制造商 Supplier：深圳市康贝特电子有限公司

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拟订 Prepared	审核 Pack	批准 Approved	物料编号 File No.	日期 Date
梁春明 技术专用章	黄小龙	尹业悦	CP.01.013.154447.01	2023.08.02

客户名称 Customer：深圳昕海科技有限公司

产品类别 Product Category	电池型号 Pack Model Name	电芯类别 Cell Category	物料编码 Material Coding
	154447PL4400mAh	锂聚合物电池 Li-polymer	

Rev.版本	Product Revision Records List 产品变更履历表	Date 日期
1.0	First issue 首次发行	2023-08-02

目录

1、适用范围 Scope：

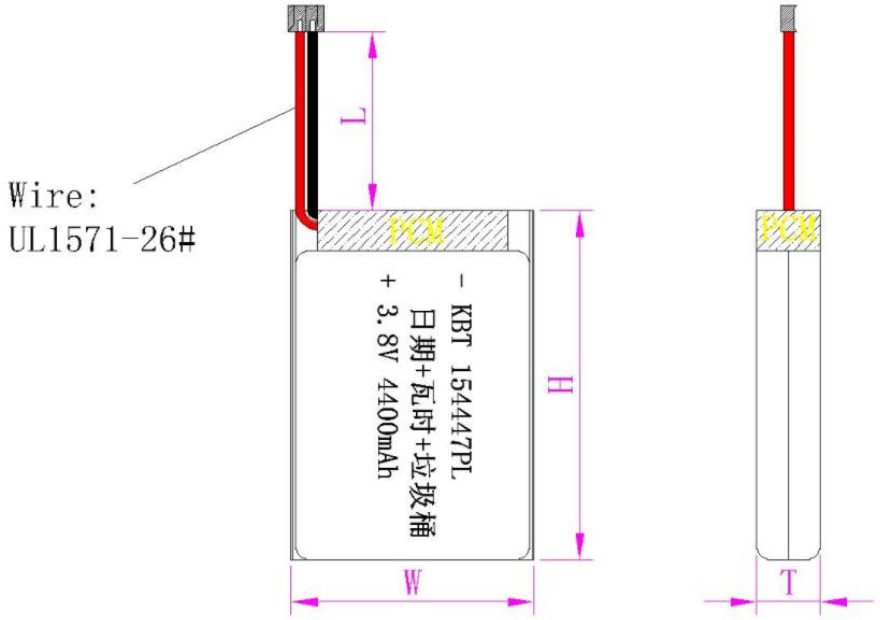
本标准规定了锂电池可充电池的基本性能、技术要求、测试方法及注意事项，电池组合定义的是包括电芯，保护板和连接线等的组合，本标准只适用于深圳市康贝特电子有限公司所生产的锂离子电池。

This standard specifies the basic performance, technical requirements, test methods and points for attention of rechargeable lithium batteries. Battery combination is defined as a combination of battery cells, protective plates and connecting wires, this standard only applies to the lithium-ion battery produced by Shenzhen kangbeite Electronics Co. , Ltd.

2、引用标准 Reference Standard:

GB/T 18287-2013 中华人民共和国蜂窝电话用锂离子电池总规范。
GB/T 18287-2013 People's Republic of cellular phone use lithium-ion batteries total norms.

