Features

- Standard 1206 footprint
- Fast Time-to-Trip (TTT) to protect against overcurrent events
- Excellent solderability with ENIG terminal
- Symmetrical designs and low profile (0.7 mm ~ 1.6 mm)
- RoHS compliant* and halogen free**
- Agency recognition: cULus and
- TÜV approval to the following standards: IEC 62319-1, IEC 60738-1 and IEC 60730-1:2013 clause 15, clause 17 and Annex J

Some models are currently available but not recommended for new designs.

MF-NSMF Series - PTC Resettable Fuses

Electrical Characteristics

Model	$V_{max.}$	$I_{max.}$	I_{hold}	I_{trip}	Resistance***		Max. Time To Trip		Tripped Power Dissipation	Agency Recognition		AEC-Q200 Compliant/ Automotive Grade
			at 23 °C		Ohms at 23 °C		at 23 °C		Watts at 23 °C	cUL	TÜV	
	Volts	Amps	Amps		$R_{min.}$	$R_{1max.}$	Amps	Sec.	Typ.	E174545	R 50256634	
MF-NSMF005/30X	30	40	0.05	0.15	2.80	20	0.5	1.5	0.6	✓	✓	✓
MF-NSMF005/60X	60	10	0.05	0.15	2.80	20	0.5	1.5	0.6	✓	✓	✓
MF-NSMF010/30X	30	40	0.10	0.25	1.35	15	0.5	1.5	0.6	✓	✓	✓
MF-NSMF010/60X	60	10	0.10	0.25	1.35	15	0.5	1.5	0.6	✓	✓	✓
MF-NSMF012	30	10	0.12	0.29	1.35	8.5	1.0	0.2	0.6	✓	✓	✓
MF-NSMF012/48X	48	10	0.12	0.29	1.00	6.5	1.0	0.2	0.6	✓	✓	✓
MF-NSMF016	30	10	0.16	0.37	0.70	6.0	1.0	0.3	0.6	✓	✓	✓
MF-NSMF016/48X	48	10	0.16	0.37	0.70	5.0	1.0	0.3	0.6	✓	✓	✓
MF-NSMF020	24	10	0.20	0.46	0.60	2.6	1.0	0.6	0.6	✓	✓	✓
MF-NSMF020X	30	60	0.20	0.40	0.60	3.3	1.0	0.6	0.6	✓	✓	✓
MF-NSMF025X	16	20	0.25	0.50	0.45	2.3	8.0	0.08	0.6	✓	✓	✓
MF-NSMF025/24X	24	80	0.25	0.50	0.45	2.3	8.0	0.05	0.6	✓	✓	✓
MF-NSMF025/30X	30	60	0.25	0.50	0.45	2.3	8.0	0.05	0.6	✓	✓	✓
MF-NSMF035	6	100	0.35	0.75	0.30	1.2	8.0	0.10	0.6	✓	✓	✓
MF-NSMF035X	16	20	0.35	0.75	0.30	1.4	3.5	0.14	0.6	✓	✓	✓
MF-NSMF035/24X	24	80	0.35	0.75	0.30	1.4	8.0	0.10	0.6	✓	✓	✓
MF-NSMF035/30X	30	60	0.35	0.75	0.30	1.4	8.0	0.10	0.6	✓	✓	✓
MF-NSMF050/8X	8	100	0.50	1.00	0.15	0.75	8.0	0.10	0.6	✓	✓	✓
MF-NSMF050	13.2	100	0.50	1.00	0.15	0.70	8.0	0.10	0.6	✓	✓	✓
MF-NSMF050/16X	16	100	0.50	1.00	0.15	0.75	8.0	0.10	0.6	✓	✓	✓
MF-NSMF050/24X	24	80	0.50	1.00	0.15	0.75	8.0	0.10	0.6	✓	✓	✓
MF-NSMF075	6	100	0.75	1.50	0.10	0.40	8.0	0.20	0.6	✓	✓	✓
MF-NSMF075/8X	8	100	0.75	1.50	0.09	0.35	8.0	0.10	0.6	✓	✓	✓
MF-NSMF075/13X	13.2	100	0.75	1.50	0.09	0.35	8.0	0.10	0.6	✓	✓	✓
MF-NSMF075/16X	16	100	0.75	1.50	0.09	0.35	8.0	0.10	0.6	✓	✓	✓

***R_{1max}: measured 1 hour post reflow.

continued

Additional Information

Click these links for more information:

PRODUCT SELECTOR | TECHNICAL LIBRARY | INVENTORY | SAMPLES | CONTACT

CALIFORNIA WARNING: Can expose you to lead, a carcinogen and reproductive toxicant.
See www.P65Warnings.ca.gov

* 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 (Cl) content is 900 ppm or less; and (c) the total Bromine (Br) and Chlorine (Cl) content is 1500 ppm or less.

