

# 产品规格书

## Product Specification

名称/Name: 聚合物锂离子电池/ Lithium polymer batteries

型号/ Model: PL805050P2200mAh 1S2P

用途/Application: \_\_\_\_\_

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日期/Date: 2015-03-03

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## 变更记录/Modification Record Table

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1	Ver: 1.0	2013.12.30	新版发行	张华南
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## 1. Scope/使用范围

This document describes the Product Specification of the Lithium-ion Polymer Battery(LIPB)

supplied by Grand-Pro.

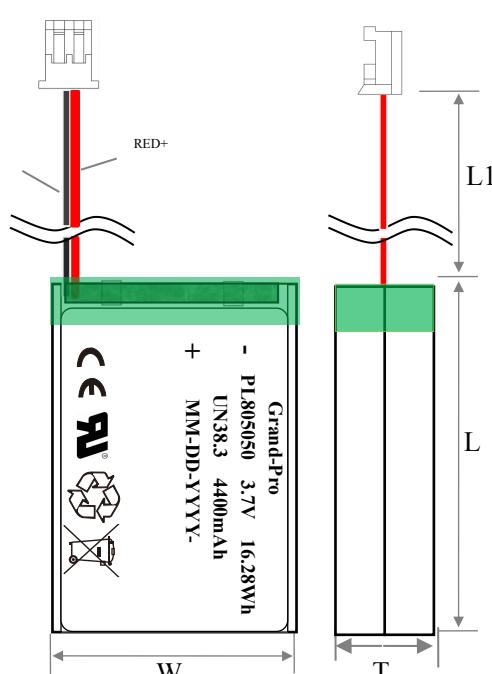
本文档描述的产品是由格兰博科技有限公司提供的聚合物锂离子电池.

## 2. Model/型号: PL805050P

2.1 Spec. (规格) : 3.7V/4400mAh

2.2 Assembly model(装配方式): 1S2P

2.3 Shipping drawing(成品图纸)

Shipping drawing(成品图纸)	Dimension (尺寸)		
	Item	Description	Dimension
	T	Thickness (MAX)	17.0mm
	W	Width (MAX)	51.0mm
	L	Length (MAX)	53.0mm
	L1	Wire length	60±5mm
	RED+	Wire(red)	UL1007/24AWG
	BLACK-	Wire(black)	UL1007/24AWG
Connect Model (连接器型号) : MOLEX5264-2P (Pitch=2.0mm) 反向插头			
Wire Type: UL1007 24AWG Red(+) Black(-)			
Label(喷码): Grand-Pro - PL805050 3.7V 16.28Wh UN38.3 4400mAh + MM-DD-YYYY 			
Other declare (其他) : <u>含精工保护板 PCM</u> . PCM 参数见下一页。 (电芯极耳转镍, 须喷码)			
Remark(备注) :			
When measuring the cell's thickness, width and length, the stress of the measuring instrument on the cell should be larger than 300gf.			
在测量电池厚度长度和宽度时, 需要在测量仪器上施加 300gf 的力压紧。			

**PCM Specification 保护板参数**

Item 项目	Symbol 符号	Content 内容	Criteria 标准
Over-charge protection 过充电保护	$V_{DET1}$	Over charge detection voltage 过充侦测电压	$4.250 \pm 0.025V$
	$T_{CU}$	Over charge detection delay time 过充侦测延迟时间	$1000 \pm 200ms$
	$V_{REL1}$	Over charge release voltage 过充保护解除电压	$4.05 \pm 0.025V$
Over-discharge protection 过放电保护	$V_{DET2}$	Over discharge detection voltage 过放侦测电压	$2.8 \pm 0.08V$
	$T_{DL}$	Over discharge detection delay time 过放侦测延迟时间	$128 \pm 30ms$
	$V_{REL2}$	Over discharge release voltage 过放保护解除电压	$3.0 \pm 0.08V$
Over-current protection 过流保护	$I_{DP}$	Over current detection current 过流侦测电流	$3 \sim 5A$
	$T_{IOV1}$	Over current detection delay time 过流侦测延迟时间	$10 \pm 5ms$
	---	Release condition 保护解除件	Cut load 断开负载
Short protection 短路保护	--	Detection condition 侦测条件	Exterior short circuit 外部短路
	$T_{IOV2}$	Short current detection delay time 短路侦测延迟时间	$200 \sim 500\mu s$
	---	Release condition 保护解除件	Cut short circuit 切断短路源
Interior resistance 内阻	$R_{DS}$	Main loop electrify resistance 主回路内阻	$R_{DS} \leq 70m\Omega$
Current consumption 电流消耗	$I_{DD}$	Current consume in normal operation 正常工作电流消耗	$7 \mu A$ Type

