Features

- Compliant with AEC-Q200 Rev-C Stress Test Qualification for Passive Components in Automotive Applications
- Compact design to save board space - 1206 footprint
- Small size results in very fast time to react to fault events
- Symmetrical design
- Low profile
- RoHS compliant* and halogen free**
- Agency recognition: c UL us

MF-NSMF 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-NSMF012	30.0	10	0.12	0.29	1.35	8.50	1.0	0.20	0.4
MF-NSMF020	24.0	10	0.20	0.46	0.60	2.60	1.0	0.60	0.6
MF-NSMF020X***	30.0	60	0.20	0.40	0.60	3.30	1.0	0.60	0.6
MF-NSMF035	6.0	100	0.35	0.75	0.30	1.20	8.0	0.10	0.6
MF-NSMF035X****	16.0	20	0.35	0.75	0.30	1.40	3.5	0.14	0.6
MF-NSMF050	13.2	100	0.50	1.00	0.15	0.70	8.0	0.10	0.4
MF-NSMF075	6.0	100	0.75	1.50	0.10	0.40	8.0	0.10	0.4
MF-NSMF110	6.0	100	1.10	2.20	0.06	0.20	8.0	0.10	0.6
MF-NSMF150	6.0	100	1.50	3.00	0.03	0.13	8.0	0.30	0.6
MF-NSMF200	6.0	100	2.00	4.00	0.02	0.085	8.0	1.00	0.7

***Features Multifuse® freeXpansion Design™ for MF-NSMF Series (TÜV pending)
****Features Multifuse® freeXpansion Design™ for MF-NSMF Series

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, Condition A	No change

Test Procedures And Requirements For Model MF-NSMF Series

Test	Test Conditions	Accept/Reject Criteria
Visual/Mech.	Verify dimensions and materials	Per MF physical description
Resistance	In still air @ 23 °C	Rmin ≤ R ≤ R1max
Time to Trip	At specified current, Vmax, 23 °C	T ≤ max. time to trip (seconds)
Hold Current	30 min. at Ihold	No trip
Trip Cycle Life	Vmax, Imax, 100 cycles	No arcing or burning
Trip Endurance	Vmax, 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 02057213
http://www.tuvdotcom.com/ Follow link to “other certificates”, enter File No. 2057213

*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.
**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.

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
- Automotive electronic control modules

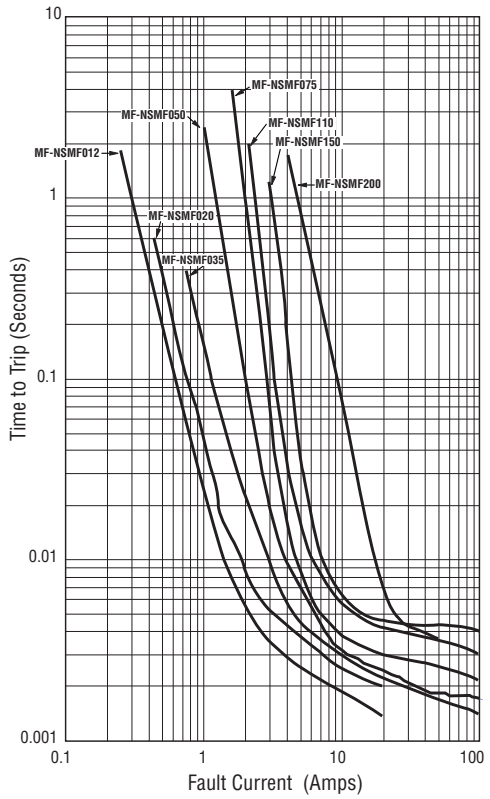
MF-NSMF Series - PTC Resettable Fuses

BOURNS®

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-NSMF012	0.19	0.17	0.15	0.12	0.11	0.10	0.09	0.08	0.07
MF-NSMF020	0.30	0.27	0.24	0.20	0.18	0.16	0.14	0.12	0.11
MF-NSMF020X	0.30	0.27	0.24	0.20	0.18	0.16	0.14	0.12	0.10
MF-NSMF035	0.51	0.46	0.40	0.35	0.30	0.27	0.24	0.22	0.18
MF-NSMF035X	0.58	0.51	0.44	0.35	0.31	0.28	0.24	0.21	0.16
MF-NSMF050	0.76	0.68	0.59	0.50	0.44	0.40	0.35	0.32	0.26
MF-NSMF075	1.11	1.00	0.85	0.75	0.67	0.61	0.52	0.50	0.42
MF-NSMF110	1.64	1.46	1.30	1.10	0.92	0.83	0.80	0.65	0.52
MF-NSMF150	2.20	1.99	1.77	1.50	1.34	1.23	1.10	1.01	0.84
MF-NSMF200	2.88	2.61	2.28	2.00	1.80	1.66	1.51	1.39	1.19

