

热敏电阻承认书

SPECIFICATION FOR APPROVAL

Description: NTC Temperature sensors

客户名称

Customer :

品名

Part Name :

片式NTC热敏电阻

Chip NTC thermistor

客户料号

Customer Part No :

承認規格

Approve Item:

0603 100KΩ

供应商料号

Part Number :

JQN0603X104J4150FB

日期

Date :

2022-06-07

客户承认

Customer approval

供应商承认

Supplier admit that



规格目录中所列的产品, 材料和尺寸其他内容如有更改, 恕不另行通知。

Specifications of products, materials and dimensions listed in the specification catalog are subject to change without prior notice.

1 外形尺寸 Shape and Dimensions

- 尺寸：见图 1 和表 1
- PCB 焊盘：见图 2 和表 1
- Dimensions: See Fig. 1 and Table 1.
- Recommended PCB land pattern for reflow soldering: See Fig.2 and Table 1

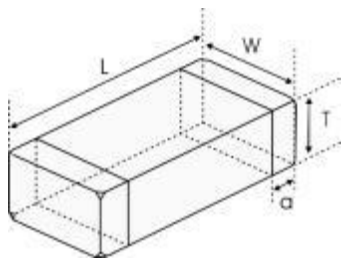


图 1 Fig.1

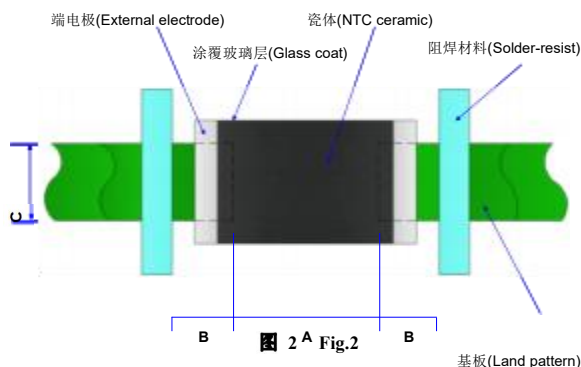


图 2 A Fig.2

表 1 (Table 1)

单位 unit: inch[mm]

类别 Type	L	W	T	a	A	B	C
0603 [1608]	0.063±0.006 [1.6±0.15]	0.031±0.006 [0.8±0.15]	0.031±0.006 [0.8±0.15]	0.012±0.008 [0.3±0.2]	[0.6-0.8]	[0.6-0.7]	[0.6-0.8]

2 产品标识(料号) Product Identification(Part Number)

J QN 0603 X 104 J 4150 F B
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① 制造厂商 Brand Mark	
J	JYH HSU (JEC)

② 类别 Type	
QN	片式 NTC 热敏电阻器 Chip NTC Thermistor

⑦ B 值常数 B Constant	
3600	3600K
3950	3950K
4150	4150K

③ 外形尺寸(mm) External Dimensions (L×W×T)	
0201[0603]	0.60×0.30×0.30
0402[1005]	1.00×0.50×0.50
0603[1608]	1.60×0.80×0.80
0805[2012]	2.00×1.25×0.85

⑤ 25℃的零功率电阻 Nominal Zero-Power Resistance	
472	4.7kΩ
683	68kΩ
104	100kΩ

⑧ B 值公差 Tolerance of B Constant	
F	±1%
H	±3%

④ 分隔符 Delimiter	
	X

⑥ 电阻值公差 Tolerance of Resistance	
F	±1%
G	±2%
H	±3%
J	±5%

⑨ B 值计算方式 B constant calculation method	
A	25℃&85℃
B	25℃&50℃

3 电气特性 Electrical Characteristics

型号 Part No	电阻值 Resistance (25℃) (kΩ)	B 常数 B Constant (25/50℃) (K)	B 常数 B Constant (25/85℃) (K)	允许工作电流 Permissible Operating Current (25℃) (mA)	耗散系数 Dissipation Factor (mW/℃)	热时间常数 Thermal Time Constant (s)	额定功率 Rated Electric Power(25℃) (mW)	工作温度 Operating ambient temperature (℃)
JQN0603X104J4150FB	100±5%	4150±1%	4210	0.10	1.0	<5	100	-40~+125

4 检验和测试程序

• 测试条件

如无特别规定，检验和测试的标准大气环境条件如下：

- a. 环境温度：20±15℃；
- b. 相对湿度：65±20%；
- c. 气压： 86 kPa~106 kPa

如果对测试结果有异议，则在下述条件下测试：

- a. 环境温度：25±2℃；
- b. 相对湿度：65±5%
- c. 气压： 86kPa~106kPa

• 检查设备

外观检查：20 倍放大镜；
阻值检查：热敏电阻测试仪

4 Test and Measurement Procedures

• Test Conditions

Unless otherwise specified, the standard atmospheric conditions for measurement/test as:

- a. Ambient Temperature: 20±15℃
- b. Relative Humidity: 65±20%
- c. Air Pressure: 86kPa to 106kPa

