


## Features

- 100 % electrically compatible with all previous generations of 1812 SMT devices
- Compatible with Pb and Pb-free solder reflow profiles
- RoHS compliant\* and halogen free\*\*
- Surface mount packaging for automated assembly
- Agency recognition: 
- Standard 4532 mm (1812 mils) footprint

## MF-MSMF L 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-MSMF110L	6.0	100	1.10	2.20	0.04	0.21	8.0	0.30	0.8
MF-MSMF150L	6.0	100	1.50	3.00	0.03	0.120	8.0	0.5	0.8
MF-MSMF160L	8.0	100	1.60	2.80	0.035	0.099	8.0	2.0	0.8
MF-MSMF200L	8.0	40	2.00	4.00	0.020	0.080	8.0	3.0	0.8
MF-MSMF260L	6.0	100	2.60	5.20	0.015	0.080	8.0	5.0	0.8

### 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-MSMF L 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

# BOURNS®

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

\*RoHS Directive 2002/95/EC Jan 27 2003 including Annex.  
 \*\*Bourns is using the definition that appears to be the prevalent definition used as the industry standard at this time. The Bourns definition of "halogen-free" is:  
 Bromine (Br) content: ≤ 900 ppm; Chlorine (Cl) content: ≤ 900 ppm; Total Br + Cl content: ≤ 1500 ppm.  
 Specifications are subject to change without notice.  
 Customers should verify actual device performance in their specific applications.

## Applications

- Overcurrent and overtemperature protection of automotive electronics
- Hard disk drives
- PC motherboards
- PC peripherals
- Point-of-sale (POS) equipment
- PCMCIA cards
- USB port protection - USB 2.0, 3.0 & OTG
- HDMI 1.4 Source protection

## MF-MSMF L Series - PTC Resettable Fuses

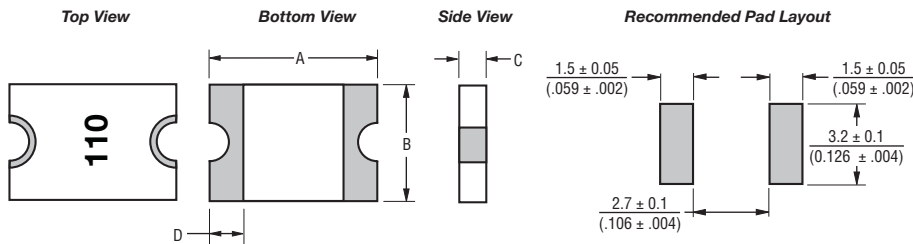
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### Product Dimensions

Model	A		B		C		D
	Min.	Max.	Min.	Max.	Min.	Max.	Min.
MF-MSMF110L	$\frac{4.37}{(0.172)}$	$\frac{4.73}{(0.186)}$	$\frac{3.07}{(0.121)}$	$\frac{3.41}{(0.134)}$	$\frac{0.45}{(0.018)}$	$\frac{0.85}{(0.033)}$	$\frac{0.30}{(0.012)}$
MF-MSMF150L	$\frac{4.37}{(0.172)}$	$\frac{4.73}{(0.186)}$	$\frac{3.07}{(0.121)}$	$\frac{3.41}{(0.134)}$	$\frac{0.55}{(0.015)}$	$\frac{0.85}{(0.033)}$	$\frac{0.30}{(0.012)}$
MF-MSMF160L	$\frac{4.37}{(0.172)}$	$\frac{4.73}{(0.186)}$	$\frac{3.07}{(0.121)}$	$\frac{3.41}{(0.134)}$	$\frac{0.55}{(0.015)}$	$\frac{0.85}{(0.033)}$	$\frac{0.30}{(0.012)}$
MF-MSMF200L	$\frac{4.37}{(0.172)}$	$\frac{4.73}{(0.186)}$	$\frac{3.07}{(0.121)}$	$\frac{3.41}{(0.134)}$	$\frac{0.45}{(0.018)}$	$\frac{0.85}{(0.033)}$	$\frac{0.30}{(0.012)}$
MF-MSMF260L	$\frac{4.37}{(0.172)}$	$\frac{4.73}{(0.186)}$	$\frac{3.07}{(0.121)}$	$\frac{3.41}{(0.134)}$	$\frac{0.48}{(0.019)}$	$\frac{0.85}{(0.033)}$	$\frac{0.30}{(0.012)}$

Packaging: 2000 pcs. per reel.

