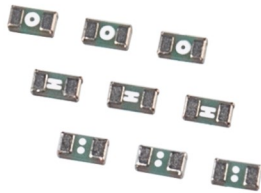


## TF-FUSE® Thin Film Surface Mount Fuses

### FF Series (Very Fast Acting), 0402 Size



#### Features:

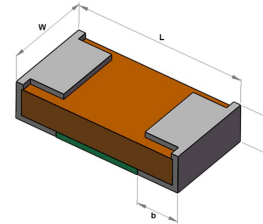
- Very fast acting
- Low DCR
- High inrush current withstanding capability
- Fiberglass enforced epoxy fuse body
- Copper termination with nickel and tin plating
- Halogen free, RoHS compliance and lead-free

#### Clearing Time Characteristics:

| % of Current Rating | Ampere Rating | Opening Time at 25°C |
|---------------------|---------------|----------------------|
| 100%                | 0.200A-5.00A  | 4 hours min.         |
| 200%                | 0.375A-5.00A  | 5 seconds max.       |
| 300%                | 0.200A-0.250A | 5 seconds max.       |
|                     | 0.375A-5.00A  | 0.2 second max.      |

#### Shape and Dimensions:

| Unit                      | Inch          | mm          |
|---------------------------|---------------|-------------|
| Length (L)                | 0.039± 0.004  | 1.00 ± 0.10 |
| Width (W)                 | 0.020 ± 0.004 | 0.51± 0.10  |
| Thickness (T)             | 0.013 ± 0.004 | 0.33 ± 0.10 |
| Termination bandwidth (b) | 0.012 ± 0.004 | 0.30 ± 0.10 |



#### 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 ( $\Omega$ ) <sup>1</sup> | Nominal $I^2t$ (A <sup>2</sup> s) <sup>2</sup> | Marking |
|---------------|--------------------|----------------------|---------------------|--|--|---------|
| T0402FF0200TM | 0.200              | 35                   | 35A@35V DC          | 0.60                                       | 0.0017   | ..      |
| T0402FF0250TM | 0.250              | 35                   |                     | 0.33                                       | 0.0035   | :       |
| T0402FF0375TM | 0.375              | 35                   |                     | 0.24                                       | 0.0036   | ...     |
| T0402FF0500TM | 0.50               | 35                   |                     | 0.16                                       | 0.0060   | I       |
| T0402FF0750TM | 0.75               | 35                   |                     | 0.10                                       | 0.012  | -       |
| T0402FF1000TM | 1.00               | 35                   |                     | 0.073                                      | 0.024  | +       |
| T0402FF1250TM | 1.25               | 35                   |                     | 0.054                                      | 0.045  | x       |
| T0402FF1500TM | 1.50               | 35                   |                     | 0.040                                      | 0.081  |         |
| T0402FF1750TM | 1.75               | 35                   |                     | 0.034                                      | 0.092  | =       |
| T0402FF2000TM | 2.00               | 35                   |                     | 0.031                                      | 0.12   | ≡       |
| T0402FF2500TM | 2.50               | 35                   |                     | 0.018                                      | 0.22   | H       |
| T0402FF3000TM | 3.00               | 35                   |                     | 0.015                                      | 0.27   | III     |
| T0402FF3500TM | 3.50               | 35                   |                     | 0.012                                      | 0.34   | III     |
| T0402FF4000TM | 4.00               | 35                   |                     | 0.011                                      | 0.36   | □       |
| T0402FF5000TM | 5.00               | 35                   |                     | 0.0090                                     | 0.55   | ○       |

