

Product Specification

Li-Ion Battery Pack

3.7V 2600mAh

(Model No.: ICR18650-1S1P)

Specification for approval

制造商确认

Manufacture Signature

GKK	条款 Item	制作 Prepared	审核 Checked	批准 Approved
	签名 Sign	沈阳	黄建福	吴新保
	日期 Date	2021-04-02	2021-04-02	2021-04-02

客户确认

Customer Signature

	部门 Dept			
	签名 Sign			
	日期 Date			

Product Change Resume

产品变更履历

No.	Date of Revised	Revised content	VER.	Revised By
1	2020-09-16	New issue	A0	沈阳
2	2021-04-02	Interchange of the positive and negative poles of the connector	A1	沈阳

1 Scope (适用范围)

This specification is applied to the reference cylindrical Li-ion battery in this Specification.

本说明书适用于本书中所提及的深圳市风云电池有限公司制造的电池。

2 Product Specification (产品技术规格)

Table 1 (表 1)

No. (序号)	Item (项目)	General Parameter (常规参数)		Remark (备注)
1	Rated Capacity (额定容量)	Typical (标称容量)	2600mAh	0.2C discharge after Standard charge (0.2C ₅ A) (标准充电后 0.2C ₅ A 放电)
		Minimum (最小容量)	2550mAh	
2	Nominal Voltage (正常电压)	3.7V		Mean Operation Voltage (即工作电压)
3	Voltage at end of Discharge (放电终止电压)	2.4V		Discharge Cut-off Voltage (放电截止电压)
4	Charging Voltage (充电电压)	4.2V		
5	Internal Impedance (内阻)	<200mΩ		Internal resistance measured at AC 1KHz after 50% charge (半电态下用交流法测量内阻) The measure must uses the new batteries that within one week after shipment and cycles less than 5 times (使用出货后不到一个星期及循 环次数少于 5 次的新电池测量)
6	Standard charge (标准充电)	Constant Current 0.2C ₅ A Constant Voltage 4.2V 0.02 C ₅ A cut-off (持续电流: 0.2C ₅ A 持续电压: 4.2V 截止电流: 0.02 C ₅ A)		Charge time : Approx 6.0h (充电时间: 大约 6.0 个小时)
7	Standard discharge (标准放电)	Constant current 0.2C ₅ A end voltage 2.7V (持续电流: 0.2C ₅ A 截止电压: 2.7V)		
8	Fast charge (快速充电)	Constant Current 0.3C ₅ A Constant Voltage 4.2V 0.02 C ₅ A cut-off (持续电流: 0.3C ₅ A 持续电压: 4.2V 截止电流: 0.02C ₅ A)		Charge time : Approx 4.5h (充电时间: 大约 4.5 个小时)

Continuous the table 1 (续 表 1)

No. (序号)	Item (项目)	General Parameter (常规参数)	Remark (备注)
9	Fast discharge (快速放电)	Constant current 0.5C ₅ A end voltage 2.7V (持续电流: 0.5C ₅ A 截止电压: 2.7V)	
10	Maximum Continuous Charge Current (最大充电持续电流)	0.5C ₅ A	Charge time : Approx 3.0h (充电时间: 大约 3.0 个小时)
11	Maximum Continuous Discharge Current (最大放电持续电流)	1C ₅ A	
12	Operation Temperature Range (工作温度范围)	Charge (充电) : 0~45℃	65±20% R.H. Bare Cell (单体电池储存湿度范围)
		Discharge (放电) : -20~60℃	
13	Storage Temperature Range (储存温度范围)	Less than 1 year: -10~25℃ (小于一年: -10~25℃)	65±20% R.H. at the shipment state (出货状态时的湿度范围)
		less than 3 months: -10~40℃ (小于 3 个月: -10~40℃)	
14	Battery Dimensions (尺寸)	Diameter: Max19.0mm (直径)	Assembling Dimension (组装尺寸)
		Height: Max70.0mm (高度)	
15	Battery pack Weight(重量)	Approx (大概) 50g	

3 Performance And Test Conditions (电池性能及测试条件)

3.1 Standard Test Conditions (标准测试条件)

Test should be conducted with new batteries within one week after shipment from our factory and the battery should not be cycled more than five times before the test. Unless otherwise specified, test and measurement shall be done under temperature of $25 \pm 2^\circ\text{C}$ and relative humidity of 45~85%. 测试必须使用出厂时间不超过一个星期的新电池，且未进行过五次以上的充放电循环。除非特别说明，否则测试会在温度 $25 \pm 2^\circ\text{C}$ ，相对湿度 45~85% 的条件下进行。

3.2 Measuring Instrument or Apparatus (测量器具及设备)

3.2.1 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。

3.2.2 Voltmeter (伏特计)

Standard class specified in the national standard or more sensitive class having inner impedance more than $10\text{k}\Omega/\text{V}$

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 $10\text{k}\Omega/\text{V}$ 。

3.2.3 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 。

3.2.4 Impedance Meter (电阻计)

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

内阻测试仪测量原理应为交流阻抗法 (1KHZ LCR)。

3.3 Standard Charge\Discharge (标准充放电)

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

标准充电：测试过程及标准如下：

$0.2C_5\text{A}$

Charging shall consist of charging at $0.2C_5\text{A}$ constant current rate until the cell reaches 4.2V. The cell shall then be charged at constant voltage of 4.2V while tapering the charge current. Charging shall be terminated when the charging current has tapered to $0.02C_5\text{A}$. Charge time : Approx 6.0h, The cell shall demonstrate no permanent degradation when charged between 0°C and 45°C .

电池先 $0.2C_5\text{A}$ 恒流充至 4.2V，当充电电流逐渐减小时再以 4.2V 恒压充至电流减小到 $0.02C_5\text{A}$ ，充电时间大约为 6.0 个小时。在 0°C - 45°C 内充电电池应没有永久损害。

3.3.2 Standard Discharge (标准放电)

$0.2C_5\text{A}$

Cells shall be discharged at a constant current of $0.2C_5\text{A}$ to 2.7V @ $25 \pm 2^\circ\text{C}$

电池以 $0.2C_5\text{A}$ 恒流放电至 2.7V @ $25 \pm 2^\circ\text{C}$

3.3.3 If no otherwise specified, the rest time between Charge and Discharge amount to 30min.

如果没有特别说明，电池充放电间隔时间为 30 分钟。

3.4 Appearance (外观)

There shall be no such defect as flaw, crack, rust, leakage, which may adversely affect commercial value of battery.

电池外观应没有划伤、破裂、污渍、生锈、漏液等影响市场价值的缺陷存在。

3.5 Initial Performance Test (初始性能测试)

Table 2 (表 2)

Item (项目)	Test Method and Condition (测试方法及条件)	Requirements (要求)
(1) Open-Circuit Voltage (开路电压)	The open-circuit voltage shall be measured within 24 hours after standard charge. (标准充电后 24 小时内测量开路电压)	$\geq 4.1V$
(2) Internal impedance (初始内阻)	Internal resistance measured at AC 1KHz after 50% charge. (半充电状态下, 测量其 AC 1KHz 下的交流阻抗)	$< 200m\Omega$
(3) Minimal Rated Capacity (最小额定容量)	The capacity on 0.2C ₅ A discharge till the voltage tapered to 2.7V shall be measured after rested for 30min then finish standard charge. (标准充电后, 搁置 30min, 测量 0.2C 放电至 2.7V 截止电压所放出的容量)	Discharge Capacity (放电容量) $\geq 2550mAh$

3.6 Temperature Dependence of discharge capacity (放电温度特性)

Battery pack should be charged per 3.3.1 and discharged @0.2C₅A to 2.7V. Except to be discharged at temperatures per Table 3. Battery should be stored for 3 hours at the test temperature prior to discharging and then should be discharged at the test temperature. The capacity of battery at each temperature shall be compared to the capacity achieved at 25 °C and the percentage shall be calculated. Each cell shall meet or exceed the requirements of Table 3.

电池按 3.3.1 规定充电。按表 3 的温度中放电, 电池必须先在该试验温度中放置 3 个小时。在每一个温度中的放电容量应不小于表 3 的要求。

Table 3 (表 3)

Discharge Temperature (放电温度)	-10°C	0°C	25°C	55°C
Discharge Capacity (0.2C ₅ A) (放电容量/0.2C ₅ A)	70%	80%	100%	95%

3.7 Cycle Life and Leakage-Proof（循环寿命及漏液试验）

Table 4（表 4）

No. (序号)	Item (项目)	Criteria (标准)	Test Conditions (测试条件)
1	Cycle Life (循环寿命) (0.2C ₅ A)	Higher than 80% of the Initial Capacities of the Cells (初始容量的 80%)	Carry out 300 cycles Charging/Discharging in the below condition. ◆Charge: Standard Charge, per 3.3.1 ◆Discharge:0.2C ₅ A to 2.7V ◆Rest Time between charge/discharge:30min. ◆Temperature:25±2℃ 循环 300 次 充放电按以下条件: ◆充电: 标准充电, 按 3.3.1 规定 ◆放电:0.2C ₅ A 放至 2.7V ◆搁置:30min. ◆温度:25±2℃
2	Leakage-Proof (漏液试验)	No leakage (visual inspection) (没有漏液/目测)	After full charge with standard charge, store at 60±3℃, 60±10%RH for 1 month. 标准充电条件下充满电后在温度 60±3℃, 湿度 60±10%RH 下储存一个月

4. Mechanical characteristics and Safety Test for single cells（安全测试及机械特性）

Table 5（表 5）

(Mechanical characteristics)

No. (序号)	Items (项目)	Test Method and Condition (测试方法及条件)	Criteria (标准)
1	Vibration Test 振动测试	After standard charging, fixed the cell to vibration table and subjected to vibration cycling that the frequency is to be varied at the rate of 1Hz per minute between 10Hz an 55Hz, the excursion of the vibration is 1.6mm. The cell shall be vibrated for 30 minutes per axis of XYZ axes. 将标准充电后的电芯固定在振动台上, 沿 X、Y、Z 三个方向各振动 30 分钟, 振幅 1.6mm, 振动频率为 10Hz~55Hz, 每分钟变化 1Hz。	No leakage 无泄漏 No fire 不起火
2	Drop Test 跌落测试	The cell is to be dropped from a height of 1 meter twice onto concrete ground. 将标准充电后的电芯从 1 米高度跌落至混凝土地面 2 次	No explosion, No fire, no leakage. 无爆炸、无起火、无泄漏

Table 6 (表 6)

(Safety Test)

No. (序号)	Items (项目)	Test Method (测试方法)	Requirements (要求)
1	Short Circuit (短路试验 25℃)	Each test sample battery, in turn, is to be short-circuited by connecting the (+) and (-) terminals of the battery with a Cu wire having a maximum resistance load of 5Ω for 10min. Tests are to be conducted at room temperature(25±2℃). (在常温下约 25±2℃ 依次把每个样品电池的正负极用铜线连接起来使电池外部短路持续 10 分钟--线路总电阻不超过 5Ω)	No explosion, No fire Temperature of the surface of the Cells are lower than 150℃(无起火无爆炸)
2	Short Circuit (短路试验 60℃)	Each test sample battery, in turn, is to be short-circuited by connecting the (+) and (-) terminals of the battery with a Cu wire having a maximum resistance load of 5Ω for 10min. Tests are to be conducted at room temperature(60±2℃). (在常温下约 60±2℃ 依次把每个样品电池的正负极用铜线连接起来使电池外部短路持续 10 分钟--线路总电阻不超过 5Ω)	No explosion, No fire Temperature of the surface of the Cells are lower than 150℃(无起火无爆炸)
3	Over charge (过充)	Battery charged at 0.5C rate to 4.6V and kept the voltage constant until the current detection to 0.02C cut-off 电芯用 0.5C 电流充电到 4.6V，恒压充到电流降到 0.02C	No explosion, No fire (无起火无爆炸)
4	Over discharge (过放)	Battery Discharge at 1C till the voltage reaches to 0V, at room temperature(25±2℃) 在 25±2℃ 下用 1C 将电池放到 0V	No explosion, No fire (无起火无爆炸)
5	Nail Pricking (针刺试验 3mm)	Prick through the sample battery with a nail having a diameter of 3mm and remain 2h. (用直径为 3mm 的钉子刺穿电池并保持 2 个小时)	No explosion, No fire (无起火无爆炸)

5. Protection circuit module (保护电路)

5.1 PCM Specification (保护板说明)

Item (项目)	Test Condition 测试条件
Over charge protection (过充保护)	The battery should be charged under 4.25V/0.5C. The charging should be shut off when the internal cell voltage becomes more than the specified protection voltage. (电池在不大于 4.25V/0.5C 的情况下充电, 当电池电压高于指定保护电压时, 充电就会停止)
Over discharge Protection (过放电保护)	The battery should be discharged within 0.5C; The discharging should be shut off when the internal cell voltage becomes less than the specified protection voltage. (电池在 0.5C 的电流下放电, 当电池电压低于指定保护电压时, 放电就会停止)
Short protection (短路保护)	After rated charge, (+) and (-) terminals are connected with 10mΩ mental resistor or equivalence. (额定充电后, 用 10mΩ 的电阻器连接电池正负极, 电池符合标准要求)

5.2 PCM Standard (保护板标准)

Symbol (符号)	Name (名称)	MIN. (最小值)	TYP. (典型值)	MAX. (最大值)	Unit (单位)
V _{DET1}	Over-Charge detect voltage for single cell (过充保护电压)	4.23	4.28	4.33	V
V _{DET2}	Over-discharge detect voltage for single cells (过放保护电压)	2.35	2.4	2.45	V
I _{EC}	Excess Current threshold (最大过流值)	3	4	5	A
I _{DD}	Supply current (自耗电流)			8	μA
R _D	Internal resistance in normal operation (导通内阻)			50	mΩ

6. Handling of Cells （电池操作注意事项）

6.1 Prohibition short circuit （禁止电池短路）

Never make short circuit cell. It generates very high current which causes heating of the cells and may cause electrolyte leakage, gassing or explosion that are very dangerous. The Li-Ion cell tabs may be easily short-circuited by putting them on conductive surface. Such outer short circuit may lead to heat generation and damage of the cell. An appropriate circuitry with PCM shall be employed to protect accidental short circuit of the battery pack.

避免电池短路。短路会产生很高的电流而使电池发热以及电解液泄漏，产生有毒气体或爆炸是非常危险的。极片连接在导电物体表面很容易短路，外部短路会导致发热及损害电池。选用一个适当的保护电路可以在意外短路时保护电池。

7. Notice for Designing Battery Pack （电池外壳设计注意事项）

7.1 Pack toughness （外壳坚韧度）

Battery pack should have sufficient strength and the cylindrical Li-Ion cell inside should be protected from mechanical shocks.

电池外壳应该有足够的机械强度使锂离子电池免受机械撞击。

7.2 Cell fixing （电池的固定）

The Li-Ion cell should be fixed to the battery pack by its large surface area. No cell movement in the battery pack should be allowed.

电池最大面积的一面应该固定在外壳上，安装后电池不能有松动。

7.3 Inside design （外壳内部设计）

No sharp edge components should be inside the pack containing the Li-Ion cell.

外壳内安装电池的部位不应有锋锐边。

7.4 Tab connection （极片连接）

Ultrasonic welding or spot welding is recommended for Li-Ion cell tab connection method.

Battery pack should be designed that shear force are not applied to the Li-Ion cell tab.

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 °C;
 - Soldering time should not be longer than 3s;
 - Soldering times 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 °C
- 建议使用超声波或点焊焊接方法；外壳设计应使极片不受外力。

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°C；

- 焊锡时间不能超过 3 秒钟；
- 焊锡次数不能超过 5 次，待极片冷却后才能进行下一次焊锡；
- 严禁直接加热电芯，高于 100℃ 度会损害电芯。

7.5 For mishaps（针对意外事件）

Battery pack should be designed not to generate heat even when leakage occurs due to mishaps.

- 1) Isolate PCM (Protection Circuit Module) from leaked electrolyte as perfectly as possible.
- 2) Avoid narrow spacing between bare circuit patterns with different voltage.
(Including around connector)
- 3) Li-ion battery should not have liquid from electrolyte, but in case If leaked electrolyte touch bare circuit patterns, higher potential terminal material may dissolve and precipitate at the lower potential terminal, and may cause short circuit. The design of the PCM must have this covered.

发生意外时外壳设计应考虑即使在电池出现漏液时也不会发热。

- 1、尽量把保护电路与渗漏的电解液隔离开。
- 2、在不同的电压情况下避免出现小间距的裸露电路——包括插头周围。
- 3、电池不应该有来自电解液的液体，但是一旦发生电解液渗漏触及裸露电路，高电势端接子材料可能会溶解然后沉淀到低电势端接子，可能会造成短路。保护板的设计必须含有覆盖保护层。

8. Charge and Storage （电池的存放）

8.1 Charge 充电

8.1.1 Charge current: 充电电流：

Charge current should be less than maximum charge current specified in the Product Specification. Charge with higher current than recommended value may cause damage to battery electrical, mechanical and safety performance and could lead to heat generation or leakage.

充电电流不得超过本标准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池组的充放电性能、机械性能和安全性能的问题，并可能会导致发热或泄漏

8.1.2 Charge voltage: 充电电压：

Charge shall be done by voltage less than that specified in the Product Specification (4.2V/battery). Charge beyond 4.25V, 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标准书中规定的额定电压（4.2V/电池组）。4.25V 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 charge with higher voltage than maximum voltage may cause damage to the battery electrical, mechanical safety performance and could lead to heat generation or leakage.

当充电电压高于电池组电压额定电压值时，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。

8.1.3 Charge temperature: 充电温度

The battery shall be charged within 0℃~45℃ range in the Product Specification.

电池组必须在 0℃~45℃ 的环境温度范围内进行充电。

8.1.4 Prohibition of reverse charge: 禁止反向充电

Reverse charge is prohibited. The battery shall be connected correctly. The polarity has to be confirmed before wiring. In case of the battery is connected improperly, the battery cannot be charged. Simultaneously, the reverse charge may cause damaging to the battery which may lead to degradation of battery performance and damage the battery safety, and could cause heat generation or leakage.

正确连接电池组的正负极，严禁反向充电。若电池组正负极接反，将无法对电池组进行充电。同时，反向充电会降低电池组的充放电性能、安全性，并会导致发热、泄漏。

8.2 Discharge 放电

8.2.1 Discharge current 放电电流

The battery shall be discharged at less than the maximum discharge current specified in the Product Specification. High discharge current may reduce the discharge capacity significantly or cause over-heat.

放电电流不得超过本标准书规定的最大放电电流，大电流放电会导致电池组容量剧减并导致过热。

8.2.2 Discharge temperature 放电温度

The battery shall be discharged within -20°C ~ 60°C range specified in the Product Specification.

电池组必须在 -20°C ~ 60°C 的环境温度范围内进行放电。

8.2.3 Over-discharge: 过放电

It should be noted that the battery would be at over-discharged state by its self-discharge characteristics in case the battery is not used for long time. In order to prevent over-discharge, the battery shall be charged periodically to maintain between 3.6 and 3.8V.

需要注意的是，在电池组长期未使用期间，它可能会用其它自放电特性而处于某种过放电状态。为防止过放电的发生，电池组应定期充电，将其电压维持在 3.6~3.8V 之间。

Over-discharge may causes loss of battery performance, characteristics, or battery functions.

过放电会导致电池组性能、电池组功能的丧失。

The charger shall be equipped with a device to prevent further discharge 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:

充电器应有装置来防止电池放电至低于本标准书规定的截止电压。此外，充电器还应有装置以防止重复充电，步骤如下：

The battery pack shall start with a low current (0.01C) for 15-30 minutes, i.e.-charge, before rapid charge starts. The rapid charge shall be started after the (individual) cell voltage has been reached above 3.0V within 15-30 minutes that can be determined with the use of an appropriate timer for pre-charge.

电池组在快速充电之前，应先以一小电流（0.01C）预充电 15~30 分钟，以使（每个）电芯的电压达到 3.0V 以上，再进行快速充电。可用一计时器来实现该预充电步骤。

8.3 Prevention of short circuit within a battery pack 电池组短路预防

Enough insulation layers between wiring and the cells shall be used to maintain extra safety protection.

电池组组装和布线时必须用绝缘层隔开确保安全

9. Others (其它)

9.1. Cell connection (电池连接)

1) Direct soldering of wire leads or devices to the cell is strictly prohibited.

2) Lead tabs with pre-soldered wiring shall be spot welded to the cells.

Direct soldering may cause damage of components, such as separator and insulator, by heat generation.

1、严禁直接焊接引线或设备到电池上。

2、极片在焊接引线之前应该先点焊到电池上，直接与电池热焊接，产生的热量会使电池的隔离体及绝缘体受损。

9.2. Prevention of short circuit within a battery pack (电池内部的短路预防)

Enough insulation layers between wiring and the cells shall be used to maintain extra safety protection. The battery pack shall be structured with no short circuit within the battery pack, which may cause generation of smoke or firing.

在电池和引线之间应该有足够的绝缘层用于安全保护。电池的包装构成应没有导致起烟起火的短路情况。

9.3 Prohibition of disassemble (禁止拆卸)

1) Never disassemble the cells.

The disassembling may generate internal short circuit in the cell, which may cause gassing, firing, explosion, or other problems.

2) Electrolyte is harmful.

Li-ion battery should not have liquid from electrolyte flowing, but in case the electrolyte come into contact with the skin, or eyes, physicians shall flush the electrolyte immediately with fresh water and medical advice is to be sought.

1. 不要拆卸电池。

拆卸电池会发生电池内部短路，会引起起火、爆炸、有害气体或者其它问题。

2. 电解液是有害的。

万一电解液沾到皮肤、进入眼睛，应立即用清水冲洗以及求助医生。

9.4 Prohibition of dumping of battery pack into fire (不要把电池倾倒入火中)

Never incinerate nor dispose the battery pack in fire. These may cause explosion of the battery, which is very dangerous and is prohibited.

不要焚毁电池，否则会致电池爆炸，这个很危险，必须禁止。

9.5 Prohibition of battery immersion into liquid such as water (禁止浸泡电池)

The battery shall never be soaked with liquids such as water, seawater, and drinks such as soft drinks, juices, coffee or others.

请不要把电池浸泡在液体当中，像清水、海水，及非酒精饮料、果汁、咖啡或者其它的饮料。

9.6 Battery replacement (更换电池)

The battery replacement shall be done only by either battery supplier or device supplier and never be done by the user.

更换电池应由电池生产商或设备供应商完成，用户不要自行更换。

9.7 Prohibition of use of damaged batteries（禁止使用损坏的电池）

The battery pack might be damaged during shipping by shock. If any abnormal features of the cells are found such as damages in a plastic envelop of the cell, deformation of the cell package, smelling of an electrolyte, an electrolyte leakage and others, the cells shall never be used any more. The battery with a smell of the electrolyte or a leakage shall be placed away from fire to avoid firing or explosion.

电池可能在出货途中碰撞而受损。如果发现电池有异常，例如包装损坏、电池包裹变形，有电解液的味道、发现漏液等等，不要再使用这些电池。电池如果有电解液的味道或者出现漏液，电池放置应该远离火源避免起火及爆炸。

10. Period of Warranty（保质期）

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

电池的保质期从出货之日算起为 1 年。的缺陷是在制造过程中形成的而不是由于用户滥用及错误使用造成，本公司负责退换电池。

11. Other The Chemical Reaction（其它的化学反应）

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.

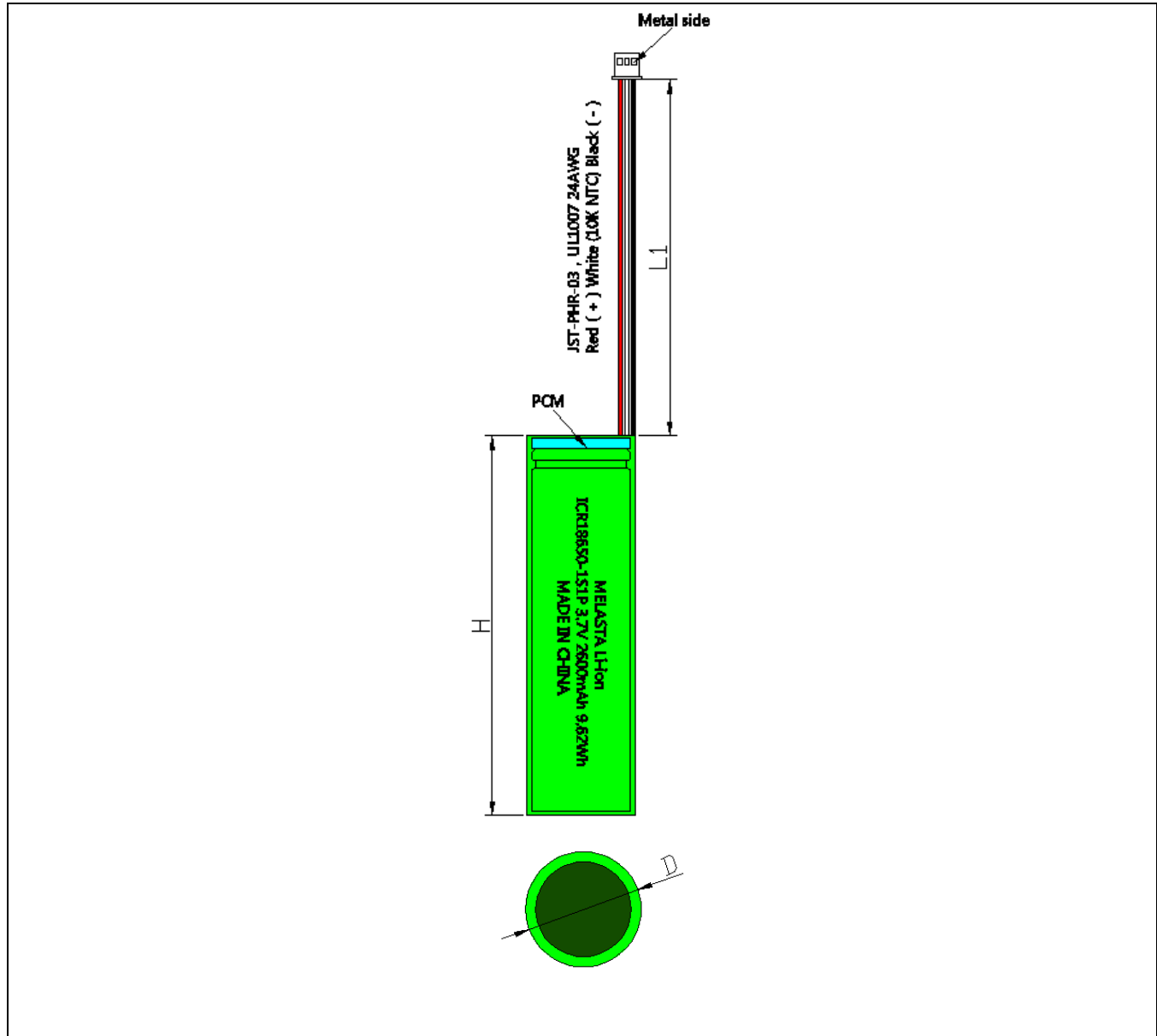
由于电池是利用化学反应的原理，所以随时间的增加电池的性能会降低，即使是存放很长一段时间而不使用。如果使用条件如充电、放电及周围环境温度等情形不在指定的使用范围内，会使缩短电池的使用寿命，或者会产生漏液导致设备损坏。如果电池长周期不能充电，即使充电方法正确，这样需要更换电池了。

12. Note:（注释）

Any other items which are not covered in this specification shall be agreed by customer and manufacturer.

本说明书未包括事项应由双方。

13. Battery Pack Dimensions: （初始尺寸）



D(直径)	MAX19.0mm	Wire	UL1007 24AWG, JST-PHR-03
H(高度)	MAX70.0mm	PVC	Green
L1(线长)	150mm±3mm		
		ICR18650-1S1P 3.7V 2600mAh	
		BATTERY DRAWING	
		Drawing ID（图号）	MB21040201