



## SinglFuse™ SF-0603SxxxM Series Features

- Single blow fuse for overcurrent protection
- 1608 (EIA 0603) miniature footprint
- Slow blow fuse (Fusing time  $\leq 5$  seconds at 250 % rated current)
- UL 248-14 listed
- Surface mount packaging for automated assembly
- Multilayer SMD design
- RoHS compliant\* and halogen free\*\*

## SF-0603SxxxM Series - Slow Blow Multilayer Surface Mount Fuses

### Electrical Characteristics

| Model          | Rated Current (Amps) | Fusing Time                               | Resistance ( $\Omega$ ) Typ.*** | Rated Voltage | Interrupting Rating | Typical $I^2t$ (A <sup>2</sup> s) **** |
|----------------|----------------------|-------------------------------------------|---------------------------------|---------------|---------------------|----------------------------------------|
| SF-0603S050M-2 | 0.50                 | Open within 5 sec. at 250 % rated current | 0.485                           | DC 63 V       | DC 63 V<br>35 A     | 0.003                                  |
| SF-0603S075M-2 | 0.75                 |                                           | 0.254                           |               |                     | 0.006                                  |
| SF-0603S100M-2 | 1.00                 |                                           | 0.147                           |               |                     | 0.013                                  |
| SF-0603S150M-2 | 1.50                 |                                           | 0.059                           |               |                     | 0.030                                  |
| SF-0603S200M-2 | 2.00                 |                                           | 0.044                           | DC 32 V       | DC 32 V<br>35 A     | 0.060                                  |
| SF-0603S250M-2 | 2.50                 |                                           | 0.032                           |               |                     | 0.100                                  |
| SF-0603S300M-2 | 3.00                 |                                           | 0.025                           |               |                     | 0.180                                  |
| SF-0603S350M-2 | 3.50                 |                                           | 0.024                           |               |                     | 0.300                                  |
| SF-0603S400M-2 | 4.00                 |                                           | 0.018                           |               |                     | 0.500                                  |
| SF-0603S500M-2 | 5.00                 |                                           | 0.013                           |               |                     | 0.800                                  |
| SF-0603S600M-2 | 6.00                 |                                           | 0.010                           | DC 24 V       | DC 24 V<br>35 A     | 1.100                                  |

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

\*\*\*\*Melting  $I^2t$  calculated at 0.001 second pre-arcing time.

### Reliability Testing

| No. | Test                      | Requirement                                                                                                  | Test Condition                                                                                             | Test Reference            |
|-----|---------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------|
| 1   | Soldering heat resistance | DCR change $\leq \pm 10$ %<br>No mechanical damage                                                           | One dip at 260 °C for 60 seconds                                                                           | MIL-STD-202<br>Method 210 |
| 2   | Solderability             | Minimum 95 % coverage                                                                                        | One dip at 245 °C for 5 seconds                                                                            | MIL-STD-202<br>Method 208 |
| 3   | Thermal shock             | DCR change $\leq \pm 10$ %<br>No mechanical damage                                                           | 100 cycles between -65 °C and +125 °C                                                                      | MIL-STD-202<br>Method 107 |
| 4   | Moisture resistance       | DCR change $\leq \pm 15$ %<br>No excessive corrosion                                                         | 10 cycles                                                                                                  | MIL-STD-202<br>Method 106 |
| 5   | Salt spray                | DCR change $\leq \pm 10$ %<br>No excessive corrosion                                                         | 48 hour exposure, 5 % salt solution                                                                        | MIL-STD-202<br>Method 101 |
| 6   | Mechanical vibration      | DCR change $\leq \pm 10$ %<br>No mechanical damage                                                           | 0.4 inch D.A. or 30 G between 5-3000 Hz                                                                    | MIL-STD-202<br>Method 204 |
| 7   | Mechanical shock          | DCR change $\leq \pm 10$ %<br>No mechanical damage                                                           | 1500 G, 0.5 ms, half-sine shocks                                                                           | MIL-STD-202<br>Method 213 |
| 8   | Life                      | No electrical "opens" during testing.<br>Voltage drop change shall be less than $\pm 20$ % of initial value. | 80 % rated current (75 % for $\leq 1$ A fuses)<br>for 2000 hours at ambient temperature<br>+20 °C ~ +30 °C | Refer to STP<br>document  |
| 9   | Terminal strength         | No mechanical damage                                                                                         | 0.5 Kg pushing force                                                                                       | Refer to STP<br>document  |

### Environmental Characteristics

Operating Temperature.....-55 °C to +125 °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

\* 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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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.

