


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 temperatures

- RoHS compliant* and halogen free**
- Agency recognition:  cULus

MF-RHS Series - High Temperature PTC Resettable Fuses

Electrical Characteristics

| Model | V _{max} | I _{max} | I _{hold} | I _{trip} | Resistance | | Max. Time to Trip | | Tripped Power Dissipation | Agency Recognition | AEC-Q200 Compliant/ Automotive Grade |
|------------|------------------|------------------|-------------------|-------------------|-----------------------|--------|-------------------|------|---------------------------|--------------------|---|
| | | | at 23 °C | | at 23 °C (Ohms) | | at 23 °C | | at 23 °C (Watts) | cUL | |
| | Volts | Amps | Amps | R _{min} | R _{1Max} *** | Amps | Seconds | Typ. | E174545 | | |
| MF-RHS350 | 16 | 100 | 3.5 | 7.0 | 0.018 | 0.050 | 17.5 | 4.5 | 3.0 | ✓ | ✓ |
| MF-RHS400 | | | 4.0 | 8.0 | 0.016 | 0.044 | 20.0 | 5.0 | 3.0 | ✓ | ✓ |
| MF-RHS450 | | | 4.5 | 9.0 | 0.0145 | 0.040 | 22.5 | 5.5 | 3.0 | ✓ | ✓ |
| MF-RHS500 | | | 5.0 | 10.0 | 0.0135 | 0.038 | 25.0 | 5.8 | 3.0 | ✓ | ✓ |
| MF-RHS550 | | | 5.5 | 11.0 | 0.0120 | 0.032 | 27.5 | 10.0 | 3.0 | ✓ | ✓ |
| MF-RHS600 | | | 6.0 | 12.0 | 0.0090 | 0.0252 | 30.0 | 6.5 | 3.3 | ✓ | ✓ |
| MF-RHS650 | | | 6.5 | 13.0 | 0.0095 | 0.0225 | 32.5 | 6.5 | 3.3 | ✓ | ✓ |
| MF-RHS700 | | | 7.0 | 14.0 | 0.0085 | 0.0190 | 35.0 | 6.8 | 3.7 | ✓ | ✓ |
| MF-RHS750 | | | 7.5 | 15.0 | 0.0073 | 0.0168 | 37.5 | 7.0 | 4.0 | ✓ | ✓ |
| MF-RHS800 | | | 8.0 | 16.0 | 0.0060 | 0.0145 | 40.0 | 8.0 | 4.3 | ✓ | ✓ |
| MF-RHS900 | | | 9.0 | 18.0 | 0.0046 | 0.0098 | 45.0 | 9.0 | 5.0 | ✓ | ✓ |
| MF-RHS1000 | | | 10.0 | 20.0 | 0.0042 | 0.0090 | 50.0 | 10.0 | 5.4 | ✓ | ✓ |
| MF-RHS1100 | | | 11.0 | 22.0 | 0.0038 | 0.0083 | 55.0 | 11.2 | 5.7 | ✓ | ✓ |
| MF-RHS1200 | | | 12.0 | 24.0 | 0.0035 | 0.0077 | 60.0 | 12.5 | 6.0 | ✓ | ✓ |
| MF-RHS1300 | | | 13.0 | 26.0 | 0.0033 | 0.0070 | 60.0 | 14.0 | 6.4 | ✓ | ✓ |

***R_{1max}: 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 _{min} < R < 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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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 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 | $R_{min} \leq R \leq R_{max}$ |
| Time to Trip | At specified current, V_{max} , 23 °C, still air | $T \leq \text{max. time to trip (seconds)}$ |
| Hold Current | 30 min. at I_{hold} , still air | No trip |
| Trip Cycle Life | V_{max} , I_{max} , 100 cycles | No arcing or burning |
| Trip Endurance | V_{max} , 48 hours | No arcing or burning |
| Solderability | 245 °C \pm 5 °C, 5 seconds | 95 % min. coverage |

Thermal Derating Table - I_{hold} (Amps)

| Model | Ambient Operating Temperature | | | | | | | | | |
|------------|-------------------------------|--------|------|-------|-------|-------|-------|-------|-------|--------|
| | -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 |

