

## TF-FUSE® Thin Film Surface Mount Fuses

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



#### Features:

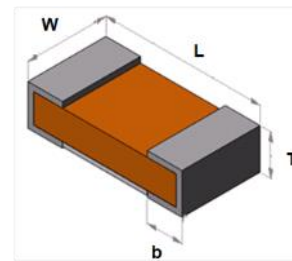
- Very fast acting
- Low DCR
- High inrush current withstanding capability
- Fiberglass enforced epoxy fuse body
- Copper termination with nickel and tin plating
- Halogen free, RoHS compliance and lead-free

#### 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		:		
T0402FF0375TM	0.375	35		...		
T0402FF0500TM	0.50	35		I		
T0402FF0750TM	0.75	35		-		
T0402FF1000TM	1.00	35		+		
T0402FF1250TM	1.25	35		x		
T0402FF1500TM	1.50	35				
T0402FF1750TM	1.75	35		=		
T0402FF2000TM	2.00	35		=		
T0402FF2500TM	2.50	35		H		
T0402FF3000TM	3.00	35		III		
T0402FF3500TM	3.50	35		III		
T0402FF4000TM	4.00	35		□		
T0402FF5000TM	5.00	35		○		

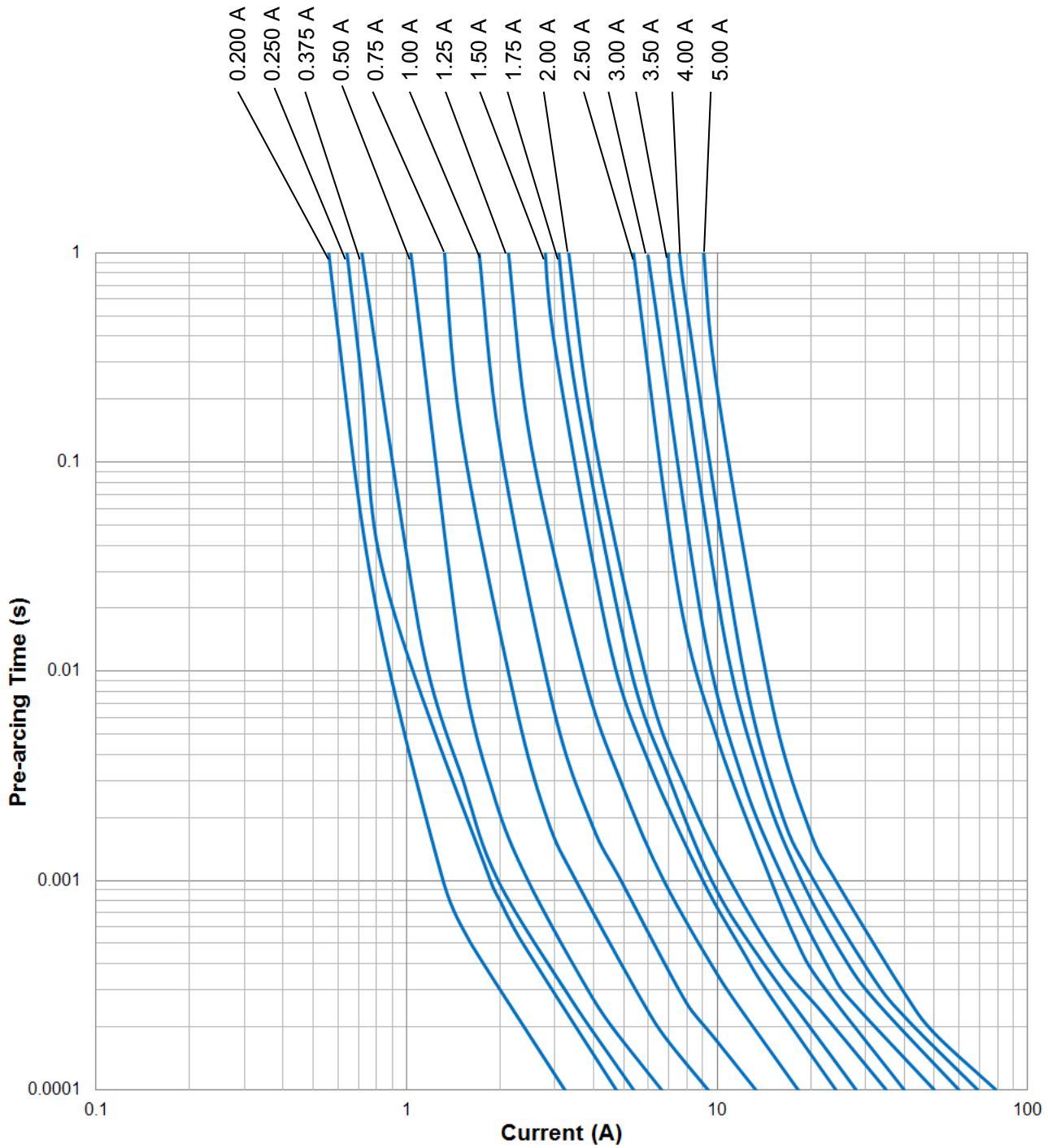
<sup>1</sup> Measured at  $\leq 10\%$  of rated current and 25°C ambient.

