

	Li-ion Battery Specification	LPRS128V-6aHLiFePO4-2PHR v1.0
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Li-ion Battery Specification

Product Name:	<u>LPRS128V-6aHLiFePO4-2PHR</u>
Product specification:	<u>12.8V 5.4Ah</u>
Data sheet version	V1.0

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1. Product Summary

1.1 Standard

1.2 The battery pack design is compliance with International or National Standard required by customer;

1.3 Production Model: LPRS128V-6aHLiFePO4-2PHR;

2. Scope of application

The specification is applied to battery manufactured by LPRS.

3. Specification

3.1 Product basic parameter

NO	Items	Parameter		Remarks
1	Cell Model	3.2V/18650-1800mAh		Discharge:0.2C
2	Nominal Capacity	5400	mAh	cut-off voltage:10V
	Rated/Minimum Capacity	5100	mAh	
3	Nominal Voltage	12.8	V	
4	Discharge cut-off voltage	10	V	CC Discharge Temperature of 25±2 °C humidity of 15%~75%
5	Standard discharge current	1080	mA	0.2c CC Discharge Temperature of 25±2 °C humidity of 15%~75%
6	Max continuous discharge current	2000	mA	Temperature of 25±2°C humidity of 15%~75%
7	Charging mode	CC+CV Charge		Charger for Lithium-Ion Batteries and Charging mode with CC+CV
8	Max. Charge voltage	14.4V~14.6	V	CC+CV Charge Temperature of 25±2 °C humidity of 15%~75%
9	Standard charge current	1080	mA	CC Charge Temperature of 25±2°C humidity of 15%~75%
10	Max continuous charge current	2000	mA	CC Charge Temperature of 25±2°C humidity of 15%~75%
11	CC Charging Cut-off Current	50	mA	Temperature of 25±2°C humidity of 15%~75%
12	Weight	630	g	

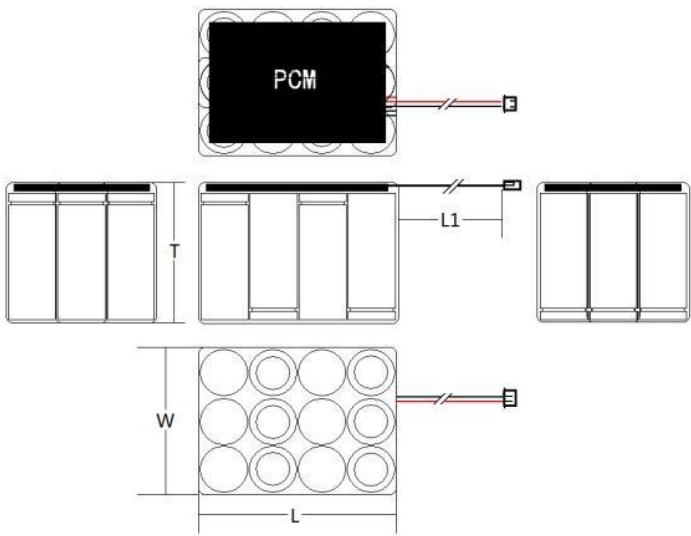
13	Operating Temperature	0~45℃	℃	Charge
		-10~60℃	℃	Discharge
14	Storage temperature	-10℃-60℃	≤1 month	charged to about 40% to 60% of capacity
		-10℃-45℃	≤3 month	
		-10℃-25℃	≤1 year	

3.2 Safety and Reliability

- (1) Cell conform to IEC 62133
- (2) All components, wires, materials used within pack should be RoHS2.0/Reach compliant.

