


BOURNS®

## Features

- Ultra-low resistance, quick response
- 0805 footprint size and low profile for space-constrained mobile applications
- Surface mount packaging for automated assembly
- RoHS compliant* and halogen free**
- Agency recognition: c UL us, TÜV

## Additional Information

Click these links for more information:

PRODUCT SELECTOR | TECHNICAL LIBRARY | INVENTORY | SAMPLES | CONTACT

# MF-PSML/X Series - Low Ohmic PTC Resettable Fuses

## Electrical Characteristics

| Model | $V_{max}$ | $I_{max}$ | $I_{hold}$ | $I_{trip}$ | Resistance | | Max. Time To Trip | | Tripped Power Dissipation | Agency Recognition | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | at 23 °C | | at 23 °C Ohms | | at 23 °C | | Watts at 23 °C | cUL | TÜV |
| | Volts | Amps | Amps | | $R_{min}$ | $R_{1max}$ | Amps | Seconds | Typ. | E174545 | R50391579 |
| MF-PSML075/6 | 6 | 50 | 0.75 | 1.5 | 0.04 | 0.3 | 8 | 0.2 | 0.7 | ✓ | ✓ |
| MF-PSML075/12 | 12 | 50 | 0.75 | 1.5 | 0.04 | 0.3 | 8 | 0.2 | 0.7 | ✓ | ✓ |
| MF-PSML110/6 | 6 | 50 | 1.1 | 2.2 | 0.03 | 0.21 | 8 | 0.3 | 0.7 | ✓ | ✓ |
| MF-PSML110/12 | 12 | 50 | 1.1 | 2.2 | 0.03 | 0.21 | 8 | 0.3 | 0.7 | ✓ | ✓ |
| MF-PSML125/6 | 6 | 50 | 1.25 | 2.5 | 0.02 | 0.16 | 8 | 0.4 | 0.7 | ✓ | ✓ |
| MF-PSML125/12 | 12 | 50 | 1.25 | 2.5 | 0.02 | 0.16 | 8 | 0.4 | 0.7 | ✓ | ✓ |
| MF-PSML150/6 | 6 | 50 | 1.5 | 3.0 | 0.015 | 0.08 | 8 | 0.5 | 0.7 | ✓ | ✓ |
| MF-PSML150/12 | 12 | 50 | 1.5 | 3.0 | 0.015 | 0.08 | 8 | 0.5 | 0.7 | ✓ | ✓ |
| MF-PSML175/6 | 6 | 50 | 1.75 | 3.5 | 0.01 | 0.065 | 8 | 1 | 0.7 | ✓ | ✓ |
| MF-PSML175/12 | 12 | 50 | 1.75 | 3.5 | 0.01 | 0.065 | 8 | 1 | 0.7 | ✓ | ✓ |
| MF-PSML200/6 | 6 | 50 | 2.0 | 4.0 | 0.005 | 0.05 | 8 | 2 | 0.8 | ✓ | ✓ |
| MF-PSML200/12 | 12 | 50 | 2.0 | 4.0 | 0.005 | 0.05 | 8 | 2 | 0.8 | ✓ | ✓ |
| MF-PSML250/6 | 6 | 50 | 2.5 | 5.0 | 0.003 | 0.04 | 8 | 2 | 0.8 | ✓ | ✓ |
| MF-PSML250/12 | 12 | 50 | 2.5 | 5.0 | 0.003 | 0.04 | 8 | 2 | 0.8 | ✓ | ✓ |
| MF-PSML260/6 | 6 | 50 | 2.6 | 5.2 | 0.003 | 0.03 | 8 | 4 | 0.8 | ✓ | ✓ |
| MF-PSML260/12 | 12 | 50 | 2.6 | 5.2 | 0.003 | 0.03 | 8 | 4 | 0.8 | ✓ | ✓ |
| MF-PSML300/6 | 6 | 50 | 3.0 | 6.0 | 0.003 | 0.02 | 8 | 5 | 0.8 | ✓ | ✓ |
| MF-PSML300/12 | 12 | 50 | 3.0 | 6.0 | 0.003 | 0.02 | 8 | 5 | 0.8 | ✓ | ✓ |
| MF-PSML350/8 | 8 | 50 | 3.5 | 7.0 | 0.002 | 0.018 | 8 | 5 | 0.9 | ✓ | ✓ |
| MF-PSML380/8 | 8 | 50 | 3.8 | 7.6 | 0.001 | 0.016 | 8 | 5 | 0.9 | ✓ | ✓ |
| MF-PSML400/8 | 8 | 50 | 4.0 | 8.0 | 0.001 | 0.014 | 8 | 12.5 | 0.9 | ✓ | ✓ |
| MF-PSML450/8 | 8 | 50 | 4.5 | 9.0 | 0.001 | 0.012 | 8 | 12.5 | 0.9 | ✓ | ✓ |

