



## Features

- Fast tripping resettable circuit protection
- Surface mount packaging for automated assembly
- Small footprint size (1210)
- RoHS compliant\* and halogen free\*\*
- Agency recognition\*   

## Applications

- Game consoles
- PC motherboards
- USB port protection - USB 2.0, 3.0 & OTG
- HDMI 1.4 Source protection
- IEEE 1394 ports
- Mobile phones
- Digital cameras

# MF-USMF Series - PTC Resettable Fuses

## Electrical Characteristics

| Model          | V max. Volts | I max. Amps | I <sub>hold</sub> | I <sub>trip</sub> | 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 <sub>Min.</sub> | R <sub>1Max.</sub> |                   |                  | Typ.                      |
| MF-USMF005     | 30           | 10          | 0.05              | 0.15              | 2.800             | 50.000             | 0.25              | 1.50             | 0.6                       |
| MF-USMF010     | 30           | 10          | 0.10              | 0.30              | 0.800             | 15.000             | 0.50              | 0.60             | 0.6                       |
| MF-USMF020     | 30           | 10          | 0.20              | 0.40              | 0.400             | 5.000              | 8.00              | 0.02             | 0.6                       |
| MF-USMF035     | 6            | 40          | 0.35              | 0.75              | 0.200             | 1.300              | 8.00              | 0.20             | 0.6                       |
| MF-USMF050     | 13.2         | 40          | 0.50              | 1.00              | 0.180             | 0.900              | 8.00              | 0.10             | 0.6                       |
| MF-USMF075     | 6            | 40          | 0.75              | 1.50              | 0.070             | 0.450              | 8.00              | 0.10             | 0.6                       |
| MF-USMF110     | 6            | 40          | 1.10              | 2.20              | 0.050             | 0.210              | 5.00              | 1.00             | 0.6                       |
| MF-USMF150     | 6            | 40          | 1.50              | 3.00              | 0.030             | 0.110              | 5.00              | 5.00             | 0.6                       |
| MF-USMF175X*** | 6            | 40          | 1.75              | 3.50              | 0.020             | 0.090              | 8.00              | 1.00             | 0.7                       |

\*\*\* CSA 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, ..... No change<br>Condition A      |

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

| Test                         | Test Conditions   | Accept/Reject Criteria                   |
|------------------------------|---|--|
| Visual/Mech. ....            | Verify dimensions and materials .....   | Per MF physical description              |
| Resistance .....             | In still air @ 23 °C.....   | R <sub>min</sub> ≤ R ≤ R <sub>1max</sub> |
| Time to Trip.....            | At specified current, V <sub>max</sub> , 23 °C .....  | T ≤ max. time to trip (seconds)          |
| Hold Current.....            | 30 min. at I <sub>hold</sub> .....  | No trip                                  |
| Trip Cycle Life.....         | V <sub>max</sub> , I <sub>max</sub> , 100 cycles.....   | No arcing or burning                     |
| Trip Endurance .....         | V <sub>max</sub> , 48 hours.....  | No arcing or burning                     |
| Solderability.....           | ANSI/J-STD-002.....   | 95 % min. coverage                       |
| UL File Number .....         | E174545<br><a href="http://www.ul.com/">http://www.ul.com/</a> Follow link to Certifications, then UL File No., enter E174545   |  |
| CSA File Number.....         | CA110338<br><a href="http://directories.csa-international.org/">http://directories.csa-international.org/</a> Under "Certification Record" and "File Number" enter 110338-0-000 |  |
| TÜV Certificate Number ..... | R 02057213<br><a href="http://www.tuvdotcom.com/">http://www.tuvdotcom.com/</a> Follow link to "other certificates", enter File No. 2057213                                     |  |

\*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.

Specifications are subject to change without notice.

Customers should verify actual device performance in their specific applications.