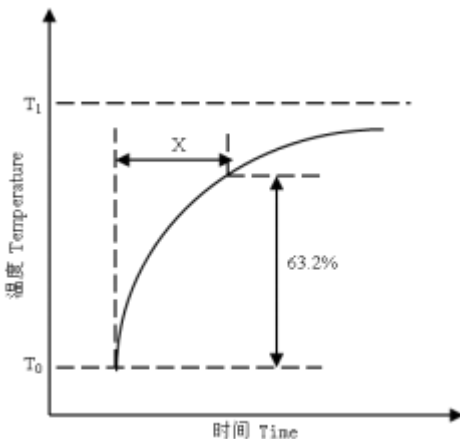
If any doubt on the results, measurements/tests should be made within the following limits:

- a. Ambient Temperature: 25±2℃
- b. Relative Humidity: 65±5%
- c. Air Pressure: 86kPa to 106kPa

• Inspection Equipment

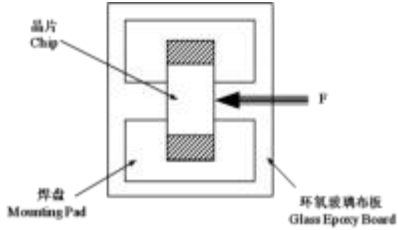
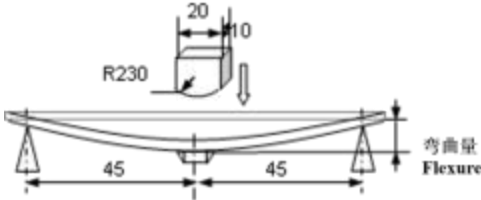
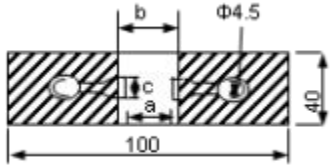
Visual Examination: 20× magnifier
Resistance value test: Thermistor resistance tester

5 电性测试 Electrical Test

序号 No.	项目 Items	测试方法及备注 Test Methods and Remarks
1	25℃零功率电阻值 Nominal Zero-Power Resistance at 25℃(R25)	环境温度 Ambient temperature : 25±0.05℃ 测试功率 Measuring electric power: ≤0.1mW
2	B 值常数 Nominal B Constant	分别在环境温度 25±0.05℃， 50±0.05℃或 85±0.05℃下测量电阻值。 Measure the resistance at the ambient temperature of 25±0.05℃, 50±0.05℃ or 85±0.05℃. $B(25-50^{\circ}\text{C}) = \frac{\ln R_{25} - \ln R_{50}}{1/T_{25} - 1/T_{50}}$ $B(25-85^{\circ}\text{C}) = \frac{\ln R_{25} - \ln R_{85}}{1/T_{25} - 1/T_{85}}$ T: 绝对温度(K) Absolute temperature (K)
3	热时间常数 Thermal Time Constant	在零功率条件下，当热敏电阻的环境温度发生急剧变化时，热敏电阻元件产生最初温度 T ₀ 与最终温度 T ₁ 两者温度差的 63.2% 的温度变化所需要的时间，通常以秒(S)表示。 The total time for the temperature of the thermistor to change by 63.2% of the difference from ambient temperature T ₀ (°C) to T ₁ (°C) by the drastic change of the power applied to thermistor from Non-zero Power to Zero-Power state, normally expressed in second(S). 

4	耗散系数 Dissipation Factor	在一定环境温度下，NTC热敏电阻通过自身发热使其温度升高1℃时所需要的功率，通常以mW/℃表示。可由下面公式计算： The required power which makes the NTC thermistor body temperature raise 1℃ through self-heated, normally expressed in milliwatts per degree Celsius (mW/℃). It can be calculated by the following formula: $\delta = \frac{W}{T-T_0}$
5	额定功率 Rated Power	在环境温度25℃下因自身发热使表面温度升高100℃所需要的功率。 The necessary electric power makes thermistor's temperature rise 100℃ by self-heating at ambient temperature 25℃.
6	允许工作电流 Permissible operating current	在静止空气中通过自身发热使其升温为1℃的电流。 The current that keep body temperature of chip NTC on the PC board in still air rising 1℃ by self-heating.

