PRODUCT SPECIFICATION

Rechargeable Polymer Lithium Ion Battery

聚合物锂离子电池产品规格书

Battery Model **电池型号**	**10544125SH50-3S1P**

Customer Approval 客户确认

Customer's Name 客户名称	
Signature/Date 客户签名/日期	
Company Stamp 客户印章	

Prepared by 制定	Checked by 审核	Approved by 批准
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诺信电子 NXEELECTRONIC

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History of revision
修改履历表

Rev. 版本	Description 变更描述	Date 日期	Prepared by 制定
1.0	First issue 首次发行	2020-3-12	Jianfang Li 李建方

Contents
目 录

1 Scope 范围

This specification is applied to Nuoxin Lithium Ion Polymer Battery manufactured by Hebi Nuoxin Electronic Co., Ltd.

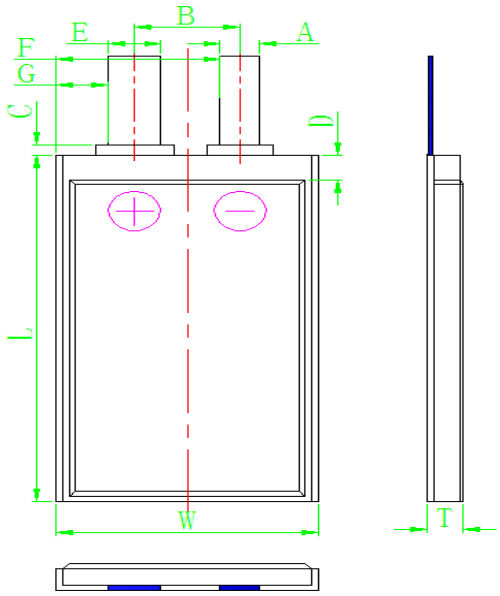
本规格书适用于鹤壁市诺信电子有限公司生产的聚合物锂离子电池。

2 Description and Model 电芯类型与型号

2.1 Cell Description电芯类型: Polymer Lithium Ion Battery 聚合物锂离子电芯

2.2 Cell Model 电芯型号10544125SH50-3S1P

2.3 Cell Outer Dimension 电芯外形尺寸:



unit: mm

Item项目	Description 描述		Dimension 尺寸
T	Cell thickness厚度	Initial 初始状态	≤ 10.8
W	Cell width 宽度		≤ 44
L	Cell length 长度		≤ 128
E	Cell tab width 正极耳宽度		15 ± 0.1
A	Cell tab width 负极耳宽度		15 ± 0.1
B	Cell tab Pitch 极耳中心距		21 ± 1
C	Cell tab glue 极耳胶外露尺寸		0.2 ~ 2.0
D	Cell top sealant length 顶封边宽度		4.0 ± 1
	Cell folded 折边形式		Single side 单折边

3 Cell Ratings 电芯技术参数

Item 项目	Rating 额定参数	Note 备注
3.1 Typical Capacity 典型容量	5350 mAh	5 A(1.0C)discharge, 3.0 V cutoff
Minimum Capacity 最小容量	4880 mAh	5 A(1.0C)恒流放电至 3.0 V
3.2 Nominal Voltage 标称电压	3.7 V	
3.3 Standard Charge Current 标准充电电流	5A(1.0C)	Ambient temperature 环境温度：25±3℃
3.4 Maximum Charge Current 最大充电电流	15A(3C)	Ambient temperature 环境温度：25±3℃
3.5 Charging Voltage 充电截止电压	4.20±0.03 V	
3.6 Charging time（Std. charge current） 充电时间（标准充电电流）	1.0~1.5 hours	
3.7 Charging time（Max. charge current） 充电时间（最大充电电流）	0.2~0.5hours	
3.8 Standard Discharge Current 标准放电电流	5A(1.0C)	Ambient temperature 环境温度：25±3℃
3.9 Maximum Discharge Current 最大放电电流	250A(50C)	Ambient temperature 环境温度：25±3℃
3.10 Discharge Cut-off Voltage 放电截止电压	3.0V	
3.11 Cell Impedance 电芯内阻	≤ 5 mΩ	AC Impedance交流内阻(1KHz)
3.12 Cell Weight 电芯重量	Approx. 124 g	
3.13 Voltage as of shipment 运输电压	3.7 ～ 3.9 V	
3.14 Operating Temperature 工作温度	0~45℃ -20~60℃	Charge 充电 Discharge放电
3.15 Storage Temperature 贮存温度	-20~45℃ -20~35℃ -20~25℃	1 month 1个月 3 month 3个月 1 year 1年

