

Customer 客户: _____

Lithium-ion Battery Specification Approval Sheet 锂离子电池规格确认书

Model 型号: Li-18650-2S4P-7.4V 10.4(10.2) Ah-PCM

| Approved by 批准 | Checked by 审核 | Prepared by 编制 | Date 日期 |
|-------------------|------------------|-------------------|------------|
| | | Bing Chen | 2015-3-9 |

Customer signature 客户签署

| | |
|-----------------------------|------|
| Client Confirmation 客户确认 | 签名盖章 |
| Date 日期 | |

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Contents 目录

| | | |
|----|--|----|
| 1 | Scope 范围 | 4 |
| 2 | Product Configuration 产品配置 | 4 |
| 3 | Product Dimension 产品尺寸 | 5 |
| 4 | Product Specification 产品规格 | 6 |
| 5 | Product Electric Performance Criteria Test 产品电性能测试 | 7 |
| 6 | Mechanical Performance 机械特性 | 7 |
| 7 | PCM Specification 保护板规格 | 8 |
| 8 | Storage and Transportation 储存和运输 | 9 |
| 9 | Warning 注意事项 | 9 |
| 10 | Product Responsibility 产品责任 | 10 |
| 11 | Others 其他 | 10 |
| 12 | Note 备注 | 10 |
| 13 | Label 标贴 | 10 |

1 Scope 范围

本规格书描述本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。

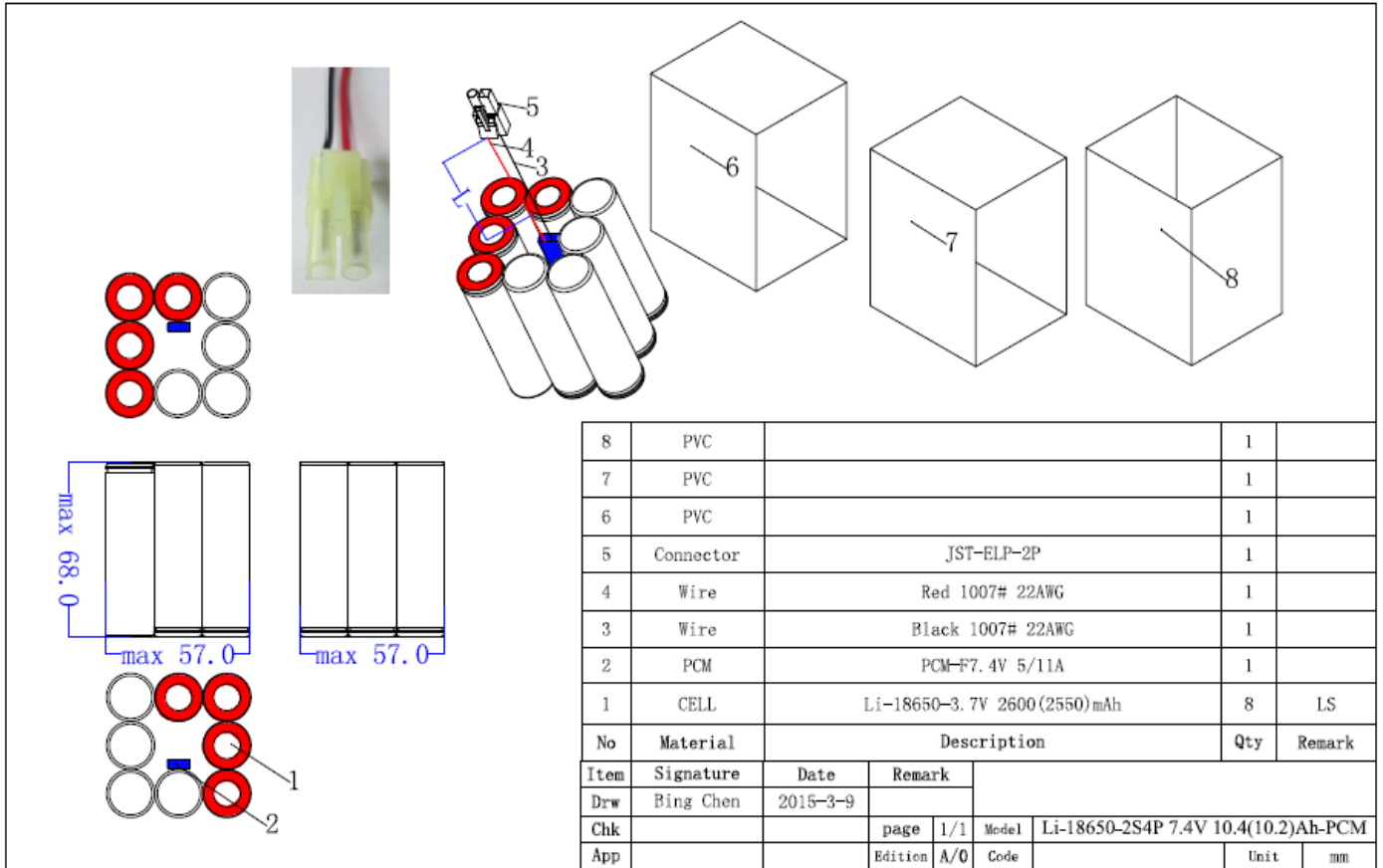
This specification describes the design and development of the company's battery; it is the product of design, production and inspection basis. Its role is to understand the quality of the product and using the correct method for customers.