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Applications

- USB & HDMI port protection
- Battery packs
- Tablet and laptop PCs
- Hard disk drives
- LCD / LED HDTVs
- Server and data center interfaces

Electrical Characteristics (continued)

Model	$V_{max.}$	$I_{max.}$	I_{hold}	I_{trip}	Resistance****		Max. Time To Trip		Tripped Power Dissipation	Agency Recognition		AEC-Q200 Compliant/ Automotive Grade
			at 23 °C		Ohms at 23 °C		at 23 °C		Watts at 23 °C	cUL	TÜV	
	Volts	Amps	Amps		$R_{min.}$	$R_{1max.}$	Amps	Sec.	Typ.	E174545	R 50256634	
MF-NSMF110	6	100	1.10	2.20	0.06	0.20	8.0	0.10	0.6	✓	✓	✓
MF-NSMF110/6X	6	100	1.10	2.20	0.06	0.24	8.0	0.10	0.8	✓	✓	✓
MF-NSMF110/16X	16	100	1.10	2.20	0.06	0.23	8.0	0.10	0.8	✓	✓	✓
MF-NSMF125	6	100	1.25	2.50	0.05	0.14	8.0	0.20	0.6	✓	✓	✓
MF-NSMF125/8X	8	100	1.25	2.50	0.04	0.15	8.0	0.20	0.8	✓	✓	✓
MF-NSMF150	6	100	1.50	3.00	0.03	0.13	8.0	0.30	0.6	✓	✓	✓
MF-NSMF150/6X	6	100	1.50	3.00	0.03	0.12	8.0	0.30	0.8	✓	✓	✓
MF-NSMF175	6	100	1.75	3.50	0.02	0.085	8.0	1.0	0.7	✓	✓	✓
MF-NSMF200	6	100	2.00	4.00	0.02	0.085	8.0	1.0	0.7	✓	✓	✓

****R_{1max}: measured 1 hour post reflow.

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)	

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}, 48 hours	No arcing or burning
Solderability	245 °C ± 5 °C, 5 seconds	95 % min. coverage

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Thermal Derating Table - 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-NSMF005/30X	0.076	0.068	0.060	0.050	0.043	0.039	0.034	0.030	0.023
MF-NSMF005/60X	0.076	0.068	0.060	0.050	0.043	0.039	0.034	0.030	0.023
MF-NSMF010/30X	0.15	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.04
MF-NSMF010/60X	0.15	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.04
MF-NSMF012	0.19	0.17	0.15	0.12	0.11	0.10	0.09	0.08	0.07
MF-NSMF012/48X	0.18	0.16	0.14	0.12	0.10	0.09	0.08	0.07	0.05
MF-NSMF016	0.21	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.09
MF-NSMF016/48X	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.09	0.08
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-NSMF025/24X	0.39	0.35	0.31	0.25	0.23	0.21	0.18	0.16	0.13
MF-NSMF025/30X	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-NSMF035/24X	0.51	0.46	0.40	0.35	0.30	0.27	0.24	0.22	0.18
MF-NSMF035/30X	0.51	0.46	0.40	0.35	0.30	0.27	0.24	0.22	0.18
MF-NSMF050/8X	0.76	0.68	0.59	0.50	0.44	0.40	0.35	0.32	0.26
MF-NSMF050	0.76	0.68	0.59	0.50	0.44	0.40	0.35	0.32	0.26
MF-NSMF050/16X	0.76	0.68	0.59	0.50	0.44	0.40	0.35	0.32	0.26
MF-NSMF050/24X	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-NSMF075/8X	1.11	1.00	0.85	0.75	0.67	0.61	0.52	0.50	0.42
MF-NSMF075/13X	1.11	1.00	0.85	0.75	0.67	0.61	0.52	0.50	0.42
MF-NSMF075/16X	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-NSMF110/6X	1.64	1.46	1.30	1.10	0.92	0.83	0.80	0.65	0.52
MF-NSMF110/16X	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-NSMF125/8X	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-NSMF150/6X	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

