



Features

- 4.5mm SMD
- Fast tripping resettable circuit protection
- Surface mount packaging for automated assembly
- Reduced component size and resistance
- Agency recognition:   

Applications

High Density Circuit Board Applications:

- Hard disk drives
- PC motherboards
- PC peripherals
- Point-of-sale (POS) equipment
- PCMCIA cards

MF-MSMD 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.}			
MF-MSMD010	30.0	10	0.10	0.20	0.70	15.00	0.5	1.5	0.8
MF-MSMD014	60.0	10	0.14	0.34	0.70	6.00	1.5	0.15	0.8
MF-MSMD020	30.0	10	0.20	0.40	0.40	5.00	6.0	0.06	0.8
MF-MSMD050	15.0	40	0.50	1.00	0.15	1.00	8.0	0.15	0.8
MF-MSMD075	13.2	40	0.75	1.50	0.11	0.45	8.0	0.20	0.8
MF-MSMD110	6.0	40	1.10	2.20	0.04	0.21	8.0	0.30	0.8
MF-MSMD125	6.0	40	1.25	2.50	0.035	0.14	8.0	0.4	0.8
MF-MSMD150	6.0	40	1.50	3.00	0.03	0.110	8.0	0.5	0.8
MF-MSMD160	10.0	40	1.60	2.80	0.066	0.099	8.0	2.0	0.5
MF-MSMD200	6.0	40	2.0	4.0	0.022	0.060	8.0	3.0	1.5
MF-MSMD260	6.0	40	2.60	5.2	0.015	0.043	8.0	10.0	1.5

Environmental Characteristics

Operating/Storage Temperature-40°C to +85°C
Maximum Device Surface Temperature
in Tripped State125°C
Passive Aging+85°C, 1000 hours±5% typical resistance change
Humidity Aging+85°C, 85% R.H. 1000 hours±5% typical resistance change
Thermal Shock+85°C to -40°C, 20 times±10% typical resistance change
Solvent ResistanceMIL-STD-202, Method 215No change
VibrationMIL-STD-883C, Method 2007.1,No change
Condition A
Stocking RecommendationsSix months with prepackaged desiccant

Test Procedures And Requirements For Model MF-MSMD 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 _{max}
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
UL File Number	E 174545S	
CSA File Number	CA 110338	
TÜV File Number	R2057213	

Additional Features

- Patents pending

MF-MSMD Series - PTC Resettable Fuses

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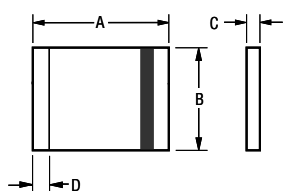
Product Dimensions

