

## **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: **%** ♠



## MF-NSMF Series - PTC Resettable Fuses

## **Electrical Characteristics**

Model	V max. Volts		l <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> .			Тур.
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-NSMF150D	6.0	100	1.50	3.00	0.03	0.11	8.0	0.30	1.0
MF-NSMF200	6.0	100	2.00	4.00	0.02	0.085	8.0	1.00	0.7

<sup>\*\*\*\*</sup>Features Multifuse® freeXpansion Design™ for MF-NSMF Series (CSA/TÜV pending) \*\*\*\*\*Features Multifuse® freeXpansion Design™ for MF-NSMF Series (CSA pending)

## **Environmental Characteristics**

Operating Temperature Maximum Device Surface Temperature	40 °C to +85 °C	
in Tripped State	125 °C	
	+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-NSMF Series

Resistance	Test Conditions . Verify dimensions and materials	. Rmin ≤ R ≤ R1max . T ≤ max. time to trip (seconds) . No trip . No arcing or burning . No arcing or burning
UL File Number		J
CSA File Number	http://directories.csa-international.org/ Under "Ce enter 110338-0-000	ertification Record" and "File Number"
TÜV Certificate Number	H 02057213 http://www.tuvdotcom.com/ Follow link to "other c	certificates", enter File No. 2057213

## **Applications**

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

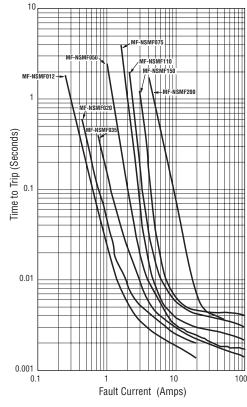
# MF-NSMF Series - PTC Resettable Fuses

## BOURNS

## Thermal Derating Chart - Ihold (Amps)

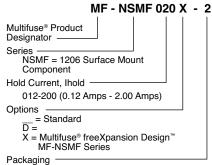
Model	Ambient Operating Temperature									
wodei	-40 °C	-20 °C	0 °C	23 °C	40 °C	50 °C	60 °C	70 °C	85 °C	
MF-NSMF012	0.19	0.17	0.15	0.12	0.11	0.10	0.09	0.08	0.07	
MF-NSMF020	0.30	0.27	0.24	0.20	0.18	0.16	0.14	0.12	0.11	
MF-NSMF020X	0.30	0.27	0.24	0.20	0.18	0.16	0.14	0.12	0.10	
MF-NSMF035	0.51	0.46	0.40	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-NSMF150D	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



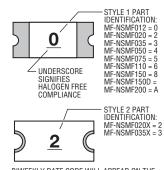
The Time to Trip curves represent typical performance of a device in a simulated application environment. Actual performance in specific customer applications may differ from these values due to the influence of other variables.

## **How to Order**



## **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

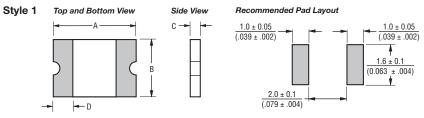
## MF-NSMF Series - PTC Resettable Fuses