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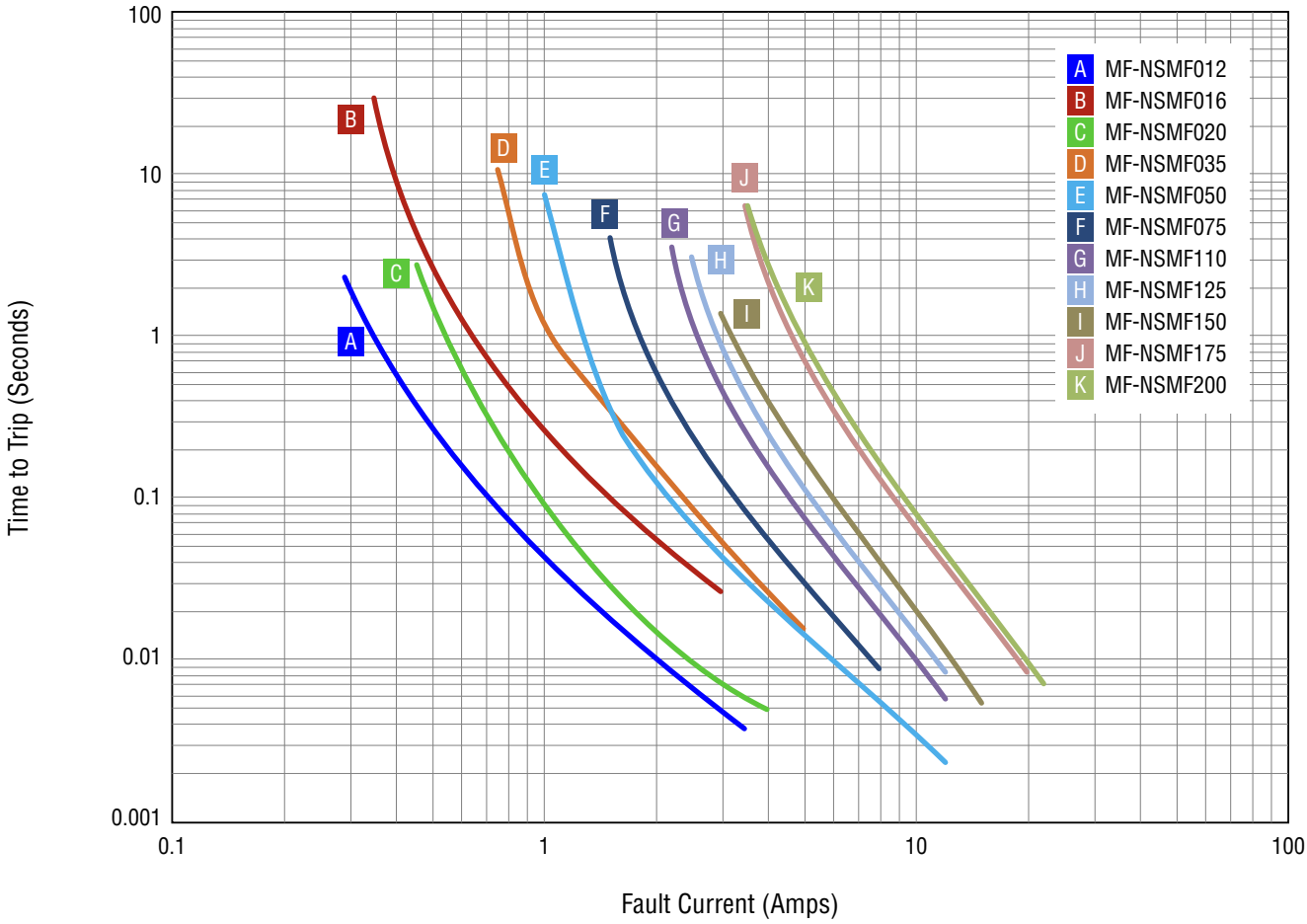
Typical Time to Trip at 23 °C



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.

