

	广东奥克莱集团有限公司 Guangdong Aokly Group Co., LTD	DOC NO	NA ⁺ -PQD-C-0097
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For any details and enquiry, please contact us:

产品规格确认书

Specification Approval Sheet

Customer Name客户代码	
Product Model产品型号	H9-N12430N
Product Code产品编码	PQD-C-0097
Cell Model电芯型号	18650-1100mAh
Voltage 组合电压	12V
Energy 电量	435.6Wh

Prepared by制作	Checked by审核	Approved by批准
吴志聪	王维	舒展鹏

Approved by customer 客户承认 (Stamp) (盖章)	Tested by 测试/日期	Checked by 审核/日期	Approved by 批准/日期

修 订 记 录

Product Modification Record List

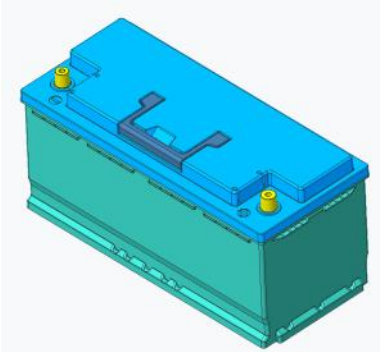
Revision No. 版本号	Description 内容描述	Modify 修改人	Approval 审批人	Date 日期
A/0	First Issue 新版发行			2024-11-04

1. Scope适用范围

This document describes the Product Specification of the S o d i u m -ion rechargeable battery cell supplied by Guangdong Aokly Group Co., Ltd.

本规格说明书描述了广东奥克莱集团有限公司生产的可充电钠离子电池的产品性能指标

2 . Dimensions of battery pack外形尺寸图 (未按比例)



3. Specifications of battery pack: 电池规格

Cell 电芯	Model 规格型号	18650-1.1Ah
	Capacity 容量	1.1Ah
	Rated Voltage 标称电压	3.0V
	Internal Resistance 内阻标准	≤20mΩ
	Combination Standard 配组标准	容差 Capacity Difference≤1%
		内阻 Resistance()=1 ~ 3 mΩ
		荷电保持能力 Current-maintaining Ability≥90%
		电压 Voltage2.5 ~ 2.8V, 压差5mv
Electrical Characteristics 电气性能	Nominal Voltage 额定电压	12V
	Energy 电量	435.6Wh
	Internal Resistance 内阻	≤3mΩ
	Cycle Life 循环寿命	>3000 cycles @1C 70%DOD
	Months Self Discharge 月自放电	<3%
	Efficiency of Discharge 放电效率	96~99% @1C
Standard	Charge Voltage 充电电压	15.8V±0.2V
	Charge Mode 充电制式	1.0C to 15.8V,then 15.8V,charge current to 0.02C(CC/CV)

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Charge 充电 CCA	Charge Current 充电电流	43A
	Cold Cranking Amps CCA	1070
Environmental 环境	Charge Temperature 充电温度	-10 °C to 45 °C (14F to 113F) @60± 25% Relative Humidity
	Discharge Temperature 放电温度	-40 °C to 60 °C (-40F to 140F) @60 ±25% Relative Humidity
	Storage Temperature 储存温度	-10 °C to 40 °C (14F to 104F) @60 ±25% Relative Humidity
	Water Dust Resistance 防水防尘	IP67
Mechanical 机械	Plastic Case 外壳材料	ABS 或70%ABS+30%PC
	Dimensions (mm) 外形尺寸	398x176x188mm±5mm, 左负右正
	Weight(kg) 重量	8.2±0.5kg

4、Test Condition and Measuring Equipment 测试环境和仪器

4.1Test conditions 测试环境

Unless otherwise specified, this specification item test should be performed in the test under the condition of normal atmospheric pressure

除非另有规定，本规范中个项试验应在试验的标准大气压条件下进行：

The temperature 温度：15℃~35℃；

Relative humidity 相对湿度：45%~75%；

Atmospheric pressure 大气压强：86KP~106KP。

4.2Measuring instrument and equipment requirements 测量仪表与设备要求

4.2.1Measure the voltage meter accuracy should be not less than 0.5 on the Richter scale,Ω resistance shall be not less than 10 k/V

测量电压的仪表准确度应不低于 0.5级，内阻应不小于 10KΩ/V。

4.2.2Measure the current meter accuracy shall be not less than 0.5

测量电流的仪表准确度应不低于 0.5级。

4.2.3The instrument accuracy measuring time shall be not less than + / - 0.1%

测量时间的仪表准确度应不低于±0.1%。

4.2.4Measuring temperature meter accuracy shall be not less than plus or minus 0.5 °C