## Environmental Characteristics

| Item | | Condition | Criteria |
|---|---|---|---|
| Operating Temperature | | -40 °C to +85 °C | |
| Storage Condition | Before Opening | +40 °C max. / 70 % RH max. | |
| | After Opening | +40 °C max. / 10 % RH max. | |
| Floor Condition After Opening | | Consumption within 4 weeks at floor condition +30 °C max. / 60 % RH max. | |
| Passive Aging | | +85 °C, 1000 hours | ±10 % typical resistance change |
| Humidity Aging | | +85 °C, 85 % R.H. 100 hours | ±15 % typical resistance change |
| Thermal Shock | | -40 °C to +85 °C, 20 times | ±30 % 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) | |

**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.
** 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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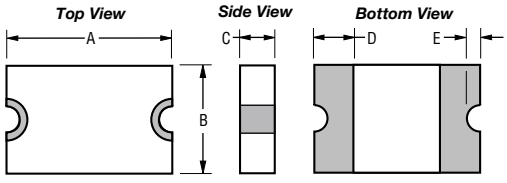
## Test Procedures and Requirements

| 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 |

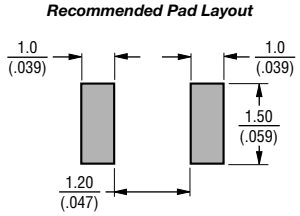
## Product Dimensions

| Model | A | | B | | C | | D | E | |
|---|---|---|---|---|---|---|---|---|---|
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Min. | Max. |
| MF-PSML075/6 | 2.0 (.079) | 2.3 (.091) | 1.2 (.047) | 1.5 (.059) | 0.4 (.016) | 0.7 (.028) | 0.2 (.008) | 0.05 (.002) | 0.45 (s.018) |
| MF-PSML075/12 | | | | | | | | | |
| MF-PSML110/6 | | | | | | | | | |
| MF-PSML110/12 | | | | | | | | | |
| MF-PSML125/6 | | | | | | | | | |
| MF-PSML125/12 | | | | | | | | | |
| MF-PSML150/6 | | | | | | | | | |
| MF-PSML150/12 | | | | | | | | | |
| MF-PSML175/6 | | | | | | | | | |
| MF-PSML175/12 | | | | | | | | | |
| MF-PSML200/6 | 2.0 (.079) | 2.3 (.091) | 1.2 (.047) | 1.5 (.059) | 0.6 (.024) | 1.2 (.047) | | | |
| MF-PSML200/12 | | | | | | | | | |
| MF-PSML250/6 | | | | | | | | | |
| MF-PSML250/12 | | | | | | | | | |
| MF-PSML260/6 | | | | | | | | | |
| MF-PSML260/12 | | | | | | | | | |
| MF-PSML300/6 | | | | | | | | | |
| MF-PSML300/12 | | | | | | | | | |
| MF-PSML350/8 | 2.0 (.079) | 2.3 (.091) | 1.2 (.047) | 1.5 (.059) | 0.6 (.024) | 0.95 (.037) | | | |
| MF-PSML380/8 | | | | | | | | | |
| MF-PSML400/8 | | | | | | | | | |
| MF-PSML450/8 | | | | | | | | | |

DIMENSIONS: MM (INCHES)




***Terminal material:***
ENIG-plated terminals




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## Packaging Quantity

MF-PSML075/6 ~ MF-PSML175/6 = 4,500 pcs. per reel
MF-PSML075/12 ~ MF-PSML175/12 = 4,500 pcs. per reel

