

# Li-ION Battery Specification

## 锂电池产品承认书

**Customer/客户:TBD**

**Product name/客户品名: TBD**

**Customer P/N /客户料号:TBD**

**Product NO./产品编号:HS-12.8V6AH**

**P/N /料号: 02.011.00025**

**Product Spec/客户产品规格: 4S1P/12.8V/6Ah**

**Versions/版本: A/1**

AUTHORIZED SIGNATURE &  
COMPANY CHOP  
客户认可及签回

APPROVED  
批准

CHECKED  
审核

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**Resume 更改履历表**

Item 项次	Revision date 修订日期	Change content 更改内容	Reason 更改原因	Reviser 修订人	Ver 版本号
1	2022-4-27	首版拟定	首版拟定	陈佳鹏 李树伟	A/0
2	2023-03-29	保护参数值更改	版本升级	罗永恒 李树伟	A/1
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 <b>深圳市海斯科技有限公司</b> Shenzhen Haisic Technology Co., Ltd.	Document NO.: WI-RDC-010- HS-12.8V6-AH	Page 4 of 21
	MODEL: <b>HS-12.8V6AH</b>	REV:A/1

## 1. PREFACE/序言

### SCOPE (使用范围)

**Name (名称):**  LiFePO4-Li-ion battery (磷酸铁锂离子电池)

Polymer Li-ion battery (聚合物锂离子电池)

**Product NO./产品编号:** HS-12.8V6AH-02

**Spec (规格):** **4S1P/12.8V/6Ah**

This product approval sheet has 21 pages (include the first page)

本产品承认书共 21 页(含首页).

This product approval sheet includes technical features, testing method, external connection graph, packing and so on.

本产品承认书包含:技术参数,检测方式,外形尺寸图外部连接图,包装等.

Amendment on this product approval sheet content must depend on below condition:

本产品承认书所归属内容的修改必须依据以下条件:

1. Customer's request or agreement.

客户要求或同意.


2. Safety guarantee and no influence to machine which the battery used in.

安全保证且与电池使用机器不产生影响.

We can give mass production after the agreement of "battery approval sheet" and sample with the customer. Designed by Haisic R&D team, this approval sheet will be the basis of test.

本《产品承认书》由我司开发部编制,经由我司与客户签准《产品承认书》和样品后,方可

进行产品之量产,并作为双方检测之依据.

 <b>深圳市海斯科技有限公司</b> Shenzhen Haisic Technology Co., Ltd.	Document NO.: WI-RDC-010- HS-12.8V6-AH	Page 5of 21
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## 2. INPUT AND OUTPUT PARAMETERS 输入输出参数

Input port Characteristic: 充电器输入端口参数:			
1	Input Charge 充电输入	DC 直流	
2	Charge Voltage 充电电压	DC14.6V	
3	Input Current 充电电流	3A	0.5C

## 2.1 TECHNICAL PARAMETERS OF BATTERY PACK 电池包技术参数

Item 项目	Rated performance 性能	Note 备注
Rated Voltage 额定电压	12.8V	3.2V*4S
Discharge Cut-off Voltage 放电终止电压	10V	2.5V*4S
Rated Capacity 额定容量	6Ah	0.5C Discharge, 10V Cut-off
Limited Charge Voltage 充电限制电压	14.6V	3.65V*4S
Charge Method 充电方式	CC-CV	
Standard Charge Current 标准充电电流	3A	0.5C (0°C ~55°C)
Max Charge Current 最大充电电流	6A	1C (0°C ~55°C)
Standard Discharge Current 标准放电电流	3A	0.5C (-20°C ~60°C)
Max Discharge Current 最大放电电流	6A	1C(-20°C ~60°C)
Initial Internal Resistance 总内阻	≤30mΩ (不带 PTC)	AC 1kHz (AC Impedance) AC 1kHz 交流阻抗值
Net weight of finished battery 成品电池净重	约 0.8kg	Electronic scale 电子秤(不含包装材料)
With group requirements 配组要求	10mV/0.1mΩ /<1Cmin*1%mAh	
Flame retardant rating of materials 材料阻燃等	V-0	
Battery Size 外型尺寸	See appearance size chart 见外观尺寸图	Calipers 卡尺
Operating Temperature 工作温度范围	Charge 充电	0°C ~55°C Humidity 65±20% 湿度 65±20%
	Discharge 放电	-20°C ~60°C Humidity 65±20% 湿度 65±20%
Storage Temperature 贮存温度范围	Standing Storage 长期贮存	1 month: -5~45°C 6 months: 0~45°C Humidity 65±20% 湿度 65±20%

Notes(说明):

1. Period of storage is counted from shipping date  
贮存时间以出货日期为起始点计算;
2. Test Method and standard listed as below, environment temperature (15~25) °C, CC/CV mode, 0.5C constant current charge to 14.6V, then constant voltage charge mode, cut off current 0.02C, 0.2C constant current discharge, cut off voltage 10V, more than 5 hours discharging time.  
测试方法及标准如下: 环境温度(15~25) °C, CC/CV 方式, 0.5C 恒流充电到 14.6V, 再恒压充电方式, 截止电流 0.02C, 0.2C 恒流放电, 截止电压 10V, 放电时间大于 5 小时。

### 3. TEST/测试

#### 3.1 TESTING ENVIRONMENT (测试条件):

##### 3.1.1 TEST TIME SHOULD BE NO MORE THAN ONE MONTH AFTER RECEIVE THE BATTERY

测试电池为用户收到后不超过 1 个月的产品.

