

## Features

- Very low profile
- Very fast tripping time
- High voltage
- RoHS compliant\* and halogen free\*\*
- 2018 footprint
- Agency recognition: 

## Applications

- Power Over Ethernet (IEEE 802.3 af) port protection
- Automotive electronic control module protection
- Telecom equipment low voltage protection

## MF-SMDF Series - PTC Resettable Fuses

### Electrical Characteristics

Model	V max. Volts	I max. Amps	I <sub>hold</sub>	I <sub>trip</sub>	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 <sub>min</sub>	R <sub>1max</sub>			Typ.
MF-SMDF030***	60	20	0.30	0.80	0.450	2.15	1.2	1.5	0.8
MF-SMDF050	60	10	0.55	1.20	0.200	1.0	2.5	3.0	0.9
MF-SMDF100/33X***	33	40	1.10	2.20	0.06	0.40	8.0	0.5	1.4
MF-SMDF150	15	40	1.50	3.00	0.05	0.17	8.0	0.8	1.1
MF-SMDF200	10	40	2.00	4.00	0.030	0.100	8.0	2.4	1.1
MF-SMDF260/24X***	24	20	2.60	5.20	0.015	0.075	8.0	0.8	1.1

\*\*\* TÜV approval pending.

### Environmental Characteristics

Operating Temperature..... -40 °C to +85 °C

Humidity Aging

MF-SMDF030, 050, 150 & 200..... +85 °C, 85 % R.H. 1000 hours..... ±1.2 % typical resistance change

MF-SMDF100/33X & 260/24X..... +85 °C, 85 % R.H. 1000 hours..... ±5 % typical resistance change

Thermal Shock

MF-SMDF030, 050, 150 & 200..... +85 °C to -40 °C, 20 times ..... ±20 % typical resistance change

MF-SMDF100/33X & 260/24X..... +85 °C to -40 °C, 20 times ..... ±10 % typical resistance change

Passive Aging

..... +85 °C, 1000 hours..... ±5 % 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<sub>min</sub> < R < R<sub>1max</sub>)

### Test Procedures And Requirements For Model MF-SMDF Series

Test	Test Conditions	Accept/Reject Criteria
Visual/Mech.	Verify dimensions and materials	Per MF physical description
Resistance	In still air @ 23 °C	R <sub>min</sub> ≤ R ≤ R <sub>1max</sub>
Time to Trip	At specified current, V <sub>max</sub> , 23 °C	T ≤ max. time to trip (seconds)
Hold Current	30 min. at I <sub>hold</sub>	No trip
Trip Cycle Life	V <sub>max</sub> , I <sub>max</sub> , 100 cycles	No arcing or burning
Trip Endurance	V <sub>max</sub> , 48 hours	No arcing or burning
Solderability	ANSI/J-STD-002	95 % min. coverage

UL File Number ..... E174545

<http://www.ul.com/> Follow link to Certifications, then UL File No., enter E174545

TÜV Certificate Number ..... R 02057213

<http://www.tuvdotcom.com/> Follow link to "other certificates", enter File No. 2057213

### Thermal Derating Chart - I<sub>hold</sub> (Amps)

Model	Ambient Operating Temperature								
	-40 °C	-20 °C	0 °C	23 °C	40 °C	50 °C	60 °C	70 °C	85 °C
MF-SMDF030	0.50	0.43	0.37	0.30	0.25	0.22	0.18	0.15	0.11
MF-SMDF050	0.87	0.77	0.67	0.55	0.46	0.41	0.36	0.31	0.23
MF-SMDF100/33X	1.66	1.47	1.29	1.10	0.91	0.83	0.73	0.64	0.50
MF-SMDF150	2.38	2.10	1.82	1.50	1.27	1.13	0.99	0.85	0.64
MF-SMDF200	2.95	2.65	2.35	2.00	1.74	1.59	1.44	1.29	1.06
MF-SMDF260/24X	3.75	3.35	3.00	2.60	2.35	2.15	2.05	1.80	1.50

\*I<sub>trip</sub> is approximately two times I<sub>hold</sub>.

