


BOURNS®

Features

- Surface Mount Devices
- Fully compatible with current industry standards
- Packaged per EIA 481-2 standard
- Lead free option available
- Agency recognition:   

Applications

Almost anywhere there is a low voltage power supply and a load to be protected, including:

- Computers & peripherals
- General electronics
- Automotive applications

MF-SM 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.}		Max.	Typ.
MF-SM030	60	40	0.30	0.60	0.90	4.80	1.5	3.0	1.7
MF-SM050	60	40	0.50	1.00	0.35	1.40	2.5	4.0	1.7
MF-SM075	30	80	0.75	1.50	0.23	1.00	8.0	0.3	1.7
MF-SM100*	30	80	1.10	2.20	0.12	0.48	8.0	0.5	1.7
MF-SM100/33	33	40	1.10	2.20	0.12	0.41	8.0	0.5	1.7
MF-SM125	15	100	1.25	2.50	0.07	0.25	8.0	2.0	1.7
MF-SM150	15	100	1.50	3.00	0.06	0.25	8.0	5.0	1.9
MF-SM150/33	33	40	1.50	3.00	0.06	0.23	8.0	5.0	1.9
MF-SM185/33	33	40	1.8	3.60	0.04	0.15	8.0	5.0	1.2
MF-SM200	15	100	2.00	4.00	0.045	0.125	8.0	12.0	1.9
MF-SM250	15	100	2.50	5.00	0.024	0.085	8.0	25.0	1.9
MF-SM260	6	100	2.60	5.20	0.025	0.075	8.0	20.0	1.7

*UL Pending

Environmental Characteristics

Operating/Storage Temperature	-40 °C to +85 °C
Maximum Device Surface Temperature in Tripped State	125 °C
Passive Aging	+85 °C, 1000 hours±5 % typical resistance change
Humidity Aging	+85 °C, 85 % R.H. 7 days±5 % typical resistance change
Thermal Shock	MIL-STD-202F, Method 107G,±10 % typical resistance change +125 °C to -55 °C, 10 cycles
Vibration	MIL-STD-883C, Method 2007.1, Condition A.....No change

Test Procedures And Requirements For Model MF-SM 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	MIL-STD-202F, Method 208F	95 % min. coverage

UL File NumberE174545

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

CSA File Number.....CA110338

<http://directories.csa-international.org/> Under "Certification Record" and "File Number" enter 110338-0-000

TÜV Certificate NumberR 02057213

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

Thermal Derating Chart - I_{hold} / I_{trip} (Amps)

Model	Ambient Operating Temperature								
	-40 °C	-20 °C	0 °C	23 °C	40 °C	50 °C	60 °C	70 °C	85 °C
MF-SM030	0.45 / 0.90	0.40 / 0.80	0.35 / 0.70	0.30 / 0.60	0.25 / 0.50	0.23 / 0.46	0.20 / 0.40	0.17 / 0.34	0.14 / 0.28
MF-SM050	0.76 / 1.52	0.67 / 1.34	0.59 / 1.18	0.50 / 1.00	0.42 / 0.84	0.38 / 0.76	0.33 / 0.66	0.29 / 0.58	0.23 / 0.46
MF-SM075	1.13 / 2.26	1.01 / 2.02	0.88 / 1.76	0.75 / 1.50	0.62 / 1.24	0.56 / 1.12	0.50 / 1.00	0.44 / 0.88	0.34 / 0.68
MF-SM100	1.66 / 3.32	1.47 / 2.94	1.29 / 2.58	1.10 / 2.20	0.91 / 1.82	0.83 / 1.66	0.73 / 1.46	0.64 / 1.28	0.50 / 1.00
MF-SM100/33	1.66 / 3.32	1.47 / 2.94	1.29 / 2.58	1.10 / 2.20	0.91 / 1.82	0.83 / 1.66	0.73 / 1.46	0.64 / 1.28	0.50 / 1.00
MF-SM125	1.89 / 3.78	1.68 / 3.36	1.46 / 2.92	1.25 / 2.50	1.04 / 2.08	0.94 / 1.88	0.83 / 1.66	0.73 / 1.46	0.56 / 1.12
MF-SM150	2.27 / 4.54	2.01 / 4.02	1.76 / 3.52	1.50 / 3.00	1.25 / 2.50	1.13 / 2.26	0.99 / 1.98	0.87 / 1.74	0.68 / 1.36
MF-SM150/33	2.27 / 4.54	2.01 / 4.02	1.76 / 3.52	1.50 / 3.00	1.25 / 2.50	1.13 / 2.26	0.99 / 1.98	0.87 / 1.74	0.68 / 1.36
MF-SM185/33	2.56 / 5.12	2.32 / 4.64	2.08 / 4.16	1.85 / 3.70	1.60 / 3.20	1.44 / 2.88	1.28 / 2.56	1.12 / 2.24	0.88 / 1.76
MF-SM200	3.02 / 6.04	2.68 / 5.36	2.34 / 4.68	2.00 / 4.00	1.66 / 3.32	1.50 / 3.00	1.32 / 2.64	1.16 / 2.32	0.90 / 1.80
MF-SM250	3.78 / 7.56	3.35 / 6.70	2.93 / 5.86	2.50 / 5.00	2.08 / 4.16	1.88 / 3.76	1.65 / 3.30	1.45 / 2.90	1.13 / 2.26
MF-SM260	3.64 / 7.28	3.25 / 6.50	2.91 / 5.82	2.60 / 5.20	2.26 / 4.52	2.08 / 4.16	1.95 / 3.90	1.74 / 3.48	1.48 / 2.96

