



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
- HDMI 1.4 Source 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-FSMF010X | 15 | 40 | 0.10 | 0.30 | 0.900 | 6.000 | 0.50 | 1.00 | 0.5 |
| 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 |

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,..... No change Condition A |

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..... | 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 50171531 http://www.tuvdotcom.com/ Follow link to "other certificates", enter File No. 50171531 | |

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-FSMF010X | 0.13 | 0.12 | 0.11 | 0.10 | 0.08 | 0.07 | 0.06 | 0.05 | 0.03 |
| 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 |

* RoHS Directive 2002/95/EC Jan 27, 2003 including Annex.

**Bourns follows the prevailing definition of "halogen free" in the industry. 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.

Customers should verify actual device performance in their specific applications.

Additional Applications

- Automotive electronic control modules
- Game console port protection

MF-FSMF Series - PTC Resettable Fuses

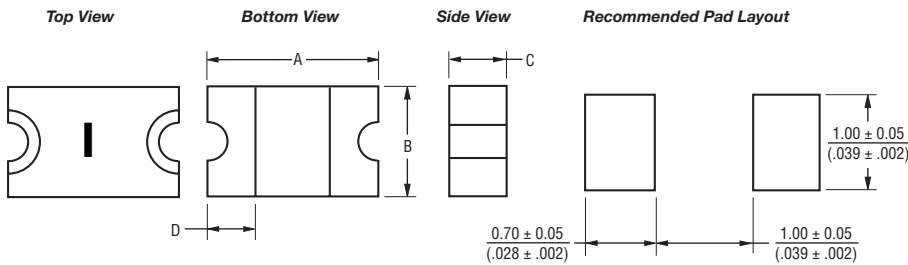
BOURNS®

Product Dimensions

| Model | A | | B | | C | | D |
|-------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. |
| MF-FSMF010X | $\frac{1.45}{(0.057)}$ | $\frac{1.85}{(0.073)}$ | $\frac{0.65}{(0.026)}$ | $\frac{1.05}{(0.041)}$ | $\frac{0.30}{(0.012)}$ | $\frac{0.65}{(0.026)}$ | $\frac{0.20}{(0.008)}$ |
| MF-FSMF020X | $\frac{1.45}{(0.057)}$ | $\frac{1.85}{(0.073)}$ | $\frac{0.65}{(0.026)}$ | $\frac{1.05}{(0.041)}$ | $\frac{0.30}{(0.012)}$ | $\frac{0.65}{(0.026)}$ | $\frac{0.20}{(0.008)}$ |
| MF-FSMF035X | $\frac{1.45}{(0.057)}$ | $\frac{1.85}{(0.073)}$ | $\frac{0.65}{(0.026)}$ | $\frac{1.05}{(0.041)}$ | $\frac{0.30}{(0.012)}$ | $\frac{0.65}{(0.026)}$ | $\frac{0.20}{(0.008)}$ |
| MF-FSMF050X | $\frac{1.45}{(0.057)}$ | $\frac{1.85}{(0.073)}$ | $\frac{0.65}{(0.026)}$ | $\frac{1.05}{(0.041)}$ | $\frac{0.65}{(0.026)}$ | $\frac{1.00}{(0.039)}$ | $\frac{0.20}{(0.008)}$ |

Packaging: MF-FSMF010X = 5000 pcs. per reel;
 MF-FSMF020X & MF-FSMF035X = 6000 pcs. per reel;
 MF-FSMF050X = 4000 pcs. per reel

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

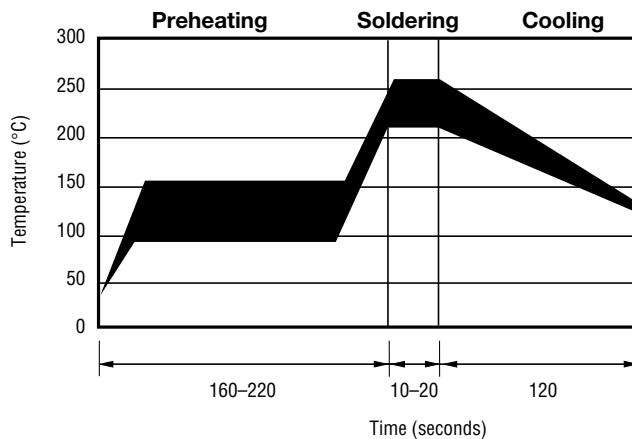


Terminal material:
 Nickel/gold plated.

