BPI 倍特力电池有限公司
BetterPower Battery Co., LTD.

Specification Approval Sheet

锂离子电池规格承认书

型号 Model: PL 903636 样品数量 NO.OF SAMPLES: PCS

容量 Cap : 1000mAh 送样日期 DATE OF SENDING SAMPLE:

版本 REV : A/0 客户代码 CUSTOMER CODE:

制定人 Prepared by	审核人 Checked by	批准人 Approved by
刘灿		

客户名 CUSTOMER NAME : BATTEX - Czech Republic

业务员 THE SALESMAN :

客户确认 CUSTOMER APPROVAL	签章 STAMP

地址：深圳市宝安区大浪街道华联工业区第 9 栋
Add: Building 9, hualian industrial park, dalang country, baoan district, Shenzhen city
电话(TEL)：0755-29009188 传真(FAX)：0755-2900958

Contents 目录

1. 适用范围 Scope

仅适用于深圳倍特力电池有限公司生产的可充电锂离子电池或电池组, 包括锂离子电池电芯和保护组件。

This document describes the product specification of lithium ion polymer battery or module which includes cell and protection devices supplied by Shenzhen BetterPower battery develop Co., Ltd.

2. 电池组成 Battery Constitution

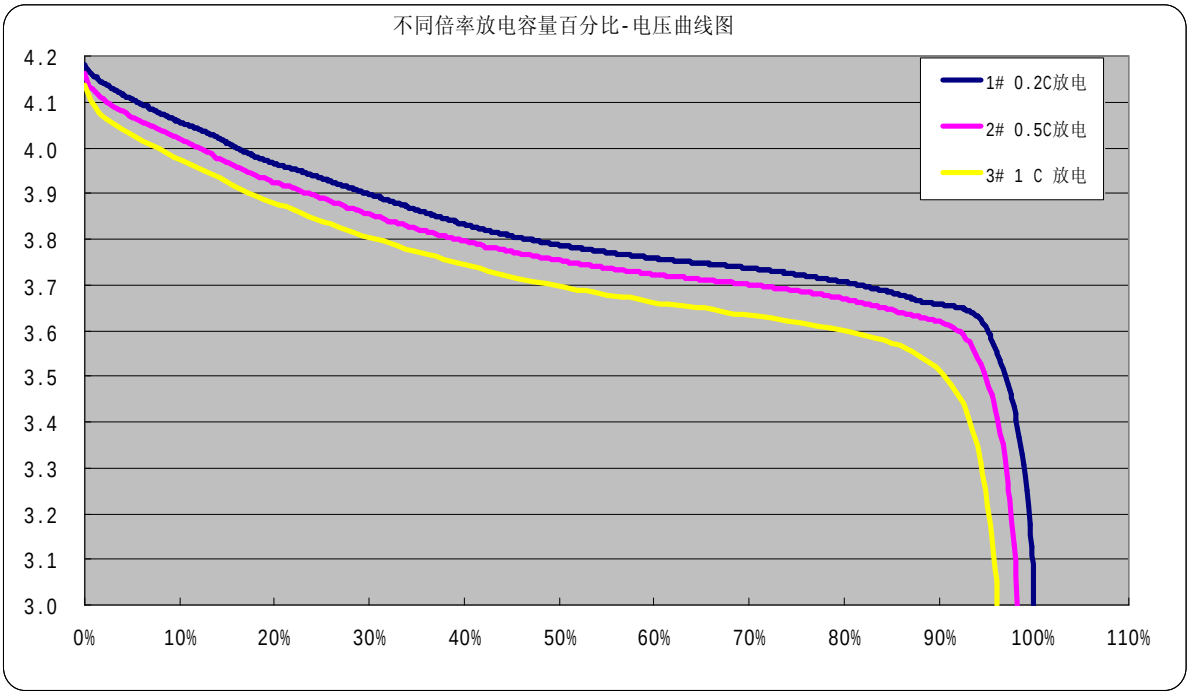
序号 No.	名称 Name	型号 Model	备注 Remark
1	1 支锂离子电芯 One piece of cell	倍特力聚合物电池 PL903636-1000 PL903636-1000	倍特力聚合物锂离子电池 BetterPower Polymer Lithium Ion Battery
2	1 个电池保护板 One piece of protection board	I C：G3J MOSFET：8205A	
3	导线（右出线 PHR-3P 反向插头线) (Right wire)	线型 UL1007 26# linear UL1007 26#	黑线外露线长 55±5mm Black Lead wire length 55±5mm 红线外露线长 55±5mm Red Lead wire length 55±5mm

