

Features

- Compliant with AEC-Q200 Rev-D 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 **Ti**us ≜



MF-NSMF Series - PTC Resettable Fuses

Electrical Characteristics

Model	V _{max} .	I _{max.}	I _{hold}	I _{trip}	Resis	stance	Max. Time To Trip		Tripped Power Dissipation	Agency Recognition	
			at 23 °C		Ohms at 23 °C		at 23 °C		Watts at 23 °C	cUL	ΤÜV
	Volts	Amps	Am	nps	R _{Min.}	R _{1Max.}	Amps	Seconds	Тур.	E174545	R 50256634
MF-NSMF012	30.0	10	0.12	0.29	1.35	8.50	1.0	0.20	0.6	1	/
MF-NSMF016	30.0	10	0.16	0.37	0.70	6.00	1.0	0.30	0.6	✓	1
MF-NSMF020	24.0	10	0.20	0.46	0.60	2.60	1.0	0.60	0.6	/	1
MF-NSMF020X	30.0	60	0.20	0.40	0.60	3.30	1.0	0.60	0.6	1	1
MF-NSMF025X	16.0	20	0.25	0.50	0.45	2.30	8.0	0.08	0.6	✓	1
MF-NSMF035	6.0	100	0.35	0.75	0.30	1.20	8.0	0.10	0.6	/	1
MF-NSMF035X	16.0	20	0.35	0.75	0.30	1.40	3.5	0.14	0.6	1	1
MF-NSMF050	13.2	100	0.50	1.00	0.15	0.70	8.0	0.10	0.6	✓	1
MF-NSMF075	6.0	100	0.75	1.50	0.10	0.40	8.0	0.20	0.6	/	1
MF-NSMF110	6.0	100	1.10	2.20	0.06	0.20	8.0	0.10	0.6	1	1
MF-NSMF125	6.0	100	1.25	2.50	0.05	0.14	8.0	0.20	0.6	1	1
MF-NSMF150	6.0	100	1.50	3.00	0.03	0.13	8.0	0.30	0.6	1	1
MF-NSMF175	6.0	100	1.75	3.50	0.02	0.085	8.0	1.00	0.7	1	/
MF-NSMF200	6.0	100	2.00	4.00	0.02	0.085	8.0	1.00	0.7	1	/

Environmental Characteristics

Item	Condition	Criteria
Operating Temperature	-40 °C to +85 °C	
Recommended Storage	+40 °C max. / 70 % R.H. max.	
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	-40 °C to +85 °C, 20 times	±10 % typical resistance change
Solvent Resistance	MIL-STD-202, Method 215	No change (marking still legible)
Vibration	MIL-STD-883C, Method 2007.1 Condition A	No change (R _{min} < R < R _{1max})
Moisture Sensitivity Level (MSL)	See Note	
ESD Classification	Class 6 (per AEC-Q200-2, HBM)	

Additional Information

Click these links for more information:











PRODUCT TECHNICAL INVENTORY SAMPLES CONTACT

^{*} RoHS Directive 2015/863, Mar 31, 2015 and Annex.

Bourns considers a product to be "halogen free" if (a) the Bromine (Br) content is 900 ppm or less; (b) the Chlorine (CI) 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. The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

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-NSMF Series - PTC Resettable Fuses

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Test Procedures and Requirements

Item	Test Conditions	Accept/Reject Criteria		
Visual/Mechanical	Verify dimensions and materials	Per MF physical description		
Resistance	In still air @ 23 °C	$R_{min} \le R \le R_{max}$		
Time to Trip	At specified current, V _{max} , 23 °C, still air	T ≤ max. time to trip (seconds)		
Hold Current	30 min. at I _{hold} , still air	No trip		
Trip Cycle Life	V _{max} , I _{max} , 100 cycles	No arcing or burning		
Trip Endurance	V _{max} , I _{max} , 48 hours	No arcing or burning		
Solderability	245 °C ± 5 °C, 5 seconds	95 % min. coverage		

