

东莞市沃尔泰电池科技有限公司
Dongguan Woertai Battery Technology Co., Ltd

21700 1S2P产品规格书
21700 1S2P Battery Data Sheet

型号 Model: 21700 1S2P 样品数量 NO. OF SAMPLES: 5PCS
容量 Capacity : 8000mAh 送样日期 DATE : 2023-03-07
版本 REV : A/1 客户代码 CUSTOMER CODE: /
承认书编号 NO. OF CONFIRMATION: WET-JS-23C0701

拟定 Prepared by	审核 Checked by	批准 Approved by
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客户确认 CUSTOMER APPROVAL	签章 STAMP

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东莞市沃尔泰电池科技有限公司
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Revision History
版本履历表

Revision 版本号	Description 内容描述	Prepared by 修定人	Approved by 审批人	Date 生效日期
A/1	New released	刘小快		2023-03-07

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Dongguan Woertai Battery Technology Co.,Ltd

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东莞市沃尔泰电池科技有限公司

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1. Scope 目的

本规格书描述东莞市沃尔泰电池科技有限公司设计开发的电池，它是产品设计、生产和检验的依据。其作用是 让顾客了解产品的质量及正确使用方法。

This document describes the performance characteristics and testing methods for Li-polymer battery produced by Dongguan Woertai Battery Technology Co., Ltd

2. Reference standard 依据标准

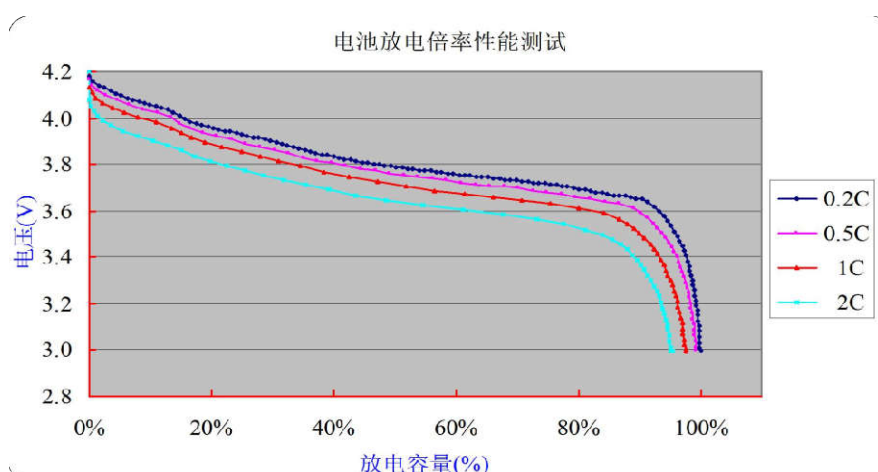
中华人民共和国国家标准‘GB/T18287-2000’《蜂窝电话用锂离子电池总规范》Reference Standard 参考标准
The standard refer to GB/T18287-2013, GB17761-1999、GB 31241-2014 , IEC/EN61960, UL1642 and the other technology standard.

本标准参考 GB/T18287-2013、GB17761-1999、GB 31241-2014、IEC/EN61960、UL1642 等技术标准规范编制而成。

3. Battery basic information 电池基本参数

No.序号	Item 项目	Parameter 规格	Note. 备注
1	Cell Model 电芯型号	21700	
2	Nominal Capacity 额定容量	4000mAh*2	@0.2C
3	Nominal Voltage 标称电压	3.7V	
4	Over charge V 过充保护电压	4.3±0.05V	
5	Over discharge V 过放保护电压	2.5±0.1V	
6	Over discharge current 过电流保护	10-18A	
7	Short protection 短路保护功能	Delay time ≤ 20ms	
8	Short protection release 短路保护恢复方式	自恢复或瞬间充电 Charge or auto release	
9	Impedance 内阻	Pack ≤ 80mΩ	cell ≤ 25mΩ
10	Max discharge current of cell 电芯最大持续放电电流	1C	标准 0.5C 最大 1C
11	Max charge current of cell 电芯最大充电电流	0.5C	标准 0.2C 最大 0.5C
12	Factory voltage 出厂电压	3.85V~4.0V	

