



## Features

- Standard 1812 footprint
- Fast Time-to-Trip (TTT) to protect against overcurrent events
- Excellent solderability with ENIG terminal
- Symmetrical designs and low profile
- RoHS compliant\* and halogen free\*\*



Model MF-MSMF110, 150, 200 & 260 are currently available but not recommended for new designs. See [Product Obsolescence Memo](#) for recommended replacements.

- Agency recognition:
- TÜV approval to the following standards: IEC 62319-1, IEC 60738-1 and IEC 60730-1:2013 clause 15, clause 17 and Annex J

## MF-MSMF Series – PTC Resettable Fuses

### Electrical Characteristics

| Model          | V <sub>max</sub> | I <sub>max</sub> | I <sub>hold</sub> | I <sub>trip</sub> | Resistance       |                   | Max. Time to Trip |         | Tripped Power Dissipation | Agency Recognition |           | AEC-Q200 Compliant |
|----------------|------------------|------------------|-------------------|-------------------|------------------|-------------------|-------------------|---------|---------------------------|--------------------|-----------|--------------------|
|                |                  |                  | at 23 °C          |                   | at 23 °C Ohms    |                   | at 23 °C          |         | at 23 °C Watts            | cUL                | TÜV       |                    |
|                |                  |                  | Amps              |                   | R <sub>Min</sub> | R <sub>1Max</sub> | Amps              | Seconds | Typ.                      | E174545            | R50256634 |                    |
| MF-MSMF010     | 60               | 40               | 0.10              | 0.30              | 0.70             | 15                | 0.5               | 1.5     | 0.8                       | ✓                  | ✓         | ✓                  |
| MF-MSMF010/33X | 33               | 40               | 0.10              | 0.30              | 0.70             | 15                | 0.5               | 1.5     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF014     | 60               | 40               | 0.14              | 0.34              | 0.40             | 6.5               | 1.5               | 0.15    | 0.8                       | ✓                  | ✓         | ✓                  |
| MF-MSMF020     | 30               | 80               | 0.20              | 0.40              | 0.40             | 6.0               | 6.0               | 0.06    | 0.8                       | ✓                  | ✓         | ✓                  |
| MF-MSMF020/33X | 33               | 40               | 0.20              | 0.40              | 0.35             | 5.0               | 8.0               | 0.02    | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF020/60X | 60               | 40               | 0.20              | 0.40              | 0.35             | 4.4               | 1.0               | 2.00    | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF020/60  | 60               | 40               | 0.20              | 0.40              | 0.40             | 6.0               | 1.5               | 0.15    | 0.8                       | ✓                  | ✓         | ✓                  |
| MF-MSMF030     | 30               | 10               | 0.30              | 0.60              | 0.30             | 3.0               | 8.0               | 0.10    | 0.8                       | ✓                  | ✓         | ✓                  |
| MF-MSMF030/33X | 33               | 40               | 0.30              | 0.60              | 0.30             | 3.0               | 8.0               | 0.10    | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF030/60X | 60               | 10               | 0.30              | 0.60              | 0.30             | 3.0               | 8.0               | 0.10    | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF035/33X | 33               | 40               | 0.35              | 0.70              | 0.25             | 1.7               | 8.0               | 0.15    | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF035/60X | 60               | 10               | 0.35              | 0.70              | 0.25             | 1.7               | 8.0               | 0.15    | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF050     | 15               | 100              | 0.50              | 1.00              | 0.15             | 1.0               | 8.0               | 0.15    | 0.8                       | ✓                  | ✓         | ✓                  |
| MF-MSMF050/16X | 16               | 100              | 0.50              | 1.00              | 0.15             | 1.3               | 8.0               | 0.20    | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF050/24X | 24               | 100              | 0.50              | 1.00              | 0.15             | 1.3               | 8.0               | 0.20    | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF050/30X | 30               | 100              | 0.50              | 1.00              | 0.15             | 1.3               | 8.0               | 0.15    | 0.8                       | ✓                  | ✓         | ✓                  |
| MF-MSMF050/40X | 40               | 20               | 0.50              | 1.00              | 0.15             | 1.3               | 8.0               | 0.15    | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF050/60X | 60               | 10               | 0.50              | 1.00              | 0.15             | 1.0               | 8.0               | 0.20    | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF075     | 13.2             | 100              | 0.75              | 1.50              | 0.11             | 0.45              | 8.0               | 0.2     | 0.8                       | ✓                  | ✓         | ✓                  |
| MF-MSMF075/16X | 16               | 100              | 0.75              | 1.50              | 0.11             | 0.45              | 8.0               | 0.2     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF075/24X | 24               | 100              | 0.75              | 1.50              | 0.11             | 0.40              | 8.0               | 0.2     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF075/24  | 24               | 40               | 0.75              | 1.50              | 0.11             | 0.45              | 8.0               | 0.2     | 0.8                       | ✓                  | ✓         | ✓                  |
| MF-MSMF075/33X | 33               | 20               | 0.75              | 1.50              | 0.11             | 0.40              | 8.0               | 0.2     | 1.4                       | ✓                  | ✓         | ✓                  |
| MF-MSMF110     | 6                | 100              | 1.10              | 2.20              | 0.04             | 0.21              | 8.0               | 0.3     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF110/8X  | 8                | 100              | 1.10              | 2.20              | 0.06             | 0.21              | 8.0               | 0.3     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF110/16X | 16               | 100              | 1.10              | 2.20              | 0.06             | 0.20              | 8.0               | 0.3     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF110/16  | 16               | 100              | 1.10              | 2.20              | 0.04             | 0.21              | 8.0               | 0.3     | 0.8                       | ✓                  | ✓         | ✓                  |
| MF-MSMF110/24X | 24               | 20               | 1.10              | 2.20              | 0.06             | 0.18              | 8.0               | 0.5     | 0.8                       | ✓                  | ✓         | ✓                  |
| MF-MSMF110/33X | 33               | 20               | 1.10              | 2.20              | 0.06             | 0.20              | 8.0               | 0.5     | 1.0                       | ✓                  | ✓         |                    |
| MF-MSMF125/8X  | 8                | 100              | 1.25              | 2.50              | 0.04             | 0.14              | 8.0               | 0.4     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF125/12X | 12               | 100              | 1.25              | 2.50              | 0.04             | 0.14              | 8.0               | 0.4     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF125/16X | 16               | 100              | 1.25              | 2.50              | 0.04             | 0.14              | 8.0               | 0.4     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF125/24X | 24               | 20               | 1.25              | 2.50              | 0.04             | 0.14              | 8.0               | 0.4     | 0.8                       | ✓                  | ✓         |                    |

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**WARNING**  
Cancer and Reproductive Harm  
[www.P65Warnings.ca.gov](http://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

