BOURNS®

Features

- High power ratings
- Low profile
- Compatible with Pb and Pb-free solder reflow profiles
- RoHS compliant* and halogen free**
- Surface mount packaging for automated assembly
- Agency recognition:
- Standard 7451 mm (2920 mils) footprint

MF-LSMF 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
			at 23 °C		at 23 °C Ohms		at 23 °C		at 23 °C Watts	cUL	TÜV	
	Volts	Amps	Amps		R_{Min}	R_{1Max}	Amps	Seconds	Typ.	E174545	R50256634	
MF-LSMF075X	30	40	0.75	1.5	0.15	1.00	8.0	0.3	1.5	✓	✓	
MF-LSMF110X	33	40	1.1	2.2	0.07	0.41	8.0	0.5	1.5	✓	✓	
MF-LSMF125X	15	40	1.25	2.5	0.05	0.25	8.0	2.0	1.5	✓	✓	
MF-LSMF125/33X	33	40	1.25	2.5	0.055	0.25	8.0	2.0	1.5	✓	✓	
MF-LSMF150X	15	40	1.5	3.0	0.05	0.23	8.0	2.0	1.5	✓	✓	
MF-LSMF150/33X	33	40	1.5	3.0	0.05	0.23	8.0	2.0	1.5	✓	✓	
MF-LSMF185X	15	40	1.85	3.7	0.045	0.15	8.0	2.5	1.5	✓	✓	
MF-LSMF185/24X	24	40	1.85	3.7	0.045	0.15	8.0	2.5	1.5	✓	✓	
MF-LSMF185/33X	33	40	1.85	3.7	0.045	0.15	8.0	2.5	1.5	✓	✓	✓
MF-LSMF200X	15	40	2.0	4.0	0.035	0.125	8.0	5.0	1.5	✓	✓	
MF-LSMF200/24X	24	40	2.0	4.0	0.035	0.125	8.0	5.0	1.5	✓	✓	
MF-LSMF260X	24	40	2.6	5.2	0.020	0.075	8.0	5.0	1.5	✓	✓	✓
MF-LSMF260/6X	6	40	2.6	5.0	0.020	0.075	8.0	10	1.5	✓	✓	
MF-LSMF260/16X	16	40	2.6	5.2	0.020	0.075	8.0	5.0	1.5	✓	✓	
MF-LSMF300X	6	40	3.0	5.0	0.015	0.048	8.0	15	1.5	✓	✓	
MF-LSMF300/16X	16	40	3.0	5.0	0.015	0.048	8.0	15	1.5	✓	✓	
MF-LSMF300/24X	24	40	3.0	5.2	0.015	0.075	8.0	15	1.5	✓	✓	✓
MF-LSMF330X	6	40	3.3	5.5	0.010	0.055	8.0	15	2.0	✓	✓	
MF-LSMF330/12X	12	40	3.3	5.5	0.010	0.055	8.0	15	2.0	✓	✓	
MF-LSMF330/16X	16	40	3.3	5.5	0.010	0.055	8.0	15	2.0	✓	✓	
MF-LSMF330/24X	24	40	3.3	5.5	0.010	0.055	8.0	15	2.0	✓	✓	
MF-LSMF400/16X	16	40	4.0	8.0	0.005	0.040	20	4.0	1.5	✓	✓	
MF-LSMF500/16X	16	40	5.0	10.0	0.005	0.025	20	5.0	1.5	✓	✓	
MF-LSMF600/12X	12	50	6.0	12.0	0.004	0.020	30	2.0	2.0	✓	✓	

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 SELECTOR | TECHNICAL LIBRARY | INVENTORY | SAMPLES | CONTACT

WARNING
Cancer and Reproductive Harm
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.

