



## Features

- Radial leaded devices
- Cured, flame retardant epoxy polymer insulating material meets UL 94V-0 requirements
- RoHS compliant\* and halogen free\*
- Agency recognition: 

## Applications

Almost anywhere there is a load to be protected with a voltage supply of up to 90 V, including:

- Broadband cable power passing taps
- Set-top boxes

# MF-R/90 Series - PTC Resettable Fuses

## Electrical Characteristics

| Model       | V max. Volts | I max. Amps | I <sub>hold</sub> |      | I <sub>trip</sub> |      | Initial Resistance Values |                  | One Hour Post-Trip Resistance Standard Trip | Max. Time to Trip |  | Nominal Tripped Power Dissipation |
|-------------|--------------|-------------|-------------------|------|-------------------|------|---------------------------|------------------|---|-------------------|--|-----------------------------------|
|             |              |             | Amperes at 23 °C  |      | Ohms at 23 °C     |      | Ohms at 23 °C             | Amperes at 23 °C | Seconds at 23 °C                            | Watts at 23 °C    |  |                                   |
|             |              |             | Hold              | Trip | Min.              | Max. | Max.                      |                  |   | Typ.              |  |                                   |
| MF-R055/90  | 90           | 10          | 0.55              | 1.1  | 0.45              | 0.9  | 2.0                       | 1.6              | 60  | 2.0               |  |                                   |
| MF-R055/90U | 90           | 10          | 0.55              | 1.1  | 0.45              | 0.9  | 2.0                       | 1.6              | 28  | 2.0               |  |                                   |
| MF-R075/90  | 90           | 10          | 0.75              | 1.5  | 0.37              | 0.75 | 1.65                      | 2.0              | 60  | 2.5               |  |                                   |

"U" suffix indicates product without insulation coating.

## 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.....±5 % typical resistance change |
| Thermal Shock .....                 | +125 °C to -55 °C, 10 times.....±10 % typical resistance change |
| Solvent Resistance .....            | MIL-STD-202, Method 215.....No change                           |
| Vibration .....                     | MIL-STD-883C, Method 2007.1.....No change<br>Condition A        |

## Test Procedures And Requirements For Model MF-R/90 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>max</sub> |
| Time to Trip .....    | 5 times I <sub>hold</sub> , 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                    |

UL File Number .....

E174545

TÜV File Number .....

R2057213

## Thermal Derating Chart - I<sub>hold</sub> / I<sub>trip</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-R055/90  | 0.85 / 1.7                    | 0.75 / 1.5 | 0.65 / 1.3 | 0.55 / 1.1 | 0.45 / 0.9  | 0.4 / 0.8  | 0.35 / 0.7  | 0.3 / 0.6   | 0.22 / 0.44 |
| MF-R055/90U | 0.85 / 1.7                    | 0.75 / 1.5 | 0.65 / 1.3 | 0.55 / 1.1 | 0.45 / 0.9  | 0.4 / 0.8  | 0.35 / 0.7  | 0.3 / 0.6   | 0.22 / 0.44 |
| MF-R075/90  | 1.15 / 2.3                    | 1.0 / 2.0  | 0.9 / 1.8  | 0.75 / 1.5 | 0.61 / 1.22 | 0.55 / 1.1 | 0.48 / 0.96 | 0.41 / 0.82 | 0.30 / 0.6  |

\* RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

\*\* Bourns follows the prevailing definition of "halogen free" in the industry. 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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Users should verify actual device performance in their specific applications.

