




**BOURNS®**

## 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

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

\*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.

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

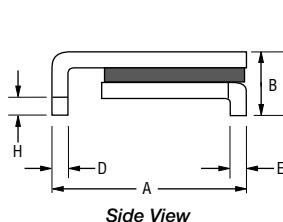
**BOURNS®**

### 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)

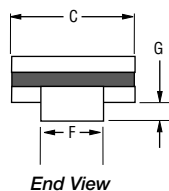
Packaging:

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.

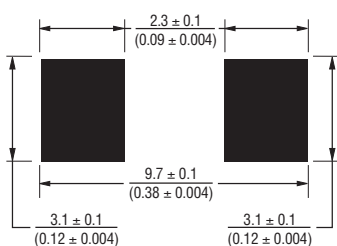


DIMENSIONS: MM  
(INCHES)

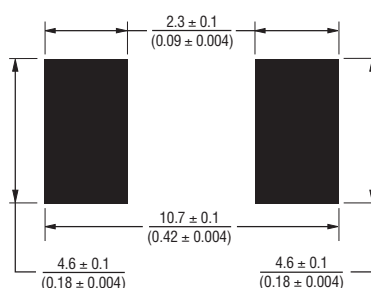
Terminal material:  
Tin-plated brass



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

#### 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-SM030-2 ..... Tape and reel packaging  
MF-SM030-2-99..... Tape and reel packaging with part number suffix option  
MF-SM150-2 ..... Tape and reel packaging  
MF-SM150/33-2-99 .. Tape and reel packaging with part number suffix option

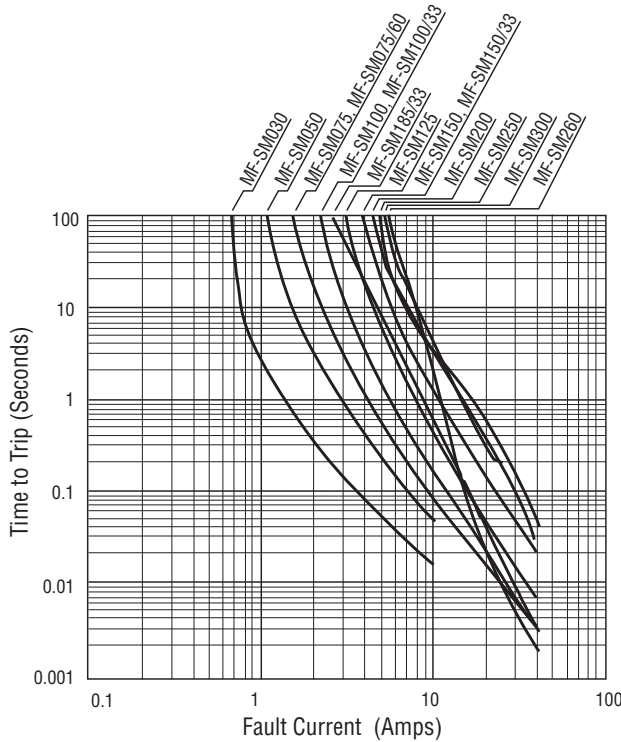
\*  $V_{max}$  entry applies only to models MF-SM075/60, MF-SM100/33, MF-SM150/33 & MF-SM185/33.  
\*\* Packaged per EIA-481-2