##### 3.1.2 TESTING ENVIRONMENT(测试环境):

Temperature(温度): 15°C~25°C  
Relative Humidity(相对湿度): 45%~85%  
Atmospheric Pressure(大气压力): 86kPa~106kPa

#### 3.2 TESTING INSTRUMENT(测试工具):

##### 3.2.1 VOLTAGE METER 0.5 GRADE OR MORE REGULATED BY IEC 51/IEC 485, MORE THAN 10KΩ/V INTERNAL RESISTANCE

电压计 IEC 51/IEC 485 所规定的 0.5 级或以上, 内阻大于 10K Ω/V

##### 3.2.2 CURRENT METER 0.5 GRADE OR MORE REGULATED BY IEC 51/IEC 485, INCLUDE WIRE RESISTANCE LESS THAN 0.01Ω.

电流计 IEC 51/IEC 485 所规定的 0.5 级或以上, 包括引线总电阻小于 0.01 Ω.

##### 3.2.3 CALIPERS DEFINITION 0.02MM

卡尺 精确度 0.02mm

**3.2.4 INTERNAL RESISTANCE METER AC 1KHZ 4 TERMINAL MEASURE SETTING.**

内阻仪 交流 1KHz 4 端子测量装置.

**3.2.5 LOAD RESISTANCE INCLUDE EXTERNAL CIRCUITRY, ALLOWED RESISTANCE FIGURE ERROR IS ±5%.**

负载电阻 包括外部线路, 电阻值允许误差为±5%.

**3.2.6 FINISHED BATTERY PRODUCT TESTING MACHINE**

成品电池测试仪

**3.3 ELECTRICAL PERFORMANCE OF BATTERY PACK (电池包电气性能)**

Item 项目		Test Method 检测方法	Request 要求
1	Shipping Voltage 出货电压	Measure with voltmeter. 使用电压表进行测量.	The battery shall be shipped in 80±5 % ( Voltage 13.3~13.6V) charged state. 电池包的出货容量:80±5% (电压 13.3~13.6V)
2	Nominal Capacity 标称容量	Charging 充电方式	1) Discharging time: ≥300 minutes. 放电时间: ≥300 分钟. 2) No distortion on appearance, no burst and no leak 电池外观应无变形、无爆裂、漏液.
	Discharging 放电方式	Environment temperature (0~45) °C, CC/CV mode, 0.5C constant current charge to 14.6V, then constant voltage charge mode, cut off current 0.02C 环境温度 (0~45) °C, CC/CV 方式, 0.5C 恒流充电到 14.6V, 再恒压充电方式, 截止电流 0.02C. Environment temperature (0~45) °C, 0.5C constant current discharge, cut off current 10V 环境温度 (0~45) °C, 0.5C 恒流放电, 截止电压 10V.	
3	Internal Resistance 内阻	AC testing method. In half capacity condition, using AC 1kHz testing method to measure the internal resistance figure between poles in battery connector. 交流测试法, 半容量状态下, 使用 AC 1kHz 检测方法, 测量电池接口处正负极之间的内阻.	≤30mΩ
4	Temperature Characteristics 温度特性	Discharge Capacity: 60°C: See the Cell specification 20°C: See the Cell specification; -20°C: See the Cell specification 放电容量: 60°C: 见电芯规格书; 20°C: 见电芯规格书; -20°C: 见电芯规格书.	1. Use nominal capacity charging method full charge the battery. 2. Capacity comparison at each temperature, measured with constant discharge current 0.5C with 10V cut-off. Percentage as an index of the capacity compared with 100% at 23°C 1. 按标称容量充电方法将电池充饱电. 2. 在不同温度条件下, 用 0.5C 的电流恒流放电至截止电压 10V. 以 23°C 时放电容量为基准计算百分比.
5	Cycle Life 循环寿命	The battery shall be constantly charged at 0.5C in the temperature of 23±2°C. When its voltage reaches 14.6V, it shall be charged to constant voltage charging. It shall not stop charging until its current is no more than 0.02C. Put it aside for	Battery should not explode smoke, burn or burst. 0.5C charge and 0.5C discharge cycle life should more than 1500 times 电池不能有爆炸, 冒烟, 燃烧, 变形等现

0.5H-1H then discharge with 0.5C in the constant current to its final voltage 10V. When the discharge is finished, the battery shall be put aside for 0.5-1H and has the next charge and discharge recycle test shall be continued unless there are two continuous discharging capacity less than 70%, which is taken as the end of the life. 在环境温度 23°C±2°C 的条件下, 以 0.5C 充电, 当电池端电压达到充电限制电压 14.6V 时, 改为恒压充电, 直到充电电流小于或等于 0.02C, 停止充电, 搁置 0.5h~1h, 然后以 0.5C 电流放电至终止电压 10V, 放电结束后, 搁置 0.5h~1h, 再进行下一个充放电循环, 直至连续两次放电容量小于 70%, 则认为寿命终止。

