| Customer's Name 客户名称： | Version 版本： A0<br>Date 日期：2025-2-10 |
|---|---|

# Specification For Approval

**型号 Model ：** 6S1P-12000mAh

| Designed 制定 | Checked 审核 | Approval 批准 |
|---|---|---|
| Weiwen Zeng | Jintao Song | Mei Long |
| Customer Approval<br>客户回签 | | |

## History of specification
## 规格书修订记录

| Date 日期 | Contents 内容 | Remarks 备注 |
|---|---|---|
| 2025-2-10 | First issue | A0 |
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# Contents 目录

## 1. Scope 适用范围

This document describes the Product Specification of the Li-Polymer Rechargeable Battery/cell supplied by 1.

本规格书描述了 1 生产的可充电锂离子聚合物电池/电芯的产品性能指标。

## 2. Specification 主要技术参数

| NO. | Items 项目 | Criteria 标准 | Remarks 备注 |
|---|---|---|---|
| 2.1 | Nominal Capacity 标称容量 | 12000mAh | Discharge:0.5C rate<br>Cut-off voltage:3.0V<br>0.5C 电流放电至 3.0V |
| | Minimum capacity 最小容量 | 12000mAh | |
| 2.2 | Nominal Voltage 标称电压 | 23.1V | |
| 2.3 | Open Circuit Voltage 出货电压 | 22.2-23.4V | |
| 2.4 | Internal Impedance 内阻 | ≤20mΩ | |
| 2.5 | Standard Charge voltage<br>标准充电限制电压 | 26.4V | |
| 2.6 | Standard charge current<br>标准充电电流 | 6000mA | 0.5C |
| 2.7 | Max. charge current<br>最大充电电流 | 12000mA | 1C |
| 2.8 | Standard discharge current<br>标准放电电流 | 6000mA | 0.5C |
| 2.9 | Max. discharge current<br>最大持续放电电流 | 360A | Constant current30C<br>持续电流：30C |
| 2.10 | Max. Discharge peak Current<br>最大瞬间放电电流 | 480A | Peak current 40C<br>瞬间电流 40C |
| 2.10 | Standard Discharge cut-off voltage<br>标准放电截止电压 | 18.0V | |
| 2.11 | Charging<br>Operating Temperature<br>充电工作温度 | 0~45℃ | |
| 2.12 | Discharging<br>Operating Temperature<br>放电工作温度 | -40~+55℃ | |
| 2.13 | Storage Temperature<br>储存温度 | -10℃～+45℃ （Less than 1 month/小于一个月）<br>-10℃～+35℃ （Less than 6 months/小于六个月） | |
| 2.14 | Weight<br>重量 | 约 1400g | Reference Value<br>参考值 |

## 3.Battery configuration 电池组成

| NO | Item | Criteria | Remarks |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 3.1 | Cell 电芯 | 12000mAh 聚合物电芯 Polymer cells | 6pcs |
| 3.2 | Terminal wires 端子线 | XT90/特软硅胶线/10#Silicone wire | 1pcs |
| 3.3 | Terminal wires 端子线 | XH2.54-7P/3239/22# | 1pcs |

## 4.Battery Performance Criteria 电池性能检查及测试

### 4.1 Appearance 外观和结构

There shall be no obvious defect as scratch, bur and other mechanical scratch. The structure and dimensions see attached drawing of the battery.

电芯的表面应无明显的划痕毛刺及其其它机械划伤。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

According to the national standard or better than this, the impedance of the voltmeter shall not be less than 10KΩ/V.

按照国家标准指定规格等级或采用更灵敏等级,内阻不小于 10 KΩ/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 0.01Ω.

照国家标准指定规格等级或采用更灵敏等级，外部总体内阻包括电流表和导线应小于 0.01Ω。

(4) Impedance Meter 内阻测试仪

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

内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 other specific demand, test and measurement shall be done under temperature of 25±3℃ and relative humidity of 45~85%.

测试电池必须是本公司出厂时间不超过一个月的新电池，且电池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 25±3℃，相对湿度 45%~85%。

### 4.4 Standard Charge 标准充电

Test procedure and its criteria are referred as follows:

Using 0.5C constant current (CC) charge to limited voltage, then using limited voltage as constant voltage to end-of-charge current 0.05C. charging time shall be less than 3.5H, meanwhile the temperature shall be 25±3℃.