### 3.Specification/规格

No.	Items 项目	Specifications 规格
1	Charge voltage 充电电压	4.2V
2	Nominal voltage 标称电压	3.7V
3	Nominal capacity 标称容量	<b>4400mAh @ 0.2C discharge</b> 0.2C 放电容量 4400mAh
	Minimum Rated capacity 最小容量	<b>4300mAh @ 0.2C discharge</b> 0.2C 放电容量 4300mAh
4	Charge current 充电电流	Standard charge/标准充电电流: 0.2C Rapid charge 快速充电电流: 0.5C
5	Standard Charging method 标准充电方法	0.2C CC(constant current) charge to 4.2V, then CV(constant voltage 4.2V) charge till charge current decline to $\leq 0.05C$ . 0.2C 恒流充电至 4.2V, 然后 4.2V 恒压充电至电流 0.05C 截止
6	Charging time 充电時間	Standard charge/ 标准充电時間: 6.0 hours (Ref.) Rapid charge/快速充电時間: 4.0 hours (Ref.)
7	Max. charge current 最大充电电流	<b>2.2A</b>
8	Max. discharge current 最大放电电流	<b>4.4A</b>
9	Discharge cut-off voltage 放电截止电压	3.0V
10	Discharge protection Voltage 放电保护电压	2.80V
11	Cycle Life 循环寿命	500cycles: $\geq 80\%$ (0.2C 充放)
12	Self-discharge 自放电	Residual capacity $> 90\%$ (After standard charging, storied at $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for 28 days)
13	Final Impedance 成品阻抗	$\leq 150\text{m}\Omega$ (at AC 1KHz after 50% charge)
14	Operating temperature 工作环境温度	Charging / 充电温度: $0^{\circ}\text{C} \sim 80^{\circ}\text{C}$ Discharging/放电温度: $-10^{\circ}\text{C} \sim 80^{\circ}\text{C}$
15	Storage temperature 储存温度	Less than 1 month/一个月: $-20^{\circ}\text{C} \sim 45^{\circ}\text{C}$ Less than 6 month/ 六个月: $-20^{\circ}\text{C} \sim 35^{\circ}\text{C}$
16	Cell weight 电芯重量	Approx.83g 大约 83g
17	As of shipment. 出货电压	《不带负载测试电压: 3.81V ~ 3.95V; 加负载 250mΩ 测试电压: 3.75V ~ 3.90V》
18	Inflation Coefficient 膨胀系数	0.15 (在 $25 \pm 5^{\circ}\text{C}$ 的使用情况下 300 次 0.5C 充放电循环测试厚度 的最大值 $\leq (1+0.15) * 8\text{mm} = 9.2\text{mm}$ )

### 3. Performance Criteria 性能标准

#### 4.1 Visual inspection/外观

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

电芯表面沒有刮痕, 瑕疵, 裂紋, 泄露等能影响电芯常规性能的缺陷.