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:

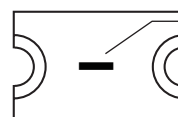
- MF-FSMF models cannot be wave soldered. Please contact Bourns for hand soldering recommendations.
- If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.
- Compatible with Pb and Pb-free solder reflow profiles.
- Excess solder may cause a short circuit,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

How To Order

MF - FSMF 020 X - 2

Multifuse® Product _____
 Designator _____
 Series _____
 FSMF = 0603 Surface Mount Component
 Hold Current, Ihold _____
 010-050 (0.10 - 0.50 Amps)
 Multifuse® freeXpansion™ Design _____
 Packaging _____
 Packaged per EIA 481-1
 -2 = Tape and Reel

Typical Part Marking



- PART IDENTIFICATION:
 MF-FSMF010X = II
 MF-FSMF020X = I
 MF-FSMF035X = •
 MF-FSMF050X = —

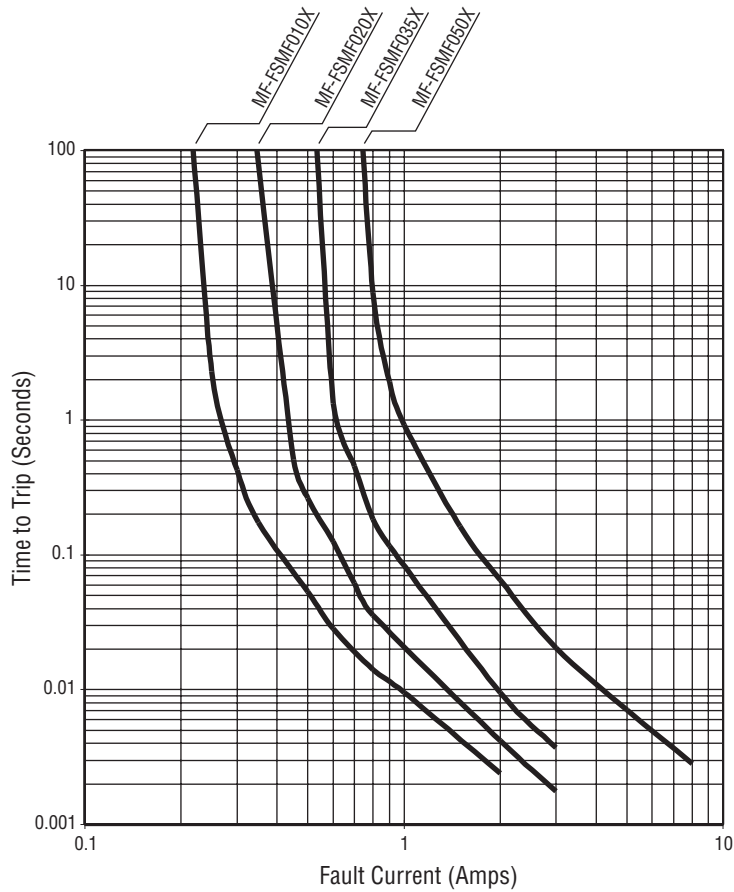
BIWEEKLY DATE CODE WILL APPEAR ON THE PACKAGING LABEL:
 WEEK 1 AND 2 = A
 WEEK 51 AND 52 = Z

"freeXpansion Design" is a trademark of Bourns, Inc.
 Specifications are subject to change without notice.
 Customers should verify actual device performance in their specific applications.

MF-FSMF Series - PTC Resettable Fuses

BOURNS®

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.

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

MF-FSMF SERIES, REV. G, 05/11

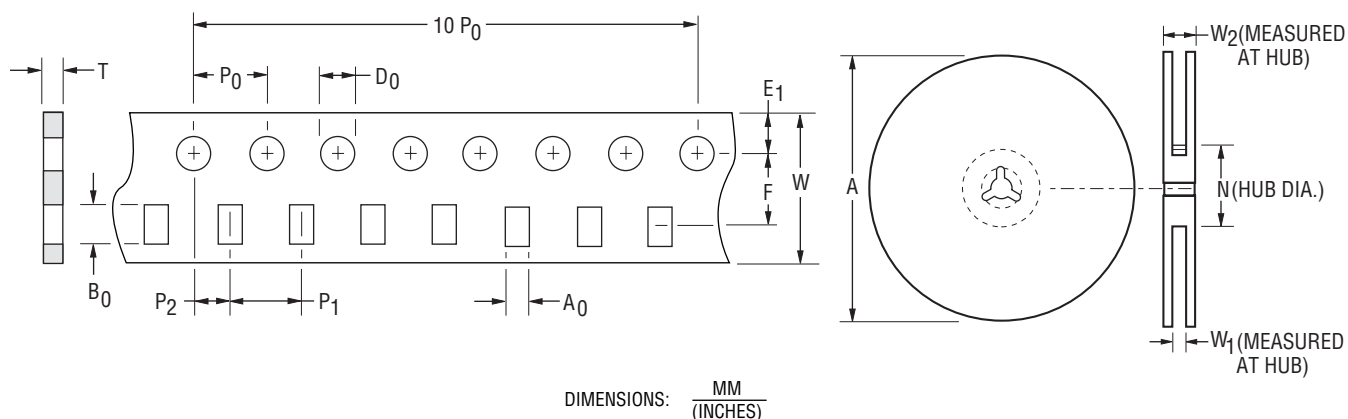
Specifications are subject to change without notice.
Customers should verify actual device performance in their specific applications.

