

## Lithium ion polymer battery specification

**Model NO.:603759    1500mAh 3.7V**

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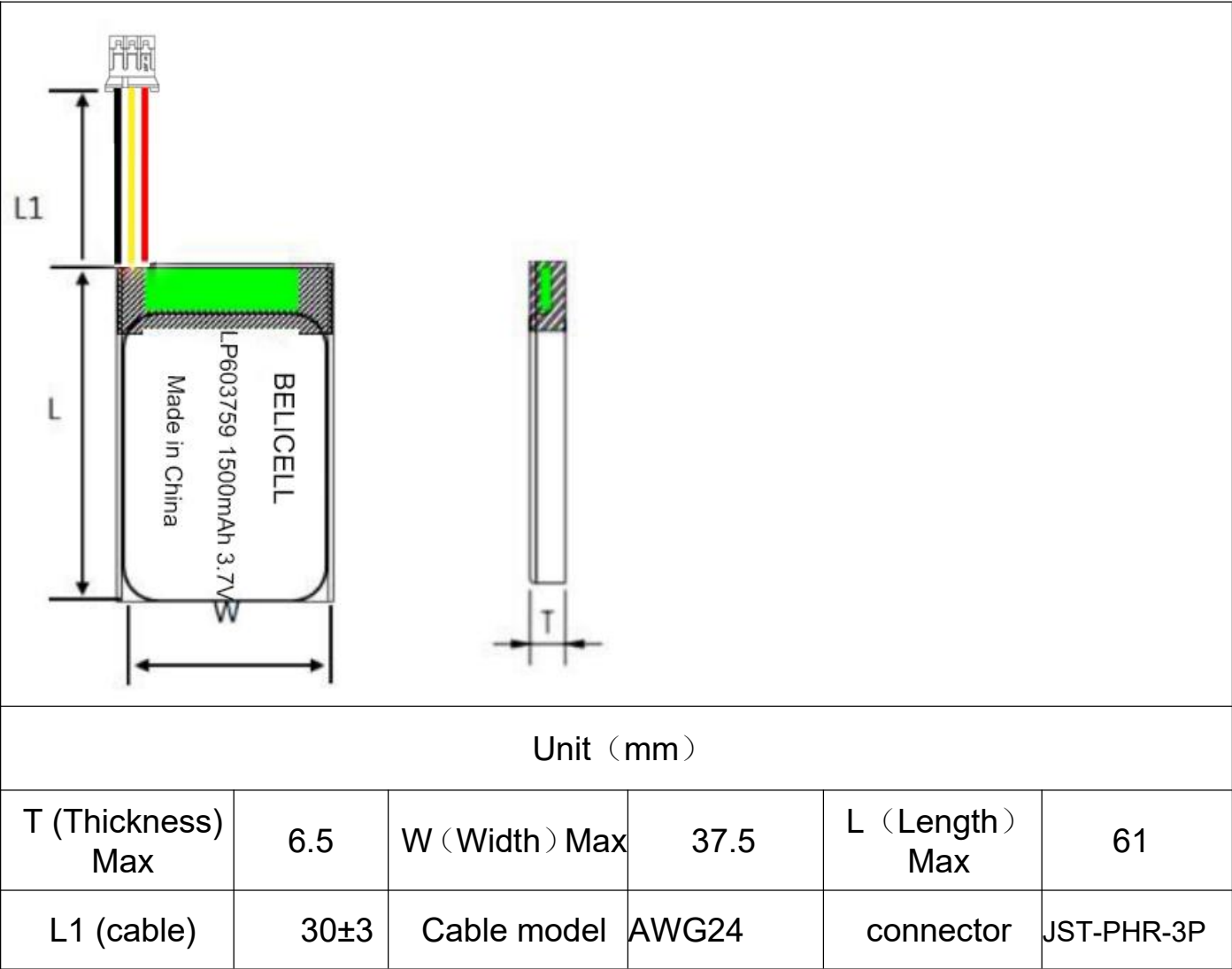
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1.Scope