测试过程及标准如下：

电芯先以 0.5C 恒流充至标准充电限制电压，当充电电流逐渐减小时再以标准充电限制电压恒压充至电流减小到 0.05C。充电时间不得超过 3.5 小时，充电工作温度应为 25±3℃。

## 4.5 Electrical Characteristics 产品电性能（电池）

| No. | Items 项目 | Test condition and criteria 测试方法和判定标准 |
|---|---|---|
| 1 | Discharge Performance 放电性能 | Under the temperature of 25±3℃, after charging the cell with standard charge, then discharge with 0.5C until the voltage is 3.0V, and the capacity is required ≥ 95% of minimum capacity.<br>在 25±3℃条件下，电芯经过标准充电结束后，再以 0.5C 放电至 3.0V，要求放电容量≥最小容量的 95%。 |
| 2 | Cycle Performance 循环寿命 | Under the temperature of 25±3℃,charge the cell with 0.5C, when the voltage reaches up to 4.40V charge with constant voltage until the charge current is 0.05C，then stop charging, then rest for 5 minutes, then discharge with 0.5C to 3.0V. Cycle with the above mode, the test shall be terminated when Discharging Capacity ＜80% of Initial Capacity in three consecutive cycles. The cycle life is required ≥300 times.<br>在 25±3℃条件下，电芯按 0.5C 充电，当电压达到 4.40V 时改为恒压充电，直到充电电流小于 0.05C 时停止充电,静置 5 分钟后，0.5C 放电至 3.0V 的方式进行循环，当连续三次放电容量＜初始容量 80%时寿命为终止,要求循环寿命≥300 次. |
| 3 | Charged Storage Characteristics 荷电保持能力 | Charge the battery with 0.2C, then shift to charge with constant voltage until the voltage reaches up to 4.40V, when the charge current ≤0.05C stop charging; rest under the temperature of 25±3℃ for 28 days then discharge with 0.2C to 3.0V. The discharge time is required ≥4.25h.<br>电池按 0.2C 充电，当端电压达到 4.40V 时改为恒压充电，充电电流小于或等于 0.05C 时，充电停止;将电池开路放置在 25±3℃条件下 28 天后，以 0.2C 放电至 3.0V，要求放电时间≥4.25h。 |
| 4 | High Temperature Characteristics 高温性能 | Under the temperature of 25±3℃, after charging the cell with standard charge, then put the cell into the constant temperature and humidity oven with 55±2℃ for 4h,then discharge with 0.5C to 3.0V. The discharge Capacity is required ≥ 85% of minimum capacity and the cell should no deformation and smoking.<br>在 25±3℃条件下，电芯经过标准充电结束后，将电芯放入 55±2℃的恒温恒湿箱中恒温 4h 后，然后以 0.5C 电流放电至 3.0V,要求放电容量≥85%最小容量，且电芯外观无变形、冒烟。 |
| 5 | Low Temperature Characteristics 低温性能 | Under the temperature of 25±3℃, after charging the cell with standard charge, then put the cell into the constant temperature and humidity oven with -10±2℃ for 4h,then discharge with 0.2C to 3.0V. The discharge Capacity is required ≥ 60% of minimum capacity and the cell should no deformation and smoking.<br>在 25±3℃条件下，电芯经过标准充电结束后，将电芯放入-10±2℃的恒温恒湿箱中恒温 4h 后，然后以 0.2C 电流放电至 3.0V,要求放电容量≥60%最小容量，且电池外观无变形、冒烟。 |

## 4.6 Safety Performance 产品可靠性（cell）

| No | Items/项目 | Testing method and determinant standard /测试方法和判定标准 |
|---|---|---|
| 1 | Over-charge<br>过充电 | A cell is to be discharged to 3.0V at 0.2C constant current, then charged at 3C constant current until the voltage is 4.6V,then charged at 4.6V constant voltage. Stop the test when the surface temperature of the cell decays to about 20% from the maximum or continuous charging time up to 7 hours .No fire, no explosion.<br>电芯先用 0.2C 恒流放电至后 3.0V，再用 3C 恒流充电至 4.6V,再恒压 4.6V 充电，当电芯表面温度比峰值低约 20%,或者持续充电时间达到 7 小时后停止测试。电芯不起火，不爆炸。 |
| 2 | Forced-Discharge Test<br>强制放电 | At 25 ± 3 ℃, the core is discharged to 3.0V at a constant current of 0.2C, and then charged in reverse at a constant current of 1.0c for 90 minutes. The core will not fire or explode.<br>在 25±3℃的温度下，电芯以 0.2C 恒流放电至 3.0V，再以 1.0C 电流恒流进行反向充电 90 分钟。电芯不起火，不爆炸。 |
| 3 | Constant Humidity and Temperature Characteristics<br>恒定湿热性能 | At 25 ± 3 ℃, after charging the cell with 0.2C, then put the cell into the constant temperature and humidity oven with 40±2℃ and 90～95% for 48h . After testing take out the cell then rest for 2h under the temperature of 25 ± 3 ℃ , discharge with 0.2C to 3.0V. The cell should be no obvious deformation, leakage, rust, smoking and explosion.The discharge time is required ≥180min.<br>在 25±3℃条件下，电池按 0.2C 充电结束后，放入 40±2℃，湿度 90～95%的恒温恒湿箱内 48h，试验结束后将电池取出搁置 2h，在 25±3℃条件下，以 0.2C 放电至 3.0V；电芯应无明显变形、漏液、生锈、冒烟或爆炸，要求放电时间≥180min。 |