4 Electrical Performance 电性能

4.1 Standard test condition 标准测试条件

4.1.1 Standard environmental test condition 测试标准环境

Test should be conducted with new batteries within one month after shipment from our factory and the cells shall not be cycled more than five times before the test. Test condition shall be at 25±3℃ and 65 ±20%RH.

测试电池必须是本公司出厂时间不超过一个月的新电池，且电池未进行过五次以上充放电循环。除非其它特殊要求，本产品规格书规定的测试条件为：温度 25±3℃，相对湿度65±20%。

4.1.2 Measuring Instrument or Apparatus测试仪器或设备

4.1.2.1 Dimension Measuring Instrument尺寸测量仪器

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

测量尺寸的仪器精度应大于或等于0.01mm。

4.1.2.2 Voltmeter 万用表

Standard class specified in the national standard or more sensitive class having inner impedance more than 10MΩ/V.

万用表测量电压及电流的准确度应不低于0.5级，测量电压时内阻不应小于10MΩ/V。

4.1.2.3 Impedance Meter 内阻测试仪

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)。

4.1.2.4 Battery Test System 电池测试系统

The precision of scale of test system is demanded as follow: 测试系统精度须满足下表要求：

项目名称Item	电压Voltage	电流Current	时间Time
测量公差tolerance	±0.5%	±0.5%	±0.1%

4.1.3 Standard Charge Definition 标准充电定义

Standard charge is defined by charging for 2.5 hours at 4.2V of constant voltage and 5000mA (1.0C) of constant current, 150mA (0.03C) cutoff.

以5000mA(1.0C)恒流充电至4.2V，转4.2V恒压充电，电流截止为150mA(0.03C)，总充电时间不超过2.5小时。

4.1.4 Rest Period 搁置时间

Unless otherwise defined, 10min rest period after full charge, 10min rest period after discharge.

如无其它特殊要求，充放电过程之间的时间间隔为10min。

4.1.5 Standard Discharge Definition标准放电定义

Standard Discharge is defined by discharging at 5000mA (1.0C) down to 3.0V.

5000mA(1.0C)电流恒流放电至3.0V。

4.2 Electrical Performance 电化学性能

No.序号	Item项目	Test Condition测试方法	Criteria标准

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小时内测量电池的开路电压。	≥ 4.15 V
2	Impedance Resistance 内阻(光身电芯)	The Impedance shall be measured in an alternating current method after standard charge. 标准充电后，采用交流法测量电池内阻。	≤ 5 mΩ
3	Initial Capacity(Cini) 初始放电容量	Standard charge, and standard discharge. 标准充电后，标准放电测试电池容量。	≥ 4880 mAh
4	High Rate Discharge Capacity 高倍率放电容量	Standard charge, and discharge at 250A(50C) down to 3.0V cutoff. 标准充电后，以250A(50C) 放电至3.0V测试电池容量。	≥ 80% Cini
5	Cycle Life 循环寿命	Temperature：25±3℃ Charge: CC-CV, 5A(1C),4.2V, 0.03CmA cutoff; Discharge: CC, 50A(10C), 3.3V cutoff; Discharge capacity should be no less than 80% of initial capacity. 测试温度：25±3℃ 5A(1C)充电至4.2V，0.03CmA截止，50A(10C)放电至3.3V截止；放电容量不少于初始容量的80%。	≥200

