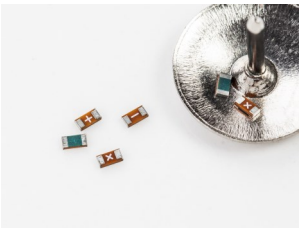
Revision of May 2019

# TF-FUSE® Thin Film Surface Mount Fuses

## FF Series (Very Fast Acting), 0603 Size



## Features:

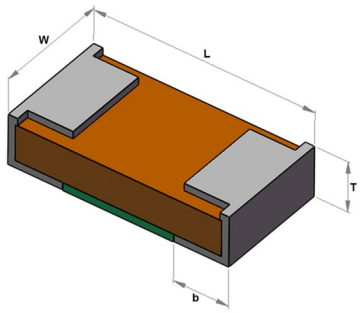
- Very fast acting at 200% overload current levels
- Low DCR
- High inrush current withstanding capability
- Fiberglass enforced epoxy fuse body
- Copper termination with nickel and tin plating
- Halogen free, RoHS compliance and lead-free

## Applications:

- Notebook computers and tablets
- Digital cameras
- Memory cards
- Toys
- Bluetooth earphones
- Portable electronic devices

## Shape and Dimensions:

| Unit | Inch | mm |
|---|---|---|
| Length (L) | 0.063 ± 0.004 | 1.60 ± 0.10 |
| Width (W) | 0.032 ± 0.004 | 0.81 ± 0.10 |
| Thickness (T) | 0.012 ± 0.004 | 0.30 ± 0.10 |
| Termination bandwidth (b) | 0.014 ± 0.004 | 0.36 ± 0.10 |




## Clearing Time Characteristics:

| % of Current Rating | Opening Time at 25°C |
|---|---|
| 100% | 4 hours min. |
| 200% | 5 seconds max. |
| 300% | 0.2 second max. |

## Agency Approval:

Recognized Under the Components Program of UL.
File Number: E232989.

## Typical Ratings and Characteristics:

Operating temperature: -55 to +90°C

| Part Number | Current Rating (A) | Voltage Rating (VDC) | Interrupting Rating | Nominal Cold DCR (Ω)1 | Nominal $I^2t$ (A2s)2 | Marking |
|---|---|---|---|---|---|---|
| T0603FF0150TM | 0.15 | 65 | 50A@35V DC/AC 13A@65V DC | 2.2 | 0.0006 | · |
| T0603FF0200TM | 0.2 | 65 | | 1.3 | 0.0014 | ·· |
| T0603FF0250TM | 0.25 | 65 | | 1.1 | 0.0016 | ⁚ |
| T0603FF0375TM | 0.375 | 65 | | 0.48 | 0.004 | ⋯ |
| T0603FF0500TM | 0.5 | 65 | | 0.185 | 0.012 | I |
| T0603FF0750TM | 0.75 | 65 | | 0.112 | 0.021 | — |
| T0603FF1000TM | 1 | 65 | | 0.069 | 0.042 | + |
| T0603FF1250TM | 1.25 | 65 | 35A@35V DC/AC 13A@65V DC | 0.048 | 0.052 | × |
| T0603FF1500TM | 1.5 | 65 | | 0.037 | 0.071 | II |
| T0603FF1750TM | 1.75 | 35 | 35A@35V DC/AC 50A@24V DC/AC | 0.031 | 0.1 | = |
| T0603FF2000TM | 2 | 35 | | 0.026 | 0.14 | = |
| T0603FF2500TM | 2.5 | 35 | | 0.021 | 0.24 | H |
| T0603FF3000TM | 3 | 35 | | 0.0176 | 0.33 | III |
| T0603FF3500TM | 3.5 | 35 | | 0.0148 | 0.49 | HH |
| T0603FF4000TM | 4 | 35 | | 0.0125 | 0.63 | □ |
| T0603FF5000TM | 5 | 35 | | 0.0095 | 1.1 | O |

[1] Measured at ≤ 10% of rated current and 25°C ambient .  [2] Melting $I^2t$ at 0.001 sec.

