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Specification for -103450 Li-Po battery pack

Prepared by	Checked by	Approved by
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Comment :

Customer Approval
Signature:
Date:

Revise record

Revision history

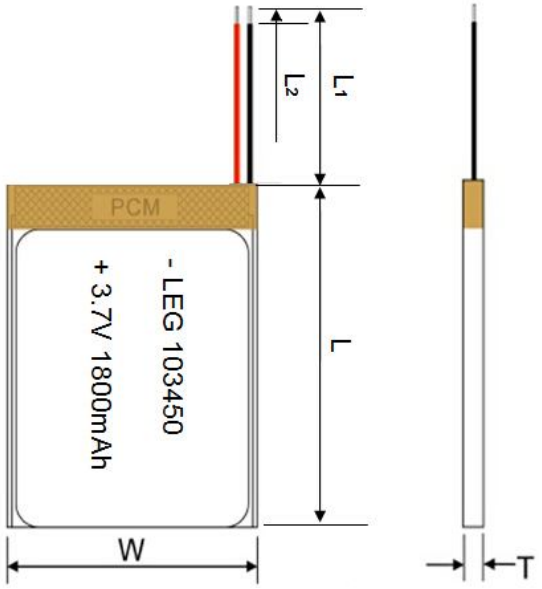
Revision	Date	Originator	Reason for revision
A00	2015-11-23	Huyuan Li	First version issued

Content

1. Scope

This specification describes the structure, performance, test method, warning and caution of the rechargeable Lithium Polymer battery pack and applies to the 3.7V 1800mAh Li-Po battery pack

2. Drawing of battery pack



PCM: SEIKO
Cables: UL1007 26AWG, right outlet

Dimension				
Length(L)	Width(W)	Thickness(T)	L_1	L_2
≤53.0 mm	≤35.0 mm	≤10.3 mm	60.0±3 mm	2.0±1 mm

3. Basic parameter of battery pack

No.	Item	Specification
1	Rated capacity	1800mAh
2	Minimum capacity	1770mAh
3	Normal voltage	3.7V
4	Initial impedance	≤160mΩ (with PCM and cables at 1KHz)
5	OCV	≥3.85V
6	Over-charge protection voltage	4.28±0.03 V
7	Over-discharge protection voltage	3.00±0.05 V
8	Standard charging method	22.5±2.5℃, 0.2C CC（constant current）charge to 4.2V, and then CV(constant voltage 4.2V)charge till charge current decline to ≤0.01C
9	Charge current	Standard charge: 0.2C
		Rapid charge: 1C
10	Charging time	Standard charge:5.5～6.5 h
		Rapid charge:1.5～2.5 h
11	Max. charging current	1.0C (5℃～+45℃)
12	Standard discharging current	0.2 C (-20℃～+60℃)
13	Max. discharging current	1C (-20℃～+60℃)
14	Operating environment	Charging： 0℃~45℃, max90%RH Discharging：-20℃~60℃, max90%RH
15	Weight	Approx 40.0 g(include PCM and cables)
16	Restoration method after over-current	Charging with tiny current

4. Basic performance of battery cell

4.1 Normal test conditions: Unless otherwise stated, tests should be done within one month of delivery under the following conditions:

Temperature: 15~35℃

Relative Humidity: 45-85%RH

Atmospheric pressure: 86 -106 KPa

4.2 Electrochemical characteristics

NO.	Item	Specification	Test method
1	The capacity discharging at 0.2C	Discharging capacity is not less than minimum capacity.	After standard charging, rest for 5 minutes ,then discharge to the ending voltage at 0.2C
2	Cycle life	The cycle life is not less than 300 cycles	Test condition： Charge：0.2C to 4.2V Discharge：0.2C to 3.0V When the discharge capacity reduced to 80% of rated capacity, Stop testing
3	Self-discharge	Discharging capacity is not less than 90% initial capacity	After standard charging, test condition： Temperature：20±5℃,Humidity≤75.0%RH Storage time：28days Then 0.2C discharge to ending voltage

