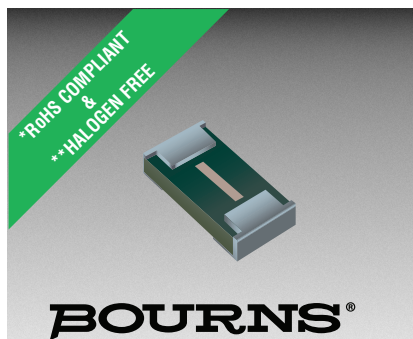




## SinglFuse™ SF-0402FPxxx F Series Features

- Single blow fuse for overcurrent protection
- 1005 (EIA 0402) miniature footprint
- Fast-acting precision fuse
- UL 248-14 listed
- RoHS compliant\* and halogen free\*\*
- Thin film chip design
- Surface mount packaging for automated assembly

## SF-0402FPxxx F Series - Fast Acting Precision Surface Mount Fuses

### Electrical Characteristics

| Model          | Rated Current (Amps) | Fusing Time                               | Resistance (Ω) Typ.*** | Rated Voltage | Interrupting Rating | Typical I <sup>2</sup> t (A <sup>2</sup> s) **** |
|----------------|----------------------|-------------------------------------------|------------------------|---------------|---------------------|--------------------------------------------------|
| SF-0402FP020F  | 0.20                 | Open within 5 sec. at 300 % rated current | 0.60                   | DC 35 V       | DC 35 V<br>35 A     | 0.0017                                           |
| SF-0402FP025F  | 0.25                 |                                           | 0.33                   |               |                     | 0.0035                                           |
| SF-0402FP0375F | 0.375                | Open within 5 sec. at 200 % rated current | 0.24                   |               |                     | 0.0036                                           |
| SF-0402FP050F  | 0.50                 |                                           | 0.16                   |               |                     | 0.0060                                           |
| SF-0402FP075F  | 0.75                 |                                           | 0.10                   |               |                     | 0.0120                                           |

\*\*\* Resistance value measured with ≤10 % rated current at 25 °C ambient.

\*\*\*\* Melting I<sup>2</sup>t calculated at 0.001 second pre-arcing time.

### Reliability Testing

| No. | Test                 | Requirement                                                                                           | Test Condition                                                                     | Test Reference          |
|-----|----------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------|
| 1   | Bending              | ≤1 A: DCR change ≤ ±10 %<br>>1 A: DCR change ≤ ±20 %                                                  | 2 mm                                                                               | Refer to STP document   |
| 2   | Solderability        | Minimum 95 % coverage                                                                                 | One dip at 255 °C for 5 seconds                                                    | MIL-STD-202 Method 208  |
| 3   | Thermal shock        | DCR change ≤ ±10 %<br>No mechanical damage                                                            | 100 cycles between -55 °C and +125 °C                                              | MIL-STD-202 Method 107  |
| 4   | Moisture resistance  | DCR change ≤ ±10 %<br>No excessive corrosion                                                          | 10 cycles                                                                          | MIL-STD-202 Method 106  |
| 5   | Salt spray           | DCR change ≤ ±10 %<br>No excessive corrosion                                                          | 48 hour exposure, 5 % salt solution                                                | MI L-STD-202 Method 101 |
| 6   | Mechanical vibration | DCR change ≤ ±10 %<br>No mechanical damage                                                            | 0.4 inch D.A. or 30 G between 5-3000 Hz                                            | MIL-STD-202 Method 204  |
| 7   | Mechanical shock     | DCR change ≤ ±10 %<br>No mechanical damage                                                            | 1500 G, 0.5 ms, half-sine shocks                                                   | MIL-STD-202 Method 213  |
| 8   | Life                 | No electrical "opens" during testing<br>Voltage drop change shall be less than ±10 % of initial value | 75 % rated current for 2000 hours at ambient temperature between +20 °C and +30 °C | Refer to STP document   |

### Agency Recognition

UL File Number ..... E198545

<http://www.ul.com/> Follow link to Online Certificates Directory, then enter UL File No. E198545, or [click here](#)

**BOURNS®**

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[www.bourns.com](http://www.bourns.com)

\* RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

\*\* 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.

"SinglFuse" is a trademark of Bourns, Inc.

Specifications are subject to change without notice.

The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time.

Users should verify actual device performance in their specific applications.