Applications

- Industrial controls
- IEEE ports
- Portable electronics

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

Product Dimensions

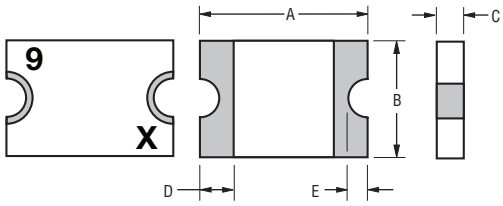
Model	A		B		C		D		E	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
MF-LSMF075X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.35 (0.014)	0.85 (0.033)				
MF-LSMF110X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.35 (0.014)	0.85 (0.033)				
MF-LSMF125X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.35 (0.014)	0.85 (0.033)				
MF-LSMF125/33X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.75 (0.030)	1.60 (0.063)				
MF-LSMF150X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.35 (0.014)	0.85 (0.033)				
MF-LSMF150/33X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.75 (0.030)	1.60 (0.063)				
MF-LSMF185X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.35 (0.014)	0.85 (0.033)				
MF-LSMF185/24X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.75 (0.030)	1.60 (0.063)				
MF-LSMF185/33X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.75 (0.030)	1.60 (0.063)	0.30 (0.012)	2.50 (0.098)	0.25 (.010)	2.00 (.079)
MF-LSMF200X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.75 (0.030)	1.60 (0.063)				
MF-LSMF200/24X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.75 (0.030)	1.60 (0.063)				
MF-LSMF260X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.75 (0.030)	1.60 (0.063)				
MF-LSMF260/6X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.35 (0.014)	0.85 (0.033)				
MF-LSMF260/16X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.75 (0.030)	1.60 (0.063)				
MF-LSMF300X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.35 (0.014)	0.85 (0.033)				
MF-LSMF300/16X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.75 (0.030)	1.60 (0.063)				
MF-LSMF300/24X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.75 (0.030)	1.60 (0.063)				

Product Dimensions (continued)

Model	A		B		C		D		E	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
MF-LSMF330X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.35 (0.014)	0.85 (0.033)				
MF-LSMF330/12X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.75 (0.030)	1.60 (0.063)				
MF-LSMF330/16X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.75 (0.030)	1.60 (0.063)				
MF-LSMF330/24X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.75 (0.030)	1.60 (0.063)	0.30 (0.012)	2.50 (0.098)	0.25 (.010)	2.00 (.079)
MF-LSMF400/16X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.75 (0.030)	1.60 (0.063)				
MF-LSMF500/16X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.75 (0.030)	1.60 (0.063)				
MF-LSMF600/12X	6.73 (0.265)	7.98 (0.314)	4.80 (0.189)	5.44 (0.214)	0.75 (0.030)	1.60 (0.063)				

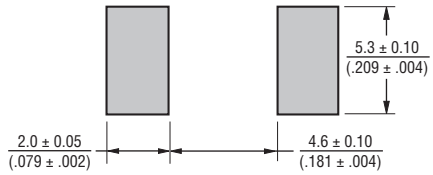
DIMENSIONS: MM (INCHES)

Top View *Bottom View* *Side View*



Terminal material:
Electroless Ni under immersion Au

Recommended Pad Layout



How to Order

MF - LSMF 185/33X - 2

Multifuse® Product Designator

Series
LSMF = 7451 mm (2920 mils) Surface Mount Component

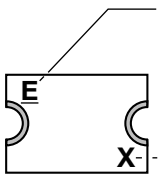
Hold Current, Ihold
0.75-600 (0.75 Amps - 6.0 Amps)

Voltage Option
/33 = 33 Volt Rated
X = Multifuse® freeXpansion™ Design

Packaging
-2 = Tape and Reel packaged per EIA-481

Typical Part Marking

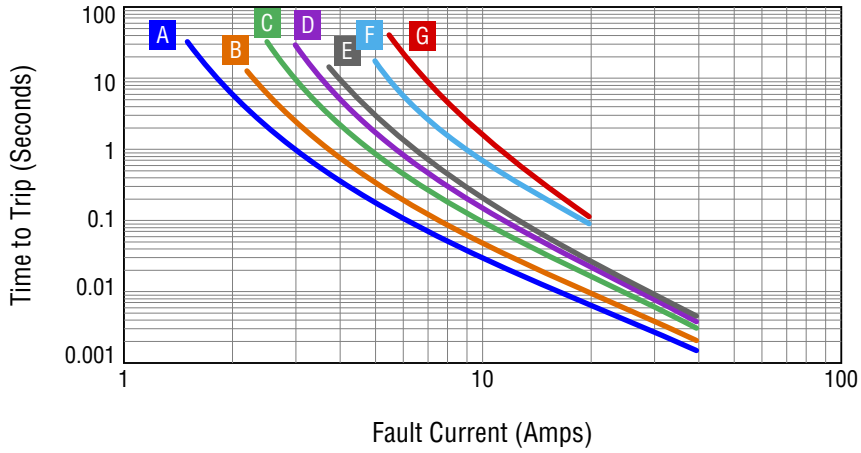
Represents total content. Layout may vary.



