广东风华新能源股份有限公司

Guangdong Fenghua New Energy Co.,Ltd.

电池产品规格书

SPECIFICATION OF BATTERY

Document No.: FH-WI-PE-001-KS-01

客户名称 Customer	酷赛
产品名称 Name	可充电锂离子聚合物电 Li-ion polymer battery
产品型号 Model	BL-A62CT
客户型号 Customer Model	SN339D
环保要求 Environmental protection requirements	RoHS2.0
风华项目号 FH Project No	F181001PA
产品规格 Description	4900mAh/3.87V

制 订 Prepared	梁文瑞 2024/1/18	审核 Checked	于代剑 2024/1/18	批准 Approved	李广怀 2024/1/18

客户确认 Customer Approved

	结果判定 Result	签名 Signature	日期 Date
外观 Surface			
结构 Structure			
电性能 Electrical characteristics			

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技编制/修改历史记录 Revision History

版本号 Revision	编制/修改 Registered	描述 Description	审核 Checked	批准 Approved	生效日期 Date
A0	梁文瑞	新版制定	于代剑	李广怀	2023-10-10
A1	梁文瑞	去掉 BOM 表备选物料	于代剑	李广怀	2023-10-25
A2	梁文瑞	更新丝印图档（增加法语警告语）	于代剑	李广怀	2024-1-18

目录 Content

1. 适用范围 Application Scope：

本规格书描述电池之标称参数、电气特性、安全性能、环境适应性及其实验和判定、使用说明和安全规程、质量评定及包装、标志、贮存、运输等。适用于采用 FHPS506586P 电芯制成的配套电池。

This specification description of the battery parameters, electrical properties, nominal safety performance,environment and its experiment and the determination of the adaptability, instructions and safety regulations, quality assessment and package, mark, storage, transportation, etc. Apply to the core FHPS506586P made of supporting the battery cell .

2. 参考标准 Reference standard：

GB/T18287-2013 蜂窝电话用锂离子电池总规范。

GB/T18287-2013 Li-ion battery specification for cell phone.

GB 31241-2014 便携式电子产品用锂离子电池和电池组安全要求。

GB 31241-2014 safety requirement for Li-ion battery using in portable electronic product.

3. 主要参数 Typical Parameters：

3.1 电芯特性 Cell Main Characteristics

Nominal Voltage 标称电压	Cell Make 电芯制造商	Cell Model 电芯型号	Cell Nominal Capacity 电芯额定容量
3.87V	FHE 风华新能	FHPS506586P	4920mAh

3.2 电池电气特性 Battery typical Characteristics：

序号 No	内　　容 Item	参　数 Specification	备 注
1	标称电压 Nominal Voltage	3.87V	
2	最小容量 Minimum capacity	4900mAh	0.2ItA to charge and discharge
	典型容量 Typical capacity	5000mAh	
3	内阻　Internal resistance	100 mΩ（Max）	
4	充电方式 Charge Method	C.C/C.V.	
5	充电时间 Charging time	≤8H	Standard charge 0.2ItA
		≤2H	Quick charge 1ItA
6	充电限制电压 Limited charging voltage	4.45V	
7	放电截止电压 Discharge cut-off voltage	3.00V	
8	充电截止电流 Taper current for charging	0.02ItA	

9	推荐充电电流 Recommendation charging current	0.2ItA	
10	推荐放电电流 Recommendation discharging current	0.2ItA	
11	最大充电电流 Maximum charging current	1ItA	
12	最大放电电流 Maximum discharging current	0.2ItA	-20~0℃
		1ItA	0~60℃
13	循环寿命 Cycle life	≥800 次	
14	工作温度范围 Operating temperature	充电温度 charge temperature	充电制式 Charging mode
		<0℃	0
		0℃~15℃	≦0.2ItA 恒流恒压充电至 4.45V,截止电流 0.02ItA ≦0.2ItA constant current constant voltage charge to 4.45V,Cut off current 0.02ItA
		15℃~45℃	≦1ItA 恒流恒压充电至 4.45V,截止电流 0.02ItA ≦1ItA constant current constant voltage charge to 4.45V,Cut off current 0.02ItA
		45℃~55℃	≦0.3ItA 恒流恒压充电至 4.15V,截止电流 0.02ItA ≦0.3ItA constant current constant voltage charge to 4.15V,Cut off current 0.02ItA
		>55℃	0
		放电:-20~60℃,湿度≦85%RH	
		*请贵司严格按照我司规格书内的阶梯充电要求设定，如未按要求设定引起的客诉问题我司一律不承担相关责任	
15	贮存温度及湿度范围 Storage temperature and humidity range	-20~60℃ Within 1 month 1 个月以内	

		-20~45℃ Within 3 month 3 个月以内	应在 3.85~3.95V 的状态下储存 Should be stored in the state of 3.85~3.95V
		-20~25℃ Within 6 month 6 个月以内	
		相对湿度 Relative humidity: 45～85 %RH	
16	NTC thermistor value	10KΩ ±1%	At=25℃
17	ID 电阻 resistance	51KΩ ±1%	
18	静电测试 ESD static test	±15KV	空气放电 Air discharge
		±8KV	接触放电 Contact discharge
19	重量 Weight	/	
20	出货电压 Battery ex-factory status	3.85~3.95V	

4. 主要物料 Materials list：

4.1 PACK 主要物料 Pack materials list：

物料 Material	规 格 Specification	数 量 Quantity	厂商 Manufacturer	备注 Remarks
电芯 Cell	FHPS506586P/4920mAh	1PCS	风华 FH	
保护板 PCM	FPC+PCB	1PCS	达人 DR/路远 LR	

4.2 电芯主要物料 cell materials list：

序号	部件	材料名称	型号	重量/数量	生产厂家
1	正极	钴酸锂	W6	≈28.13g	湖南杉杉
2	负极	石墨	G6	≈15.79g	上海杉杉
3	隔离膜	混涂膜	11 微米（7 微米基膜）	≈0.21㎡	深圳旭然（基膜） 重庆纽米（涂覆）
4	电解质	六氟磷酸锂	F/H 类	≈8.3g	新宙邦
5	外壳	铝塑膜	88 微米	≈0.026㎡	紫江

5．测试规范 Test Protocol：

Test Condition/测试条件：

The test should be at(23±2) ℃with 60±25% relative humidity if there are no special requirements.