3.主要技术参数 Specification

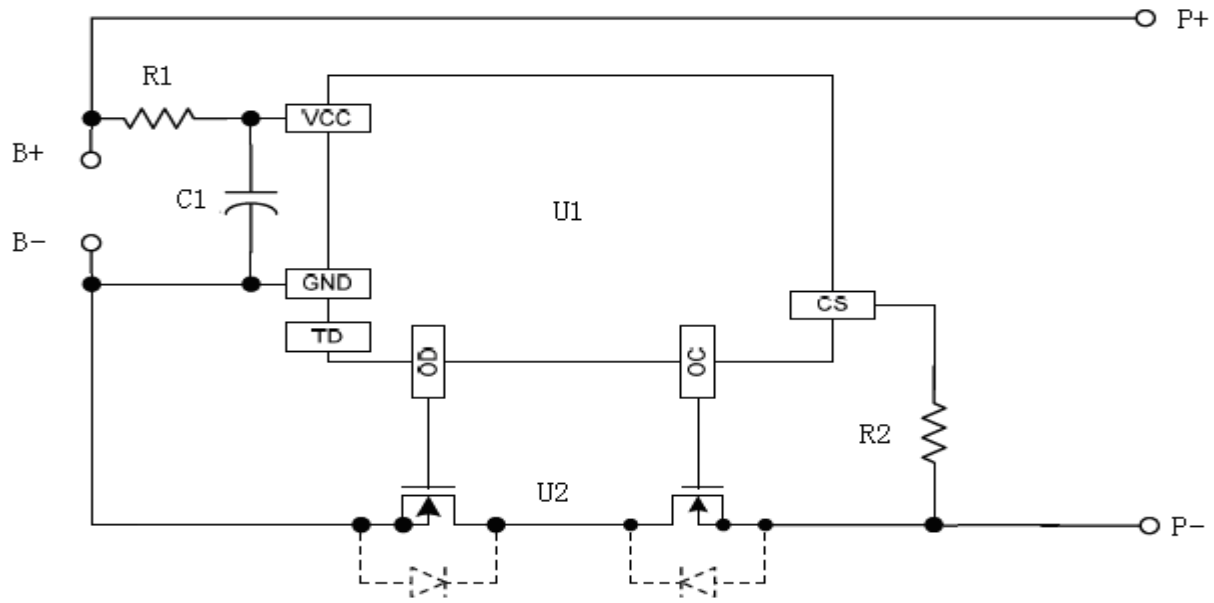
序号 NO.	项目 Items	标准 Criteria	备注 Remarks
3.1	典型容量 Typical capacity	1000mAh	0.2C 充放电至终止电压 0.2C charge and discharge for cut-off voltage
3.1	最小容量 Minimum Capacity	980Ah	
3.2	标称电压 Nominal Voltage	3.70V	
	出货电压 Shipment voltage	3.85-3.95V	
3.3	内阻（含 PCB） Internal Impedance	≤200mΩ	标准充电后 AC 1KHz 测试 AC 1KHz after standard charge
3.4	充电截止电压（V） Charge cut-off voltage	4.28±0.025 V	
3.5	放电截止电压（V） Discharge cut-off voltage	3.0±0.05V	
3.6	电芯约重 About heavy single batteries	20g	