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## SinglFuse™ SF-0603SxxxM 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

### SF-0603SxxxM Series - Slow Blow Multilayer Surface Mount Fuses

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#### Typical Part Marking

Represents total content. Layout may vary.



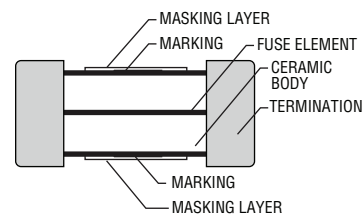
RATED CURRENT (A)  
 C = 0.50 K = 3.00  
 D = 0.75 L = 3.50  
 E = 1.00 M = 4.00  
 G = 1.50 N = 5.00  
 I = 2.00 O = 6.00  
 J = 2.50

#### How to Order

**SF - 0603 S 100 M - 2**

SinglFuse™  
 Product Designator  
 SMD Footprint  
 0603 = 1608 (EIA 0603) size  
 Fuse Blow Type  
 S = Slow blow  
 Rated Current  
 050-600 (0.50 A - 6.00 A)  
 Structure  
 M = Multilayer  
 Packaging Type  
 - 2 = Tape & Reel

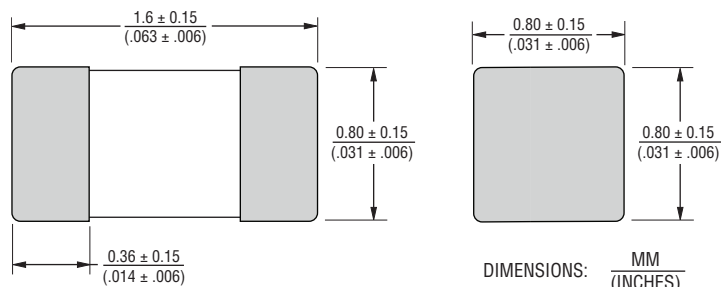
#### Construction



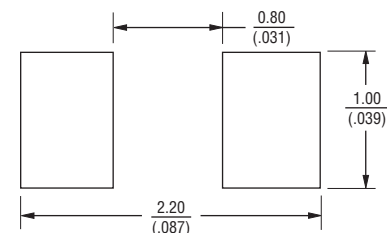
