





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 State | 125 °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 Resistance | MIL-STD-202, Method 215 No change |
| Vibration | MIL-STD-883C, Method 2007.1, Condition A No change |

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 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_{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 |

Additional Features

- Patents pending

MF-USMD Series - PTC Resettable Fuses

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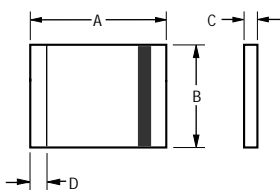
Product Dimensions

| 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 | $\frac{3.00}{(0.118)}$ | $\frac{3.43}{(0.135)}$ | $\frac{2.35}{(0.093)}$ | $\frac{2.80}{(0.110)}$ | $\frac{0.30}{(0.012)}$ | $\frac{0.48}{(0.019)}$ | $\frac{0.30}{(0.012)}$ |

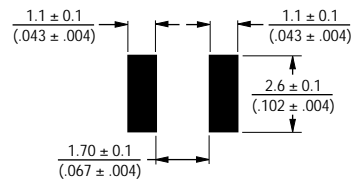
Packaging: 3000 pcs. per reel.

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

Top and Bottom View Side View



Recommended Pad Layout

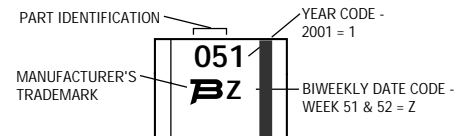


Terminal material: solder-plated copper

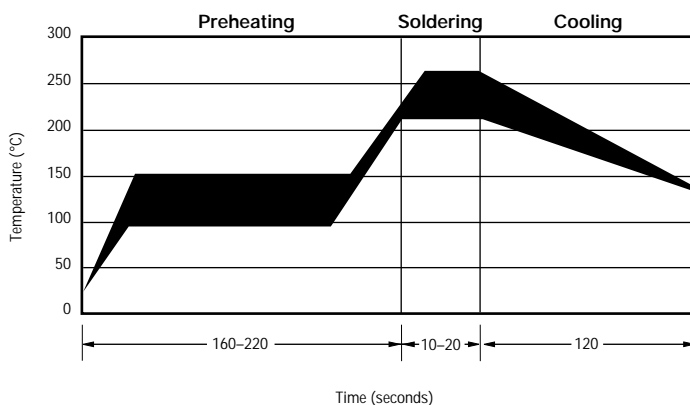
Termination pad solderability: Meets EIA Specification RS-186-9E, ANSI/J-STD-002 Category 3.

Typical Part Marking

Represents total content. Layout may vary.



Solder Reflow Recommendations



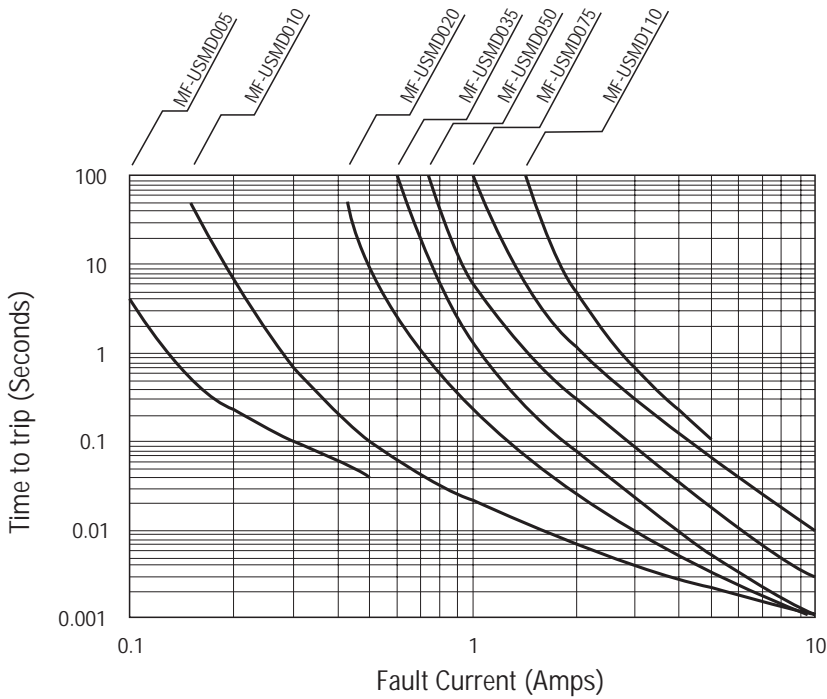
Note:

- 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

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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. | $\frac{18.4}{(0.724)}$ | $\frac{14.4}{(0.567)}$ | $\frac{30.4}{(1.20)}$ |

