



Li-ion Battery Specification
锂电池规格书

Specification For Approval

客户承认书

Customer (客户名称): _____

Model number (客户型号): NL1834

Revision (版本): A/1

Date (日期): 2023-03-24

Customer approval(客户承认)

Remarks (备注):

Customer signature/ Date(客户签名/日期): _____

Prepared 制定	Checked 审核	Approved 批准



Sysmax Innovations Co., Ltd.

广州希脉创新科技有限公司

版本: A/0

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修订记录

[illegible]



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锂电池规格书

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1.Scope

This document describes the Product Specification of Li battery supplied by SYSMAX.

适用范围

本规格书描述了广州希脉创新科技有限公司生产的可充电锂离子电池的产品性能指标.

2. 引用标准

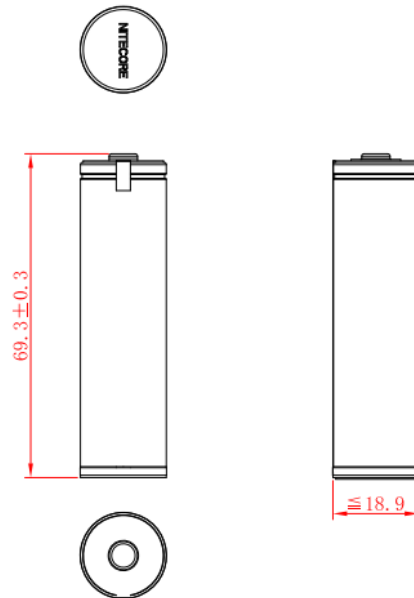
GB/T 18287-2013 中华人民共和国蜂窝电话用锂离子电池总规范。

3.Dimensions of battery pack

电池组尺寸 W: $\leq 18.9\text{mm}$ * L : $69.8 \pm 0.3\text{mm}$

成品代码 8015. 10. 0096

物料编码	物料型号	物料用量
8010. 10. 0054	创明 CMICR18650F9-3350mAh	1pcs
18. 00. 11. 0144	MAS-180-2-3A (防水版) 持续充放电电流3A 正极保护 打三防漆 防水工艺 镍柱配不锈钢	1pcs
8012. 19. 0027	NL1834 思迈18650-3400彩色贴纸	1pcs
8012. 17. 0150	尺寸17*0.2 mm 平板 钢印NITECORE字印开头 , 材质: 不锈钢	1pcs



技术要求:

1. 创明 18650-3350mah电芯;
2. 使用正极3A保护板打三防漆;
3. 用NL1834的贴纸
4. 板正极镍柱使用不锈钢材质, 负极片使用不锈钢

				名称:		业务确认:		
				NL1834散装-1		共	张	第
				成品代码:		版	单	比
				8015. 10. 0096		本	位	例
版本	标记	更改描述	签名	日期	文件编号:	A/0	mm	1:1
设计	魏浪基	日期	2022. 06. 02		TZ-YF-0234			
审核		日期						
核准		日期			关键尺寸 *			

3.1 Label 标贴



4. Battery pack configuration 电池组

4. 1 BOM(Bill of Materials) of battery pack

电池组合主要物料清单

No.	Item 项目	Criteria 标准	Remarks 备注
1	Battery cell model 电芯型号	创明 CMICR18650F9-3350mAh	3350mAh 单节
2	PCM 保护板	MAS-18B-2-3A（防水版）	3.7V
3	/	/	/
4	/	/	/

4. 2 Battery pack specifications

电池组规格

No.	Item 项目	Specifications 产品规格	Comments
1	Assemble way 组装方式	18650-1P1S-3350mAh	
2	Nominal Capacity 标称容量	3350mAh	
	Minimun Capacity 最小容量	3250mAh	
3	Internal resistance 初始内阻	≤ 120mΩ(Added after the board) at 25 °C (加板后) 常温 25℃	
4	Weight 电池重量	Approx: 54 g 约: 54 g	
5	Overcharge protection voltage 过充保护电压	4.30±0.08V	单节
6	Max. charge current 最大充电电流	0.5C	
7	Over discharge protection voltage 过放保护电压	2.50±0.1V	单节
8	Max discharge current 最大放电电流	3A	
9	Charge temperature 充电温度	0℃ ~ +45℃	
10	Discharge temperature 放电温度	-20℃ ~ +50℃	
11	Storage temperature 储存温度	less than 1 month 一个月以内	-20~+50℃
		less than 3 month 三个月以内	-20~+45℃
		less than 1 year 一年以内	-20~+25℃
12	Storage humidity 储存湿度	≤ 75%	



