THE DATASHEET OF

MF-MSMF075-2

Features

- Compliant with AEC-Q200 Rev-C- Stress Test Qualification for Passive Components in Automotive Applications
- 100 % electrically compatible with all previous generations of 1812 SMT devices
- Compatible with Pb and Pb-free solder reflow profiles
- RoHS compliant* and halogen free**
- Surface mount packaging for automated assembly
- Agency recognition: c UL us, TÜV
- Standard 4532 mm (1812 mils) footprint
- Patents pending

MF-MSMF 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-MSMF010	60.0	40	0.10	0.30	0.70	15.00	0.5	1.50	0.8
MF-MSMF014	60.0	40	0.14	0.34	0.40	6.50	1.5	0.15	0.8
MF-MSMF020	30.0	80	0.20	0.40	0.40	6.00	6.0	0.06	0.8
MF-MSMF020/60	60.0	40	0.20	0.40	0.40	6.00	1.5	0.15	0.8
MF-MSMF030	30.0	10	0.30	0.60	0.30	3.00	8.0	0.10	0.8
MF-MSMF050	15.0	100	0.50	1.00	0.15	1.00	8.0	0.15	0.8
MF-MSMF050/30X	30.0	40	0.50	1.00	0.15	1.30	8.0	0.15	0.8
MF-MSMF050/40X***	40.0	20	0.50	1.00	0.15	1.30	8.0	0.15	0.8
MF-MSMF075	13.2	100	0.75	1.50	0.11	0.45	8.0	0.20	0.8
MF-MSMF075/24	24.0	40	0.75	1.50	0.11	0.45	8.0	0.20	0.8
MF-MSMF075/33X***	33.0	20	0.75	1.50	0.11	0.40	8.0	0.20	1.4
MF-MSMF110	6.0	100	1.10	2.20	0.04	0.21	8.0	0.30	0.8
MF-MSMF110/16	16.0	100	1.10	2.20	0.04	0.21	8.0	0.30	0.8
MF-MSMF110/24X	24.0	20	1.10	2.20	0.06	0.18	8.0	0.50	0.8
MF-MSMF125	6.0	100	1.25	2.50	0.05	0.14	8.0	0.40	0.8
MF-MSMF150	6.0	100	1.50	3.00	0.03	0.120	8.0	0.5	0.8
MF-MSMF150/12	12.0	100	1.50	3.00	0.03	0.120	8.0	0.5	0.8
MF-MSMF150/24X	24.0	20	1.50	3.00	0.03	0.120	8.0	1.50	1.0
MF-MSMF160	8.0	100	1.60	2.80	0.035	0.099	8.0	2.0	0.8
MF-MSMF200	8.0	40	2.00	4.00	0.020	0.080	8.0	2.0	0.8
MF-MSMF250/16X	16.0	100	2.50	5.00	0.015	0.100	8.0	5.0	1.2
MF-MSMF260	6.0	100	2.60	5.20	0.015	0.080	8.0	5.0	0.8

***TUV approval pending.

Environmental Characteristics

Operating Temperature	-40 °C to +85 °C	
Recommended Storage	40 °C max./ 70 % RH 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	+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 (Rmin < R < R1max)
Moisture Sensitivity Level (MSL)	See Note	
ESD Classification - HBM	Class 6	

Test Procedures And Requirements

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
TÜV Certificate Number ..... R 50256634

*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.
**Bourns is using the definition that appears to be the prevalent definition used as the industry standard at this time. The Bourns definition of "halogen-free" is: Bromine (Br) content: ≤ 900 ppm; Chlorine (Cl) content: ≤ 900 ppm; Total Br + Cl content: ≤1500 ppm.

WARNING Cancer and Reproductive Harm
www.P65Warnings.ca.gov

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Applications

- Overcurrent and overtemperature protection of automotive electronics
- Hard disk drives
- PC motherboards
- PC peripherals
- Point-of-sale (POS) equipment
- PCMCIA cards
- USB port protection - USB 2.0, 3.0 & OTG
- HDMI 1.4 Source protection

MF-MSMF Series - PTC Resettable Fuses

BOURNS®

Product Dimensions (see next page for outline drawings)