This specification shall be applied to Li-ion battery manufactured by Shenzhen Eisto Electronics Co., Ltd.

2 Product Configuration 产品配置

| 序号 No. | 项目 Item | 标准 Criteria | 备注 Remark |
|-----------|-----------------------------------|-------------------------------|---------------------------------|
| 1 | 电芯 Lithium-ion Battery Cell | Li-18650-3.7V 2600 (2550) mAh | LS-SK |
| 2 | 保护板 PCM | PCM-F7.4V 5/11A | PCB 编号: PCB-RYD-02S-036 V1.0 |
| 3 | 导线&连接器 Wire& Connector | Con-JST-ELP-2P-1007-22# | |

3 Product Dimension 产品尺寸



| 8 | PVC | | 1 | |
|------|-----------|-----------------------------|---------|-------------------------------------|
| 7 | PVC | | 1 | |
| 6 | PVC | | 1 | |
| 5 | Connector | JST-ELP-2P | 1 | |
| 4 | Wire | Red 1007# 22AWG | 1 | |
| 3 | Wire | Black 1007# 22AWG | 1 | |
| 2 | PCM | PCM-F7.4V 5/11A | 1 | |
| 1 | CELL | Li-18650-3.7V 2600(2550)mAh | 8 | LS |
| No | Material | Description | Qty | Remark |
| Item | Signature | Date | Remark | |
| Drw | Bing Chen | 2015-3-9 | | |
| Chk | | | page | 1/1 |
| App | | | Edition | A/0 |
| | | | Model | Li-18650-2S4P 7.4V 10.4(10.2)Ah-PCM |
| | | | Code | |
| | | | Unit | mm |

| 序号 No. | 电池类型 Battery type | 电池尺寸 (mm)Dimensions T*W*H (max) | 导线长度 (mm) Lead exposure L | 端子头方向 Terminal head direction | 浸锡长度 Immersion tin size |
|-----------|----------------------|---------------------------------------|---------------------------------|-------------------------------------|----------------------------|
| 1 | 锂离子 Li-ion | 57.0*57.0*68.0 | 100(+15-0) | / | / |