象。  
0.5C 充电, 0.5C 放电循环寿命应 ≥1500 次。

### 3.4 RELIABILITY CHARACTERISTICS (可靠性特性)

Item 项目	Test Method 检测方法	Request 要求
1 High temperature Resistant Capability 抗高温性能	1). Use nominal capacity charging method full charge the battery. 按标称容量充电方法将电池充饱电。 2). Put full-charged battery in 55°C ± 2°C thermostat for 2h, then use 0.5C discharge to 10V 将充饱电的电池置入 55°C ± 2°C 恒温箱中存放 2h 后, 并以 0.5C 放电至 10V.	1). After test, 0.5C capacity should be ≥4.5 hours. 实验后的 0.5C 容量应 ≥4.5 小时。 2). Case appearance should not be distorted and crack. 电池外观应无变形、无爆裂。
2 Low temperature Resistant Capability 抗低温性能	1). Use nominal capacity charging method full charge the battery. 按标称容量充电方法将电池充饱电。 2). Put full-charged battery in -20°C ± 2°C chest freezer for 24h, then use 0.5C discharge to 10V 将充饱电的电池置放在 -20°C ± 2°C 冷冻柜中 24h 后, 并以 0.5C 放电至 10V.	1). After test, 0.5C capacity should be ≥2.0 hours. 实验后的 0.5C 容量应 ≥2.0 小时。 2). Case appearance should not be distorted and crack. 电池外观应无变形、无爆裂。
3 Vibration Proof Capability 抗振动性能	Set the vibration testing machine on F=20HZ, I=90%, T=30min. Record the discharging capacity after test. 实验过程中将振动仪设置在 F=20HZ; I=90%; T=30min 实验后记录电池的 0.5C 放电容量	1) After test, 0.5C capacity should be no less than 95% of it before test Internal resistance discrepancy should be no more than 3mΩ. 实验后的 0.5C 容量 ≥ 实验前 95%, 内阻相差不超过 3mΩ。 2) Battery appearance should not be obvious nick, leak, smoke and burst. 电池外观应无明显损伤、漏液、冒烟或爆炸。
4 Fall Proof Capability 抗跌落性能	Hang the battery in one meter high in the air. Let the cells fall down by 3 sides (Anode and Cathode side, crosswise sides) 1 time each, all together 3 times. 将电池悬空在 1 米高处, 将电芯自由跌落 3 面 (正负极面, 横向面) 各 1 次, 共 3 次。	1) Battery should not be leak, smoke and burst. 电池应不漏液、不冒烟、不爆炸。 2) After test, 0.5C capacity should be no less than 95% of it before test. Internal resistance discrepancy should be no more than 3mΩ. 实验后的 0.5C 容量 ≥ 实验前 95%, 内阻相差不超过 3mΩ。



5	Capacity Retention 荷电保持能力	<p>1). In environmental temperature <math>23^{\circ}\text{C} \pm 2^{\circ}\text{C}</math> condition, Use nominal capacity charging method full charge the battery. 在环境温度 <math>23^{\circ}\text{C} \pm 2^{\circ}\text{C}</math> 条件下, 按标称容量充电方法将电池充饱电.</p> <p>2) Lay the battery opened circuit 28 days, then use 0.5C discharge it to cut off voltage. 将电池开路搁置 28 天, 再以 0.5C 放电至终止电压.</p>	<p>0.5C discharging capacity should no less than 85%. 0.5C 放电容量应不低于 85%.</p>
6	Constant Temperature and Humidity Proof Capability 抗恒定湿热性能	<p>Lay the battery in temperature <math>40 \pm 2^{\circ}\text{C}</math> and humidity 90% ~ 95% environmental chambers for 48 hours. Then lay the battery in environmental temperature <math>23 \pm 2^{\circ}\text{C}</math> condition for 2 hours. Later discharge it in 0.5C and record the capacity. 将电池放入 <math>40^{\circ}\text{C} \pm 2^{\circ}\text{C}</math>, 相对湿度为 90%~95% 的恒温恒湿箱中搁置 48 小时后, 将电池取出在环境温度 <math>23^{\circ}\text{C} \pm 2^{\circ}\text{C}</math> 的条件下搁置 2h, 以 0.5C 放电, 并记录容量。</p>	<p>1) Battery appearance should not be obvious nick, leak, smoke and burst. 电池外观应无明显变形锈蚀、冒烟或爆炸.</p> <p>2) 0.5C discharging capacity should no less than 5 minutes. Internal resistance discrepancy should be no more than <math>3\text{m}\Omega</math>. 0.5C 放电容量应 <math>\geq 72</math> 分钟, 内阻相差不超过 <math>3\text{m}\Omega</math>.</p>
7	INGRESS PROTECTION 防护等级	防护等级 IP55	
8	Salt spray test 盐雾测试	<p>Battery discharge connector and charging connector (excluding customer supply materials) pass the salt spray test for 96 hours (spray 5% salt solution for 24 hours, air dry for 24 hours for one cycle, do two cycles); 电池放电连接器及充电连接器(不包括客供物料)通过 96 小时盐雾测试(用 5%盐溶液喷雾 24 小时, 自然风干 24 小时为一次循环, 做两次循环);</p>	<p>exterior have no different color, No corrosion 外观无异色、无腐蚀</p>

