

**Surface Mountable PTC Resettable Fuse: FSMD0603 Series****1. Summary**

- (a) **RoHS Compliant & Halogen Free**
- (b) **Applications: All high-density boards**
- (c) **Product Features: Small surface mountable, Solid state, Faster time to trip than standard SMD devices, Lower resistance than standard SMD devices**
- (d) **Operation Current: 10mA~200mA**
- (e) **Maximum Voltage: 9VDC~60VDC**
- (f) **Temperature Range : -40°C to 85°C**

**2. Agency Recognition**

UL: \*File No. E211981

C-UL: \*File No. E211981

TÜV: \*File No. R50090556

\*Note: FSMD001-0603-R~FSMD004-0603-R UL,C-UL and TÜV Pending.

**3. Electrical Characteristics (23°C)**

| Part Number    | Hold Current       | Trip Current       | Rated Voltage          | Max Current          | Typical Power | Max Time to Trip |      | Resistance       |                   |
|----------------|--------------------|--------------------|------------------------|----------------------|---------------|------------------|------|------------------|-------------------|
|                | I <sub>H</sub> , A | I <sub>T</sub> , A | V <sub>MAX</sub> , VDC | I <sub>MAX</sub> , A | Pd, W         | Current          | Time | R <sub>MIN</sub> | R <sub>1MAX</sub> |
|                |                    |                    |                        |                      |               | A                | Sec  | Ohms             | Ohms              |
| FSMD001-0603-R | 0.01               | 0.03               | 60                     | 40                   | 0.5           | 0.20             | 1.00 | 15.00            | 100.00            |
| FSMD002-0603-R | 0.02               | 0.06               | 60                     | 40                   | 0.5           | 0.20             | 1.00 | 12.00            | 70.00             |
| FSMD003-0603-R | 0.03               | 0.09               | 30                     | 40                   | 0.5           | 0.20             | 1.00 | 6.00             | 50.00             |
| FSMD004-0603-R | 0.04               | 0.12               | 24                     | 40                   | 0.5           | 0.20             | 1.00 | 4.00             | 40.00             |
| FSMD005-0603-R | 0.05               | 0.15               | 15                     | 40                   | 0.5           | 0.50             | 0.10 | 3.80             | 30.00             |
| FSMD010-0603-R | 0.10               | 0.25               | 15                     | 40                   | 0.5           | 0.70             | 0.10 | 0.90             | 8.00              |
| FSMD012-0603-R | 0.12               | 0.30               | 9                      | 40                   | 0.5           | 0.80             | 0.10 | 1.10             | 5.80              |
| FSMD016-0603-R | 0.16               | 0.40               | 9                      | 40                   | 0.5           | 1.00             | 0.10 | 1.00             | 4.20              |
| FSMD020-0603-R | 0.20               | 0.45               | 9                      | 40                   | 0.5           | 2.00             | 0.10 | 0.55             | 3.50              |

I<sub>H</sub>=Hold current-maximum current at which the device will not trip at 23°C still air.I<sub>T</sub>=Trip current-minimum current at which the device will always trip at 23°C still air.V<sub>MAX</sub>=Maximum voltage device can withstand without damage at it rated current.(I<sub>MAX</sub>)I<sub>MAX</sub>= Maximum fault current device can withstand without damage at rated voltage (V<sub>MAX</sub>).

Pd=Typical power dissipated-type amount of power dissipated by the device when in the tripped state in 23°C still air environment.

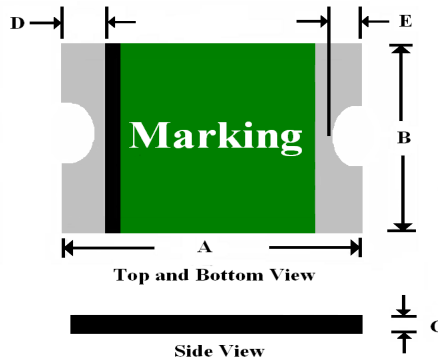
R<sub>MIN</sub>=Minimum device resistance at 23°C prior to tripping.R<sub>1MAX</sub>=Maximum device resistance at 23°C measured 1 hour after tripping or reflow soldering of 260°C for 20 seconds.

