
## Features

- Compliant with AEC-Q200 Rev-C - Stress Test Qualification for Passive Components in Automotive Applications
- Small footprint size (1206)
- Operating temperature range up to 125 °C
- Low thermal derating factor
- Higher hold currents at elevated temperatures
- RoHS compliant*

## Applications

- Protection of automotive circuitry including engine control modules
- Overcurrent surge protection of electronic equipment required to operate at high operating temperature ranges
- Resettable fault protection for general electronic equipment

# MF-NSHT Series - PTC Resettable Fuses

## Electrical Characteristics

| Model | V max. Volts | I max. Amps | $I_{hold}$ | $I_{trip}$ | Resistance | | Max. Time To Trip | | Tripped Power Dissipation |
|---|---|---|---|---|---|---|---|---|---|
| | | | Amperes at 23 °C | | Ohms at 23 °C | | Amperes at 23 °C | Seconds at 23 °C | Watts at 23 °C |
| | | | Hold | Trip | $R_{Min.}$ | $R_{1Max.}$** | | | Typ. |
| MF-NSHT016KX | 30 | 20 | 0.16 | 0.80 | 0.7 | 6.0 | 8.0 | 0.1 | 0.9 |
| MF-NSHT035KX | 30 | 20 | 0.35 | 1.75 | 0.4 | 2.6 | 8.0 | 0.1 | 0.9 |

**$R_{1Max.}$ measured 24 hours post reflow.

## Environmental Characteristics

| | | |
|---|---|---|
| Operating Temperature | -40 °C to +125 °C | |
| Passive Aging | +125 °C, 1000 hours | $R_{final} < R_{1max.}$ |
| Humidity Aging | +85 °C, 85 % R.H. 1000 hours | $R_{final} < R_{1max.}$ |
| Thermal Shock | +125 °C to -40 °C, 20 times | $R_{final} < R_{1max.}$ |
| Solvent Resistance | MIL-STD-202, Method 215 | No change |
| Vibration | MIL-STD-883C, Method 2007.1, Condition A | No change |
| Moisture Sensitivity Level (MSL) | Level 1 | |
| ESD Classification - HBM | Class 6 | |

## Test Procedures And Requirements For Model MF-NSHT Series

| Test | Test Conditions | Accept/Reject Criteria |
|---|---|---|
| Visual/Mech. | Verify dimensions and materials | Per MF physical description |
| Resistance | In still air @ 23 °C | $R_{min} \le R \le R_{1max}$ |
| Time to Trip | At specified current, Vmax, 23 °C | T ≤ max. time to trip (seconds) |
| Hold Current | 30 min. at $I_{hold}$ | No trip |
| Trip Cycle Life | $V_{max}$, $I_{max}$, 100 cycles | No arcing or burning |
| Trip Endurance | $V_{max}$, 48 hours | No arcing or burning |
| Solderability | ANSI/J-STD-002 | 95 % min. coverage |

## Thermal Derating Chart - $I_{hold}$ (Amps)

| Model | Ambient Operating Temperature | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | -40 °C | -20 °C | 0 °C | +23 °C | +40 °C | +50 °C | +60 °C | +70 °C | +85 °C | +125 °C |
| MF-NSHT016KX | 0.232 | 0.210 | 0.186 | 0.160 | 0.141 | 0.130 | 0.118 | 0.107 | 0.090 | 0.043 |
| MF-NSHT035KX | 0.508 | 0.459 | 0.406 | 0.350 | 0.308 | 0.284 | 0.259 | 0.235 | 0.196 | 0.095 |

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**WARNING Cancer and Reproductive Harm -** www.P65Warnings.ca.gov

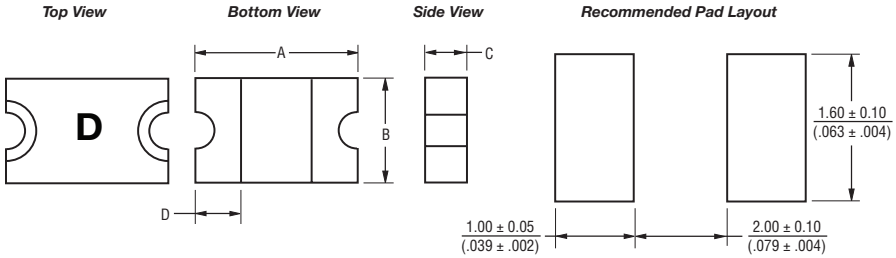
*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.
Specifications are subject to change without notice.
Users should verify actual device performance in their specific applications.