Model	A		B		C		D
	Min.	Max.	Min.	Max.	Min.	Max.	Min.
MF-MSMD010	$\frac{4.37}{(0.172)}$	$\frac{4.73}{(0.186)}$	$\frac{3.07}{(0.121)}$	$\frac{3.41}{(0.134)}$	$\frac{0.56}{(0.022)}$	$\frac{0.81}{(0.032)}$	$\frac{0.30}{(0.012)}$
MF-MSMD014	$\frac{4.37}{(0.172)}$	$\frac{4.73}{(0.186)}$	$\frac{3.07}{(0.121)}$	$\frac{3.41}{(0.134)}$	$\frac{0.56}{(0.022)}$	$\frac{0.81}{(0.032)}$	$\frac{0.30}{(0.012)}$
MF-MSMD020	$\frac{4.37}{(0.172)}$	$\frac{4.73}{(0.186)}$	$\frac{3.07}{(0.121)}$	$\frac{3.41}{(0.134)}$	$\frac{0.56}{(0.022)}$	$\frac{0.81}{(0.032)}$	$\frac{0.30}{(0.012)}$
MF-MSMD050	$\frac{4.37}{(0.172)}$	$\frac{4.73}{(0.186)}$	$\frac{3.07}{(0.121)}$	$\frac{3.41}{(0.134)}$	$\frac{0.38}{(0.015)}$	$\frac{0.62}{(0.024)}$	$\frac{0.30}{(0.012)}$
MF-MSMD075	$\frac{4.37}{(0.172)}$	$\frac{4.73}{(0.186)}$	$\frac{3.07}{(0.121)}$	$\frac{3.41}{(0.134)}$	$\frac{0.38}{(0.015)}$	$\frac{0.62}{(0.024)}$	$\frac{0.30}{(0.012)}$
MF-MSMD110	$\frac{4.37}{(0.172)}$	$\frac{4.73}{(0.186)}$	$\frac{3.07}{(0.121)}$	$\frac{3.41}{(0.134)}$	$\frac{0.38}{(0.015)}$	$\frac{0.62}{(0.024)}$	$\frac{0.30}{(0.012)}$
MF-MSMD125	$\frac{4.37}{(0.172)}$	$\frac{4.73}{(0.186)}$	$\frac{3.07}{(0.121)}$	$\frac{3.41}{(0.134)}$	$\frac{0.28}{(0.011)}$	$\frac{0.48}{(0.019)}$	$\frac{0.25}{(0.010)}$
MF-MSMD150	$\frac{4.37}{(0.172)}$	$\frac{4.73}{(0.186)}$	$\frac{3.07}{(0.121)}$	$\frac{3.41}{(0.134)}$	$\frac{0.28}{(0.011)}$	$\frac{0.48}{(0.019)}$	$\frac{0.25}{(0.010)}$
MF-MSMD160	$\frac{4.37}{(0.172)}$	$\frac{4.73}{(0.186)}$	$\frac{2.80}{(0.110)}$	$\frac{3.41}{(0.134)}$	$\frac{0.38}{(0.015)}$	$\frac{0.62}{(0.024)}$	$\frac{0.30}{(0.012)}$
MF-MSMD200	$\frac{4.60}{(0.181)}$	$\frac{4.75}{(0.187)}$	$\frac{3.20}{(0.126)}$	$\frac{3.60}{(0.142)}$	$\frac{1.50}{(0.059)}$	$\frac{2.00}{(0.079)}$	$\frac{1.4}{(0.055)}$
MF-MSMD260	$\frac{4.60}{(0.181)}$	$\frac{4.75}{(0.187)}$	$\frac{3.20}{(0.126)}$	$\frac{3.60}{(0.142)}$	$\frac{1.50}{(0.059)}$	$\frac{2.00}{(0.079)}$	$\frac{1.4}{(0.055)}$

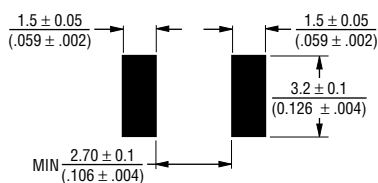
Packaging: 1500 pcs. per reel.

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

Top and Bottom View Side View

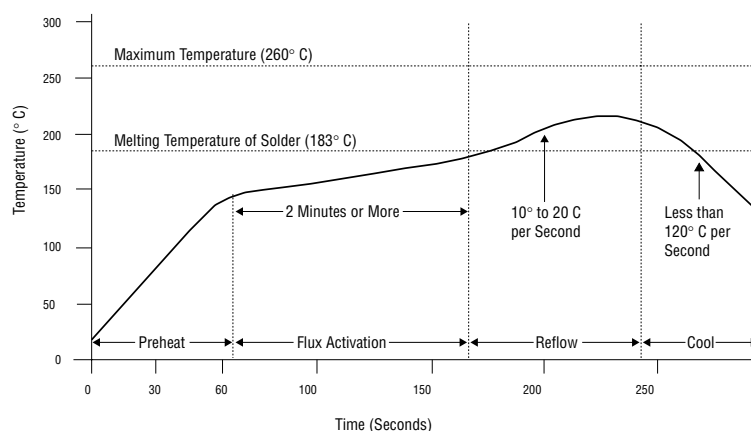


Recommended Pad Layout



Terminal material: solder-plated copper
Termination pad solderability: Meets EIA
Specification RS-186-9E, ANSI/J-STD-002
Category 3.

