PTCON 汕头市鹏泰电子科技有限公司

SHANTOU PENGTAI Electronic Technology Co., Ltd.

规 格 承 认 书

APPROVAL SHEET

客户名称 Customer:	
零件名称 Description:	铝电解电容器
系列规格 Series&Spec.:	HP 400V560UF 35*50
客户料号 Customer P/N:	
版 本 号 Dwg. No:	A/0
送样日期 Issued Date :	2020.05.12
性能特点 Characteristics:	105℃ 2000H

承 认 签 章 APPROVED					
供 方 确 认 Supply-side confirmation			客 户 承 认 Customer acknowledges		
制定 Formulate	审核 Review	批准 Approve	工程师 Engineer	审核 Review	批准 Approve
蔡梓腾	林泽波	林镇鹏			
日期 Date	2020.05.12		日期 Date		
批示 Instructions:	☐接受 Acceptance		☐有条件接受 Conditional acceptance		
备注 Remarks:					

目录 Contents

修订履历表Revision record

修订日期 Revision date	修订原因 Reason for revision	修订内容简述 Revised description of content	修订页码 Revised page	版号 Version number	拟制 Writer	批准 Approval

一、产品系列承认Product series recognition

序号 NO	客户物料号 Customer(P/N)	编码PT(P/N)	系列	规格	尺寸	容差	温度	样品数量 (PCS) Amount
1	/	/	HP	400V560UF	35*50	-10%	105℃	10
2	/	/	/	/	/	/	/	/
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二、 技术参数的具体说明 Technical parameter specification：

◆LGX Series：Withstand high temperature for General purples，Endurance:105℃ 2000 hours （紋波疊加）

◆SPECIFICATIONS

1、容量、损耗、漏电流的说明 Capacity, Loss, Leakage current description

Item 项目	Characteristics.特性参数							
Operating temperature range 使用温度范围	-25 ~ +105℃							
Surge voltage 浪涌电压（V.DC）	530							
Rated voltage range 额定工作电压（V）	400							
Nominal capacity 标称容量（μF）	560							
Capacitance range 容量范围	±10%							
Dissipation factor(tg δ） 损耗角正切值 （%） (at 20℃,120Hz)	≤10							
Leakage current(I) 漏电流 （μA）1min	≤2240							
Ripplecurrent 纹波电流（A r.m.s MAX.）	≤1.6							

2、测试条件及方法 Test conditions and methods：

容量及损耗 Capacity and loss	漏电流 Leakage current
环境温度：25 至 35℃，相对湿度：45 至 85%，大气压力：86kpa 至 106kpa，如果相对测试结果有异议，可以在以下条件测试： 环境温度：25±2℃ 相对湿度：60 至 70% 大气压力：86kpa 至 106kpa Unless otherwise specified, the standard range of atmospheric conditions for making Measurements and tests are as follows. Ambient temperature:25 to 35℃ Relative humidity:45 to 85% Air pressure:86kpa to 106kpa If there may be doubt on the results ,measurement shall be made within the following limits. Ambient temperature:25±2℃， Relative humidity:60 to 70% Air pressure:86kpa to 106kpa	After 5 minute application of rated voltage. 额定电压 5 分钟后。 I ≤ 3 倍根号 CV, (3mA max)whichever is greater. Where c: Nominal capacitance in μF, v: Rated voltage in v. 其中:C-定义为容量,单位μF; V:额定电压,单位 V.

3. Ripple Current Multipliers 纹波电流系数

3.1、Frequency multiplying factor 频率倍加系数

Freq / Vdc	60	120	1k	10k ≦
10~100wv	0.9	1.00	1.10	1.15
160~250wv	0.8	1.00	1.30	1.50
350~450wv	0.8	1.00	1.10	1.15

