

## **Features**

- Operating temperature range up to 125 °C
- Low thermal derating factor
- Higher hold currents at elevated temperatures
- RoHS compliant\* and halogen free\*\*
- Agency recognition: c **Tu**us

# MF-RHS Series - High Temperature PPTC Resettable Fuses

### **Electrical Characteristics**

Model	V <sub>max</sub>	I <sub>max</sub>	I <sub>hold</sub>	I <sub>trip</sub>	Resis	stance	Max. Time to Trip		Tripped Power Dissipation	Agency Recognition
		ax	at 23 °C		at 23 °C (Ohms)		at 23 °C		at 23 °C (Watts)	cUL
	Volts	Amps			R <sub>min</sub>	R <sub>1Max</sub> .***	Amps Seconds		Тур.	E174545
MF-RHS350			3.5	7.0	0.018	0.050	17.5	4.5	3.0	<b>✓</b>
MF-RHS400			4.0	8.0	0.016	0.044	20.0	5.0	3.0	1
MF-RHS450			4.5	9.0	0.0145	0.040	22.5	5.5	3.0	1
MF-RHS500			5.0	10.0	0.0135	0.038	25.0	5.8	3.0	1
MF-RHS550			5.5	11.0	0.0120	0.032	27.5	10.0	3.0	1
MF-RHS600			6.0	12.0	0.0090	0.0252	30.0	6.5	3.3	1
MF-RHS650			6.5	13.0	0.0095	0.0225	32.5	6.5	3.3	1
MF-RHS700	16	100	7.0	14.0	0.0085	0.0190	35.0	6.8	3.7	1
MF-RHS750			7.5	15.0	0.0073	0.0168	37.5	7.0	4.0	1
MF-RHS800	1		8.0	16.0	0.0060	0.0145	40.0	8.0	4.3	1
MF-RHS900	1		9.0	18.0	0.0046	0.0098	45.0	9.0	5.0	1
MF-RHS1000	7		10.0	20.0	0.0042	0.0090	50.0	10.0	5.4	1
MF-RHS1100	7		11.0	22.0	0.0038	0.0083	55.0	11.2	5.7	1
MF-RHS1200	7		12.0	24.0	0.0035	0.0077	60.0	12.5	6.0	1
MF-RHS1300	1		13.0	26.0	0.0033	0.0070	60.0	14.0	6.4	1

<sup>\*\*\*</sup>R<sub>1max</sub>: measured 1 hour post reflow.

#### **Environmental Characteristics**

Item	Condition	Criteria
Operating Temperature	-40 °C to +125 °C	
Recommended Storage	+40 °C max. / 70 % R.H. max.	
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	-40 °C to +125 °C, 10 times	±10 % 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 <sub>min</sub> < R < R <sub>1max</sub> )
Moisture Sensitivity Level (MSL)	See Note	
ESD Classification	Class 6 (per AEC-Q200-2, HBM)	

## **Additional Information**

Click these links for more information:











PRODUCT TECHNICAL INVENTORY SAMPLES CONTACT



### WARNING **Cancer and Reproductive Harm** 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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## **Applications**

- DC motors
- Servers and data centers
- HVAC (heating, ventilation and cooling) protection in motors, air-flow detection and I/O

# MF-RHS Series - High Temperature PPTC Resettable Fuses

## **Test Procedures and Requirements**

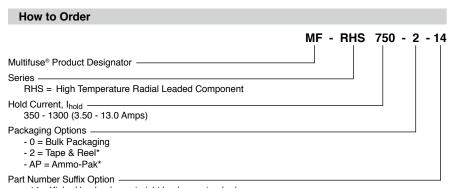
Item	Test Conditions	Accept/Reject Criteria		
Visual/Mechanical	Verify dimensions and materials	Per MF physical description		
Resistance	In still air @ 23 °C	$R_{min} \le R \le R_{max}$		
Time to Trip	At specified current, V <sub>max</sub> , 23 °C, still air	T ≤ max. time to trip (seconds)		
Hold Current	30 min. at I <sub>hold</sub> , still air	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		
Solderability	245 °C ± 5 °C, 5 seconds	95 % min. coverage		

