

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-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
Solvent Resistance.....	MIL-STD-202, Method 215..... No change
Vibration	MIL-STD-883C, Method 2007.1,
	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

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



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*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.

Additional Features

- Patents pending

Additional Applications

- Automotive electronic control modules
- Game console port protection

MF-FSMF Series - PTC Resettable Fuses

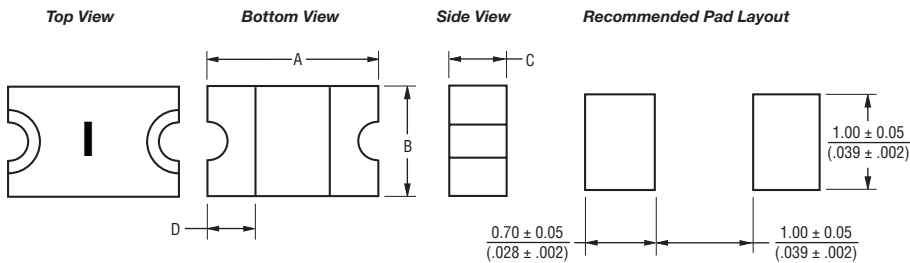
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Product Dimensions

Model	A		B		C		D
	Min.	Max.	Min.	Max.	Min.	Max.	Min.
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-FSMF020X & MF-FSMF035X = 6000 pcs. per reel;
MF-FSMF050X = 4000 pcs. per reel

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

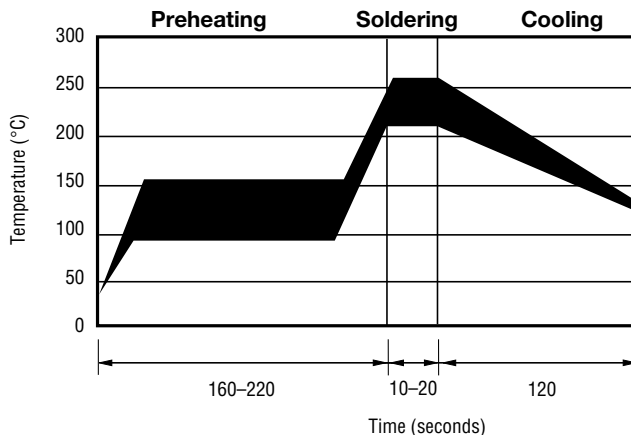


Terminal material:
Nickel/gold plated.

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:

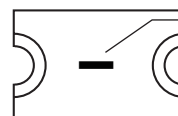
- MF-FSMF models cannot be wave soldered. Please contact Bourns for hand soldering recommendations.
- If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.
- Compatible with Pb and Pb-free solder reflow profiles.
- Excess solder may cause a short circuit, 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 _____
 020-050 (0.20 - 0.50 Amps)
 freeXpansion™ Design _____
 Packaging _____
 Packaged per EIA 481-1
 -2 = Tape and Reel