Specifications are subject to change without notice.
Customers should verify actual device performance in their specific applications.

Additional Features

- Patents pending

MF-SM Series - PTC Resettable Fuses

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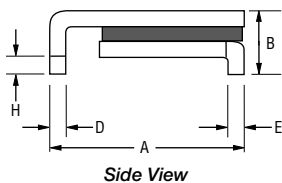
Product Dimensions

Model	A		B	C	D		E		F		G		H
	Min.	Max.	Max.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
MF-SM030	6.73 (0.265)	7.98 (0.314)	3.18 (0.125)	5.44 (0.214)	0.56 (0.022)	0.71 (0.028)	0.56 (0.022)	0.71 (0.028)	2.16 (0.085)	2.41 (0.095)	0.66 (0.026)	1.37 (0.054)	0.43 (0.017)
MF-SM050	6.73 (0.265)	7.98 (0.314)	3.18 (0.125)	5.44 (0.214)	0.56 (0.022)	0.71 (0.028)	0.56 (0.022)	0.71 (0.028)	2.16 (0.085)	2.41 (0.095)	0.66 (0.026)	1.37 (0.054)	0.43 (0.017)
MF-SM075	6.73 (0.265)	7.98 (0.314)	3.18 (0.125)	5.44 (0.214)	0.56 (0.022)	0.71 (0.028)	0.56 (0.022)	0.71 (0.028)	2.16 (0.085)	2.41 (0.095)	0.66 (0.026)	1.37 (0.054)	0.43 (0.017)
MF-SM100	6.73 (0.265)	7.98 (0.314)	3.00 (0.118)	5.44 (0.214)	0.56 (0.022)	0.71 (0.028)	0.56 (0.022)	0.71 (0.028)	2.16 (0.085)	2.41 (0.095)	0.66 (0.026)	1.37 (0.054)	0.43 (0.017)
MF-SM100/33	6.73 (0.265)	7.98 (0.314)	3.00 (0.118)	5.44 (0.214)	0.56 (0.022)	0.71 (0.028)	0.56 (0.022)	0.71 (0.028)	2.16 (0.085)	2.41 (0.095)	0.66 (0.026)	1.37 (0.054)	0.43 (0.017)
MF-SM125	6.73 (0.265)	7.98 (0.314)	3.00 (0.118)	5.44 (0.214)	0.56 (0.022)	0.71 (0.028)	0.56 (0.022)	0.71 (0.028)	2.16 (0.085)	2.41 (0.095)	0.66 (0.026)	1.37 (0.054)	0.43 (0.017)
MF-SM150	8.00 (0.315)	9.50 (0.374)	3.00 (0.118)	6.71 (0.264)	0.56 (0.022)	0.71 (0.028)	0.56 (0.022)	0.71 (0.028)	3.68 (0.145)	3.94 (0.155)	0.66 (0.026)	1.37 (0.054)	0.43 (0.017)
MF-SM150/33	8.00 (0.315)	9.50 (0.374)	3.00 (0.118)	6.71 (0.264)	0.56 (0.022)	0.71 (0.028)	0.56 (0.022)	0.71 (0.028)	3.68 (0.145)	3.94 (0.155)	0.66 (0.026)	1.37 (0.054)	0.43 (0.017)
MF-SM185/33	8.00 (0.315)	9.50 (0.374)	3.00 (0.118)	6.71 (0.264)	0.56 (0.022)	0.71 (0.028)	0.56 (0.022)	0.71 (0.028)	3.68 (0.145)	3.94 (0.155)	0.66 (0.026)	1.37 (0.054)	0.43 (0.017)
MF-SM200	8.00 (0.315)	9.50 (0.374)	3.00 (0.118)	6.71 (0.264)	0.56 (0.022)	0.71 (0.028)	0.56 (0.022)	0.71 (0.028)	3.68 (0.145)	3.94 (0.155)	0.66 (0.026)	1.37 (0.054)	0.43 (0.017)
MF-SM250	8.00 (0.315)	9.50 (0.374)	3.00 (0.118)	6.71 (0.264)	0.56 (0.022)	0.71 (0.028)	0.56 (0.022)	0.71 (0.028)	3.68 (0.145)	3.94 (0.155)	0.66 (0.026)	1.37 (0.054)	0.43 (0.017)
MF-SM260	6.73 (0.265)	7.98 (0.314)	3.00 (0.118)	5.44 (0.214)	0.56 (0.022)	0.71 (0.028)	0.56 (0.022)	0.71 (0.028)	2.16 (0.085)	2.41 (0.095)	0.66 (0.026)	1.37 (0.054)	0.43 (0.017)

