



Specification Approval Sheet

产品规格确认书

| | |
|---------------------------|-----------------------------|
| Product Name 产品名称 | Li-MnO ₂ Battery |
| Model SPEC 型号规格 | CP155050/600mAh/3.0V |
| Company Name 客户名称 | |
| Document Number 文件编号 | GMBJSYG170405 |
| Sample Number 样品单编号 | |
| Document Revision 文件版本 | A0 |

| Approved By 批准 | Checkup 审核 | Make 制定 |
|-------------------|---------------|------------|
| | | |

| Customer Confirmation 客户确认 | Signature 签名 | Date 日期 |
|----------------------------------|---------------------------|------------|
| | | |
| | Company Name : 公司名称 : | |
| | Company Stamp : 公司印章 : | |

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AMENDMENT RECORDS

(规格变更记录)

| Modification Time | Description | Issued Date | Approved By |
|-------------------|-------------|-------------|-------------|
| 0 | New release | 2017-04-05 | 蔡欣 |
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无效

1. Scope:

适用范围：

围：

This document is made according to customer parameter requirements, and it describes the Product Specification of soft-packed Li-MnO₂ Battery produced by Huizhou Markyn New Energy Co., LTD..

本规格书是惠州基安比新能源有限公司根据客户提供参数要求双方制定的锂锰软包装电池电芯。

2. Description

说明

2.1 Model: CP155050

型号：CP155050

2.2 Assembly method

装配方式

two cells in series.

单电芯内折点焊 1S1P

3. Specification

产品规格：

3.1 Assembled cell parameters

装配后电芯组件参数：

| No. | Item | Spec | Note |
|-----|--------------------------|--------------------------------|---|
| 1 | Model 型号 | CP155050/600mAh | 1S1P |
| 2 | Nominal Voltage 标称电压 | 3.0V | Open circuit voltage range 3.05V and 3.25V. 出货时，电芯开路电压在 3.05 V~3.25V 之间。 |
| 3 | Nominal Capacity 额定容量 | Typ:600mAh@1.0mA Discharge(放电) | Nominal Capacity refers to capacity at 1.0mA discharge to 2.0V cut-off voltage at 25°C ambient. 在25°C，用 1.0 mA 电流放电至 2.0V 的容量。 |

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| | | | |
|----|---|--|--|
| 4 | Max. Discharge Current 最大持续放电电流 | 100 mA | At $25 \pm 2^\circ\text{C}$ if the battery is discharged at the max continuous discharge rate or less, the battery capacity will be at least 50% of the nominal capacity. 在 $25 \pm 2^\circ\text{C}$ 的环境下，电池能够至少放出额定容量的 50% 所能允许的最大连续放电电流值。 |
| 5 | Max. Discharge Pulse Current 最大脉冲放电电流 | 200 mA | At $25 \pm 2^\circ\text{C}$, if pulse discharge duration is limited to 3 Seconds, repeating every 27 seconds, the battery capacity will be at least 50% of the nominal capacity 在 $25 \pm 2^\circ\text{C}$ 的环境下，电池以工作 3S, 静置 27S 的脉冲放电方式能够至少放出额定容量的 50% 所能允许的最大脉冲放电电流值 |
| 6 | Discharge Cut-off Voltage 放电截止电压 | 2.0V | |
| 7 | Operating Temperature 工作温度 | $-20^\circ\text{C} \sim +60^\circ\text{C}$ | Exceeding the operating temperature range could lead to battery operating voltage reduction or even a safety risk. 超过使用温度范围可能导致电池容量减少、工作电压降低甚至有安全隐患。 |
| 8 | Operating Humidity 工作湿度 | 15%RH – 90%RH | |
| 9 | Shipping Temperature 运输温度 | $-25^\circ\text{C} \sim +70^\circ\text{C}$ | Exceeding the shipping temperature range could lead to battery operating voltage reduction or possibly a safety risk. 超过使用温度范围可能导致电池容量减少、工作电压降低甚至有安全隐患。 |
| 10 | Storage temperature 储存温度 | $-5^\circ\text{C} \sim +35^\circ\text{C}$ | The cell voltage shall be $3.05\text{V} \sim 3.25\text{V}$ range 电芯应在 $3.05\text{V} \sim 3.25\text{V}$ 状态下储存。 |
| 11 | Storage life 储存寿命 | 5 years (年) | Relative humidity 相对湿度: 45~75%RH Temperature $-10^\circ\text{C} \sim +40^\circ\text{C}$ |
| 12 | Cell Weight 电芯重量 | Approx: 5.5 g 约: 5.5 g | |