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

# MF-SM Series - PTC Resettable Fuses

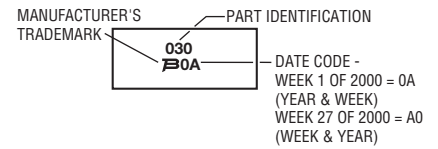


## Typical Time to Trip at 23 °C

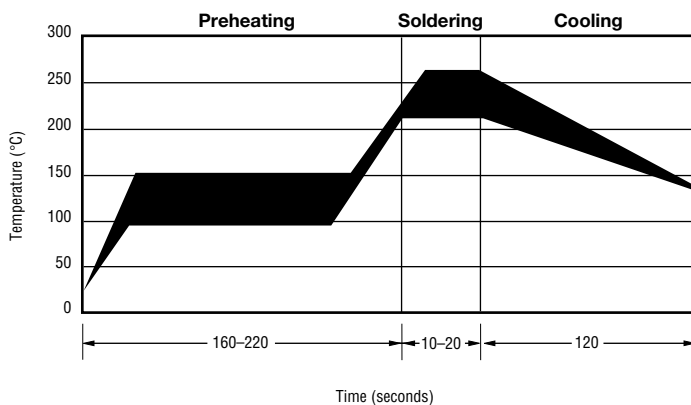


## Typical Part Marking

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 SERIES, REV. P, 11/10

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

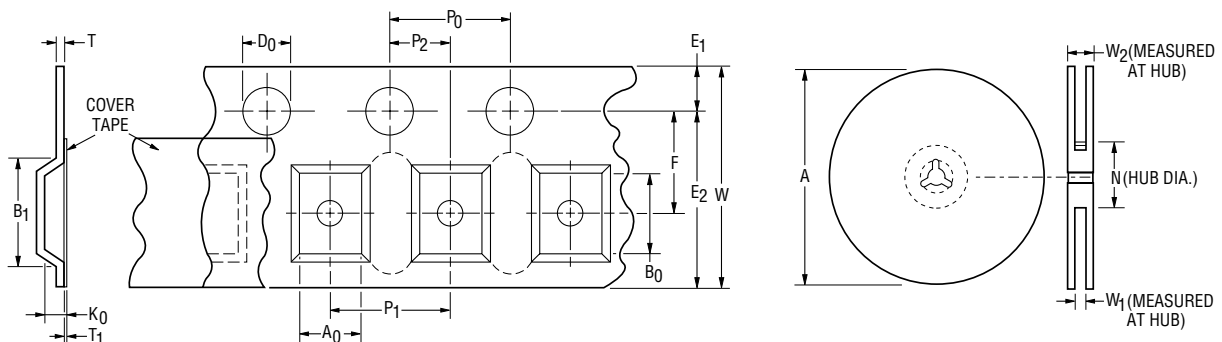


NOTE: Effective December 1, 2010 (product date code V0), the cover tape will be changed to the new 3M™ Universal Cover Tape (UCT).

Tape Dimensions	MF-SM030, 050, 075, 100, 125, 260, 300; MF-SM075/60; MF-SM-100/33	MF-SM150, 200, 250; MF-SM-150/33, MF-SM-185/33; MF-SM013/250 per EIA 481-2
	per EIA-481-2	per EIA 481-2
W	$16.0 \pm 0.3$ (0.630 ± 0.012)	$16.0 \pm 0.3$ (0.630 ± 0.012)
P <sub>0</sub>	$4.0 \pm 0.1$ (0.157 ± 0.004)	$4.0 \pm 0.1$ (0.157 ± 0.004)
P <sub>1</sub>	$8.0 \pm 0.1$ (0.315 ± 0.004)	$12.0 \pm 0.1$ (0.472 ± 0.004)
P <sub>2</sub>	$2.0 \pm 0.1$ (0.079 ± 0.004)	$2.0 \pm 0.1$ (0.079 ± 0.004)
A <sub>0</sub>	$5.7 \pm 0.1$ (0.224 ± 0.004)	$6.9 \pm 0.1$ (0.272 ± 0.004)
B <sub>0</sub>	$8.1 \pm 0.1$ (0.319 ± 0.004)	$9.6 \pm 0.1$ (0.378 ± 0.004)
B <sub>1</sub> max.	$12.1$ (0.476)	$12.1$ (0.476)
D <sub>0</sub>	$1.5 + 0.1/-0.0$ (0.059 + 0.004/-0)	$1.5 + 0.1/-0.0$ (0.059 + 0.004/-0)
F	$7.5 \pm 0.1$ (0.295 ± 0.004)	$7.5 \pm 0.1$ (0.295 ± 0.004)
E <sub>1</sub>	$1.75 \pm 0.1$ (0.069 ± 0.004)	$1.75 \pm 0.1$ (0.069 ± 0.004)
E <sub>2</sub> min.	$14.25$ (0.561)	$14.25$ (0.561)
T max.	$0.6$ (0.024)	$0.6$ (0.024)
T <sub>1</sub> max.	$0.1$ (0.004)	$0.1$ (0.004)
K <sub>0</sub>	$3.4 \pm 0.1$ (0.134 ± 0.004)	$3.4 \pm 0.1^*$ (0.134 ± 0.004)*
Leader min.	$390$ (15.35)	$390$ (15.35)
Trailer min.	$160$ (6.30)	$160$ (6.30)
<b>Reel Dimensions</b>		
A max.	$360$ (14.17)	$360$ (14.17)
N min.	$50$ (1.97)	$50$ (1.97)
W <sub>1</sub>	$16.4 + 2.0/-0.0$ (0.646 + 0.079/-0)	$16.4 + 2.0/-0.0$ (0.646 + 0.079/-0)
W <sub>2</sub> max.	$22.4$ (0.882)	$22.4$ (0.882)

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

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



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Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.