



## SinglFuse™ SF-0402FPxxxF 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-0402FPxxxF 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                |   | 0.24                   |               |                     | 0.0036   |
| SF-0402FP050F  | 0.50                 | 0.16                                      | 0.0060                 |               |                     |  |
| SF-0402FP075F  | 0.75                 | 0.10                                      | 0.0120                 |               |                     |  |
| SF-0402FP100F  | 1.00                 | 0.073                                     | 0.024                  |               |                     |  |
| SF-0402FP125F  | 1.25                 | 0.054                                     | 0.045                  |               |                     |  |
| SF-0402FP150F  | 1.50                 | 0.040                                     | 0.081                  |               |                     |  |
| SF-0402FP175F  | 1.75                 | 0.034                                     | 0.092                  |               |                     |  |
| SF-0402FP200F  | 2.00                 | 0.031                                     | 0.120                  |               |                     |  |
| SF-0402FP250F  | 2.50                 | 0.018                                     | 0.220                  |               |                     |  |
| SF-0402FP300F  | 3.00                 | 0.015                                     | 0.270                  |               |                     |  |
| SF-0402FP350F  | 3.50                 | 0.012                                     | 0.340                  |               |                     |  |
| SF-0402FP400F  | 4.00                 | 0.011                                     | 0.360                  |               |                     |  |
| SF-0402FP500F  | 5.00                 | 0.009                                     | 0.550                  |               |                     |  |

\*\*\* 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   |

\* 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.

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Users should verify actual device performance in their specific applications.

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# SingIFuse™ SF-0402FPxxxF Series Applications

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

## SF-0402FPxxxF Series - Fast Acting Precision Surface Mount Fuses **BOURNS®**

### 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

### 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](#)

### Typical Part Marking

Represents total content. Layout may vary.



RATED CURRENT (A)

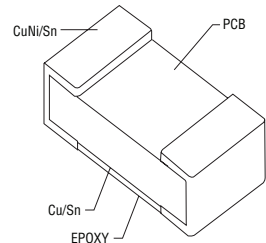
|             |           |             |
|-------------|-----------|-------------|
| •• = 0.200  | ⊕ = 1.00  | H = 2.50    |
| • = 0.250   | × = 1.25  | III = 3.00  |
| ••• = 0.375 | II = 1.50 | IIII = 3.50 |
| I = 0.500   | — = 1.75  | □ = 4.00    |
| — = 0.750   | ⊞ = 2.00  | ○ = 5.00    |

### How to Order

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

SingIFuse™  
 Product Designator  
 SMD Footprint  
   0402 = 1005 (EIA 0402) size  
 Fuse Blow Type  
   FP = Fast acting precision  
 Rated Current  
   020 ~ 500 (200 mA ~ 5.00 A)  
 Structure Type  
   F = Thin film  
 Packaging Type  
   - 2 = Tape & Reel