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MF-RHS Series - High Temperature PTC Resettable Fuses



How to Order

MF - RHS 750 - 2 - 14

Multifuse® Product Designator _____

Series _____
 RHS = High Temperature Radial Leaded Component

Hold Current, I_{hold} _____
 350 - 1300 (3.50 - 13.0 Amps)

Packaging Options _____
 - 0 = Bulk Packaging
 - 2 = Tape & Reel*
 - AP = Ammo-Pak*

Part Number Suffix Option _____
 - 14 = Kinked leads where straight leads are standard

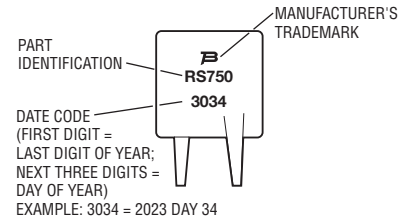
*Packaged per EIA-468

Packaging Quantity

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

Typical Part Marking

Represents total content. Layout may vary.

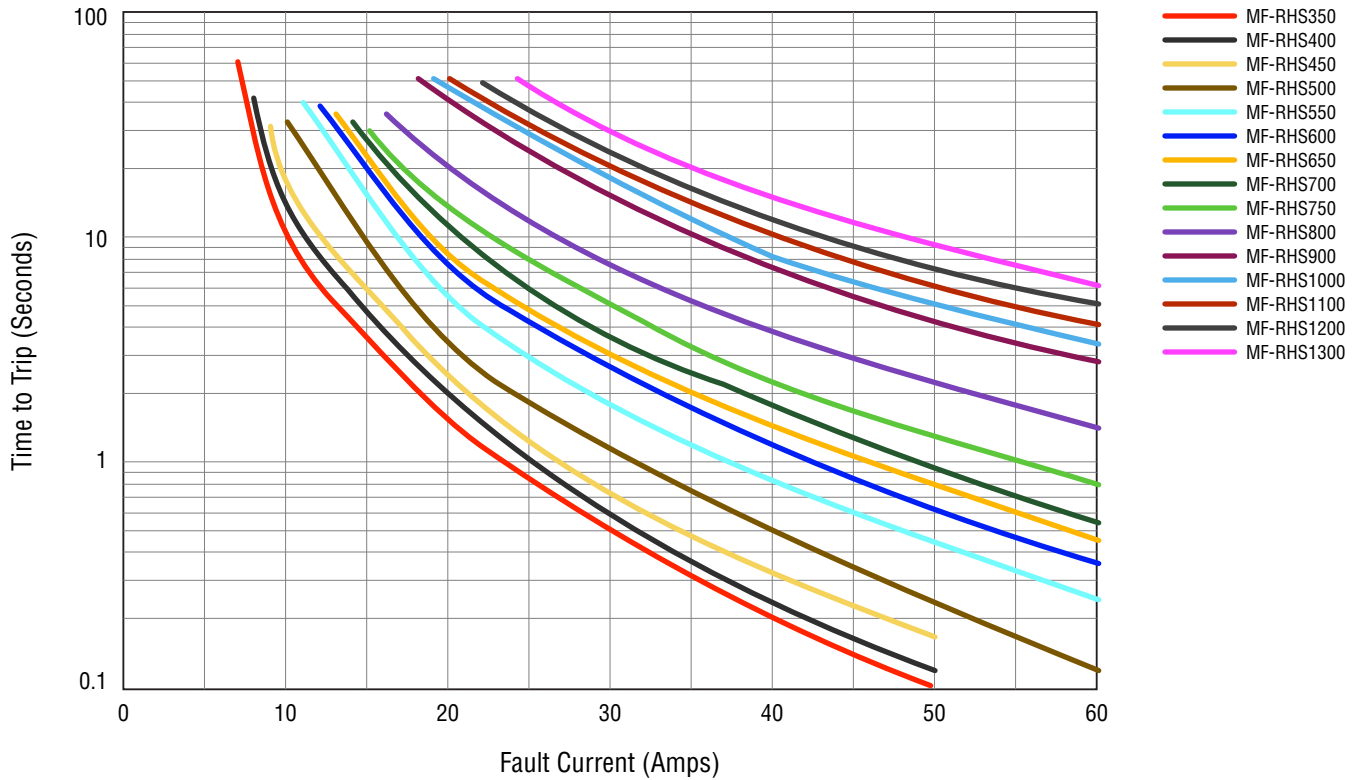


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Typical Time to Trip at 23 °C



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.

