

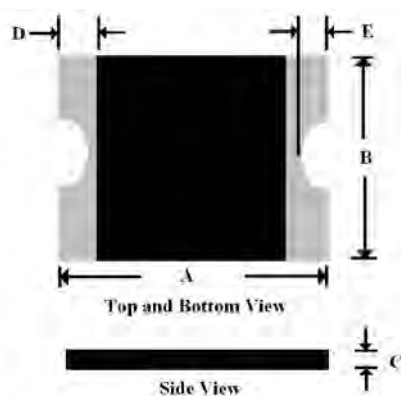
## Summary

- **RoHS Compliant & Halogen Free**
- **Applications:** All high-density boards
- **Product Features:** Small surface mountable Solid state, Faster time to trip than standard SMD devices, Lower resistance than standard SMD devices
- **Operation Current:** 0.10~0.50A
- **Maximum Voltage:** 6V
- **Temperature Range :** -40°C to 85°C

## Agency Recognition

UL: In Process  
C-UL: In Process  
TÜV: In Process

## TSMD Product Dimensions (Millimeters)



| Part Number    | A    |      | B    |      | C    |      | D    |      | E    |      |
|----------------|------|------|------|------|------|------|------|------|------|------|
|                | Min  | Max  | Min  | Max  | Min  | Max  | Min  | Max  | Min  | Max  |
| TSMD010-0402RZ | 0.85 | 1.15 | 0.35 | 0.65 | 0.35 | 0.75 | 0.10 | 0.45 | 0.05 | 0.40 |
| TSMD020-0402RZ | 0.85 | 1.15 | 0.35 | 0.65 | 0.35 | 0.75 | 0.10 | 0.45 | 0.05 | 0.40 |
| TSMD035-0402RZ | 0.85 | 1.15 | 0.35 | 0.65 | 0.35 | 0.75 | 0.10 | 0.45 | 0.05 | 0.40 |
| TSMD050-0402RZ | 0.85 | 1.15 | 0.35 | 0.65 | 0.35 | 0.75 | 0.10 | 0.45 | 0.05 | 0.40 |

## Electrical Characteristics (23°C)

| Part Number    | Hold               | Trip               | Rated                  | Max                  | Typical            | Max Time to Trip |      | Resistance       |                   |
|----------------|--------------------|--------------------|------------------------|----------------------|--------------------|------------------|------|------------------|-------------------|
|                | Current            | Current            | Voltage                | Current              | Power              | Current          | Time | R <sub>MIN</sub> | R <sub>1MAX</sub> |
|                | I <sub>H</sub> , A | I <sub>T</sub> , A | V <sub>MAX</sub> , VDC | I <sub>MAX</sub> , A | P <sub>d</sub> , W | A                | Sec  | Ohms             | Ohms              |
| TSMD010-0402RZ | 0.10               | 0.30               | 6                      | 100                  | 0.5                | 0.5              | 1.0  | 0.150            | 2.000             |
| TSMD020-0402RZ | 0.20               | 0.50               | 6                      | 100                  | 0.5                | 1.0              | 1.0  | 0.100            | 1.250             |
| TSMD035-0402RZ | 0.35               | 0.70               | 6                      | 100                  | 0.5                | 8.0              | 0.1  | 0.050            | 0.700             |
| TSMD050-0402RZ | 0.50               | 1.00               | 6                      | 100                  | 0.5                | 8.0              | 0.1  | 0.040            | 0.400             |

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>).

P<sub>d</sub>=Typical power dissipated-type amount of power dissipated by the device when in the tripped state in 23°C still air environment.