#### 4.2 Standard environmental test condition 标准环境测试条件

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

Temperature/温度: :  $23 \pm 5^\circ\text{C}$

Humidity/湿度:  $65 \pm 20\% \text{ RH}$

Standard Charge/标准充电

0.2C CC(constant current) charge to 4.2V, then CV(constant voltage 4.2V) charge till charge current decline to  $\leq 0.05\text{C}$  . 0.2C 恒流充电至 4.2V, 然后 4.2V 恒压充电至电流 0.05C 截止

除非有其他规格说明, 所有测试条件都遵循以下规格:

#### 4.3 Special Electronic Characteristics 特殊电器性能

No.	Items 项目	Test Method and Condition 测试方法和条件	Criteria 标准
1	Discharge at low Temperature 低温放电	After standard charging, laying the Cells 16h at $-10 \pm 2^\circ\text{C}$ , then discharging at 0.2C to ending voltage, recording the discharging time. 电池标准充电后, 在 $-10 \pm 2^\circ\text{C}$ 恒温环境放置 16 小时, 采用 0.2C 的电流放完电, 记录放电时间。	$\geq 210\text{min}$
2	Discharge at High Temperature 高温放电	After standard charging, laying the Cells 2h at $55 \pm 2^\circ\text{C}$ , then discharging at 0.5C to ending voltage, recording the discharging time. 电池标准充电后, 在 $55 \pm 2^\circ\text{C}$ 恒温环境放置 2 小时, 采用 0.5C 的电流放完电, 记录放电时间。	$\geq 108\text{min}$
3	Dimension change at high temperature 高温下尺寸变化	After standard charging, storing the cell 4hrs at $85 \pm 2^\circ\text{C}$ , then recording the thickness change of the cell. 电池标准充电后, 在 $85 \pm 2^\circ\text{C}$ 恒温环境放置 4 小时, 采用 0.2C 的电流放完电, 记录电池厚度变化。	$\leq 5\%$

4	Cycle Life 循环寿命	<p>Test condition: 测试条件</p> <p>Step1: 0.2C charged to 4.2V, 0.01C cut-off current 第1步: 0.2C 充电至 4.2V, 截止电流 0.01C</p> <p>Step 2: Standby 10min; 第2步: 静置 10分钟</p> <p>Step3: Discharge the cell at 0.2C to 3.0V; 第3步: 0.2C 放电至 3.0V,</p> <p>Step 4: Standby 10min; 第4步: 静置 10分钟</p> <p>Step5: Repeat step1 to step4 for 500 times. 第5步: 重复第1步至第4步500次, 记录500周循环后容量与第1次循环容量的比值.</p>	500cycles: ≥80%
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**Electrical performance test: 电性能测试:**

Battery charging standards, in a different environment temperature place 16 hours, use 0.2 C after constant exile (cut-off voltage of 2.75 V) to meet the requirements.

电池标准充电后, 在不同环境温度放置 16 小时, 采用 0.2C 的恒流放完 (截止电压 2.80V) 满足一下要求。

放电温度 (°C)	-20	0	25	60	80
放电容量 (%)	50	70	100	90	70

**4.4 Mechanical characteristics 机械性能**

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	<p>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 1.8mm. The cell shall be vibrated for 30 minutes per axis of XYZ axes.</p> <p>测试方法: 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 1.8mm, 振动频率 10Hz~55Hz, 每分钟变化 1Hz.</p>	<p>No leakage, Capacity-recovery rate: ≥ 90% (Standby 3 hours).</p> <p>无泄漏, 容量恢复率: ≥ 90%(放置 3h)</p>
2	Drop Test 跌落测试	<p>The cell is to be dropped from a height of 1 meter 2 times onto concrete ground.</p> <p>电芯由 1 米高跌落至混凝土地面 2 次.</p>	<p>No explosion, no fire, no leakage.</p> <p>不爆炸, 不起火, 无泄漏</p>

