

### Features

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

# MF-R/90 Series - PTC Resettable Fuses

#### **Electrical Characteristics**

Model	V max. Volts	l max. Amps	I <sub>hold</sub>	I <sub>trip</sub>	Resis	tial tance ues	One Hour Post-Trip Resistance Standard Trip	Max. Time to Trip		Nominal Tripped Power Dissipation	Agency Recognition	
			Amperes at 23 °C		Ohms at 23 °C		Ohms at 23 °C	Amperes at 23 °C	Seconds at 23 °C	Watts at 23 °C	cUL	ΤÜV
			Hold	Trip	Min.	Max.	Max.			Тур.	<u>E174545</u>	<u>R 50366745</u>
MF-R055/90	90	10	0.55	1.4	0.45	0.9	2.0	2.0	60	2.5	1	1
MF-R055/90U	90	10	0.55	1.4	0.45	0.9	2.0	2.0	60	2.5	1	1
MF-R075/90	90	10	0.75	1.8	0.37	0.75	1.65	2.0	60	2.5	1	1

"U" suffix indicates product without insulation coating.

#### **Environmental Characteristics**

Humidity Äging Thermal Shock Solvent Resistance	. +40 °C max, 70 % R.H. max. . +85 °C, 1000 hours . +85 °C, 85 % R.H. 1000 hours . +125 °C to -55 °C, 10 times . MIL-STD-202, Method 215 . MIL-STD-883C, Method 2007.1,	±5 % typical resistance change ±10 % typical resistance change No change (marking still legible)
Moisture Sensitivity Level (MSL) ESD Classification		

#### **Test Procedures and Requirements**

Test	Test Conditions	Accept/Reject Criteria
Visual/Mech	Verify dimensions and materials	Per MF physical description
Resistance	In still air @ 23 °C	Rmin $\leq R \leq Rmax$
Time to Trip	5 times Ihold, Vmax, 23 °C	T ≤ max. time to trip (seconds)
Hold Current	30 min. at Ihold	No trip
Trip Cycle Life	Vmax, Imax, 100 cycles	No arcing or burning
Trip Endurance	Vmax, 48 hours	No arcing or burning
Solderability	245 °C ±5 °C, 5 seconds	95 % min. coverage

### Thermal Derating Table - Ihold (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	1.0	0.90	0.80	0.55	0.50	0.45	0.40	0.35	0.30
MF-R055/90U	1.0	0.90	0.80	0.55	0.50	0.45	0.40	0.35	0.30
MF-R075/90	1.32	1.15	1.04	0.75	0.70	0.63	0.55	0.47	0.35

Itrip is approximately two times Ihold.



#### WARNING Cancer and Reproductive Harm - <u>www.P65Warnings.ca.gov</u>

\*RoHS Directive 2015/863, Mar 31, 2015 and Annex. \*\* Bourns follows the prevailing definition of "halogen

\*\* 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.

Specifications are subject to change without notice. Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.



### **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

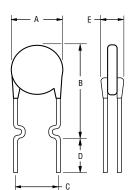
## BOURNS

#### **Product Dimensions**

	A	В	C (Pitch)	D	E	Phy	sical Characte	eristics
Model	Max.	Max.	Nom.	Min.	Max.	Style	Lead Dia.	Material
MF-R055/90	<u>10.9</u> (0.429)	<u>16.7</u> (0.657)	$\frac{5.1 \pm 0.7}{(0.201 \pm 0.028)}$	<u>6.3</u> (0.248)	<u>3.6</u> (0.142)	1	<u>0.81</u> (0.032)	Sn/Cu
MF-R055/90U	<u>10.3</u> (0.406)	<u>16.7</u> (0.657)	$\frac{5.1 \pm 0.7}{(0.201 \pm 0.028)}$	<u>6.3</u> (0.248)	<u>3.0</u> (0.118)	1	<u>0.81</u> (0.032)	Sn/Cu
MF-R075/90	<u>11.9</u> (0.469)	<u>15.5</u> (0.610)	$\frac{5.1 \pm 0.7}{(0.201 \pm 0.028)}$	<u>6.3</u> (0.248)	<u>3.6</u> (0.142)	1	<u>0.81</u> (0.032)	Sn/Cu

DIMENSIONS: <u>MM</u>(INCHES)

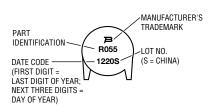
#### Style 1



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

**Typical Part Marking** 

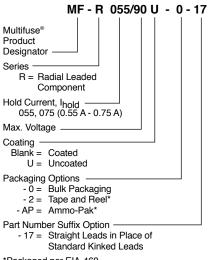
Represents total content. Layout may vary.