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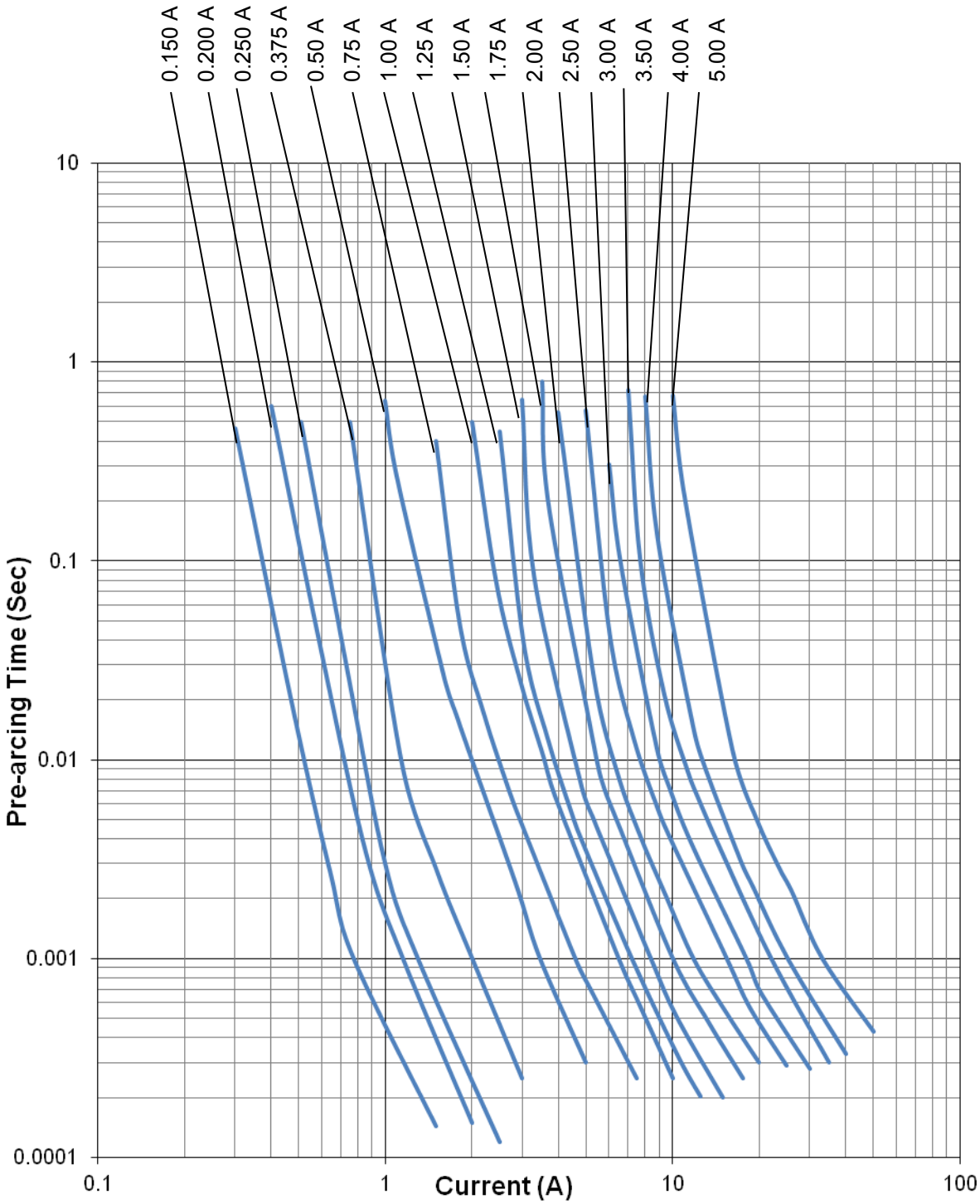
## FF Series (Very Fast Acting), 0603 Size

