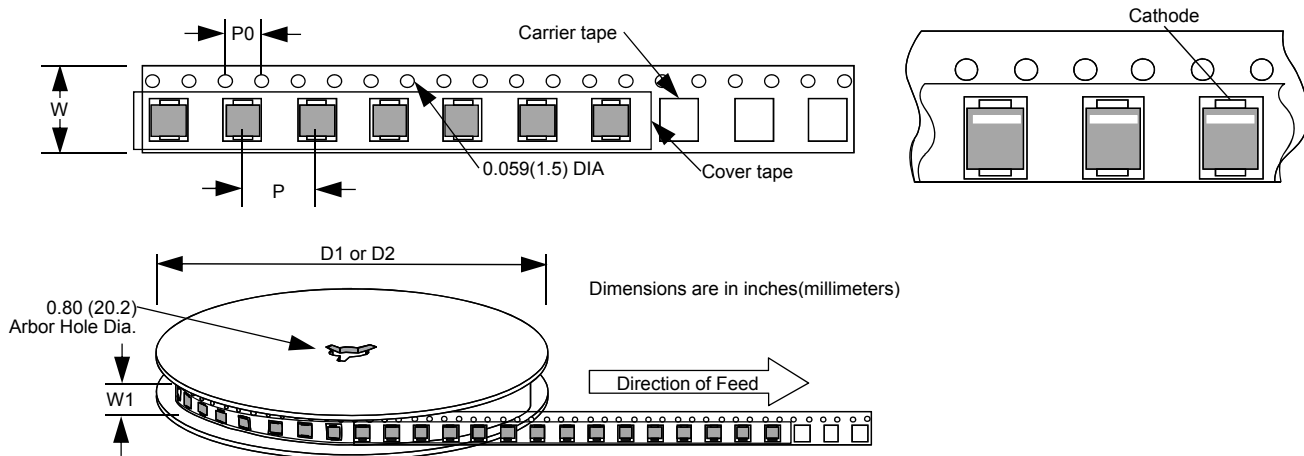
YYWW = Date Code
xx = Type Code

»Soldering Parameters



| Reflow Condition | | Lead-free assembly |
|--|------------------------------------|-------------------------|
| Pre Heat | - Temperature Min ($T_{s(min)}$) | 150°C |
| | - Temperature Max ($T_{s(max)}$) | 200°C |
| | - Time (min to max) (t_s) | 60 – 180 secs |
| Average ramp up rate (Liquidus Temp (T_L) to peak) | | 3°C/second max |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 3°C/second max |
| Reflow | - Temperature (T_L) (Liquidus) | 217°C |
| | - Time (t_L) | 60 – 150 secs |
| Peak Temperature (T_P) | | 260 ^{+0/-5} °C |
| Time within 5°C of actual peak Temperature (t_p) | | 20 – 40 secs |
| Ramp-down Rate | | 6°C/second max |
| Time 25°C to peak Temperature (t) | | 8 minutes Max. |
| Do not exceed | | 260°C |

»Tape and Reel Specification



| Dimension | Inches | | | Millimeters | | |
|-----------|--------|-------|-----|-------------|-------|-----|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| P | | 0.157 | | | 4 | |
| P0 | | 0.157 | | | 4 | |
| W | | 0.315 | | | 8 | |
| W1 | | 0.374 | | | 9.5 | |
| D1 | | 7 | | | 177.8 | |
| D2 | | 13 | | | 330.2 | |

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