

Li-ion Battery Technology Specification 锂离子电池规格书

Customer _____
客户
Part name _____ Li-ion Battery 锂离子电池
产品
Model No _____ ICR21700 5000mAh 3.7V
型号
Serial No _____
序列号
Produce No _____
产品编号

Approval 批准	Checked 审核	Draft 制定
Longbin	Wenfei liang	Xiaojun Nie
Customer Approval 客户回签		

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History of specification
变 更 记 录

Date 日期	Contents 内容	Modified by 修改	Remarks 备注
20260421			A0
20260902	更新日期码格式	Xiaojun Nie	A1

1.Scope 适用范围

This product specification only applies to the protection parameters of rechargeable lithium-ion battery products and batteries designed by PKCELL.

本产品规格书仅适用由深圳市比苛电池有限公司设计的可充电锂离子电池产品和电池组的保护参数。

2.The Specification Amendment 规格书修订

If the raw materials, production processing, production system or battery usage environments & other conditions need to be changed, the amendment side needs provide the written advice to the other side, only the both sides come to agreement, the amendment will be effective.

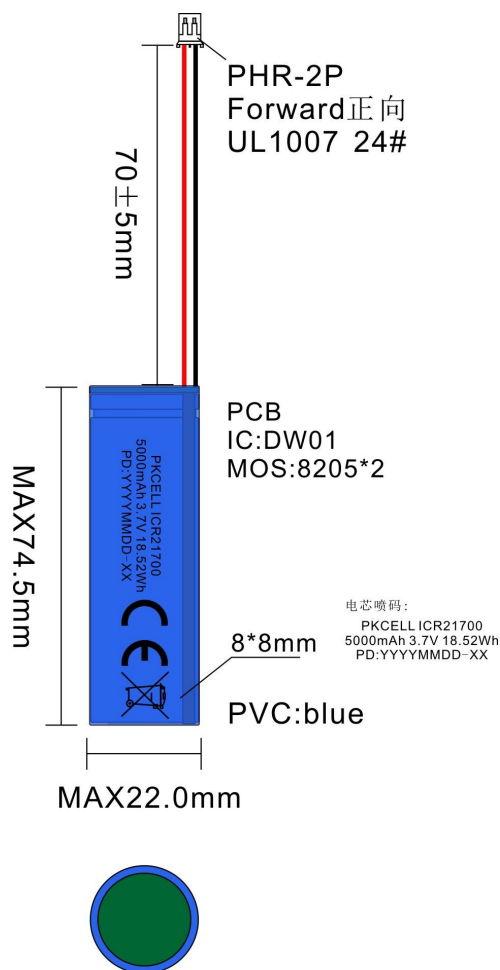
如因原材料、生产制程、生产系统或电池使用环境或其他条件发生改变，修订方需将改变的信息以书面形式通知对方取得供需双方同意后再行修订。

3.Product or Cell testing conditions 电池或电芯的测试条件

It is recommended to use newly produced battery packs and new cells for related tests. Unless specified, testing and measurement shall be done under temperature of $20\pm5^{\circ}\text{C}$ and relative humidity of 45~75%.

采用新生产的电池组和新的电芯用作相关的测试。除非有特别要求，否则测试需要在温度 $20\pm5^{\circ}\text{C}$ ，相对湿度45~75%的条件下进行。

4.Battery Assembly Drawing and Dimensions 电池组装图及尺寸



5.Specification 主要技术参数

No.	Item 项目	Characteristics 特性	Remarks 备注	
1	Nominal Capacity 额定容量	Minimum 最小值:4750mAh Typical 典型值:5000mAh	Standard discharge after Standard charge (0.2C) 0.2C标准充电, 标准放电	
2	Nominal Voltage 额定电压	3.7V	—	
3	Charging Cut-off Voltage 充电截止电压	4.2V	—	
4	Discharge Cut-off Voltage 放电截止电压	3.0V	—	
5	Standard Charge 标准充电	Constant Current 0.2C Constant Voltage 4.2V 0.01C cut-off 0.2C恒流恒压充电至4.2V, 截止电流0.01C	Charge Time :Approx 6.5h 充电时间: 约6.5h	
6	Maximum Constant Charging Current 最大充电电流	3A	—	
7	Standard Discharge 标准放电	Discharge at 0.2C to 3.0V 以0.2C放电至3.0V	—	
8	Maximum Continuous Discharging Current 最大持续放电电流	3A	—	
9	Operating Temperature 工作温度	Charge 充电: 0~45°C Discharge 放电: -20~60°C	Charge	0~15°C: 0.2~0.5C 15~30°C: 3A 30~45°C: 0.5C
			Discharge	-20~-0°C: 0.2~0.5C 0~15°C: 0.5C~3A 15~30°C: 3A 30~60°C: 3A~0.5C
10	Storage Temperature 存贮温度	-20~45°Cfor 1Month 一个月: -20~45°C -10~35°Cfor 6Months 六个月: -10~35°C	—	
11	Storage Voltage 存贮电压	3.6-3.85V	—	
12	Impedance 内阻	≤120mΩ	出厂时间小于6个月, 循环次数小于50次	

