

规格承认书

SPECIFICATION

编号(No):

日期(Date):

客户 (Customer):

品名(Product Name): 片式NTC热敏电阻 Chip NTC thermistor

恭成料号 (QAMCN Part Number) : QN0402X103F4050FB

客户规格(Customer's Part Number):

客户承认 CUSTOMER CONFIRM			
承认章	核准	审核	经办人
STAMP	APPROVE	CHECK	SIGNATURE

恭成科技有限公司

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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 pattern for reflow soldering: See Fig.2 and Table 1

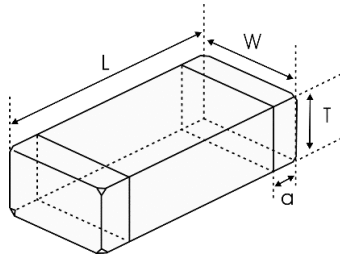


图 1 Fig.1

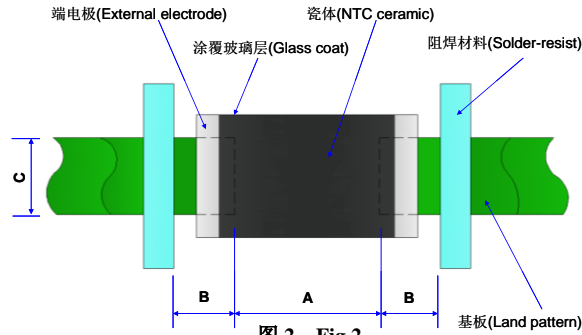


图 2 Fig.2

表 1 (Table 1)

单位 unit: inch[mm]

类别 Type	L	W	T	a	A	B	C
0402 [1005]	0.039±0.006 [1.0±0.15]	0.020±0.006 [0.5±0.15]	0.020±0.006 [0.5±0.15]	0.010±0.004 [0.25±0.1]	[0.45-0.55]	[0.4-0.5]	[0.45-0.55]

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

QN 0402 X 103 F 4050 F B
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① 类别 Type	
QN	片式 NTC 热敏电阻器 Chip NTC Thermistor
② 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
1206[3216]	3.20×1.60×0.85
③ 分隔符 Delimiter	
	X

④ 25℃的零功率电阻 Nominal Zero-Power Resistance	
222	2.2kΩ
103	10kΩ
474	470kΩ
⑤ 电阻值公差 Tolerance of Resistance	
F	±1%
G	±2%
H	±3%
J	±5%

⑥ B 值常数 B Constant	
3380	3380K
4050	4050K
4250	4250K
⑦ B 值公差 Tolerance of B Constant	
F	±1%
H	±3%
⑧ 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 (℃)
QN0402X103F4050FB	10±1%	4050±1%	4110	0.31	1.0	<3	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

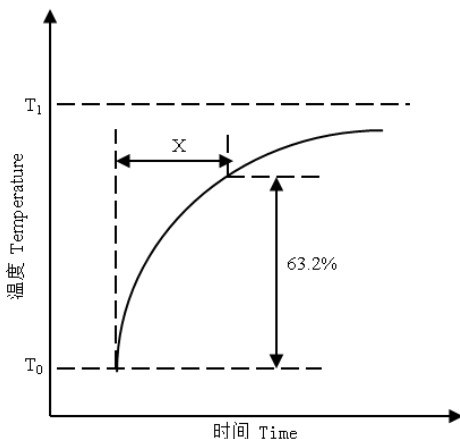
If any doubt on the results, measurements/tests should be made within the following limits:

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

▪ **Inspection Equipment**

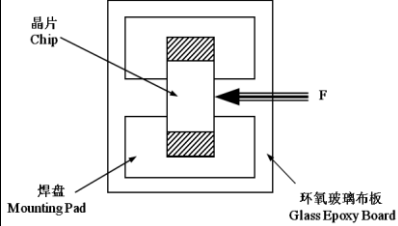
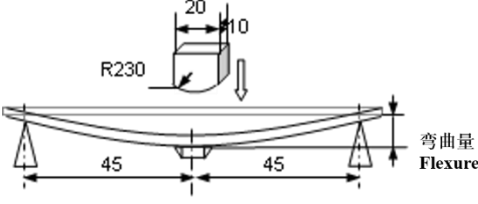
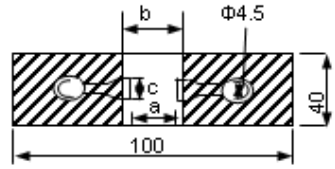
Visual Examination: 20× magnifier
Resistance value test: Thermistor resistance tester