#### Packaging Quantity

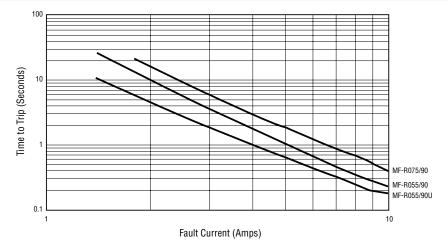
Bulk	
Tape & Reel	
Ammo-Pack	1000 pcs. per pack

#### How to Order



\*Packaged per EIA-468

### Typical Time to Trip at 23 °C



#### MF-R/90, REV. N, 11/19

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Users should verify actual device performance in their specific applications.

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# **MF-R/90 Series Tape and Reel Specifications**

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Devices taped using EIA-468/IEC 60286-2 standards. See table below and Figures 1 and 2 for details.

Carrier tape widthWW1 $\frac{1}{(709)}$ $\frac{1}{(5022+039)}$ Hold down tape widthW0 $\frac{5}{(197)}$ min.Hold down tapeNo protrusionW2 $\frac{3}{(118)}$ max.Hold down tapeW2 $\frac{3}{(118)}$ max.Sprocket hole positionW1W1 $\frac{9}{(1554)}$ $\frac{-0.5/40.75}{(10.022+0.075)}$ Sprocket hole dameterD0D0 $\frac{4}{(157)}$ $\frac{4.028}{(160)}$ Height to seating plane (straight lead)HH $18-20$ $\frac{1}{(150)}$ Height to seating plane (tormed lead)H0H0 $\frac{16}{(63)}$ $\frac{4.05}{(4.05)}$ Dorote plichP0P0 $\frac{12.7}{(1551)}$ $\frac{4.03}{(143)}$ Sprocket hole plichP0P0 $\frac{12.7}{(1551)}$ $\frac{4.03}{(4.02)}$ Dorote plichP1P1 $\frac{38.5}{(4.03)}$ max.Sprocket hole plichP0P0 $\frac{12.7}{(1551)}$ $\frac{4.03}{(4.03)}$ Dorote plichP111 $\frac{9.05}{(9.052)}$ max.Dorote plichP0P0 $\frac{12.7}{(1551)}$ $\frac{4.03}{(4.03)}$ Dorote plich $\lambda_h$ $\Lambda_h$ $\Lambda_h$ $\Lambda_h$ Dorote plich $\Lambda_h$ $\Lambda_h$ $\Lambda_h$ $\frac{10.9}{(0.079)}$ Dorote plich $\Lambda_h$ $\Lambda_h$ $\Lambda_h$ $\frac{10.9}{(0.079)}$ $\frac{10.32}{(4.03)}$ Dorote plich $\Lambda_h$ $\Lambda_h$ $\Lambda_h$ $\Lambda_h$ $\frac{10.9}{(0.079)}$ $\frac{10.32}{(4.03)}$ Dorote plich $\Lambda_h$ $\Lambda_h$ $\Lambda_h$ $\Lambda_h$ $\Lambda_h$ $\Lambda_h$ $\Lambda_h$	Dimension Description	IEC Mark	EIA Mark	Dimensions Dimensions Tolerance		
Hold down tape width $W_0$ $W_0$ $\frac{5}{(197)}$ min.         Hold down tape       No protrusion       No protrusion         Athesive tape position $W_1$ $W_2$ $\frac{3}{(110)}$ max.         Sprocket hole position $W_1$ $W_1$ $\frac{95}{(450)}$ $\frac{-0.5740}{(40.024) 0.03}$ Sprocket hole diameter $D_0$ $\frac{1}{(4.57)}$ $\frac{40.02}{(4.0078)}$ $\frac{40.02}{(4.0078)}$ Height to seating plane (straight lead) $H$ $H$ $\frac{18.6.3}{(1.600)}$ $\frac{40.02}{(4.007)}$ Sprocket hole plane (formed lead) $H_0$ $H_0$ $H_0$ $\frac{16.3}{(1.600)}$ $\frac{40.02}{(4.000)}$ Sprocket hole plath $P_0$ $P_0$ $\frac{12.7}{(1.5110)}$ $\frac{40.3}{(4.002)}$ Sprocket hole plath $P_0$ $P_0$ $\frac{12.7}{(2.5)}$ $\frac{40.3}{(4.002)}$ Sprocket hole plath $P_0$ $P_0$ $\frac{12.7}{(2.5)}$ $\frac{40.3}{(4.032)}$ Sprocket hole plath $P_0$ $\frac{12.7}{(0.5)}$ $\frac{40.3}{(4.032)}$ $\frac{40.3}{(4.032)}$ Sprocket hole plath $P_0$ $\frac{12.7}{(0.5)}$ $\frac{40.3}{(4.032)}$ $\frac{40.3}{(4.032)}$ $\frac{40.3}{(4.032)}$ $\frac{40.3}{(4.032)}$	Carrier tape width	W	W			
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Height to seating plane (straight lead)HH $\frac{18 - 20}{(.709787)}$ Height to seating plane (formed lead)HoHo $\frac{16}{(.63)}$ $\frac{40.5}{(.402)}$ Diverall height above abscissaH1H1 $\frac{38.5}{(1.516)}$ maxDutout LengthL $\frac{11}{(.433)}$ maxSprocket hole pitchPoPo $\frac{12.7}{(0.5)}$ $\frac{40.3}{(.612)}$ Device pitchPP $\frac{12.7}{(0.5)}$ $\frac{40.3}{(.612)}$ Device pitchPP $\frac{12.7}{(0.5)}$ $\frac{40.3}{(.612)}$ Device pitchPP $\frac{12.7}{(0.5)}$ $\frac{40.3}{(.6012)}$ Device pitchPP $\frac{12.7}{(0.5)}$ $\frac{40.3}{(.6012)}$ Device pitchPP $\frac{12.7}{(0.5)}$ $\frac{40.3}{(.6012)}$ Device pitchPP $\frac{12.7}{(.65)}$ $\frac{40.3}{(.6012)}$ Device pitchPP $\frac{12.7}{(.65)}$ $\frac{40.3}{(.6012)}$ Device pitchPP $\frac{12.7}{(.65)}$ $\frac{40.3}{(.6012)}$ Device pitchPP $\frac{12.7}{(.65)}$ $\frac{40.3}{(.6012)}$ Device pitchPP $\frac{12.7}{(.6079)}$ $\frac{40.3}{(.6012)}$ Device pitch $\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{2.000}$ $\frac{10.3}{(.6012)}$ Device pitch $\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{1}$ $\frac{10.3}{(.6012)}$ Device pitch $\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{1}$ $\frac{10.3}{(.6012)}$ Device pitch $\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{1}$	Sprocket hole diameter	D <sub>0</sub>	D <sub>0</sub>	4	±0.2	
