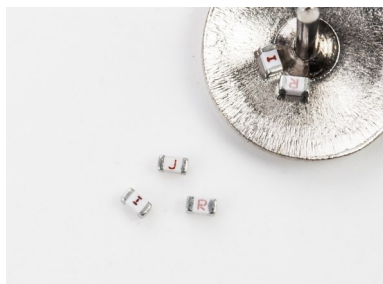


## SolidMatrix® Surface Mount Fuses

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



#### Features:

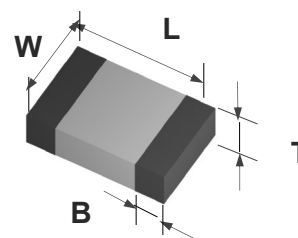
- High inrush current withstanding capability
- Ceramic Monolithic structure
- Silver fusing element and silver termination with nickel and tin plating
- Symmetrical design with marking on both sides (optional)
- Operating temperature range: -55°C to +150°C (with de-rating)

#### Clearing Time Characteristics:

| % of Current Rating | Clearing time at 25°C |                   |
|---------------------|-----------------------|-------------------|
| 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                                                     | O                               |
| F0603SB7000V032TM | 7.0                | 32                   |                       | 0.008                            | 5.00                                                     | P                               |
| F0603SB8000V032TM | 8.0                | 32                   |                       | 0.006                            | 7.00                                                     | R                               |

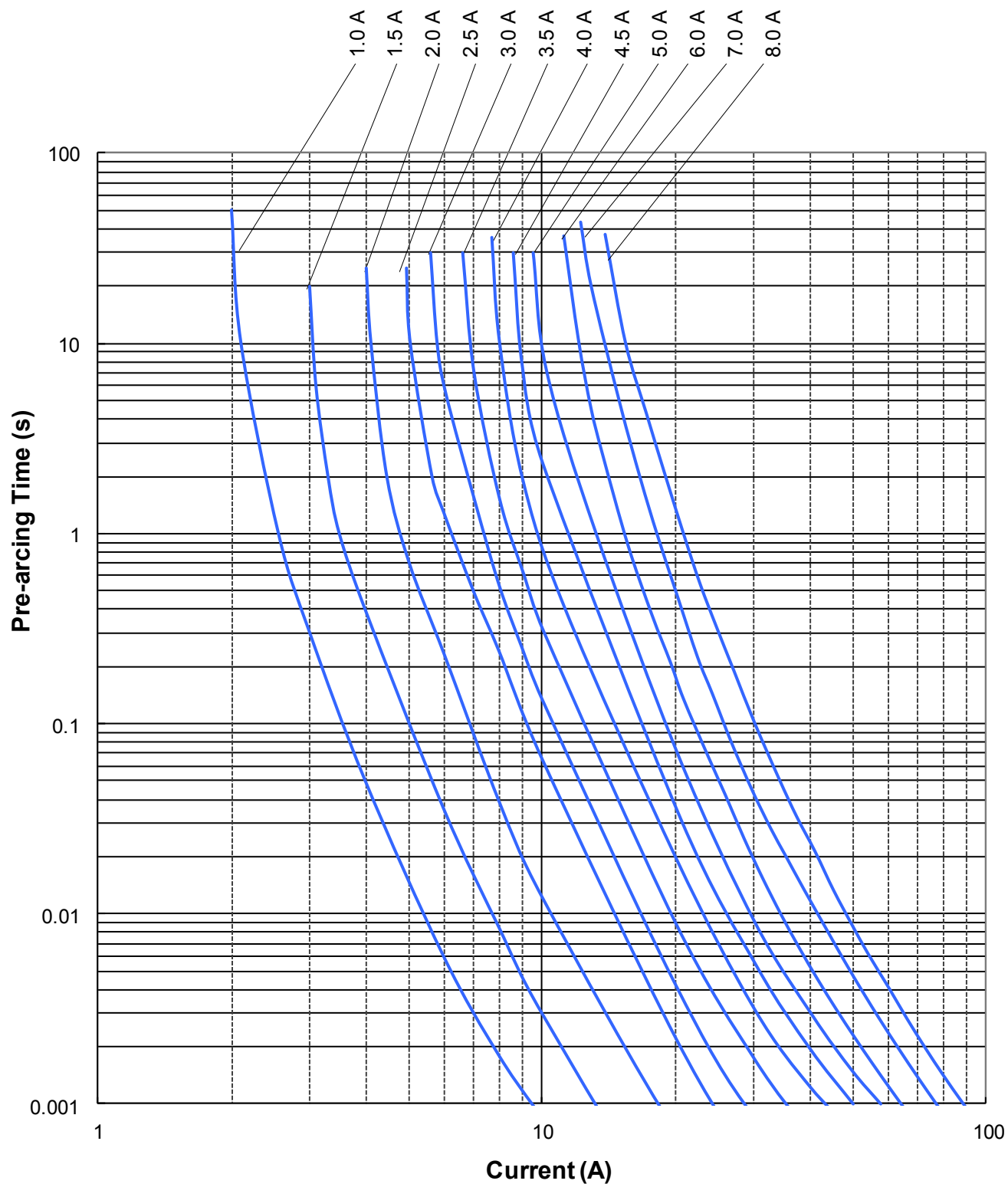
1. Measured at ≤ 10% rated current and 25°C ambient.