4 Product Specification 产品规格

| 序号 No. | 内容 content | 规格 specification | 备注 Remark |
|-----------|---|--|---|
| 1 | 充电截止电压 Charge cut-off voltage | 8.4V | |
| 2 | 放电终止电压 Discharge cut-off voltage | 5.5V | |
| 3 | 标准充电模式 Standard charge | 以0.2C电流恒流充电至8.4V，转8.4V恒压充电，直到充电电流 $\leq 0.02C$ 。 Charge the battery at constant current of 0.2C to reach 8.4V. Then charge the battery at constant 8.4V voltage until the charging current decreasing to 0.02C. | |
| 4 | 标准放电模式 Standard discharge | 以标准充电模式充满后，搁置1小时，以0.2C电流恒流放电至5.5V。 After the standard charging, rest for 1 hour then discharge to 5.5V@0.2C. | |
| 5 | 持续放电电流 Continuous discharge current | 3A | |
| 6 | 瞬间最大工作电流 Pulse maximum discharge current | 5A | |
| 7 | 最大充电电流 Maximum charge current | 3A | |
| 8 | 容量 Rated capacity | 标称容量Typical capacity: 10.4Ah 最小容量Minimum capacity: 10.2Ah-5% | 标准充电然后标准放电 standard discharge after standard charge |
| 9 | 工作温度 Operation temperature range | 充电: 0~40°C Charge: 0~40°C 放电: -20~60°C Discharge: -20~60°C | 湿度: 60±25% 60±25%R.H |
| 10 | 储存温度 Storage temperature | 小于1个月: -20~45°C ≤ 1 month: -20~45°C 小于3个月: -20~35°C ≤ 3 months: -20~35°C 小于1年: 0~25°C ≤ 1 year: 0~25°C | 湿度: 60±25% 长时间储存最佳温度: 10~25°C 60±25%R.H Best 10~25°C for long-time storage |
| 11 | 内阻 Impedance | <100mΩ | |
| 12 | 重量 Weight | Approx:385g | |

5 Product Electric Performance Criteria Test 产品电性能测试

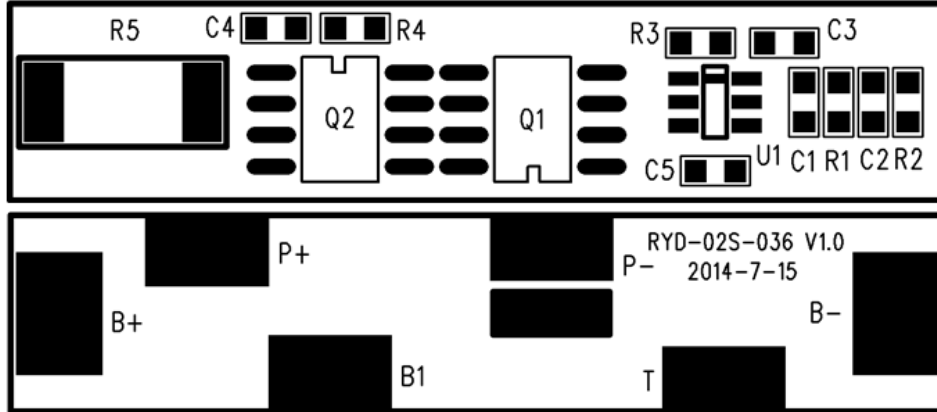
| 序号 No. | 项目 Items | 测试方法 Test Conditions | 达到要求 Requirements |
|-----------|---|---|--|
| 1 | 荷电保持能力 Capacity retention | 以标准模式充电后, 在环境温度 $20^{\circ}\text{C}\pm 5^{\circ}\text{C}$ 的条件下, 将电池开路搁置 28d, 再以 0.2C 电流进行放电至 5.5V。 Fully charging, store them at $(20\pm 5)^{\circ}\text{C}$ for 28 days, then discharge to 5.5V @0.2C. | 放电时间 $\geq 255\text{min}$ Discharging time $\geq 255\text{min}$ |
| 2 | 常温循环寿命 Cycle Life @ 25°C | 以 0.2C 电流恒流放电至 5.5V, 再以 0.2C 电流恒流充电至 8.4V, 然后恒压 8.4V 充至电流 $\leq 0.02\text{C}$, 静止 10min, 以 0.2C 电流恒流放电至 5.5V, 放电结束后, 静止 10min, 再进行下一充放循环, 直至连续三次放电容量小于 80% 的 0.2C 的首次放电容量。 Discharge to 5.5V @0.2C, then Charge the battery @0.2C to reach 8.4V. Then charge the battery at constant 8.4V voltage until the charging current decreasing to 0.02C. Rest for 10 min. discharge to 5.5V@ 0.2C and rest for 10 min. Continue the charge/discharge cycles until discharge capacity lower than 80% of rated capacity. | 循环次数 ≥ 300 次 Cycle life ≥ 300 |
| 3 | 储存 storage | 以标准模式充电给电池充入 40%~65% 的容量, 然后在环境温度 $20^{\circ}\text{C}\pm 5^{\circ}\text{C}$, 相对湿度 45%~85% 的环境中贮存。贮存 12 个月后满充以 0.2C 电流放电至终止电压。 进行贮存试验的电池应选自生产日期到试验日期不足 3 个月的电池 Charge the battery to 40%~65% of its rated capacity using standard charging mode, then keep it in an $20^{\circ}\text{C}\pm 5^{\circ}\text{C}$, humidity 45%~85% room for 12 months, fully charge and discharge it @0.2C until voltage down to 5.5V. (The testing sample should be within 3 months dated from production date) | 放电时间 $\geq 240\text{min}$ Discharge time $\geq 240\text{min}$ |