**4.5 Safety Test 安全测试**

No.	Items 项目	Test Method and Condition 测试方法和条件	Criteria 标准
1	Over-charge 过充	To charge the standard charged cell with 3C constant current until cell voltage reaches 10V, then be charged at constant voltage of 10V while tapering the charge current at 25°C for 0.5hrs. 标准充电后, 3C 恒流恒压将电池充电至 10V, 时间限制 0.5 小时。	No fire, no explosion , and no smoke. 无起火、爆炸、冒烟
2	Over-discharge 过放	At 20±5 °C conditions, the battery will be discharge with constant current 0.2C to cut-off voltage, then connect with external load of 30mΩfor 24 hours. 在室温 20±5°C 条件下, 电池以 0.2C 持续放电至截止电压, 然后电池外接 30 毫欧电阻短路 24 小时	No explosion, no fire, no smoke, no leakage. 无爆炸、起火、冒烟、漏液
3	Short-circuit 短路	To short-circuit the standard charged cell by connecting positive and negative terminal by less than 50mΩwire. 电池标准充电后, 使用内阻小于 50mΩ 的导线将电池正负极连接	No explosion, no fire, no smoke,无起火、爆炸、冒烟
4	Heat shock 热冲击	After fully charged, heat up the standard charged cell at heating rate 5°C per minute up to 130°C and keep the cell in oven for 30 minutes. 电池标准充电后, 将电池放入烘箱中, 以 5°C 每分钟的速度升温至 130°C, 并保持 30 分钟.	No explosion or fire 无爆炸、起火
5	Humidity and heat test 恒温高湿	After fully charged, battery is placed in a box for 48 hours where the temperature is 40±2°C and the relative humidity is 90-95% . 电池标准充电后, 将电池放置在温度 40±2°C 相对湿度在 90-95% 的箱子内保持 48 小时	No smoke or explosion 无冒烟或爆炸

**4. Storage and Others 存放和其他**
**5.1 Long Time Storage 长期存放**

If the Cell is stored for a long time, the cell's storage voltage should be 3.6~3.7V and the cell is to be stored in a condition as Item. 4.2.

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电芯在 4.2 的存放条件下长期存放, 电芯的存储电压应在 3.6~3.7V.

请每隔 3 个月按下面方法激活电池一次: **please activate the battery once every 3 months according to the following method:**

0.2C 充电至 4.2V, 搁置 5 分钟, 然后用 0.2C 放电至每颗电池 3.0V, 搁置 5 分钟, 0.2C 充电 3.9V.

Charge at 0.2C to 4.2V, rest 5 min, then discharge with 0.2C to 3.0V/cell, rest 5 min, then charge at 0.2C to 3.9V.

## 5.2 Others 其他

Any matters that this specification does not cover should be conferred between the customer and GLB

任何此规格书沒有涉及的条件都应在客户和格兰博间协商确实.

## 7. Appendix A/附录

### Handling Precautions and Guideline For LIPB (Lithium-Ion Polymer Batteries)

使用指南及预防措施  
聚合物锂离子充电电池

#### Preface (序言)

This document of 'Handling Precautions and Guideline LIPB shall be applied to the cells supplied by GLB.

此锂离子聚合物电池使用指南适用于格兰博提供的电芯.

#### Note/要点

1)The customer is requested to contact GLB 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.

如果客户需要此规格书所描述以外的应用或操作条件, 客户要提前与格兰博联系. 在这种情况下需要附加实验来检验性能和安全.

2) GLB will take no responsibility for any accident when the cell is used under other conditions than those described in this Document.

格兰博不對不在此规格书描述条件下使用所造成事故的电芯负责.

3)GLB will inform, in a written form, the customer of improvement(s) regarding proper use and handling of the cell, if it is deemed necessary.

如果必要, 格兰博会以书面形式通知客户关于电芯改进的正确使用。

4)Subject to change without notice.

本说明书内容如有更新恕不另行通知。

#### 7.1 Charging 充电

##### 1.1 Charging current:充电

Charging current should be less than maximum charge current specified in the Product Specification. Charging with higher current than recommended value may cause damage to cell electrical, mechanical, and safety performance and could lead to heat generation or leakage.

充电电流应小于规格书中的最大充电电流. 采用高于推荐值的电流充电会损坏电芯的电性能, 机械性能和安全性能或导致发热和泄漏。

##### 1. 2 Charging voltage:充电电压

Charging shall be done by voltage less than that specified in the Product Specification (4.2V/cell). Charging beyond 4.25V, which is the absolute maximum voltage, must be strictly prohibited. The charger shall be designed to comply with this condition.

It is very dangerous that charging with higher voltage than specified value may cause damage to the cell electrical, mechanical safety performance and could lead to heat generation or leakage.