#### Packaging Quantity

.....4,000 pieces per 7 inch reel

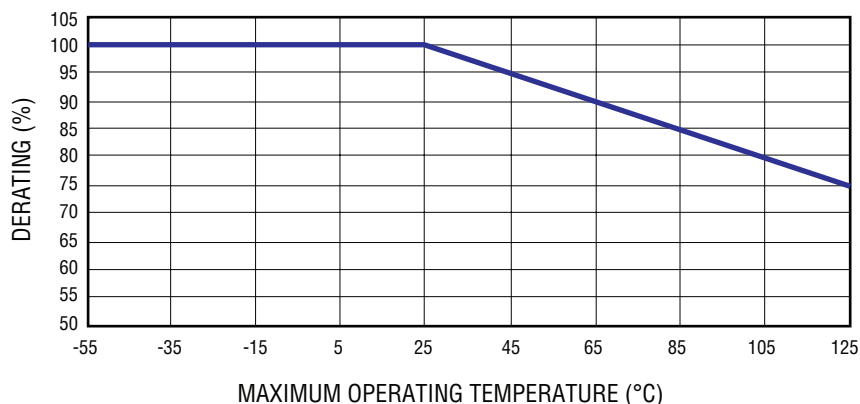
#### Product Dimensions



#### Recommended Pad Layout

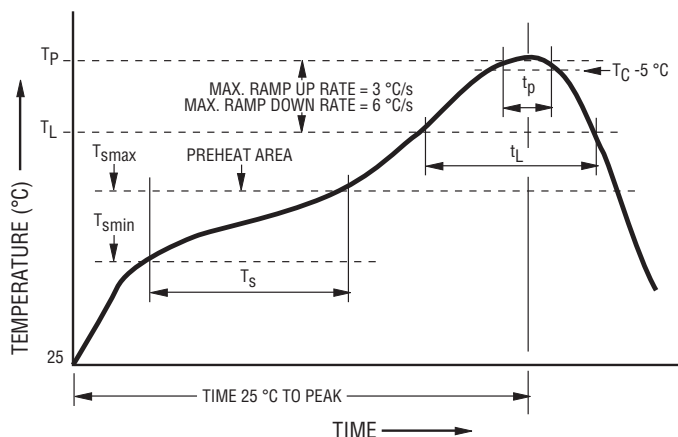


#### Current Rating Thermal Derating Curve



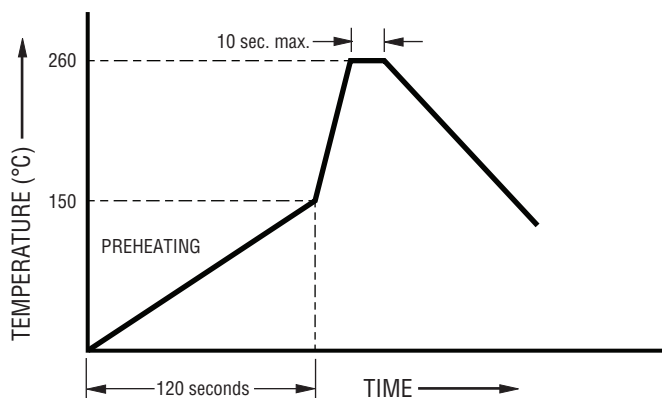
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**Solder Reflow Recommendations**

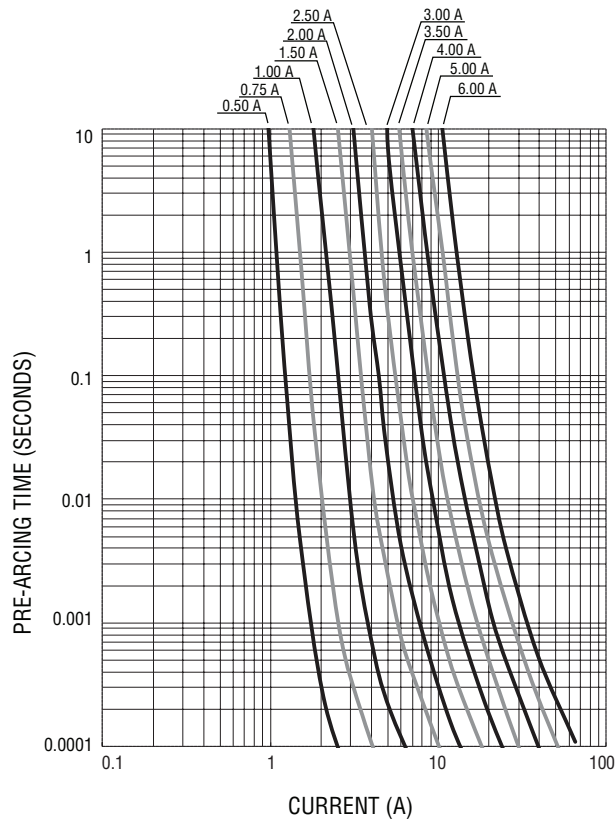
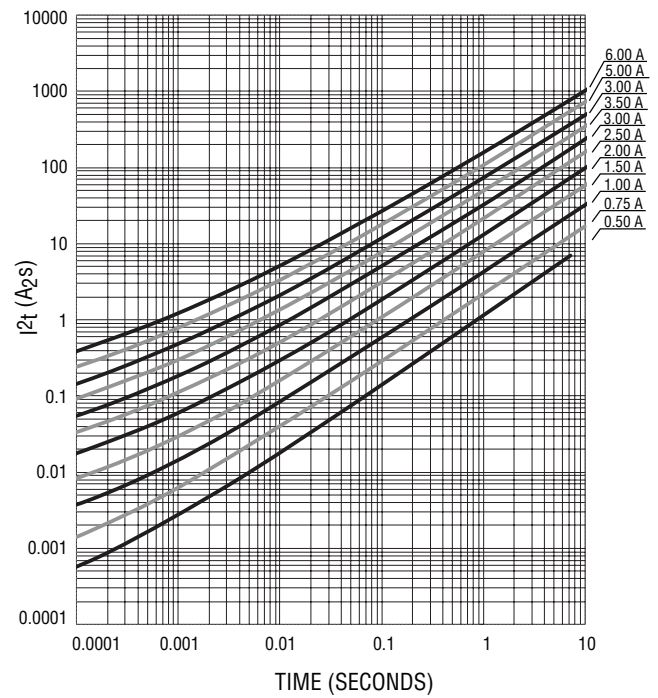
| Profile Feature                                                                                                                           | Pb-Free Assembly                   |
|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 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 $T_P$ )                                                                                                           | 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.