## Thermal Derating Table - Ihold (Amps)

Madal		Ambient Operating Temperature										
Model	-40 °C	-20 °C	0 °C	23 °C	40 °C	50 °C	60 °C	70 °C	85 °C	125 °C		
MF-RHS350	4.8	4.5	4.1	3.5	3.2	3.0	2.8	2.5	2.1	1.0		
MF-RHS400	5.2	4.9	4.5	4.0	3.5	3.3	3.0	2.6	2.2	1.0		
MF-RHS450	5.4	5.2	5.0	4.5	3.8	3.5	3.2	2.9	2.4	1.1		
MF-RHS500	6.3	6.0	5.7	5.0	4.7	4.4	4.0	3.8	3.3	1.5		
MF-RHS550	8.1	7.2	6.2	5.5	5.1	4.8	4.3	4.0	3.5	1.7		
MF-RHS600	8.6	7.7	6.6	6.0	5.5	5.2	4.8	4.4	3.8	1.8		
MF-RHS650	9.0	8.1	7.2	6.5	6.0	5.5	5.1	4.7	4.1	1.9		
MF-RHS700	9.4	8.6	7.9	7.0	6.4	5.8	5.4	4.9	4.4	2.0		
MF-RHS750	9.9	9.1	8.4	7.5	6.7	6.1	5.8	5.2	4.6	2.2		
MF-RHS800	11.2	9.7	8.9	8.0	7.1	6.5	6.3	5.8	4.8	2.6		
MF-RHS900	13.1	11.4	10.3	9.0	8.4	7.8	7.4	6.6	5.9	3.1		
MF-RHS1000	15.0	13.1	11.2	10.0	9.4	8.8	8.1	7.6	6.8	3.5		
MF-RHS1100	15.7	13.8	12.2	11.0	10.0	9.2	8.4	7.9	7.1	3.6		
MF-RHS1200	16.3	14.6	12.9	12.0	10.5	9.6	8.9	8.2	7.3	3.8		
MF-RHS1300	16.8	15.4	14.0	13.0	11.5	10.3	9.4	8.5	7.5	3.9		

# MF-RHS Series - High Temperature PPTC Resettable Fuses

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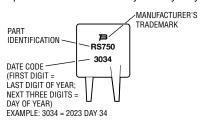
<sup>- 14 =</sup> Kinked leads where straight leads are standard

### **Packaging Quantity**

Packaging options	Models	Unit Quantity (Pcs.)	Unit
Bulk	All models	500	Bag
	MF-RHS350, MF-RHS400, MF-RHS450, MF-RHS500, MF-RHS550, MF-RHS600, MF-RHS650	3000	
Tape & Reel	MF-RHS700, MF-RHS750, MF-RHS800, MF-RHS900, MF-RHS1000	1500	Reel
	MF-RHS1100, MF-RHS1200, MF-RHS1300	1000	
	MF-RHS350, MF-RHS400, MF-RHS450, MF-RHS500, MF-RHS550, MF-RHS600, MF-RHS650	2000	
Ammo-Pack	MF-RHS700, MF-RHS750, MF-RHS800, MF-RHS900, MF-RHS1000	1000	Box
	MF-RHS1100, MF-RHS1200, MF-RHS1300	500	

### **Typical Part Marking**

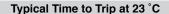
Represents total content. Layout may vary.

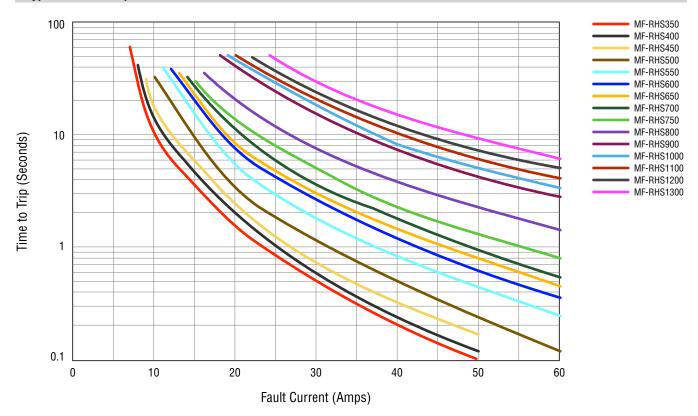


<sup>\*</sup>Packaged per EIA-468

# MF-RHS Series - High Temperature PPTC Resettable Fuses

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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.

