Lithium Polymer Cell - 1100mAh Specifications Report

1. Scope:
This product specification describes model # 803048 1100mAh polymer lithium-ion battery. Please read the precautions recommended in the specifications before using the battery cell.

2. Product Type, Model and Dimension:
2.1 Type: Polymer lithium-ion battery
2.2 Model: #803048 with PCB and lead wire
2.3 Nominal Dimension (Pack): 8.1 x 31.0 x 51.5 mm

3. Specification:

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Capacity</td>
<td>1100mAh</td>
<td>0.2C₅ discharge</td>
</tr>
<tr>
<td>Nominal Voltage</td>
<td>3.7V</td>
<td>Average Voltage at 0.2C₅ discharge</td>
</tr>
<tr>
<td>Charge Current</td>
<td>Standard: 0.2 C₅A; Max: 1C₅A</td>
<td>Working temperature: 0~40°C</td>
</tr>
<tr>
<td>Charge cut-off Voltage</td>
<td>4.20±0.03V</td>
<td></td>
</tr>
<tr>
<td>Discharge Current</td>
<td>Continuously: 0.2C₅A; Max: 2C₅A</td>
<td>Working temperature: 0~60°C</td>
</tr>
<tr>
<td>Discharge cut-off Voltage</td>
<td>2.75V</td>
<td></td>
</tr>
<tr>
<td>Cell Voltage</td>
<td>3.8~3.9V</td>
<td>When leave factory</td>
</tr>
<tr>
<td>Impedance</td>
<td>≤130mΩ</td>
<td>AC 1KHz after 50% charge</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx: 24 g</td>
<td></td>
</tr>
<tr>
<td>Storage temperature</td>
<td>≤1month: -20~45°C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤3month: 0~30°C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤6month: 20±5°C</td>
<td></td>
</tr>
<tr>
<td>Storage humidity</td>
<td>65±20% RH</td>
<td>Best 20±5°C for long-term storage</td>
</tr>
</tbody>
</table>

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4. General Performance:

**Definition of Standard charging method:** At 20±5°C, charging the cell initially with constant current 0.2C₅A till voltage 4.2V, then with constant voltage 4.2V till current declines to 0.05C₅A.

<table>
<thead>
<tr>
<th>Item</th>
<th>Test Methods</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 0.2C Capacity</td>
<td>After standard charging, laying the battery 0.5h, then discharging at 0.2C₅A to voltage 2.75V, recording the discharging time.</td>
<td>≥300min</td>
</tr>
<tr>
<td>4.2 1C Discharge</td>
<td>After standard charging, laying the battery 0.5h, then discharging at 1C₅A to voltage 2.75V, recording the discharging time.</td>
<td>≥51min</td>
</tr>
<tr>
<td>4.3 Cycle Life</td>
<td>Constant current 1C₅A charge to 4.2V, then constant voltage charge to current declines to 0.05C₅A, stay 5min, constant current 1C₅A discharge to 2.75V, stay 5min. Repeat above steps till continuously discharging time less than 36min.</td>
<td>≥300times</td>
</tr>
<tr>
<td>4.4 Storage</td>
<td>20±5°C. After standard charging, laying the battery 28days, discharging at 0.2C₅A to voltage 2.75V, recording the discharging time.</td>
<td>≥240min</td>
</tr>
</tbody>
</table>

5. Environment Performance:

<table>
<thead>
<tr>
<th>Item</th>
<th>Test Methods</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1 High temperature</td>
<td>After standard charging, laying the battery 4h at 60°C, then discharging at 0.2C₅A to voltage 2.75V, recording the discharging time.</td>
<td>≥270min</td>
</tr>
<tr>
<td>5.2 Low temperature</td>
<td>After standard charging, laying the battery 4h at 0.2C₅A, then discharging at 0.2C₅A to voltage 2.75V, recording the discharging time.</td>
<td>≥210min</td>
</tr>
<tr>
<td>5.3 Constant humidity and temperature</td>
<td>After standard charging, laying the battery 48h at 40±2°C, RH 93±2%. Recording 0.2C₅A discharging time</td>
<td>No distortion No electrolytes leakage ≥270 min</td>
</tr>
<tr>
<td>5.4 Temperature shock</td>
<td>After standard charging, battery stored at -20°C for 2 hours, then stored at 50°C for 2 hours. Repeat 10 times.</td>
<td>No electrolytes leakage</td>
</tr>
</tbody>
</table>
6、Mechanical Performance:

<table>
<thead>
<tr>
<th>Item</th>
<th>Test Methods</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Vibration</td>
<td>After standard charging, put battery on the vibration table. 30 min experiment from X, Y, Z axis. Scan rate: 1 oct/min; Frequency 10-30Hz, Swing 0.38mm; Frequency 30-55Hz, Swing 0.19mm.</td>
<td>No influence to batteries' electrical performance and appearance.</td>
</tr>
<tr>
<td>6.2 Collision</td>
<td>After vibration test, batteries were laying on the vibration table about X, Y, Z axis. Max frequency acceleration: 100m/s²; collision times per minutes: 40~80; frequency keeping time 16ms; all collision times 1000±10.</td>
<td>No influence to batteries' electrical performance and appearance.</td>
</tr>
<tr>
<td>6.3 Drop</td>
<td>Random drop the battery from 10m height onto concrete one times.</td>
<td>No explosion or fire</td>
</tr>
</tbody>
</table>

7、Safety Test:

Test conditions: The following tests must be measured at flowing air and safety protection conditions. All batteries must standard charge and lay 24h.

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<thead>
<tr>
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<th>Test Methods</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1 Over charge</td>
<td>At 20±5℃, charging batteries with constant current 3C₅A to voltage 5V, then with constant voltage 5V till current decline to 0. Stop test till batteries’ temperature 10℃ lower than max temperature.</td>
<td>No explosion or fire</td>
</tr>
<tr>
<td>7.2 Over discharge</td>
<td>At 20±5℃, discharge battery with 0.2C₅A continuously 12.5h.</td>
<td>No explosion or fire</td>
</tr>
<tr>
<td>7.3 short-circuit</td>
<td>At 20±5℃, connect batteries’ anode and cathode by wire which impedance less than 50mΩ, keep 6h.</td>
<td>No explosion or fire</td>
</tr>
<tr>
<td>7.4 Extrusion</td>
<td>At 20±5℃, put the battery in two parallel steal broad, add pressure 13kN.</td>
<td>No explosion or fire</td>
</tr>
<tr>
<td>7.5 Thermal shock</td>
<td>Put the battery in the oven. The temperature of the oven is to be raised at 5±1℃ per minute to a temperature of 130±2℃ and remains 60 minutes.</td>
<td>No explosion or fire</td>
</tr>
</tbody>
</table>
8. Precautions:

8.1 Care of batteries during operation

The batteries must be handled with extreme care as it has a soft exterior.

8.1.1 Aluminium packing materials

The aluminium packing material can be easily damaged by the sharp edge objects, such as nickel-tabs.

1. Never use sharp object touching or in contact with the battery;
2. When surface cleaning is required, avoid the rubbing/scrubbing sharp edge parts of cells;
3. Strictly prohibited to pierce the battery with nail and other sharp items;
4. Contact forbidden with metal, such as necklace, hairpin etc in transportation and storage.

8.1.2 Sealed edge

Sealing edge is very vulnerable to damage and cannot be bent.

The Al interlayer of package has good electric performance. It is forbidden to connect interlayer with any exterior component in order to prevent possible short-circuits.

Fig.1 Exterior schematic of polymer lithium-ion cells
8.1.3 Folding edge

The folding edge is formed in batteries’ processes and passed all hermetic tests, please do not open or deform it. The Al interlayer of package has good electric performance. It is prohibited to connect with exterior component to preventing short-circuits.

![Fig.2. Single folding edge of PL cells](image1)
![Fig.3. Reverse folding edge of PL cells](image2)

8.1.4 Tabs

The batteries’ tabs are not so hardy or durable especially for aluminium tabs. Don’t bend tabs.

8.1.5 Mechanical shock

Don’t fall, hit, bent the batteries’ body.

8.1.6 Short-circuit

Short-circuit is strictly prohibited. It can cause irreparable damage to batteries.

8.2 Standard Test Environment for polymer lithium-ion batteries

Environment temperature: 20±5℃,
Humidity: 45-85%

8.3 Cautions of charge & discharge

8.3.1 charge

Charging current should be lower than values that recommend below. Higher current and voltage charging may cause damage to cell electrical, mechanical, safety performance and could lead to high heat generation or chemical leakage.

(1) Batteries charger should charging with constant current and constant voltage mode;
(2) Charging current should be lower than (or equal to )1C₅A;
(3) Temperature 0～40℃ is preferred when charging;
(4) Charging voltage must be lower than 4.25V.

