



深圳市科恩瑟尔电池有限公司

Li-ion Polymer Battery Specification

锂离子聚合物电池说明书

Product Model

产品型号: KE 602025

Nominal Capacity

标称容量: 350 mAh

Customer Code

客户代码: _____

Product Part Number

成品料号: _____

Version Number

版本号: A0

Total Page

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| Approval 批准 | Sale 销售 | Checked 审核 | Designed 编制 |
|----------------|------------|---------------|----------------|
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| | | | |

| Customer Approval 客户确认 | | |
|---------------------------|-----------------|------------|
| Dept. 部门 | Signature 签名 | Date 日期 |
| QA Dept 品质 | | |
| R&D Dept 研发 | | |
| Approval 批准 | | |

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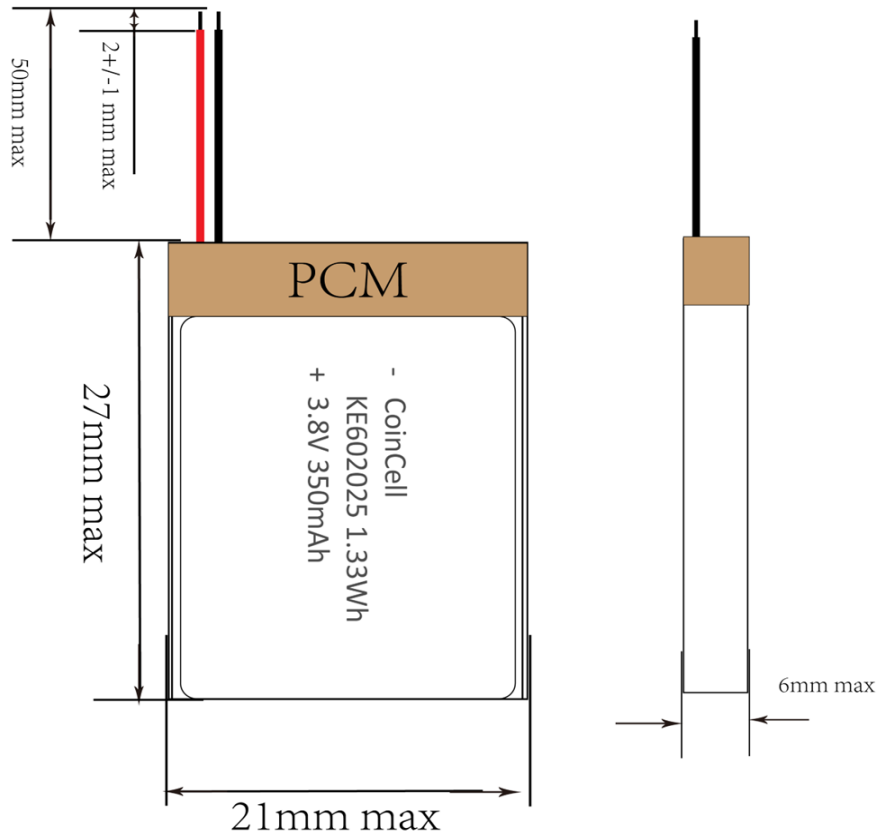
2. Scope 适用范围

This specification describes the basic performance, technical requirement, testing method, warning and caution of the lithium ion Polymer rechargeable battery .The specification only applies to Shenzhen Coincell Battery Co., Ltd.

本标准规定了锂聚合物可充电电池的基本性能、技术要求、测试方法及注意事项，本标准只适用于深圳市科恩瑟尔电池有限公司所生产的锂聚合物电池。

3. Product Specification 产品规格

3.1 Drawing of PACK 包装示意图



| Item 项目 | Description 描述 | Specification 规格 |
|------------|-------------------|---------------------|
| Cell | 电芯 | 602025-350mAh |
| PCM | 保护板 | DAM+8205 |
| 出线方式 | | 左侧出线（正极侧） |
| L | Tab Length / 出线长度 | 50.0 ±3mm(不含插头) |
| Wire | 导线线型、线号 | UL 10064 - 32 # AWG |
| Conector | 插头规格 | 0.8-2P刺破插头 正向 |
| T | Thickness / 厚度 | Max 6.0 mm |
| W | Width / 宽度 | Max 21.0 mm |
| H | Height / 高度 | Max 27.0 mm |



