



Features

- Surface mount packaging for automated assembly
- 0603 footprint size and low profile for space-constrained mobile applications
- Operating temperature range up to 125 °C
- Low thermal derating factor
- Higher hold currents at elevated temperatures
- RoHS compliant*
- Agency recognition: cUL and TÜV

MF-FSHT Series – PTC Resettable Fuses

Electrical Characteristics

| Model | V _{max} | I _{max} | I _{hold} | I _{trip} | Resistance | | Max. Time To Trip | | Tripped Power Dissipation | Certifications | |
|--------------|------------------|------------------|-------------------|-------------------|-------------------|----------------------|-------------------|---------|---------------------------|-------------------------|----------------------------|
| | | | at 23 °C | | at 23 °C Ohms | | at 23 °C | | at 23 °C Watts | cUL | TÜV |
| | Volts | Amps | Amps | | R _{Min.} | R _{1Max.**} | Amps | Seconds | Typical | E174545 | R 50384138 |
| MF-FSHT005KX | 12 | 40 | 0.05 | 0.25 | 1.5 | 30 | 0.5 | 1.5 | 0.5 | ✓ | ✓ |
| MF-FSHT010KX | 12 | 40 | 0.10 | 0.50 | 0.9 | 8.5 | 2.5 | 1.5 | 0.5 | ✓ | ✓ |
| MF-FSHT016KX | 12 | 40 | 0.16 | 0.80 | 0.6 | 6.0 | 8.0 | 0.1 | 0.5 | ✓ | ✓ |

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

Environmental Characteristics

| Item | Condition | Criteria |
|----------------------------------|---|---|
| Operating Temperature | -40 °C to +125 °C | |
| Recommended Storage | +40 °C max. / 70 % R.H. max. | |
| Passive Aging | +125 °C, 1000 hours | R < R _{1max} |
| Humidity Aging | +85 °C, 85 % R.H. 1000 hours | R < R _{1max} |
| Thermal Shock | -40 °C to +125 °C, 20 times | R < R _{1max} |
| 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) | |

Additional Information

Click these links for more information:



[PRODUCT SELECTOR](#) [TECHNICAL LIBRARY](#) [INVENTORY](#) [SAMPLES](#) [CONTACT](#)

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} ≤ R ≤ 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 |



WARNING Cancer and Reproductive Harm

www.P65Warnings.ca.gov

*RoHS Directive 2015/863, Mar 31, 2015 and Annex. Specifications are subject to change without notice.

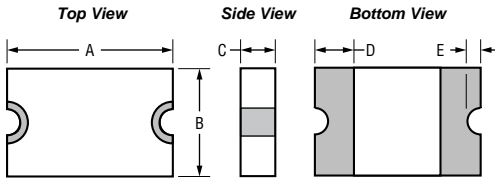
Users should verify actual device performance in their specific applications.

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MF-FSHT Series – PTC Resettable Fuses



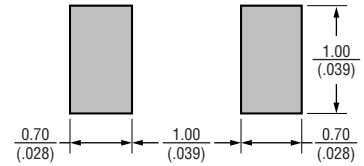
Product Dimensions



Terminal Material:
ENIG-plated terminals

Recommended Pad Layout

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

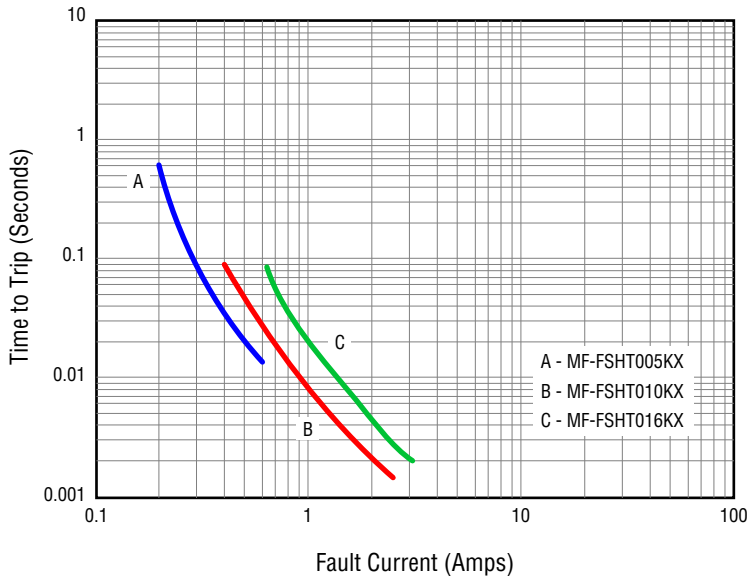


| Model | A | | B | | C | | D | E |
|--------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Min. |
| MF-FSHT005KX | $\frac{1.45}{(.057)}$ | $\frac{1.85}{(.073)}$ | $\frac{0.65}{(.026)}$ | $\frac{1.05}{(.041)}$ | $\frac{0.30}{(.012)}$ | $\frac{0.65}{(.026)}$ | $\frac{0.20}{(.008)}$ | $\frac{0.05}{(.002)}$ |
| MF-FSHT010KX | $\frac{1.45}{(.057)}$ | $\frac{1.85}{(.073)}$ | $\frac{0.65}{(.026)}$ | $\frac{1.05}{(.041)}$ | $\frac{0.30}{(.012)}$ | $\frac{0.65}{(.026)}$ | $\frac{0.20}{(.008)}$ | $\frac{0.05}{(.002)}$ |
| MF-FSHT016KX | $\frac{1.45}{(.057)}$ | $\frac{1.85}{(.073)}$ | $\frac{0.65}{(.026)}$ | $\frac{1.05}{(.041)}$ | $\frac{0.30}{(.012)}$ | $\frac{0.65}{(.026)}$ | $\frac{0.20}{(.008)}$ | $\frac{0.05}{(.002)}$ |

