



ARL9024

Li-ion Polymer Battery Specification

锂离子聚合物电池说明书

MODEL

型号: 103450AY PACK

Capacity

容量: 1800 mAh

Customer

客户: _____

Total Page

文件页数: 13

Registered 编制	Checked 审核	Approved 批准
<input checked="" type="checkbox"/> 其博		
2010-6-8		

Customer Approve 客户确认		
Dept 部门	Signature 签名	Date 日期
QA Dept 品质		
R&D Dept 研发		
Approved 批准		

Content

目录

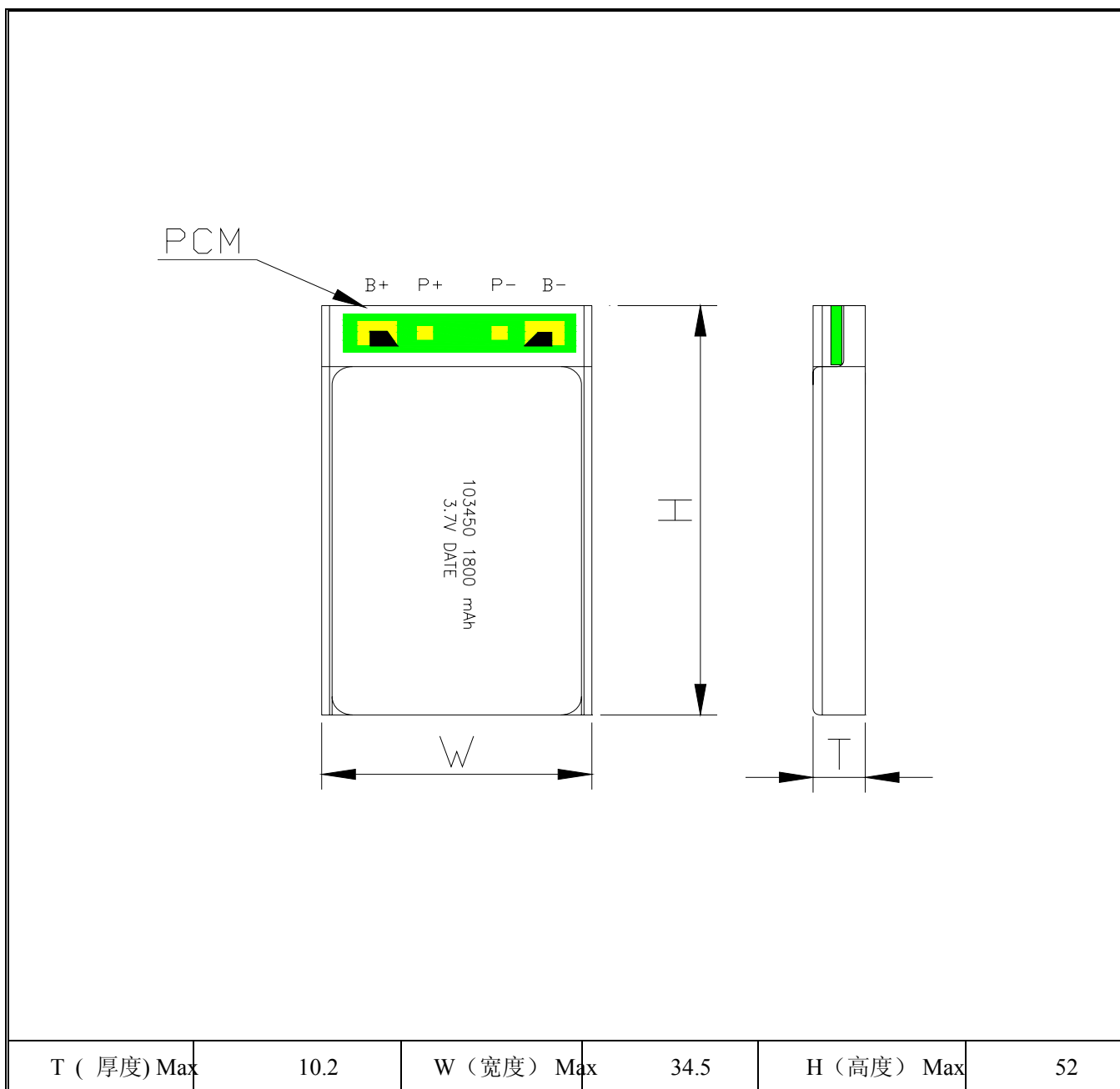
1. MODIFIED LIST 修订履历	3
2. Scope 适用范围	4
3. Initial Dimension 初始尺寸	4
4. Specification 产品规格	5
5 General Performance 常规性能	6
6 Environment Performance 环境性能	6
7 Safe Characteristic 安全性能	7
8. Protection circuit(保护电路)	7
9. Warnings 警告	8
10. Cautions 注意	9
11. Handling of Cells 电池操作注意事项	9
12. Notice for Designing Battery Pack (电池外壳设计注意事项)	11
13. Period of Warranty 保质期	12
14. Others 其它事项	12