3.2 Basic performance 基本性能

| NO. 序号 | Item 项目 | Specification 规格 | Note 备注 |
|-----------|--|--|--|
| | Combination method 组合方式 | 1 P 1 S | |
| 1 | Nominal capacity 标称容量 | 350 mAh | Standard charge & Standard discharge 标准充放电 |
| 2 | Minimum capacity 最小容量 | 340 mAh | |
| 3 | Charging Voltage 充电电压 | 4.35 V | |
| 4 | Discharge Cut-off Voltage 放电截止电压 | 3.00 V | |
| 5 | Nominal Voltage 标称电压 | 3.8 V | |
| 6 | Initial Impedance 内阻 | ≤ 260 mΩ | |
| 7 | Shipping Voltage 出货电压 | 3.85 - 3.95 V | |
| 8 | PACK weight 电池重量 | ≈ 7.0 g | |
| 9 | Standard Charge Method 标准充电方式 | 0.2C CC charge to 4.35V, then CV to ≤0.01C cut off 0.2C恒流充电至4.35V, 然后4.20V恒压充 电直至充电电流≤0.01C截止 | 23±2℃ |
| 10 | Standard Discharge Method 标准放电方式 | 0.2C CC discharge to 3.00V 0.2C恒流放电至3.00V | 23±2℃ |
| 11 | Max. Charge Current 最大充电电流 | 1C | 15-45℃ |
| 12 | Max. Discharge Current 最大放电电流 | 1C | 15-45℃ |



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| | | | | |
|----|-------------------------------|------------------------------|-----------------------------|--|
| 13 | Operating Temperature 工作温度 | Charging (充电) 0°C~45°C | 0°C~15°C | 0.2C Max to 4.35V 最大0.2C充电至4.35V |
| | | | 15°C~45°C | 1C Max to 4.35V 最大1C充电至4.35V |
| | | Discharge -20°C~60°C | -20°C~0°C | Discharge Current Max 0.2C 最大放电电流 0.2C |
| | | | 15°C~45°C | Discharge Current Max 1.0C 最大放电电流1.0C |
| | | | 0°C~15°C and 45°C~60°C | Discharge Current Max 0.5C 最大放电电流0.5C |
| 14 | Storage temperature 储存温度 | -10°C~+45°C | Less than 1 month 少于一个月 | Storage voltage 3.70~4.00V 存储电压3.70~4.00V Storage humidity 65±20%RH 存储湿度为65±20%RH |
| | | -5°C~35°C | Less than 3 months 少于三个月 | |
| | | 15~30°C | over 3 months 三个月以上 | |

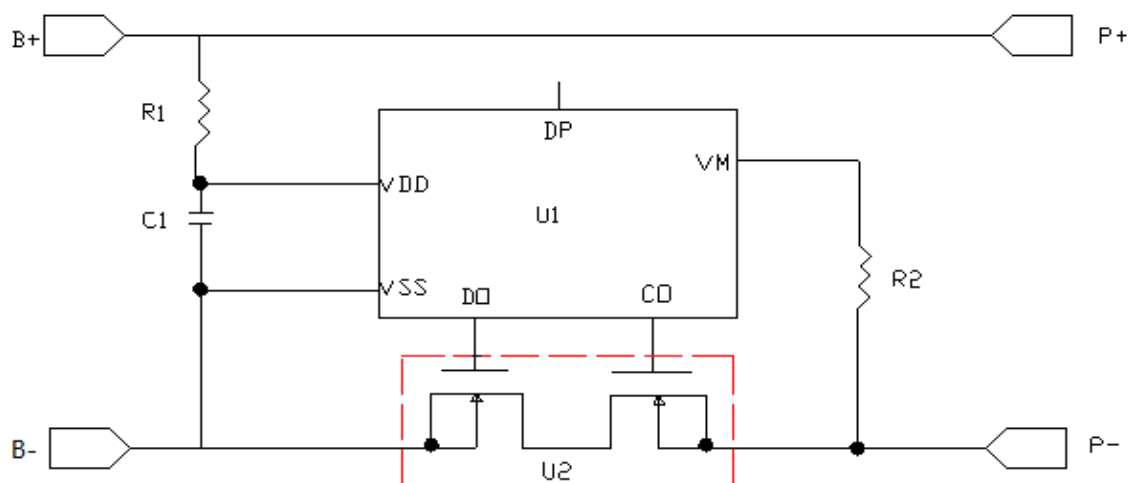
3.4 Protection circuit(保护电路)

