

Li-ion Polymer Battery Specification

锂离子聚合物电池规格书

Pack Type	
组合类型:	单体电芯
Cell Model	
电芯型号:	9860110
Cell Capacity (mAh)	
电芯容量(mAh):	10000
Customer Code	
客户代码:	HN
Total Page	
文件页数:	11

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Customer Approve 客户确认		
Dept. 部门	Signature 签名	Date 日期
QA Dept 品质		
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Approved 批准		

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1. MODIFIED LIST

修订履历

Product Modified Record List

产品变更履历表

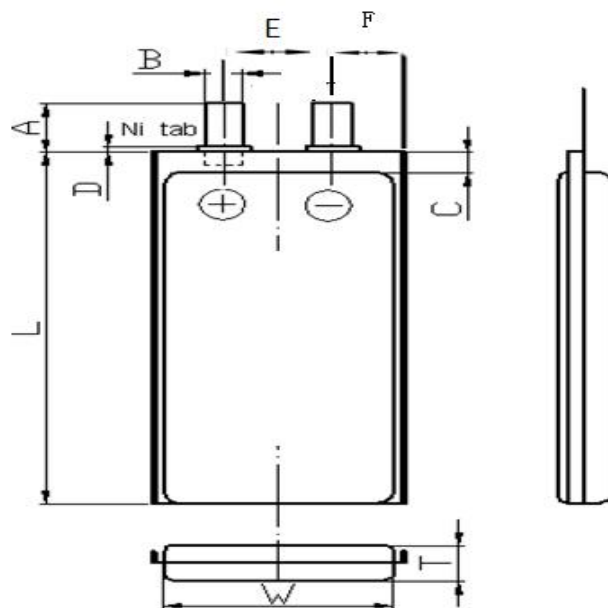
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2.Scope 适用范围

This specification describes the basic performance, technical requirement, testing method ,warning and caution of the Li-ion Polymer rechargeable battery pack, the pack defined in this documentation is an assembly which include battery, PCM and wire, the specification only applies to DONGGUAN NENGYOU ENERGY SCIENCE AND TECHNOLOGY CO., LTD

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，电池组合定义的是包括电芯，保护板和连接线的组合，本标准只适用于东莞市能优能源科技有限公司所生产的锂聚合物电池。

3. Initial Dimension 初始尺寸



Item	Specifications		
T ₁	10.0mm max.		
T ₂ (含高温胶厚度)	10.05mm max		
W	60.0mm max.		
L	110.5mm max. (不含极耳胶高度)		
D	0.2~1.5mm		
A	9.0±1mm		
B	6.0±0.1mm		
C	3.0±0.5mm		
E	33.0±1mm		
F	/		
Design	Drawing	Checked	Approval

4.Specification 产品规格

NO.	Item 项目	Specifications 规格要求
4.1	Minimum capacity 最小容量 Typical capacity 典型容量	10000mAh 0.2C Discharge (0.2C 放电) 10050mAh 0.2C Discharge (0.2C 放电)
4.2	Initial Impedance (Cell) 初始内阻 Initial Impedance(Battery) 初始内阻	$\leq 40\text{m}\Omega$ $\leq /$
4.3	Weight 重量	Approx(约): 146g
4.4	Nominal voltage 标称电压 Fully charge voltage(FC) 满充电压 FC Fully discharge voltage(FD) 满放电电压 FD	3.7V 4.2V Defined in this DOC: FC = 4.2V 3.0V Defined in this DOC: FD = 3.0V
4.5	Standard charge current 标准充电电流	0.2 C
4.6	Standard charging method 标准充电方法	0.2C CC (constant current) charge to FC, then CV(constant voltage FC)charge till charge current decline to $\leq 0.01\text{C}$ 0.2C CC (恒流) 充电至 FC, 再 CV (恒压 FC) 充电直至充电电流 $\leq 0.01\text{C}$
4.7	Charging time 充电时间	Standard Charging (标准充电) Approx 7.5 hours 大约 7.5 小时
4.8	Max. charge current 最大充电电流	0°C~15°C 0.2C 15°C~25°C 0.5C 25°C~45°C 0.5C
4.9	Max. discharge current 最大放电电流	-10°C~15°C 0.2C 15°C~60°C 0.7C
4.10	Standard Discharge Current 标准放电电流	Constant current 0.2 C end voltage FD 持续电流: 0.2C 截止电压: FD
4.11	Charge cut-off voltage 充电截止电压	Ref. 8.1 VDET1 同过充保护电压
4.12	Discharge cut-off Voltage 放电截止电压	Ref. 8.1 VDET2 同过放保护电压
4.13	Storage temperature 储存温度	-20°C~45°C ≤ 1 month -20°C~35°C ≤ 3 month -20°C~28°C ≤ 1 year 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%
4.14	Recoverable capacity 恢复容量	Constant current 0.2C charge to FC, then constant voltage FC charge to current declines to 0.01C, rest for 10min, constant current 0.2C discharge to FD, rest for 10min.Repeat above steps 3 times, recording the maximum capacity 先用 0.2 C 恒流充电至 FC, 再恒压 FC 充电直至充电电流 $\leq 0.01\text{C}$,搁置 10 分钟,再用 0.2C 电流放电至 FD; 又搁置 10 分钟,重复以上步骤 3 次,记录容量最大值
4.15	Storage Humidity 储存湿度	$\leq 75\% \text{ RH}$
4.16	Appearance 外观	Without distortion and leakage 无变形、电解液泄露
4.17	Standard testing condition 标准测试环境	Temperature(温度) : 25°C~30°C Humidity (湿度) : $\leq 75\% \text{ RH}$ Atmospheric Pressure (大气压) : 86-106 Kpa