Typical Part Marking



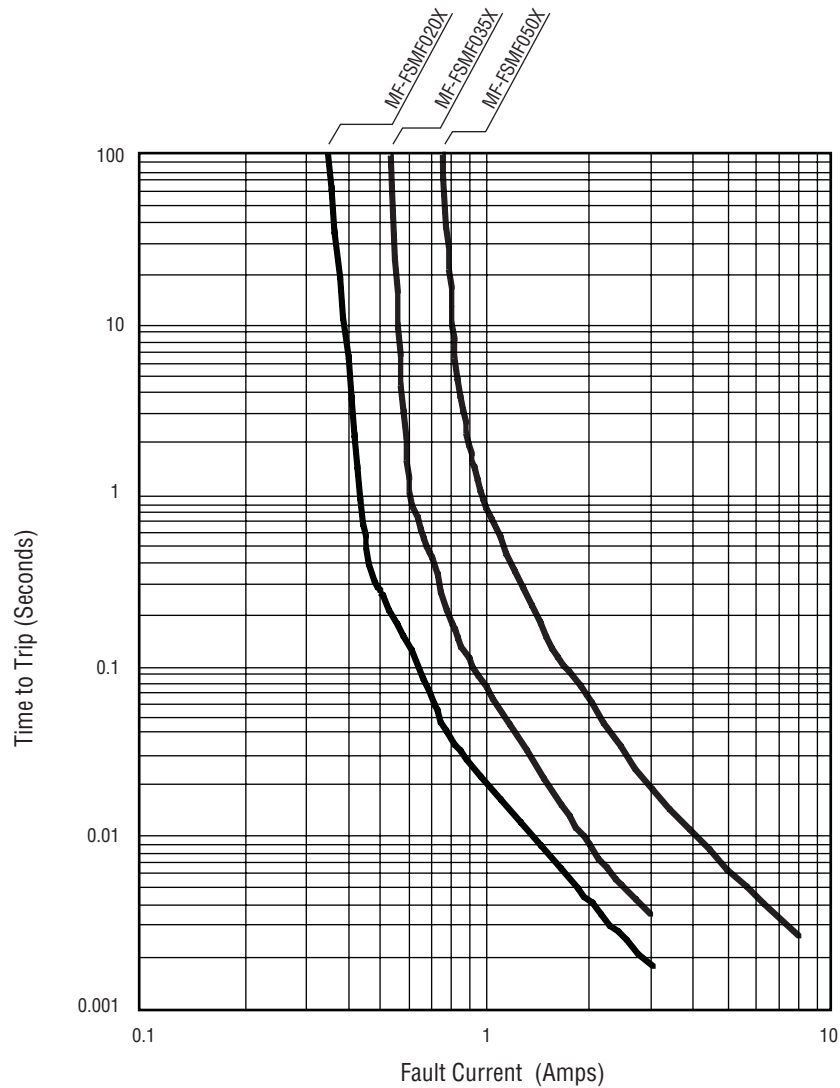
- PART IDENTIFICATION:
MF-FSMF020X = I
MF-FSMF035X = •
MF-FSMF050X = —

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

MF-FSMF Series - PTC Resettable Fuses

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Typical Time to Trip at 23 °C



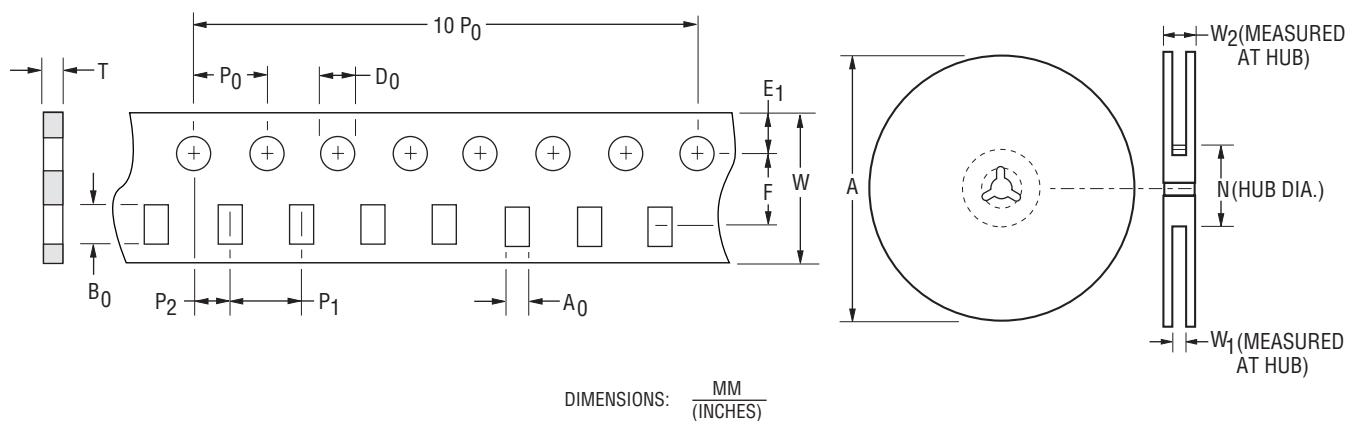
The Time to Trip curves represent typical performance of a device in a simulated application environment. Actual performance in specific customer applications may differ from these values due to the influence of other variables.

MF-FSMF Series Tape and Reel Specifications

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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)



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Customers should verify actual device performance in their specific applications.