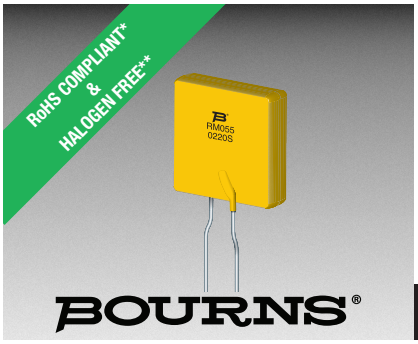



## Features

- Radial leaded devices
- Cured, flame retardant epoxy polymer insulating material meets UL 94V-0 requirements
- Bulk packaging, tape and reel available
- Resettable circuit protection
- Agency recognition: c UL us, TÜV
- RoHS compliant* and halogen free**

## Applications

- Food blenders, coffee machines
- HVAC
- Electric fans, blowers
- AC adaptors

# MF-RM Series - Line Voltage PTC Resettable Fuses

## Electrical Characteristics

| Model | Maximum Voltage | | Max. Current | $I_{hold}$ | $I_{trip}$ | Initial Resistance | 1 Hour Post-Trip Resistance $R_{1max}$ | Max. Time To Trip | | Tripped Power Dissipation | Agency Recognition | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Oper. | Inter. | $I_{max}$ | at 23 °C | | Min. at 23 °C | Max. at 23 °C | at 23 °C | | Typ. at 23 °C | cUL | TÜV |
| | VAC | VAC | Amps | Amps | | Ohms | Ohms | Amps | Seconds | Watts | E174545 | 50232433 |
| MF-RM005/240 | 240 | 265 | 1.0 | 0.05 | 0.12 | 18.5 | 65.0 | 0.25 | 10.0 | 0.9 | ✓ | ✓ |
| MF-RM008/240 | 240 | 265 | 1.2 | 0.08 | 0.19 | 7.4 | 26.0 | 0.40 | 10.0 | 0.9 | ✓ | ✓ |
| MF-RM012/240 | 240 | 265 | 1.2 | 0.12 | 0.30 | 3.0 | 12.0 | 0.60 | 15.0 | 1.0 | ✓ | ✓ |
| MF-RM016/240 | 240 | 265 | 2.0 | 0.16 | 0.37 | 2.5 | 7.80 | 0.80 | 15.0 | 1.4 | ✓ | ✓ |
| MF-RM025/240 | 240 | 265 | 3.5 | 0.25 | 0.56 | 1.3 | 3.80 | 1.25 | 18.5 | 1.5 | ✓ | ✓ |
| MF-RM033/240 | 240 | 265 | 4.5 | 0.33 | 0.74 | 0.77 | 2.60 | 1.65 | 21.0 | 1.7 | ✓ | ✓ |
| MF-RM040/240 | 240 | 265 | 5.5 | 0.40 | 0.90 | 0.60 | 1.90 | 2.00 | 24.0 | 2.0 | ✓ | ✓ |
| MF-RM055/240 | 240 | 265 | 7.0 | 0.55 | 1.25 | 0.45 | 1.45 | 2.75 | 26.0 | 3.4 | ✓ | ✓ |

## Environmental Characteristics

| Item | Condition | Criteria |
|---|---|---|
| Operating Temperature | -20 °C to +85 °C | |
| Recommended Storage | +40 °C max. / 70 % R.H. max. | |
| Passive Aging | +85 °C, 1000 hours | ±20 % typical resistance change |
| Humidity Aging | +85 °C, 85 % R.H. 1000 hours | ±20 % typical resistance change |
| Thermal Shock | -40 °C to +85 °C, 10 times | ±15 % typical resistance change |
| Solvent Resistance | MIL-STD-202, Method 215 | No change (marking still legible) |
| Vibration | MIL-STD-883C, Method 2007.1 Condition A | No change ($R_{min} \le R \le R_{1max}$) |
| Moisture Sensitivity Level (MSL) | See Note | |
| ESD Classification | Class 6 (per AEC-Q200-2, HBM) | |