4. Cell Discharge curve 电池放电曲线图



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5. Battery test environment 电池使用环境

Item 项目	Unit 单位	Min 最小值	typical 典型值	Max 最大值	Test time 测试时间
Charge Temperature 充电温度	℃	0	25	45	
Discharge Temperature 放电温度	℃	-20	25	65	
Storage Temperature 存储温度	℃	-20	25	45	1 个月 one month
	℃	-20	25	35	6 个月 6 months
	推荐储存: 15~35℃				

备注：电池存储时应将电池容量充电至标称容量的 40%-65%。

Note: when cell have been storage, cell capacity should in 40%_65%.

6. Cell Technology Characteristics 技术指标

Cell Nominal Performance 电池常规性能

N o	Item 内 容	Test condition 条件	Criteria 达到要求
1	End of charge voltage 充电截止电压	4.2±0.05V	
2	End of discharge voltage 放电终止电压	2.5±0.05V	
3	Standard charge model 标准充电模式	With charging voltage 4.2V, current .0.5C. continued to charge the battery pack, when charging current drops to 0.01C. charging is terminated, shall be full charged. 以0.5C电流恒流充电至4.2V, 转4.2V恒压充电, 直到充电电流≤0.01C电流	Charging time≤8h 充电时间≤8 小时
4	Standard discharge Model 标准放电性能	After standard charging, waiting 1h, and discharging cell with 0.2C to2.5V; 以标准充电模式满充后, 搁置1小时, 以0.2C电流恒流放电至2.5V。	Discharge time ≥ 290min 放电时间≥290Min
5	1C discharge 1 倍率放电性能	After standard charging, waiting 1h, and discharging cell with 1C current to2.5V; 以标准充电模式满充后, 搁置 1 小时, 以 1C 电流恒流放电至 2.5V。	Discharge time ≥51Min 放电时间≥51Min
6	High temperature performance 高温性能	After fully charging, storage cell 2h at 55℃±2℃, and discharge cell to 2.5V with 1C. 电池满充后在 55℃±2℃度的环境下搁置 2 小时, 然后以 1C 电流放电至 2.5V。	Discharge time ≥51Min; No visible distortion, fire or explosion, 放电时间≥51Min, 电池外观无变形、 无爆裂。
7	Low temperature performance 低温性能	After standard charging, storing cell in low temperature (-10±2) °C chamber at least 16~24h, then discharge cell to 2.5V with 0.2C. 以标准模式充电, 将电池放入 (-10±2) °C 的低温箱中恒温 16~24h 后, 0.2C 电流恒流放电至 2.5V。	Discharge time ≥210Min, No visible distortion, fire or explosion, 放电时间≥210Min, 电池外观无变形、 无爆裂。

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8	Retention Capability 荷电保持能力	After full charging, storing the battery 28 days with $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ condition, and then discharge with discharge current of $0.2\text{C}_5\text{A}$ till 2.5V cut-off voltage, discharge time should be $\geq 255\text{min}$ 电池充满电后, 在 $20 \pm 5^{\circ}\text{C}$ 的环境条件下存放 28 天, 然后以 0.2C 电流连续放电至 2.5V 终止电压, 放电时间 $\geq 255\text{min}$	Discharge time $\geq 255\text{min}$; 放电时间 $\geq 255\text{Min}$
9	Cycle life 循环寿命	At $20 \pm 5^{\circ}\text{C}$ conditions, with discharge current of 0.5C till 2.5V ; Again with 0.5C constant current charging to 4.2V , then with constant voltage 4.2V charge until the charge current drops to 0.02C , rest 30 min, with discharge current of 0.5C till 2.5V , rest 30 min, after 300 cycles, the capacity with 0.2C discharge current should be $\geq 80\%$ 在 $20 \pm 5^{\circ}\text{C}$ 条件下以 0.5C 电流恒流放电至 2.5V , 再以 0.5C 电流恒流充电至 4.2V , 然后恒压 4.2V 充电至电流小于 0.02C , 搁置 30min, 以 0.5C 电流恒流放电至 2.5V , 放电结束后, 搁置 30min, 重复循环 300 次后, 0.2C 电流放电容量应 $\geq 80\%$.	Cycle time ≥ 300 ; 循环次数 ≥ 300 次

