

Features

- Compliant with AEC-Q200 Rev-C- Stress Test Qualification for Passive Components in Automotive Applications
- Surface mount devices
- Fully compatible with current industry standards
- Packaged per EIA 481-2 standard

■ RoHS compliant* and halogen free**

Patents pending

■ Agency recognition: **%**



MF-SM Series - PTC Resettable Fuses

Electrical Characteristics

Model	V max. Volts	I max Amps	lhold	l _{trip}	Resistance Ohms at 23 °C		Max. Time To Trip		Tripped Power Dissipation
wodei				eres 3 °C			Amperes Seconds at 23 °C at 23 °C		Watts at 23 °C
			Hold	Trip	R Min.	R1 Max.		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-SM075/60	60	10	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	1.80	3.60	0.04	0.15	8.0	5.0	1.9
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
MF-SM300**	6	100	3.00	6.00	0.015	0.048	8.0	35.0	1.5

^{**}UL approved, CSA & TUV approval pending.

Environmental Characteristics

Operating Temperature.....-40 °C to +85 °C Maximum Device Surface Temperature

 Maximum Device Surface Temperature
 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

 Vibration
 MIL-STD-883C, Method 2007.1, Condition A
 Rmin ≤ R ≤ R1max

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	Rmin ≤ R ≤ R1max
Time to Trip	At specified current, Vmax, 23 °C	T ≤ max. time to trip (seconds)
Hold Current		
Trip Cycle Life	Vmax, Imax, 100 cycles	No arcing or burning
Trip Endurance		
Solderability	MIL-STD-202F, Method 208F	95 % min. coverage
•	*	v

Thermal Derating Chart - Ihold (Amps)

Madel	Ambient Operating Temperature											
Model	-40 °C	-20 °C	0 ℃	23 °C	40 °C	50 °C	60 °C	70 °C	85 °C			
MF-SM030	0.45	0.40	0.35	0.30	0.25	0.23	0.20	0.17	0.14			
MF-SM050	0.76	0.67	0.59	0.50	0.42	0.38	0.33	0.29	0.23			
MF-SM075	1.11	0.99	0.84	0.75	0.63	0.57	0.49	0.45	0.36			
MF-SM075/60	1.11	0.99	0.84	0.75	0.63	0.57	0.49	0.45	0.36			
MF-SM100	1.66	1.47	1.29	1.10	0.91	0.83	0.73	0.64	0.50			
MF-SM100/33	1.66	1.47	1.29	1.10	0.91	0.83	0.73	0.64	0.50			
MF-SM125	1.89	1.68	1.46	1.25	1.04	0.94	0.83	0.73	0.56			
MF-SM150	2.27	2.01	1.76	1.50	1.25	1.13	0.99	0.87	0.68			
MF-SM150/33	2.27	2.01	1.76	1.50	1.25	1.13	0.99	0.87	0.68			
MF-SM185/33	2.56	2.32	2.08	1.85	1.60	1.44	1.28	1.12	0.88			
MF-SM200	3.02	2.68	2.34	2.00	1.66	1.50	1.32	1.16	0.90			
MF-SM250	3.78	3.35	2.93	2.50	2.08	1.88	1.65	1.45	1.13			
MF-SM260	3.64	3.25	2.91	2.60	2.26	2.08	1.95	1.74	1.48			
MF-SM300	4.13	3.75	3.30	2.87	2.62	2.43	2.25	2.00	1.78			

Itrip is approximately two times Ihold.

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

^{**}Bourns follows the prevailing definition of "halogen free" in the industry. 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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The device haracteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time.

Users should verify actual device performance in their specific applications.

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

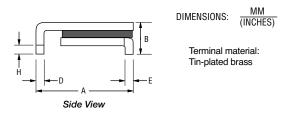
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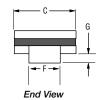
Product Dimensions