测量温度的仪表准确度应不低于±0.5℃。

4.2.5Adjustable constant current source of constant current, in the process of charging or discharging, the current changes shall be within + / - 1%

恒流源的电流恒定可调，在充电或放电过程中，其电流变化应在±1% 范围内。

4.2.6Constant voltage source voltage is adjustable, and its voltage range is + / - 0.5%

恒压源的电压可调，其电压变化范围为±0.5%。

4.2.7Measuring instrument accuracy is not lower than 0.02 mm size, range of 200 mm


尺寸测量仪的准确度不低于 0.02mm，量程为 200mm。

4.2.8Weighing the quality of the instruments are not less than 0.1 g, weighing 1.5 Kg

称量质量的仪器感量不低于 0.1g，秤量为 1.5Kg。

5、Electrical Characteristic 充放电性能

NO. 序号	Item 检测项目	Test Method 检测方法	Criteria 检验标准
1	Charge Method 充电制式	Standard Charge Method: The charging the Battery at a constant current of 0.5C until the limit voltage , then charged at a constant voltage until its current is less than cut-off current 0.02C, the charging time less than 5h. 标准充电：在环境温度为25℃±5℃的条件下,先以恒定电	


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		流0.5C.充电至限制电压,再恒压充电至电流小于截止电流 0.02C.最长充电时间不大于5小时。	
2	0.2C Discharge Capacity 0.2C放电容量	A battery is charged in accordance with 6.1a, and then stored in an ambient temperature of 20°C±5°C for 0.5h ~ 1h, finally discharged to cut-off voltage at a constant current of 0.2C 电池按6.1规定充电后在环境温度为20°C±5°C的条件下搁置0.5h ~ 1h,而后以0.2C电流放电到终止电压	Discharge time is more than 5h 放电时间≥5h
3	1C Discharge Capacity 1C放电容量	The battery is charged in accordance with 6.1, and then stored in an ambient temperature of 20°C±5°C for 0.5h ~ 1h,finally discharged to cut-off voltage at a constant current of 1C 电池按6.1规定充电后在环境温度20°C±5°C的条件下搁置0.5h ~ 1h,而后以1C电流放电到终止电压	Discharge time is less than 52min 放电时间≤52min
4	Cycle Life 循环寿命	With 1C constant-current charging to Limit voltage, then constant voltage charging to the cut-off current or less, let stand for 30 min, use electricity to the cut-off Voltage,1.0C constant exile let stand for 30 min. Repeat the above steps, record the battery charge and discharge capacity 用1C恒流充电至限制电压, 恒压充电至截止电流 ≤0.05C, 静置30min后, 用1C恒流放电至终止电压, 静置	≥3000 cycles. Retention capacity ≥70% of the initial. 循环寿命不少于3000次,剩余容量

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		5min。重复上述步骤，记录电池充放电容量	≥70%初始容量
5	Storage Characteristics 储存性能	Capacity after 28days storage at 25°C±5°C from standard charge. 标准充电方式充电后，25°C±5°C下储存28天后的容量	Retention Capacity ≥95% 剩余容量≥95%

6、Environmental Characteristic 环境性能


NO. 序号	Item 检测项目	Test Method 检测方法	Criteria 检验标准
1	High temperature performance 高温性能	After standard charge, and stored in an ambient temperature of 55°C±2°C for 2h, then discharged to cut-off voltage at a constant current of 1C. After that, fetch out the battery and place it in the ambient temperature of 25°C±5°C for 2h, then check its appearance 电池按标准充电方式充满电,将电池放入55°C±2°C的高温箱中恒温2h,然后以1C电流放电至终止电压,实验结束后,将电池取出在环境温度为25±5°C的条件下搁置2h,然后目测电池外观.	The discharge time must ≥57min, and the battery must have no distortion, no explosion. 放电时间应不少于57分钟，外观应无变形、无爆裂。
2	Low temperature performance	After standard charge, and stored in an ambient temperature of -20°C±2°C for 8h,then discharged to cut-off voltage at a constant current of 0.2C. After that,fetch out the battery and place it in the ambient temperature of 20°C ±5°C for 2h,then check its	The discharge time must ≥255min, and the battery must have no distortion, no