3.7	标准充电电流 Standard charge current	200mA	0.2C
3.8	最大充电电流 Max. charge current	1000mA	1.0C
3.9	标准放电电流 Standard dis-charge current	200mA	0.2C
3.10	建议最大瞬间放电电流 SuggestedContinousdischargingcurrent	1000mA	1.0C
3.11	工作温度 Operating Temperature	0℃~+45℃	充电 Charging
		-10℃~+45℃	放电 Discharging
3.12	贮存温度 Storage Temperature	-10℃ / +45℃	小于一个月 Less than 1 month
		-10℃ / +35℃	小于六个月 Less than 6 months

4. 电芯放电曲线图 Batteries discharge curve



5. 保护板原理图 Protection board principle diagram



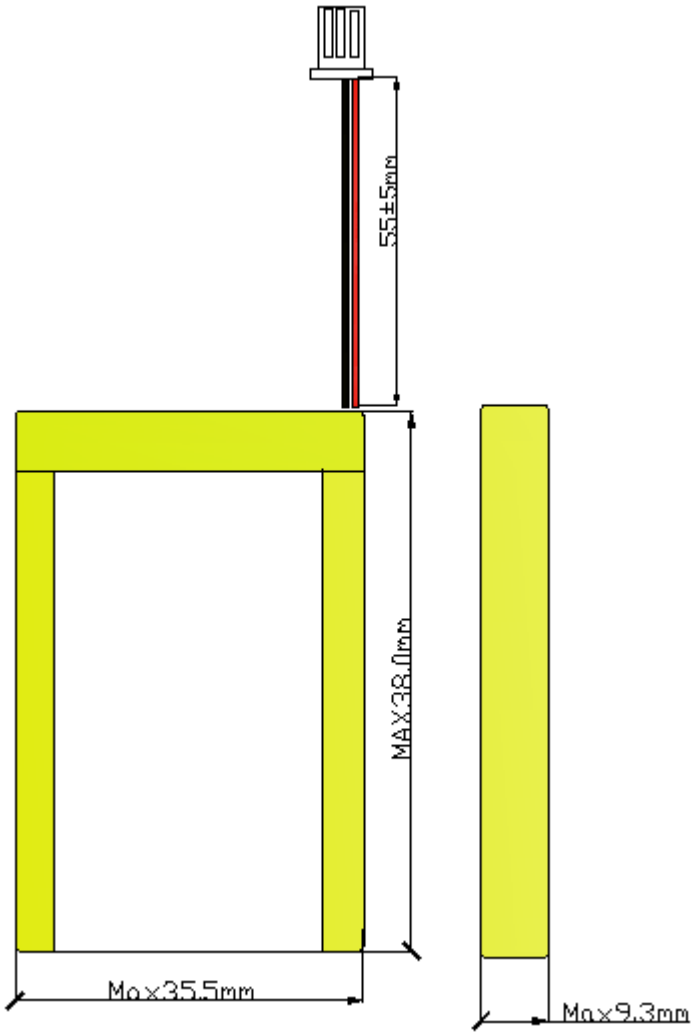
6. 保护板电气性能 Protection board electrical properties

NO.	项目 Items	标准 Criteria	单位 Unit
5.1	过充保护电压 Overcharge Detection Voltage	4.28±0.025	V
5.2	过放保护电压 Overdischarge Detection Voltage	3.0±0.05	V
5.3	过流保护电流 Overcurrent Detection current	**1.5-4.5**	A
5.4	自耗电流 Supply current	**≤7.0**	uA
5.5	保护板内阻 Protection board resistance	**10-60**	mΩ

7. 保护板元器件 Protection board component

位置 position	规格 specifications	数量 quantity
R1	471 5%	1PCS
R2	202 5%	1PCS
C1	104 5% 25V	1PCS
U1	G3JSOT-23	1PCS
U2	8205	1PCS