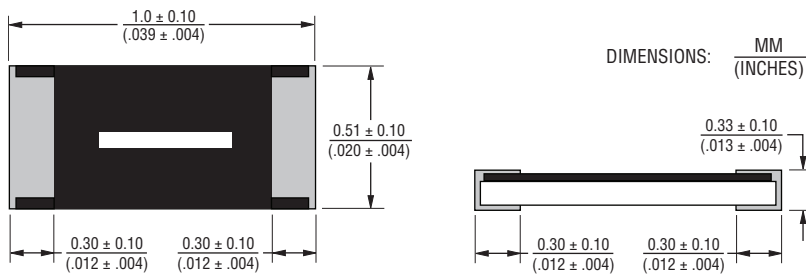
### Construction



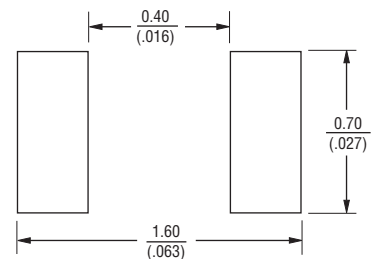
### Packaging Quantity

20,000 pieces per 7-inch reel

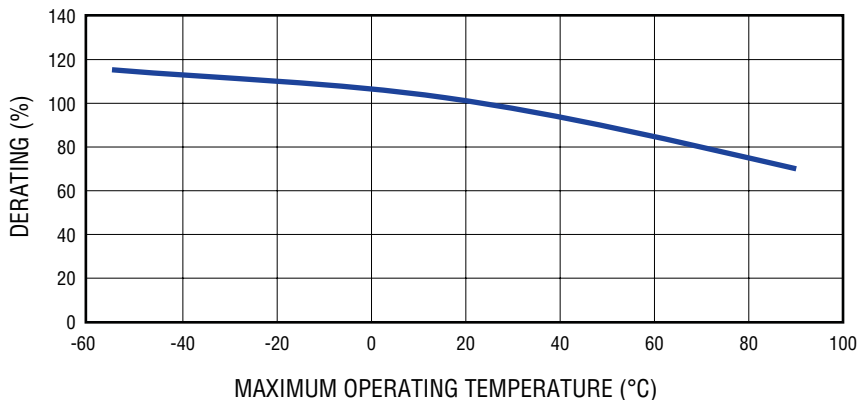
### Product Dimensions



### Recommended Pad Layout



### Current Rating Thermal Derating Curve



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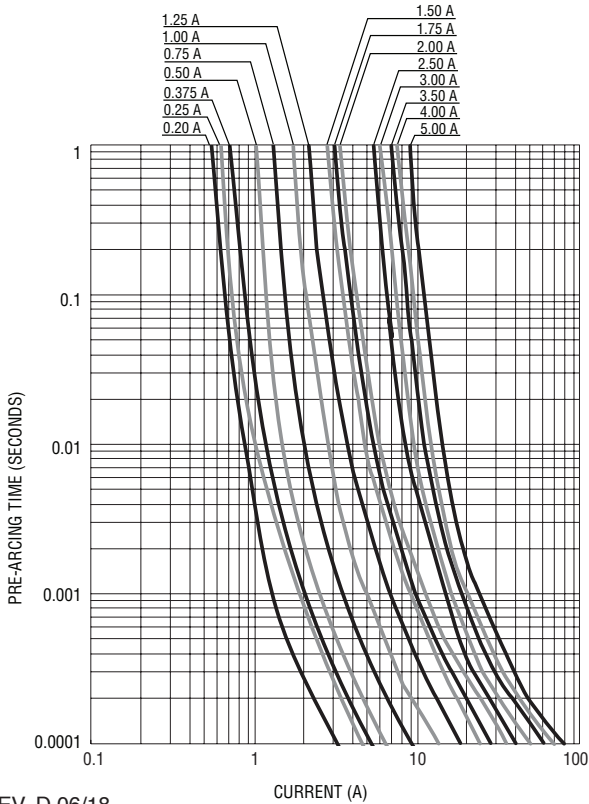
**Solder Reflow Recommendations**



