



**THE DATASHEET OF  
MF-PSMF020X-2**





## Features

- Compact design to save board space - 0805 footprint
- Small size results in very fast time to react to fault events
- Symmetrical design
- Low profile
- RoHS compliant\* and halogen free\*\*
- Agency recognition: 

## Applications

- USB port protection - USB 2.0, 3.0 & OTG
- HDMI 1.4 Source protection
- PC motherboards - Plug and Play protection
- Mobile phones - Battery and port protection
- PDAs / digital cameras
- Game console port protection

# MF-PSMF 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-PSMF010X	15	40	0.10	0.30	1.0	7.5	0.5	1.5	0.5
MF-PSMF010/24X***	24	80	0.10	0.30	1.0	7.5	0.5	1.5	0.5
MF-PSMF020X	9	40	0.20	0.50	0.65	3.5	8.00	0.02	0.5
MF-PSMF035X	6	40	0.35	0.75	0.250	1.200	8.00	0.10	0.5
MF-PSMF050X	6	40	0.50	1.00	0.150	0.900	8.00	0.10	0.5
MF-PSMF075X	6	40	0.75	1.50	0.090	0.350	8.00	0.20	0.6
MF-PSMF110X	6	40	1.10	2.20	0.060	0.210	8.00	0.30	0.6

\*\*\*TÜV approval pending.

## Environmental Characteristics

Operating Temperature.....	-40 °C to +85 °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-PSMF 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

<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<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-PSMF010X	0.15	0.13	0.12	0.10	0.09	0.08	0.07	0.06	0.05
MF-PSMF010/24X	0.15	0.13	0.12	0.10	0.09	0.08	0.07	0.06	0.05
MF-PSMF020X	0.28	0.25	0.23	0.20	0.17	0.14	0.12	0.10	0.07
MF-PSMF035X	0.47	0.44	0.39	0.35	0.30	0.27	0.24	0.20	0.14
MF-PSMF050X	0.68	0.62	0.55	0.50	0.40	0.37	0.33	0.29	0.23
MF-PSMF075X	1.00	0.90	0.79	0.75	0.63	0.57	0.53	0.42	0.35
MF-PSMF110X	1.45	1.35	1.20	1.10	0.92	0.84	0.75	0.65	0.52

\* 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. Users should verify actual device performance in their specific applications.

