
## Features

- Standard 1206 footprint
- Fast Time-to-Trip (TTT) to protect against overcurrent events
- Excellent solderability with ENIG terminal
- Symmetrical designs and low profile (0.7 mm ~ 1.6 mm)
- RoHS compliant* and halogen free**
- Agency recognition: cULus and TÜV
- 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-NSMF Series - PTC Resettable Fuses

## Electrical Characteristics

| Model | $V_{max.}$ | $I_{max.}$ | $I_{hold}$ | $I_{trip}$ | Resistance*** | | Max. Time To Trip | | Tripped Power Dissipation | Agency Recognition | | AEC-Q200 Compliant/ Automotive Grade |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | at 23 °C | | Ohms at 23 °C | | at 23 °C | | Watts at 23 °C | cUL | TÜV | |
| | Volts | Amps | Amps | | $R_{min.}$ | $R_{1max.}$ | Amps | Sec. | Typ. | E174545 | R 50256634 | |
| MF-NSMF005/30X | 30 | 40 | 0.05 | 0.15 | 2.80 | 20 | 0.5 | 1.5 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF005/60X | 60 | 10 | 0.05 | 0.15 | 2.80 | 20 | 0.5 | 1.5 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF010/30X | 30 | 40 | 0.10 | 0.25 | 1.35 | 15 | 0.5 | 1.5 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF010/60X | 60 | 10 | 0.10 | 0.25 | 1.35 | 15 | 0.5 | 1.5 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF012 | 30 | 10 | 0.12 | 0.29 | 1.35 | 8.5 | 1.0 | 0.2 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF012/48X | 48 | 10 | 0.12 | 0.29 | 1.00 | 6.5 | 1.0 | 0.2 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF016 | 30 | 10 | 0.16 | 0.37 | 0.70 | 6.0 | 1.0 | 0.3 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF016/48X | 48 | 10 | 0.16 | 0.37 | 0.70 | 5.0 | 1.0 | 0.3 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF020 | 24 | 10 | 0.20 | 0.46 | 0.60 | 2.6 | 1.0 | 0.6 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF020X | 30 | 60 | 0.20 | 0.40 | 0.60 | 3.3 | 1.0 | 0.6 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF025X | 16 | 20 | 0.25 | 0.50 | 0.45 | 2.3 | 8.0 | 0.08 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF025/24X | 24 | 80 | 0.25 | 0.50 | 0.45 | 2.3 | 8.0 | 0.05 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF025/30X | 30 | 60 | 0.25 | 0.50 | 0.45 | 2.3 | 8.0 | 0.05 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF035 | 6 | 100 | 0.35 | 0.75 | 0.30 | 1.2 | 8.0 | 0.10 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF035X | 16 | 20 | 0.35 | 0.75 | 0.30 | 1.4 | 3.5 | 0.14 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF035/24X | 24 | 80 | 0.35 | 0.75 | 0.30 | 1.4 | 8.0 | 0.10 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF035/30X | 30 | 60 | 0.35 | 0.75 | 0.30 | 1.4 | 8.0 | 0.10 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF050/8X | 8 | 100 | 0.50 | 1.00 | 0.15 | 0.75 | 8.0 | 0.10 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF050 | 13.2 | 100 | 0.50 | 1.00 | 0.15 | 0.70 | 8.0 | 0.10 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF050/16X | 16 | 100 | 0.50 | 1.00 | 0.15 | 0.75 | 8.0 | 0.10 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF050/24X | 24 | 80 | 0.50 | 1.00 | 0.15 | 0.75 | 8.0 | 0.10 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF075 | 6 | 100 | 0.75 | 1.50 | 0.10 | 0.40 | 8.0 | 0.20 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF075/8X | 8 | 100 | 0.75 | 1.50 | 0.09 | 0.35 | 8.0 | 0.10 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF075/13X | 13.2 | 100 | 0.75 | 1.50 | 0.09 | 0.35 | 8.0 | 0.10 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF075/16X | 16 | 100 | 0.75 | 1.50 | 0.09 | 0.35 | 8.0 | 0.10 | 0.6 | ✓ | ✓ | ✓ |

***$R_{1max}$: measured 1 hour post reflow.

*continued*

## Additional Information

Click these links for more information:

PRODUCT SELECTOR | TECHNICAL LIBRARY | INVENTORY | SAMPLES | CONTACT

**WARNING**
**Cancer and Reproductive Harm**
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.

Specifications are subject to change without notice. Users should verify actual device performance in their specific applications. The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

## Applications

- USB & HDMI port protection
- Battery packs
- Tablet and laptop PCs
- Hard disk drives
- LCD / LED HDTVs
- Server and data center interfaces