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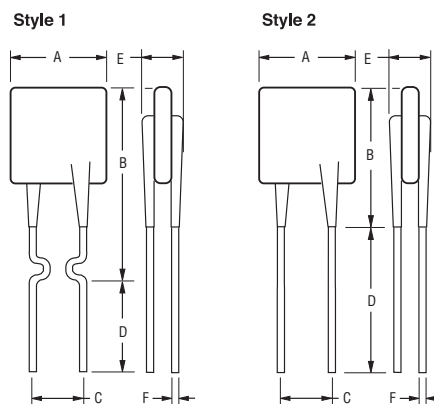
MF-RHS Series - High Temperature PTC Resettable Fuses

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Product Dimensions

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

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



NOTE: Kinked lead option (-14) is also available, e.g. MF-RHS750-2-14. (refer to "How to Order" section.)

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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 |
|---|---------------------------------------|------------|---------------------------------------|------------------------------------|
| Carrier tape width | W | W | $\frac{18}{(.709)}$ | $\frac{+1.0/-0.5}{(+.039/- .020)}$ |
| Hold down tape width | W_0 | W_0 | $\frac{5}{(.197)}$ | min. |
| Hold down tape | No protrusion beyond the carrier tape | | | |
| Adhesive tape position | W_2 | W_2 | $\frac{3}{(.118)}$ | max. |
| Sprocket hole position | W_1 | W_1 | $\frac{9}{(.354)}$ | $\frac{+0.75-0.5}{(+.030/- .020)}$ |
| Sprocket hole diameter | D_0 | D_0 | $\frac{4}{(.157)}$ | $\frac{\pm 0.2}{(\pm .0078)}$ |
| Height to seating plane (straight lead) | H | H | $\frac{18 \sim 20}{(.709 \sim .787)}$ | |
| Height to seating plane (formed lead) | H_0 | H_0 | $\frac{16}{(.630)}$ | $\frac{\pm 0.5}{(\pm .020)}$ |
| Overall height above abscissa: MF-RHS350 ~ MF-RHS650 | H_1 | H_1 | $\frac{38.5}{(1.516)}$ | max. |
| Overall height above abscissa: MF-RHS700 ~ MF-RHS1300 | H_1 | H_1 | $\frac{45.0}{(1.772)}$ | max. |
| Cutout length | | L | $\frac{11}{(.433)}$ | max. |
| Sprocket hole pitch | P_0 | P_0 | $\frac{12.7}{(.500)}$ | $\frac{\pm 0.3}{(\pm .012)}$ |
| Device pitch: MF-RHS350 ~ MF-RHS650 | P | P | $\frac{12.7}{(0.50)}$ | $\frac{\pm 0.3}{(\pm .012)}$ |
| Device pitch: MF-RHS700 ~ MF-RHS1300 | P | P | $\frac{25.4}{(1.00)}$ | $\frac{\pm 0.6}{(\pm .024)}$ |
| Pitch tolerance | | | 20 consecutive | $\frac{\pm 1}{(\pm .039)}$ |
| Composite tape thickness | t | t | $\frac{0.9}{(.035)}$ | max. |
| Overall tape and lead thickness | t_1 | t_1 | $\frac{2.3}{(.091)}$ | max. |
| Splice sprocket hole alignment | | | 0 | $\frac{\pm 0.3}{(\pm .012)}$ |
| Front-to-back deviation | Δ_h | Δ_h | 0 | $\frac{\pm 1.0}{(\pm .039)}$ |
| Side-to-side deviation | Δ_p | Δ_p | 0 | $\frac{\pm 1.3}{(\pm .051)}$ |
| Ordinate to adjacent component lead: MF-RHS350 ~ MF-RHS800 | P_1 | P_1 | $\frac{3.81}{(.150)}$ | $\frac{\pm 0.7}{(\pm .028)}$ |
| Ordinate to adjacent component lead: MF-RHS900 ~ MF-RHS1300 | P_1 | P_1 | $\frac{7.62}{(.300)}$ | $\frac{\pm 0.7}{(\pm .028)}$ |
| Lead spacing: MF-RHS350 ~ MF-RHS800 | F | F | $\frac{5.08}{(.200)}$ | $\frac{+0.6/-0.2}{(+.024/- .008)}$ |
| Lead spacing: MF-RHS900 ~ MF-RHS1300 | F | F | $\frac{10.2}{(.400)}$ | $\frac{+0.6/-0.2}{(+.024/- .008)}$ |

