



**THE DATASHEET OF  
MF-RG700-2**





## Features

- Compliant with AEC-Q200 Rev-D- Stress Test Qualification for Passive Components in Automotive Applications
- Radial leaded devices
- Smaller size vs. comparable  $I_{hold}$  ratings
- Faster tripping
- RoHS compliant\* and halogen free\*\*
- Agency recognition: cULus

## Applications

- Automotive applications
- Where space is limited and fast tripping is required

## MF-RG Series - PTC Resettable Fuses

### 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 +85 °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) | <a href="#">See Note</a>                |  |
| ESD Classification               | Class 6 (per AEC-Q200-2, HBM)           |  |

### Additional Information

Click these links for more information:



### Electrical Characteristics

| Model     | $V_{max}$ | $I_{max}$ | $I_{hold}$ | $I_{trip}$ | Initial Resistance |        | 1 Hour ( $R_1$ ) Post-Trip Resistance | Max. Time to Trip |         | Tripped Power Dissipation | Agency Recognition      | AEC-Q200 Compliant |
|-----------|-----------|-----------|------------|------------|--------------------|--------|---------------------------------------|-------------------|---------|---------------------------|-------------------------|--------------------|
|           |           |           |            |            | at 23 °C           |        | at 23 °C                              | at 23 °C          |         | at 23 °C                  | cUL                     |                    |
|           |           |           |            |            | Min.               | Max.   | Max.                                  | Amps              | Seconds | Typ.                      | <a href="#">E174545</a> |                    |
| MF-RG300  | 16        | 100       | 3.0        | 5.1        | 0.0380             | 0.0650 | 0.0975                                | 15                | 1.0     | 2.3                       | ✓                       | ✓                  |
| MF-RG400  | 16        | 100       | 4.0        | 6.8        | 0.0210             | 0.0385 | 0.0600                                | 20                | 1.7     | 2.4                       | ✓                       | ✓                  |
| MF-RG500  | 16        | 100       | 5.0        | 8.5        | 0.0150             | 0.0230 | 0.0340                                | 25                | 2.0     | 2.6                       | ✓                       | ✓                  |
| MF-RG600  | 16        | 100       | 6.0        | 10.2       | 0.0100             | 0.0185 | 0.0280                                | 30                | 3.3     | 2.8                       | ✓                       | ✓                  |
| MF-RG650  | 16        | 100       | 6.5        | 11.1       | 0.0088             | 0.0158 | 0.0240                                | 33                | 3.5     | 3.0                       | ✓                       | ✓                  |
| MF-RG700  | 16        | 100       | 7.0        | 11.9       | 0.0077             | 0.0130 | 0.0200                                | 35                | 3.5     | 3.0                       | ✓                       | ✓                  |
| MF-RG800  | 16        | 100       | 8.0        | 13.6       | 0.0056             | 0.0110 | 0.0175                                | 40                | 5.0     | 3.0                       | ✓                       | ✓                  |
| MF-RG900  | 16        | 100       | 9.0        | 15.3       | 0.0047             | 0.0092 | 0.0135                                | 45                | 5.5     | 3.3                       | ✓                       | ✓                  |
| MF-RG1000 | 16        | 100       | 10.0       | 17.0       | 0.0040             | 0.0071 | 0.0102                                | 50                | 6.0     | 3.6                       | ✓                       | ✓                  |
| MF-RG1100 | 16        | 100       | 11.0       | 18.7       | 0.0037             | 0.0062 | 0.0089                                | 55                | 7.0     | 3.7                       | ✓                       | ✓                  |

\* 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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Cancer and Reproductive Harm  
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# MF-RG Series - PTC Resettable Fuses