4. Product Drawing

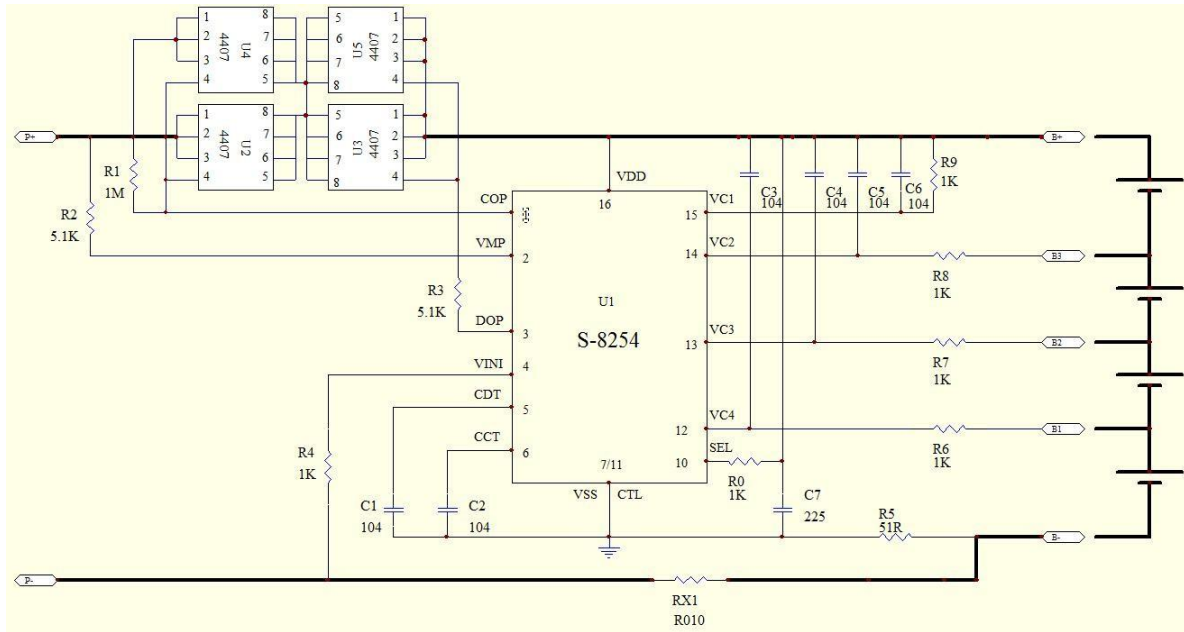
4.1 Product Dimension



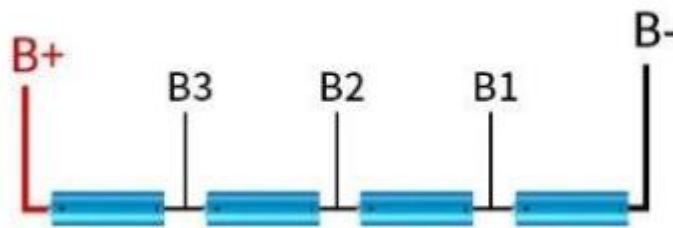
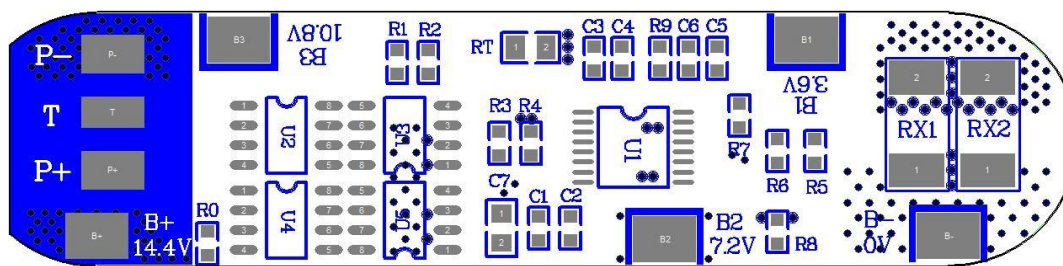
Marker	(mm)
T	72mm
W	56mm
L	74mm
L1	100±10mm

