



## Features

- Standard 1812 footprint
- Fast Time-to-Trip (TTT) to protect against overcurrent events
- Excellent solderability with ENIG terminal
- Symmetrical designs and low profile
- AEC-Q200 compliant (select models)
- 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                       | ✓                  | ✓         | ✓                  |
| NEW! MF-MSMF010/60X | 60               | 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                       | ✓                  | ✓         | ✓                  |
| NEW! MF-MSMF014/60X | 60               | 40               | 0.14              | 0.34              | 0.40             | 6.0               | 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                       | ✓                  | ✓         |                    |

Continued on next page



**CALIFORNIA WARNING:** Can expose you to lead, a carcinogen and reproductive toxicant. See [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

for:

- PC motherboards
- PC peripherals
- Point-of-sale (POS) equipment
- PCMCIA cards
- USB port protection - USB 2.0, 3.0 & OTG
- Hard disk drives
- HDMI 1.4 Source protection
- Server and data center interfaces

## 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       |                    |
|                |                  |                  | Amps              |                   | R <sub>Min</sub> | R <sub>1Max</sub> | Amps              | Seconds | Typ.                      | E174545            | R50256634 |                    |
| 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                       | ✓                  | ✓         | ✓                  |
| MF-MSMF150     | 6                | 100              | 1.50              | 3.00              | 0.030            | 0.120             | 8.0               | 0.5     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF150/8X  | 8                | 100              | 1.50              | 3.00              | 0.030            | 0.110             | 8.0               | 0.5     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF150/12X | 12               | 100              | 1.50              | 3.00              | 0.030            | 0.110             | 8.0               | 0.5     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF150/12  | 12               | 100              | 1.50              | 3.00              | 0.030            | 0.120             | 8.0               | 0.5     | 0.8                       | ✓                  | ✓         | ✓                  |
| MF-MSMF150/16X | 16               | 100              | 1.50              | 3.00              | 0.030            | 0.120             | 8.0               | 0.5     | 0.8                       | ✓                  | ✓         | ✓                  |
| MF-MSMF150/24X | 24               | 20               | 1.50              | 3.00              | 0.030            | 0.120             | 8.0               | 1.5     | 1.0                       | ✓                  | ✓         | ✓                  |
| MF-MSMF160/8X  | 8                | 100              | 1.60              | 2.80              | 0.030            | 0.100             | 8.0               | 1.0     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF160/12X | 12               | 100              | 1.60              | 2.80              | 0.030            | 0.100             | 8.0               | 1.0     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF160/16X | 16               | 100              | 1.60              | 2.80              | 0.030            | 0.100             | 8.0               | 1.0     | 0.8                       | ✓                  | ✓         | ✓                  |
| MF-MSMF160/24X | 24               | 20               | 1.60              | 3.20              | 0.030            | 0.100             | 8.0               | 1.0     | 0.8                       | ✓                  | ✓         | ✓                  |
| MF-MSMF200     | 8                | 40               | 2.00              | 4.00              | 0.020            | 0.080             | 8.0               | 2.0     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF200/8X  | 8                | 100              | 2.00              | 3.50              | 0.020            | 0.070             | 8.0               | 2.0     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF200/12X | 12               | 100              | 2.00              | 3.50              | 0.020            | 0.070             | 8.0               | 2.0     | 1.0                       | ✓                  | ✓         |                    |
| MF-MSMF200/16X | 16               | 100              | 2.00              | 3.50              | 0.020            | 0.070             | 8.0               | 2.0     | 1.0                       | ✓                  | ✓         | ✓                  |
| MF-MSMF250/16X | 16               | 100              | 2.50              | 5.00              | 0.015            | 0.100             | 8.0               | 5.0     | 1.2                       | ✓                  | ✓         | ✓                  |
| MF-MSMF260     | 6                | 100              | 2.60              | 5.20              | 0.015            | 0.080             | 8.0               | 5.0     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF260/6X  | 6                | 100              | 2.60              | 5.20              | 0.015            | 0.060             | 8.0               | 5.0     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF260/8X  | 8                | 100              | 2.60              | 5.20              | 0.015            | 0.050             | 8.0               | 5.0     | 0.8                       | ✓                  | ✓         |                    |
| MF-MSMF260/12X | 12               | 100              | 2.60              | 5.20              | 0.015            | 0.050             | 8.0               | 5.0     | 1.2                       | ✓                  | ✓         |                    |
| MF-MSMF260/16X | 16               | 100              | 2.60              | 5.00              | 0.015            | 0.050             | 8.0               | 5.0     | 1.2                       | ✓                  | ✓         | ✓                  |
| MF-MSMF300/6X  | 6                | 100              | 3.00              | 5.00              | 0.010            | 0.040             | 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-MSMF010/60X | 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-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-MSMF014/60X | 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     | 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     |