- Overcurrent and overtemperature protection of automotive electronics
- Hard disk drives
- PC motherboards
- PC peripherals
- Point-of-sale (POS) equipment
- PCMCIA cards
- USB port protection - USB 2.0, 3.0 & OTG
- HDMI 1.4 Source protection

## MF-MSMF Series – PTC Resettable Fuses

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### Electrical Characteristics (continued)

| Model          | V <sub>max</sub> | I <sub>max</sub> | I <sub>hold</sub> | I <sub>trip</sub> | Resistance       |                   | Max. Time to Trip |         | Tripped Power Dissipation | Agency Recognition |           | AEC-Q200 Compliant |
|----------------|------------------|------------------|-------------------|-------------------|------------------|-------------------|-------------------|---------|---------------------------|--------------------|-----------|--------------------|
|                |                  |                  | at 23 °C          |                   | at 23 °C Ohms    |                   | at 23 °C          |         | at 23 °C Watts            | cUL                | TÜV       |                    |
|                | Volts            | Amps             | Amps              |                   | R <sub>Min</sub> | R <sub>1Max</sub> | Amps              | Seconds | Typ.                      | E174545            | R50256634 |                    |
| MF-MSMF150     | 6                | 100              | 1.50              | 3.00              | 0.03             | 0.12              | 8.0               | 0.5     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF150/8X  | 8                | 100              | 1.50              | 3.00              | 0.03             | 0.11              | 8.0               | 0.5     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF150/12X | 12               | 100              | 1.50              | 3.00              | 0.03             | 0.11              | 8.0               | 0.5     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF150/12  | 12               | 100              | 1.50              | 3.00              | 0.03             | 0.12              | 8.0               | 0.5     | 0.8                       | ✓                  | ✓         | ✓                  |
| MF-MSMF150/16X | 16               | 100              | 1.50              | 3.00              | 0.03             | 0.12              | 8.0               | 0.5     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF150/24X | 24               | 20               | 1.50              | 3.00              | 0.03             | 0.12              | 8.0               | 1.5     | 1.0                       | ✓                  | ✓         | ✓                  |
| MF-MSMF160/8X  | 8                | 100              | 1.60              | 2.80              | 0.30             | 0.100             | 8.0               | 1.0     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF160/12X | 12               | 100              | 1.60              | 2.80              | 0.30             | 0.100             | 8.0               | 1.0     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF160/16X | 16               | 100              | 1.60              | 2.80              | 0.30             | 0.100             | 8.0               | 1.0     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF160/24X | 24               | 20               | 1.60              | 3.20              | 0.30             | 0.100             | 8.0               | 1.0     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF200     | 8                | 40               | 2.00              | 4.00              | 0.20             | 0.080             | 8.0               | 2.0     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF200/8X  | 8                | 100              | 2.00              | 3.50              | 0.20             | 0.070             | 8.0               | 2.0     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF200/12X | 12               | 100              | 2.00              | 3.50              | 0.20             | 0.070             | 8.0               | 2.0     | 1.0                       | ✓                  | ✓         |                    |
| MF-MSMF200/16X | 16               | 100              | 2.00              | 3.50              | 0.20             | 0.070             | 8.0               | 2.0     | 1.0                       | ✓                  | ✓         |                    |
| MF-MSMF250/16X | 16               | 100              | 2.50              | 5.00              | 0.15             | 0.100             | 8.0               | 5.0     | 1.2                       | ✓                  | ✓         | ✓                  |
| MF-MSMF260     | 6                | 100              | 2.60              | 5.20              | 0.15             | 0.080             | 8.0               | 5.0     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF260/6X  | 6                | 100              | 2.60              | 5.20              | 0.15             | 0.060             | 8.0               | 5.0     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF260/8X  | 8                | 100              | 2.60              | 5.20              | 0.15             | 0.050             | 8.0               | 5.0     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF260/12X | 12               | 100              | 2.60              | 5.20              | 0.15             | 0.050             | 8.0               | 5.0     | 1.2                       | ✓                  | ✓         |                    |
| MF-MSMF260/16X | 16               | 100              | 2.60              | 5.00              | 0.15             | 0.050             | 8.0               | 5.0     | 1.2                       | ✓                  | ✓         | ✓                  |

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## MF-MSMF Series – PTC Resettable Fuses

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### 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, 20 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)           |                                        |

### 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      | 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    | $V_{max}$ , $I_{max}$ , 48 hours                   | No arcing or burning                        |
| Solderability     | 245 °C ±5 °C, 5 seconds                            | 95 % min. coverage                          |

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# MF-MSMF Series – PTC Resettable Fuses

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## Product Dimensions (see page 7 for outline drawings)

| Model          | A               |                 | B               |                 | C               |                 | D               |                 | E               |                 | Style |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------|
|                | Min.            | Max.            | Min.            | Max.            | Min.            | Max.            | Min.            | Max.            | Min.            | Max.            |       |
| MF-MSMF010     | 4.37<br>(0.172) | 4.73<br>(0.186) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.10<br>(0.043) | 0.30<br>(0.012) | —               | —               | —               | 1     |
| MF-MSMF010/33X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.60<br>(0.024) | 1.10<br>(0.043) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF014     | 4.37<br>(0.172) | 4.73<br>(0.186) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.10<br>(0.043) | 0.30<br>(0.012) | —               | —               | —               | 1     |
| MF-MSMF020     | 4.37<br>(0.172) | 4.73<br>(0.186) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.10<br>(0.043) | 0.30<br>(0.012) | —               | —               | —               | 1     |
| MF-MSMF020/33X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.60<br>(0.024) | 1.10<br>(0.043) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF020/60X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.60<br>(0.024) | 1.10<br>(0.043) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF020/60  | 4.37<br>(0.172) | 4.73<br>(0.186) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.10<br>(0.043) | 0.30<br>(0.012) | —               | —               | —               | 1     |
| MF-MSMF030     | 4.37<br>(0.172) | 4.73<br>(0.186) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.10<br>(0.043) | 0.30<br>(0.012) | —               | —               | —               | 1     |
| MF-MSMF030/33X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.60<br>(0.024) | 1.10<br>(0.043) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF030/60X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 1.20<br>(0.047) | 1.80<br>(0.071) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF035/33X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.60<br>(0.024) | 1.10<br>(0.043) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF035/60X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 1.20<br>(0.047) | 1.80<br>(0.071) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF050     | 4.37<br>(0.172) | 4.73<br>(0.186) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.55<br>(0.022) | 0.85<br>(0.033) | 0.30<br>(0.012) | —               | —               | —               | 1     |
| MF-MSMF050/16X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.40<br>(0.016) | 0.85<br>(0.033) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF050/24X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.40<br>(0.016) | 0.85<br>(0.033) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF050/30X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.40<br>(0.016) | 0.85<br>(0.033) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF050/40X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.40<br>(0.016) | 0.85<br>(0.033) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF050/60X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 1.20<br>(0.047) | 1.80<br>(0.071) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF075     | 4.37<br>(0.172) | 4.73<br>(0.186) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.55<br>(0.022) | 0.85<br>(0.033) | 0.30<br>(0.012) | —               | —               | —               | 1     |