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## Additional Features

- Bulk packaging, tape and reel and Ammo-Pak available on most models

# MF-R/90 Series - PTC Resettable Fuses

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### Product Dimensions

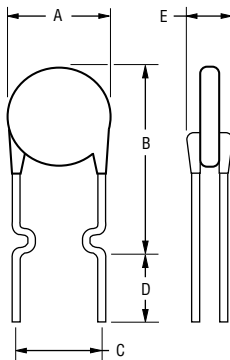
| Model       | A<br>Max.             | B<br>Max.             | C (Pitch)<br>Nom.                       | D<br>Min.             | E<br>Max.             | Physical Characteristics |                        |          |
|-------------|-----------------------|-----------------------|---|-----------------------|-----------------------|--------------------------|------------------------|----------|
|             |                       |                       |   |                       |                       | Style                    | Lead Dia.              | Material |
| MF-R055/90  | $\frac{10.9}{(0.43)}$ | $\frac{16.7}{(0.65)}$ | $\frac{5.1 \pm 0.7}{(0.201 \pm 0.028)}$ | $\frac{6.3}{(0.248)}$ | $\frac{3.6}{(0.142)}$ | 1                        | $\frac{0.81}{(0.032)}$ | Sn/Cu    |
| MF-R055/90U | $\frac{10.3}{(0.4)}$  | $\frac{16.7}{(0.65)}$ | $\frac{5.1 \pm 0.7}{(0.201 \pm 0.028)}$ | $\frac{6.3}{(0.248)}$ | $\frac{3.0}{(0.118)}$ | 1                        | $\frac{0.81}{(0.032)}$ | Sn/Cu    |
| MF-R075/90  | $\frac{11.9}{(0.47)}$ | $\frac{15.5}{(0.61)}$ | $\frac{5.1 \pm 0.7}{(0.201 \pm 0.028)}$ | $\frac{6.3}{(0.248)}$ | $\frac{3.6}{(0.142)}$ | 1                        | $\frac{0.81}{(0.032)}$ | Sn/Cu    |

Packaging options:

BULK: 500 pcs. per bag. TAPE & REEL: 1500 pcs. per reel. AMMO-PACK: 1000 pcs. per pack

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

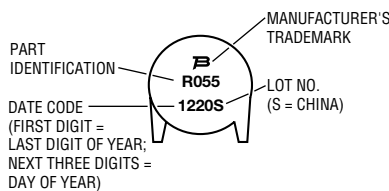
### Style 1



Also available with straight leads (see How to Order).

### Typical Part Marking

Represents total content. Layout may vary.



### How to Order

**MF - R 055/90 U - 0 - 17**

Multifuse®  
 Product Designator  
 Series  
 R = Radial Leaded Component  
 Hold Current, I<sub>hold</sub>  
 055, 075 (0.55 A - 0.75 A)  
 Max. Voltage, V  
 Coating  
 \_ = Coated  
 U = Uncoated  
 Packaging Options  
 - 0 = Bulk Packaging  
 - 2 = Tape and Reel\*  
 - AP = Ammo-Pak\*  
 Part Number Suffix Option  
 - 17 = Straight Leads in Place of Standard Kinked Leads  
 \*Packaged per EIA486-B

### Typical Time to Trip at 23 °C



MF-R/90, REV. L, 04/17

Fault Current (Amps)

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## MF-R, MF-R/90, MF-R/600, & MF-RX, & MF-RX/72 Series Tape and Reel Specifications

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Devices taped using EIA468-B/IEC286-2 standards. See table below and Figures 1 and 2 for details.