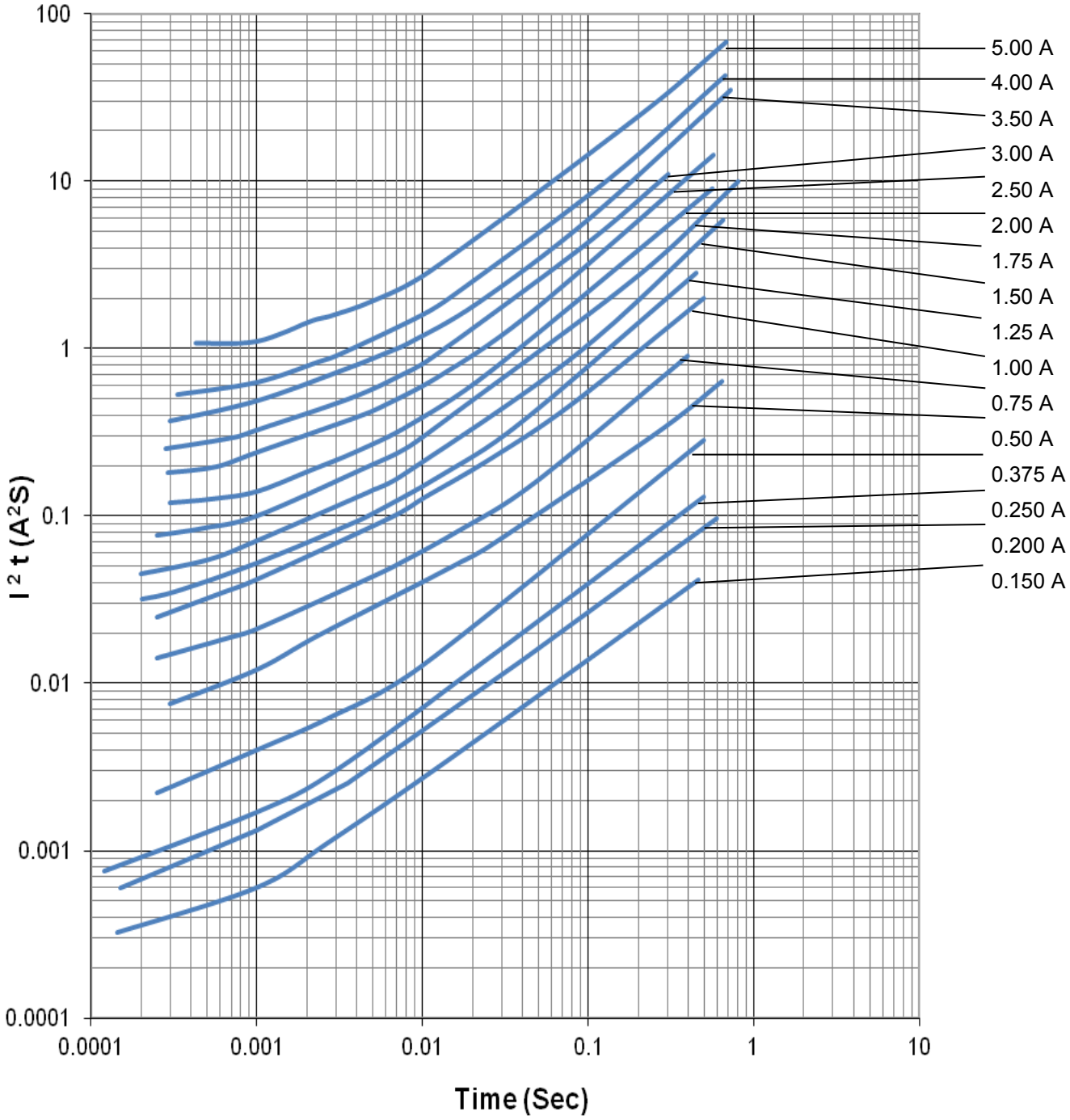
### Average Pre-arcing Time Curves:



# TF-FUSE® Thin Film Surface Mount Fuses

## FF Series (Very Fast Acting), 0603 Size

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



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# TF-FUSE® Thin Film Surface Mount Fuses

