

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): QN0402X103J3950FB

客户规格(Customer's Part Number):

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

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变更履历表 **Version change history**

[illegible]

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

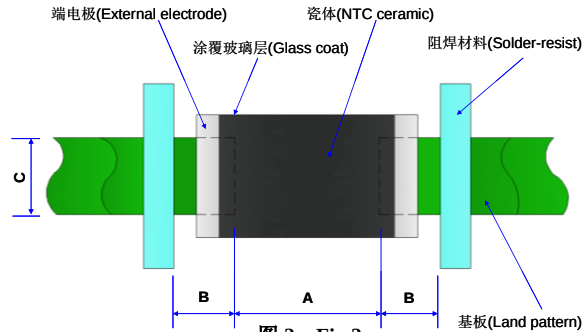


图 2 Fig.2

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 J 3950 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

③ 分隔符 Delimiter	
	X

④ 25℃的零功率电阻 Nominal Zero-Power Resistance	
502	5kΩ
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	
3450	3450K
3950	3950K
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 (℃)
QN0402X103J3950FB	10±5%	3950±1%	3987 ref.	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：

- 环境温度：20±15℃；
- 相对湿度：65±20%；
- 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：

- 环境温度：25±2℃；
- 相对湿度：65±5%
- 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:

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

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

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

▪ Inspection Equipment

Visual Examination: 20× magnifier

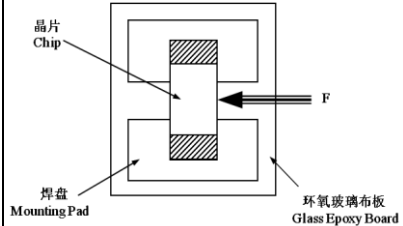
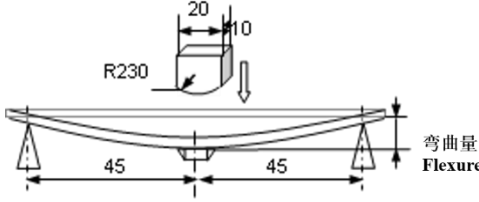
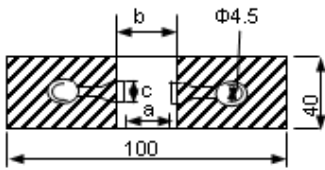
Resistance value test: Thermistor resistance tester

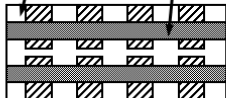
5 电性测试 Electrical Test

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℃. $B(25-50^{\circ}\text{C}) = \frac{\ln R_{25} - \ln R_{50}}{1/T_{25} - 1/T_{50}} \quad B(25-85^{\circ}\text{C}) = \frac{\ln R_{25} - \ln R_{85}}{1/T_{25} - 1/T_{85}}$ 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 T₀ (°C) to T₁ (°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	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. <table><tr><td>尺寸 Size</td><td>F</td><td>保持时间 Duration</td></tr><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></table>	尺寸 Size	F	保持时间 Duration	0201	2N	10±1s	0402, 0603	5N	0805	10N	端电极无脱落且瓷体无损伤。 No removal or split of the termination or other defects shall occur. 																				
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	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;  <table><tr><td>尺寸 Size</td><td>弯曲变形量 Flexure</td><td>施压速度 Pressurizing Speed</td><td>保持时间 Duration</td></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	① 无外观损伤。 No visible damage. ② $\Delta R_{25}/R_{25} \leq 2\%$ 单位 unit: mm <table><tr><td>类型 Type</td><td>a</td><td>b</td><td>c</td></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																														
0201,	1mm	<0.5mm/s	10±1s																														
0402, 0603, 0805	2mm																																
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0201	0.25	0.3	0.3																														
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0603	1.0	3.0	1.2																														
0805	1.2	4.0	1.65																														