6 信赖性试验 Reliability Test

项目 Items	测试标准 Standard	测试方法及备注 Test Methods and Remarks	要求 Requirements																														
端头附着力 Terminal Strength	IEC 60068-2-21	<p>将晶片焊接在测试基板上(如右图所示的环氧玻璃布板)，按箭头所示方向施加作用力； Solder the chip to the testing jig (glass epoxy board shown in the right) using eutectic solder. Then apply a force in the direction of the arrow.</p> <table border="1"> <thead> <tr> <th>尺寸 Size</th> <th>F</th> <th>保持时间 Duration</th> </tr> </thead> <tbody> <tr> <td>0201</td> <td>2N</td> <td rowspan="3">10±1s</td> </tr> <tr> <td>0402, 0603</td> <td>5N</td> </tr> <tr> <td>0805</td> <td>10N</td> </tr> </tbody> </table>	尺寸 Size	F	保持时间 Duration	0201	2N	10±1s	0402, 0603	5N	0805	10N	<p>端电极无脱落且瓷体无损伤。 No removal or split of the termination or other defects shall occur.</p> 																				
尺寸 Size	F	保持时间 Duration																															
0201	2N	10±1s																															
0402, 0603	5N																																
0805	10N																																
抗弯强度 Resistance to Flexure	IEC 60068-2-21	<p>将晶片焊接在测试基板上(如右图所示的环氧玻璃布板)，按下图箭头所示方向施加作用力； Solder the chip to the test jig (glass epoxy board shown in the right) using a eutectic solder. Then apply a force in the direction shown as follow;</p>  <table border="1"> <thead> <tr> <th>尺寸 Size</th> <th>弯曲变形量 Flexure</th> <th>施压速度 Pressurizing Speed</th> <th>保持时间 Duration</th> </tr> </thead> <tbody> <tr> <td>0201,</td> <td>1mm</td> <td rowspan="2"><0.5mm/s</td> <td rowspan="2">10±1s</td> </tr> <tr> <td>0402, 0603, 0805</td> <td>2mm</td> </tr> </tbody> </table>	尺寸 Size	弯曲变形量 Flexure	施压速度 Pressurizing Speed	保持时间 Duration	0201,	1mm	<0.5mm/s	10±1s	0402, 0603, 0805	2mm	<p>① 无外观损伤。 No visible damage. ② $\Delta R_{25}/R_{25} \leq 2\%$</p> <p>单位 unit: mm</p> <table border="1"> <thead> <tr> <th>类型 Type</th> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td>0201</td> <td>0.25</td> <td>0.3</td> <td>0.3</td> </tr> <tr> <td>0402</td> <td>0.4</td> <td>1.5</td> <td>0.5</td> </tr> <tr> <td>0603</td> <td>1.0</td> <td>3.0</td> <td>1.2</td> </tr> <tr> <td>0805</td> <td>1.2</td> <td>4.0</td> <td>1.65</td> </tr> </tbody> </table> 	类型 Type	a	b	c	0201	0.25	0.3	0.3	0402	0.4	1.5	0.5	0603	1.0	3.0	1.2	0805	1.2	4.0	1.65
尺寸 Size	弯曲变形量 Flexure	施压速度 Pressurizing Speed	保持时间 Duration																														
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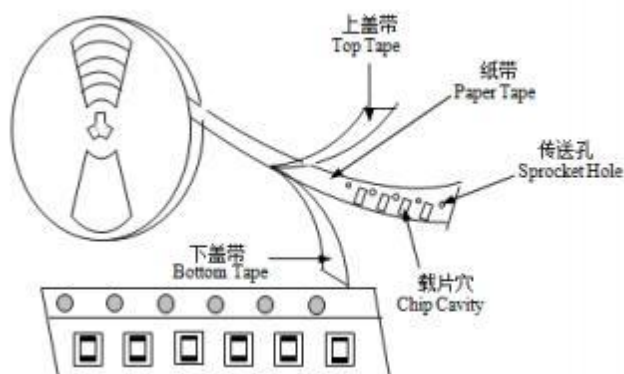
<p>振动 Vibration</p>	<p>IEC 60068-2-80</p>	<p>① 将晶片焊接在测试基板上(如右图所示的环氧玻璃布板); Solder the chip to the testing jig (glass epoxy board shown in the left) using eutectic solder.</p> <p>② 晶片以全振幅为 1.5mm 进行振动, 频率范围为 10Hz ~55Hz; The chip shall be subjected to a simple harmonic motion having total amplitude of 1.5 mm, the frequency being varied uniformly between the approximate limits of 10 and 55 Hz.</p> <p>③ 振动频率按 10Hz→55Hz→10Hz 循环, 周期为 1 分钟, 在空间三个互相垂直的方向上各振动 2 小时(共 6 小时)。 The frequency ranges from 10 to 55 Hz and return to 10 Hz shall be traversed in approximately 1 minute. This motion shall be applied for a period of 2 hours in each 3 mutually perpendicular directions (total of 6 hours).</p>	<p>无外观损伤。 No visible damage.</p> 															
<p>坠落 Dropping</p>	<p>IEC 60068-2-32</p>	<p>从 1m 的高度让晶片自由坠落至水泥地面 10 次。 Drop a chip 10 times on a concrete floor from a height of 1 meter.</p>	<p>无外观损伤。 No visible damage.</p>															
<p>可焊性 Solderability</p>	<p>IEC 60068-2-58</p>	<p>① 焊接温度 Solder temperature: 245±5°C. ② 浸渍时间 Duration: 3±0.3s. ③ 焊锡成分 Solder: 96.5Sn/3.0Ag/0.5Cu. ④ 助焊剂 Flux: (重量比) 25%松香和 75%酒精 25% Resin and 75% ethanol in weight.</p>	<p>① 无外观损伤; No visible damage. ② 元件端电极的焊锡覆盖率不小于 95%。 Wetting shall exceed 95% coverage.</p>															
<p>耐焊性 Resistance to Soldering Heat</p>	<p>IEC 60068-2-58</p>	<p>① 焊接温度 Solder temperature: 260±5°C. ② 浸渍时间 Duration: 10±1s. ③ 焊锡成分 Solder: 96.5Sn/3.0Ag/0.5Cu. ④ 助焊剂 Flux: (重量比) 25%松香和 75%酒精 25% Resin and 75% ethanol in weight. ⑤ 试验后标准条件下放置 1~2 小时后测量。 The chip shall be stabilized at normal condition for 1~2 hours before measuring.</p>	<p>① 无外观损伤; No visible damage. ② $\Delta R_{25}/R_{25} \leq 2\%$ ③ $\Delta B/B \leq 1\%$</p>															
<p>温度周期 Temperature cycling</p>	<p>IEC 60068-2-14</p>	<p>① 无负载于下表所示的环境条件下重复 5 次。 5 cycles of following sequence without loading.</p> <table border="1" data-bbox="491 1429 1040 1621"> <thead> <tr> <th>步骤 Step</th> <th>温度 Temperature</th> <th>时间 Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40±5°C</td> <td>30±3min</td> </tr> <tr> <td>2</td> <td>25±2°C</td> <td>5±3min</td> </tr> <tr> <td>3</td> <td>125±2°C</td> <td>30±3min</td> </tr> <tr> <td>4</td> <td>25±2°C</td> <td>5±3min</td> </tr> </tbody> </table> <p>② 试验后标准条件下放置 1~2 小时后测量。 The chip shall be stabilized at normal condition for 1~2 hours before measuring.</p>	步骤 Step	温度 Temperature	时间 Time	1	-40±5°C	30±3min	2	25±2°C	5±3min	3	125±2°C	30±3min	4	25±2°C	5±3min	<p>① 无外观损伤; No visible damage. ② $\Delta R_{25}/R_{25} \leq 2\%$ ③ $\Delta B/B \leq 1\%$</p>
步骤 Step	温度 Temperature	时间 Time																
1	-40±5°C	30±3min																
2	25±2°C	5±3min																
3	125±2°C	30±3min																
4	25±2°C	5±3min																
<p>高温存放 Resistance to dry heat</p>	<p>IEC 60068-2-2</p>	<p>① 在 125±5°C 空气中, 无负载放置 1000±24 小时。 125±5°C in air, for 1000±24 hours without loading. ② 试验后标准条件下放置 1~2 小时后测量。 The chip shall be stabilized at normal condition for 1~2 hours before measuring.</p>	<p>① 无外观损伤; No visible damage. ② $\Delta R_{25}/R_{25} \leq 2\%$ ③ $\Delta B/B \leq 1\%$</p>															