6	Shelf Life 荷电保持能力	Standard charge and then storage at 25±3℃ for 28 days, standard discharge. 标准充电后，电池在25±3℃环境下储存28 天，然后标准放电。 Then standard charge and standard discharge. 测试完保持容量后，标准充电，然后标准放电。	Keep the capacity 保持容量≥ 80%Cini Recovery capacity 恢复容量≥ 85%Cini
		Standard charge and then storage at 60±2℃ for 7 days, standard discharge. 标准充电后，电池在60±2℃环境下储存7 天，然后标准放电。 Then standard charge and standard discharge. 测试完保持容量后，标准充电，然后标准放电。	Keep the capacity 保持容量≥ 80%Cini Recovery capacity 恢复容量≥ 85%Cini

4.3 Environmental Test 环境测试

No.序号	Item项目	Test Condition测试方法	Criteria标准
1	Vibration Test 振动	After standard charge, cells are to be tested as following conditions: Amplitude:0.8mm, Frequency: 10~55Hz(sweep: 1Hz/min), Direction: X/Y/Z axis for 90~100min. The battery is to be tested in three mutually perpendicular to each axis. 标准充电后, 按下列条件进行试验：振幅：0.8mm；频率：10~55Hz(扫描速度：1Hz/min)；方向：X/Y/Z轴振动 90~100min. 电池在X、Y、Z三个垂直方向进行实验。	No leakage, no explosion, no fire 不漏液、不爆炸、不起火
2	Drop Test 跌落	Drop cells in the shipment condition (50% charge) from 1.0m height onto 5cm or thicker concrete with p-tile on it 3 times each of X, Y, and Z directions at 25±3℃. 将电池在运输条件(50%充电)下从1.0m的高度自由跌落到5cm或更厚的水泥地面上，从X,Y,Z三个方向上每个方向跌落一次，环境温度25±3℃。	No leakage, no explosion, no fire. 不漏液、不爆炸、不起火

4.4 Safety Performance 安全性能

No.序号	Item项目	Test Condition测试方法	Criteria标准
1	Overcharge Test 过充测试	After standard discharge, cells are charged at constant current of 15A(3C) and constant voltage of 4.5V while tapering the charge current. Charging is continued for 48 hours. 标准充电，标准放电后，以恒流15A（3C）充电至4.5V后恒压充电，充电过程持续48小时。	No explosion, no fire. 不爆炸、不起火
2	Heating Test 热冲击	After standard charge, Cells are to be heated in a gravity convection or circulating air oven. The temperature of the oven is to be raised at a rate of 5±2℃/min to a temperature of 130±2℃ at which temperature the oven is to remain for 10 minutes before the test is discontinued. 标准充电后, 电池放置于热箱中，温度以5±2°C/min的速率升至130°C并保温10min。	No explosion, no fire,. 不爆炸、不起火
3	External Short-Circuit Test 外部短路	After standard charge, cells are to be short-circuited by connecting the positive and negative terminals of cells with copper wire having a maximum resistance load of 0.08Ω. 标准充电后, 以铜线将正负极短路（铜线内阻小于0.08Ω）。	No explosion, no fire. 不爆炸、不起火