2. Melting I<sup>2</sup>t at 0.001 second pre-arcing time.

3. Red Marking Character Code.

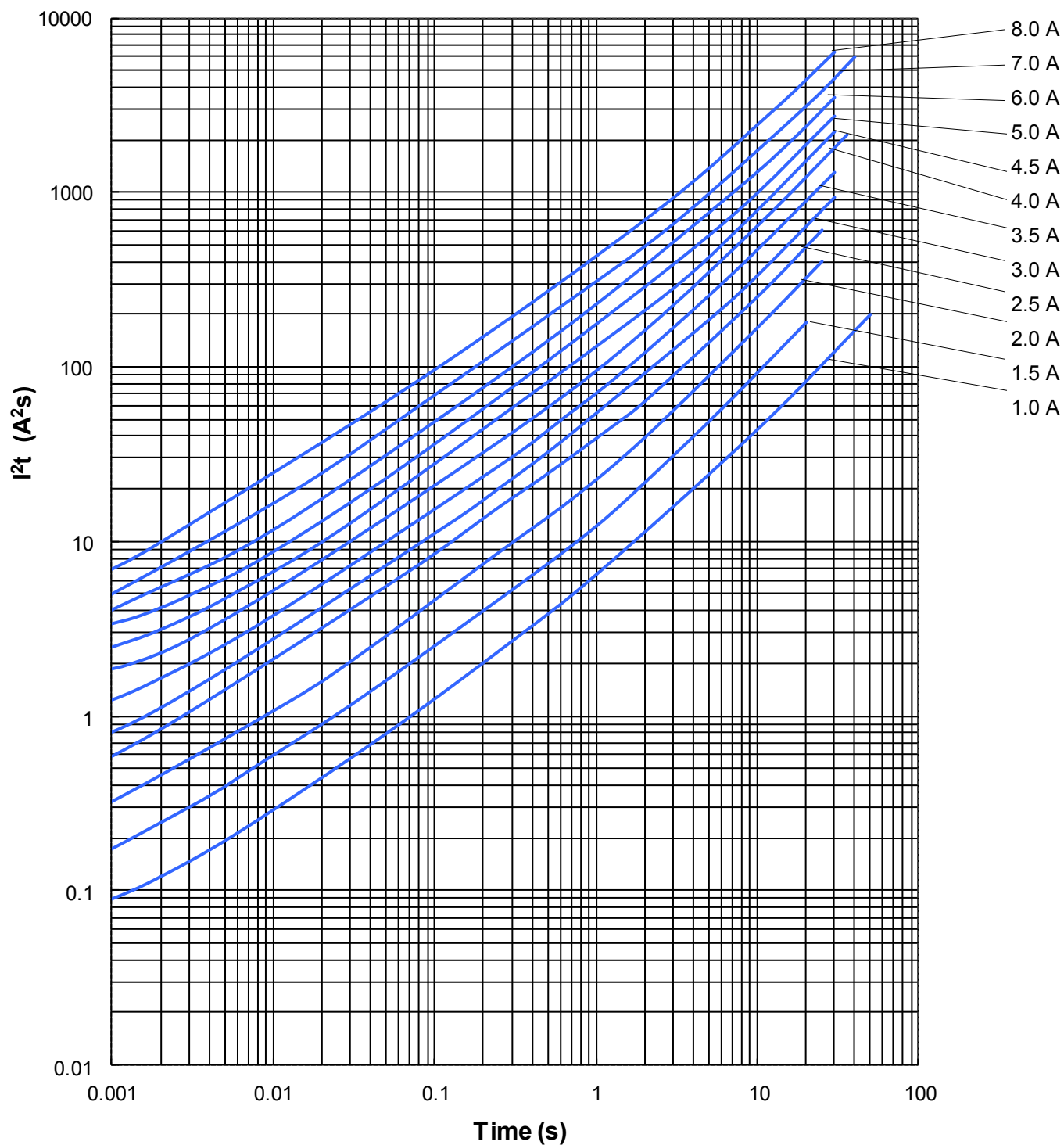
# SolidMatrix® Surface Mount Fuses SB Series (Slow Blow), 0603 Size