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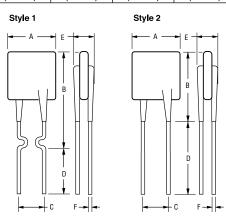
www.bourns.com

# MF-RHS Series - High Temperature PPTC Resettable Fuses

## **Product Dimensions**

	Α	В	(		D	E	F	Physical (	Characteristics
Model	Max.	Max.	Nom.	Tol. ±	Min.	Max.	Nom.	Style	Material
MF-RHS350	8.40 (0.331)	16.9 (0.665)	<u>5.1</u> (0.201)	<u>0.7</u> (0.028)	7.6 (0.299)	3.0 (0.118)	<u>0.81</u> (0.032)	2	Sn/Cu
MF-RHS400	8.40 (0.331)	17.9 (0.705)	<u>5.1</u> (0.201)	<u>0.7</u> (0.028)	7.6 (0.299)	3.0 (0.118)	0.81 (0.032)	2	Sn/Cu
MF-RHS450	8.40 (0.331)	18.9 (0.744)	<u>5.1</u> (0.201)	<u>0.7</u> (0.028)	7.6 (0.299)	3.0 (0.118)	<u>0.81</u> (0.032)	2	Sn/Cu
MF-RHS500	9.20 (0.362)	19.2 (0.756)	<u>5.1</u> (0.201)	<u>0.7</u> (0.028)	7.6 (0.299)	3.0 (0.118)	<u>0.81</u> (0.032)	2	Sn/Cu
MF-RHS550	9.30 (0.366)	19.5 (0.768)	<u>5.1</u> (0.201)	<u>0.7</u> (0.028)	7.6 (0.299)	3.0 (0.118)	<u>0.81</u> (0.032)	2	Sn/Cu
MF-RHS600	8.75 (0.344)	22.4 (0.882)	<u>5.1</u> (0.201)	<u>0.7</u> (0.028)	7.6 (0.299)	3.0 (0.118)	<u>0.81</u> (0.032)	2	Sn/Cu
MF-RHS650	10.70 (0.421)	23.2 (0.913)	<u>5.1</u> (0.201)	<u>0.7</u> (0.028)	7.6 (0.299)	3.0 (0.118)	<u>0.81</u> (0.032)	2	Sn/Cu
MF-RHS700	11.80 (0.465)	23.3 (0.917)	<u>5.1</u> (0.201)	<u>0.7</u> (0.028)	7.6 (0.299)	3.0 (0.118)	<u>0.81</u> (0.032)	2	Sn/Cu
MF-RHS750	11.80 (0.465)	24.3 (0.957)	<u>5.1</u> (0.201)	<u>0.7</u> (0.028)	7.6 (0.299)	3.0 (0.118)	0.81 (0.032)	2	Sn/Cu
MF-RHS800	12.80 (0.504)	24.7 (0.972)	<u>5.1</u> (0.201)	<u>0.7</u> (0.028)	7.6 (0.299)	3.6 (0.142)	1.00 (0.039)	2	Sn/Cu
MF-RHS900	14.40 (0.567)	24.9 (0.980)	10.2 (0.402)	<u>0.7</u> (0.028)	7.6 (0.299)	3.6 (0.142)	1.00 (0.039)	2	Sn/Cu
MF-RHS1000	14.40 (0.567)	27.9 (1.098)	10.2 (0.402)	<u>0.7</u> (0.028)	7.6 (0.299)	3.6 (0.142)	1.00 (0.039)	2	Sn/Cu
MF-RHS1100	17.40 (0.685)	27.9 (1.098)	10.2 (0.402)	<u>0.7</u> (0.028)	7.6 (0.299)	3.6 (0.142)	1.00 (0.039)	2	Sn/Cu
MF-RHS1200	17.40 (0.685)	27.9 (1.098)	10.2 (0.402)	<u>0.7</u> (0.028)	7.6 (0.299)	3.6 (0.142)	1.00 (0.039)	2	Sn/Cu
MF-RHS1300	17.40 (0.685)	28.9 (1.138)	10.2 (0.402)	<u>0.7</u> (0.028)	7.6 (0.299)	3.6 (0.142)	1.00 (0.039)	2	Sn/Cu

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



Also available with kinked leads in place of standard leads (Style 1). (see How to Order).