低温存放 Resistance to cold	IEC 60068-2-1	① 在-40±3℃空气中，无负载放置 1000±24 小时。 -40±3℃ in air, for 1000±24 hours without loading. ② 试验后标准条件下放置 1~2 小时后测量。 The chip shall be stabilized at normal condition for 1~2 hours before measuring.	① 无外观损伤; No visible damage. ② $ \Delta R25/R25 \leq 2\%$ ③ $ \Delta B/B \leq 1\%$
湿热存放 Resistance to damp heat	IEC 60068-2-78	① 在 40±2℃，相对湿度 90~95%空气中，无负载放置 1000±24 小时。 40±2℃, 90~95%RH in air, for 1000±24 hours without loading. ② 试验后标准条件下放置 1~2 小时后测量。 The chip shall be stabilized at normal condition for 1~2 hours before measuring.	① 无外观损伤; No visible damage. ② $ \Delta R25/R25 \leq 2\%$ ③ $ \Delta B/B \leq 1\%$
高温负荷 Resistance to high temperature load	IEC 60539-1 5.25.4	① 在 85±2℃空气中，施加允许工作电流 1000±48 小时。 85±2℃ in air with permissive operating current for 1000±48 hours ② 试验后标准条件下放置 1~2 小时后测量。 The chip shall be stabilized at normal condition for 1~2 hours before measuring.	① 无外观损伤; No visible damage. ② $ \Delta R25/R25 \leq 2\%$ ③ $ \Delta B/B \leq 1\%$

7 编带 Taping

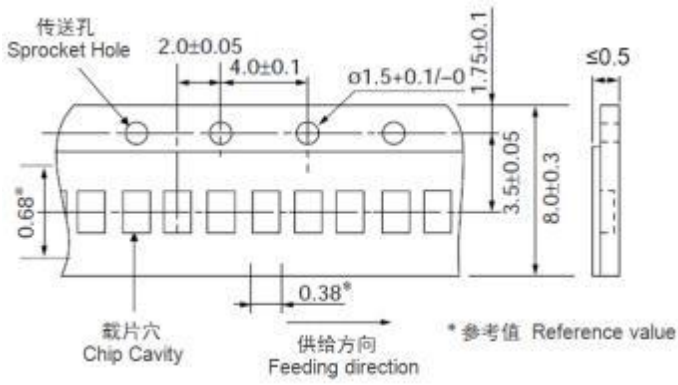
类型 Type	0201	0402	0603	0805
编带厚度 Tape thickness(mm)	0.5±0.15	0.5±0.15	0.8±0.15	0.85±0.2
编带材质 Tape material	纸带 Paper Tape			
每盘数量 Quantity per Reel	15K	10K	4K	4K