# BOURNS®

## Test Procedures and Requirements

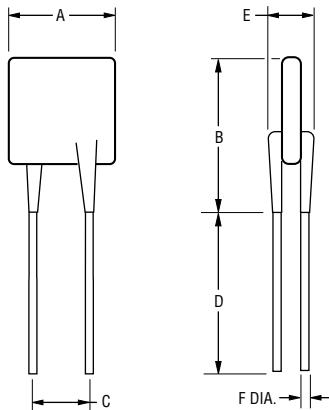
| Item              | Test Condition                         | Accept/Reject Criteria               |
|-------------------|--|--------------------------------------|
| Visual/Mechanical | Verify dimensions and materials        | Per MF physical description          |
| Resistance        | In still air @ 23 °C                   | $R_{min} \leq R \leq R_{max}$        |
| Time to Trip      | 5 times $I_{hold}$ , $V_{max}$ , 23 °C | $T \leq$ max. time to trip (seconds) |
| Hold Current      | 30 min. at $I_{hold}$                  | 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                   |

## Product Dimensions

| Model    | A<br>Max.              | B<br>Max.              | C                     |                       | D<br>Min.                  | E<br>Max.             | F<br>Nom.              | Physical Characteristics |               |
|----------|------------------------|------------------------|-----------------------|-----------------------|----------------------------|-----------------------|------------------------|--------------------------|---------------|
|          |                        |                        | Nom.                  | Tol. $\pm$            |                            |                       |                        | Style                    | Wire Material |
| MF-RG300 | $\frac{7.1}{(0.280)}$  | $\frac{11.0}{(0.433)}$ | $\frac{5.1}{(0.201)}$ | $\frac{0.7}{(0.028)}$ | $\frac{7.6}{(0.299)}$      | $\frac{3.0}{(0.118)}$ | $\frac{0.81}{(0.032)}$ | 1                        | Sn/Cu         |
| MF-RG400 | $\frac{9.9}{(0.390)}$  | $\frac{12.8}{(0.504)}$ | $\frac{5.1}{(0.201)}$ | $\frac{0.7}{(0.028)}$ | $\frac{7.6}{(0.299)}$      | $\frac{3.0}{(0.118)}$ | $\frac{0.81}{(0.032)}$ | 1                        | Sn/Cu         |
| MF-RG500 | $\frac{10.4}{(0.409)}$ | $\frac{14.3}{(0.563)}$ | $\frac{5.1}{(0.201)}$ | $\frac{0.7}{(0.028)}$ | $\frac{7.6}{(0.299)}$      | $\frac{3.0}{(0.118)}$ | $\frac{0.81}{(0.032)}$ | 1                        | Sn/Cu         |
| MF-RG600 | $\frac{10.7}{(0.421)}$ | $\frac{17.1}{(0.673)}$ | $\frac{5.1}{(0.201)}$ | $\frac{0.7}{(0.028)}$ | $\frac{7.6}{(0.299)}$      | $\frac{3.0}{(0.118)}$ | $\frac{0.81}{(0.032)}$ | 1                        | Sn/Cu         |
| MF-RG650 | $\frac{11.2}{(0.441)}$ | $\frac{19.7}{(0.776)}$ | $\frac{5.1}{(0.201)}$ | $\frac{0.7}{(0.028)}$ | $\frac{7.6}{(0.299)}$      | $\frac{3.0}{(0.118)}$ | $\frac{0.81}{(0.032)}$ | 1                        | Sn/Cu         |
| MF-RG700 | $\frac{11.2}{(0.441)}$ | $\frac{19.7}{(0.776)}$ | $\frac{5.1}{(0.201)}$ | $\frac{0.7}{(0.028)}$ | $\frac{7.6}{(0.299)}$      | $\frac{3.0}{(0.118)}$ | $\frac{0.81}{(0.032)}$ | 1                        | Sn/Cu         |
| MF-RG800 | $\frac{12.7}{(0.500)}$ | $\frac{20.9}{(0.823)}$ | $\frac{5.1}{(0.201)}$ | $\frac{0.7}{(0.028)}$ | $\frac{7.6}{(0.299)}$      | $\frac{3.0}{(0.118)}$ | $\frac{0.81}{(0.032)}$ | 1                        | Sn/Cu         |
| MF-RG900 | $\frac{14.0}{(0.551)}$ | $\frac{21.7}{(0.854)}$ | $\frac{5.1}{(0.201)}$ | $\frac{0.7}{(0.028)}$ | $\frac{7.6}{(0.299)}$ </tr |                       |                        |                          |               |