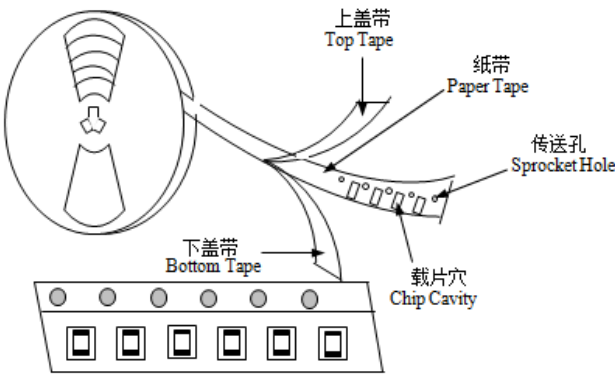
振动 Vibration	IEC 60068-2-80	① 将晶片焊接在测试基板上（如右图所示的环氧玻璃布板）； Solder the chip to the testing jig (glass epoxy board shown in the left) using eutectic solder. ② 晶片以全振幅为 1.5mm 进行振动，频率范围为 10Hz ~55 Hz； The chip shall be subjected to a simple harmonic motion having total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55 Hz. 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 3mutually perpendicular directions (total of 6 hours).	无外观损伤。 No visible damage. 铜箔 Cupad 阻焊膜 Solder mask  环氧玻璃布板Glass Epoxy Board															
坠落 Dropping	IEC 60068-2-32	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.	无外观损伤。 No visible damage.															
可焊性 Solderability	IEC 60068-2-58	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.	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.															
耐焊性 Resistance to Soldering Heat	IEC 60068-2-58	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.	① 无外观损伤； No visible damage. ② ΔR25/R25 ≤2% ③ ΔB/B ≤1%															
温度周期 Temperature cycling	IEC 60068-2-14	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. <table><tr><td>步骤 Step</td><td>温度 Temperature</td><td>时间 Time</td></tr><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></table> 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.	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	① 无外观损伤； No visible damage. ② ΔR25/R25 ≤2% ③ ΔB/B ≤1%
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																
高温存放 Resistance to dry heat	IEC 60068-2-2	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.	① 无外观损伤； No visible damage. ② ΔR25/R25 ≤2% ③ ΔB/B ≤1%															

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 ΔR25/R25 ≤2% ③ ΔB/B ≤1%
湿热存放 Resistance to damp heat	IEC 60068-2-78	① 在 60±2℃，相对湿度 90~95%空气中，无负载放置 1000±24 小时。 60±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 ΔR25/R25 ≤2% ③ ΔB/B ≤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 ΔR25/R25 ≤2% ③ ΔB/B ≤1%

7 编带 Taping

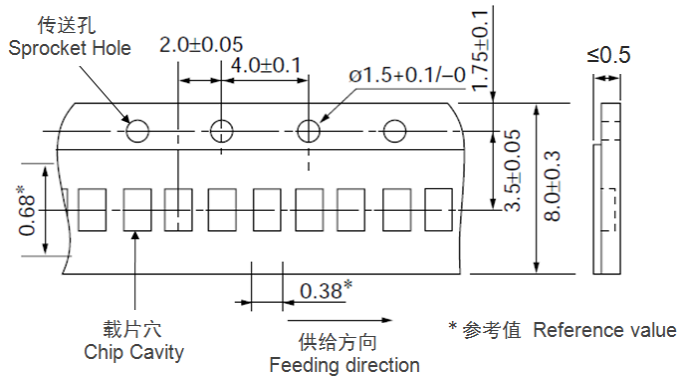
类型 Type	0201	0402	0603	0805
编带厚度 Tape thickness(mm)	0.5±0.15	0.5±0.15	0.8±0.15	0.85±0.2
编带材质 Tape material	纸带 Paper Tape			
每盘数量 Quantity per Reel	15K	10K	4K	4K