2. Scope 适用范围

This specification describes the basic performance, technical requirement, testing method, warning and caution of the Li-ion Polymer rechargeable battery.

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，本标准只适用于曙鹏科技（深圳）有限公司所生产的锂聚合物电池。

3. Initial Dimension 初始尺寸



4.Specification 产品规格

NO.	Item 项目	Specifications 规格要求		
4.1	Min capacity 最小容量	1800mAh 0.2C Discharge (0.2C 放电)		
4.2	Nominal voltage 标称电压	3.7V		
4.3	Charge current 充电电流 S	tandard Charge (标准充电) : 0.5C		
4.4	Standard Charging method 标准充电方法	0.5C CC (constant current) charge to 4.2V, then CV(constant voltage 4.2V) charge till charge current decline to $\leq 0.01C$ 0.5C CC (恒流) 充电至 4.2V, 再 CV (恒压 4.2V) 充电直至充电电流 $\leq 0.01C$		
4.5	Charging time 充电时间	Standard Charging (标准充电) Approx 3hours 大约 3 小时		
4.6	Max. charge current 最大充电电流	Constant Current 1C Constant Voltage 4.2V 0.01C cut-off (持续电流: 1C 持续电压: 4.2V 截止电流: 0.01C)		
4.7	Max. discharge current 最大放电电流	Constant current 0.5C end voltage 3.0V (持续电流: 0.5C 截止电压: 3.0V)		
4.8	Standard Discharge Current 标准放电电流	Constant current 0.2C end voltage 3.0V (持续电流: 0.2C 截止电压: 3.0V)		
4.9	Discharge cut-off voltage 放电截止电压	2.95~3.05V		
4.10	Charge cut-off Voltage 充电截止电压	4.255~4.305V		
4.11	Initial Impedance 初始内阻	$\leq 150m\Omega$		
4.12	Weight 重量 A	pprox(约): 40g		
4.13	Operating temperature 工作温度	Charging(充电): $0^{\circ}C \sim 45^{\circ}C$ Discharging(放电): $-20^{\circ}C \sim 60^{\circ}C$		
4.14	Storage temperature 储存温度	$-20^{\circ}C \sim 60^{\circ}C$	≤ 1 month	Percentage of recoverable capacity no less than 80% of the initial capacities 恢复容量不低于初始容量的 80%
		$-20^{\circ}C \sim 45^{\circ}C$	≤ 3 month	
		$-20^{\circ}C \sim 20^{\circ}C$	≤ 1 year	
4.15	Recoverable capacity 恢复容量	Constant current 0.5C charge to 4.2V, then constant voltage charge to current declines to 0.01C, rest for 10min, constant current 0.5C discharge to 3.0V, rest for 10min. Repeat above steps 3 times, recording the maximum capacity 先用 0.5C 恒流充电至 4.2V, 再恒压 4.2V 充电直至充电电流 $\leq 0.01C$, 搁置 10 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 3 次, 记录容量最大值		
4.16	Storage Humidity 储存湿度	$\leq 75\% RH$		
4.17	Appearance 外观	Without, distortion and leakage (无变形、电解液泄露)		
4.18	Standard environmental condition 标准环境	Temperature(温度) : $23 \pm 5^{\circ}C$ Humidity (湿度) : 45-75%RH Atmospheric Pressure (大气压) : 86-106 Kpa		

