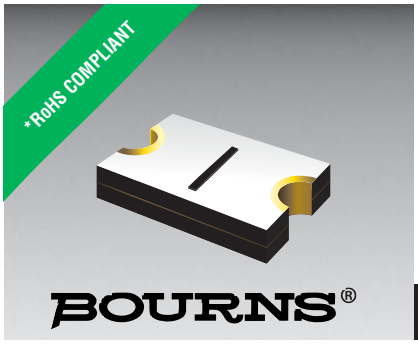



## Features

- Compact design to save board space - 0603 footprint
- Small size results in very fast time to react to fault events
- Low profile
- RoHS compliant* and halogen free**
- Agency recognition:

## Applications

- USB port protection
- PC motherboards - Plug and Play protection
- Mobile phones - Battery and port protection
- PDAs / digital cameras

# MF-FSMF 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-FSMF020X | 9 | 40 | 0.20 | 0.50 | 0.550 | 3.500 | 1.00 | 0.60 | 0.5 |
| MF-FSMF035X | 6 | 40 | 0.35 | 0.75 | 0.200 | 1.400 | 8.00 | 0.10 | 0.5 |
| MF-FSMF050X*** | 6 | 40 | 0.50 | 1.00 | 0.100 | 0.800 | 8.00 | 0.10 | 0.5 |

***UL 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
Vibration ..... MIL-STD-883C, Method 2007.1, Condition A ..... No change

## Test Procedures And Requirements For Model MF-FSMF Series

| Test | Test Conditions | Accept/Reject Criteria |
|---|---|---|
| Visual/Mech. | Verify dimensions and materials | Per MF physical description |
| Resistance | In still air @ 23 °C | Rmin ≤ R ≤ R1max |
| Time to Trip | At specified current, Vmax, 23 °C | T ≤ max. time to trip (seconds) |
| Hold Current | 30 min. at Ihold | No trip |
| Trip Cycle Life | Vmax, Imax, 100 cycles | No arcing or burning |
| Trip Endurance | Vmax, 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

## Thermal Derating Chart - $I_{hold}$ (Amps)

| Model | Ambient Operating Temperature | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | -40 °C | -20 °C | 0 °C | 23 °C | 40 °C | 50 °C | 60 °C | 70 °C | 85 °C |
| MF-FSMF020X | 0.27 | 0.25 | 0.23 | 0.20 | 0.17 | 0.14 | 0.12 | 0.10 | 0.07 |
| MF-FSMF035X | 0.47 | 0.41 | 0.38 | 0.35 | 0.29 | 0.26 | 0.24 | 0.20 | 0.14 |
| MF-FSMF050X | 0.67 | 0.59 | 0.54 | 0.50 | 0.41 | 0.37 | 0.34 | 0.29 | 0.20 |

BOURNS®

**Asia-Pacific:** Tel: +886-2 2562-4117 • Fax: +886-2 2562-4116
**Europe:** Tel: +41-41 768 5555 • Fax: +41-41 768 5510
**The Americas:** Tel: +1-951 781-5500 • Fax: +1-951 781-5700
**www.bourns.com**

*RoHS Directive 2002/95/EC Jan 27 2003 including Annex.
**To be considered halogen free, each homogenous material can have a maximum concentration of 900 ppm of either bromine or chlorine.

## Additional Features

- Patents pending

## Additional Applications

- Automotive electronic control modules
- Game console port protection
- HDMI ports

# MF-FSMF Series - PTC Resettable Fuses

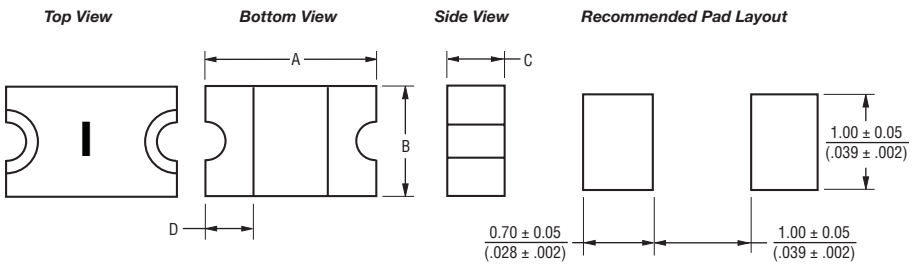
BOURNS®

### Product Dimensions

| Model | A | | B | | C | | D |
|---|---|---|---|---|---|---|---|
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. |
| MF-FSMF020X | 1.45 (0.057) | 1.85 (0.073) | 0.65 (0.026) | 1.05 (0.041) | 0.30 (0.012) | 0.65 (0.026) | 0.20 (0.008) |
| MF-FSMF035X | 1.45 (0.057) | 1.85 (0.073) | 0.65 (0.026) | 1.05 (0.041) | 0.30 (0.012) | 0.65 (0.026) | 0.20 (0.008) |
| MF-FSMF050X | 1.45 (0.057) | 1.85 (0.073) | 0.65 (0.026) | 1.05 (0.041) | 0.65 (0.026) | 1.00 (0.039) | 0.20 (0.008) |

