

**Lithium-ion Battery Pack
Specification**

Model: PCLI18650-2S-2.2Ah

ZEUS CONFIDENTIAL

191 Covington Drive, Bloomingdale, IL 60108
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PCL118650-2S-2.2Ah
7.4V 2200mAh Lithium-ion

Amendment History

Rev	Description	Date	Name
Pre	Initial Release	5-26-17	Kevin Oh

Customer Approval

Company/Customer Name	Department	Date	Signature

- **For Air Shipments:** A 30% state of charge (SOC) limit on secondary lithium-ion cells and batteries, including Section II cells and batteries, will now apply. This does not apply to batteries packed with or contained in equipment (Effective April 1, 2016).
- Lithium cells/battery packs must be charged within 45 days of receipt to avoid over discharge.
- Shipping lithium materials must be done through a licensed shipper with appropriate packaging & labeling to meet current regulations.

These amendments are detailed in a lithium battery update document found on the International Air Transport Association (IATA) website: <http://www.iata.org/whatwedo/cargo/dgr/Documents/lithium-battery-update.pdf>

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1. Scope

This product specification applies to rechargeable Lithium-ion battery supplied by Zeus Battery Products.

2. Description and Model

Model: PCLI18650-2S-2.2Ah

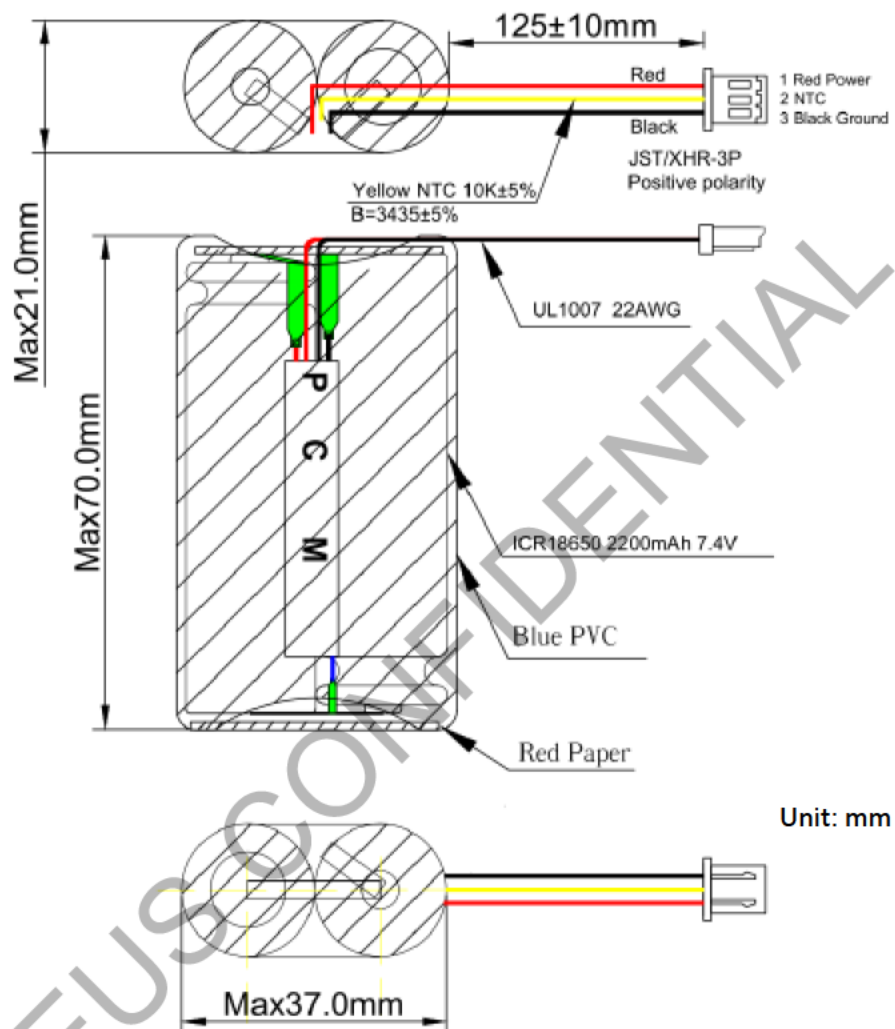
Description: 7.4V 2200mAh

3. Nominal Specifications

No.	Item	Specification	Remark
1	Nominal Capacity	2200mAh	@ 0.2C discharge, room temperature
2	Nominal Voltage	7.4V	
3	Charge Voltage	8.40+/-0.02V	
4	Standard Charge current	440mA	0.2C
5	Max. continuous charge current	2.2A	1.0C
6	Max. continuous discharge current	4.4A	2.0C
7	Discharge cut-off Voltage	5.60V	2.80V/cell
8	Internal resistance	≤180mΩ	
9	Weight	Approx. 94.0g	
10	Operating temperature	Charge: 0 ~ 45°C Discharge: -20 ~ 60°C	
11	Storage temperature	1 yr: -10 ~ 25°C 6 months: 25 ~ 45°C 1 month: 45 ~ 55°C	Recommended 25+/-5°C at 50% SOC
12	Cycle Life	≥500 cycles	@ 0.2C discharge, room temperature