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



#### Terminal material:

Electroless Ni under immersion Au

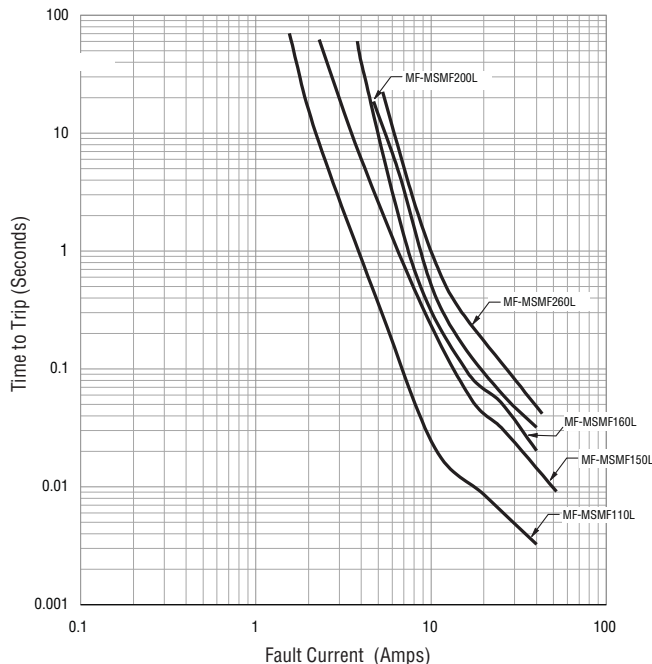
#### Termination pad solderability:

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

#### Recommended Storage:

40 °C max./70 % RH max.

### 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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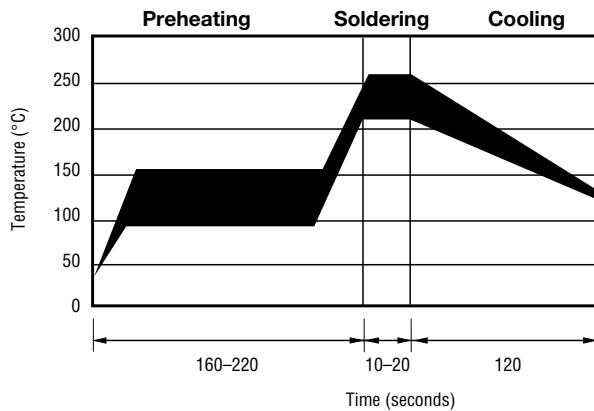
# MF-MSMF L Series - PTC Resettable Fuses

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## 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-MSMF110L	1.59	1.43	1.26	1.10	0.95	0.87	0.80	0.71	0.60
MF-MSMF150L	2.17	1.95	1.72	1.50	1.30	1.18	1.09	0.97	0.82
MF-MSMF160L	2.30	2.20	1.90	1.60	1.45	1.30	1.15	1.03	0.91
MF-MSMF200L	3.08	2.71	2.35	2.00	1.80	1.60	1.50	1.40	1.25
MF-MSMF260L	4.00	3.52	3.06	2.60	2.34	2.08	1.95	1.39	1.04

## Solder Reflow Recommendations



### Notes:

- MF-MSMF 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.

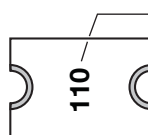
## How to Order

**MF - MSMF 110 L - 2**

Multifuse® Product Designator \_\_\_\_\_  
 Series \_\_\_\_\_  
 MSMF = 4532 mm (1812 mils) Surface Mount Component  
 Hold Current, I<sub>hold</sub> \_\_\_\_\_  
 110-260 (1.10 Amps - 2.60 Amps)  
 Model Suffix \_\_\_\_\_  
 Packaging \_\_\_\_\_  
 Packaged per EIA 481-1  
 -2 = Tape and Reel

## Typical Part Marking

Represents total content. Layout may vary.