### 3.5 PROTECTION CAPABILITY TEST METHOD AND REQUEST(保护性能检测与要求)

Item 项目	Test Method 检测方法	Request 要求
1	<p>Overcharge Test 过充测试</p> <p>After standard discharge, the battery is charged with 1.5C5A current to 14.6V, and then charged at constant voltage at 14.6V for 7h. 电池标准放电后, 以 1.5C5A 电流充电至 14.6V, 然后在 14.6V 下恒压充电 7h。</p>	<p>Battery could not be burst, burn, leak and smoke 电池应不爆炸、不爆炸、不冒烟或漏液。</p>
2	<p>Over discharge Test 过放测试</p> <p>Discharge the battery at 0.5C to cut off voltage, then discharge with loading <math>30\Omega</math> for 24hs. 以 0.5C 放电至终止电压后外接 <math>30\Omega</math> 负载放电 24H</p>	<p>Battery could not be burst, burn, leak and smoke 电池应不爆炸。不爆炸。不冒烟或漏液。</p>
3	<p>Over-current protection 过电流保护</p> <p>The battery is fully charged to rated capacity. 按标称容量充电方法将电池充饱电。 Load current at 0.2A/S to cut off the output of the battery. 以 0.2A/S 的速度加载线性电流, 致使电池切断输出。</p>	<p>Battery could not be burst, burn, leak and smoke 电池应不爆炸。不爆炸。不冒烟或漏液。</p>

4	Pack Short-circuit Protection 短路保护	<p>The battery is charged to rated capacity. 按标称容量充电方法将电池充饱电.</p> <p>The battery is to be short-circuited by connecting the positive and negative terminals of the battery with thermocouple having a maximum resistance load of 0.1 Ω for 1h. 将接有热电偶的电池置于通风橱中, 将电池正负极用 0.1 Ω 电阻器持续短路 1h.</p>	<p>Battery could not be burst, burn, leak and smoke After charging. 电池应不爆炸、不打火、不冒烟或漏液.</p>
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## 4. CELL/电芯

- 1) Chem: LiFePO4-Li-ion battery
- 2) 类别: 磷酸铁锂离子电池
- 3) Spec: IFR32700-6000mAh
- 4) 规格: IFR32700-6000mAh

### 2. 标准规格 Nominal Specification

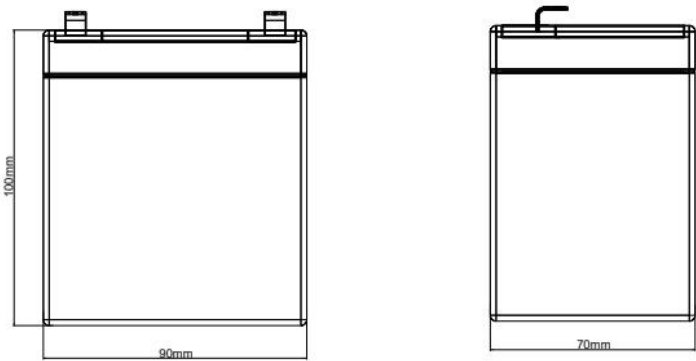
项目 Item	条件 Condition/ Note	规格 Specification	备注
2.1 标称容量 Nominal Capacity	1I <sub>1</sub> 放电容量 1I <sub>1</sub> discharge capacity	6.0 Ah	标准充放电
2.2 交流内阻 AC Impedance	10%SOC 在 1000 Hz 下测量 10%SOC test at 1000 Hz	≤8.5mΩ	
2.3 标称电压 Nominal Voltage		3.2 V	
2.4 电芯尺寸 Cell Size	电芯直径 Cell Diameter	32.2±0.2 mm Max. 32.4 mm	图形结构详细信息, 请参阅附图 1。 For details, please refer to Figure 1.
	电芯高度 Cell Height	70.5±0.3 mm Max. 70.8mm	
2.5 电芯重量 Cell Weight	(光身电芯)	140± 5 g	
2.6 充电截止电压 End-of-charge Voltage	恒流充电 CC Mode	3.65 V	
2.7 充电截止电流 End-of-charge Current	恒压充电 CV Mode	0.30 A	
2.8 充电方式 Charging Method	标准充电 Standard Charging	1I <sub>1</sub> at CC/CV	
	快速充电 Fast Charging	2I <sub>1</sub> at CC/CV	
2.9 放电截止电压 End-of-discharge Voltage	恒流放电 DC Mode	2.75 V (45°C~60°C) 2.5 V (20°C~45°C) 2.0 V (-20°C~20°C)	
2.10 最大持续放电电流 Max continuous Discharging Current		18 A	
2.11 最大瞬时放电电流 Max Pulse Discharging Current		30 A	5s

 Global Battery Manufacturer	文件编号	GBM-RD-SPEC11	版本号	A2	页码	5/12
	文件名称	圆柱型锂离子电池规格书				

2.12 循环性能 Cycle Life	II <sub>1</sub> /100% DOD	常温循环 ( 20℃ ~30℃ ): ≥2000 cycles	
2.13 操作温度范围 Operating Temperature Range	充电温度 Charging Temperature	0~60℃	
	放电温度 Discharging Temperature	-20~60℃	
	储存温度 Storage Temperature	1年 1 year	-10~40℃
2.14 外观 Appearance	无破裂、划痕、变形、污渍、电解液泄露等 Without break, scratch, distortion, contamination, leakage and so on		

