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## 香港睿隆信息技术有限公司



RUSINO INFORMATION

HongKong Rusino Information Technology Limited

## Specification For Approval

Model 型号 : JS5744127-Q5/4400mAh(20C)Type 类型 : Li-ion Polymer

Approval 批准	Checked 审核	ME/EE Draft 制定
Customer Approval 客户回签		

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## 1.Scope 适用范围

The specification shall be applied to Li-ion polymer rechargeable cell of JS5744127-Q5/4400mAh (6S1P), which is manufactured by HongKongRusinoInformationTechnologyLimited. The products satisfy ROHS requirements.

本规格书适用于香港睿隆信息技术有限公司生产的 JS5744127-Q5/4400mAh(6S1P) 可充电聚合物锂电芯，产品满足ROHS 要求。

## 2.Specification 主要技术参数

NO	Items	Criteria	Remarks
2.1	Typical Capacity 典型容量	4400mAh	0.5C Discharge after 0.5C charge 0.5C 充电后 0.5C 放电 (25±2℃)
	Minimum Capacity 最小容量	4400mAh	
2.2	Nominal Voltage 标称电压	22.8V	
2.3	Open Circuit Voltage 出厂电压	22.80-24.00V	
2.4	Cell Resistance 电芯内阻	≤4.0mΩ	Internal resistance measured at AC 1KHZ after 50% charge 半电状态下用交流法测量内阻
	PACK Resistance PACK 内阻	放电≤26mΩ	
2.5	Charge Voltage 充电电压	26.1V	
2.6	Max Charge Voltage 最大充电电压	26.28V	
2.7	Charging cut-off current 充电截止电流	88mA	0.02C
2.8	Standard Charge Current 标准充电电流	2200mA	0.5C
2.9	Max. Constant Charge Current 最大持续充电电流	4400mA	1C
2.10	Standard Discharge Current 标准放电电流	2200mA	0.5C
2.11	Max. Constant Discharge Current 最大持续放电电流	88A	20C
2.12	Discharge Cut-off Voltage 放电截止电压	18.0V	
2.13	Operating Temperature 工作温度	0℃~+45℃	Charging 充电 (0℃~+10℃,0.2C)
		-10℃~+60℃	Discharging 放电
2.14	Storage Temperature 贮存温度	-10℃~+45℃	Less than 1 month 小于一个月
		-10℃~+35℃	Less than 6 months 小于六个月
2.15	Weight 重量	约 485g(成品)	约 76g(单个)

### 3.Cell configuration 电芯组成

NO	Item	Criteria	Remarks
3.1	Cell 电芯	JS5744127-4400mAh-3.8V	6pcs 一组
3.2	Connector & WIRE 插件和导线	XT60-S JST-XH-7P	1 1
3.3	Other 其它	/	

### 4.Cell Performance Criteria 电芯性能检查及测试

#### 4.1 Appearance 外观和结构

There shall be no scratch, bur and other mechanical scratch, and the connector should be no rust dirt. The structure and dimensions see attached drawing of the Cell.

电芯的表面应无明显的划痕毛刺及其它机械划伤，外露的金属端子应无锈蚀污垢。结构尺寸见电芯的外形尺寸图；

#### 4.2 Measurement Apparatus 测试设备要求

(1) Dimension Measuring Instrument 尺寸测量设备

The dimension measurement shall be implemented by instruments with equal or more precision scale of 0.01mm. 测量尺寸的仪器的精度应不小于 0.01mm

(2)Voltmeter 电压表

Standard class specified in the national standard or more sensitive class, impedance not less than 10 K $\Omega$ /V.

国家标准或更灵敏等级, 内阻不小于 10 K $\Omega$ /V

(3) Ammeter 电流表

Standard class specified in the national standard or more sensitive class. Total external resistance including ammeter and wire is less than 0.01 $\Omega$ .

国家标准或更灵敏等级，外部总体内阻包括电流表和导线应小于 0.01 $\Omega$ .

(4) Impedance Meter 内阻测试仪

Impedance shall be measured by a sinusoidal alternating current method (AC 1kHz LCR meter).

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阻测试仪测试方法为交流阻抗法(AC 1kHz LCR).

#### 4.3 Standard Test Condition 标准的测试条件

Test should be conducted with new batteries within one month after shipment from our factory and the cells shall not be cycled more than five times before the test. Unless otherwise defined, test and measurement shall be done under temperature of 23 $\pm$ 2 $^{\circ}$ C and relative humidity of 75% or less.