## SinglFuse™ SF-0402FPxxx F Series Applications

- Portable memory
- LCD monitors
- Disk drives
- PDAs
- Digital cameras
- MP3 players
- Cell phones
- Rechargeable battery packs
- Battery chargers
- Set-top boxes
- Industrial controllers
- Battery Management Systems (BMS)
- LED lighting
- Power tools

## SF-0402FPxxx F Series - Fast Acting Precision Surface Mount Fuses

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### Environmental Characteristics

|                                  |                                 |
|----------------------------------|---------------------------------|
| Operating Temperature.....       | -55 °C to +90 °C                |
| Storage Conditions               |                                 |
| Temperature .....                | +5 °C to +35 °C                 |
| Humidity.....                    | 40 % to 75 %                    |
| Shelf Life.....                  | 2 years from manufacturing date |
| Moisture Sensitivity Level ..... | 1                               |
| ESD Classification (HBM).....    | Class 6                         |

### Typical Part Marking

Represents total content. Layout may vary.



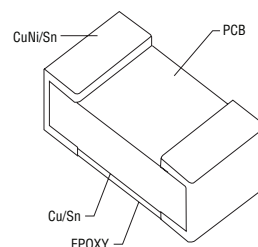
RATED CURRENT (A)  
 .. = 0.200  
 : = 0.250  
 ... = 0.375  
 I = 0.500  
 — = 0.750

### How to Order

**SF - 0402 FP 050 F - 2**

SinglFuse™  
 Product Designator  
 SMD Footprint  
 0402 = 1005 (EIA 0402) size  
 Fuse Blow Type  
 FP = Fast acting precision  
 Rated Current  
 020 ~ 075 (200 mA ~ 0.75 A)  
 Structure Type  
 F = Thin film  
 Packaging Type  
 - 2 = Tape & Reel

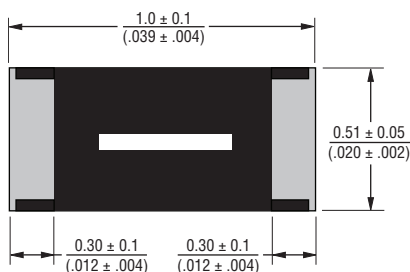
### Construction



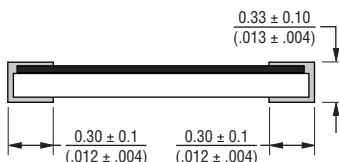
### Packaging Quantity

20,000 pieces per 7-inch reel

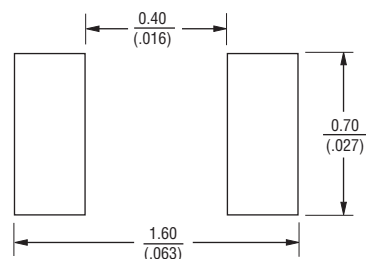
### Product Dimensions



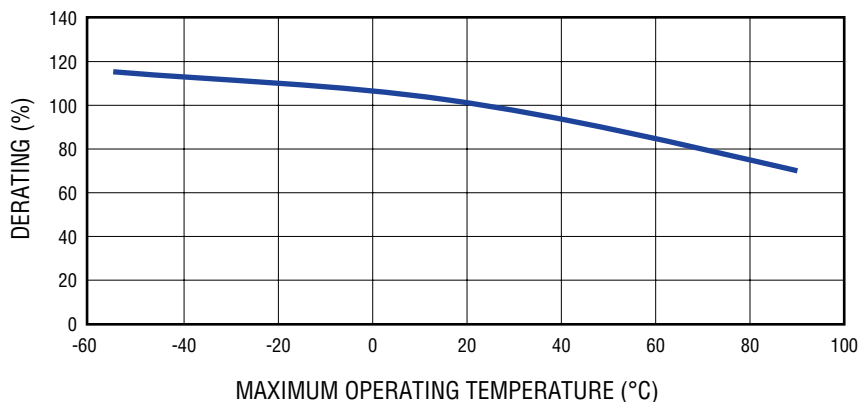
DIMENSIONS:  $\frac{\text{MM}}{(\text{INCHES})}$