## 5. OUTLINE/外观尺寸

尺寸公差									
尺寸	长度尺寸				圆角及倒角				
	3以下	3~6	6~30	30~120	120以上	3以下	3~6	6以上	角度
	±0.1	±0.1	±0.2	±0.3	±0.5	±0.2	±0.5	±1	±1°
	±0.2	±0.3	±0.5	±0.8	±1.2	±0.4	±1	±2	±3°



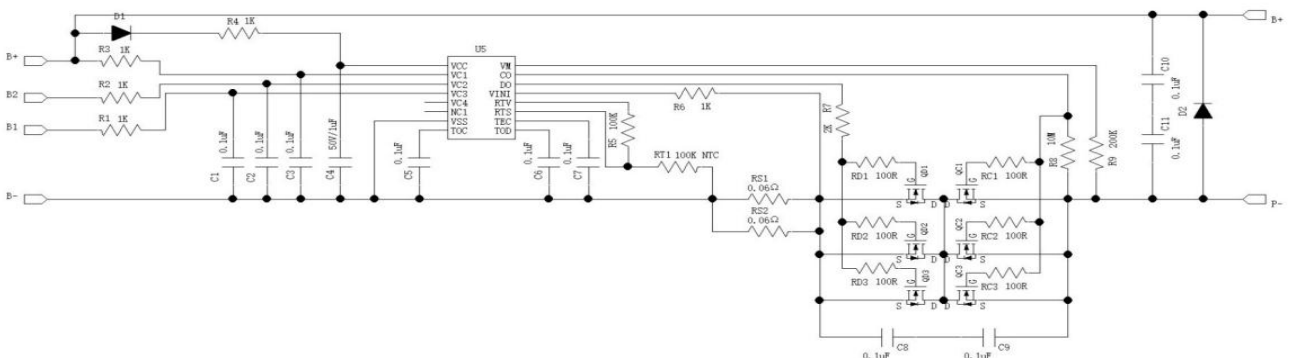
△					外形尺寸圖	L90xW70xH100				
符號	日期	訂正內容	訂正批准	No.	名稱	材質*規格	件數	處理	件號	備註
頁數	/	比例	2/1	單位	mm	製圖	校對	批准	品名	外形尺寸圖
深圳海斯科技有限公司									圖號	XXXX-XX

