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Customer 客户名称：

Part NO.:

File 文件编号：
Ver 版本： A4
Date 日期： 2019-07-22
Part NO.:

广东力科新能源有限公司

Guangdong Pow-Tech New Power Co.,Ltd.

PRODUCT SPECIFICATION

产品规格书

Model 型号: ACC-006-591

Type 类型: Li-ion

Approval 批准	Checked 审核	Draft 制定
Mark	Chris-Wang	YS-Liang
Customer Approval 客户回签		

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REVISION HISTORY 规格书修订记录

Date 日期	Contents 内容	Remarks 备注
2018-04-25	First issue 新发行	A0
2018-06-12	更新保护板参数/最小容量	A1
2019-06-13	更新充电温度为 5-45℃，满足 BSMI 测试要求&更新充电电压为 12.3V,更新增加 Label	A2
2019-07-05	,更新 Label	A3
2019-07-22	更新外形图	A4

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1 .Application 适用范围

This specification describes the basic performance, technical requirement, testing method, warning and caution of the Li-ion rechargeable battery .The specification only applies to Guangdong Pow-Tech New Power Co., Ltd.

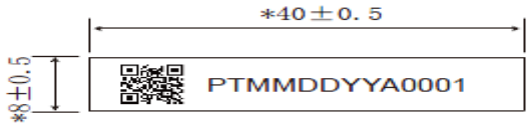
本标准规定了锂离子可充电池的基本性能、技术要求、测试方法及注意事项，本标准只适用于广东力科新能源有限公司。

2.Battery pack outline dimensions 电池组外形尺寸

Unit:mm

名称 Name	Description 描述	Q'ty 用量	Remark 备注
电芯 CELL	INR18650F1L	9	
PCM	FR4/1.0mm	1	
Connector	152-1293H	1	
胶壳	黑色	1	

贴纸



二维码说明：PTMMDDYYA0001（共13位）
PT：代表力科
MMDDYY：代表月/日/年（随着生产日期而变化）
A：代表生产拉线
0001：流水号（0001~9999）

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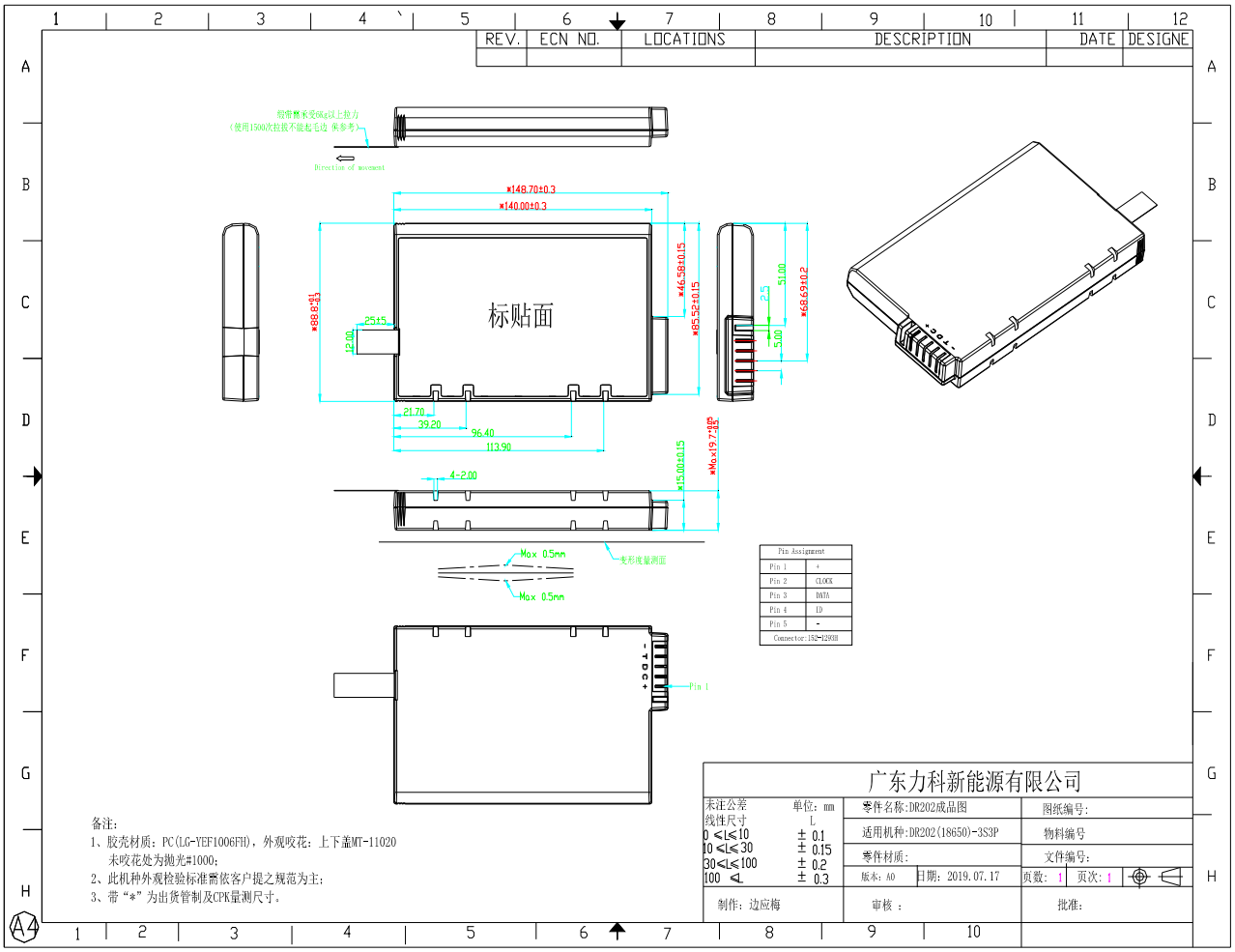
外形图