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

Continued on next page

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# MF-MSMF Series – PTC Resettable Fuses

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## Product Dimensions – continued (see page 7 for outline drawings)

| Model          | A               |                 | B               |                 | C               |                 | D               |                 | E               |                 | Style |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------|
|                | Min.            | Max.            | Min.            | Max.            | Min.            | Max.            | Min.            | Max.            | Min.            | Max.            |       |
| MF-MSMF075/16X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.35<br>(0.014) | 0.80<br>(0.031) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF075/24X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.35<br>(0.014) | 0.80<br>(0.031) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF075/24  | 4.37<br>(0.172) | 4.73<br>(0.186) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.55<br>(0.022) | 0.85<br>(0.033) | 0.30<br>(0.012) | —               | —               | —               | 1     |
| MF-MSMF075/33X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.60<br>(0.063) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF110     | 4.37<br>(0.172) | 4.73<br>(0.186) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.55<br>(0.022) | 0.85<br>(0.033) | 0.30<br>(0.012) | —               | —               | —               | 1     |
| MF-MSMF110/8X  | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.35<br>(0.014) | 0.80<br>(0.031) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF110/16X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.35<br>(0.014) | 0.80<br>(0.031) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF110/16  | 4.37<br>(0.172) | 4.73<br>(0.186) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.55<br>(0.022) | 0.85<br>(0.033) | 0.30<br>(0.012) | —               | —               | —               | 1     |
| MF-MSMF110/24X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.60<br>(0.063) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF110/33X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 1.20<br>(0.047) | 1.80<br>(0.071) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF125/8X  | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.35<br>(0.014) | 0.80<br>(0.031) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF125/12X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.35<br>(0.014) | 0.80<br>(0.031) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF125/16X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.60<br>(0.063) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF125/24X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.60<br>(0.063) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF150     | 4.37<br>(0.172) | 4.73<br>(0.186) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.55<br>(0.022) | 0.85<br>(0.033) | 0.30<br>(0.012) | —               | —               | —               | 1     |
| MF-MSMF150/8X  | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.35<br>(0.014) | 0.80<br>(0.031) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF150/12X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.35<br>(0.014) | 0.80<br>(0.031) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF150/12  | 4.37<br>(0.172) | 4.73<br>(0.186) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.55<br>(0.022) | 0.85<br>(0.033) | 0.30<br>(0.012) | —               | —               | —               | 1     |
| MF-MSMF150/16X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.60<br>(0.063) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |

Continued on next page

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

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# MF-MSMF Series – PTC Resettable Fuses

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## Product Dimensions – continued (see page 7 for outline drawings)

| Model          | A               |                 | B               |                 | C               |                 | D               |                 | E               |                 | Style |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------|
|                | Min.            | Max.            | Min.            | Max.            | Min.            | Max.            | Min.            | Max.            | Min.            | Max.            |       |
| MF-MSMF150/24X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.60<br>(0.063) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF160/8X  | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.35<br>(0.014) | 0.80<br>(0.031) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF160/12X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.60<br>(0.063) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF160/16X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.60<br>(0.063) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF160/24X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.60<br>(0.063) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF200     | 4.37<br>(0.172) | 4.73<br>(0.186) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.45<br>(0.018) | 0.85<br>(0.033) | 0.30<br>(0.012) | —               | —               | —               | 1     |
| MF-MSMF200/8X  | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.35<br>(0.014) | 0.80<br>(0.031) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF200/12X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.60<br>(0.063) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF200/16X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.60<br>(0.063) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF250/16X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.60<br>(0.063) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.65<br>(0.026) | 2     |
| MF-MSMF260     | 4.37<br>(0.172) | 4.73<br>(0.186) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.45<br>(0.018) | 0.85<br>(0.033) | 0.30<br>(0.012) | —               | —               | —               | 1     |
| MF-MSMF260/6X  | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.35<br>(0.014) | 0.80<br>(0.031) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.20<br>(0.008) | 2     |
| MF-MSMF260/8X  | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.60<br>(0.063) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.20<br>(0.008) | 2     |
| MF-MSMF260/12X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.60<br>(0.063) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.20<br>(0.008) | 2     |
| MF-MSMF260/16X | 4.37<br>(0.172) | 4.83<br>(0.190) | 3.07<br>(0.121) | 3.41<br>(0.134) | 0.70<br>(0.028) | 1.60<br>(0.063) | 0.30<br>(0.012) | 1.20<br>(0.047) | 0.20<br>(0.008) | 0.20<br>(0.008) | 2     |

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

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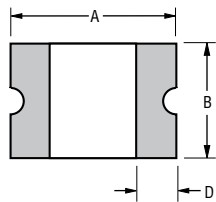
# MF-MSMF Series – PTC Resettable Fuses

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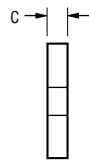
## Product Dimensions (see previous pages for dimensions)

### Style 1

Top and Bottom View



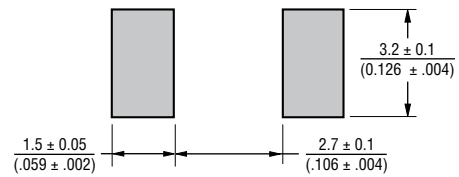
Side View



**Terminal material:**  
Electroless Ni under immersion Au

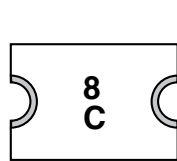
DIMENSIONS:  $\frac{\text{MM}}{(\text{INCHES})}$