Thermal Derating Table - Ihold (Amps)

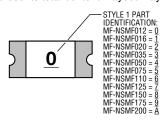
Model	Ambient Operating Temperature										
	-40 °C	-20 °C	0 °C	23 °C	40 °C	50 °C	60 °C	70 °C	85 °C		
MF-NSMF012	0.19	0.17	0.15	0.12	0.11	0.10	0.09	0.08	0.07		
MF-NSMF016	0.21	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.09		
MF-NSMF020	0.30	0.27	0.24	0.20	0.18	0.16	0.14	0.12	0.11		
MF-NSMF020X	0.30	0.27	0.24	0.20	0.18	0.16	0.14	0.12	0.10		
MF-NSMF025X	0.39	0.35	0.31	0.25	0.23	0.21	0.18	0.16	0.13		
MF-NSMF035	0.51	0.46	0.40	0.35	0.30	0.27	0.24	0.22	0.18		
MF-NSMF035X	0.51	0.46	0.40	0.35	0.30	0.27	0.24	0.22	0.18		
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-NSMF125	1.84	1.66	1.47	1.25	1.11	1.02	0.91	0.82	0.69		
MF-NSMF150	2.20	1.99	1.77	1.50	1.34	1.23	1.10	1.01	0.84		
MF-NSMF175	2.52	2.28	1.99	1.75	1.57	1.45	1.32	1.21	1.04		
MF-NSMF200	2.88	2.61	2.28	2.00	1.80	1.66	1.51	1.39	1.19		

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™ Packaging -2 = Tape and Reel

Packaged per EIA 481

Typical Part Marking

Represents total content. Layout may vary.





PACKAGING LABEL:
WEEK 1 AND 2 = A
WEEK 51 AND 52 = Z

Packaging Quantity

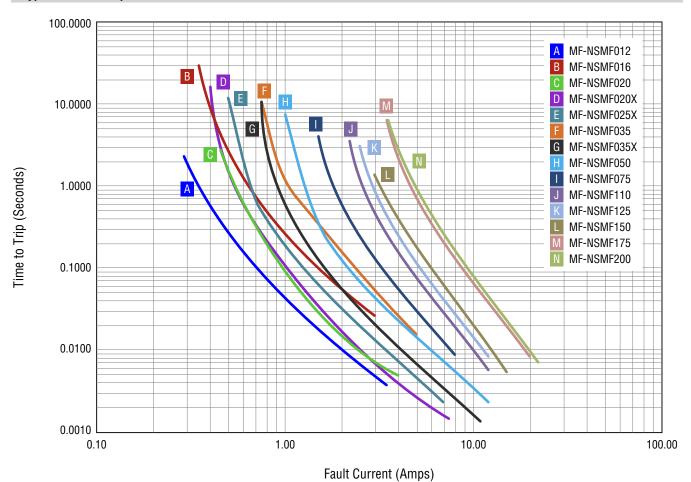
3000 pcs. per reel

Specifications are subject to change without notice. Users should verify actual device performance in their specific applications.

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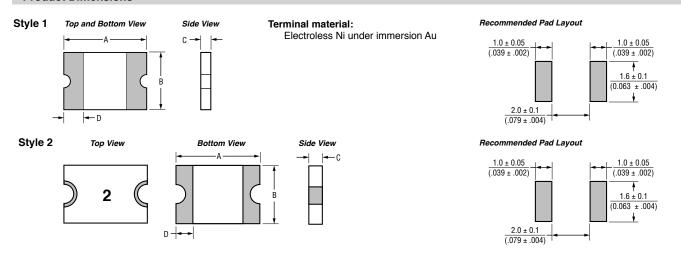
www.bourns.com/docs/legal/disclaimer.pdf.