(1) 编带图 Taping Drawings

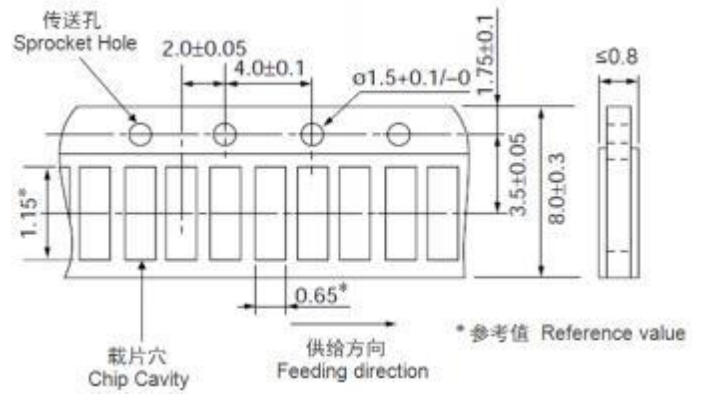


(2) 纸带尺寸 Paper Tape Dimensions (单位 Unit: mm)

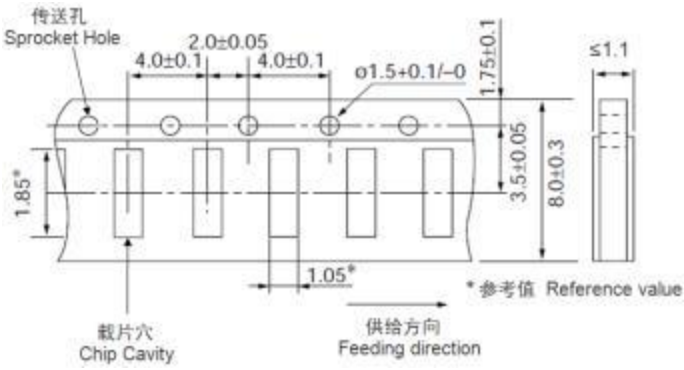
QN0201 系列 QN0201 series



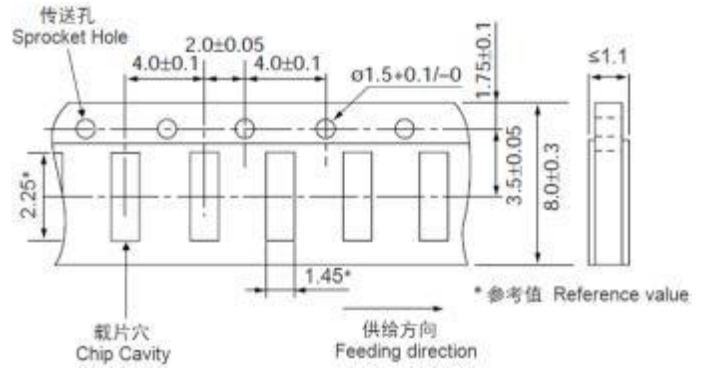
QN0402 系列 QN0402 series



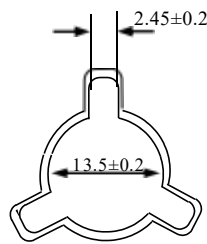
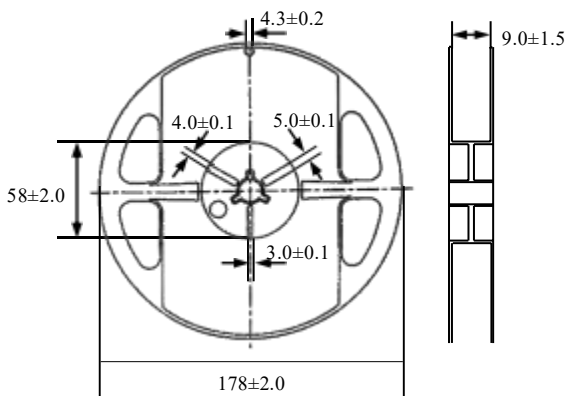
QN0603 系列 QN0603 series



QN0805 系列 QN0805 series



(3) 卷盘尺寸 Reel Dimensions (单位 Unit: mm)



8 储存

储存条件

- a. 储存温度: $-10^{\circ}\text{C}\sim 40^{\circ}\text{C}$
- b. 相对湿度: $\leq 75\%RH$
- c. 避免接触粉尘、腐蚀性气氛和阳光

- **储存期限: 产品交付后 6 个月**

9 注意事项

- QN 系列热敏电阻不可在以下条件下工作或储存:
 - (1) 腐蚀性气体或还原性气体
(氯气、硫化氢气体、氨气、硫酸气体、一氧化氮等)。
 - (2) 挥发性或易燃性气体
 - (3) 多尘条件
 - (4) 高压或低压条件
 - (5) 潮湿场所
 - (6) 存在盐水、油、化学液体或有机溶剂的场所
 - (7) 强烈振动
 - (8) 存在类似有害条件的其他场所
- QN 系列热敏电阻的陶瓷属于易碎材料, 使用时不可施加过大压力或冲击。
- QN 系列热敏电阻不可在超过目录规定的温度范围情况下工作。

8 Storage

Storage Conditions

- a. Storage Temperature: $-10^{\circ}\text{C}\sim 40^{\circ}\text{C}$
- b. Relative Humidity: $\cong 75\%RH$
- c. Keep away from corrosive atmosphere and sunlight.