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 T0 与最终温度 T1 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"> <tr> <th>尺寸 Size</th> <th>F</th> <th>保持时间 Duration</th> </tr> <tr> <td>0201, 0402, 0603</td> <td>5N</td> <td rowspan="2">10±1s</td> </tr> <tr> <td>0805</td> <td>10N</td> </tr> </table>	尺寸 Size	F	保持时间 Duration	0201, 0402, 0603	5N	10±1s	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, 0402, 0603	5N	10±1s																															
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"> <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> <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> </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"> <tr> <th>类型 Type</th> <th>a</th> <th>b</th> <th>c</th> </tr> <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> </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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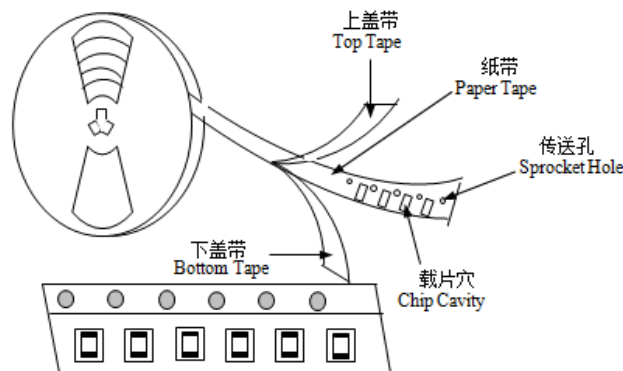
<p>振动 Vibration</p>	<p>IEC 60068-2-80</p>	<p>① 将晶片焊接在测试基板上（如右图所示的环氧玻璃布板）； Solder the chip to the testing jig (glass epoxy board shown in the left) using eutectic solder.</p> <p>② 晶片以全振幅为 1.5mm 进行振动，频率范围为 10Hz ~55 Hz； The chip shall be subjected to a simple harmonic motion having total amplitude of 1.5mm, 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℃. 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℃. 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 ΔR25/R25 ≤2% ③ ΔB/B ≤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 1624"> <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℃</td> <td>30±3min</td> </tr> <tr> <td>2</td> <td>25±2℃</td> <td>5±3min</td> </tr> <tr> <td>3</td> <td>125±2℃</td> <td>30±3min</td> </tr> <tr> <td>4</td> <td>25±2℃</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℃	30±3min	2	25±2℃	5±3min	3	125±2℃	30±3min	4	25±2℃	5±3min	<p>① 无外观损伤； No visible damage. ② ΔR25/R25 ≤2% ③ ΔB/B ≤1%</p>
步骤 Step	温度 Temperature	时间 Time																
1	-40±5℃	30±3min																
2	25±2℃	5±3min																
3	125±2℃	30±3min																
4	25±2℃	5±3min																
<p>高温存放 Resistance to dry heat</p>	<p>IEC 60068-2-2</p>	<p>① 在 125±5℃ 空气中，无负载放置 1000±24 小时。 125±5℃ 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 ΔR25/R25 ≤2% ③ ΔB/B ≤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

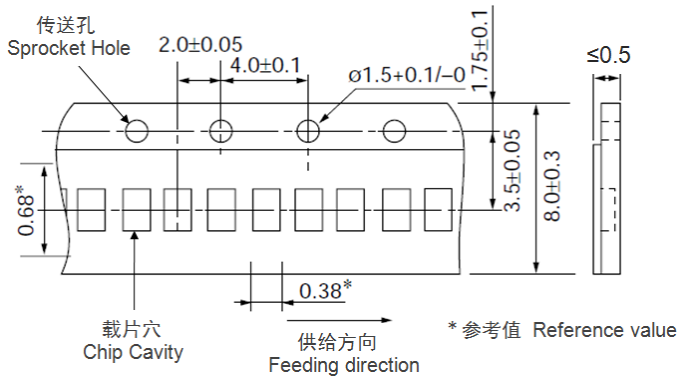
类型 Type	0201	0402	0603	0805
编带厚度 Tape thickness(mm)	0.5±0.15	0.5±0.15	0.8±0.15	0.85±0.2
编带材质 Tape material	纸带 Paper Tape			
每盘数量 Quantity per Reel	15K	10K	4K	4K