Condition adapting characteristics 电池环境适应性能

No	Item 内容	Test condition 条件	Criteria 达到要求
1	Invariableness humid and hot 恒定湿热	After put the battery in the invariableness humid and hot box of $65^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and relative humidity of $90 \sim 95\%$ for 48 hours, and with discharging current $1.0\text{C}_5\text{A}$ till $2.5 * n(\text{V})$ cut off voltage. 将电池放入 $65^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 及相对湿度为 $90 \sim 95\%$ 的恒温恒湿箱中 48 小时后, 再以 $1.0\text{C}_5\text{A}$ 电流放电至 $2.5 * n(\text{V})$ 。	No visible distortion, fire or explosion, the discharging time is over 36 minutes 无泄漏、冒烟、起火或爆炸; 放电时间 $\geq 36\text{min}$ 。
2	Vibration 振动实验	The full charging battery vibrate from 90 to 100 minutes at three mutually perpendicular planes with excursion of 0.8mm , and change the frequency from 10 to 55 HZ with 1Hz/min speed. 满充电后的电池在三个相互垂直的方向按振幅 0.8mm 的谐振形式进行振动, 频率在 $10 \sim 55\text{HZ}$ 以 1Hz/min 的速率变化, 往复振动 90 至 100min。	The battery has no distortion, no visible evidence of leakage, fume, fire or explosion 电池外观无变形, 无漏液、冒烟、起火或爆炸
3	High/low Temperature 高/低温性能	After the battery full charging at $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$, measure the discharging capacity with discharging current $0.2\text{C}_5\text{A}$ till $2.5 * n(\text{V})$ cut off voltage at different temperature. (as compared with initial capacity) 在 $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 条件下满充电后, 测量电池在不同温度下用 $0.2\text{C}_5\text{A}$ 电流放电至 $2.5 * n(\text{V})$ 所放出的容量 (与初始容量作为比较)。	在 -20°C 时 $\geq 60\%$ At -20°C is $\geq 60\%$ 在 -10°C 时 $\geq 70\%$ At -10°C is $\geq 70\%$ 在 55°C 时 $\geq 90\%$ At 55°C is $\geq 90\%$
4	Free fall 自由跌落试验	The battery fall from a height of 1m free fall into the cement floor, from X、Y、Z positive and negative direction of each direction free fall time, and with discharging current $1.0\text{C}_5\text{A}$ till $2.5 * n(\text{V})$ cut off voltage. 电池将从 1 米高处自由跌落到水泥地板上, 从 X、Y、Z 正负方向每个方向自由跌落一次, 再以 1.0C 放电至 $2.5 * n(\text{V})$	no visible evidence of leakage, fume, fire or explosion, 无漏液、冒烟、起火或爆炸