Model	A		B		C		D	Style
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	
MF-MSMF010	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.70 (0.028)	1.10 (0.043)	0.30 (0.012)	1
MF-MSMF014	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.70 (0.028)	1.10 (0.043)	0.30 (0.012)	1
MF-MSMF020	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.70 (0.028)	1.10 (0.043)	0.30 (0.012)	1
MF-MSMF020/60	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.70 (0.028)	1.10 (0.043)	0.30 (0.012)	1
MF-MSMF030	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.70 (0.028)	1.10 (0.043)	0.30 (0.012)	1
MF-MSMF050	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.55 (0.022)	0.85 (0.033)	0.30 (0.012)	1
MF-MSMF050/30X	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.40 (0.016)	0.85 (0.033)	0.30 (0.012)	2
MF-MSMF050/40X	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.40 (0.016)	0.85 (0.033)	0.30 (0.012)	2
MF-MSMF075	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.55 (0.022)	0.85 (0.033)	0.30 (0.012)	1
MF-MSMF075/24	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.55 (0.022)	0.85 (0.033)	0.30 (0.012)	1
MF-MSMF075/33X	4.37 (0.172)	4.83 (0.190)	3.07 (0.121)	3.41 (0.134)	0.70 (0.028)	1.60 (0.063)	0.30 (0.012)	2
MF-MSMF110	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.45 (0.018)	0.85 (0.033)	0.30 (0.012)	1
MF-MSMF110/16	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.45 (0.018)	0.85 (0.033)	0.30 (0.012)	1
MF-MSMF110/24X	4.37 (0.172)	4.83 (0.190)	3.07 (0.121)	3.41 (0.134)	0.70 (0.028)	1.60 (0.063)	0.30 (0.012)	2
MF-MSMF125	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.55 (0.022)	0.85 (0.033)	0.30 (0.012)	1
MF-MSMF150	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.55 (0.022)	0.85 (0.033)	0.30 (0.012)	1
MF-MSMF150/12	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.55 (0.022)	0.85 (0.033)	0.30 (0.012)	1
MF-MSMF150/24X	4.37 (0.172)	4.83 (0.190)	3.07 (0.121)	3.41 (0.134)	0.70 (0.028)	1.60 (0.063)	0.30 (0.012)	2
MF-MSMF160	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.55 (0.022)	0.85 (0.033)	0.30 (0.012)	1
MF-MSMF200	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.55 (0.022)	0.85 (0.033)	0.30 (0.012)	1
MF-MSMF250/16X	4.37 (0.172)	4.83 (0.190)	3.07 (0.121)	3.41 (0.134)	0.70 (0.028)	1.60 (0.063)	0.30 (0.012)	2
MF-MSMF260	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.48 (0.019)	0.85 (0.033)	0.30 (0.012)	1

Packaging:
MF-MSMF010 through MF-MSMF030 = 1500 pcs. per reel.
MF-MSMF050 through MF-MSMF260 = 2000 pcs. per reel.
MF-MSMF075/33X, MF-MSMF110/24X , MF-MSMF150/24X & MF-MSMF250/16X = 1500 pcs. per reel.

DIMENSIONS: MM (INCHES)

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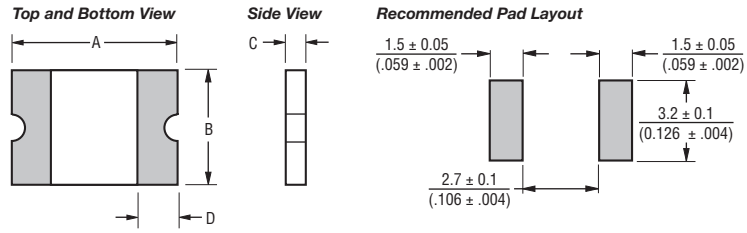
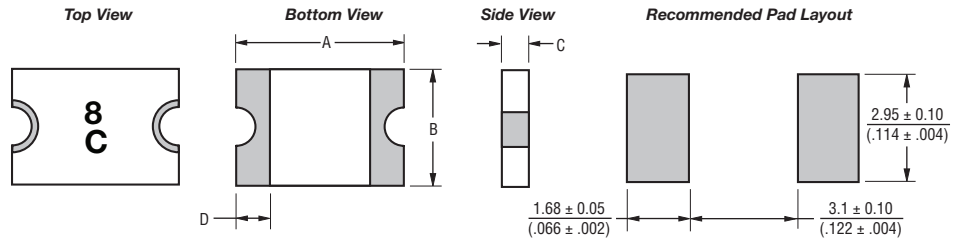
Product Dimensions (see previous page for dimensions)