6 Mechanical Performance 机械特性

| 序号 No. | 项目 Items | 测试方法 Testing method | 达到要求 Requirements |
|-----------|------------------------|--|---|
| 1 | 振动测试 Vibration Test | 电池标准充电后固定在振动台上, 以 X, Y, Z 三个方向从 10Hz~55Hz 循环振动各 30min, 扫描速率为 1oct/min; 振动频率: 10Hz~30Hz; 移位振幅/单振幅: 0.38mm; 振动频率: 30Hz~55Hz; 移位振幅/单振幅: 0.19mm。 After standard charging, put battery on the vibration table. 30 min experiment from X,Y,Z axis. Scan rate: 1oct/min; Frequency 10-30Hz, Swing 0.38mm; Frequency 30-55Hz, Swing 0.19mm. | 电性能及外观不受影响 No influence to batteries' electrical performance and appearance. |

7 PCM Specification 保护板规格

7.1 PCM layout 保护板布局图



7.2 PCM 参数

| 项目 Item | 内容 Content | 标准 Criterion |
|------------------------------------|---|----------------------------------|
| 过充保护 Over charge Protection | 过充电检测电压 Over charge detection voltage | 4.250±0.025V |
| | 检测延迟时间 Detection delay time | 1.0S±0.3S |
| | 过充电解除电压 Over charge release voltage | 4.050±0.050V |
| 过放电保护 Over discharge protection | 过放电检测电压 Over discharge detection voltage | 2.400±0.060V |
| | 检测延迟时间 Detection delay time | 128±39mS |
| | 过放电解除电压 Over discharge release voltage | 3.000±0.080V |
| 过流保护 Over current protection | 过电流检测电流 Over current detection current | 11±2A |
| | 检测延迟时间 Detection delay time | 12±4mS |
| | 额定开路电流 Rated operational current | ≤5.0A |
| 均衡 Balance | 均衡开启电压 Balanced open voltage | / |
| | 均衡释放电压 Balanced off voltage | / |
| | 均衡电流 Balanced current | / |
| 短路保护 Short protection | 保护条件 Detection condition | 外部电路短路 Exterior short circuit |
| | 解除条件 Release condition | 断开短路电路 Cut short circuit |
| 内阻 Interior resistance | 主回路导通电阻 Main loop electrify resistance | ≤30.0mΩ |
| 静态电流 Current consumption | 自耗电 Current consume | ≤8.0μA |

8 Storage and Transportation 储存和运输

8.1 Storage 储存

8.1.1 锂离子电池需保存在阴凉，干燥，通风的环境中，避免接触火源与热源。

The Li-ion battery pack should be stored in a cool, dry and well-ventilated area, and should be far from the fire and the high temperature.

8.1.2 电池需按规格书规定温度范围进行储存，最佳储存温度为 $25\pm 5^{\circ}\text{C}$ ，最佳湿度为 $60\pm 15\%$ 。

The battery should store in the product specification book stipulation temperature range, the best storage temperature is $25\pm 5^{\circ}\text{C}$. The best humidity is $60\pm 15\%$.

