

Features

- Very low profile
- Very fast tripping time
- High voltage
- RoHS compliant* and halogen free**
- 2018 footprint
- Agency recognition:  

Applications

- Power Over Ethernet (IEEE 802.3 af) port protection
- Automotive electronic control module protection
- Telecom equipment low voltage protection

MF-SMDF Series - PTC Resettable Fuses

Electrical Characteristics

| Model | V max. Volts | I max. Amps | I _{hold} | I _{trip} | Resistance | | Max. Time To Trip | | Tripped Power Dissipation |
|--------------------|--------------|-------------|-------------------|-------------------|------------------|-------------------|-------------------|------------------|---------------------------|
| | | | Amperes at 23 °C | | Ohms at 23 °C | | Amperes at 23 °C | Seconds at 23 °C | Watts at 23 °C |
| | | | Hold | Trip | R _{min} | R _{1max} | | | Typ. |
| MF-SMDF050 | 60 | 10 | 0.55 | 1.20 | 0.200 | 1.0 | 2.5 | 3.0 | 0.9 |
| MF-SMDF100/33X (1) | 33 | 40 | 1.10 | 2.20 | 0.06 | 0.40 | 8.0 | 0.5 | 1.4 |
| MF-SMDF150 | 15 | 40 | 1.50 | 3.00 | 0.05 | 0.17 | 8.0 | 0.8 | 1.1 |
| MF-SMDF200 (2) | 10 | 40 | 2.00 | 4.00 | 0.030 | 0.100 | 8.0 | 2.4 | 1.1 |
| MF-SMDF260/24X (1) | 24 | 20 | 2.60 | 5.20 | 0.015 | 0.075 | 8.0 | 0.8 | 1.1 |

(1) UL recognized, TÜV pending.

(2) Agency approval pending.

Environmental Characteristics

| | |
|--|---|
| Operating Temperature..... | -40 °C to +85 °C |
| Maximum Device Surface Temperature in Tripped State | 125 °C |
| Passive Aging | +85 °C, 1000 hours..... ±5 % typical resistance change |
| Humidity Aging | +85 °C, 85 % R.H. 1000 hours..... ±5 % typical resistance change |
| Thermal Shock | +85 °C to -40 °C, 20 times..... ±10 % typical resistance change |
| Solvent Resistance..... | MIL-STD-202, Method 215..... No change (marking still legible) |
| Vibration | MIL-STD-883C, Method 2007.1, Condition A..... No change (R _{min} < R < R _{1max}) |

Test Procedures And Requirements For Model MF-SMDF Series

| Test | Test Conditions | Accept/Reject Criteria |
|----------------------|---|--|
| Visual/Mech..... | Verify dimensions and materials..... | Per MF physical description |
| Resistance..... | In still air @ 23 °C..... | R _{min} ≤ R ≤ R _{1max} |
| Time to Trip..... | At specified current, V _{max} , 23 °C | T ≤ max. time to trip (seconds) |
| Hold Current..... | 30 min. at I _{hold} | No trip |
| Trip Cycle Life..... | V _{max} , I _{max} , 100 cycles..... | No arcing or burning |
| Trip Endurance | V _{max} , 48 hours..... | No arcing or burning |
| Solderability..... | ANSI/J-STD-002..... | 95 % min. coverage |

UL File Number E174545

<http://www.ul.com/> Follow link to Certifications, then UL File No., enter E174545

TÜV Certificate Number R 02057213

<http://www.tuvdotcom.com/> Follow link to "other certificates", enter File No. 2057213