充电电压应低于产品规格书中规定的 4.2V. 严禁充电到最大电压 4.25V. 充电器应当在此条件下设计. 采用高于指定值的电压来充电时非常危险的, 可能损坏电芯的电性能, 机械性能和安全性能或导致发热和泄漏.

**1.3 Charging temperature: 充电温度**

The cell shall be charged within the specified temperature range in the Product Specification.

电芯充电应当在产品规格书中指定的温度范围内充电。

**1.4 Prohibition of reverse charging: 禁止反充**

Reverse charging is prohibited. The cell shall be connected correctly. The polarity has to be confirmed before wiring. In case of the cell is connected improperly, the cell cannot be charged. Simultaneously, the reverse charging may cause damaging to the cell which may lead to degradation of cell performance and damage the cell safety, and could cause heat generation or leakage.

禁止反充。电芯应当正确连接。配线前就要确认极性。万一连接不正确，电芯将不能充电。同时，反充可能损坏电芯，它会导致电芯性能下降，破坏电芯安全性，还可能导致发热和泄漏。

**7.2 Discharging 放电****2.1 Discharging current/ 放电电流**

The cell shall be discharged at less than the maximum discharge current specified in the Product Specification. High discharging current may reduce the discharging capacity significantly or cause over-heat.

电芯应当在低于规格书中指定的最大放电电流条件下放电。高放电电流会显著降低放电容量和导致过热。

**2.2 Discharging temperature/ 放电温度**

The cell shall be discharged within the temperature range specified in the Product Specification.

电芯应当在产品规格书中规定的温度范围内放电。

**2.3 Over-discharging/ 过放**

It should be noted that the cell would be at an over-discharged state by its self-discharge characteristics in case the cell is not used for long time. In order to prevent over-discharging, the cell shall be charged periodically to maintain between 3.7V and 3.9V.

需要注意的是，在电芯长时间未使用期间，它可能会用其自放电特性而处于某种过放电状态。为防止过放电的发生，电芯应定期充电，将其电压维持在 3.7V 至 3.9V 之间。

Over-discharging may cause loss of cell performance, characteristics, or cell functions. The charger shall be equipped with a device to prevent further discharging exceeding a cut-off voltage specified in the Product Specification. Also the charger shall be equipped with a device to control the recharging procedures as follows:

The cell pack shall start with a low current (0.01C) for 15 - 30 minutes, i.e. pre-charging, before rapid charging starts. The rapid charging shall be started after the individual cell voltage has been reached above 3V within 15 - 30 minutes that can be determined with the use of an appropriate timer for pre-charging.

In case the individual cell voltage does not rise to 3V within the pre-charging time, then the charger shall have functions to stop further charging and display the cell/pack is at abnormal state.

过放电会导致电芯性能、电池功能的丧失。

充电器应有装置来防止电池放电至低于本标准规定的截止电压。此外，充电器应有装置已放在重复充电，步骤如下：

电池在快速充电之前，应先以小电流 (0.01C) 预充电 15~30 分钟，以使 (每个) 电芯的电压达到 3V 以上，再进行快速充电。可用一计时器来实现该预充电步骤。如果在预充电规定时间内，(个

別) 电芯的电压仍未升到 3.0V 以上, 充电器应能够停止下一步快速充电, 并显示该电芯/电池正处于非正常状态。

### 7.3 Storage 存放

The cell should be stored within the proper voltage and temperature range specified in the Product Specification.

电芯应当在产品规格书中指定的电压和温度范围内存放。

### 7.4 Handling of Cells/电芯操作注意事项

Since the cell is packed in soft package, to ensure its better performance, it's very important to carefully handle the cell

由于电芯属于软包装, 为保证电芯的性能不受损害, 必须小心对电芯进行操作。

#### 4.1 Soft Aluminium foil

铝箔包装材料

Sharp edge parts such as Ni-tabs, pins and needles, very easily damage the soft aluminum packing foil.