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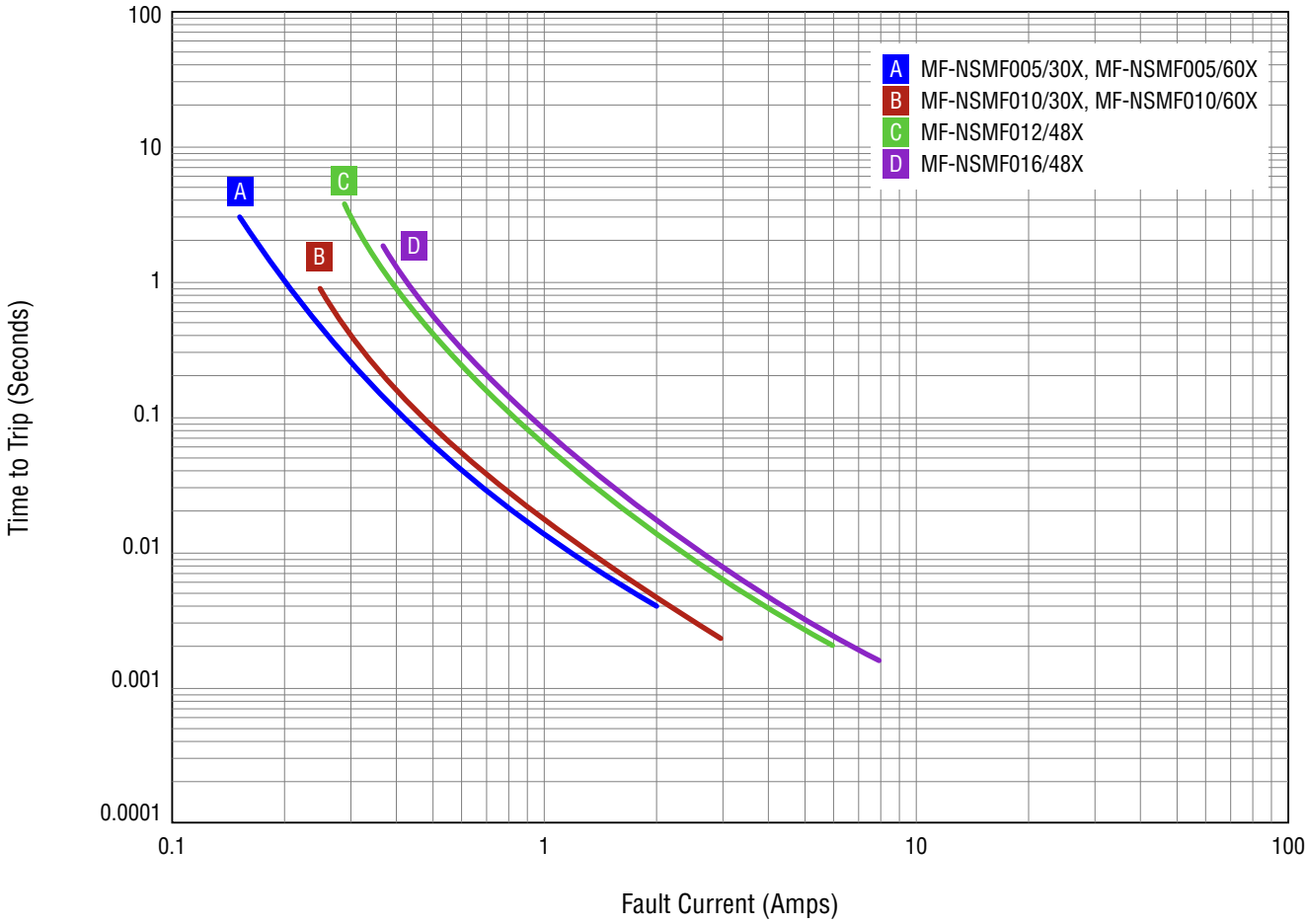
Typical Time to Trip at 23 °C (continued)



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.