Style 1

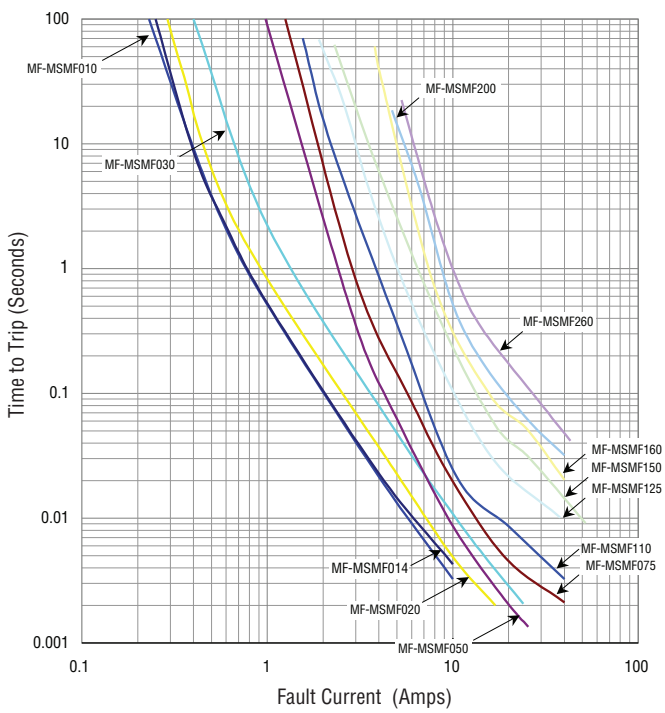


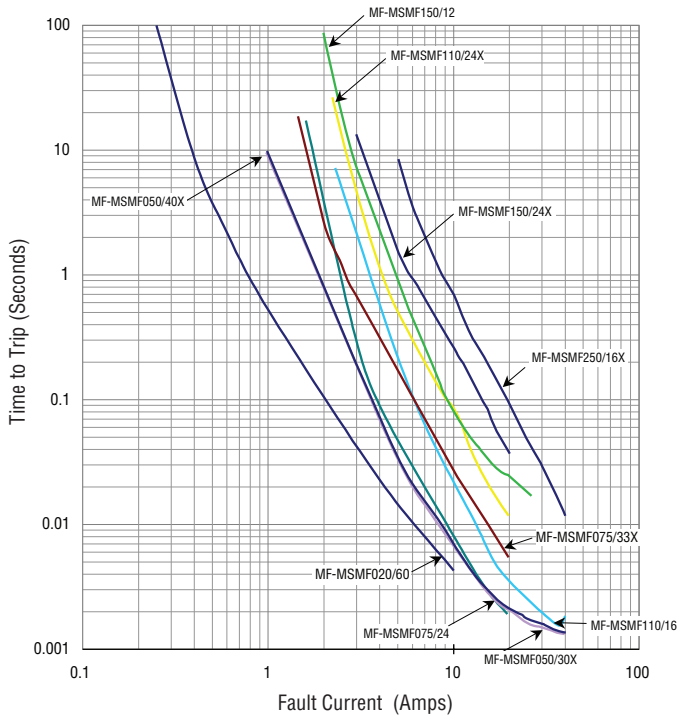
Terminal material:
Electroless Ni under immersion Au