Remark: 1.From 4.1 to 4.12, the testing condition is following 4.17 (standard testing condition)

从 4.1 至 4.12 项目, 测试环境遵从 4.17 (标准测试环境)

2.Operating temperature (使用温度) : charging(充电) 10°C~45°C ; Discharging (放电): -10°C~60°C

If the working condition is out of 4.17 , the performance will be some shift.

如果工作环境超出 4.17 范围, 性能将会有一些偏移。

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	At standard testing condition , after standard charging, rest battery for 10min, then discharging at 0.2C to voltage FD, recording the discharging time. 在标准测试环境下, 标准充电电后,搁置 10 分钟,然后用 0.2C 电流放电至 FD, 所记录放电时间	$\geq 300\text{min}$ (分钟)
5.2	0.7C Capacity 0.7C 容量	At standard testing condition , after standard charging, rest battery for 10min, then discharging at 0.7C to voltage FD, recording the discharging time. 在标准测试环境下, 标准充电电后,搁置 10 分钟,然后用 0.7C 电流放电至 FD, 所记录放电时间	$\geq 72\text{min}$ (分钟)
5.2	Cycle Life 循环寿命	At standard testing condition, constant current 0.2C charge to FC, then constant voltage charge to current declines to 0.01C, rest 10min, constant current 0.2C discharge to FD, rest 10min. Repeat above steps till continuously discharging capacity Higher than 80% of the Initial Capacities of the Cells 在标准测试环境下, 先用 0.2C 恒流充电至 FC, 再恒压 FC 充电直至充电电流 $\leq 0.01\text{C}$,搁置 10 分钟,再用 0.2C 电流放电至 FD;又搁置 10 分钟,重复以上步骤,直到放电容量是标称容量的 80%	≥ 300 times(次)
5.3	Capability of keeping electricity 荷电保持能力	At standard testing condition , After standard charging, no outer loading circuit, rest the pack 28days, discharging at 0.2C to voltage FD, recording the discharging time. 在标准测试环境下, 标准充电电后, 无外接负载线路, 电池组合搁置 28 天,然后用 0.2C 放电至 FD,所记录放电时间.	$\geq 240\text{min}$ (分钟)

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	At standard testing condition , after standard charging, rest the Cells 2.5h at $60 \pm 2^\circ\text{C}$, then discharging at 0.2C to voltage FD, recording the discharging time. 在标准测试环境下, 标准充电后, 在 $60 \pm 2^\circ\text{C}$ 条件下贮存 2.5h, 然后用 0.2C 放电至 FD,所记录放电时间.	$\geq 285\text{min}$ (分钟)
6.2	Discharge at low temperature 低温放电	At standard testing condition , after standard charging, rest the Cells 2.5h at $-10 \pm 2^\circ\text{C}$, then discharging at 0.2C to voltage FD, recording the discharging time. 在标准测试环境下, 标准充电后, 在 $-10 \pm 2^\circ\text{C}$ 条件下贮存 2.5h, 然后用 0.2C 放电至 FD,所记录放电时间.	$\geq 150\text{min}$ (分钟)

7. Safe Characteristic 安全性能

No.	Item 项目	Test Methods and Condition 测试方法和条件	Criteria 标准
7.1	Overcharge testing (NO PCM) 过充测试 (无保护板)	At standard testing condition , charging cell with constant current 0.5C to voltage 4.6V, then with constant voltage 4.6V till current decline to 0. Stop test till cells temperature 10℃ lower than max temperature. 在标准测试环境下, 电池用 0.5C 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,当电池温度下降至低于峰值 10℃时,停止实验.	No smoke or fire 不起火,不冒烟
7.2	Over-discharge testing (NO PCM) 过放测试 (无保护板)	At standard testing condition, the pack be discharge to cut-off voltage, then connect with external load of 30 ohm for 24 hours. 在标准测试环境下, 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