标准测试条件，如下测试如未特别规定，均应在(23±2) ℃，相对湿度 60±25%条件下进行。

Test illustration/测试说明：

Battery means one block with PCM, cell and parts of structure; Cell means a monomer cell.

在本规格书中，电池及电池组指带保护板、电芯与结构的整体，电芯则指电芯单体。

Test Meter and Equipment Requirement/测量仪表与设备要求：

The test accuracy of ammeter and voltmeter must be higher than 0.5 level.

电流表及电压表的测量精度不低于 0.5 级。

Standard Charge/标准充电方式：

a）标准充电：在 23℃±2℃的环境温度下（可接受 25±3℃环境温度），以 0.2C 电流充电，当电池或 电池组端电压达到充电限制电压时，改为恒压充电，直到充电电流小于或等于 0.02C，最长充电时 间不大于 8h，停止充电；

Standard charging: charging with 0.2C current at the ambient temperature of 23℃±2℃ (acceptable25℃±3℃). When the terminal voltage of the battery or battery reaches the charging limit voltage, it is changed to constant voltage charging until the charging current is less than or equal to 0.02C, and the longest charging time is not more than 8 hours, and the charging stops.

b）0.5C 充电：在 23℃±2℃的环境温度下（可接受 25±3℃环境温度），以 0.5C 电流充电，当电池或 电池组端电压达到充电限制电压时，改为恒压充电，直到充电电流小于或等于 0.02C，最长充电时 间不大于 4h，停止充电；

0.5C charging: charging with 0.5C current at the ambient temperature of 23℃±2℃(acceptable 25℃±3℃). When the terminal voltage of the battery or battery reaches the charging limit voltage, it is changed to constant voltage charging until the charging current is less than or equal to 0.02C, and the

longest charging time is not more than 4 hours, and the charging stops.

c）标准放电方法：在环境温度 23℃±2℃，相对湿度≤75%下，电池或电池组依照规格书规定的电流进 行恒流放电至截止电压 3.0V。

Standard discharge method: Under ambient temperature of 23℃±2℃ and relative humidity of less than 75%, the battery or battery group discharges at constant current to cut-off voltage of 3.0V according to the current specified in the specification.

5.1 常规测试 General Test

No.	项目 Items	测试方式 Conditions	标　准 Criteria
1	标准充电 Standard charge	在 25±2℃环境温度下以 0.2ItA 恒流充电，当电池端电压达 4.45V 时恒压充电，直到充电电流至 0.02ItA。 under the temperature of 25±2℃ , Charge at 0.2 ItA when the voltage reaches the limited charging voltage, charge the battery with invariable voltage until the charge current to 0.02ItA.	充电时间≤8H。 The charging time should be less than 8h.
2	0.2ItA放电容量 0.2ItA Capacity	以 0.2ItA 放电至 3.00V，然后静置 30 分钟，以 0.2ItA/4.45V 恒流恒压模式直至充电电流 0.02ItA。静置 30 分钟后，以 0.2ItA 放电至 3.00V。Discharge with 0.2ItA at (25℃±2℃) down to 3.00V, rest of 30 minutes， then charge at 0.2ItA/4.45V CC/CV mode until I to 0.02ItA. After rest of 30 minutes,discharge at 0.2ItA down to 3.00V.	上述试验可以重复循环 5 次，当循环过程中有一次电池放电时间不小于 300 分钟，试验时取该次放电容量。 The test may be repeated 5 times, if the discharge time ≥300mins in any time,then the capacity of the battery is ensured.
3	3.4V 平台时间 3.4V platform time	电池标准充电结束后，搁置 0.5h～1h，以 0.2ItA 放电至 3.4V Put on rest the battery for 0.5h～1h after standard charge, discharge to 3.4V at 0.2C	放电容量≥95%初始容量 Discharge capacity ≥ 95% of initial capacit
4	0.5ItA放电容量 0.5ItA Capacity	以 0.2ItA 放电至 3.00V，然后静置 30 分钟，以 0.2ItA/4.45V 恒流恒压模式直至充电电流 0.02ItA。静置 30 分钟后，以 0.5ItA 放电至 3.00V。Discharge with 0.2C at (25℃±2℃) down to 3.00V, rest of 30 minutes， then charge at 0.2ItA/4.45V CC/CV mode until I to 0.02ItA. After rest of 30 minutes,discharge at 0.5ItA down to 3.00V.	上述试验可以重复循环 5 次，当循环过程中有一次电池放电时间不小于 108 分钟，试验时取该次放电容量。 The test may be repeated 5 times, if the discharge time ≥108mins in any time,then the capacity of the battery is ensured.

5	1ItA 放电容量 1ItA Capacity	以 0.2ItA 放电至 3.00V,然后静置 30 分钟，以 0.2ItA/4.45V 恒流恒压模式直至充电电流 0.02ItA。静置 30 分钟后，以 1ItA 放电至 3.00V。Discharge with 0.2C at (25℃±2℃) down to 3.00V, rest of 30 minutes， then charge at 0.2ItA/4.45V CC/CV mode until I to 0.02ItA. After rest of 30 minutes,discharge at 1ItA down to 3.00V.	上述试验可以重复循环 5 次，当循环过程中有一次电池放电时间不小于 51 分钟，试验时取该次放电容量。 The test may be repeated 5 times, if the discharge time ≥51mins in any time,then the capacity of the battery is ensured.
6	高温性能测试 High Temperature Performance	1. 在环境温度 23±2℃下以 0.5ItA 恒流恒压充满（0.02ItA 截止）； 2. 将电池放入（60±2℃）恒温箱中恒温 2H；以 0.2C 电流恒流放电至 3.00V，记录放电时间和容量； 3. 放电结束. 将电池放在 23±2℃条件下，放置 2 小时后，作外观检查。 1. Fully charged with 0.5ItA constant current and constant voltage under 23±2°C (0.02ItA cut off); 2. Put the cell in a (60±2℃) incubator for 2H; discharge at a constant current of 0.2ItA to 3.00V, and record the discharge time and capacity; 3. After discharge, put the cell under 23±2℃ for 2h for visual inspection.	高温放电时间≥285min，电池外观无明显缺陷，不漏液、不泄压、不起火、不破裂、不爆炸. discharge time≧285min, no obvious defects in the appearance, no leakage, no venting, no fire, no crack, no explosion
7	低温性能测试 Discharge Behavior Under Low Temperature	电池按标准充电制式规定充电结束后，将电池放入-10℃±2℃的低温箱中恒温 4h 然后以 0.2ItA 电流放电到终止电压，放电时间应符合标准要求。该试验结束后，将电池取出在 25±2℃的环境温度下搁置 2h，然后目测电池外观，应符合标准要求。 Charge in this way under (25±2)℃: charge at 0.2C until the voltage reaches 4.45V, then charge under a constant 4.45V, until the current to 0.02ItA. Then let the battery stay at (-10±2)℃ for 4h and then discharge at 0.2ItA until the voltage drops to3.00V, then stay at (25±2)℃ for 2h.	1. 放电时间≥3.5 小时 2. 电池无变形、无爆裂。 The discharge time must ≥3.5H and the battery must have no distortion, no explosion.
8	荷电保持 Storage Characteristic	电池按标准充电制式规定充电结束后，在 25±2℃的环境温度下，将电池开路搁置 28 天后，以 0.2ItA 电流放电到终止电压，放电时间应符合标准要求。 Discharge at 0.2ItA down to 3.00V, rest of 30 minutes, then charge at 0.2ItA/4.45V CC/CV mode until Ito 0.02ItA. Store the battery at （25±2）℃, 28 days, then discharge at 0.2ItA down to 3.00V.	放电时间≥4.25H The discharge time must ≥4.25H