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## Additional Applications

- Automotive electronic control modules

# MF-PSMF Series - PTC Resettable Fuses

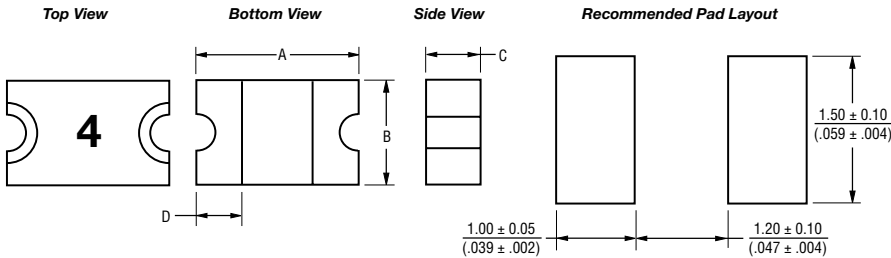
# BOURNS®

### Product Dimensions

Model	A		B		C		D
	Min.	Max.	Min.	Max.	Min.	Max.	Min.
MF-PSMF010X	$\frac{2.00}{(0.079)}$	$\frac{2.30}{(0.091)}$	$\frac{1.20}{(0.047)}$	$\frac{1.50}{(0.059)}$	$\frac{0.48}{(0.019)}$	$\frac{0.85}{(0.033)}$	$\frac{0.20}{(0.008)}$
MF-PSMF010/24X	$\frac{2.00}{(0.079)}$	$\frac{2.30}{(0.091)}$	$\frac{1.20}{(0.047)}$	$\frac{1.50}{(0.059)}$	$\frac{0.48}{(0.019)}$	$\frac{0.85}{(0.033)}$	$\frac{0.20}{(0.008)}$
MF-PSMF020X	$\frac{2.00}{(0.079)}$	$\frac{2.30}{(0.091)}$	$\frac{1.20}{(0.047)}$	$\frac{1.50}{(0.059)}$	$\frac{0.48}{(0.019)}$	$\frac{0.85}{(0.033)}$	$\frac{0.20}{(0.008)}$
MF-PSMF035X	$\frac{2.00}{(0.079)}$	$\frac{2.30}{(0.091)}$	$\frac{1.20}{(0.047)}$	$\frac{1.50}{(0.059)}$	$\frac{0.48}{(0.019)}$	$\frac{0.85}{(0.033)}$	$\frac{0.20}{(0.008)}$
MF-PSMF050X	$\frac{2.00}{(0.079)}$	$\frac{2.30}{(0.091)}$	$\frac{1.20}{(0.047)}$	$\frac{1.50}{(0.059)}$	$\frac{0.48}{(0.019)}$	$\frac{0.85}{(0.033)}$	$\frac{0.20}{(0.008)}$
MF-PSMF075X	$\frac{2.00}{(0.079)}$	$\frac{2.30}{(0.091)}$	$\frac{1.20}{(0.047)}$	$\frac{1.50}{(0.059)}$	$\frac{0.75}{(0.030)}$	$\frac{1.25}{(0.049)}$	$\frac{0.20}{(0.008)}$
MF-PSMF110X	$\frac{2.00}{(0.079)}$	$\frac{2.30}{(0.091)}$	$\frac{1.20}{(0.047)}$	$\frac{1.50}{(0.059)}$	$\frac{0.75}{(0.030)}$	$\frac{1.25}{(0.049)}$	$\frac{0.20}{(0.008)}$

Packaging: 3000 pcs. per reel.

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



#### Terminal material:

Nickel/gold plated.

#### Termination pad solderability:

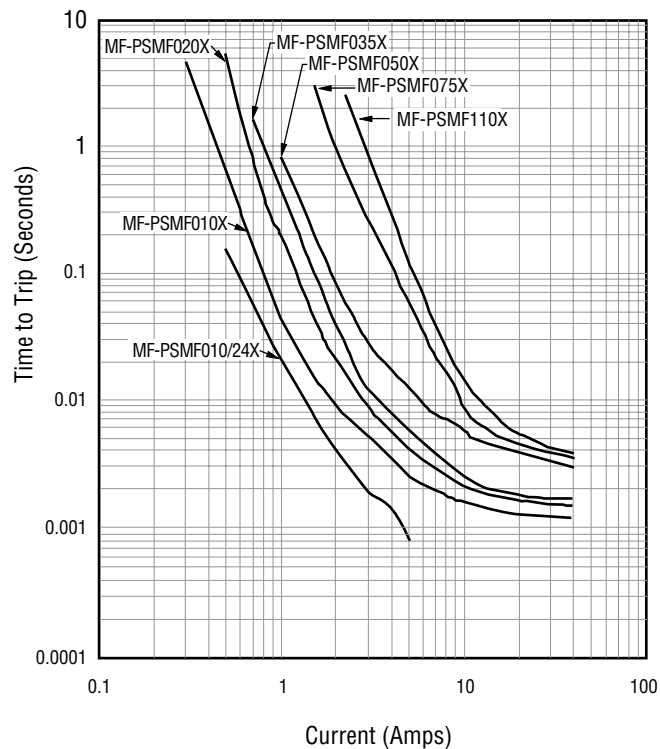
Standard Au finish:  
Meets ANSI/J-STD-002 Category 2.

#### Recommended Storage:

40 °C max./70 % RH max.