### Electrical Characteristics (continued)

| Model | $V_{max.}$ | $I_{max.}$ | $I_{hold}$ | $I_{trip}$ | Resistance**** | | Max. Time To Trip | | Tripped Power Dissipation | Agency Recognition | | AEC-Q200 Compliant/ Automotive Grade |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | at 23 °C | | Ohms at 23 °C | | at 23 °C | | Watts at 23 °C | cUL | TÜV | |
| | Volts | Amps | Amps | | $R_{min.}$ | $R_{1max.}$ | Amps | Sec. | Typ. | E174545 | R 50256634 | |
| MF-NSMF110 | 6 | 100 | 1.10 | 2.20 | 0.06 | 0.20 | 8.0 | 0.10 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF110/6X | 6 | 100 | 1.10 | 2.20 | 0.06 | 0.24 | 8.0 | 0.10 | 0.8 | ✓ | ✓ | ✓ |
| MF-NSMF110/16X | 16 | 100 | 1.10 | 2.20 | 0.06 | 0.23 | 8.0 | 0.10 | 0.8 | ✓ | ✓ | ✓ |
| MF-NSMF125 | 6 | 100 | 1.25 | 2.50 | 0.05 | 0.14 | 8.0 | 0.20 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF125/8X | 8 | 100 | 1.25 | 2.50 | 0.04 | 0.15 | 8.0 | 0.20 | 0.8 | ✓ | ✓ | ✓ |
| MF-NSMF150 | 6 | 100 | 1.50 | 3.00 | 0.03 | 0.13 | 8.0 | 0.30 | 0.6 | ✓ | ✓ | ✓ |
| MF-NSMF150/6X | 6 | 100 | 1.50 | 3.00 | 0.03 | 0.12 | 8.0 | 0.30 | 0.8 | ✓ | ✓ | ✓ |
| MF-NSMF175 | 6 | 100 | 1.75 | 3.50 | 0.02 | 0.085 | 8.0 | 1.0 | 0.7 | ✓ | ✓ | ✓ |
| MF-NSMF200 | 6 | 100 | 2.00 | 4.00 | 0.02 | 0.085 | 8.0 | 1.0 | 0.7 | ✓ | ✓ | ✓ |

****$R_{1max}$: measured 1 hour post reflow.

### 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) | See Note | |
| ESD Classification | Class 6 (per AEC-Q200-2, HBM) | |

### Test Procedures and Requirements

| Item | Test Conditions | Accept/Reject Criteria |
|---|---|---|
| Visual/Mechanical | Verify dimensions and materials | Per MF physical description |
| Resistance | In still air @ 23 °C | $R_{min} \le R \le R_{max}$ |
| Time to Trip | At specified current, $V_{max}$, 23 °C, still air | T ≤ max. time to trip (seconds) |
| Hold Current | 30 min. at $I_{hold}$, still air | No trip |
| Trip Cycle Life | $V_{max}$, $I_{max}$, 100 cycles | No arcing or burning |
| Trip Endurance | $V_{max}$, 48 hours | No arcing or burning |
| Solderability | 245 °C ± 5 °C, 5 seconds | 95 % min. coverage |

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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-NSMF005/30X | 0.076 | 0.068 | 0.060 | 0.050 | 0.043 | 0.039 | 0.034 | 0.030 | 0.023 |
| MF-NSMF005/60X | 0.076 | 0.068 | 0.060 | 0.050 | 0.043 | 0.039 | 0.034 | 0.030 | 0.023 |
| MF-NSMF010/30X | 0.15 | 0.14 | 0.12 | 0.10 | 0.08 | 0.07 | 0.06 | 0.05 | 0.04 |
| MF-NSMF010/60X | 0.15 | 0.14 | 0.12 | 0.10 | 0.08 | 0.07 | 0.06 | 0.05 | 0.04 |
| MF-NSMF012 | 0.19 | 0.17 | 0.15 | 0.12 | 0.11 | 0.10 | 0.09 | 0.08 | 0.07 |
| MF-NSMF012/48X | 0.18 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 | 0.07 | 0.05 |
| MF-NSMF016 | 0.21 | 0.20 | 0.18 | 0.16 | 0.14 | 0.13 | 0.12 | 0.11 | 0.09 |
| MF-NSMF016/48X | 0.22 | 0.20 | 0.18 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 |
| MF-NSMF020 | 0.30 | 0.27 | 0.24 | 0.20 | 0.18 | 0.16 | 0.14 | 0.12 | 0.11 |
| MF-NSMF020X | 0.30 | 0.27 | 0.24 | 0.20 | 0.18 | 0.16 | 0.14 | 0.12 | 0.10 |
| MF-NSMF025X | 0.39 | 0.35 | 0.31 | 0.25 | 0.23 | 0.21 | 0.18 | 0.16 | 0.13 |
| MF-NSMF025/24X | 0.39 | 0.35 | 0.31 | 0.25 | 0.23 | 0.21 | 0.18 | 0.16 | 0.13 |
| MF-NSMF025/30X | 0.39 | 0.35 | 0.31 | 0.25 | 0.23 | 0.21 | 0.18 | 0.16 | 0.13 |
| MF-NSMF035 | 0.51 | 0.46 | 0.40 | 0.35 | 0.30 | 0.27 | 0.24 | 0.22 | 0.18 |
| MF-NSMF035X | 0.51 | 0.46 | 0.40 | 0.35 | 0.30 | 0.27 | 0.24 | 0.22 | 0.18 |
| MF-NSMF035/24X | 0.51 | 0.46 | 0.40 | 0.35 | 0.30 | 0.27 | 0.24 | 0.22 | 0.18 |
| MF-NSMF035/30X | 0.51 | 0.46 | 0.40 | 0.35 | 0.30 | 0.27 | 0.24 | 0.22 | 0.18 |
| MF-NSMF050/8X | 0.76 | 0.68 | 0.59 | 0.50 | 0.44 | 0.40 | 0.35 | 0.32 | 0.26 |
| MF-NSMF050 | 0.76 | 0.68 | 0.59 | 0.50 | 0.44 | 0.40 | 0.35 | 0.32 | 0.26 |
| MF-NSMF050/16X | 0.76 | 0.68 | 0.59 | 0.50 | 0.44 | 0.40 | 0.35 | 0.32 | 0.26 |
| MF-NSMF050/24X | 0.76 | 0.68 | 0.59 | 0.50 | 0.44 | 0.40 | 0.35 | 0.32 | 0.26 |
| MF-NSMF075 | 1.11 | 1.00 | 0.85 | 0.75 | 0.67 | 0.61 | 0.52 | 0.50 | 0.42 |
| MF-NSMF075/8X | 1.11 | 1.00 | 0.85 | 0.75 | 0.67 | 0.61 | 0.52 | 0.50 | 0.42 |
| MF-NSMF075/13X | 1.11 | 1.00 | 0.85 | 0.75 | 0.67 | 0.61 | 0.52 | 0.50 | 0.42 |
| MF-NSMF075/16X | 1.11 | 1.00 | 0.85 | 0.75 | 0.67 | 0.61 | 0.52 | 0.50 | 0.42 |
| MF-NSMF110 | 1.64 | 1.46 | 1.30 | 1.10 | 0.92 | 0.83 | 0.80 | 0.65 | 0.52 |
| MF-NSMF110/6X | 1.64 | 1.46 | 1.30 | 1.10 | 0.92 | 0.83 | 0.80 | 0.65 | 0.52 |
| MF-NSMF110/16X | 1.64 | 1.46 | 1.30 | 1.10 | 0.92 | 0.83 | 0.80 | 0.65 | 0.52 |
| MF-NSMF125 | 1.84 | 1.66 | 1.47 | 1.25 | 1.11 | 1.02 | 0.91 | 0.82 | 0.69 |
| MF-NSMF125/8X | 1.84 | 1.66 | 1.47 | 1.25 | 1.11 | 1.02 | 0.91 | 0.82 | 0.69 |
| MF-NSMF150 | 2.20 | 1.99 | 1.77 | 1.50 | 1.34 | 1.23 | 1.10 | 1.01 | 0.84 |
| MF-NSMF150/6X | 2.20 | 1.99 | 1.77 | 1.50 | 1.34 | 1.23 | 1.10 | 1.01 | 0.84 |
| MF-NSMF175 | 2.52 | 2.28 | 1.99 | 1.75 | 1.57 | 1.45 | 1.32 | 1.21 | 1.04 |
| MF-NSMF200 | 2.88 | 2.61 | 2.28 | 2.00 | 1.80 | 1.66 | 1.51 | 1.39 | 1.19 |