6.Characteristics 特性

6.1 Electrical performance characteristics 性能

No.	Item 项目	Testing Method 测试方法	Requirements 要求
1	Fully Charged State 充满电	CCCV or Constant current charge to 4.2V @0.2 C follow by a constant voltage holding at 4.2V until current drops below 0.01C. 0.2 C恒流充电至4.2V, 随后恒压保持在4.2V, 直到电流下降到0.01C以下。	—
2	Rated Capacity 额定容量	0.2C CC/CV 0.01c at 4.2V (per 6.1) at room temp. (20±5°C), rest for 1-2 hrs then discharge at a constant current of 0.2C to 3.0V, testing will be terminated by either 5 cycles or any one discharge Capacity exceeds 4750mAh. 在室温(20±5°C),0.2C 恒流恒压充电至4.2V, 截止电流 0.01C, 静置1-2H, 然后以0.2C 电流放电至 3.0V, 测试 5 个循环终止, 任何一个循环的放电容量超过4750mAh。	≥4750mAh
3	Cycle Life @25°C 循环寿命	Discharge to 3.0V @0.2C, then 0.2C CC/CV 0.01C charge to 4.2V, rest for 10 min. ischarge @ 0.2C to 3.0V and rest for 10 min. Continue the charge discharge cycles ntil discharge capacity lower than 80% of rated capacity. 0.2C放电至3.0V, 然后 0.2C恒流恒压充电至 4.2V截止 电流 0.01C, 静置10分钟。0.2C放电至3.0V, 静置10分钟。继续充电/放电循环, 直到放电容量低于额定容量的80%。	Cycle life 循环寿命≥300
4	Capacity Retention 容量保持	Fully charge cells per 6.1, store them at (20±2)°C for 28 days, then discharge the cells to 3.0V at 0.2C. 按6.1充满电, 存储在 (20±2) °C下 28天, 然后0.2C 放电到3.0V。	Discharge Capacity 放电容量≥4000mAh
5	Shipping Voltage 出货电压	Check open circuit voltage (OCV) of cells prior to the delivery to customers 在交付给客户之前, 电池的开路电压。	≥3.6V