\*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

\*\*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-SMDF Series - PTC Resettable Fuses

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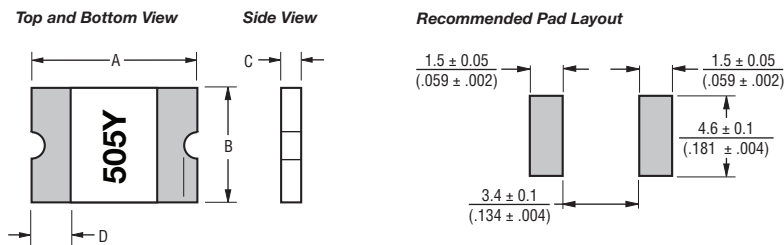
## Product Dimensions

Model	A		B		C		D	E		Style
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.	Max.	
MF-SMDF030	4.72 (0.186)	5.44 (0.214)	4.22 (0.166)	4.93 (0.194)	0.79 (0.031)	1.09 (0.043)	0.30 (0.012)	N/A	N/A	1
MF-SMDF050	4.72 (0.186)	5.44 (0.214)	4.22 (0.166)	4.93 (0.194)	0.79 (0.031)	1.09 (0.043)	0.30 (0.012)	N/A	N/A	1
MF-SMDF100/33X	4.72 (0.186)	5.44 (0.214)	4.22 (0.166)	4.93 (0.194)	0.70 (0.028)	1.25 (0.049)	0.30 (0.012)	0.25 (0.010)	0.70 (0.028)	2
MF-SMDF150	4.72 (0.186)	5.44 (0.214)	4.22 (0.166)	4.93 (0.194)	0.55 (0.022)	0.85 (0.033)	0.30 (0.012)	N/A	N/A	1
MF-SMDF200	4.72 (0.186)	5.44 (0.214)	4.22 (0.166)	4.93 (0.194)	0.55 (0.022)	0.85 (0.033)	0.30 (0.012)	N/A	N/A	1
MF-SMDF260/24X	4.72 (0.186)	5.44 (0.214)	4.22 (0.166)	4.93 (0.194)	0.70 (0.028)	2.00 (0.079)	0.30 (0.012)	0.25 (0.010)	0.70 (0.028)	3

Packaging: 6000 pcs. per reel; 4000 pcs. per reel for Model MF-SMDF260/24X.

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

### Style 1



#### Terminal material:

Electroless Ni under immersion Au

#### Termination pad solderability:

Standard Au finish:

Meets ANSI/J-STD-002 Category 2.

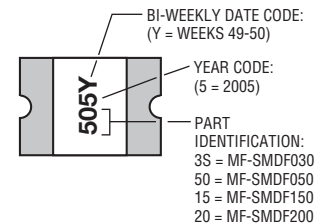
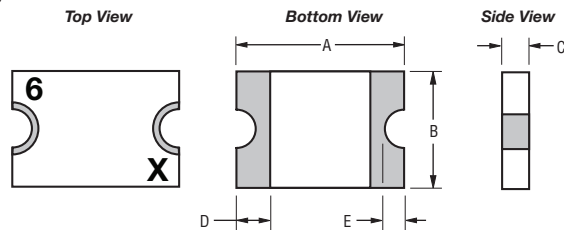
#### Recommended Storage:

40 °C max./70 % RH max.

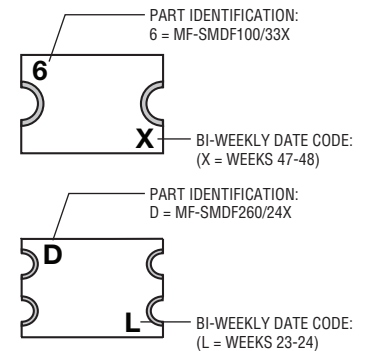
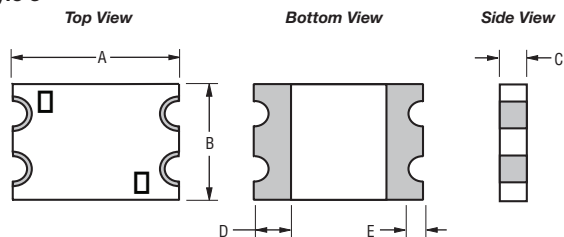
### Typical Part Marking

Represents total content. Layout may vary.