## **Product Dimensions**

Model	l A	4	l	3			D	Ctyle
Wodei	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Style
MF-NSMF012	3.00	3.40	1.40	1.80	0.70	1.10	0.25	1
IVII -INOIVII 012	(0.118)	(0.134)	(0.055)	(0.071)	(0.028)	(0.043)	(0.010)	'
MF-NSMF020	3.00	3.40	1.40	1.80	_0.48_	0.85	0.25	1 1
IVII -INGIVII 020	(0.118)	(0.134)	(0.055)	(0.071)	(0.019)	(0.033)	(0.010)	'
MF-NSMF020X	3.00	3.40	1.40	1.80	0.40	0.85	0.25	2
IVII -INOIVII UZUX	(0.118)	(0.134)	(0.055)	(0.071)	(0.016)	(0.033)	(0.010)	
MF-NSMF035	_3.00_	3.40	1.40	_1.80_	_0.48_	_0.85_	0.25	1
IVII -INGIVII 000	(0.118)	(0.134)	(0.055)	(0.071)	(0.019)	(0.033)	(0.010)	'
MF-NSMF035X	3.00_	3.40	1.40	1.80	_0.40_	0.85	0.25	2
IVII -INGIVII 000X	(0.118)	(0.134)	(0.055)	(0.071)	(0.016)	(0.033)	(0.010)	
MF-NSMF050	_3.00_	3.40	1.40	_1.80_	_0.48_	0.85	0.25	1
IVII -INGIVII 030	(0.118)	(0.134)	(0.055)	(0.071)	(0.019)	(0.033)	(0.010)	
MF-NSMF075	3.00	3.40	1.40	1.80	_0.40_	0.70	0.25	1 1
IVII IVOIVII 073	(0.118)	(0.134)	(0.055)	(0.071)	(0.016)	(0.028)	(0.010)	'
MF-NSMF110	3.00	3.40	1.40	1.80	_0.40_	0.70	0.25	1
IVII -INOIVII 110	(0.118)	(0.134)	(0.055)	(0.071)	(0.016)	(0.028)	(0.010)	' '
MF-NSMF150	3.00_	3.40	1.40	1.80	_0.40_	0.70	0.25	1 1
	(0.118)	(0.134)	(0.055)	(0.071)	(0.016)	(0.028)	(0.010)	'
MF-NSMF150D	3.00	3.40	1.40	1.80	_0.40_	0.75	0.25	1 1
IVII TVOIVII TOOD	(0.118)	(0.134)	(0.055)	(0.071)	(0.016)	(0.030)	(0.010)	'
MF-NSMF200	3.00	3.50	1.40	1.80	0.70	1.60	0.25	4
IVII -INGIVII 200	(0.118)	(0.138)	(0.055)	(0.071)	(0.028)	(0.063)	(0.010)	'

Packaging: 3000 pcs. per reel.

MM DIMENSIONS: (INCHES)



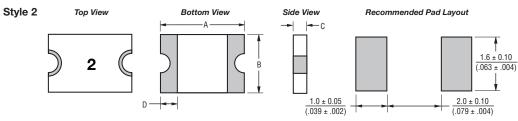
## Terminal material:

Electroless Ni under immersion Au

## Termination pad solderability:

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

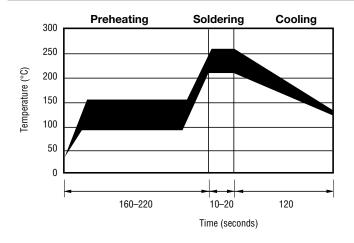
Recommended Storage: 40 °C max./70 % RH max.