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Safety performance 电池安全性能

N o	Item 内 容	Test condition 条件	Criteria 达到要求
1	Overcharge protection 过充保护性能	After battery charge finished, then charge the battery for 8 hours with a power which can provide 2 times more than nominal voltage and $2C_5A$ current. 电池充电结束后, 用 $2C_5A$ 电流和2倍标称电压输出的电源 继续加载8小时.	No explosion, no fire, no smoking. The. 无冒烟、起火、爆炸。
2	Over discharge protection 过放保护	After the battery is fully charged, discharge at $20\pm 5^{\circ}C$ conditions with $0.2C_5A$ until the battery voltage drops to the over discharge voltage, then discharge with a 30Ω resister for 24 hours. 电池满充电后, 在 $20\pm 5^{\circ}C$ 条件下, 以 $0.2C$ 放电至终止电压后, 外接 30Ω 负载放电24h.	No explosion, no fire, no smoking. 无冒烟、起火、爆炸.
3	Short protection 短路保护性能	After the battery is fully charged, short the positive and negative terminal with $100m\Omega$ wire resistance for 1 hour, then charge with $1C_5A$ for 5s, measure the battery open circuit voltage. 电池满充电后, 将正负极用 $100m\Omega$ 电阻短路1H后, 将正负极断开, 电池以 $1C_5A$ 电流瞬时充电5s后, 测量电池开路电压	No explosion, no fire, no smoking. $OCV \geq 3.7 * n (V)$ 无冒烟、起火、爆炸, 开路电压 $\geq 3.7 * n (V)$
4	Impact 重物撞击	After standard charging, a 15.8 mm diameter bar is to be placed across the center of the cell, a 9.1 kg mass is to be dropped from a height of $61\pm 2.5cm$ onto the cell 将电芯满充电后, 放置冲击台上, 将一直径为 15.8 mm 的棒放在电芯的中心 (宽侧面), 让 9.1 kg 重锤自 $61\pm 2.5cm$ 高度跌落, 冲击固定在夹具中电芯 (电芯面积的最大面应与台面垂直)。	No explosion, no fire, no smoking. 无冒烟、起火、爆炸
5	Crush 挤压	After standard charging, a cell is to be crushed between two flat surfaces, once the maximum pressure has been to $13\pm 1KN$ it is to be released. 将电芯满充电后, 用两平板挤压电芯扁平面, 调节挤压力, 压力达到最大值 $13\pm 1KN$ 时停止试验。	No explosion, no fire, no smoking. 无冒烟、起火、爆炸。
6	Thermal exposure test 热冲击	The battery is fully charged in standard charging condition, and store in $(5\pm 2^{\circ}C)$ /min rate rose to $130\pm 2^{\circ}C$ for 30 minutes. 将电池满充电后, 放置于热箱中, 温度以 $(5\pm 2^{\circ}C)$ /min 的速率升至 $130^{\circ}C \pm 2^{\circ}C$ 并保温 30min。	No explosion, no fire, no smoking. 无冒烟、起火、爆炸。
7	Over charge 过充电	After standard charging, then charged at constant current of $3C_5A$ and constant voltage of 4.6V while tapering the charge current. Charging is continued for 8 hours.(No PCM) 满充电后的电芯, 用 $3C_5A$ 电流和4.6V 的极限电压充电 8小时。本实验是在无电芯保护线路的情况下进行的。	No explosion, no fire, no smoking. 无冒烟、起火、爆炸。

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8	Short 短路	After standard charging, connect the positive and negative terminals of the cell with copper wire having maximum resistance load of 0.1 Ω at room temperature, the test is discontinued when the surface temperature lower than 10°C.(No PCM) 满充电后，将接有热电偶的电芯置于通风橱中，短路正负极（线路总电阻不大于0.1 Ω），试验过程中，监视电芯温度变化，当温度下降到比峰值低约10°C时，结束试验。 本实验是在无电池保护线情况下进行的	No explosion, no fire, no smoking. Cell surface temp less than 150°C. 电池不起火、不爆炸，电池的外部温度不得高于 150°C
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Test condition as below: 以上技术性能标准测试环境

