深圳市晶创和立科技有限公司

承　认　书

APPROVAL SHEET

客户名称: **Customer Name**	
产品名称: **Product Name**	片式负温度系数热敏电阻器 CHIP　NTC　THERMISTOR
制造商料号: **Manufacturer P/N**	
客户料号: **Customer P/N**	
版本号: **Version No.**	15.01
标准类型: Standard type	■标准品 Standard product 非标准品 Custom product

制造厂商 **Manufacturer**		
拟制 **Draft**	审核 **Check**	
	品管部	技术部
林晓华	徐雪枫	岑权进
日期 **Date**	**2015-09-14**	**2015-09-14**

客户承认印章 **APPROVAL SIGNET**	
日期 **Date**	

注：请确认后签回，如不签回，则视贵公司默认产品发货按我司标准品标准执行。

Note：Please confirm and sign back, if not we will considered the acception as our standard.

深圳市晶创和立科技有限公司

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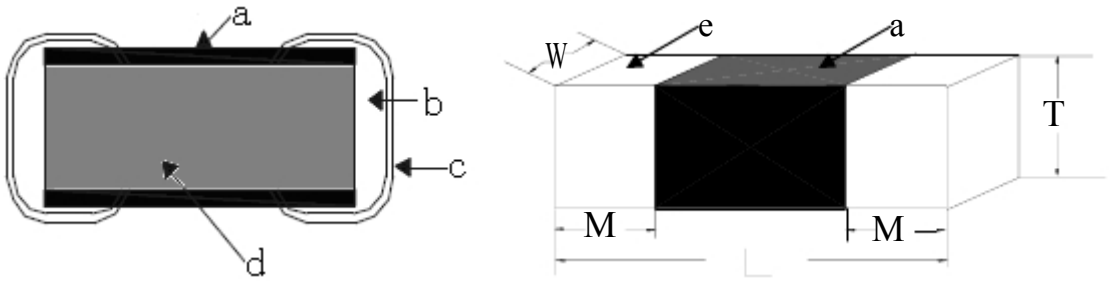
深圳市晶创和立科技有限公司

履历表 **Resume**

版本 Version No.	修改明细 Modify Details	日期 Date
15.01	首次发行 Initial issue	2015-02-01

1外形尺寸与内部结构 Dimension & Inner-configuration：



a.玻璃层：Gass layer

b.银层 Ag layer

c.镀层 Ni/Sn plating

d.NTC 瓷体 NTC or ceramic

e.端电极 Terminal electrode

序号 No.	部位 Component		材料 Material
1	NTC瓷体NTC or ceramic		锰钴镍Mn-Co- Ni
2	玻璃层：Gass layer		硅铋系Si-Bi
3	端电极 Terminal electrode	银层 Ag laye	银Ag
		电镀层Ni/Sn plating	镍层-锡层Ni-Sn

单位Unit：mm（inch）

型号 Size	L	W	T	M
0402	1.0±0.15 (0.040±0.006)	0.5±0.10(0.020±0.004)	0.5Max. (0.020Max.)	0.10Min.(0.004Min.)
0603	1.6±0.15(0.063±0.006)	0.8±0.15(0.031±0.006)	0.95Max.(0.037Max.)	0.10Min.(0.004Min.)
0805	2.0±0.20(0.08±0.008)	1.25±0.20(0.05±0.008)	1.25Max.(0.05Max.)	0.15Min.(0.006Min.)
1206	3.2±0.20(0.126±0.008)	1.6±0.20(0.063±0.008)	1.50Max.(0.060Max.)	0.20Min.(0.008Min.)

2产品品名构成 Product Spec. Model

CMF X XXX X XXXX X X X X

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① 产品代号：表示片式负温度系数热敏电阻

Product Code：Chip NTC Thermistor

② 尺寸规格代码

Size Code

代码/Code	D	A	B	C
尺寸（英制） Size（Inches）	0402	0603	0805	1206

③ 标称电阻值 为 25℃时的零功率电阻，单位为 Ω，

前二位为有效数字，第三位数字表示有效数字后“0”的个数。.

Rated zero-power resistance(R_{25}) Unit: Ω

The first two are significant figure of resistance and the third one expresses number of following zeros.