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5. Battery performance test

电性能检查及测试

5.1 Charge and discharge performance 充放电性能

No.	Items 项目	Test ways and conditions 测试方法和条件	Standard 标准
5.1.1	Standard Charge 标准充电	at 23℃ ±2℃, the 0.5C charges, when the battery or battery pack terminal voltage reaches the limit voltage, the constant voltage charging, until the charge current is less than or equal to 0.02ItA, the longest charge time is no more than 2h, stop charging. The charging method for the test of the charging method. 在 23℃ ±2℃ 的环境温度下, 以 0.5C 充电, 当电池或电池组端电压达到充电限制电压时, 改为恒压充电, 直到充电电流小于或等于 0.02ItA, 最长充电时间不大于 2h, 停止充电。此充电制式为试验的仲裁充电方法。	
5.1.2	First Discharge Capacity 放电容量	The battery or battery pack is charged by 5.1.1, and the 1H ~ 0.5h is used to discharge the 1C current at the ambient temperature at 23℃ ±2℃. The above test can be repeated 5 times. 电池或电池组按 5.1.1 规定充电, 搁置 0.5h~1h, 在 23℃ ±2℃ 的环境温度下以 1C 电流放电到终止电压。上述试验可以重复循环 5 次。	When there is a battery discharge capacity to meet the discharge time is not less than 1h. 当有一次电池组放电容量符合放电时间不低于 1h。
5.1.3	Cycle Life 循环寿命	The test should be carried out in the ambient temperature at 23℃ ±2℃, and the test process, every 50 cycles to do a capacity check, battery or battery life to 50 times, said the steps in table 1. Repeat 1 to 50 cycles, the charge and discharge between 1H ~ 2.5h, until either fiftieth cycles of discharge time is less than 2.5h, according to the provisions of the fiftieth cycle of a cycle, if the discharge time is still less than 2.5h, then that the life termination 试验应在 23℃ ±2℃ 的环境温度下进行, 试验过程中, 每 50 次循环做一次容量检查, 电池或电池组寿命以 50 的倍数表示, 步骤按表 1 进行。 重复进行 1~50 次循环, 充放电之间搁置 0.5h~1h, 直至任一个第 50 次循环放电时间低于 2.5h 时, 按照第 50 次循环的规定再进行一次循环, 如果放电时间仍然低于 2.5h 时, 则认为寿命终止	300 周 (cycle) ≥70%初始容量
5.1.4	Electrical load maintenance ability 荷电保持能力	1, the battery or battery pack according to the 5.1.1 charging, at 20℃ ±5℃, the battery or battery pack open circuit on the 28d, the 1C current at 23℃ ±2℃ 2, and then charged by 5.1.1, then the 0.2ItA discharge to the termination voltage at 23℃ ±2℃ 1、电池或电池组按 5.1.1 规定充电, 在 20℃ ±5℃ 的环境温度下, 将电池或电池组开路搁置 28d 后, 在 23℃ ±2℃ 的环境温度下以 1C 电流进行放电至终止电压。	1, discharge time should be no less than 1h; 2, the discharge time of the charge after the discharge of the discharge time should be no less than 1h.



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		2、然后按 5.1.1 规定充电后，再在 $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 的环境温度下以 1C 放电至终止电压。	1、放电时间应不低于 1h; 2、充电后再次放电的放电时间应不低于 1h。
5.1.5	Initial internal resistance 电池初始内阻	Internal resistance measured at AC 1KHz after 50% charge , at 25°C . 在 25°C 环境中，半充状态下，测量其 AC 1KHz 下的交流阻抗	$\leq 120\text{m}\Omega$
5.1.6	Temperature Characteristics 温度特性	1. According to item 5.1.1, at $25 \pm 5^{\circ}\text{C}$. 2. Capacity comparison at each temperature, measured with constant discharge current 1C with 3.0V cut-off. Percentage as an index of the capacity compared with 100% at 25°C 1. 在 $25 \pm 5^{\circ}\text{C}$ 条件下，用 5.1.1 方法将电池充电。 2. 在不同温度条件下，用 1C 的电流恒流放电至截止电压 3.0V。以 25°C 时放电容量为基准计算百分比。	$-10^{\circ}\text{C}: \geq 50\%$ $25^{\circ}\text{C}: 100\%$ $40^{\circ}\text{C}: \geq 80\%$
5.1.7	Constant humidity and temperature 恒定湿热	After standard charging, laying the battery 48h at $40 \pm 2^{\circ}\text{C}$, RH $93 \pm 2\%$. Recording 0.2ItA discharging time 电池标准充电后在 $40 \pm 2^{\circ}\text{C}$ ，相对湿度 $93 \pm 2\%$ 环境中放置 48h，用 1C 放电至截止电压 3.00V，记录电池放电时间	No distortion No electrolytes leakage 不变形、不漏液， 放电时间 $\geq 1\text{h}$