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-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     |
| 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     |

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-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) | 0.65<br>(0.026) | 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) | 0.65<br>(0.026) | 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) | 0.65<br>(0.026) | 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) | 0.65<br>(0.026) | 2     |
| MF-MSMF300/6X  | 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     |

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

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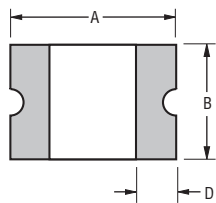
# MF-MSMF Series – PTC Resettable Fuses

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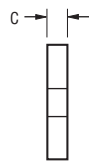
## Product Dimensions (see previous pages for dimensions)

### Style 1

Top and Bottom View



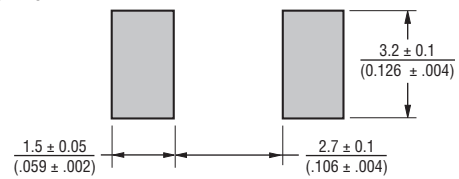
Side View



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

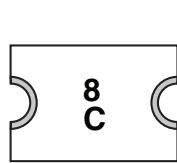
DIMENSIONS:  $\frac{\text{MM}}{(\text{INCHES})}$

Recommended Pad Layout

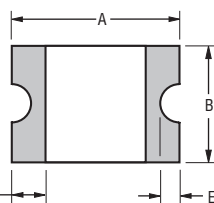


### Style 2

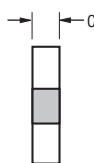
Top View



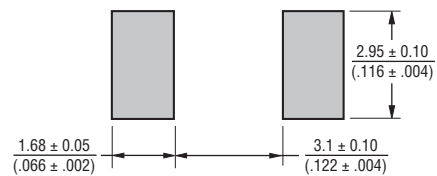
Bottom View



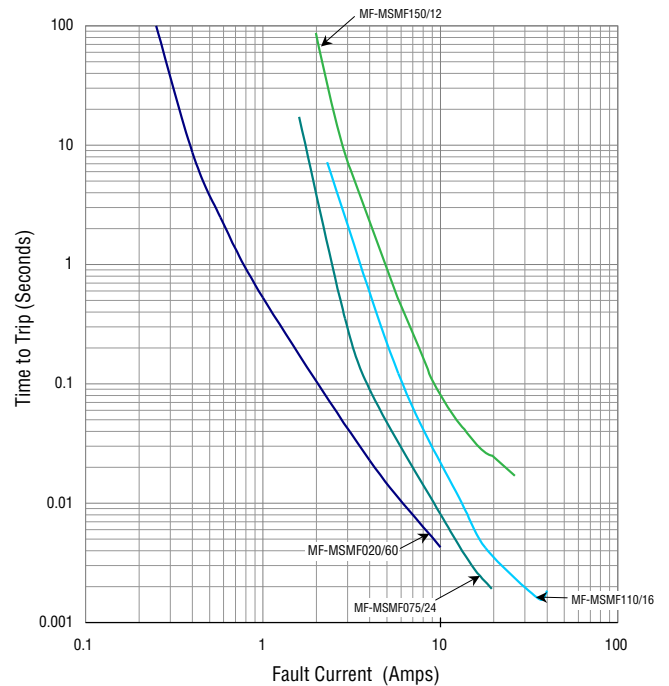
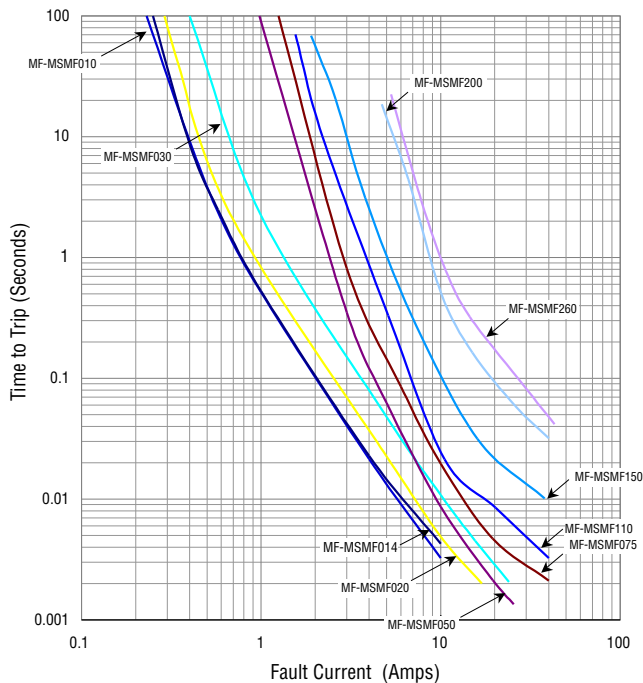
Side View



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.

Specifications are subject to change without notice.