- **Period of Storage: 6 Months after delivery**

9 Notes & Warnings

- The QN series thermistors shall not be operated and stored under the following environmental condition:
 - (1) Corrosive or deoxidized atmospheres
(such as chlorine, sulfurated hydrogen, ammonia, sulfuric acid, nitric oxide and so on)
 - (2) Volatile or inflammable atmospheres
 - (3) Dusty condition
 - (4) Excessively high or low pressure condition
 - (5) Humid site
 - (6) Places with brine, oil, chemical liquid or organic solvent
 - (7) Intense vibration
 - (8) Places with analogously deleterious conditions
- The ceramic body of the QN series thermistors is fragile, no excessive pressure or impact shall be exerted on it.
- The QN series thermistors shall not be operated beyond the specified "Operating Temperature Range" in the catalog.

10 建议焊接条件

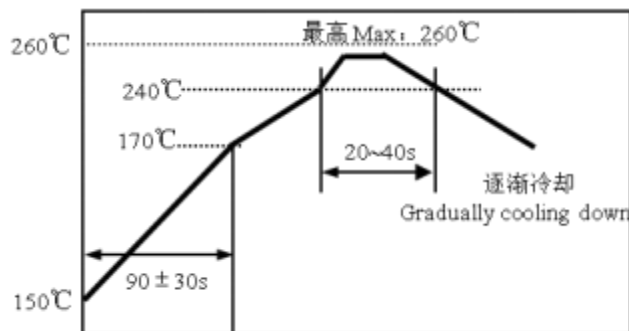
• 回流焊

- 温升 1~2°C/sec.
- 预热: 150~170°C/90±30 sec.
- 大于 240°C时间: 20~40sec
- 峰值温度: 最高 260°C/10 sec.
- 焊锡: 96.5Sn/3.0Ag/0.5Cu
- 回流焊: 最多 2次

10 Recommended Soldering Technologies

• Re-flowing Profile

- 1~2°C/sec. Ramp
- Pre-heating: 150~170°C/90±30 sec.
- Time above 240°C: 20~40 sec.
- Peak temperature: 260°C Max./10 sec.
- Solder paste: 96.5Sn/3.0Ag/0.5Cu
- Max.2 times for re-flowing



• 手工焊

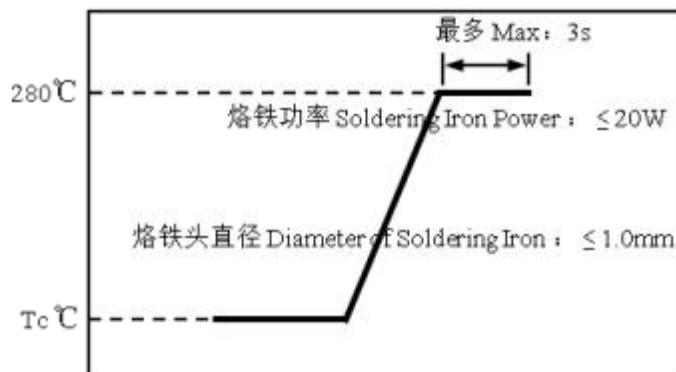
- 烙铁功率: 最大 20W
- 预热: 150°C/60sec.
- 烙铁头温度: 最高 280°C
- 焊接时间: 最多 3sec.
- 焊锡: 96.5Sn/3.0Ag/0.5Cu
- 手工焊: 最多 1次

• Iron Soldering Profile

- Iron soldering power: Max.20W
- Pre-heating: 150°C/60sec.
- Soldering Tip temperature: 280°C Max.
- Soldering time: 3 sec Max.
- Solder paste: 96.5Sn/3.0Ag/0.5Cu
- Max. 1 times for iron soldering

[注: 不要使烙铁头接触到端头]

[Note: Take care not to apply the tip of the soldering iron to the terminal electrodes.]