5. Protection Circuit

5.1 Circuit Diagram



5.2 Layout Diagram



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5.3 PCM parameter PCM

No	Item	Condition	Specification
1	Overcharge	Detection voltage	CELL 3.9±0.05V
2		Release voltage	CELL 3.8±0.05V
3		Detection delay time	50-2000ms
4	Over discharge	Detection voltage	CELL 2.0±0.1V
5		Release voltage	CELL 2.5±0.1V
6		Detection delay time	50-2000ms
7	Over discharge current	Over current	10-18A
8		delay time	500-1000-1500ms
9		Short detection delay time	200us~800us
10		Release Conditions	Cut off load
11	Normal current consumption	Normal current consumption of PCM	60uA Max
12	0V charger	0V allowed 0V change	YES
13	Suggest working conditions	suggest working temperature	-20~+60°C
14	IR resistance	IR of PCM	≤50 mΩ

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6. Battery Performance Test

6.1 Appearance

There shall be no such defects as scratch, bur and other mechanical scratch, and the connector should be no rust dirt.

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6.2 Test Equipment

(1) Dimension Measuring Instrument

The dimension measurement shall be implemented by instruments with accuracy of no less than 0.01mm.

(2) Voltmeter

Class with national standard or more sensitive class with inner impedance not less than 10 KΩ/V.

(3) Ammeter

Class with national standard or more sensitive class. Total external resistance including ammeter and wire is less than 0.01Ω.

(4) Impedance Meter

Impedance shall be measured by a AC impedance method (AC 1kHz LCR meter).

6.3 Test conditions

Unless otherwise specified, the default is to follow the following conditions.

- 1) At the ambient temperature of 25±2°C and humidity of 15%~75% 。
- 2) Standard Charge: Charge with constant current 0.2C and constant voltage (CC/CV) of 14.6V. Cut -off at the current of 50mA.
- 3) Standard Discharge: discharge with 0.2C to 10V.
- 4) Rest Period: Unless otherwise defined, 30 min, rest period after charge/ discharge.

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6.4 Common Performance

No	Items/	Test Methods and Condition	Criteria
1	Cycle Performance	Under the temperature of $25\pm5^{\circ}\text{C}$, charge the battery with 0.2C when the voltage reaches up to 14.6V charge with constant voltage until the charge current $\leq 50\text{mA}$, then stop charging, rest for 10min, then discharge with 0.5C to 10V. Cycle with the above mode, when the continuous discharge time $< 80\%$ stop cycling.	≥ 2000 times.
2	Charged Storage Characteristics	Charge the battery with 0.2C, then shift to charge with constant voltage until the voltage reaches up to 14.6V, when the charge current $\leq 57\text{mA}$ stop charging; rest under the temperature of $25\pm5^{\circ}\text{C}$ for 28d then discharge with 0.2C to 10V. recording the discharging time.	≥ 270 min.
3	Storage Characteristics	Charge the battery, which is newly manufactured shorter than 3 months, with 0.2C until the capacity reaches to 40~50%, then charge with 0.2C to 14.6V then shift to charge with constant voltage, after full- charge rest for, resting for 6 months under the temperature of $25\pm5^{\circ}\text{C}$ and the humidity of 45 ~85%, then discharge with 0.2C to 10V.	≥ 240 min.

