

## TF-FUSE® Thin Film Surface Mount Fuses

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



#### Features:

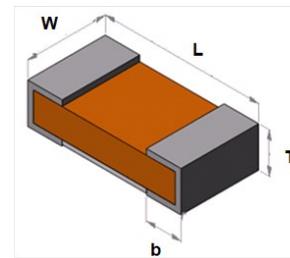
- Very fast acting
- Low DCR
- High inrush current withstanding capability
- Fiberglass enforced epoxy fuse body
- Copper termination with nickel and tin plating
- Halogen free, RoHS compliance and lead-free

#### 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	○

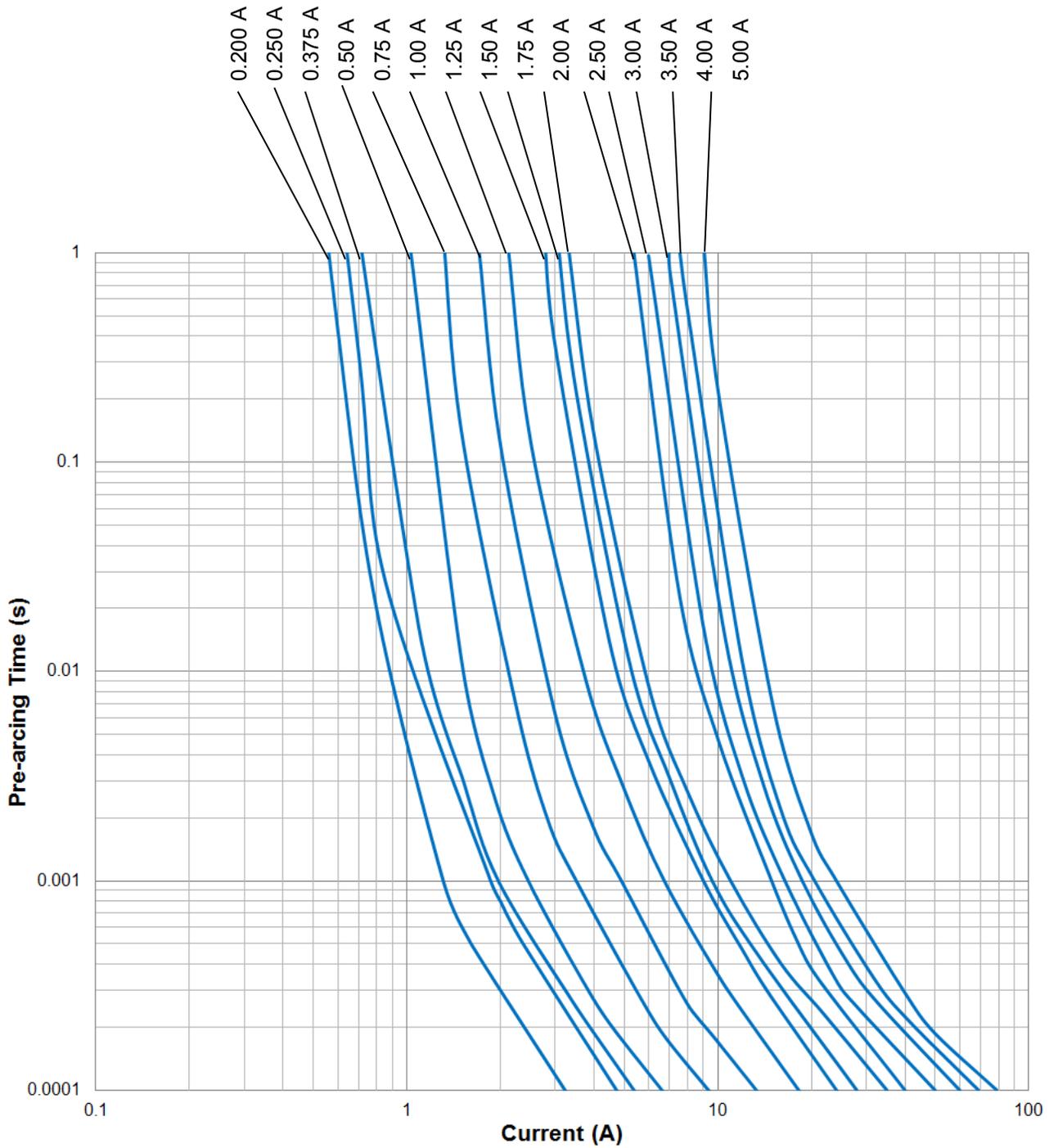
<sup>1</sup> Measured at  $\leq 10\%$  of rated current and 25°C ambient .