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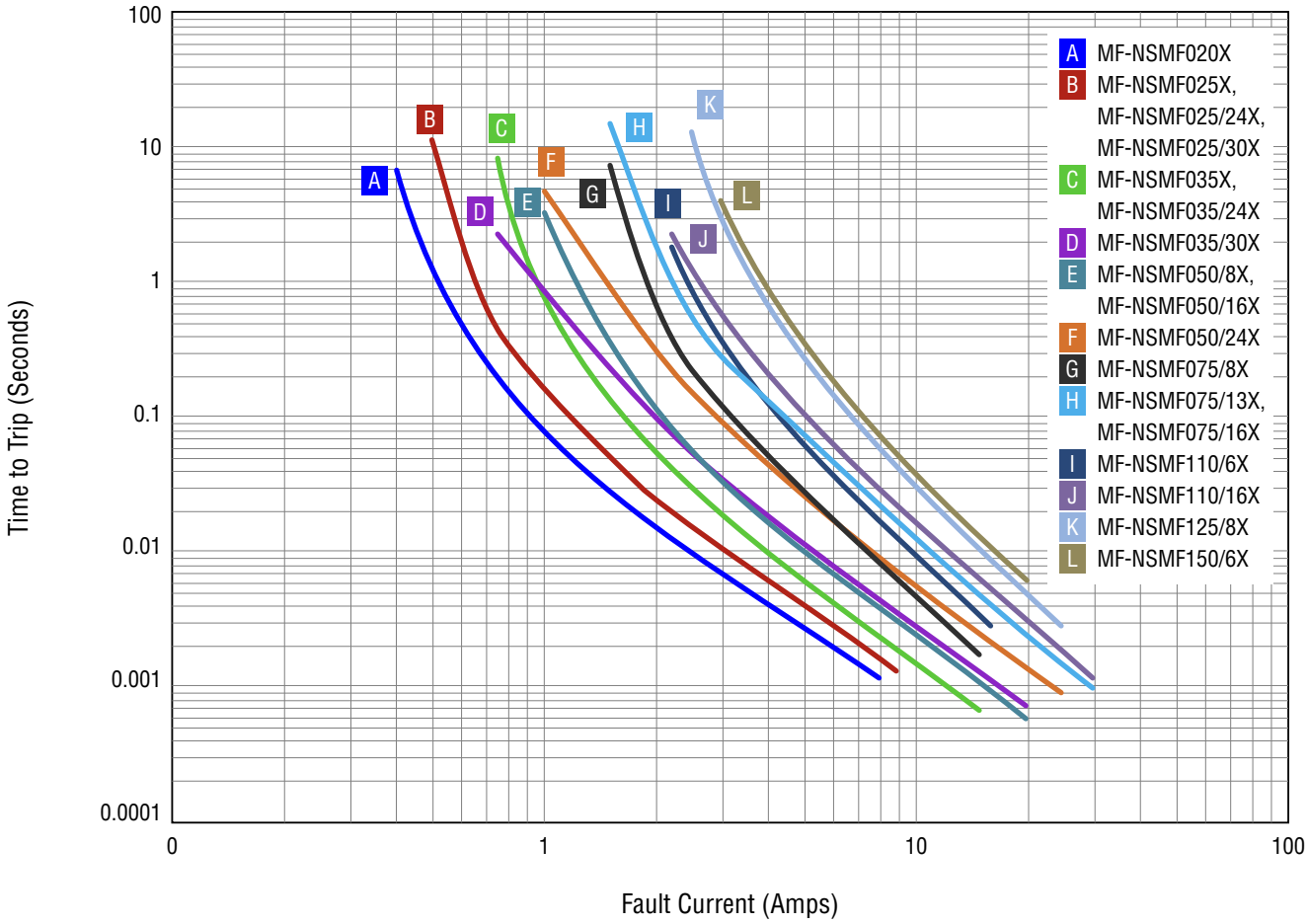
Typical Time to Trip at 23 °C



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.

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How to Order

MF - NSMF 025 / 30 X - 2

Multifuse® Product Designator

Series
NSMF = 1206 Surface Mount Component

Hold Current I_{hold} Indicator
005 ~ 200 (0.05 ~ 2.0 Amps)

Voltage Options
6 = 6 Voltage Rated
8 = 8 Voltage Rated
13 = 13.2 Voltage Rated
16 = 16 Voltage Rated
24 = 24 Voltage Rated
30 = 30 Voltage Rated
48 = 48 Voltage Rated
60 = 60 Voltage Rated

MultiFuse® Design Specific Code
X = MultiFuse® freeXpansion™ Design

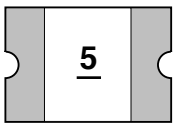
Packaging
-2 = Tape and Reel Packaged per EIA 481

Packaging Quantity

Model				Packaging Quantity
MF-NSMF005/30X MF-NSMF005/60X MF-NSMF010/30X MF-NSMF010/60X MF-NSMF012 MF-NSMF012/48X MF-NSMF016	MF-NSMF016/48X MF-NSMF020 MF-NSMF020X MF-NSMF025X MF-NSMF035 MF-NSMF035X MF-NSMF035/30X	MF-NSMF050 MF-NSMF050/24X MF-NSMF075 MF-NSMF075/13X MF-NSMF075X/16X MF-NSMF110 MF-NSMF110/16X	MF-NSMF125 MF-NSMF125/8X MF-NSMF150 MF-NSMF150/6X MF-NSMF175 MF-NSMF200	3,000 pcs. per reel
MF-NSMF025/24X MF-NSMF025/30	MF-NSMF035/24X MF-NSMF050/8X	MF-NSMF050/16X MF-NSMF075/8X	MF-NSMF110/6X	4,000 pcs. per reel

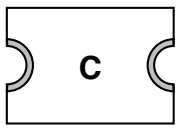
Typical Part Marking

Represents total content. Layout may vary.