Termination pad characteristics

Termination pad materials: Pure Tin

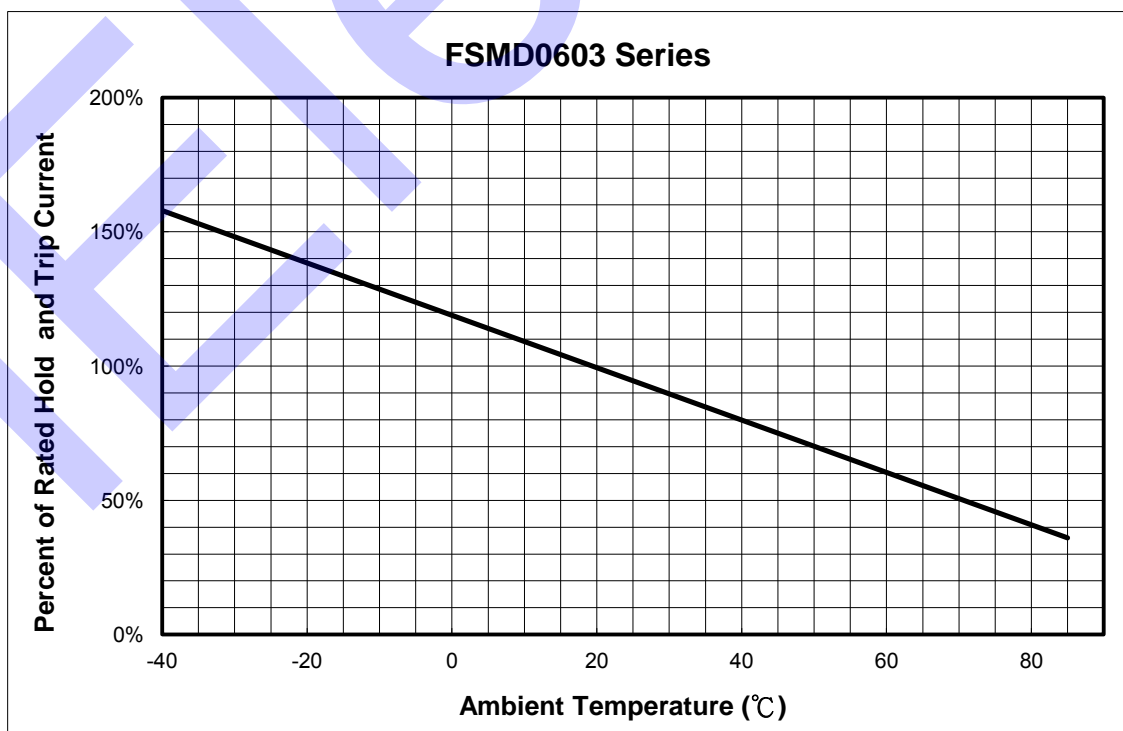


### 4. FSMD Product Dimensions (Millimeters)



| Part Number    | A    |      | B    |      | C    |      | D    |      | E    |      |
|----------------|------|------|------|------|------|------|------|------|------|------|
|                | Min  | Max  | Min  | Max  | Min  | Max  | Min  | Max  | Min  | Max  |
| FSMD001-0603-R | 1.40 | 1.80 | 0.45 | 1.00 | 0.35 | 0.85 | 0.10 | 0.50 | 0.08 | 0.40 |
| FSMD002-0603-R | 1.40 | 1.80 | 0.45 | 1.00 | 0.35 | 0.85 | 0.10 | 0.50 | 0.08 | 0.40 |
| FSMD003-0603-R | 1.40 | 1.80 | 0.45 | 1.00 | 0.35 | 0.75 | 0.10 | 0.50 | 0.08 | 0.40 |
| FSMD004-0603-R | 1.40 | 1.80 | 0.45 | 1.00 | 0.35 | 0.75 | 0.10 | 0.50 | 0.08 | 0.40 |
| FSMD005-0603-R | 1.40 | 1.80 | 0.45 | 1.00 | 0.35 | 0.75 | 0.10 | 0.50 | 0.08 | 0.40 |
| FSMD010-0603-R | 1.40 | 1.80 | 0.45 | 1.00 | 0.35 | 0.75 | 0.10 | 0.50 | 0.08 | 0.40 |
| FSMD012-0603-R | 1.40 | 1.80 | 0.45 | 1.00 | 0.35 | 0.75 | 0.10 | 0.50 | 0.08 | 0.40 |
| FSMD016-0603-R | 1.40 | 1.80 | 0.45 | 1.00 | 0.35 | 0.75 | 0.10 | 0.50 | 0.08 | 0.40 |
| FSMD020-0603-R | 1.40 | 1.80 | 0.45 | 1.00 | 0.35 | 0.75 | 0.10 | 0.50 | 0.08 | 0.40 |