MF-PSML200/6 ~ MF-PSML300/6 = 3,000 pcs. per reel
MF-PSML200/12 ~ MF-PSML300/12 = 3,000 pcs. per reel
MF-PSML350/8 ~ MF-PSML450/8 = 3,000 pcs. per reel

## 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-PSML075/6 | 1.12 | 1.01 | 0.95 | 0.75 | 0.64 | 0.58 | 0.52 | 0.47 | 0.37 |
| MF-PSML075/12 | 1.12 | 1.01 | 0.95 | 0.75 | 0.64 | 0.58 | 0.52 | 0.47 | 0.37 |
| MF-PSML110/6 | 1.65 | 1.48 | 1.4 | 1.1 | 0.94 | 0.85 | 0.77 | 0.69 | 0.55 |
| MF-PSML110/12 | 1.65 | 1.48 | 1.4 | 1.1 | 0.94 | 0.85 | 0.77 | 0.69 | 0.55 |
| MF-PSML125/6 | 1.87 | 1.69 | 1.59 | 1.25 | 1.06 | 0.96 | 0.87 | 0.79 | 0.62 |
| MF-PSML125/12 | 1.87 | 1.69 | 1.59 | 1.25 | 1.06 | 0.96 | 0.87 | 0.79 | 0.62 |
| MF-PSML150/6 | 2.25 | 2.02 | 1.9 | 1.5 | 1.28 | 1.16 | 1.05 | 0.94 | 0.75 |
| MF-PSML150/12 | 2.25 | 2.02 | 1.9 | 1.5 | 1.28 | 1.16 | 1.05 | 0.94 | 0.75 |
| MF-PSML175/6 | 2.62 | 2.36 | 2.22 | 1.75 | 1.49 | 1.35 | 1.22 | 1.1 | 0.87 |
| MF-PSML175/12 | 2.62 | 2.36 | 2.22 | 1.75 | 1.49 | 1.35 | 1.22 | 1.1 | 0.87 |
| MF-PSML200/6 | 2.99 | 2.70 | 2.54 | 2.0 | 1.70 | 1.54 | 1.39 | 1.26 | 0.99 |
| MF-PSML200/12 | 2.99 | 2.70 | 2.54 | 2.0 | 1.70 | 1.54 | 1.39 | 1.26 | 0.99 |
| MF-PSML250/6 | 3.75 | 3.38 | 3.18 | 2.5 | 2.13 | 1.92 | 1.75 | 1.57 | 1.24 |
| MF-PSML250/12 | 3.75 | 3.38 | 3.18 | 2.5 | 2.13 | 1.92 | 1.75 | 1.57 | 1.24 |
| MF-PSML260/6 | 3.89 | 3.51 | 3.3 | 2.6 | 2.21 | 2.01 | 1.81 | 1.63 | 1.29 |
| MF-PSML260/12 | 3.89 | 3.51 | 3.3 | 2.6 | 2.21 | 2.01 | 1.81 | 1.63 | 1.29 |
| MF-PSML300/6 | 4.49 | 4.05 | 3.8 | 3.0 | 2.55 | 2.31 | 2.09 | 1.89 | 1.49 |
| MF-PSML300/12 | 4.49 | 4.05 | 3.8 | 3.0 | 2.55 | 2.31 | 2.09 | 1.89 | 1.49 |
| MF-PSML350/8 | 5.24 | 4.72 | 4.44 | 3.5 | 2.98 | 2.70 | 2.44 | 2.2 | 1.74 |
| MF-PSML380/8 | 5.69 | 5.12 | 4.82 | 3.8 | 3.24 | 2.93 | 2.65 | 2.39 | 1.89 |
| MF-PSML400/8 | 5.99 | 5.39 | 5.07 | 4.0 | 3.41 | 3.09 | 2.79 | 2.51 | 1.99 |
| MF-PSML450/8 | 6.74 | 6.07 | 5.71 | 4.5 | 3.83 | 3.47 | 3.14 | 2.83 | 2.24 |

## How to Order

**MF - PSML 200 / 12 - 2**

Multifuse® Product Designator

Series
PSML = 0805 Low Ohmic Surface Mount Component

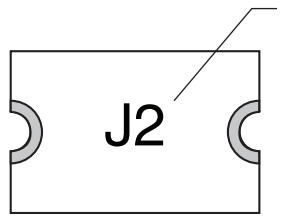
Hold Current, $I_{hold}$
075 ~ 450 (0.75 ~ 4.5 Amps)

Maximum Voltage, $V_{max}$
12 = 12 Volts
8 = 8 Volts
6 = 6 Volts

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

## Typical Part Marking

Represents total content. Layout may vary.




