

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**
- Agency recognition: ¶ ⊕ ⊕
- Patents pending



MF-SM Series - PTC Resettable Fuses

Electrical Characteristics

	V max.	l max	l _{hold}	I _{trip}	Resistance		Max. Time To Trip		Tripped Power Dissipation
Model	Volts	olts Amps		eres 3 °C	Ohms at 23 °C		Amperes at 23 °C	Seconds 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

^{*}CSA recognition pending.

Environmental Characteristics

Operating Temperature	40 °C to +85 °C	
Maximum Device Surface Temperature		
in Tripped State		
Passive Aging	+85 °C, 1000 hours	±5 % typical resistance change
Humidity Aging	+85 °C, 85 % R.H. 7 days	±5 % typical resistance change
		±10 % typical resistance change
	+125 °C to -55 °C,10 cycles	,,
Vibration	MIL-STD-883C, Method 2007.1, Con	dition 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
Time to Trip	At specified current, Vmax, 23 °C	T ≤ max. time to trip (seconds)
Hold Current	30 min. at Ihold	No trip
Trip Cycle Life	Vmax, Imax, 100 cycles	No arcing or burning
	Vmax, 48 hours	
Solderability	MIL-STD-202F, Method 208F	95 % min. coverage
UL File Number E174545 CSA File Number CA110338	http://www.ul.com/ Follow link to Certifications, then Ulhttp://directories.csa-international.org/ Under "Certifications"	tion Record" and "File Number" enter 110338-0-
TÜV Certificate Number R 02057213	http://www.tuvdotcom.com/ Follow link to "other certific	cates", enter File No. 2057213

Thermal Derating Chart - Ihold (Amps)

Mandal	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		

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

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

^{*}RoHS Directive 2002/95/EC Jan 27 2003 including Annex.
**To be considered halogen free, each homogenous material can have a maximum concentration of 900 ppm of either bromine or chlorine. Specifications are subject to change without notice.

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

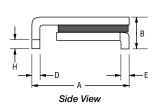
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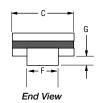
Product Dimensions

		A B		С	C D		E		F		G		Н
Model	Min.	Max.	Max.	Max.	Min.								
145 014000	6.73	7.98	3.18	5.44	0.56	0.71	0.56	0.71	2.16	2.41	0.66	1.37	0.43
MF-SM030	(0.265)	(0.314)	(0.125)	(0.214)	(0.022)	(0.028)	(0.022)	(0.028)	(0.085)	(0.095)	(0.026)	(0.054)	(0.017)
NAT ONAOTO	6.73	7.98	3.18	5.44	0.56	0.71	0.56	0.71	2.16	2.41	0.66	1.37	0.43
MF-SM050	(0.265)	(0.314)	(0.125)	(0.214)	(0.022)	(0.028)	(0.022)	(0.028)	(0.085)	(0.095)	(0.026)	(0.054)	(0.017)
MF-SM075	6.73	7.98	3.18	5.44	0.56	0.71	0.56	0.71	2.16	2.41	0.66	1.37	0.43
IVIF-SIVIU75	(0.265)	(0.314)	(0.125)	(0.214)	(0.022)	(0.028)	(0.022)	(0.028)	(0.085)	(0.095)	(0.026)	(0.054)	(0.017)
MF-SM075/60	6.73	7.98	3.18	5.44	0.56	0.71	0.56	0.71	2.16	2.41	0.66	1.37	0.43
IVIF-5IVIU/5/60	(0.265)	(0.314)	(0.125)	(0.214)	(0.022)	(0.028)	(0.022)	(0.028)	(0.085)	(0.095)	(0.026)	(0.054)	(0.017)
ME CM100	6.73	7.98	3.0	5.44	0.56	0.71	0.56	0.71	2.16	2.41	0.66	1.37	0.43
MF-SM100	(0.265)	(0.314)	(0.118)	(0.214)	(0.022)	(0.028)	(0.022)	(0.028)	(0.085)	(0.095)	(0.026)	(0.054)	(0.017)
MF-SM100/33	6.73	7.98	3.0	5.44	0.56	0.71	0.56	0.71	2.16	2.41	0.66	1.37	0.43
IVIF-SIVI 100/33	(0.265)	(0.314)	(0.118)	(0.214)	(0.022)	(0.028)	(0.022)	(0.028)	(0.085)	(0.095)	(0.026)	(0.054)	(0.017)
ME CM105	6.73	7.98	3.0	5.44	0.56	0.71	0.56	0.71	2.16	2.41	0.66	1.37	0.43
MF-SM125	(0.265)	(0.314)	(0.118)	(0.214)	(0.022)	(0.028)	(0.022)	(0.028)	(0.085)	(0.095)	(0.026)	(0.054)	(0.017)
ME CM150	8.00	9.50	3.0	6.71	0.56	0.71	0.56	0.71	3.68	3.94	0.66	1.37	0.43
MF-SM150	(0.315)	(0.374)	(0.118)	(0.264)	(0.022)	(0.028)	(0.022)	(0.028)	(0.145)	(0.155)	(0.026)	(0.054)	(0.017)
MF-SM150/33	8.00	9.50	3.0	6.71	0.56	0.71	0.56	0.71	3.68	3.94	0.66	1.37	0.43
IVIF-5IVI 150/33	(0.315)	(0.374)	(0.118)	(0.264)	(0.022)	(0.028)	(0.022)	(0.028)	(0.145)	(0.155)	(0.026)	(0.054)	(0.017)
MF-SM185/33	8.00	9.50	3.0	6.71	0.56	0.71	0.56	0.71	3.68	3.94	0.66	1.37	0.43
IVIF-5IVI 105/33	(0.315)	(0.374)	(0.118)	(0.264)	(0.022)	(0.028)	(0.022)	(0.028)	(0.145)	(0.155)	(0.026)	(0.054)	(0.017)
MF-SM200	8.00	9.50	_3.0_	6.71	0.56	0.71	0.56	0.71	3.68	3.94	0.66	1.37	0.43
IVIF-5IVI200	(0.315)	(0.374)	(0.118)	(0.264)	(0.022)	(0.028)	(0.022)	(0.028)	(0.145)	(0.155)	(0.026)	(0.054)	(0.017)
ME CMOSO	8.00	9.50	3.0	6.71	0.56	0.71	0.56	0.71	3.68	3.94	0.66	1.37	0.43
MF-SM250	(0.315)	(0.374)	(0.118)	(0.264)	(0.022)	(0.028)	(0.022)	(0.028)	(0.145)	(0.155)	(0.026)	(0.054)	(0.017)
MF-SM260	6.73	7.98	3.0	5.44	0.56	0.71	0.56	0.71	2.16	2.41	0.66	1.37	0.43
IVIE-SIVIZOO	(0.265)	(0.314)	(0.118)	(0.214)	(0.022)	(0.028)	(0.022)	(0.028)	(0.085)	(0.095)	(0.026)	(0.054)	(0.017)
MF-SM300	6.73	7.98	3.0	5.44	0.56	0.71	0.56	0.71	2.16	2.41	0.66	1.37	0.43
INIL-2INI200	(0.265)	(0.314)	(0.118)	(0.214)	(0.022)	(0.028)	(0.022)	(0.028)	(0.085)	(0.095)	(0.026)	(0.054)	(0.017)