3.2、Temperature multiplying factor 温度倍加系数

Temperature(℃)	~55	60	70	85	105
Factor	2.23	2.27	2.0	1.75	1.00

4.产品结构与尺寸 Product structure and size：

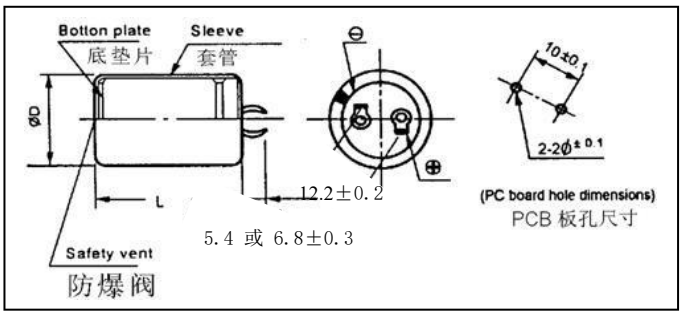
4.1、产品结构 Product structure ：

序号 S/N	部件名称 Component name	本体材料 Body material
1	焊针 Welding needle	镀锡铜包钢 Tin clad steel
2	盖板 Cover plate	低氯酚醛纸板 Low chlorine phenolic board
3	电解纸 Paper	植物纤维 Plant fiber
4	芯包 The core package	组件 Component
5	铝壳 Case	铝 Aluminum
6	引出条 Lead bar	铝 Aluminum
7	阳极箔 Anode Foil	铝 Aluminum
8	阴极箔 Cathode Foil	铝 Aluminum
9	套管 Sleeve Material	PET
10	电解液 electrolyte	有机溶液 Organic solution
11	垫片Botton plate	PP

焊针式铝电解电容器的结构图

4.2、外形尺寸图 Dimension and size（Unit: mm）

D±0.5	35			
L±2.0	50			
F±0.2	12.2			
焊针脚长	6.8			



5、标记 Marking

序号	说明Instructions	序号	说明Instructions
1	生产厂商商标（Manufacture's name or trade mark）	5	额定温度（Rated temperature）
2	系列（Series)	6	容量范围（Capacitance range）
3	标称容量（Capacitance）&工作电压（Rated voltage)		
4	负极标志（Polarity of the terminals）		

6、包装说明 Packing instructions：

6.1、采用泡沫直立式包装，具体包装数量如下：Foam vertical packaging, the number of specific packaging is as follows

产品尺寸ΦD×L Product size	层数 Layer number	内箱数量(只) Number per layer	包装数量(只/件) The package number(pcs)
35*50	2 层	72	288

First use the plastic bags, and then placed in a box, specific packaging quantity as follows(size: mm)：

6.2、包装标识：注明产品系列、规格、尺寸、数量、生产日期、生产批号、套管周期.

The neutral label, package, indicate the product series, specifications, size, number, production date, production lot。

三、ROHS 执行情况 ROHS implementation：

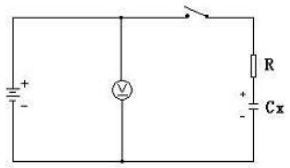
本公司所生产的产品符合欧盟ROHS，REACH环保要求。

The company produced products meet the EU ROHS, REACH environmental protection requirements.

四、 环境及可靠性测试Environmental reliability test：

Low temperature characteristics 低温特性（at 120Hz)	Working voltage	10	16	25	35	50	63	80	100	160	200	250	350	400~450
	z-25℃/z+20℃	5	5	4	4	4	4	4	4	4	4	4	8	8
	z-40℃/z+20℃	15	15	10	8	6	5	4	4	8	10	/	/	/

Load life 高温负荷	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage with max. ripple current for 2000hours at 105℃. 在 105℃的条件下，施加额定电压与最大纹波电流 2000 小时后，在室温 20℃完全恢复测试	
	Capacitance change 容量变化	≤20% of the initial value ≤初始值 20%
	tgδ 损耗角	≤200% of the initial specified value ≤规定值 2 倍
	LC 漏电流	≤The initial specified value ≤规定值
Shelf life 高温贮存	温度 Temp:105±2℃,时间 Time：1000 小时 电压处理：在常温下电容器串联保护电阻（额定电压为 100V 以下，使用约 100Ω保护电阻，额定电压超过 100V，使用约 1KΩ保护电阻），印加额定电压 1 小时，放电，常温放置 12~48 小时后测量。 Condition:The DC rated voltage shall be applied across the capacitor and its protective resistor(The value of which shall be approximately 100Ω for rated voltages up to and including 100V,and approximately 100Ω for rated voltages above 100V)for 1 h,The capacitor shall then be stored under standard atmospheric Conditions for 12~48 hours. 若判定有疑义，则按 JIS C5101-4 4.1 进行电压处理。 If any doubt arises on the judgment ,the capacitors shall be subjected to voltage treatment specified in JIS C5101-4 4.1。	
	Capacitance change 容量变化	≤20% of the initial value ≤初始值 20%
	tgδ 损耗角	≤200% of the initial specified value ≤规定值 2 倍
	LC 漏电流	≤the initial specified value ≤规定值