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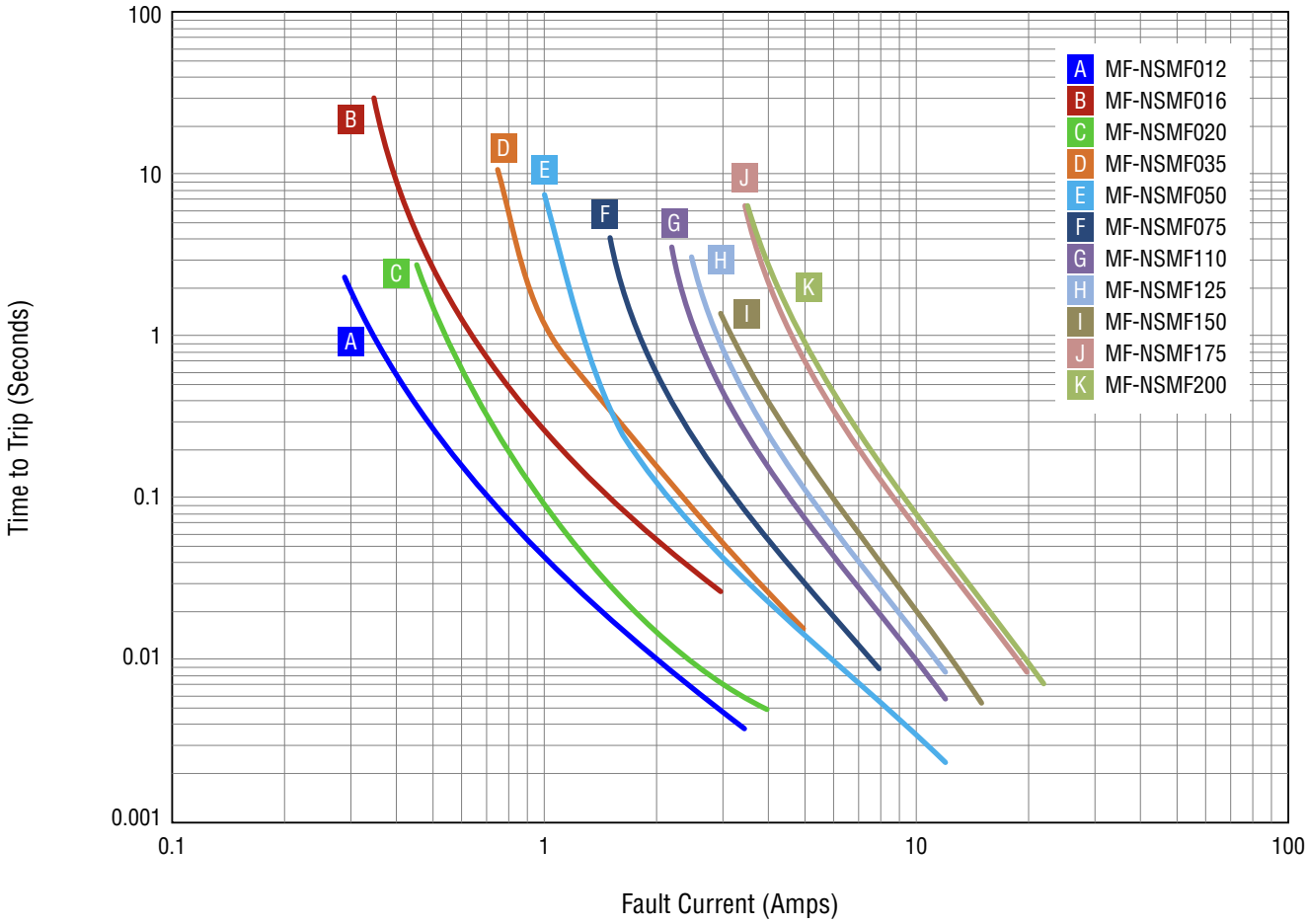
## Typical Time to Trip at 23 °C




