

## SolidMatrix® Surface Mount Fuses

### SB Series (Slow Blow), 0603 Size



#### Features:

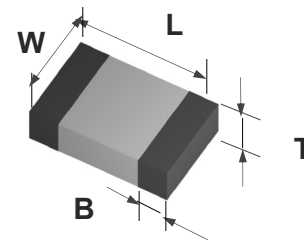
- High inrush current withstanding capability
- Ceramic Monolithic structure
- Silver fusing element and silver termination with nickel and tin plating
- Symmetrical design with marking on both sides (optional)
- Operating temperature range: -55°C to +150°C (with de-rating)

#### Clearing Time Characteristics:

% of Current Rating	Clearing time at 25°C	
	4 hours min.	120 seconds max.
100%	4 hours min.	
200%	1 second min.	120 seconds max.
300%	0.1 seconds min.	3 seconds max.
800% (1 A - 1.5 A)	0.0005 seconds min.	0.05 seconds max.
800% (2 A - 8 A)	0.001 seconds min.	0.05 seconds max.

#### Shape and Dimensions:

Unit	Inch	mm
L	0.063 ± 0.006	1.60 ± 0.15
W	0.031 ± 0.006	0.80 ± 0.15
T	0.031 ± 0.006	0.80 ± 0.15
B	0.014 ± 0.006	0.36 ± 0.15



#### 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", "ZL201020551352.3", "ZL201020551360.8", "ZL201010299185.2", "ZL201220030614.0", "ZL201210020693.1.

#### Ordering Information:

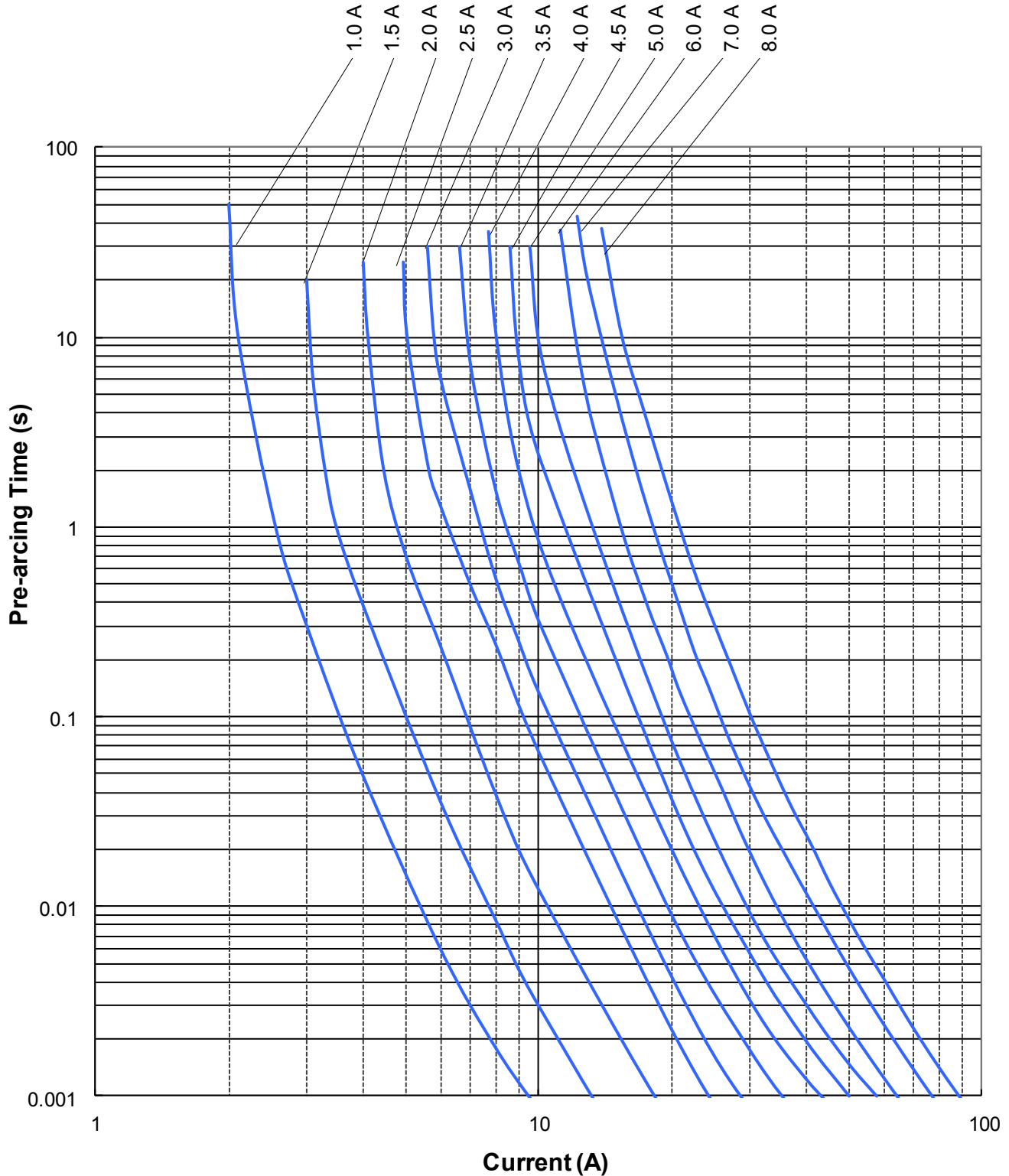
Part Number	Current Rating (A)	Voltage Rating (VDC)	Interrupting Ratings	Nominal Cold DCR(Ω) <sup>1</sup>	Nominal I <sup>2</sup> t (A <sup>2</sup> s) <sup>2</sup>	Marking (Optional) <sup>3</sup>
F0603SB1000V032TM	1.0	32	50 A at rated voltage	0.200	0.093	E
F0603SB1500V032TM	1.5	32		0.100	0.18	G
F0603SB2000V032TM	2.0	32		0.052	0.32	I
F0603SB2500V032TM	2.5	32		0.041	0.63	J
F0603SB3000V032TM	3.0	32		0.031	0.87	K
F0603SB3500V032TM	3.5	32		0.021	1.20	L
F0603SB4000V032TM	4.0	32		0.017	2.30	M
F0603SB4500V032TM	4.5	32		0.015	2.70	T
F0603SB5000V032TM	5.0	32		0.013	3.20	N
F0603SB6000V032TM	6.0	32		80 A at rated voltage	0.010	4.00
F0603SB7000V032TM	7.0	32	0.008		5.00	P
F0603SB8000V032TM	8.0	32	0.006		7.00	R