Model	Δ.		В	С	I)	ı	E	ı	F		G	н
	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)	<u>5.44</u> (0.214)	0.56 (0.022)	$\frac{0.71}{(0.028)}$	0.56 (0.022)	<u>0.71</u> (0.028)	2.16 (0.085)	2.41 (0.095)	0.66 (0.026)	1.37 (0.054)	<u>0.43</u> (0.017)
MF-SM075	6.73 (0.265)	7.98 (0.314)	3.18 (0.125)	5.44 (0.214)	0.56 (0.022)	$\frac{0.71}{(0.028)}$	0.56 (0.022)	<u>0.71</u> (0.028)	2.16 (0.085)	2.41 (0.095)	0.66 (0.026)	1.37 (0.054)	0.43 (0.017)
MF-SM075/60	6.73 (0.265)	7.98 (0.314)	3.18 (0.125)	5.44 (0.214)	0.56 (0.022)	$\frac{0.71}{(0.028)}$	0.56 (0.022)	0.71 (0.028)	2.16 (0.085)	2.41 (0.095)	0.66 (0.026)	1.37 (0.054)	$\frac{0.43}{(0.017)}$
MF-SM100	6.73 (0.265)	7.98 (0.314)	3.0 (0.118)	5.44 (0.214)	0.56 (0.022)	$\frac{0.71}{(0.028)}$	0.56 (0.022)	<u>0.71</u> (0.028)	2.16 (0.085)	2.41 (0.095)	0.66 (0.026)	1.37 (0.054)	$\frac{0.43}{(0.017)}$
MF-SM100/33	6.73 (0.265)	7.98 (0.314)	3.0 (0.118)	5.44 (0.214)	0.56 (0.022)	$\frac{0.71}{(0.028)}$	0.56 (0.022)	<u>0.71</u> (0.028)	2.16 (0.085)	2.41 (0.095)	0.66 (0.026)	1.37 (0.054)	$\frac{0.43}{(0.017)}$
MF-SM125	6.73 (0.265)	7.98 (0.314)	3.0 (0.118)	5.44 (0.214)	0.56 (0.022)	$\frac{0.71}{(0.028)}$	0.56 (0.022)	$\frac{0.71}{(0.028)}$	2.16 (0.085)	2.41 (0.095)	0.66 (0.026)	1.37 (0.054)	$\frac{0.43}{(0.017)}$
MF-SM150	8.00 (0.315)	9.50 (0.374)	3.0 (0.118)	6.71 (0.264)	0.56 (0.022)	$\frac{0.71}{(0.028)}$	0.56 (0.022)	$\frac{0.71}{(0.028)}$	3.68 (0.145)	3.94 (0.155)	<u>0.66</u> (0.026)	1.37 (0.054)	$\frac{0.43}{(0.017)}$
MF-SM150/33	8.00 (0.315)	9.50 (0.374)	3.0 (0.118)	6.71 (0.264)	0.56 (0.022)	$\frac{0.71}{(0.028)}$	0.56 (0.022)	$\frac{0.71}{(0.028)}$	3.68 (0.145)	3.94 (0.155)	0.66 (0.026)	1.37 (0.054)	$\frac{0.43}{(0.017)}$
MF-SM185/33	8.00 (0.315)	9.50 (0.374)	3.0 (0.118)	6.71 (0.264)	0.56 (0.022)	$\frac{0.71}{(0.028)}$	0.56 (0.022)	<u>0.71</u> (0.028)	3.68 (0.145)	3.94 (0.155)	0.66 (0.026)	1.37 (0.054)	$\frac{0.43}{(0.017)}$
MF-SM200	8.00 (0.315)	9.50 (0.374)	3.0 (0.118)	6.71 (0.264)	0.56 (0.022)	$\frac{0.71}{(0.028)}$	0.56 (0.022)	$\frac{0.71}{(0.028)}$	3.68 (0.145)	3.94 (0.155)	<u>0.66</u> (0.026)	1.37 (0.054)	$\frac{0.43}{(0.017)}$
MF-SM250	8.00 (0.315)	9.50 (0.374)	3.0 (0.118)	<u>6.71</u> (0.264)	<u>0.56</u> (0.022)	$\frac{0.71}{(0.028)}$	<u>0.56</u> (0.022)	<u>0.71</u> (0.028)	3.68 (0.145)	3.94 (0.155)	<u>0.66</u> (0.026)	1.37 (0.054)	0.43 (0.017)
MF-SM260	6.73 (0.265)	7.98 (0.314)	3.0 (0.118)	5.44 (0.214)	0.56 (0.022)	$\frac{0.71}{(0.028)}$	0.56 (0.022)	0.71 (0.028)	2.16 (0.085)	2.41 (0.095)	0.66 (0.026)	1.37 (0.054)	$\frac{0.43}{(0.017)}$
MF-SM300	6.73 (0.265)	7.98 (0.314)	3.0 (0.118)	5.44 (0.214)	0.56 (0.022)	<u>0.71</u> (0.028)	0.56 (0.022)	<u>0.71</u> (0.028)	2.16 (0.085)	2.41 (0.095)	0.66 (0.026)	1.37 (0.054)	0.43 (0.017)

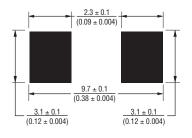
Packaging:

TAPE & REEL: MF-SM030, 050, 075, 075/60, 100, 100/33, 125, 260, 300 = 2000 pcs. per reel; MF-SM150, 150/33, 185/33, 200, 250 = 1500 pcs. per reel.