Solder Reflow Recommendations



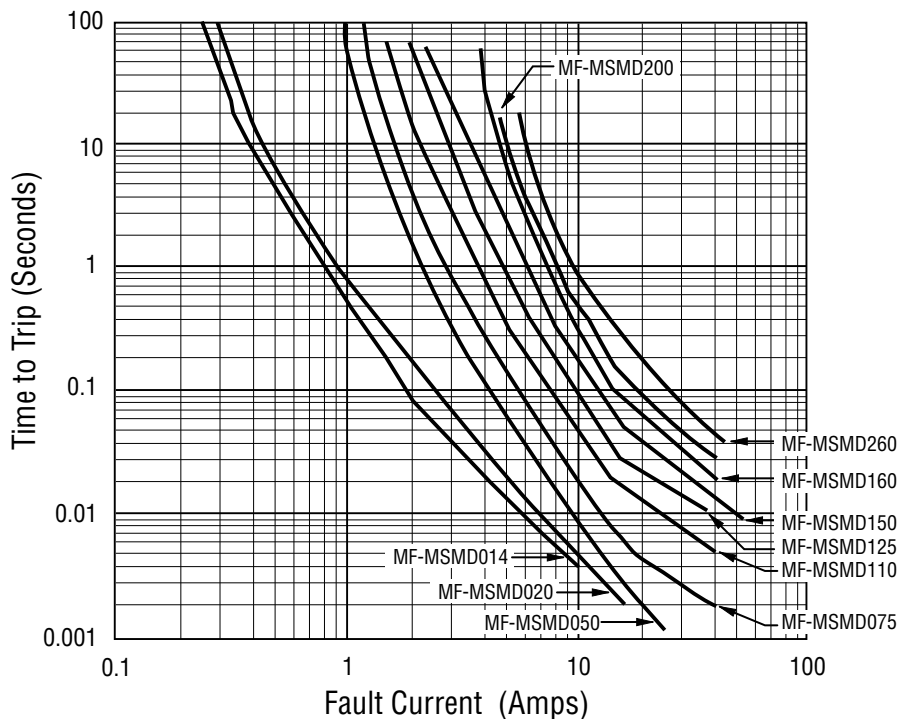
Note:

- MF-MSMD models can be wave soldered and reworked.
- If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

MF-MSMD Series - PTC Resettable Fuses

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Typical Time to Trip at 23°C



How to Order

MF - MSMD 020 - 2

Multifuse® Product Designator _____

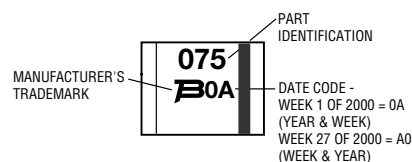
Series _____
MSMD = 4.5mm Surface Mount Component

Hold Current, I_{hold} _____
010-260 (0.10 Amps - 2.60 Amps)

Packaging _____
Packaged per EIA 481-1
-2 = Tape and Reel

Typical Part Marking

Represents total content. Layout may vary.