(1) 编带图 Taping Drawings

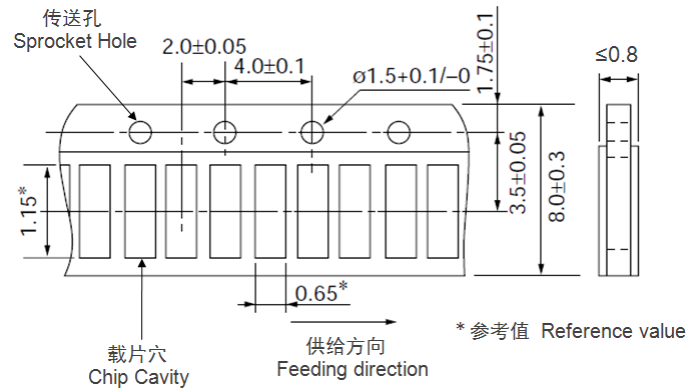


(2) 纸带尺寸 Paper Tape Dimensions (单位 Unit: mm)

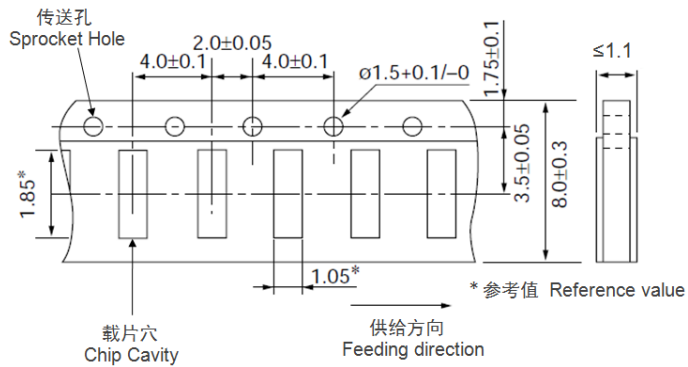
QN0201 系列 QN0201 series



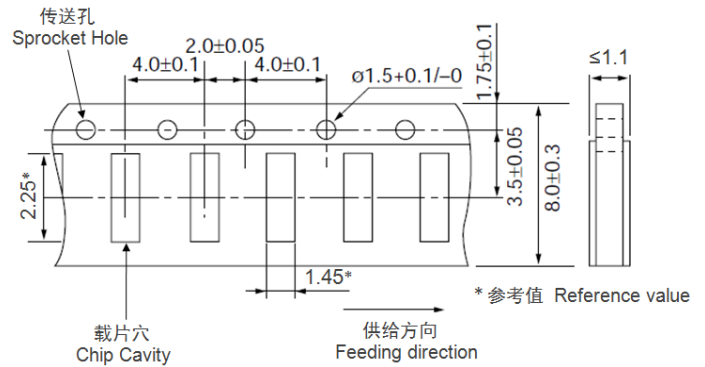
QN0402 系列 QN0402 series



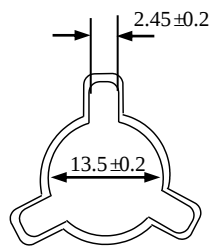
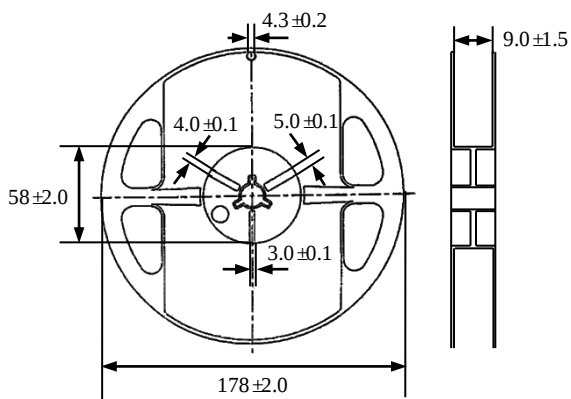
QN0603 系列 QN0603 series