<table>
<tr>
<td>耐浪涌电压
Surge Test</td>
<td>充电 30±5 秒，放电 5.5±0.5 分钟作为一个周期，共进行 1000 次.
测试温度:15℃-35℃
然后在标准大气条件下放置达到热稳定,测试各参数.
1000times of charging for 30±5sec, with a period of 5.5±0.5min.
Test temperature 15℃-35℃
And the capacitors shall be stored under standard atmospheric conditions to obtain thermal stability, after which measurements shall be made.</td>
<td>容量：不低于试验前的 80%。
损耗角正切值不大于 200%特性参数表中规定值。
漏电流：达到标准漏电要求
Capacitance:
Not less than 80% of the value before test.
Dissipation factor:
Not more 200% of thespecified value in Characteristics
Leakage current:
To satisfy LC
Test circuit
 

Note: This requirement is applicable only to instantaneous over voltage which may be applied to terminals of capacitors, therefore, not applicable to such over voltages as often applied.</td>
</tr>
<tr>
<td>端子强度
TERMINAL STRENGTH</td>
<td>端子抗拉强度：
沿电容器端子引线方向施加*1N 的拉力，10±1 秒。
<table>
<tr><td>引线直径 ϕ</td><td>0.45</td><td>0.5</td><td>0.6</td><td>0.8</td><td>1.0</td></tr>
<tr><td>拉力 N</td><td colspan="2">5</td><td colspan="2">10</td><td>20</td></tr>
</table>
端子抗弯强度：
在电容器引线施加固定重力*2N，然后，将电容体弯折 900 后回到原位，再向相反方向弯折 900 后回到原位。
上述过程在 5 秒内完成。
<table>
<tr><td>引线直径 ϕ</td><td>0.45</td><td>0.5</td><td>0.6</td><td>0.8</td><td>1.0</td></tr>
<tr><td>拉力 N</td><td colspan="2">2.5</td><td colspan="2">5</td><td>10</td></tr>
</table>
Tensile strength of termination:
A static load of 1N shall be applied to the terminal in the down-lead direction for second
Bending strength of termination
A static load of 1N shall be applied to the lead wire, then bent the body through 900, rectum to the original position,
Next bent it in opposite direction 90° with the same speed, again return to the original position.
Carry out this operation in about 5 sec.</td>
<td>测量电容器应无接触不良、开路或短路，无可见机械损伤

When the capacitors is measured, there shall be no intermittent contacts, or open or short-circuiting.
There shall be no such mechanical damage.</td>
</tr>
<tr>
<td>振动试验
Resistance to Vibration</td>
<td>依据 JIS C 5102.8.2 和 JIS C 5025 试验.
在 3 个互相垂直的方向分别施加 2 小时振动,共 6 小时
To comply with JIS C 5102.8.2and JIS C 5025
Direction and duration of vibration:
3 orthogonal directions mutually each for 2h,Total 6h</td>
<td>测时电容器应无接触不良开路或短路无可见机械损伤。
When the capacitors is measured there shall be no intermittent contacts or open or short circuiting
There shall be no such mechanical damage.</td>
</tr>
</table>