1. Measured at ≤ 10% rated current and 25°C ambient. 2. Melting I<sup>2</sup>t at 0.001 second pre-arcing time. 3. Red Marking Character Code.

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

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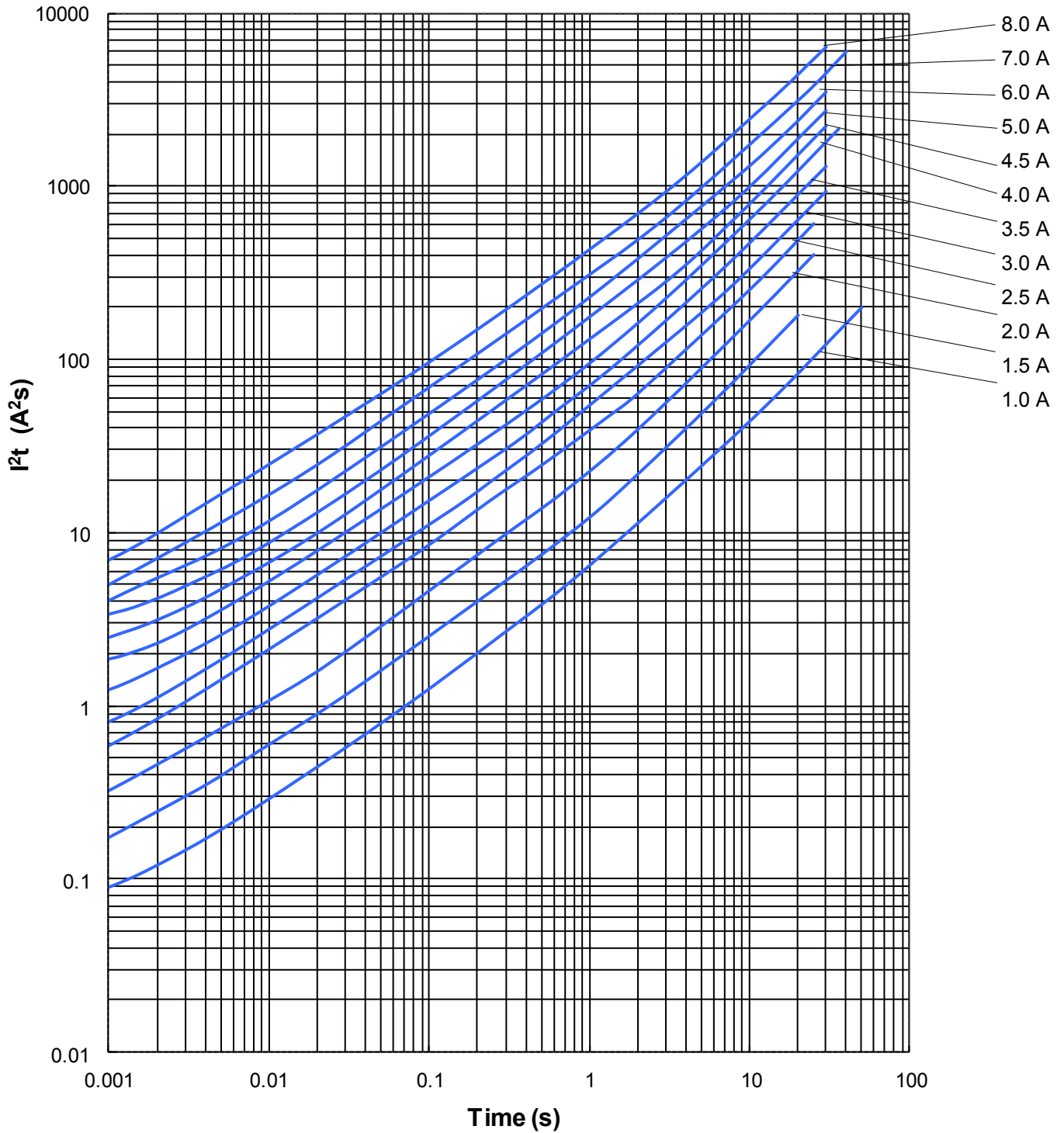
### Average Pre-arcing Time Curves:



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



## SolidMatrix® Surface Mount Fuses

### Product Identification:

#### F 0603 FA 1000 V032 T M

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

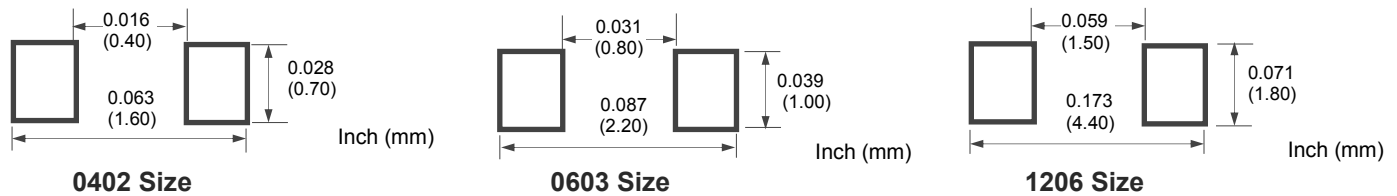
- (1) **Product Code:** F—Chip Fuse
- (2) **Size Code:** Standard EIA Chip Sizes
- (3) **Series Code:** FA - Fast Acting, SB - Slow Blow, HI - High Inrush, FF - Very Fast Acting, HB - High Current
- (4) **Current Rating Code:** 1000 - 1000 mA (For HB, 10 - 10A)
- (5) **Voltage Rating Code:** V032 - 32 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

### 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:**

### 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 De-Rating Curve for SolidMatrix Fuses



## SolidMatrix® Surface Mount Fuses

### Soldering Temperature Profile:

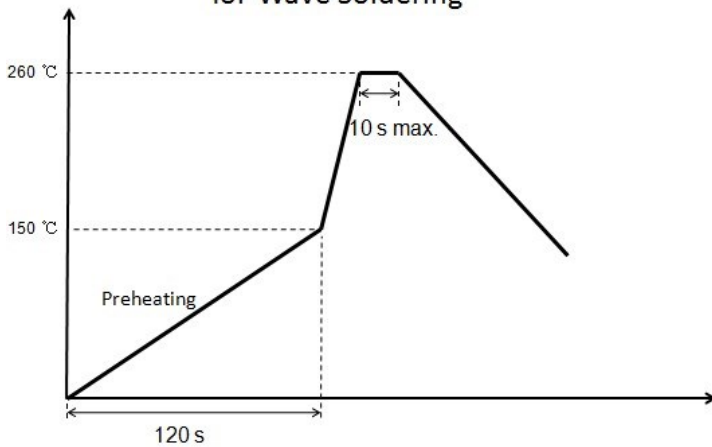
\* Recommended Temperature Profile for Reflow Soldering



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.

### 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

## Disclaimer

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