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

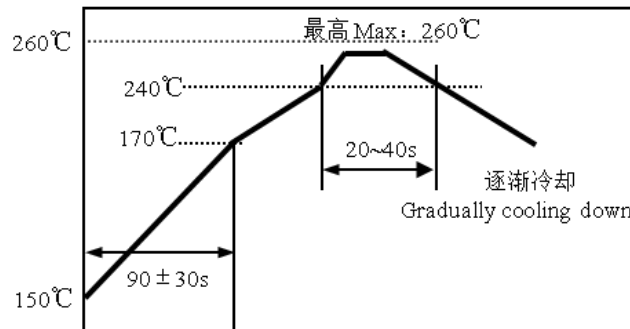
• 回流焊

- 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

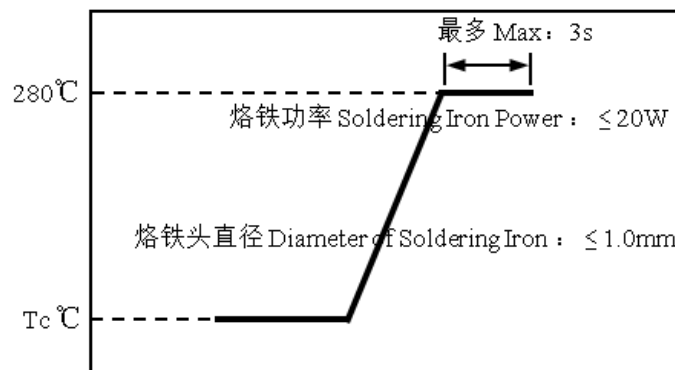
- 烙铁功率: 最大 20W
- 预热: 150°C/60sec.
- 烙铁头温度: 最高 280°C
- 焊接时间: 最多 3sec.
- 焊锡: 96.5Sn/3.0Ag/0.5Cu
- 手工焊: 最多 1 次

• 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

QN0402X103J3950FB

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	316.597	345.275	375.609	8.79%	1.26
-39	296.180	322.791	350.913	8.71%	1.26
-38	277.219	301.925	328.010	8.64%	1.26
-37	259.601	282.549	306.757	8.57%	1.26
-36	243.223	264.549	287.025	8.50%	1.26
-35	227.988	247.816	268.695	8.43%	1.26
-34	213.810	232.254	251.659	8.35%	1.26
-33	200.608	217.774	235.817	8.29%	1.26
-32	188.310	204.292	221.077	8.22%	1.26
-31	176.847	191.735	207.356	8.15%	1.25
-30	166.157	180.032	194.577	8.08%	1.25
-29	156.184	169.120	182.670	8.01%	1.25
-28	146.875	158.941	171.569	7.94%	1.25
-27	138.181	149.441	161.215	7.88%	1.25
-26	130.059	140.571	151.553	7.81%	1.25
-25	122.466	132.284	142.532	7.75%	1.25
-24	115.350	124.522	134.088	7.68%	1.25
-23	108.694	117.266	126.198	7.62%	1.25
-22	102.465	110.480	118.824	7.55%	1.24
-21	96.632	104.130	111.928	7.49%	1.24
-20	91.170	98.185	105.477	7.43%	1.24
-19	86.050	92.618	99.438	7.36%	1.24
-18	81.251	87.402	93.783	7.30%	1.24
-17	76.750	82.513	88.486	7.24%	1.24
-16	72.526	77.927	83.521	7.18%	1.24
-15	68.562	73.626	78.866	7.12%	1.23
-14	64.839	69.588	74.499	7.06%	1.23
-13	61.341	65.797	70.401	7.00%	1.23
-12	58.053	62.237	66.554	6.94%	1.23
-11	54.962	58.890	62.941	6.88%	1.23
-10	52.055	55.744	59.546	6.82%	1.23
-9	49.319	52.786	56.355	6.76%	1.22
-8	46.744	50.002	53.354	6.70%	1.22
-7	44.318	47.382	50.531	6.65%	1.22
-6	42.034	44.916	47.875	6.59%	1.22
-5	39.880	42.592	45.374	6.53%	1.22
-4	37.847	40.400	43.016	6.48%	1.21
-3	35.930	38.333	40.794	6.42%	1.21
-2	34.122	36.385	38.701	6.36%	1.21
-1	32.416	34.548	36.727	6.31%	1.21
0	30.805	32.814	34.866	6.26%	1.21
1	29.285	31.179	33.113	6.20%	1.20