※ 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. Battery Protection 电池保护

8.1 PCM Standard (保护板标准)

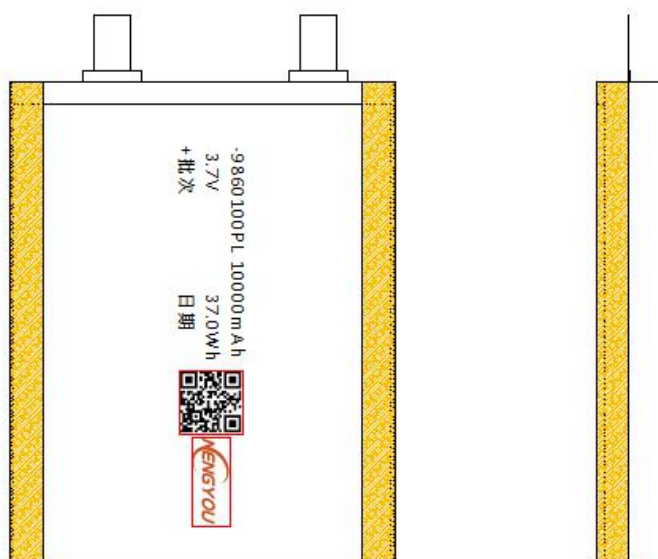
Symbol (符号)	Name (名称)	MIN. (最小值)	Typical. (典型值)	MAX. (最大值)	Unit (单位)
VDET1	Over-Charge detect voltage (过充电保护电压)	/	/	/	V
VDET2	Over-discharge detect voltage (过放电保护电压)	/	/	/	V
IEC	Excess Current threshold (最大过流值)	/	/	/	A
IDD	Supply current (自耗电流)	/	/	/	μ A
RD	Internal resistance in normal operation (导通内阻)	/	/	/	m Ω
T	/				

8.2 Schematic diagram(原理图)

8.3 BOM for PCM (保护板物料表)

序号	物料名称	规格型号	封装形式	位号	单位	数量
1	贴片电容				Pcs	
2	贴片电阻				Pcs	
3	贴片电阻				Pcs	
4	MOS				Pcs	
5	IC				Pcs	
6	PCB				Pcs	

9. Code content 喷码内容



10. Warnings 警告

Load circuit may cause voltage and current, and the voltage or current may add to pack, the voltage or current must be controlled as lower than RWV and RWI, larger voltage or current may damage the PCM of pack.

☆负载可能产生电压和电流,该电压和电流会反加在电池组合(含 PCM)上,该电压和电流不能超过保护板自身反向耐压耐流值,过高电压或电流会损坏电池组合中的保护板。

To prevent the possibility of the pack from leaking, heating, fire .please observe the following precautions:

☆为防止电池组合可能发生的泄漏,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 pack with any sharp edge parts.

☆ 电池组合外包装膜易被镍片,尖针等尖锐部件损伤,禁止用尖锐部件碰伤电池。

Do not immerse the pack in water and seawater

☆ 严禁将电池组合浸入海水或水中。

Do not use and leave the pack near a heat source as fire or heater

☆ 禁止将电池组合在热高温源旁,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 positive and negative terminals

☆ 禁止颠倒正负极使用电池组合

Do not connect the pack to an electrical outlet

☆ 禁止将电池组合直接接入电源插座

Do not discard the pack in fire or heat it

☆ 禁止将电池组合丢入火或加热器中

Do not short-circuit the pack by directly connecting the positive and negative terminal with metal object such as wire

☆ 禁止用金属直接将电池组合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.

☆ 禁止将电池组合与金属,如发夹,项链等一起运输或贮存。

Do not strike or throw the pack.

☆ 禁止敲击或抛掷,踩踏电池组合等。

Do not directly solder the pack or battery and pierce the battery with a nail or other sharp object.

☆ 禁止直接焊接电池组合或电芯,禁止用钉子或其它利器刺穿电池组合或电芯。

11. Cautions 注意

Do not use or leave the pack 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)使用或放置电池组合,否则可能会引起电池过热,起火或功

能失效,从而导致电池组合寿命减短.

Do not use it in a location where static electricity is great, otherwise, the safety devices in the pack 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,否则易破坏电池组合的安全保护装置,带来不安全隐患.

If the pack 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 pack takes 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.

△ 如果电池组合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 pack 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.

△ 如果电池组合的连接点弄脏,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 pack should be stored at room temperature, charged to about 40% to 60% of capacity. In case of over-discharge, pack 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.

△ 电池组合应当在室温下存放,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。

12. Handling of Cells 电池操作注意事项

1 Soft Aluminum 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 pack circuit. 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.

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。

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、弯曲等等都可能降低聚合物电池的性能。

13.Period of Warranty 保质期

The period of warranty is one year from the date of shipment. NengYou Amperex guarantees 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。

申明：我司产品购买平安保险，若因我司产品造成的安全事故，可拨打平安保险服务热线。

14. Others 其它事项

1. The customer is requested to contact NengYou Amperex 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应用，或在文件规定以外的使用条件下使用电池，应事先联系能优能源，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. NengYou Amperex 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，能优新能源概不负责。

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

如有必要，能优能源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 and NengYou Amperex.

任何本说明书中未提及的事项，须经双方协商确定。