测试电芯必须是本公司出厂时间不超过一个月的电芯，且电芯未进行过五次以上充放电循环。除非其它特殊要求，本产品规格书规定的测试的环境条件为：温度 23 $\pm$ 2 $^{\circ}$ C，相对湿度 $\leq$ 75%。

## 4.4 Common Performance 产品的常规性能

No	Items/项目	Testing method and determinant standard /测试方法和判定标准
1	Charge Mode (Full charge) 充电模式 (充满电)	<p>①Standard charge mode: 23±2℃, 0.5C (CC) charge the Cell until its voltage reaches 26.1V, then changed at 26.1V (CV) while tapering the charge current 0.02C. Charging time is 3.0 hours in all. ①标准充电模式: 23±2℃, 0.5C 恒流充电到 26.1V 后, 转 26.1V 恒压充电直到充电电流小于或等于 0.02C 时停止充电。充电时间不超过3.0 小时。</p> <p>②Faster charge mode: 23±2℃, 1.0C (CC)charge the Cell until its voltage reaches 26.1V, then changed at 26.1V(CV) while tapering the charge current 0.02C. Charging time is1.5 hours in all. ②快速充电模式: 23±2℃, 1.0C恒流充电到26.1V后, 转26.1V恒压充电直到充电电流小于或等于0.02C时停止充电。充电时间不超过1.5小时。</p>
2	Discharge Performance 放电性能	<p>Within 5 min after fully charge, discharge at 0.5C continuously down to 18.0V The discharge Capacity is required ≥4350mAh. 电芯充满电后, 开路搁置 5min, 再以 0.5C 放电至 18.0V, 要求放容量≥4350mAh。</p>
3	Cycle Performance 循环寿命	<p>10min rest period after Standard charge, 1C discharge to a cut-off voltage of 18.0V, 30min rest period; the test shall be terminated when discharging capacity ≤80% of the minimum capacity in three consecutive cycles. Standard charge and discharge at 23±2℃ . 标准充电后, 搁置 10min, 1C 放电至 18.0V, 搁置 30min, 重复上述步骤进行循环, 直至电芯放电容量连续3 次≤80%最小容量, 测试温度 23±2℃ (影响电芯循环性能的重要参数), 要求如下: Cycle time≥300 times循环次数≥300次.</p>
4	Charged Storage Characteristics 荷电保持能力	<p>Within 28 days at 20±5℃ after standard charge, at 23±2℃, then discharge at 0.2C to 18.0V. The discharge time is required ≥4.25h. 电芯充满电后, 将电芯开路放置在 20±5℃条件下 28 天后, 在 23±2℃条件下, 以 0.2C 放电至 18.0V, 要求放电时间≥4.25h。</p>
5	High Temperature Storage Characteristics 高温存放性能	<p>After cell full charging in 0.5C, put it into box with high temperature of 55℃±5℃ for 48h, then put the cell on room temperature, 5min later ,The cell appearance will be no deformation、no gas inflation. 0.5C 标准充满电后, 在 55℃±5℃的高温箱中放置 48H, 然后取出电芯放置室温 5min 后, 要求电芯外观无变形、无气胀。</p>

## 4.5 Safety Performance 产品可靠性

Item 项目	Measuring Procedure 内容	Requirements 备注
Heating Test 热冲击测试	<p>The cell is placed in a thermal chamber. Temperature is raised to <math>130\pm 2^{\circ}\text{C}</math> at the rate of <math>(5\pm 2^{\circ}\text{C})/\text{min}</math> and held for 10 minutes, then cooled to room temperature at the rate of <math>5\pm 2^{\circ}\text{C}/\text{min}</math>. the Cell should be no fire and explosion.</p> <p>电芯置于热箱中，温度以 <math>(5\pm 2^{\circ}\text{C})/\text{min}</math> 的速率升至 <math>130\pm 2^{\circ}\text{C}</math> 并保温 10min,再以 <math>5\pm 2^{\circ}\text{C}/\text{min}</math> 的速度降至室温。电芯应不起火或爆炸。</p>	No explosion, no fire. 不爆炸，不起火
Over-charging Test 过充电测试	<p>After standard charge, the Cell is subjected to a charging current by connecting it to a dc-power supply. The beginning current is 3.0C, which is to be obtained by connecting a resistor of specified size and rating in series with the Cell; the voltage of the dc-power supply is 4.60V. The test time is 7hours.</p> <p>标准充电后，电芯及滑动变阻器串联于一恒流恒压源，电压调节为 4.60V，通过滑动变阻器调节电流至 3.0CmA，然后对电芯以 3.0CmA 充电。测试时间为 7H。</p>	No explosion, no fire. 不爆炸，不起火
Over-discharge Test 过放电测试	<p>Discharge at a current of 0.2C to 18.0V. Then charge in opposite current of 1C for 1.5h. There should be no fire and explosion.</p> <p>电芯以 0.2C 放电至 18.0V,然后以 1C 的电流对电芯进行反向充电，要求充电时间 1.5h,要求试验过程中电芯不起火、不爆炸。</p>	No explosion, no fire. 不爆炸，不起火

## 4.6 Rest Period 搁置时间

Unless otherwise defined, 30min, rest period after charge, 30min, rest period after discharge.