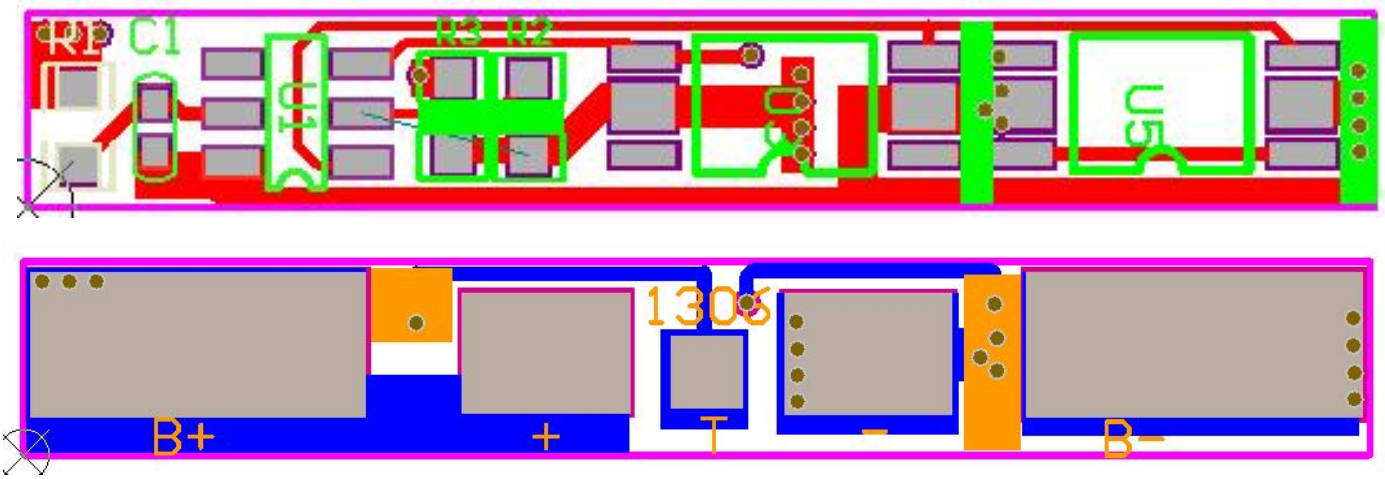
3、成品尺寸图 （mm）Product drawing (mm)



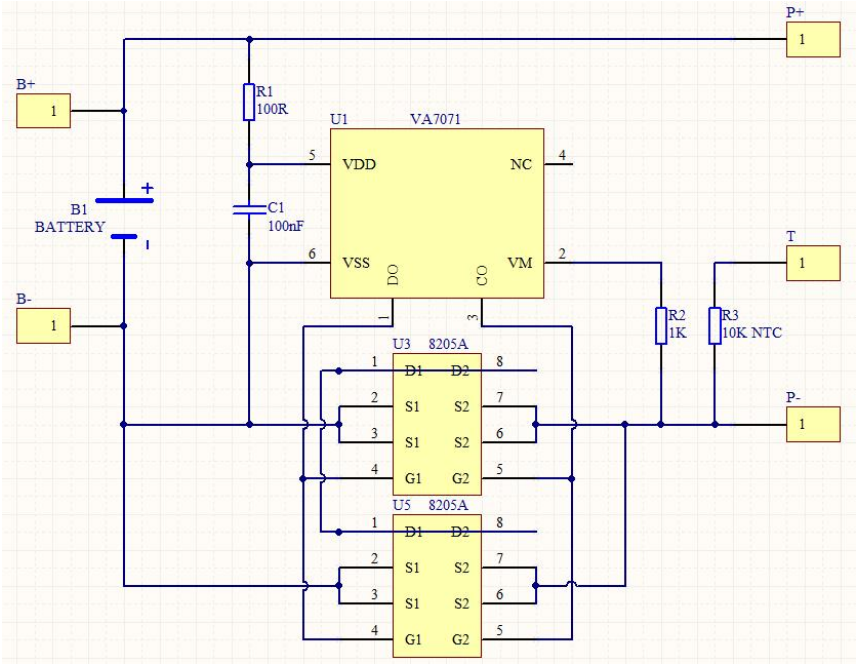
Remark:出货日期丝印在内置电芯表面 data code be printed on the cell surface.

Unit单位（mm）		
宽（W）： 44.0mm	厚（T）:15.0mm	高度（H）： 47.0mm
W（宽度）： ±0.5mm	T1(厚度）Max T*1.06 After cycle	H(高度）： ±0.5mm
线材 Wire Rod	红黑线 Red-black line	1.25正向端子 UL1571/26≠ 外径1.0 ±0.05mm
出线长度	L＝50±5mm	线长红75mm，黑80mm

4、PCB 图：PCB Layout



5、保护板原理图和电池框图：PCM diagramor Battery diagram



位号 Designator	名称 Name	规格 Specifications
U1	IC	VA7071 SOT-23-6
U3 U5	MOS	8205A TSSOP8
R2	贴片电阻	1K 0603 5% 1/10W
R1	贴片电阻	100R 0603 5% 1/10W
C1	贴片电容	100nF 0402 20% 16V

6、成品电池电气特性 Battery PACK Electrical characteristics:

序号NO.	内容 Content	参数 Parameter		备注 remark
1	标称电压Nominal voltage	3.80V		
2	充满电压 Full voltage	4.35V		Pack成品后要求电压
3	放电电压截止Discharge Voltage cut-off	2.75V		±0.05V
4	标称容量 Nominal capacity	4400mAh		完全充电后用 0.2C 放电至截止电压的容量 Fully charged with a 0.2C discharge capacity to the cut-off voltage
5	最小容量Minimum capacity	4180mAh		完全充电后用 0.2C 放电至截止电压的容量 Fully charged with a 0.2C discharge capacity to the cut-off voltage
6	内阻Resistance	≤120mΩ		
7	充电方式Charging	0.5C CC（恒流）充电至 FC，再 CV（恒压 FC）充电直至充电电流≤0.01C		0.5C CC （ constant current ） charge to FC, then CV(constant voltage FC)charge till charge current decline to≤0.01C
8	充电时间Charging time	标 准 充 电 Standard Charge	5.0-5.5Hour	0.2C
		快速充电charging Fast	1.0-1.5Hour	1.0C
9	最大充电电流Maximum charging current	0℃-15℃		0.2C
		15℃-25℃		0.5C
		25℃-45℃		1.0C
10	最大放电电流Maximum discharge current	-10℃-15℃		0.2C
		15℃-60℃		1.0C
11	标准放电电流Standard discharge current	持续放电电流0.2C Continuous discharge current 0.2 C		截止电压（FD）2.75V Cutoff Voltage (FD)2.75V
12	充电截止电压Charge cut-off voltage	4.375V±0.05V		
13	过充保护恢复电压 Overcharge protection recovery voltage	4.175±0.05V		
14	过充保护延时时间 Overcharge Protection Delay Time	110±30%ms		

15	过放电保护电压 Over discharge protection voltage	2.50±0.075V	
16	过放保护恢复电压 Overshoot protection recovery voltage	2.70±0.075V	
17	充电过流保护电流 Charging Over current detection current	5.0-9.0A	
18	输出短路保护 Output short circuit protection	保护后撤销短路负载回复 After the revocation of short-circuit protection of load response	
19	静态消耗电流 Standby current	10.0 uA	
20	过电流保护侦测延迟时间 Detection delay time over current protection	7±30%mS	
21	有无 0V 充电功能 There is no 0V charging function	有 There are	
22	过放电保护侦测延迟时间 Over discharge detection delay time protection	55±30%mS	
23	贮存温度 Storage temperature	-5℃-35℃ 推荐（25±5℃）	贮存时应充电至容量的40%-50% Storage capacity should be charged to40% to 50%
24	电池重量 Battery weight	大约 75g About 75g	用天平或电子秤称量 With balance or electronic weighing scales
25	循环寿命Life cycle	＞400 cycles	
26	短路保护 Short circuit protection	MOS 管立即断路并不能过热 MOS tube circuit can not overheat immediately	
27	短路保护解除Short-circuit protection release	解除负载后电池恢复正常 Battery back to normal after the lifting of the load	

**:是电池常规使用温度和最大充放电电流，本电芯是高温电池，低温放电性能差。禁止在低温环境下充电。若需做破坏性试验（如外部短路，内部短路，热滥用，则按照安全性能和机械性能要求执行）。5.9 and 5.10 are the normal operating temperature and the maximum charge and discharge current of the battery. The battery cell is a high temperature battery with poor discharge performance at low temperature. Do not charge at low temperature. If destructive tests are required (e. g. external short circuit, internal short circuit, heat abuse, follow safety and mechanical performance requirements) .

7.可靠性测试规范（电芯）Reliability test norms(cell):

7. 1 测试条件:除非另有规定,本规范中各项试验应在试验的标准大气条件下进行:

温度： -5℃-35℃推荐（25±5℃） 相对湿度：≦45%-75% 大气压强：86KP—106KP

Test conditions: Unless otherwise specified, the specification test of the test should be carried out under standard atmospheric conditions: emperature: -5 ℃ -35 ℃ Recommended (25 ± 5 ℃) Relative Humidity: ≦ 45% -75% Atmospheric pressure: 86KP-106KP

7.2 测量仪表与设备的要求：Measuring instruments and equipment requirements

7.2.1测量电压的仪表准确度应不低于 0.5 级，内阻应不小于 10KΩ/V

Measuring the voltage meter accuracy should not be less than 0.5, the resistance should be not less than 10KΩ / V

7.2.2测量电流的仪表准确度应不低于 0.5 级.Measuring current meter accuracy should not be less than 0.5

7.2.3测量时间的仪表准确度不低于±0.1%.Accurate instrument for measuring time not less than ± 0.1%

7.2.4测量温度的仪表准确度不低于±0.5℃.Accurate instrument for measuring temperature of not less than ± 0.5 ℃.