This specification describes the basic performance, technical requirement, testing method ,warning and caution of the Li-ion Polymer rechargeable battery pack, the pack defined in this documentation is an assembly which include battery, PCM and wire, the specification only applies to Yongzhou BELICELL Technology Co.,Ltd

2.Initial Dimension

2.1



### 3.Specification

NO.	Item3	Specifications		
3.1	Nominal capacity	1500mAh @ 0.5C Discharge		
3.2	Initial Impedance	Pack ≤60 mΩ		
3.3	Weight	Approx: 35g		
3.4	Nominal voltage	3.7V		
	Fully charge voltage (FC)	4.2V Defined in this DOC: FC = 4.2V		
	Fully discharge voltage (FD)	3.0VDefined in this DOC: FD =3.0V		
3.5	Charge current	0.5C=750mA	Standard Charging	
		1.0C=1500mA	Rapid charge	
3.6	Standard charging method	0.5C CC （ constant current ） charge to FC, then CV(constant voltage FC)charge till charge current decline to ≤0.02C 0.5C CC		
3.7	Charging time	2.5hours(Ref.)	Standard Charging	
		1.5 -2.0hours(Ref.)	Rapid charge	
3.8	Max. charge current	Constant Current 1.0C Constant Voltage FC 0.02 C		
3.9	Max. discharge current	Constant current1.0C end voltage FD		
3.10	Standard Discharge Current	Constant current 0.5 C end voltage FD		
3.11	Charge cut-off voltage	Ref. 7.1 VDET1		
3.12	Discharge cut-off Voltage	Ref. 7.1 VDET2		
3.13	Operating temperature	0℃~45℃	Charging	
		-10℃~50℃	Discharging	
	Storage temperature	-20℃~ +45℃	less than 1 month	Recommended storage temperature: 25℃, at the shipment state
		-10℃~ +30℃	less than 6 months	

3.14	Recoverable capacity	Constant current 0.5C charge to FC, then constant voltage FC charge to current declines to 0.02C, rest for 10min, constant current 0.5C discharge to FD, rest for 10min.Repeat above steps 3 times, recording the maximum capacity
3.15	Storage Humidity	≤75% RH
3.1	Appearance	Without distortion and leakage
3.17	Standard testing condition	Temperature: 23±5℃ Humidity : ≤75%RH Atmospheric Pressure: 86-106 Kpa

Remark: From 3.1 to 3.12, the testing condition is following 3.17 (standard testing condition)

#### 4.General Performance

No.	Item	Test Methods and Condition	Criteria
4.1	Standard Charge	Charging the cell initially with constant current at 0.2C and then with constant voltage at 4.2V till charge current declines to 0.02C	
4.2	Rated Capacity	The capacity means the discharge capacity of the cell, which is measured with discharge current of 0.5C with 3.0V cut-off voltage after standard charge.	≥1500mAh
4.3	Cycle Life	Test condition: Charge:1.0C to 4.2V Discharge:0.5C to 3.0V When the discharge capacity is reduced to 80% of the initial capacity, the number of cycles completed is defined as the cycle life of the cell	≥500
4.4	Storage Characteristics	After the standard charging, storied the cells under the condition as No.4.4 for 30 days, then measured the apacity with 0.2C till 3.0V	Residual capacity>85%
4.5	Initial impedance	Internal resistance measured at AC 1KHz after 50% charge	≤60 mΩ
4.6	Cell Voltage	As of shipment.	3.85V~4.05V
4.7	Temperature Characteristics	1. According to item 5.1, at 25±2℃. 2. Capacity comparison at each temperature, measured with constant discharge current 0.2C with 3.0V cut-off. Percentage as an index of the capacity compared with 100% at 25℃	-5℃: ≥90% 25℃: 100% 50℃: ≥95%

## 5.Safe Characteristic

No.	Item	Test Methods and Condition	Criteria
5.1	Overcharge testing	At standard testing condition, charging cell with constant current 2.0C to voltage 4.6V, then with constant voltage 5.0V till current decline to 0. Stop test till cells temperature 10℃ lower than max temperature.	No smoke, No fire
5.2	Forced discharge	After the standard discharge of the electric core, the 1.0C current to its reverse charging, 90min	No fire, no explosion
5.3	Short-circuit testing (NO PCM)	At standard testing condition, after standard charging, connect pack anode and cathode by wire which impedance less than $80 \pm 20 \text{m}\Omega$ , keep 24h.	No smoke no fire
5.4	Drop Test	After the charge of the electric core from 10meters height fell to the ground each surface of the concrete fell 1 times a total of 6 tests	Open circuit voltage should be no less than 90% initial voltage No fire, no leakage.