Recommended Pad Layout

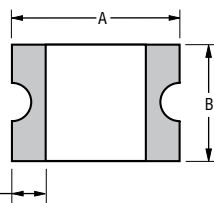


### Style 2

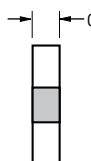
Top View



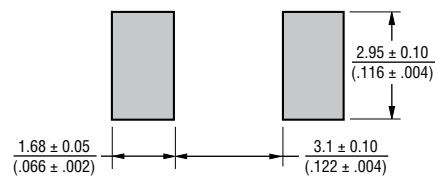
Bottom View



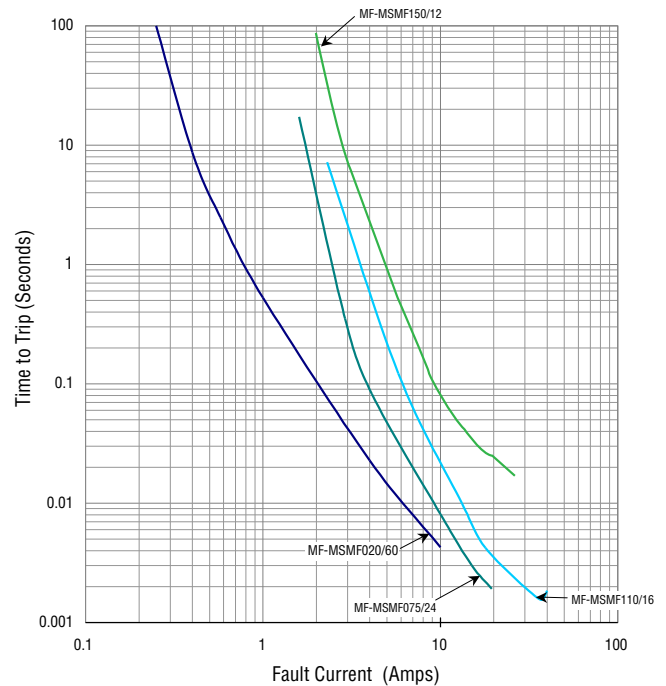
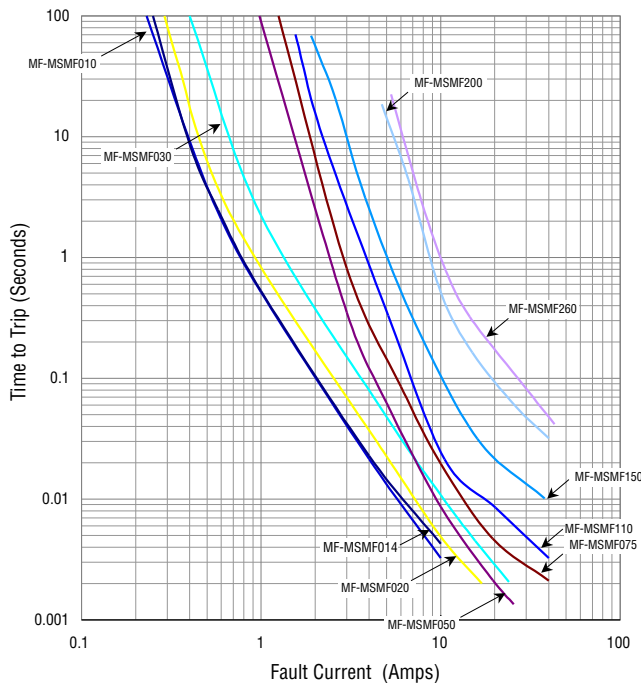
Side View



Recommended Pad Layout



## 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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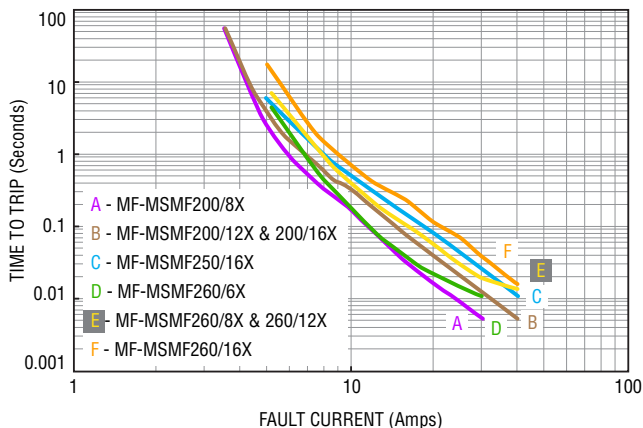
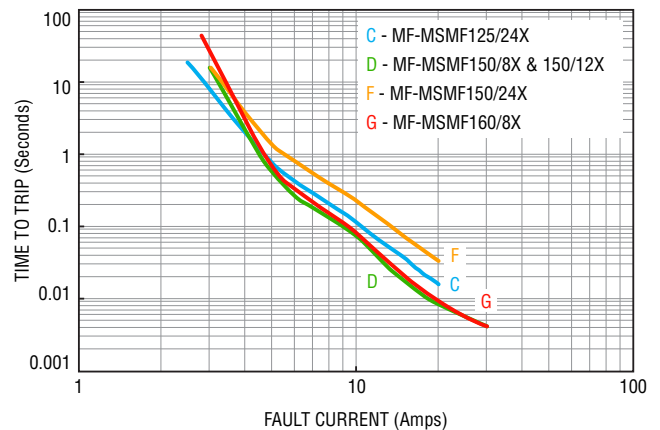
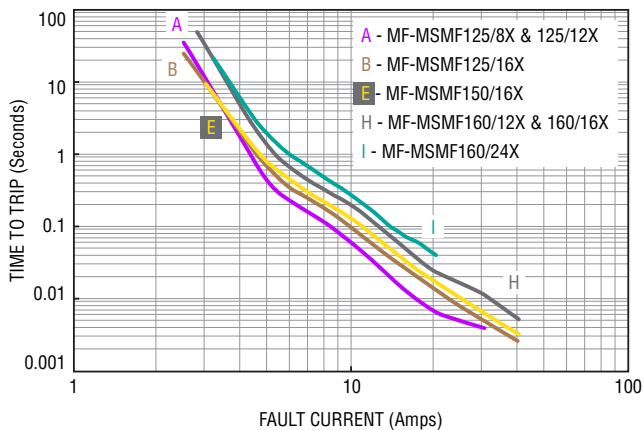
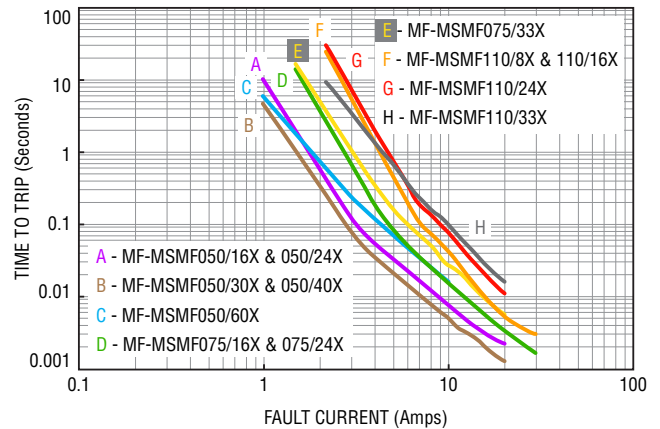
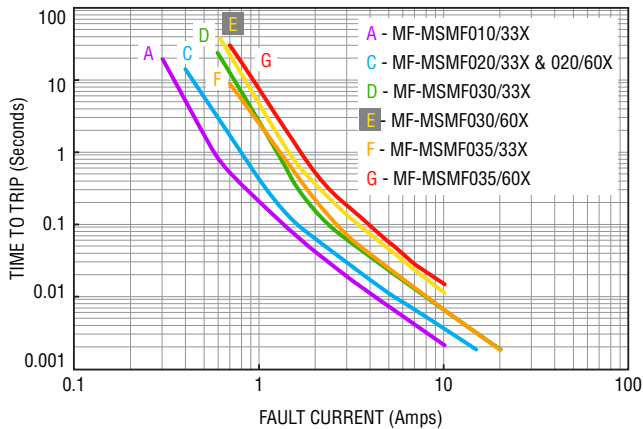
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# MF-MSMF Series – PTC Resettable Fuses