(1) 编带图 Taping Drawings

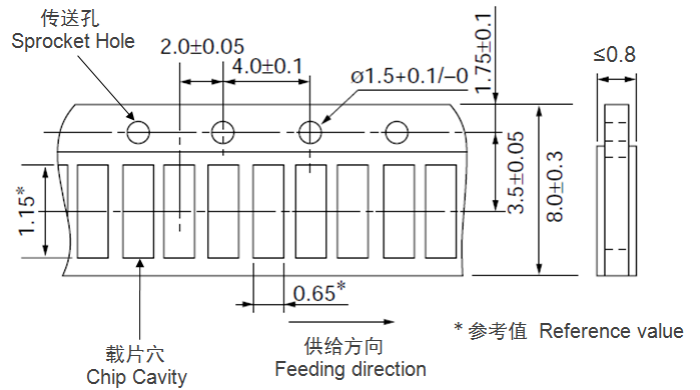


(2) 纸带尺寸 Paper Tape Dimensions (单位 Unit: mm)

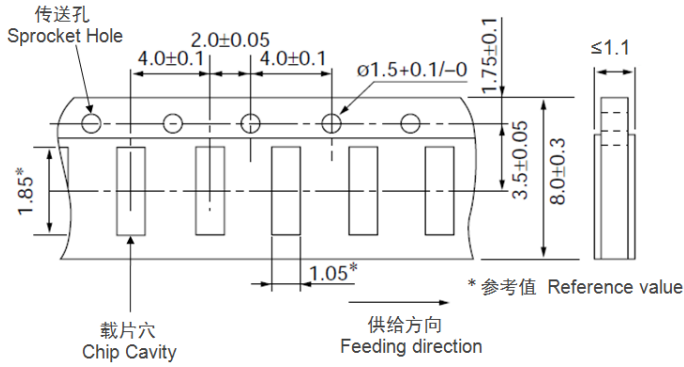
QN0201 系列 QN0201 series



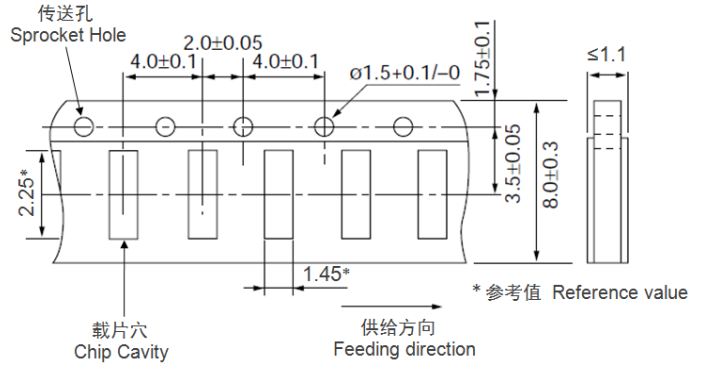
QN0402 系列 QN0402 series



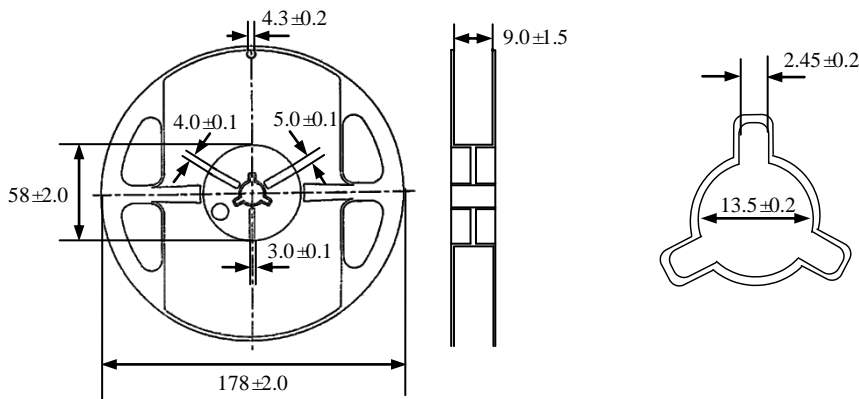
QN0603 系列 QN0603 series



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: $\leq 75\% \text{RH}$
 - 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: $\cong 75\% \text{RH}$
 - 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

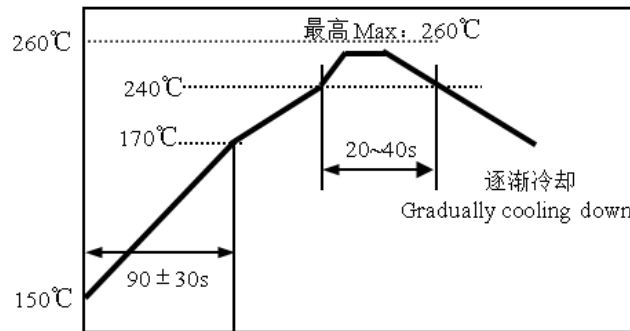
• **回流焊**

- 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**

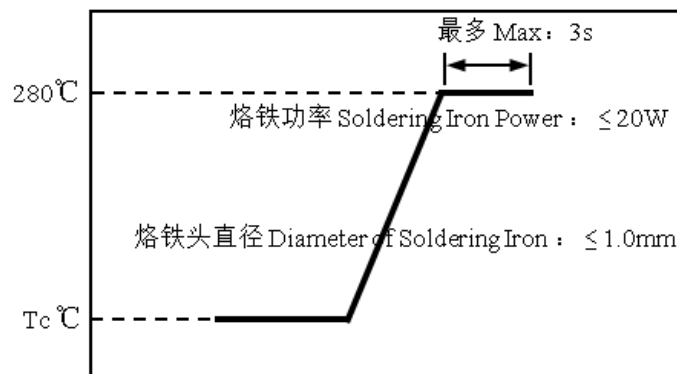
- 烙铁功率：最大 20W
- 预热：150°C/60sec.
- 烙铁头温度：最高 280°C
- 焊接时间：最多 3sec.
- 焊锡：96.5Sn/3.0Ag/0.5Cu
- 手工焊：最多 1 次

• **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

QN0402X103F4050FB

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	355.103	371.898	389.448	4.72%	0.66
-39	331.715	347.164	363.297	4.65%	0.66
-38	310.027	324.245	339.081	4.58%	0.65
-37	289.905	302.995	316.644	4.50%	0.65
-36	271.226	283.282	295.844	4.43%	0.64
-35	253.877	264.985	276.550	4.36%	0.64
-34	237.755	247.992	258.645	4.30%	0.63
-33	222.764	232.204	242.019	4.23%	0.63