- Don't strike cell with any sharp edge parts
- Trim your nail or wear glove before taking cell
- Clean worktable to make sure no any sharp particle

铝箔包装材料易被尖锐部件损伤, 诸如: 镍片、尖针。

禁止用尖锐部件碰撞电池;

取放电芯时, 请修短指甲或戴上手套;

应清洁工作环境, 避免有尖锐物体存在。



#### 4.2 Sealed edge 顶封边

Sealing edge is very flimsy.

- Don't bend or fold sealing edge

顶封边非常容易受到损害。

禁止弯折顶封边。

#### 4.3 Folding edge/折边

The folding edge is formed in cell process

and passed all hermetic test

- Don't open or deform folding edge

折边在电池生产过程中已完成, 并通过了密封测试。

禁止打开或者破坏折边。

#### 4.4 Tabs 极耳

The cell tabs are not so stubborn especially for aluminum tab.

- Don't bend tab.

极耳的机械强度并非异常坚固, 特别是铝极耳。

禁止弯折极耳。



#### 4.5 Mechanical shock

机械撞击

- Don't Fall, hit, bend cell body.

禁止坠落、冲击、弯折电芯。



#### 4.6 Short 短路

- Short terminals of cell is strictly prohibited, it may damage cell.

任何时候禁止短路电芯，它会导致电芯严重损坏。



#### 7.5 Others 其他

##### Prevention of short circuit within a battery pack 严禁电池组合短路

Enough insulation layers between wiring and the cells shall be used to maintain extra safety protection.

The battery pack shall be structured with no short circuit within the battery pack, which may cause generation of smoke or firing.

在配线与电芯之间要有足够的绝缘层来提供额外的安全保护。

电池在组合时结构必须没有短路，否则会导致冒烟或者起火。

##### Prohibition of disassembly 严禁拆卸

###### Never disassemble the cells 禁止拆卸电芯

The disassembling may generate internal short circuit in the cell, which may cause gassing, flinng, explosion, or other problems.

拆卸会导致内部短路，它会产生泄气，泄漏，爆炸，或者其他问题。

##### Electrolyte is harmful 电解液有害

LIPB should not have liquid from electrolyte flowing, but in case the electrolyte come into contact with the skin, or eyes, physicians shall flush the electrolyte immediately with fresh water and medical advice is to be sought.

锂离子聚合物电池没有来自于流动电解液的液体，但万一电解液与皮肤或者眼睛接触，应当立即用纯净水冲洗电解液，建议医学检查。

##### Prohibition of dumping of cells into fire 严禁将电芯抛入火中

Never incinerate nor dispose the cells in fire. These may cause explosion of the cells, which is very dangerous and is prohibited. 禁止把电芯扔入火中. 它会导致电芯爆炸。

##### Prohibition of cells immersion into liquid such as water 禁止电芯浸入液体

The cells shall never be soaked with liquids such as water, seawater, drinks such as soft drinks, juices, coffee or others. 电芯严禁用液体例如水，海水，饮料等浸湿。

##### Prohibition of use of damaged cells 禁止使用损坏电芯

The cells might be damaged during shipping by shock. If any abnormal features of the cells are found such as damages in a plastic envelop of the cell, deformation of the cell package, smelling of an electrolyte, an electrolyte leakage and others, the cells shall never be used any more.

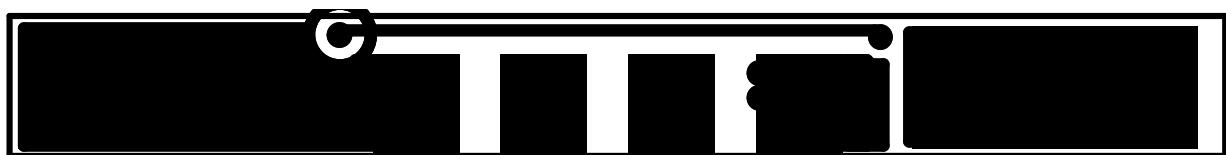
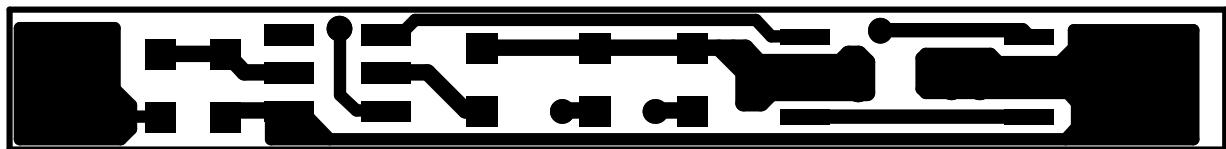
The Cells with a smell of the electrolyte or a leakage shall be placed away from fire to avoid firing or explosion.