4.3 Environment characteristics

NO.	Item	Specification	Test method
1	Constant temperature and constant humidity test	No explosion，no fire， no leakage. Discharging capacity is not less than 60% initial capacity	After Standard Charging, test condition： Temperature：40±5℃ Relative humidity：90~95%RH Storage time：48 hours Then return to room temperature for 2 hours，Then discharged to ending voltage at 1C

2	Vibration test	No explosion, no fire，no leakage	After Standard Charging，fixed the cell to vibration table, then subjected to vibration test for 30 minutes per axis of XYZ axes Sweep speed：1oct/min Vibration frequency：10Hz-30Hz Excursion (single amplitude)：0.38mm Vibration frequency：30Hz-55Hz Excursion (single amplitude)：0.19mm
3	Shock test	No explosion, no fire，no leakage	After Standard Charging，test condition： Acceleration：100m/s^2 Pulse lasting time：<16ms Shock times：1000±10 times

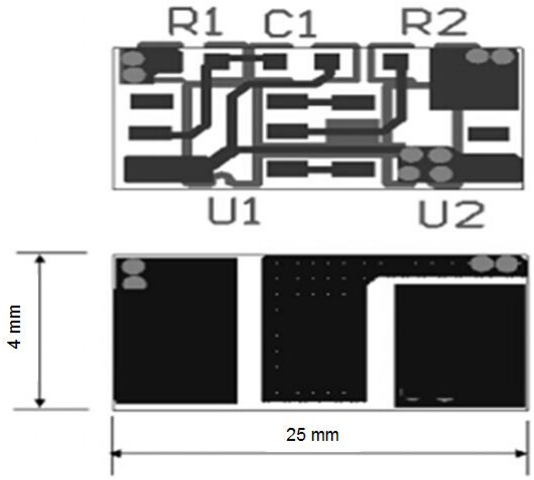
4.4 Safety characteristics

NO.	Item	Specification	Test method
1	Over-charge test	No explosion, no fire	After standard charge, discharge at 1C to3.0V Charge : charge to 4.8V at 1C, and maintain for 8 h
2	Short circuit test	No explosion, no fire	After Standard Charging，Short circuit the positive and negative，and the resistance of copper wire is not more than 80mΩ ,When the temperature falls 10℃ lower than the peak ,Stop testing
3	Thermal test	No explosion, no fire	Put cell into an hot box, test condition: Temperature Rate ： 5±2℃ /min Ending temperature :130℃±2℃ Keep temperature for 30 minutes , Then stop testing
4	Drop test	No Leakage ,no explosion，no fire，Impedance offset≤15%，Voltage offset≤5%。	The battery to be fully charged with standard charging condition ,then fall from height of 1.0m and hit on concrete ground

Note: Above testing of safe characteristics must be carried out with protective equipment.