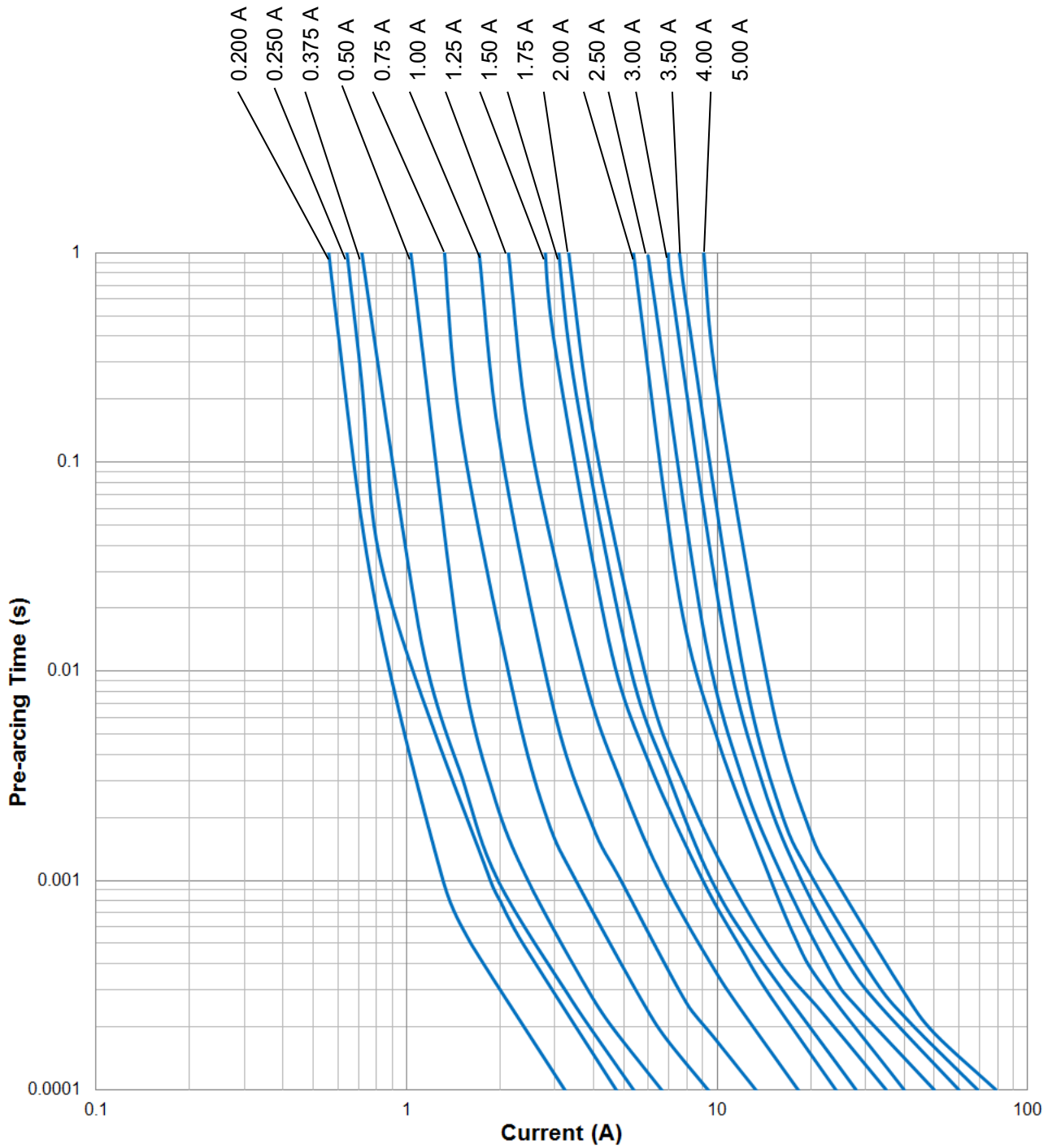
<sup>1</sup> Measured at  $\leq 10\%$  of rated current and 25°C ambient.

<sup>2</sup> Melting  $I^2t$  at 0.001 second of current rating.