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| | | | |
|----|-------------------------------------|--|---|
| 13 | Self Discharge Rate 年自放电率 | 2% | Self-discharge rate is only guaranteed within recommended storage temp range. 当电池的储存条件不在推荐范围时,电池的自放电率可能加大。 |
| 14 | Pack Dimensions 装配尺寸 | Length : 50.0mm Max Width : 50.0mm Max Thickness : 1.5mm Max | Measured weight of 300gf at 25 °C ± 1 °C. Not including battery drawing line. 测量时测量仪器作用于电池上的压力为 300gf, 温度 25°C±1°C, 不包括电池引线。 |

4. Battery Cell Performance Criteria

电芯性能标准

4.1 Standard testing environment

标准测试环境

Unless specifically stated otherwise, tests must be done within one month of delivery.

Ambient Temperature : 25°C ± 2°C

Ambient Humidity :
45~75%RH

除非另有说明,测试应在电池出货的 1 个月内进行。本产品规格书中的所有测试均在以下环境条件下进行:

温度: 25°C ± 2°C

湿度:
45~75%RH

4.2 The requirement of measure instrument

测量设备要求

- (1) The measurement instrument has been certified by a qualified source.
 - (2) The accuracy of the measuring instrument is less than 0.01mm.
 - (3) The accuracy of voltage measurement is within ±0.5%.
 - (4) Current measurement within ±0.1%, barometric measurement within ±0.5%, time measurement within ±0.1%.
 - (5) Thermometer reading within ±0.5°C.
- (1) 测量设备、仪器需经检定机构检验合格。
 - (2) 测量尺寸的仪器精确度小于 0.01mm。
 - (3) 万用表测量电压及电流的准确度应不低于 0.5%。
 - (4) 电池测试系统的电流精度应在 ±0.1% 以上, 恒压精度 ±0.5%, 计时精度不低于 ±0.1%。
 - (5) 测量温度的仪表准确度应不低于 ±0.5°C。

4.3 Visual inspection

外观检查

A battery must be rejected if it has any visual defects that could affect the electronic characteristics, such as leakage. Also, a battery must be rejected if it has visual defects resulting from damage to the pack.

不允许有影响电芯性能的外观缺陷, 诸如泄漏、损坏等。

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4.4 Mechanical Characteristics 机械特性

| No. 序号 | Item 项目 | Testing Conditions and Method 测试方法及条件 | Standard 标准 |
|--------|-------------------------------|--|--|
| 1 | Vibration Test 振动测试 | After standard charging, the cell is secured to a vibration table and subjected to vibration cycling in which the frequency is varied at the rate of 1Hz per minute between 10Hz and 55Hz; the excursion of the vibration is 0.38mm. The cell shall be vibrated for 30 minutes on each of X, Y, and Z axis. 将标准充电后的电芯固定在振动台上,并沿 X、Y、Z 三个方向各振动 30 分钟,振幅为 0.38mm,振动频率为 10Hz - 55Hz,每分钟变化 1Hz。 | UL1642 No explosion, no fire 无爆炸、无起火 |
| 2 | Drop Test 跌落测试 | A battery is dropped from a height of 1 meter two times onto a concrete surface. 标准充电后,将电芯 2 次从 1 米的高度跌落至混凝土地面。 | UL1642 No explosion, no fire 无爆炸、无起火 |

4.5 Safety Test 安全测试

| No. 序号 | Item 项目 | Testing Conditions and Method 测试方法及条件 | Standard 标准 |
|--------|--|--|--|
| 1 | Short-circuit 短路 | A battery is short-circuited for 1 hour at 0.04Ω. 将标准充电后的电芯,用 0.04Ω 电阻器短接 1h。 | UL1642 No explosion, no fire 无爆炸、无起火 |
| 2 | Heat shock 热冲击 | The cell is placed in a thermal chamber. Temperature is raised to 130±2°C at the rate of (5±2°C)/min and held for 10 minutes, then cooled to room temperature at the rate of 5±2°C/min. 电池置于热箱中,温度以 (5±2°C)/min 的速率升至 130±2°C 并保温 10min,再以 5±2°C/min 的速度降至室温。 | UL1642 No explosion, no fire 无爆炸、无起火 |
| 3 | Humidity and heat test 湿度和热度测试 | A battery is placed in a box for 48 hours where the temperature is 40°C±2°C and the relative humidity is 90%~95% 将电芯放入温度为 40°C±2°C,相对湿度为 90%~95% 的箱子中,保持 48h。 | UL1642 No explosion, no fire 无爆炸、无起火 |