5.2 Mechanical characteristics

机械特性

No.	Items 项目	Test Method and Condition 测试方法和条件	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 and 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 1.6 mm, 振动频率为 10Hz~55Hz, 每分钟变化为 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 meter twice onto concrete ground. 将标准充电后的电池从 1 米高度跌落至混凝土地面 2 次	No fire, no leakage. 无起火、无泄漏

5.3 Visual inspection

There shall be no such defect as scratch, flaw, crack, and leakage, which may adversely affect commercial value of the cell.

外观检查

不允许有任何影响电池性能的外观缺陷, 诸如裂纹、裂缝、泄漏等。

5.4 Standard test condition

Unless otherwise specified, all tests stated in this Product Specification are conducted at below condition:

Temperature: 25.0±5.0℃

Humidity: ≤75.0%RH

标准测试环境

除非特别说明, 本标准书中所有测试均在以下环境条件下进行:

温度: 25.0±5.0℃

湿度: ≤75.0%RH

6. PM parameter PCM 参数



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6.1 PCM 参数

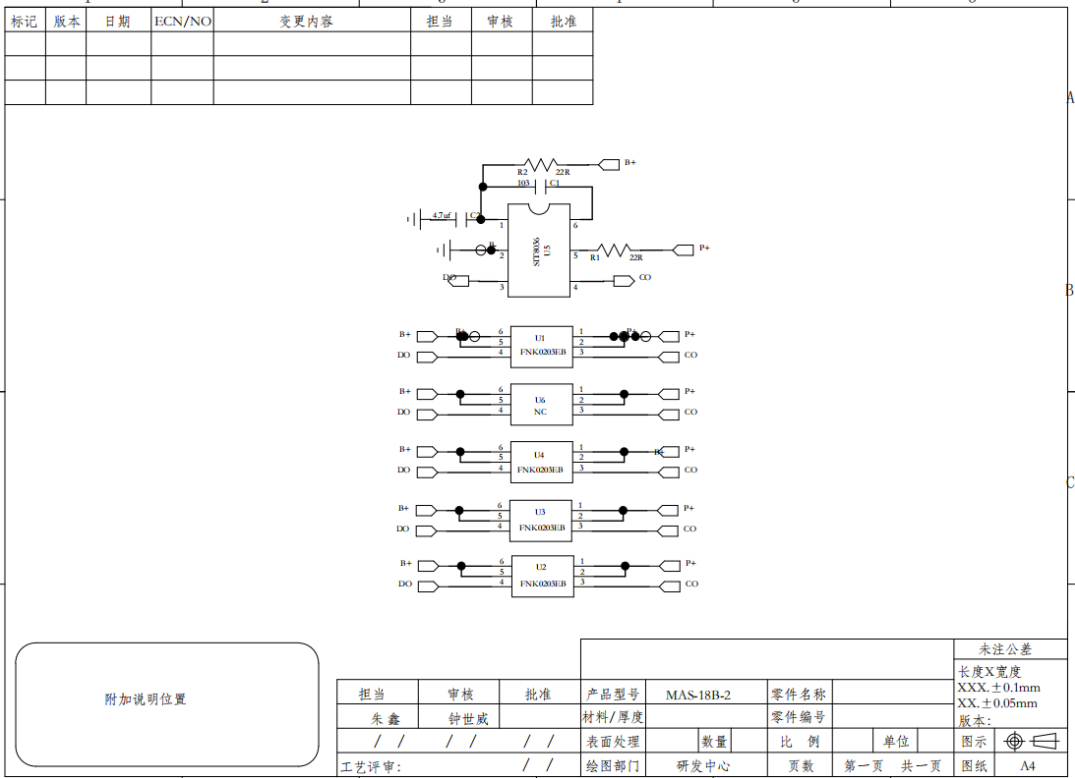
No	Item	Condition	Specification
1	输入电压/input Voltage	B+/B-间输入电压/input Voltage B+ to B-	-8~+8V
2	过充电 Overcharge	保护电压/Detection voltage	4.3±0.08V
3		恢复电压/ Release voltage	4.1±0.1V
4		保护延迟时间/ Detection delay time	50~100mS
5	过放电 Over discharge	保护电压/Detection voltage	2.50±0.10V
6		恢复电压/ Release voltage	2.9±0.05V
7		保护延迟时间/ Detection delay time	40~80mS
8	放电过流 Over discharge current	放电过流保护电流/Over current	3~15A
9		放电过流保护延时/delay time	<20ms
10	短路保护	短路保护延时/ Short detection delay time	200us
11		恢复条件/Release Conditions	断开负载/Cut off load
12	自耗电 Normal current consumption	工作状态自耗电 Normal current consumption of PCM	Max 100.0uA
13	0V 充电/0V charger	是否允许 0V 充电/allowed 0V change	YES
14	建议工作条件 Suggest working conditions	建议最大持续充/放电电流 max continuous charge/discharge current	3A
15		建议工作温度/suggest working temperature	-20℃~60℃
16	内阻/IR resistance	PCM 内阻/ IR of PCM	≤100mΩ
17	PCM 尺寸 The size of final PCM	长度/ The length of final PCB	18.2±0.15 mm
		宽度/ The width of final PCB	16.9±0.15 mm
18		厚度/ The thickness of final PCM	MAX:3.20±0.3mm
19	外观 Appearance	1) 没有元器件的破损/Nothing part deflection 2) 所有焊点良好/The status of solder is all right 3) PCM 没有翘曲/ PCM will not crook	
20	可靠性测试 Reliability test	1) ESD 测试: 接触 4KV 空气 8KV / ESD test : connect 4KV Air 8KV	



