





Features

- Surface mount packaging for automated assembly
- Small footprint size (1206) and low profile for space-constrained mobile applications
- Ultra-low resistance
- RoHS compliant* and halogen free**
- Agency recognition:  

Applications

- Thermal protection for Li-ion & polymer battery packs
- USB port protection - USB 2.0, 3.0 & OTG
- HDMI 1.4 Source protection
- PC motherboards - Plug & Play protection
- Mobile phones - Battery & port protection
- PDAs / digital cameras
- Game console port protection

MF-NSML Series - Low Ohmic 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-NSML150	6	50	1.50	3.00	0.0100	0.0650	8.00	0.50	0.8
MF-NSML175	6	50	1.75	3.50	0.0050	0.0300	8.00	0.50	0.8
MF-NSML190	6	50	1.90	4.90	0.0050	0.0280	8.00	1.00	0.8
MF-NSML200	6	50	2.00	4.00	0.0050	0.0250	8.00	1.00	0.8
MF-NSML260	6	50	2.60	5.20	0.0030	0.0260	8.00	4.00	0.8
MF-NSML300	6	50	3.00	6.00	0.0025	0.0200	8.00	4.00	0.8
MF-NSML350	6	50	3.50	7.00	0.0020	0.0180	8.00	5.00	0.8
MF-NSML380	6	50	3.80	8.00	0.0015	0.0140	8.00	5.00	0.8
MF-NSML400	6	50	4.00	8.00	0.0010	0.0080	8.00	5.00	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..... ±10 % typical resistance change
Humidity Aging.....	+85 °C, 85 % R.H. 100 hours ±15 % typical resistance change
Thermal Shock	+85 °C to -40 °C, 20 times..... ±30 % typical resistance change
Solvent Resistance.....	MIL-STD-202, Method 215 No change
Vibration	MIL-STD-883C, Method 2007.1,..... No change (R _{min} <R<R _{1max}) Condition A

Test Procedures And Requirements For Model MF-NSML 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

cUL File Number.....	E174545 http://www.ul.com/ Follow link to Certifications, then cUL 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.

Specifications are subject to change without notice.

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MF-NSML Series - Low Ohmic PTC Resettable Fuses

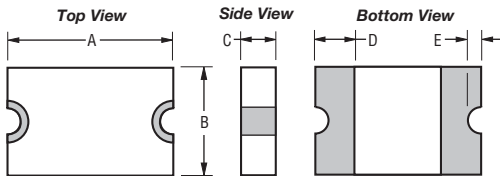


Product Dimensions

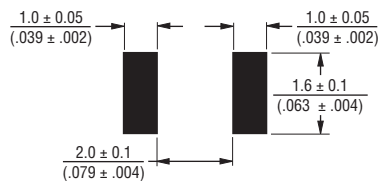
Model	A		B		C		D	E	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.	Max.
MF-NSML150	$\frac{3.00}{(0.118)}$	$\frac{3.50}{(0.138)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.30}{(0.012)}$	$\frac{0.60}{(0.024)}$	$\frac{0.25}{(0.010)}$	$\frac{0.05}{(0.002)}$	$\frac{0.45}{(0.018)}$
MF-NSML175	$\frac{3.00}{(0.118)}$	$\frac{3.50}{(0.138)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.30}{(0.012)}$	$\frac{0.60}{(0.024)}$	$\frac{0.25}{(0.010)}$	$\frac{0.05}{(0.002)}$	$\frac{0.45}{(0.018)}$
MF-NSML190	$\frac{3.00}{(0.118)}$	$\frac{3.50}{(0.138)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.30}{(0.012)}$	$\frac{0.60}{(0.024)}$	$\frac{0.25}{(0.010)}$	$\frac{0.05}{(0.002)}$	$\frac{0.45}{(0.018)}$
MF-NSML200	$\frac{3.00}{(0.118)}$	$\frac{3.50}{(0.138)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.30}{(0.012)}$	$\frac{0.60}{(0.024)}$	$\frac{0.25}{(0.010)}$	$\frac{0.05}{(0.002)}$	$\frac{0.45}{(0.018)}$
MF-NSML260	$\frac{3.00}{(0.118)}$	$\frac{3.50}{(0.138)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.45}{(0.018)}$	$\frac{0.80}{(0.031)}$	$\frac{0.25}{(0.010)}$	$\frac{0.05}{(0.002)}$	$\frac{0.45}{(0.018)}$
MF-NSML300	$\frac{3.00}{(0.118)}$	$\frac{3.50}{(0.138)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.45}{(0.018)}$	$\frac{0.80}{(0.031)}$	$\frac{0.25}{(0.010)}$	$\frac{0.05}{(0.002)}$	$\frac{0.45}{(0.018)}$
MF-NSML350	$\frac{3.00}{(0.118)}$	$\frac{3.50}{(0.138)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.45}{(0.018)}$	$\frac{0.80}{(0.031)}$	$\frac{0.25}{(0.010)}$	$\frac{0.05}{(0.002)}$	$\frac{0.45}{(0.018)}$
MF-NSML380	$\frac{3.00}{(0.118)}$	$\frac{3.50}{(0.138)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.45}{(0.018)}$	$\frac{0.80}{(0.031)}$	$\frac{0.25}{(0.010)}$	$\frac{0.05}{(0.002)}$	$\frac{0.45}{(0.018)}$
MF-NSML400	$\frac{3.00}{(0.118)}$	$\frac{3.50}{(0.138)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.40}{(0.016)}$	$\frac{0.70}{(0.028)}$	$\frac{0.25}{(0.010)}$	$\frac{0.05}{(0.002)}$	$\frac{0.45}{(0.018)}$