The Time to Trip curves represent typical performance of a device in a simulated application environment. Actual performance in specific customer applications may differ from these values due to the influence of other variables.

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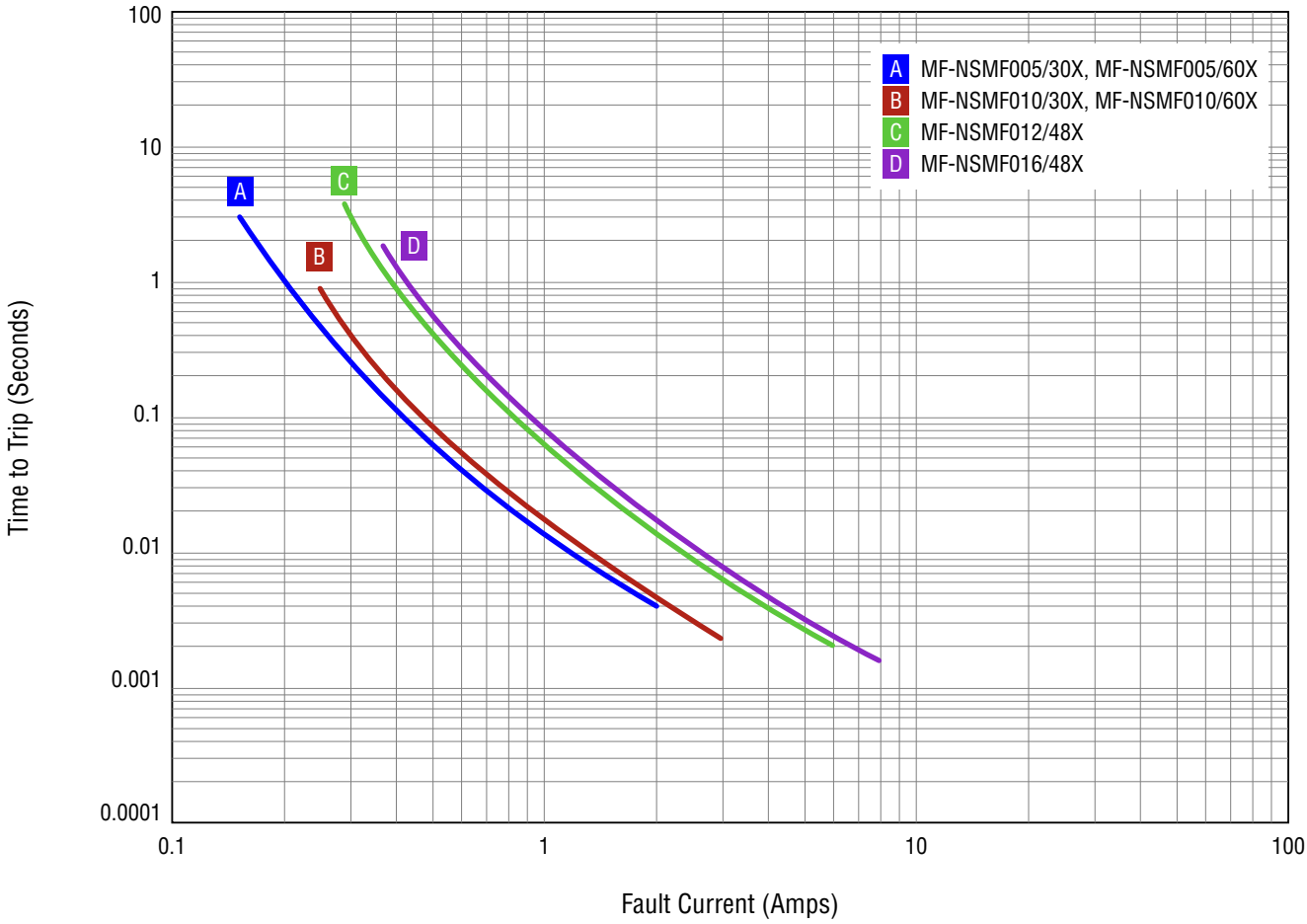
## Typical Time to Trip at 23 °C (continued)