***Note on Air transport: Lithium ion cells and batteries must be offered for transport at a state of charge (SoC) not exceeding 30% of their rated design capacity**

3. Dimension



4. Standard Test Conditions

4.1 Environmental Conditions

Unless otherwise specified, all tests stated in this specification are conducted at $25 \pm 5^\circ\text{C}$ and $60 \pm 20\%$ humidity.

4.2 Measuring Equipment

1) Ammeter and Voltmeter

Standard class specified in the national standard or more sensitive class

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2) Slide caliper

The slide caliper should have 0.01mm accuracy.

3) Impedance meter

An impedance meter with 1kHz AC should be used.

5. Environmental Tests

No	Items	Test Method and Condition	Criteria
1	Free fall test	The battery is to be fully charged in accordance with standard charge condition, then drop the battery three times from a height of 1,0 m onto a concrete floor. The batteries are dropped so as to obtain impacts in random orientations	No Fire,
2	Vibration test	After standard, install battery on the vibration table; adjust the equipment according to the following vibration and amplitude frequency. From X,Y,Z three directions in 10Hz~55Hz sweep vibration to sweep for 30mins with the sweep frequency speed rate at 1oct/min: Vibration frequency: 10Hz~30 Hz(single amplitude) Displacement amplitude(single): 0.38mm; Amplitude frequency: 30Hz~55 Hz(single amplitude) Displacement amplitude (single) 0.19mm	No explosion, No leakage, No fire
3	Shock Test	Affix the battery through the fixture from the three perpendicular X,Y,Z axes respectively to the vibration table, then following the requests below to adjust the acceleration, pulse duration time for crash test: Pulse peak acceleration: 100m/s ² , Collision frequency per min: 40~80 Pulse duration time: 16mins collision Frequency 1000±10	No explosion, No fire
4	Shock test	The fully charged battery is to be secured to the testing machine by means of a rigid mount which will support all mounting surfaces of the cell or battery. The battery is subjected to a total of three shocks of equal magnitude. The shocks are applied in each of three mutually perpendicular directions. At least one of them shall be perpendicular to a flat face. For each shock the cell or battery is accelerated in such a manner that during the initial 3 milliseconds the minimum average acceleration is 75gn. The peak acceleration shall be between 125gn and 175gn. Cells or batteries are tested in an ambient temperature of 20~25°C	No explosion, No leakage, No fire

6. Battery Handling Precautions

- ◆ The battery should be stored at half charged state in a dry, clean area with good ventilation. If the battery has to be stored for extended period of time (over 3 months), the environmental condition should be 20+/-5°C with 65+/-20% Relative Humidity.
- ◆ Charging current and voltage should be less than maximum charge current specified in the Product Specification. Charging with higher current or voltage than recommended value may damage the battery and lead to poor performance increased safety risk.
- ◆ Do not reverse the polarity of battery pack leads. Reverse charging may cause damage to the battery and lead to degradation of performance and increased safety risk.
- ◆ Please use a charger appropriate for charging lithium batteries.
- ◆ The battery shall be discharged at less than the maximum discharge current specified in the Product Specification. Higher current than allowed may reduce performance and lead the battery to over-heat.
- ◆ Always adhere to operating temperature as listed in the Product Specification. Using batteries outside of its operating temperature will lead to reduced performance and increased safety risk.
- ◆ Never short-circuit the battery pack.
- ◆ Do not disassemble the battery pack as it may generate internal short circuit in the battery and lead to gassing, fire, or other safety problems
- ◆ If electrolytes leak and come into contact with the skin or eyes, flush with fresh water and seek medical attention immediately.
- ◆ Never incinerate or dispose the battery in fire.
- ◆ Never allow the battery to come into contact with liquids such as water, soft drinks, juices and etc.
- ◆ Batteries might be damaged during shipping. If abnormal features are present such as damage in a plastic envelop, visible deformation of packaging, or electrolyte odor, the battery shall not be used and placed in a safe well ventilated area away from heat source.

7. Warranty

Products supplied by Zeus Battery Products contain 12 months warranty against manufacturing defects. Zeus Battery Products shall not be responsible for any accident or damage resulting from user abuse or misuse.

Note: This product specification is subject to change without prior notice.

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