Thermal Derating Chart - I_{hold}/I_{trip} (Amps)

| Model | Ambient Operating Temperature | | | | | | | | |
|----------------|-------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | -40 °C | -20 °C | 0 °C | 23 °C | 40 °C | 50 °C | 60 °C | 70 °C | 85 °C |
| MF-SMDF050 | 0.87 / 1.90 | 0.77 / 1.68 | 0.67 / 1.46 | 0.55 / 1.20 | 0.46 / 1.00 | 0.41 / 0.89 | 0.36 / 0.79 | 0.31 / 0.68 | 0.23 / 0.50 |
| MF-SMDF100/33X | 1.66 / 3.32 | 1.47 / 2.94 | 1.29 / 2.58 | 1.10 / 2.20 | 0.91 / 1.82 | 0.83 / 1.66 | 0.73 / 1.46 | 0.64 / 1.28 | 0.50 / 1.00 |
| MF-SMDF150 | 2.38 / 4.76 | 2.10 / 4.20 | 1.82 / 3.64 | 1.50 / 3.00 | 1.27 / 2.54 | 1.13 / 2.26 | 0.99 / 1.98 | 0.85 / 1.70 | 0.64 / 1.28 |
| MF-SMDF200 | 2.95 / 5.90 | 2.65 / 5.30 | 2.35 / 4.70 | 2.00 / 4.00 | 1.74 / 3.48 | 1.59 / 3.18 | 1.44 / 2.88 | 1.29 / 2.58 | 1.06 / 2.12 |
| MF-SMDF260/24X | 3.75 / 7.50 | 3.35 / 6.70 | 3.00 / 6.00 | 2.60 / 5.20 | 2.35 / 4.70 | 2.15 / 4.30 | 2.05 / 4.10 | 1.80 / 3.60 | 1.50 / 3.00 |

*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

**Bourns considers a product to be "halogen free" if (a) the Bromine (Br) content is 900 ppm or less; (b) the Chlorine (Cl) content is 900 ppm or less; and (c) the total Bromine (Br) and Chlorine (Cl) content is 1500 ppm or less. Specifications are subject to change without notice.

The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time. Users should verify actual device performance in their specific applications.

MF-SMDF Series - PTC Resettable Fuses

BOURNS®

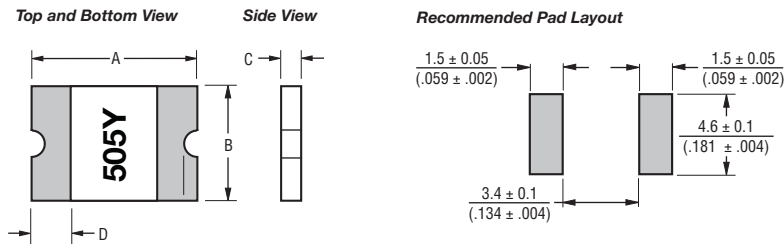
Product Dimensions

| Model | A | | B | | C | | D | E | | Style |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------|
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Min. | Max. | |
| MF-SMDF050 | 4.72 (0.186) | 5.44 (0.214) | 4.22 (0.166) | 4.93 (0.194) | 0.79 (0.031) | 1.09 (0.043) | 0.30 (0.012) | N/A | N/A | 1 |
| MF-SMDF100/33X | 4.72 (0.186) | 5.44 (0.214) | 4.22 (0.166) | 4.93 (0.194) | 0.70 (0.028) | 1.25 (0.049) | 0.30 (0.012) | 0.25 (0.010) | 0.70 (0.028) | 2 |
| MF-SMDF150 | 4.72 (0.186) | 5.44 (0.214) | 4.22 (0.166) | 4.93 (0.194) | 0.55 (0.022) | 0.85 (0.033) | 0.30 (0.012) | N/A | N/A | 1 |
| MF-SMDF200 | 4.72 (0.186) | 5.44 (0.214) | 4.22 (0.166) | 4.93 (0.194) | 0.55 (0.022) | 0.85 (0.033) | 0.30 (0.012) | N/A | N/A | 1 |
| MF-SMDF260/24X | 4.72 (0.186) | 5.44 (0.214) | 4.22 (0.166) | 4.93 (0.194) | 0.70 (0.028) | 2.00 (0.079) | 0.30 (0.012) | 0.25 (0.010) | 0.70 (0.028) | 3 |

Packaging: 6000 pcs. per reel; 4000 pcs. per reel for Model MF-SMDF260/24X.