### Recommended Pad Layout



### Current Rating Thermal Derating Curve



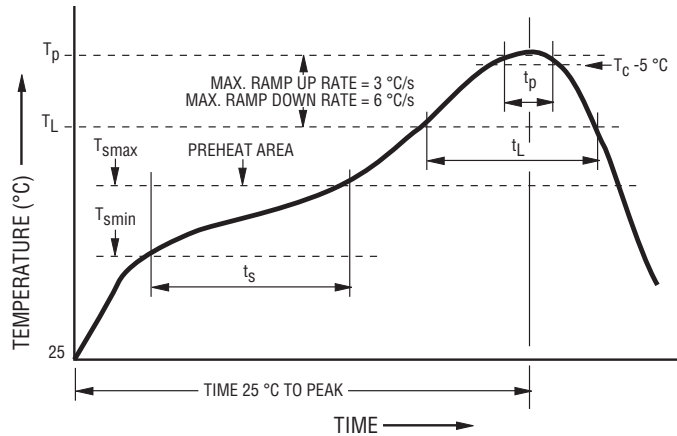
Specifications are subject to change without notice.

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# SF-0402FPxxx Series - Fast Acting Precision Surface Mount Fuses

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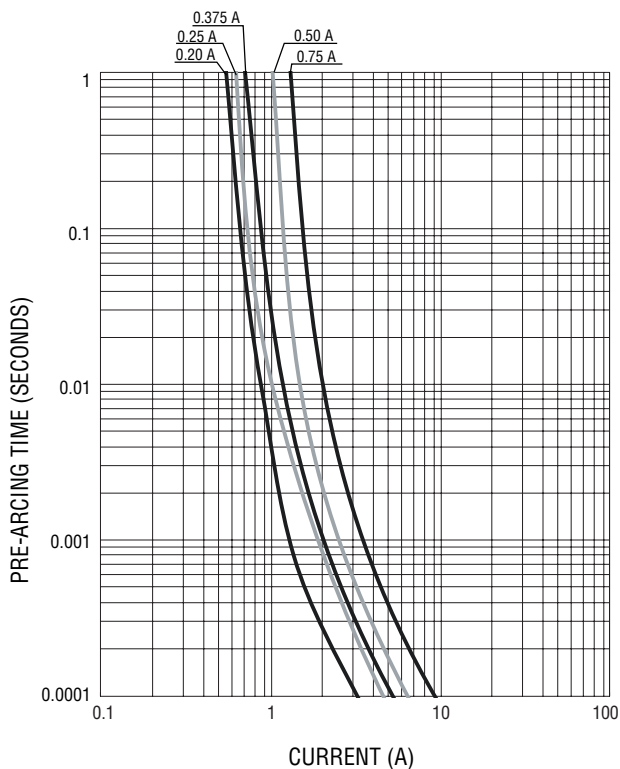
## Solder Reflow Recommendations



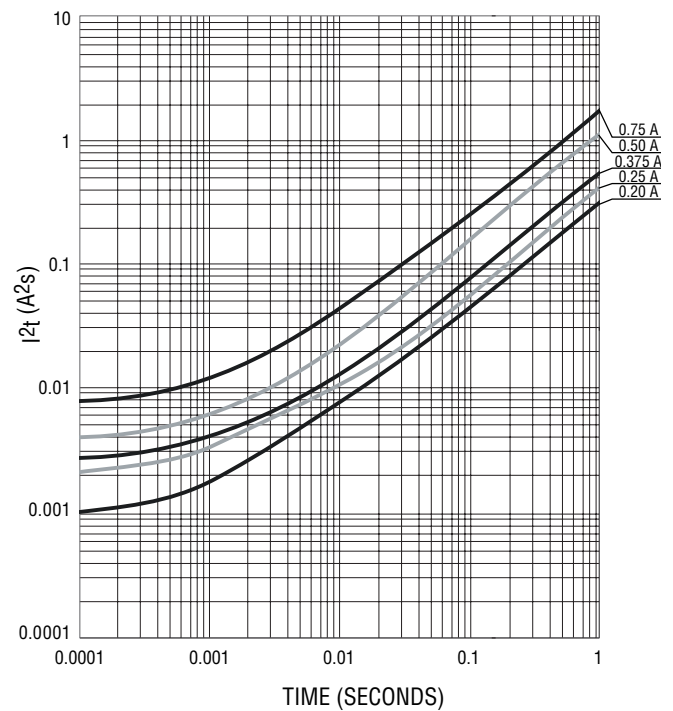
| Profile Feature                                                                                                                           | Pb-Free Assembly                   |
|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Preheat / Soak:<br>Temperature Min. ( $T_{smin}$ )<br>Temperature Max. ( $T_{smax}$ )<br>Time ( $t_s$ ) from ( $T_{smin}$ to $T_{smax}$ ) | 150 °C<br>200 °C<br>60~120 seconds |
| Ramp Up Rate ( $T_L$ to $T_p$ )                                                                                                           | 3 °C / second max.                 |
| Liquidous Temperature ( $T_L$ )<br>Time ( $t_L$ ) maintained above $T_L$                                                                  | 217 °C<br>60~150 seconds           |
| Peak Package Body Temperature ( $T_p$ )                                                                                                   | 260 °C                             |
| Time ( $t_p$ )* within 5 °C of the specified classification temperature ( $T_c$ )                                                         | 30 seconds*                        |
| Ramp Down Rate ( $T_p$ to $T_L$ )                                                                                                         | 6 °C / second max.                 |
| Time 25 °C to Peak Temperature                                                                                                            | 8 minutes max.                     |

\* Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum.

## Average Pre-Arcing Time vs. Current Curves



## Average $I^2t$ vs. $t$ Curves



REV. A 03/18

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# SF-0402FPxxxF Series Tape and Reel Packaging Specifications

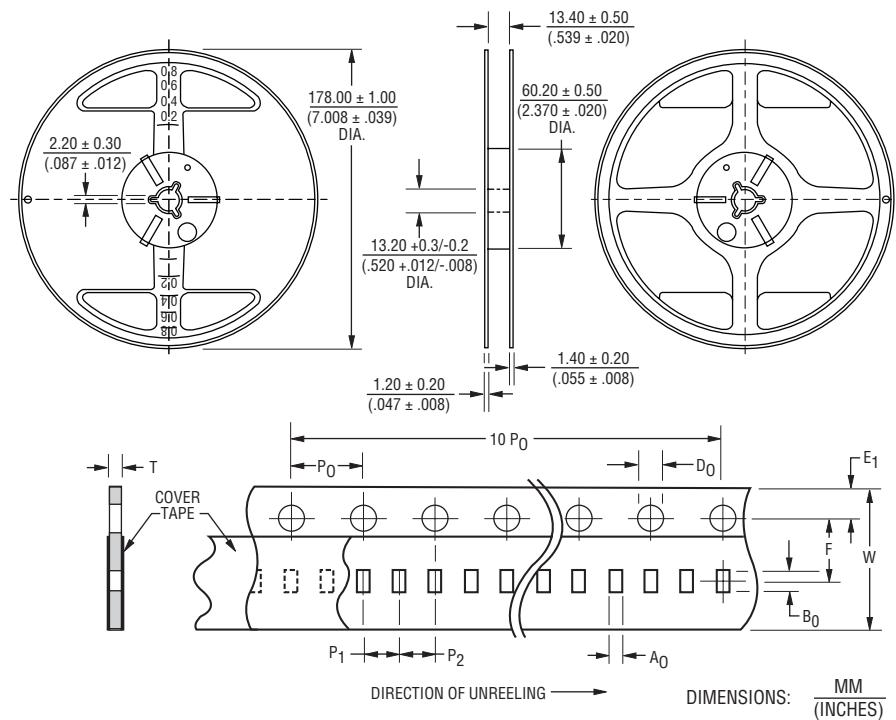
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## SF-0402FPxxxF Series per EIA 481-2

### Tape Dimensions

|                |                                         |
|----------------|-----------------------------------------|
| W              | $\frac{8.00 \pm 0.10}{(.315 \pm .004)}$ |
| P <sub>0</sub> | $\frac{4.0 \pm 0.10}{(.157 \pm .004)}$  |
| P <sub>1</sub> | $\frac{2.0 \pm 0.10}{(.079 \pm .004)}$  |
| P <sub>2</sub> | $\frac{2.0 \pm 0.05}{(.079 \pm .002)}$  |
| A <sub>0</sub> | $\frac{0.61 \pm 0.05}{(.024 \pm .002)}$ |
| B <sub>0</sub> | $\frac{1.15 \pm 0.05}{(.045 \pm .002)}$ |
| F              | $\frac{3.50 \pm 0.05}{(.138 \pm .002)}$ |
| E <sub>1</sub> | $\frac{1.75 \pm 0.10}{(.069 \pm .004)}$ |
| D <sub>0</sub> | $\frac{1.50 \pm 0.10}{(.059 \pm .004)}$ |
| T              | $\frac{0.43 \pm 0.03}{(.017 \pm .001)}$ |

PACKAGING: Paper tape, 20,000 pcs. per reel



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