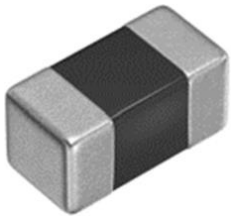
CSG Series

SMD Type NTC Thermistor



◆ Application Introduction

The SMD chip thermistor is a temperature measurement component. In line with the current trend of miniaturization and integration in electronic devices, the SMD chip form factor allows for integration onto various circuit boards, providing precise and reliable temperature monitoring solutions for numerous fields.

The core of the SMD chip thermistor is a high-precision thermistor sensing chip, composed of a resistor body, glass glaze, and triple-plated terminal electrodes. This chip utilizes special materials and manufacturing processes, exhibiting highly sensitive resistance characteristics to temperature changes. When the ambient temperature changes, its resistance value decreases as its body temperature increases.

◆ Feature

1. Complies with RoHS and Halogen-Free requirements
2. High accuracy
3. Operating temperature range: -40℃ ~ +125℃
4. Small size, lightweight
5. Stable electrical performance, high reliability
6. Lead-free, excellent solderability

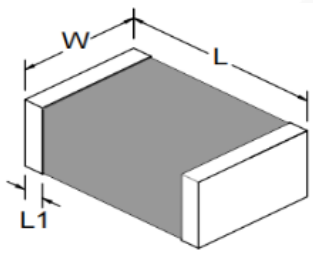
◆ Applications

1. 1. Electronics: Smartphones, Tablets, Laptops
2. Home Appliances: TVs, Air Conditioners, Washing Machines
3. Medical Equipment: Infusion Pumps, Ventilators, Blood Glucose Meters, Blood Pressure Monitors
4. Industrial Manufacturing: Industrial Control Boards, Multimeters, Oscilloscopes
5. Communication Equipment: Routers, Switches, Communication Base Stations
6. Other Fields: LED Lighting, Cameras

◆ Coding Principles

1	2	3	4	5	6	7	8	9		10	11	12		□	
Product Type			Size		Resistance value			Resistance value accuracy		B value		packaging method		Optional suffix	
CSG	SMD Chip Resistor		02	0201	102	1KΩ	F	±1%		34	B(25/85)=3435	R	Axis installation	1	standard
			04	0402	103	10KΩ	G	±2%		38	B(25/50)=3800	B	bulk	AT	Automotive Standard
			06	0603	473	47KΩ	H	±3%		39	B(25/50)=3950				
							J	±5%		40	B(25/85)=4000				

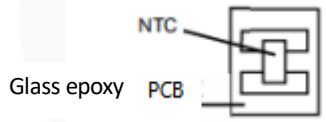
◆ Structure and dimensions

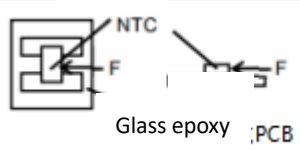


Model	Size	L(mm)	W(mm)	L1(mm)
CSG02	0201	0.60±0.03	0.30±0.03	0.15±0.05
CSG04	0402	1.00±0.05	0.50±0.05	0.25±0.10
CSG06	0603	1.60±0.15	0.80±0.15	0.2-0.6

◆ Reliability

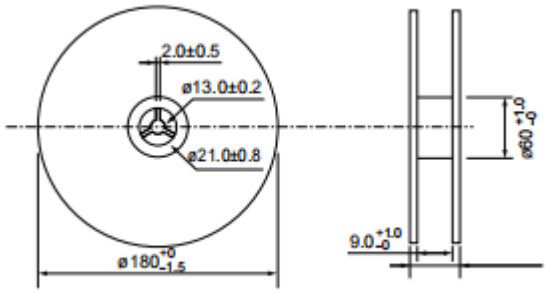
Test Item	Test Standard	Test Condition/Method	Performance Requirements
Flex Test	IEC 60068-2-21	After the NTC thermistor is soldered to the test board, apply force in the direction shown in the figure. Bending speed: 1.0mm/s Bending strength: 1.0mm Dwell time: 5±1s Substrate size:100mm*40mm*t1.6mm Substrate material: Glass epoxy PCB 	ΔR25/R25≤±5% ΔB/B≤±2%