## 4.7 Rest Period 搁置时间

The rest period between charging and discharging is 30min under no specific demand.
如无特殊要求，电池充放电间隔为 30min。

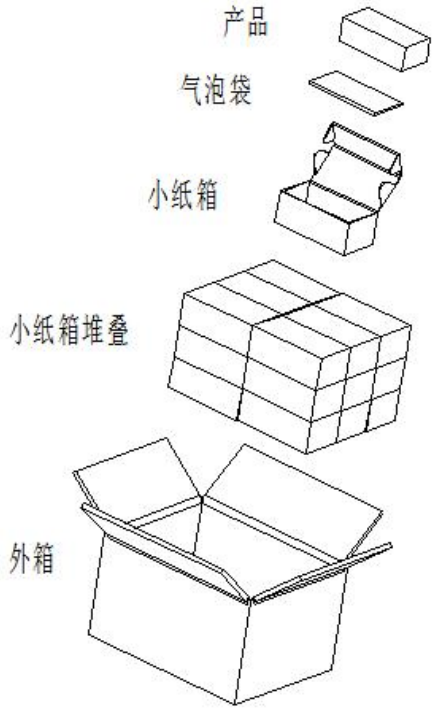
## 5. Storage and Others 贮存及其它事项

### 5.1 Long Time Storage 长期贮存

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 3.7V~3.9V and the cell is to be stored in a condition as appendix .

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 3.7V～3.9V 且贮存环境要求如附录。

### 5.2 Packing Diagram 打包示意图




### 5.3 Period of Warranty 保质期

The period of warranty is one year from the date of shipment. 1 guarantees to give a replacement in case of batteries with defects proven due to manufacturing process instead of the customer abuse and misuse.

电池的保质期为出货之日起一年，本公司承诺在质保期一年内如果证明电池的缺陷是在制造过程中形成而不是由于客户滥用或误用而导致，本公司将负责进行调换。

### 5.4 Others 其它事项

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

任何本说明书中未提及的事项，须经双方协商确定。

# Appendix 附录

**Handling Precautions and Guideline**
**(Lithium-Ion Polymer) Rechargeable Batteries**
**锂离子充电电池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 battery cells manufactured by **1**

本档“锂离子充电电芯操作指示及注意事项”仅适用于 **1** 生产电芯。

**Note (1) ：声明一**

The customer is requested to contact **1** in advance, if and when the customer needs 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 **1**，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**

**1** 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，1 概不负责。

**Note (3)：声明三**

**1** will inform the customer of improvement(s) regarding proper use and handling of the cell in a written form, if it is deemed necessary.

如有必要，1 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。

# Liability 责任书

The user has to operate the products according to the instructions printed on the battery label or follow the advises described in this Product Specification published by **1** .In case the battery were overheated or even catch fire or explosion caused by mishandling of user side.**1** will not be liable for the lose caused by any of such mishandling.

用户必须按照电池标签上的说明或者此份 **1** 的电池规格书来使用。如果由于用户的不正当使用引起电池过热甚至起火或者爆炸等造成的损失，**1** 将不承担任何责任。

## 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.
— 禁止用导线或其它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中!
— 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!
— Do not contact any conductive substance and electronic components directly with the aluminum plastic film edge of the cells.
— 禁止任何导电物质和电子元器件直接与电芯铝塑包装膜边缘接触!
— The aluminum plastic film edge of the cells a must be insulated.
— 电芯铝塑膜边缘必须绝缘!

## 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，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。

Use the battery only under the following environmental conditions. Failure to do so can result in reduced performance or a shorten service life. Recharging the battery outside of these temperatures can cause the battery to overheat, explode or catch fire.

只能在下述条件下使用电池，否则将会降低电池的性能或缩短电池的使用寿命。

**Tab connection** 极耳连接

Ultrasonic welding or spot welding is recommended for the battery tabs connection method.