## MF-NSMF Series - PTC Resettable Fuses

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## **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 & MF-NSMF150D per EIA 481-1	MF-NSMF075 ~ MF-NSMF150 per EIA 481-1	MF-NSMF020X & MF-NSMF035X per EIA 481-1
W	$\frac{8.0 \pm 0.30}{(0.315 \pm 0.012)}$	$\frac{8.0 \pm 0.30}{(0.315 \pm 0.012)}$	$\frac{8.0 \pm 0.30}{(0.315 \pm 0.012)}$	$\frac{8.0 \pm 0.30}{(0.315 \pm 0.012)}$
$\overline{P_0}$	$\frac{4.0 \pm 0.10}{(0.157 \pm 0.004)}$	$\frac{4.0 \pm 0.10}{(0.157 \pm 0.004)}$	$\frac{4.0 \pm 0.10}{(0.157 \pm 0.004)}$	$\frac{4.0 \pm 0.10}{(0.157 \pm 0.004)}$
P <sub>1</sub>	$\frac{4.0 \pm 0.10}{(0.157 \pm 0.004)}$	$\frac{4.0 \pm 0.10}{(0.157 \pm 0.004)}$	$\frac{4.0 \pm 0.10}{(0.157 \pm 0.004)}$	$\frac{4.0 \pm 0.10}{(0.157 \pm 0.004)}$
P <sub>2</sub>	$\frac{2.0 \pm 0.05}{(0.079 \pm 0.002)}$	$\frac{2.0 \pm 0.05}{(0.079 \pm 0.002)}$	$\frac{2.0 \pm 0.05}{(0.079 \pm 0.002)}$	$\frac{2.0 \pm 0.05}{(0.079 \pm 0.002)}$
A <sub>0</sub>	$\frac{1.90 \pm 0.10}{(0.075 \pm 0.004)}$	$\frac{1.90 \pm 0.10}{(0.075 \pm 0.004)}$	$\frac{1.90 \pm 0.10}{(0.075 \pm 0.004)}$	$\frac{1.90 \pm 0.10}{(0.075 \pm 0.004)}$
В0	$\frac{3.50 \pm 0.10}{(0.138 \pm 0.004)}$	$\frac{3.45 \pm 0.10}{(0.136 \pm 0.004)}$	$\frac{3.45 \pm 0.10}{(0.136 \pm 0.004)}$	$\frac{3.55 \pm 0.10}{(0.140 \pm 0.004)}$
B <sub>1</sub> max.	4.35 (0.171)	<u>4.35</u> (0.171)	4.35 (0.171)	4.35 (0.171)
D <sub>0</sub>	$\frac{1.5 + 0.10/-0.0}{(0.059 + 0.004/-0)}$	$\frac{1.5 + 0.10/-0.0}{(0.059 + 0.004/-0)}$	$\frac{1.5 + 0.10/-0.0}{(0.059 + 0.004/-0)}$	$\frac{1.5 + 0.10/-0.0}{(0.059 + 0.004/-0)}$
F	$\frac{3.5 \pm 0.05}{(0.138 \pm 0.002)}$	$\frac{3.5 \pm 0.05}{(0.138 \pm 0.002)}$	$\frac{3.5 \pm 0.05}{(0.138 \pm 0.002)}$	$\frac{3.5 \pm 0.05}{(0.138 \pm 0.002)}$
E <sub>1</sub>	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$
E <sub>2</sub> min.	6.25 (0.246)	6.25 (0.246)	<u>6.25</u> (0.246)	6.25 (0.246)
T max.	$\frac{0.6}{(0.024)}$	0.6 (0.024)	$\frac{0.6}{(0.024)}$	<u>0.6</u> (0.024)
T <sub>1</sub> max.	<u>0.1</u> (0.004)	<u>0.1</u> (0.004)	<u>0.1</u> (0.004)	0.1 (0.004)
κ <sub>0</sub>	$\frac{1.35 \pm 0.10}{(0.053 \pm 0.004)}$	$\frac{1.04 \pm 0.10}{(0.041 \pm 0.004)}$	$\frac{0.85 \pm 0.10}{(0.033 \pm 0.004)}$	$\frac{0.80 \pm 0.10}{(0.032 \pm 0.004)}$
Leader min.	390 (15.35)	<u>390</u> (15.35)	<u>390</u> (15.35)	<u>390</u> (15.35)
Trailer min.	<u>160</u> (6.30)	<u>160</u> (6.30)	<u>160</u> (6.30)	160 (6.30)
Reel Dimensions				
A max.	<u>185</u> (7.28)	<u>185</u>	<u>185</u> (7.28)	<u>185</u> (7.28)
N min.	<u>50</u> (1.97)	<u>50</u> (1.97)	<u>50</u> (1.97)	50 (1.97)
W <sub>1</sub>	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 <sub>2</sub> max.	14.4 (0.567)	14.4 (0.567)	14.4 (0.567)	14.4 (0.567)