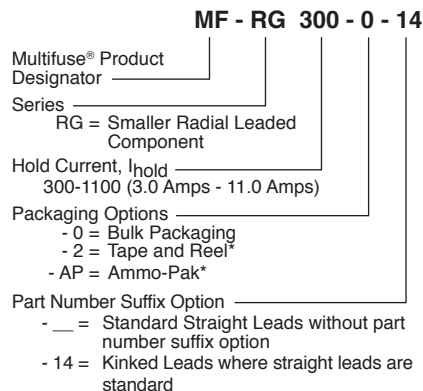
DIMENSIONS:  $\frac{MM}{(INCHES)}$

### Style 1



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

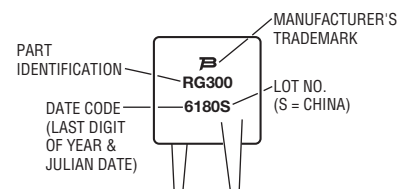
### How to Order



\*Packaged per EIA-468

### Typical Part Marking

Represents total content. Layout may vary.



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# MF-RG Series - PTC Resettable Fuses

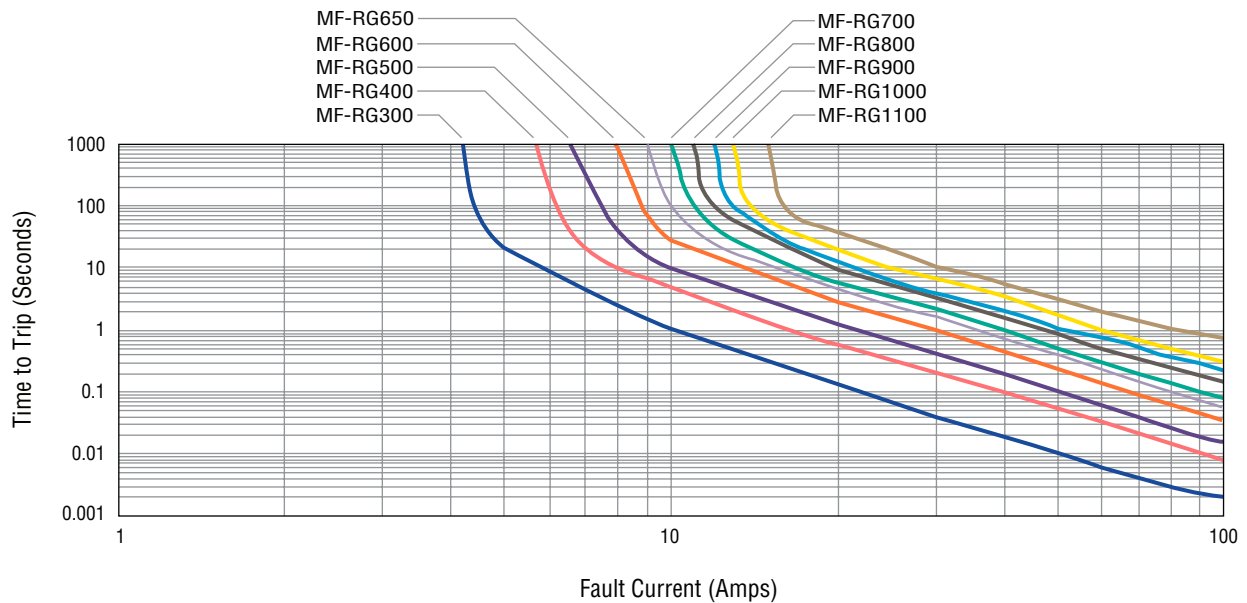


Thermal Derating Table - I<sub>hold</sub> (Amps)