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	低温性能	appearance. 电池按标准充电方式充满电,将电池放入-20℃±2 °C的低温箱中恒温8h,然后以0.2C电流放电至终止电压,实验结束后,将电池取出在环境温度为20℃±5℃的条件下搁置2h,然后目测电池外观.	explosion. 放电时间应不少于255分钟, 外观应无变形、无爆裂。
3	Ultra-low Temperature Discharge 超低温放电	Under the temperature of 25± 2°C, after charging the cell with standard charge mode, then put the cell into the constant temperature and humidity oven with -40± 2°C for 8h,thendischarge with 0.5C to 1.5V. 在25±2°C条件下, 电芯按标准充电结束后, 将电芯放入-40± 2°C的恒温恒湿箱中恒温8h, 然后以0.5C 电流放电至1.5V。	-40°C Discharge Capacity ≥ 65%Cmin -40°C 放电容量 ≥65%Cmin
4	constant humidity performance 恒定湿热性能	After standard charge, and put the battery in the temperature is 65 degrees Celsius and the humidity is 90% of the constant temperature and humidity box shelved after 48 hours, remove the battery at room temperature for 2h,then discharge at 1C to the cut-off voltage 电池按标准充电方式充满电,将电池放入温度为40±2摄氏度和湿度为90-95%的恒温恒湿箱中搁置48小时后, 将电池取出在常温下搁置2h,然后以1C放电至截止电压	Recovery capacity≥85% 恢复容量≥85%

7、Mechanical Characteristic 机械性能

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NO. 序号	Item 检测项目	Test Method 检测方法	Criteria 检验标准
1	Vibration 振动	<p>After standard charge, 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 ~ 55 Hz, the excursion of the vibration is 1.6mm.</p> <p>The cell shall be vibrated for 30 minutes per axis of XYZ axes.</p> <p>将标准充电后的电池固定在振动台上, 沿X,Y,Z三个方向各振动30分钟, 振幅1.6mm, 振动频率为10Hz ~ 55 Hz, 每分钏变化为1Hz.</p>	<p>The battery shall not rupture, smoke, catch fire, vent or leak and the voltage not be lower than 1.5V</p> <p>电池应无破裂、冒烟、着火、泄漏或漏液, 并且电压不低于1.5V</p>
2	Impacting Testing 撞击	<p>After vibration, the battery will be impacted 1000±10 times(60±20 times per minute)with the acceleration of m/s2 and pulse lasting time 16ms.</p> <p>将振动后的电池以峰值加速度为100m/s2的脉冲撞击1000±10次(平均每分钟60±20次), 脉冲持续时间为16ms。</p>	<p>The battery shall not rupture, smoke, catch fire, vent or leak and the voltage not be lower than 1.5V</p> <p>电池应无破裂、冒烟、着火、泄漏或漏液, 并且电压不低于1.5V</p>
3	Free fall	<p>After Impacting, the battery will be dropped free five times in three mutually perpendicular directions from</p>	<p>The battery shall not rupture, smoke, catch fire, vent or leak and the voltage not be</p>

	自由跌落	the height of 1.0m onto a hard board with the thickness of 20mm. 撞击实验结束后，将电池由高度为1m的位置自由跌落到水泥地面上的20mm厚的硬木板上，比X、Y、Z正负方向（六个方向）每个方向自由跌落1次。	lower than 1.5V 电池应无破裂、冒烟、着火、泄漏或漏液，并且电压不低于1.5V
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8、Safe Characteristic 安全性能

NO. 序号	Item 检测项目	Test Method 检测方法	Criteria 检验标准
1	Abnormal Charging Test 过充测试	After discharge to 2 . 5V cut-off with discharge current 1C , the battery is to be subjected to a charging current 3c The specified charging current is to be obtained by connecting a resistor of the specified size and rating in series with the battery . The test time is to be calculated using the formula: tc = 2 . 5c / 3 (1 c) 将电池1C放电至2.5V后，调节电流3C充电，充电时间按以下公式计算：tc = 2 . 5*电池额定容量 / (3 *制造商给定1 c电流)。	The battery shall not rupture, smoke, catch fire, vent or leak. 电池应无破裂、冒烟、着火、泄漏或漏液。
2	Over discharge testing 过放测试	After standard charge, the battery will be connected with external with a maximum resistance load of 0.10 Ω for 24hrs until it is completely discharged and the battery case temperature has returned to near ambient temperature. 以标准方式充电后,将电池正负端以内阻小于0.1欧姆的铜导线连接24小时,直至电池完全放电,温度下降到环境温度。	The battery shall not rupture, smoke, catch fire, vent or leak. 电池应无破裂、冒烟、着火、泄漏或漏液。

9、Battery Required Protection Functions 电池组保护功能要求

PCM Electrical Characteristics (at 25°C)