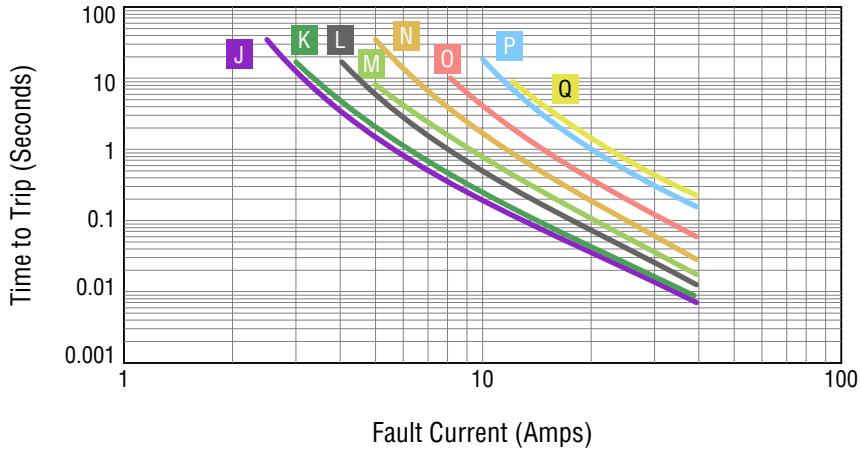
PART IDENTIFICATION EXAMPLES:

MF-LSMF075X = 5	MF-LSMF185X = N	MF-LSMF300/16X = H
MF-LSMF110X = 6	MF-LSMF185/24X = 9	MF-LSMF300/24X = J
MF-LSMF125X = 7	MF-LSMF185/33X = 9	MF-LSMF330X = X
MF-LSMF125/33X = L	MF-LSMF200X = A	MF-LSMF330/12X = Q
MF-LSMF150X = M	MF-LSMF200/24X = A	MF-LSMF330/16X = Q
MF-LSMF150/33X = 8	MF-LSMF260X = E	MF-LSMF330/24X = Q
	MF-LSMF260/6X = P	MF-LSMF400/16X = K
BI-WEEKLY DATE CODE:	MF-LSMF260/16X = E	MF-LSMF500/16X = S
WEEKS 47-48 = X	MF-LSMF300X = F	MF-LSMF600/12X = T

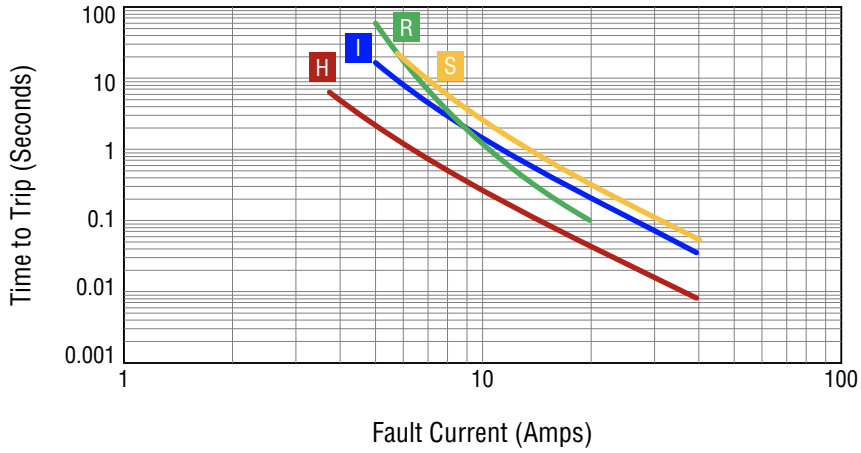
Typical Time to Trip at 23 °C



A MF-LSMF075X
B MF-LSMF110X
C MF-LSMF125X
D MF-LSMF150X
E MF-LSMF185X
F MF-LSMF260/6X
G MF-LSMF330X



J MF-LSMF125/33X
K MF-LSMF150/33X
L MF-LSMF200X, MF-LSMF200/24X
M MF-LSMF260X, MF-LSMF260/16X
N MF-LSMF300/16X
O MF-LSMF400/16X
P MF-LSMF500/16X
Q MF-LSMF600/12X



H MF-LSMF185/24X, MF-LSMF185/33X
I MF-LSMF300/24X
R MF-LSMF300X
S MF-LSMF330/12X, MF-LSMF330/16X, MF-LSMF330/24X

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.