## 6. PCBA ELECTRONIC CHARACTERISTIC/保护板电气参数

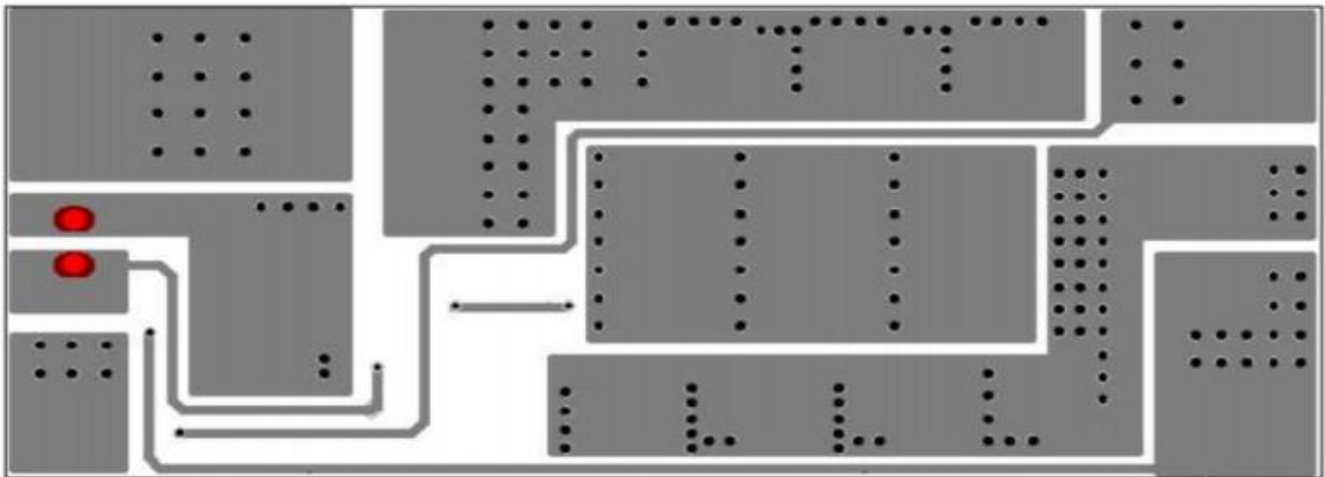
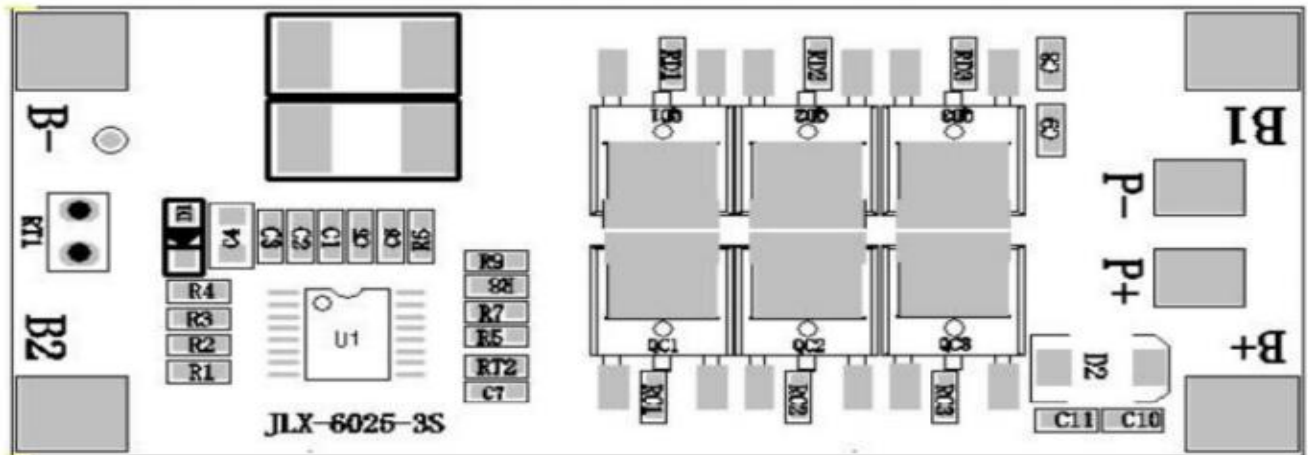
No	Item 项目	Condition 条件	Standard 规范标准
1		BMS 工作电压 BMS Operating voltage	10V-14.6V
2	BMS 工作电压范围 BMS Operating voltage	BMS 关机电压(每节) BMS off voltage (Any CELL)	<2.500V(2.500*4s)
3		禁充电压(每节) Forbidden charging voltage (Any CELL)	<1.000 V(1.00*4s)
4	输出电压 Out Voltage	P+/P-间输出电压 out Voltage P+ to P-	10V-14.6V
5		一级保护电压 Detection voltage	3.650±0.1V
6	过充电(每节) Overcharge (Any CELL)	恢复电压 Release voltage	3.550±0.1V
7		保护延迟时间 Detection delay time	1000±500mS
8		保护电压 Detection voltage	2.32±0.1V
9	过放电(每节) Over discharge( Any CELL)	恢复电压 Release voltage	2.58±0.1V
10		保护延迟时间 Detection delay time	1000±500mS
11		放电过流(一级)保护 OC (1st Tier) Dsg	20.0±5A
12	放电过流 Over discharge current	放电过流(一级)保护延时 OC (1st Tier) Dsg time	1000±500mS
13		恢复条件 Release Conditions	Self-recovery (60S) or charge recovery 自恢复(≤60S)或充电恢复
14		充电过流(一级)保护 OC (1st Tier) Chg	20.0±5A
15	充电过流 Over charge current	充电过流(一级)保护延时 OC (1st Tier) Chg time	500~1500mS
16		恢复条件/Release Conditions	Discharge recovery (current> 200 mA) 放电恢复(电流>200mA)
17	短路保护 Short detection delay time	放电短路保护延时 Short detection delay time	Time: 100~600us 时间:100~600us
18		恢复条件/Release Conditions	Disconnect the load 断开负载
19	温度保护	充电高温保护	50±5℃

	temperature protection 温度保护误差: $\pm 3^{\circ}\text{C}$ Temperature deviation: $\pm 3^{\circ}\text{C}$	Over Temp Chg	
20		充电高温恢复条件 Release Conditions Temp Chg	$45 \pm 5^{\circ}\text{C}$
21		充电低温保护 Under Temp Chg	$-10 \pm 5^{\circ}\text{C}$
22		充电低温恢复条件 Release Conditions Temp Chg	$0 \pm 5^{\circ}\text{C}$
23		放电高温保护 Over Temp Dsg	$70 \pm 5^{\circ}\text{C}$
24		放电高温恢复条件 Release Conditions Temp Dsg	$60 \pm 5^{\circ}\text{C}$
25		放电低温保护 Under Temp Dsg/	$-40 \pm 5^{\circ}\text{C}$
26		放电低温恢复条件 Release Conditions low Temp Dsg	$-20 \pm 5^{\circ}\text{C}$
27		MOSFET 过温保护点	$85^{\circ}\text{C}$
28		MOSFET 过温保护点释放点	$80^{\circ}\text{C}$
29		均衡开启电压 Balance starting voltage	NO
30	均衡电压 Balance starting voltage	均衡开启电芯电压差值 Balance starting of difference cell voltage	NO
31		均衡开启条件 Balance starting condition	NO
32		工作状态 Normal model (不包含风扇显示屏)	Max 50mA
33	自耗电 Normal current consumption	休眠状态 Sleep model	Max100uA
34		低电压状态/Power down	Max 50 uA
35	ESD 可靠性测试 ESD Reliability test	接触/ $\pm 8\text{KV}$ ;空气/ $\pm 12\text{KV}$ connect/ $\pm 8\text{KV}$ ;Air/ $\pm 12\text{KV}$	PASS