No	Item	Condition	Specification	
1	电压 /voltage	电池充电电压/Battery charging voltage	15.8V	3.95V/CELL
2	均衡/ equalization	均衡电压/voltage equalizing	3.8±0.025	
		均衡电流/equalizing current	40mA	
		均衡模式/Blance model	被动/Passive	
		均衡精度/ voltage eaccuracy	≤10mV±2 mV	
3	过充电/ Over charge	保护电压/Detection voltage	3.95V±0.025V	
		恢复电压/ Release voltage	3.85V±0.05V	
		保护延迟时间/ Detection delay time	0.5-1.5S	
4	自耗电/ Normal current consumption	工作状态自耗电/ Normal current consumption of PCM	≤5mA	
5	0V 充电/ 0V charger	是否允许 0V 充电/allowed 0V change	NO	
6	建议工作条件/ Suggest working conditions	建议最大持续放电电流 / max continuous discharge current	60A 持续	
7	内阻/ IR resistance	建议工作温度/ suggest working temperature	-40-70℃	
		PCM 内阻/ IR of PCM	≤10mΩ	
8	PCM 尺寸/ The size of final PCM	长度/ The length of final PCM	60±0.5mm	
		宽度/ The width of final PCM	50±0.5mm	
		厚度/ The thickness of final PCM	10±1mm	

10、Warranty Period & Product Liability 保质期限及产品责任

Guangdong Aokly GroupCo.,Ltd. is not responsible for the troubles caused by mishandling of the battery which is clearly against the instructions in this specification.

广东奥克莱集团有限公司因没有按本规格书规定操作而导致的意外不负责任。

When Guangdong Aokly Group Co., LTD. finds any new facts Natrium onerequire modification of this document, we will inform you again.

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广东奥克莱集团有限公司发现本规格书有新的修改细节，我们将再告知。

11、Safety warning 安全警示

Dangerous 危险

In order to prevent battery leakage, heat, explosion, please observe the following precautions:

为了防止电池泄漏、发热、爆炸，请遵守以下防范事项：

Don't put battery into water or seawater, note moist;

不要将电池浸入水或海水中，注意防潮；

Don't the battery near heat sources, such as fire or heater;

不要将电池接近热源，如火或发热器；

When charging, please use the specific charger;

在充电时，请用特定的充电器；

Don't reverse battery is negative;

不要颠倒电池的正负极；

Do not connect the battery in the power of export;

不要将电池连接在电源的出口；

Do not place the battery in fire or hot items;

不要将电池放置于火里或热的物品上；

Don't across the electrodes of the battery short circuit conductors;

不要将电池的正负极用导体短路；

Don't put the battery and the metal conductor, such as necklace, hairpin, etc connected or stored together;

不要把电池和金属导体，如项链、发夹等一起连接或存储；

Do not knock or throw the battery;

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不要敲打或丢抛电池;

Don't Pierce the battery with pin or other sharp;

不要用针或其他锋利物刺穿电池;

Don't use hammer strike or step on the top;

不要用锤击打或者踩在上面;

Don't direct welding power source;

不要直接焊接电源;

Battery with safety device, in order to guarantee its inherent security features, please don't split the battery or change any part;

电池内有安全装置, 为了保证其固有的安全功能, 请不要将电池分解或改变任何的部分;

Don't charge near the fire or in a hot environment. 不要

在接近火源或在酷热的环境中充电。

Warning 警告

Don't put the battery in a microwave oven or pressure in the closet;

不要将电池放入微波炉或压力柜子里;

Do not put batteries and other chemical battery (such as dry cell) or pooling of different capacity, brand of battery, if the battery scent, fever, discoloration, deformation, or in the use of charge, storage process, any abnormal please immediately from the device or charger, stop using;

不要将电池与其他化学电池 (像干电池) 或不同容量、牌子的电池合用, 若电池发出气味、发热、变色、变形或者在使用充电、存储过程中, 出现任何的不正常请立即从装置或充电器取出, 停止使用

Specify the charging time if can't charge please do not continue to charge;

指定充电时间内若不能再充电请不要继续充电;

Batteries in the children can't touch place, if children ingest batteries, please immediately go to a doctor;

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电池放于小孩子不能触摸的地方，若小孩咽下电池，请立即就医；

If the battery leaks or electrolytic gas emit odor, please away from the fire, otherwise leaked solution catches fire, the battery will be on fire;

若电池泄露或电解放出怪味之气体，请速离火源，否则泄露解质会着火，电池将会着火；

If the battery leaks or electrolytic into eyes, do not rub eyes, after the application of clean water to rinse the eye doctor, otherwise will cause eye diseases.