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	27.850	29.636	31.457	6.15%	1.20
3	26.493	28.178	29.895	6.09%	1.20
4	25.210	26.800	28.418	6.04%	1.20
5	23.996	25.497	27.023	5.99%	1.19
6	22.846	24.263	25.703	5.93%	1.19
7	21.758	23.096	24.454	5.88%	1.19
8	20.728	21.992	23.274	5.83%	1.19
9	19.753	20.947	22.157	5.78%	1.18
10	18.829	19.958	21.101	5.73%	1.18
11	17.955	19.022	20.101	5.68%	1.18
12	17.126	18.135	19.155	5.63%	1.18
13	16.340	17.294	18.259	5.58%	1.17
14	15.594	16.498	17.409	5.53%	1.17
15	14.887	15.742	16.604	5.48%	1.17
16	14.216	15.025	15.841	5.43%	1.16
17	13.578	14.345	15.116	5.38%	1.16
18	12.973	13.699	14.429	5.33%	1.16
19	12.398	13.086	13.777	5.28%	1.15
20	11.852	12.504	13.159	5.23%	1.15
21	11.333	11.951	12.571	5.19%	1.15
22	10.840	11.426	12.013	5.14%	1.15
23	10.371	10.926	11.483	5.09%	1.14
24	9.925	10.452	10.979	5.05%	1.14
25	9.500	10.000	10.500	5.00%	1.14
26	9.088	9.570	10.053	5.05%	1.15
27	8.696	9.162	9.628	5.09%	1.17
28	8.323	8.773	9.223	5.14%	1.19
29	7.968	8.402	8.838	5.18%	1.21
30	7.630	8.049	8.470	5.23%	1.22
31	7.309	7.713	8.120	5.27%	1.24
32	7.002	7.393	7.786	5.32%	1.26
33	6.711	7.088	7.468	5.36%	1.28
34	6.433	6.797	7.165	5.41%	1.30
35	6.167	6.520	6.875	5.45%	1.32
36	5.915	6.255	6.599	5.49%	1.34
37	5.674	6.003	6.335	5.54%	1.35
38	5.444	5.762	6.084	5.58%	1.37
39	5.225	5.532	5.843	5.62%	1.39
40	5.015	5.313	5.614	5.67%	1.41
41	4.815	5.103	5.394	5.71%	1.43
42	4.625	4.903	5.185	5.75%	1.45
43	4.442	4.711	4.984	5.79%	1.47
44	4.268	4.529	4.793	5.84%	1.49
45	4.102	4.354	4.610	5.88%	1.51
46	3.943	4.187	4.435	5.92%	1.53

