

Specification Approval Sheet

Product Name	Lithium Polymer Battery
Model Spec	LP-645060 2S1P 7.4V 2000mAh with PCM
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Make	Checkup	Approved
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1 Scope

This document describes the performance characteristics and testing methods for Li-polymer battery produced by Shenzhen ryder electronics co.,ltd.

2 Product type and model number

2.1 Product type

Lithium-polymer battery

2.2 Model number

LP-645060 2S1P 7.4V 2000 mAh with PCM

3 Rated performance

Form 1: Battery rated performance

No	Item	Rated performance	Remark
1	Capacity	2000mAh ± 5%	Standard discharge after standard charge
2	Nominal voltage	7.4V	Mean operation voltage during standard discharge after standard charge
3	Voltage at end of discharge	5.5V	Discharge cut-off voltage
4	Charging voltage	8.4V	
5	Impedance	<150mΩ	The measure must be uses the new battery that within one week after shipment and cycles less than 5 times
6	Standard charge	Constant current 0.2C ₅ A Constant voltage 8.4V Cut-off current 0.01C ₅ A	
7	Standard discharge	Constant current 0.2 C ₅ A End voltage 5.5V	
8	Fast charge	Constant current 0.5C ₅ A Constant voltage 8.4V 0.01C ₅ A cut-off	
9	Fast discharge	Constant current 0.5C ₅ A End voltage 5.5V	
10	Maximum continuous discharge current	2C ₅ A	
11	Operation temperature range	Charge: 0~40℃ Discharge: 0~60℃	60±25% R.H
12	Cycle life	>300cycles	Charging/discharging in the below condition: Charge: standard charge Discharge: 0.2C ₅ A to 5.5V Rest time between charge/discharge: 30min Until the discharge capacity <60% of NC
13	Storage temperature	During 1 month: -10 ~ 45℃ During 6 months: 20 ± 5℃	60±25% R.H
14	Weight	Approx: 88g	
15	Dimension(mm)	Thickness*width*height(Max)	14.5*52*65

4 Electrical performances

Form 2: Battery electrical performances

No	Items	Test procedure	Requirements
1	Nominal voltage	The average value of the working voltage during the whole discharge process.	7.4V
2	Discharge performance	The discharge capacity of the battery, measured with 0.2C ₅ A down to 5.5V within 1 hour after a standard charge	Discharge time ≥ 5h
3	Capacity retention	After 28 days storage at 25±5°C, after having been standard charged and discharged at 0.2C ₅ A to 5.5V (the residual capacity is above 80% of nominal capacity)	Discharge time ≥ 4h
4	Cycle life	Charging/discharging in the below condition: Charge: standard charge Discharge: 0.2C ₅ A to 5.5V Rest time between charge/discharge: 30min Until the discharge capacity < 60% of NC	> 300 cycles

5 Standard test conditions

Test should be conducted with new batteries within one week after shipment from our factory and the batteries shall not be cycled more than five times before the test. Unless otherwise defined, test and measurement shall be done under temperature of 20±5°C and relative humidity of 45~85%. If it is judged that the test results are not affected by such conditions, the tests may be conducted at temperature 15~30°C and humidity 25~85%RH.

6 Cautions in use

To ensure proper use of the battery please read the manual carefully before using it.

6.1 Handling

- Do not expose to, dispose of the battery in fire.
- Do not put the battery in a charger or equipment with wrong terminals connected.
- Avoid shorting the battery.
- Avoid excessive physical shock or vibration.
- Do not disassemble or deform the battery.
- Do not immerse in water.
- Do not use the battery mixed with other different make, type, or model batteries.
- Keep out of the reach of children.

6.2 charge and discharge

- Battery must be charged in appropriate charger only.
- Never use a modified or damaged charger.
- Do not leave battery in charge over 24 hours.

6.3 storage

- Store the battery in a cool, dry and well-ventilated area.

6.4 disposal

- Regulations vary for different countries, Dispose of in accordance with local regulations.

7 Battery operation instruction

7.1 Charging

Charging current Cannot surpass the biggest charging current which in this specification book stipulated.
Charging voltage :Does not have to surpass the highest amount which in this specification book stipulated to decide the voltage.

Charge temperature : The battery must carry on the charge in the ambient temperature scope which this specification book stipulated. Uses the constant electric current and the constant voltage way charge, the prohibition reverse charges. If the battery positive electrode and the cathode meet instead, can damage the battery.

7.2 Discharging current

The discharging current does not have to surpass this specification book stipulation the biggest discharging

current, the oversized electric current electric discharge can cause the battery capacity play to reduce and to cause the battery heat.

7.3 Electric discharge temperature

The battery discharge must carry on in the ambient temperature scope which this specification book stipulated.

7.4 Over-discharges

After the short time excessively discharges charges immediately cannot affect the use, but the long time excessively discharges can cause the battery the performance, battery function losing. The battery long-term has not used, has the possibility to be able to be at because of its automatic flashover characteristic certain excessively discharges the condition, or prevented excessively discharges the occurrence, the battery should maintain the certain electric quantity.

7.5 Storing the batteries

The battery should store in the product specification book stipulation temperature range. If has surpasses above for six months the long time storage, suggested you should carry on additional charge to the battery.

8 Period of warranty

The period of warranty is one year from the date of shipment. Ryder guarantees to give a replacement in case of batteries with defects proven due to manufacturing process instead of the customers abuse and misuse.

9 Other the chemical reaction

Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage. If the batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may indicate it is time to change the battery.

10 Note

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

11 PCM performance

11.1 Electrical characteristics

Form3:Electrical characteristics

Item	Symbol	Content	Criterion
Over charge Protection	V _{DET1}	Over charge detection voltage	4.30±0.05V
	tV _{DET1}	Over charge detection delay time	1.15±0.23S
	V _{REL1}	Over charge release voltage	4.10±0.05V
Over discharge protection	V _{DET2}	Over discharge detection voltage	2.4±0.1V
	tV _{DET2}	Over discharge detection delay time	144±29mS
	V _{REL2}	Over discharge release voltage	3.0±0.1V
Over current protection	V _{DET3}	Over current detection voltage	0.2±0.015V
	I _{DP}	Over current detection current	4.0~7.0A
	tV _{DET3}	Detection delay time	7.2~11mS
		Release condition	Cut load
Short protection		Detection condition	Exterior short circuit
	T _{SHORT}	Detection delay time	220~380uS
		Release condition	Cut short circuit
Interior resistance	R _{SS}	Main loop electrify resistance	V _C =4.2V; R _{SS} ≤70mΩ
Current consumption	I _{DD}	Current consume in normal operation	5.0μA Type 15.0μA Max

11.5 Terminal explanations



- 11.5.1 B+: Connected to the second battery's positive terminal
- 11.5.2 BM: Connected to the first battery's positive terminal
- 11.5.3 B-: Connected to the first battery's negative terminal
- 11.5.4 P+: Connected to the battery's output or the charger's positive terminal
- 11.5.5 P-: Connected to the battery's output or the charger's negative terminal

12 Battery pack drawing

Drawing 1: Battery pack drawing