5 Battery PACK Ratings 电池组技术参数

Item项目		Rating额定参数	Note备注
5.1 Capacity容量	Nominal 典型值	5350 mAh	5 A(1.0C)discharge, 9.0 V cutoff 5 A(1.0C)恒流放电3 9.0 V
	Minimum 最小值	4880 mAh	
5.2 Nominal Voltage 标称电压		11.1V	
5.3 Standard Charge Current 标准充电电流		5A (1.0C)	Ambient temperature 环境温度： 25±3℃
5.4 Maximum Charge Current 最大充电电流		15A (3C)	Ambient temperature 环境温度： 25±3℃
5.5 Charging Voltage 充电截至电压		12.6V	
5.6 Charging time（Std. charge current） 充电时间（标准充电电流）		1.0~1.5 hours	
5.7 Charging time（Max. charge current） 充电时间（最大充电电流）		0.2~0.5hours	
5.8 Standard Discharge Current 标准放电电流		5A (1.0C)	Ambient temperature 环境温度： 25±3℃
5.9 Maximum Discharge Current 最大放电电流		75A (15C)	Ambient temperature 环境温度： 25±3℃
5.10 Discharge Cut-off Voltage 放电截止电压		9.0 V	
5.11 Voltage as of shipment 运输电压		11.1 ~ 12 V	3.7 ~ 3.9 V/cell
5.12 Pack Dimensio 尺寸	Thickness 厚度	35.0 mm	
	Width 宽度	46.5 mm	
	Length 长度	138.0 mm	
5.13 Pack method 组合方式		3S1P	
5.14 Mpedance at 1khz 内阻		≤ 25mΩ	AC Impedance交流内阻(1KHz)
5.15 PACK Weight PACK重量		Approx. 424g	
5.16 Operating Temperature 工作温度		0~45℃	Charge 充电
		-20~60℃	Discharge放电
5.17 Storage Temperature 贮存温度		-20~45℃	1 month 1个月
		-20~35℃	3 month 3个月
		-20~25℃	1 year 1年

6 Storage 贮存

6.1 Ambient temperature 环境温度: 20℃±5℃
Relative Humidity 相对湿度: 65±20%

6.2 Please activate the battery once every 3 months according to the following method: Charge at 1.0C to12.6V, rest 10 min, then discharge with 1.0C to9.0V, rest 10 min, then charge at 1.0C to11.55V.
请每隔3 个月按下面方法激活电池一次: 1.0C充电至12.6V，休息10 分钟，然后用1.0C放电至9.0V，休息10分钟，1.0C充电11.55V。

7 Period of Warranty保质期

The period of warranty is 6 months from the date of shipment. Nuoxin guarantees to give a replacement in case of cells with defects proven due to manufacturing process instead of the customer's abuse and misuse.
电池保质期为出厂后6个月。 我司承诺如果在保质期内由于电池本身的质量问题，本公司将负责进行调换，如果是由于用户误用或进行破坏性测试而产生的问题，恕不负责。

8 Shipment运输

Cells shall be shipped in approximately50% state of charge. Voltage is3.7V/Cell~3.9V/Cell. This measuring test should be performed within one month after shipment from our factory.
电池应在大约50%的充电状态下进行运输。电压测量值为3.7V/电芯~3.9V/电芯，应在出厂后1个月之内测量。

9 Others 其他

Any matters that this specification doesn't cover should be conferred between the customer and Nuoxin Electronic.
其它产品规格书未涉及到的内容可由客户与诺信电子共同商议。

Appendix 附录

Handling Precautions and Guideline
For LIP (Lithium-Ion Polymer) Rechargeable Batteries
聚合物锂离子充电电池操作指示及注意事项

Preface 前言

This document of 'Handling Precautions and Guideline LIP Rechargeable Batteries shall be applied to the battery cells manufactured by Hebi Nuoxin Electronic Technology Co.,Ltd.

“聚合物锂离子充电电芯操作指示及注意事项”仅适用于鹤壁诺信电子有限公司生产的电芯。

Note (1) ：声明一

The customer is requested to contact Nuoxin 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.

客户若需要将电芯用于超出本规格书规定以外的设备，或在本规格书规定以外的使用条件下使用电芯，应事先联系鹤壁市诺信电子有限公司，因为需要进行特定的实验测试以核实电芯在该使用条件下的性能及安全性。

Note (2) ：声明二

Nuoxin will take no responsibility for any accident when the cell is used under other conditions than those described in this Document.