DIMENSIONS: $\frac{\text{MM}}{\text{(INCHES)}}$

Style 1



Terminal material:

Electroless Ni under immersion Au

Termination pad solderability:

Standard Au finish:
Meets ANSI/J-STD-002 Category 2.

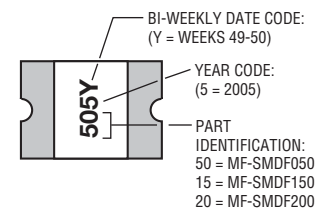
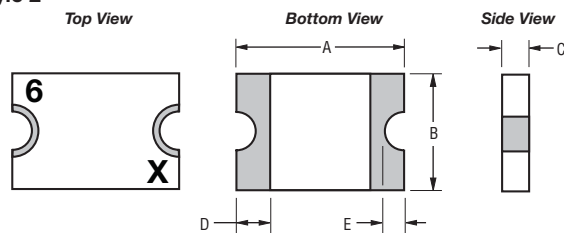
Recommended Storage:

40 °C max./70 % RH max.

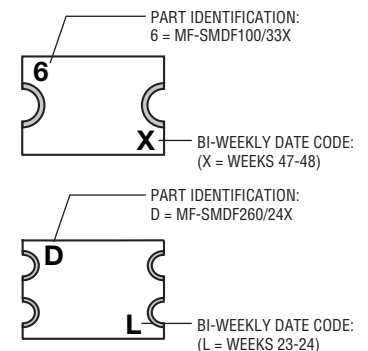
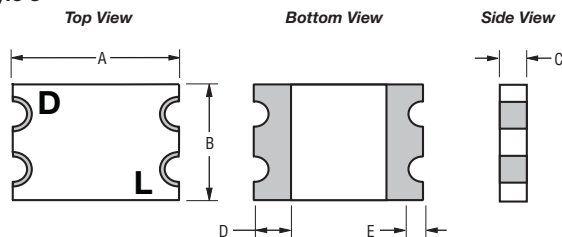
Typical Part Marking

Represents total content. Layout may vary.

Style 2



Style 3

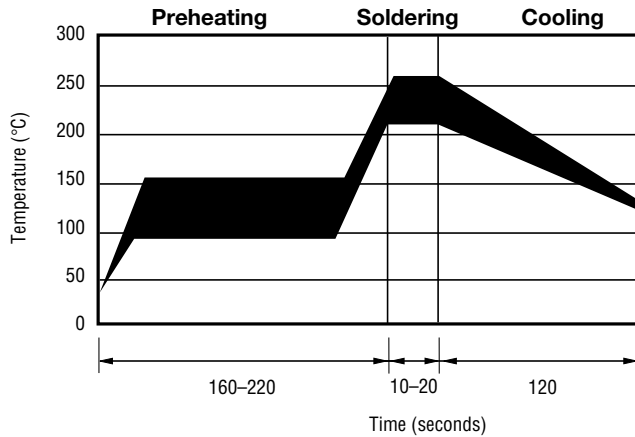


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MF-SMDF Series - PTC Resettable Fuses



Solder Reflow Recommendations



Notes:

- MF-SMDF models cannot be wave soldered. Please contact Bourns for hand soldering recommendations.
- If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.
- Compatible with Pb and Pb-free solder reflow profiles.
- Excess solder may cause a short circuit, especially during hand soldering. Please refer to the Multifuse® Polymer PTC Soldering Recommendation guidelines.