<table>
<tr><td>Damp Heat, Steady State</td><td>IEC 60068-2-78</td><td>Subject to air at 60±2°C and 90~95% relative humidity, for 1000+48/-0 hours, no load.</td><td>ΔR25/R25≤±5%
ΔB/B≤±2%</td></tr>
<tr><td>High Temperature Storage Test</td><td>IEC 60068-2-2</td><td>Subject to air at 125±3°C, for 1000+48/-0 hours, no load.</td><td>ΔR25/R25≤±5%
ΔB/B≤±2%</td></tr>
<tr><td>High Temperature Storage Test</td><td>IEC 60068-2-14</td><td>Perform 5 cycles under the following conditions:
<table>
<tr><th>Step</th><th>Temperature (℃)</th><th>Time (min)</th></tr>
<tr><td>1</td><td>-40±3</td><td>30</td></tr>
<tr><td>2</td><td>room temperature</td><td>10-15</td></tr>
<tr><td>3</td><td>125+3/-0</td><td>30</td></tr>
<tr><td>4</td><td>room temperature</td><td>10-15</td></tr>
</table></td><td>ΔR25/R25≤±5%
ΔB/B≤±2%</td></tr>
<tr><td>High temperature load test</td><td>MIL-STD-202 Method 108</td><td>In air at 85 ± 2 ℃, apply maximum operating current and place continuously
1000+48/-0 hrs</td><td>ΔR25/R25≤±5%
ΔB/B≤±2%</td></tr>
<tr><td>Low temperature load test</td><td>IEC 60068-2-1</td><td>Continuous 1000+48/-0 hours without load in air at -40 ± 3 ℃</td><td>ΔR25/R25≤±5%
ΔB/B≤±2%</td></tr>
<tr><td>Vibration test</td><td>IEC 60068-2-6</td><td>Solder the NTC thermistor to the glass epoxy PCB as shown in the figure below.
Vibration: 10Hz-55Hz-10Hz (1 minute per cycle)
Maximum amplitude: 1.5mm
Duration: 2 hours of vibration per axis, alternating along three
 

mutually perpendicular axes.(toal6h)</td><td>ΔR25/R25≤±5%
ΔB/B≤±2%</td></tr>
<tr><td>Terminal electrode strength</td><td>IEC 60068-2-21</td><td>Weld the NTC thermistor onto the glass epoxy PCB and follow the instructions in the following figure
Apply a force of 5N in the direction
 
</td><td>The electrode will not peel off</td></tr>
<tr><td>Weldability test</td><td>IEC 60068-2-58</td><td>Welding temperature: 245 ± 5 ℃
Solder: Sn-3.0Ag-0.5Cu
Immersion time: 3 ± 0.5s
NTC thermistor should be completely submerged under the solder liquid surface</td><td>Tin plating area≥95%</td></tr>
<tr><td>Welding heat resistance test</td><td>IEC 60068-2-58</td><td>Welding temperature: 260 ± 5 ℃
Solder: Sn-3.0Ag-0.5Cu
Immersion time: 10 ± 0.5s
NTC thermistor should be completely submerged under the solder liquid surface
Preheating conditions: temperature: 150 ± 5 ℃, time: 3 minutes</td><td>ΔR25/R25≤±5%
ΔB/B≤±2%</td></tr>
</table>

◆ Packaging

1. Roll size



（单位：mm）

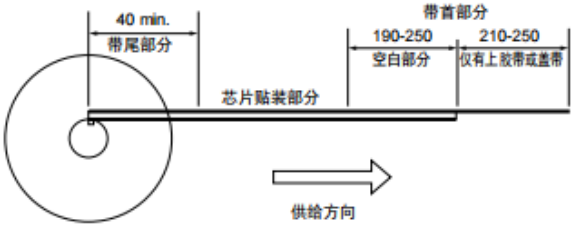
2. Tape packaging method

(1) The tape reel contains the beginning and end portions of unpackaged products. (Please refer to the following image)

(2) When sticking the upper tape and bottom tape, or plastic bag and cover tape together, at least the first 5 center to center distances should be left.

(3) The reel should be labeled.

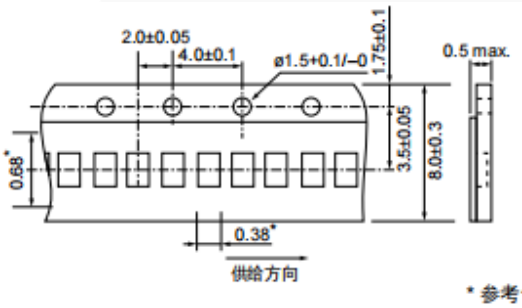
(4) The tape reel needs to be packaged separately.