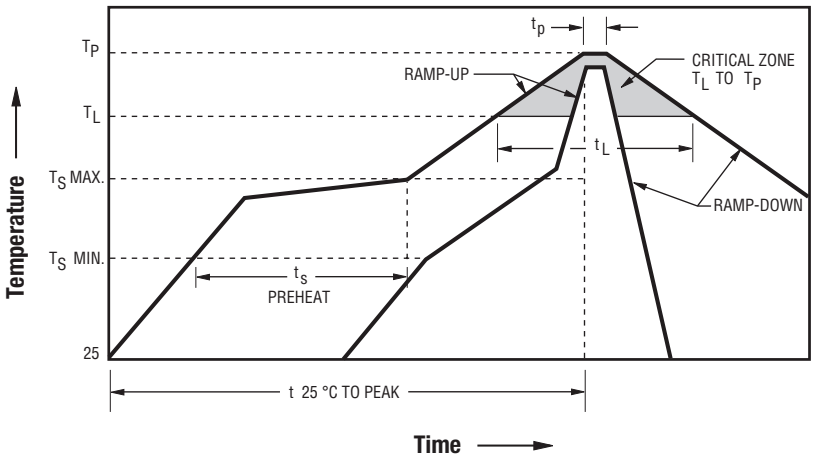
Thermal Derating Chart - I_{hold} (Amps)

Model	Ambient Operating Temperature								
	-40 ˚C	-20 ˚C	0 ˚C	23 ˚C	40 ˚C	50 ˚C	60 ˚C	70 ˚C	85 ˚C
MF-LSMF075X	1.10	1.01	0.89	0.75	0.63	0.56	0.50	0.44	0.34
MF-LSMF110X	1.61	1.47	1.30	1.10	0.92	0.83	0.73	0.64	0.50
MF-LSMF125X	1.83	1.68	1.48	1.25	1.05	0.94	0.83	0.73	0.56
MF-LSMF125/33X	1.83	1.68	1.48	1.25	1.05	0.94	0.83	0.73	0.56
MF-LSMF150X	2.19	2.01	1.77	1.50	1.26	1.13	0.99	0.87	0.68
MF-LSMF150/33X	2.19	2.01	1.77	1.50	1.26	1.13	0.99	0.87	0.68
MF-LSMF185X	2.70	2.48	2.18	1.85	1.55	1.39	1.22	1.07	0.83
MF-LSMF185/24X	2.80	2.47	2.17	1.85	1.54	1.39	1.22	1.07	0.85
MF-LSMF185/33X	2.80	2.47	2.17	1.85	1.54	1.39	1.22	1.07	0.85
MF-LSMF200X	2.92	2.68	2.36	2.00	1.68	1.50	1.32	1.16	0.90
MF-LSMF200/24X	2.92	2.68	2.36	2.00	1.68	1.50	1.32	1.16	0.90
MF-LSMF260X	3.75	3.35	3.00	2.60	2.35	2.15	2.05	1.80	1.30
MF-LSMF260/6X	3.80	3.48	3.07	2.60	2.18	1.95	1.72	1.51	1.17
MF-LSMF260/16X	3.75	3.35	3.00	2.60	2.35	2.15	2.05	1.80	1.30
MF-LSMF300X	4.53	4.02	3.51	3.00	2.52	2.26	1.99	1.75	1.34
MF-LSMF300/16X	4.38	4.02	3.54	3.00	2.52	2.25	1.98	1.74	1.35
MF-LSMF300/24X	4.00	3.55	3.20	3.30	2.50	2.25	2.15	1.85	1.50
MF-LSMF330X	4.82	4.42	3.89	3.30	2.77	2.48	2.18	1.91	1.49
MF-LSMF330/12X	4.82	4.42	3.89	3.30	2.77	2.48	2.18	1.91	1.49
MF-LSMF330/16X	4.82	4.42	3.89	3.30	2.77	2.48	2.18	1.91	1.49
MF-LSMF330/24X	4.82	4.42	3.89	3.30	2.77	2.48	2.18	1.91	1.49
MF-LSMF400/16X	5.84	5.36	4.72	4.00	3.36	3.00	2.64	2.32	1.80
MF-LSMF500/16X	7.30	6.70	5.90	5.00	4.20	3.75	3.30	2.90	2.25
MF-LSMF600/12X	8.76	8.04	7.08	6.00	5.04	4.50	3.96	3.48	2.70

Packaging Quantity

Model			Unit Quantity (pcs.)	Unit
MF-LSMF125/33X MF-LSMF150/33X MF-LSMF185/24X MF-LSMF185/33X MF-LSMF200X MF-LSMF200/24X	MF-LSMF260X MF-LSMF260/16X MF-LSMF300/16X MF-LSMF300/24X MF-LSMF330/12X MF-LSMF330/16X	MF-LSMF330/24X MF-LSMF400/16X MF-LSMF500/16X MF-LSMF600/12X	4000	Reel
MF-LSMF075X MF-LSMF110X MF-LSMF125X	MF-LSMF150X MF-LSMF185X MF-LSMF260/6X	MF-LSMF300X MF-LSMF330X	6000	Reel

Solder Reflow Recommendations



Notes:

- MF-LSMF 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 document 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.