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## Typical Time to Trip at 23 °C – continued



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-MSMF Series – PTC Resettable Fuses

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**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 |
| MF-MSMF010     | 0.16                          | 0.14   | 0.12 | 0.10  | 0.08  | 0.07  | 0.06  | 0.05  | 0.03  |
| MF-MSMF010/33X | 0.16                          | 0.14   | 0.12 | 0.10  | 0.08  | 0.07  | 0.06  | 0.05  | 0.03  |
| MF-MSMF014     | 0.23                          | 0.20   | 0.17 | 0.14  | 0.12  | 0.10  | 0.09  | 0.08  | 0.06  |
| MF-MSMF020     | 0.30                          | 0.27   | 0.23 | 0.20  | 0.17  | 0.15  | 0.13  | 0.12  | 0.09  |
| MF-MSMF020/33X | 0.29                          | 0.26   | 0.23 | 0.20  | 0.17  | 0.15  | 0.14  | 0.12  | 0.07  |
| MF-MSMF020/60X | 0.29                          | 0.26   | 0.23 | 0.20  | 0.17  | 0.15  | 0.14  | 0.12  | 0.07  |
| MF-MSMF020/60  | 0.29                          | 0.26   | 0.23 | 0.20  | 0.17  | 0.15  | 0.13  | 0.11  | 0.08  |
| MF-MSMF030     | 0.46                          | 0.40   | 0.36 | 0.30  | 0.26  | 0.22  | 0.20  | 0.18  | 0.14  |
| MF-MSMF030/33X | 0.46                          | 0.40   | 0.36 | 0.30  | 0.26  | 0.22  | 0.20  | 0.18  | 0.13  |
| MF-MSMF030/60X | 0.46                          | 0.40   | 0.36 | 0.30  | 0.26  | 0.22  | 0.20  | 0.18  | 0.13  |
| MF-MSMF035/33X | 0.50                          | 0.45   | 0.40 | 0.35  | 0.30  | 0.26  | 0.24  | 0.20  | 0.15  |
| MF-MSMF035/60X | 0.50                          | 0.45   | 0.40 | 0.35  | 0.30  | 0.26  | 0.24  | 0.20  | 0.15  |
| MF-MSMF050     | 0.77                          | 0.68   | 0.59 | 0.50  | 0.44  | 0.40  | 0.37  | 0.33  | 0.29  |
| MF-MSMF050/16X | 0.77                          | 0.68   | 0.59 | 0.50  | 0.44  | 0.40  | 0.37  | 0.33  | 0.25  |
| MF-MSMF050/24X | 0.77                          | 0.68   | 0.59 | 0.50  | 0.44  | 0.40  | 0.37  | 0.33  | 0.25  |
| MF-MSMF050/30X | 0.77                          | 0.68   | 0.59 | 0.50  | 0.44  | 0.40  | 0.37  | 0.33  | 0.25  |
| MF-MSMF050/40X | 0.77                          | 0.68   | 0.59 | 0.50  | 0.44  | 0.40  | 0.37  | 0.33  | 0.25  |
| MF-MSMF050/60X | 0.77                          | 0.68   | 0.59 | 0.50  | 0.44  | 0.40  | 0.33  | 0.27  | 0.20  |
| MF-MSMF075     | 1.15                          | 1.01   | 0.88 | 0.75  | 0.65  | 0.60  | 0.55  | 0.49  | 0.43  |
| MF-MSMF075/16X | 1.06                          | 0.95   | 0.84 | 0.75  | 0.60  | 0.55  | 0.50  | 0.45  | 0.37  |
| MF-MSMF075/24X | 1.06                          | 0.95   | 0.84 | 0.75  | 0.60  | 0.55  | 0.50  | 0.45  | 0.37  |
| MF-MSMF075/24  | 1.15                          | 1.01   | 0.88 | 0.75  | 0.65  | 0.60  | 0.55  | 0.49  | 0.43  |
| MF-MSMF075/33X | 1.16                          | 1.03   | 0.90 | 0.75  | 0.63  | 0.56  | 0.49  | 0.42  | 0.32  |
| MF-MSMF110     | 1.59                          | 1.43   | 1.26 | 1.10  | 0.95  | 0.87  | 0.80  | 0.71  | 0.60  |
| MF-MSMF110/8X  | 1.58                          | 1.43   | 1.26 | 1.10  | 0.95  | 0.85  | 0.77  | 0.71  | 0.58  |
| MF-MSMF110/16X | 1.58                          | 1.43   | 1.26 | 1.10  | 0.95  | 0.85  | 0.77  | 0.71  | 0.58  |
| MF-MSMF110/16  | 1.59                          | 1.43   | 1.26 | 1.10  | 0.95  | 0.87  | 0.80  | 0.71  | 0.60  |

*Continued on next page*

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# MF-MSMF Series – PTC Resettable Fuses

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**Thermal Derating Table -  $I_{hold}$  (Amps) – continued**