# MF-USMF Series - PTC Resettable Fuses

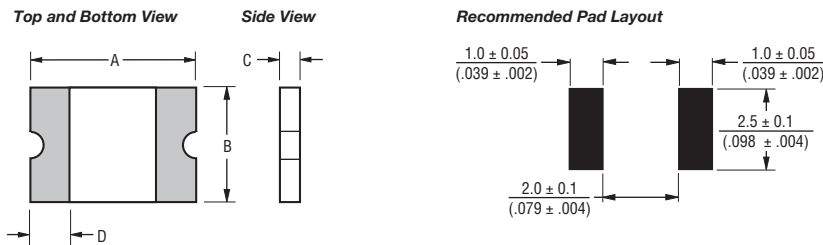
**BOURNS®**

## Product Dimensions

| Model       | A                      |                        | B                      |                        | C                      |                        | D                      |
|-------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|             | Min.                   | Max.                   | Min.                   | Max.                   | Min.                   | Max.                   | Min.                   |
| MF-USMF005  | $\frac{3.00}{(0.118)}$ | $\frac{3.43}{(0.135)}$ | $\frac{2.35}{(0.093)}$ | $\frac{2.80}{(0.110)}$ | $\frac{0.80}{(0.031)}$ | $\frac{1.1}{(0.043)}$  | $\frac{0.30}{(0.012)}$ |
| MF-USMF010  | $\frac{3.00}{(0.118)}$ | $\frac{3.43}{(0.135)}$ | $\frac{2.35}{(0.093)}$ | $\frac{2.80}{(0.110)}$ | $\frac{0.80}{(0.031)}$ | $\frac{1.1}{(0.043)}$  | $\frac{0.30}{(0.012)}$ |
| MF-USMF020  | $\frac{3.00}{(0.118)}$ | $\frac{3.43}{(0.135)}$ | $\frac{2.35}{(0.093)}$ | $\frac{2.80}{(0.110)}$ | $\frac{0.80}{(0.031)}$ | $\frac{1.1}{(0.043)}$  | $\frac{0.30}{(0.012)}$ |
| MF-USMF035  | $\frac{3.00}{(0.118)}$ | $\frac{3.43}{(0.135)}$ | $\frac{2.35}{(0.093)}$ | $\frac{2.80}{(0.110)}$ | $\frac{0.55}{(0.022)}$ | $\frac{0.85}{(0.033)}$ | $\frac{0.30}{(0.012)}$ |
| MF-USMF050  | $\frac{3.00}{(0.118)}$ | $\frac{3.43}{(0.135)}$ | $\frac{2.35}{(0.093)}$ | $\frac{2.80}{(0.110)}$ | $\frac{0.55}{(0.022)}$ | $\frac{0.85}{(0.033)}$ | $\frac{0.30}{(0.012)}$ |
| MF-USMF075  | $\frac{3.00}{(0.118)}$ | $\frac{3.43}{(0.135)}$ | $\frac{2.35}{(0.093)}$ | $\frac{2.80}{(0.110)}$ | $\frac{0.55}{(0.022)}$ | $\frac{0.85}{(0.033)}$ | $\frac{0.30}{(0.012)}$ |
| MF-USMF110  | $\frac{3.00}{(0.118)}$ | $\frac{3.43}{(0.135)}$ | $\frac{2.35}{(0.093)}$ | $\frac{2.80}{(0.110)}$ | $\frac{0.55}{(0.022)}$ | $\frac{0.85}{(0.033)}$ | $\frac{0.30}{(0.012)}$ |
| MF-USMF150  | $\frac{3.00}{(0.118)}$ | $\frac{3.43}{(0.135)}$ | $\frac{2.35}{(0.093)}$ | $\frac{2.80}{(0.110)}$ | $\frac{0.40}{(0.016)}$ | $\frac{0.85}{(0.033)}$ | $\frac{0.30}{(0.012)}$ |
| MF-USMF175X | $\frac{3.00}{(0.118)}$ | $\frac{3.43}{(0.135)}$ | $\frac{2.35}{(0.093)}$ | $\frac{2.80}{(0.110)}$ | $\frac{0.40}{(0.016)}$ | $\frac{0.85}{(0.033)}$ | $\frac{0.30}{(0.012)}$ |

Packaging: 3000 pcs. per reel.

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



### Terminal material:

Electroless Ni under immersion Au

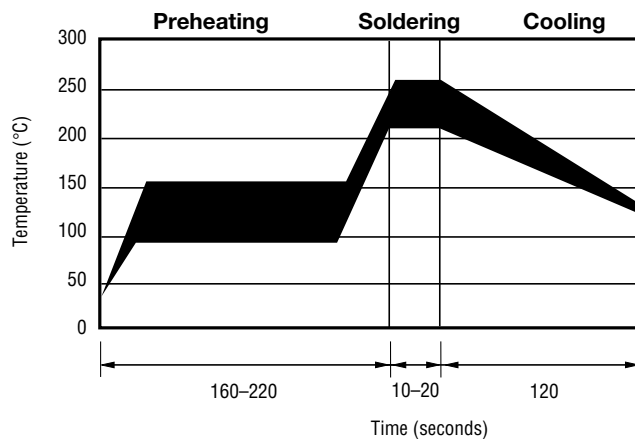
### Termination pad solderability:

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

### Recommended Storage:

40 °C max./70 % RH max.