7.2.5恒流源的电流恒定可调,在充电或放电过程中,其电流变化应在±1%范围内.Adjustable constant current source current, the charging or discharge process, the current changes should be ± 1% range.

7.2.6恒压源的电压可调,其电压变化范围为±0.5%.Adjustable constant voltage source, the voltage range of ± 0.5%

7.2.7尺寸测量仪的准确度不低于 0.02mm,量程为 200mm.The accuracy of measuring dimensions of not less than 0.02mm, range of 200mm

7.2.8称量质量的仪器感量不低于 0.1g,秤量为 1.5Kg.A sense of quality weighing instruments the amount of not less than 0.1g, weighing of 1.5Kg.

8.常规性能 General specification:

No.	Item 项目	Test Methods and Condition 测试方法和条件	Criteria 标准
8.1	0.2C Capacity 0.2C 容量	After standard charging, rest battery for 10min, then discharging at 0.2C to voltage2.75V, recording the discharging time. 标准充饱电后,搁置 10 分钟,然后用 0.2C 电流放电至 2.75V， 所记录放电时间	≥260min
8.2	Cycle Life 循环寿命	Constant current 0.3C charge to 4.35V, then constant voltage charge to current declines to 0.01C, rest 10min, constant current 0.5C discharge to 2.75V, rest 10min. Repeat above steps till continuously discharging capacity Higher than 80% of the Initial Capacities of the Cells 先用 0.3C 恒流充电至 4.35V，再恒压 4.35V 充电直至充电电流≤0.01C,搁置 10 分钟,再用 0.5C 电流放电至 2.75V;又搁置 10 分钟,重复以上步骤,直到放电容量是初始容量的 80%	≥400 times(次)
8.3	Capability of keeping electricity 荷电保持能力	20 ± 5 ℃, After standard charging, rest the battery 28days, discharging at 0.2C to voltage 2.75V, recording the discharging time. 在 20±5℃状态下,标准充饱电后,电芯搁置 28 天,然后用 0.2C 放电至 2.75V,所记录放电时间.	≥240min
No.	Item 项目	Test Methods and Condition 测试方法和条件	Criteria 标准

8.4	Discharge at high temperature 高温放电	After standard charging, rest the cells 4h at 60±2℃, then discharging at 1C to voltage 2.75V, recording the discharging time. 标准充电后，在60±2℃条件下贮存4h，然后用1C放电至2.75V,所记录放电时间.	≥52min
8.5	Discharge at low temperature 低温放电	After standard charging, rest the cells for 16h at 5±2℃, then discharging at 0.2C to voltage 2.75V, recording the discharging time. 标准充电后，在5±2℃条件下贮存16h，然后用0.2C放电至2.75V,所记录放电时间.	≥200min
8.6	Thermal shock 热冲击	Put the cells in the oven. The temperature of the oven is to be raised at 5±2℃ per minute to a temperature of 70±2℃ and remains 30 minutes. 将电池放进烘箱内，以5±2℃/min速度升高烘箱内温度至70±2℃后,恒温30min.	No fire, no smoke 不起火,不冒烟
No.	Item 项目	Test Methods and Condition 测试方法和条件	Criteria 标准
8.7	Over charge testing 过充测试	At 23±5℃, charging cells with constant current 1C to voltage 5.0V, then with constant voltage 5.0V till current decline to 0. Stop test till cells temperature 10℃ lower than max temperature. 在23±5℃状态下,电池用1C电流充电至5.0V,然后恒压5.0V让电流下降接近为0A,监视电池温度变化,当电池温度下降一峰值低约10℃时,停止实验.	No smoke or fire 不起火,不冒烟
8.8	Over discharge testing 过放测试	At 23±5℃, According to the requirements of standard charge, the cells will be discharge to cut-off voltage, then connect with external load of 30 ohm for 24 hours. 在23±5℃状态下，按标准放电的要求放电至终止电压后,外接30Ω负载放电12小时.	No fire, no smoke, no leakage. 无起火,无冒烟,无泄液
8.9	Short-circuit testing 短路测试	At 23±5℃, After standard charging, connect cells anode and cathode by wire which impedance less than 50mΩ, keep 1h. 在23±5℃状态下,标准充电后,将电池的正负极用一根小于50mΩ的导线连接,放置1小时.	No smoke or fire 不起火,不冒烟