| Model          | Ambient Operating Temperature |        |      |       |       |       |       |       |       |
|----------------|-------------------------------|--------|------|-------|-------|-------|-------|-------|-------|
|                | -40 °C                        | -20 °C | 0 °C | 23 °C | 40 °C | 50 °C | 60 °C | 70 °C | 85 °C |
| MF-MSMF110/24X | 2.00                          | 1.70   | 1.40 | 1.10  | 0.95  | 0.88  | 0.80  | 0.73  | 0.61  |
| MF-MSMF110/33X | 1.55                          | 1.40   | 1.25 | 1.10  | 0.93  | 0.83  | 0.73  | 0.63  | 0.50  |
| MF-MSMF125/8X  | 2.00                          | 1.75   | 1.52 | 1.25  | 1.00  | 0.95  | 0.90  | 0.75  | 0.61  |
| MF-MSMF125/12X | 2.00                          | 1.75   | 1.52 | 1.25  | 1.00  | 0.95  | 0.90  | 0.75  | 0.61  |
| MF-MSMF125/16X | 2.00                          | 1.75   | 1.52 | 1.25  | 1.00  | 0.95  | 0.90  | 0.75  | 0.61  |
| MF-MSMF125/24X | 1.98                          | 1.73   | 1.50 | 1.25  | 0.98  | 0.93  | 0.86  | 0.67  | 0.53  |
| MF-MSMF150     | 2.17                          | 1.95   | 1.72 | 1.50  | 1.30  | 1.18  | 1.09  | 0.97  | 0.82  |
| MF-MSMF150/8X  | 2.06                          | 1.93   | 1.79 | 1.50  | 1.28  | 1.10  | 1.02  | 0.80  | 0.68  |
| MF-MSMF150/12X | 2.06                          | 1.93   | 1.76 | 1.50  | 1.28  | 1.10  | 1.02  | 0.80  | 0.68  |
| MF-MSMF150/12  | 2.17                          | 1.95   | 1.72 | 1.50  | 1.30  | 1.18  | 1.09  | 0.97  | 0.82  |
| MF-MSMF150/16X | 2.04                          | 1.88   | 1.68 | 1.50  | 1.25  | 1.08  | 1.00  | 0.78  | 0.64  |
| MF-MSMF150/24X | 2.10                          | 1.90   | 1.70 | 1.50  | 1.25  | 1.13  | 1.00  | 0.88  | 0.69  |
| MF-MSMF160/8X  | 2.20                          | 2.06   | 1.91 | 1.60  | 1.36  | 1.17  | 1.09  | 0.85  | 0.72  |
| MF-MSMF160/12X | 2.18                          | 2.03   | 1.87 | 1.60  | 1.33  | 1.15  | 1.07  | 0.83  | 0.68  |
| MF-MSMF160/16X | 2.18                          | 2.03   | 1.87 | 1.60  | 1.33  | 1.15  | 1.07  | 0.83  | 0.68  |
| MF-MSMF160/24X | 2.15                          | 2.00   | 1.84 | 1.60  | 1.31  | 1.13  | 1.05  | 0.81  | 0.66  |
| MF-MSMF200     | 3.08                          | 2.71   | 2.35 | 2.00  | 1.80  | 1.60  | 1.50  | 1.40  | 1.25  |
| MF-MSMF200/8X  | 2.60                          | 2.44   | 2.22 | 2.00  | 1.78  | 1.67  | 1.50  | 1.45  | 1.29  |
| MF-MSMF200/12X | 2.58                          | 2.41   | 2.18 | 2.00  | 1.75  | 1.65  | 1.48  | 1.43  | 1.25  |
| MF-MSMF200/16X | 2.58                          | 2.41   | 2.18 | 2.00  | 1.75  | 1.68  | 1.48  | 1.43  | 1.25  |
| MF-MSMF250/16X | 3.90                          | 3.42   | 2.96 | 2.50  | 2.24  | 1.98  | 1.85  | 1.29  | 0.94  |
| MF-MSMF260     | 3.40                          | 3.16   | 2.90 | 2.60  | 2.32  | 2.18  | 2.00  | 1.90  | 1.69  |
| MF-MSMF260/6X  | 3.40                          | 3.16   | 3.00 | 2.60  | 2.30  | 2.15  | 2.00  | 1.85  | 1.50  |
| MF-MSMF260/8X  | 3.36                          | 3.12   | 2.95 | 2.60  | 2.26  | 2.12  | 1.97  | 1.82  | 1.50  |
| MF-MSMF260/12X | 3.36                          | 3.12   | 2.95 | 2.60  | 2.26  | 2.12  | 1.97  | 1.82  | 1.50  |
| MF-MSMF260/16X | 3.50                          | 3.42   | 2.96 | 2.60  | 2.30  | 2.15  | 2.00  | 1.85  | 1.63  |

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## MF-MSMF Series – PTC Resettable Fuses

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### Packaging Quantity

| Model          |                | Packaging Quantity  |
|----------------|----------------|---------------------|
| MF-MSMF030/60X | MF-MSMF035/60X | 1,000 pcs. per reel |
| MF-MSMF050/60X | MF-MSMF110/33X |                     |
| MF-MSMF010     | MF-MSMF014     | 1,500 pcs. per reel |
| MF-MSMF020     | MF-MSMF020/60  |                     |
| MF-MSMF030     |                |                     |
| MF-MSMF075/33X |                |                     |
| MF-MSMF110/24X | MF-MSMF125/16X |                     |
| MF-MSMF125/24X | MF-MSMF150/16X |                     |
| MF-MSMF150/24X | MF-MSMF160/12X |                     |
| MF-MSMF160/16X | MF-MSMF160/24X |                     |
| MF-MSMF200/12X | MF-MSMF200/16X |                     |
| MF-MSMF250/16X | MF-MSMF260/8X  |                     |
| MF-MSMF260/12X | MF-MSMF260/16X |                     |
| MF-MSMF050     | MF-MSMF075     | 2,000 pcs. per reel |
| MF-MSMF075/24  | MF-MSMF110     |                     |
| MF-MSMF110/16  | MF-MSMF150     |                     |
| MF-MSMF150/12  | MF-MSMF200     |                     |
| MF-MSMF260     |                |                     |
| MF-MSMF010/33X | MF-MSMF020/33X |                     |
| MF-MSMF020/60X | MF-MSMF030/33X |                     |
| MF-MSMF035/33X | MF-MSMF050/16X |                     |
| MF-MSMF050/24X | MF-MSMF050/30X |                     |
| MF-MSMF050/40X | MF-MSMF075/16X |                     |
| MF-MSMF075/24X | MF-MSMF110/8X  |                     |
| MF-MSMF110/16X | MF-MSMF125/8X  |                     |
| MF-MSMF125/12X | MF-MSMF150/8X  |                     |
| MF-MSMF150/12X | MF-MSMF160/8X  |                     |
| MF-MSMF200/8X  | MF-MSMF260/6X  |                     |

### How to Order

**MF - MSMF 160 / 16 X - 2**

Multifuse® Product Designator \_\_\_\_\_

Series \_\_\_\_\_  
 MSMF = 4532 mm (1812 mils)  
 Surface Mount Component

Hold Current,  $I_{hold}$  \_\_\_\_\_  
 010 ~ 260 (0.1 ~ 2.6 Amps)

Voltage Options \_\_\_\_\_  
 6 = 6 Voltage Rated    8 = 8 Voltage Rated  
 12 = 12 Voltage Rated    16 = 16 Voltage Rated  
 24 = 24 Voltage Rated    30 = 30 Voltage Rated  
 33 = 33 Voltage Rated    40 = 40 Voltage Rated  
 48 = 48 Voltage Rated    60 = 60 Voltage Rated

Multifuse® Design Specific Code \_\_\_\_\_  
 Blank = Standard Voltage  
 X = Multifuse® freeXpansion™ Design