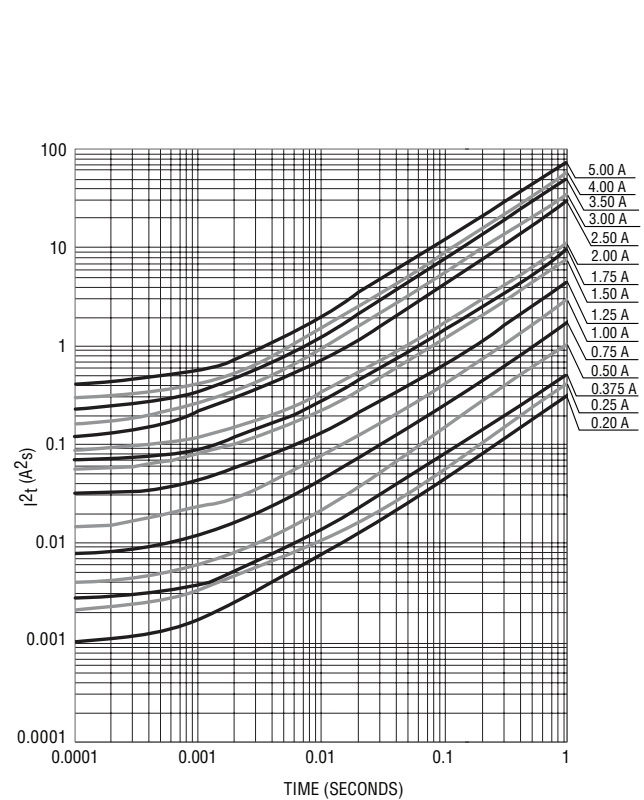
| Profile Feature   | Pb-Free Assembly                   |
|---|------------------------------------|
| Preheat / Soak:<br>Temperature Min. ( $T_{smin}$ )<br>Temperature Max. ( $T_{smax}$ )<br>Time ( $t_s$ ) from ( $T_{smin}$ to $T_{smax}$ ) | 150 °C<br>200 °C<br>60~120 seconds |
| Ramp Up Rate ( $T_L$ to $T_d$ )   | 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 ( $T_d$ )   | 260 °C                             |
| Time ( $t_p$ )* within 5 °C of the specified classification temperature ( $T_c$ )   | 30 seconds*                        |
| Ramp Down Rate ( $T_d$ 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. D 06/18

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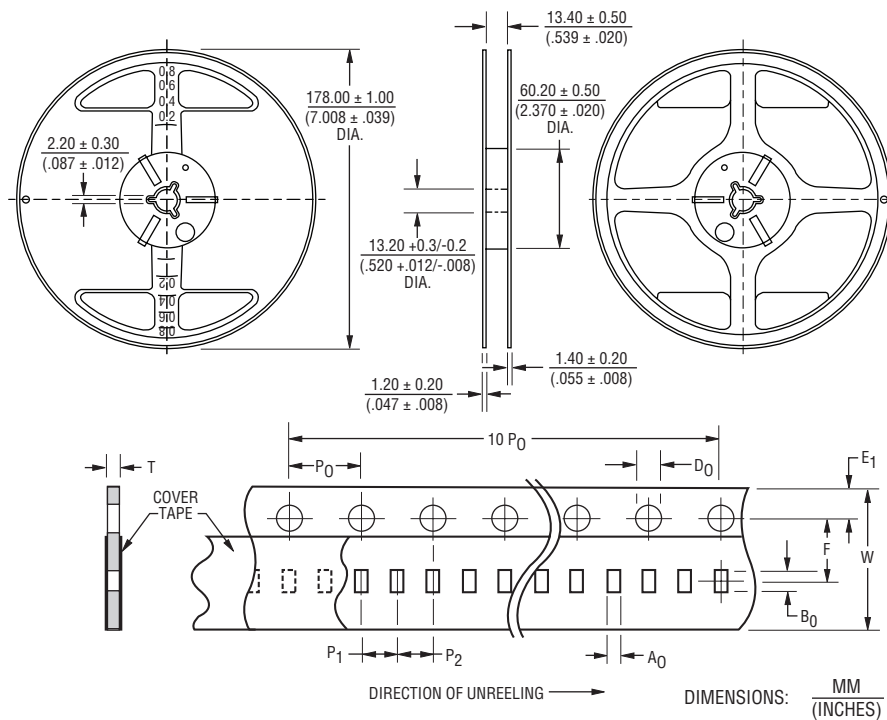
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# SF-0402FPxxxF Series Tape and Reel Packaging Specifications

# BOURNS®

| Tape Dimensions | SF-0402FPxxxF Series<br>per EIA 481-2   |
|-----------------|---|
| 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>  | $\frac{2.0 \pm 0.05}{(.079 \pm .002)}$  |
| 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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