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

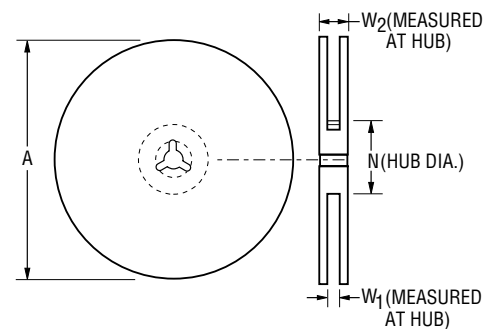
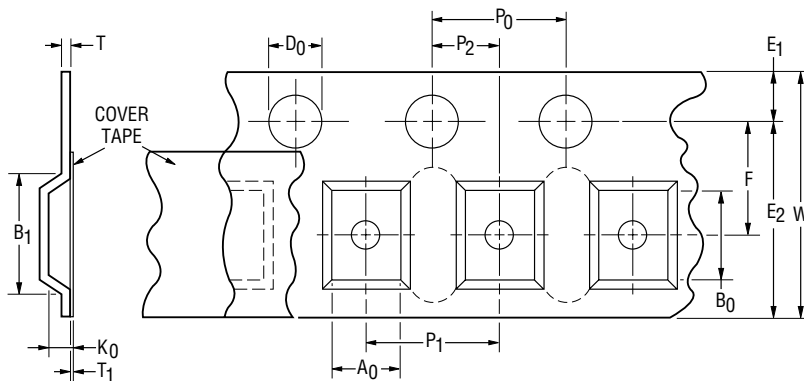
Model	Ambient Operating Temperature								
	-40°C	-20°C	0°C	23°C	40°C	50°C	60°C	70°C	85°C
MF-MSMD010	0.16 /	0.14 /	0.12 /	0.11 /	0.08 /	0.07 /	0.06 /	0.05 /	0.03 /
MF-MSMD014	0.23 / 0.52	0.19 / 0.45	0.17 / 0.40	0.14 / 0.34	0.12 / 0.29	0.10 / 0.25	0.09 / 0.23	0.08 / 0.21	0.06 / 0.16
MF-MSMD020	0.29 / 0.58	0.26 / 0.52	0.23 / 0.46	0.20 / 0.40	0.17 / 0.34	0.15 / 0.30	0.14 / 0.28	0.12 / 0.24	0.10 / 0.20
MF-MSMD050	0.77 / 1.54	0.68 / 1.36	0.59 / 1.18	0.50 / 1.00	0.44 / 0.88	0.40 / 0.80	0.37 / 0.74	0.33 / 0.66	0.29 / 0.58
MF-MSMD075	1.15 / 2.30	1.01 / 2.02	0.88 / 1.76	0.75 / 1.50	0.65 / 1.30	0.60 / 1.20	0.55 / 1.10	0.49 / 0.98	0.43 / 0.86
MF-MSMD110	1.59 / 3.18	1.43 / 2.86	1.26 / 2.52	1.10 / 2.20	0.95 / 1.90	0.87 / 1.74	0.80 / 1.60	0.71 / 1.42	0.60 / 1.20
MF-MSMD125	1.80 / 3.61	1.63 / 3.25	1.43 / 2.86	1.25 / 2.50	1.08 / 2.16	0.99 / 1.98	0.91 / 1.82	0.81 / 1.62	0.68 / 1.36
MF-MSMD150	2.17 / 4.34	1.95 / 3.90	1.72 / 3.44	1.50 / 3.00	1.30 / 2.59	1.18 / 2.37	1.09 / 2.18	0.97 / 1.94	0.82 / 1.64
MF-MSMD160	2.30 / 5.00	2.20 / 4.40	1.90 / 3.80	1.60 / 2.80	1.45 / 2.90	1.30 / 2.60	1.15 / 2.30	1.03 / 2.06	0.91 / 1.82
MF-MSMD200	3.08 / 6.14	2.71 / 5.39	2.35 / 4.62	2.00 / 4.01	1.80 / 1.61	1.60 / 3.19	1.50 / 2.98	1.07 / 2.12	0.80 / 1.58
MF-MSMD260	4.00 / 7.98	3.52 / 7.01	3.06 / 6.09	2.60 / 5.15	2.34 / 4.64	2.08 / 4.13	1.95 / 3.87	1.39 / 2.74	1.04 / 2.05