如无特殊要求，电芯充放电间隔为 30min.

## 4.7 Cell Coding Rules 电芯喷码规则

4.8 Dimensional Drawing of Cell 电芯产品规格图纸

Items 项目	Description 描述	Dimension and Spec 尺寸和规格	Picture of Cell 电芯图
T	Thickness 厚度	Max 5.9mm	
W	Width 宽度	Max 44.5mm	
L	Length 长度	Max 128.0mm	
W1	Tab Width 极耳宽度	15.0±0.1mm	
L1	Tab length 极耳长度	10.0±2.0mm	
L2	Sealant Length 极耳胶长度	0.2~2.5mm	
H	Distance between 2 tabs 极耳中心距	21.0±2.0mm	
/	Side sealing edge mode 折边方式	单折边	
/	Tab processing mode 极耳加工方式	1、正极超声转0.2mm 铜镀镍 2、顶部贴美纹胶纸	



## 6.Period of Warranty 保质期

The period of warranty is 12 month.Rusino guarantees to give a replacement in case of cells with defects proven due to manufacturing process instead of the customer's abuse and misuse.

电芯保质期为 12 个月。睿隆承诺如果在保质期内由于电芯本身的质量问题，本公司将负责进行调换，如果是由于用户误用或进行破坏性测试而产生的问题，恕不负责。

## Appendix 附录

### Handling Precautions and Guideline For LIP (Lithium-ion Polymer) Rechargeable Batteries 聚合物锂离子充电电芯操作指示及注意事项

#### Preface 前言

This document of 'Handling Precautions and Guideline LIP Rechargeable Batteries' shall be applied to the cell manufactured by HongKong Rusino Information Technology Limited.

本档“聚合物锂离子充电电芯操作指示及注意事项”仅适用于香港睿隆信息技术有限公司生产电芯。

#### Note (1) : 声明一

The customer is requested to contact HongKong Rusino Information Technology Limited in advance if and when the customer need s other applications or operating conditions than those described in this document. Additional experimentation may be required to verify performance and safety under such conditions.

客户若需要将电芯用于超出本规格书规定以外的设备，或在本规格书规定以外的使用条件下使用电芯，应事先联系香港睿隆信息技术有限公司，因为需要进行特定的实验测试以核实电芯在该使用条件下的性能及安全性。

#### Note (2) : 声明二

HongKong Rusino Information Technology Limited will take no responsibility for any accident when the cell is used under other conditions than those described in this document.

对于在超出本规格书规定以外的条件下使用电芯而造成的任何意外事故，香港睿隆信息技术有限公司概不负责。

#### Note (3): 声明三

HongKong Rusino Information Technology Limited will inform, in a written form, the customer of improvement(s) regarding proper use and handling of the battery, if it is deemed necessary.

如有必要，香港睿隆信息技术有限公司会以书面形式告知客户有关正确操作使用电芯的改进措施。

## 1. Charging 充电

### 1.1 Charging current 充电电流

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.

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。

### 1.2 Charging voltage 充电电压

Charging shall be done by voltage less than that specified in the product specification (26.1V/battery). Charging beyond 26.28V, which is the absolute maximum voltage, must be strictly prohibited. The charger shall be designed to comply with this condition.

充电电压不得超过本规格书刊号中规定的额定电压（26.1V/电芯）。26.28V 为充电电压最高极限，充电器的设计应满足此条件。

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.

电芯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。电芯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。

### 1.3 Charging temperature 充电温度

The cell shall be charged within the range in the product specification.

电芯必须在本规格书要求的环境温度范围内进行充电。

### 1.4 Prohibition of reverse charging 禁止反向充电

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.

正确连接电芯的正负极，严禁反向充电。若电芯正负极接反，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。

## 2. Discharging 放电

### 2.1 Discharging current 放电电流

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 Discharging temperature 放电温度

The cell shall be discharged within the range specified in the product specification.