— Continued on next page —

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

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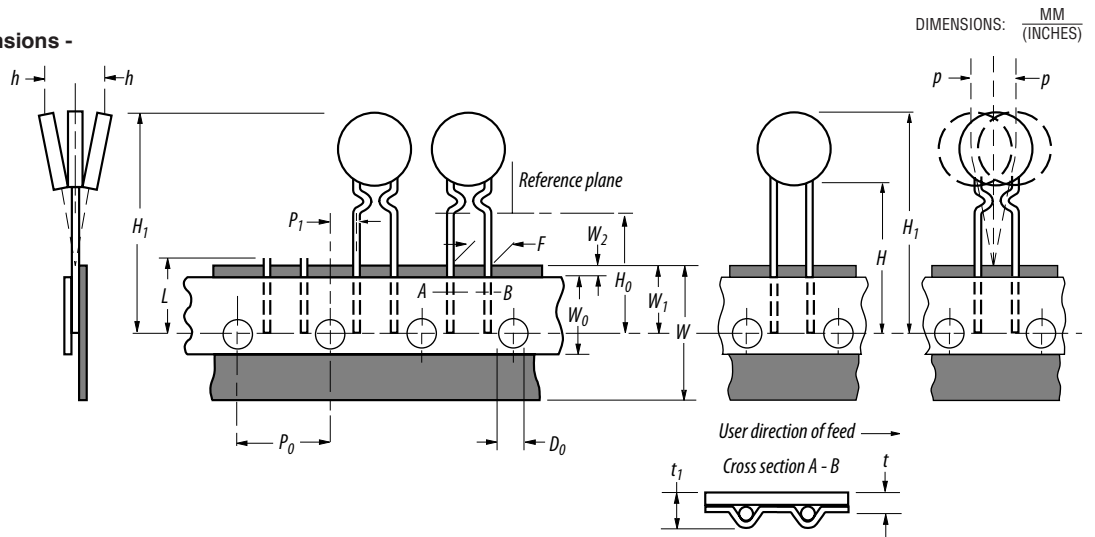
MF-RHS Series Tape and Reel Specifications

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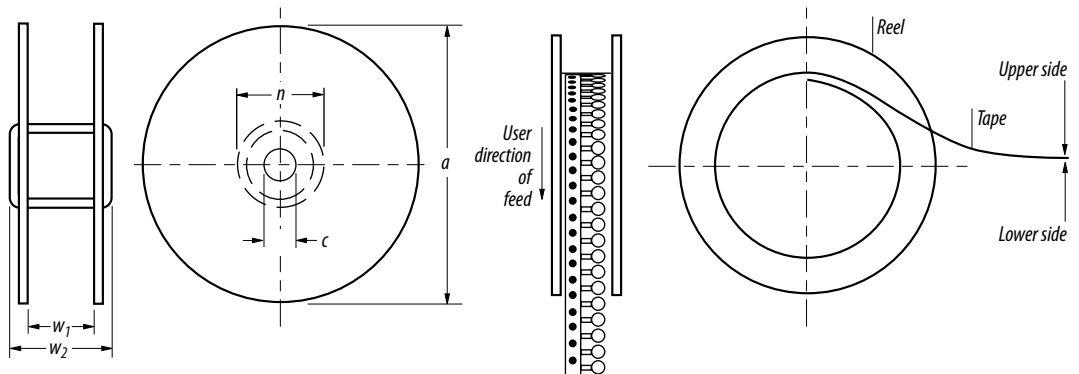
Devices taped using EIA-468/IEC 60286-2 standards. See table below and figures for details.