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3. Battery pack Specifications 电池组规格

No	Item 项目		Specifications 规格	
3.1	Capacity 容量	Nominal Capacity 标称容量	8250mAh @ 0.2C to 8.4V	
		Minimum Capacity 最小容量	8150mAh @ 0.2C to 8.4V(C_{min})	
3.2	Nominal voltage 标称电压		10.9V	
3.3	Charge 充电	Charging Method 充电模式	CC-CV (constant voltage with limited current)	
		Charging voltage 充电电压	12.3V	
		Standard charge current 标准充电电电流	1160mA	
		Max Charging current 最大充电电流	3000mA	
		Charging Time 充电时间	Max charge : 4.5hours 充电时间：4.5 小时；	
3.4	Discharge 放电	Standard Discharge current 标准放电电流	1650mA	
		Max. Discharge current 最大放电电流	6000mA(持续)	
3.5	Approx. Weight (g) 参考重量		About:450g	
3.6	Operating Temperature 操作温度		Charge 充电	5 to 45℃
			Discharge 放电	-20 to 50℃
3.7	Storage temperature 储存温度		1 y e a r 一年	-20~25℃
			3 months 三个月	-20~45℃
			1 month 一个月	-20~60℃
3.8	AC Impedance 交流内阻		≤180mΩ	
3.9	Storage humidity 储存湿度		< 75%RH	
3.10	As of shipment（status of the delivery） 出货状态（Pack Voltage 电池组电压）		10.2V-11.25V	

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4. Cell Specifications 电芯规格

NO.	Items 项目		Specifications 规格
4.1	Capacity	Nominal Capacity 标称容量	3350mAh (0.2C, 2.5V discharge)
		Minimum Capacity 最小容量	3250mAh (0.2C, 2.5V discharge)
4.2	Charging Voltage 充电电压		4.2V
4.3	Nominal Voltage 标称电压		3.63V
4.4	Charging Method 充电方法		CC-CV (constant voltage with limited current)
4.5	Charging Current 充电电流		Standard charge: 975mA 标准充电电流
4.6	Charge time 充电时间		Standard charge : 5hours 标准充电时间5小时
4.7	Standard Discharge current 标准放电电流		650mA
4.8	Discharge Cut-off Voltage 放电关断电压		2.5V
4.9	Cell Dimension 电芯尺寸		Height 高度：Max65.5mm External diameter 外径:Max18.5mm
4.10	Operating Temperature 运行温度		Charge : 0 to 45℃充电:0 to 45℃ Discharge: -20 to 5℃ 0.5C(1625mA)Max 5 to 45℃ 1.5C(4875mA)Max 45 to 50℃ 1.0C(3250mA)Max
4.11	Storage Temperature 贮存温度		1 y e a r : -20~20℃ 一年：-20~25℃ 3 months : -20~45℃ 三个月：-20~45℃ 1 month : -20~60℃ 一个月：-20~60℃

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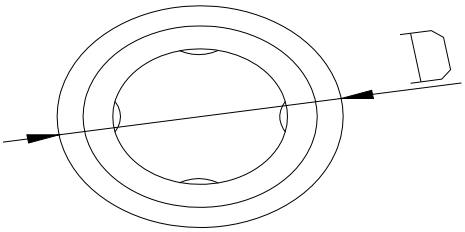
5. Cell Outline Dimensions 电芯外形尺寸