How to Order

MF - SMDF 100 /33X - 2

Product Designator

Series

SMDF = 2018 Surface Mount Component

Hold Current, I_{hold}

050 = 0.50 A
100 = 1.10 A
150 = 1.50 A
200 = 2.00 A
260 = 2.60 A

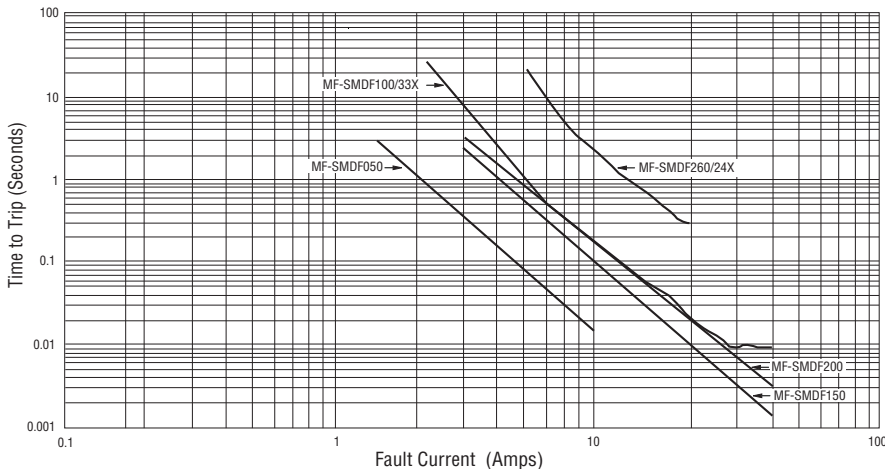
Higher Voltage Option

= Standard Voltage
/24X = 24 V Rated
/33X = 33 V Rated
X = Multifuse® freeXpansion Design™ MF-SMDF Series

Packaging

Packaged per EIA 481-1
-2 = Tape and Reel

Typical Time to Trip at 23 °C

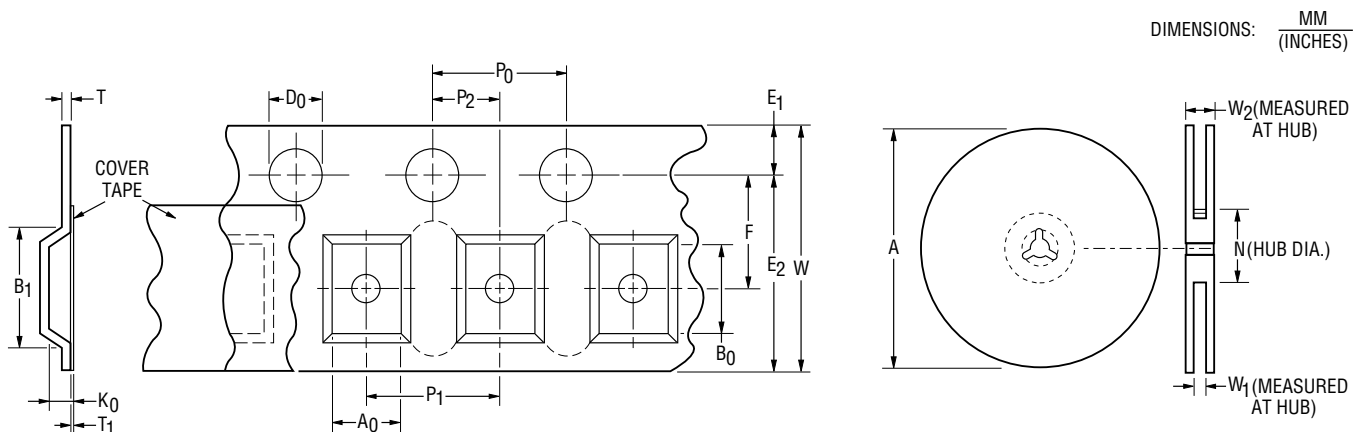


The Time to Trip curves represent typical performance of a device in a simulated application environment. Actual performance in specific customer applications may differ from these values due to the influence of other variables.