Style 1 part identification:

MF-NSMF012 = 0
MF-NSMF016 = 1
MF-NSMF020 = 2
MF-NSMF035 = 3
MF-NSMF050 = 4
MF-NSMF075 = 5
MF-NSMF110 = 6
MF-NSMF125 = 7
MF-NSMF150 = 8
MF-NSMF175 = 9
MF-NSMF200 = A



Style 2 part identification:

MF-NSMF005/30X, MF-NSMF005/60X = K
MF-NSMF010/30X, MF-NSMF010/60X = 0
MF-NSMF012/48X = X
MF-NSMF016/48X = 1
MF-NSMF020X = 2
MF-NSMF025X, MF-NSMF025/24X,
MF-NSMF025/30X = C
MF-NSMF035X, MF-NSMF035/24X = 3
MF-NSMF035/30X = P
MF-NSMF050/8X, MF-NSMF050/16X = 4
MF-NSMF050/24X = T
MF-NSMF075/8X = 5
MF-NSMF075/13X, MF-NSMF075X/16X = U
MF-NSMF110/6X = 6
MF-NSMF110/16X = V
MF-NSMF125/8X = 7
MF-NSMF150/6X = 8

A bi-weekly date code will appear on the package label: weeks 05-06 = C

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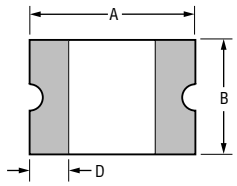
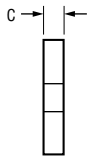
Product Dimensions

Style 1

Top and Bottom View



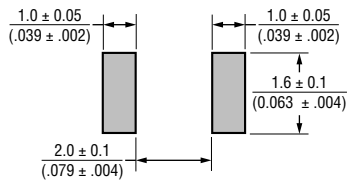
Side View



Terminal material:
Electroless Ni under immersion Gold (ENIG)

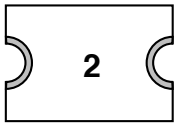
DIMENSIONS: MM / (INCHES)

Recommended Pad Layout

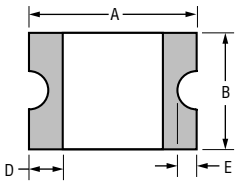


Style 2

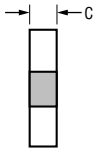
Top View



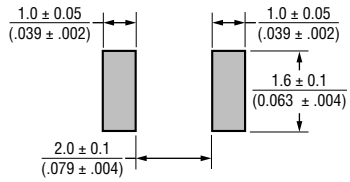
Bottom View



Side View



Recommended Pad Layout



Model	A		B		C		D		E		Style
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
MF-NSMF005/30X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.60 (0.024)	1.10 (0.043)	0.25 (0.010)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
MF-NSMF005/60X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.60 (0.024)	1.10 (0.043)	0.25 (0.010)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
MF-NSMF010/30X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.60 (0.024)	1.10 (0.043)	0.25 (0.010)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
MF-NSMF010/60X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.60 (0.024)	1.10 (0.043)	0.25 (0.010)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
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-NSMF012/48X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.60 (0.024)	1.10 (0.043)	0.25 (0.010)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
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-NSMF016/48X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.60 (0.024)	1.10 (0.043)	0.25 (0.010)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
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)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	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)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
MF-NSMF025/24X	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)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
MF-NSMF025/30X	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)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	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

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Product Dimensions (continued)

Model	A		B		C		D		E		Style
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
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)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
MF-NSMF035/24X	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)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
MF-NSMF035/30X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.75 (0.030)	1.25 (0.049)	0.25 (0.010)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
MF-NSMF050/8X	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)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	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-NSMF050/16X	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)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
MF-NSMF050/24X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.75 (0.030)	1.25 (0.049)	0.25 (0.010)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
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-NSMF075/8X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.35 (0.014)	0.80 (0.031)	0.25 (0.010)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
MF-NSMF075/13X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.70 (0.028)	1.20 (0.047)	0.25 (0.010)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
MF-NSMF075/16X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.70 (0.028)	1.20 (0.047)	0.25 (0.010)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
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-NSMF110/6X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.35 (0.014)	0.80 (0.031)	0.25 (0.010)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
MF-NSMF110/16X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.60 (0.024)	1.10 (0.043)	0.25 (0.010)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
MF-NSMF125	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-NSMF125/8X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.60 (0.024)	1.10 (0.043)	0.25 (0.010)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
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-NSMF150/6X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.60 (0.024)	1.10 (0.043)	0.25 (0.010)	1.0 (0.039)	0.05 (0.002)	0.35 (0.014)	2
MF-NSMF175	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
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)