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, rest battery for 10 min, then discharging at 0.2C to voltage 3.0V, recording the discharging time. 标准充饱电后,搁置 10 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, rest battery for 10 min, then discharging at 1C to voltage 3.0V, recording the discharging Capacity 标准充饱电后,搁置 10 分钟,然后用 1C 电流放电至 3.0V,记录容量	≥54min
5.3	Cycle Life 循环寿命	Constant current 0.5C charge to 4.2V, then constant voltage charge to current declines to 0.01C, rest 10 min, constant current 0.5C discharge to 3.0V, rest 10min. Repeat above steps till continuously discharging capacity Higher than 80% of the Initial Capacities of the Cells 先用 0.5 C 恒流充电至 4.2V, 再恒压 4.2V 充电直至充电电流≤0.01C, 搁置 10 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%	≥300 times(次)
5.4	Capability of keeping electricity 荷电保持能力	20±5°C, After standard charging, rest the battery 28 days, discharging at 0.2C to voltage 3.0V, recording the discharging time. 在 20±5°C 状态下,标准充饱电后,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, rest the Cells 4h at 60±2°C, then discharging at 1C 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 1C 放电至 3.0V,所记录放电时间.	≥54min
6.2	Discharge at low temperature 低温放电	After standard charging, rest 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	a 标准
7.1	Overcharge testing 过充测试	At 23 ± 5°C, charging cells with constant current 3C to voltage 4.6V, then with constant voltage 4.6V till current decline to 0. Stop test till cells 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, 当电池温度下降一峰值低于 10°C 时, 停止实验.		No smoke or fire 不起火, 不冒烟
7.2	Over discharge testing/ 过放测试	At 23 ± 5°C, According to the requirements of standard charge, the cells 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 30 Ω 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 短路测试	At 23 ± 5°C, After standard charging, connect cells anode and cathode by wire which impedance less than 50m Ω, 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 50m Ω 的导线连接, 放置 6 小时.		No smoke or fire 不起火, 不冒烟

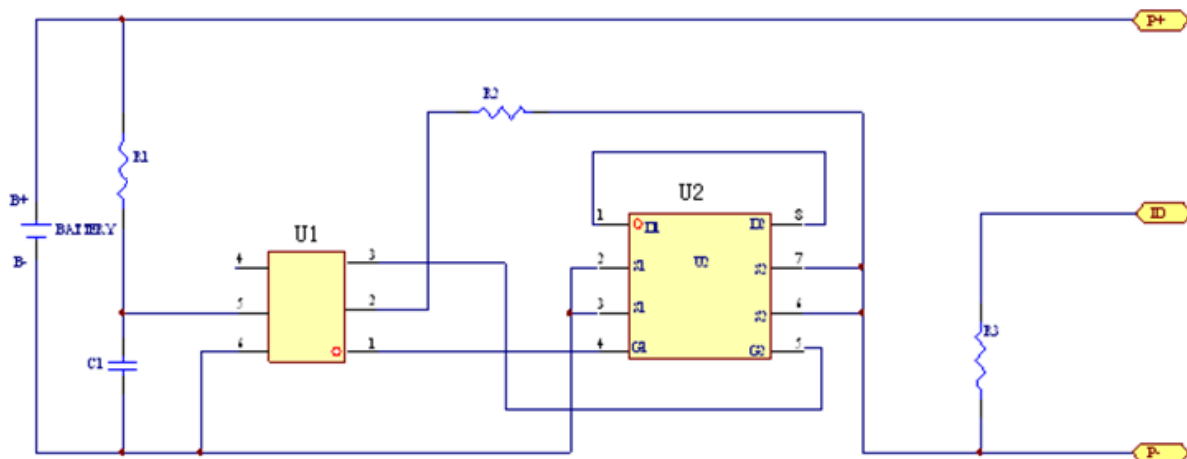
※ Above testing of safe characteristic must be with protective equipment.(安全性能测试应在有保护措施下进行)

8. Protection circuit(保护电路)

1 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)
VDET1	Over-Charge detect voltage (过充电保护电压)	4.255	4.28	4.305	V
VDET2	Over-discharge detect voltage (过放电保护电压)	2.95	3.0	3.05	V
IEC	Excess Current threshold (最大过流值)	1.5		5	A
IDD	Supply current (自耗电流)	-- --		7	μ A
RD	Internal resistance in normal operation (导通内阻)	-- --		65	m Ω
Withstand Voltage	Max12 V				
Resistance to current	Max5 A				

2 Schematic diagram(原理图)



9. Warnings 警告

Pulsed DC load or load may have added to the battery (with PCM) on the protection of voltage and current can not exceed the value of withstand such board itself.