PART IDENTIFICATION:

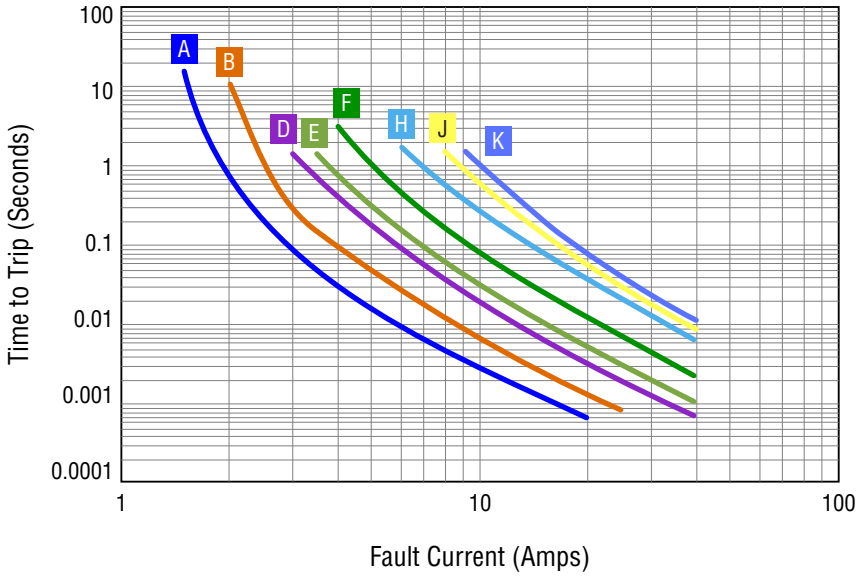
| | |
|---|---|
| MF-PSML075/6 = D6 | MF-PSML250/6 = M6 |
| MF-PSML075/12 = D2 | MF-PSML250/12 = M2 |
| MF-PSML110/6 = E6 | MF-PSML260/6 = N6 |
| MF-PSML110/12 = E2 | MF-PSML260/12 = N2 |
| MF-PSML125/6 = F6 | MF-PSML300/6 = P6 |
| MF-PSML125/12 = F2 | MF-PSML300/12 = P2 |
| MF-PSML150/6 = G6 | MF-PSML350/8 = S8 |
| MF-PSML150/12 = G2 | MF-PSML380/8 = V8 |
| MF-PSML175/6 = H6 | MF-PSML400/8 = U8 |
| MF-PSML175/12 = H2 | MF-PSML450/8 = X8 |
| MF-PSML200/6 = J6 | |
| MF-PSML200/12 = J2 | |

Manufacturing date code is located on packaging label

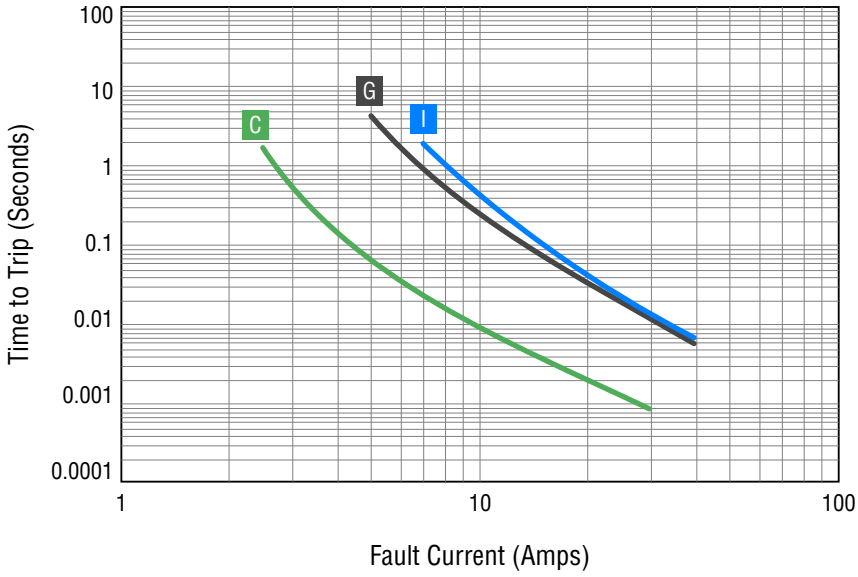
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## Typical Time to Trip at 23 °C