电芯必须在本规格书要求的环境温度范围内进行放电。

### 2.3 Over-discharging 过放电

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

过放电会导致电芯性能、电芯功能的丧失。

The charger shall be equipped with a device to prevent further discharging exceeding a cut-off voltage specified in the product specification. Also the charger shall be equipped with a device to control the recharging procedures as follows: The cell shall start with a low current (0.01C) for 15 - 30 minutes, i.e. pre-charging, before rapid charging starts. The rapid charging shall be started after the (individual) cell voltage has been reached above 18.0V within 15 - 30 minutes that can be determined with the use of an appropriate timer for pre-charging. In case the (individual) cell voltage does not rise to 18.0V within the pre-charging time, then the charger shall have functions to stop further charging and display the battery/ is at abnormal state.

充电器应有装置来防止电芯放电至低于本规格书规定的截止电压。此外，充电器还应有装置以防止重复充电，步骤如下：电芯在快速充电之前，应先以一小电流（0.01C）预充电 15~30 分钟，以使电芯的电压达到 18.0V 以上，再进行快速充电。可用一计时器来实现该预充电步骤。如果在预充电规定时间内，电芯的电压仍未升到 18.0V 以上，充电器应能够停止下一步快速充电，并显示该电芯/电芯正处于非正常状态。

## 3. Storage 贮存

If the cell has to be storied for a long time, the environmental condition should be: Temperature:  $20 \pm 5^{\circ}\text{C}$ , Humidity:

65±20%RH

长期存储电芯须置于温度为 20±5℃、湿度为65±20%RH 的环境中。

The voltage for a long time storage shall be 22.2V~23.4V range.

贮存电压为 22.2V~23.4V。

We recommend that batteries be charged about once per half a year to prevent over discharge.

如长时间储存，建议每半年充一次电以防止电芯过放电。

## 4. Handling Instructions 电芯的注意事项

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

认真阅读下面的注意事项，确保正确使用聚合物锂离子电芯。香港睿隆信息技术有限公司对违反下述注意事项而产生的任何问题不予负责。

### Danger!

### 危险!

- Do not immerse the cell in water or allow it to get wet.
- 勿将电芯投入水中或将其弄湿!
- Do not use or store the cell near sources of heat such as a fire or heater.
- 禁止在火源或极热条件下给电芯充电! 勿在热源(如火或加热器)附近使用或贮存电芯! 如果电芯泄漏或发出异味, 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 cell directly to wall outlets or car cigarette-lighter sockets.
- 勿将电芯直接连接到墙上插座或车载点烟式插座上!
- Do not put the cell into a fire or apply direct heat to it.
- 勿将电芯投入火中或给电芯加热!
- Do not short-circuit the cell by connecting wires or other metal objects to the positive (+) and negative (-) terminals.
- 禁止用导线或其它金属物体将电芯正负极短路, 禁止将电芯与项链、发夹或其它金属物体一起运输或贮存!
- Do not pierce the cell 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芯壳体, 禁止锤击或脚踏电芯!
- Do not strike, throw or subject the cell to sever physical shock.
- 禁止撞击、投掷或者使电芯受到机械震动!
- Do not directly solder the cell terminals.
- 禁止直接焊接电芯端子!
- Do not attempt to disassemble or modify the cell in any way.
- 禁止以任何方式分解电芯!
- Do not place the cell in a microwave oven or pressurized container.
- 禁止将电芯置入微波炉或压力容器中!
- Do not use the cell in combination with primary batteries (such as dry-cell batteries) or batteries of different capacity, type or brand.

- 禁止与一次电芯（如干电芯）或不同容量、型号、品种电芯组合使用！
- Do not use the cell if it gives off an odor, generates heat, becomes discolored or deformed, or appears abnormal in any way. If the cell is in use or being recharged, remove it from the device or charger immediately and discontinue use.
- 如果电芯发出异味、发热、变形、变色或出现其它任何异常现象时不得使用；如果电芯正在使用或充电，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 cell where is exposed to extremely hot, such as under window of a car in direct sunlight in a hot day. Otherwise, the cell may be overheated. This can also reduce cell performance and/or shorten service life.

不要使用处于极热环境中的电芯，如阳光直射或热天的车内。否则，电芯会过热，可能着火（点燃），这样就会影响电芯的性能、缩短电芯的使用寿命。

If the cell 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.

如果电芯漏液后电解液进入眼睛，不要擦，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。

## 5. Amendment of this Specification 产品规格书的修订

This specification is subject to change with prior notice. Any matters that this specification does not cover should be conferred between the customer and Joysun.

本公司有权对本产品规格书进行修订，在对产品规格书修订后香港睿隆信息技术有限公司将会通知客户。本说明书中未提及的事项，需经双方协商确定。