# TF-FUSE® Thin Film Surface Mount Fuses

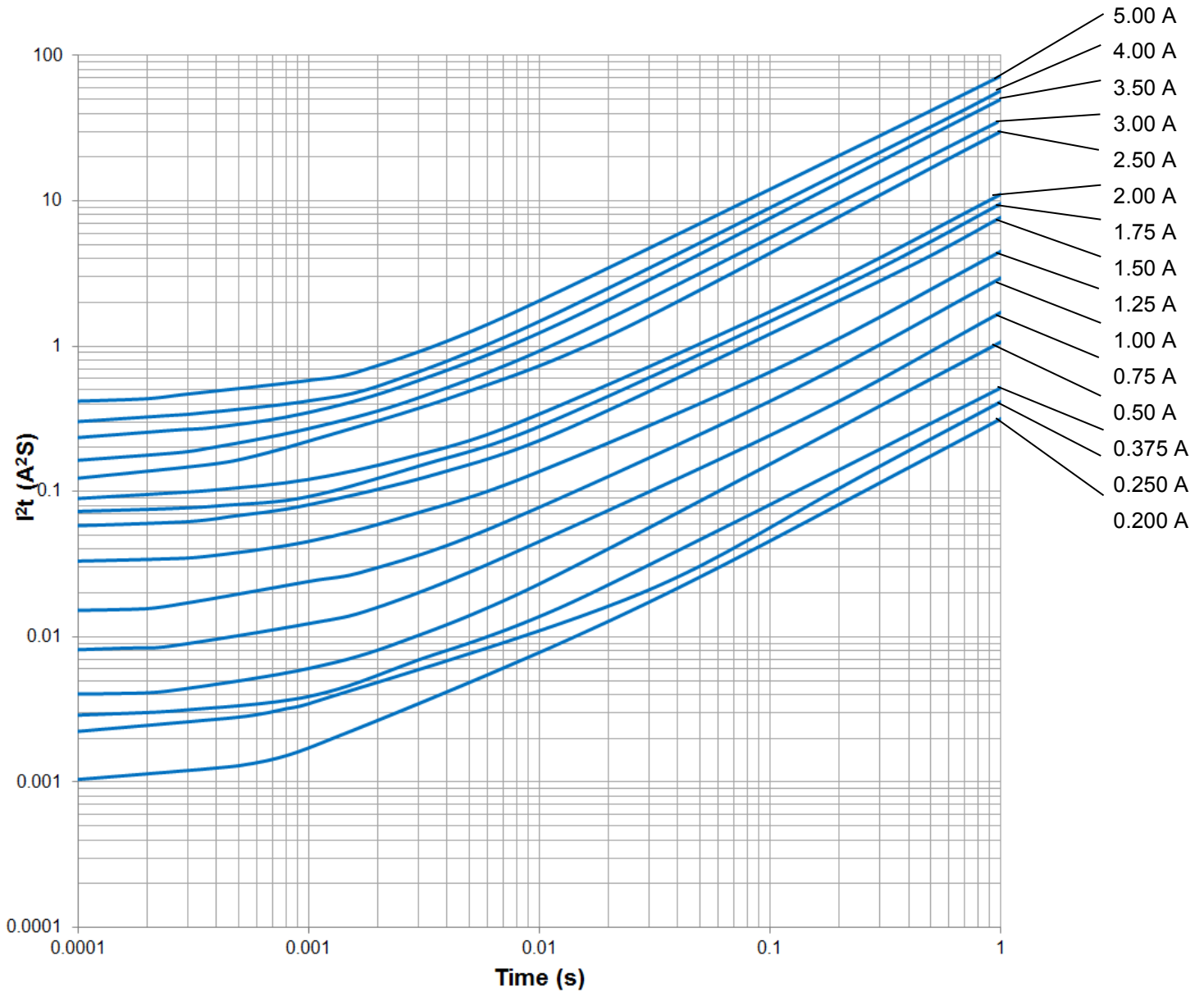
## FF Series (Very Fast Acting), 0402 Size