- A MF-PSML075/6 & MF-PSML075/12
- B MF-PSML110/6 & MF-PSML110/12
- D MF-PSML150/6 & MF-PSML150/12
- E MF-PSML175/6 & MF-PSML175/12
- F MF-PSML200/6 & MF-PSML200/12
- H MF-PSML300/6 & MF-PSML300/12
- J MF-PSML380/8 & MF-PSML400/8
- K MF-PSML450/8




- C MF-PSML125/6 & MF-PSML125/12
- G MF-PSML250/6, MF-PSML250/12, MF-PSML260/6 & MF-PSML260/12
- I MF-PSML350/8

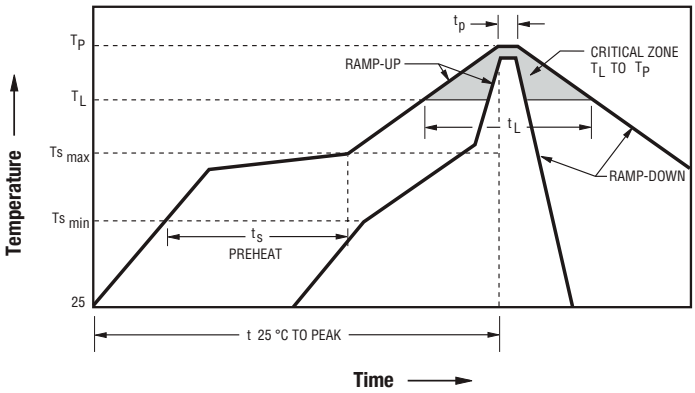
The Time to Trip curves represent typical performance of a device in a simulated application environment.

Actual performance in specific customer applications may differ from these values due to the influence of other variables

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## Solder Reflow Recommendations




**Notes:**

- MF-PSML/X 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.

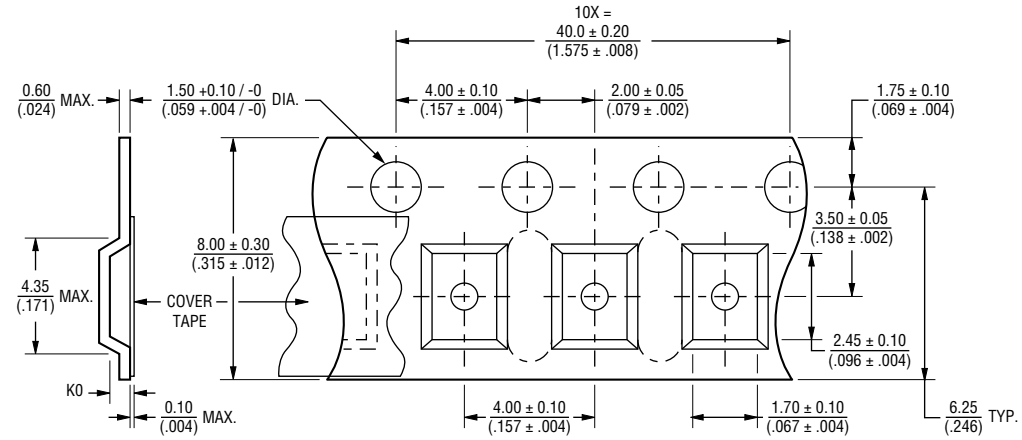
| Profile Feature | Pb-Free Assembly |
|---|---|
| Average Ramp-Up Rate ($Ts_{max}$ to $T_p$) | 3 °C / second max. |
| PREHEAT:<br>Temperature Min. ($Ts_{min}$)<br>Temperature Max. ($Ts_{max}$)<br>Time ($Ts_{min}$ to $Ts_{max}$) (ts) | <br>150 °C<br>200 °C<br>60~180 seconds |
| TIME MAINTAINED ABOVE: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