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6.2 Application Schematic

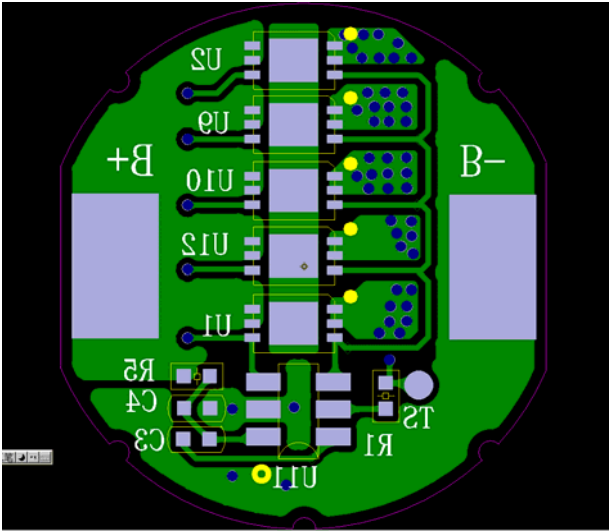
电气原理图



6.3 PCB Dimensions

外形尺寸及 PCB 板图纸

6.4 PCB 贴片图/SMT drawing





7. Packaging、 Storage and Transportation 包装、储存及运输

7.1 Packaging model

7.2 Storage 储存:

7.2.1 The Li-ion battery pack should be stored in a cool, dry and well-ventilated area, and should be far from the fire and the high temperature.

锂离子电池需保存在阴凉, 干燥, 通风的环境中, 避免接触火源与热源。

7.2.2 The battery should store in the product specification book stipulation temperature range, the best storage temp. is $25\pm 5^{\circ}\text{C}$. The best humidity is $60\pm 15\%$.

电池需按规格书规定温度范围进行储存, 最佳储存温度为 $25\pm 5^{\circ}\text{C}$, 最佳湿度为 $60\pm 15\%$ 。

7.2.3 The battery should be stored within room temperature, and charged to 40%~60% electric quantity(3.85V). In order to avoid over-discharge, we suggest charge and discharge the batteries every three months.,Then charge to 40%~60%electric quantity(3.85V).