Battery pack should be designed that shear force are not applied to the battery tabs.

If apply manual solder method to connect tab with PCM,below notice is very important to ensure battery performance:

The solder iron should be temperature controlled and ESD safe;

Soldering temperature should not exceed 350℃;

Soldering time should not be longer than 3s;

Soldering time should not exceed 5 times.Keep battery tab cold down before next time soldering;

Directly heat cell body is strictly prohibited.Battery may be damaged by heat above approx 100℃;

Tin welding position should be more than 2 mm away from the top of the battery tab glues.

建议使用超声波或点焊焊接方法；外壳设计应使电池极耳不受外力。

如果使用人工焊接保护板，下面的注意事项对于确保电池性能非常重要：

焊接铬铁的温度必须可控且可防静电；

焊接时铬铁的温度不能超过 350℃；

焊锡时间不能超过 3 秒钟；

焊锡次数不能超过 5 次，且需等极耳冷却后才能进行下一次焊锡；

严禁直接加热电芯，高于 100℃会损害电芯。

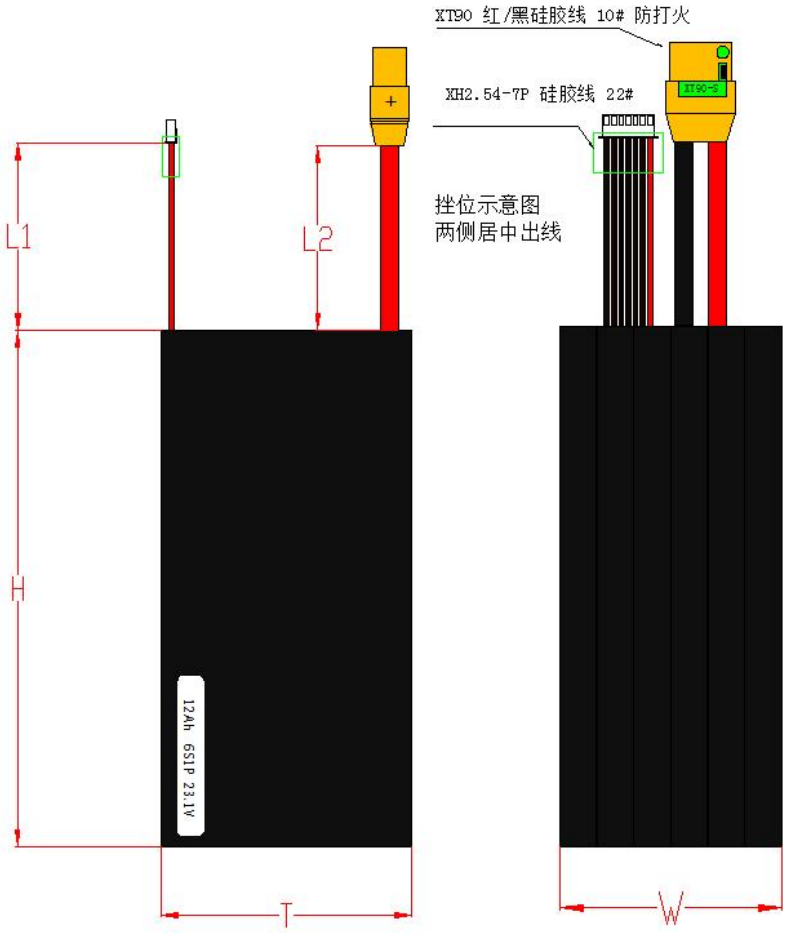
**Amendment of this Specification 产品规格书的修订**

The company has the right to amend the specifications of the product ，the product specification revised by **1** will notify customers.

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 **1** 将会通知客户。

## Attachment 附件

尺寸图 Dimensional drawings




| 标识 logotype | 描述 description | 尺寸规格 Dimensions |
|---|---|---|
| H | 高度 length | ≤155.0mm |
| W | 宽度 width | ≤71.0mm |
| T | 厚度 thickness | ≤68.0mm |
| L1 | 外露线长 Length of exposed line | 100±10mm |
| L2 | 外露线长 Length of exposed line | 100±10mm |
| 外观要求 Appearance requirements | 贴标签参照上图，套 PVC 黑膜 Label according to the above figure, covered by PVC black film | |

Note: If you have any questions, please keep us informed within a week, or we will think that you have agreed to the above standards.Thank you!

注：如果您有任何疑问，请在一周内告知我们，否则我们将认为您已经同意以上标准，谢谢！