11 R-T 表 R-T table

JQN0603X104J4150FB

温度 Temp. (°C)	R 最小值 R_Min (Kohm)	R 中心值 R_Cent (Kohm)	R 最大值 R_Max (Kohm)	阻值公差 Res TOL.	温度公差 Temp. TOL.(°C)
-40	3,682.850	4,022.587	4,382.681	8.95%	1.23
-39	3,428.204	3,741.741	4,073.744	8.87%	1.23
-38	3,193.110	3,482.646	3,788.940	8.79%	1.23
-37	2,975.928	3,243.462	3,526.210	8.72%	1.23
-36	2,775.165	3,022.518	3,283.688	8.64%	1.23
-35	2,617.489	2,849.104	3,093.461	8.58%	1.23
-34	2,443.208	2,657.552	2,883.473	8.50%	1.23
-33	2,281.841	2,480.315	2,689.312	8.43%	1.23
-32	2,132.340	2,316.224	2,509.676	8.35%	1.23
-31	1,993.749	2,164.212	2,343.377	8.28%	1.22
-30	1,883.309	2,043.154	2,211.023	8.22%	1.22
-29	1,762.462	1,910.769	2,066.377	8.14%	1.22
-28	1,650.261	1,787.939	1,932.260	8.07%	1.22
-27	1,546.030	1,673.908	1,807.832	8.00%	1.22
-26	1,449.146	1,567.986	1,692.329	7.93%	1.22
-25	1,370.793	1,482.374	1,599.030	7.87%	1.21
-24	1,285.959	1,389.738	1,498.137	7.80%	1.21
-23	1,206.992	1,303.563	1,404.341	7.73%	1.21
-22	1,133.445	1,223.355	1,317.096	7.66%	1.21
-21	1,064.911	1,148.660	1,235.899	7.59%	1.21
-20	1,008.056	1,086.732	1,168.619	7.54%	1.21
-19	947.859	1,021.201	1,097.467	7.47%	1.21
-18	891.687	960.090	1,031.156	7.40%	1.20
-17	839.244	903.070	969.322	7.34%	1.20
-16	790.257	849.842	911.635	7.27%	1.20
-15	749.040	805.082	863.153	7.21%	1.20
-14	705.849	758.204	812.406	7.15%	1.20
-13	665.452	714.385	764.999	7.08%	1.19
-12	627.650	673.405	720.690	7.02%	1.19
-11	592.259	635.062	679.257	6.96%	1.19
-10	562.051	602.353	643.930	6.90%	1.19
-9	530.735	568.462	607.348	6.84%	1.19
-8	501.381	536.713	573.098	6.78%	1.18
-7	473.853	506.955	541.014	6.72%	1.18
-6	448.026	479.052	510.947	6.66%	1.18
-5	425.500	454.730	484.753	6.60%	1.18
-4	402.583	429.998	458.132	6.54%	1.17
-3	381.056	406.779	433.153	6.48%	1.17
-2	360.826	384.972	409.706	6.42%	1.17
-1	341.808	364.481	387.687	6.37%	1.17
0	325.091	346.480	368.353	6.31%	1.16
1	308.150	328.247	348.781	6.26%	1.16

温度 Temp. (°C)	R 最小值 R_Min (Kohm)	R 中心值 R_Cent (Kohm)	R 最大值 R_Max (Kohm)	阻值公差 Res TOL.	温度公差 Temp. TOL.(°C)
2	292.206	311.096	330.380	6.20%	1.16
3	277.194	294.956	313.072	6.14%	1.16
4	263.053	279.761	296.787	6.09%	1.15
5	250.377	266.147	282.204	6.03%	1.15
6	237.749	252.592	267.690	5.98%	1.15
7	225.841	239.816	254.019	5.92%	1.15
8	214.608	227.771	241.136	5.87%	1.14
9	204.008	216.409	228.991	5.81%	1.14
10	194.372	206.087	217.962	5.76%	1.14
11	184.878	195.922	207.106	5.71%	1.13
12	175.910	186.324	196.861	5.66%	1.13
13	167.434	177.259	187.190	5.60%	1.13
14	159.422	168.693	178.056	5.55%	1.12
15	152.036	160.800	169.643	5.50%	1.12
16	144.840	153.114	161.456	5.45%	1.12
17	138.030	145.845	153.716	5.40%	1.11
18	131.585	138.967	146.396	5.35%	1.11
19	125.481	132.458	139.472	5.30%	1.11
20	119.767	126.366	132.995	5.25%	1.10
21	114.272	120.511	126.773	5.20%	1.10
22	109.064	114.965	120.881	5.15%	1.10
23	104.126	109.708	115.301	5.10%	1.09
24	99.443	104.725	110.012	5.05%	1.09
25	95.000	100.000	105.000	5.00%	1.09
26	90.689	95.506	100.328	5.05%	1.10
27	86.601	91.242	95.892	5.10%	1.12
28	82.722	87.195	91.680	5.14%	1.14
29	79.041	83.352	87.679	5.19%	1.16
30	75.502	79.657	83.830	5.24%	1.17
31	72.177	76.183	80.210	5.29%	1.19
32	69.019	72.882	76.768	5.33%	1.21
33	66.018	69.744	73.496	5.38%	1.23
34	63.167	66.760	70.382	5.43%	1.24
35	60.389	63.854	67.348	5.47%	1.26
36	57.808	61.150	64.524	5.52%	1.28
37	55.352	58.577	61.836	5.56%	1.30
38	53.015	56.128	59.276	5.61%	1.32
39	50.791	53.797	56.838	5.65%	1.34
40	48.595	51.494	54.428	5.70%	1.35
41	46.577	49.376	52.212	5.74%	1.37
42	44.655	47.358	50.099	5.79%	1.39
43	42.824	45.435	48.084	5.83%	1.41
44	41.078	43.601	46.162	5.88%	1.43
45	39.339	41.773	44.246	5.92%	1.45