## Additional Information

Click these links for more information:

PRODUCT SELECTOR | TECHNICAL LIBRARY | INVENTORY | SAMPLES | CONTACT

**CALIFORNIA WARNING:** Can expose you to lead, a carcinogen and reproductive toxicant.
See www.P65Warnings.ca.gov

* RoHS Directive 2015/863, Mar 31, 2015 and Annex.
** Bourns considers a product to be "halogen free" if (a) the Bromine (Br) content is 900 ppm or less; (b) the Chlorine (Cl) content is 900 ppm or less; and (c) the total Bromine (Br) and Chlorine (Cl) content is 1500 ppm or less.
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## Advantages

- Resettable feature with overtemperature and overcurrent protection can save expensive components from having to be replaced after tripping, e.g., transformers with built in thermal fuses
- Faster than bimetallic switch designs that take on average approximately 30 seconds to cool down and reset
- Generally lower electromagnetic interference than bimetallic switches

## Benefits

- Reduced repair and replacement costs
- Reduced nuisance tripping
- Combined overcurrent and overtemperature protector in one device

# MF-RM Series - Line Voltage PTC Resettable Fuses

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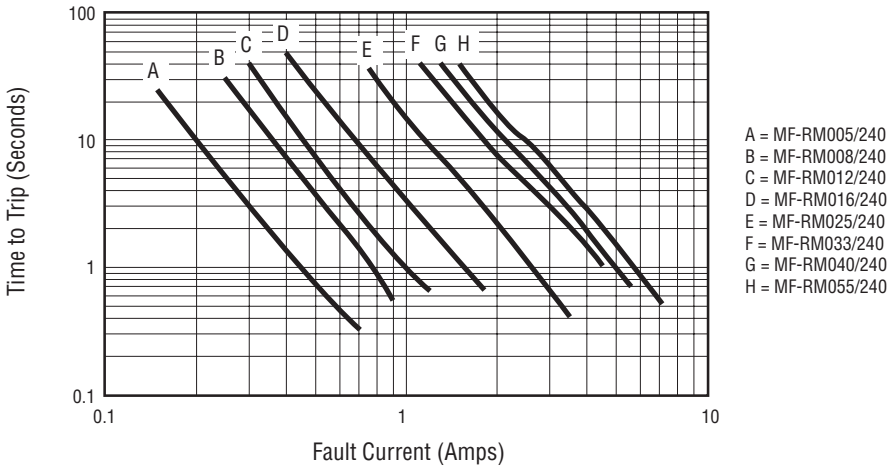
### Test Procedures and Requirements

| Item | Test Conditions | Accept/Reject Criteria |
|---|---|---|
| Visual/Mechanical | Verify dimensions and materials | Per MF physical description |
| Resistance | In still air @ 23 °C | $R_{min} \le R \le R_{max}$ |
| Time to Trip | At specified current, $V_{max}$, 23 °C, still air | T ≤ max. time to trip (seconds) |
| Hold Current | 30 min. at $I_{hold}$, still air | No trip |
| Trip Cycle Life | Operating voltage, $I_{max}$, 100 cycles | No arcing or burning |
| Trip Endurance A | Operating voltage, $I_{max}$, 24 hours | No arcing or burning |
| Trip Endurance B | Interrupt voltage, $I_{max}$, 30 minutes | No arcing or burning |
| Solderability | 245 °C ± 5 °C, 5 seconds | 95 % min. coverage |