3.4.1 PCM Standard (保护板规格)

| 项目 item | 最小值 Min. | 典型值 Type value | 最大值 Max. | 单位 Unit |
|--|-------------|-------------------|-------------|------------|
| 过充保护电压 Over charge protection voltage | 4.380 | 4.400 | 4.420 | V |
| 过充恢复电压 Over charge release voltage | 4.30 | 4.35 | 4.40 | V |
| 过放保护电压 Over discharge protection voltage | 2.95 | 3.00 | 3.05 | V |
| 过放恢复电压 Over discharge release voltage | 3.1 | 3.2 | 3.3 | V |
| 过充保护延迟时间 Over charge protection delay time | 700.0 | 1000.0 | 1300.0 | ms |
| 过放保护延迟时间 Over discharge protection delay time | 179.2 | 256 | 332.8 | ms |
| 过电流保护延迟时间 Over current protection delay time | 11.2 | 16 | 20.6 | ms |
| 短路保护延迟时间 Short protection delay time | 196 | 280 | 364 | us |

| | | | | |
|--|--|-----|-----|----|
| 内阻 Impedance | | 45 | 65 | mΩ |
| 正常状态下静态电流 Current consumption (Operation) | / | 3.0 | 6.0 | uA |
| 过放保护电流 Over current protection current | 2 | 4.0 | 6 | A |
| 最大持续充电电流 Max continuous charge current | | | 1 | A |
| 最大持续放电电流 Max continuous discharge current | | | 1 | A |
| 输入电压 (B+与B-间) Input voltage (B+ to B-) | -0.3 | | 6 | V |
| 工作温度 Operating temperature | -40 | | +85 | °C |
| 推荐存储条件 Recommendatory storage condition | Temperature range: -5~+35°C Humidity: 0%~75%RH | | | |
| 0V电池充电功能 0V battery charge function | 允许available | | | |

3.4.2 Schematic diagram(原理图)



3.4.3 material spec(材料规格表)

| 序号 | 名称 | 位号 | 规格 | 用量 | 供应商 | 备注 |
|----|------|----|-----------|----|-----|----|
| 1 | 保护IC | U1 | 8261DAM | 1 | | |
| 2 | MOS | Q1 | 8205 | 1 | | |
| 3 | 电阻 | R1 | 330Ω, ±5% | 1 | | |
| 4 | 电阻 | R2 | 470Ω, ±5% | 1 | | |
| 5 | / | / | / | / | | |



| | | | | | | |
|---|-----|-----|---------------|---|--|--|
| 6 | 电容 | C1 | 0.1uF | 1 | | |
| 7 | 线路板 | PCB | FR-4 V-0 UL94 | 1 | | |

4. Performance And Test Conditions 电池性能测试条件

4.1 Standard environmental test condition 标准测试环境

Unless otherwise specified, all tests stated in this Product Specification are conducted at below condition: Temperature: $23 \pm 2^\circ\text{C}$ Humidity: $65 \pm 20\%RH$.

除非特别说明，本标准书中所有测试均在以下环境条件下进行：温度： $23 \pm 2^\circ\text{C}$ 湿度： $65 \pm 20\%RH$

4.2 Measuring Instrument or Apparatus 测量器具及设备

4.2.1 Dimension Measuring Instrument 尺寸测量器具

The dimension measurement shall be implemented by instruments with equal or more precision scale of 0.01mm.