8. 电池尺寸 Battery Drawing



项目 Items	标准 Criteria
电池长度 L1 Battery length L1	最大 38.0mm 毫米 38.0mm Max.
电池宽度 Battery width	最大 35.5 毫米 35.5mm Max.
电池厚度 Battery thickness	最大 9.3 毫米 9.3mm Max.
外观 Appearance	正极折镍加板加线（右出线） Bend Cathode Ni tab
导线（右出线 PHR-3P 反向插头线 ） Lead wire (Right wire)	线型 UL1007 26# 外露长度:55±5mm Wire UL1007 26# length 55±5mm

9. 电池性能 Battery Performance

9.1 外观 Visual Inspection

电池外表面应保持干净、清洁，不能出现划痕、凹点、脏污、漏液、变形等不良现象。

There shall be no such defects as scratch, flaw, crack, and leakage, which may adversely affect commercial value of the battery.

9.2 标准测试条件 Standard Testing Condition

除非另有说明,涉及本规格书的所有测试项目均应在温度 25±5℃,相对湿度 45％－75%RH 条件下进行。

Unless otherwise specified, all tests stated in this product specification are conducted at below condition:

Temperature: 25 ± 5°C

Humidity: 45％－75% RH

9.3 电性能 Electric Performance

序号 No.	项目 Items	测试条件 Test Method and Condition	标准 Criteria
1	标准充电模式 Standard Charge	0.2C 恒流充电至 4.2V，然后恒压充电至 0.05C Charge to 4.2V at constant current 0.2C, then constant voltage charge to taper current 0.05C	总充电时间不超过 6.5 小时，其中在 25±2℃环境下充电；Constant voltage 4.2V for 6.5hours in all at25±2℃.
2	循环 Cycle Life	（1）充电过程：标准充电模式；（2）放电过程：标准放电模式。重复以上步骤 300 次。Charge: Standard charge model Discharge: Standard discharge model Repeat the procedures below 300 cycles	300 次循环后放电容量大于等于第一次放电容量的 80% Residual capacity ≥ 80% after 300 cycles vs. Discharge capacity of first cycle
3	电池温度性能 Temperature Performance of Battery	充电过程：标准充电模式 放电过程：分别在-10° C, 0° C 和 45° C 温度下以 0.2C 恒流放电至 3.0V Charge: Standard charge model Discharge: Discharge to 3.0V at 0.2C constant current at -10° C, 0° C and 45° C respectively	-10°C 下，容量≥75% 0°C 下，容量≥80% 45°C 下，容量≥95% -10°C, capacity ≥75% 0°C, capacity ≥ 80% 45°C, Capacity ≥95%

9.4 机械性能测试 Mechanical Performance Testing

序号 No.	项目 Items	测试条件 Test Method and Condition	判断标准 Criteria
1	振动测试 Vibration Test	充满电电池按 X、Y、Z 三个方向，每个方向上从 10HZ∽55HZ 的频率循环扫描振动 90min 振动频率 10HZ～50HZ 位移幅值 （单振幅 0.8mm）。After standard charging, fixed the capacitor 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 capacitor shall be vibrated for 30 minutes per axis of XYZ axes.	不起火,不爆炸,不冒烟或漏液 No fire, no explode, no smoke or no leakage
2	跌落测试 Drop Test	电池完全充电后从 1300mm 高度由 X，Y，Z 正负 6 个方向自由跌落到置于水泥地面上 18mm-20mm 的厚木板上,每个方向跌落 1 次,最后用 1C 进行充放循环 3 次。Battery is dropped from a height of 1.3 meters 6 times at six angles (X, Y, Z plus positive, negative) to concrete ground, then cycle three times at 1C current.	不起火,不爆炸,不冒烟或漏液 No fire, no explode, no smoke or no leakage