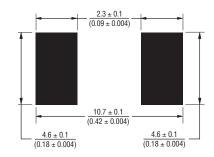




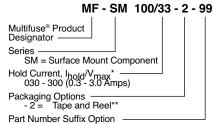
Recommended Pad Layout MF-SM030, 050, 075, 075/60, 100, 100/33, 125, 260, 300



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



How to Order



- 99 = As of date code April 1, 2005 all MF-SM models are RoHS compliant. The suffix "-99" can be used if a new part number is required to reference the RoHS compliance.

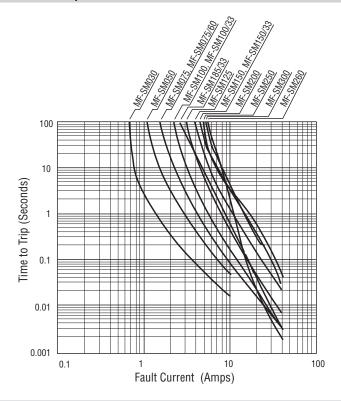
- * Vmax entry applies only to models MF-SM075/60, MF-SM100/33, MF-SM150/33 & MF-SM185/33.
- ** Packaged per EIA-481-2

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MF-SM Series - PTC Resettable Fuses

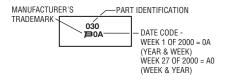
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Typical Time to Trip at 23 °C

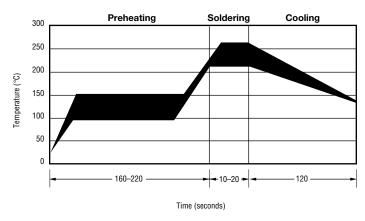


Typical Part Marking

Represents total content. Layout may vary.



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.

Reworl

A device should not be reworked.

Storage Recommendations

The recommended long term storage conditions for Multifuse® Polymer PTC devices are 40 °C maximum and 70 % RH maximum. All devices should remain in the original sealed packaging prior to use. Devices may not conform with data sheet specifications if these storage recommendations are exceeded. Devices stored in this manner have an indefinite shelf life.

MF-SM SERIES, REV.R, 01/14

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MF-SM, MF-SM/33, MF-SM/60 & MF-SM/250 Series Tape and Reel Specifications **BOURNS**°

NOTE: Effective December 1, 2010 (product date code V0), the cover tape was changed to the new 3M™ Universal Cover Tape (UCT).

Tape Dimensions	MF-SM030, 050, 075, 100, 125, 260, 300; MF-SM075/60; MF-SM-100/33 per EIA-481-2	MF-SM150, 200, 250; MF-SM-150/33, MF-SM-185/33; MF-SM013/250 per EIA 481-2
W	16.0 ± 0.3	16.0 ± 0.3
··	$ (0.630 \pm 0.012) $ $ 4.0 \pm 0.1 $	$\frac{(0.630 \pm 0.012)}{4.0 \pm 0.1}$
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	8.0 ± 0.1	12.0 ± 0.1
	$ (0.315 \pm 0.004) $ $ 2.0 \pm 0.1 $	$\frac{(0.472 \pm 0.004)}{2.0 \pm 0.1}$
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	8.1 ± 0.1 (0.319 ± 0.004)	$\frac{9.6 \pm 0.1}{(0.378 \pm 0.004)}$
B ₁ max.	<u>12.1</u>	_12.1_
	(0.476) 1.5 + 0.1/-0.0	(0.476) 1.5 + 0.1/-0.0
D_0	$\frac{1.3 + 0.17 - 0.0}{(0.059 + 0.004/-0)}$	$\frac{1.3 + 0.17 - 0.0}{(0.059 + 0.004/-0)}$
F	7.5 ± 0.1	7.5 ± 0.1
	(0.295 + 0.004) 1.75 ± 0.1	(0.295 + 0.004) 1.75 ± 0.1
E ₁	$\frac{1.73 \pm 0.1}{(0.069 \pm 0.004)}$	$\frac{1.73 \pm 0.1}{(0.069 \pm 0.004)}$
E ₂ min.	14.25 (0.561)	14.25 (0.561)
T max.		0.6
	(0.024) 0.1	(0.024) 0.1
T ₁ max.	<u>0.1</u> (0.004)	$\overline{(0.004)}$
κ_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.	390 (15.35)	390 (15.35)
Trailer min.	160	160
Reel Dimensions	(6.30)	(6.30)
A max.	360	360
Alliax.	(14.17)	(14.17)
N min.	<u>50</u> (1.97)	$\frac{50}{(1.97)}$
W ₁	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.	_ 22.4_	_22.4_
* Model MF-SM013/250 = 3.8 ± 0.1	(0.882)	(0.882)
$\frac{100001 \text{ Wir}300013/250}{(0.150 \pm 0.004)}$		DIMENSIONS: $\frac{MM}{(INCHES)}$
COVER TAPE K0 P1 P1	P2 + E ₁	W ₂ (MEASURED AT HUB) N(HUB DIA.) W ₁ (MEASURED AT HUB)

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