BOURNS®

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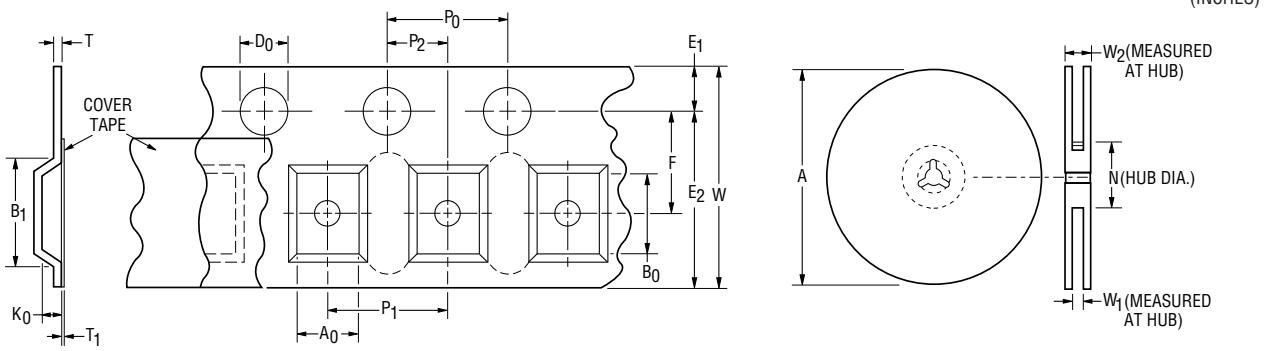
MF-LSMF Series Tape and Reel Specifications

BOURNS®

Tape Dimensions per EIA 481	MF-LSMF075X, MF-LSMF110/X, MF-LSMF125X, MF-LSMF150X, MF-LSMF185X, MF-LSMF260/6X, MF-LSMF300X & MF-LSMF330X	MF-LSMF125/33X, MF-LSMF150/33X, MF-LSMF185/24X, MF-LSMF185/33X, MF-LSMF200X, MF-LSMF200/24X, MF-LSMF260X, MF-LSMF260/16X, MF-LSMF300/16X, MF-LSMF300/24X, MF-LSMF330/12X, MF-LSMF330/16X, MF-LSMF330/24X, MF-LSMF400/16X, MF-LSMF500/16X & MF-LSMF600/12X
W	16.0 ± 0.30 (0.630 ± 0.012)	16.0 ± 0.30 (0.630 ± 0.012)
P_0	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)
10 P_0	40 ± 0.20 (1.575 ± 0.008)	40 ± 0.20 (1.575 ± 0.008)
P_1	8.0 ± 0.10 (0.315 ± 0.004)	8.0 ± 0.10 (0.315 ± 0.004)
P_2	2.0 ± 0.10 (0.079 ± 0.004)	2.0 ± 0.10 (0.079 ± 0.004)
A_0	5.74 ± 0.10 (0.226 ± 0.004)	5.70 ± 0.10 (0.224 ± 0.004)
B_0	8.02 ± 0.10 (0.316 ± 0.004)	8.10 ± 0.10 (0.319 ± 0.004)
B_1 max.	12.1 (0.476)	12.1 (0.476)
D_0	1.5 +0.10/-0 (0.059 +0.004/-0)	1.5 +0.10/-0 (0.059 +0.004/-0)
F	7.5 ± 0.10 (0.295 ± 0.004)	7.5 ± 0.10 (0.295 ± 0.004)
E_1	1.75 ± 0.10 (0.069 ± 0.004)	1.75 ± 0.10 (0.069 ± 0.004)
E_2 min.	14.25 (0.561)	14.25 (0.561)
T max.	0.6 (0.024)	0.6 (0.024)
T_1 max	0.1 (0.004)	0.1 (0.004)
K_0	0.91 ± 0.10 (0.036 ± 0.004)	1.70 ± 0.10 (0.067 ± 0.004)
Leader min.	390 (15.35)	390 (15.35)
Trailer min.	160 (6.30)	160 (6.30)
Reel Dimensions		
A max.	331 (13.03)	331 (13.03)
N min.	50 (1.97)	50 (1.97)
W_1	16.4 +2.0/-0 (0.646 + 0.079/-0)	16.4 +2.0/-0 (0.646 + 0.079/-0)
W_2 max.	22.4 (0.882)	22.4 (0.882)

DIMENSIONS: MM (INCHES)



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