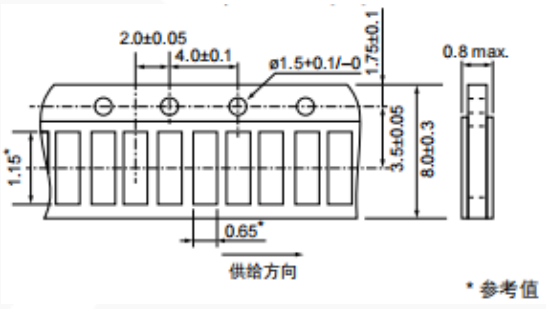
（单位：mm）

3. paper tape

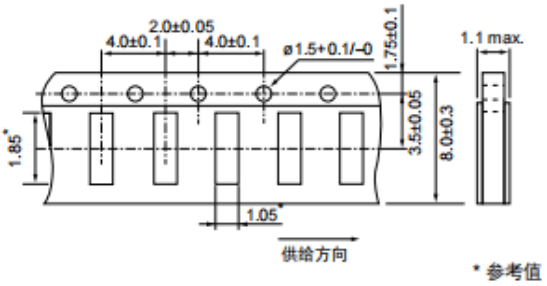
CSG02 Series



CSG04 Series



CSG06 Series



(1) Other conditions

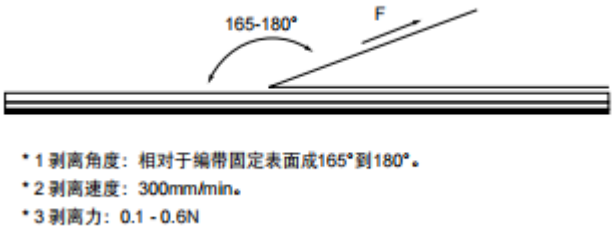
(a)Packaging

The product is packaged in the bottom tape cavity and sealed with upper and lower tape.

(b)Weaving tape

The upper and lower tapes have no seams, and the product is continuously encapsulated and sealed in the bottom tape cavity.

(2) Peel force of adhesive tape



(3) tensile strength

The tensile strength of the adhesive tape is required to be at least 10N.

The tensile strength of the adhesive tape is required to be at least 5N.

◆ Warning/Precautions

1. Warning (storage and usage conditions)

The product is suitable for ordinary environments (normal room temperature, humidity, and air pressure).

Please do not use under the following conditions, as all of these factors can lead to deterioration of product characteristics or cause failure and combustion.

(1) Corrosive gases or deoxygenative gases (chlorine gas, hydrogen sulfide gas, ammonia gas, sulfuric acid gas, nitric oxide, etc.)

(2) Volatile or flammable gases

(3) Dusty conditions

(4) Vacuum, high pressure or low pressure conditions

(5) Wet places

(6) Places with saltwater, oil, chemical liquids, or organic solvents present

(7) Intense vibration

(8) Other places with similar harmful conditions

2.Warning (Other)

Please make sure to equip your product with appropriate automatic insurance functions to prevent secondary damage that may occur due to abnormal or malfunctioning product functionality.

3. Precautions (storage and working conditions)

To maintain the weldability of the product, it is recommended to adopt the following storage conditions.

(1) Storage conditions:

Temperature -10 to 45 ℃

Humidity below 75% RH (non condensing)

(2)Storage period:

Please use this product within 6 months after delivery using the first in, first out inventory method.

(3) Storage location:

Do not store this product in environments with corrosive gases (such as sulfuric acid gas, chlorine gas, etc.) or direct sunlight exposure.

4. Precautions (rated value)

Please use this product within the specified temperature range.

Excessive temperature can cause secondary damage to product characteristics or materials.

5. Precautions (when using)

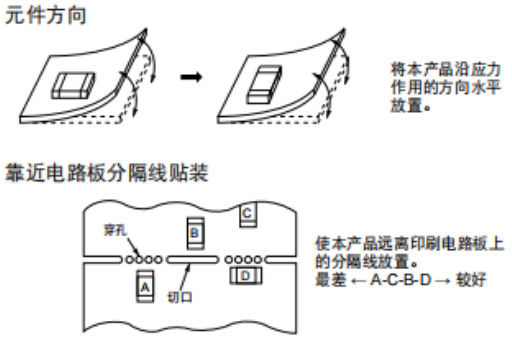
The ceramic of this product is a fragile material, so be careful not to apply excessive pressure or impact when using it.