-32	208.819	217.525	226.572	4.16%	0.62
-31	195.840	203.873	212.214	4.09%	0.62
-30	183.753	191.167	198.861	4.02%	0.61
-29	172.492	179.337	186.435	3.96%	0.61
-28	161.995	168.317	174.868	3.89%	0.60
-27	152.205	158.045	164.093	3.83%	0.60
-26	143.071	148.468	154.053	3.76%	0.59
-25	134.544	139.532	144.692	3.70%	0.58
-24	126.580	131.192	135.959	3.63%	0.58
-23	119.139	123.405	127.810	3.57%	0.57
-22	112.183	116.129	120.202	3.51%	0.57
-21	105.677	109.328	113.094	3.44%	0.56
-20	99.590	102.969	106.452	3.38%	0.55
-19	93.891	97.020	100.242	3.32%	0.55
-18	88.555	91.451	94.433	3.26%	0.54
-17	83.556	86.238	88.997	3.20%	0.54
-16	78.869	81.354	83.908	3.14%	0.53
-15	74.475	76.777	79.141	3.08%	0.52
-14	70.353	72.485	74.675	3.02%	0.52
-13	66.484	68.460	70.488	2.96%	0.51
-12	62.852	64.683	66.561	2.90%	0.50
-11	59.440	61.138	62.877	2.85%	0.50
-10	56.234	57.808	59.419	2.79%	0.49
-9	53.221	54.680	56.173	2.73%	0.48
-8	50.387	51.740	53.123	2.67%	0.48
-7	47.721	48.975	50.257	2.62%	0.47
-6	45.212	46.375	47.563	2.56%	0.46
-5	42.850	43.928	45.029	2.51%	0.46
-4	40.623	41.622	42.642	2.45%	0.45
-3	38.524	39.451	40.396	2.40%	0.44
-2	36.546	37.406	38.282	2.34%	0.44
-1	34.682	35.479	36.290	2.29%	0.43
0	32.924	33.663	34.414	2.23%	0.42
1	31.265	31.950	32.647	2.18%	0.41