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

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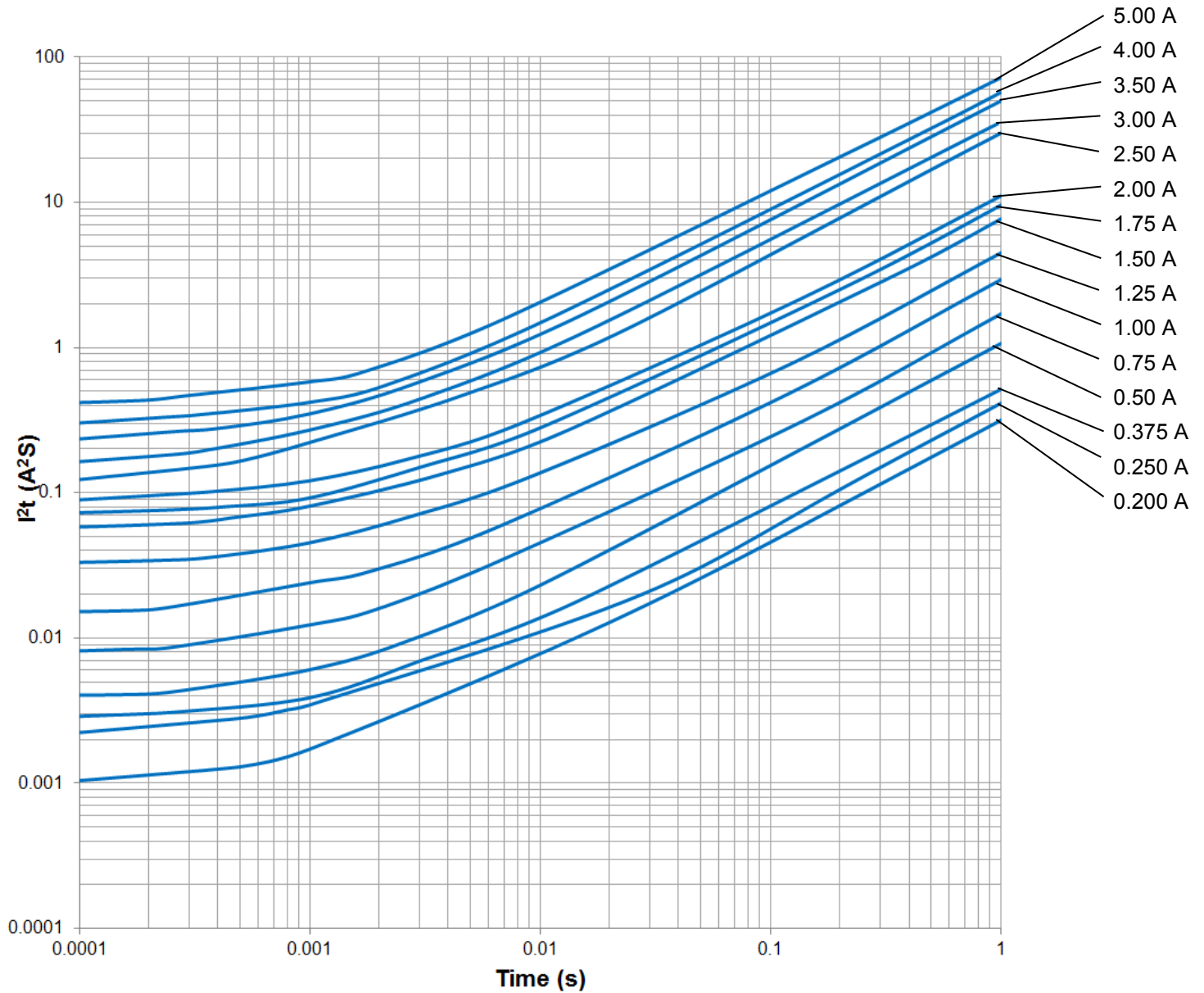
### Average Pre-arcing Time Curves:



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### Average $I^2t$ 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
- (6) **Marking Code:** M—With mark (optional)