温度 Temp. (°C)	R 最小值 R_Min (Kohm)	R 中心值 R_Cent (Kohm)	R 最大值 R_Max (Kohm)	阻值公差 Res TOL.	温度公差 Temp. TOL.(°C)
46	37.752	40.104	42.496	5.96%	1.47
47	36.238	38.511	40.825	6.01%	1.49
48	34.794	36.992	39.229	6.05%	1.51
49	33.416	35.540	37.706	6.09%	1.53
50	32.017	34.067	36.158	6.14%	1.54
51	30.761	32.744	34.767	6.18%	1.56
52	29.562	31.480	33.438	6.22%	1.58
53	28.416	30.272	32.167	6.26%	1.61
54	27.322	29.117	30.952	6.30%	1.63
55	26.203	27.936	29.710	6.35%	1.64
56	25.204	26.881	28.598	6.39%	1.66
57	24.248	25.872	27.535	6.43%	1.69
58	23.334	24.906	26.517	6.47%	1.71
59	22.460	23.982	25.543	6.51%	1.73
60	21.555	23.025	24.534	6.55%	1.75
61	20.755	22.179	23.641	6.59%	1.77
62	19.989	21.369	22.786	6.63%	1.79
63	19.256	20.593	21.967	6.67%	1.81
64	18.554	19.849	21.181	6.71%	1.83
65	17.818	19.069	20.357	6.75%	1.85
66	17.174	18.387	19.636	6.79%	1.87
67	16.558	17.733	18.945	6.83%	1.89
68	15.966	17.106	18.281	6.87%	1.91
69	15.400	16.505	17.645	6.91%	1.94
70	14.804	15.873	16.976	6.95%	1.96
71	14.284	15.320	16.391	6.99%	1.98
72	13.784	14.790	15.829	7.03%	2.00
73	13.305	14.281	15.289	7.06%	2.02
74	12.845	13.792	14.771	7.10%	2.04
75	12.350	13.266	14.213	7.14%	2.06
76	11.927	12.816	13.736	7.18%	2.09
77	11.521	12.384	13.277	7.22%	2.11
78	11.131	11.968	12.836	7.25%	2.13
79	10.756	11.569	12.413	7.29%	2.16
80	10.353	11.140	11.956	7.33%	2.18
81	10.007	10.771	11.565	7.37%	2.20
82	9.675	10.418	11.189	7.40%	2.22
83	9.356	10.077	10.827	7.44%	2.25
84	9.049	9.750	10.478	7.47%	2.27
85	8.715	9.393	10.099	7.51%	2.29
86	8.431	9.091	9.777	7.55%	2.31
87	8.159	8.799	9.467	7.58%	2.34
88	7.896	8.519	9.168	7.62%	2.36
89	7.644	8.249	8.881	7.65%	2.38

温度 Temp. (°C)	R 最小值 R_Min (Kohm)	R 中心值 R_Cent (Kohm)	R 最大值 R_Max (Kohm)	阻值公差 Res TOL.	温度公差 Temp. TOL.(°C)
90	7.365	7.952	8.563	7.69%	2.41
91	7.132	7.702	8.297	7.73%	2.43
92	6.907	7.462	8.041	7.76%	2.45
93	6.690	7.230	7.794	7.79%	2.48
94	6.482	7.007	7.555	7.83%	2.50
95	6.253	6.761	7.293	7.87%	2.52
96	6.059	6.555	7.072	7.90%	2.55
97	5.873	6.355	6.859	7.93%	2.57
98	5.694	6.163	6.654	7.97%	2.60
99	5.520	5.977	6.455	8.00%	2.62
100	5.325	5.767	6.231	8.04%	2.64
101	5.164	5.595	6.046	8.07%	2.67
102	5.009	5.429	5.869	8.10%	2.69
103	4.860	5.268	5.697	8.14%	2.72
104	4.715	5.113	5.531	8.17%	2.75
105	4.554	4.940	5.345	8.21%	2.77
106	4.420	4.796	5.191	8.24%	2.79
107	4.290	4.657	5.042	8.27%	2.82
108	4.165	4.522	4.898	8.30%	2.85
109	4.045	4.393	4.759	8.33%	2.87
110	3.908	4.245	4.601	8.37%	2.89
111	3.796	4.125	4.471	8.40%	2.92
112	3.687	4.008	4.346	8.43%	2.95
113	3.582	3.895	4.225	8.46%	2.97
114	3.481	3.786	4.108	8.49%	3.00
115	3.365	3.661	3.973	8.53%	3.02
116	3.270	3.559	3.864	8.56%	3.05
117	3.179	3.461	3.758	8.59%	3.08
118	3.091	3.366	3.656	8.62%	3.10
119	3.005	3.274	3.557	8.65%	3.13
120	2.909	3.169	3.445	8.69%	3.15
121	2.829	3.083	3.352	8.72%	3.18
122	2.752	3.000	3.263	8.75%	3.21
123	2.677	2.920	3.176	8.78%	3.23
124	2.605	2.842	3.092	8.81%	3.26
125	2.520	2.750	2.993	8.84%	3.29