**Recommended Temperature Profile for Wave Soldering**

Wave soldering is suitable for 0603 size models.

Average Pre-Arcing Time Curves

Minimum  $I^2t$  vs.  $t$  Curves

# SF-0603SxxxM Series Tape and Reel Specifications

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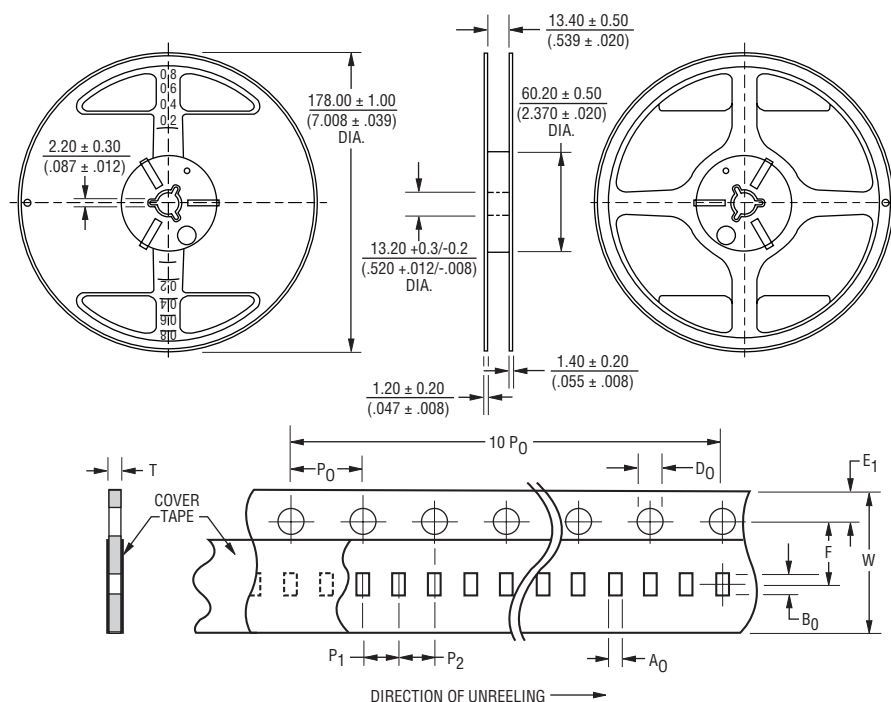
## SF-0603SxxxM Series per EIA 481-2

### 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> | $\frac{4.0 \pm 0.10}{(.157 \pm .004)}$  |
| P <sub>2</sub> | $\frac{2.0 \pm 0.05}{(.079 \pm .002)}$  |
| A <sub>0</sub> | $\frac{1.00 \pm 0.10}{(.039 \pm .004)}$ |
| B <sub>0</sub> | $\frac{1.80 \pm 0.10}{(.071 \pm .004)}$ |
| F              | $\frac{3.5 \pm 0.05}{(.138 \pm .002)}$  |
| 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              | $\frac{0.95 \pm 0.08}{(.037 \pm .003)}$ |

PACKAGING: Paper tape, 4,000 pcs. per reel

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



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