若电池泄露或电解后进入眼睛，切勿揉眼睛，应用清水冲洗眼睛后就医，否则将致眼疾。

Matters needing attention 注意事项

Don't put the battery in high temperature place (such as direct sunlight or heat the world in the car), otherwise, will overheat and fire performance degradation or shorten the life.

不要将电池放于高温处（如阳光直射或热天下汽车里），否则，会过热着火，性能降低或寿命缩短

Safety device, in order to ensure safety, the battery should be installed in the electrostatic manufacturing when required by the electrostatic when do not use, otherwise, the safety device failure, lead to the battery's cells from overheating, rupture, explosion and fire.

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。

Please in normal use under the following conditions, otherwise it will overheat and catch fire, performance degradation or shorten the life span.

请在下列条件下正常使用，否则会过热，着火，性能降低或缩短寿命。

Environmental conditions 环境条件：

(Temperature温度) charge 充电: 0 ~ + 45°C

discharge 放电: -40 ~ +60°C

Within 30 days of preservation 30 天内保存: -10 ~ +45°C

Within 90 days of preservation 90 天内保存: 0 ~ +30°C

If a child USES batteries, shall designate them according to the instruction manual for use and ensure

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the normal order of the battery at any time must be used.

如果小孩使用电池，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 the battery leaks, electrolytic touch on the skin or clothing, application of water to rinse or use running water to wash clothes, otherwise the skin will be corrosion.

若电池泄露，电解沾于皮肤或衣服上，应用水冲洗掉或用流水洗衣服，否则将会腐蚀皮肤。

In order not to put the wrong battery or spoilage battery, please carefully read the instructions for installation and remove from the device.

为了不装错电池或损耗电池，请认真阅读使用说明书进行安装与拆卸（从装置上）。

If the battery is not long time use, please take the battery out and put in dry place, otherwise will be corrosion ,performance and life.

若是电池不长时间使用，请把电池拿出并放于干燥的地方，否则将会被腐蚀、降低性能和减少寿命。

If the battery terminal, dirty, please clean with dry cloth before use, otherwise will lead to poor contact with equipment, power failure or inadequate charge, must realize the discarded battery can lead to fire, and with a belt tied down to isolate its positive and negative extremely.

若弄脏了电池终端，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，必须意识到丢弃电池会导致着火，用带子绑住以隔离其正负极端。

12、Transport and Store 运输和存储

12.1 Transport 运输

Batteries should be in half charged states (50%-80%) for charging status into boxes for shipping, should avoid violent vibration and impact during the transit or extrusion, prevent from, adapt to sea air transport.

电池应在半荷电状态（50%-80%充电状态）下包装成箱进行运输，在运输过程中应防止剧烈振动、冲击或挤压，防止日晒雨淋，适应于海陆空的交通运输。

12.2 Store 储存

Batteries should be stored at ambient temperature of 5 °C to 35 °C in clean, dry and ventilated indoor, should avoid contact with corrosive substances, stay away from fire and heat source.

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电池应储存在环境温度为-5℃至35℃的清洁、干燥通风的室内，应避免与腐蚀性物质接触，应远离火源及热源。

13、Logo and packaging 标志和包装

13.1 The packing 包装

A) Packing: packing box inside must also be attached product inspection certificate, specification, and certificate of three guarantees.

包装方式：包装盒内还必须附有产品检验合格证、使用说明书、产品三包凭证；

B) Equipped with battery products packing box should be placed in dry, dust-proof, moisture-proof packaging box;

装有电池产品的包装盒应放在干燥、防尘、防潮的包装箱内；

C) Outside should indicate the product name, model, quantity, gross weight, manufacturers and contact address, date of production, should be "handle with care", "keep dry", "up" necessary signs, such as the packing storage icon marking shall comply with the terms of GB191-1990.

包装箱外应标明产品名称、型号、数量、毛重、制造厂商及联络地址、出厂日期，应有“小心轻放”、“怕湿”、“向上”等必要标志，其包装储运图标志应符合 GB191-1990 的规定。

13.2 mark 标志

Each battery shall have the Chinese sign of the following: product name, type and nominal voltage, nominal capacity, the positive and negative polarity, marks and warning specifications, manufacturing date, batch number, manufacturing factory name.

每个电池上应有下列中文标志：产品名称、型号、标称电压、额定容量、正负极性、商标和警示说明、制造日期、批号、制造厂名。