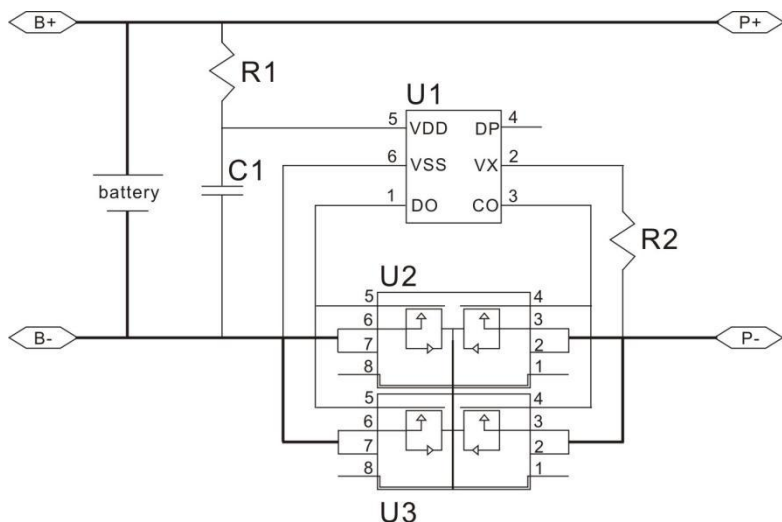
6.2 Safety characteristic 安全性能

No.	Item	Test Method	Requirements
1	Over charge 过充 (Cell)	Discharge cells to 2.4V at 0.2C, then charge to 4.45V at 3C and rest for 8 hours. 在0.2C下将电池放电至2.4V, 然后在3C下充电至4.45V, 并静置8小时。	No fire No explosion No leakage 无火、无爆炸、无泄漏
2	Over discharge 过放	Fully charge cells per 6.1, then discharge the battery to 3.0V with 0.2CmA at room temperature, connect with external load of 30Ω for 24 hours. 按6.1充满电, 然后在室温下用0.2CmA将电池放电至3.0V, 用30Ω的外部负载连接24小时。	No fire No explosion No leakage 无火、无爆炸、无泄漏

6.3 Reliability 性能测试

No.	Item 项目	Test Method 测试方法	Requirements 要求
1	High Temperature Test 高温测试	Fully charged per 6.1, then rest at $60\pm 2^{\circ}\text{C}$ for 2 hours. 按6.1充满电，然后在 $60\pm 2^{\circ}\text{C}$ 放置2小时。	Electrical performance、visual test not changed 外观和电性能上没有明显的变化
2	Low Temperature Test 低温测试	Fully charge cells per 6.1, rest at $-20\pm 2^{\circ}\text{C}$ for 2 hours. Then the cells are placed at room temperature for 3 hours. 按6.1充满电，在 $-20\pm 2^{\circ}\text{C}$ 放置2小时，然后将电池在室温下放置3h。	No appreciable alternation electrically and visually 外观和性能上没有明显的变化
3	Humidity Test 湿度测试	Fully charge cells per 6.1, rest at $40\pm 2^{\circ}\text{C}$ with 90%~95RH% for 48 hours. Then the cells are placed at room temperature to “dry out” for 2 hours. 按6.1充满电，放置在 $40\pm 2^{\circ}\text{C}$ 90%~95RH%环境下48小时。然后将电池置于室温下“干燥”2小时。	No appreciable alternation electrically and visually 外观和性能上没有明显的变化
4	Vibration Test 振动测试	After standard charged, fixed the cell to vibration table and subjected to vibration cycling that the frequency is to be varied at the rate of 1Hz per minute between 10Hz and 55Hz, the excursion of the vibration is 1.6mm. The cell shall be vibrated for 30 minutes per axis of XYZ axes. 标准充电后，将电池固定在振动台上，并进行振动循环，频率以1Hz /分钟的速率在10Hz 和55Hz之间变化，振动偏移为1.6mm。电池应在XYZ轴方向的每个轴上振动30分钟。	No fire No explosion No leakage 无火、无爆炸、无泄漏
5	Crush 挤压测试	Crush between two flat plates. Applied force is about 13kN(1.72Mpa) for 30min. 用力约 13kN (1.72Mpa) 把电池压扁在两个平板之间30分钟。	No fire No explosion No leakage 无火、无爆炸、无泄漏
6	Thermal shoc 温度急增测试	Batteries in hot box Temperature in $5^{\circ}\text{C}\pm 2^{\circ}\text{C}/\text{min}$, rising to $50^{\circ}\text{C}\pm 2^{\circ}\text{C}$ keep 30min 电池放在烤温箱中，以 $5^{\circ}\text{C}\pm 2^{\circ}\text{C}/\text{min}$ ，升至 $50^{\circ}\text{C}\pm 2^{\circ}\text{C}$ 保持 30min。	No fire No explosion No leakage 无火、无爆炸、无泄漏

7. Protection board principle diagram 电路原理图



8. Protection board component 保护板组件

No	Part Name 名称	Description 规格	QTY 数量
1	U1	DW01	1pcs
2	U2/U3	8205	2pcs
3	R1	470Ω (471)	1pcs
4	R2	2KΩ (202)	1pcs
5	C1	0.1uF (104)16V	1pcs
6	NTC	/	/

9. Protection board electrical properties 保护板组件参数

No	Items 项目	Criteria 参数	Unit 单位
1	Overcharge Detection Voltage 过充保护电压	4.3±0.05V	V
2	Overdischarge Detection Voltage 过放保护电压	2.4±0.1V	V
3	Overcurrent Detection current 过流保护电流	5-10	A
4	Supply current 自耗电电流	≤8.0	uA

10.Appearance 外观

No scratches, dirt, defect, leakage of electrolyte or gassing should be observed as a new product.