Packaging \_\_\_\_\_  
 -2 = Tape and Reel Packaged per EIA-481

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

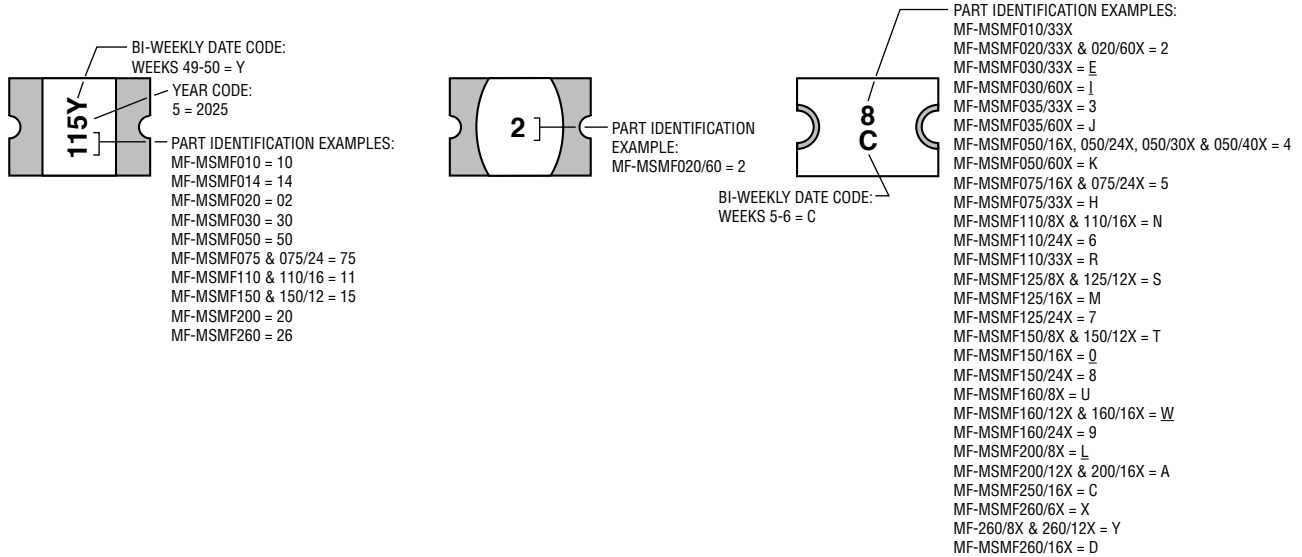
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# MF-MSMF Series – PTC Resettable Fuses

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## Typical Part Marking

Represents total content. Layout may vary.



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**Asia:** Tel: +886-2-2562-4117 • Email: [asiacus@bourns.com](mailto:asiacus@bourns.com)

**EMEA:** Tel: +36 88 885 877 • Email: [eurocus@bourns.com](mailto:eurocus@bourns.com)

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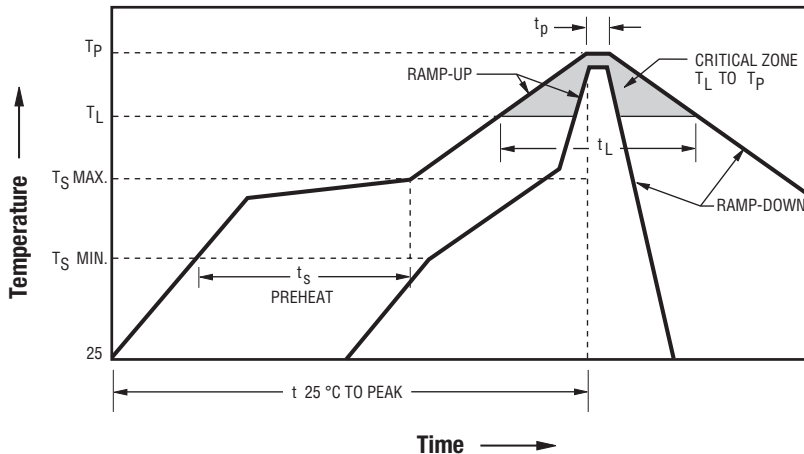
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# MF-MSMF Series – PTC Resettable Fuses

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## Solder Reflow Recommendations

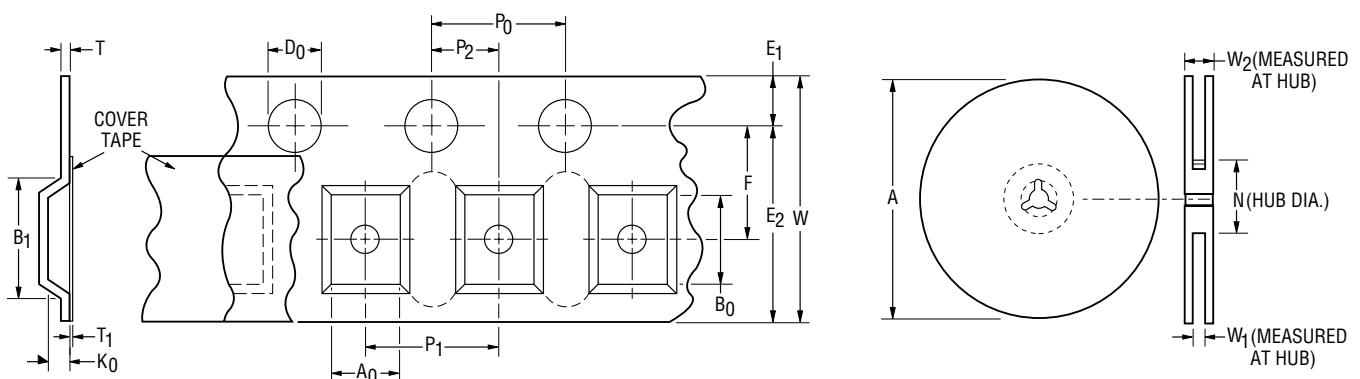


### Notes:

- MF-MSMF models are intended for reflow soldering (including but not limited to heating plate, hot air, IR, nitrogen, and vapor phase).
- Wave soldering is permissible only if the device is on the top of the PCB, opposite the heat source.
- Hand soldering is not recommended for these devices.
- All temperatures refer to the topside of the device, measured on the device body surface.
- If reflow temperatures exceed the recommended profile, devices may not meet the published specifications.
- Compatible with Pb and Pb-free solder reflow profiles.
- Excess solder may cause a short circuit.
- Please refer to the [Multifuse® Polymer PTC Resettable Fuse Soldering Recommendations](#) document for more details.