尺寸测量器具的精度等级应不小于0.01 mm。

4.2.2 Voltmeter (伏特计) Standard class specified in the national standard or more sensitive class having inner impedance more than $10k\Omega/V$

按照国家标准指定规格等级或采用灵敏度更高的，测量电压时内阻不应小于 $10k\Omega/V$ 。

4.2.3 Ammeter (安培计) Standard class specified in the national standard or more sensitive class. Total external resistance including ammeter and wire is less than 0.01Ω .

按照国家标准指定规格等级或采用灵敏度更高的，包括电流表及电线在内的总外阻应小于 0.01Ω 。

4.2.4 Impedance Meter (电阻计) Impedance shall be measured by a sinusoidal alternating current method (2kHz LCR meter).

内阻测试仪测量原理应为交流阻抗法 (2kHz LCR)。

4.3 Visual inspection (外观检查) There shall be no such defect as scratch, flaw, crack, and leakage, which may adversely affect commercial value of the cell.

不允许有任何影响电池性能的外观缺陷，诸如裂纹、裂缝、泄漏等。

4.4 Standard Charge&Discharge 标准充放电

4.4.1 Standard Charge : Test procedure and its criteria are referred as follows:

标准充电：测试过程及标准如下：

0.2C The battery will be charged to 4.35V with 0.2C from constant current to constant voltage, when the current is 0.01C, stop to charge.

以0.2C 电流恒流充电至限制电压4.35V 时, 改为恒压充电, 直到截止电流为0.01C 时停止充电

4.4.2 Standard Discharge 0.2C The battery will be discharged at a constant current of 0.2C to 3.0V

电池以0.2C恒流放电至3.0V

4.4.3 If no otherwise specified, the rest time between Chare and Discharge amount to 10min.

如果没有特别说明，电池充放电间隔时间为10分。



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5. General Performance 常规性能

| No. | Item项目 | Test Methods and Condition测试方法和条件 | Criteria标准 |
|-----|---|---|---|
| 5.1 | 0.2C Capacity 0.2C容量 | After standard charging, laying the battery 5min, then discharging at 0.2C to voltage 3.0V, recording the discharging time. 标准充电后, 搁置5分钟, 然后用0.2C电流放电至3.0V, 所记录放电时间 | ≥300min |
| 5.2 | 1C Capacity 1C容量 | After standard charging, laying the battery 5min, then discharging at 1C to voltage 3.0V, recording the discharging Time 标准充电后, 搁置5分钟, 然后用1C电流放电至3.0V, 记录时间 | ≥54min |
| 5.3 | Cycle Life 循环寿命 | Constant current 0.5C charge to 4.35V, then constant voltage charge to current declines to 0.01C, stay 5min, constant current 0.5C discharge to 3.0V, stay 10min. Repeat above steps till continuously discharging capacity Higher than 80% of the Initial Capacities of the Cells, after cycle the thickness swelling less than 10%. 先用0.5C恒流充电至4.35V, 再恒压4.35V充电直至充电电流≤0.01C, 搁置5分钟, 再用0.5C电流放电至3.0V; 又搁置10分钟, 重复以上步骤, 直到放电容量是初始容量的80%, 循环后厚度增加不超过10%。 | ≥300 times(次) Thickness swelling≤10% |
| 5.4 | Capability of keeping electricity 荷电保持能力 | 20±5°C, After standard charging, laying the battery 28days, discharging at 0.2C to voltage 3.0V, recording the discharging time. 在20±5°C状态下, 标准充电后, 电芯搁置28天, 然后用0.2C放电至3.0V, 所记录放电时间。 | ≥240min |