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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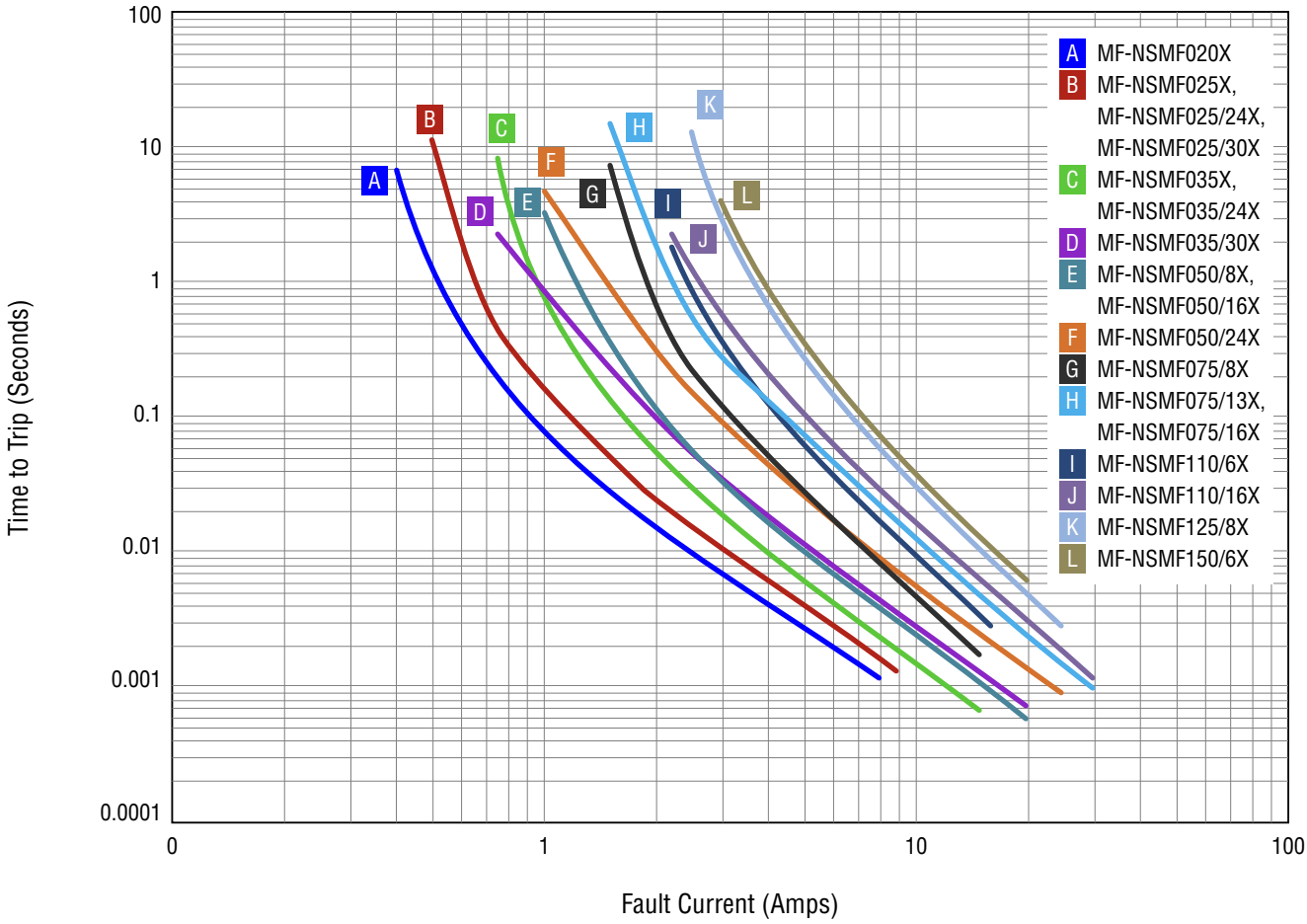
## Typical Time to Trip at 23 °C




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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## How to Order

**MF - NSMF 025 / 30 X - 2**

Multifuse® Product Designator

Series
NSMF = 1206 Surface Mount Component

Hold Current $I_{hold}$ Indicator
005 ~ 200 (0.05 ~ 2.0 Amps)

Voltage Options
6 = 6 Voltage Rated
8 = 8 Voltage Rated
13 = 13.2 Voltage Rated
16 = 16 Voltage Rated
24 = 24 Voltage Rated
30 = 30 Voltage Rated
48 = 48 Voltage Rated
60 = 60 Voltage Rated

MultiFuse® Design Specific Code
X = MultiFuse® freeXpansion™ Design

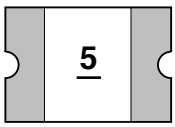
Packaging
-2 = Tape and Reel Packaged per EIA 481

## Packaging Quantity

| Model | | | | Packaging Quantity |
|---|---|---|---|---|
| MF-NSMF005/30X<br>MF-NSMF005/60X<br>MF-NSMF010/30X<br>MF-NSMF010/60X<br>MF-NSMF012<br>MF-NSMF012/48X<br>MF-NSMF016 | MF-NSMF016/48X<br>MF-NSMF020<br>MF-NSMF020X<br>MF-NSMF025X<br>MF-NSMF035<br>MF-NSMF035X<br>MF-NSMF035/30X | MF-NSMF050<br>MF-NSMF050/24X<br>MF-NSMF075<br>MF-NSMF075/13X<br>MF-NSMF075X/16X<br>MF-NSMF110<br>MF-NSMF110/16X | MF-NSMF125<br>MF-NSMF125/8X<br>MF-NSMF150<br>MF-NSMF150/6X<br>MF-NSMF175<br>MF-NSMF200 | 3,000 pcs. per reel |
| MF-NSMF025/24X<br>MF-NSMF025/30 | MF-NSMF035/24X<br>MF-NSMF050/8X | MF-NSMF050/16X<br>MF-NSMF075/8X | MF-NSMF110/6X | 4,000 pcs. per reel |

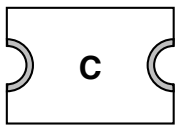
## Typical Part Marking

Represents total content. Layout may vary.