## 7. SCHEMATIC/原理图



## 8. PCB LAYOUT



## 9. CERTIFICATIO/认证

**UL2054、FCC、IEC62133-CE、ROHS、UN38.3**

## 10. LABEL/标签




## 11. PACKING AND TRANSPORTATION/包装和运输

### 13.1 包装 packing

每个电池都应用防静电胶袋包装. 电池产品应放在干燥、防尘、防潮的包装箱内. 包装箱外应标明产品名称、型号、数量、毛重、制造厂商及其联络地址、出厂日期, 还应有“小心轻放”、“怕湿”、“向上”等必要标志. 其包装储运图示标志应符合 GB191—2000 的规定. 每个电池说明书上应有下列中文标志: 产品名称、型号、标称电压、额定容量、充电限制电压、执行标准编号、正负极性、商标和警示说明、以及制造日期、批号、制造厂名 (或包括以上数据的串号) .

Every battery should be packed by anti-static bag. Every package with battery should be stored in the dry, anti-dust and anti-moisture packing carton. Every packing carton outside should be indicated product name, type, quantity, gross weight, manufacturer and contact address, also should show 'handle with care', 'keep dry' and 'up' and other necessary signs. The packing and storage figure should be in accord with GB191--2000 Requirement. Every battery instruction should have the following Chinese signs: product name, model, rated voltage, rated capacity, limited charging voltage, standard implementation code, positive and negative pole, trademark, warning instruction,

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manufacturing date, lot number and manufacturer name (serial number including the above data).

### 13.2 运输 Shipment

电池建议应在半荷电状态（30%—50%充电状态）下包装成箱进行运输, 在运输过程中应防止剧烈振动、冲击或挤压, 防止日晒雨淋, 应适用汽车、火车、轮船、飞机等普通交通工具运输.

Battery should be packed in cartons and shipped under the state of half capacity 30%-50%. The excessive vibration, impaction or squeezing, and exposing in the sun or rain should be prevented in the transportation process.

The batteries should be transported by the normal vehicle such as by automobile, by train, by sea or by air.

## 12. STORAGE AND GUARANTEE PERIOD/储存与保质期

电池应贮存在环境温度为-20℃~45℃的清洁、干燥通风的室内, 相对湿度不大于 75%, 应避免与腐蚀性物质接触, 应远离火源及热源.

The batteries should be stored in the clean, dry and ventilated room at the temperature of -20℃~45℃ , and the relative humidity is not more than 75% . The battery should avoid touching the corrosive substance, and keep far away fire and heat.

电池在贮存过程中每六个月充电一次, 充电后的电压保持在 13V~14V. 电池在加工过程中使用库存电芯和电池交货出库时, 均应该遵循“先进先出”的原则.

Battery should be charged every six months during storage , and the voltage keep 13V~14V after charging . Using the stored cells and delivering batteries should follow ' first in, first out ' .

电池从入库之日起, 保存期限为 12 个月, 超过贮存期限的产品必须重新进行逐批检查, 合格后才能交付订货方, 逐批检查不合格的批按再次提交检查的批处理. 若仍然不合格, 将由订货方决定处置.

The storage time limit of battery is 12 months from the beginning day of storing. The expired batteries must be inspected completely, only the qualified batteries can deliver to the purchaser. The unqualified ones should be checked again. If they are still unqualified, the purchaser has right to deal with the bad ones.


## 13. INSTRUCTIONS AND WARNINGS/使用说明与注意事项

### 1、使用说明 Instructions

1) 使用电池前, 请仔细阅读使用说明书和电池表面标识.

Before use, please carefully read the manual and outer label of the battery.



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2) 请在正常的、室内环境中使用电池. 温度:  $-20\sim+45^{\circ}\text{C}$ , 相对湿度:  $55\pm 20\%$ .

Please use the battery in normal indoor environment .temp: $-20\sim+45^{\circ}\text{C}$ ,relative humidity:  $55\pm 20\%$ .

3) 在使用过程中, 应远离热源、高压, 避免儿童玩弄电池. 切勿摔打电池. 本电池只能使用配套充电器充电. 不要将电池放在充电器中充电超过 24h.

While using the battery, stay away from heat source and high pressure, don't let children play the battery. Only using specified charger for charging. Don't charge the battery over 24 hours.

4) 切勿将电池正负极短路, 切勿自己拆装电池, 也勿让电池受潮, 以免发生危险.

Don't short circuit two poles of the battery. Don't dismantle the battery yourself. Keep the battery from moisture to avoid danger.

5) 长期不用时, 请将电池储存完好. 让电池处于半荷电状态. 请用不导电材料包裹电池, 以避免金属直接接触电池, 造成电池损坏. 将电池保存在阴凉干燥处.

If the battery would out of use for a long time, please keep the battery in save place. Make the battery in the state of half-charged. Don't wrap the battery by conductive material to avoid the danger of the direct contact of metal materials. Keep the battery in cool dry place.

6) 废弃电池请安全妥当处理, 不要投入火中或液体中.

Properly handle the waste batteries, don't not dump them to fire or liquid.

## 2、注意事项 Attention

1) 在强阳光下使用电池 Using the battery under strong sunshine.

请不要在强阳光暴晒的环境下使用电池, 以免发热、变形、冒烟. 至少避免电池性能下降、减少寿命.