Temperature: 25 $\pm$ 2°C 温度: 25 $\pm$ 2°C

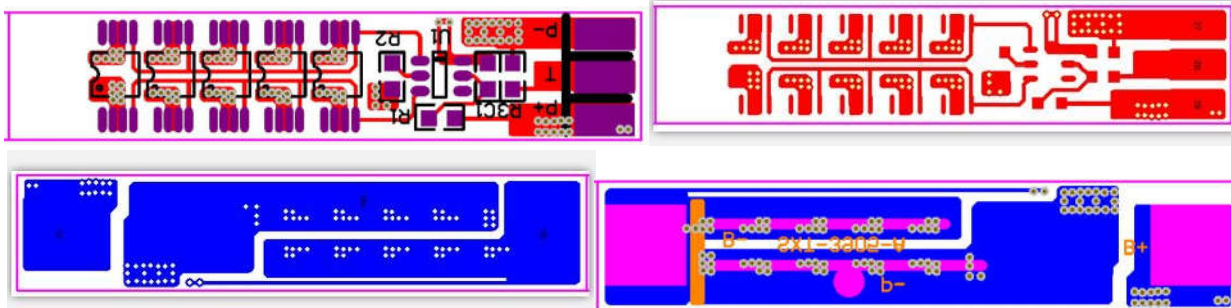
Humidity: 45 $\pm$ 20% 相对湿度: 45 $\pm$ 20%（除非另外要求）

Note: 1. Item 7 & 8, battery without PCBA, which is protection device to battery. The others should be assembly PCBA to protect cell.

1. 对于带保护装置的电池，除电池安全性能中的 6 和 7 两项为不带保护装置的情况下，其他测试是在带保护装置的情况下进行的。

7. Battery protection characteristics 保护板规格与特性

PCB layout 保护板元件图



Performance parameters 保护板性能参数

Electronics parameters 电气特性

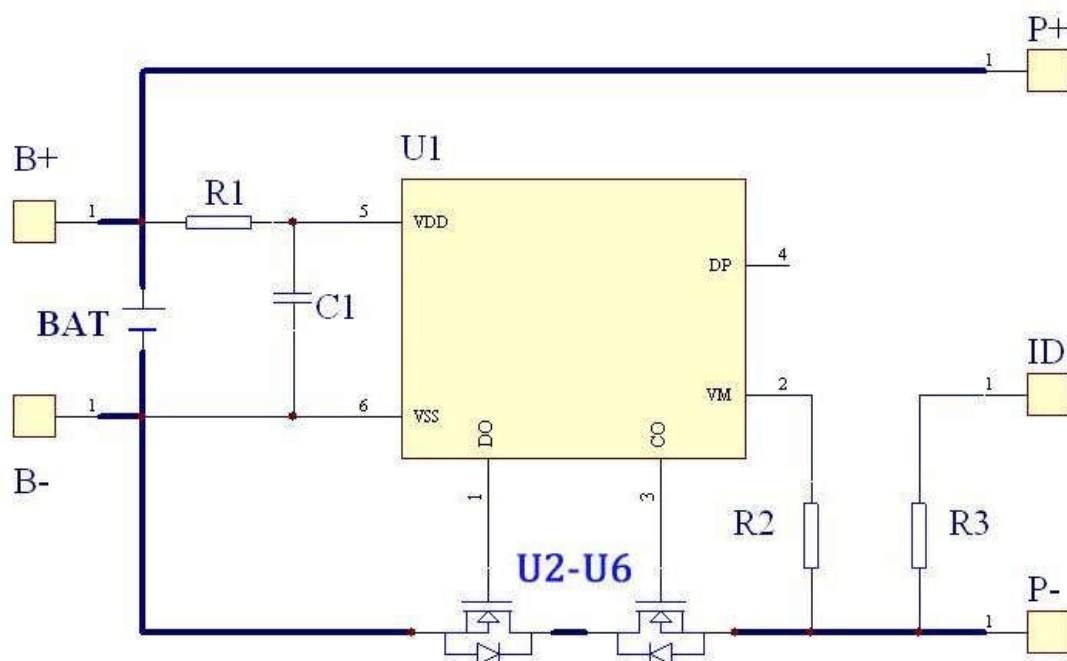
No	Item 项目	Parameter 参数	Unit 单位
1	IC working Voltage 控制 IC 工作电压	1.5~10V	NA
2	Overcharge protection detection voltage 过充保护检测电压	4.3 $\pm$ 0.05V	Battery voltage is greater than the protection voltage, and the delay time to reach, then the state of the battery into over charge protection. 电池电压大于过充保护电压，且延时时间达到，则电池进入过充电保护状态。
3	Overcharge protection delay time 过充保护延迟时间	800(typ)ms	
4	Overcharge release voltage 过充恢复电压	4.1 $\pm$ 0.05V	When the battery voltage reduce to the release voltage, the battery will recovery charging. 当电池电压下降到过充恢复电压时，电池恢复充电。