对于在超出本规格书规定以外的条件下使用电芯而造成的任何意外事故，鹤壁市诺信电子有限公司概不负责。

Note (3)：声明三

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

如有必要，诺信电子会以书面形式告知客户有关正确操作使用电芯的改进措施。

1 Charging 充电

1.1 Charging current 充电电流

Charging current should be less than maximum charge current specified in the Product Specification.

Charging with higher current than recommended value may cause damage to cell electrical, mechanical,

and safety performance and could lead to heat generation or leakage.

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

1.2 Charging voltage 充电电压

Charging shall be done by voltage less than that specified in the Product Specification (4.2V/cell). Charging beyond 4.30V, 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规格书规定的额定电压（4.2V/电芯）。4.30V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 charging with higher voltage than maximum voltage may cause damage to the cell electrical, mechanical safety performance and could lead to heat generation or leakage.

电池电压高于额定电压值时，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，可能会导致致发热或泄漏。

1.3 Charging temperature 充电温度

The cell shall be charged within range in the Product Specification.

电池必须在本规格书规定的环境温度范围内进行充电。

1.4 Prohibition of reverse charging 禁止反向充电

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

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

2 Discharging 放电

2.1 Discharging current 放电电流

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

放电电流不得超过本规格书规定的最大放电电流，大电流放电会导致电芯容量剧减并导致过热。

2.2 Discharging temperature 放电温度

The cell shall be discharged within range specified in the Product Specification.

电池必须在本规格书规定的环境温度范围内进行放电。

2.3 Over-discharging 过放电

It should be noted that the cell would be at an over-discharged state by its self-discharge characteristics in case the cell is not used for long time. In order to prevent over-discharging, the cell shall be charged periodically to maintain between 3.7V and3.9V.

需要注意的是，在电池长期未使用期间，它可能会用其自放电特性而处于某种过放电状态。为防止过放电的发生，电池应定期充电，将其电压维持在3.7V至3.9V之间。过放电会导致电芯性能、电池功能的丧失。

The charger shall be equipped with a device to prevent further discharging exceeding a cut-off voltage specified in the Product Specification. Also the charger shall be equipped with a device to control the recharging.

充电器应有装置来防止电池放电至低于本规格书规定的截止电压。此外，充电器还应有装置以防止重复充电。

3 Portection Circuit Module 保护电路模块

The cell/battery pack shall be with a PCM that can protect cell/battery pack properly. PCM shall have functions of (1) overcharging prevention, (2) over-discharging prevention, (3) over current prevention to maintain safety and prevent significant deterioration of cell performance. The over current can occur by external short circuit.

电芯/电池包装应配有PCM 以正确保护电芯/电池。PCM 应具有以下功能以保证安全并防止损坏电池性能：(1) 过充保护功能；（2）过放保护功能；（3）过流保护

3.1 overcharging prohibition: 过充保护电压

Overcharging prohibition function shall stop charging if any one of the cells of the battery pack reaches 4.275±0.02V.

当电池中任一电芯的电压达到4.275±0.02V时，过充电保护功能应立即启动并停止充电。

3.2 over-discharging prohibition: 过放电保护

Over-discharging prevention function shall work to avoid further drop in cell voltage of3.0±0.035V or less per cell in any cell of the battery pack. It is recommended that the dissipation current of PCM Shall beminimized to 0.5uA or less with the over-discharging prevention.The protection function shall monitor each bank of the battery pack and control the current all the time.

当电池中任一电芯的电压降至3.0±0.035V以下时，过放保护功能应起保护作用以避免电芯的深度放电。推荐PCM 的静态电流小于0.5uA，并具有过放保护功能。该保护功能应实时监控所有电池。

3.3 Not Portection Circuit Module无保护模块电池组注意事项

If corporation shipments not Portection Circuit Module, charging need externalprotective device of consumer or use Balance charger, when the battery is being used，the battery should connect external protection device or protect with load.

