

## SolidMatrix® Surface Mount Fuses

### Product Identification:

#### **F 0603 FA 1000 V032 T M**

(1) (2) (3) (4) (5) (6) (7)

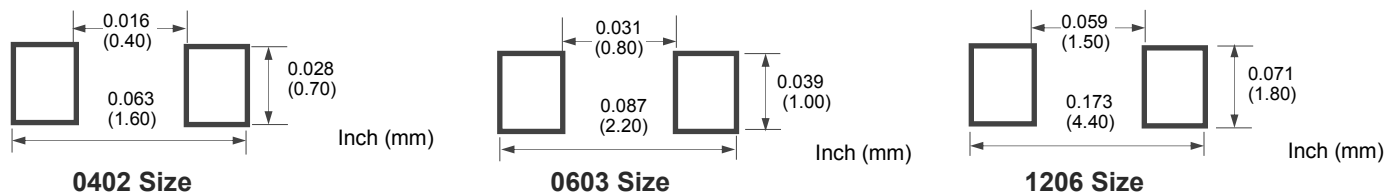
- (1) **Product Code:** F—Chip Fuse
- (2) **Size Code:** Standard EIA Chip Sizes
- (3) **Series Code:** FA - Fast Acting, SB - Slow Blow, HI - High Inrush, FF - Very Fast Acting, HB - High Current
- (4) **Current Rating Code:** 1000 - 1000 mA (For HB, 10 - 10A)
- (5) **Voltage Rating Code:** V032 - 32 VDC
- (6) **Package Code:** T - Tape & Reel, B - Bulk
- (7) **Marking Code:** M - With Marking

#### **F 1206 HC 20A0 T M**

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

- (1) **Product Code:** F—Chip Fuse
- (2) **Size Code:** L x W (inch), the first two digits-L (length), the last two digits-W (width)
- (3) **Series Code:** HC Series
- (4) **Current Rating Code:** 20A0—20.0A
- (5) **Package Code:** T - Tape & Reel, B - Bulk
- (6) **Marking Code:** M - With Marking

### Recommended Land Pattern:



### Environmental Tests:

No.	Test	Requirement	Test condition	Test reference
1	Soldering heat resistance	DCR change $\leq \pm 10\%$ No mechanical damage	One dip at 260°C for 60 seconds	MIL-STD-202 Method 210
2	Solderability	Minimum 95% coverage	One dip at 245°C for 5 seconds	MIL-STD-202 Method 208
3	Thermal shock	DCR change $\leq \pm 10\%$ No mechanical damage	100 cycles between -65°C and +125°C	MIL-STD-202 Method 107
4	Moisture resistance	DCR change $\leq \pm 15\%$ No excessive corrosion	10 cycles	MIL-STD-202 Method 106
5	Salt spray	DCR change $\leq \pm 10\%$ No excessive corrosion	48 hour exposure	MIL-STD-202 Method 101
6	Mechanical vibration	DCR change $\leq \pm 10\%$ No mechanical damage	0.4 " D.A. or 30 G between 5 – 3000 Hz	MIL-STD-202 Method 204
7	Mechanical shock	DCR change $\leq \pm 10\%$ No mechanical damage	1500 G, 0.5 ms, half-sine shocks	MIL-STD-202 Method 213
8	Life	No electrical "opens" during testing voltage drop change shall be less than $\pm 20\%$ of initial value	80% rated current (75% for < 1 A fuses) for 2000 hours at ambient temperature between +20°C and +30°C	Refer to AEM QIQ106

## SolidMatrix® Surface Mount Fuses

### Electrical Specification:

**Clearing Time Characteristics:**

Same as specified on the Short Form Data Sheet

**Insulation Resistance after Opening:**

20,000 ohms typical when cleared with rated voltage applied. Fuse clearing under low voltage conditions may result in lower after clearing insulation resistance values. (Note: Under normal fault conditions (low or rated voltage conditions), AEM SolidMatrix fuses provide sufficient after clearing insulation resistance values for circuit protection.)