**Style 1 part identification:**

MF-NSMF012 = 0
MF-NSMF016 = 1
MF-NSMF020 = 2
MF-NSMF035 = 3
MF-NSMF050 = 4
MF-NSMF075 = 5
MF-NSMF110 = 6
MF-NSMF125 = 7
MF-NSMF150 = 8
MF-NSMF175 = 9
MF-NSMF200 = A




**Style 2 part identification:**

MF-NSMF005/30X, MF-NSMF005/60X = K
MF-NSMF010/30X, MF-NSMF010/60X = 0
MF-NSMF012/48X = X
MF-NSMF016/48X = 1
MF-NSMF020X = 2
MF-NSMF025X, MF-NSMF025/24X,
MF-NSMF025/30X = C
MF-NSMF035X, MF-NSMF035/24X = 3
MF-NSMF035/30X = P
MF-NSMF050/8X, MF-NSMF050/16X = 4
MF-NSMF050/24X = T
MF-NSMF075/8X = 5
MF-NSMF075/13X, MF-NSMF075X/16X = U
MF-NSMF110/6X = 6
MF-NSMF110/16X = V
MF-NSMF125/8X = 7
MF-NSMF150/6X = 8

A bi-weekly date code will appear on the package label: weeks 05-06 = C

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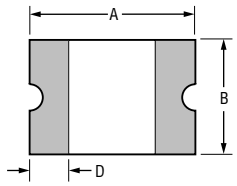
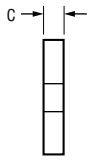
## Product Dimensions

**Style 1**

*Top and Bottom View*



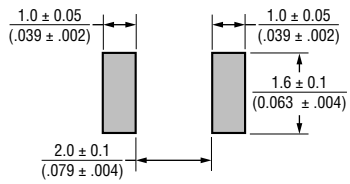

*Side View*




**Terminal material:**
Electroless Ni under immersion Gold (ENIG)

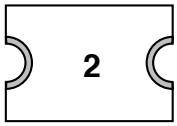
DIMENSIONS: MM / (INCHES)

*Recommended Pad Layout*

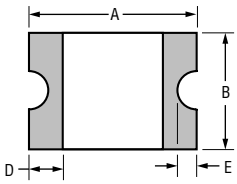



**Style 2**

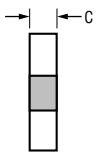
*Top View*



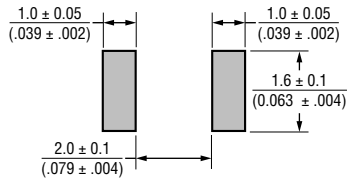

*Bottom View*




*Side View*




*Recommended Pad Layout*




| Model | A | | B | | C | | D | | E | | Style |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | |
| MF-NSMF005/30X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.60 (0.024) | 1.10 (0.043) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF005/60X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.60 (0.024) | 1.10 (0.043) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF010/30X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.60 (0.024) | 1.10 (0.043) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF010/60X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.60 (0.024) | 1.10 (0.043) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF012 | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.70 (0.028) | 1.10 (0.043) | 0.25 (0.010) | | | | 1 |
| MF-NSMF012/48X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.60 (0.024) | 1.10 (0.043) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF016 | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.48 (0.019) | 0.85 (0.033) | 0.25 (0.010) | | | | 1 |
| MF-NSMF016/48X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.60 (0.024) | 1.10 (0.043) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF020 | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.48 (0.019) | 0.85 (0.033) | 0.25 (0.010) | | | | 1 |
| MF-NSMF020X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.40 (0.016) | 0.85 (0.033) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF025X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.40 (0.016) | 0.85 (0.033) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF025/24X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.40 (0.016) | 0.85 (0.033) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF025/30X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.40 (0.016) | 0.85 (0.033) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF035 | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.48 (0.019) | 0.85 (0.033) | 0.25 (0.010) | | | | 1 |

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## Product Dimensions (continued)

| Model | A | | B | | C | | D | | E | | Style |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | |
| MF-NSMF035X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.40 (0.016) | 0.85 (0.033) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF035/24X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.40 (0.016) | 0.85 (0.033) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF035/30X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.75 (0.030) | 1.25 (0.049) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF050/8X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.40 (0.016) | 0.85 (0.033) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF050 | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.48 (0.019) | 0.85 (0.033) | 0.25 (0.010) | | | | 1 |
| MF-NSMF050/16X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.40 (0.016) | 0.85 (0.033) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF050/24X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.75 (0.030) | 1.25 (0.049) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF075 | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.40 (0.016) | 0.70 (0.028) | 0.25 (0.010) | | | | 1 |
| MF-NSMF075/8X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.35 (0.014) | 0.80 (0.031) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF075/13X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.70 (0.028) | 1.20 (0.047) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF075/16X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.70 (0.028) | 1.20 (0.047) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF110 | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.40 (0.016) | 0.70 (0.028) | 0.25 (0.010) | | | | 1 |
| MF-NSMF110/6X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.35 (0.014) | 0.80 (0.031) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF110/16X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.60 (0.024) | 1.10 (0.043) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF125 | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.40 (0.016) | 0.70 (0.028) | 0.25 (0.010) | | | | 1 |
| MF-NSMF125/8X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.60 (0.024) | 1.10 (0.043) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF150 | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.40 (0.016) | 0.70 (0.028) | 0.25 (0.010) | | | | 1 |
| MF-NSMF150/6X | 3.00 (0.118) | 3.40 (0.134) | 1.40 (0.055) | 1.80 (0.071) | 0.60 (0.024) | 1.10 (0.043) | 0.25 (0.010) | 1.0 (0.039) | 0.05 (0.002) | 0.35 (0.014) | 2 |
| MF-NSMF175 | 3.00 (0.118) | 3.50 (0.138) | 1.40 (0.055) | 1.80 (0.071) | 0.70 (0.028) | 1.60 (0.063) | 0.25 (0.010) | | | | 1 |
| MF-NSMF200 | 3.00 (0.118) | 3.50 (0.138) | 1.40 (0.055) | 1.80 (0.071) | 0.70 (0.028) | 1.60 (0.063) | 0.25 (0.010) | | | | 1 |