Such strong force may cause the product to break or shatter.

6. Precautions (Welding and Installation)

(1) Installation position

Choose the appropriate mounting position to minimize the stress applied to the modified chip when the circuit board bends or bends.



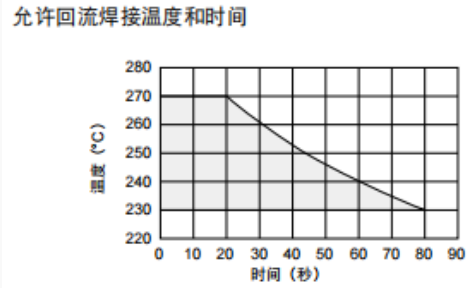
(2) Allow welding temperature and time

(a) Complete welding within the temperature and time indicated by the diagonal line in the following figure.

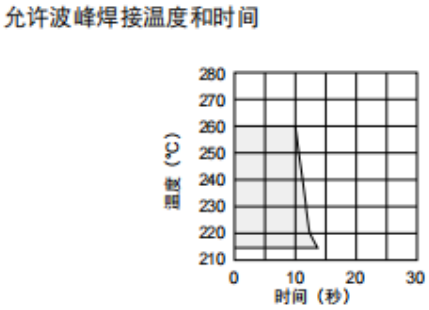
(b) Not meeting the welding conditions may cause metal decomposition or a decrease in the wetting level of solder paste on external electrodes.

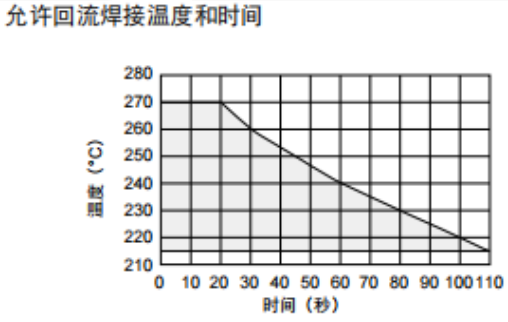
(c)If welding is repeated, the cumulative welding time should be within the range shown in the following figure. (For example, peak temperature of reflow soldering Temperature: 260 ℃, the cumulative total welding time for 2 times ->260 ℃ must be within 30 seconds.)

CSG02/CSG04 Series



CSG06 Series





(3) Recommended welding temperature curve

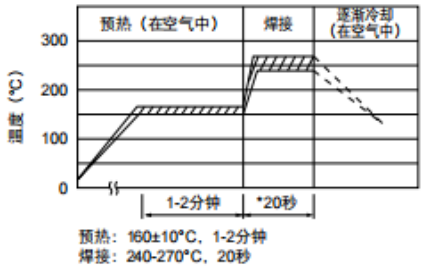
(a) Insufficient preheating may cause the ceramic body to fracture. The difference between the preheating temperature and the maximum temperature on the curve should be 100 ℃.

(b) It is not recommended to soak the components in solvents or use other methods to quickly cool them.

If welding is repeated, the cumulative welding time must be within the range shown in Part 2.

CSG02/CSG04 Series

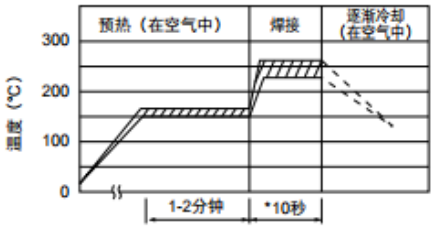
回流焊接条件



预热：160±10°C，1-2分钟
焊接：240-270°C，20秒

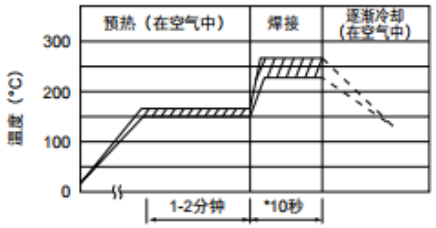
CSG06 Series

波峰焊接条件



预热：160±10°C，1-2分钟
焊接：230-260°C，10秒

回流焊接条件



预热：160±10°C，1-2分钟
焊接：230-270°C，20秒