Don't use the battery under strong sunshine environment, to avoid heating, deformation and fuming, at least to avoid the lowering of the performance and longevity of the battery.


2) 防静电 Anti-static

电池中装有保护电路可以避免各种意外情况的发生. 不要在产生静电的场所使用电池, 因为高压静电容易损坏保护板, 而导致电池工作不正常, 发热、变形、冒烟或起火燃烧.

The battery with protection circuit can avoid various accidents. Do not use batteries in the electrostatic field, because the high pressure and electrostatic is easy to damage the PCBA, causing the battery to be abnormal, heating, deformed, fuming or firing.

3) 充电温度范围 Charging Temperature Range

推荐的充电温度范围请依据第 7 页第 4 项充放电曲线图. 在超出此范围的环境中充电有可能造成电池性能下降、

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减少寿命.

Recommended charging temperature range is 0--60°C Please recommended charging temperature range according the charge-discharge curves on page 7 item 4, If the charging temperature beyond the range, it may cause lowering of the battery performance and life.

4) 使用手册 manual

在使用电池之前, 请仔细阅读使用手册并经常在需要时阅读.

Before use, please read carefully the manual and read it in need.

5) 充电方式 Charge Way

请使用专用充电器和推荐的充电方式, 在推荐的环境条件下给电池充电.

Please use specific and recommended charge way, charge battery in recommended environment.

6) 第一次使用 First use

在第一次使用电池时, 若发现电池不整洁或有异味等不正常现象, 不可继续使用电池, 应将电池返回销售商.

If you find any abnormal situation occurred during your first use, such as unclean or odor etc., stop using it, then return the battery to its franchiser.

7) 儿童使用 Use by Child

儿童使用电池前, 应受父母指导, 并在使用中受监督是否正确.

Before child use, parents should conduct them and monitor them whether the use is appropriate and correct.

8) 注意漏液 Be care of the leakage.

假如皮肤或衣物接触到电池漏液, 请用清水冲洗, 以免造成皮肤不适.

If skin or clothes contact to the battery electrolyte, please wash them in water to avoid skin discomfort.

9) 咨询 consultancy


购买电池时, 请注意销售商联络方法. 以便在需要时及时与销售商取得联系, 得到咨询.

While purchasing battery, please note the contact way of franchiser so that you can promptly contact the franchiser to consult when you are in need.

10) 保用期 warranty period

保用期是自出厂之日起十二个月. 寿命为 0.5C 充放电循环 1500 次容量  $\geq 70\%$ . 但是, 属于使用不当而非质量问题, 即使在保用期内生产厂家也不会无偿更换新电池.

warranty period is from the ex-factory date for 12 months, the warranty longevity is 1500 charge-discharge circles(0.5C), capacity  $\geq 70\%$ . If the malfunction is caused by abnormal use but not the quality problem, even in the

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warranty period, the manufacturer would not replace new one for free.

#### 11) 安全使用保障 Assurance for Safety

如果将电池用于其他设备, 请与供应商讨论保护功能的完善性. 至少应该咨询电池的大电流、快速充电、特殊应用的问题.

If apply the battery to other devices, please contact the supplier for its protection function integrity. At lease you should consult for the questions of large current, quick charging, special apply etc.

### 3、警告 Warning

#### 1) 不可与其它电池混用 Don't use with other batteries.

电池不可与其它类型的一次或二次电池混用, 否则会因为不正常的充、放电造成电池发热、冒烟、变形或燃烧. Don't use with other batteries, or it can cause heating, fuming, deformation or firing of the battery.

#### 2) 将电池远离孩童 Keep the battery away from children.

将电池置于孩童不能得到的地方, 以避免孩童噬咬或吞咽电池. 如果吞咽了电池, 应迅速送医院处理. Put the battery to a place where a child cannot reach for avoiding them biting or swallowing the battery. If the battery has been swallowed by him, promptly send him to hospital.

#### 3) 不可长期置于充电器上 Don't charge for long time.

如果超过正常充电时间很长时间充电器仍在充电, 应停止充电. 不正常的充电有可能会使电池发热、冒烟、变形或燃烧. Stop charging the battery if it has been charged for much longer time than normal charging time. Abnormal charging can cause heating, fuming, deformation or fir.

#### 4) 不可置于微波炉或其他压力容器中瞬间加热或结构损坏会使电池发热、冒烟、变形或燃烧.

Don't transiently heat the battery in microwave oven or other pressure vessel. Corrupted structure can cause heating, fuming, deformation or firing

#### 5) 漏液电池不可近火 leaking battery cannot be close to fire.


假如发现电池漏液 (或有异味), 应让电池远离火源. 否则, 渗漏的电解液会着火, 甚至造成其它危险.

If leaking or smelly battery are found, it should be away from fire. Otherwise, the leaked electrolyte can cause fire or even further damages.

#### 6) 不可使用不正常电池 Don't use abnormal battery

假如发现电池有异味、变形、变色或扭曲, 应让电池离开手机或充电器并弃用. 使用不正常的电池会发热、冒烟、变形或燃烧.

If there is any odor, deformation or distort, take off the battery from cellphone or charger and never use it anymore.

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Using abnormal batteries can cause heating, fuming, deformation or fire.