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4.6 High and low temperature test 高低温性能测试

| No. 序号 | Item 项目 | Testing Conditions and Method 测试方法及条件 | Standard 标准 |
|-----------|---------------------------------|--|--|
| 1 | High Temperature 高温性能 | A battery is placed in an oven for 2 hours at $55^{\circ}\text{C}\pm 2^{\circ}\text{C}$, then discharged at a 1mA current to the termination voltage. 在 $55^{\circ}\text{C}\pm 2^{\circ}\text{C}$ 条件下, 将电芯放入高温箱中 2h 后, 再以 1mA 电流放电至终止电压。 | Discharge 90 percent of the original capacity. 可放出初始容量的 90%. |
| 2 | Low Temperature 低温性能 | A battery is placed in a thermal chamber for 2 hours at $-10^{\circ}\text{C}\pm 2^{\circ}\text{C}$; then discharged at 1mA to the termination voltage. 在 $-10^{\circ}\text{C}\pm 2^{\circ}\text{C}$ 条件下, 将标准充电后的电芯放入低温箱中 2h 后, 再以 1mA 电流放电至终止电压。 | Discharge more than 45 percent of the original capacity. 可放出初始容量的 45% (-10°C) 以上. |

5. Storage and others

贮存及其它事项

5.1 Long term Storage

长期贮存

If the cell is to be stored for 3 months or longer it should be held in a dry and cool environment.

Voltage during storage will remain between 3.05 V~3.25V and the storage

conditions should comply with section 3.1.10 and 3.1.11.

长期贮存的电池(超过 3 个月)须置于干燥凉爽处, 储存电压应保持在 3.05V~3.25V, 且储存要求与 3.1.10和3.1.11 条相同。

5.2 Any issues not covered in this specification should be discussed between the customer and GMB.

本说明书中未提及的任何事项, 须经双方协商确定。

6. Repair period 包修期限

The repair period is 6 months from the date that the batteries are shipped out from GMB factory (the printing date on the cell).

产品包修期限为 6 个月, 自出厂日期 (喷码) 开始算起。

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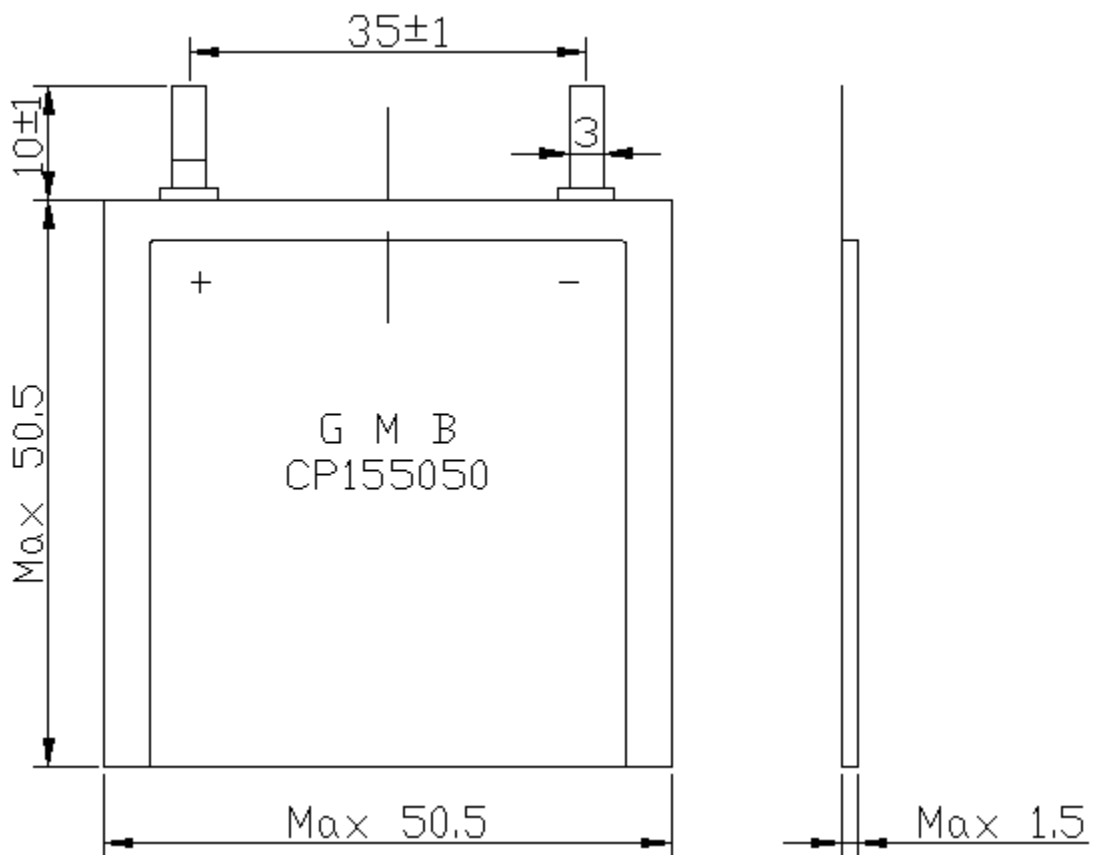
7. Drawing