DIMENSIONS: MM (INCHES)

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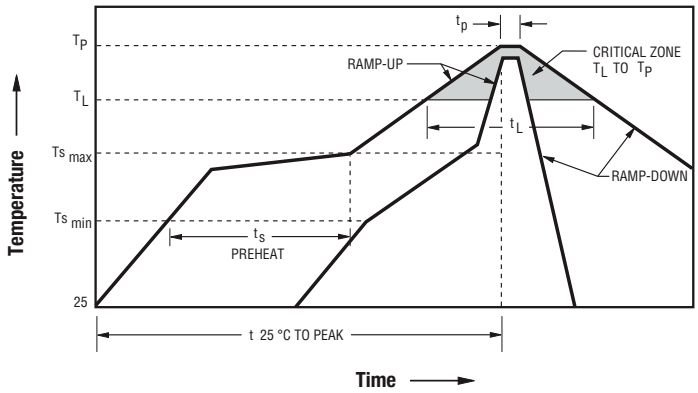
## Solder Reflow Recommendations




**Notes:**

- MF-NSMF 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 for more details.

| Profile Feature | Pb-Free Assembly |
|---|---|
| Average Ramp-Up Rate ($Ts_{max}$ to $T_p$) | 3 °C / second max. |
| PREHEAT:<br>Temperature Min. ($Ts_{min}$)<br>Temperature Max. ($Ts_{max}$)<br>Time ($Ts_{min}$ to $Ts_{max}$) (ts) | <br>150 °C<br>200 °C<br>60~180 seconds |
| TIME MAINTAINED ABOVE:<br>Temperature ($T_L$)<br>Time ($t_L$) | <br>217 °C<br>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. |

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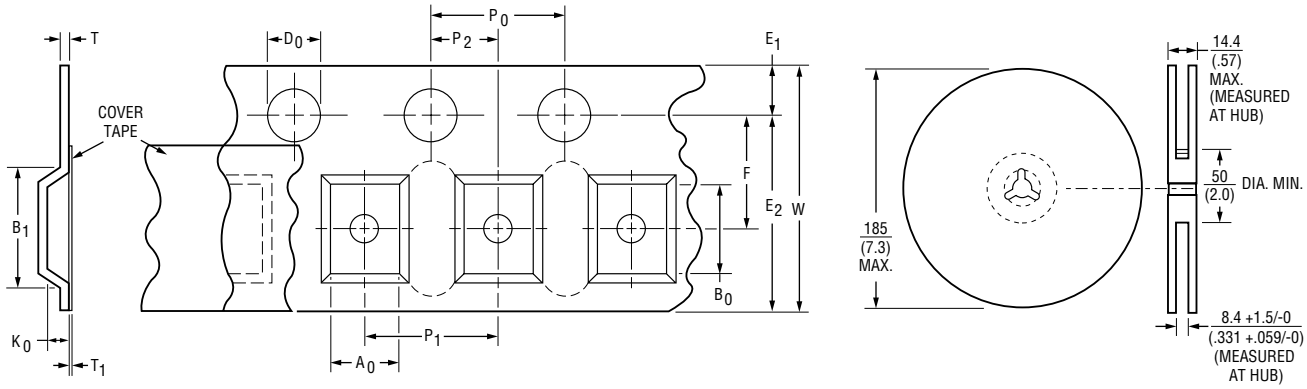
## Tape and Reel Specifications




| Tape Dimensions per EIA-481 | MF-NSMF012<br>MF-NSMF175<br>MF-NSMF200 | MF-NSMF016<br>MF-NSMF020<br>MF-NSMF035<br>MF-NSMF050 | MF-NSMF075 | MF-NSMF110<br>MF-NSMF125<br>MF-NSMF150 |
|---|---|---|---|---|
| W | 8.00 ± 0.30 (.315 ± .012) | | | |
| $P_0$ | 4.00 ± 0.10 (.157 ± .004) | | | |
| 10 $P_0$ | 40.0 ± 0.20 (1.575 ± .008) | | | |
| $P_1$ | 4.00 ± 0.10 (.157 ± .004) | | | |
| $P_2$ | 2.00 ± 0.05 (.079 ± .002) | | | |
| $A_0$ | 1.95 ± 0.10 (.077 ± .004) | 1.90 ± 0.10 (.075 ± .004) | 1.90 ± 0.10 (.075 ± .004) | 1.90 ± 0.10 (.075 ± .004) |
| $B_0$ | 3.55 ± 0.10 (.140 ± .004) | 3.45 ± 0.10 (.136 ± .004) | 3.50 ± 0.10 (.138 ± .004) | 3.45 ± 0.10 (.136 ± .004) |
| $B_{1\ max}$ | 4.35 (.171) | | | |
| $D_0$ | 1.50 +0.10/-0 (.059 +.004/-0) | | | |
| F | 3.50 ± 0.05 (.138 ± .002) | | | |
| $E_1$ | 1.75 ± 0.10 (.069 ± .004) | | | |
| $E_2$ typ | 6.25 (.246) | | | |
| T max | 0.60 (.024) | | | |
| $T_1$ max | 0.10 (.004) | | | |
| $K_0$ | 1.35 ± 0.10 (.053 ± .004) | 1.04 ± 0.10 (.041 ± .004) | 0.85 ± 0.10 (.033 ± .004) | 0.85 ± 0.10 (.033 ± .004) |
| Leader min. | 390 (15.4) | | | |
| Trailer min. | 160 (6.3) | | | |