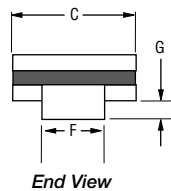
Packaging:

TAPE & REEL: MF-SM030, 050, 075, 100, 100/33, 125, 260 = 2000 pcs. per reel;
MF-SM150, 150/33, 185/33, 200, 250 = 1500 pcs. per reel.

UNIT = $\frac{MM}{(INCHES)}$

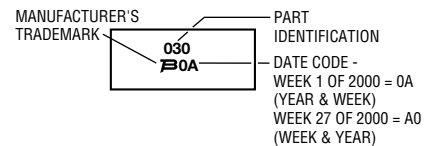


Terminal material:
Tin-plated brass

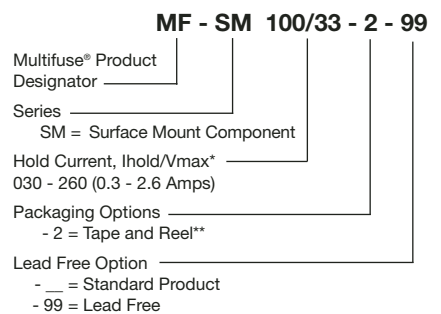


Typical Part Marking

Represents total content. Layout may vary.



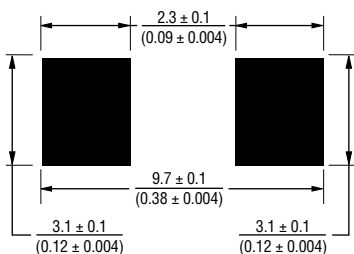
How to Order



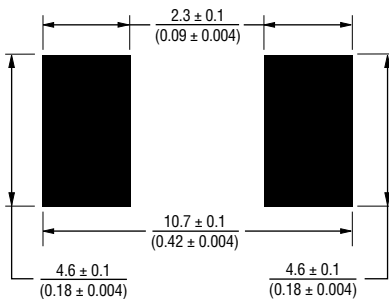
* V_{max} entry applies only to models MF-SM100/33, MF-SM150/33 & MF-SM185/33.