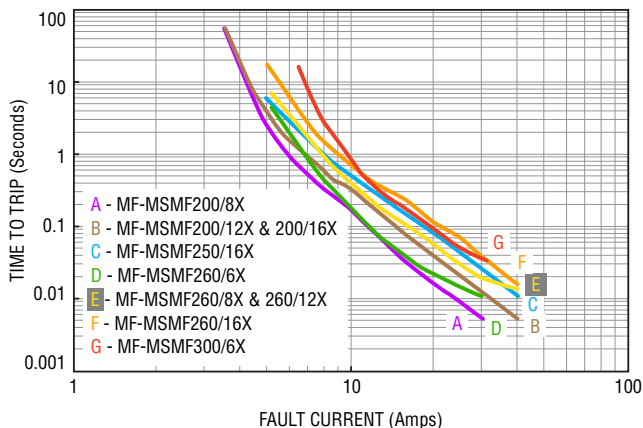
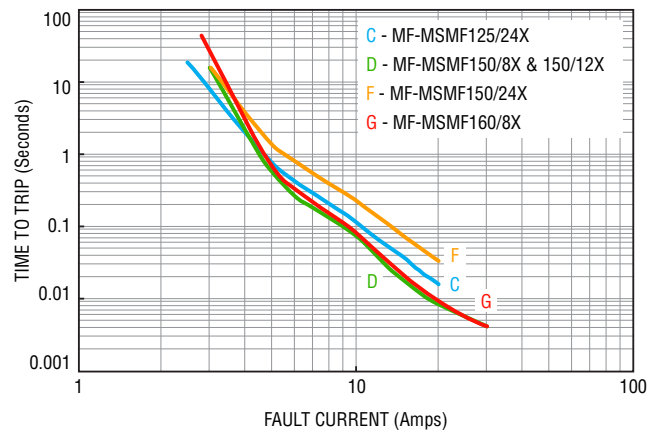
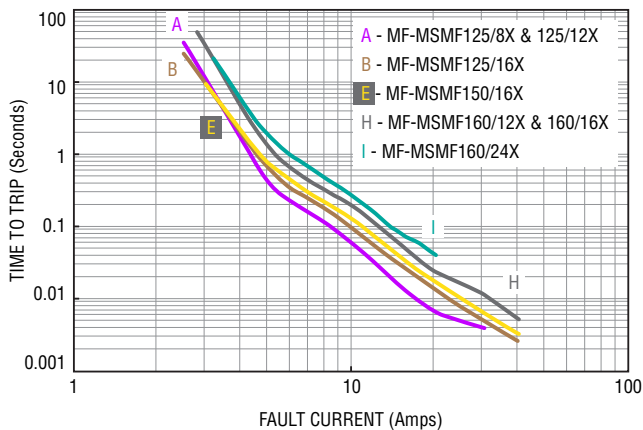
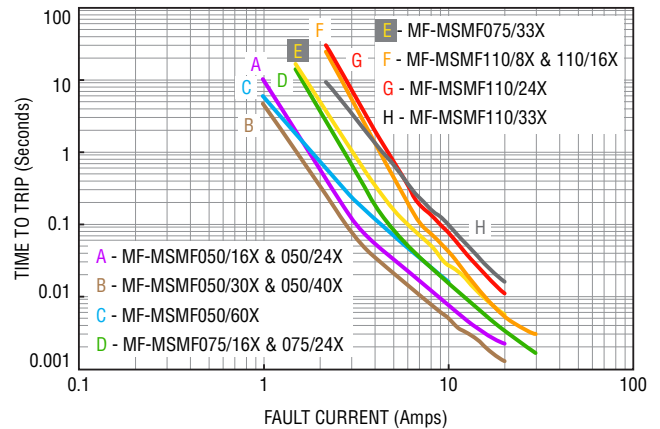
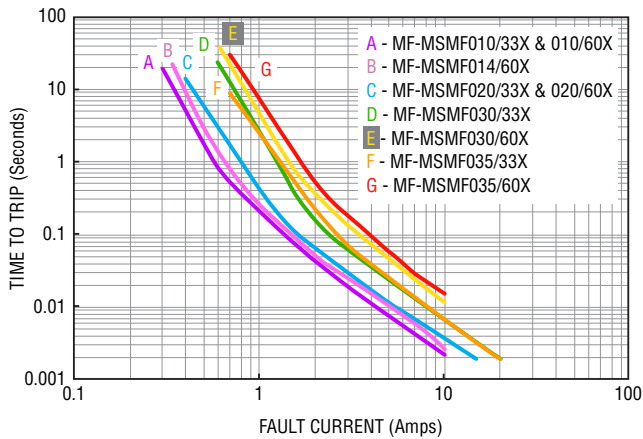
Users should verify actual device performance in their specific applications.

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## MF-MSMF Series – PTC Resettable Fuses

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### Typical 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-MSMF010/60X | 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-MSMF014/60X | 0.23                          | 0.20   | 0.17 | 0.14  | 0.12  | 0.10  | 0.09  | 0.08  | 0.05  |
| 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

**BOURNS®**

**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  |
| MF-MSMF300/6X  | 4.13                          | 3.75   | 3.30 | 3.00  | 2.62  | 2.43  | 2.25  | 2.00  | 1.78  |

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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-MSMF300/6X  |                | 2,000 pcs. per reel |
| MF-MSMF050     | MF-MSMF075     |                     |
| MF-MSMF075/24  | MF-MSMF110     |                     |
| MF-MSMF110/16  | MF-MSMF150     |                     |
| MF-MSMF150/12  | MF-MSMF200     |                     |
| MF-MSMF260     |                |                     |
| MF-MSMF010/33X | MF-MSMF010/60X |                     |
| MF-MSMF014/60X | 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 ~ 300 (0.1 ~ 3.0 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

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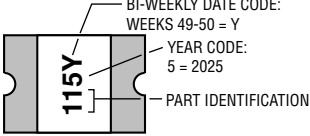
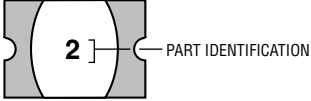
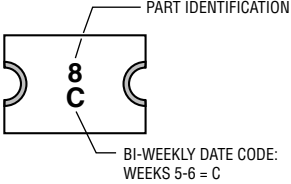
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## MF-MSMF Series – PTC Resettable Fuses