| Dimension Description  | IEC Mark   | EIA Mark   | Dimensions             |                                    |
|--|------------|------------|------------------------|------------------------------------|
|  |            |            | Dimensions             | Tolerance                          |
| Carrier tape width   | $W$        | $W$        | $\frac{18}{(.709)}$    | $\frac{-0.5/+1.0}{(-0.02/+0.039)}$ |
| Hold down tape width   | $W_0$      | $W_4$      | $\frac{11}{(.433)}$    | min.                               |
| Hold down tape   |            |            | No protrusion          |                                    |
| Top distance between tape edges  | $W_2$      | $W_6$      | $\frac{3}{(.118)}$     | max.                               |
| Sprocket hole position   | $W_1$      | $W_5$      | $\frac{9}{(.354)}$     | $\frac{-0.5/+0.75}{(-0.02/+0.03)}$ |
| Sprocket hole diameter   | $D_0$      | $D_0$      | $\frac{4}{(.157)}$     | $\frac{\pm 0.2}{(\pm .0078)}$      |
| Abscissa to plane (straight lead)  | $H$        | $H$        | $\frac{18.5}{(.728)}$  | $\frac{\pm 3.0}{(\pm .118)}$       |
| Abscissa to plane (kinked lead)  | $H_0$      | $H_0$      | $\frac{16}{(.63)}$     | $\frac{\pm 0.5}{(\pm .02)}$        |
| Abscissa to top (straight lead)  | $H_1$      | $H_1$      | $\frac{38.0}{(1.496)}$ | max.                               |
| Abscissa to top (kinked lead)  | $H_1$      | $H_1$      | $\frac{32.2}{(1.268)}$ | max.                               |
| Overall width w/lead protrusion (straight lead)  |            | $C_1$      | $\frac{55.0}{(2.165)}$ | max.                               |
| Overall width w/lead protrusion (kinked lead)  |            | $C_1$      | $\frac{43.2}{(1.7)}$   | max.                               |
| Overall width w/o lead protrusion (straight lead)  |            | $C_2$      | $\frac{54.0}{(2.126)}$ | max.                               |
| Overall width w/o lead protrusion (kinked lead)  |            | $C_2$      | $\frac{42.5}{(1.673)}$ | max.                               |
| Lead protrusion  | $l_1$      | $L_1$      | $\frac{1.0}{(.039)}$   | max.                               |
| Protrusion of cutout   | $L$        | $L$        | $\frac{11}{(.433)}$    | max.                               |
| Protrusion beyond hold-down tape   | $l_2$      | $l_2$      | Not specified          |                                    |
| Sprocket hole pitch  | $P_0$      | $P_0$      | $\frac{12.7}{(0.5)}$   | $\frac{\pm 0.3}{(\pm .012)}$       |
| Pitch tolerance  |            |            | 20 consecutive         | $\frac{\pm 1}{(\pm .039)}$         |
| Device pitch: MF-R005–MF-R160, MF-R/90,<br>MF-RX020/72–MF-RX030/72                                   |            |            | $\frac{12.7}{(0.5)}$   | $\frac{\pm 0.3}{(\pm .012)}$       |
| Device pitch: MF-R185–MF-R400, MF-R/600, MF-RX110–MF-RX375<br>MF-RX040/72–MF-RX375/72                |            |            | $\frac{25.4}{(1.0)}$   | $\frac{\pm 0.6}{(\pm .024)}$       |
| Tape thickness   | $t$        | $t$        | $\frac{0.9}{(.035)}$   | max.                               |
| Tape thickness with splice: MF-R010–MF-R160,<br>MF-RX110/72–MF-RX185/72                              |            | $t_1$      | $\frac{1.5}{(.059)}$   | max.                               |
| Tape thickness with splice: MF-R250–MF-R1100,<br>MF-RX110–MF-RX375, MF-R/90, MF-RX250/72–MF-RX375/72 |            | $t_1$      | $\frac{2.3}{(.091)}$   | max.                               |
| Splice sprocket hole alignment   |            |            | 0                      | $\frac{\pm 0.3}{(\pm .012)}$       |
| Body lateral deviation   | $\Delta_h$ | $\Delta_h$ | 0                      | $\frac{\pm 1.0}{(\pm .039)}$       |
| Body tape plane deviation  | $\Delta_p$ | $\Delta_p$ | 0                      | $\frac{\pm 1.3}{(\pm .051)}$       |

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

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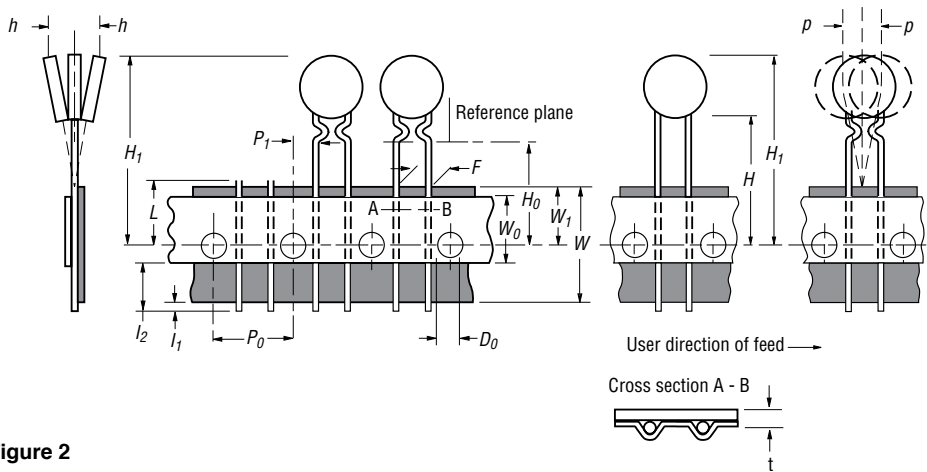
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# MF-R, MF-R/90, MF-R/600, MF-RX, & MF-RX/72 Series Tape and Reel Specifications