### Thermal Derating Table - $I_{hold}$ (Amps)

| Model | Ambient Operating Temperature | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | -20 °C | 0 °C | 23 °C | 40 °C | 50 °C | 60 °C | 70 °C | 85 °C |
| MF-RM005/240 | 0.08 | 0.06 | 0.05 | 0.04 | 0.04 | 0.03 | 0.03 | 0.02 |
| MF-RM008/240 | 0.12 | 0.10 | 0.08 | 0.07 | 0.06 | 0.05 | 0.04 | 0.03 |
| MF-RM012/240 | 0.18 | 0.15 | 0.12 | 0.10 | 0.09 | 0.07 | 0.06 | 0.04 |
| MF-RM016/240 | 0.24 | 0.20 | 0.16 | 0.13 | 0.11 | 0.10 | 0.08 | 0.05 |
| MF-RM025/240 | 0.38 | 0.32 | 0.25 | 0.21 | 0.18 | 0.15 | 0.13 | 0.09 |
| MF-RM033/240 | 0.50 | 0.42 | 0.33 | 0.27 | 0.23 | 0.20 | 0.17 | 0.11 |
| MF-RM040/240 | 0.61 | 0.51 | 0.40 | 0.33 | 0.28 | 0.24 | 0.20 | 0.14 |
| MF-RM055/240 | 0.80 | 0.68 | 0.55 | 0.46 | 0.40 | 0.35 | 0.29 | 0.22 |

### Typical Time to Trip at 23 °C




A = MF-RM005/240
B = MF-RM008/240
C = MF-RM012/240
D = MF-RM016/240
E = MF-RM025/240
F = MF-RM033/240
G = MF-RM040/240
H = MF-RM055/240

The Time to Trip curves represent typical performance of a device in a simulated application environment.
Actual performance in specific customer applications may differ from these values due to the influence of other variables.

### How to Order

**MF - RM 005 / 240 - 2 - 17**

Multifuse® Product Designator

Series
RM = Radial Leaded Line Voltage Component

Hold Current, $I_{hold}$
005-055 (0.05 A - 0.55 A)

Operating Voltage, $V_{max}$
240 = 240 Vac

Packaging Options
- 0 = Bulk Packaging
- 2 = Tape and Reel per EIA-468

Part Number Suffix Option
- 17 = Straight Leads where Kinked Leads are Standard

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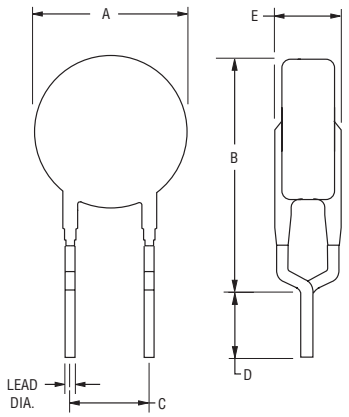
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## Product Dimensions

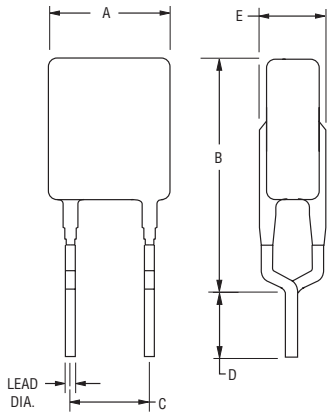
| Model | A Max. | B Max. | C | | D Min. | E Max. | Physical Characteristics | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Nom. | Tol. ± | | | Style | Lead Dia. | Material |
| MF-RM005/240 | 8.3 (0.327) | 12.9 (0.508) | 5.1 (0.201) | 0.7 (0.028) | 7.6 (0.299) | 3.8 (0.150) | 1 | 0.51 (0.020) | Sn/Cu |
| MF-RM008/240 | 8.3 (0.327) | 12.9 (0.508) | 5.1 (0.201) | 0.7 (0.028) | 7.6 (0.299) | 3.8 (0.150) | 1 | 0.51 (0.020) | Sn/Cu |
| MF-RM012/240 | 8.3 (0.327) | 12.9 (0.508) | 5.1 (0.201) | 0.7 (0.028) | 7.6 (0.299) | 3.8 (0.150) | 1 | 0.51 (0.020) | Sn/Cu |
| MF-RM016/240 | 9.9 (0.390) | 13.8 (0.543) | 5.1 (0.201) | 0.7 (0.028) | 7.6 (0.299) | 3.8 (0.150) | 1 | 0.51 (0.020) | Sn/Cu |
| MF-RM025/240 | 10.0 (0.394) | 20.0 (0.787) | 5.1 (0.201) | 0.7 (0.028) | 7.6 (0.299) | 3.8 (0.150) | 2 | 0.65 (0.026) | Sn/Cu |
| MF-RM033/240 | 11.4 (0.449) | 20.0 (0.787) | 5.1 (0.201) | 0.7 (0.028) | 7.6 (0.299) | 3.8 (0.150) | 2 | 0.65 (0.026) | Sn/Cu |
| MF-RM040/240 | 11.5 (0.453) | 20.9 (0.823) | 5.1 (0.201) | 0.7 (0.028) | 7.6 (0.299) | 3.8 (0.150) | 2 | 0.65 (0.026) | Sn/Cu |
| MF-RM055/240 | 14.0 (0.551) | 22.4 (0.882) | 5.1 (0.201) | 0.7 (0.028) | 7.6 (0.299) | 4.1 (0.161) | 2 | 0.81 (0.032) | Sn/Cu |