在运输过程中电芯可能由于振动而损坏. 如果发现电芯反常特征比如电芯被塑胶包围且损坏，电芯变形，闻到电解液气味，电解液泄漏或者其他，严禁使用此类电芯。

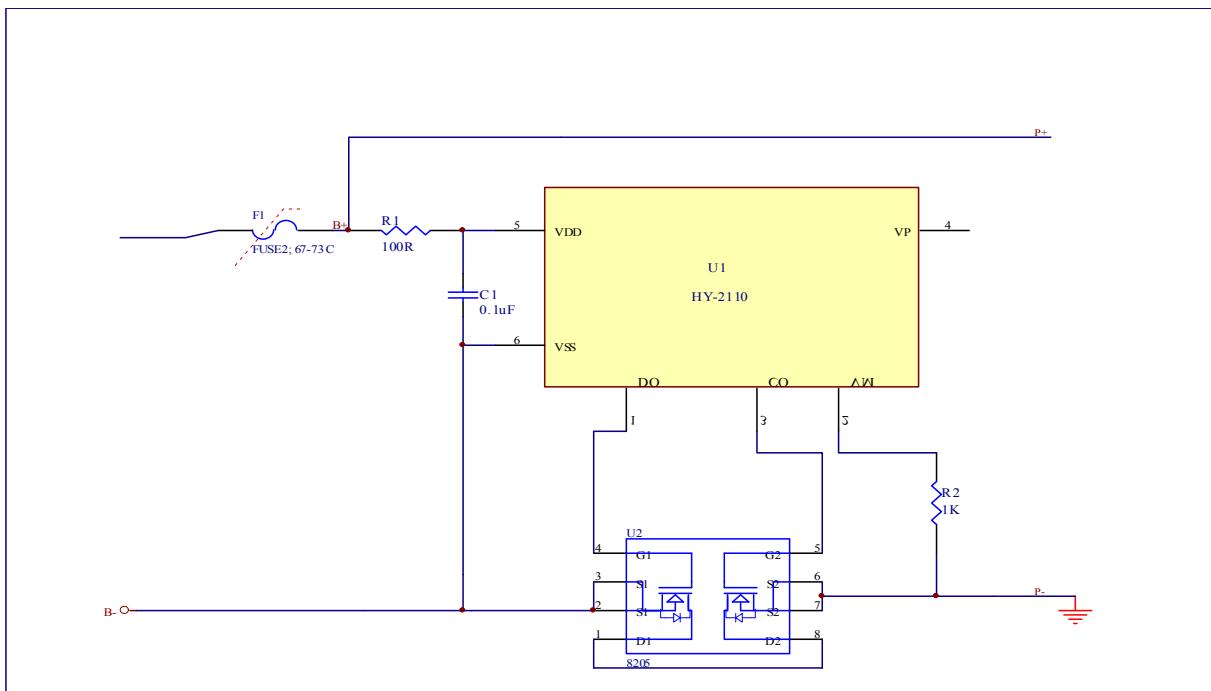
有电解液气味或者电解液泄漏的电芯应当远离火来避免电芯起火和爆炸。

**7.0 PCM 板图及工作原理图:**

PCM 图



工作原理图:



PCM BOM

序号	名称	型号	用量	备注
1	贴片电阻	1K 0603	1	
2	贴片电阻	100 欧 0603	1	
3	贴片电容	0. 1UF/50V 0603	1	
4	保护 IC	S8261-G3P	1	精工保护 IC
5	CMOS	S8205 SOP-8	1	
6	PCB	Fr-4	1	