※ Above testing of safe characteristic must be with protective equipment.

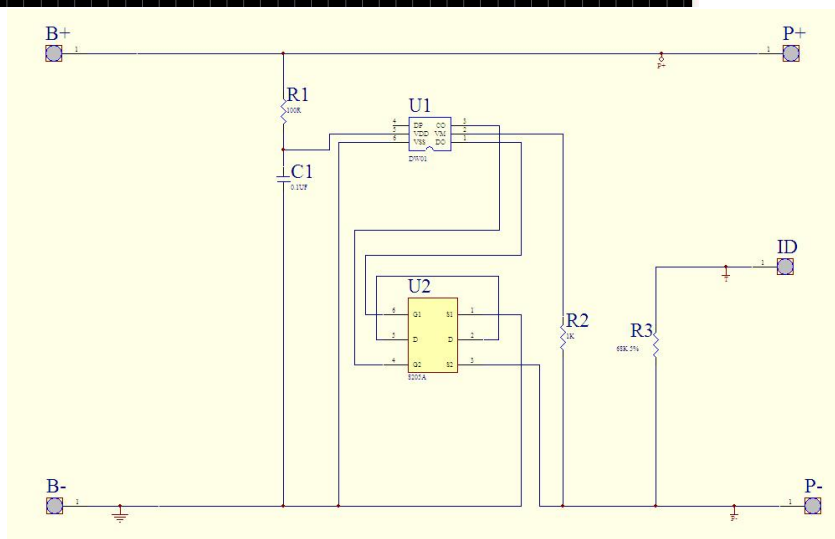
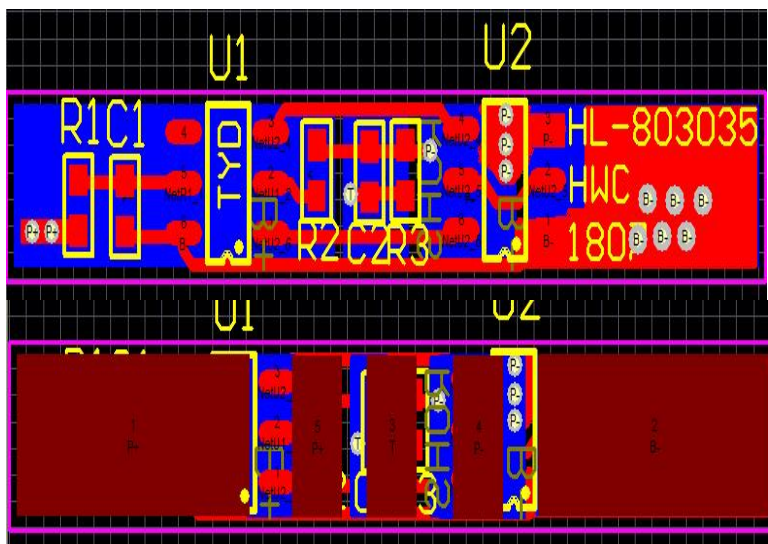
## 6.Protection circuit

### 6.1 PCM Standard

Parameter	Value		
	Min	Type	Max
Overcharge Testing Voltage	4.23V	4.28V	4.33V
Overcharge renew voltage	4.03V	4.08V	4.13V
Over-discharge protect Voltage		120ms	160ms
Over-discharge testing Voltage	2.3V	2.4V	2.5V
Over-discharge renew voltage	2.9V	3.0V	3.1V