Typical Time to Trip at 23 °C



MF-NSMF Series - PTC Resettable Fuses

Product Dimensions



Model	A	4	E	3			D	Chulo
Model	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Style
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-NSMF016	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-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)	<u>0.40</u> (0.016)	0.85 (0.033)	0.25 (0.010)	2
MF-NSMF025X	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)	<u>0.40</u> (0.016)	<u>0.85</u> (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)	<u>0.40</u> (0.016)	<u>0.70</u> (0.028)	<u>0.25</u> (0.010)	1
MF-NSMF110	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	<u>0.40</u> (0.016)	<u>0.70</u> (0.028)	0.25 (0.010)	1
MF-NSMF125	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	<u>0.40</u> (0.016)	<u>0.70</u> (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)	<u>0.40</u> (0.016)	<u>0.70</u> (0.028)	<u>0.25</u> (0.010)	1
MF-NSMF175	3.00 (0.118)	3.50 (0.138)	1.40 (0.055)	1.80 (0.071)	<u>0.70</u> (0.028)	1.60 (0.063)	<u>0.25</u> (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

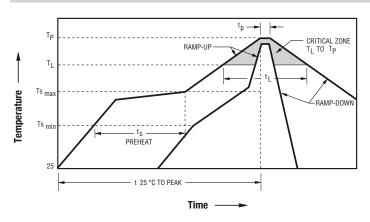
DIMENSIONS:

MM (INCHES)

MF-NSMF Series - PTC Resettable Fuses

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Solder Reflow Recommendations



Notes:

- MF-NSMF models are intended for reflow soldering (including, but not limited to heating plate, hot air, IR, nitrogen, and vapor phase).
- Wave soldering is permissible only if the device is on the top of the PCB, opposite the heat source.
- · Hand soldering is not recommended for these devices.
- All temperatures refer to the topside of the device, measured on the device 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.
- Please refer to the <u>Multifuse® Polymer PTC Resettable Fuse Soldering</u>
 <u>Recommendations</u> for more details.

Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (Ts _{max} to T _p)	3 °C / second max.
PREHEAT:	
Temperature Min. (Ts _{min})	150 °C
Temperature Max. (Ts _{max})	200 °C
Time (Ts _{min} to Ts _{max}) (ts)	60~180 seconds
TIME MAINTAINED ABOVE:	
Temperature (T _L)	217 °C
Time (t _L)	60~150 seconds
Peak Temperature (T _p)	260 °C
Time within 5 °C of Actual Peak Temperature (tp)	20~40 seconds
Ramp-Down Rate	6 °C / second max.
Time 25 °C to Peak Temperature	8 minutes max.