| Profile Feature                                               | Pb-Free Assembly   |
|---------------------------------------------------------------|--------------------|
| Average Ramp-Up Rate ( $T_{S \text{ max}}$ to $T_P$ )         | 3 °C / second max. |
| PREHEAT:                                                      |                    |
| Temperature Min. ( $T_{S \text{ min}}$ )                      | 150 °C             |
| Temperature Max. ( $T_{S \text{ max}}$ )                      | 200 °C             |
| Time ( $T_{S \text{ min}}$ to $T_{S \text{ max}}$ ) ( $t_s$ ) | 60~180 seconds     |
| TIME MAINTAINED ABOVE:                                        |                    |
| Temperature ( $T_L$ )                                         | 217 °C             |
| Time ( $t_L$ )                                                | 60~150 seconds     |
| Peak Temperature ( $T_P$ )                                    | 260 °C             |
| Time within 5 °C of Actual Peak Temperature ( $t_p$ )         | 20~40 seconds      |
| Ramp-Down Rate                                                | 6 °C / second max. |
| Time 25 °C to Peak Temperature                                | 8 minutes max.     |

## Packaging Dimensions – continued (see next page for dimensions)



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# MF-MSMF Series Tape and Reel Specifications

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| Tape<br>Dimensions<br>per EIA-481 | MF-MSMF010<br>MF-MSMF014<br>MF-MSMF020<br>MF-MSMF020/60<br>MF-MSMF030 | MF-MSMF110/8X<br>MF-MSMF110/16X<br>MF-MSMF125/8X<br>MF-MSMF125/12X<br>MF-MSMF150/8X<br>MF-MSMF150/12X<br>MF-MSMF160/8X<br>MF-MSMF200/8X<br>MF-MSMF260/6X | MF-MSMF010/33X MF-MSMF075/16X<br>MF-MSMF020/33X MF-MSMF075/24<br>MF-MSMF020/60X MF-MSMF075/24X<br>MF-MSMF030/33X MF-MSMF110<br>MF-MSMF035/33X MF-MSMF110/16<br>MF-MSMF050 MF-MSMF125<br>MF-MSMF050/16X MF-MSMF150<br>MF-MSMF050/24X MF-MSMF150/12<br>MF-MSMF050/30X MF-MSMF160<br>MF-MSMF050/40X MF-MSMF200<br>MF-MSMF075 MF-MSMF260 |  | MF-MSMF075/33X<br>MF-MSMF110/24X<br>MF-MSMF125/16X<br>MF-MSMF125/24X<br>MF-MSMF150/16X<br>MF-MSMF150/24X<br>MF-MSMF160/12X<br>MF-MSMF160/16X<br>MF-MSMF160/24X<br>MF-MSMF200/12X<br>MF-MSMF200/16X<br>MF-MSMF250/16X<br>MF-MSMF260/8X<br>MF-MSMF260/12X<br>MF-MSMF260/16X | MF-MSMF030/60X<br>MF-MSMF035/60X<br>MF-MSMF050/60X<br>MF-MSMF110/33X |
|-----------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
|                                   |                                                                       |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                           |                                                                      |
| W                                 | $\frac{12.00 \pm 0.30}{(0.472 \pm 0.012)}$                            |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                           |                                                                      |
| P <sub>0</sub>                    | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$                             |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                           |                                                                      |
| 10 P <sub>0</sub>                 | $\frac{40.0 \pm 0.20}{(1.575 \pm 0.008)}$                             |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                           |                                                                      |
| P <sub>1</sub>                    | $\frac{8.00 \pm 0.10}{(0.315 \pm 0.004)}$                             |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                           |                                                                      |
| P <sub>2</sub>                    | $\frac{2.00 \pm 0.05}{(0.079 \pm 0.002)}$                             |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                           |                                                                      |
| A <sub>0</sub>                    | $\frac{3.58 \pm 0.10}{(0.141 \pm 0.004)}$                             | $\frac{3.66 \pm 0.15}{(0.144 \pm 0.006)}$                                                                                                                | $\frac{3.66 \pm 0.15}{(0.144 \pm 0.006)}$                                                                                                                                                                                                                                                                                            |  | $\frac{3.70 \pm 0.10}{(0.146 \pm 0.004)}$                                                                                                                                                                                                                                 | $\frac{3.50 \pm 0.10}{(0.138 \pm 0.004)}$                            |
| B <sub>0</sub>                    | $\frac{4.93 \pm 0.10}{(0.194 \pm 0.004)}$                             | $\frac{4.98 \pm 0.10}{(0.196 \pm 0.004)}$                                                                                                                | $\frac{4.98 \pm 0.10}{(0.196 \pm 0.004)}$                                                                                                                                                                                                                                                                                            |  | $\frac{5.10 \pm 0.10}{(0.201 \pm 0.004)}$                                                                                                                                                                                                                                 | $\frac{4.90 \pm 0.10}{(0.193 \pm 0.004)}$                            |
| B <sub>1</sub> max.               | $\frac{5.90}{(0.232)}$                                                |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                           |                                                                      |
| D <sub>0</sub>                    | $\frac{1.50 +0.10/-0}{(0.059 +0.004/-0)}$                             |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                           |                                                                      |
| F                                 | $\frac{5.50 \pm 0.05}{(0.217 \pm 0.002)}$                             |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                           |                                                                      |
| E <sub>1</sub>                    | $\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$                             |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                           |                                                                      |
| E <sub>2</sub> typ.               | $\frac{10.25}{(0.404)}$                                               |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                           |                                                                      |
| T max.                            | $\frac{0.60}{(0.024)}$                                                |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                           |                                                                      |
| T <sub>1</sub> max.               | $\frac{0.10}{(0.004)}$                                                |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                           |                                                                      |
| K <sub>0</sub>                    | $\frac{1.30 \pm 0.10}{(0.051 \pm 0.004)}$                             | $\frac{0.95 \pm 0.10}{(0.037 \pm 0.004)}$                                                                                                                | $\frac{0.95 \pm 0.10}{(0.037 \pm 0.004)}$                                                                                                                                                                                                                                                                                            |  | $\frac{1.50 \pm 0.10}{(0.059 \pm 0.004)}$                                                                                                                                                                                                                                 | $\frac{1.80 \pm 0.10}{(0.071 \pm 0.004)}$                            |
| Leader min.                       | $\frac{390}{(15.4)}$                                                  |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                           |                                                                      |
| Trailer min.                      | $\frac{160}{(6.3)}$                                                   |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                           |                                                                      |

## Reel Dimensions

|                     |                                        |
|---------------------|----------------------------------------|
| A max.              | $\frac{185}{(7.3)}$                    |
| N min.              | $\frac{50}{(2.0)}$                     |
| W <sub>1</sub>      | $\frac{12.4 +2.0/-0}{(0.49 +0.08/-0)}$ |
| W <sub>2</sub> max. | $\frac{18.4}{(0.72)}$                  |

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

MF-MSMF SERIES, REV. AY, 07/25

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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:  
[https://www.bourns.com/docs/RoHS-MSL/msl\\_mf.pdf](https://www.bourns.com/docs/RoHS-MSL/msl_mf.pdf)

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