| Model     | Ambient Operating Temperature |        |      |       |       |       |       |       |       |
|-----------|-------------------------------|--------|------|-------|-------|-------|-------|-------|-------|
|           | -40 °C                        | -20 °C | 0 °C | 23 °C | 40 °C | 50 °C | 60 °C | 70 °C | 85 °C |
| MF-RG300  | 4.4                           | 4.0    | 3.6  | 3.0   | 2.6   | 2.4   | 2.1   | 1.9   | 1.4   |
| MF-RG400  | 5.9                           | 5.3    | 4.8  | 4.0   | 3.5   | 3.2   | 2.8   | 2.5   | 1.9   |
| MF-RG500  | 7.3                           | 6.6    | 6.0  | 5.0   | 4.4   | 4.0   | 3.6   | 3.1   | 2.4   |
| MF-RG600  | 8.8                           | 8.0    | 7.2  | 6.0   | 5.2   | 4.8   | 4.2   | 3.8   | 2.8   |
| MF-RG650  | 9.5                           | 8.6    | 7.8  | 6.5   | 5.7   | 5.2   | 4.6   | 4.1   | 3.0   |
| MF-RG700  | 10.3                          | 9.3    | 8.4  | 7.0   | 6.2   | 5.6   | 5.0   | 4.4   | 3.3   |
| MF-RG800  | 11.7                          | 10.7   | 9.6  | 8.0   | 6.9   | 6.4   | 5.6   | 5.1   | 3.7   |
| MF-RG900  | 13.2                          | 11.9   | 10.7 | 9.0   | 7.9   | 7.2   | 6.4   | 5.6   | 4.2   |
| MF-RG1000 | 14.7                          | 13.3   | 12.0 | 10.0  | 8.7   | 8.0   | 7.0   | 6.3   | 4.7   |
| MF-RG1100 | 16.1                          | 14.6   | 13.1 | 11.0  | 9.7   | 8.8   | 7.8   | 6.9   | 5.2   |

I<sub>trip</sub> is approximately two times I<sub>hold</sub>.

Typical Time to Trip at 23 °C



Packaging Quantity

| Packaging options | Models               | Unit Quantity (Pcs.) | Unit |
|-------------------|----------------------|----------------------|------|
| Bulk              | All models           | 500                  | Bag  |
| Tape & Reel       | MF-RG300 ~ MF-RG500  | 3000                 | Reel |
|                   | MF-RG600 ~ MF-RG1100 | 1000                 |      |
| Ammo-Pack         | MF-RG300 ~ MF-RG500  | 2000                 | Pack |
|                   | MF-RG600 ~ MF-RG1100 | 1000                 |      |

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# MF-RG 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 |            |                                       |                                    |
| 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-RG300 ~ MF-RG800  | $H_1$         | $H_1$      | $\frac{38.5}{(1.516)}$                | max.                               |
| Overall height above abscissa: MF-RG900 ~ MF-RG1100 | $H_1$         | $H_1$      | $\frac{43.5}{(1.713)}$                | 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-RG300 ~ MF-RG500                   | $P$           | $P$        | $\frac{12.7}{(.500)}$                 | $\frac{\pm 0.3}{(\pm .012)}$       |
| Device pitch: MF-RG600 ~ MF-RG1100                  | $P$           | $P$        | $\frac{25.4}{(1.00)}$                 | $\frac{\pm 0.6}{(\pm .024)}$       |
| 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                             | $\Delta_h$    | $\Delta_h$ | 0                                     | $\frac{\pm 1.0}{(\pm .039)}$       |
| Side-to-side deviation                              | $\Delta_p$    | $\Delta_p$ | 0                                     | $\frac{\pm 1.3}{(\pm .051)}$       |
| Ordinate to adjacent component lead                 | $P_1$         | $P_1$      | $\frac{3.81}{(.150)}$                 | $\frac{\pm 0.7}{(\pm .028)}$       |
| Lead spacing  | $F$           | $F$        | $\frac{5.08}{(.200)}$                 | $\frac{+0.6/-0.2}{(+.024/- .008)}$ |

— Continued on next page —

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

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- 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:  
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- ✓ Obsolete Management
- ✓ Cost Control Management
- ✓ Shortage Management
- ✓ Alternative Solution
- ✓ Excess Inventory Management