### 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.



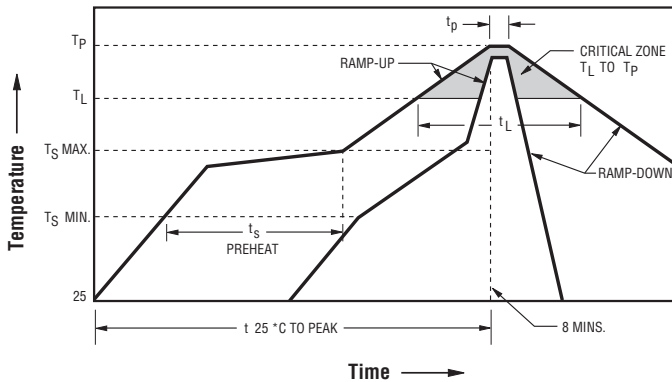
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# MF-PSMF Series - PTC Resettable Fuses

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## Solder Reflow Recommendations



### Notes:

- MF-FSML models cannot be wave soldered or hand soldered. Please contact Bourns for soldering recommendations.
- All temperatures refer to topside of the package, measured on the package body surface.
- If reflow temperatures exceed the recommended profile, devices may not meet the published specifications.
- 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.
- Designed for single solder reflow operations.

Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (T <sub>S</sub> max to T <sub>p</sub> )	3 °C / second max.
PREHEAT: Temperature Min. (T <sub>S</sub> min) Temperature Max. (T <sub>S</sub> max) Time (t <sub>S</sub> min to t <sub>S</sub> max)	150 °C 200 °C 60~180 seconds
TIME MAINTAINED ABOVE: Temperature (T <sub>L</sub> ) Time (t <sub>L</sub> )	217 °C 60~150 seconds
Peak / Classification Temperature (T <sub>p</sub> )	260 °C
Time within 5 °C of Actual Peak Temperature (t <sub>p</sub> )	20~40 seconds
Ramp-Down Rate	6 °C / second max.
Time within 25 °C to Peak Temperature	8 minutes max.

### How to Order

**MF - PSMF 010 /24 X - 2**

Multifuse® Product Designator

Series  
PSMF = 0805 Surface Mount Component

Hold Current, I<sub>hold</sub>  
010-110 (0.10 - 1.10 Amps)

Higher Voltage Option  
Blank = Standard Voltage  
/24 = 24 V

Multifuse® freeExpansion™ Design

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

### Typical Part Marking

Represents total content. Layout may vary.



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

PART IDENTIFICATION:  
MF-PSMF010X = 1  
MF-PSMF010/24X = 1  
MF-PSMF020X = 2  
MF-PSMF035X = 3  
MF-PSMF050X = 4  
MF-PSMF075X = 5  
MF-PSMF110X = 6

**BOURNS®**

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MF-PSMF SERIES, REV. O 05/17

"freeExpansion Design" is a trademark of Bourns, Inc.

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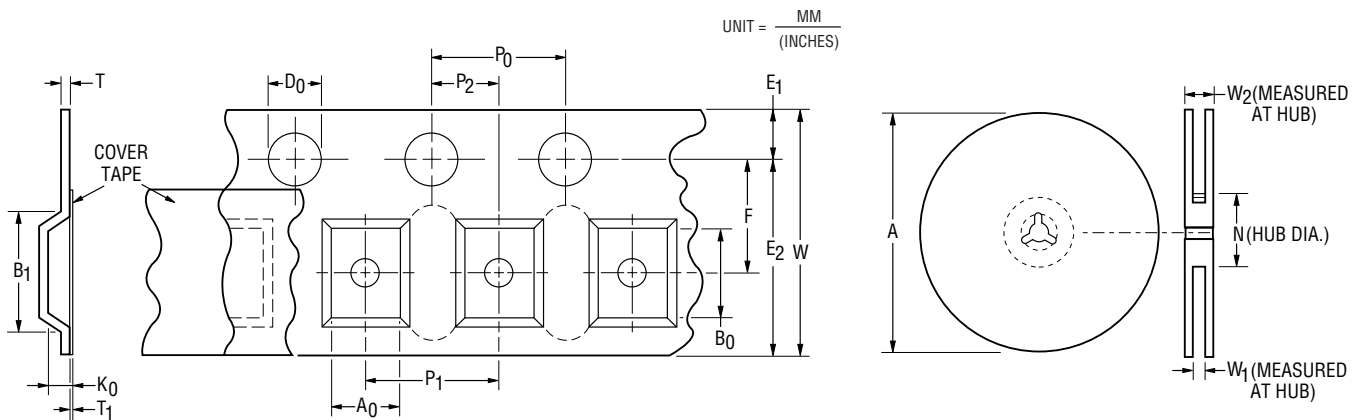
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# MF-PSMF Series Tape and Reel Specifications