☆ 直流负载或可能产生脉冲的负载加在电池（含 PCM）上的电压和电流不能超过保护板自身耐压耐流值。

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 at 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 battery 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。

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。

10. 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, which will cause 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。

The batteries should be stored at room temperature, charged to about 40% to 60% of capacity. In case of over-discharge, batteries should be charged for one time every 3 months while storing and batteries should be discharge and charge after being stored more than a year in order to activate it and restore energy.

△ 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 个月进行一次充电,如储存时间超过一年,建议每年进行一次充、放电以激活电池。

11. Handling of Cells 电池操作注意事项

11 Soft Aluminium foil (铝箔软包装)

Easily damaged by sharp edge parts such as pins and needles, Ni-tabs, comparing with metal-can-cased LIB.

相对于金属壳的方形电池，铝箔软包装比较容易被锐利部件刺损，如针尖、镍带。

△Don't strike battery with any sharp edge parts 勿用尖锐处撞击电池。

△Trim your nail or wear glove before taking battery 剪掉指甲，或者戴手套。

△Clean worktable to make sure no any sharp particle 清理工作台，避免尖锐零部件。



2 Sealed edge may be damaged by heat above 100°C, bend or fold sealed edge.

封边被加热到 100°C 以上以及弯折封边都容易使封边受损。



3 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 LIP 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。

4 .Mechanical shock (机械撞击)

△LIP cells have less mechanical endurance than metal-can-cased LIB.

△Falling, hitting, bending, etc. may cause degradation of LIP characteristics.

聚合物电池比金属壳方形电池的机械耐久性更小。

跌落、碰撞、弯曲等等都可能会降低聚合物电池的性能。



5 Handling of tabs (极片操作注意事项)

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

Don't bend tab.

Do not bend tabs unnecessarily.

极片的机械强度并非异常坚固，特别是铝片。没有必要时禁止弯折极片。



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

1 Pack toughness (外壳坚韧度)

Battery pack should have sufficient strength and the LIP cell inside should be protected from mechanical shocks.

电池外壳应该有足够的机械强度使聚合物电池免受机械撞击。

2 Cell fixing (电池的固定)

The LIP 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。

3 Inside design (外壳内部设计)

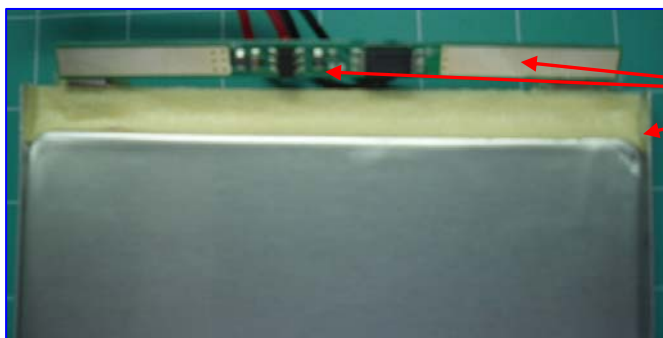
No sharp edge components should be inside the pack containing the LIP cell.

外壳内安装电池的部位不应有锋锐边。

4 Avoid some components to contact the edge of packing foil of batteries

避免其他物质接触电芯包装箔片

Avoiding negative Ni-tabs contacting these two edges, they must be insulated 绝缘保护，避免负极镍片接触到电池两侧边缘。



Avoiding the components of the PCM contacting the packing foil and leading to the battery short circuit 绝缘保护，避免保护板的元器件接触到电池包装膜导致电池短路。

5 Tab connection (极片连接)

Ultrasonic welding or spot welding is recommended for LIP tab connection method.

Battery pack should be designed that shear force are not applied to the LIP 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 370°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：

- 焊接烙铁的温度必须可控且可防静电；
- 焊接时烙铁的温度不能超过 370°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°C 度会损害电芯。



13.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 battery 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。

14. Others 其它事项

1.The customer is request contact 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，应事先联系曙鹏科技，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。

2. We 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，曙鹏科技概不负责。

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

如有必要，曙鹏科技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。

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

任何本说明书中未提及的事项，须经双方协商确定。