9.5 安全性能测试 Safety Performance Testing

序号 No.	项目 Items	测试条件 Testing condition	标准 Criteria
1	过充电测试 Overcharge testing	充满电的电池外接 3C/4.6V 的电源给电池持续加载 2 小时 3C/4.6V DC power supply charge 2hrs after fully charge	不起火,不爆炸,不冒烟或漏液 No fire, no explode, no smoke or no leakage
2	短路测试 Short circuit testing	充满电电池用小于 0.1Ω电阻短路 1 h Short circuit 0.1hr through less than 0.1Ω resistor after fully charge	不起火,不爆炸,不冒烟或漏液 No fire, no explode, no smoke or no leakage
3	热冲击实验 Hot oven test	将充满电的电池放在重力对流或循环空气的烘箱中进行加热，烘箱的温度以 5±2℃的速率上升到 130±2℃后保温 10 分钟。Put a fully charged battery in a forced air oven and raise the temperature at 5±2℃/min. to130±2℃ Rest for10 minutes。	不起火,不爆炸， No fire, no explode
4	过放电测试 Overdischarge testing	将电池放电至终止电压后,以 30Ω负载给电池持续加载 28 小时 Discharge 28hrs through 30Ω resistor after fully charge	不起火,不爆炸,不冒烟或漏液 No fire, no explode, no smoke or no leakage

9.6 高温储存性能测试 HT Storage Performance Testing

序号 No.	项目 Items	测试条件 Testing condition	标准 Criteria
1	45℃/7 天 45℃/7 days	充满电电池在 45±2℃高温箱中搁置 7 天,再放电至终止电压 Storage 7 days at 45±2℃ oven after fully charge, then discharge to 3.0V at RT	不起火,不爆炸，不冒烟或漏液 No fire, no explode, no smoke or no leakage 容量衰减 < 10%, 内阻增加 < 30% Cap loss < 10%, imp increase < 30%

10. 贮存及其它事项 Storage and Others

10.1 长期贮存 Long Time Storage

长期贮存的电池（超过 3 个月）须置于干燥、凉爽处。贮存电压为 3.75～3.95V.

If stored for a long time(exceed three months), the cell should be stored in drying and cooling place. The cell's storage voltage should be 3.75~3.95V

10.2 其它事项 Others

任何本说明书中未提及的事项，须经双方协商确定

Any matters that this specification does not cover should be conferred between the customer and BPI.

Appendix 附录

聚合物锂离子充电电池操作指示及注意事项

Handling Precautions and Guideline For LIP (Lithium-Ion Polymer) Rechargeable Batteries

前言 Preface

本檔“聚合物锂离子充电电芯操作指示及注意事项”仅适用于 深圳倍特力电池有限公司生产电芯。

This document of 'Handling Precautions and Guideline LIP Rechargeable Batteries' shall be applied to the battery cells manufactured by BPI.

1 充电 Charging

1.1 充电电流 Charging current

充电电流不得超过本规格书中规定的最大充电电流。使用高于推荐值电流充电将可能引起电芯的充放电性 能、机械性能和安全性能的问题，并可能会导致发热或泄漏。

Charging current should be less than maximum charge current specified in the Product Specification. Charging with higher current than recommended value may cause damage to cell electrical, mechanical, and safety performance and could lead to heat generation or leakage.

1.2 充电电压 Charging voltage

充电电压不得超过本规格书刊号中规定的额定电压。充电器的设 计应满足此条件。电池电压高于额定电压值时，将可能引起电芯的充放电性能、机械性能和安全性能的问题，可能会导致发热或泄漏。

Charging shall be done by voltage less than that specified in the Product Specification . which is the absolute maximum voltage, must be strictly prohibited. The charger shall be designed to comply with this condition. It is very dangerous that charging with higher voltage than maximum voltage may cause damage to the cell electrical, mechanical safety performance and could lead to heat generation or leakage.

1.3 充电温度 Charging temperature

电池必须在 0℃~45 ℃ 的环境温度范围内进行充电。

The cell shall be charged within 0℃~45 ℃ range in the Product Specification.

1.4 禁止反向充电 Prohibition of reverse charging

正确连接电池的正负极，严禁反向充电。若电池正负极接反，将无法对电芯进行充电。同时，反向充电会降低电芯的充放电性能、安全性，并会导致发热、泄漏。

Reverse charging is prohibited. The cell shall be connected correctly. The polarity has to be confirmed before wiring. In case of the cell is connected improperly, the cell cannot be charged.Simultaneously, the reverse charging may cause damaging to the cell which may lead to degradation of cell performance and damage the cell safety, and could cause heat generation or leakage.