Packaging: MF-FSMF020X & MF-FSMF035X = 6000 pcs. per reel;
MF-FSMF050X = 4000 pcs. per reel

DIMENSIONS: MM / (INCHES)

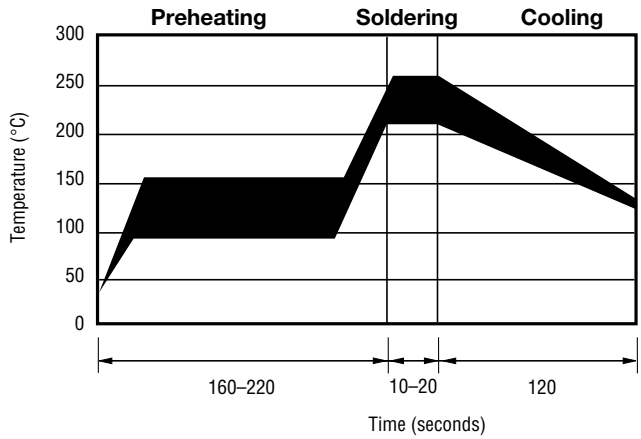



Terminal material:
Nickel/gold plated.

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

Recommended Storage:
40 °C max./70 % RH max.

### Solder Reflow Recommendations




Notes:

- MF-FSMF 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.

### How To Order

**MF - FSMF 020 X - 2**

Multifuse® Product Designator

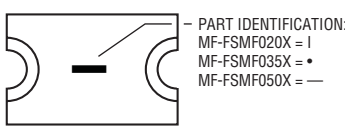
Series
FSMF = 0603 Surface Mount Component

Hold Current, Ihold
020-050 (0.20 - 0.50 Amps)

freeXpansion™ Design

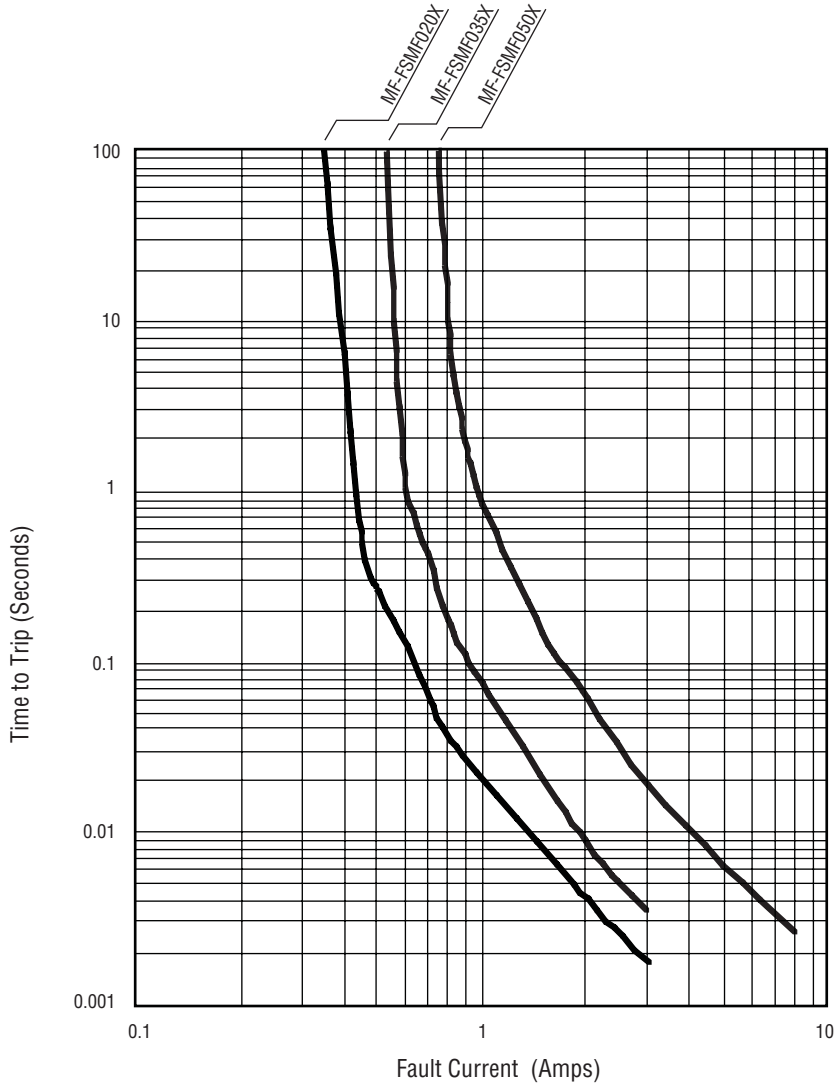
Packaging
Packaged per EIA 481-1
-2 = Tape and Reel