**Packaged per EIA-481-2

Recommended Pad Layout MF-SM030, 050, 075, 100, 100/33, 125, 260



Recommended Pad Layout MF-SM150, 150/33, 185/33, 200, 250

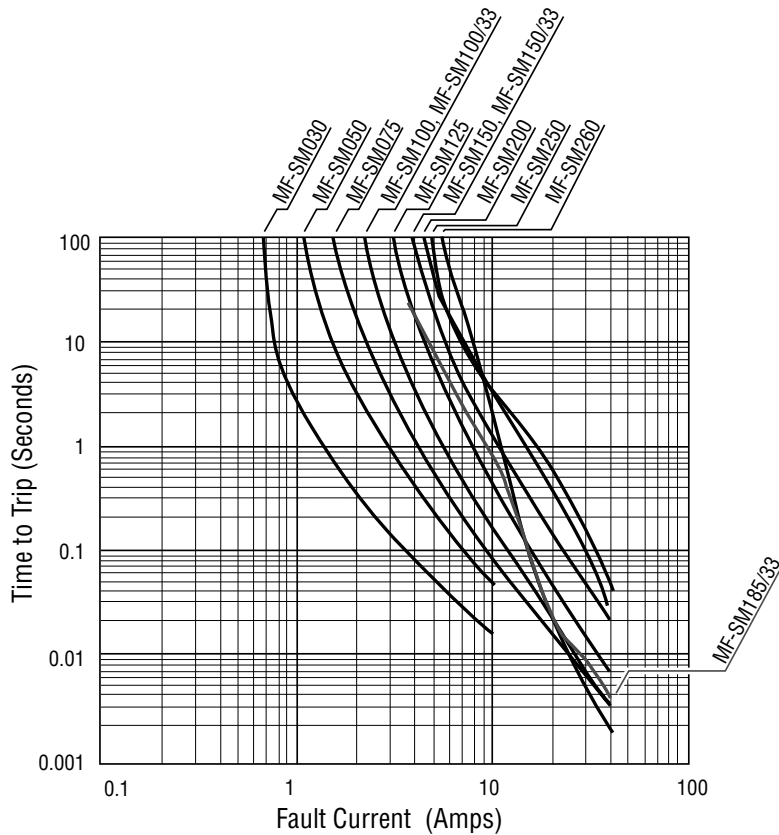


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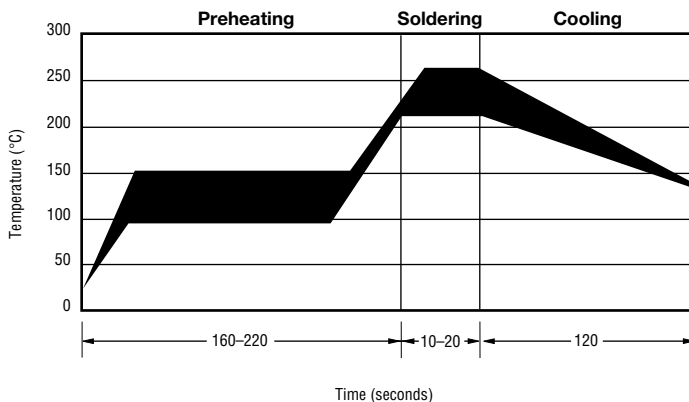
MF-SM Series - PTC Resettable Fuses

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Typical Time to Trip at 23 °C



Solder Reflow Recommendations



Solder reflow

- Recommended reflow methods: IR, vapor phase oven, hot air oven.
- Devices are not designed to be wave soldered to the bottom side of the board.
- Gluing the devices is not recommended.
- Recommended maximum paste thickness is 0.25 mm (.010 inch).
- Devices can be cleaned using standard industry methods and solvents.

Note:

- If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

Rework

- A device should not be reworked.