电池应当在室温下存放, 应充到 40%至 60%的电量(3.85V)。为防止电池过放, 建议每 3 个月按标准充放电方式进行一次充电,然后按标准充电方式进行充电至 40%~60%的电量 (3.85V)。

7.3 Transportation 运输:

7.3.1 Do not mix the battery products with other car gos.

请勿与其他货物混合。

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

请勿将电池浸入水中或使其受潮。

7.3.3 Do not over 7 layers staking and upside-down.

请勿叠放超过 7 层或倒置。

7.3.4 The highest temperature in transportation is lower than 65°C .

最高运输温度不超过 65°C 。

8. Use Attentions 使用注意事项:

To ensure proper use of the battery please read the manual carefully before using it.

为确保电池正确使用, 请在使用之前阅读使用说明书。

8.1 Warnings 警告:

8.1.1 Do not expose to, dispose of the battery in fire.

不可将电池置于火中。

8.1.2 Do not put the battery in a charger or equipment with wrong terminals connected.

不可将电池充电器正负极反接。

8.1.3 Avoid shorting the battery.

不可将电池短路(P+、P-)。

8.1.4 Avoid excessive physical shock or vibration.

避免电池过度冲击和震荡。

8.1.5 Do not disassemble or deform the battery.

不可拆解或扭曲电池。

8.1.6 Do not immerse in water.

不可浸入水中。

8.1.7 Do not use the battery mixed with other different type or model batteries.

不可将该电池与其他种类和型号的电池混用。



8.1.8 Keep out of the reach of children.

请置于儿童接触不到的地方。

8.2 Charge 充电:

8.2.1 Battery must be charged in appropriate charger only.

请使用合适的充电器对电池充电。

8.2.2 Never use a modified or damaged charger.

请勿用返修或损坏过的充电器充电。

8.2.3 Do not leave battery in charger over 24 hours.

请勿对电池充电 24H 以上。

8.2.4 Charging current: Can not surpass the biggest charging current which in this specification book stipulated.

不可使用超出本规格书最大充电电流对电池进行充电。

8.2.5 Charging voltage: Does not have to surpass the highest amount which in this specification book stipulated to decide the voltage.

充电电压: 请不要超出本规格书所规定最高充电电压。

8.2.6 Charge temperature: The battery must carry on the charge in the ambient temperature scope which this specification book stipulated.

充电温度: 电池需在指定温度范围内进行充放电。

8.2.7 Uses constant current and constant voltage way charge. PLS connect the positive and negative terminals in right way, or the battery may be damaged.

请使用恒流恒压方式进行充电。请勿反接正负极, 以免损坏电池。

8.3 Discharge 放电:

8.3.1 The discharging current should not surpass the biggest discharging current this specification book stipulation, The large discharge current can cause heat and lower capacity.

放电电流不可超过规格书最大额定放电电流。大电流会导致电池发热和容量降低。

8.3.2 Discharge temperature: The battery discharge must carry on in the ambient temperature scope which this specification book stipulated.

放电温度: 电池必须在规格书规定温度范围内放电。

8.3.3 Over-discharge: After short time over discharge, then charge immediately won't damage the battery. But the battery will be damaged for being long time over discharged. During long-term storage, the battery may be within over-discharging condition for self discharge. To prevent the occurrence of over discharging, the battery should maintain the certain capacity when storage.

过放电: 电池瞬间过放然后立即充电不会损坏电池。但是如果长时间过放, 电池将会被损坏。在长期储存中, 可能由于电池自放电而导致电池处于过放状态。因此为避免电池过放, 必须带电储存。

8.4 Handling of Cells 电池操作注意事项

1 Soft Al foil (铝箔软包装)

●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 Handling of Tabs (极耳操作注意事项)



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

Do not bend tabs unnecessarily.

极耳的机械强度并非异常坚固，特别是铝极耳。没有必要时禁止弯折极耳。

4 Tab Connection（极耳连接）

Ultrasonic welding or spot welding is recommended for LIP • 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℃；
- 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。

8.5 Disposal 处理措施：

Regulations vary for different countries. Dispose of in accordance with local regulations.

不同国家有不同规定。 请按当地规定进行处理。

8.6 Note:

Any other items which are not covered in this specification shall be agreed by both parties.

规格书所未包含的其它条款由双方协议解决。