### 5. Thermal Derating Curve

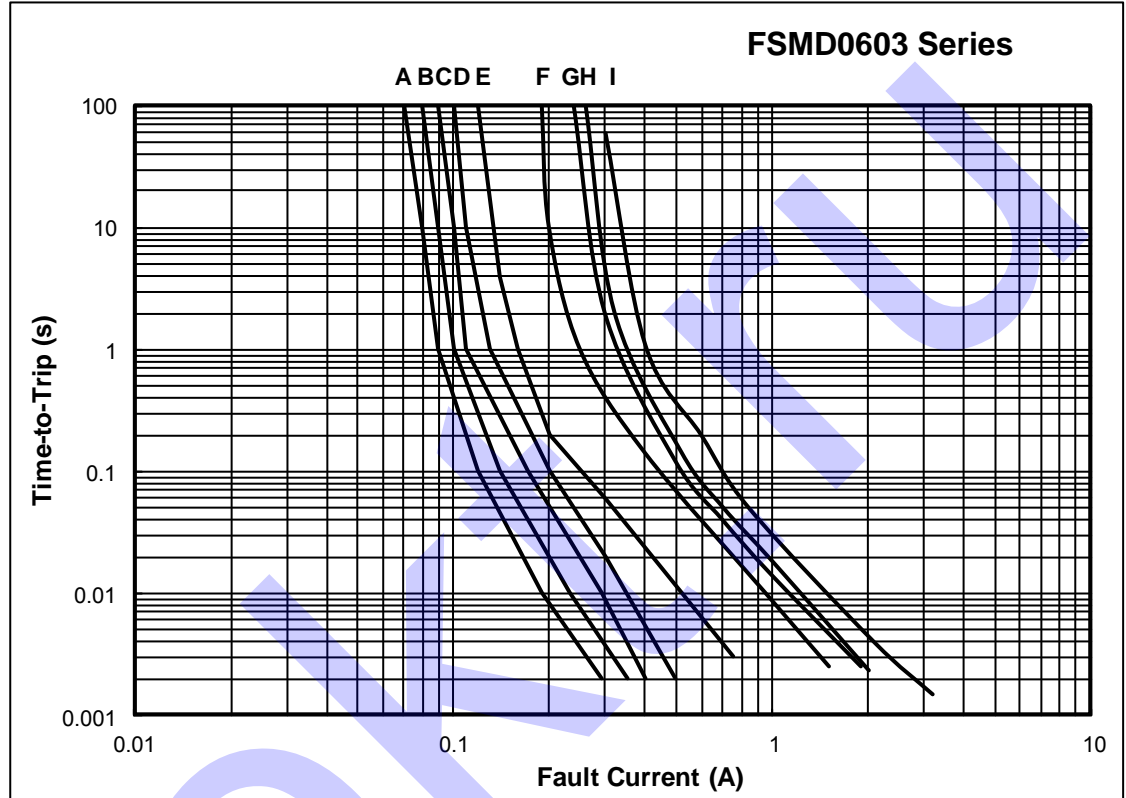


NOTE : Specification subject to change without notice.



### 6. Typical Time-To-Trip at 23°C

- A=FSMD001-0603-R
- B=FSMD002-0603-R
- C=FSMD003-0603-R
- D=FSMD004-0603-R
- E=FSMD005-0603-R
- F=FSMD010-0603-R
- G=FSMD012-0603-R
- H=FSMD016-0603-R
- I=FSMD020-0603-R



### 7. Material Specification

Terminal pad material: Pure Tin

Soldering characteristics: Meets EIA specification RS 186-9E, ANSI/J-std-002 Category 3

### 8. Part Numbering and Marking System

#### Part Numbering System

FSMD □ □ □ -0603-R

Current Rating

#### Part Marking System

D

Example

□

Part Identification

- X=FSMD001-0603-R
- Y=FSMD002-0603-R
- Z=FSMD003-0603-R
- A=FSMD004-0603-R
- B=FSMD005-0603-R
- D=FSMD010-0603-R
- E=FSMD012-0603-R
- F=FSMD016-0603-R
- G=FSMD020-0603-R

**Warning:** -Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.



-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.

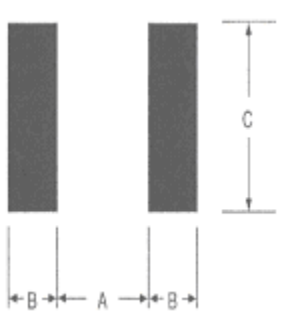
-Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance.

NOTE : Specification subject to change without notice.