## Product Identification:

**T 0603 FF 1000 T M**

**(1) (2) (3) (4) (5) (6)**

**(1) Product Code:** T-Thin Film

**(2) Size Code:** Standard EIA chip sizes

**(3) Series Code:** FF—Very Fast Acting, HI—High Inrush

**(4) Current Rating Code:** 0500—0.5A, 1000—1.0A

**(5) Package Code:** T—Tape & Reel; B—Bulk

## Environmental Tests:

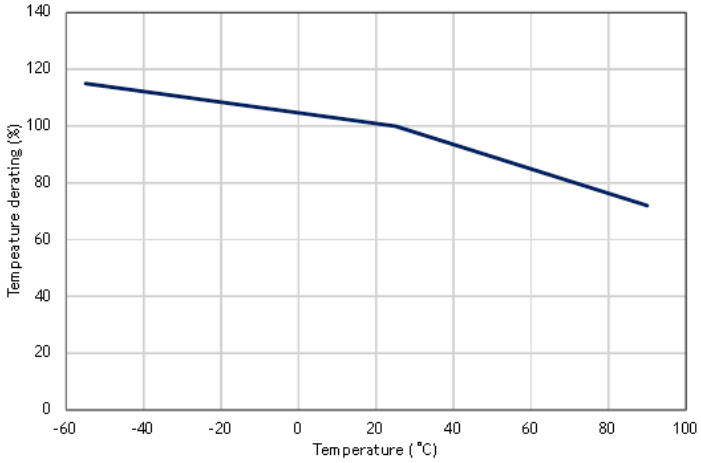
| No. | Test item | Requirement | Test condition | Reference |
|---|---|---|---|---|
| 1 | Bending | ≤1A: 10% DCR change max.<br>>1A: 20% DCR change max. | 2mm | Refer to AEM QIQ034 |
| 2 | Solderability | 95% coverage min. | One dip at 255℃ for 5 seconds | MIL-STD-202<br>Method 208 |
| 3 | Thermal shock | DCR change within ±10%<br>No mechanical damage | 100 cycles between -55°C and +125°C | MIL-STD-202<br>Method 107 |
| 4 | Moisture resistance | DCR change within ±10%<br>No excessive corrosion | 10 cycles | MIL-STD-202<br>Method 106 |
| 5 | Salt spray | DCR change within ≤ ±10%<br>No excessive corrosion | 5% salt solution, 48 hour exposure | MIL-STD-202<br>Method 101 |
| 6 | Mechanical vibration | DCR change within ≤ ±10%<br>No mechanical damage | 0.4” D.A. or 30G between 5 and 3000 Hz | MIL-STD-202<br>Method 204 |
| 7 | Mechanical shock | DCR change within ≤ ±10%<br>No mechanical damage | 1500G, 0.5 ms, half sine shocks | MIL-STD-202<br>Method 213 |
| 8 | Life | Change of voltage drop within ±10%, no open circuit | 75% rated current, 2000 hours, ambient temperature +20°C to 30°C | Refer to AEM QIQ106 |

## Packaging:

| Chip Size | Parts on 7 inch (178mm) Reel |
|---|---|
| 0603(1608) | 8,000 |
| 0402(1005) | 20,000 |

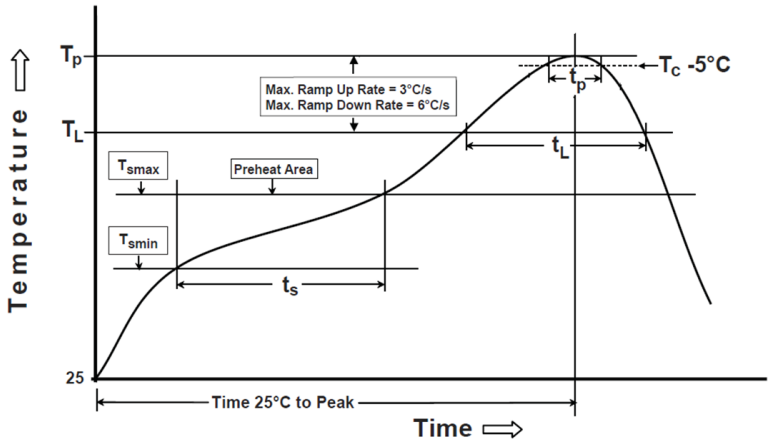
# TF-FUSE® Thin Film Surface Mount Fuses

## Temperature Effect on Current Rating:




## Recommended Reflow Soldering Profile:

| 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 $T_{smax}$) | <br>150°C<br>200°C<br>60~120 seconds |
| Ramp-uprate ($T_L$ 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 | |




## Thermal Shock When Making Correction with a Soldering Iron:

The temperature of solder iron tip should be controlled under 350 °C and soldering time should be less than 3 sec.
The soldering iron tip should not directly touch the top side termination of the component.

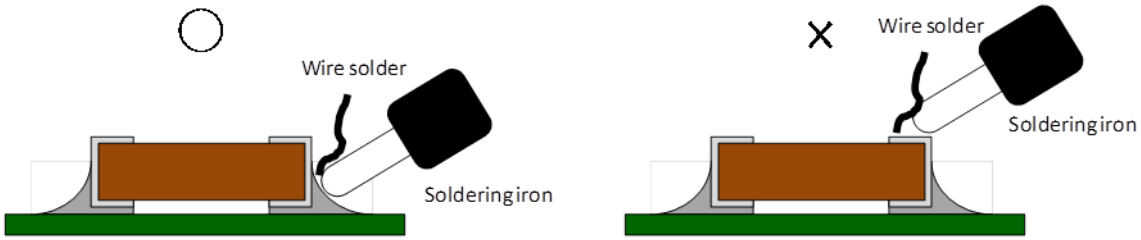



Fig 3 Correct handling method of soldering iron

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