Style 2



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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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-MSMF010	0.16	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.03
MF-MSMF014	0.23	0.19	0.17	0.14	0.12	0.10	0.09	0.08	0.06
MF-MSMF020	0.29	0.26	0.23	0.20	0.17	0.15	0.14	0.12	0.10
MF-MSMF020/60	0.29	0.26	0.23	0.20	0.17	0.15	0.14	0.12	0.10
MF-MSMF030	0.44	0.39	0.35	0.30	0.26	0.23	0.21	0.18	0.15
MF-MSMF050	0.77	0.68	0.59	0.50	0.44	0.40	0.37	0.33	0.29
MF-MSMF050/30X	0.77	0.68	0.59	0.50	0.44	0.40	0.37	0.33	0.25
MF-MSMF050/40X	0.77	0.68	0.59	0.50	0.44	0.40	0.37	0.33	0.25
MF-MSMF075	1.15	1.01	0.88	0.75	0.65	0.60	0.55	0.49	0.43
MF-MSMF075/24	1.15	1.01	0.88	0.75	0.65	0.60	0.55	0.49	0.43
MF-MSMF075/33X	1.16	1.03	0.90	0.75	0.63	0.56	0.49	0.42	0.32
MF-MSMF110	1.59	1.43	1.26	1.10	0.95	0.87	0.80	0.71	0.60
MF-MSMF110/16	1.59	1.43	1.26	1.10	0.95	0.87	0.80	0.71	0.60
MF-MSMF110/24X	2.00	1.70	1.40	1.10	0.95	0.88	0.80	0.73	0.61
MF-MSMF125	1.80	1.63	1.43	1.25	1.08	0.99	0.91	0.81	0.68
MF-MSMF150	2.17	1.95	1.72	1.50	1.30	1.18	1.09	0.97	0.82
MF-MSMF150/12	2.17	1.95	1.72	1.50	1.30	1.18	1.09	0.97	0.82
MF-MSMF150/24X	2.10	1.90	1.70	1.50	1.25	1.13	1.00	0.88	0.69
MF-MSMF160	2.30	2.20	1.90	1.60	1.45	1.30	1.15	1.03	0.91
MF-MSMF200	3.08	2.71	2.35	2.00	1.80	1.60	1.50	1.40	1.25
MF-MSMF250/16X	3.90	3.42	2.96	2.50	2.24	1.98	1.85	1.29	0.94
MF-MSMF260	4.00	3.52	3.06	2.60	2.34	2.08	1.95	1.39	1.04

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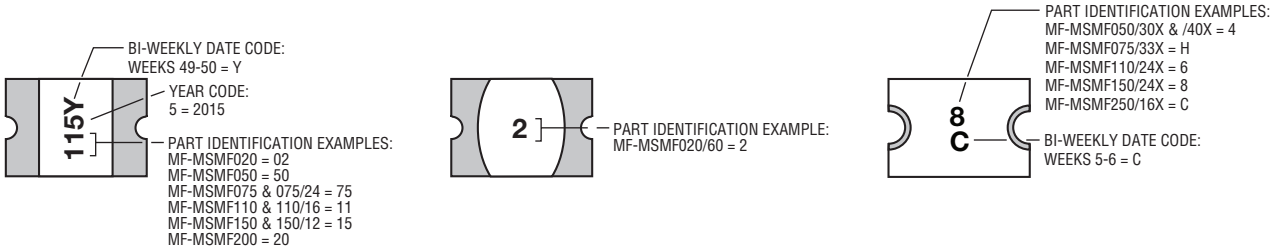
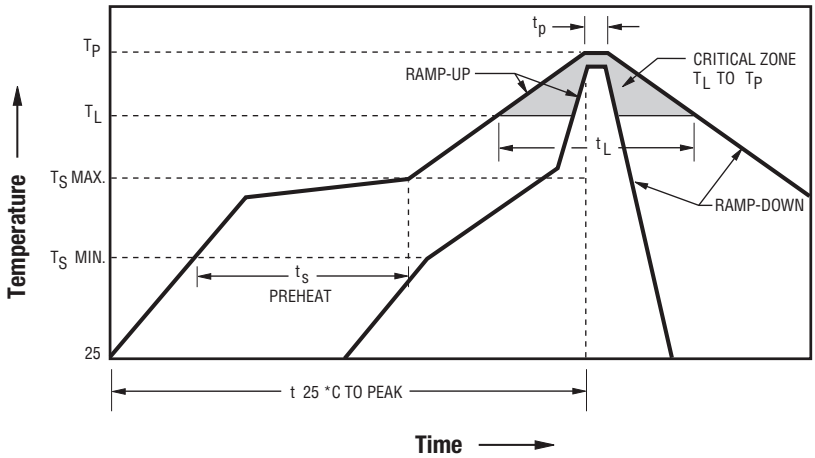
Typical Part Marking

Represents total content. Layout may vary.



Solder Reflow Recommendations



Notes:

- MF-MSMF models cannot be wave soldered or hand soldered. Please contact Bourns for soldering recommendations.
- All temperatures refer to topside of the package, measured on the package 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, especially during hand soldering. Please refer to the Multifuse® Polymer PTC Soldering Recommendation guidelines.
- Designed for single solder reflow operations.

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 (t_p)	20~40 seconds
Ramp-Down Rate	6 °C / second max.
Time 25 °C to Peak Temperature	8 minutes max.