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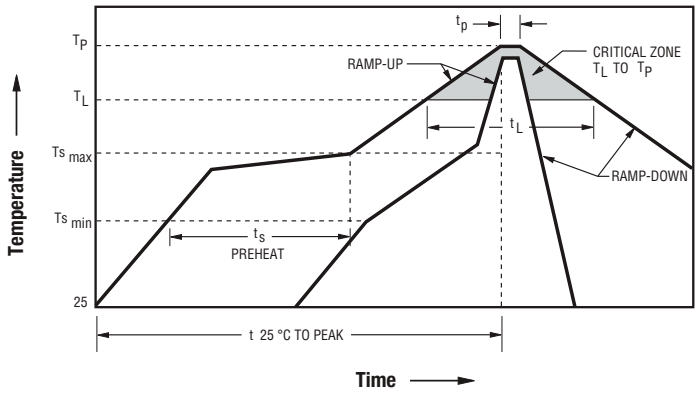
Solder Reflow Recommendations



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 Multifuse® Polymer PTC Resettable Fuse Soldering Recommendations 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}) Temperature Max. (Ts_{max}) Time (Ts_{min} to Ts_{max}) (ts)	 150 °C 200 °C 60~180 seconds
TIME MAINTAINED ABOVE: Temperature (T_L) Time (t_L)	 217 °C 60~150 seconds
Peak Temperature (T_p)	260 °C
Time within 5 °C of Actual Peak Temperature (t_p)	20~40 seconds
Ramp-Down Rate	6 °C / second max.
Time 25 °C to Peak Temperature	8 minutes max.

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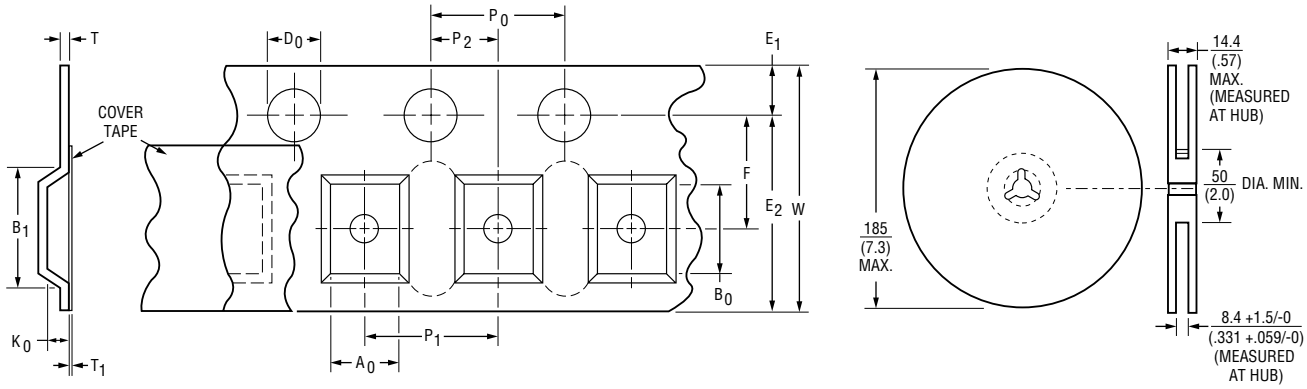
Tape and Reel Specifications