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 - NSMF 020 X - 2

Multifuse® Product Designator

Series
NSMF = 1206 Surface Mount Component

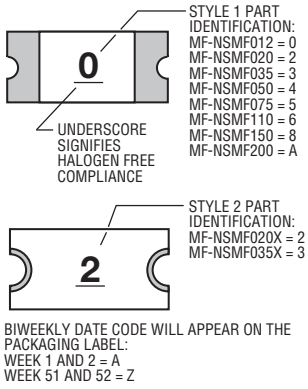
Hold Current, Ihold
012-200 (0.12 Amps - 2.00 Amps)

Options
— = Standard
X = Multifuse® freeXpansion Design™ MF-NSMF Series

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

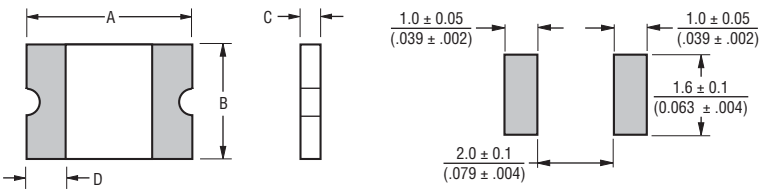
Product Dimensions

Model	A		B		C		D	Style
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	
MF-NSMF012	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.70 (0.028)	1.10 (0.043)	0.25 (0.010)	1
MF-NSMF020	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.48 (0.019)	0.85 (0.033)	0.25 (0.010)	1
MF-NSMF020X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.40 (0.016)	0.85 (0.033)	0.25 (0.010)	2
MF-NSMF035	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.48 (0.019)	0.85 (0.033)	0.25 (0.010)	1
MF-NSMF035X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.40 (0.016)	0.85 (0.033)	0.25 (0.010)	2
MF-NSMF050	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.48 (0.019)	0.85 (0.033)	0.25 (0.010)	1
MF-NSMF075	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.40 (0.016)	0.70 (0.028)	0.25 (0.010)	1
MF-NSMF110	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.40 (0.016)	0.70 (0.028)	0.25 (0.010)	1
MF-NSMF150	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.40 (0.016)	0.70 (0.028)	0.25 (0.010)	1
MF-NSMF200	3.00 (0.118)	3.50 (0.138)	1.40 (0.055)	1.80 (0.071)	0.70 (0.028)	1.60 (0.063)	0.25 (0.010)	1

Packaging: 3000 pcs. per reel.

DIMENSIONS: MM / (INCHES)

Style 1

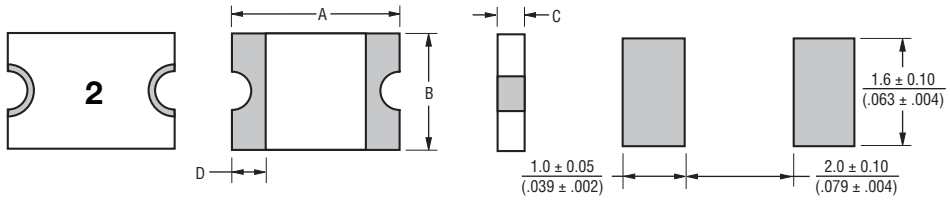


Terminal material:
Electroless Ni under immersion Au

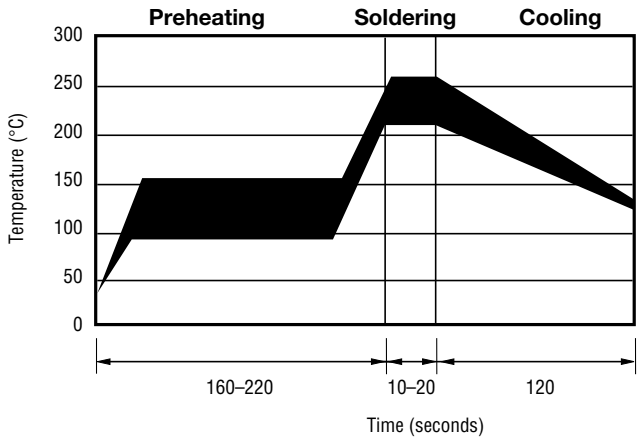
Termination pad solderability:
Standard Au finish:
Meets ANSI/J-STD-002 Category 2.

Recommended Storage:
40 °C max./70 % RH max.

Style 2



Solder Reflow Recommendations



Notes:

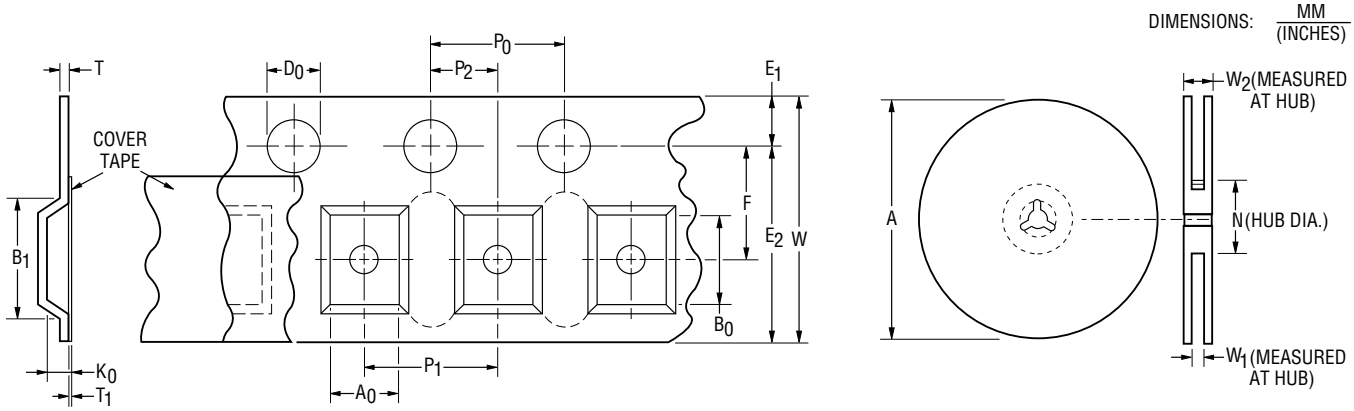
- MF-NSMF models cannot be wave soldered. Please contact Bourns for hand soldering recommendations.
- If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.
- Compatible with Pb and Pb-free solder reflow profiles.
- Excess solder may cause a short circuit,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

MF-NSMF Series Tape and Reel Specifications

BOURNS®

Tape Dimensions	MF-NSMF012 & MF-NSMF200 per EIA 481-1	MF-NSMF020 ~ MF-NSMF050 per EIA 481-1	MF-NSMF075 ~ MF-NSMF150 per EIA 481-1	MF-NSMF020X & MF-NSMF035X per EIA 481-1
W	8.0 ± 0.30 (0.315 ± 0.012)	8.0 ± 0.30 (0.315 ± 0.012)	8.0 ± 0.30 (0.315 ± 0.012)	8.0 ± 0.30 (0.315 ± 0.012)
P_0	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)
P_1	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)
P_2	2.0 ± 0.05 (0.079 ± 0.002)	2.0 ± 0.05 (0.079 ± 0.002)	2.0 ± 0.05 (0.079 ± 0.002)	2.0 ± 0.05 (0.079 ± 0.002)
A_0	1.90 ± 0.10 (0.075 ± 0.004)	1.90 ± 0.10 (0.075 ± 0.004)	1.90 ± 0.10 (0.075 ± 0.004)	1.90 ± 0.10 (0.075 ± 0.004)
B_0	3.50 ± 0.10 (0.138 ± 0.004)	3.45 ± 0.10 (0.136 ± 0.004)	3.45 ± 0.10 (0.136 ± 0.004)	3.55 ± 0.10 (0.140 ± 0.004)
B_1 max.	4.35 (0.171)	4.35 (0.171)	4.35 (0.171)	4.35 (0.171)
D_0	1.5 + 0.10/-0.0 (0.059 + 0.004/-0)	1.5 + 0.10/-0.0 (0.059 + 0.004/-0)	1.5 + 0.10/-0.0 (0.059 + 0.004/-0)	1.5 + 0.10/-0.0 (0.059 + 0.004/-0)
F	3.5 ± 0.05 (0.138 ± 0.002)	3.5 ± 0.05 (0.138 ± 0.002)	3.5 ± 0.05 (0.138 ± 0.002)	3.5 ± 0.05 (0.138 ± 0.002)
E_1	1.75 ± 0.10 (0.069 ± 0.004)	1.75 ± 0.10 (0.069 ± 0.004)	1.75 ± 0.10 (0.069 ± 0.004)	1.75 ± 0.10 (0.069 ± 0.004)
E_2 min.	6.25 (0.246)	6.25 (0.246)	6.25 (0.246)	6.25 (0.246)
T max.	0.6 (0.024)	0.6 (0.024)	0.6 (0.024)	0.6 (0.024)
T_1 max.	0.1 (0.004)	0.1 (0.004)	0.1 (0.004)	0.1 (0.004)
K_0	1.35 ± 0.10 (0.053 ± 0.004)	1.04 ± 0.10 (0.041 ± 0.004)	0.85 ± 0.10 (0.033 ± 0.004)	0.80 ± 0.10 (0.032 ± 0.004)
Leader min.	390 (15.35)	390 (15.35)	390 (15.35)	390 (15.35)
Trailer min.	160 (6.30)	160 (6.30)	160 (6.30)	160 (6.30)
Reel Dimensions				
A max.	185 (7.28)	185 (7.28)	185 (7.28)	185 (7.28)
N min.	50 (1.97)	50 (1.97)	50 (1.97)	50 (1.97)
W_1	8.4 + 1.5/-0.0 (0.331 + 0.059/-0.0)	8.4 + 1.5/-0.0 (0.331 + 0.059/-0.0)	8.4 + 1.5/-0.0 (0.331 + 0.059/-0.0)	8.4 + 1.5/-0.0 (0.331 + 0.059/-0.0)
W_2 max.	14.4 (0.567)	14.4 (0.567)	14.4 (0.567)	14.4 (0.567)

DIMENSIONS: MM (INCHES)



Specifications are subject to change without notice.
The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time.
Users should verify actual device performance in their specific applications.