6 Environment Performance 环境性能

| No. | Item项目 | Test Methods and Condition测试方法和条件 | Criteria标准 |
|-----|---------------------------------------|--|-------------------------------|
| 6.1 | Discharge at high temperature 高温放电 | After standard charging, laying the Cells 4h at 60±2°C, then discharging at 0.5C to voltage 3.0V, recording the discharging time. 标准充电后, 在60±2°C条件下贮存4h, 然后用0.5C放电至3.0V, 所记录放电时间。 | ≥108min |
| 6.2 | Discharge at low temperature 低温放电 | After standard charging, laying the Cells 16h at -20±2°C, then discharging at 0.2C to voltage 3.0V, recording the discharging time. 标准充电后, 在-20±2°C条件下贮存16h, 然后用0.2C放电至3.0V, 所记录放电时间。 | ≥210min |
| 6.3 | Thermal shock 热冲击 | Put the battery in the oven. The temperature of the oven is to be raised at 5±2°C per minute to a temperature of 130±2°C and remains 30 minutes. 将电池放进烘箱内, 以5±2°C/min速度升高烘箱内温度至130±2°C后, 恒温30min. | No fire, no smoke 不起火, 不冒烟 |



7 Safe Characteristic 安全性能

| No. | Item项目 | Test Methods and Condition测试方法和条件 | Criteria标准 |
|-----|--|---|---|
| 7.1 | Overcharge testing/NOPCM 过充测试/没有保护板 | At 23±5°C, charging batteries with constant current 3C to voltage 4.6V, then with constant voltage 4.6V till current decline to 0. Stop test till batteries' temperature 10°C lower than max temperature. 在23±5°C状态下, 电池用3C电流充电至4.6V, 然后恒压4.6V让电流下降接近为0A, 监视电池温度变化, 当电池温度下降到峰值低约10°C时, 停止实验. | No smoke or fire 不起火, 不冒烟 |
| 7.2 | Over discharge testing / NOPCM 过放测试/没有保护板 | At 23±5°C, According to the requirements of standard charge, the battery will be discharge to cut-off voltage, then connect with external load of 30 ohm for 24 hours. 在23±5°C状态下, 按标准放电的要求放电至终止电压后, 外接30Ω负载放电24小时. | No fire, no smoke, no leakage. 无起火, 无冒烟, 无泄液 |
| 7.3 | Short-circuit testing /NO PCM 短路测试 /没有保护板 | At 23±5°C, After standard charging, connect batteries' anode and cathode by wire which impedance less than 80mΩ, keep 6h. 在23±5°C状态下, 标准充电后, 将电池的正负极用一根小于80mΩ的导线连接, 放置6小时. | No smoke or fire 不起火, 不冒烟 |

※ Above testing of safe characteristic must be with protective equipment.
(安全性能测试应在有保护措施下进行)

8. Warnings 警告

To prevent the possibility of the battery from leaking, heating, fire please observe the following precautions:

为防止电池可能发生的泄漏, 发热, 起火, 请注意以下预防措施:

The soft aluminum packing foil is very easily damaged by sharp edge parts such as Ni-tabs, pins and needles .Do not strike battery with any sharp edge parts.

☆ 电池外包装膜易被镍片, 尖针等尖锐部件损伤, 禁止用尖锐部件碰伤电池.

Do not immerse the battery in water and seawater

☆ 严禁将电池浸入海水或水中.

Do not use and leave the battery near a heat source as fire or heater

☆ 禁止将电池在热高温源旁, 如火, 加热器等使用设备.

When recharging, use the battery charger specifically for that purpose

☆ 充电时请选用锂离子电池专用充电器.

Do not reverse the position and negative terminals

☆ 禁止颠倒正负极使用电池

Do not connect the battery to an electrical outlet

☆ 禁止将电池直接接入电源插座

Do not discard the battle in fire or heat it

☆ 禁止将电池丢入火或加热器中

The battery tabs are not so stubborn especially for aluminum tab.Do not bend tab.

☆ 电池极耳的机械强度不坚固, 特别是铝极耳, 禁止弯折.

Do not short-circuit the battery by directly connecting the positive and negative terminal with metal object such wire

☆ 禁止用金属直接将电池的正负极进行短路连接.



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Do not transport and store the battery together with metal objects such as necklaces, hairpins etc.