### Style 2



### Style 3

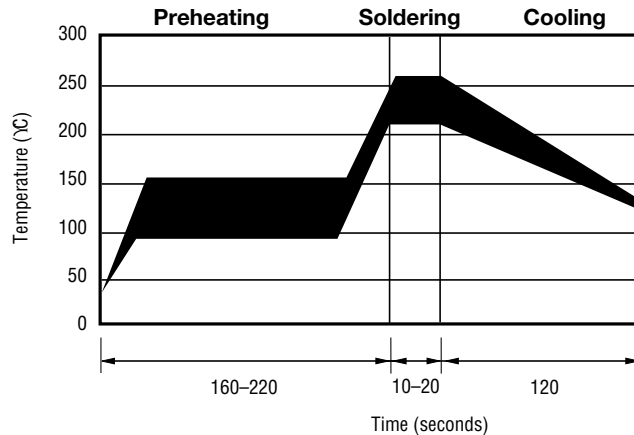


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## Solder Reflow Recommendations



### Notes:

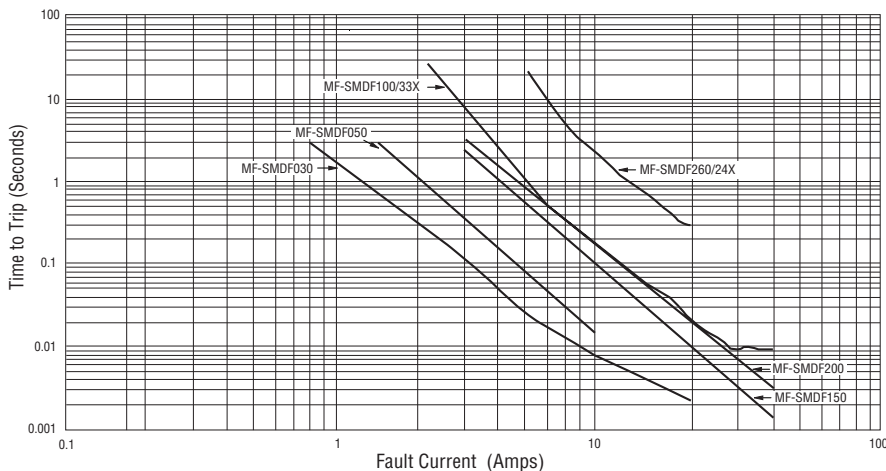
- MF-SMDF models cannot be wave soldered. Please contact Bourns for hand soldering recommendations.
- If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.
- Compatible with Pb and Pb-free solder reflow profiles.
- Excess solder may cause a short circuit, especially during hand soldering. Please refer to the Multifuse® Polymer PTC Soldering Recommendation guidelines.

## How to Order

**MF - SMDF 100 /33X - 2**

Product Designator  
Series  
SMDF = 2018 Surface Mount Component  
Hold Current,  $I_{hold}$   
030 = 0.30 A  
050 = 0.50 A  
100 = 1.10 A  
150 = 1.50 A  
200 = 2.00 A  
260 = 2.60 A  
Higher Voltage Option  
= Standard Voltage  
/24X = 24 V Rated  
/33X = 33 V Rated  
X = Multifuse® freeXpansion Design™ MF-SMDF Series  
Packaging  
Packaged per EIA 481-1  
-2 = Tape and Reel

## Typical Time to Trip at 23 °C



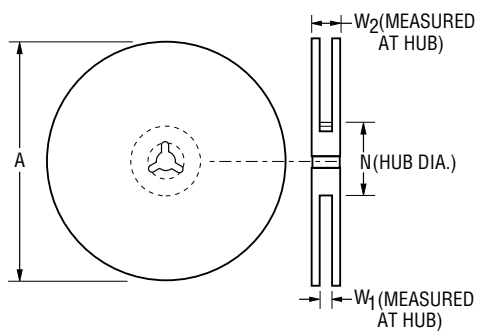
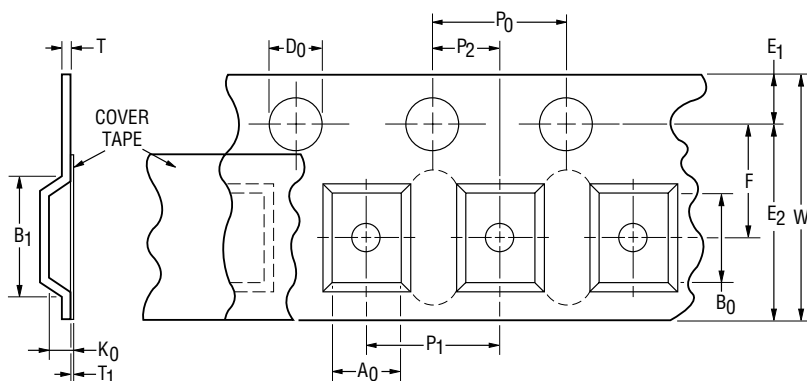
The Time to Trip curves represent typical performance of a device in a simulated application environment. Actual performance in specific customer applications may differ from these values due to the influence of other variables.