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

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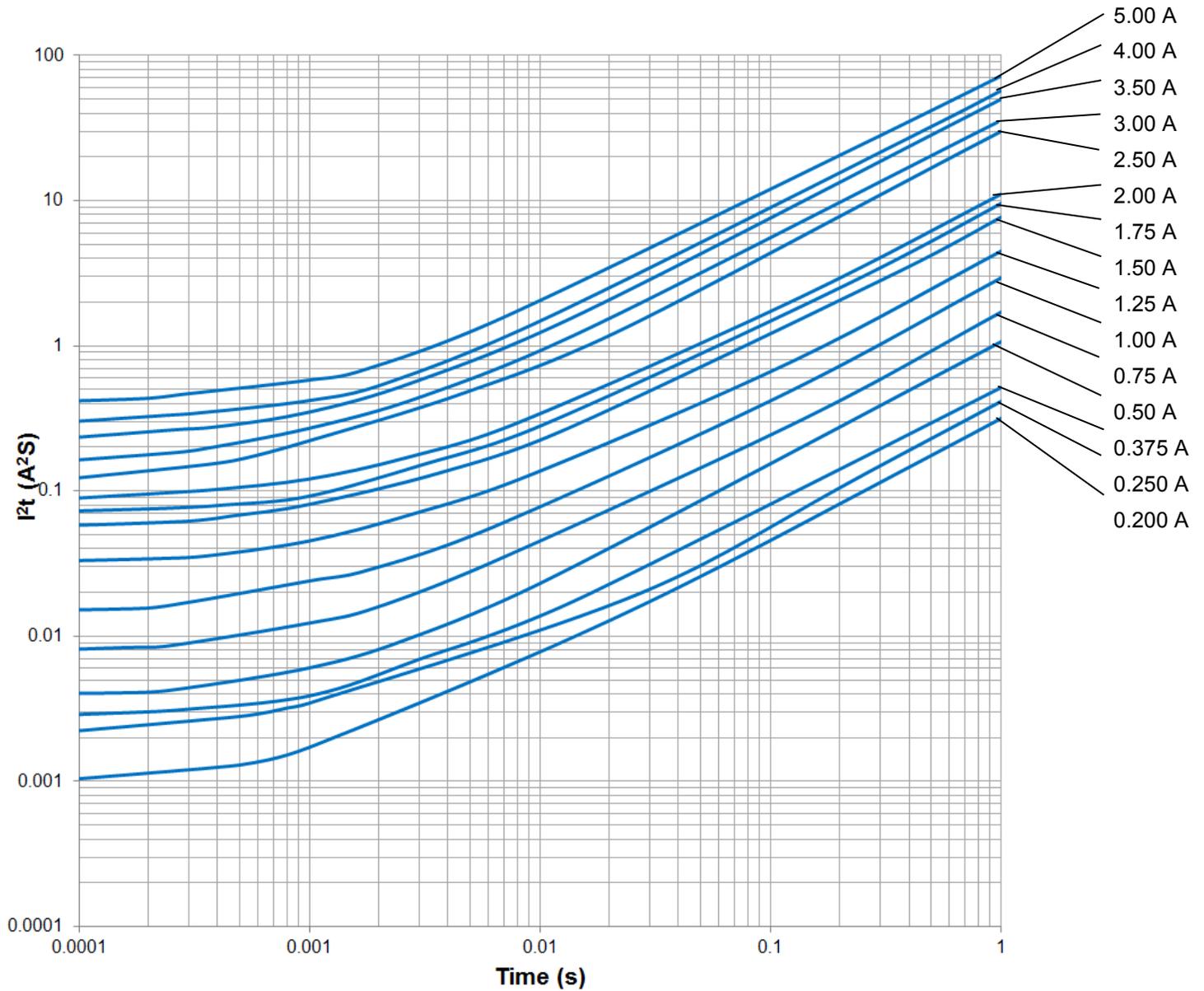
### Average Pre-arcing Time Curves:



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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

### Environmental Tests:

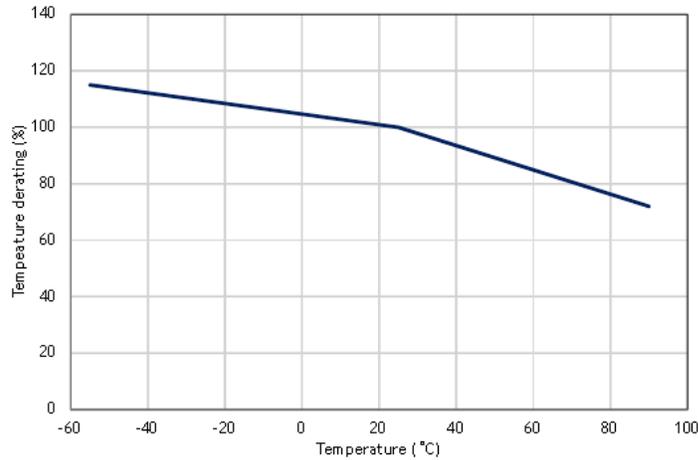
No.	Test item	Requirement	Test condition	Reference
1	Bending	≤1A: 10% DCR change max. >1A: 20% DCR change max.	2mm	Refer to AEM QIQ034
2	Solderability	95% coverage min.	One dip at 255°C for 5 seconds	MIL-STD-202 Method 208
3	Thermal shock	DCR change within ±10% No mechanical damage	100 cycles between -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

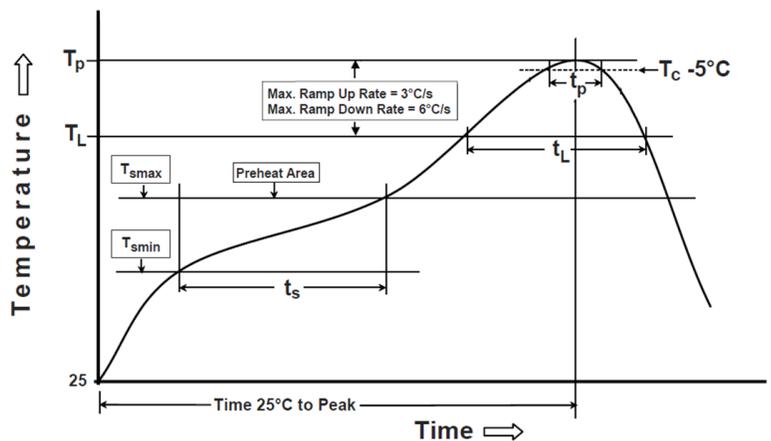
## TF-FUSE® Thin Film Surface Mount Fuses

### Temperature Effect on Current Rating:



### Recommended Reflow Soldering Profile:

Profile Feature	Pb-Free Assembly
<b>Preheat/Soak</b>	
Temperature Min ( $T_{smin}$ )	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

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