Packaging: 3000 pcs. per reel.

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



Recommended Pad Layout



Terminal material:

ENIG-plated terminals
(Tin-plated terminals available upon request).

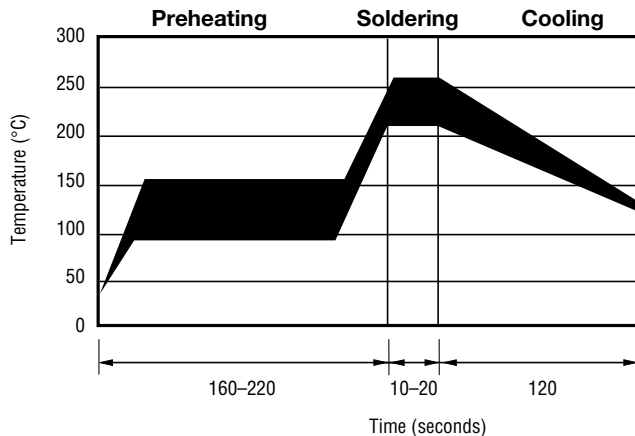
Termination pad solderability:

Meets ANSI/J-STD-002 Category 2.

Recommended Storage:

40 °C max./70 % RH max.

Solder Reflow Recommendations



Notes:

- MF-NSML models cannot be wave soldered or hand soldered. Please contact Bourns for 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.
- Designed for single solder reflow operations.

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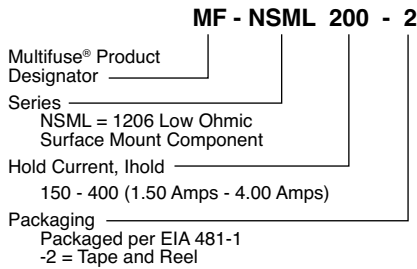
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Thermal Derating Chart - I_{hold} (Amps)

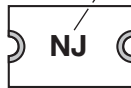
Model	Ambient Operating Temperature								
	-40 °C	-20 °C	0 °C	23 °C	40 °C	50 °C	60 °C	70 °C	85 °C
MF-NSML150	2.67	2.32	1.95	1.50	1.15	0.96	0.78	0.64	0.52
MF-NSML175	2.57	2.33	2.07	1.75	1.49	1.34	1.24	1.00	0.91
MF-NSML190	2.89	2.58	2.25	1.90	1.54	1.36	1.21	0.94	0.77
MF-NSML200	3.30	2.90	2.50	2.00	1.62	1.39	1.16	0.90	0.52
MF-NSML260	3.71	3.42	3.01	2.60	2.08	1.72	1.49	1.30	0.89
MF-NSML300	4.41	3.99	3.54	3.00	2.55	2.32	2.13	1.71	1.56
MF-NSML350	5.51	4.66	4.13	3.50	2.98	2.71	2.49	2.00	1.82
MF-NSML380	5.59	5.05	4.48	3.80	3.23	2.95	2.70	2.17	1.98
MF-NSML400	5.71	5.26	4.63	4.00	3.20	2.70	2.29	2.00	1.37

How to Order



Typical Part Marking

Represents total content. Layout may vary.