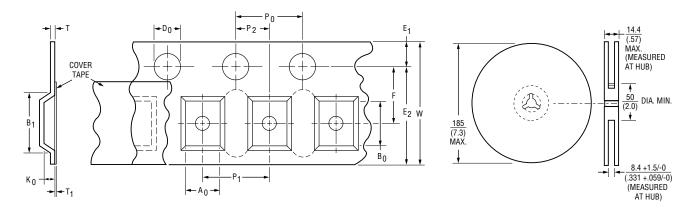
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Tape Dimensions per EIA-481	MF-NSMF012	MF-NSMF016 MF-NSMF020 MF-NSMF035 MF-NSMF050	MF-NSMF075	MF-NSMF110 MF-NSMF125 MF-NSMF150 MF-NSMF175 MF-NSMF200	MF-NSMF020X MF-NSMF025X MF-NSMF035X
W			$\frac{8.00 \pm 0.30}{(.315 \pm .012)}$		
P ₀			$\frac{4.00 \pm 0.10}{(.157 \pm .004)}$		
10 P ₀			$\frac{40.0 \pm 0.20}{(1.575 \pm .008)}$		
P ₁			$\frac{4.00 \pm 0.10}{(.157 \pm .004)}$		
P ₂			$\frac{2.00 \pm 0.05}{(.079 \pm .002)}$		
A ₀	$\frac{1.90 \pm 0.10}{(.075 \pm .004)}$	$\frac{1.90 \pm 0.10}{(.075 \pm .004)}$	$\frac{1.90 \pm 0.10}{(.075 \pm .004)}$	$\frac{1.90 \pm 0.10}{(.075 \pm .004)}$	$\frac{1.95 \pm 0.10}{(.077 \pm .004)}$
В ₀	$\frac{3.50 \pm 0.10}{(.138 \pm .004)}$	$\frac{3.45 \pm 0.10}{(.136 \pm .004)}$	$\frac{3.50 \pm 0.10}{(.138 \pm .004)}$	$\frac{3.45 \pm 0.10}{(.136 \pm .004)}$	$\frac{3.55 \pm 0.10}{(.140 \pm .004)}$
B _{1 max}			4.35 (.171)		
D ₀			1.50 +0.10/-0 (.059 +.004/-0)		
F			$\frac{3.50 \pm 0.05}{(.138 \pm .002)}$		
E ₁			$\frac{1.75 \pm 0.10}{(.069 \pm .004)}$		
E ₂ typ			6.25 (.246)		
T max			0.60 (.024)		
T ₁ max			<u>0.10</u> (.004)		
Κ ₀	$\frac{1.35 \pm 0.10}{(.053 \pm .004)}$	$\frac{1.04 \pm 0.10}{(.041 \pm .004)}$	$\frac{0.85 \pm 0.10}{(.033 \pm .004)}$	$\frac{0.85 \pm 0.10}{(.033 \pm .004)}$	$\frac{0.80 \pm 0.15}{(.031 \pm .006)}$
Leader min.			390 (15.4)		
Trailer min.			160 (6.3)		

DIMENSIONS:

(INCHES)

Bourns® Multifuse® PPTC Resettable Fuses

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Application Notice

- Users are responsible for independent and adequate evaluation of Bourns® Multifuse® Polymer PTC devices in the user's
 application, including the PPTC device characteristics stated in the applicable data sheet.
- Polymer PTC devices must not be allowed to operate beyond their stated maximum ratings. Operation in excess of such
 maximum ratings could result in damage to the PTC device and possibly lead to electrical arcing and/or fire. Circuits with
 inductance may generate a voltage above the rated voltage of the polymer PTC device and should be thoroughly evaluated
 within the user's application during the PTC selection and qualification process.
- Polymer PTC devices are intended to protect against adverse effects of temporary overcurrent or overtemperature
 conditions up to rated limits and are not intended to serve as protective devices where overcurrent or overvoltage conditions
 are expected to be repetitive or prolonged.
- In normal operation, polymer PTC devices experience thermal expansion under fault conditions. Thus, a polymer PTC device must be protected against mechanical stress, and must be given adequate clearance within the user's application to accommodate such thermal expansion. Rigid potting materials or fixed housings or coverings that do not provide adequate clearance should be thoroughly examined and tested by the user, as they may result in the malfunction of polymer PTC devices if the thermal expansion is inhibited.
- Exposure to lubricants, silicon-based oils, solvents, gels, electrolytes, acids, and other related or similar materials may adversely affect the performance of polymer PTC devices.
- Aggressive solvents may adversely affect the performance of polymer PTC devices. Conformal coating, encapsulating, potting, molding, and sealing materials may contain aggressive solvents including but not limited to xylene and toluene, which are known to cause adverse effects on the performance of polymer PTCs. Such aggressive solvents must be thoroughly cured or baked to ensure their complete removal from polymer PTCs to minimize the possible adverse effect on the device.
- Recommended storage conditions should be followed at all times. Such conditions can be found on the applicable data sheet and on the Multifuse® Polymer PTC Moisture/Reflow Sensitivity Classification (MSL) note: https://www.bourns.com/docs/RoHS-MSL/msl mf.pdf

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X-ON Electronics

Largest Supplier of Electrical and Electronic Components

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