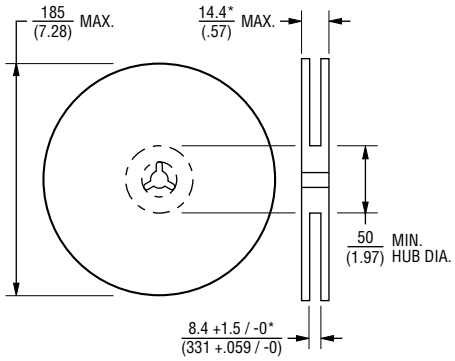
MF-PSML/X Series per EIA-481




K0

0.95 ± 0.10 (.037 ± .004) MF-PSML075/6 ~ MF-PSML175/6, MF-PSML075/12 ~ MF-PSML175/12

1.21 ± 0.10 (.048 ± .004) MF-PSML200/6 ~ MF-PSML300/6, MF-PSML200/12 ~ MF-PSML300/12, MF-PSML350/8 ~ MF-PSML450/8




*MEASURED AT HUB

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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The characteristics and parameters of a Bourns® product set forth in its data sheet are based on laboratory conditions, and statements regarding the suitability of products for certain "typical" applications are based on Bourns' knowledge of typical requirements in generic applications. Bourns assumes that "typical" applications include failsafe/backup features to address critical risks to users and are designed to allow rework of Bourns® product to avoid scrap of a device solely due to malfunctioning Bourns® product. The characteristics and parameters of a Bourns® product in a user application may vary from the data sheet characteristics and parameters due to (i) the combination of the Bourns® product with other components in the user's application, or (ii) the environment of the user application itself. The characteristics and parameters of a Bourns® product also can and do vary in different applications and actual performance may vary over time. Thus, users should always verify the actual performance of the Bourns® product in their specific devices and applications and make their own independent judgments regarding the suitability of Bourns® product and the amount of additional test margin to design into their device or application to compensate for differences between laboratory and real-world conditions.

Unless Bourns has explicitly designated an individual Bourns® product as meeting the requirements of a particular industry standard (e.g., IATF 16949) or a particular qualification (e.g., UL listed or recognized), Bourns is not responsible for any failure of an individual Bourns® product to meet the requirements of such industry standard or particular qualification even if such industry standard or qualification is a "state of art". Users of Bourns® products are responsible for ensuring compliance with safety-related requirements and standards applicable to their devices or applications.

Bourns® products are not recommended, authorized or intended for use in applications where failure or malfunction may result in personal injury, death, or severe property or environmental damage, such as without limitation nuclear, life-critical medical and certain automotive and aviation applications. Except as set forth in the bullet points below or unless expressly and specifically approved in writing on a case-by-case basis by an authorized Bourns' representative, use of any Bourns® products in such unauthorized high-risk applications is at the user's sole risk.

- Bourns considers implantable/invasive devices and devices/procedures designed as life-supporting or life-sustaining by the U.S. Food and Drug Administration or equivalent organizations outside of the United States as "life-critical" medical applications. Bourns expressly identifies those Bourns® standard products that are suitable for use in typical medical applications that are not life-critical in its publication entitled "Bourns Medical Grade Component Guide."

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- Bourns expressly identifies Bourns® standard products that are suitable for use in the typical aviation applications/systems requiring System Design Assurance Level (RTCA DO-254 DAL) of C, D or E in its publication entitled "Bourns Civilian Aerospace/Aviation Grade Component Guide." Bourns does not test its products for compliance with United States Federal Aviation Administration standards or any other generally equivalent governmental organization standard applicable to products designed or manufactured for use in aviation applications. Use of Bourns® standard components in aviation applications associated with RTCA DO-254 DAL A or B without proper approval noted above shall be at the user's sole risk.

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