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Tape Dimensions	MF-PSMF010X, MF-PSMF010/24X, MF-PSMF020X, MF-PSMF035X & MF-PSMF050X per EIA 481-1	MF-PSMF075X & MF-PSMF110X per EIA 481-1
	W	$\frac{8.0 \pm 0.30}{(0.315 \pm 0.012)}$
P <sub>0</sub>	$\frac{4.0 \pm 0.10}{(0.157 \pm 0.004)}$	$\frac{4.0 \pm 0.10}{(0.157 \pm 0.004)}$
P <sub>1</sub>	$\frac{4.0 \pm 0.10}{(0.157 \pm 0.004)}$	$\frac{4.0 \pm 0.10}{(0.157 \pm 0.004)}$
P <sub>2</sub>	$\frac{2.0 \pm 0.05}{(0.079 \pm 0.002)}$	$\frac{2.0 \pm 0.05}{(0.079 \pm 0.002)}$
A <sub>0</sub>	$\frac{1.65 \pm 0.10}{(0.065 \pm 0.004)}$	$\frac{1.65 \pm 0.10}{(0.065 \pm 0.004)}$
B <sub>0</sub>	$\frac{2.4 \pm 0.10}{(0.094 \pm 0.004)}$	$\frac{2.4 \pm 0.10}{(0.094 \pm 0.004)}$
B <sub>1</sub> max.	$\frac{4.35}{(0.171)}$	$\frac{4.35}{(0.171)}$
D <sub>0</sub>	$\frac{1.50 + 0.10/-0.0}{(0.059 + 0.004/-0)}$	$\frac{1.50 + 0.10/-0.0}{(0.059 + 0.004/-0)}$
F	$\frac{3.5 \pm 0.05}{(0.138 \pm 0.002)}$	$\frac{3.5 \pm 0.05}{(0.138 \pm 0.002)}$
E <sub>1</sub>	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$
E <sub>2</sub> min.	$\frac{6.25}{(0.246)}$	$\frac{6.25}{(0.246)}$
T max.	$\frac{0.6}{(0.024)}$	$\frac{0.6}{(0.024)}$
T <sub>1</sub> max.	$\frac{0.10}{(0.004)}$	$\frac{0.10}{(0.004)}$
K <sub>0</sub>	$\frac{0.95 \pm 0.10}{(0.037 \pm 0.004)}$	$\frac{1.25 \pm 0.10}{(0.049 \pm 0.004)}$
Leader min.	$\frac{390}{(15.35)}$	$\frac{390}{(15.35)}$
Trailer min.	$\frac{160}{(6.30)}$	$\frac{160}{(6.30)}$
<b>Reel Dimensions</b>		
A max.	$\frac{185}{(7.28)}$	$\frac{185}{(7.28)}$
N min.	$\frac{50}{(1.97)}$	$\frac{50}{(1.97)}$
W <sub>1</sub>	$\frac{8.4 + 1.5/-0.0}{(0.331 + 0.059/-0)}$	$\frac{8.4 + 1.5/-0.0}{(0.331 + 0.059/-0)}$
W <sub>2</sub> max.	$\frac{14.4}{(0.567)}$	$\frac{14.4}{(0.567)}$



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-  Cost Control Management
-  Shortage Management
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-  Excess Inventory Management