Height 高度：Max65.15mm*External diameter 外径:Max18.4mm



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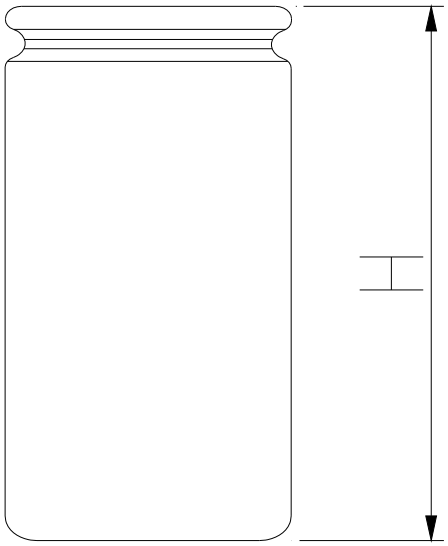

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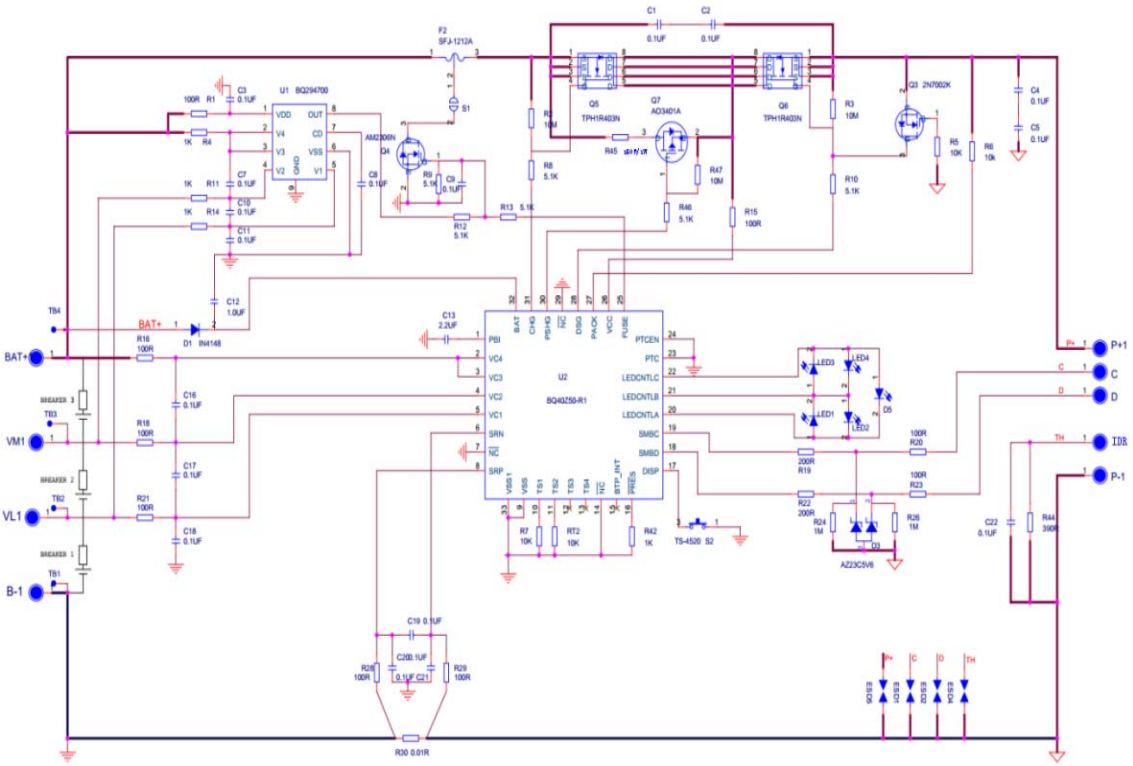
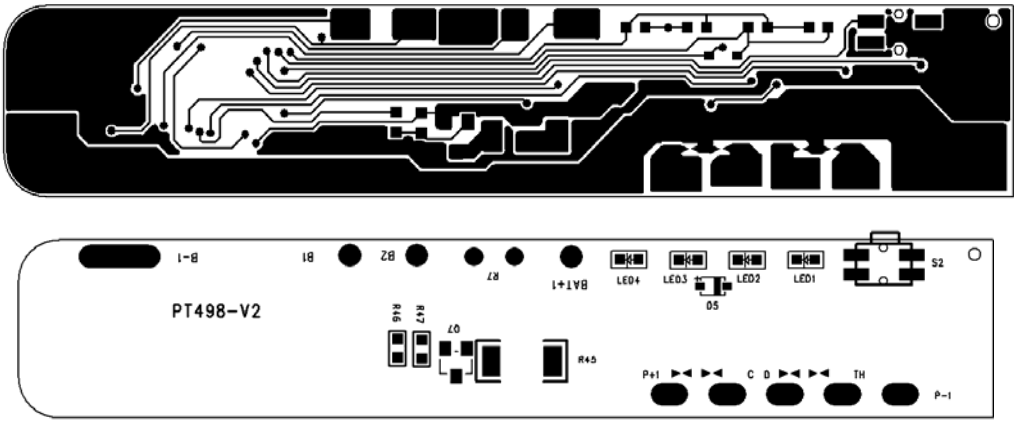
6. Protect Function 保护功能

6.1Circuit Diagram 电路原理图



6.2 PCB Layout 布线图

TOP SILKSCREEN



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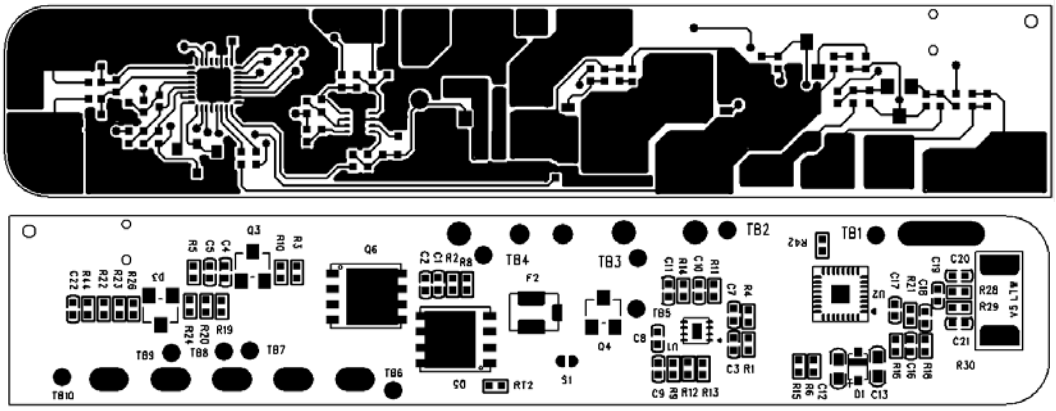
BOTTOM SILKSCREEN



6.3 PCM BOM

器件编号 Location	描述 Description	规格/尺寸/封装/part No. Specification/Size	单位 Units	数量 Qty	供应商 Vendor	备注 Remark
U2	IC	BQ40Z50RSMT-R1,2/3/4 串电量管理 IC,VQFN32,HF,TI	PCS	1	TI	
U1	IC	BQ294700DSGR,二次保护 IC,S-PWSON-N8,HF,TI	PCS	1	TI	
Q5,Q6	MOS 管	TPH1R403NL,DFN5*6,ROHS,TOSHIBA(5K/盘)	PCS	2	TOSHIBA	
Q3	MOS 管	2N7002K-7,Single-N,SOT-23,HF,DIODES	PCS	1	DIODES	
F2	FUSE	FUSE,SFJ-1212U,SMT,HF,SONY	PCS	1	SONY	
D1	二极管	IN4148WS,二极管,100V,SOD-323,HF,Diodes（3K 一盘）	PCS	1	DIODES	
D3	稳压二极管	AZ23C5V6-T-F,稳压二极管/5.6V,SOT-23,ROHS,DIODES	PCS	1	DIODES	
Q4	MOS 管	AM2306N,SOT-23,ROHS,AP	PCS	1	AP	
Q7	MOS	AO3401A,Single-P,SOT-23,HF,AOS	PCS	1	AOS	
R5，R6	贴片电阻	RC0402FR-0710KL,0402,10KΩ,±1%,1/16W,HF,YAGEO	PCS	2	YAGEO	
R4,R11,R14,R42	贴片电阻	RC0402FR-071KL,0402,1KΩ,±1%,1/16W,HF,YAGEO	PCS	4	YAGEO	
R24,R26	贴片电阻	RC0402FR-071ML,0402,1MΩ,±1%,1/16W,HF,YAGEO	PCS	2	YAGEO	
R19,R22	贴片电阻	RC0402JR-07200RL,0402,	PCS	2	YAGEO	

		200Ω, ±5% , 1/16W, HF, YAGEO				
R2, R3	贴片电阻	RC0402FR-0710ML, 0402, 10MΩ, ±1%, 1/16W, 无卤素, YAGEO	PCS	2	YAGEO	
R30	合金电阻	RLM25FEER003, 2512, 3mΩ, ±1%, 2W, HF, 大毅（4K 一盘）	PCS	1	大毅	
R8, R9, R10, R12, R13	贴片电阻	RC0402FR-075K1L, 0402 , 5.1KΩ, ±1%, 1/16W, HF, YAGEO	PCS	5	YAGEO	
R44	贴片电阻	RC0402JR-07390RL, 0402, 390Ω, ±5% , 1/16W, HF, YAGEO	PCS	1	YAGEO	
R45	贴片电阻	RC2010JK-07120RL, 2010, 120Ω ± 5%, 3/4W, HF, YAGEO	PCS	1	YAGEO	
R1, R15, R16, R18, R20, R21, R23, R28, R29	贴片电阻	RC0402FR-07100RL, 0402, 100Ω, ±1%, 1/16W, HF, YAGEO	PCS	9	YAGEO	
RT2	NTC	CN0402R103B3435FT, 0402, 10KΩ, ± 1%, B=3435, HF, 仙桥	PCS	1	仙桥	
R7	NTC	蝌蚪型 NTC, ZL103FBXH060, 10K±1%, B=3435, φ0.28 红色漆包线, L=60±3mm, ROHS, 卓朗微	PCS	1	卓朗微	后焊
R46	贴片电阻	RC0603FR-075K1L, 0603 , 5.1KΩ, ±1%, 1/10W, HF, YAGEO	PCS	1	YAGEO	
R47	贴片电阻	RC0603JR-0710ML, 0603, 10MΩ, ±5%, 1/10W, HF, YAGEO	PCS	1	YAGEO	
胶水	固定 RT1	UV 蓝胶 326, 1L/支, HF, 乐泰	g	0.1	乐泰	
C1, C2, C3, C4, C5, C7, C8, C9, C10, C11, C16, C17, C18, C19, C20, C21, C22	贴片电容	GRM155R71E104KE14D, 0402, 0.1uf, ± 10%, X7R, 25V, 无卤素, 村田	PCS	17	村田	
C12	贴片电容	GRM188R71E105KA12D 0603, 1UF, ± 10%, X7R, 25V, HF, 村田（4K 一盘）	PCS	1	村田	
C13	贴片电容	GRM188R61E225KA01D, 0603, 2.2uF, ± 10%, X5R, 25V, HF, MURATA	PCS	1	MURATA	
LED1	LED	HQ27-2101SURC, 侧面红色, SMD 0603 ROHS, 友联华创	PCS	1	宏齐	

LED2,LED3,LED4		HQ27-2101UBGC,侧面翠绿色，SMD 0603 ROHS,友联华创	PCS	3	宏齐	
S2	开关	中乌龟.3.5X4.7mm 侧按轻触开关，防水带柱四脚迷你开关,森义，ROHS	PCS	1	森义	

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6.4PCM parameter 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-	0~12.6V
2	过充电 Overcharge	保护电压/Detection voltage	4.250±0.030V
3		恢复电压/ Release voltage	4.100±0.050V
4		保护延迟时间/ Detection delay time(Typical)	2S
5	过放电 Over discharge	保护电压/Detection voltage	2.800±0.050V
6		恢复电压/ Release voltage	3.000±0.080V
7		保护延迟时间/ Detection delay time(Typical)	2S
8	一级充电过流 1st Over charge current	充电过流保护电流/Over current	5.6±0.5A
9		充电过流保护延时/delay time(Typical)	3S
10	二级充电过流 2st Over charge current	充电过流保护电流/Over current	6.6±0.5A
11		充电过流保护延时/delay time(Typical)	2S
12	充电过流解除 Over current protection release	过流保护解除条件 Over current protection release condition	电流下降至 20mA 保护解除。
13	一级放电过流 1st Over discharge current	放电过流保护电流/Over current	7.8±0.5A
14		放电过流保护延时/delay time(Typical)	3S
15	二级放电过流 2st Over discharge current	放电过流保护电流/Over current	8.8±0.5A
16		放电过流保护延时/delay time(Typical)	2S
17	放电过流解除 Over current protection release	过流保护解除条件 Over current protection release condition	电流下降至-20mA 保护解除。
18	短路保护 Short detection	短路保护条件 Short circuit protection condition	外部短路电流＞25A External Short circuit current＞25A

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19		短路保护延时 Short detection delay time(Typical)	915uS
20		恢复条件/Release Conditions	15S 后自动恢复
21	充电过温保护 Over temperature charge protection	保护温度 Detecion temperature	55±5℃
22		保护延时时间 Protection delay time(Typical)	3S
23		保护解除温度 Recovery temperature	45±5℃
24	充电低温保护 Under temperature charge protection	保护温度 Detecion temperature	0±5℃
25		保护延时时间 Protection delay time(Typical)	3S
26		保护解除温度 Recovery temperature	5±5℃
27	放电过温保护 Over temperature discharge protection	保护温度 Detecion temperature	65±5℃
28		保护延时时间 Protection delay time(Typical)	3S
29		保护解除温度 Recovery temperature	55±5℃
30	放电低温保护 Under temperature discharge protection	保护温度 Detecion temperature	-20±5℃
31		保护延时时间 Protection delay time(Typical)	3S
32		保护解除温度 Recovery temperature	5±5℃
33	二次硬件过压保护/2nd over charge voltage protection	二次硬件过压保护/2nd over charge voltage protection(Cell)	4.350±0.030V
34		保护延时时间 Protection delay time	1-3S
35	自耗电 Current consumption	工作状态自耗电 Normal current consumption of PCM	Max 600.00uA

36		休眠状态自耗电 Sleep mode current consumption of PCM	Max 150.00uA
37	OV 充电/0V charger	是否允许 0V 充电/allowed 0V change	NO
38	预充电/Pre-charge	预充电流/Pre-charge current	25±15mA
39		预充电压/Pre-charge Voltage(cell)	2.5-3.0V
40	关断模式/Shuwdown model	关断模式电压/Cell shutdown voltage protection	2.75V
41	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	≤8A
42		建议工作温度/suggest working temperature	-20-60℃
43	内阻/IR resistance	PCM 内阻/IR of PCM	≤50mΩ

满充条件/FC Conditions

满充条件(两个 40 秒周期内所有条件发生）/FC Conditions（All of the conditions must occur for two consecutive 40-s periods:）	满充电压门限/Full Charge Voltage Threshold	4100mV
	充电终止增量电压/Charge Termination delta Voltage	100mV
	充电终止收尾电流/Charge Termination Taper Current	300mA

7. Battery Performance 电池性能

7.1 Standard test condition 标准测试条件

7.1.1 Standard Charge 标准充电

Unless otherwise specified, “Standard Charge” shall consist of charging at constant current of 0.2C. The cell shall then be charged at constant voltage of 12.3V while tapering the charge current. Charging shall be terminated when the charging current has tapered to 0.02C. For test purposes, charging shall be performed at 25ºC ± 2ºC.

除非另外说明，本电池的标准充电是指在 25ºC ± 2ºC 的环环境下，以 0.2C 的恒定电流，再以 12.3V 的恒定电压，充电截止电流为 0.02C；

7.1.2 Standard Discharge 标准放电

“Standard Discharge” shall consist of discharging at a constant current of 0.2C to 8.4V. Discharging is to be performed at 25 ºC ± 2 ºC.

标准放电是指电池在标准充电完成后，在 25 ºC ± 2 ºC 条件下，以 0.2C 恒定电流放电至 8.4V;

7.2 Electrical Specification电气性能

Item 项目	Condition 条件	Specification 规格
7.2.1 AC Impedance 交流内阻	Cell shall be measured at 1kHz after chargeper 7.1.1. 电池应按 7.1.1 充电后在 1kHz 条件下测试	≤180mΩ
7.2.2 InitialCapacity 初始容量	Cells shall be charged per 7.1.1 anddischarged per 7.1.2 within 1h after fullcharge; 电池按 7.1.1 充电 1 小时内以 7.1.2 放电容量；	Cini ≥8150mAh(Cmin)
7.2.3 CycleLife 循环寿命	Cells shall be per7.1.1 charged and per7.1.2 discharged, 300 cycles. A cycle is defined as on e charge and one discharge. 电池按7.1.1标准充电，再按7.1.2标准放电，循环300次为一个周期；	≥80 % (of Cmin in 3.1)

7．3 Environmental specification 环境规格

Item 项目	Condition 条件	Specification 规格
7.3.1 Storage Characteristic 贮存特性	Cells shall be charged per 7.1.1 and stored ina temperature-controlled environment at 25ºC±2ºC for 30 days. After storage, cells shall bedischarged per 7.1.2 to obtain the remainingcapacity.* 电池按 7.1.1 标准充电后，在按 25ºC±2ºC 条件下贮存 30 天后，再按 7.1.2 的标准模式放出的剩余容量	Capacity remaining rate ≥ 90% of Cmin in 3.1 剩余容量≥初始最小容的 90%
7.3.2 HighTemperatureStorage Test 高温贮存测试	Cells shall be charged per 7.1.1 and stored ina temperature-controlled environment at 45ºCfor 1 week. After storage, cells shall bedischarged per 7.1.2 and cycled per 7.1.1 and 7.1.2 for 3 cycles to obtain recoverycapacity; 电池按 7.1.1 的标准模式充电后，在 45ºC 条件贮存 1 周,贮存后	No leakage, Capacityrecovery rate ≥ 80%of Cmin in3.1 无泄漏； 恢复容量≥80%初始最

