

### **Features**

- Compliant with AEC-Q200 Rev-D- Stress Test Qualification for Passive Components in Automotive Applications
- Operating temperature range up to 125 °C
- Low thermal derating factor
- Higher hold currents at elevated temperature
- Choice of operating currents
- RoHS compliant\* and halogen free\*\*
- Resettable fault protection of general electronic equipment
- Agency recognition: c **Tu**us

# MF-RHT Series - High Temperature PTC Resettable Fuses

#### **Electrical Characteristics**

	V <sub>max</sub>	I <sub>max</sub>	Imay	Imay	l <sub>hold</sub>	I <sub>trip</sub>	Initial Resistance	1 Hour (R <sub>1</sub> ) Post-Trip Resistance		. Time Trip	Tripped Power Dissipation	Ager Recogn	
Model	IIIax	IIIax	at 23 °C		at 23 °C Ohms	at 23 °C Ohms	at 23 °C		at 23 °C Watts	cUL	ΤÜV		
	Volts	Amps	An	nps	Min.	Max.	Amps Seconds		Тур.	E174545			
MF-RHT050	30	40	0.5 0.92		0.48	1.10	2.5	2.5	0.9	✓	Pending		
MF-RHT070	16	40	0.7	1.4	0.30	0.80	3.5	4.0	1.4	✓	Pending		
MF-RHT100	30	40	1.0	1.8	0.18	0.43	5.2	5.0	1.4	✓	Pending		
MF-RHT200	16	100	2.0	3.8	0.045	0.110	12.5	3.0	1.4	✓	Pending		
MF-RHT200/32	32	50	2.0	3.8	0.045	0.110	12.5	3.0	1.4	✓	Pending		
MF-RHT300	16	100	3.0	6.0	0.033	0.079	15.0	5.0	3.0	✓	Pending		
MF-RHT400	16	100	4.0	7.5	0.024	0.060	20.0	5.0	3.3	✓	Pending		
MF-RHT450	16	100	4.5	7.8	0.022	0.054	22.5	3.0	3.6	✓	Pending		
MF-RHT500	16	100	5.0	9.0	0.0175	0.045	25.0	9.0	3.6	✓	Pending		
MF-RHT550	16	100	5.5	10.0	0.0150	0.037	27.5	6.0	3.5	✓	Pending		
MF-RHT600	16	100	6.0	10.8	0.0130	0.032	30.0	5.0	4.1	✓	Pending		
MF-RHT650	16	100	6.5	12.0	0.0110	0.026	32.5	5.5	4.3	✓	Pending		
MF-RHT700	16	100	7.0	13.0	0.0100	0.025	35.0	7.0	4.0	✓	Pending		
MF-RHT750	16	100	7.5	13.1	0.0094	0.022	37.5	7.0	4.5	✓	Pending		
MF-RHT800	16	100	8.0	15.0	0.0080	0.020	40.0	8.0	4.2	✓	Pending		
MF-RHT900	16	100	9.0	16.5	0.0074	0.017	45.0	10.0	5.0	✓	Pending		
MF-RHT1000	16	100	10.0	18.5	0.0062	0.015	50.0	9.0	5.3	✓	Pending		
MF-RHT1100	16	100	11.0	20.0	0.0055	0.013	55.0	11.0	5.5	✓	Pending		
MF-RHT1300	16	100	13.0	24.0	0.0041	0.010	60.0	13.0	6.9	✓	Pending		

#### **Environmental Characteristics**

Item	Condition	Criteria
Operating Temperature	-40 °C to +85 °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)	

### **Test Procedures and Requirements**

Item	Test Condition	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	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
Solderability	245 °C ±5 °C, 5 seconds	95 % min. coverage



RoHS Directive 2015/863, Mar 31, 2015 and Annex.

Or less.

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

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<sup>\*\*</sup> 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

### **MF-RHT Series - High Temperature PTC Resettable Fuses**

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### Thermal Derating Table - Ihold (Amps)