MF-SMDF Series Tape and Reel Specifications

BOURNS®

| Tape Dimensions | MF-SMDF050, 150, 200 per EIA 481-2 | MF-SMDF100/33X per EIA 481-2 | MF-SMDF260/24X per EIA 481-2 |
|------------------------|--|--|--|
| W | $\frac{16.0 \pm 0.3}{(0.630 \pm 0.012)}$ | $\frac{16.0 \pm 0.3}{(0.630 \pm 0.012)}$ | $\frac{16.0 \pm 0.3}{(0.630 \pm 0.012)}$ |
| P ₀ | $\frac{4.0 \pm 0.1}{(0.157 \pm 0.004)}$ | $\frac{4.0 \pm 0.1}{(0.157 \pm 0.004)}$ | $\frac{4.0 \pm 0.1}{(0.157 \pm 0.004)}$ |
| P ₁ | $\frac{8.0 \pm 0.1}{(0.315 \pm 0.004)}$ | $\frac{8.0 \pm 0.1}{(0.315 \pm 0.004)}$ | $\frac{8.0 \pm 0.1}{(0.315 \pm 0.004)}$ |
| P ₂ | $\frac{2.0 \pm 0.1}{(0.079 \pm 0.004)}$ | $\frac{2.0 \pm 0.1}{(0.079 \pm 0.004)}$ | $\frac{2.0 \pm 0.1}{(0.079 \pm 0.004)}$ |
| A ₀ | $\frac{5.1 \pm 0.15}{(0.201 \pm 0.006)}$ | $\frac{5.1 \pm 0.1}{(0.201 \pm 0.004)}$ | $\frac{5.4 \pm 0.15}{(0.213 \pm 0.006)}$ |
| B ₀ | $\frac{5.6 \pm 0.23}{(0.220 \pm 0.009)}$ | $\frac{5.6 \pm 0.1}{(0.221 \pm 0.004)}$ | $\frac{5.7 \pm 0.15}{(0.234 \pm 0.006)}$ |
| B ₁ max. | $\frac{12.1}{(0.476)}$ | $\frac{12.1}{(0.476)}$ | $\frac{12.1}{(0.476)}$ |
| D ₀ | $\frac{1.5 + 0.1/-0.0}{(0.059 + 0.004/-0)}$ | $\frac{1.5 + 0.1/-0.0}{(0.059 + 0.004/-0)}$ | $\frac{1.5 + 0.1/-0.0}{(0.059 + 0.004/-0)}$ |
| F | $\frac{7.5 \pm 0.10}{(0.295 \pm 0.004)}$ | $\frac{7.5 \pm 0.10}{(0.295 \pm 0.004)}$ | $\frac{7.5 \pm 0.10}{(0.295 \pm 0.004)}$ |
| E ₁ | $\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$ | $\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$ | $\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$ |
| E ₂ min. | $\frac{14.25}{(0.561)}$ | $\frac{14.25}{(0.561)}$ | $\frac{14.25}{(0.561)}$ |
| T max. | $\frac{0.6}{(0.024)}$ | $\frac{0.6}{(0.024)}$ | $\frac{0.6}{(0.024)}$ |
| T ₁ max. | $\frac{0.1}{(0.004)}$ | $\frac{0.1}{(0.004)}$ | $\frac{0.1}{(0.004)}$ |
| K ₀ | $\frac{1.0 \pm 0.15}{(0.039 \pm 0.006)}$ | $\frac{1.1 \pm 0.1}{(0.043 \pm 0.004)}$ | $\frac{2.15 \pm 0.15}{(0.085 \pm 0.006)}$ |
| Leader min. | $\frac{390}{(15.35)}$ | $\frac{390}{(15.35)}$ | $\frac{390}{(15.35)}$ |
| Trailer min. | $\frac{160}{(6.30)}$ | $\frac{160}{(6.30)}$ | $\frac{160}{(6.30)}$ |
| Reel Dimensions | | | |
| A max. | $\frac{331}{(13.03)}$ | $\frac{331}{(13.03)}$ | $\frac{331}{(13.03)}$ |
| N min. | $\frac{50}{(1.97)}$ | $\frac{50}{(1.97)}$ | $\frac{50}{(1.97)}$ |
| W ₁ | $\frac{16.4 + 2.0/-0.0}{(0.646 + 0.079/-0)}$ | $\frac{16.4 + 2.0/-0.0}{(0.646 + 0.079/-0)}$ | $\frac{16.4 + 2.0/-0.0}{(0.646 + 0.079/-0)}$ |
| W ₂ max. | $\frac{22.4}{(0.882)}$ | $\frac{22.4}{(0.882)}$ | $\frac{22.4}{(0.882)}$ |



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