可焊性 Solder ability	依据 IEC60068-6-6 进行试验 焊锡温度:250±5℃ 浸入时间:2±0.5 秒 To comply with IEC60068-2-2 Temperature or solder: 250±5℃ Dipping time: 2±0.5sec	浸入焊锡的引线表面积约 90%以上应附着新锡 At least 90% of circumferential surface of the dipping portion of term in at ion shall be covered with new solder
耐焊接热 Resistance to soldering heat	焊槽法: 焊锡温度:260±5℃ 浸入时间:10±1 秒 电 路 板 :1.6mm Solder bath method Solder temperature: 260±5℃ Immersion time: 10±1sec Printed wiring board:1.6mm	容量变化:在初始值±10%范围内 损失角正切值:不在大于规定值 漏电流:满足 LC 要求 外观:无异常 Variation of capacitance Within ±10% of the value before test Dissipation factor: Not more than the specified value Leakage current To satisfy NO.LC Appearance: No remarkable abnormality
稳态湿热 Resistance to damp heat (steady state)	依据 JIS C 5023 进行试验 试验温度:40±2℃ 试验时间:240±8h 相对湿度:90～95% 试验后,电容量在标准大气条件下 1～2 小时,然后测试参数 To comply with JIS C 5023 Test temperature: 40±2℃ Test time : 240±8h Relative humidity : 90～95% After completion of lest, the capacitors shall be subjected to standard atmospheric conditions for 1 to 2 hours, after which measurements shall be made	容量变化:在初始值±15%范围内 损失角正切值:不在大于规定值 漏电流:满足 LC 要求 外观:无异常 Variation of capacitance Within ±15% of the value before test Dissipation factor: Not more than the specified value Leakage current To satisfy NO.LC Appearance: No remarkable abnormality.
防瀑试验 SATETY VENT	在电容器两极施加反向工作电压，其中通过的电流应不大于 1A，在测试时防爆装置应能在 30 分钟内动作。 D．C．Application test The capacitors shall be subjected to a reverse D.C. voltage equal to the rated D.C. voltage The current flowing through the capacitors shall be limited to 1A. If the vent opened with the voltage applied for 30 minutes, the test is considered to be passed	上述过程中应无引线、铝箔等散射，无火花产生。 The vent device is actuated under the test conditions, thereby preventing terminals, metal pieces, etc, of the capacitors from scattering due to burst, the case from separating from the seal packing or the capacitors from producing flame.
Others 其它	Satisfies characteristic W of JIS C5141.其它参数满足国际 JIS C5141 标准。	

五、使用注意事项Points for attention in use：

1. 普通铝电解电容器是有极性的，其极性在电容器上标出，在使用时注意不要接反；如果接反，则电容器在短路状态，使 电容器受到损坏；在极性不明或是极性经常变动的电路中，则使用双极性电容器。请注意，目录中的双极性电容器不一定 能使用在交流电路中。

Aluminum electrolytic capacitor has polarity. The polarity is marked on body of the capacitor. If polarity is connected in the wrong direction, the circuit will be shortened and the capacitor may be damaged. In the circuits where the polarity is unknown or constantly change, am bipolar capacitor should be used. Please note that the am bipolar capacitors described in this catalog must not be used in AC applications.

2. 施加于电容器两端的直流电压不能高于额定的工作电压，当电容器上施加的电压高于额定工作电压时，漏电流会增大，电容器的寿命会缩短。推荐电容器的实际工作电压不要超过其额定工作电压的 70%-80%使用，这样有助于延长电容器的使用寿命。当交流电压叠加在直流电压上时，直流电压和交流电压峰值之和不能超过电容器的额定工作电压。

Do not apply DC voltage exceeding the rated working voltage of the capacitor. when a capacitor is used at a higher voltage than rated working voltage, leakage current increase and the capacitor's life is shortened. 70%-80% of the working voltage is recommended for the sake of capacitor usage life. When AC voltage is superimposed to DC voltage, the sum of the DC voltage and the peak AC voltage should not exceed the rated working voltage of the capacitor.

3. 施加在电容器上的纹波电流不要超过额定纹波电流范围；如果纹波电流过大，产品会过热，从而造成电容器的恶化，寿命缩短；施加的纹波电压要低于直流电压。

Do not apply ripple current exceeding the rated max ripple current. Excessive heat can result if too much ripple current is applied. Excessive heat can shorten the life of the capacitor and in some cases failure may occur. The peak value of the ripple current should be less than the DC voltage.

4. 普通的铝电解电容器不适用于频繁的充放电，如频繁的充放电，会使电容器过热而导致失效或损坏。特殊设计的电容器才可以满足此要求。

General aluminum electrolytic capacitor is not suitable for frequent charging and discharging, otherwise the capacitor maybe damaged because of over heating. Specified capacitors can be designed to meet the requirements.

5. 电容器的寿命受到周围环境温度的影响很大，在室温下使用可保证有较长的寿命。铝电解电容器的寿命与环境温度的关系遵从阿伦尼亚斯原则，即：环境温度每升高 10℃，寿命会降低一半。

The life of an aluminum electrolytic capacitor is greatly affected by the ambient temperatures. The lower the operating Temperature the longer the life expectancy of the capacitor. In general, the Arrhenius'rule can be applied to aluminum electrolytic capacitor: which says the life of a capacitor decrease half when operating temperature increase 10℃,.