9. 使用说明和安全规程 The use of notes and safety regulations

！危险 Danger

*充电时请使用指定的充电器并按照说明书的要求进行充电。

Charge to use the specified charger and charge in accordance with the requirements of the specification

*仅在指定的设备上使用电池。

Only on the specified device using the battery

*不要把电池加热或投进火中。

Do not heat the battery or thrown into the fire

*不要在火源附近或温度超过 60℃的轿车中使用或遗留电池，也不要在这些环境中进行充电。

Do not fire near the source or the temperature exceeds 60 ℃ or left using car batteries do not recharge in these environments.

*不要把电池投入水中，也不要弄湿。

Do not throw batteries into the water, do not wet

*不要把电池同项链、发夹、硬币或镙钉等金属品一起放在兜里或包中，也不要把电池同上述物品一起储存。

Do not throw batteries with necklaces, hairpins, coins, or screws and other metal items together in the pocket or pack, the battery should not be stored together with the above items

*不要使用金属导体短路电池的正负极。

Do not use metal conductor short-circuit the battery positive and negative.

*在装入设备时注意电池的正负极不要反装。

Loading equipment in the battery positive and negative attention Do not reversed.

*不要使用锐利的物品刺穿电池。

Do not use sharp objects puncture

*不要对电池进行分解。

Do not break down the battery

*不要直接对电池进行焊接。

Do not weld the battery directly

*不要使用带有严重伤痕或变形的电池。

Do not use with serious scar or deformation of the battery

*在使用之前请详细阅读操作说明书，不适当的操作可能引起电池变热、着火、爆炸、毁坏或电池容量的衰减。

Please read before use operating instructions, improper operation may cause the battery to become hot, fire, explosion, destruction or decay of battery capacity

！警告 Warning

*不要把电池放在加热器皿、洗衣机或高压容器中。

Do not put batteries on the heating utensils, washing machines or high-pressure container.

*不要把电池同干电池或其它原电池一起使用，也不要同不同包装、不同型号或不同品牌的电池一起使用。

Do not throw batteries with batteries or other batteries used with the original, nor with different packaging, different models or different brands of batteries.

*如果在规定的充电时间内充电没有结束，停止充电。

If the required charging time is not over charging, stop charging.

*在使用、充电或储存期间如发现电池有变热、散发气味、变色、变形或其它反常应停止使用。

In use, charging or storage batteries are found during the hot, emission of odor, discoloration, deformation or other abnormality should stop using the.

*当发现电池漏液到皮肤或衣服上，立刻用清水清洗。

When they find the battery leaks to the skin or clothes, immediately wash with water

*如果电解液渗出并进入眼睛里，不要揉擦眼睛，立刻用干净的水清洗并去看医生。

If electrolyte leaking into the eyes, do not rub your eyes, immediately wash with clean water and see a doctor

！注意 Note

*把电池放到小孩够不到的地方以免吞服。

Put the battery out of reach of children so as not to swallow

*小孩使用电池时，监护人应详细解释操作方法。

Children using the battery, the guardian should explain in detail the methods of operation

*在使用电池之前，应详细阅读操作指南并对使用中的注意事项有足够深刻的理解。

When using the battery, you should read the operating instructions and use precautions in a deep enough understanding of

*在对电池充电之前仔细阅读操作指南。

Charging the battery carefully reading the operating instructions before

*在将电池装入设备或从设备中取出之前详细阅读设备操作手册。

In the battery into the device or remove from the device before the device operating manual read

*电池具有使用寿命，如果使用电池的设备的工作时间比平常少得多，要对电池进行更换。

Battery has a life, if you use battery-powered devices much less than usual working hours, to replace the battery

*电池寿命终止后要立刻从设备中取出。

Immediately after the termination of battery life, removed from the equipment

*当长期不用时，要将电池从设备中取出并放在低温低湿的环境中保存。

When the long-term when not, to remove the battery from the device on the low temperature and humidity of the environment and save

*电池应在远离静电的场所进行充电、使用和储存。

Batteries should be charged away from static electricity, use and storage

*如果电池的接线端变脏，在使用之前用干布擦净。

If the battery terminals become dirty, wipe with a dry cloth before use

*电池在使用时的温度不能超出下面的要求：

The temperature of the battery when in use can not exceed the following requirements:

*充电温度范围：0℃ to 45℃

Charging temperature range: 0℃ to 45℃

*放电温度范围：-10℃ to 60℃

Discharge temperature range: -10℃ to 60℃

10、质量评定 quality evaluation:

质量检验分为鉴定检验和质量一致性检验。鉴定检验一般在设计定型、更改设计和生产定型时进行，抽样方案、检验项目、顺序以及判定规则等事宜由供需双方协商确定。原则上应包括以上各项性能试验。质量一致性检验分为逐批检查和周期检查，用以判定产品生产过程中能否合格保证产品质量的持续稳定。可以参照 GB2828—1987，标准执行。具体检查的检验项目应包括外观、内阻、额定容量或 1c5A 放电容量等。

Identification of inspection and quality inspection into the quality consistency test. Identification test is generally designed to shape, change shape when the design and production, sampling plans, test items, order and determine matters such as rules negotiated by both parties. In principle, should include the above performance test. Consistency test is divided into batches of quality inspection and periodic inspection to determine whether the qualified production process to ensure product quality remained stable. Can refer to GB2828-1987, standards. Specific test items should be checked, including appearance, internal resistance, discharge capacity 1C5A rated capacity or other

11、环保要求 pro-environment:

此产品符合 ROHS 环保要求。

The products comply with ROHS environmental requirements

12、其他事项 other business:

以上述，可以作为供需双方对于电池产品性能和检验规则的约定框架。如果没有新的书面约定或更改通知，即可按此执行。

The above, as both supply and demand for battery performance and inspection rules agreed framework. If there is no written agreement or a new change notification, you can perform here.

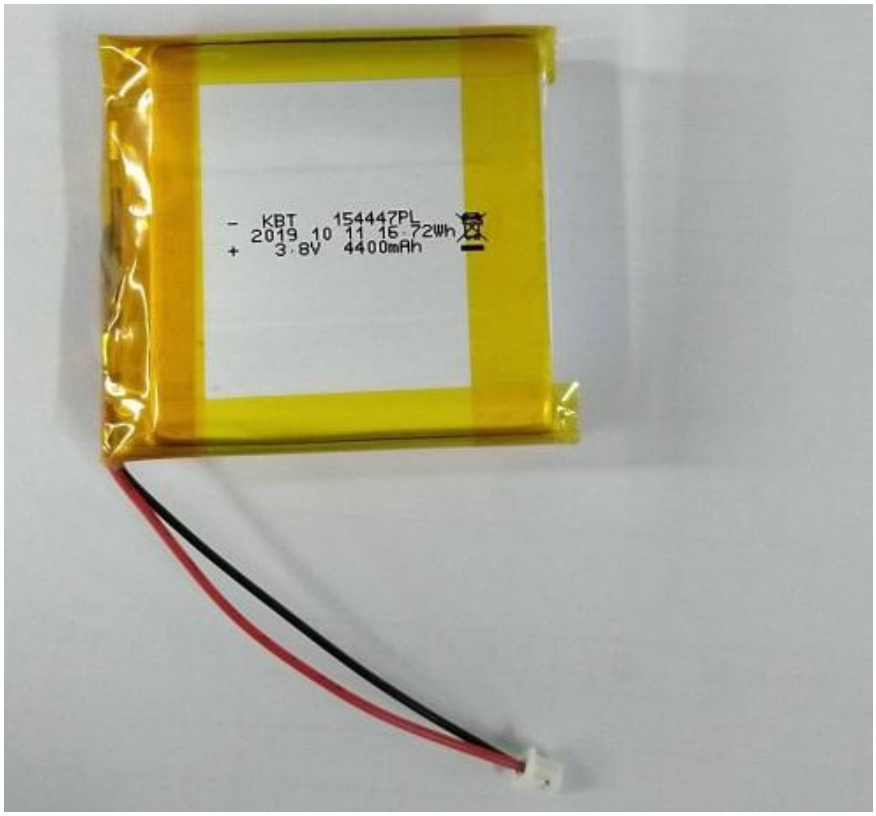
13、附件：Annex:

电池丝印图 Battery screen printing:

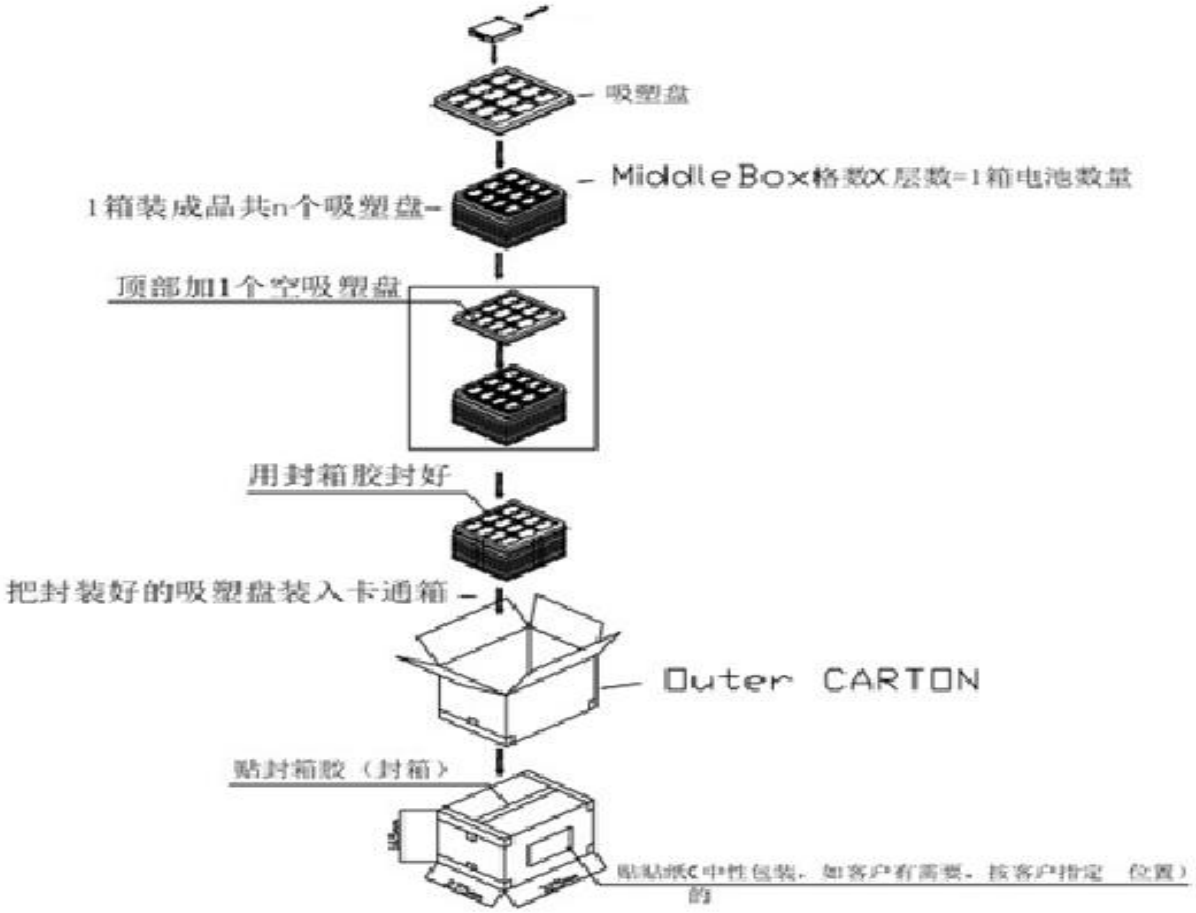
丝印要求：-KBT 154447PL

日期+瓦时+垃圾桶

+3.8V 4400mAh



14、包装规格说明：Packing specifications：



15、客户要求：Customer Inquiry

Model 型号：154447/4400mAh

Version 版本：A01

1.If the customer approves the specification and samples, please sign the specification back to KBT within 1 week. It is invalid when expires.

如果客户认可本承认书和样品，请于 7 天内回签本承认书给 KBT 电子有限公司，过期视为无效。

2. If the customer requires more explanation or the operating conditions are different from the specification content, please write down your information and contact KBT Electronics Co., Ltd in advance. KBT Electronics Co., Ltd could design and build products according to your special request.

如果客户需要其他方面的说明或工作条件与规格书内容不一致,请客户提前和 KBT 电子有限公司联系. KBT 电子有限公司将按照贵公司特殊要求设计和开发产品.特殊要求标准:

项目 / 序号	特殊要求：Special Request	标准：Criteria
1		
2		
3		
4		
5		

Company Name ：　　Signature ：　　Date:

公司名称:　　签名:　　日期: