

Specification for Polymer Li-ion Battery

聚合物锂离子电池规格书

Pack Type	Cell +PCM
组合类型:	电芯+保护板
Cell Model	
电芯型号:	2X104049-2600mAh
Part Code	
产品编码:	
Customer Code	
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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		

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备注: 本公司保留在未通知客户的情况下, 对规格书进行修改的权利!

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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 GOLDEN CEL BATTERY (DONGGUAN) 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，本规格说明书描述了东莞金赛尔电池有限公司（以下简称赛尔电池）所生产的锂聚合物电池。

3.Specification 产品规格

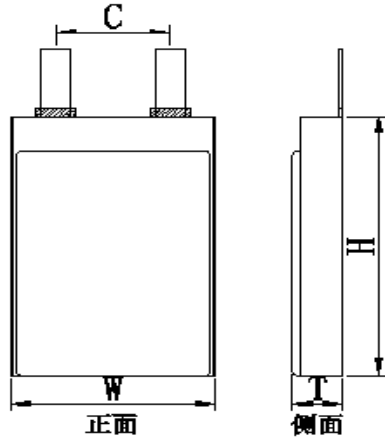
NO.	Item 项目		Specifications 规格要求	
3.1	Typical capacity	典型容量	2650mAh	0.2C Discharge (0.2C 放电)
	Minimum capacity	最小容量	2600mAh	0.2C Discharge (0.2C 放电)
3.2	Battery impedance 组装内阻		≤350mΩ	(1kHz 交流内阻 50%SOC 25±3℃)
3.3	Shipment voltage 出货电压		≥7.6V	
3.4	Weight 重量		Approx (约): 95g	
3.5	Nominal voltage	标称电压	7.4V	
	Fully charge voltage(FC)	满充电压 FC	8.4V	Defined in this DOC: FC = 8.4V
	Fully discharge voltage(FD)	满放电电压 FD	6.0V	Defined in this DOC: FD = 6.0V
3.6	Standard charge current 标准充电电流		0.2 C	
3.7	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 ≤0.01C 0.2C CC (恒流) 充电至 FC, 再 CV (恒压 FC) 充电直至充电电流≤0.01C	
3.8	Standard Discharge Current 标准放电电流		0.2C	
3.9	Max. Continuous charge current 最大持续充电电流		0℃~15℃	0.2C
			15℃~35℃	1C
			35℃~45℃	1C max to 4.1V, then CV to 0.05Cmin
3.10	Max. Continuous discharge current 最大持续放电电流		-10℃~15℃	0.5C
			15℃~60℃	1C
3.11	Charge cut-off voltage	充电截止电压	Ref.5.2 OVP	
3.12	Discharge cut-off Voltage	放电截止电压	Ref.5.2 UVP	
3.13	Storage temperature 储存温度		-20℃~60℃	≤7day
			-20℃~40℃	≤1 month
			-20℃~30℃	≤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% Recommended storage temperature is 25±2℃ of half charge state (3.7~3.95v). 推荐储存温度 25±2℃，电芯为半电状态(3.7~3.95v)储存。				
3.14	Storage Humidity		储存湿度	
			≤75% RH	
3.15	Appearance 外观		Without distortion and leakage 无变形、电解液泄露	
3.16	Standard testing condition 标准测试环境		Temperature(温度) : 25±3℃	
			Humidity (湿度) : ≤75%RH	
			Atmospheric Pressure (大气压) : 86-106 Kpa	

3.1 项目，测试时间为到货 7 天内测试

从 3.1 至 3.13 项目，测试环境遵从 3.16（标准测试环境），如果工作环境超出 3.16 范围，性能将会有一些偏移。

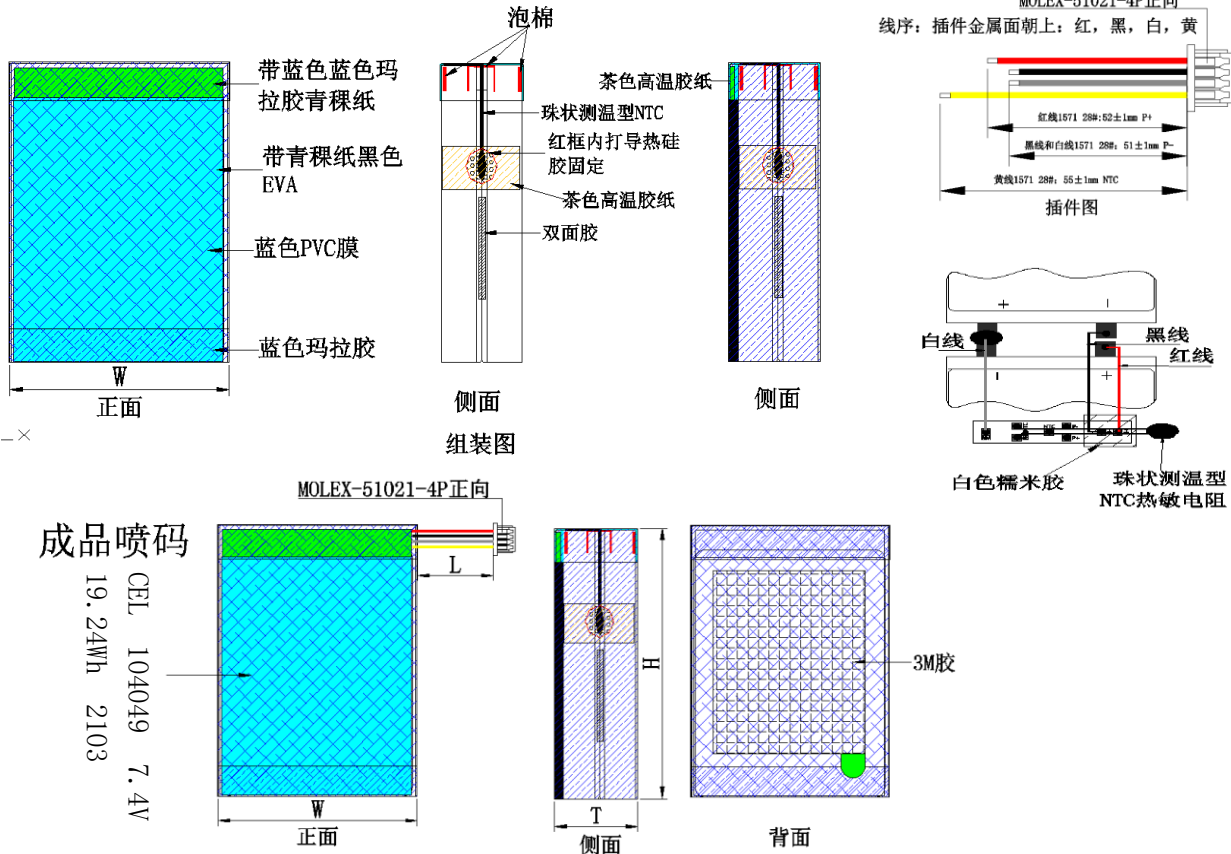
4.0 Assembly Drawing 装配图 (all unit is mm, not in scale)

电芯尺寸图



单位	mm
T	11Max
W	40.5Max
H	49.5Max
C	18 ± 1.5

成品尺寸图



长度 H	宽度 W	厚度 T	导线外露长度 L	单位
51Max	42Max	26.4Max	35 ⁺⁴ ₋₀	mm

4.1 PACK BOM 清单

物料名称	规格	数量 (PCS)
电芯	104049-2600mAh	2
保护板	NT1724AHQA+DP8204+ NT1724AFKA+DP8204+NTC	1
电子线	1571 28#	4
插件	Molex 51021-4P 正向	1

5.0 Electronic Protection 电子保护

5.1. Based on dual NMos transistor in series with the Li-polymer cell negative terminal, to be driven by a standard safety IC, e.g. FS/DW01A or equivalent. Protections which shall be provided are:

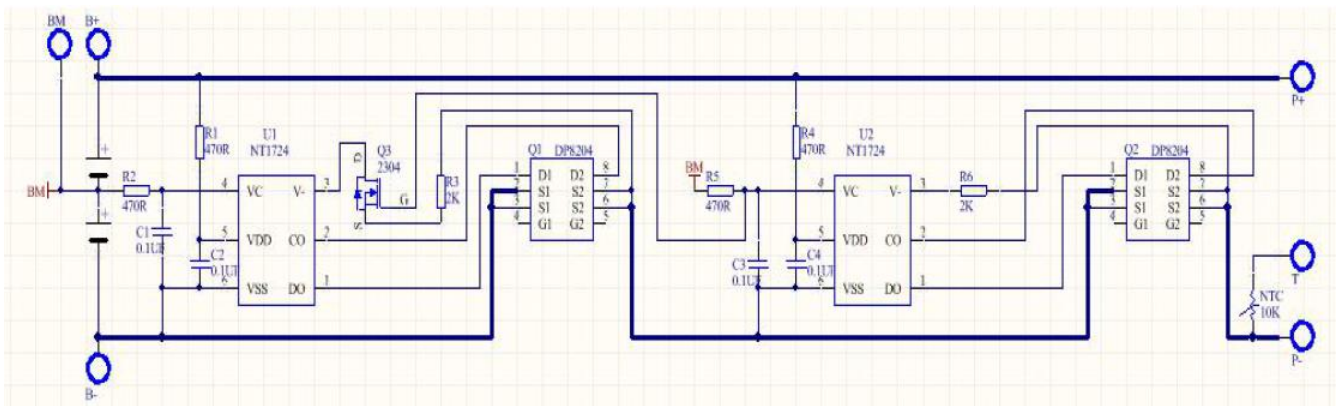
基于双 NMos 晶体管串联 Li-polymer 电池负极, 是由一个标准的安全集成电路, 如 FS / DW01A 或等价的。

5.2 PCM 参数表

以下检测项目中, ※表示批量生产必测项; ◎表示品质管控项; ○表示该产品无此项功能或不管控							
Protection scheme 保护方案		NT1724AHQA+DP8204+NT172 4AFKA+DP8204+NTC	Parameter Values/参数				
		Normal temperature 25 °C 常温 25°C					
No. 序号	Item 项目	Min 最小值	Type 典型值	Max 最大值	Unit 单位	检测度	
1	Overcharge 过充电	Detection voltage/保护电压	4.26	4.28	4.30	V	※
2		Release voltage/恢复电压	4.05	4.08	4.11	V	◎
3		Detection delay time/保护延迟时间	0.8	1.0	1.2	s	◎
4	Over discharge 过放电	Detection voltage/保护电压	2.75	2.80	2.85	V	※
5		Release voltage/恢复电压	2.90	3.00	3.10	V	◎
6		Detection delay time/保护延迟时间	102.4	128	153.6	ms	◎
7	Discharge overcurrent current 放电过流	Detection overcurrent /保护电流	5	-	12	A	※
8		Detection delay time/保护延迟时间	6.4	8	9.6	ms	◎
9	Charge overcurrent 充电过流	Detection overcurrent /保护电流	5	-	13	A	◎
10		Detection delay time/保护延迟时间	6.4	8	9.6	ms	◎
11	Short protection Short protection	Short detection delay time/短路保护 延时	224	320	448	us	◎
12		Release Conditions/恢复条件	Cut off load/断开负载				◎
13	Consume electricity while working/工作时自耗电		-	-	8	uA	※
14	IR of PCM/PCM 内阻		-	-	65	mΩ	※
15	suggest working temperature/建议工作温度		-40		+85	°C	
16	0V Charging function/OV 充电功能		Availble 允许				◎
17	NTC Resistor(25°C)/NTC 电阻		-	-	-	KΩ	◎

以下检测项目中,※表示批量生产必测项; ◎表示品质管控项; ○表示该产品无此项功能或不管控							
Protection scheme 保护方案		NT1724AHQA+DP8204+NT172 4AFKA+DP8204+NTC		Parameter Values/参数			检测度
				Normal temperature 25 °C 常温 25°C			
No. 序号	Item 项目		Min 最小值	Type 典型值	Max 最大值	Unit 单位	
1	Overcharge 过充电	Detection voltage/保护电压	4.23	4.25	4.27	V	※
2		Release voltage/恢复电压	4.02	4.05	4.08	V	◎
3		Detection delay time/保护延迟时间	0.8	1.0	1.2	s	◎
4	Over discharge 过放电	Detection voltage/保护电压	2.45	2.50	2.55	V	※
5		Release voltage/恢复电压	2.90	3.00	3.10	V	◎
6		Detection delay time/保护延迟时间	102.4	128	153.6	ms	◎
7	Discharge overcurrent current 放电过流	Detection overcurrent /保护电流	5	-	12	A	※
8		Detection delay time/保护延迟时间	6.4	8	9.6	ms	◎
9	Charge overcurrent 充电过流	Detection overcurrent /保护电流	5	-	13	A	◎
10		Detection delay time/保护延迟时间	6.4	8	9.6	ms	◎
11	短路保护 Short protection	Short detection delay time/短路保护 延时	224	320	448	us	◎
12		Release Conditions/恢复条件	Cut off load/断开负载				◎
13	Consume electricity while working/工作时自耗电		-	-	8	uA	※
14	IR of PCM/PCM 内阻		-	-	65	mΩ	※
15	suggest working temperature/建议工作温度		-40		+85	°C	
16	0V Charging function/OV 充电功能		Available 允许				◎
17	NTC Resistor(25°C)/NTC 电阻		9.0	10	11	KΩ	◎

5.3 Circuit Diagram (原理图)



5.4.PCB BOM

NO. 序号	Name of material 物料名称	Symb ol 代号	Spec./Model 规格型号	Size 尺寸/封装	Q'ty 数量	Unit 单位	供应商 Vendor	Rem arks 备注
1	Protection IC	U1	NT1724AHQA 丝印: ****, "****" 代表可变化 丝印	SOT-23-6	1	PCS	新德	
2	Protection IC	U2	NT1724AFKA 丝印: ****, "****" 代表可变化 丝印	SOT-23-6	1	PCS	新德	
3	MOS Tube	Q1.Q2	DP8204 丝印: DP8204**, "***" 代表可变化丝印		2	PCS	德普微	
4	PCB	PCB		/	1	PCS	精维进	
5	MOS	Q3	2304		1	PCS	长电	
6	SMD Resistance 贴片电阻	R1.R2. R4.R5	470Ω±5%		4	PCS	国巨	
7	SMD Resistance 贴片电阻	R3.R6	2K±5%		2	PCS	国巨	
8	SMD Capacitance 贴片电容	C1.C2. C3.C4	0.1uF-20+80% 16- 25V		4	PCS	国巨	
9	NTC	NTC	10K 1% B=3435		1	PCS	卓英社	

6.General Performance 常规性能

No.	Item 项目	Test Methods and Condition 测试方法和条件	Criteria 标准
6.1	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, 标准充饱电后, 搁置 10 分钟, 然后用 0.2C 电流放电至 FD, 所记录放电时间	≥300min(分钟)
6.2	1C Capacity 1C 容量	At standard testing condition, after standard charging, rest battery for 10min, then discharging at 1C to voltage FD, recording the discharging Capacity 在标准测试环境下, 标准充饱电后, 搁置 10 分钟, 然后用 1C 电流放电至 FD, 记录容量	≥56min (分钟)
6.3	Cycle Life 循环寿命	At standard testing condition, constant current 0.5C charge to FC, then constant voltage charge to current declines to 0.01C, rest 10min, constant current 0.5C 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 0.5 C 恒流充电至 FC, 再恒压 FC 充电直至充电电流 ≤0.01C, 搁置 10 分钟, 再用 0.5C 电流放电至 FD; 又搁置 10 分钟, 重复以上步骤, 直到放电容量是初始容量的 80%	≥300 times(次)

6.4	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, 标准充饱电后, 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.	≥270min (分钟)
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7. Environment Performance 环境性能

No.	Item 项目	Test Methods and Condition 测试方法和条件	Criteria 标准
7.1	Temperature Characteristics 温度特性	At item3.16 .condition, charge the battery as per Item3.7. Stored the recharged battery for 4hrs at 55 ± 2°C, 25±2°C, 0±2°C or - 10±2°C, and discharged at 0.2C to FD Voltage at the same temp., record the discharge time. 在 3.16 条件下, 按 3.7 方式满充电后, 分别在 55 ± 2°C、25±2°C、0±2°C 或 - 10 ± 2°C 下储存电池 4hrs, 然后在相同温度下用 0.2C 将电池放电至 FD 电压, 记录放电时间。	55°C: ≥95% 25°C: ≥100% 0°C: ≥80% - 10°C: ≥70% - 20°C: ≥50%
7.2	Thermal shock 热冲击	After standard charging, put the pack 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. 标准充电后, 将电池组放进烘箱内, 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

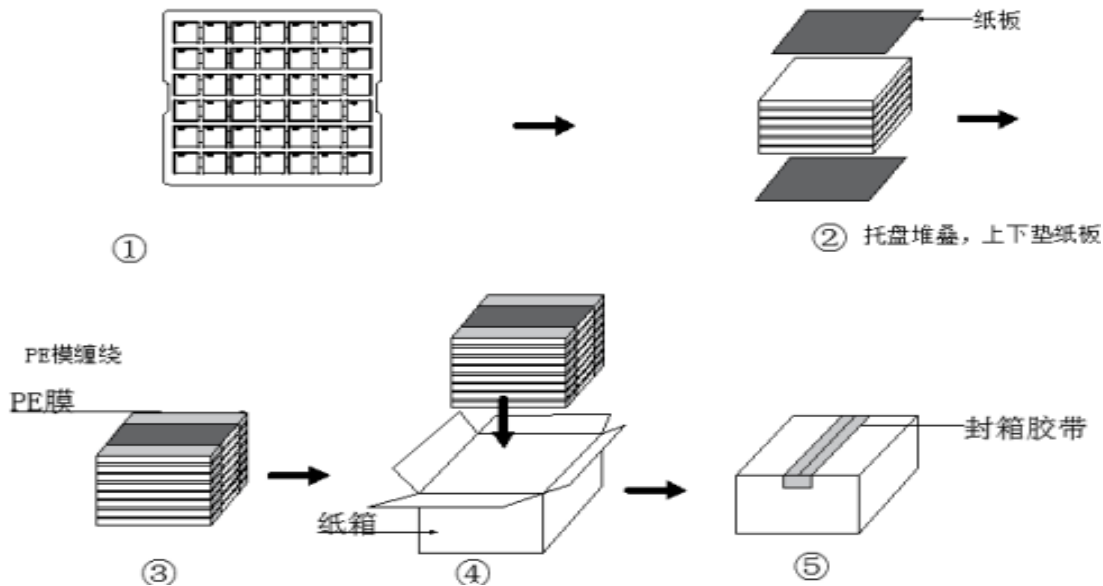
8. Battery Pack Safe Characteristic 电池组安全性能

NO	Items/项目	Test methods and criteria/测试方法和判定标准
8.1	Hightemperature performance 高温性能	At the 23 + 2 centigrade condition, after the battery is charged at the end of 0.2C standard, the battery is placed in the constant temperature and constant humidity box of 60 + 2 C at constant temperature for 2h. Then the battery is discharged to 3.0V with 0.2C current, the discharge time is more than 4.75h, and the appearance of the battery has no deformation and smoke. 在 23±2°C 条件下, 电池按 0.2C 标准充电结束后, 将电池放入 60±2°C 的恒温恒湿箱中恒温 2h 后, 然后以 0.2C 电流放电至 3.0V, 放电时间 ≥ 4.75h, 且电池外观无变形, 冒烟。
8.2	Low temperature performance 低温性能	At the 23 + 2 centigrade condition, after the battery is charged at the end of 0.2C standard, the battery is placed in the constant temperature and constant humidity box of -10 + 2 C at constant temperature 4h, then discharge to 3.0V with 0.2C current, the discharge time is more than 3.5h, and the appearance of the battery is not deformed and smokes. 在 23±2°C 条件下, 电池按 0.2C 标准充电结束后, 将电池放入 -10±2°C 的恒温恒湿箱中恒温 4h, 然后以 0.2C 电流放电至 3.0V, 放电时间 ≥ 3.5h, 且电池外观无变形, 冒烟。

8.3	Overcharge rotection performance 过充电保护性能	Constant current voltage source voltage is set to 4.6V. The current is set to 2 times nominal. Then the battery is loaded on the battery 7h. The battery does not smoke and explode during the experiment. 将恒流恒压源电压设为 4.6V,电流设为标称 3 倍, 然后加载于电池上 7h, 要求实验过程中电池不冒烟和爆炸。
8.4	Over discharge rotection performance 过放电保护性能	At 23 + 2 0.2C, the battery is discharged to 3.0V at the rate of 0.2C, and the external discharge is 30 ohm, which requires that the battery does not leak, fire, smoke and explode during the experiment. 在 23±2℃条件下, 电池按 0.2C 放电至 3.0V 后, 外接 30Ω 负载放电 7h,要求实验过程中电池不漏液, 起火, 冒烟和爆炸。
8.5	Short circuit protection performance 短路保护性能	Under the condition of 23 + 2 C, after the battery is filled with 0.2C, the positive and negative short circuit (80 + 20m omega) of the battery is sustained 1H, then the positive and negative electrode of the battery is broken, and the voltage of the battery is not less than 3.6V after the instantaneous charge of the battery, and the battery does not leak, deform, smoke and explode in the process of the experiment. 在 23±2℃条件下, 电池按 0.2C 充满电后, 将电池正负极短路(外接电阻 80±20mΩ) 持续 1h,再将电池正负极断开, 电池以 1C 瞬时充电后电压应不小于 3.6V, 且实验过程中电池不漏液, 变形, 冒烟和爆炸。
8.6	Constant humid and thermal properties 恒定湿热性能	Under the condition of 23 + 2 centigrade, the battery should be placed at the end of 0.2C charge and put into the constant temperature and constant humidity box of 90~95% at 40 + 2 C. The battery should have no obvious deformation, leakage, rust, smoke or explosion. After the test, the battery is removed and put on the 2H. Under the condition of 23 + 5 C, the battery is set to 3.0V by 0.2C, and the discharge time is more than 3h. 在 23±2℃条件下, 电池按 0.2C 充电结束后, 放入 40±2℃, 湿度 90~95%的恒温恒湿箱内 48h,电池应无明显变形, 漏液, 生锈, 冒烟或爆炸, 试验结束后将电池取出搁置 2h, 在 23±5℃条件下, 电池按 0.2C 放电至 3.0V, 要求放电时间 ≥ 3h.
8.7	Drop Test 跌落实验	At 23 + 2 C, after the battery is filled with 0.2C, the battery is shelved 1~4h, test the open circuit voltage of the battery, and then drop the battery from the height of 1.2 meters to the concrete floor (X, Y, Z positive and negative direction falling down each direction in each direction respectively), the battery should not smoke, explode, after the test, the battery carries on the 0.2C discharge performance measurement. Test, request battery voltage more than 90% open circuit voltage. 在 23±2℃条件下, 电池按 0.2C 充满电后,搁置 1~4h,测试电池开路电压, 然后将电池从 1.2 米高度自由跌落至混凝土地板上(X,Y,Z 正负方向 6 个方向每个方向分别朝下跌落一次) 电池应不冒烟, 爆炸, 试验结束后, 将电池进行 0.2C 放电性能测试, 要求电池电压 ≥ 90%开路电压。

※ 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)

9. Packing 包装



10. Warnings 警告

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 battery in liquid such as water, beverages, or other fluids.

☆严禁将电池组合浸入水或饮料或其它液体中。

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

☆禁止将电池组合放在热高温源旁,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.

Only charge the battery between 0°C and 45°C. Charging outside of this temperature range may cause the battery to leak, generate heat, or result in serious damage. It may also cause the battery's performance and life to deteriorate.

△电池只能在 0° C~45° C 温度范围充电.超出此温度范围可能导致电池漏液、发热,或导致电池严重的损坏.它也可能导致电池的性能和寿命的恶化.

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 (about 3.8~3.9V) . In case of over-discharge, pack should be charged for one time every 6 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(3.8~3.9V)。为防止电池过放,建议每 6 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，铝箔软包装很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 outershort 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、弯曲等等都可能会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. CEL Battery 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。

14. Others 其它事项

1. The customer is requested to contact CEL Battery 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，应事先联系赛尔电池，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. CEL Battery 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，赛尔电池概不负责。

3. CEL Battery 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，赛尔电池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 CEL Battery
任何本说明书中未提及的事项，须经双方协商确定。

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