EEMB CO., LTD

Polymer Li-ion Battery

Specification

聚合物锂离子电池

产品规格书

<table>
<thead>
<tr>
<th>Model 型号：</th>
<th>LP753048-PCM-LD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity 容量：</td>
<td>1100mAh</td>
</tr>
</tbody>
</table>

Customer 客户名称：

Customer Approval（Customer confirmation）客户确认：

<table>
<thead>
<tr>
<th>Signature 签字</th>
<th>Checked 审核</th>
<th>Approved 批准</th>
</tr>
</thead>
</table>

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http://www.eemb.com
<table>
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<th>描述 Description</th>
<th>日期 Date</th>
<th>批准 Approval</th>
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</tbody>
</table>
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1. **Scope 适用范围**

This product specification defines the requirements of the rechargeable polymer lithium-ion battery supplied to the customer by EEMB Co., Ltd.

本产品规格书适用于 EEMB 提供的聚合物锂离子电池

2. **Battery Pack Basic Characteristics 电池组合产品基本特性**

<table>
<thead>
<tr>
<th>No.</th>
<th>Item 项目</th>
<th>Characteristics 性能指标</th>
<th>Remark 备 注</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Model 型号</td>
<td>LP753048-PCM-LD</td>
<td></td>
</tr>
<tr>
<td>2.2</td>
<td>Capacity 容量</td>
<td>Nominal 标称容量</td>
<td>1100 mAh 0.2C₅A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minimum 最小容量</td>
<td>1000 mAh 0.2C₅A</td>
</tr>
<tr>
<td>2.3</td>
<td>Nominal Voltage 额定电压</td>
<td>3.7 V</td>
<td></td>
</tr>
<tr>
<td>2.4</td>
<td>Weight 重量</td>
<td>Approx. 22 g</td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>Internal Impedance 内阻</td>
<td>≤ 80 mΩ AC 1KHz(50% charge)</td>
<td></td>
</tr>
<tr>
<td>2.6</td>
<td>Dimension 外形尺寸</td>
<td>Length 长</td>
<td>≤ 50 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Width 宽</td>
<td>≤ 30.5 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thickness 厚</td>
<td>≤ 7.8 mm</td>
</tr>
<tr>
<td>2.7</td>
<td>Charge 充电</td>
<td>Maximum Current 最大充电电流</td>
<td>1100 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Limited Voltage 充电上限电压</td>
<td>4.28±0.05 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>End-of Current 充电截至电流</td>
<td>22 mA</td>
</tr>
<tr>
<td>2.8</td>
<td>Discharge 放电</td>
<td>Maximum Current 最大放电电流</td>
<td>2200 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cut-off Voltage 放电终止电压</td>
<td>2.3±0.10 V</td>
</tr>
<tr>
<td>2.9</td>
<td>Charger 充电器</td>
<td>Voltage/Current 电压/电流</td>
<td>4.2V / 0.1A V/A Reference 推荐</td>
</tr>
<tr>
<td>2.10</td>
<td>Operation Temperature 工作温度</td>
<td>Charge 充电温度</td>
<td>0 ~ 45 ℃</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discharge 放电温度</td>
<td>-20 ~ +60 ℃</td>
</tr>
<tr>
<td>2.11</td>
<td>Storage Temperature 贮存温度</td>
<td>1 month 1 个月（贮存期）</td>
<td>-20 ~ +60 ℃</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 months 3 个月（贮存期）</td>
<td>-20 ~ +45 ℃</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 months 12 个月（贮存期）</td>
<td>-20 ~ +25 ℃</td>
</tr>
<tr>
<td>2.12</td>
<td>Storage Relative Humidity 贮存湿度</td>
<td>65±20 %</td>
<td></td>
</tr>
</tbody>
</table>
3. Battery Pack Shape and Dimensions (Unit: mm)
电池组合产品外形及尺寸（单位：mm）

1. Drawing 尺寸示意图：
厚：T（max）=7.8mm
宽：W（max）=30.5mm
长：H（max）=50mm
线长：L=100±3.0mm
剥头：3±0.5mm

2. Materials 材料：
① Cell 电芯：LP753048
② PCM 保护板
③ Wire: black (—) 黑线 UL1007 AWG24
④ Wire: red (+) 红线 UL1007 AWG24

4. Appearance 外观

It shall be free from any defects such as remarkable scratches, breaks, cracks, discoloration, leakage, or middle deformation.
电池表面无划伤、裂纹、脏点、锈蚀、变形、变色、漏液等缺陷，中间无翘起