7.1 Assembly diagram (not to scale)

装配尺寸图(未按比例)

Model : CP155050

Unit : mm



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Handling Precautions and Guidelines

For CP batteries Preface

This document of 'Handling Precautions and Guidelines for CP Batteries' shall be applied to the battery cells manufactured by GMB Energy (Hui zhou) Co., Ltd.

前言

本文件“锂锰软包装电池操作指示及注意事项”仅适用于基安比新能源(惠州)有限公司生产的电芯。

Note (1): The customer is requested to contact GMB in advance if and when the customer needs variations of the operating conditions described in this document. Additional experimentation may be required to verify performance and safety under such conditions.

注(1):

客户若需要变动文件中规定的工作条件,应事先联系基安比新能源。需要额外进行试验以核实电芯在该使用条件下的性能及安全性。

Note (2): GMB will take no responsibility for any accident when the cell is used under conditions outside of this specification.

注(2):

对于在超出文件规定以外的条件下使用电芯而造成的任何意外事故,基安比新能源概不负责。

Note (3): GMB will inform the customer in writing of improvement(s) regarding proper use and handling of the cell if it is deemed necessary.

GMB Energy reserves the right to revise this specification before the customer signs the data sheet. If a revision is required, GMB will notify the customer.

注(3):

如有必要基安比新能源会以书面形式告知客户有关正确使用及操作电芯的改进措施。

在规格书未签确前,本公司有权对本产品规格书进行修订,如有必要修订后,基安比新能源将会通知客户。

1. Discharging Current:

放电电流

The cell shall be discharged at less than the maximum discharge current specified in the Specification Approval Sheet. A high discharging current may reduce the discharge capacity significantly or cause overheating.

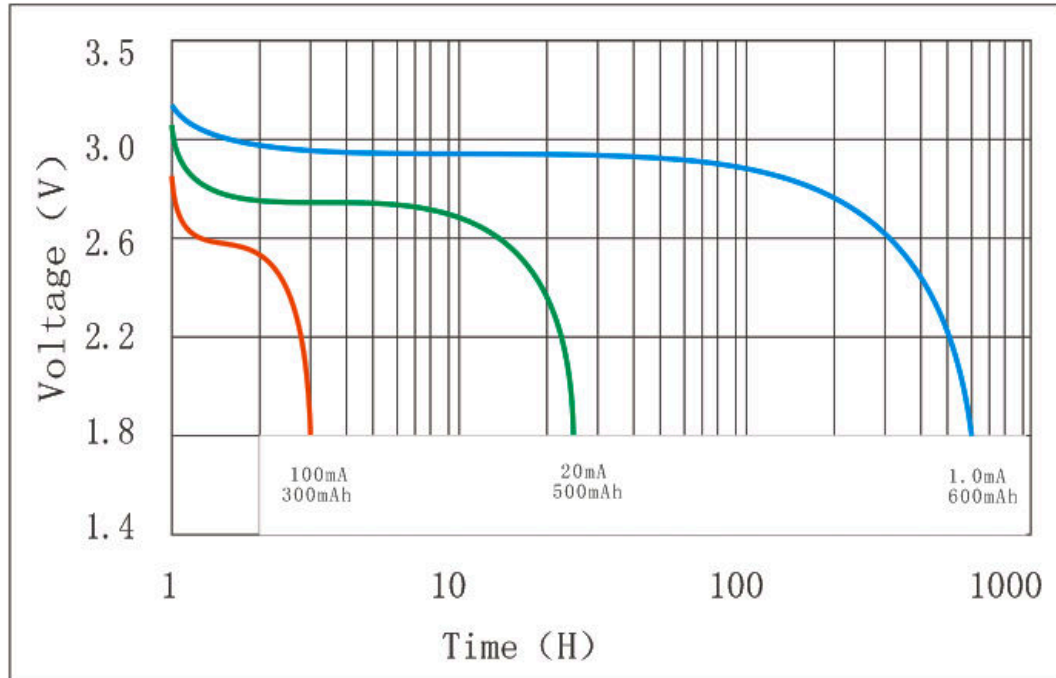
放电电流不得超过本规格书规定的最大放电电流,过大的放电电流会导致电芯容量剧减并导致电芯过热。