MF-FSMF Series Tape and Reel Specifications

BOURNS®

Product Dimensions

| Tape Dimensions | MF-FSMF010X per EIA 481-1 | MF-FSMF020X, MF-FSMF035X per EIA 481-1 | MF-FSMF050X per EIA 481-1 |
|------------------------|---|---|---|
| W | $\frac{8.0 \pm 0.1}{(0.315 \pm 0.004)}$ | $\frac{8.0 \pm 0.1}{(0.315 \pm 0.004)}$ | $\frac{8.0 \pm 0.1}{(0.315 \pm 0.004)}$ |
| P 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 | $\frac{4.0 \pm 0.05}{(0.157 \pm 0.002)}$ | $\frac{4.0 \pm 0.05}{(0.157 \pm 0.002)}$ | $\frac{4.0 \pm 0.05}{(0.157 \pm 0.002)}$ |
| P ₂ | $\frac{2.0 \pm 0.05}{(0.079 \pm 0.002)}$ | $\frac{2.0 \pm 0.05}{(0.079 \pm 0.002)}$ | $\frac{2.0 \pm 0.05}{(0.079 \pm 0.002)}$ |
| A ₀ | $\frac{1.17 \pm 0.05}{(0.046 \pm 0.002)}$ | $\frac{1.17 \pm 0.05}{(0.046 \pm 0.002)}$ | $\frac{1.17 \pm 0.05}{(0.046 \pm 0.002)}$ |
| B ₀ | $\frac{2.02 \pm 0.05}{(0.079 \pm 0.002)}$ | $\frac{2.02 \pm 0.05}{(0.079 \pm 0.002)}$ | $\frac{2.02 \pm 0.05}{(0.079 \pm 0.002)}$ |
| D ₀ | $\frac{1.55 \pm 0.05}{(0.061 \pm 0.002)}$ | $\frac{1.55 \pm 0.05}{(0.061 \pm 0.002)}$ | $\frac{1.55 \pm 0.05}{(0.061 \pm 0.002)}$ |
| F | $\frac{3.5 \pm 0.05}{(0.138 \pm 0.002)}$ | $\frac{3.5 \pm 0.05}{(0.138 \pm 0.002)}$ | $\frac{3.5 \pm 0.05}{(0.138 \pm 0.002)}$ |
| E ₁ | $\frac{1.75 \pm 0.1}{(0.069 \pm 0.004)}$ | $\frac{1.75 \pm 0.1}{(0.069 \pm 0.004)}$ | $\frac{1.75 \pm 0.1}{(0.069 \pm 0.004)}$ |
| T | $\frac{0.75 \pm 0.05}{(0.030 \pm 0.002)}$ | $\frac{0.60 \pm 0.05}{(0.024 \pm 0.002)}$ | $\frac{0.95 \pm 0.05}{(0.037 \pm 0.002)}$ |
| 10 P ₀ | $\frac{40.0 \pm 0.1}{(1.575 \pm 0.004)}$ | $\frac{40.0 \pm 0.1}{(1.575 \pm 0.004)}$ | $\frac{40.0 \pm 0.1}{(1.575 \pm 0.004)}$ |
| Reel Dimensions | | | |
| A max. | $\frac{185}{(7.283)}$ | $\frac{185}{(7.283)}$ | $\frac{185}{(7.283)}$ |
| N min. | $\frac{50}{(1.97)}$ | $\frac{50}{(1.97)}$ | $\frac{50}{(1.97)}$ |
| W ₁ | $\frac{8.4 + 1.5/-0.0}{(0.331 + 0.059/-0)}$ | $\frac{8.4 + 1.5/-0.0}{(0.331 + 0.059/-0)}$ | $\frac{8.4 + 1.5/-0.0}{(0.331 + 0.059/-0)}$ |
| W ₂ max. | $\frac{14.4}{(0.567)}$ | $\frac{14.4}{(0.567)}$ | $\frac{14.4}{(0.567)}$ |



Specifications are subject to change without notice.
Customers should verify actual device performance in their specific applications.



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.