## Solder Reflow Recommendations



### Notes:

- MF-USMF models cannot be wave soldered.
- 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.

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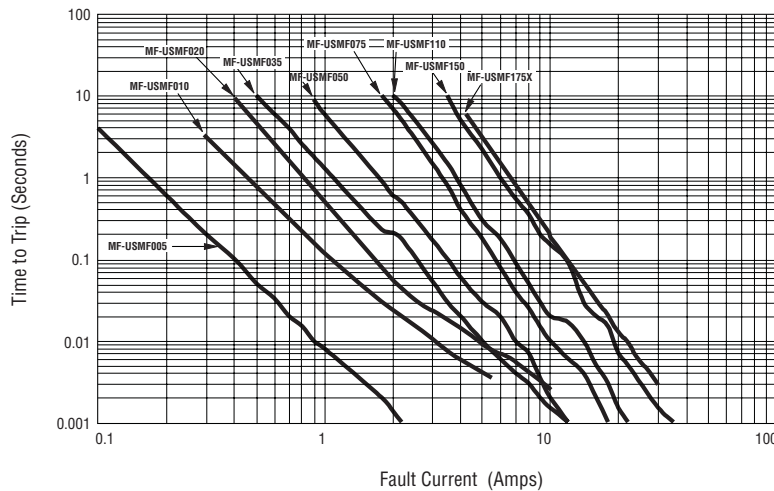
# MF-USMF Series - PTC Resettable Fuses

# BOURNS®

Thermal Derating Chart - I<sub>hold</sub> (Amps)

| Model       | Ambient Operating Temperature |        |      |       |       |       |       |       |       |
|-------------|-------------------------------|--------|------|-------|-------|-------|-------|-------|-------|
|             | -40 °C                        | -20 °C | 0 °C | 23 °C | 40 °C | 50 °C | 60 °C | 70 °C | 85 °C |
| MF-USMF005  | 0.08                          | 0.07   | 0.06 | 0.05  | 0.04  | 0.04  | 0.03  | 0.03  | 0.02  |
| MF-USMF010  | 0.15                          | 0.13   | 0.12 | 0.10  | 0.09  | 0.08  | 0.07  | 0.06  | 0.05  |
| MF-USMF020  | 0.32                          | 0.28   | 0.24 | 0.20  | 0.18  | 0.16  | 0.14  | 0.12  | 0.10  |
| MF-USMF035  | 0.51                          | 0.46   | 0.40 | 0.34  | 0.30  | 0.27  | 0.24  | 0.22  | 0.18  |
| MF-USMF050  | 0.76                          | 0.66   | 0.58 | 0.48  | 0.42  | 0.38  | 0.35  | 0.29  | 0.23  |
| MF-USMF075  | 1.10                          | 0.97   | 0.86 | 0.72  | 0.64  | 0.58  | 0.55  | 0.47  | 0.39  |
| MF-USMF110  | 1.60                          | 1.42   | 1.26 | 1.10  | 0.94  | 0.86  | 0.80  | 0.70  | 0.58  |
| MF-USMF150  | 2.30                          | 2.02   | 1.76 | 1.43  | 1.24  | 1.11  | 1.00  | 0.85  | 0.65  |
| MF-USMF175X | 2.80                          | 2.45   | 2.10 | 1.75  | 1.55  | 1.45  | 1.35  | 1.25  | 1.10  |

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.

### How to Order

**MF - USMF 010 X - 2**

Multifuse® Product Designator \_\_\_\_\_

Series \_\_\_\_\_  
 USMF = 1210 Surface Mount Component

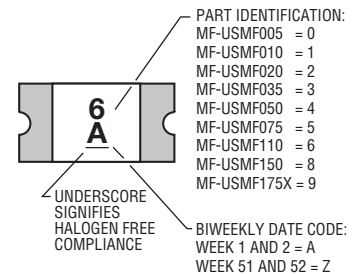
Hold Current, I<sub>hold</sub> \_\_\_\_\_  
 005-175 (0.05-1.75 Amps)

Multifuse® freeXpansion™ Design \_\_\_\_\_

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

### Typical Part Marking

Represents total content. Layout may vary.