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	29.700	30.335	30.980	2.13%	0.41
3	28.222	28.810	29.408	2.07%	0.40
4	26.826	27.371	27.925	2.02%	0.39
5	25.507	26.013	26.525	1.97%	0.38
6	24.261	24.729	25.204	1.92%	0.38
7	23.083	23.516	23.956	1.87%	0.37
8	21.969	22.370	22.777	1.82%	0.36
9	20.915	21.286	21.662	1.77%	0.35
10	19.917	20.261	20.609	1.72%	0.35
11	18.973	19.291	19.612	1.67%	0.34
12	18.079	18.373	18.670	1.62%	0.33
13	17.232	17.503	17.778	1.57%	0.32
14	16.429	16.680	16.933	1.52%	0.31
15	15.668	15.900	16.134	1.47%	0.31
16	14.947	15.161	15.376	1.42%	0.30
17	14.263	14.460	14.659	1.37%	0.29
18	13.614	13.795	13.978	1.33%	0.28
19	12.998	13.165	13.333	1.28%	0.27
20	12.413	12.567	12.722	1.23%	0.26
21	11.858	11.999	12.141	1.18%	0.26
22	11.330	11.460	11.591	1.14%	0.25
23	10.829	10.948	11.068	1.09%	0.24
24	10.353	10.462	10.571	1.05%	0.23
25	9.900	10.000	10.100	1.00%	0.22
26	9.461	9.561	9.661	1.05%	0.23
27	9.044	9.143	9.243	1.09%	0.25
28	8.647	8.746	8.846	1.14%	0.26
29	8.270	8.369	8.467	1.18%	0.27
30	7.911	8.009	8.107	1.22%	0.28
31	7.570	7.667	7.764	1.27%	0.29
32	7.245	7.341	7.438	1.31%	0.30
33	6.936	7.031	7.126	1.36%	0.32
34	6.642	6.736	6.830	1.40%	0.33
35	6.362	6.454	6.547	1.44%	0.34
36	6.095	6.186	6.278	1.49%	0.35
37	5.840	5.930	6.021	1.53%	0.37
38	5.598	5.686	5.776	1.57%	0.38
39	5.367	5.454	5.542	1.61%	0.39
40	5.146	5.232	5.319	1.66%	0.40
41	4.936	5.020	5.106	1.70%	0.42
42	4.736	4.818	4.902	1.74%	0.43
43	4.544	4.626	4.708	1.78%	0.44
44	4.361	4.441	4.522	1.82%	0.45
45	4.187	4.265	4.345	1.86%	0.47
46	4.020	4.097	4.176	1.91%	0.48