## Product Dimensions

| Model | A | | B | | C | | D |
|---|---|---|---|---|---|---|---|
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. |
| MF-NSHT016KX | 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) |
| MF-NSHT035KX | 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) |

Packaging: 3000 pcs. per reel.

DIMENSIONS: MM (INCHES)

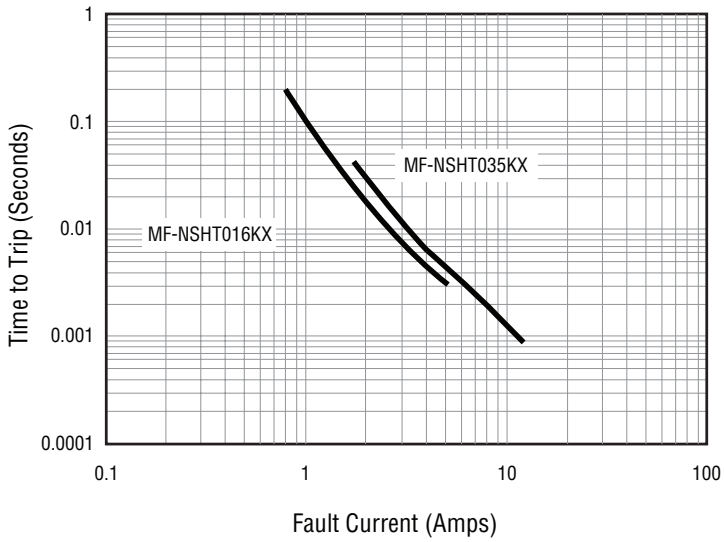



**Terminal material:**
Nickel/gold plated.

**Termination pad solderability:**
Standard Au finish:
Meets ANSI/J-STD-002 Category 2.

**Recommended Storage:**
40 °C max./70 % RH max.

## 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.

## How to Order

**MF - NSHT 016 K X - 2**

Multifuse® Product Designator

Series
NSHT = 1206 High Temperature Surface Mount Component

Hold Current, $I_{hold}$
016 - 035 (0.16 - 0.35 Amps)

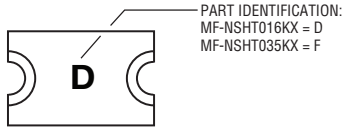
Material Specific Code

Multifuse® freeXpansion™ Design

Packaging
Packaged per EIA 481-1
-2 = Tape and Reel

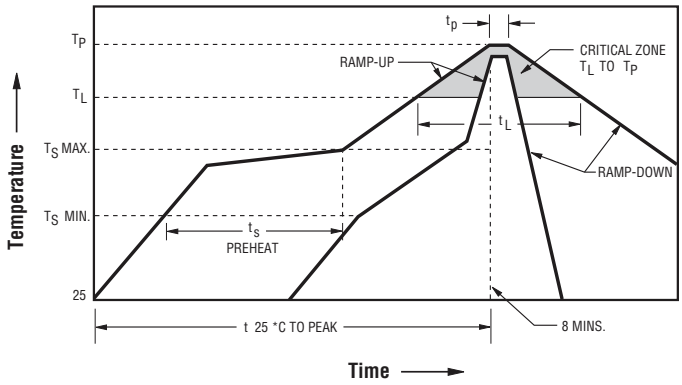
## Typical Part Marking

Represents total content. Layout may vary.