DIMENSIONS: MM (INCHES)

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## Tape and Reel Specifications (continued)

| Tape Dimensions per EIA-481 | MF-NSMF005/30X<br>MF-NSMF005/60X<br>MF-NSMF010/30X<br>MF-NSMF010/60X<br>MF-NSMF012/48X<br>MF-NSMF016/48X<br>MF-NSMF110/16X<br>MF-NSMF125/8X<br>MF-NSMF150/6X | MF-NSMF020X<br>MF-NSMF025X<br>MF-NSMF025/24X<br>MF-NSMF025/30X<br>MF-NSMF035X<br>MF-NSMF035/24X<br>MF-NSMF050/8X<br>MF-NSMF050/16X<br>MF-NSMF075/8X<br>MF-NSMF110/6X | MF-NSMF035/30X<br>MF-NSMF050/24X | MF-NSMF075/13X<br>MF-NSMF075X/16X |
|---|---|---|---|---|
| W | 8.00 ± 0.30 (.315 ± .012) | | | |
| $P_0$ | 4.00 ± 0.10 (.157 ± .004) | | | |
| 10 $P_0$ | 40.0 ± 0.20 (1.575 ± .008) | | | |
| $P_1$ | 4.00 ± 0.10 (.157 ± .004) | | | |
| $P_2$ | 2.00 ± 0.05 (.079 ± .002) | | | |
| $A_0$ | 1.90 ± 0.10 (.075 ± .004) | 1.95 ± 0.10 (.077 ± .004) | 1.95 ± 0.10 (.077 ± .004) | 1.95 ± 0.10 (.077 ± .004) |
| $B_0$ | 3.50 ± 0.10 (.138 ± .004) | 3.55 ± 0.10 (.140 ± .004) | 3.55 ± 0.10 (.140 ± .004) | 3.50 ± 0.10 (.138 ± .004) |
| $B_{1\ max}$ | 4.35 (.171) | | | |
| $D_0$ | 1.50 +0.10/-0 (.059 +.004/-0) | | | |
| F | 3.50 ± 0.05 (.138 ± .002) | | | |
| $E_1$ | 1.75 ± 0.10 (.069 ± .004) | | | |
| $E_2$ typ | 6.25 (.246) | | | |
| T max | 0.60 (.024) | | | |
| $T_1$ max | 0.10 (.004) | | | |
| $K_0$ | 1.04 ± 0.10 (.041 ± .004) | 0.80 ± 0.10 (.031 ± .004) | 1.35 ± 0.10 (.053 ± .004) | 1.22 ± 0.10 (.048 ± .004) |
| Leader min. | 390 (15.4) | | | |
| Trailer min. | 160 (6.3) | | | |

DIMENSIONS: MM (INCHES)



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## Application Notice

- Users are responsible for independent and adequate evaluation of Bourns® Multifuse® Polymer PTC devices in the user's application, including the PPTC device characteristics stated in the applicable data sheet.
- Polymer PTC devices must not be allowed to operate beyond their stated maximum ratings. Operation in excess of such maximum ratings could result in damage to the PTC device and possibly lead to electrical arcing and/or fire. Circuits with inductance may generate a voltage above the rated voltage of the polymer PTC device and should be thoroughly evaluated within the user's application during the PTC selection and qualification process.
- Polymer PTC devices are intended to protect against adverse effects of temporary overcurrent or overtemperature conditions up to rated limits and are not intended to serve as protective devices where overcurrent or overvoltage conditions are expected to be repetitive or prolonged.
- In normal operation, polymer PTC devices experience thermal expansion under fault conditions. Thus, a polymer PTC device must be protected against mechanical stress, and must be given adequate clearance within the user's application to accommodate such thermal expansion. Rigid potting materials or fixed housings or coverings that do not provide adequate clearance should be thoroughly examined and tested by the user, as they may result in the malfunction of polymer PTC devices if the thermal expansion is inhibited.
- Exposure to lubricants, silicon-based oils, solvents, gels, electrolytes, acids, and other related or similar materials may adversely affect the performance of polymer PTC devices.
- Aggressive solvents may adversely affect the performance of polymer PTC devices. Conformal coating, encapsulating, potting, molding, and sealing materials may contain aggressive solvents including but not limited to xylene and toluene, which are known to cause adverse effects on the performance of polymer PTCs. Such aggressive solvents must be thoroughly cured or baked to ensure their complete removal from polymer PTCs to minimize the possible adverse effect on the device.
- Recommended storage conditions should be followed at all times. Such conditions can be found on the applicable data sheet and on the Multifuse® Polymer PTC Moisture/Reflow Sensitivity Classification (MSL) note: https://www.bourns.com/docs/RoHS-MSL/msl_mf.pdf


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