	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-RHT050	0.68	0.62	0.56	0.5	0.44	0.4	0.36	0.34	0.28	0.12		
MF-RHT070	0.95	0.87	0.79	0.7	0.62	0.56	0.51	0.47	0.39	0.17		
MF-RHT100	1.36	1.24	1.13	1.0	0.89	0.80	0.73	0.67	0.56	0.24		
MF-RHT200	2.71	2.49	2.26	2.0	1.77	1.60	1.46	1.34	1.11	0.49		
MF-RHT200/32	2.71	2.49	2.26	2.0	1.77	1.60	1.46	1.34	1.11	0.49		
MF-RHT300	4.07	3.74	3.41	3.0	2.65	2.40	2.21	2.00	1.66	0.74		
MF-RHT400	5.57	5.11	4.65	4.0	3.62	3.29	3.01	2.73	2.27	1.01		
MF-RHT450	6.1	5.6	5.1	4.5	4.0	3.6	3.3	3.0	2.5	1.1		
MF-RHT500	6.78	6.22	5.67	5.0	4.44	4	3.67	3.33	2.78	1.22		
MF-RHT550	7.47	6.86	6.24	5.5	4.85	4.41	4.04	3.66	3.05	1.36		
MF-RHT600	8.20	7.50	6.80	6.0	5.3	4.9	4.4	4	3.3	1.5		
MF-RHT650	8.8	8.1	7.4	6.5	5.7	5.3	4.8	4.3	3.6	1.6		
MF-RHT700	9.51	8.73	7.95	7.0	6.17	5.61	5.15	4.66	3.88	1.73		
MF-RHT750	10.2	9.4	8.6	7.5	6.6	6.1	5.6	5.0	4.1	1.9		
MF-RHT800	10.87	9.98	9.08	8.0	7.06	6.41	5.88	5.33	4.43	1.97		
MF-RHT900	12.21	11.19	10.16	9.0	7.97	7.20	6.56	6.04	5.01	2.19		
MF-RHT1000	13.6	12.5	11.4	10.0	8.8	8.10	7.40	6.60	5.50	2.5		
MF-RHT1100	14.94	13.72	12.49	11.0	9.7	8.82	8.09	7.32	6.09	2.71		
MF-RHT1300	17.7	16.3	14.8	13.0	11.4	10.5	9.6	8.6	7.2	3.3		

### 

- 14 = Kinked Leads in Place of Std. Straight Leads

- 17 = Straight Leads in Place of Std. Kinked Leads

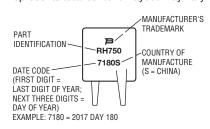
\*Packaged per EIA-468

#### **Packaging Quantity**

Packaging options	Models	Unit Quantity (Pcs.)	Unit	
Bulk	MF-RHT050 ~ MF-RHT800	500	Bag	
Duik	MF-RHT900 ~ MF-RHT1300	250		
	MF-RHT050 ~ MF-RHT400	3000		
Tape & Reel	MF-RHT450 ~ MF-RHT700	1500	Reel	
	MF-RHT750 ~ MF-RHT1300	1000		
	MF-RHT050 ~ MF-RHT400	2000		
Ammo-Pack	mmo-Pack MF-RHT450 ~ MF-RHT900		Pack	
	MF-RHT1000 ~ MF-RHT1300	500		

### Typical Part Marking

Represents total content. Layout may vary.



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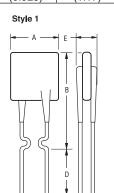
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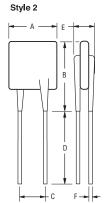
### **MF-RHT Series - High Temperature PTC Resettable Fuses**

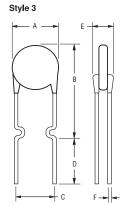
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#### **Product Dimensions**