BIWEEKLY DATE CODE WILL APPEAR ON THE PACKAGING LABEL:
WEEK 1 AND 2 = A
WEEK 51 AND 52 = Z

## Solder Reflow Recommendations




**Notes:**

- MF-NSHT models cannot be wave soldered or hand soldered. Please contact Bourns for soldering recommendations.
- All temperatures refer to topside of the package, measured on the package 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, especially during hand soldering. Please refer to the Multifuse® Polymer PTC Soldering Recommendation guidelines.
- Designed for single solder reflow operations.

| 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 $ts_{max}$) | <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 / Classification 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 within 25 °C to Peak Temperature | 8 minutes max. |

# MF-NSHT Series Tape and Reel Specifications

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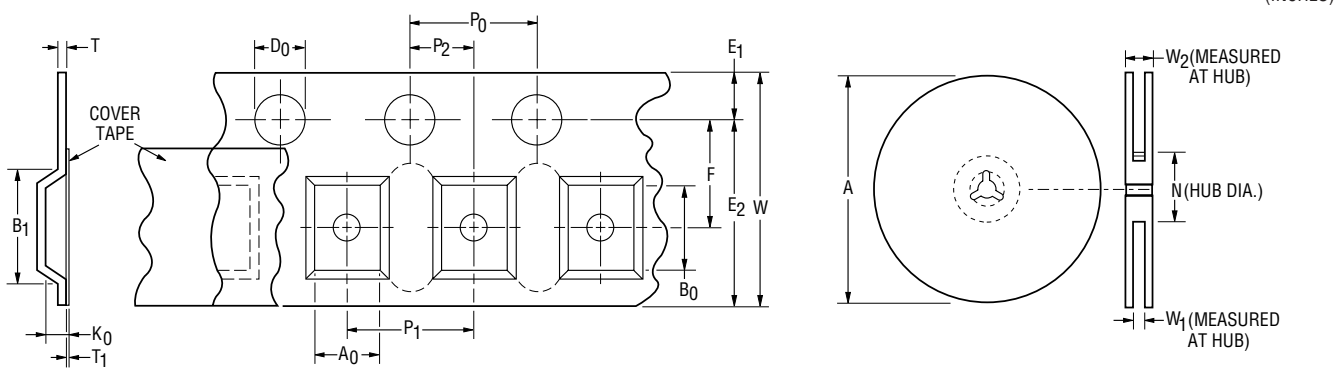
| Tape Dimensions | MF-NSHT Series per EIA 481-1 |
|---|---|
| W | 8.0 ± 0.30 (0.315 ± 0.012) |
| $P_0$ | 4.0 ± 0.10 (0.157 ± 0.004) |
| $P_1$ | 4.0 ± 0.10 (0.157 ± 0.004) |
| $P_2$ | 2.0 ± 0.05 (0.079 ± 0.002) |
| $A_0$ | 1.95 ± 0.10 (0.077 ± 0.004) |
| $B_0$ | 3.55 ± 0.10 (0.140 ± 0.004) |
| $B_1$ max. | 4.35 (0.171) |
| $D_0$ | 1.5 + 0.10/-0.0 (0.059 + 0.004/-0) |
| F | 3.5 ± 0.05 (0.138 ± 0.002) |
| $E_1$ | 1.75 ± 0.10 (0.069 ± 0.004) |
| $E_2$ min. | 6.25 (0.246) |
| T max. | 0.6 (0.024) |
| $T_1$ max. | 0.1 (0.004) |
| $K_0$ | 0.80 ± 0.15 (0.031 ± 0.006) |
| Leader min. | 390 (15.35) |
| Trailer min. | 160 (6.30) |
| **Reel Dimensions** | |
| A max. | 185 (7.28) |
| N min. | 50 (1.97) |
| $W_1$ | 8.4 + 1.5/-0.0 (0.331 + 0.059/-0.0) |
| $W_2$ max. | 14.4 (0.567) |

DIMENSIONS: MM (INCHES)



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