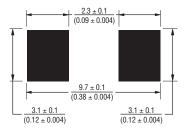
Packaging:

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.

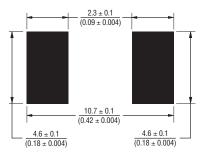




Recommended Pad Layout MF-SM030, 050, 075, 075/60, 100, 100/33, 125, 260, 300

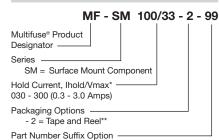


Recommended Pad Layout MF-SM150, 150/33, 185/33, 200, 250



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

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.

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

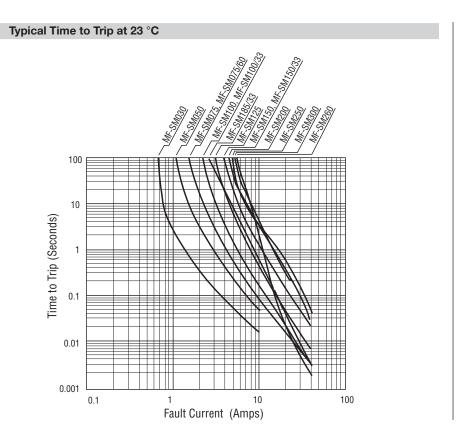
MF-SM150/33-2-99 ..Tape and reel packaging with part number suffix option

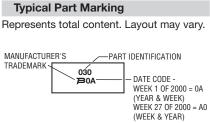
 $^*\mbox{Vmax}$ entry applies only to models MF-SM075/60, MF-SM100/33, MF-SM150/33 & MF-SM185/33.

**Packaged per EIA-481-2

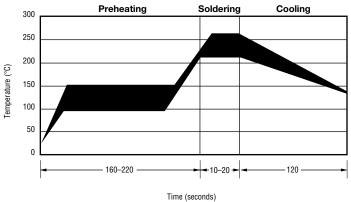
MF-SM Series - PTC Resettable Fuses

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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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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	$\frac{16.0 \pm 0.3}{(0.630 \pm 0.012)}$	$\frac{16.0 \pm 0.3}{(0.630 \pm 0.012)}$					
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	8.1 ± 0.1 (0.319 ± 0.004)	$\frac{9.6 \pm 0.1}{(0.378 \pm 0.004)}$					
B ₁ max.	12.1 (0.476)	12.1 (0.476)					
$\overline{D_0}$	1.5 + 0.1/-0.0 (0.059 + 0.004/-0)	1.5 + 0.1/-0.0 (0.059 + 0.004/-0)					
F	$ \frac{7.5 \pm 0.1}{(0.295 + 0.004)} $	$\frac{7.5 \pm 0.1}{(0.295 + 0.004)}$					
E ₁	1.75 ± 0.1 (0.069 ± 0.004)	$\frac{1.75 \pm 0.1}{(0.069 \pm 0.004)}$					
E ₂ min.	14.25 (0.561)	14.25 (0.561)					
T max.	0.6 (0.024)	0.6 (0.024)					
T ₁ max.	0.1 (0.004)	0.1 (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.	$\frac{160}{(6.30)}$	160 (6.30)					
Reel Dimensions							
A max.	360 (14.17)	360 (14.17)					
N min.	50 (1.97)	50 (1.97)					
$\overline{W_1}$	$\frac{16.4 + 2.0/ - 0.0}{(0.646 + 0.079/-0)}$	$\frac{16.4 + 2.0/ -0.0}{(0.646 + 0.079/-0)}$					
W ₂ max.	$\frac{22.4}{(0.882)}$	22.4 (0.882)					

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