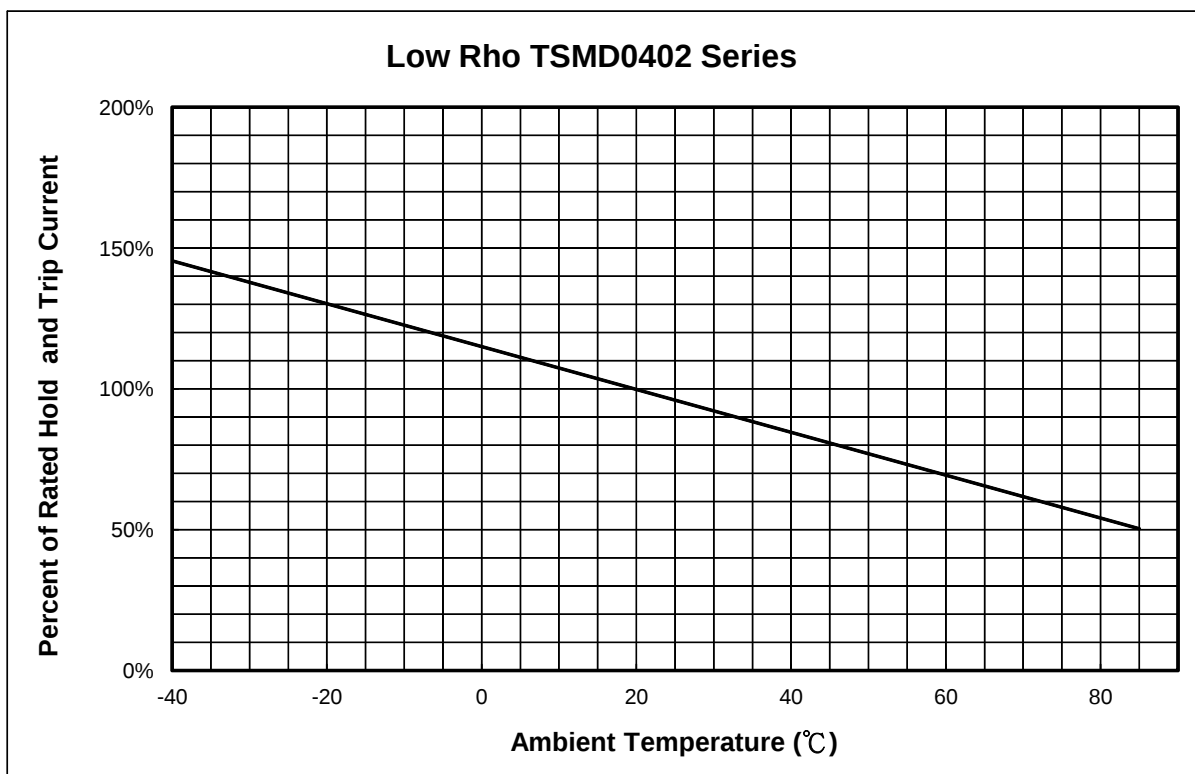
R<sub>MIN</sub>=Minimum device resistance at 23°C prior to tripping.

R<sub>1MAX</sub>=Maximum device resistance at 23°C measured 1 hour post trip.