Madal	Α	В	(		D	E	F	Physical (	Characteristics
Model	Max.	Max.	Nom.	Tol. ±	Min.	Max.	Nom.	Style	Material
MF-RHT050	7.40	12.7	5.1	0.7	7.6	3.0	0.51	3	Sn/CuFe
1011 11111030	(0.291)	(0.500)	(0.201)	(0.028)	(0.30)	(0.12)	(0.020)	0	On/Our C
MF-RHT070	6.86 (0.27)	10.8 (0.425)	5.1 (0.201)	0.7 (0.028)	$\frac{7.6}{(0.30)}$	3.0 (0.12)	0.51 (0.020)	1	Sn/CuFe
MF-RHT100	9.70 (0.382)	13.6 (0.535)	5.1 (0.201)	0.7 (0.028)	$\frac{7.6}{(0.30)}$	$\frac{3.0}{(0.12)}$	0.51 (0.020)	3	Sn/CuFe
MF-RHT200	9.4 (0.37)	14.0 (0.55)	<u>5.1</u> (0.201)	0.7 (0.028)	7.6 (0.30)	3.0 (0.12)	0.51 (0.020)	3	Sn/CuFe
MF-RHT200/32	9.4 (0.37)	14.0 (0.55)	<u>5.1</u> (0.201)	0.7 (0.028)	$\frac{7.6}{(0.30)}$	3.0 (0.12)	0.51 (0.020)	3	Sn/CuFe
MF-RHT300	8.80 (0.35)	13.8 (0.55)	5.1 (0.201)	0.7 (0.028)	$\frac{7.6}{(0.30)}$	3.0 (0.12)	0.81 (0.032)	2	Sn/Cu
MF-RHT400	10.0 (0.394)	15.0 (0.591)	5.1 (0.201)	0.7 (0.028)	7.6 (0.30)	3.0 (0.12)	0.81 (0.032)	2	Sn/Cu
MF-RHT450	10.4 (0.41)	15.6 (0.61)	5.1 (0.201)	$\frac{0.7}{(0.028)}$	7.6 (0.30)	3.0 (0.12)	0.81 (0.032)	2	Sn/Cu
MF-RHT500	11.2 (0.441)	18.9 (0.744)	5.1 (0.201)	$\frac{0.7}{(0.028)}$	7.6 (0.30)	3.0 (0.12)	$\frac{0.81}{(0.032)}$	2	Sn/Cu
MF-RHT550	11.2 (0.441)	18.9 (0.744)	5.1 (0.201)	0.7 (0.028)	7.6 (0.30)	3.0 (0.12)	$\frac{0.81}{(0.032)}$	2	Sn/Cu
MF-RHT600	11.2 (0.441)	21.0 (0.827)	5.1 (0.201)	0.7 (0.028)	7.6 (0.30)	3.0 (0.12)	$\frac{0.81}{(0.032)}$	2	Sn/Cu
MF-RHT650	12.7 (0.50)	22.2 (0.88)	5.1 (0.201)	$\frac{0.7}{(0.028)}$	7.6 (0.30)	3.0 (0.12)	$\frac{0.81}{(0.032)}$	2	Sn/Cu
MF-RHT700	14.0 (0.55)	21.9 (0.862)	5.1 (0.201)	$\frac{0.7}{(0.028)}$	7.6 (0.30)	3.0 (0.12)	$\frac{0.81}{(0.032)}$	2	Sn/Cu
MF-RHT750	14.0 (0.55)	21.9 (0.862)	<u>5.1</u> (0.201)	$\frac{0.7}{(0.028)}$	$\frac{7.6}{(0.30)}$	3.0 (0.12)	$\frac{0.81}{(0.032)}$	2	Sn/Cu
MF-RHT800	16.5 (0.65)	22.5 (0.88)	5.1 (0.201)	0.7 (0.028)	$\frac{7.6}{(0.30)}$	3.0 (0.12)	$\frac{0.81}{(0.032)}$	2	Sn/Cu
//F-RHT900	16.5 (0.65)	25.7 (1.012)	5.1 (0.201)	0.7 (0.028)	$\frac{7.6}{(0.30)}$	3.0 (0.12)	0.81 (0.032)	2	Sn/Cu
//F-RHT1000	17.5 (0.689)	<u>26.7</u> (0.51)	10.2 (0.402)	$\frac{0.7}{(0.028)}$	$\frac{7.6}{(0.30)}$	3.0 (0.12)	$\frac{0.81}{(0.032)}$	2	Sn/Cu
//F-RHT1100	21.0 (0.65)	26.1 (0.88)	10.2 (0.402)	0.7 (0.028)	7.6 (0.30)	3.0 (0.12)	0.81 (0.032)	2	Sn/Cu
MF-RHT1300	23.5 (0.925)	28.7	10.2 (0.402)	0.7 (0.028)	7.6 (0.30)	3.6 (0.14)	1.0 (0.040)	2	Sn/Cu





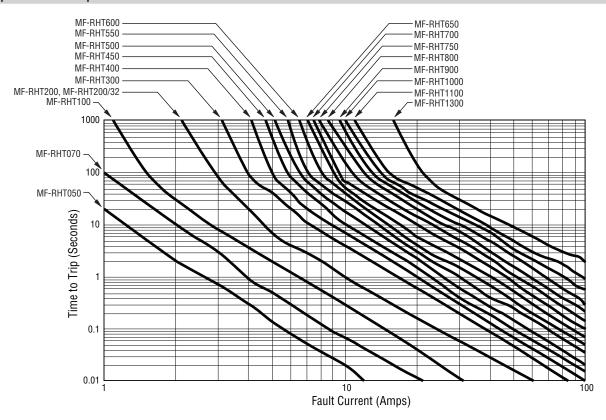


Also available with kinked and straight leads in place of standard leads (see How to Order).

DIMENSIONS:

(INCHES)

### Typical Time to Trip at 23 °C



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.