9	循环寿命测试 Cycle Life	在环境温度为 25±2℃条件下，以 1ItA 充电至电池电压达到 4.45V，然后改为恒压充电，直至充电电流 0.02ItA；停止充电，静置 0.5h，然后以 0.5ItA 恒流放电至 3.00V，放电结束后，静置 0.5h，为一个循环。 Charge at 1ItA at (25±2)℃ until the battery's voltage up to 4.45V, then charge under this constant voltage until the current to 0.02ItA. Rest of 0.5h. Then discharge at 0.5ItA, until the battery's voltage drops to 3.00V. Rest of 0.5h. Then begin with next cycle.	第 800 次循环，0.2C 放电至 3.0V ，容量≥80%； 厚度变化率≤10%。 Residual Capacity≥80% initial capacity ,Thickness swelling ratio after cycle≤10%

5.2 环境适应性测试 Environmental Test

No.	检验项目 Items	测试条件 Conditions	测试标准要求 Criteria
1	ESD 测试 ESD Testing	ESD 测试要参照 IEC 61000-4-2 完成.将电池在±8kV 条件下接触放电和在±15kV 条件下空气中放电，10 次放电的最大值。 ESD testing shall be performed as per IEC 61000-4-2. Battery shall be subjected to ±8kV contact discharge at each of the contacts and ±15kV air discharge at each pack corner, up to a maximum of 10 discharges per location.	电池可以正常充放电，所有保护功能正常。 After the test, the battery should be no explosive, no smoke, no fire or leakage and the relative protection should be well worked.
2	恒定湿热测试 Constant heat and humid	电池按标准充满电后，将电池放入 45℃±2℃，相对湿度 90～95%的恒温恒湿箱中搁置 48h 后，将电池取出在环境温度 25±2℃的条件下搁置 2h，再以 1ItA 放电至终止电压。 After fully charged, , place the battery for 48h after charging at the temperature of 45℃±2℃ and the relative humidity of 90% ～ 95%. Then, take the battery out and place at the 25±2℃ for 2h. After checking the appearance, discharge the battery with the current of 0.2ItA to the ending voltage.	1、电池外观应无明显变形、无锈蚀、不泄漏、不爆裂、不起火。 2、1C 放电时间≥51min，0.2C 恢复容量≥98%。 1) After the test, the battery should be no explosive, no smoke, no fire or leakage. 2) 1C discharge time ≥51 minutes, 0.2C recovery capacity ≥98%..

3	振动测试 Vibration Test	完全充电结束后，将电池固定在振动台上，按下面的振动频率和对应的振幅调整好试验设备，X、Y、Z 三个方向每个方向上从(10-55)Hz 循环扫频振动 30min 扫频速度：1Hz/min； 振动频率：10Hz～30 Hz 位移幅值（单振幅）：0.38mm 振动频率：30Hz～55 Hz 位移幅值（单振幅）：0.19mm Fix the fully charged battery on the vibration table. Adjust the instrument as follows. There are 3 directions: X, Y, Z. In each direction, the battery should be vibrated for 30min from 10Hz to 55Hz. Frequency sweeping rate:1Hz/min; Vibrating frequency: 10Hz～30 Hz; Movement amplitude(mono-amplitude): 0.38mm;Vibrating frequency: 30Hz～55 Hz;Movement amplitude(mono- amplitude): 0.19mm.	开路电压≥3.6V。 外观无明显损伤、不漏液、不冒烟、不爆炸。 The battery has no distortion, no leakage, no smoking and no explosion. And the voltage shall be ≥3.6V.
4	跌落测试 Drop Testing (内置电池配合整机测试) (Built in battery for complete machine test)	将电池样品由高度（最低点高度）为 1m 的位置自由跌落到置于水泥地面上的硬木板上，从 X、Y、Z 正负方向（六个方向）每个方向自由跌落 2 次。自由跌落结束后，将电池以 0.5ItA 电流放电至终止电压 3.00V。 Drop the battery sample from the position with the height of 1m (the height of the lowest point) to the hardwood on the cement floor, and drop it twice from the positive and negative directions (six directions) of X, y and Z. After the free fall, discharge the battery with 0.5ita current to the termination voltage of 3.00V.	电池外观应不漏液、不冒烟、不爆炸. 保护板各项保护功能正常,0.5ItA 放电时间≥102 分钟。 The battery has no leakage, no smoking, no explosion. The 0.5ItA discharge time ≥102min.