☆ 禁止将电池与金属, 如发夹, 项链等一起运输或贮存.

Do not strike or throw the battery.

☆ 禁止敲击或抛掷, 踩踏电池等.

Do not directly solder the battery and pierce the battery with a nail or other sharp object.

☆ 禁止直接焊接电池和用钉子或其它利器刺穿电池.

9. Cautions 注意

Do not use or leave the battery at very high temperature (for example, at strong direct sunlight or a vehicle in extremely hot conditions). Otherwise, it can overheat or fire or its performance will be degenerate and its service life will be decreased.

△ 禁止在高温下(直热的阳光下或很热的汽车中)使用或放置电池, 否则可能会引起电池过热, 起火或功能失效, 从而导致电池寿命减短.

Do not use it in a location where static electricity is great, otherwise, the safety devices may be damaged, causing hidden trouble of safety.

△ 禁止在强静电和强磁场的地方使用, 否则易破坏电池安全保护装置, 带来安全隐患.

If the battery leaks, and the electrolyte get into the eyes. Do not rub eyes, instead, rinse the eyes, with clean running water, and immediately seek medical attention. Otherwise, eye injury can result.

△ 如果电池发生泄漏, 电解液进入眼睛, 请不要揉擦, 应用清水冲洗眼睛, 并立即送医院治疗, 否则会伤害眼睛.

If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, immediately remove it from the device or battery charge and stop using it.

△ 如果电池在使用或贮存中发出异味, 发热, 变色, 变形, 或者是在充电过程中出现任何异常现象, 立即将电池从充电器或装置中移开, 并停止使用.

In case the battery terminals are dirt, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection with the instrument.

△ 如果电池弄脏, 使用前应用干布抹净, 否则可能会因接触不良而影响性能失效.

Be aware discharged battery may cause fire or smoke, tape the terminals to insulate them.

△ 废弃之电池应用绝缘纸包住电极, 以防起火, 冒烟.

If the battery is stored for a long time, When the battery voltage is less than or equal to 3.6, stored electricity to 3.90 V the battery storage should be 3.90V and the battery is to be stored in a condition, Temperature $23 \pm 5^{\circ}\text{C}$, Humidity 45-75%RH.

△ 长期贮存的电池(超过3个月)须置于干燥、凉爽处, 当电池电压 ≤ 3.6 时, 补电至3.90V储存. 贮存电压为3.90V且贮存环境要求. 温度在 $23 \pm 5^{\circ}\text{C}$, 湿度在45-75%RH.

10. Period of Warranty 保质期

The period of warranty is one year from the date of shipment. Shenzhen Coincell Battery Co., Ltd. guarantees to give a replacement in case of battery with defects proven due to manufacturing process instead of the customers abuse and misuse.

电池的保质期从出货之日算起为一年. 如果证明电池的缺陷是在我们公司制造过程中造成的而不是客户滥用或错误使用造成, 本公司负责退换电池.



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11. Others 其它事项

11.1. The customer is requested to contact Shenzhen Coincell Battery Co., Ltd. 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.

客户若需要将电池用于超出文件规定以外的设备，或在文件规定以外的使用条件下使用电池，应事先联系深圳市科恩瑟尔电池有限公司，因为需要进行特定的实验测试以核实电池在该使用条件下的性能及安全性。

11.2. Shenzhen Coincell Battery Co., Ltd. will take no responsibility for any accident when the battery is used under other conditions than those described in this Document.

对于在超出文件规定以外的条件下使用电池而造成的任何意外事故，深圳市科恩瑟尔电池有限公司概不负责。

11.3. Shenzhen Coincell Battery Co., Ltd. will inform, in a written form, the customer of improvement(s) regarding proper use and handing of the battery, if it is deemed necessary.

如有必要，深圳市科恩瑟尔电池有限公司会以书面形式告之客户有关正确操作使用电池的改进措施。

11.4. Any matters that this specification does not cover should be conferred between the customer and Shenzhen Coincell Battery Co., Ltd..

任何本说明书中未提及的事项，须经双方协商确定。