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 | +125 °C |
| MF-FSHT005KX | 0.073 | 0.066 | 0.058 | 0.05 | 0.044 | 0.041 | 0.037 | 0.034 | 0.028 | 0.014 |
| MF-FSHT010KX | 0.15 | 0.13 | 0.12 | 0.10 | 0.09 | 0.08 | 0.074 | 0.067 | 0.056 | 0.027 |
| MF-FSHT016KX | 0.23 | 0.21 | 0.19 | 0.16 | 0.14 | 0.13 | 0.12 | 0.11 | 0.09 | 0.04 |

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-FSHT Series – PTC Resettable Fuses

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How to Order

MF - FSHT 005 K X - 2

Multifuse® Product Designator _____
 Series _____
 FSHT = 0603 High Temperature Surface Mount Component
 Hold Current, I_{hold} _____
 005 - 016 (0.05 - 0.16 Amps)
 K = Material Specific Code _____
 X = Multifuse® freeXpansion™ Design _____
 Packaging _____
 -2 = Tape and Reel Packaged per EIA-481

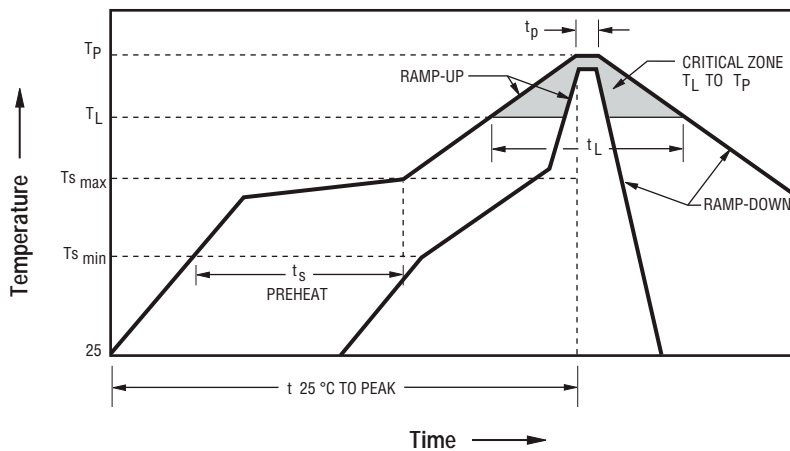
Typical Part Marking

No marking

Packaging Quantity

5,000 pieces per reel

Solder Reflow Recommendations



Notes:

- MF-FSHT models cannot be wave soldered or hand soldered. Please contact Bourns for soldering recommendations.
- 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 ($T_{s_{max}}$ to T_p) | 3 °C / second max. |
| PREHEAT: Temperature Min. ($T_{s_{min}}$) Temperature Max. ($T_{s_{max}}$) Time ($T_{s_{min}}$ to $T_{s_{max}}$) (t_s) | 150 °C 200 °C 60~180 seconds |
| TIME MAINTAINED ABOVE: Temperature (T_L) Time (t_L) | 217 °C 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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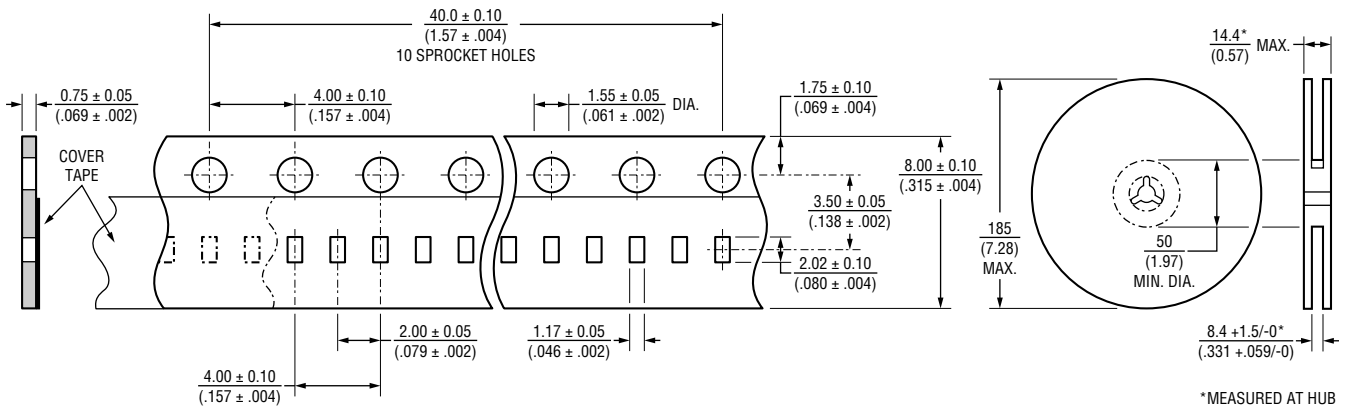
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MF-FSHT Series – PTC Resettable Fuses

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Packaging Dimensions



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

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REV. 11/20

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

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