



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*

■ Agency recognition:

■ Patents pending



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	RMin.	R1Max.		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

*CSA recognition pending.

**UL approved, CSA & TUV approval pending.

Environmental Characteristics

Operating 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 Number	E174545	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
TUV Certificate Number	R 02057213	http://www.tuvdotcom.com/ Follow link to "other certificates", enter File No. 2057213

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-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

I_{trip} is approximately two times I_{hold}.

*RoHS Directive 2002/95/EC Jan 27 2003 including Annex. Product manufactured with a date code later than April 1, 2005 is RoHS compliant.

Specifications are subject to change without notice.

Customers 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

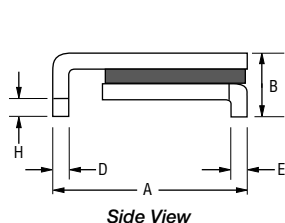
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Product Dimensions

Model	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-SM075/60	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)	3.0 (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)	3.0 (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)	3.0 (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)	3.0 (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)	3.0 (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)	3.0 (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)	3.0 (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)	3.0 (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)	3.0 (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-SM300	6.73 (0.265)	7.98 (0.314)	3.0 (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)

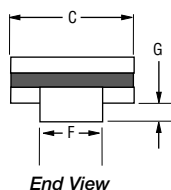
Packaging:

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



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

Terminal material:
Tin-plated brass



How to Order

MF - SM 100/33 - 2 - 99

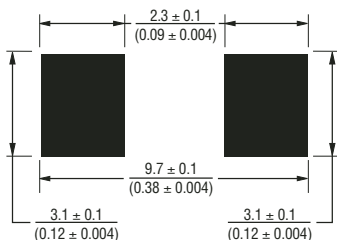
Multifuse® Product Designator _____
Series _____
SM = Surface Mount Component
Hold Current, I_{hold}/V_{max}* _____
030 - 300 (0.3 - 3.0 Amps)
Packaging Options _____
- 2 = Tape and Reel**
Part Number Suffix Option _____
- 99 = As of date code April 1, 2005 all MF-SM models are RoHS compliant. The suffix "-99" can be used if a new part number is required to reference the RoHS compliance.
Examples:
MF-SM030-2Tape and reel packaging
MF-SM030-2-99Tape and reel packaging with part number suffix option
MF-SM150-2Tape and reel packaging
MF-SM150/33-2-99...Tape and reel packaging with part number suffix option

*V_{max} entry applies only to models MF-SM075/60, MF-SM100/33, MF-SM150/33 & MF-SM185/33.

**Packaged per EIA-481-2

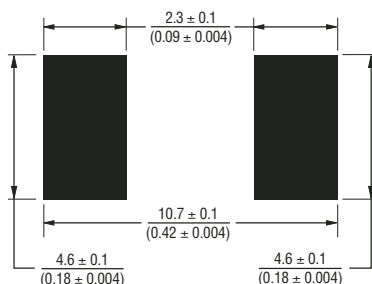
Recommended Pad Layout

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



Recommended Pad Layout

MF-SM150, 150/33, 185/33, 200, 250

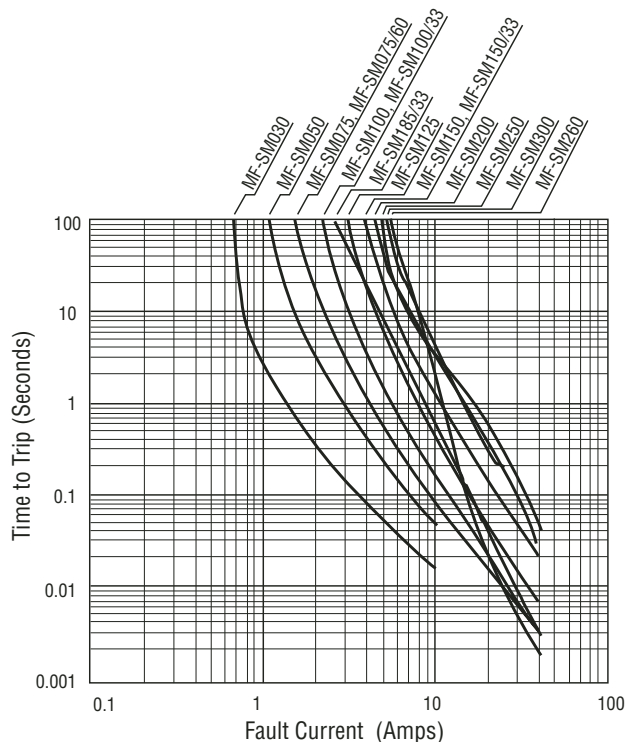


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MF-SM Series - PTC Resettable Fuses