**Current Carrying Capacity:**

100% rated current at +25°C ambient for 4 hours minimum when evaluated per MIL-PRF-23419

**Interrupt Ratings:**

Same as specified in this catalog.

### Fuse Selection and Temperature De-rating Guideline:

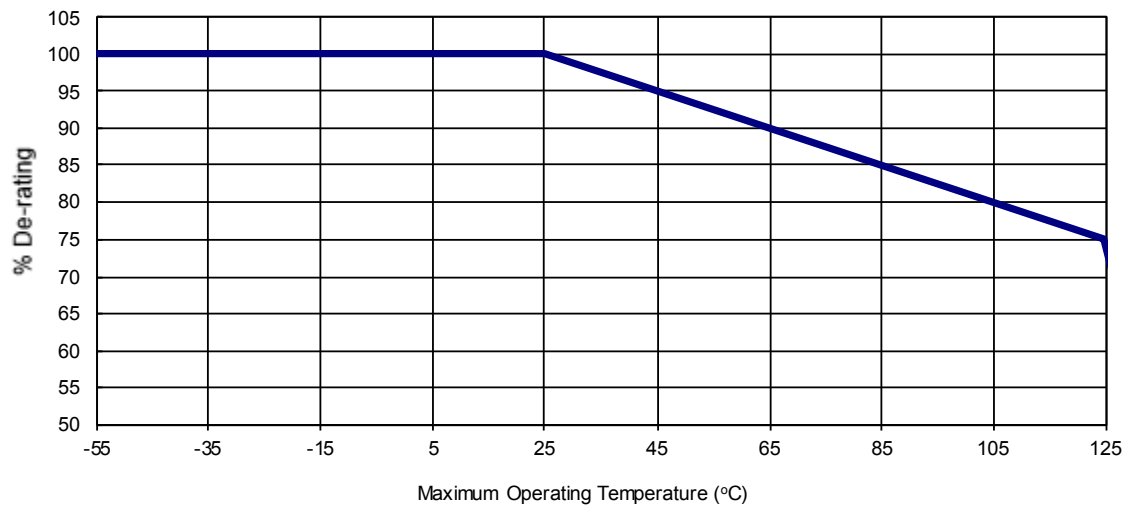
The ambient temperature affects the current carrying capacity of fuses. When a fuse is operating at a temperature higher than 25°C, the fuse shall be “de-rated”.

To select a fuse from the catalog, the following rule may be followed:

Catalog Fuse Current Rating = Nominal Operating Current / 0.75 / % De-rating at the maximum operating temperature.

Example: At maximum operating temperature of 65°C, % De-rating is 90%. The nominal operating current is 4 A. The current rating for fuse selected from the catalog shall be:  $4 / 0.75 / 90\% = 5.9$  or 6 A. Specifications and descriptions in this literature are as accurate as known at the time of publish, but are subject to change without notice.

**Temperature Effect on Current Rating**



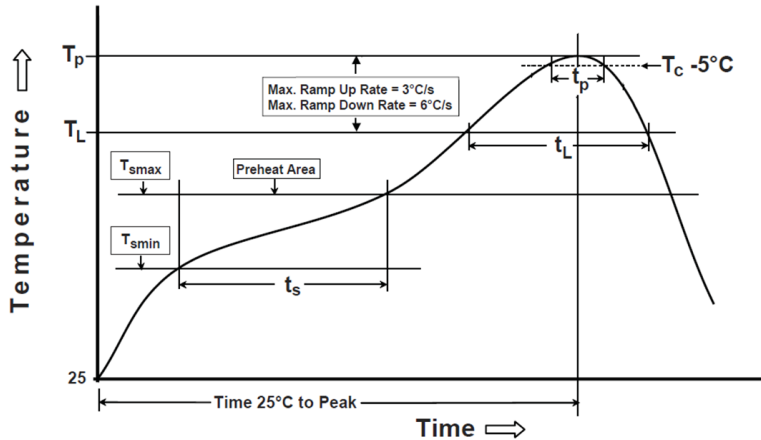
### Packaging:

Chip Size	Parts on 7 inch (178 mm) Reel
0402 (1005)	10,000
0603 (1608)	4,000
0603FF (1608)	6,000
1206 (3216)	3,000

## SolidMatrix® Surface Mount Fuses

### Soldering Temperature Profile:

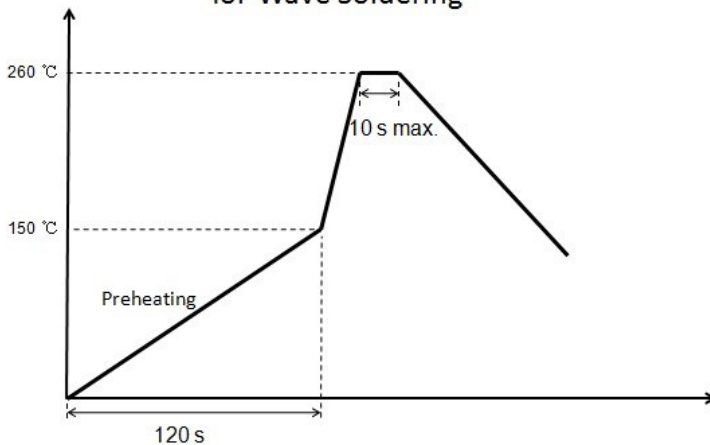
\* Recommended Temperature Profile for Reflow Soldering



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	

\* Recommended Temperature Profile for Wave Soldering

### Recommended Temperature Profile for Wave Soldering



Notice: Wave Soldering is suitable for 1206 and 0603 size.

### 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.

## SolidMatrix<sup>®</sup> Surface Mount Fuses

### FA Series (Fast Acting), 0402 Size



#### Features:

- Multilayer monolithic structure with glass ceramic body and silver fusing element
- Silver termination with nickel and pure-tin solder plating, providing excellent solderability
- Compatible with both wave and reflow soldering processes
- Operating temperature range: -55°C to +125°C (with de-rating)

#### Clearing Time Characteristics:

% of current rating	Clearing time at 25°C
100%	4 hours min.
250%	5 seconds max.
400%	0.05 seconds max.

#### Shape and Dimensions:

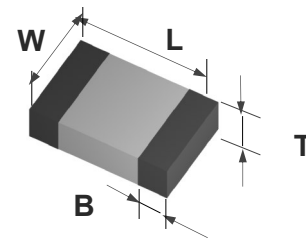
Unit	Inch	mm
L	0.039 ± 0.004	1.00 ± 0.10
W	0.020 ± 0.004	0.51 ± 0.10
T	0.020 ± 0.004	0.51 ± 0.10
B	0.010 ± 0.004	0.25 ± 0.10

#### Agency Approval:

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

#### Patents:

Patent numbers "US6,034,589", "US6,602,766", "US7,268,661 B2", "ZL00134544.3", "ZL02114719.1", "ZL200410104280.7", "ZL201020551360.8", "ZL201010299185.2", "ZL201220030614.0", "ZL201210020693.1".