	按 7.1.2 放电，再按 7.1.1 充电和 7.1.2 放电三个循环后的容量;		小容量
7.3.3 Thermal ShockTest 温度适应性测试	65ºC (8h) ← 3hrs → -20ºC (8h) for 8 cycleswith cells charged per7.1.1 After test, cellsare discharged per 7.1.2 and cycled per 7.1.1for 3 cycles to obtain recovery capacity； 电池按 7.1.1 标准充电后，以 65ºC (8h) ← 3hrs → -20ºC (8h) 循环贮存 8 次，然后按 7.1.2 放电，再以 7.1.1 充电，如此三个循环的恢复容量;		No leakage Capacityrecovery rate ≥ 80%of Cmin in 3.1 无泄漏； 恢复容量≥80%初始最小容量
7.3.4 Temperature Dependency of Capacity 容量温度特性	Cells shall be charged per 7.1.1 at 25ºC ± 2ºCand discharged per 7.1.2 at the followingtemperatures 电池在 25ºC ± 2ºC 按 7.1.1 要求充电，再按 7.1.2 电流在以下温度下放电		
	Charge 充电	Discharge 放电	Capacity 容量
	25ºC	-10ºC	≥50%Cmin
		0ºC	≥80%Cmin
		25ºC	≥100%Cmin
		40ºC	≥80%Cmin

7.4 Mechanical Specification 机械特性

Item 项目	Condition 条件	Specification 规格
Drop Test 跌落测试	Cells charged per 7.1.1 are dropped onto an oak board from 1 meter height for 1 cycle, 2 drops fromeach cell terminal and 1 drop from side of cell. (Total number of drops =3) 电芯按照 7.1.1 充电后，将电芯从 1m 高度跌落混泥土板上，电芯 2 端各跌 1 次，电芯每个面各跌一次，共进行 3 次实验	No fire 不起火 No explosion 不爆炸
VibrationTest 振动测试	Cells charged per 7.1.1 are vibrated for 90 minutesper each of the three mutually perpendicular axes (x, y, z) with total excursion of 0.8mm, frequency of 10Hzto 55Hz and sweep of 1Hz change per minute. 电芯按照 7.1.1 充电后，沿 X,Y,Z，三个方向各震动 90 分钟，振幅 0.8mm,，震动频率为 10Hz~55Hz,每分钟变化 1Hz.	No leakage 无泄漏

7．5 Safety Specification 安全特性

Item 项目	Condition 条件	Specification 规格
7.5.1Overcharg e Test 过充测试	Cells are discharged per 7.1.2, then charged at constant current of 3 times the max. charge condition and constant voltage of 4.2V while tapering the charge current. Charging is continued for 7 hours (Per UL1642). 电池以 7.1.2 标准放电后，以 3 倍容量电流恒压 4.2V 充电 7 个小时	No fire 不起火 No explosion 不爆炸
7.5.2 External Short - Circuiting Test 外部短路测试	Cells are charged per 7.1.1, and the positive and negative terminal is connected by a 100mΩ-wire for 1 hour 电池按 7.1.1 标准充电后，连接一只小于 100 mΩ 负责 1 小时	No fire 不起火 No explosion 不爆炸
7.5.3 Overdischarge Test 过放测试	Cells are discharged at constant current of 0.2C to250% of the minimum capacity. 电池以 0.2C 电流放电以电池最小容量的 250%容量	No fire 不起火 No explosion 不爆炸
	Cells are charged per 7.1.1 and heated in a circulating air	No fire 不起火

7.3.4 Heating Test 热冲击	oven at a rate of 5ºC per minute to 130ºC. At130ºC, oven is to remain for 10 minutes before test is discontinued 电池以 7.1.1 方式充饱后，放置于每分钟以 5 ºC 上升至 130 ºC 后停置 10 分钟中止测试;	No explosion 不爆炸

8.Test instrumentation equipment requirements

测试量仪器仪表设备要求

10.1 Measure the voltage meter accuracy should not be less than ±0.5%
测量电压的仪表准确度应不低于±0.5%.

10.2 Measure the current meter accuracy should not be less than ±0.5%
测量电流的仪表准确度应不低于±0.5%.

10.3 The instrument accuracy measuring time shall not be less than±0.1%.
测量时间的仪表准确度应不低于±0.1%.

10.4 The instrument accuracy measuring temperature shall not be less than plus or minus ±0.5 ℃
测量温度的仪表准确度应不低于±0.5℃.

10.5 Current adjustable constant current source, in the process of constant current charge or discharge, the relative change of the current should be within ±1%.
恒流源的电流可调，在恒流充电或放电过程中，其电流的相对变化应在±1%范围内。

10.6 constant voltage source voltage is adjustable, in the process of constant voltage charging, the relative changes of voltage shall be within ±1%.
恒压源的电压可调，在恒压充电过程中，其电压的相对变化应在±1%范围内。

9. Package 包装

The graphics, sizes, color of marking should match GB/T191-2000 requirement.
标志的图形、尺寸、颜色应符合 GB/T 191－2000 的要求
9.1 Model and specification of product; 产品的名称和型号及规格；
9.2 Quantity;数量；
9.3 Qualified Identification ;合格品标识；
9.4 Manufacturing date 制造日期；
9.5 Other markings (color etc).其他标识，如颜色。