5	存储 Storage	进行存储试验的电池生产日期不大于 3 个月,存储前充电至半满状态(电压: 3.85～3.95V),环境温度为(25±2)℃,相对湿度为 45%～85%,存储期为 12 个月。储存期满后，经完全充电后，0.2ItA 放电至 3.00V。(1)The battery production date is no more than 3 months and is charged 1/2 of fully capacity ,the voltage is (3.85～3.95V） ;(2)storage temperature is（25±2）℃,and the relative humidity is 45%～85%.(3) The storage life is 12 months. After the expiry of the storage life, discharge the fully charged battery with 0.2ItA to 3.00V.	放电时间不小于 4 小时 Discharge time ≥4h

5.3 安全保护性能测试 Safety Performance Test

No.	项目 Items	测试条件 Conditions	判定标准 Criteria
1	过充电保护测试 Over Charge Protection	在环境温度为(25±2)℃的条件下，充电电源以 0.5ItA 电流恒流充电，直至电池电压达到 4.45V，然后改为恒压充电式充电直至电流至 0.02ItA 终止。再用电压为 2 倍标称电压，可输出电流为 2ItA 的电流的外接电源持续给电池加载 8h. Charge in this way under (25±2)℃: charge at 0.5ItA until the voltage reaches 4.45V, then charge under a constant 4.45V, until the current to 0.02ItA. Then charge the battery for 8h with a power which can provide two times nominal voltage of the battery and 2ItA current. The over charge protection function should work.	电池应不漏液、不冒烟、不起火、不爆炸。 The battery must has no explosion, no fire , no smoking and no leakage.
2	过放电保护性能测试 Over Discharge Protection	电池在环境温度 25±2℃的条件下,以 0.2ItA 放电至终止电压后,外接 30Ω 负载电阻放电 24h。 Discharge in this way under (25±2)℃: Discharge at 0.2ItA at（25±2）℃ until the battery voltage drops to the over discharge voltage , then discharge through a 30Ω resister for 24h. The over discharge protection function should work.	电池应不起火,不冒烟 、不漏液. 不爆炸。 The battery must has no explosion, no fire , no smoking and no leakage.

3	短路保护性能测试 Short Circuit Protection	电池完全充电后,将正负极用 0.08-0.1Ω 电阻短路 1h,将正负极断开后,电池以 0.5ItA 电流瞬时充电 5S 后用电压表测量电池电压应符合标准要求。 Fully charging the battery, discharge through a 0.08-0.1Ω resistor for 8h.Then charge at 0.5ItA for 5s, observe the battery's appearance.	电池应不爆炸,不起火;瞬时充电后电池电压不低于 3.6V。 The battery has no explosion, no fire.And the voltage of the battery should be ≥3.6V.
4	高温储存 High temperature storage	电池在 60±2℃的高温环境下存储 7 天。 Battery SOC: 100% charged Temperature: 60℃±2℃ Storage duration: 7Day After storage take out battery sample and decrease battery temperature to room-temperature.	无漏液、无爆裂，鼓包膨胀率应不大于 5%。 No leakage, explode, and battery thickness variation <5%.
5	热冲击 Thermal Shock	完全充电后，将电池放于热箱中，温度以（5±2℃）/min 的速率升至 130±2℃并保温 30min。 After fully charged, the battery be placed into the thermostatic oven.Then the temperature will raise to 130±2℃ at the speed of (5±2℃）/min for 30 minutes.	电池应不起火， 不爆炸。 The battery must has no fire， no explosion。
6	重物冲击 Impact （参考项）	电池满充电后，将电池平行放于冲击平面上，并将一直径（15.8±0.2）mm 的钢柱置于电池中心，垂直于电池的纵轴，然后用（9.1±0.1）Kg 重锤从（610±25）mm 高自由落下冲击电池最大面，试验结束后取出电池开路搁置 6h 观察电池状态。 After full charge of the battery, the battery on the impact of parallel plane, and a diameter of (15.8 + 0.2) mm steel column in the battery center, perpendicular to the longitudinal axis of the battery, and then use the (9.1 + 0.1) Kg weight (610 + 25) mm from the high drop impact battery, the end of the experiment after removing the battery using 6h observation battery status.	电池不爆炸、不起火 The battery does not explode or does not fire

6. 运输 Transportation：

电池应在半荷电状态 20-50%充电状态下包装成箱进行运输，在运输过程中应防止剧烈振动、冲击或挤压，防止日晒雨淋，应适用汽车、火车、轮船、飞机等普通运输工具。

battery shall be transported within case under half charge state (50% charge state); during transportation, it is required to prevent excessive vibration, shock or crush and prevent exposure to the sun and rain and it is applicable to transportation by sea, land and air.

7. 注意事项与警告 Cautions And Warnings：

使用前请阅读以下说明，不正确的使用将导致电池变热、着火、破裂、损坏和电池能量退减。

7.1 注意事项 Cautions

7.1.1 使用电池前，请仔细阅读电池服务手册。

Before using the batteries, carefully read the service manual and the identification on the surface of the batteries.

7.1.2 避免儿童玩弄电池。

Children should not be allowed to play with them.

7.1.3 本电池只能使用配套充电器充电。

The batteries should only be charged with a matching charger.

7.1.4 长期不用时，请将电池储存完好，让电池处于半荷电状态。请用不导电材料包裹电池，以避免金属直接接触电池，造成电池损坏，将电池保存阴凉干燥处。

When the batteries are not be used for a long time, please store them safely so that they will stay in a half-charged state. Please wrap the batteries with non-conductive materials in order that metallic materials will not contact the batteries directly, which may result in damage to the batteries. Keep the batteries in a cool and dry place.

7.2 警告 Warnings

7.2.1 在使用过程中，电池应远离热源、高压源。

During their use, the batteries should be kept away from heat sources and high voltages..

7.2.2 切勿私自拆装电池。

Don’t disassemble or assemble the batteries by yourself.

7.2.3 不要将电池的正负极用金属连接，也不要将电池与金属片放在一起存储和移动。

Do not short circuit the positive and negative poles of the battery with metal and do not store or move the batteries together with metal sheets either.

7.2.4 严禁将电池投入火中加热和焚烧电池。

Do not heat and burn of the batteries, throwing them in fire.

7.2.5 禁止弄湿电池。

Damping of the battery is prohibited

7.2.6 避免在火源附近或阳光直射下充电

Avoid to charge battery near a fire source or in direct sunlight

7.2.7 禁止用金属凿入电池、锤打或摔打电池或其他方法破坏电池。

The battery should not be damaged by means of methods like knocking metallic things into the battery, hammering the battery, knocking it violent or etc.

7.2.8 禁止在电池上直接焊。

Welding is not allowed to be conducted on the battery

7.2.9 不要直接触及漏液电池。

Don’t directly contact with the leaking battery.