DIMENSIONS: MM (INCHES)

### Style 1



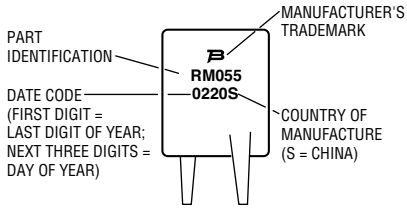

### Style 2




NOTE: Straight lead option (-17) is also available, e.g. MF-RM012/240-2-17 or MF-RM033/240-2-17. (Refer to "How to Order" section.)

## Typical Part Marking

Represents total content. Layout may vary.




## Packaging Quantity

| Packaging options | Models | Unit Quantity (Pcs.) | Unit |
|---|---|---|---|
| Bulk | All models | 500 | Bag |
| Tape & Reel | MF-RM005/240 ~ MF-RM040/240 | 2000 | Reel |
| | MF-RM055/240 | 1000 | |

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# MF-RM Series Tape and Reel Specifications

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Devices taped using EIA-468/IEC 60286-2 standards. See table below and figures for details.

| Dimension Description | IEC Mark | EIA Mark | Dimensions | Tolerance |
|---|---|---|---|---|
| Carrier tape width | $W$ | $W$ | 18 (.709) | +1.0/-0.5 (+.039/-.020) |
| Hold down tape width | $W_0$ | $W_0$ | 5 (.197) | min. |
| Hold down tape | | No protrusion beyond the carrier tape | | |
| Adhesive tape position | $W_2$ | $W_2$ | 3 (.118) | max. |
| Sprocket hole position | $W_1$ | $W_1$ | 9 (.354) | +0.75/-0.5 (+.030/-.020) |
| Sprocket hole diameter | $D_0$ | $D_0$ | 4 (.157) | ±0.2 (±.0078) |
| Height to seating plane (straight lead) | $H$ | $H$ | 18 ~ 20 (.709 ~ .787) | |
| Height to seating plane (formed lead) | $H_0$ | $H_0$ | 16 (.630) | ±0.5 (±.020) |
| Overall height above abscissa | $H_1$ | $H_1$ | 38.5 (1.516) | max. |
| Cutout length | | $L$ | 11 (.433) | max. |
| Sprocket hole pitch | $P_0$ | $P_0$ | 12.7 (.500) | ±0.3 (±.012) |
| Device pitch: MF-RM005/240 ~ MF-RM040/240 | $P$ | $P$ | 12.7 (.500) | ±0.3 (±.012) |
| Device pitch: MF-RM055/240 | $P$ | $P$ | 25.4 (1.00) | ±0.6 (±.024) |
| Pitch tolerance | | | 20 consecutive | ±1 (±.039) |
| Composite tape thickness | $t$ | $t$ | 0.9 (.035) | max. |
| Overall tape and lead thickness: MF-RM005/240 ~ MF-RM040/240 | $t_1$ | $t_1$ | 2.0 (.079) | max. |
| Overall tape and lead thickness: MF-RM055/240 | $t_1$ | $t_1$ | 2.3 (.091) | max. |
| Splice sprocket hole alignment | | | 0 | ±0.3 (±.012) |
| Front-to-back deviation | $\Delta_h$ | $\Delta_h$ | 0 | ±1.0 (±.039) |
| Side-to-side deviation | $\Delta_p$ | $\Delta_p$ | 0 | ±1.3 (±.051) |
| Ordinate to adjacent component lead | $P_1$ | $P_1$ | 3.81 (.150) | ±0.7 (±.028) |
| Lead spacing | $F$ | $F$ | 5.08 (.200) | +0.6/-0.2 (+.024/-.008) |