10. Visual inspection 外观检查

Scratch, flaw, crack, and leakage are not allowed
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。

Standard environmental test conditionUnless otherwise specified, all tests should be conducted within one month of delivery under the following conditions:
Temperature：20±5℃
Humidity: 60±15%RH
Barometric Pressure:86kpa-106kpa
标准测试环境
除非特别说明，本标准书中所有测试均在交货一个月内在以下环境条件下进行：

温度：20±5℃

湿度：60±15%RH

大气压：86kpa-106kpa

11.CAUTIONS IN USE 使用警告

Please read the manual carefully before using it to ensure properly use.

为了使电池安全的使用及处理请在使用前认真的阅读操作说明

- Do not make the battery exposure or thrown into fire.
- 不能把电池曝晒或丢在火中
- Never reverse charge the battery.
- 电池充电时不能把正负极性装反
- Never short circuit the battery.
- 避免短路电池
- Avoid excessive physical shock or vibration.
- 避免过分的物理震动和冲击电池
- Do not disassemble or deform the battery.
- 不能拆解或使电池变形
- Never allow the battery to get wet or be immersed in water.
- 不能将电池浸入水中
- Do not mixed use different types together..
- 不能将其它不同厂家，类型，型号的电池混合使用
- Keep away from children
- 禁止小孩接触电池

charge and discharge 充放电

- Charge should be at the appropriate conditions.
- 电池必须在合适的条件下充电
- Never use the faulted charger to charging.
- 决不能用故障的充电器给电池充电
- Chargingshould not be more than12 hours.
- 电池持续充电不能超过 12H

12.Battery operating instruction 电池操作说明

12.1 Charge 充电

Charge current: could not over the max charge current as mentioned in specification.

充电电流：不能超过规格书规定的最大的充电电流

Charge voltage：could not over the max charge voltage as mentioned in specification.\

充电电压：不能超过规格书规定的最高的限制电压

Charge temperature： Please follow the temperature range as specification.

充电温度：电池充电温度必须按照规格书的温度范围执行

Charge as constant current before constant voltage, Never reverse charge the battery.

先恒流后恒压方式充电，禁止颠倒的方式充电。如果电池正负极颠倒充电会带来危险。

12.2 Discharge current 放电电流

The discharge current is not allowed to out of max current as specification. Otherwise, the battery will be over heat and capacity fading.

电池放电电流不能超过规格书规定的最大放电电流，过大的电流放电会造成电池发热和容量衰减。

12.3 Discharge temperature 放电温度

Please refer to the temperature range as specification.

电池放电温度必须按照规格书的温度范围执行

12.4Over-discharge 过放电

It's workable if over charge and discharge for a short while but not allow to do it for a long time . over discharge may result in self-energy disappear . Please keep a certain electric quantity to prevent over discharge.

短时间的的过充过放不影响电池的使用，但是长时间的过放电会影响到电池的功能失效，电池永久性不能适用，电池可能过放还有一个原因是自动能量的消失。预防电池过放的出现方法是电池应保持一定的电量。

12.5Storing the Batteries 贮存电池

Please store the battery in the adequate temperature as mentioned in specification and recharge if keep in storage more than 6 months.

电池贮存在规格书规定的温度范围内，如果电池贮存超过六个月，建议你开始给电池充电。

13. Warranty period 保质期

Quality assurance for one year against workmanship and material defects, but. we are not responsible for the damage caused by inadequate and improper use. The information (subject to change without prior notice) contained in this document is for reference only and should not be used as a basis for product guarantee or warranty. For applications other than those described here, please contact our office. Manufacturer reserves the right toalter, amend the design, model and specification without prior notice.

电池的保质期从出货之日算起为 1 年。如果证明电池的缺陷是在制造过程中形成的而不是由于用户滥用及错误使用造成，本公司负责退换电池。

14. Other Chemical Reaction 其它化学反应

The battery performance will reduce if over time using or unused for a long time due to it's a reaction of chemical. In addition, the battery life will be shorten or injury or damage itself from electrolyte leakage, heating ignition or explosion for improper handling. It's necessary to replace battery if unable to charge for a long time even with proper way.

由于电池是利用化学反应的原理，所以随时间的增加电池的性能会降低，即使是存放很长一段时间而不使用。如果使用条件如充电、放电及周围环境温度等情形不在指定的使用范围内，也会缩短电池的使用寿命，或者产生漏液导致电池损坏。如果电池长周期不能充电，即使充电方法正确，这样需要更换电池。

15.Note: 备注

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

本说明书未包括事项应由双方协议确定。