PART IDENTIFICATION EXAMPLES:  
 MF-MSMF110L = 110  
 MF-MSMF150L = 150  
 MF-MSMF160L = 160  
 MF-MSMF200L = 200  
 MF-MSMF260L = 260

MF-MSMF L SERIES, REV. A, 01/11

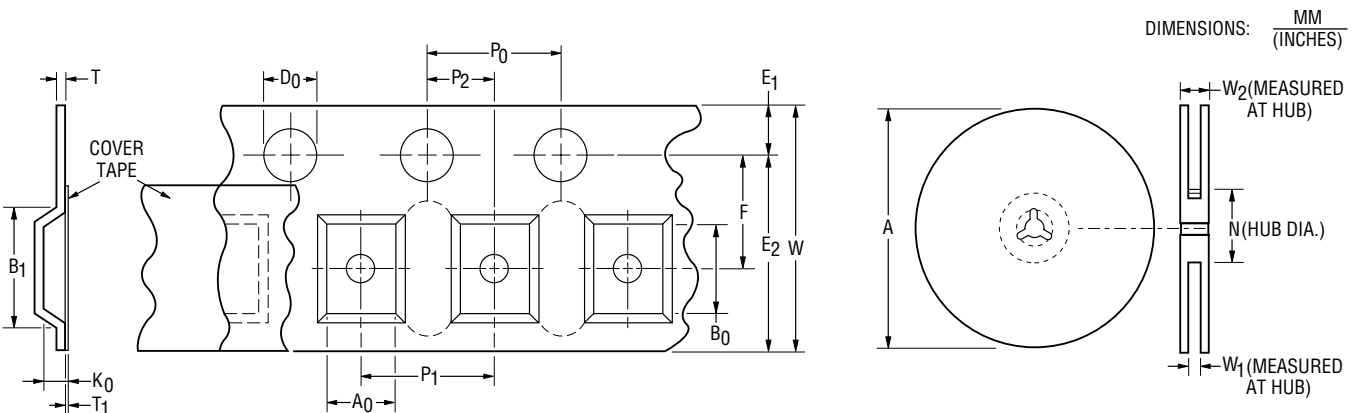
“freeXpansion Design” is a trademark of Bourns, Inc.  
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# MF-MSMF L Series Tape and Reel Specifications

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Tape Dimensions	MF-MSMF L Series per EIA 481-1
W	$12.0 \pm 0.30$ (0.472 ± 0.012)
P <sub>0</sub>	$4.0 \pm 0.10$ (0.157 ± 0.004)
P <sub>1</sub>	$8.0 \pm 0.10$ (0.315 ± 0.004)
P <sub>2</sub>	$2.0 \pm 0.05$ (0.079 ± 0.002)
A <sub>0</sub>	$3.66 \pm 0.15$ (0.144 ± 0.006)
B <sub>0</sub>	$4.98 \pm 0.10$ (0.196 ± 0.004)
B <sub>1</sub> max.	$5.9$ (0.232)
D <sub>0</sub>	$1.5 + 0.10/-0.0$ (0.059 + 0.004/-0)
F	$5.5 \pm 0.05$ (0.217 ± 0.002)
E <sub>1</sub>	$1.75 \pm 0.10$ (0.069 ± 0.004)
E <sub>2</sub> min.	$10.25$ (0.404)
T max.	$0.6$ (0.024)
T <sub>1</sub> max.	$0.1$ (0.004)
K <sub>0</sub>	$0.95 \pm 0.10$ (0.037 ± 0.004)
Leader min.	$390$ (15.35)
Trailer min.	$160$ (6.30)
<b>Reel Dimensions</b>	
A max.	$185$ (7.28)
N min.	$50$ (1.97)
W <sub>1</sub>	$12.4 + 2.0/-0.0$ (0.488 + 0.079/-0.0)
W <sub>2</sub> max.	$18.4$ (0.724)



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