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6.5 Safety Performance

No	Items	Test Methods and Condition	Criteria
1	High Temperature Characteristics	Under the temperature of $25\pm5^{\circ}\text{C}$, after charging the battery with 0.2C then put the battery into the constant temperature and humidity oven with $50\pm2^{\circ}\text{C}$ for 2h, then discharge with 0.2C to 10V. Compare discharge capacity with that at room temperature of $25\pm2^{\circ}\text{C}$.	Capacity $\geq 95\%$
2	Low Temperature Characteristics	Under the temperature of $25\pm5^{\circ}\text{C}$ after charging the battery with 0.2C, at the -10°C temperature for 2h, then discharge with 0.2C to 10V. Compare discharge capacity with that at room temperature of $25\pm2^{\circ}\text{C}$.	Capacity $\geq 50\%$
3	Overcharge Protection Characteristics	Battery standards after charging, the charging current of 1C to 17.5V, and then in the 14.6V under constant voltage charging 7h batteries.	No fire, no explosion
4	Over-discharge Protection Characteristics	Under the temperature of $25\pm5^{\circ}\text{C}$, after discharging the battery with 0.2C to 10V, then connect the load with 30Ω and discharge for 24h.	No fire, no explosion
5	Short-circuit Protection Characteristics	Under the temperature of $25\pm5^{\circ}\text{C}$, after a full charging the battery with 0.2C, then make the battery's anode and cathode short-circuit for 1h (the connecting resistance is smaller than $100\text{m}\Omega$), then cut the anode and cathode.	No fire, no explosion

7. Transportation and Storage

7.1 Transportation

- 1) The product can be transported by any means of transport, keep the product from collision, violent vibration, rain, snow, and water, etc.
- 2) The product shall not be stored in an open-air warehouse.
- 3) The products can't have any damage and performance degradation after shipping.

7.2 Storage

The product should be stored in a clean dry, ventilated, non-corrosive gas environment there must be no direct sunlight, the storage temperature is $-10\sim 40^{\circ}\text{C}$, and the relative humidity is not more than 65%.

8 Caution

1.1 Use precautions

Do not use or store the battery where is exposed to extremely hot, such as under window of a car in direct sunlight in a hot day. Otherwise, the battery may be overheated. This can also reduce battery performance and/or shorten

- 1) Do not use any chargers other than those recommended.
- 2) During the use of batteries, there should be no abnormal use such as overcharge (voltage > 4.25V), over discharge voltage < 2.5V), over current charging and discharging (maximum current allowed by current temperature), etc. It is strictly prohibited to use cores in environments prone to static electricity and poor sealing (water, dust entering).
- 3) Charging with >0.5C, using in high/low temperature environment, using in vibration environment, using in bad environment and using in humid environment will reduce the service life of the core.
- 4) Batteries cannot be used in high frequency microwave and ultrasonic environment. When batteries are used in series and in parallel, it is suggested that high voltage conductors should be covered with electromagnetic insulation to prevent electromagnetic wave damage to nearby devices and human body.
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- 5) Do not short-circuit the battery by connecting wires or other metal objects to the positive (+) and negative (-) terminals.
- 6) The pack should be charged and discharged in strict accordance with the current specified in the specifications to ensure service life and safety of pack.
- 7) The pack should be stored at room temperature, charged to about 40% to 60% of capacity. In case of over-discharge, the 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.

1.2 Safety precautions

- 1) Do not immerse the battery in water or allow it to get wet.
- 2) Do not use or store the battery near sources of heat such as a fire or heater.
- 3) Do not connect the battery directly to wall outlets or car cigarette-lighter sockets.
- 4) Do not put the battery into a fire or apply direct heat to it.
- 5) Do not pierce the battery casing with a nail or other sharp object, break it open with a hammer, or step on it.
- 6) Do not strike, throw or subject the battery to sever physical shock.



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- 7) Do not directly solder the battery terminals.
- 8) Do not attempt to disassemble or modify the battery in any way.
- 9) Do not place the battery in a microwave oven or pressurized container.
- 10) Do not use the battery if it gives off an odor, generates heat, becomes discoloured or deformed, or appears abnormal in any way. If the battery is in use or being recharged, remove it from the device or charger immediately and discontinue use.
- 11) If the battery leaks and electrolyte gets in your eyes, do not rub them. Instead, rinse them with clean running water and immediately seek medical attention. If left as is, electrolyte can cause eye injury.
- 12) Do not use the battery in combination with primary batteries (such as dry-cell batteries) or batteries of different Capacity type or brand.
- 13) Do not immerse the battery in water or allow it to get wet.

✧ Any matters that this specification does not cover should be conferred between the Supplier.