How to Order

MF - MSMF 075/24 - 2

Multifuse® Product Designator

Series
MSMF = 4532 mm (1812 mils) Surface Mount Component

Hold Current, Ihold
010-260 (0.10 Amps - 2.60 Amps)

Higher Voltage Option
Blank = Standard Voltage
/12, /16, /24, /30, /33, /40, /60 = Specific Voltage Rated
X = Multifuse® freeXpansion Design™ MF-MSMF Series

Packaging
Packaged per EIA 481
-2 = Tape and Reel

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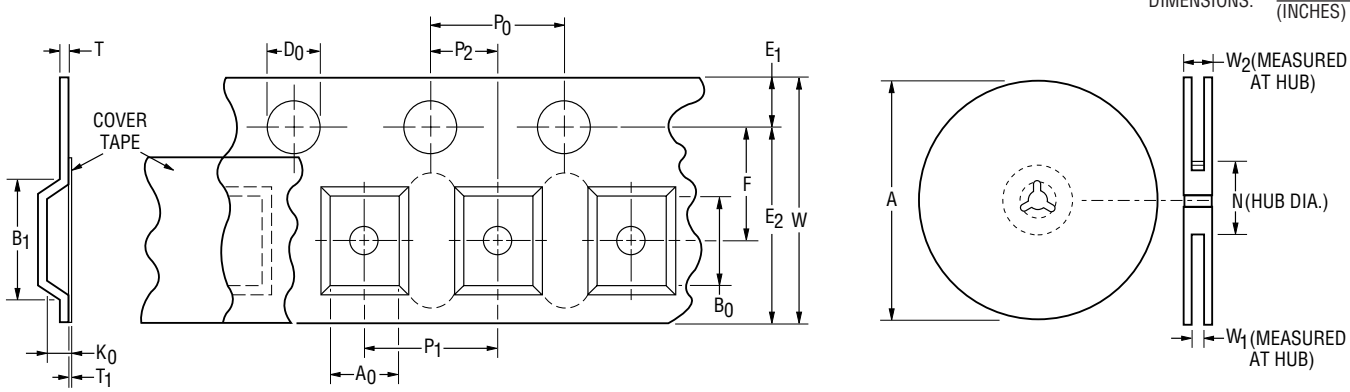
MF-MSMF Series Tape and Reel Specifications

BOURNS®

Tape Dimensions	MF-MSMF010 - MF-MSMF030 per EIA-481	MF-MSMF050 - MF-MSMF260 per EIA 481	MF-MSMF-075/33X MF-MSMF-110/24X MF-MSMF150/24X MF-MSMF250/16X per EIA 481
W	12.0 ± 0.30 (0.472 ± 0.012)	12.0 ± 0.30 (0.472 ± 0.012)	12.0 ± 0.30 (0.472 ± 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)
P_1	8.0 ± 0.10 (0.315 ± 0.004)	8.0 ± 0.10 (0.315 ± 0.004)	8.0 ± 0.10 (0.315 ± 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)
A_0	3.58 ± 0.10 (0.141 ± 0.004)	3.66 ± 0.15 (0.144 ± 0.006)	3.70 ± 0.10 (0.146 ± 0.004)
B_0	4.93 ± 0.10 (0.194 ± 0.004)	4.98 ± 0.10 (0.196 ± 0.004)	5.10 ± 0.10 (0.200 ± 0.004)
B_1 max.	5.9 (0.232)	5.9 (0.232)	5.9 (0.232)
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)
F	5.5 ± 0.05 (0.217 ± 0.002)	5.5 ± 0.05 (0.217 ± 0.002)	5.5 ± 0.05 (0.217 ± 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)
E_2 min.	10.25 (0.404)	10.25 (0.404)	10.25 (0.404)
T max.	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)
K_0	1.30 ± 0.10 (0.051 ± 0.004)	0.95 ± 0.10 (0.037 ± 0.004)	1.50 ± 0.10 (0.059 ± 0.004)
Leader min.	390 (15.35)	390 (15.35)	390 (15.35)
Trailer min.	160 (6.30)	160 (6.30)	160 (6.30)
Reel Dimensions			
A max.	185 (7.28)	185 (7.28)	185 (7.28)
N min.	50 (1.97)	50 (1.97)	50 (1.97)
W_1	12.4 + 2.0/-0.0 (0.488 + 0.079/-0.0)	12.4 + 2.0/-0.0 (0.488 + 0.079/-0.0)	12.4 + 2.0/-0.0 (0.488 + 0.079/-0.0)
W_2 max.	18.4 (0.724)	18.4 (0.724)	18.4 (0.724)

DIMENSIONS: MM (INCHES)



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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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