### Typical Part Marking




BIWEEKLY DATE CODE WILL APPEAR ON THE PACKAGING LABEL:
WEEK 1 AND 2 = A
WEEK 51 AND 52 = Z

**Typical Time to Trip at 23 °C**



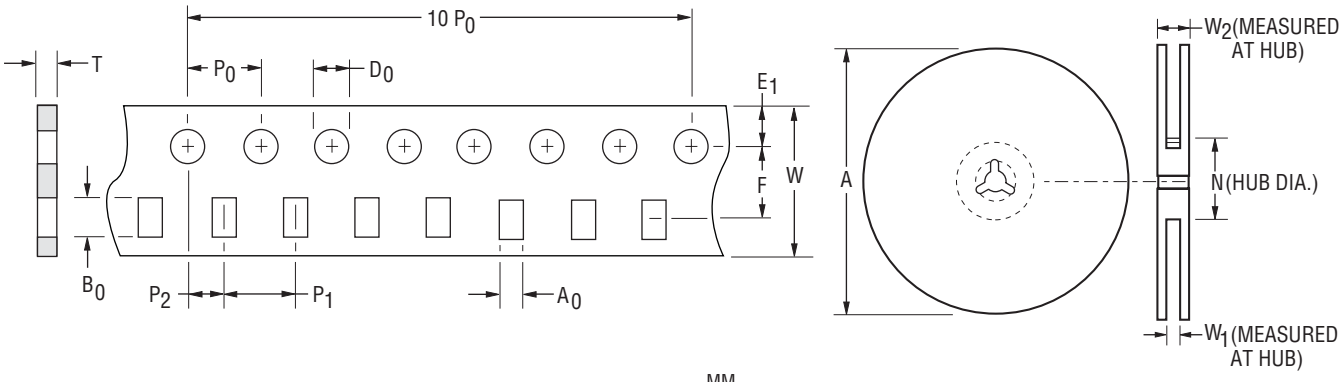

The Time to Trip curves represent typical performance of a device in a simulated application environment. Actual performance in specific customer applications may differ from these values due to the influence of other variables.

# MF-FSMF Series Tape and Reel Specifications

BOURNS®

## Product Dimensions

| Tape Dimensions | MF-FSMF Series per EIA 481-1 |
|---|---|
| W | 8.0 ± 0.1 (0.315 ± 0.004) |
| $P_0$ | 4.0 ± 0.1 (0.157 ± 0.004) |
| $P_1$ | 4.0 ± 0.05 (0.157 ± 0.002) |
| $P_2$ | 2.0 ± 0.05 (0.079 ± 0.002) |
| $A_0$ | 1.17 ± 0.05 (0.046 ± 0.002) |
| $B_0$ | 2.02 ± 0.05 (0.079 ± 0.002) |
| $D_0$ | 1.55 ± 0.05 (0.061 ± 0.002) |
| F | 3.5 ± 0.05 (0.138 + 0.002) |
| $E_1$ | 1.75 ± 0.1 (0.069 ± 0.004) |
| T max. | 0.95 ± 0.05 (0.037 ± 0.002) |
| 10 $P_0$ | 40.0 ± 0.1 (1.575 ± 0.004) |
| **Reel Dimensions** | |
| A max. | 185 (7.283) |
| N min. | 50 (1.97) |
| $W_1$ | 8.4 + 1.5/ -0.0 (0.331 + 0.059/-0) |
| $W_2$ max. | 14.4 (0.567) |




DIMENSIONS: MM (INCHES)