### Environmental Tests:

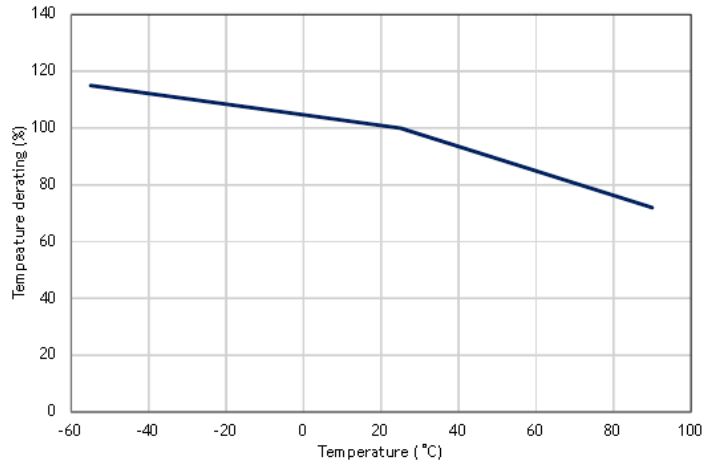
No.	Test item	Requirement	Test condition	Reference
1	Bending	≤1A: 10% DCR change max. >1A: 20% DCR change max.	2mm	Refer to AEM QIQ034
2	Solderability	95% coverage min.	One dip at 255°C for 5 seconds	MIL-STD-202 Method 208
3	Thermal shock	DCR change within ±10% No mechanical damage	100 cycles between -55°C and +125°C	MIL-STD-202 Method 107
4	Moisture resistance	DCR change within ±10% No excessive corrosion	10 cycles	MIL-STD-202 Method 106
5	Salt spray	DCR change within ≤ ±10% No excessive corrosion	5% salt solution, 48 hour exposure	MIL-STD-202 Method 101
6	Mechanical vibration	DCR change within ≤ ±10% No mechanical damage	0.4" D.A. or 30G between 5 and 3000 Hz	MIL-STD-202 Method 204
7	Mechanical shock	DCR change within ≤ ±10% No mechanical damage	1500G, 0.5 ms, half sine shocks	MIL-STD-202 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

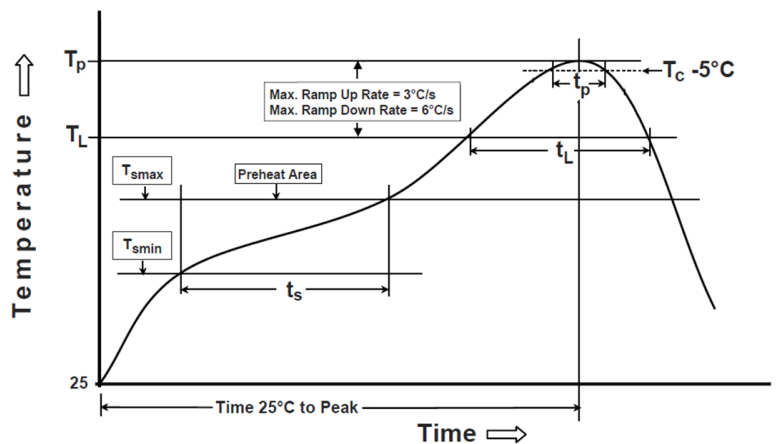
## TF-FUSE® Thin Film Surface Mount Fuses

### Temperature Effect on Current Rating:



### Recommended Reflow Soldering Profile:

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

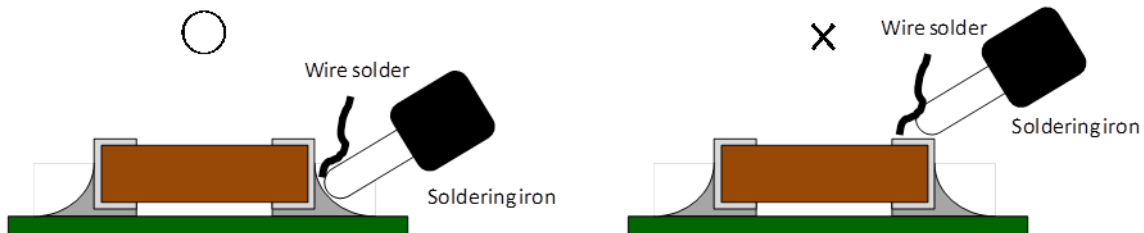


Fig 3 Correct handling method of soldering iron

## Disclaimer

*Specifications are subject to change without notice. AEM products are designed for specific applications and should not be used for any purpose (including, without limitation, automotive, aerospace, medical, life-saving applications, or any other application which requires especially high reliability for the prevention of such defect as may directly cause damage to the third party's life, body or property) not expressly set forth in applicable AEM product documentation. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Warranties granted by AEM shall be deemed void for products used for any purpose not expressly set forth in applicable AEM product documentation. AEM shall not be liable for any claims or damages arising out of products used in applications not expressly intended by AEM as set forth in applicable AEM product documentation. The sale and use of AEM products is subject to AEM terms and conditions of sale. Please refer to AEM's website for updated catalog and terms and conditions of sale.*