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	3.791	4.027	4.267	5.96%	1.55
48	3.646	3.874	4.107	6.00%	1.57
49	3.507	3.728	3.953	6.04%	1.59
50	3.374	3.588	3.806	6.08%	1.61
51	3.247	3.454	3.666	6.12%	1.63
52	3.125	3.326	3.531	6.16%	1.65
53	3.009	3.203	3.402	6.20%	1.67
54	2.897	3.086	3.278	6.24%	1.69
55	2.790	2.973	3.160	6.28%	1.71
56	2.688	2.865	3.046	6.32%	1.73
57	2.590	2.761	2.937	6.36%	1.75
58	2.496	2.662	2.832	6.40%	1.77
59	2.406	2.567	2.732	6.44%	1.79
60	2.319	2.476	2.636	6.48%	1.81
61	2.236	2.388	2.544	6.51%	1.84
62	2.157	2.304	2.455	6.55%	1.86
63	2.081	2.224	2.370	6.59%	1.88
64	2.008	2.146	2.289	6.63%	1.90
65	1.938	2.072	2.210	6.67%	1.92
66	1.870	2.001	2.135	6.70%	1.94
67	1.806	1.932	2.062	6.74%	1.96
68	1.743	1.866	1.993	6.78%	1.99
69	1.684	1.803	1.926	6.81%	2.01
70	1.626	1.742	1.861	6.85%	2.03
71	1.571	1.684	1.800	6.89%	2.05
72	1.518	1.628	1.740	6.92%	2.08
73	1.468	1.574	1.683	6.96%	2.10
74	1.419	1.522	1.628	7.00%	2.12
75	1.372	1.472	1.576	7.03%	2.14
76	1.327	1.424	1.525	7.07%	2.17
77	1.283	1.378	1.476	7.10%	2.19
78	1.241	1.333	1.428	7.14%	2.21
79	1.201	1.290	1.383	7.17%	2.23
80	1.162	1.249	1.339	7.21%	2.26
81	1.125	1.209	1.297	7.24%	2.28
82	1.089	1.171	1.256	7.28%	2.30
83	1.054	1.134	1.217	7.31%	2.33
84	1.021	1.099	1.180	7.34%	2.35
85	0.989	1.065	1.143	7.38%	2.37
86	0.958	1.032	1.108	7.41%	2.40
87	0.928	1.000	1.074	7.45%	2.42
88	0.899	0.969	1.042	7.48%	2.45
89	0.872	0.940	1.010	7.51%	2.47
90	0.845	0.911	0.980	7.55%	2.49
91	0.819	0.884	0.951	7.58%	2.52

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	0.794	0.857	0.922	7.61%	2.54
93	0.770	0.831	0.895	7.64%	2.57
94	0.747	0.807	0.869	7.68%	2.59
95	0.725	0.783	0.843	7.71%	2.62
96	0.703	0.760	0.819	7.74%	2.64
97	0.683	0.738	0.795	7.77%	2.67
98	0.663	0.716	0.772	7.81%	2.69
99	0.643	0.695	0.750	7.84%	2.72
100	0.625	0.675	0.729	7.87%	2.74
101	0.607	0.656	0.708	7.90%	2.77
102	0.589	0.637	0.688	7.93%	2.79
103	0.572	0.619	0.669	7.96%	2.82
104	0.556	0.602	0.650	7.99%	2.84
105	0.540	0.585	0.632	8.02%	2.87
106	0.525	0.569	0.614	8.05%	2.89
107	0.510	0.553	0.598	8.08%	2.92
108	0.496	0.538	0.581	8.11%	2.95
109	0.482	0.523	0.565	8.15%	2.97
110	0.469	0.508	0.550	8.18%	3.00
111	0.456	0.495	0.535	8.21%	3.02
112	0.443	0.481	0.521	8.23%	3.05
113	0.431	0.468	0.507	8.26%	3.08
114	0.420	0.456	0.493	8.29%	3.10
115	0.408	0.443	0.480	8.32%	3.13
116	0.397	0.432	0.468	8.35%	3.16
117	0.387	0.420	0.455	8.38%	3.18
118	0.376	0.409	0.444	8.41%	3.21
119	0.367	0.399	0.432	8.44%	3.24
120	0.357	0.388	0.421	8.47%	3.26
121	0.348	0.378	0.410	8.50%	3.29
122	0.339	0.368	0.400	8.52%	3.32
123	0.330	0.359	0.390	8.55%	3.35
124	0.321	0.350	0.380	8.58%	3.37
125	0.313	0.341	0.370	8.61%	3.40