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### Typical Part Marking

Represents total content. Layout may vary.

|                                                                                                                                                                                                                                                                                                                   |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <p>PART IDENTIFICATION EXAMPLES:</p> <p>MF-MSMF010 = 10</p> <p>MF-MSMF014 = 14</p> <p>MF-MSMF020 = 02</p> <p>MF-MSMF030 = 30</p> <p>MF-MSMF050 = 50</p> <p>MF-MSMF075 &amp; 075/24 = 75</p> <p>MF-MSMF110 &amp; 110/16 = 11</p> <p>MF-MSMF150 &amp; 150/12 = 15</p> <p>MF-MSMF200 = 20</p> <p>MF-MSMF260 = 26</p> | <p>PART IDENTIFICATION EXAMPLE:</p> <p>MF-MSMF020/60 = 2</p>                      | <p>PART IDENTIFICATION EXAMPLES:</p> <p>MF-MSMF010/33X &amp; 010/60X = 0</p> <p>MF-MSMF014/60X = 1</p> <p>MF-MSMF020/33X &amp; 020/60X = 2</p> <p>MF-MSMF030/33X = E</p> <p>MF-MSMF030/60X = I</p> <p>MF-MSMF035/33X = 3</p> <p>MF-MSMF035/60X = J</p> <p>MF-MSMF050/16X, 050/24X, 050/30X &amp; 050/40X = 4</p> <p>MF-MSMF050/60X = K</p> <p>MF-MSMF075/16X &amp; 075/24X = 5</p> <p>MF-MSMF075/33X = H</p> <p>MF-MSMF110/8X &amp; 110/16X = N</p> <p>MF-MSMF110/24X = 6</p> <p>MF-MSMF110/33X = R</p> <p>MF-MSMF125/8X &amp; 125/12X = S</p> <p>MF-MSMF125/16X = M</p> <p>MF-MSMF125/24X = 7</p> <p>MF-MSMF150/8X &amp; 150/12X = T</p> <p>MF-MSMF150/16X = Q</p> <p>MF-MSMF150/24X = 8</p> <p>MF-MSMF160/8X = U</p> <p>MF-MSMF160/12X &amp; 160/16X = W</p> <p>MF-MSMF160/24X = 9</p> <p>MF-MSMF200/8X = L</p> <p>MF-MSMF200/12X &amp; 200/16X = A</p> <p>MF-MSMF250/16X = C</p> <p>MF-MSMF260/6X = X</p> <p>MF-260/8X &amp; 260/12X = Y</p> <p>MF-MSMF260/16X = D</p> <p>MF-MSMF300/6X = Z</p> |

**BOURNS®**

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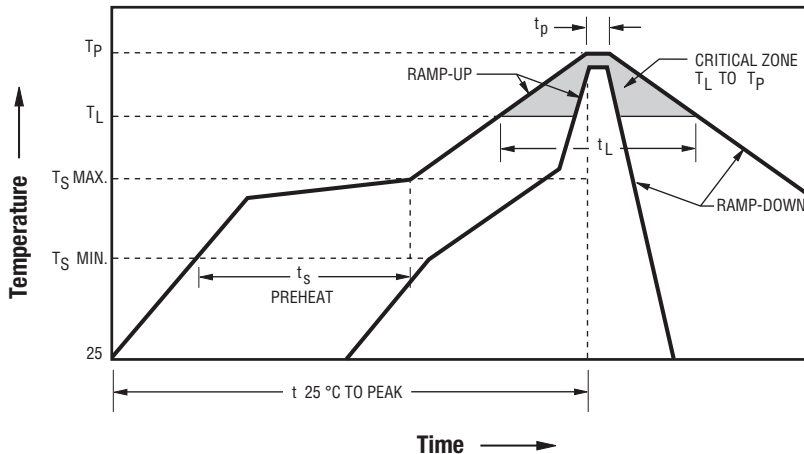
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## MF-MSMF Series – PTC Resettable Fuses