2 放电 Discharging

2.1 放电电流 Discharging current

The cell shall be discharged at less than the maximum discharge current specified in the Product Specification. High discharging current may reduce the discharging capacity significantly or cause over-heat.

放电电流不得超过本规格书规定的最大放电电流，大电流放电会导致电芯容量剧减并导致过热。

2.2 放电温度 Discharging temperature

The cell shall be discharged within -20℃~60 ℃ range specified in the Product Specification.

电池必须在 -20℃~60 ℃ 的环境温度范围内进行放电。

2.3 过放电 Over-discharging

需要注意的是，在电池长期未使用期间，它可能会用其自放电特性而处于某种过放电状态。为防止过放电的发生，电池应定期充电，将其电压维持在 3.75V 至 3.95V 之间。

It should be noted that the cell would be at an over-discharged state by its self-discharge characteristics in case the cell is not used for long time. In order to prevent over-discharging, the cell shall be charged periodically to maintain between 3.75V and3.95V.

过放电会导致电芯性能、电池功能的丧失。

Over-discharging may causes loss of cell performance, characteristics, or battery functions.

3.保护电路模块 Prtection Circuit Module

电芯/电池包装应配有 PCM 以正确保护电芯/电池。PCM 应具有以下功能以保证安全并防止损坏电池性能：(1)过充保护功能；（2）过放保护功能；（3）过流保护

The cell/battery pack shall be with a PCM that can protect cell/battery pack properly. PCM shall have functions of (1) overcharging prevention ,(2) over-discharging prevention,(3) over current prevention to maintain safety and Prevent significant deterioration of cell performance. The over current can occur by external short circuit

4. 电池的注意事项 **Handling Instructions**

认真阅读下面的注意事项，确保正确使用聚合物锂离子电池。倍特力对违反下述注意事项而产 生的任何问题不予负责。

Read and observe the following warnings and precautions to ensure correct and safe use of Li-ion batteries.

Danger!

危险！

安全警示及使用说明 Caution and Guideline

使用前应先阅读产品规格书以及安全警示，确保正确使用电池和确保电池使用过程中的安全。

Before using battery, please read specification and safety caution, insure proper application and safety.

安全警示 Caution

下面的操作可能导致电池泄漏，发热甚至燃烧：
Failing in following items can cause leakage, heat even fire：
禁止反向充电！
Prohibition of reverse charge of battery.
禁止过充电！
Prohibition of overcharge of battery.
禁止过放电！
Prohibition of overdischarge of battery.
禁止正负极短路！
Prohibition of short circuit of positive and negative of battery.
请使用指定的充电器充电！
Please charge by specified charger.
请不要撞击，敲打，钉刺或拆卸电池！
Don’t knock, beat, nail or disassemble battery.
请保持电芯远离热源，禁止将电芯扔入火中！
Please keep away from fire or other heating sources and prohibition of dumping of battery into fire.



使用说明 Guideline

如果电解液接触到皮肤或眼睛，请立刻用清水冲洗接触的区域并寻求医生的建议！
If electrolyte comes into contact with the skin or eyes where shall flush the electrolyte immediately with fresh water and physicians’ advice is to be sought.
请不要在规定的范围外使用或储存电池，否则将削弱电池的性能，缩短电池的寿命，甚至导致电池发热，起火或爆炸！
Don’t use or storage battery under the circumstance beyond specified, unless will weaken battery performance and shorten battery life-span, even will cause heating, fire or explosion.
使用前请确保电池在质量保证期内。
Please insure battery in quality guarantee duration before using.
如果电池太脏，使用前请清扫它们，否则可能导致其不正常工作。
If batteries are too dirty, please clean them before using. Unless will cause abnormal work of battery.
请不要使电池的封口边缘与金属直接接触。

Please don't make the battery side edge of direct contact with the metal.