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Sprocket hole pitch $P_0$ $P_0$ $\frac{12.7}{(0.5)}$ $\frac{40.3}{(\pm 0.12)}$ Device pitch $P$ $P$ $\frac{12.7}{(0.5)}$ $\frac{40.3}{(\pm 0.12)}$ Device pitch $P$ $P$ $\frac{12.7}{(0.5)}$ $\frac{40.3}{(\pm 0.03)}$ Differ tolerance $20$ consecutive $\frac{41}{(\pm 0.03)}$ Domposite tape thickness $t$ $t$ $\frac{0.9}{(0.079)}$ Domposite tape thickness $t$ $t$ $\frac{0.9}{(0.079)}$ Device pitch $0$ $\frac{40.3}{(\pm 0.012)}$ Device pitch $0$ $\frac{40.3}{(\pm 0.02)}$ Device pitch $\Delta_h$ $\Delta_h$ Device pitch $\Delta_h$ $\Delta_h$ Device pitch $\Delta_h$ $0$ Splice sprocket hole alignment $0$ Front-to-back deviation $\Delta_h$ $\Delta_h$ $\Delta_h$ $\Delta_p$ $\Delta_p$ $\Delta_h$ $\Delta_p$ $\Delta_p$ $\Delta_p$ $\Delta_p$ $0$ $(\pm 0.039)$ Side-to-side deviation $\Delta_p$ $\Delta_p$ $0$ $(\pm 0.02)$ Dredinate to adjacent component lead $P_1$ $P_1$ $P_1$ $\frac{3.81}{(0.150)}$ $(\pm 0.024)$ Dimension between flanges (measured at hub) $W_3$ $w_1$ allow proper reeling and unreelingReel diameter $A$ $A$ $a$ $(1475)$ $(\pm 3.25)$ $(1475)$ $(\pm 3.25)$ $(1475)$ $(\pm 3.25)$ $(1475)$ $(\pm 4.12)$ Core diameter $A$ $A$ $a$ $(2.44)$ $($	Cutout Length		L		max.	
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Pitch tolerance20 consecutive $\frac{\pm 1}{(\pm .039)}$ Composite tape thickness $t$ $t$ $\frac{0.9}{(.035)}$ max.Diverall tape and lead thickness $t_1$ $t_1$ $\frac{2.0}{(.0.079)}$ max.Splice sprocket hole alignment $0$ $\frac{\pm 0.3}{(\pm .012)}$ max.Splice sprocket hole alignment $0$ $\frac{\pm 0.3}{(\pm .012)}$ max.Front-to-back deviation $\Delta_h$ $\Delta_h$ $0$ $\frac{\pm 1.0}{(\pm .051)}$ Solice sprocket hole alignment $\Delta_p$ $\Delta_p$ $0$ $\frac{\pm 1.3}{(\pm .051)}$ Drefate to adjacent component lead $P_1$ $P_1$ $P_1$ $\frac{3.81}{(0.150)}$ $\frac{\pm 0.7}{(\pm .021)}$ Lead spacing $F$ $F$ $5.08$ $\pm 0.6/-0.2$ $(\pm 0.028)$ Lead spacing $F$ $F$ $\frac{5.08}{(0.2)}$ $\frac{\pm 0.6/-0.2}{(\pm 0.028)}$ Dimension between flanges (measured at hub) $W_3$ $w_1$ allow proper reeling and unreelingSpace between flanges (at hub, excluding device) $\frac{4.75}{(.187)}$ $\frac{\pm 3.25}{(.187)}$ Arbor hole diameter $C$ $c$ $26.0$ $\frac{\pm 12.0}{(1.024)}$ Core diameter $N$ $n$ $\frac{80}{(3.15)}$ min.Box dimensions $\frac{62}{(2.44)}$ $\frac{372}{(14.6)}$ max.Core diameter $S$ $s$ $s$ $s$ Core diameter $S$ $s$ $s$ $s$	Device pitch	Р	Р	12.7	±0.3	
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Reel width including flanges and hub $W_4$ $w_2$ $\frac{62.0}{(2.44)}$ max.Dimension between flanges (measured at hub) $W_3$ $w_1$ allow proper reeling and unreelingReel diameterAa $\frac{370.0}{(14.57)}$ max.Space between flanges (at hub, excluding device) $\frac{4.75}{(.187)}$ $\frac{±3.25}{(\pm .128)}$ Arbor hole diameterCc $\frac{26.0}{(1.024)}$ $\frac{\pm 12.0}{(\pm .472)}$ Core diameterNn $\frac{80}{(3.15)}$ min.Box dimensions $\frac{62}{(2.44)}$ $\frac{372}{(14.6)}$ max.Consecutive missing places3max.	Lead spacing	F	F	5.08	+0.6/-0.2	
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A definitionAa $\overline{(14.57)}$ Infax.Space between flanges (at hub, excluding device) $\frac{4.75}{(.187)}$ $\frac{\pm 3.25}{(\pm .128)}$ Arbor hole diameterCc $\frac{26.0}{(1.024)}$ $\frac{\pm 12.0}{(\pm .472)}$ Core diameterNn $\frac{80}{(3.15)}$ min.Box dimensions $\frac{62}{(2.44)}$ $\frac{372}{(14.6)}$ $\frac{372}{(14.6)}$ max.Consecutive missing places3max.	Dimension between flanges (measured at hub)	W3	w1		eling and unreeling	
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Consecutive missing places 3 max.	Box dimensions			62 372 372		
Empty places per reel Not specified	Consecutive missing places					
	Empty places per reel			Not specified		