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5	Over-discharge protection detection voltage 过放保护检测电压	2.5±0.1V	Battery voltage is less than the protection voltage, and the delay time to reach, then the state of the battery into over-discharge protection.
6	Over-discharge protection delay time 过放保护延迟时间	100ms	电池电压小于过放保护电压，且延时时间达到，则电池进入过放电保护状态。
7	Over discharge release voltage 过放恢复电压	2.8±0.1V	When the battery voltage rise to the release voltage by charger, the battery will recovery discharging. 当电池电压通过充电器充到电池过放恢复电压时，电池恢复放电。
8	Over-current discharge protection current 放电过流保护电流	10-18A	Battery discharge current is greater than the protection current, and the delay time to reach, then the state of the battery into over-current protection 电池放电电流大于过流保护，且延时时间达到，则电池进入放电过流保护状态。
9	Over-current discharge protection delay time 放电过流保护延时时间	10(typ)ms	
10	Short current protection delay time 短路保护延时时间	600(max)us	NA
11	Power consumption of PCM PCM 自耗电	0.1uA (sleep mode) 休眠模式	NA
		7.0 uA max (operation mode 工作模式)	
12	Battery pack impedance 电池内阻	10 mΩ≤R≤80 mΩ	Measuring impedance should by sinusoidal alternating (1 KHZ) test 内阻应由正弦交变(1KHZ)进行测试得到的数据

Schematic circuit diagram 保护板原理图



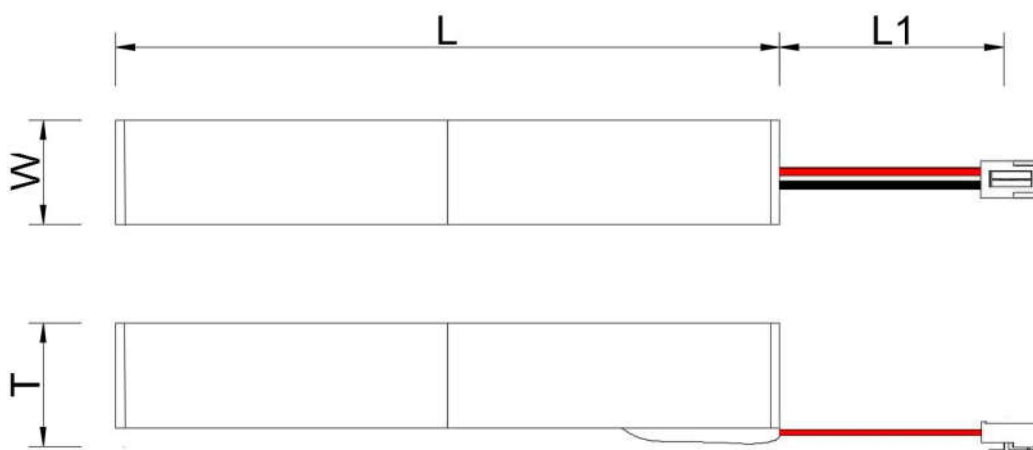
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Bill of materials 保护板 BOM