#### Ordering Information:

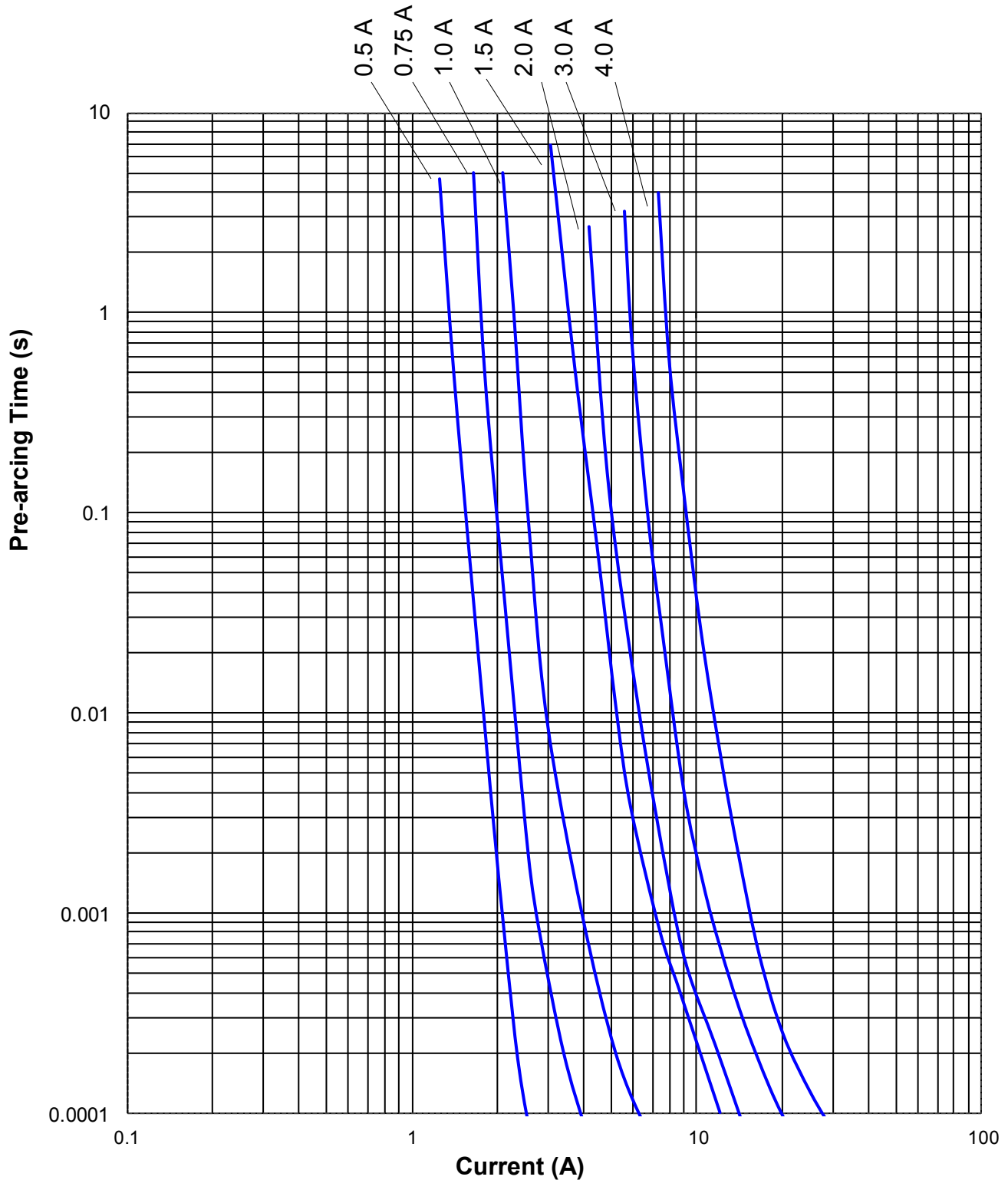
Part Number	Current Rating (A)	Voltage Rating (VDC)	Interrupting Ratings	Nominal Cold DCR ( $\Omega$ ) <sup>1</sup>	Nominal $I^2t$ ( $A^2s$ ) <sup>2</sup>
F0402FA0500V024T	0.5	24	35 A at rated voltage	0.380	0.004
F0402FA0750V024T	0.75	24		0.210	0.007
F0402FA1000V024T	1.0	24		0.120	0.014
F0402FA1500V024T	1.5	24		0.056	0.050
F0402FA2000V024T	2.0	24		0.035	0.070
F0402FA3000V024T	3.0	24		0.021	0.11
F0402FA4000V024T	4.0	24		0.014	0.21

1. Measured at  $\leq 10\%$  rated current and 25°C ambient.  
2. Melting  $I^2t$  at 0.001 second pre-arcing time.

# SolidMatrix<sup>®</sup> Surface Mount Fuses

## FA Series (Fast Acting), 0402 Size

### Average Pre-arcing Time Curves:



# SolidMatrix<sup>®</sup> Surface Mount Fuses

## FA Series (Fast Acting), 0402 Size

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