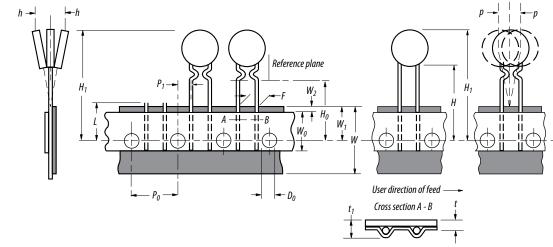
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MM DIMENSIONS: (INCHES)

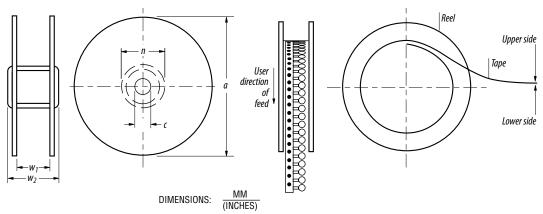
# MF-R/90 Series Tape and Reel Specifications

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Taped Component Dimensions - per EIA Mark -Figure 1



Reel Dimensions - per EIA Mark -Figure 2



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## Bourns® Multifuse® PPTC Resettable Fuses

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#### **Application Notice**

- Users are responsible for independent and adequate evaluation of Bourns<sup>®</sup> Multifuse<sup>®</sup> 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<sup>®</sup> Polymer PTC Moisture/Reflow Sensitivity Classification (MSL) note: <u>https://www.bourns.com/docs/RoHS-MSL/msl\_mf.pdf</u>

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