6. 电容器焊接到线路板上时，套管会因为温度过高而发生二次收缩。请注意：手工焊接时，焊接温度应低于 350℃，时间少于 3 秒。请避免烙铁头直接与套管接触，否则套管将损坏。

When capacitors are soldered on the board, the sleeve maybe result the secondary shrinkage due to excessive heat. Please take note the melted temperature should be lower 350℃ and the time less 3 seconds. If melted solder comes in direct contact with the sleeping ,the sleeve will be damaged Please avoid this situation.

7. 防爆阀需要有一个空间才能有效，该空间在防爆阀正上方，大小其决于铝壳尺寸，以下推荐的容间大小：

The vent needs a space to work well make the space above the vent ,the space required is depending up on the case diameter. Following is the recommended space:

Case Diameter 产品直径	Φ6.3～Φ16	Φ18～Φ35	Φ40 or more
Clearance(min)最小间隙	2mm	3mm	5mm

8. 不要对电容器的引线或引出端施加应力，当电容器焊接到 PCB 板上后，不要强行取出电容器，不要提着电容器来搬动 PCB 板。

Do not apply excessive force to the lead and terminal .Do not pick out capacitor by force after soldering to the PC board, dot not move the Pc board by picking the capacitor.

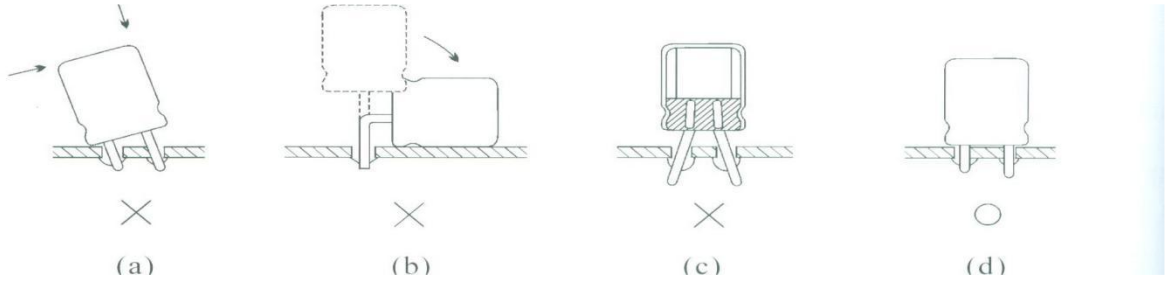
Following examples are typical stress to capacitors to be prevented.：以下电容器受力典型例子：

(a) Do not lean after soldered. 焊接后产品不要倾斜

(b) Do not bend the capacitor after soldering.焊接后不要弯倒电容器

(C) Mismatch of the terminals and the install holes on the PC board.引出端间距不合 PC 板上安装孔

(d) Correct installation way.正确的安装方式



9. 铝壳与阴极是不绝缘的，在 PCB 板上，不要在铝电解电容器下设任何导线，辅助端子和阴极也不是绝缘的，辅助端子和阳极一定不要有电的连接，否则产品将会造成短路。

The aluminum case is not insulated from the cathode. Do not locate any copper or any via hole under the aluminum capacitors, on the PC board. Also, the dummy terminal is not insulated from the cathode. The dummy terminal must not be connected electrically to the anode .Other wise, both cases may cause a short circuit.

10. 电容器要贮存在常温、常湿、无酸、无碱的环境下，并且要避免阳光直射，如果电容器贮存超过 6 个月以上时，通常其漏电流有增大，对使用寿命上有影响，在使用时请串排上 1KΩ之保护电阻，使其持续负载额定工作电压 30 分钟。

The capacitor shall storage in the condition of normal temperature ,non-acid ,non-alkali and normal humidity. If the capacitors have been stored for a longtime and leakage current is a critical parameter ,the parts can be re formed by applying voltage before using them.

11. 铝电解电容器在搬动、检验及使用时，要轻拿轻放，请避免由外力的原因使产品变形、碰伤，影响其外观和电气性能。

When move, check and use the aluminum electrolytic capacitor, do it carefully to avoid distortion, damage, appearance, or performance.