MF-MSMD, MF-USMD & MF-ESMD Series Tape and Reel Specs

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Tape Dimension Identifiers	MF-MSMD Series per EIA-481-1	MF-USMD Series per EIA 481-1	MF-ESMD Series per EIA 481-1
W	$\frac{12 \pm 0.3}{(.472 \pm .012)}$	$\frac{8 \pm 0.3}{(.040 \pm .012)}$	$\frac{8 \pm 0.3}{(.040 \pm .012)}$
P ₀	$\frac{4.0 \pm 0.10}{(.157 \pm .004)}$	$\frac{4.0 \pm 0.10}{(.157 \pm .004)}$	$\frac{4.0 \pm 0.10}{(.157 \pm .004)}$
P ₁	$\frac{8.0 \pm 0.10}{(.315 \pm .004)}$	$\frac{4.0 \pm 0.10}{(.157 \pm .004)}$	$\frac{4.0 \pm 0.10}{(.157 \pm .004)}$
P ₂	$\frac{2.0 \pm 0.05}{(.079 \pm .039)}$	$\frac{2.0 \pm 0.05}{(.079 \pm .039)}$	$\frac{2.0 \pm 0.05}{(.079 \pm .039)}$
A ₀	$\frac{3.5 \pm 0.23}{(.134 \pm .009)}$	$\frac{2.8 \pm 0.1}{(.110 \pm .004)}$	$\frac{2.8 \pm 0.1}{(.110 \pm .004)}$
B ₀	$\frac{5.1 \pm 0.15}{(.201 \pm .006)}$	$\frac{3.5 \pm 0.1}{(.138 \pm .004)}$	$\frac{3.5 \pm 0.1}{(.138 \pm .004)}$
B ₁ max.	$\frac{5.9}{(.232)}$	$\frac{4.35}{(.171)}$	$\frac{4.35}{(.171)}$
D ₀	$\frac{1.5 \pm 0.1/-0}{(.059 \pm .004/-0)}$	$\frac{1.5 \pm 0.1/-0}{(.059 \pm .004/-0)}$	$\frac{1.5 \pm 0.1/-0}{(.059 \pm .004/-0)}$
F	$\frac{5.5 \pm 0.05}{(2.165 \pm .002)}$	$\frac{3.5 \pm 0.05}{(.138 \pm .002)}$	$\frac{3.5 \pm 0.05}{(.138 \pm .002)}$
E ₁	$\frac{1.75 \pm 0.10}{(.069 \pm .004)}$	$\frac{1.75 \pm 0.10}{(.069 \pm .004)}$	$\frac{1.75 \pm 0.10}{(.069 \pm .004)}$
E ₂ min.	$\frac{10.25}{(.404)}$	$\frac{6.25}{(.246)}$	$\frac{6.25}{(.246)}$
T max.	$\frac{0.6}{(.024)}$	$\frac{0.6}{(.024)}$	$\frac{0.6}{(.024)}$
T ₁ max.	$\frac{0.1}{(.004)}$	$\frac{0.1}{(.004)}$	$\frac{0.1}{(.004)}$
K ₀	$\frac{0.9 \pm 0.15}{(.035 \pm .006)}$	$\frac{1.1 \pm 0.05}{(.043 \pm .002)}$	$\frac{0.8 \pm 0.1}{(.031 \pm .004)}$
Leader min.	$\frac{390}{(15.35)}$	$\frac{390}{(15.35)}$	$\frac{390}{(15.35)}$
Trailer min.	$\frac{160}{(6.30)}$	$\frac{160}{(6.30)}$	$\frac{160}{(6.30)}$
Reel Dimension Identifiers			
A max.	$\frac{185}{(7.283)}$	$\frac{185}{(7.283)}$	$\frac{185}{(7.283)}$
N min.	$\frac{50}{(1.97)}$	$\frac{50}{(1.97)}$	$\frac{50}{(1.97)}$
W ₁	$\frac{12.4 \pm 2.0/-0}{(.488 \pm .075/-0)}$	$\frac{8.4 \pm 1.5/-0}{(.331 \pm .059/-0)}$	$\frac{8.4 \pm 1.5/-0}{(.331 \pm .059/-0)}$
W ₂ max.	$\frac{18.4}{(.724)}$	$\frac{14.4}{(.567)}$	$\frac{14.4}{(.567)}$

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



Specifications are subject to change without notice.