— Continued on next page —

DIMENSIONS: MM (INCHES)

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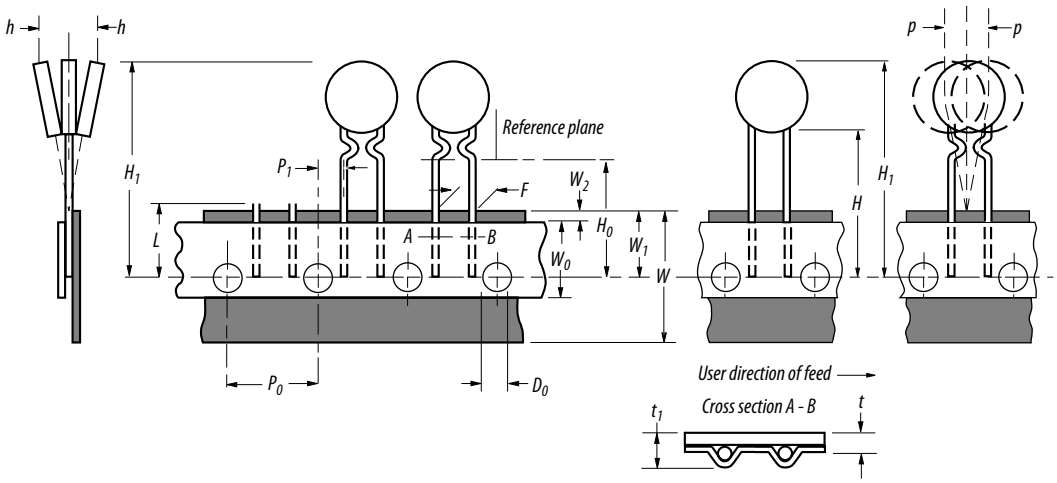
# MF-RM Series Tape and Reel Specifications

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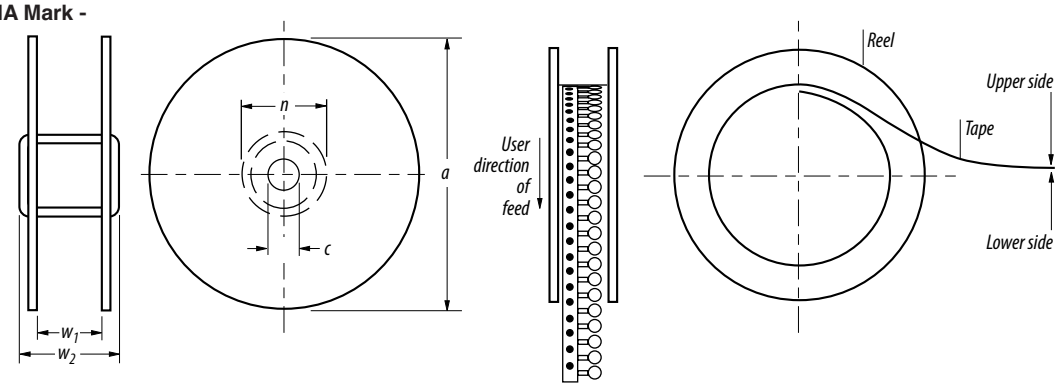
Devices taped using EIA-468/IEC 60286-2 standards. See table below and figures for details.