8.1.3 电池应当在室温下存放，应充到 40%至 60%的电量。为防止电池过放，建议每 3 个月按标准充放电方式进行一次充电,然后按标准充电方式进行充电至 40%~60%的电量。

The battery should be stored within room temperature, and charged to 40% ~ 60% electric quantities. In order to avoid over-discharge, we suggest charge and discharge the batteries every three months, then charge to 40%~60%electric quantities.

8.2 Transportation 运输

8.2.1 请勿与其他货物混合。

Do not mix the battery products with other cargos.

8.2.2 请勿将电池浸入水中或使其受潮。

Do not immerse the battery products in water or allow it to get wet.

8.2.3 请勿叠放超过 7 层或倒置。

Do not over 7 layers staking and upside-down.

8.2.4 最高运输温度不超过 65°C 。

The highest temperature in transportation is lower than 65°C .

9 Warning 注意事项

9.1 为确保安全，电池应安装安全装置，在静电强于制造时所要求的静电时请勿使用，否则，安全装置会失效，导致电池过热、破裂、爆炸及着火。

In order to ensure the safe, battery should be installed safety device, in static than manufacturing request when electrostatic when do not use, otherwise, safety device would failure, battery overheat, rupture, explosion and fire.

9.2 请在下列条件下正常使用，否则会过热、着火、性能降低及缩短寿命。

In the normal use of the following conditions, otherwise they will overheat and catch fire, performance and shorten the life.

环境条件 Ambient condition: (T 温度 temperature)

充电 charging: $0\sim +40^{\circ}\text{C}$

放电 discharging: $-20\sim +60^{\circ}\text{C}$

9.3 如果儿童使用电池，应指定他们按使用说明书进行使用，且保证电池在任何时候都必须是正常使用。

If children use the battery, you should specify them by using the instructions for use, and ensure the battery at any time must be in normal use.

9.4 若电池泄露，电解质粘于皮肤或衣服上，请用水冲洗掉或用流水洗衣服，否则将会腐蚀皮肤。

If the battery leaks, electrolytes stick to the skin or clothing, wash off with water or fluid washing clothes or skin corrosion will die.

9.5 为了不装错或损耗电池，请认真阅读使用说明书，并按照指导进行安装与拆卸(从装置上)。

In order to not install error or loss of the battery, please carefully read the operating instructions, and follow the instructions for installation and removal (from device).

9.6 若电池不长期使用，请把电池拿出并放于干燥的地方，否则电器将会被腐蚀电池降低性能和减少寿命。

If the battery is not used, please take the battery out and placed in a dry place or electrical appliances will be corrosion of battery performance and reduce life.

9.7 若被污染了电池终端，请在使用之前用干布擦干净，否则将导致与装置接触不良，功率不足或充电失败。

If it is polluted battery terminal, please before you use it with a dry cloth to wipe clean, otherwise will result in poor contact with the device, power shortage or charge failure.

10 Product responsibility 产品责任

您必须严格遵守我司规格书和文件后面的注释使用电池，由于误用会引起电池过热，发生火灾或爆炸。对于没有按照规格书进行操作所造成的任何以外事故，我司不负担任何责任。

You must strictly adhere to our specifications and documentation comment later, due to the misuse of batteries can cause the battery to overheat, fire or explosion. For the specification for any accidental, I Secretary does not bear any responsibility.

如果规格书、原材料、生产过程或生产控制系统发生改变，改变的信息将会随质量和可靠性数据以书面形式通知消费者。

If the specification, raw materials, production processes or production control system is changed, the change of information will vary depending on the quality and reliability data to inform consumers in writing.

11 Others 其他

因为电池是利用化学反应，电池的性能会随时间恶化，即使存放很长一段时间没有被使用。此外，如果使用条件如充电，放电，温度，等不在指定的范围内的电池的寿命可能会缩短或设备中的电池使用的电解质渗漏损坏的可能。如果电池无法保持长时间的充电，即使充电正确，这可能表明是时候更换电池。

Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage. If the batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may indicate it is time to change the battery.

12 Note 备注

其他项目不包括在本规范应经双方同意。

Any other items which are not covered in this specification shall be agreed by both parties.

13 Label 标贴

待定

TBD