Tape Dimensions per EIA-481	MF-NSMF012 MF-NSMF175 MF-NSMF200	MF-NSMF016 MF-NSMF020 MF-NSMF035 MF-NSMF050	MF-NSMF075	MF-NSMF110 MF-NSMF125 MF-NSMF150
W	8.00 ± 0.30 (.315 ± .012)			
P_0	4.00 ± 0.10 (.157 ± .004)			
10 P_0	40.0 ± 0.20 (1.575 ± .008)			
P_1	4.00 ± 0.10 (.157 ± .004)			
P_2	2.00 ± 0.05 (.079 ± .002)			
A_0	1.95 ± 0.10 (.077 ± .004)	1.90 ± 0.10 (.075 ± .004)	1.90 ± 0.10 (.075 ± .004)	1.90 ± 0.10 (.075 ± .004)
B_0	3.55 ± 0.10 (.140 ± .004)	3.45 ± 0.10 (.136 ± .004)	3.50 ± 0.10 (.138 ± .004)	3.45 ± 0.10 (.136 ± .004)
$B_{1\ max}$	4.35 (.171)			
D_0	1.50 +0.10/-0 (.059 +.004/-0)			
F	3.50 ± 0.05 (.138 ± .002)			
E_1	1.75 ± 0.10 (.069 ± .004)			
E_2 typ	6.25 (.246)			
T max	0.60 (.024)			
T_1 max	0.10 (.004)			
K_0	1.35 ± 0.10 (.053 ± .004)	1.04 ± 0.10 (.041 ± .004)	0.85 ± 0.10 (.033 ± .004)	0.85 ± 0.10 (.033 ± .004)
Leader min.	390 (15.4)			
Trailer min.	160 (6.3)			

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Tape and Reel Specifications (continued)

Tape Dimensions per EIA-481	MF-NSMF005/30X MF-NSMF005/60X MF-NSMF010/30X MF-NSMF010/60X MF-NSMF012/48X MF-NSMF016/48X MF-NSMF110/16X MF-NSMF125/8X MF-NSMF150/6X	MF-NSMF020X MF-NSMF025X MF-NSMF025/24X MF-NSMF025/30X MF-NSMF035X MF-NSMF035/24X MF-NSMF050/8X MF-NSMF050/16X MF-NSMF075/8X MF-NSMF110/6X	MF-NSMF035/30X MF-NSMF050/24X	MF-NSMF075/13X MF-NSMF075X/16X
W	8.00 ± 0.30 (.315 ± .012)			
P_0	4.00 ± 0.10 (.157 ± .004)			
10 P_0	40.0 ± 0.20 (1.575 ± .008)			
P_1	4.00 ± 0.10 (.157 ± .004)			
P_2	2.00 ± 0.05 (.079 ± .002)			
A_0	1.90 ± 0.10 (.075 ± .004)	1.95 ± 0.10 (.077 ± .004)	1.95 ± 0.10 (.077 ± .004)	1.95 ± 0.10 (.077 ± .004)
B_0	3.50 ± 0.10 (.138 ± .004)	3.55 ± 0.10 (.140 ± .004)	3.55 ± 0.10 (.140 ± .004)	3.50 ± 0.10 (.138 ± .004)
$B_{1\ max}$	4.35 (.171)			
D_0	1.50 +0.10/-0 (.059 +.004/-0)			
F	3.50 ± 0.05 (.138 ± .002)			
E_1	1.75 ± 0.10 (.069 ± .004)			
E_2 typ	6.25 (.246)			
T max	0.60 (.024)			
T_1 max	0.10 (.004)			
K_0	1.04 ± 0.10 (.041 ± .004)	0.80 ± 0.10 (.031 ± .004)	1.35 ± 0.10 (.053 ± .004)	1.22 ± 0.10 (.048 ± .004)
Leader min.	390 (15.4)			
Trailer min.	160 (6.3)			

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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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- Bourns expressly identifies those Bourns® standard products that are suitable for use in typical automotive applications associated with any Automotive Safety Integrity Level (ASIL) in its publication entitled "Bourns Automotive Grade Component Guide." Bourns' designation of Bourns® product as compliant with the AEC-Q standard does not by itself mean that Bourns has approved such product for use in an automotive application.

- Bourns expressly identifies Bourns® standard products that are suitable for use in the typical aviation applications/systems requiring System Design Assurance Level (RTCA DO-254 DAL) of C, D or E in its publication entitled "Bourns Civilian Aerospace/Aviation Grade Component Guide." Bourns does not test its products for compliance with United States Federal Aviation Administration standards or any other generally equivalent governmental organization standard applicable to products designed or manufactured for use in aviation applications. Use of Bourns® standard components in aviation applications associated with RTCA DO-254 DAL A or B without proper approval noted above shall be at the user's sole risk.

- Bourns will review and authorize on a case-by-case basis the use of Bourns® standard products which are at least AEC-Q compliant in space-related civil applications (rockets, satellites) with a negotiated cross-waiver and indemnity agreement.

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