### 9. Pad Layouts 、 Solder Reflow and Rework Recommendations

The dimension in the table below provide the recommended pad layout for each FSMD0603 device



| Pad dimensions (millimeters) |           |           |           |
|------------------------------|-----------|-----------|-----------|
| Device                       | A Nominal | B Nominal | C Nominal |
| FSMD0603 Series              | 0.80      | 0.60      | 0.80      |

| Profile Feature   | Pb-Free Assembly |
|---|------------------|
| Average Ramp-Up Rate (T <sub>smax</sub> to T <sub>p</sub> ) | 3 °C/second max. |
| Preheat :   |                  |
| Temperature Min (T <sub>smin</sub> )                        | 150 °C           |
| Temperature Max (T <sub>smax</sub> )                        | 200 °C           |
| Time (t <sub>smin</sub> to t <sub>smax</sub> )              | 60-180 seconds   |
| Time maintained above:                                      |                  |
| Temperature(T <sub>L</sub> )                                | 217 °C           |
| Time (t <sub>L</sub> )                                      | 60-150 seconds   |
| Peak/Classification Temperature(T <sub>p</sub> ) :          | 260 °C           |
| Time within 5°C of actual Peak :                            |                  |
| Temperature (t <sub>p</sub> )                               | 20-40 seconds    |
| Ramp-Down Rate :  | 6 °C/second max. |
| Time 25 °C to Peak Temperature :                            | 8 minutes max.   |

Note 1: All temperatures refer to of the package, measured on the package body surface.

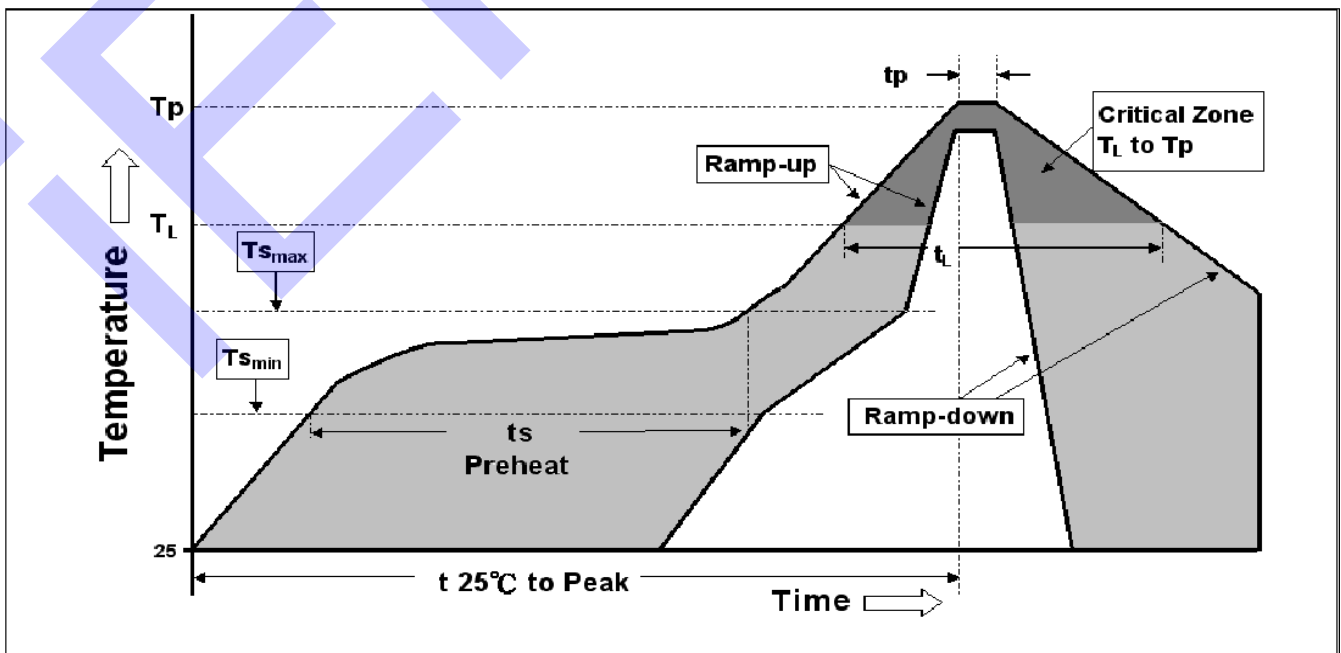
#### Solder reflow

- ※ Due to "Lead Free" nature, Temperature and Dwelling time for the soldering zone is higher than those for Regular. This may cause damage to other components.
- 1. Recommended max past thickness > 0.25mm.
- 2. Devices can be cleaned using standard methods and aqueous solvent.
- 3. Rework use standard industry practices.
- 4. Storage Environment : < 30°C / 60%RH

#### Caution:

- 1. If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.
- 2. Devices are not designed to be wave soldered to the bottom side of the board.

#### Reflow Profile



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