8. 包装和标识 Mark and package

8.1 电池表面应有必要的产品标识：产品名称、型号、标称电压、额定容量、充电限制电压、执行标准编号、正负极性、制造厂名、商标和警告说明，其中充许将执行标准编号、厂址、邮编和联系电话标识在包装或产品规格书中。

Positive and negative polarity, trademark and warning specification, manufacturing date, batch number and name of manufacturer; each battery shall have the following Chinese signs: product name, model, nominal

voltage and reted capacity.

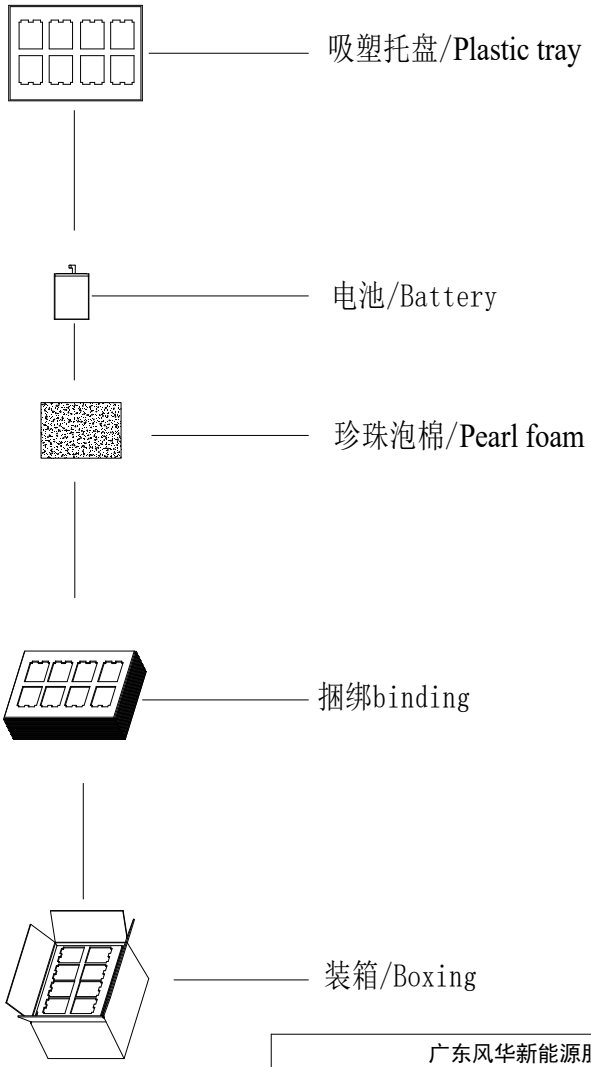
8.2 电池的包装需按客户的要求进行,包装箱外应标明产品名称、型号、数量、毛重、制造商及其联地址、出厂日期、还应有“小心轻放”、“怕湿”、“向上”等必要标示

The outside of packaging case shall indicate product name, model, quantity, gross weight, manufacturer, address and manufacturing date and shall have necessary marks like “Handle with care”, “Keep dry” and “Right side up” and so on.

8.3 包装 **Packaging Diagram**

Revision History 变 更 记 录			
Mark 标示	Change content 变更内容	Signature 签名	Date 日期
A0	New version 新版本	yudaijian 于代剑	

包装示意图Packaging diagram:



广东风华新能源股份有限公司				
Product model 产品型号	General packaging通用包装			
entry name 项目名称		Drafting 制图	yudaijian 于代剑	
Version 版本	A0	Checked 审核	luoxunwu 罗循武	
unit 单位	mm	Approved 批准	liguanghuai 李广怀	
visual angle 视角		Page 页码	Page 1 第 1 页	total of 1 Pages 共 1 页

9. 保质期限 Warranty period：

自交货之日算起，质量保证期为 12 个月；保质期内，如果确系产品本身质量问 题，按照制度规定给予售后服务。

Warranty period of this product is 12 months from manufacture code, Which the battery should be used accordance with this specification.

