




**THE DATASHEET OF
MF-USMD035-2**





BOURNS®

Features

- Very small size 1210 footprint - 44 % smaller design than MF-MSMD Series
- Fast tripping resettable circuit protection
- Surface mount packaging for automated assembly
- Agency recognition:   

Applications

- PC motherboards
- PC modems
- USB
- Analog and digital line cards
- IEEE 1394
- General electronics: Phones, fax machines, televisions, printers, video equipment

MF-USMD 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.}			Typ.
MF-USMD005	30.0	10	0.05	0.15	2.80	50.0	0.25	1.5	0.8
MF-USMD010	30.0	10	0.10	0.30	0.80	15.0	0.5	0.6	0.8
MF-USMD020	30.0	10	0.20	0.40	0.40	5.00	8.0	0.02	0.8
MF-USMD035	6.0	40	0.35	0.75	0.20	1.30	8.0	0.2	1.0
MF-USMD050	13.2	40	0.50	1.00	0.18	0.90	8.0	0.1	1.0
MF-USMD075	6.0	40	0.75	1.50	0.07	0.450	8.0	0.1	1.2
MF-USMD110	6.0	40	1.10	2.20	0.05	0.210	5.0	1.0	1.2

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±10 % 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

Test Procedures And Requirements For Model MF-USMD 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 NumberE174545
<http://www.ul.com/> Follow link to Certifications, then UL File No., enter E174545
 CSA File NumberCA110338
<http://directories.csa-international.org/> Under "Certification Record" and "File Number" enter 110338-0-000
 TÜV Certificate NumberR 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-USMD005	0.08	0.07	0.06	0.05	0.04	0.04	0.03	0.03	0.02
MF-USMD010	0.16	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.04
MF-USMD020	0.32	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.06
MF-USMD035	0.47	0.45	0.40	0.35	0.33	0.28	0.24	0.21	0.18
MF-USMD050	0.76	0.67	0.58	0.50	0.43	0.40	0.36	0.32	0.28
MF-USMD075	1.00	0.97	0.86	0.75	0.64	0.59	0.54	0.48	0.40
MF-USMD110	1.60	1.42	1.26	1.10	0.94	0.86	0.80	0.70	0.58

Specifications are subject to change without notice.

Additional Features

- Patents pending

MF-USMD Series - PTC Resettable Fuses

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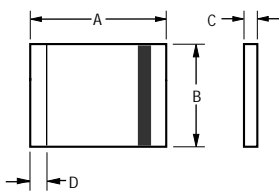
Product Dimensions

Model	A		B		C		D
	Min.	Max.	Min.	Max.	Min.	Max.	Min.
MF-USMD005	$\frac{3.00}{(0.118)}$	$\frac{3.43}{(0.135)}$	$\frac{2.35}{(0.093)}$	$\frac{2.80}{(0.110)}$	$\frac{0.50}{(0.020)}$	$\frac{0.85}{(0.033)}$	$\frac{0.30}{(0.012)}$
MF-USMD010	$\frac{3.00}{(0.118)}$	$\frac{3.43}{(0.135)}$	$\frac{2.35}{(0.093)}$	$\frac{2.80}{(0.110)}$	$\frac{0.50}{(0.020)}$	$\frac{0.85}{(0.033)}$	$\frac{0.30}{(0.012)}$
MF-USMD020	$\frac{3.00}{(0.118)}$	$\frac{3.43}{(0.135)}$	$\frac{2.35}{(0.093)}$	$\frac{2.80}{(0.110)}$	$\frac{0.50}{(0.020)}$	$\frac{0.85}{(0.033)}$	$\frac{0.30}{(0.012)}$
MF-USMD035	$\frac{3.00}{(0.118)}$	$\frac{3.43}{(0.135)}$	$\frac{2.35}{(0.093)}$	$\frac{2.80}{(0.110)}$	$\frac{0.38}{(0.015)}$	$\frac{0.62}{(0.025)}$	$\frac{0.30}{(0.012)}$
MF-USMD050	$\frac{3.00}{(0.118)}$	$\frac{3.43}{(0.135)}$	$\frac{2.35}{(0.093)}$	$\frac{2.80}{(0.110)}$	$\frac{0.38}{(0.015)}$	$\frac{0.62}{(0.024)}$	$\frac{0.30}{(0.012)}$
MF-USMD075	$\frac{3.00}{(0.118)}$	$\frac{3.43}{(0.135)}$	$\frac{2.35}{(0.093)}$	$\frac{2.80}{(0.110)}$	$\frac{0.38}{(0.015)}$	$\frac{0.62}{(0.025)}$	$\frac{0.30}{(0.012)}$
MF-USMD110	$\frac{3.00}{(0.118)}$	$\frac{3.43}{(0.135)}$	$\frac{2.35}{(0.093)}$	$\frac{2.80}{(0.110)}$	$\frac{0.30}{(0.012)}$	$\frac{0.48}{(0.019)}$	$\frac{0.30}{(0.012)}$

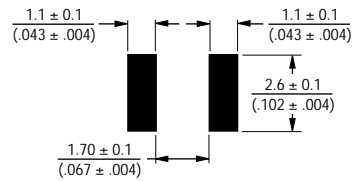
Packaging: 3000 pcs. per reel.