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8、 Discharge curve

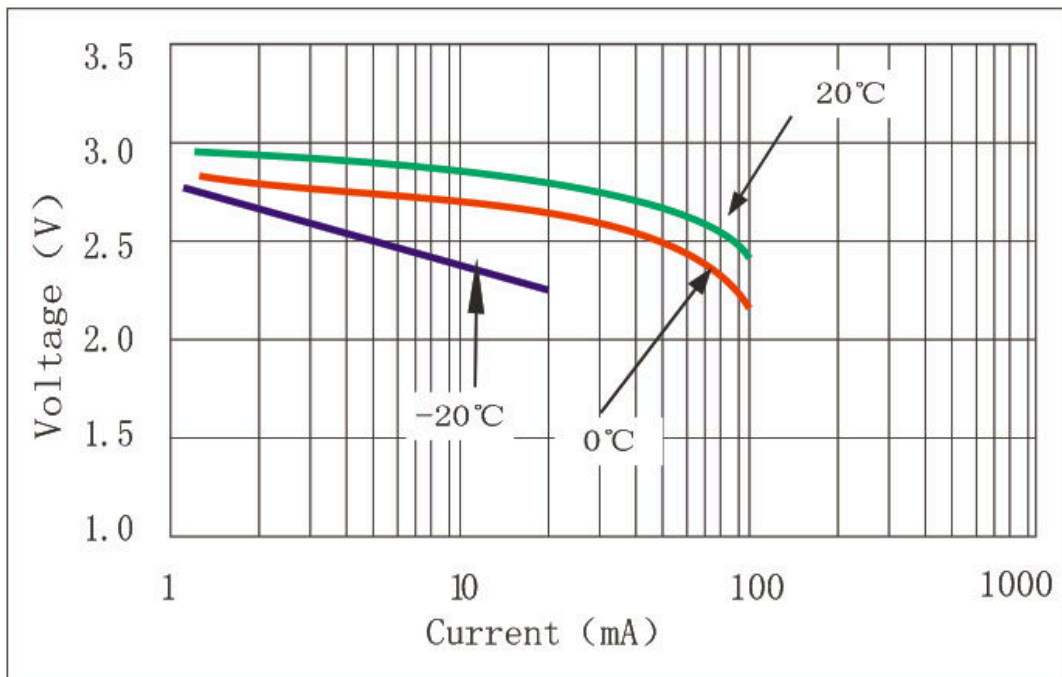
8.1 Different current discharge curve at 23°C

CP155050 电池在 23°C不同电流条件下放电曲线图



8.2 Voltage VS Current & Temperature Curve

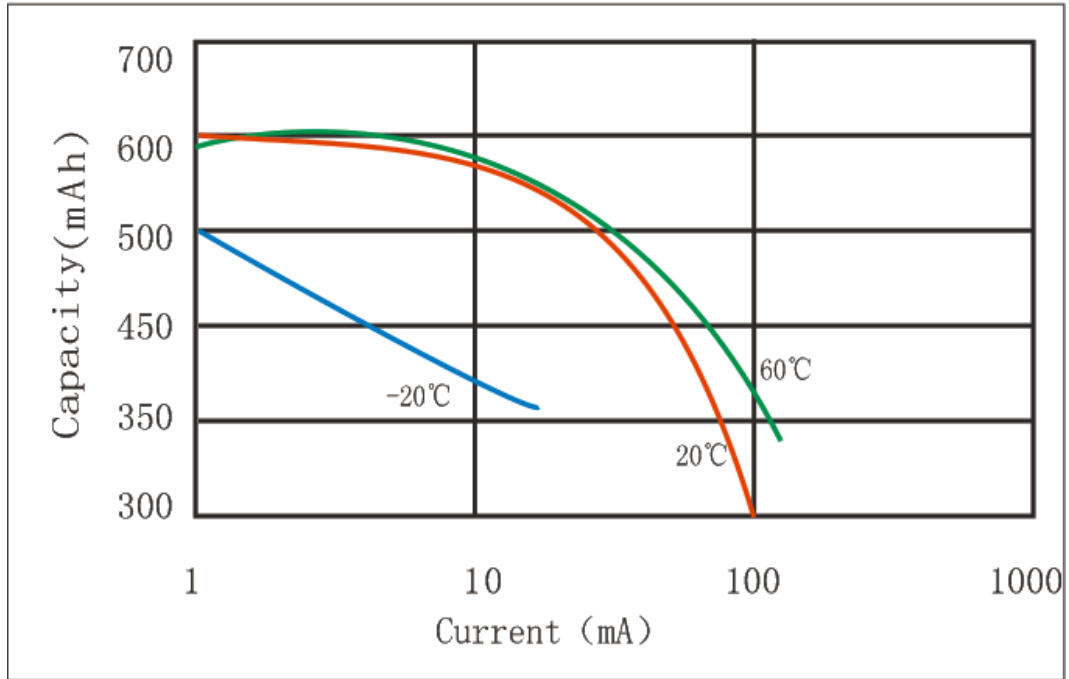
CP155050 电压、电池与温度关系曲线



8.3 Capacity VS Current & Temperature Curve

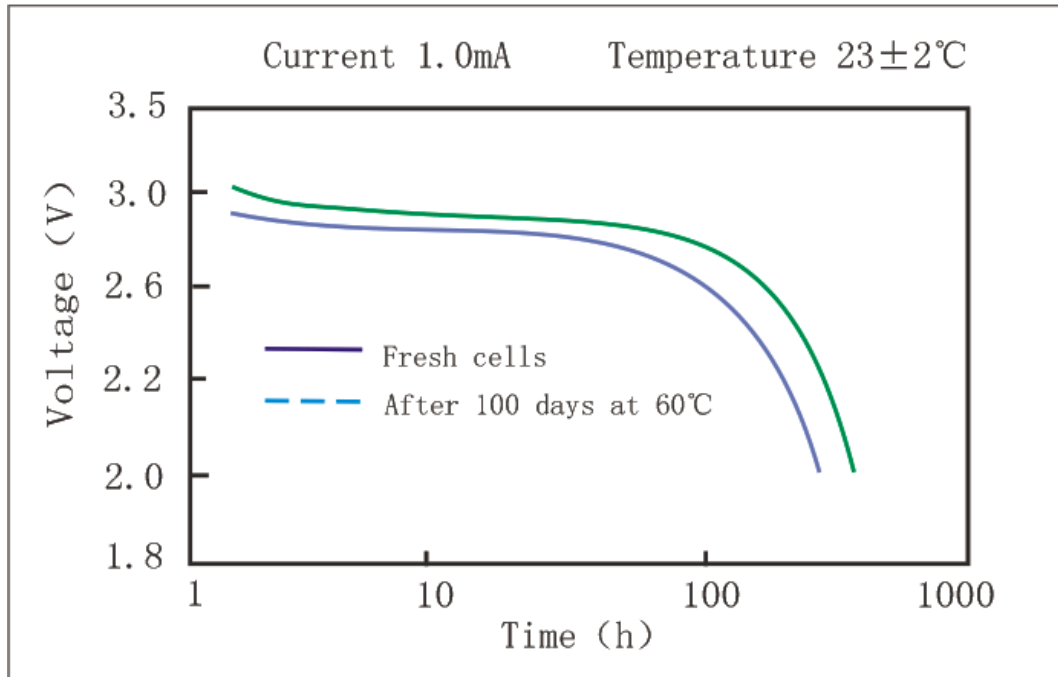
CP155050 容量、电池及温度关系曲线

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8.4 Storage characteristics

CP155050 储存特性



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电芯放电温度必须在本规格书规定的环境温度范围内进行。

3. Over-Discharge

过放电

Over-discharging will cause cell degradation and functional losses. The cell can degrade into an over-discharge state through self-discharging.

过放电会导致电芯性能及功能的丧失，要避免过放电。电芯长期未使用期间，它也可能会因其自放电特性而处于某些过放电状态。应保持其开路电压在 6.20V ~ 6.50V 之间。

4. Storage

贮存

Cells should be stored at the proper temperature that is identified in the Specification Approval Sheet.

电芯应在产品规格书规定的温度范围内储存。

5. Notice

注意事项

5.1 Handling of cells:

- ★ Avoid any short-circuit. It will cause the leads to get hot and lose electronic functions.
- ★ Soft package is easily damaged by sharp objects such as needles and knives. Avoid touching the cells with sharp objects when handling and storing.
- ★ Next to the leads is the sealed edge. Don't bend or fold the sealing edge as it is sensitive to movement.
- ★ Don't open the folded edge on the sides of the cell.
- ★ Don't bend the tabs as the tabs are sensitive.
- ★ Avoid mechanical shock to the cells.
- ★ Don't put the cells into an oven, washing machine or any high-voltage container.
- ★ Adults should supervise the use of batteries by children.
- ★ Before using batteries, please carefully read and understand the handling guidelines.
- ★ Avoid electro-static discharge when using, charging, and storing cells.
- ★ Avoid putting the battery in contact with metal conductors such as neck chains, barrettes, or bolts, etc.
- ★ Don't use metal conductors to connect the positive and negative leads together.
- ★ During assembly, take precautions to prevent contact between the positive lead and the negative lead.

5.1 使用电芯时应注意

- ★ 慎防短路，任何情况引起的短路可能会导致极耳金属发热，使电池功能失效。
- ★ 电芯属于软包装，包装材料易被尖锐物品刺伤，诸如尖针，刀片等，电芯在使用和存放时，应避免与尖锐物品碰撞。
- ★ 电芯极耳引出端为顶封边，顶封边为电芯密封敏感区，使用时，禁止弯折顶封边。
- ★ 禁止打开电芯两侧的折边。

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- ★ 电芯极耳的机械强度并非异常坚固，禁止弯折极耳，特别是铝极耳。
- ★ 禁止机械撞击电芯、坠落、弯折电芯。
- ★ 不要把电池放在加热器皿、洗衣机或高压容器中。
- ★ 不要使用非指定的和没有安全认证的充电器给电池充电。
- ★ 把电池放到小孩够不到的地方以免吞服。
- ★ 儿童使用电池时，监护人应详细解释操作方法。
- ★ 在使用电池之前，应仔细阅读操作指南并对使用中的注意事项有足够深刻的理解。
- ★ 电池应在远离静电的场所进行充电、使用和储存。
- ★ 不要在火源附近或温度超过 60°C 的轿车中使用或遗留电池，也不要这些环境中进行充放电。
- ★ 不要把电池同项链发夹硬币或螺钉等金属品一起放在手提包中，也不要把电池同上述物品一起储存。
- ★ 不要使用金属导体短路电池的正、负极。
- ★ 在使用时应注意电池的正、负极不要反装。
- ★ 不要使用带有严重变形的电池。

5.2 Notice for Designing Battery Pack

电池外壳设计注意事项

5.2.1 Package Design

外壳设计

- ① The battery pack should have sufficient strength and the battery should be protected from mechanical shock.
- ② No sharp objects should be inside the pack containing the battery.
- ① 电池外壳应有足够的机械强度以确保其内部电芯免受机械伤害。
- ② 外壳内安装电芯的部位不应有锋利的边角。

5.3 Notice for Assembling Battery Pack

电池外壳组装注意事项

5.3.1 Tab connection

电芯的连接

- ① Ultrasonic welding or spot welding is recommended to connect the battery with the PCM or other parts.
- ② If the tab is to be soldered to the PCM, the instructions below are very important to ensure battery performance.
 - a) The solder iron should be temperature controlled and ESD safe.
 - b) Soldering temperature should not exceed $350 \pm 10^{\circ}\text{C}$.
 - c) Soldering time should not be longer than 3 seconds.
 - d) Soldering times should not exceed 5 times.
 - e) Let the battery tab cool down before soldering again.
 - f) Direct heat to the cell body is strictly prohibited. The battery will be damaged by heat above approx. 60°C .
- ① 建议使用超声波焊接或点焊技术来连接电芯与保护电路模块或其它部分。
- ② 如使用手工锡焊，须注意以下事项，以保证电芯的功能：
 - a) 烙铁的温度可控且防静电。

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- b) 烙铁的温度不能超过 $350 \pm 10^{\circ}\text{C}$ 。
- c) 锡焊时间不能超过 3 秒；
- d) 锡焊次数不能超过 5 次；
- e) 必须在极耳金属片冷却后再进行二次焊接；
- f) 禁止直接加热电芯，高于 60°C 会导致电芯损坏。

5.3.2 Cell fixing

电芯的安装

- ① The cell should be fixed to the battery pack by its large surface area.
 - ② There should be no sharp edges at the assembly contact area.
 - ③ Cells must be held firmly in the battery pack; movement is not allowed.
 - ④ The total thickness (the cell thickness plus the thickness of auxiliary materials, e.g. sponge pad, insulate pad, tape and so on) can't exceed the interior room of the plastic case, in order to prevent the cell from the damage and safe issue.
- ① 应将电芯的宽面安装在外壳内；
 - ② 装电芯的位置不能有毛刺和尖锐边角；
 - ③ 电芯不能在壳内活动。
 - ④ 电芯的厚度与辅助材料(如：海面垫、绝缘片、胶带等)的总厚度不能大于壳体内部空间尺寸，以免造成对电芯的损坏和安全隐患。

6. Others

其它注意事项

6.1 Disassembly may cause an internal short circuit to the cell, which may cause out-gassing, fire, or other problems.

在任何情况下不得拆卸或解剖电芯，拆卸和解剖可能会引致电芯内部短路，进而引起鼓气、冒烟、起火及其它安全问题。

6.2 LIP battery should not have liquid flowing, but in case the electrolyte come into contact with the skin, or eyes, physicians, we recommend as below:

电芯内容物理论上不存在流动的电解液，但万一电池密封不严或刺伤造成吸潮而泄漏接触到皮肤、眼睛、或身体其它部位，以下是建议预防措施：

- a. The electrolyte touch eyes: Flush the electrolyte immediately with water for 15 minutes and seek medical advice immediately.
- b. The electrolyte touch skin: Flush the electrolyte immediately with water for minimum 15 minutes.
- c. Breath the released gas: Go outside to breath fresh air.
- d. If accidentally digested. Consult physician immediately.

- a. 眼睛触到电芯内容物：立即用清水冲洗至少 15 分钟，如仍有不适，建议到相关医院就诊。
- b. 皮肤接触：立即用大量的清水冲洗。
- c. 吸入排放气体：换场所吸入新鲜空气。
- d. 误食：需马上医疗就诊。

6.3 Prohibition of dumping of cells into fire

Never incinerate or dispose the cells in fire, for these may cause firing of the cells.

严禁将电芯投入火中

6.4 The cells should never be soaked with liquids such as water, drinks or oil.

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严禁将电芯浸入液体中, 如水, 饮料, 汽油等。

6.5 Prohibit using the cells mixed with different manufacturers. Prohibit using new cells mixed with old ones.

禁止和不同厂家的电芯混用, 禁止新旧电芯混用。

6.6 Prohibit using damaged cells.

禁止使用已损坏的电芯。

7. Recommended Notice:

推荐使用事项

7.1 Using cells on specified facilities only.

仅在指定的设备上使用电池。

7.2 Using cells in normal ambient temperature. Temperature: $-10 \sim 35^{\circ}\text{C}$, Relative Humidity : 45~75%.

请在正常的室内环境中使用电池。温度 $-10 \sim 35^{\circ}\text{C}$, 相对湿度 : 45~75%。

7.3 Using the cells, away from heat source. Don't let children play with cells.

在使用过程中, 应远离热源, 避免儿童玩弄电池。切勿摔打电池。

7.4 Avoid the positive pole shorting with the negative one. Avoid moisture.

切勿将电池正、负极短路, 切勿让电池受潮, 以免发生危险。

7.5 Don't drop them into the water or fire.

废弃电池请安全妥当处理, 不要投入火中或水中。