Asia-Pacific: TEL +886-2 25624117 • FAX +886-2 25624116

Europe: TEL +41-41 7685555 • FAX +41-41 7685510

The Americas: TEL +1-951 781-5500 • FAX +1-951 781-5700

[www.bourns.com](http://www.bourns.com)

MF-USMF SERIES, REV. M, 04/10

“freeXpansion Design” is a trademark of Bourns, Inc.  
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# MF-USMF Series Tape and Reel Specifications



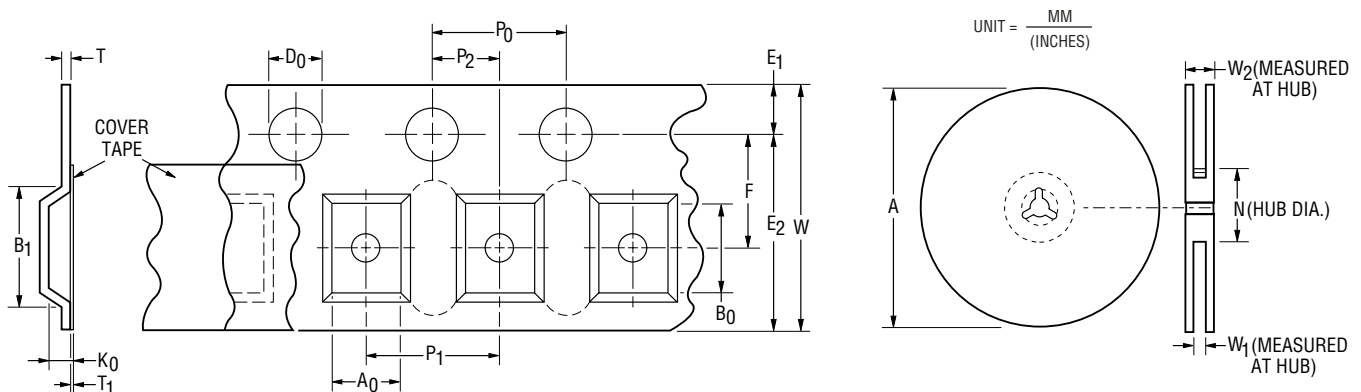
## MF-USMF Series per EIA 481-2

### Tape Dimensions

|                     |   |
|---------------------|---|
| W                   | $\frac{8.0 \pm 0.3}{(0.315 \pm 0.012)}$     |
| P <sub>0</sub>      | $\frac{4.0 \pm 0.1}{(0.157 \pm 0.004)}$     |
| P <sub>1</sub>      | $\frac{4.0 \pm 0.1}{(0.157 \pm 0.004)}$     |
| P <sub>2</sub>      | $\frac{2.0 \pm 0.05}{(0.079 \pm 0.002)}$    |
| A <sub>0</sub>      | $\frac{2.76 \pm 0.10}{(0.109 \pm 0.004)}$   |
| B <sub>0</sub>      | $\frac{3.50 \pm 0.10}{(0.138 \pm 0.004)}$   |
| B <sub>1</sub> max. | $\frac{4.35}{(0.171)}$                      |
| D <sub>0</sub>      | $\frac{1.5 + 0.1/-0.0}{(0.059 + 0.004/-0)}$ |
| F                   | $\frac{3.5 \pm 0.05}{(0.138 \pm 0.002)}$    |
| E <sub>1</sub>      | $\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$   |
| E <sub>2</sub> min. | $\frac{6.25}{(0.246)}$                      |
| T max.              | $\frac{0.6}{(0.024)}$                       |
| T <sub>1</sub> max. | $\frac{0.1}{(0.004)}$                       |
| K <sub>0</sub>      | $\frac{1.07 \pm 0.10}{(0.042 \pm 0.004)}$   |
| Leader min.         | $\frac{390}{(15.35)}$                       |
| Trailer min.        | $\frac{160}{(6.30)}$                        |

### Reel Dimensions

|                     |   |
|---------------------|---|
| A max.              | $\frac{185}{(7.283)}$                         |
| N min.              | $\frac{50}{(1.97)}$                           |
| W <sub>1</sub>      | $\frac{8.4 + 1.5/-0.0}{(0.331 + 0.059/-0.0)}$ |
| W <sub>2</sub> max. | $\frac{14.4}{(0.567)}$                        |



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## Данный компонент на территории Российской Федерации

### Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

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Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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