| Dimension Description | IEC Mark | EIA Mark | Dimensions | Tolerance |
|--|----------|----------|---|------------------------------|
| Reel width including flanges and hub | W_4 | w_2 | $\frac{62.0}{(2.44)}$ | max |
| Dimension between flanges (measured at hub) | W_3 | w_1 | allow proper reeling and unreeling | |
| Reel diameter | A | a | $\frac{370.0}{(14.57)}$ | max. |
| Space between flanges (at hub, excluding device) | | | $\frac{4.75}{(.187)}$ | ± 3.25 ($\pm .128$) |
| Arbor hole diameter | C | c | $\frac{26.0}{(1.024)}$ | ± 12.0 ($\pm .472$) |
| Core diameter | N | n | $\frac{80}{(3.15)}$ | min. |
| Box dimensions | | | $\frac{62 \times 372 \times 372}{(2.44 \times 14.6 \times 14.6)}$ | 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



MF-RHS SERIES, REV. D, 05/26

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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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The characteristics and parameters of a Bourns® product set forth in its data sheet are based on laboratory conditions, and statements regarding the suitability of products for certain "typical" applications are based on Bourns' knowledge of typical requirements in generic applications. Bourns assumes that "typical" applications include failsafe/backup features to address critical risks to users and are designed to allow rework of Bourns® product to avoid scrap of a device solely due to malfunctioning Bourns® product. The characteristics and parameters of a Bourns® product in a user application may vary from the data sheet characteristics and parameters due to (i) the combination of the Bourns® product with other components in the user's application, or (ii) the environment of the user application itself. The characteristics and parameters of a Bourns® product also can and do vary in different applications and actual performance may vary over time. Thus, users should always verify the actual performance of the Bourns® product in their specific devices and applications and make their own independent judgments regarding the suitability of Bourns® product and the amount of additional test margin to design into their device or application to compensate for differences between laboratory and real-world conditions.

Unless Bourns has explicitly designated an individual Bourns® product as meeting the requirements of a particular industry standard (e.g., IATF 16949) or a particular qualification (e.g., UL listed or recognized), Bourns is not responsible for any failure of an individual Bourns® product to meet the requirements of such industry standard or particular qualification even if such industry standard or qualification is a "state of art". Users of Bourns® products are responsible for ensuring compliance with safety-related requirements and standards applicable to their devices or applications.

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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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- Bourns expressly identifies Bourns® standard products that are suitable for use in the typical aviation applications/systems requiring System Design Assurance Level (RTCA DO-254 DAL) of C, D or E in its publication entitled "Bourns Civilian Aerospace/Aviation Grade Component Guide." Bourns does not test its products for compliance with United States Federal Aviation Administration standards or any other generally equivalent governmental organization standard applicable to products designed or manufactured for use in aviation applications. Use of Bourns® standard components in aviation applications associated with RTCA DO-254 DAL A or B without proper approval noted above shall be at the user's sole risk.
- Bourns will review and authorize on a case-by-case basis the use of Bourns® standard products which are at least AEC-Q compliant in space-related civil applications (rockets, satellites) with a negotiated cross-waiver and indemnity agreement.

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.

Use of Bourns® products or Bourns' technology in military/defense applications must be reviewed with Bourns for compliance with applicable export control laws and embargoes. Users shall not sell, transfer, export or re-export (which includes transfers within a country) any Bourns® products or technology or technical data for use in activities which involve the design, development, production, use or stockpiling of nuclear, chemical or biological weapons or missiles, nor shall they use Bourns® products or technology or technical data in any facility which engages in activities relating to such devices. Further, Bourns® products and Bourns' technology and technical data may not under any circumstance be exported or re-exported to countries subject to international sanctions or embargoes. Bourns® products and technology may not, without prior authorization from Bourns and/or the Government of a country where such product/technology is designed and/or manufactured, be resold, transferred, or re-exported (including within the same country) to any party not eligible to receive commodities, software, and technical data originating in such country.

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