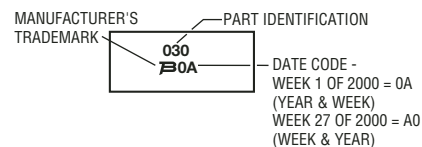
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Typical Time to Trip at 23 °C

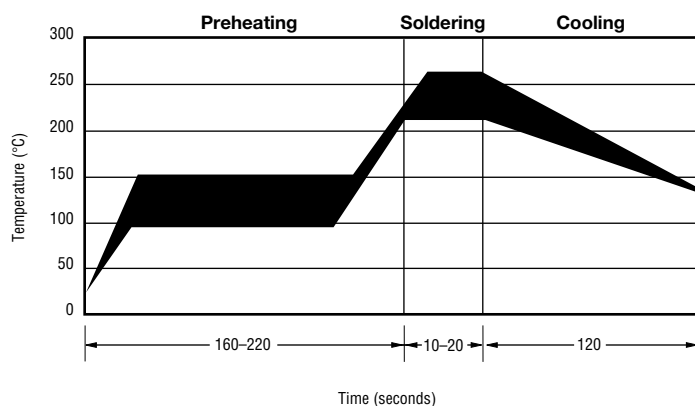


Typical Part Marking

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.

Rework

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

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**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**

Tape Dimensions

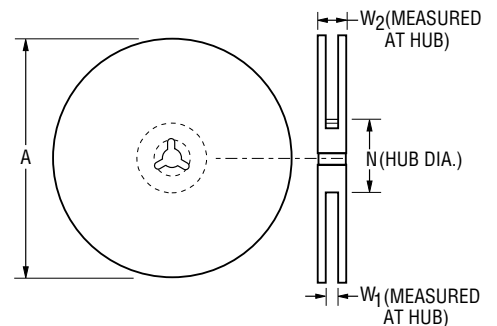
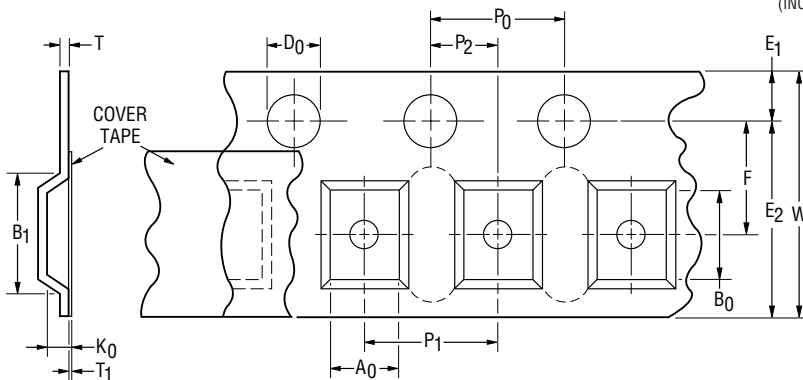
W	$\frac{16.0 \pm 0.3}{(0.630 \pm 0.012)}$	$\frac{16.0 \pm 0.3}{(0.630 \pm 0.012)}$
P ₀	$\frac{4.0 \pm 0.1}{(0.157 \pm 0.004)}$	$\frac{4.0 \pm 0.1}{(0.157 \pm 0.004)}$
P ₁	$\frac{8.0 \pm 0.1}{(0.315 \pm 0.004)}$	$\frac{12.0 \pm 0.1}{(0.472 \pm 0.004)}$
P ₂	$\frac{2.0 \pm 0.1}{(0.079 \pm 0.004)}$	$\frac{2.0 \pm 0.1}{(0.079 \pm 0.004)}$
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	$\frac{1.5 \pm 0.1/-0.0}{(0.059 \pm 0.004/-0)}$	$\frac{1.5 \pm 0.1/-0.0}{(0.059 \pm 0.004/-0)}$
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	$\frac{16.4 \pm 2.0/-0.0}{(0.646 \pm 0.079/-0)}$	$\frac{16.4 \pm 2.0/-0.0}{(0.646 \pm 0.079/-0)}$
W ₂ max.	$\frac{22.4}{(0.882)}$	$\frac{22.4}{(0.882)}$

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

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



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