# **MF-RHT 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)	-0.5/+1.0 (-0.02/+.039)
Hold down tape width	W <sub>O</sub>	$W_{O}$	<u>5</u> (.197)	min.
Hold down tape			No protrusion	
Adhesive tape position	W <sub>2</sub>	W <sub>2</sub>	3 (.118)	max.
Sprocket hole position	W <sub>1</sub>	W <sub>1</sub>	9 (.354)	-0.5/+0.75 (-0.02/+0.03)
Sprocket hole diameter	D <sub>0</sub>	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)	H <sub>0</sub>	H <sub>0</sub>	<u>16</u> (.63)	±0.5 (±.02)
Overall height above abscissa	H <sub>1</sub>	H <sub>1</sub>	38.5 (1.516)	max.
Cutout Length		L	<u>11</u> (.433)	max.
Sprocket hole pitch	P <sub>0</sub>	P <sub>0</sub>	12.7 (0.5)	±0.3 (±.012)
Device pitch: MF-RHT050 ~ MF-RHT400	Р	Р	12.7 (0.5)	±0.3 (±.012)
Device pitch: MF-RHT450 ~ MF-RHT1300	Р	Р	25.4 (1.0)	±0.6 (±.024)
Pitch tolerance			20 consecutive	±1 (±.039)
Composite tape thickness	t	t	0.9 (.035)	max.
Overall tape and lead thickness: MF-RHT050 ~ MF-RHT200/32	t <sub>1</sub>	t <sub>1</sub>	2.0 (0.079)	max.
Overall tape and lead thickness: MF-RHT300 ~ MF-RHT1300	t <sub>1</sub>	t <sub>1</sub>	2.3 (0.091)	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	$\Delta_{\mathcal{P}}$	$\Delta_{\mathcal{p}}$	0	±1.3 (±.051)
Ordinate to adjacent component lead: MF-RHT050 ~ MF-RHT900	P <sub>1</sub>	P <sub>1</sub>	3.81 (0.150)	±0.7 (±0.028)
Ordinate to adjacent component lead: MF-RHT1000 ~ MF-RHT1300	P <sub>1</sub>	P <sub>1</sub>	7.62 (0.300)	±0.7 (±0.028)
Lead spacing: MF-RHT050 ~ MF-RHT900	F	F	5.08 (0.2)	+0.6/-0.2 (+0.024/-0.008)
Lead spacing: MF-RHT1000 ~ MF-RHT1300	F	F	10.2 (0.4)	+0.6/-0.2 (+0.024/-0.008)
Splice sprocket hole alignment  Front-to-back deviation  Side-to-side deviation  Ordinate to adjacent component lead: MF-RHT050 ~ MF-RHT900  Ordinate to adjacent component lead: MF-RHT1000 ~ MF-RHT1300  Lead spacing: MF-RHT050 ~ MF-RHT900	$\Delta h$ $\Delta p$ $P_1$ $P_1$ $F$	Δh Δp P1 P1	(0.091) 0 0 0 3.81 (0.150) 7.62 (0.300) 5.08 (0.2)	$\begin{array}{c} \pm 0.3 \\ \hline (\pm .012) \\ \hline \pm 1.0 \\ \hline (\pm .039) \\ \hline \pm 1.3 \\ \hline (\pm .051) \\ \hline \pm 0.7 \\ \hline (\pm 0.028) \\ \hline \pm 0.7 \\ \hline (\pm 0.028) \\ \hline \pm 0.6 / 0.2 \\ \hline (+0.024 / -0.008) \\ \hline +0.6 / -0.2 \\ \hline \end{array}$

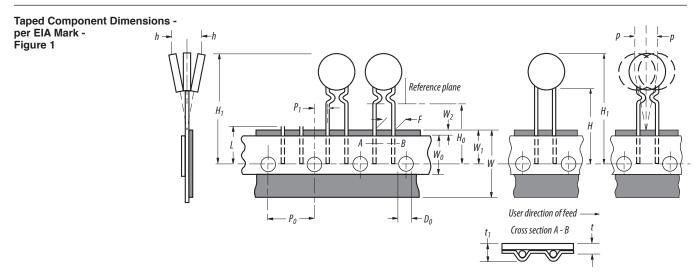
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DIMENSIONS:

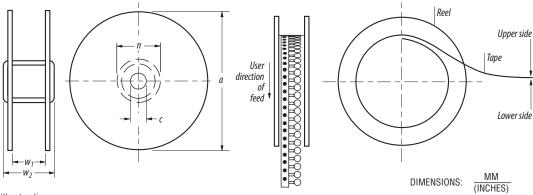
 $\frac{\text{MM}}{\text{(INCHES)}}$ 

#### **MF-RHT Series Tape and Reel Specifications IEC** EIA **Dimension Description Dimensions** Mark Mark **Tolerance** 62.0 Reel width including flanges and hub $W_4$ max. W2 (2.44)Wз Dimension between flanges (measured at hub) allow proper reeling and unreeling W1 370.0 Reel diameter Α а max. (14.57)4.75 ±3.25 Space between flanges (at hub, excluding device) (.187)(±.128) 26.0 ±12.0 CArbor hole diameter С (1.024)(±.472) 80 Core diameter Ν n min. (3.15)62 372 372 Box dimensions max. (2.44)(14.6)(14.6)Consecutive missing places 3 max

Empty places per reel Not specified



Reel Dimensions - per EIA Mark - Figure 2



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: https://www.bourns.com/docs/RoHS-MSL/msl\_mf.pdf

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