## Average Pre-arcing Time Curves:



# SolidMatrix<sup>®</sup> Surface Mount Fuses SB Series (Slow Blow), 0603 Size

## 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)

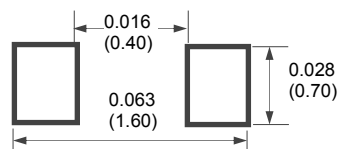
- (1) **Product Code:** F—Chip Fuse
- (2) **Size Code:** Standard EIA Chip Sizes
- (3) **Series Code:** FA - Fast Acting, SB - Slow Blow, HI - High Inrush, FF - Very Fast Acting, HB - High Current
- (4) **Current Rating Code:** 1000 - 1000 mA (For HB, 10 - 10A)
- (5) **Voltage Rating Code:** V032 - 32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

**F 1206 HC 20A0 T M**

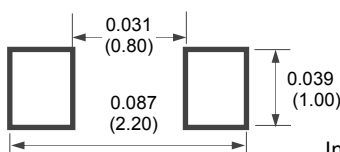
(1) (2) (3) (4) (5) (6)

- (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

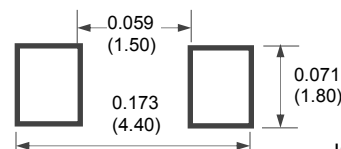
### Recommended Land Pattern:



**0402 Size**



**0603 Size**



**1206 Size**

### Environmental Tests:

| No. | Test                      | Requirement                                                                                                | Test condition                                                                                          | Test reference            |
|-----|---------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|---------------------------|
| 1   | Soldering heat resistance | DCR change $\leq \pm 10\%$<br>No mechanical damage                                                         | One dip at 260°C for 60 seconds                                                                         | MIL-STD-202<br>Method 210 |
| 2   | Solderability             | Minimum 95% coverage                                                                                       | One dip at 245°C for 5 seconds                                                                          | MIL-STD-202<br>Method 208 |
| 3   | Thermal shock             | DCR change $\leq \pm 10\%$<br>No mechanical damage                                                         | 100 cycles between -65°C and +125°C                                                                     | MIL-STD-202<br>Method 107 |
| 4   | Moisture resistance       | DCR change $\leq \pm 15\%$<br>No excessive corrosion                                                       | 10 cycles                                                                                               | MIL-STD-202<br>Method 106 |
| 5   | Salt spray                | DCR change $\leq \pm 10\%$<br>No excessive corrosion                                                       | 48 hour exposure                                                                                        | MIL-STD-202<br>Method 101 |
| 6   | Mechanical vibration      | DCR change $\leq \pm 10\%$<br>No mechanical damage                                                         | 0.4 " D.A. or 30 G between 5 – 3000 Hz                                                                  | MIL-STD-202<br>Method 204 |
| 7   | Mechanical shock          | DCR change $\leq \pm 10\%$<br>No mechanical damage                                                         | 1500 G, 0.5 ms, half-sine shocks                                                                        | MIL-STD-202<br>Method 213 |
| 8   | Life                      | No electrical "opens" during testing<br>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<br>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:

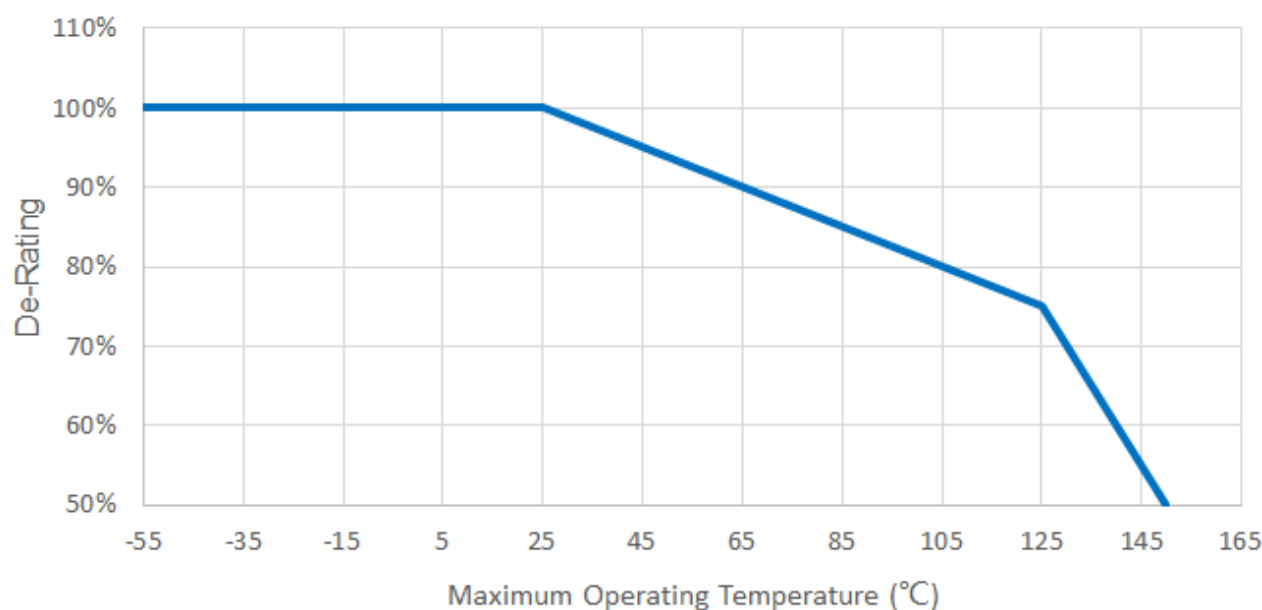
The ambient temperature affects the current carrying capacity of fuses. When a fuse is operating at a temperature higher than 25°C, the fuse shall be “de-rated”.

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.

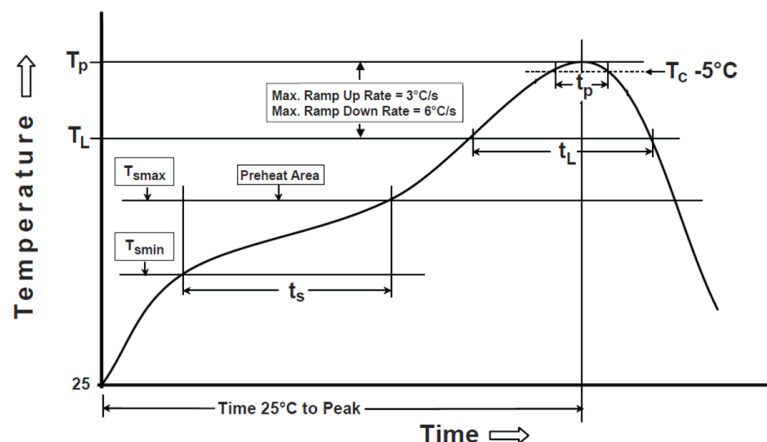
Temperature De-Rating Curve for SolidMatrix Fuses



## SolidMatrix® Surface Mount Fuses

### Soldering Temperature Profile:

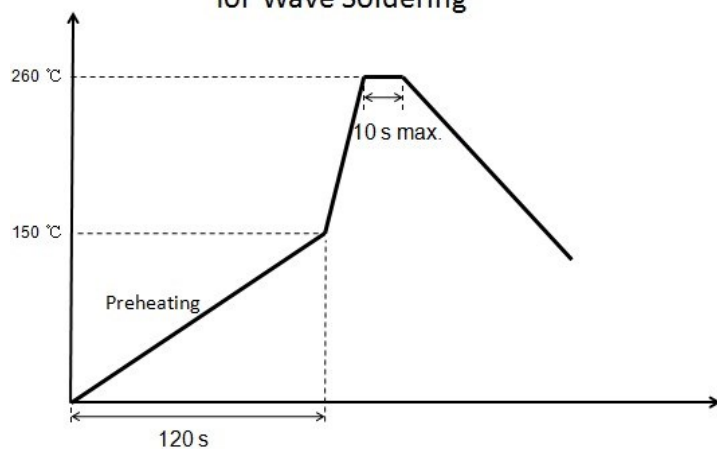
\* Recommended Temperature Profile for Reflow Soldering



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

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