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)
47	3.861	3.937	4.013	1.95%	0.49
48	3.709	3.783	3.859	1.99%	0.51
49	3.564	3.637	3.710	2.03%	0.52
50	3.425	3.496	3.569	2.07%	0.53
51	3.292	3.362	3.433	2.11%	0.55
52	3.165	3.234	3.303	2.15%	0.56
53	3.044	3.111	3.179	2.19%	0.57
54	2.928	2.993	3.060	2.23%	0.59
55	2.816	2.881	2.946	2.26%	0.60
56	2.710	2.773	2.837	2.30%	0.61
57	2.608	2.669	2.732	2.34%	0.63
58	2.510	2.571	2.632	2.38%	0.64
59	2.417	2.476	2.536	2.42%	0.66
60	2.327	2.385	2.444	2.46%	0.67
61	2.242	2.298	2.355	2.50%	0.68
62	2.160	2.215	2.271	2.53%	0.70
63	2.081	2.135	2.190	2.57%	0.71
64	2.006	2.058	2.112	2.61%	0.73
65	1.933	1.985	2.037	2.65%	0.74
66	1.864	1.914	1.965	2.68%	0.76
67	1.797	1.846	1.897	2.72%	0.77
68	1.733	1.781	1.831	2.76%	0.79
69	1.672	1.719	1.767	2.79%	0.80
70	1.613	1.659	1.706	2.83%	0.82
71	1.557	1.601	1.647	2.87%	0.83
72	1.502	1.546	1.591	2.90%	0.85
73	1.450	1.493	1.537	2.94%	0.86
74	1.400	1.442	1.484	2.98%	0.88
75	1.352	1.392	1.434	3.01%	0.89
76	1.305	1.345	1.386	3.05%	0.91
77	1.261	1.300	1.340	3.08%	0.92
78	1.218	1.256	1.295	3.12%	0.94
79	1.177	1.214	1.253	3.15%	0.95
80	1.138	1.174	1.211	3.19%	0.97
81	1.100	1.135	1.172	3.22%	0.98
82	1.063	1.098	1.134	3.26%	1.00
83	1.028	1.062	1.097	3.29%	1.02
84	0.994	1.028	1.062	3.32%	1.03
85	0.962	0.994	1.028	3.36%	1.05
86	0.931	0.962	0.995	3.39%	1.06
87	0.900	0.931	0.963	3.43%	1.08
88	0.871	0.901	0.933	3.46%	1.10
89	0.843	0.873	0.903	3.49%	1.11
90	0.816	0.845	0.875	3.53%	1.13
91	0.790	0.818	0.847	3.56%	1.15

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)
92	0.765	0.793	0.821	3.59%	1.16
93	0.741	0.768	0.796	3.63%	1.18
94	0.718	0.744	0.771	3.66%	1.20
95	0.695	0.721	0.747	3.69%	1.21
96	0.673	0.699	0.725	3.72%	1.23
97	0.653	0.677	0.703	3.76%	1.25
98	0.633	0.657	0.681	3.79%	1.26
99	0.613	0.637	0.661	3.82%	1.28
100	0.594	0.617	0.641	3.85%	1.30
101	0.576	0.599	0.622	3.88%	1.32
102	0.559	0.581	0.604	3.92%	1.33
103	0.542	0.564	0.586	3.95%	1.35
104	0.526	0.547	0.569	3.98%	1.37
105	0.510	0.531	0.552	4.01%	1.39
106	0.495	0.515	0.536	4.04%	1.40
107	0.480	0.500	0.520	4.07%	1.42
108	0.466	0.485	0.505	4.10%	1.44
109	0.452	0.471	0.491	4.13%	1.46
110	0.439	0.457	0.476	4.16%	1.47
111	0.426	0.444	0.463	4.19%	1.49
112	0.414	0.431	0.450	4.23%	1.51
113	0.402	0.419	0.437	4.26%	1.53
114	0.390	0.407	0.425	4.29%	1.55
115	0.379	0.396	0.413	4.32%	1.57
116	0.369	0.385	0.401	4.34%	1.58
117	0.358	0.374	0.390	4.37%	1.60
118	0.348	0.363	0.379	4.40%	1.62
119	0.338	0.353	0.369	4.43%	1.64
120	0.329	0.344	0.359	4.46%	1.66
121	0.320	0.334	0.349	4.49%	1.68
122	0.311	0.325	0.340	4.52%	1.70
123	0.302	0.316	0.331	4.55%	1.72
124	0.294	0.308	0.322	4.58%	1.73
125	0.286	0.299	0.313	4.61%	1.75

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