# MF-SMDF Series Tape and Reel Specifications

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Tape Dimensions	MF-SMDF030, 050, 150, 200 per EIA 481-2	MF-SMDF100/33X per EIA 481-2	MF-SMDF260/24X per EIA 481-2
W	$\frac{16.0 \pm 0.3}{(0.630 \pm 0.012)}$	$\frac{16.0 \pm 0.3}{(0.630 \pm 0.012)}$	$\frac{16.0 \pm 0.3}{(0.630 \pm 0.012)}$
P <sub>0</sub>	$\frac{4.0 \pm 0.1}{(0.157 \pm 0.004)}$	$\frac{4.0 \pm 0.1}{(0.157 \pm 0.004)}$	$\frac{4.0 \pm 0.1}{(0.157 \pm 0.004)}$
P <sub>1</sub>	$\frac{8.0 \pm 0.1}{(0.315 \pm 0.004)}$	$\frac{8.0 \pm 0.1}{(0.315 \pm 0.004)}$	$\frac{8.0 \pm 0.1}{(0.315 \pm 0.004)}$
P <sub>2</sub>	$\frac{2.0 \pm 0.1}{(0.079 \pm 0.004)}$	$\frac{2.0 \pm 0.1}{(0.079 \pm 0.004)}$	$\frac{2.0 \pm 0.1}{(0.079 \pm 0.004)}$
A <sub>0</sub>	$\frac{5.1 \pm 0.15}{(0.201 \pm 0.006)}$	$\frac{5.1 \pm 0.1}{(0.201 \pm 0.004)}$	$\frac{5.4 \pm 0.15}{(0.213 \pm 0.006)}$
B <sub>0</sub>	$\frac{5.6 \pm 0.23}{(0.220 \pm 0.009)}$	$\frac{5.6 \pm 0.1}{(0.221 \pm 0.004)}$	$\frac{5.7 \pm 0.15}{(0.234 \pm 0.006)}$
B <sub>1</sub> max.	$\frac{12.1}{(0.476)}$	$\frac{12.1}{(0.476)}$	$\frac{12.1}{(0.476)}$
D <sub>0</sub>	$\frac{1.5 + 0.1/-0.0}{(0.059 + 0.004/-0)}$	$\frac{1.5 + 0.1/-0.0}{(0.059 + 0.004/-0)}$	$\frac{1.5 + 0.1/-0.0}{(0.059 + 0.004/-0)}$
F	$\frac{7.5 \pm 0.10}{(0.295 \pm 0.004)}$	$\frac{7.5 \pm 0.10}{(0.295 \pm 0.004)}$	$\frac{7.5 \pm 0.10}{(0.295 \pm 0.004)}$
E <sub>1</sub>	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$
E <sub>2</sub> min.	$\frac{14.25}{(0.561)}$	$\frac{14.25}{(0.561)}$	$\frac{14.25}{(0.561)}$
T max.	$\frac{0.6}{(0.024)}$	$\frac{0.6}{(0.024)}$	$\frac{0.6}{(0.024)}$
T <sub>1</sub> max.	$\frac{0.1}{(0.004)}$	$\frac{0.1}{(0.004)}$	$\frac{0.1}{(0.004)}$
K <sub>0</sub>	$\frac{1.0 \pm 0.15}{(0.039 \pm 0.006)}$	$\frac{1.1 \pm 0.1}{(0.043 \pm 0.004)}$	$\frac{2.15 \pm 0.15}{(0.085 \pm 0.006)}$
Leader min.	$\frac{390}{(15.35)}$	$\frac{390}{(15.35)}$	$\frac{390}{(15.35)}$
Trailer min.	$\frac{160}{(6.30)}$	$\frac{160}{(6.30)}$	$\frac{160}{(6.30)}$
<b>Reel Dimensions</b>			
A max.	$\frac{331}{(13.03)}$	$\frac{331}{(13.03)}$	$\frac{331}{(13.03)}$
N min.	$\frac{50}{(1.97)}$	$\frac{50}{(1.97)}$	$\frac{50}{(1.97)}$
W <sub>1</sub>	$\frac{16.4 + 2.0/-0.0}{(0.646 + 0.079/-0)}$	$\frac{16.4 + 2.0/-0.0}{(0.646 + 0.079/-0)}$	$\frac{16.4 + 2.0/-0.0}{(0.646 + 0.079/-0)}$
W <sub>2</sub> max.	$\frac{22.4}{(0.882)}$	$\frac{22.4}{(0.882)}$	$\frac{22.4}{(0.882)}$

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



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