### Average Pre-arcing Time Curves:



**TF-FUSE<sup>®</sup> Thin Film Surface Mount Fuses**  
**FF Series (Very Fast Acting), 0402 Size**

**Average I<sup>2</sup>t vs. t Curves:**



## 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:

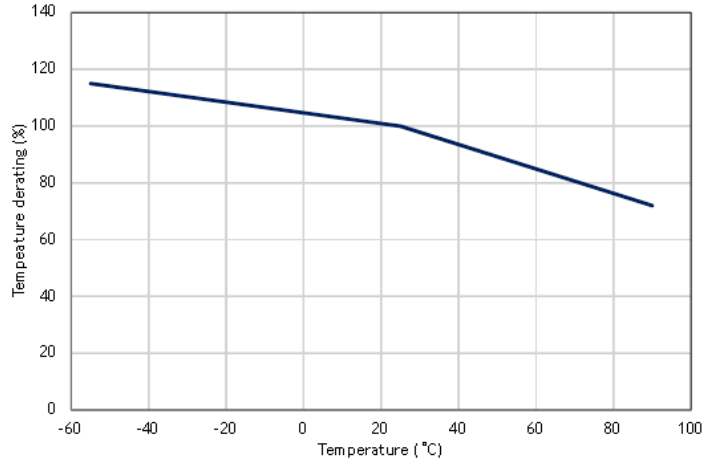
| No. | Test item            | Requirement  | Test condition   | Reference                 |
|-----|----------------------|--|--|---------------------------|
| 1   | Bending              | ≤1A: 10% DCR change max.<br>>1A: 20% DCR change max. | 2mm  | Refer to AEM QIQ034       |
| 2   | Solderability        | 95% coverage min.                                    | One dip at 255°C 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                       |

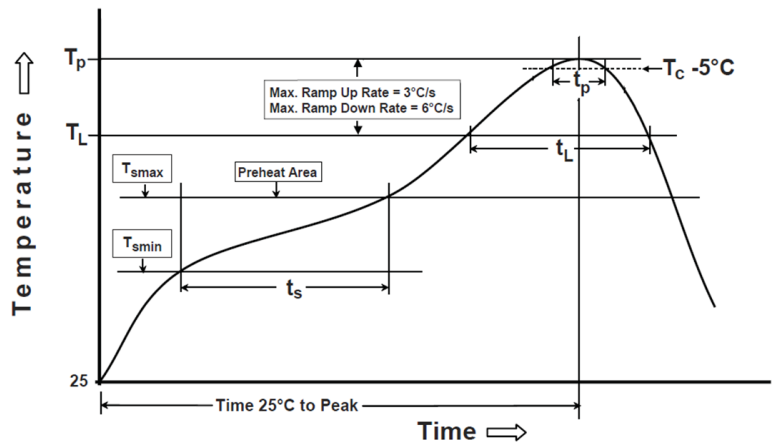
## TF-FUSE® Thin Film Surface Mount Fuses

### Temperature Effect on Current Rating:



### Recommended Reflow Soldering Profile:

| Profile Feature  | Pb-Free Assembly |
|--|------------------|
| <b>Preheat/Soak</b>  |                  |
| Temperature Min ( $T_{smin}$ )   | 150°C            |
| Temperature Max ( $T_{smax}$ )   | 200°C            |
| Time ( $t_s$ ) from ( $T_{smin}$ to $T_{smax}$ )   | 60~120 seconds   |
| Ramp-up rate ( $T_L$ to $T_p$ )  | 3°C/second max.  |
| Liquidous temperature ( $T_L$ )  | 217°C            |
| Time ( $t_L$ ) maintained above $T_L$  | 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 soldering 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.

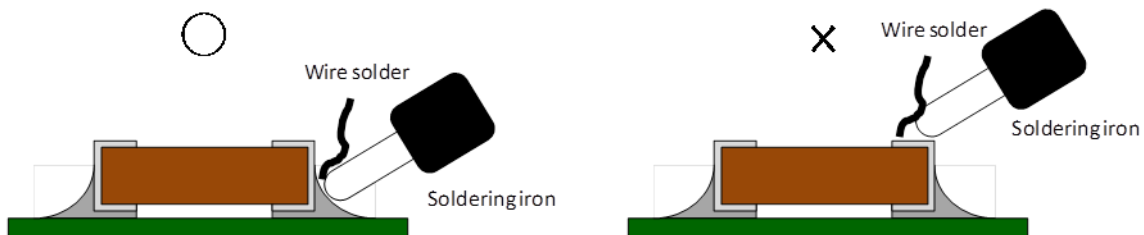


Fig 3 Correct handling method of soldering iron

## Disclaimer

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