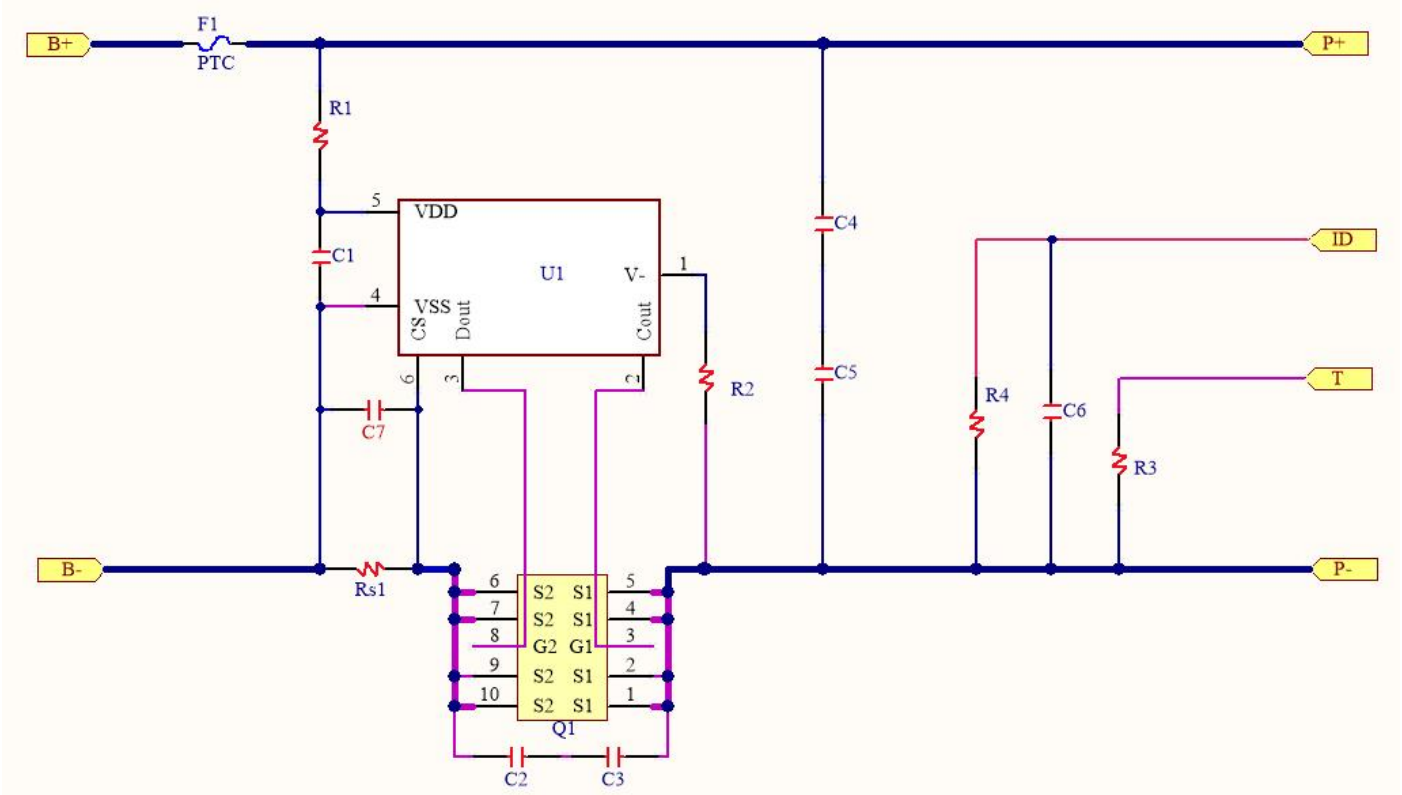
10. 免责条款 Product Liability

任何由于使用者的不当处理所导致的损坏,任何由于使用者违反操作规范或说明书明确描述的操作指示所造成的产品不良，特别是超 高温操作等。 任何在无广东风华新能源股份有限公司授权的情况下，对产品所采取的拆卸、修改及局部维修等造成产品的不良。在《产品规格书》上或产品在各种国家标准上明令禁止的行为，并因此造成产品的不良。

Any damage caused by improper handling by the user, any product defect caused by the user's violation of the operation specifications or the operation instructions clearly described in the instructions, especially the ultra-high temperature operation, etc. Any disassembly, modification and partial maintenance of the products without the authorization of Guangdong Fenghua new energy Co., Ltd. may cause the products to be defective. The behavior expressly prohibited in the product specification or in various national standards of the product, and resulting in the poor product.

附件 Attachments：

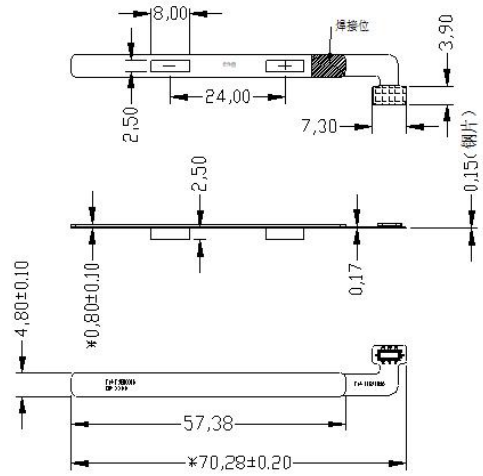
1.1、 电路原理图 Schematic diagram：



1.2、 保护板电性能 **PCM Electrical Characteristics**：（at=25℃）

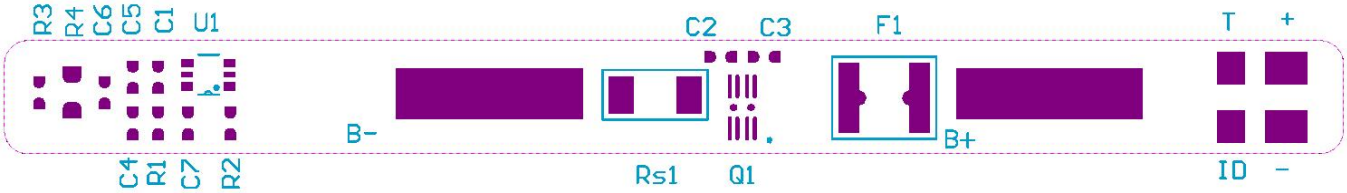
No./序号	Item/项目	Unit/单位	Min./最小值	Typ./典型值	Max./最大值
1	Over charge protection voltage/过护电压	V	4.505	4.525	4.545
2	Delay time for over charge protection/过充保护延迟时间	mS	717	1024	1331
3	Over charge release voltage/过充恢复电压	V	4.325	4.375	4.425
4	Over discharge protection voltage/过放保护电压	V	2.300	2.350	2.400
5	Delay time for over discharge protection/过放保护延迟时间	mS	44.8	64	83.2
6	Over discharge release voltage/过放恢复电压	V	2.475	2.550	2.625
7	Charge Over current protection testing values/充电过流保护电流	A	13	-	16.5
8	Delay time for charge over current protection/充电过流保护延迟时间	mS	11.2	16	20.8
9	Discharge Over current protection testing values/放电过流保护电流	A	9	-	12
10	Delay time for discharge over current protection/放电过流保护延迟时间	mS	2509	3584	4659
11	Delay time for short circuit protection/短路保护延迟时间	uS	168	280	476
12	Operating Current consumption/工作消耗电流	uA	0.9	1.8	4.0
13	Current consumption (during overdischarge)/过时消耗电流	uA	-	0.5	1.0
14	PCM internal resistance/PCM 内阻	mΩ	-	-	48