④ 阻值公差代码（%）

Tolerance of R_{25} (%)

代码/ Code	E	F	G	H	J	K	X
阻值公差 Tolerance of R_{25}	±0.5	±1.0	±2.0	±3.0	±5.0	±10.0	特殊公差

⑤ B 值常数,单位为 K

B value constant Unit:K

⑥ B 值精度代码(%)

Tolerance of B value(%)

代码/ Code	E	F	G	H	J	X
B 值公差 Tolerance of B value	±0.5	±1.0	±2.0	±3.0	±5.0	特殊公差

⑦ B 值温度代码 （℃/℃）

B value Temperature Code

代码/ Code	A	B	C	D	E	F	G	H	M	N
T_1/T_2	25/50	25/ 85	0/25	0/50	0/100	0/80	25/100	-18/25	-20/25	5/25

⑧ 端电极材料代号：N—三层电极

Termination Code: N—Nickel Barrier

⑨ 包装方式代码：T—编带包装、B—散包装

Packaging style Code: T—Tape & Reel、B—Bulk

3电性能参数表 Electrical Characteristics List

型号规格 Part Number	客户料号 Customer no.	R_{25}（KΩ）	$B_{25/50}$(k)
CMFC103J3950HANT		10±5%	3950±3%

4可靠性试验项目 Reliability Testing Items

序号 No.	项目 Items	要求 Requirements	试验方法及备注 Test Methods and Remarks
1	工作温度范围 Operating Temperature Range	-40℃～+120℃	
2	可焊 Solder ability	至少 95%端电极表面被焊锡覆盖。 At least 95% of terminal electrode should be covered with solder	预热温度:100℃～150℃ 预热时间:1～2Min. 焊锡温度: 245±5℃ 浸锡时间: 5±0.5s Preheating Temp. :100℃～150℃ Preheating Time: 1～2min. Soldering Temp. : 260±5℃ Immersion Time: 5±0.5s
3	耐焊接热 Resistance to Soldering	至少 90%的焊锡覆盖在端电极表面，无可见机械损伤。 R_{25} 变化率小于±5% B 值($B_{25/50}$)变化率小于±2% At least 90% of terminal electrode should be covered with solder. No mechanical damage. R_{25} change shall be less than±5%; B-constant($B_{25/50}$)change shall be less than ±2%.	预热温度:100℃～150℃ 预热时间:1～2Min. 焊锡温度: 260±5℃ 浸锡时间: 10±0.5s Preheating Temp. : 100℃～150℃ Preheating Time:1～2min. Soldering Temp. : 260±5℃ Immersion Time: 10±1s
4	端电极强度 External Electrode Strength	瓷体及端头均不受破坏 Ceramic and termination shall not be damaged.	

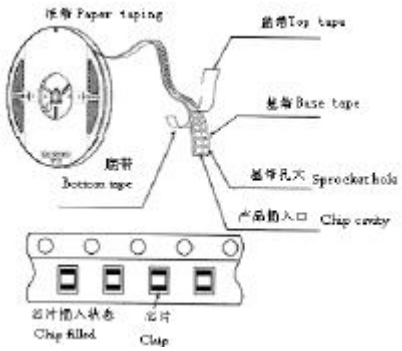
类型 Type	推力(N) Force (N)	时间(s) Time (s)
0402	5	5±1
0603	5	5±1
0805	10	5±1
1206	10	5±1