若我司出货电池无保护电路模块，充电时客户应外接保护装置或者使用平衡充电器充电，放电时客户也应外接保护装置或通过负载进行过放保护

4 Storage 贮存

The cell shall be stored within range environmental condition of specification.

电芯贮存必须是在本规格书规定的环境条件范围内贮存。

5 Handling Instructions 电池的注意事项

Read and observe the following warnings and precautions to ensure correct and Nuoxin use of Li-ion batteries.

认真阅读下面的注意事项，确保正确使用聚合物锂离子电池。诺信电子对违反下述注意事项而产生的任何问题不予负责。

Danger!

危 险!

——Do not immerse the battery in water or allow it to get wet.

——勿将电池投入水中或将其弄湿!

——Do not use or store the battery near sources of heat such as a fire or heater.

——禁止在火源或极热条件下给电池充电！勿在热源（如火或加热器）附近使用或贮存电池！如果电池泄漏或发出异味，应立即将其从接近明火处移开；

——Do not use any chargers other than those recommended by Nuoxin.

——请使用专用充电器!

——Do not reverse the positive(+) and negative(-) terminals.

——勿将正负极接反!

——Do not connect the battery directly to wall outlets or car cigarette-lighter sockets.

——勿将电池直接连接到墙上插座或车载点烟式插座上!

——Do not put the battery into a fire or apply direct heat to it.

——勿将电池投入火中或给电池加热!

——Do not short-circuit the battery by connecting wires or other metal objects to the positive(+) and negative (-) terminals.

——禁止用导线或其它金属物体将电池正负极短路，禁止将电池与项链、发夹或其它金属物体一起运输或贮存!

——Do not pierce the battery casing with a nail or other sharp object, break it open with a hammer, or step on it!

——禁止用钉子或其它尖锐物体刺穿电池壳体，禁止锤击或脚踏电池!

——Do not strike, throw or subject the battery to physical shock.

——禁止撞击、投掷或者使电池受到机械震动!

——Do not directly solder the battery terminals.

——禁止直接焊接电池端子!

——Do not attempt to disassemble or modify the battery in any way.

——禁止以任何方式分解电池!

——Do not place the battery in a microwave oven or pressurized container.

——禁止将电池置入微波炉或压力容器中！

——Do not use the battery in combination with primary batteries(such as dry-cell batteries) or batteries of different capacity, type or brand.

——禁止与一次电池（如干电池）或不同容量、型号、品种电池组合使用！

—— Do not use the battery if it gives off an odor, generates heat, becomes discolored or deformed, or appears abnormal in any way. If the battery is in use or being recharged, remove it from the device or charger immediately and discontinue use.

—— 如果电池发出异味、发热、变形、变色或出现其它任何异常现象时不得使用；如果电池正在使用或充电，应立即从用电器中或充电器上取出并停止使用！

Caution!

注 意!

Do not use or store the battery where is exposed to extremely hot, such as under window of a car in direct sunlight in a hot day. Otherwise, the battery may be overheated. This can also reduce battery performance and/or shorten service life.

不要使用处于极热环境中的电池，如阳光直射或热天的车内。否则，电池会过热，可能着火（点燃），这样就会影响电池的性能、缩短电池的使用寿命。

If the battery leaks and electrolyte gets in your eyes, do not rub them. Instead, rinse them with clean runningwater and immediately seek medical attention. If left as is, electrolyte can cause eye injury.

如果电池漏液后电解液进入眼睛，不要擦，应用水冲洗，立即寻求医疗救助。如不及时处理，眼睛将会受到伤害。

Use the battery only under the specification of cell. Failure to do so can result in reduced performance or a shorten service life.

只能在电芯规定的条件下使用电池，否则将会降低电池的性能或缩短电池的使用寿命。