2.1、PCB 尺寸图 **Dimension Figure Of The PCB：**（未注公差：±0.10mm）

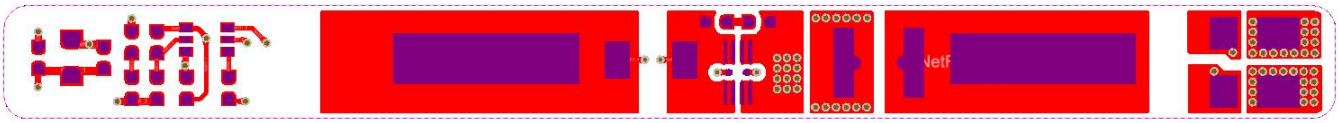


2.2、PCB 布线图 **PCB Layout**

顶层焊盘、丝印

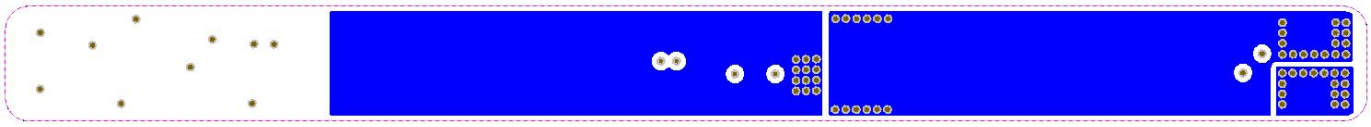


顶层线路

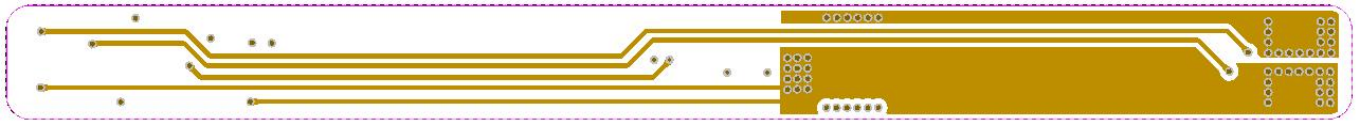


底层焊盘、丝印

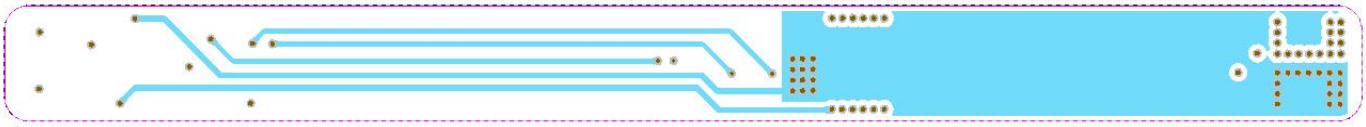
底层线路



中间 1 层

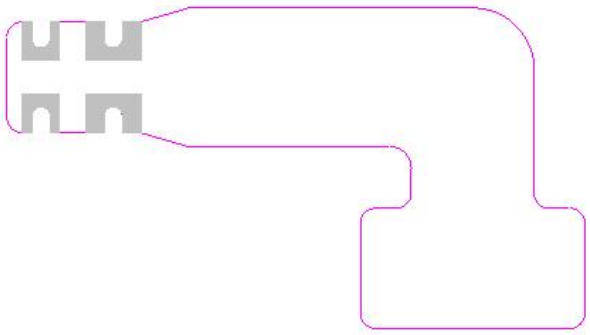


中间 2 层

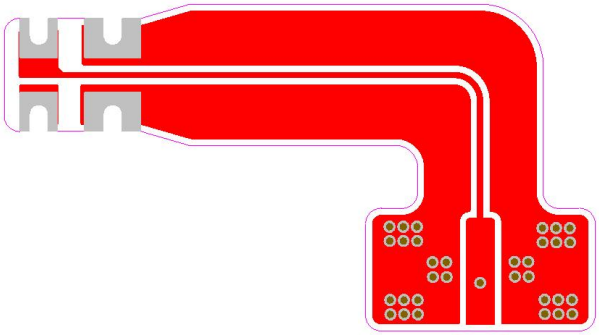


2.3、FPC 布线图

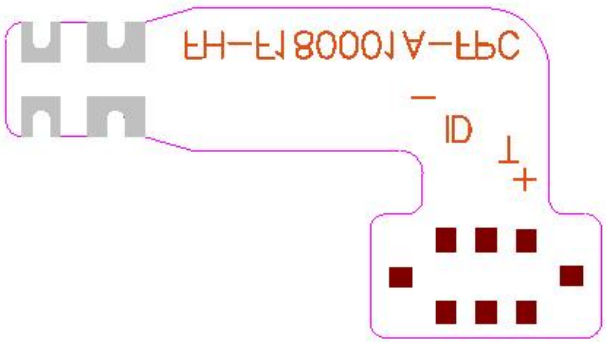
顶层焊盘、丝印



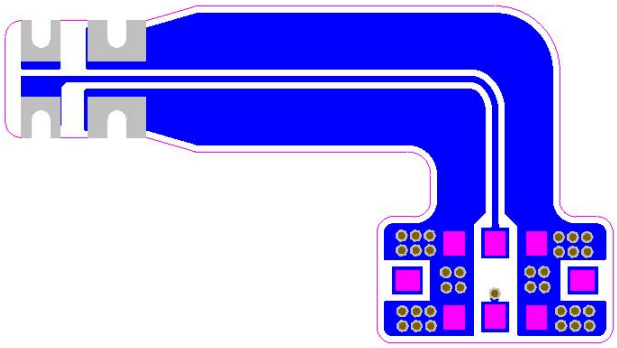
顶层线路



底层焊盘、丝印



底层线路



3.1、保护板元器件清单 PCM Parts List：

序号 No.	编号 Symbol	名称 Name	规格Spec./型号Model	封装 Packaging	数量 Qty.	厂商 Manufacturer/备注 Remark
1	U1	Protection IC	CM1003-BCD	DFN1.9x1.6-6L	1	创芯微
2	Q1	MOSFET	CJ8208SP-A	CSP	1	长晶
3	R1	Resistor	330Ω ±5%	0402	1	国巨/厚声
4	R2	Resistor	1KΩ ±5%	0402	1	国巨/厚声
5	R3	NTC	10KΩ ±1% B3380	0402	1	村田
6	R4	ID resistor	51KΩ ±1%	0603	1	国巨/厚声
7	C1-C7	Capacitor	0.1uF，0±10%，16V，X5R	0402	7	国巨
8	RS1	Resistor	1mΩ ±1% ,1W	1206	1	萨特
9	B+ B-	Steel disc	8*2.5*2.5*0.1mm	/	2	
10	F1	PTC	LP-USML750HF	1210	1	维安
11	/	PCB	4 层,OSP,黑油 白字,1.5OZ, 57.38*4.8*0.8mm	/	1	九和咏
12	/	FPC	无胶压延铜,2 层,沉金,黑油 白字,1.2OZ, 18.8*10.4*0.17mm,, 钢片补强	/	1	源康
13	P+ P- T ID	Connector	818003969	J1	1	电连