| Dimension Description | IEC Mark | EIA Mark | Dimensions | Tolerance |
|---|---|---|---|---|
| Reel width including flanges and hub | $W_4$ | $w_2$ | 62.0 (2.44) | max |
| Dimension between flanges (measured at hub) | $W_3$ | $w_1$ | allow proper reeling and unreeling | |
| Reel diameter | $A$ | a | 370.0 (14.57) | max. |
| Space between flanges (at hub, excluding device) | | | 4.75 (.187) | ±3.25 (±.128) |
| Arbor hole diameter | $C$ | $c$ | 26.0 (1.024) | ±12.0 (±.472) |
| Core diameter | $N$ | $n$ | 80 (3.15) | min. |
| Box dimensions | | | 62 x 372 x 372 (2.44 x 14.6 x 14.6) | max. |
| Consecutive missing places | | | 3 | max. |
| Empty places per reel | | | Less than 0.1 % | |

**Taped Component Dimensions - per EIA Mark - Figure 1**




**Reel Dimensions - per EIA Mark - Figure 2**






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## Application Notice

- Users are responsible for independent and adequate evaluation of Bourns® Multifuse® Polymer PTC devices in the user's application, including the PPTC device characteristics stated in the applicable data sheet.
- Polymer PTC devices must not be allowed to operate beyond their stated maximum ratings. Operation in excess of such maximum ratings could result in damage to the PTC device and possibly lead to electrical arcing and/or fire. Circuits with inductance may generate a voltage above the rated voltage of the polymer PTC device and should be thoroughly evaluated within the user's application during the PTC selection and qualification process.
- Polymer PTC devices are intended to protect against adverse effects of temporary overcurrent or overtemperature conditions up to rated limits and are not intended to serve as protective devices where overcurrent or overvoltage conditions are expected to be repetitive or prolonged.
- In normal operation, polymer PTC devices experience thermal expansion under fault conditions. Thus, a polymer PTC device must be protected against mechanical stress, and must be given adequate clearance within the user's application to accommodate such thermal expansion. Rigid potting materials or fixed housings or coverings that do not provide adequate clearance should be thoroughly examined and tested by the user, as they may result in the malfunction of polymer PTC devices if the thermal expansion is inhibited.
- Exposure to lubricants, silicon-based oils, solvents, gels, electrolytes, acids, and other related or similar materials may adversely affect the performance of polymer PTC devices.
- Aggressive solvents may adversely affect the performance of polymer PTC devices. Conformal coating, encapsulating, potting, molding, and sealing materials may contain aggressive solvents including but not limited to xylene and toluene, which are known to cause adverse effects on the performance of polymer PTCs. Such aggressive solvents must be thoroughly cured or baked to ensure their complete removal from polymer PTCs to minimize the possible adverse effect on the device.
- Recommended storage conditions should be followed at all times. Such conditions can be found on the applicable data sheet and on the Multifuse® Polymer PTC Moisture/Reflow Sensitivity Classification (MSL) note: https://www.bourns.com/docs/RoHS-MSL/msl_mf.pdf


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- Bourns considers implantable/invasive devices and devices/procedures designed as life-supporting or life-sustaining by the U.S. Food and Drug Administration or equivalent organizations outside of the United States as "life-critical" medical applications. Bourns expressly identifies those Bourns® standard products that are suitable for use in typical medical applications that are not life-critical in its publication entitled "Bourns Medical Grade Component Guide."

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