Over-discharge protect prolong time		60ms	80ms
Over-current testing Voltage	0.12V	0.15V	0.18V
Over current prolong time	5ms	7ms	10ms
Short testing Voltage	0.72V	1.30V	1.75V
Short protect prolong time	us	400us	600us
over current	2A	/	5A
Power consumption	/	3.0uA	6.0uA
Resistance	/	/	$\leq 60\text{m}\Omega$

## 6.2 Schematic diagram



### 6.3 PCM-BOM

Item	Model No	Name	Specification	package	QTY	Unit	Remark
1	R1	resistance	100R ohm	0402	1	PCS	
	R2	resistance	1K ohm	0402	1	PCS	
2	R3	resistance	10K NTC	0402	1	PCS	
3	C1	capacitance	0.1uf	0402	1	PCS	
4	U1	IC	DW01	SOT23-6	1	PCS	
5		PCB	20*3.7*0.6mm		1	PCS	
6	U2	MOS	8205S	SOT23-6	1	<b>PCS</b>	

### 7.Warning

Load circuit may cause voltage and current, and the voltage or current may add to pack, the voltage or current must be controlled as lower than RWV and RWI, larger voltage or current may damage the PCM of pack.

To prevent the possibility of the pack from leaking, heating, fire .please observe the following precautions:

The soft aluminum packing foil is very easily damaged by sharp edge parts such as Ni-tabs, pins and needles .Do not strike at pack with any sharp edge parts.

Do not immerse the pack in water and seawater

Do not use and leave the pack near a heat source as fire or heater

When recharging, use the battery charger specifically for that purpose

Do not reverse the position and negative terminals

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Do not connect the pack to an electrical outlet

Do not discard the pack in fire or heat it

Do not short-circuit the pack by directly connecting the positive and negative terminal with metal object such wire

Do not transport and store the battery together with metal objects such as necklaces, hairpins etc.

Do not strike or throw the pack.

Do not directly solder the pack or battery and pierce the battery with a nail or other sharp object.

## **8.Cautions**

Do not use or leave the pack at very high temperature (for example, at strong direct sunlight or a vehicle in extremely hot conditions).Otherwise, it can overheat or fire or its performance will be degenerate and its service life will be decreased.

Do not use it in a location where static electricity is great, otherwise, the safety devices in the pack may be damaged, which will cause hidden trouble of safety.

If the pack leaks and the electrolyte get into the eyes, do not rub eyes, instead, rinse the eyes, with clean running water, and immediately seek medical attention. Otherwise, eye injury can result.

If the pack takes off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, immediately remove it from the device or battery charge and stop using it.

In case the pack terminals are dirt, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection with the

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instrument.

Be aware discharged battery may cause fire or smoke, tape the terminals to insulate them.

The pack should be stored at room temperature, charged to about 40% to 60% of capacity. In case of over-discharge, 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.

## **9.Handling of Cells**

### **9.1 Soft Aluminium foil**

Easily damaged by sharp edge parts such as pins and needles, Ni-tabs, comparing with metal- can-cased LIB.

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

9.2 Sealed edge may be damaged by heat above 100°C, bend or fold sealed edge.

### **9.3 Prohibition short circuit**

Never make short pack circuit. It generates very high current which causes heating of the cells and may cause electrolyte leakage, gassing or explosion that are very dangerous. The LIP tabs may be easily short-circuited by putting them on conductive surface. Such outer short circuit may lead to heat generation and damage of the cell.

### **9.4 Mechanical shock**

- △LIP cells have less mechanical endurance than metal-can-cased LIB.
- △Falling, hitting, bending, etc. may cause degradation of LIP characteristics.

## **10.Period of Warranty**

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

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## **11.Others**

11.1 The customer is requested to contact BELICELL Gin 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.

11.2 BELICELL will take no responsibility for any accident when the battery is used under other conditions than those described in this Document.

11.3 BELICELL will inform, in a written form, the customer of improvement(s) regarding proper use and handing of the battery, if it is deemed necessary.

11.4 Any matters that this specification does not cover should be conferred between the customer and BELICELL.

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