3.2、PCM 端口定义 PCM **Pad description**：

B+：连接电芯正极

B+：Positive connection pad of cell

B-：连接电芯负极

B-: Negative connection pad of battery

P+：电池正极输出端

P+：Positive connection pad of pack

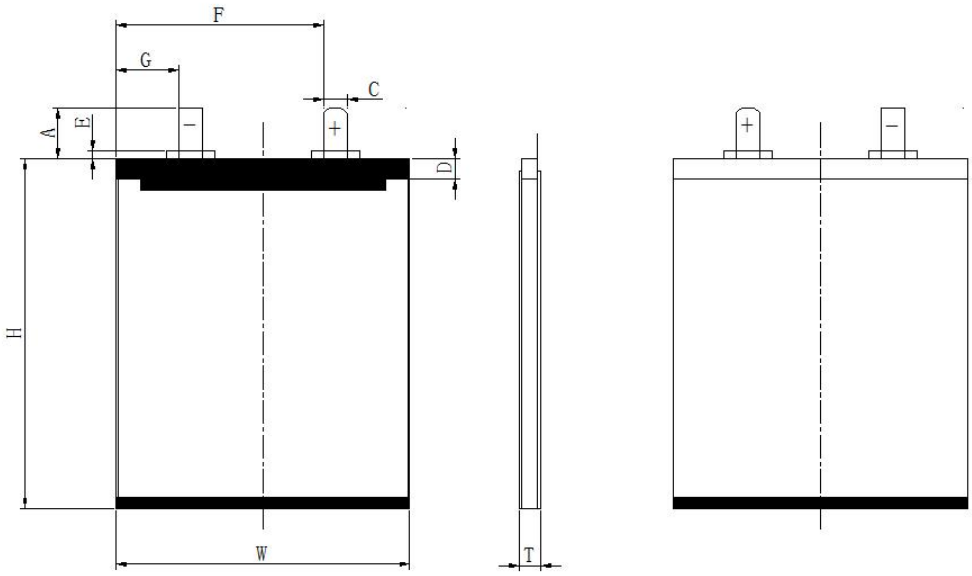
P-：电池负极输出端

P-：Negative connection pad of pack

NTC：热敏电阻

NTC：Connection pad of NTC

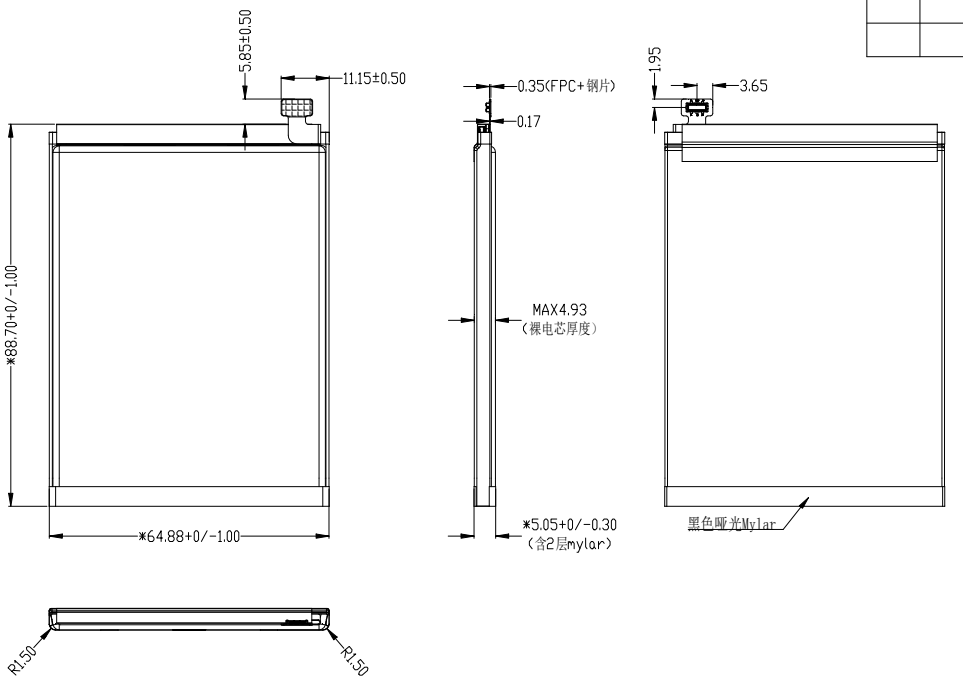
4、电芯尺寸图 Cell dimension Figure

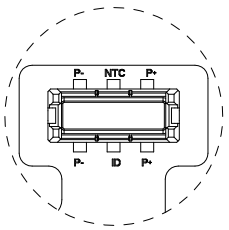


尺寸 Dimension			
项目 Item	规格 Spec.	项目 Item	规格 Spec.
电芯厚度（T 含高温胶）Cell thickness (T not include high temperature	5.03^{+0}_{-3}mm	负极耳边距 (G) Anode tab margin (G)	20.28±1.0mm
电芯厚度（T 含高温胶）Cell thickness (T include high temperature tape)	MAX5.42mm	正极耳边距 (F) Cathode tab margin (F)	44.28±1.0mm
电芯宽度（W 含高温胶）Cell width (W include high temperature tape)	64.88^{+0}_{-1}mm	极耳宽度 (C) Tab width (C)	6.0±0.2mm
电芯高度 (H) Cell height H)	86.1^{+0}_{-1}mm	顶封宽度 (D) Top sealing width (D)	3.0±0.5mm
密封胶外露 (E) Sealant length (E)	0.2~2.0mm	顶部贴胶 Tape adhered on the top	马甲胶+腔体胶
极耳长度 (A) Tab length (A)	10.0±2.0mm	底部贴胶 Tape adhered at the bottom	哑黑胶，U 型
出货电压 (V) Shipment Voltage(V)	3.85~3.95	侧面贴胶 Tape adhered at the side	/
侧面折叠方式 Side folding type	双折边 Doubie Side Folding	喷码位置	反面二维码
正极是否转镍 Whether the positive electrode is nickel	否 No		

5、外形尺寸图 Dimension Figure

变更记录			
标示	变更内容	签名	日期
A0	新版本	于代剑	2023-10-10





局部放大图

备注：连接器型号:
818003969(电连),
固定脚NC处理

一般技术要求：
1. 适用电芯：FHPS506586P/4920mAh,内阻≦100mΩ；
2. 外观要求：表面不许有划伤、氧化、锈蚀、脏污等；
3. 标有*号尺寸为重点控制尺寸,未注尺寸参见3D图；
4. 产品符合ROHS2.0要求；

广东风华新能源股份有限公司				
产品型号	F181001PA			
项目名称	E13	制　图	于代剑	
版　本	A0	审　核	李广怀	
单　位	mm	批　准	李广怀	
视　角		页　码	第 1 页	共 1 页

6、丝印图档/Label image file