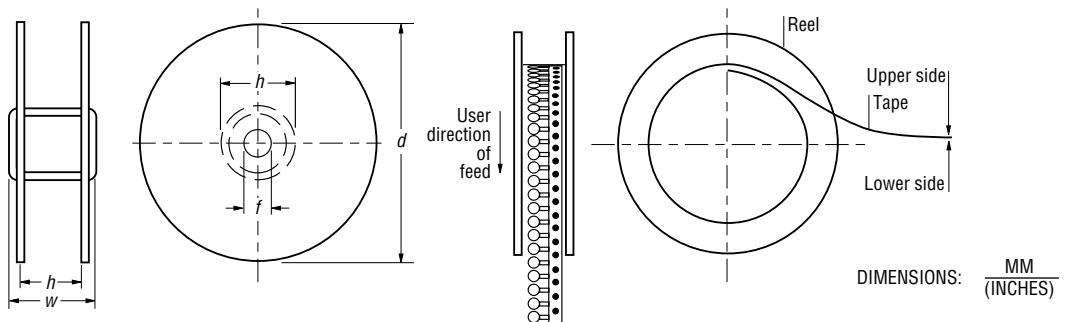
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| Dimension Description                                  | IEC Mark             | EIA Mark             | Dimensions   |                               |
|--|----------------------|----------------------|--|-------------------------------|
|  |                      |                      | Dimensions   | Tolerance                     |
| Lead spacing: MF-R, MF-R/90, MF-R/600, MF-RX, MF-RX/72 | <i>F</i>             | <i>F</i>             | $\frac{5.08}{(0.2)}$   | $\frac{\pm 0.2}{(\pm 0.008)}$ |
| Reel width   | <i>w</i>             | <i>W<sub>2</sub></i> | $\frac{56.0}{(2.205)}$   | max.                          |
| Reel diameter  | <i>d</i>             | <i>a</i>             | $\frac{370.0}{(14.57)}$  | max.                          |
| Space between flanges less device                      | <i>W<sub>1</sub></i> | <i>h</i>             | $\frac{4.75}{(.187)}$  | $\frac{\pm 3.25}{(\pm .128)}$ |
| Arbor hole diameter                                    | <i>f</i>             | <i>c</i>             | $\frac{26.0}{(1.024)}$   | $\frac{\pm 12.0}{(\pm .472)}$ |
| Core diameter: MF-R, MF-RX, MF-R/90                    | <i>h</i>             | <i>n</i>             | $\frac{80}{(3.15)}$  | max.                          |
| Core diameter: MF-R/600                                | <i>h</i>             | <i>n</i>             | $\frac{91}{(3.58)}$  | max.                          |
| Box: MF-R, MF-RX, MF-R/90                              |                      |                      | $\frac{62}{(2.44)}$ $\frac{355}{(14.0)}$ $\frac{345}{(13.6)}$  | nom.                          |
| Box: MF-R/600  |                      |                      | $\frac{64}{(2.52)}$ $\frac{372}{(14.6)}$ $\frac{362}{(14.25)}$ | max.                          |
| Consecutive missing places: MF-R, MF-RX, MF-R/90       |                      |                      | 3  | max.                          |
| Consecutive missing places: MF-R/600                   |                      |                      | none   |                               |
| Empty places per reel: MF-R, MF-RX, MF-R/90            |                      |                      | Not specified  |                               |
| Empty places per reel: MF-R/600                        |                      |                      | 0.1 %  |                               |

**Taped Component Dimensions -  
Figure 1**



**Reel Dimensions - 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](https://www.bourns.com/docs/RoHS-MSL/msl_mf.pdf)

MFAN 12/18

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The use and level of testing applicable to Bourns® custom products shall be negotiated on a case-by-case basis by Bourns and the user for which such Bourns® custom products are specially designed. Absent a written agreement between Bourns and the user regarding the use and level of such testing, the above provisions applicable to Bourns® standard products shall also apply to such Bourns® custom products.

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