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### Solder Reflow Recommendations

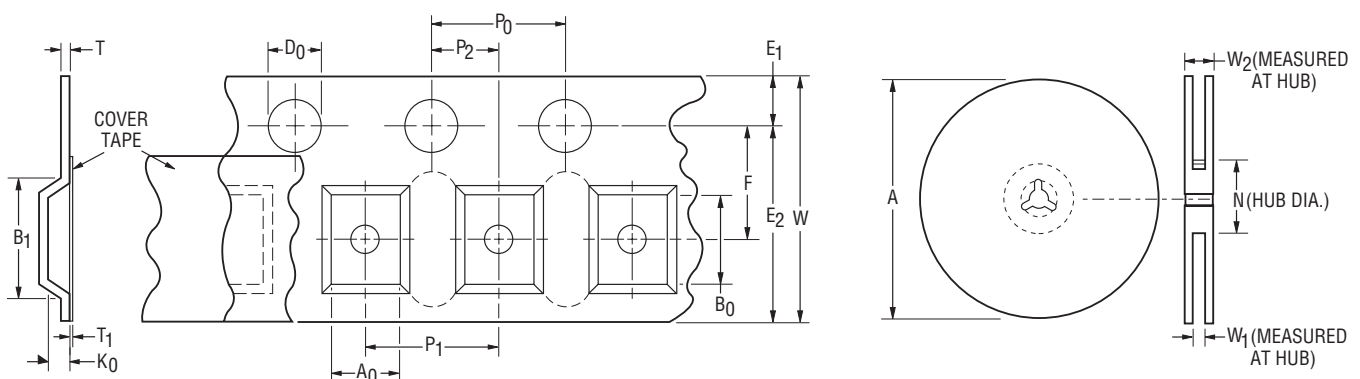


#### Notes:

- 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<br>MF-MSMF010/60X MF-MSMF075/16X<br>MF-MSMF014/60X MF-MSMF075/24<br>MF-MSMF020/33X MF-MSMF075/24X<br>MF-MSMF020/60X MF-MSMF110<br>MF-MSMF030/33X MF-MSMF110/16<br>MF-MSMF035/33X MF-MSMF125<br>MF-MSMF050 MF-MSMF150<br>MF-MSMF050/16X MF-MSMF150/12<br>MF-MSMF050/24X MF-MSMF160<br>MF-MSMF050/30X MF-MSMF200<br>MF-MSMF050/40X 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<br>MF-MSMF300/6X | MF-MSMF030/60X<br>MF-MSMF035/60X<br>MF-MSMF050/60X<br>MF-MSMF110/33X |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|--|
|                                                                                                                                                                                                                                                 |                                                                       |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                                                                                                                                                                                            |                                                                      |  |
|                                                                                                                                                                                                                                                 |                                                                       |                                                                                                                                                          | W<br>$\frac{12.00 \pm 0.30}{(0.472 \pm 0.012)}$                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                                                                                                                                                                                            |                                                                      |  |
|                                                                                                                                                                                                                                                 |                                                                       |                                                                                                                                                          | P <sub>0</sub><br>$\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$                                                                                                                                                                                                                                                                                                           |  |                                                                                                                                                                                                                                                                                            |                                                                      |  |
|                                                                                                                                                                                                                                                 |                                                                       |                                                                                                                                                          | 10 P <sub>0</sub><br>$\frac{40.0 \pm 0.20}{(1.575 \pm 0.008)}$                                                                                                                                                                                                                                                                                                        |  |                                                                                                                                                                                                                                                                                            |                                                                      |  |
|                                                                                                                                                                                                                                                 |                                                                       |                                                                                                                                                          | P <sub>1</sub><br>$\frac{8.00 \pm 0.10}{(0.315 \pm 0.004)}$                                                                                                                                                                                                                                                                                                           |  |                                                                                                                                                                                                                                                                                            |                                                                      |  |
|                                                                                                                                                                                                                                                 |                                                                       |                                                                                                                                                          | P <sub>2</sub><br>$\frac{2.00 \pm 0.05}{(0.079 \pm 0.002)}$                                                                                                                                                                                                                                                                                                           |  |                                                                                                                                                                                                                                                                                            |                                                                      |  |
|                                                                                                                                                                                                                                                 |                                                                       |                                                                                                                                                          | A <sub>0</sub><br>$\frac{3.58 \pm 0.10}{(0.141 \pm 0.004)}$<br>$\frac{3.66 \pm 0.15}{(0.144 \pm 0.006)}$<br>$\frac{3.66 \pm 0.15}{(0.144 \pm 0.006)}$<br>$\frac{3.70 \pm 0.10}{(0.146 \pm 0.004)}$<br>$\frac{3.50 \pm 0.10}{(0.138 \pm 0.004)}$                                                                                                                       |  |                                                                                                                                                                                                                                                                                            |                                                                      |  |
