

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	R50384138
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:

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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	$R_{min} \le R \le R_{max}$
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

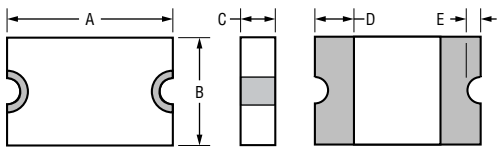
CALIFORNIA WARNING: Can expose you to lead, a carcinogen and reproductive toxicant.
See www.P65Warnings.ca.gov

*RoHS Directive 2015/863, Mar 31, 2015 and Annex.
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Product Dimensions

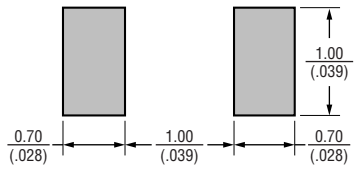
Top View *Side View* *Bottom View*



Terminal Material:
ENIG-plated terminals

DIMENSIONS: MM / (INCHES)

Recommended Pad Layout

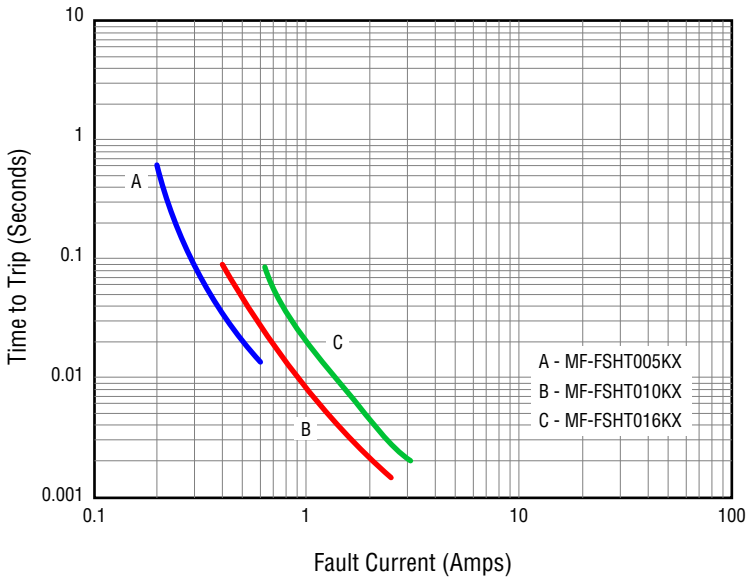


Model	A		B		C		D	E
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.
MF-FSHT005KX	1.45 (.057)	1.85 (.073)	0.65 (.026)	1.05 (.041)	0.30 (.012)	0.65 (.026)	0.20 (.008)	0.05 (.002)
MF-FSHT010KX	1.45 (.057)	1.85 (.073)	0.65 (.026)	1.05 (.041)	0.30 (.012)	0.65 (.026)	0.20 (.008)	0.05 (.002)
MF-FSHT016KX	1.45 (.057)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

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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

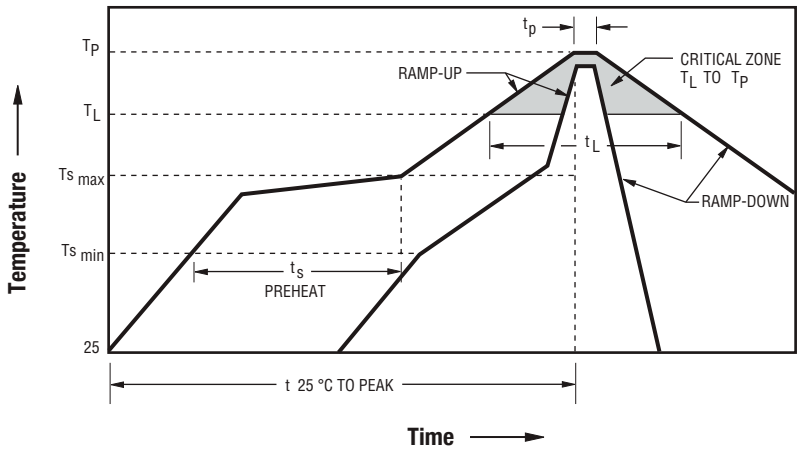
Typical Part Marking

No marking

Packaging Quantity

5,000 pieces per reel

Solder Reflow Recommendations



Notes:

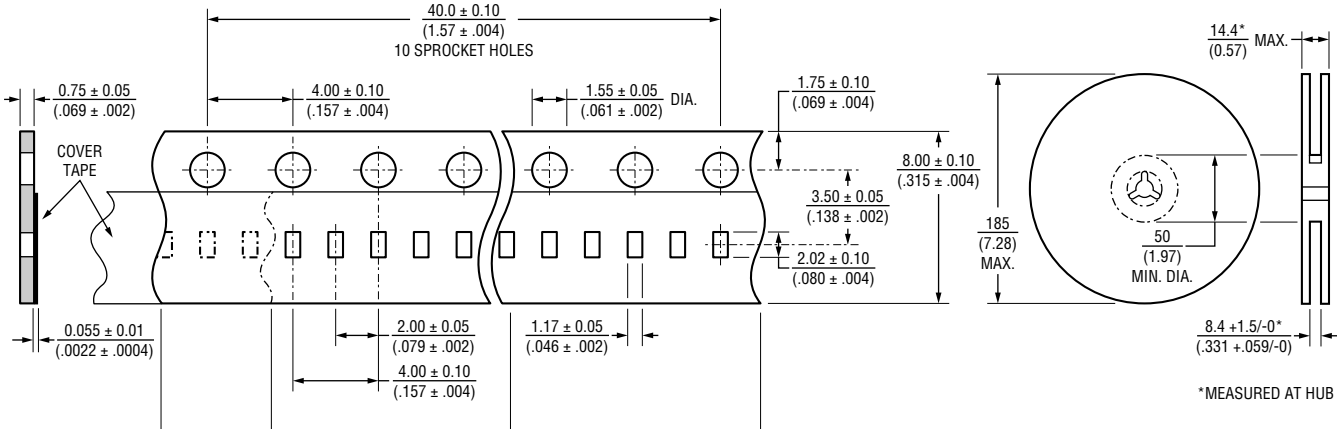
- MF-FSHT models cannot be wave soldered or hand soldered. Please contact Bourns for soldering recommendations.
- All temperatures refer to the topside of the device, measured on the device body surface.
- If reflow temperatures exceed the recommended profile, devices may not meet the published specifications.
- 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 (Ts_{max} to T_p)	3 °C / second max.
PREHEAT: Temperature Min. (Ts_{min}) Temperature Max. (Ts_{max}) Time (Ts_{min} to Ts_{max}) (ts)	 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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Packaging Dimensions



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REV. 09/26

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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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