PART IDENTIFICATION:

MF-NSML150 = NG
 MF-NSML175 = NH
 MF-NSML190 = NI
 MF-NSML200 = NJ
 MF-NSML260 = NN
 MF-NSML300 = NP
 MF-NSML350 = NS
 MF-NSML380 = NV
 MF-NSML400 = NU

MANUFACTURING DATE CODE IS LOCATED ON PACKING LABEL.



Asia-Pacific: Tel: +886-2 2562-4117 • Fax: +886-2 2562-4116
Europe: Tel: +41-41 768 5555 • Fax: +41-41 768 5510
The Americas: Tel: +1-951 781-5500 • Fax: +1-951 781-5700
www.bourns.com

MF-NSML SERIES, REV. C, 06/13

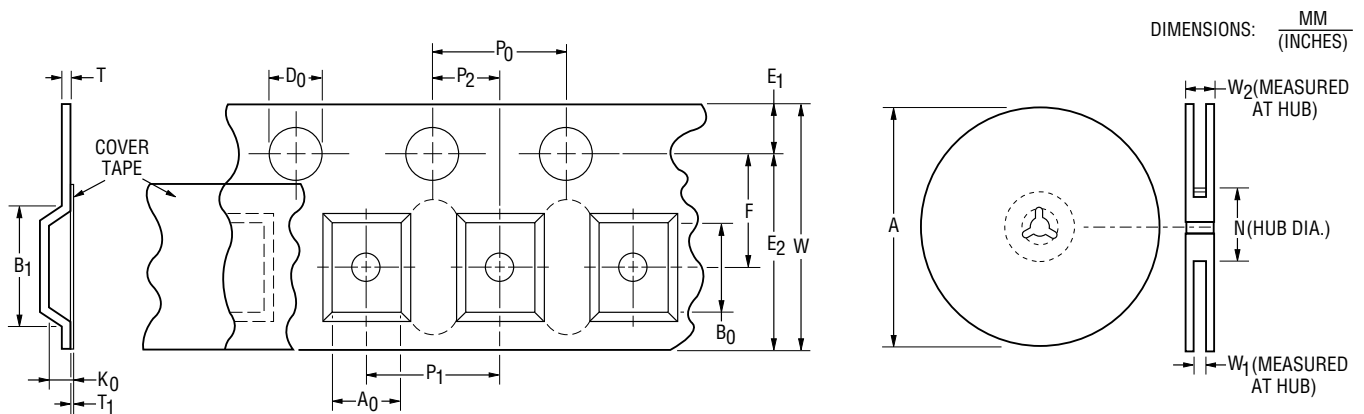
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BOURNS®

Tape Dimensions	MF-NSML Series per EIA 481-2
W	8.0 ± 0.30 (0.315 ± 0.012)
P ₀	4.0 ± 0.10 (0.157 ± 0.004)
P ₁	4.0 ± 0.10 (0.157 ± 0.004)
P ₂	2.0 ± 0.05 (0.079 ± 0.002)
A ₀	1.95 ± 0.10 (0.077 ± 0.004)
B ₀	3.55 ± 0.10 (0.140 ± 0.004)
B ₁ max.	4.35 (0.171)
D ₀	$1.5 + 0.10/-0.0$ (0.059 + 0.004/-0)
F	3.5 ± 0.05 (0.138 ± 0.002)
E ₁	1.75 ± 0.10 (0.069 ± 0.004)
E ₂ min.	6.25 (0.246)
T max.	0.6 (0.024)
T ₁ max.	0.1 (0.004)
K ₀	0.80 ± 0.10 (0.032 ± 0.004)
Leader min.	390 (15.35)
Trailer min.	160 (6.30)
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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