Termination pad characteristics

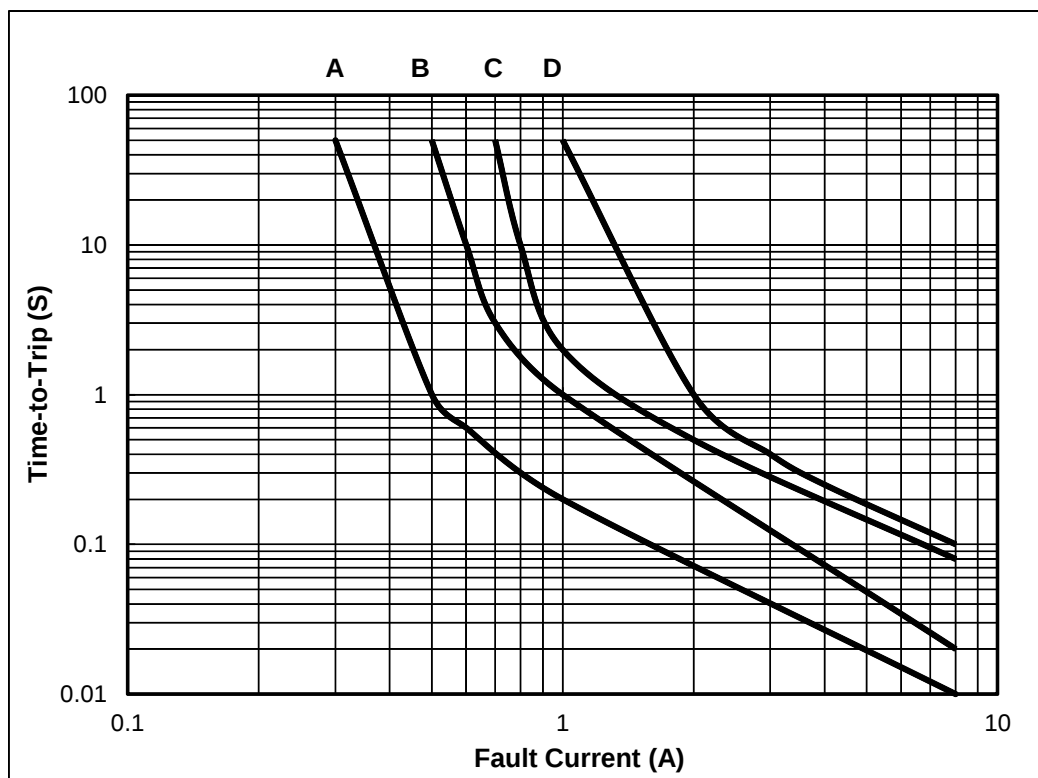
Termination pad materials: Pure Tin

## Thermal Derating Curve



## Typical Time-To-Trip at 23°C

A = TSMD010-0402RZ  
 B = TSMD020-0402RZ  
 C = TSMD035-0402RZ  
 D = TSMD050-0402RZ



## Material Specification

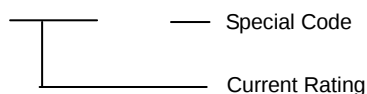
Terminal pad material: Pure Tin

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

## Part Numbering and Marking System

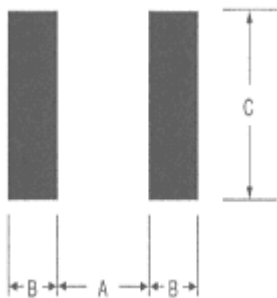
### Part Numbering System

TSMD □ □ □ - 0402 RZ



## Pad Layouts 、 Solder Reflow and Rework Recommendations

The dimension in the table below provide the recommended pad layout for each TSMD0402 device



Pad dimensions (millimeters)

| Device              | A<br>Nominal | B<br>Nominal | C<br>Nominal |
|---------------------|--------------|--------------|--------------|
| All TSMD0402 Series | 0.40         | 0.60         | 0.70         |

| 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.

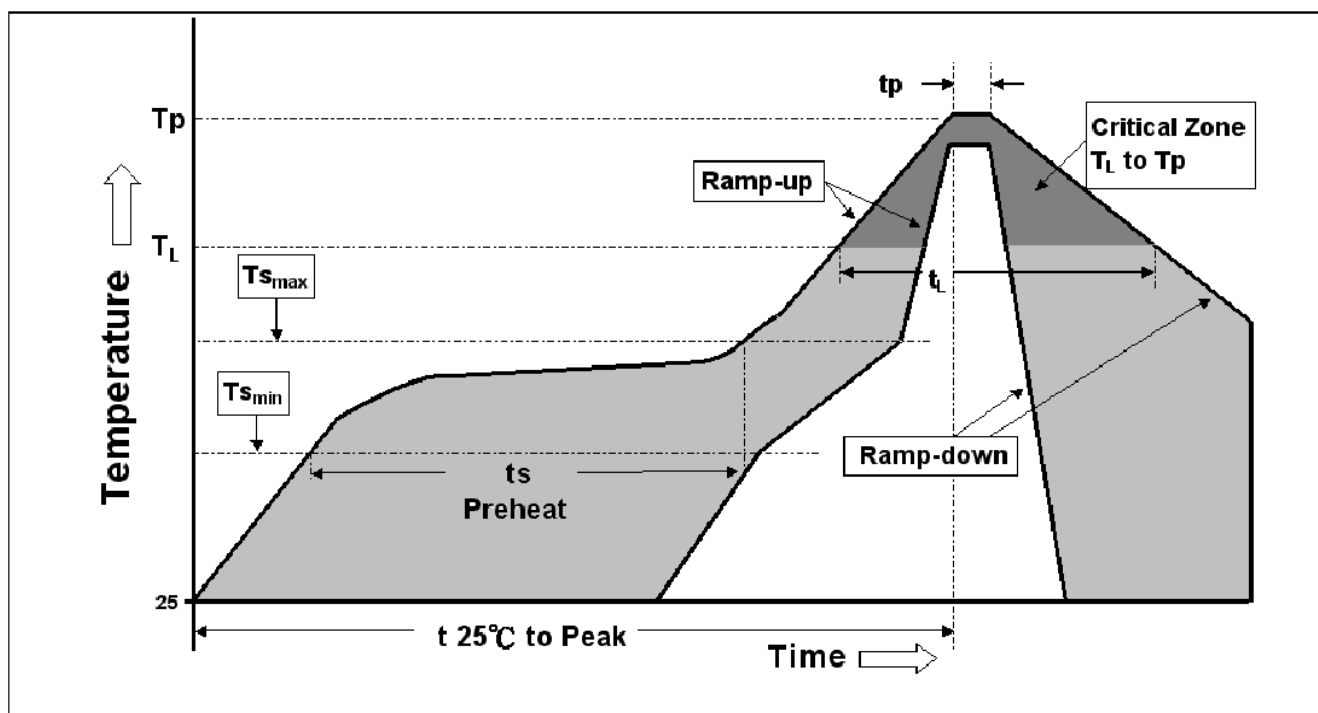
### Solder reflow

- ※ 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



**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.