产品外观没有划痕, 污垢, 缺陷, 电解液泄漏或胀气等现象。

11.Warranty 保质期

Warranty period for this product is 1 year starting from the date when the products left the door of manufacturer.

产品的保质期为出厂日期开始的1年。

12.Liability 责任

The user has to operate the products according to the instructions printed on the battery label or follow the advice described in this “Product Specification for Lithium Ion Batteries published by PKCELL Limited. In case the battery were overheated or even catch fire or explosion caused by mishandling of the user side, PKCELL Limited. will not be liable for the lose caused by any of such mishandling. PKCELL Limited. will notify the users in written form if any modifications in specification, raw material, production process control.

用户必须根据电池标签上的说明操作产品, 或遵循深圳市比苛电池有限公司出版的“锂离子电池产品规格书”中所述的建议。如果电池过热, 甚至由于用户错误操作而引起火灾或爆炸, 深圳市比苛电池有限公司不会对任何这种使用不当造成的损失负责。如果在规格, 原材料, 生产过程控制方面有任何修改, 深圳市比苛电池有限公司将以书面形式通知客户。

13.Warnings and Cautions in Handling the Lithium-ion Battery 使用电池前, 请阅读使用说明书

To prevent potential leaking, overheating or explosion of batteries please be advised to take following precautions:

为防止电池漏液, 过热或爆炸, 建议采取以下预防措施:

Danger!

危 险!

- Do not immerse the battery in water or allow it to get wet.
- 勿将电池投入水中或将其弄湿!
- Do not use or store the battery near sources of heat such as a fire or heater.
- 禁止在火源或极热条件下给电池充电! 勿在热源(如火或加热器)附近使用或贮存电池! 如果电池泄漏或发出异味, 应立即将其从接近明火处移开!
- Do not use any chargers other than those recommended.
- 请使用专用充电器!
- Do not reverse the positive (+) and negative (-) terminals.
- 勿将正负极接反!
- Do not connect the battery directly to wall outlets or car cigarette-lighter sockets.
- 勿将电池直接连接到墙上插座或车载点烟式插座上!
- Do not put the battery into a fire or apply direct heat to it.
- 勿将电池投入火中或给电池加热!
- Do not short-circuit the battery by connecting wires or other metal objects to the positive (+) and negative (-) terminals.
- 禁止用导线或金属物体将电池正负极短路, 禁止将电池与项链、发夹或其它金属物体一起运输或贮存!
- Do not pierce the battery casing with a nail or other sharp object, break it open with a hammer, or step on it.
- 禁止用钉子或其它尖锐物体刺穿电池壳体, 禁止锤击或脚踏电池!
- Do not strike, throw or subject the battery to sever physical shock.
- 禁止撞击、投掷或者使电池受到机械震动!
- Do not directly solder the battery terminals.
- 禁止直接焊接电池端子!
- Do not attempt to disassemble or modify the battery in any way.
- 禁止以任何方式分解电池!
- Do not place the battery in a microwave oven or pressurized container.
- 禁止将电池置入微波炉或压力容器!

- Do not use the battery in combination with primary batteries (such as dry-cell batteries) or batteries of different capacity, type or brand.
- 禁止与一次电池（如干电池）或不同容量、型号、品种电池组合使用！
- Do not use the battery if it gives off an odor, generates heat, becomes discolored or deformed, or appears abnormal in any way. If the battery is in use or being recharged, remove it from the device or charger immediately and discontinue use.
- 如果电池发出异味、发热、变形、变色或出现其它任何异常现象时不得使用； 如果电池正在使用或充电，应立即从用电器中或充电器上取出并停止使用！

Caution!

注 意！

- Do not use or store the battery where is exposed to extremely hot, such as under window of a car in direct sunlight in a hot day. Otherwise, the battery may be overheated. This can also reduce battery performance and/or shorten service life.
- 不要使用处于极热环境中的电池，如阳光直射或热天的车内。否则，电池会过热，可能着火（点燃）这样就会影响电池的性能、缩短电池的使用寿命。
- If the battery leaks and electrolyte gets in your eyes, do not rub them. Instead, rinse them with clean running water and immediately seek medical attention. If left as is, electrolyte can cause eye injury.
- 如果电池漏液后电解液进入眼睛，应用水冲洗,立即寻求医疗救助。如不及时处理，眼睛将会受到伤害。

.....END.....