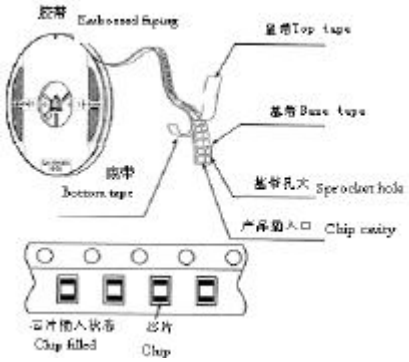
<table>
<tr><th>序号
No.</th><th>项目
Items</th><th>要求
Requirements</th><th>试验方法及备注
Test Methods and Remarks</th></tr>
<tr><td>5</td><td>振 动
Vibration</td><td>无可见机械损伤；
R_{25} 变化率小于±5%;
B 值($B_{25/50}$)变化率小于±2%.
Novisible mechanical damage；
R_{25} change shall be less than±5%;
B-constant($B_{25/50}$)change shall be less than ±2%.</td><td>振动频率范围:10Hz～55Hz～10Hz
全振幅: 1.52mm
时间:X\Y\Z 轴各 2hrs
Frequency:10Hz～55Hz～10Hz
Amplitude: 1.52mm
Time: Vibrated for a period of 2hrs,in three directions perpendicularly intersecting each other.</td></tr>
<tr><td>6</td><td>抗弯强度
Resistance to flexure</td><td>无可见机械损伤;
R_{25} 变化率小于±5%;
B 值($B_{25/50}$)变化率小于±2%.
No visible mechanical damage;
R_{25} change shall be less than±5%;
B-constant($B_{25/50}$)change shall be less than ±2%.</td><td>条 件
<table><tr><th>规格
Size code</th><th>弯曲度 h (mm)
Camber (mm)</th></tr><tr><td>0402、0603</td><td>0.7</td></tr><tr><td>0805、1206</td><td>1.0</td></tr></table>
度:0.5mm/s
Condition: print circuit board.
Pressing speed: 0.5 mm/s</td></tr>
<tr><td>7</td><td>跌落
Drop</td><td>无可见机械损伤;
R_{25} 变化率小于±5%;
B 值($B_{25/50}$)变化率小于±2%.
No visible mechanical damage;
R_{25} change shall be less than±5%;
B-constant($B_{25/50}$)change shall be less than ±2%.</td><td>从高度为 1 米的空中自由落到混凝土地板，重复 10 次
Drop 10 times on a concrete floor from a high of 1m.</td></tr>
<tr><td>8</td><td>耐高温
Resistance to High Temperature</td><td>外观无可见损伤；
R_{25} 变化率小于±5%;
B 值($B_{25/50}$)变化率小于±2%.
No visible damage；
R_{25} change shall be less than±5%;
B-constant($B_{25/50}$)change shall be less than ±2%.</td><td>温度：125±2℃(无负荷)
试验时间：500±2hrs
Temp.：125±2℃(No Load)
Time：500±2hrs</td></tr>
</table>

<table>
<tr><th>序号
No.</th><th>项目
Items</th><th>要求
Requirements</th><th>试验方法及备注
Test Methods and Remarks</th></tr>
<tr><td>9</td><td>耐低温
Resistance to High Temperature</td><td>外观无可见机械损伤;
R_{25} 变化率小于±5%
B 值($B_{25/50}$)变化率小于±2%
No visible mechanical damage;
R_{25} change shall be less than±5%;
B-constant($B_{25/50}$)change shall be less than ±2%.</td><td>在-40±2℃的条件下放置 500±2hrs
Temp.：-40±2℃
Time ：500±2hrs</td></tr>
<tr><td>10</td><td>恒定湿热
Static Humidity</td><td>外观无可见机械损伤；
R_{25} 变化率小于±5%;
B 值($B_{25/50}$)变化率小于±2%.
No visible mechanical damage;
R_{25} change shall be less than±5%;
B-constant($B_{25/50}$)change shall be less than ±2%.</td><td>在下列条件下放置 500±2hrs
温度：55±2℃
湿度：90～95%RH
Temp.：55±2℃
Humidity：90～95%RH
Time：500±2hrs</td></tr>
<tr><td>11</td><td>温度循环
Temperature cycling</td><td>外观无可见损伤；
R_{25} 变化率小于±5%;
B 值($B_{25/50}$)变化率小于±2%
No visible damage；
R_{25} change shall be less than ±5%;
B-constant($B_{25/50}$)change shall be less than ±2%.</td><td>无负荷,在下列条件循环 32 次
cycles without load
<table>
<tr><th>阶段
Step</th><th>温度
Temp.</th><th>时间
Time
(Min.)</th></tr>
<tr><td>1</td><td>-40℃</td><td>30±3</td></tr>
<tr><td>2</td><td>室温/Room Temp</td><td>10±2</td></tr>
<tr><td>3</td><td>+125℃</td><td>30±3</td></tr>
<tr><td>4</td><td>室温/Room Temp</td><td>10±2</td></tr>
</table></td></tr>
<tr><td colspan="4">注：以上要求测试电性能的项目，应试验后在标准条件下放置 24 小时后测试。
Note:When there are questions concerning, measurement shall be made after 24±2hrs of recovery under the standard condition.</td></tr>
</table>

5产品包装 Packaging

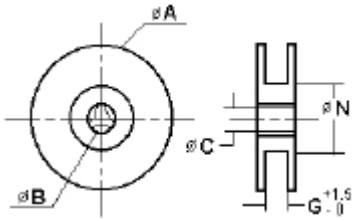
1）编带图 **Taping drawings**



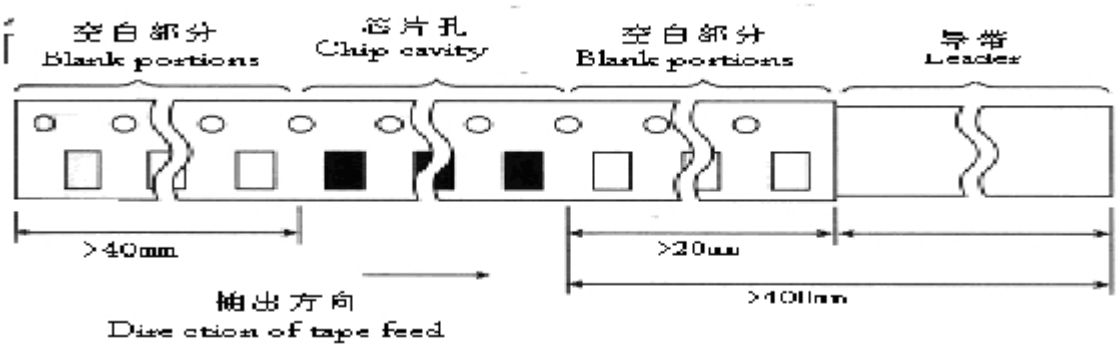


2）卷盘尺寸 **Reel dimensions (Unit:mm)**

	A	B	C	N	G
CF-8	178 ±2.0	22.0 ±2.0	12.5 ±1.5	57 ±2.0	8

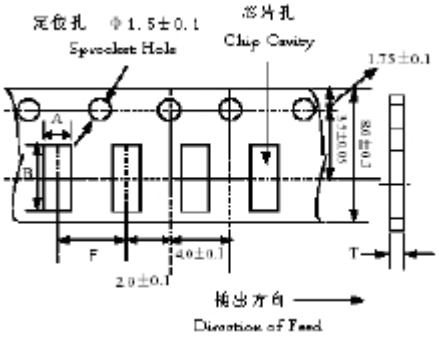


3） 导带及空格部分 **Leader and blank portion**



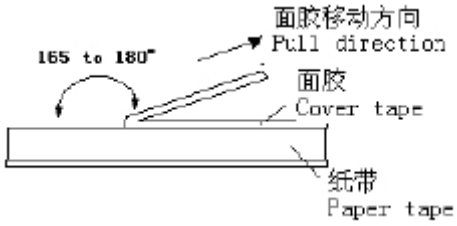
4）编带尺寸 **Taping dimensions (Unit: mm)**

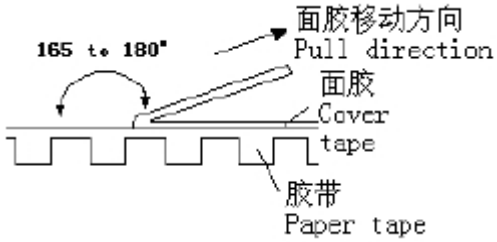
纸带 **Paper tape**



Part NO.	A	B	F	T
0402	0.65±0.1	1.15±0.1	2.0±0.05	0.8max
0603	1.1±0.2	1.9±0.2	4.0±0.2	1.1max
0805	1.5±0.2	2.3±0.2	4.0±0.2	1.1max
1206	1.9±0.2	3.5±0.2	4.0±0.2	1.1max

5）剥离力检验 **Peeling off force**





（1）盖带的剥离力：沿面胶移动方向拉时要求剥离力为 0.1N～0.7N。

Peeling force should be 0.1~0.7N pulling in the direction of arrow.

（2）剥离速度：300mm/min

Speed of peeling off: 300mm/min.

（在胶带、纸带剥落时，面胶不能有破损，不能粘纸带。
The cover bond should not be damaged and bond the tape when it peeled off.

6）包装数量（单位：粒）**Packaging number (Unit: Pcs)**

类型 SIZE	1206	0805	0603	0402
每卷数量 REEL	4000	4000	4000	10000
每盒数量 BOX	40000	40000	40000	100000
每箱数量 CASE	240000	240000	240000	600000

7) 标签粘贴位置 **Label stick station**

卷盘标签	纸盒标签	纸盒标签	外箱标签

推荐焊接条件 Recommend Soldering Conditions

6.1 焊接要求 **Soldering conditions**

（1）预热时，产品表温与焊料温度的温差最大不允许超出 150℃，焊接完冷却时，产品表温与溶剂温度之间的温差最大不超过 100℃。预热不足有可能引发产品表面裂纹，从而导致产品品质下降。

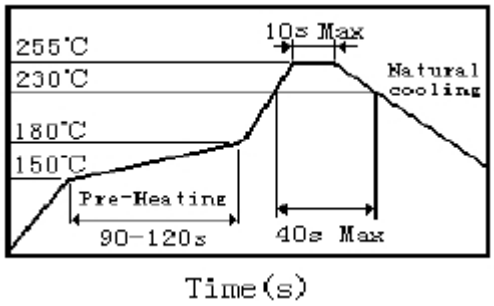
Pre-heating should be in such a way that the temperature difference between solder and ferrite surface is limited to 150℃ max. Also cooling into solvent after soldering should be in such way that the temperature difference is limited to 100℃ max. Un-enough pre-heating may cause cracks on the ferrite, resulting in the deterioration of product quality.

（2）产品要在以下画出的曲线允许的范围内进行焊接。其它焊接条件可能引起产品电极的腐蚀。当焊接重复时，允许的时间为第一次做的累计时间。

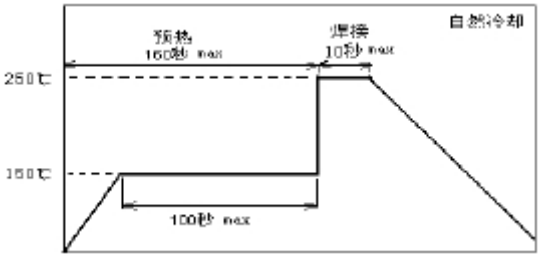
Products should be soldered within the following allowable range indicated by the slanted line. The excessive

soldering conditions may cause the corrosion of the electrode. When soldering is repeated, allowable time is the accumulated time.

6.2 回流焊曲线 **Reflow soldering profile**

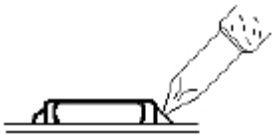


6.3 波峰焊曲线 **Flow soldering profile**



6.4 手工焊接 Iron soldering

烙铁温度：350℃ Perform soldering at 350℃ on 30W max
功率：最大为 30W Time: < 5S
烙铁停留时间：< 5S
注意:烙铁头不得与瓷体直接接触 Caution: Do not allow the iron-tip to directly touch the ceramic body.



6.5 清洗条件 **Cleaning Conditions**

清洗温度：60℃（最高） Cleaning temperature : 60℃ max
清洗时间：1 分钟（最少） Cleaning time: 1 minute min.

超声波功率：最大为 200W Ultrasonic output power: 200W max

6.6 PC 板的设计 PCB design

（1）当片式 NTCR 被安装在 PC 板上后，所使用的焊料的量（焊盘的大小）会直接影响到片式 NTCR 的性能，因此在设计基板时，必须慎重考虑焊盘的大小和配置，这些对组成基板的焊料的量有着决定的作用，过量的焊料会影响到芯片耐机械应力的能力。

When chip thermistors are mounted on a PCB, the amount of solder used(size of fillet) can directly affect thermistor performance Therefore, when design land- patterns it is necessary to consider the appropriate size and configuration of the solder pads, which determines the amount of solder necessary to form the fillets. Excess solder can affect the ability of chips to withstand mechanical stress.

②基板配置：将片式 NTCR 安装在板上之后，芯片将承受在下一加工过程中产生的机械应力，出于这个原因，在设计焊盘和片式 NTCR 的位置时，应注意考虑将应力减少到最低点。

Pattern configurations: After chip thermistor have been mounted on the board, chips can be subject to mechanical stresses in subsequent manufacturing process , for this reason, planning pattern configurations and the position of SMD thermistors should be carefully performed to minimize stress.

6.7 自动安装应考虑到的问题 Considerations for automatic placement.

①在将片式 NTCR 安装在 PC 板上时，不能让其承受过量的冲击力。

Excessive impact load should not be imposed on the thermistor when mounting on the PCB .

②应定期对安装机器进行维护和检查。

The maintenance and inspection of the mounting devices should be conducted periodically .

③当 PC 板沿着接缝孔切割开时，片式 NTCR 所受机械应力的大小因使用的方法不同而不同。以下方法按应力从小到大进行排列：推板、割裂、V 形凹槽、接缝孔。因此。任何理想的片式 NTCR 的布局必须考虑到 PC 板的分割方法。

When beating PCB along their perforations, the amount of mechanical stress on the thermistor can vary according to the method used .The following methods are listed in order from least stressful to most stressful: push-back, slit, v-grooving, and perforation. Thus, any ideal SMD thermistor layout must also consider the PCB splitting procedure.

6.8 焊膏的印刷 printing solder paste

①焊膏的印刷厚度建议在 150μm~200μm。

Recommendable thickness of solder paste printing should from 150μm to 200μm.

②焊接后，爬锡高度为 0.2mm 至本产品的厚度。

After soldering, the solder fillet shall be a height from 0.2mm to the thickness of chip thermistor.

③过多的焊料将给本产品过大的机械应力，这些应力将导致断裂或机械损伤，也可能破坏产品的电性能。

Too much solder gives too strong mechanical stress to chip thermistor, such stress may cause cracking or any mechanical damage. And also, it can destroy the electrical performance of this product.

6.9 粘合剂作用和处理 Adhesive Application and curing

①在流体焊过程中，如果黏性不好或粘合剂不够坚硬，可能会导致产品和底板松散连接。

If insufficient adhesive is applied or if the adhesive is not sufficiently hardened this product may have a loose contact with the land， during flow soldering.

②黏胶的黏性太低将导致焊接后产品在板上滑动。

Too low viscosity of adhesive causes chip thermistor to slip on broad, after mounting.

7存储要求 Storage Requirements

1）存储期限 **Storage period**

距电感公司出厂检验时间 6 个月内，产品可以使用检验时间可以通过包装外侧标记的检验号确认。若时间超过 6 个月，应检查焊接性能后方可使用。

Products which inspected in INDUCTOR COMPANY over 6 months ago should be examined and used, which can be Confirmed with inspection No. marked on the container. Solder ability should be checked if this period is exceeded.

2）存储条件 **Storage conditions**

⑴ 存放货物的库房应满足以下条件：温度：-10 ～ +40℃，相对湿度：30 ～ 70%。

Products should be storage in the warehouse on the following conditions:

Temperature : -10~+40℃ Humidity: 30~70% relative humidity

⑵ 禁止将产品保管在腐蚀性物质中，如硫磺、氯气或酸，否则将引起端头氧化，导致降低焊接性。

Don't keep products in corrosive gases such as sulfur, chlorine gas or acid , or it may case oxidization of Electrodes resulting in poor solder ability.

⑶ 为了避免受潮气、灰尘等物质的影响，产品应保管于货架上。

Products should be storaged on the palette for the prevention of the influence from humidity, dust and so on.

⑷ 产品保管在库房中，应避免热冲击、振动以及直接光照等等。

Products should be storaged in the warehouse without heat shock, vibration, direct sunlight and so on.

⑸ 产品应密封包装。

Products should be storaged under the airtight packaged condition.

8 ODS（消耗臭氧层物质）的使用情况 Usage Of ODS

1）对于以下所列物质，我公司在生产过程中绝不使用。

ODS：CCl_4（四氯化碳）、HCFC 等。

For ODS listed below , we don't use in process。

ODS: CCl_4, HCFC, etc.

9 注意事项 Notes

（1）若本次承认的为"整体无铅"产品，则表明该产品符合RoHS指令的要求。

If the parcel label on product is "Unitary lead free" that indicate the products in accord with ROHS appointed requests.

（2）本承认书保证我司产品作为一个单体时的质量情况，当我司产品被安装到贵司产品上时请保证贵司的产品已根据贵司的规范进行了有效评价和确认。

This product specification guarantees the quality of our product as a single unit, Please make sure that your product has been evaluated and confirmed against your specifications when our product is mounted to your product.

（3）如果贵司对我司产品的试用已超过了本测试规范所界定的产品功能，对于此所引发的失效我司将不予保证。

We can't warrant against failure caused by any use of our product that deviates from the intended use as described in this product specification.

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