# **MF-RHS Series Tape and Reel Specifications**

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 <sub>o</sub>	<u>11</u> (.433)	min.
Hold down tape		No p	rotrusion	
Adhesive tape position	$W_2$	$W_2$	<u>3</u> (.118)	max.
Sprocket hole position	<i>W</i> <sub>1</sub>	W <sub>1</sub>	9 (.354)	+0.75-0.5 (+.030/020)
Sprocket hole diameter	$D_0$	D <sub>0</sub>	<u>4</u> (.157)	±0.2 (±.0078)
Height to seating plane (straight lead)	Н	Н	18 ~ 20 (.709 ~ .787)	
Height to seating plane (formed lead)	Н <sub>0</sub>	H <sub>0</sub>	16 (.630)	±0.5 (±.020)
Overall height above abscissa: MF-RHS350 ~ MF-RHS650	H <sub>1</sub>	H <sub>1</sub>	38.5 (1.516)	max.
Overall height above abscissa: MF-RHS700 ~ MF-RHS1300	H <sub>1</sub>	H <sub>1</sub>	45.0 (1.772)	max.
Cutout length		L	11 (.433)	max.
Sprocket hole pitch	$P_0$	P <sub>0</sub>	12.7 (.500)	±0.3 (±.012)
Device pitch: MF-RHS350 ~ MF-RHS650	Р	Р	12.7 (0.50)	±0.3 (±.012)
Device pitch: MF-RHS700 ~ MF-RHS1300	Р	Р	<u>25.4</u> (1.00)	±0.6 (±.024)
Pitch tolerance			20 consecutive	±1 (±.039)
Composite tape thickness	t	t	<u>0.9</u> (.035)	max.
Overall tape and lead thickness	t <sub>1</sub>	t <sub>1</sub>	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: MF-RHS350 ~ MF-RHS800	P <sub>1</sub>	P <sub>1</sub>	3.81 (.150)	±0.7 (±.028)
Ordinate to adjacent component lead: MF-RHS900 ~ MF-RHS1300	P <sub>1</sub>	P <sub>1</sub>	7.62 (.300)	±0.7 (±.028)
Lead spacing: MF-RHS350 ~ MF-RHS800	F	F	<u>5.08</u> (.200)	+0.6/-0.2 (+.024/008)
Lead spacing: MF-RHS900 ~ MF-RHS1300	F	F	10.2 (.400)	+0.6/-0.2 (+.024/008)

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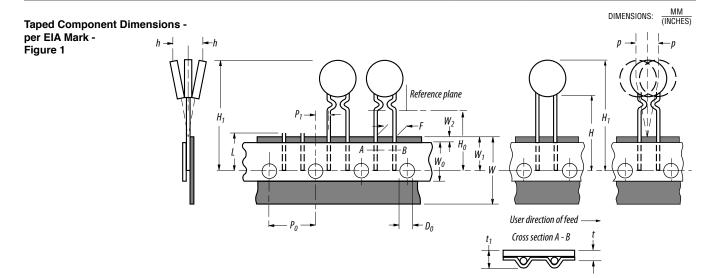
DIMENSIONS:  $\frac{MM}{(INCHES)}$ 

# **MF-RHS Series Tape and Reel Specifications**

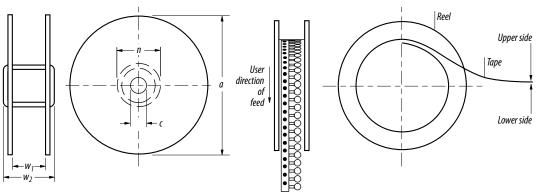
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Devices taped using EIA-468/IEC 60286-2 standards. See table below and figures for details.

Dimension Description	IEC Mark	EIA Mark	Dimensions	Tolerance
Reel width including flanges and hub	$W_4$	w <sub>2</sub>	<u>62.0</u> (2.44)	max
Dimension between flanges (measured at hub)	$W_3$	w <sub>1</sub>	allow proper reeling	and unreeling
Reel diameter	А	а	370.0 (14.57)	max.
Space between flanges (at hub, excluding device)			4.75 (.187)	±3.25 (±.128)
Arbor hole diameter	С	С	<u>26.0</u> (1.024)	±12.0 (±.472)
Core diameter	N	п	<u>80</u> (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 %	



Reel Dimensions - per EIA Mark - Figure 2



MF-RHS SERIES, REV. A, 12/23

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

# **Bourns® Multifuse® PPTC Resettable Fuses**

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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: <a href="https://www.bourns.com/docs/RoHS-MSL/msl\_mf.pdf">https://www.bourns.com/docs/RoHS-MSL/msl\_mf.pdf</a>

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