NO.	元件编号	元件名称	规格	数量
1	U1	保护 IC	DW01 SOT-23-6	1
2	U2-U6	MOSFET	8205A TSSOP-8	5
3	C1	电容	0.01uF 20% 50V 0603	1
4	R1	电阻	330Ω 5% 1/16W 0603	1
5	R2	电阻	1KΩ 5% 1/16W 0603	1
6	B+B-	镍片	4*4*0.3mm	2
7	PCB	HYTY-HX-4008	40*8*0.6-0.7mm	1

8. Battery Outline Drawing 电池尺寸



Item	Description	Dimension and specification
T	厚度 Thickness (MAX)	25 (±0.5) mm
W	宽度 Width(MAX)	22 (±0.5) mm
L	长度 Length(MAX)	144 (±1) mm
L1	外露长 Wire length	80 (±5) mm

BOM of Product

No.	Title	Specification	Quantity	Unit	Remark
1	Polymer battery 电芯	21700-4000mAh	2	PCS	
2	端子线材	VH3.96-2P 反向 1007-18AWG	1	PCS	Black /red黑、红
3	保护板 PCM	5 个8 脚MOS	1	PCS	
4	PVC 套管		1	PCS	蓝色
5	青稞纸	21700	3	PCS	墨绿色

Note: The battery of materials should be consistent with the requirements of the RoHS.

注：电池组所使用的材料应符合 RoHS 的要求。

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9、Package description 包装说明

Figure, size, color flag comply with GP/T 191-2000 requirements.

Or according to jkn digital standard.

标志的图形、尺寸、颜色符合 GP/T 191-2000 的要求。或按照东莞市沃尔泰电池科技有限公司标准执行。

Others 其他事项

Any matters that this specification doesn't cover should be conferred between the customer and Dongguan Woertai Battery Technology Co., Ltd.

任何本规格书中未提及的事项，需要经双方协商确定。

10. Safety Warning 安全警示（附件1）

Warning 安全警示

Battery Precautions and Safety Instructions 电池组使用注意事项及安全说明

Please be sure to take to comply with the specifications and the following precautions to use with batteries, did not follow the specifications for the operation caused any accidents, Walter Tai Battery Technology Co., Ltd will not accept any responsibility.

请您务必遵守本规格书和以下使用注意事项使用电池，对于没有按照规格书进行操作所造成的任何意外事故，沃尔泰电池科技有限公司将不承担任何责任。

Guarantee to keep the battery in good repair in 12 months from the shipment.

从出厂代码日起 12 个月内保修。

Please use 0.5C current to charge up 60% capacity after the battery placed 3 months.

电池每放置三个月,请预先以 0.5C 充电 1 次,即让电池具备 60%以上的电量. Before

Use the battery, carefully read the instruction and battery labels on the surface.使用电

池前，请仔细阅读使用说明书和电池表面标识。

Need to use the original battery charger, and should be placed in a dry ventilated place.

电池需使用原装充电器充电，并应放置在干燥通风场所。

Such as long-term when not in use, the battery charger to charge state half full, remove the battery from the device and separated, to avoid metal contact with the battery, causing short-circuit or damage to the phenomenon.

如长期不使用时，请将电池充电至半满电荷状态，把电池从设备中拆除并分开放置，避免金属接触电池，造成短

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路或损坏现象.

In use or during storage, battery found there has been high fever, leakage, odor, distortion and other anomalies, please stop using it immediately and stay away from the battery.

在使用或储存期间, 如发现电池有出现高温发热、漏液、散发异味、变形及其它异常现象时, 请立即停止使用并远离电池.

Do not short-circuit the battery positive and negative, and careful not to allow the battery to moisture, to avoid danger.

切勿将电池正负极短路, 并注意不可让电池受潮, 以免发生危险. Using,

keep away from heat, High pressure place, and do not beat, hit the battery. 使用过

程中, 应远离热源、高压场所, 并勿摔打、撞击电池.

Battery end of life should be immediately removed from the equipment, Please properly handle security of spent batteries, do not put into fire or water.

电池寿命终止应立刻从设备中取出, 废弃电池请安全妥善处理, 切勿投入火中或水中.

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!

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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.