5. Protection Circuit Module (PCM) of battery pack

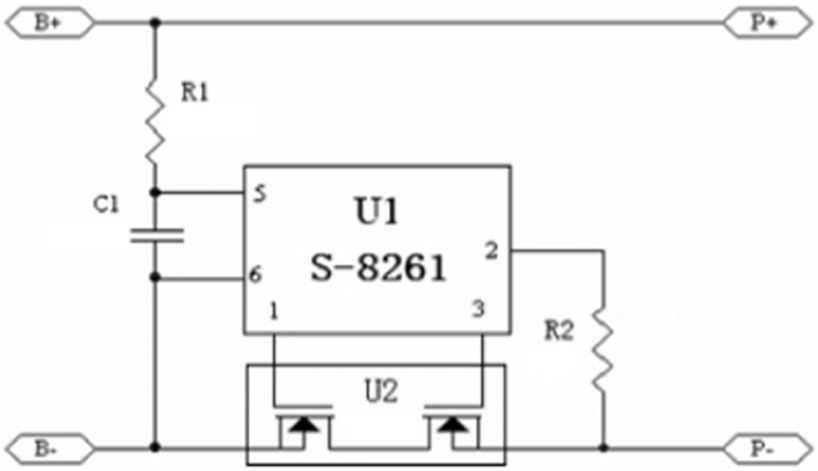
5.1 Layout of PCM



5.2 Basic parameter of PCM

NO.	Item	Specification
Over-charge protection	Over-charge detection voltage	4.28±0.03 V
	Restoration voltage after over-charging	4.08±0.03 V
	Over-charge delay time	Max 1.4s
Over-discharge protection	Over-discharge detection voltage	3.00±0.05 V
	Restoration method after over-discharging	Charge
	Over-discharge delay time	Max 180ms
Over-current	Over-current detection current	1.4-2.5A
	Over-current delay time	Max 11ms
Short circuit protection	Detection condition	short circuit
	short circuit protection delay time	Max 0.5 ms
	Release condition	Cut off circuit
Internal resistance	R≤65mΩ	Main loop electrify resistance
Current consumption	Max 10μA	Current consume when no load

5.3 Circuit diagram of PCM



6. Storage and Shipment Requirement

Item		Requirement
Storage environment	Short period less than 1 month	-20°C ~ +45°C，90％RH Max
	Long period more than 3 month	-10°C ~ + 45°C，90％RH Max
	Recommend storage	15°C -35°C，85％RH Max
Long time storage : If the cell is stored for a long time, the cell's storage voltage should be 3.7-3.9V and the cell should be stored in a condition as No.4.1. Also, it is recommended to charge the cell per six months.		

7. Warning and Cautions

Danger warning (it should be described in manual or instruction for users, indicated especially) to prevent the possibility of the battery from leaking, heating, explosion. Please observe the following precautions:

- Don't immerse the battery in water and seawater. Please put it in cool and dry environment if no using.
- Do not discard or leave the battery near a heat source as fire or heater
- Being charged, using the battery charger specifically for that purpose
- Don't reverse the positive and negative terminals
- Don't connect the battery to an electrical outlet directly.

- Don’t connect the positive and negative terminal directly with metal objects such as wire. Short terminals of battery is strictly prohibited, it may damage battery.
- Do not transport and store the battery together with metal objects such as necklaces, hairpins.
- Do not strike , throw or trample the battery.
- Do not directly solder the battery and pierce the battery with a nail or other sharp object
- Do not use lithium ion battery and others different lithium polymer battery model in mixture
- Prohibition of use of damaged cells
- Don’t bend or fold sealing edge. Don’t open or deform folding edge Don’t fillet the end of the folding edge
- Don’t fall, hit, bend battery body.
- Battery pack designing and packing Prohibition injury batteries.
- Never disassemble the cells
- The battery replacement shall be done only by either cells supplier or device supplier and never be done by the user.
- Keep the battery away from babies.

Caution

- Do not use or leave the battery at very high temperature conditions (for example, 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 is electrostatic and magnetic greatly, otherwise, the safety devices may be damaged, causing hidden trouble of safety.
- If the battery leaks, and the electrolyte get into the eyes. Do not wipe eyes, instead, rinse the eyes with clean running water, and immediately seek medical attention. Otherwise, eyes injury can result.
- If the battery gives 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 battery 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 instrument.
- Prohibition of use for damaged cells
- Be aware discharged batteries may cause fire; tape the terminals to insulate them.

8. Note

Note (1): The period of warranty is one year from the date of shipment. Supplier . guarantee to give a replacement in case of battery with defects proven due to manufacturing process instead of the customer abuse and misuse.

Note (2): The customer is requested to contact in advance if and when the variations of the operating conditions described in this document. Additional experimentation may be required to verify performance and safety under such conditions.

Note (3): take no responsibility for any accident when the cell is used under conditions outside of this specification.

Note (4): inform the customer in writing of improvement(s) regarding proper use and handling of the cell if it is deemed necessary. Supplier reserves the right to revise this specification before the customer signs the datasheet. If a revision is required, notify the customer.

Appendix.

N/A