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

Top and Bottom View Side View



Recommended Pad Layout

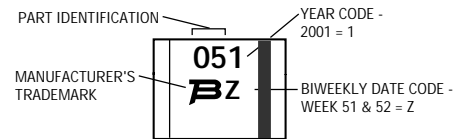


Terminal material: solder-plated copper

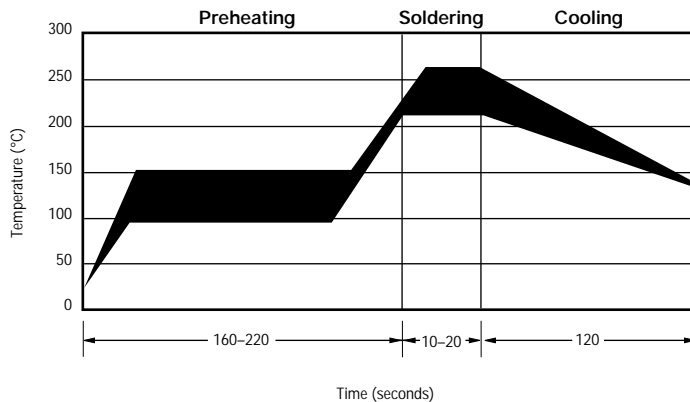
Termination pad solderability: Meets EIA Specification RS-186-9E, ANSI/J-STD-002 Category 3.

Typical Part Marking

Represents total content. Layout may vary.



Solder Reflow Recommendations



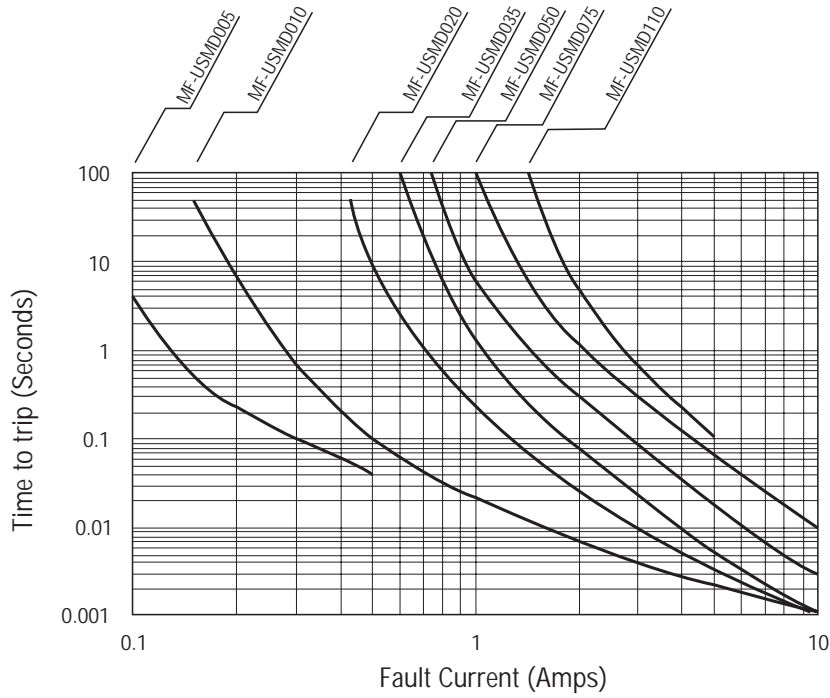
Note:

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

MF-USMD Series - PTC Resettable Fuses



Typical Time to Trip at 23 °C

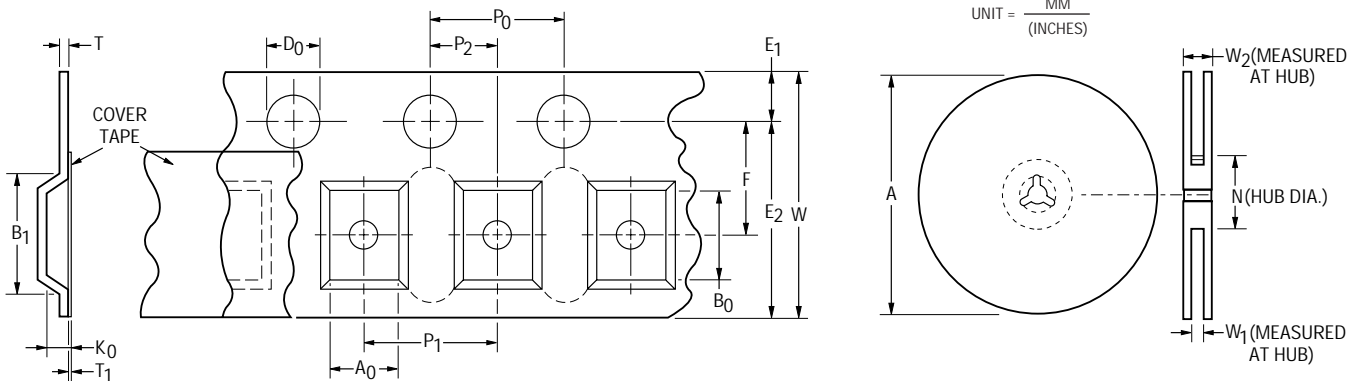


How to Order

MF - USMD 005 - 2
 Multifuse® Product
 Designator _____
 Series _____
 USMD = 1210 Surface Mount Component
 Hold Current, I_{hold} _____
 005-110 (0.05 Amps - 1.10 Amps)
 Packaging _____
 Packaged per EIA 481-1
 -2 = Tape and Reel

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



Tape Dimensions	MF-MSMD Series per EIA-481-1	MF-USMD Series per EIA 481-1	MF-ESMD Series per EIA 481-2
W	$\frac{12.0 \pm 0.30}{(0.472 \pm 0.012)}$	$\frac{8.0 \pm 0.30}{(0.315 \pm 0.012)}$	$\frac{24.0 \pm 0.3}{(0.945 \pm 0.012)}$
P ₀	$\frac{4.0 \pm 0.10}{(0.157 \pm 0.004)}$	$\frac{4.0 \pm 0.10}{(0.157 \pm 0.004)}$	$\frac{4.0 \pm 0.1}{(0.157 \pm 0.004)}$
P ₁	$\frac{8.0 \pm 0.10}{(0.315 \pm 0.004)}$	$\frac{4.0 \pm 0.10}{(0.157 \pm 0.004)}$	$\frac{8.0 \pm 0.1}{(0.315 \pm 0.004)}$
P ₂	$\frac{2.0 \pm 0.05}{(0.079 \pm 0.002)}$	$\frac{2.0 \pm 0.05}{(0.079 \pm 0.002)}$	$\frac{2.0 \pm 0.1}{(0.079 \pm 0.004)}$
A ₀	$\frac{3.66 \pm 0.15}{(0.144 \pm 0.006)}$	MF-USMD005,010,020: $\frac{2.76 \pm 0.10}{(0.109 \pm 0.004)}$	MF-USMD035,050,075,110: $\frac{2.93 \pm 0.15}{(0.115 \pm 0.006)}$
B ₀	$\frac{4.98 \pm 0.10}{(0.196 \pm 0.004)}$	MF-USMD005,010,020: $\frac{3.5 \pm 0.1}{(0.138 \pm 0.004)}$	MF-USMD035,050,075,110: $\frac{3.56 \pm 0.1}{(0.140 \pm 0.004)}$
B ₁ max.	$\frac{5.9}{(0.232)}$	$\frac{4.35}{(0.171)}$	$\frac{20.1}{(0.791)}$
D ₀	$\frac{1.5 + 0.10/-0.00}{(0.059 + 0.004/-0)}$	$\frac{1.50 + 0.1/-0.0}{(0.059 + 0.004/-0)}$	$\frac{1.5 + 0.1/-0.0}{(0.059 + 0.004/-0)}$
F	$\frac{5.5 \pm 0.05}{(0.217 \pm 0.002)}$	$\frac{3.5 \pm 0.05}{(0.138 \pm 0.002)}$	$\frac{11.5 \pm 0.10}{(0.453 \pm 0.004)}$
E ₁	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$
E ₂ min.	$\frac{10.25}{(0.404)}$	$\frac{6.25}{(0.246)}$	$\frac{22.25}{(0.876)}$
T max.	$\frac{0.6}{(0.024)}$	$\frac{0.6}{(0.024)}$	$\frac{0.6}{(0.024)}$
T ₁ max.	$\frac{0.1}{(0.004)}$	$\frac{0.1}{(0.004)}$	$\frac{0.1}{(0.004)}$
K ₀	$\frac{0.95 \pm 0.10}{(0.037 \pm 0.004)}$	MF-USMD005,010,020: $\frac{1.07 \pm 0.10}{(0.042 \pm 0.004)}$	MF-USMD035,050,075,110: $\frac{0.75 \pm 0.10}{(0.030 \pm 0.004)}$
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 Dimensions			
A max.	$\frac{185}{(7.28)}$	$\frac{185}{(7.28)}$	$\frac{360}{(14.17)}$
N min.	$\frac{50}{(1.97)}$	$\frac{50}{(1.97)}$	$\frac{60}{(2.36)}$
W ₁	$\frac{12.4 + 2.0/-0.0}{(0.488 + 0.079/-0.0)}$	$\frac{8.4 + 1.5/-0.0}{(0.331 + 0.059/-0)}$	$\frac{24.4 + 2.0/-0.0}{(0.961 + 0.079/-0)}$
W ₂ max.	$\frac{18.4}{(0.724)}$	$\frac{14.4}{(0.567)}$	$\frac{30.4}{(1.20)}$



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