8.3.2 Discharge

(1) Discharging current must be lower than (or equal to) 5C\textsubscript{5}A;
(2) Temperature 0\textdegree~60\textdegree{C} is preferred when discharging;
(3) Discharging voltage must not be lower than 2.75V.

8.3.3 Over-discharge

It should be noted that the cell would be at an over-discharge state by prolonged self-discharge. In order to prevent over-discharge, the cell shall be charged periodically to maintain voltage between 3.6-3.9V. Over-discharge may cause permanent loss of cell performance. It should be noted that the cell would continue to discharge till voltage is below 2.5V.

8.4 Storage of polymer lithium-ion batteries

The ideal environmental condition for long-term storage:
- Temperature: 20±5\textdegree{C};
- Humidity: 45-85%;
- Batteries charged state at 40~60%.

8.5 Transportation of polymer lithium-ion batteries

The batteries should be transported in not exceeding 10~50% charged states.

8.6 Others

Please note precautions below to prevent cells’ leakage, heat generation and explosion.
- Prohibition of disassembly or dismantling of cells;
- Prohibition of cells immersion into liquid such as water or seawater;
- Prohibition of dumping cells into naked fire or incinerator, explosion may occur;
- Prohibition of using damaged or bloated cells. The cells with a smell of electrolyte or leakage must be placed away from fire to avoid catching fire;
- In case of electrolyte leakage contact with skin, eye, or any body parts; immediately flush the electrolyte with fresh water and medical advice is to be sought.
9、Notice on Assembling of Battery Pack:

9.1 Pack design
Battery pack should have sufficient strength and battery should be protected from mechanical shock. No sharp edge components should be inside the pack containing the battery.

9.2 PCM design
The overcharge threshold voltage should not exceed 4.25V. The over discharge threshold voltage should not be lower than 2.75V. The PCM should have short protection function built-in.

9.3 Tab connection
Ultrasonic welding or spot welding is recommended to connect battery with PCM or other parts. If apply manual solder method to connect tab with PCM, the notice below is very important to ensure battery performance.
(1) The electric iron should be temperature controlled and ESD safe;
(2) Soldering temperature should not exceed 350°C;
(3) Soldering time should not be longer than 3s, allow battery tab to cold down before next soldering;
(4) Soldering times should not exceed 5 times on same spot; and
(5) Apply direct heat to cell body is strictly prohibited, battery may be damaged by heat above 100°C.

9.4 Cell fixing
The battery should be fixed to the battery pack by its large surface area. No cell movement in the battery pack should be allowed.

9.5 Cells replacement
The cell replacement should be performed by professionals. Avoid short-circuit between cells, Aluminium package and exterior component.

Fig.4. Protect schematic of transforming component connecting with cell
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10. Drawing: (mm)

![Diagram](Image)

<table>
<thead>
<tr>
<th>Sign</th>
<th>Item</th>
<th>Max (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Battery Thickness</td>
<td>8.1</td>
</tr>
<tr>
<td>B</td>
<td>Battery Length</td>
<td>51.5</td>
</tr>
<tr>
<td>C</td>
<td>Battery Width</td>
<td>31.0</td>
</tr>
<tr>
<td></td>
<td>Wire Standard</td>
<td>AWG28#×30</td>
</tr>
</tbody>
</table>

10. PCB Parameter

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over charged Protect Voltage</td>
<td>4.275 ± 0.050 V</td>
<td></td>
</tr>
<tr>
<td>Over charged Protect Delay time</td>
<td>≤ 1400 mS</td>
<td>H313A PCB</td>
</tr>
<tr>
<td>Over charged Protect Relieve Voltage</td>
<td>4.175 ± 0.025 V</td>
<td></td>
</tr>
<tr>
<td>Over Discharged Protect Voltage</td>
<td>2.30 ± 0.10 V</td>
<td></td>
</tr>
<tr>
<td>Over Discharged Protect Delay time</td>
<td>≤ 173 mS</td>
<td></td>
</tr>
<tr>
<td>Over Discharged Protect Relieve</td>
<td>Charge</td>
<td></td>
</tr>
<tr>
<td>Over Current Protect</td>
<td>3.0 ± 0.5 A</td>
<td></td>
</tr>
<tr>
<td>Over Current Protect Delay time</td>
<td>≤ 11 mS</td>
<td></td>
</tr>
<tr>
<td>Protect Component Static State Power</td>
<td>&lt; 7 µA</td>
<td></td>
</tr>
</tbody>
</table>

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