12. 浪涌电压是短时间内电容器可以承受的最大直流过电压，在 5 分钟的连续间隔里，该直流电压施加在电容器上的时间大约不超过 30 秒；电容器的浪涌电压如下表。

The surge voltage rating is the maximum DC over-voltage to which the capacitor may be subjected for short periods, not exceeding approximately 30 seconds at infrequent intervals of more than five minutes. The rated surge voltage is as follows:

额定电压（V）Rated Voltage	4	6.3	10	16	25	35	50	63	80	100	160	200	250	315	350	400	450	500
浪涌电压（V）Surge Voltage	5	8	13	20	32	44	63	79	100	125	200	250	300	365	400	450	500	550

13. 请不要在下述环境下使用电容器：

a) 直接与水、盐水及油类相接触、或相对湿度超过 75%的环境；

b) 充满有害气体的环境（硫化物、H2SO3、HNO2、C12、氨水等）；

c) 置于日照、O3、紫外线及有放射性物质的环境；

d) 振动及冲击的恶劣环境；

e) 使用含卤素的固定剂、树脂涂层剂固化电容器。

Please do not use capacitors in the following circumstances:

a) directly with water, salt and oil in contact, or more than 75% relative humidity environment;

b) an environment filled with harmful gases (sulfide, H2SO3, HNO2, Cl2, ammonia, etc.);

c) placed in sunlight, O3, UV rays and radioactive substances in the environment;

d) the impact of vibration and harsh environments;

e) use of halogen-fixed, resin-coated curing agent capacitors.

14. 使用其他固定剂、涂层剂时，请客户确认以下内容：

a) 电容器散热变差所造成的寿命缩短；

b) 固化剂与电容器本体的化学反应。

The use of other fixatives, coating agents, ask the customer to confirm the following:

a) Thermal variation caused by the capacitor shorten the life span;

b) curing agent and the capacitor body's chemical reactions.

声明：如果您不按我们的使用说明进行规范操作，我们将不承担任何责任。

Announce: If you have not carried on the standard on the standard operation according to the operating instructions, our company will not undertake any res passivity.

六、成品检验报告Product inspection report

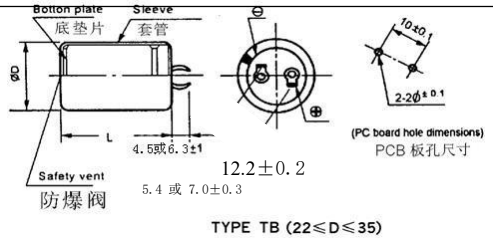
客 户		客户料号		序 号	20200316	检验日期	2020.05.12
型 号		规 格	HP 400V560UF	尺寸	Φ35X50	样品数量	10只

检验项目	抽样水平		AQL	抽检数量	Ac	Re	判定
1.外观检验	重缺陷	I	0.15	10只	0	1	OK
	轻缺陷	I	0.15	10只	0	1	OK
2.尺寸检查				10只	0	1	OK
3.电性能检验	I		0.25	10只	0	1	OK
4.可焊性检验				1只	0	1	OK
5.保质期限				每批	0	1	OK

项目 / 记录	容量 (120Hz)/1V	损耗 (120Hz)	ESR(100KHZ)	漏电流
	612-816μF	≤10%	≤/Ω	≤2240μA
1	532	4.4		126
2	528	4.6		139
3	530	4.2		153
4	531	4.3		129
5	535	3.9		118
6	530	3.8		121
7	529	4.5		135
8	530	4.6		149
9	531	4.2		136
10	534	4.4		145

项目	标准值	最大值	最小值
F(mm)	12.2±0.2	12.3	11.9
D(mm)	35±0.5	35.2	35.1
d(mm)	±	/	/
L(mm)	50±2	50.8	50.6
l(mm)	±	/	/
λ(mm)	±	/	/

尺寸示意图



抽样标准	GB/T2828.1-2003
检测设备	ZX2615E 容量测试 ZX2589 漏电流测仪 焊锡炉 数显卡尺
检验判定	■合 格 □不合格
备注	测試環境(Test Ambient):溫度(Temp.): 25 ℃濕度(RH): 65 % 测 ESR 值要夹在引脚根部

检验员	审核
QIANS	林泽波