MF-SM, MF-SM/33 & MF-SM/250 Series Tape and Reel Specifications

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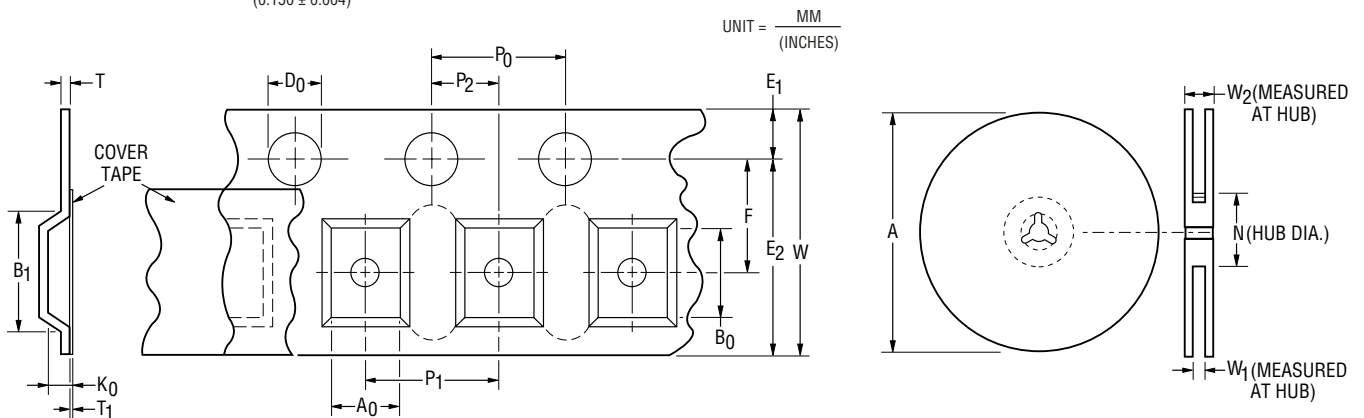
**MF-SM030, 050, 075, 100, 125, 260;
MF-SM-100/33
per EIA-481-2**

**MF-SM150, 200, 250;
MF-SM-150/33; MF-SM185/33; MF-SM013/250
per EIA 481-2**

Tape Dimensions

W	$\frac{16.0 \pm 0.3}{(0.630 \pm 0.012)}$	$\frac{16.0 \pm 0.3}{(0.630 \pm 0.012)}$
P ₀	$\frac{4.0 \pm 0.1}{(0.157 \pm 0.004)}$	$\frac{4.0 \pm 0.1}{(0.157 \pm 0.004)}$
P ₁	$\frac{8.0 \pm 0.1}{(0.315 \pm 0.004)}$	$\frac{12.0 \pm 0.1}{(0.472 \pm 0.004)}$
P ₂	$\frac{2.0 \pm 0.1}{(0.079 \pm 0.004)}$	$\frac{2.0 \pm 0.1}{(0.079 \pm 0.004)}$
A ₀	$\frac{5.7 \pm 0.1}{(0.224 \pm 0.004)}$	$\frac{6.9 \pm 0.1}{(0.272 \pm 0.004)}$
B ₀	$\frac{8.1 \pm 0.1}{(0.319 \pm 0.004)}$	$\frac{9.6 \pm 0.1}{(0.378 \pm 0.004)}$
B ₁ max.	$\frac{12.1}{(0.476)}$	$\frac{12.1}{(0.476)}$
D 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	$\frac{7.5 \pm 0.1}{(0.295 \pm 0.004)}$	$\frac{7.5 \pm 0.1}{(0.295 \pm 0.004)}$
E ₁	$\frac{1.75 \pm 0.1}{(0.069 \pm 0.004)}$	$\frac{1.75 \pm 0.1}{(0.069 \pm 0.004)}$
E ₂ min.	$\frac{14.25}{(0.561)}$	$\frac{14.25}{(0.561)}$
T max.	$\frac{0.6}{(0.024)}$	$\frac{0.6}{(0.024)}$
T ₁ max.	$\frac{0.1}{(0.004)}$	$\frac{0.1}{(0.004)}$
K ₀	$\frac{3.4 \pm 0.1}{(0.134 \pm 0.004)}$	$\frac{3.4 \pm 0.1^*}{(0.134 \pm 0.004)^*}$
Leader min.	$\frac{390}{(15.35)}$	$\frac{390}{(15.35)}$
Trailer min.	$\frac{160}{(6.30)}$	$\frac{160}{(6.30)}$
Reel Dimensions		
A max.	$\frac{360}{(14.17)}$	$\frac{360}{(14.17)}$
N min.	$\frac{50}{(1.97)}$	$\frac{50}{(1.97)}$
W ₁	$\frac{16.4 + 2.0/-0.0}{(0.646 + 0.079/-0)}$	$\frac{16.4 + 2.0/-0.0}{(0.646 + 0.079/-0)}$
W ₂ max.	$\frac{22.4}{(0.882)}$	$\frac{22.4}{(0.882)}$

* Model MF-SM013/250 = $\frac{3.8 \pm 0.1}{(0.150 \pm 0.004)}$



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