|                                                                                                                                                                                                                                                 |                                                                       |                                                                                                                                                          | B <sub>0</sub><br>$\frac{4.93 \pm 0.10}{(0.194 \pm 0.004)}$<br>$\frac{4.98 \pm 0.10}{(0.196 \pm 0.004)}$<br>$\frac{4.98 \pm 0.10}{(0.196 \pm 0.004)}$<br>$\frac{5.10 \pm 0.10}{(0.201 \pm 0.004)}$<br>$\frac{4.90 \pm 0.10}{(0.193 \pm 0.004)}$                                                                                                                       |  |                                                                                                                                                                                                                                                                                            |                                                                      |  |
|                                                                                                                                                                                                                                                 |                                                                       |                                                                                                                                                          | B <sub>1</sub> max.<br>$\frac{5.90}{(0.232)}$                                                                                                                                                                                                                                                                                                                         |  |                                                                                                                                                                                                                                                                                            |                                                                      |  |
| D <sub>0</sub><br>$\frac{1.50 + 0.10/-0}{(0.059 + 0.004/-0)}$                                                                                                                                                                                   |                                                                       |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                                                                                                                                                                                            |                                                                      |  |
| F<br>$\frac{5.50 \pm 0.05}{(0.217 \pm 0.002)}$                                                                                                                                                                                                  |                                                                       |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                                                                                                                                                                                            |                                                                      |  |
| E <sub>1</sub><br>$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$                                                                                                                                                                                     |                                                                       |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                                                                                                                                                                                            |                                                                      |  |
| E <sub>2</sub> typ.<br>$\frac{10.25}{(0.404)}$                                                                                                                                                                                                  |                                                                       |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                                                                                                                                                                                            |                                                                      |  |
| T max.<br>$\frac{0.60}{(0.024)}$                                                                                                                                                                                                                |                                                                       |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                                                                                                                                                                                            |                                                                      |  |
| T <sub>1</sub> max.<br>$\frac{0.10}{(0.004)}$                                                                                                                                                                                                   |                                                                       |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                                                                                                                                                                                            |                                                                      |  |
| K <sub>0</sub><br>$\frac{1.30 \pm 0.10}{(0.051 \pm 0.004)}$<br>$\frac{0.80 \pm 0.10}{(0.031 \pm 0.004)}$<br>$\frac{0.95 \pm 0.10}{(0.037 \pm 0.004)}$<br>$\frac{1.50 \pm 0.10}{(0.059 \pm 0.004)}$<br>$\frac{1.80 \pm 0.10}{(0.071 \pm 0.004)}$ |                                                                       |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                                                                                                                                                                                            |                                                                      |  |
| Leader min.<br>$\frac{390}{(15.4)}$                                                                                                                                                                                                             |                                                                       |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                                                                                                                                                                                            |                                                                      |  |
| Trailer min.<br>$\frac{160}{(6.3)}$                                                                                                                                                                                                             |                                                                       |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                                                                                                                                                                                            |                                                                      |  |

## 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. BA, 11/25

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

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