5. Battery Pack’s Shipping Standard 电池组合出货标准

Voltage: 3.83V~3.9V
Internal Resistance: ≤200mΩ
电池出货电压：3.83V~3.9V
电池内阻：≤200mΩ

6. Specification of PCM 保护板参数

The specification shall be applied to Lithium polymer battery protection circuit module manufactured by EEMB CO., LTD.
此参数适用于 EEMB 生产的聚合物锂离子电池保护板。
### 6.1 Basic Specification (T=25℃) 基本参数 (Reference)

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Content</th>
<th>Criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over charge protection</td>
<td>V&lt;sub&gt;DET1&lt;/sub&gt;</td>
<td>Over charge detection voltage</td>
<td>4.28±0.05V</td>
</tr>
<tr>
<td></td>
<td>tV&lt;sub&gt;DET1&lt;/sub&gt;</td>
<td>Over charge detection delay time</td>
<td>0.96S-1.40S</td>
</tr>
<tr>
<td></td>
<td>V&lt;sub&gt;REL1&lt;/sub&gt;</td>
<td>Over charge release voltage (参考)</td>
<td>4.175±0.01V</td>
</tr>
<tr>
<td>Over discharge protection</td>
<td>V&lt;sub&gt;DET2&lt;/sub&gt;</td>
<td>Over discharge detection voltage</td>
<td>2.3±0.10V</td>
</tr>
<tr>
<td></td>
<td>tV&lt;sub&gt;DET2&lt;/sub&gt;</td>
<td>Over discharge detection delay time</td>
<td>115ms-173ms</td>
</tr>
<tr>
<td></td>
<td>V&lt;sub&gt;REL2&lt;/sub&gt;</td>
<td>Over discharge release voltage (参考)</td>
<td>3.5±0.010V</td>
</tr>
<tr>
<td>Limited to Max peak value current</td>
<td>Peak value(A)</td>
<td>2A</td>
<td>Duration (S)</td>
</tr>
<tr>
<td>Limited to Max loading current</td>
<td>Constant (A)</td>
<td>1A</td>
<td></td>
</tr>
<tr>
<td>Short protection</td>
<td>Detection condition</td>
<td>Exterior short circuit</td>
<td>4</td>
</tr>
<tr>
<td>Short protection</td>
<td>Release condition</td>
<td>Cut short circuit</td>
<td>4</td>
</tr>
<tr>
<td>Interior resistance</td>
<td>R&lt;sub&gt;DS&lt;/sub&gt;</td>
<td>Main loop electrify resistance</td>
<td>R&lt;sub&gt;DS&lt;/sub&gt;≤70mΩ</td>
</tr>
<tr>
<td>Current consumption</td>
<td>I&lt;sub&gt;DD&lt;/sub&gt;</td>
<td>Current consume in normal operation</td>
<td>3μA Type 7μA Max</td>
</tr>
</tbody>
</table>
6.2 PCM Circuit Diagram (FYI) 保护板原理图(参考)

7. Battery Cell Basic Characteristics 电芯产品基本特性

<table>
<thead>
<tr>
<th>No.</th>
<th>Item 项目</th>
<th>Characteristics 性能指标</th>
<th>Remark 备 注</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1</td>
<td>Model 型号</td>
<td>LP753048</td>
<td></td>
</tr>
<tr>
<td>7.2</td>
<td>Capacity 容量</td>
<td>Nominal 标称容量 1100 mAh</td>
<td>0.2C₅A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minimum 最小容量 1000 mAh</td>
<td>0.2C₅A</td>
</tr>
<tr>
<td>7.3</td>
<td>Nominal Voltage 额定电压</td>
<td>3.7 V</td>
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<td>Weight 重量</td>
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</tr>
<tr>
<td>7.5</td>
<td>Internal Impedance 内阻</td>
<td>≤ 80 mΩ</td>
<td>AC 1KHz(50% charge)</td>
</tr>
<tr>
<td>7.6</td>
<td>Charge 充电</td>
<td>Maximum Current 最大充电电流 1100 mA</td>
<td>1C₅A（CC&amp;CV）</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Limited Voltage 充电上限电压 4.200±0.020 V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>End-of Current 充电截至电流 22 mA</td>
<td></td>
</tr>
<tr>
<td>7.7</td>
<td>Discharge 放电</td>
<td>Maximum Current 最大放电电流 2200 mA</td>
<td>2.0C₅A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cut-off Voltage 放电终止电压 2.750±0.005 V</td>
<td></td>
</tr>
</tbody>
</table>
### 8. Battery Cell Electrical Characteristics 电芯性能测试

<table>
<thead>
<tr>
<th>No.</th>
<th>Item 项目</th>
<th>Criteria 标准</th>
<th>Test Instructions 测试方法</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.1</td>
<td>1C5A rate discharge capacity 1C5A 放电容量</td>
<td>Discharge Capacity ≥ Minimum Capacity 放电容量≥最小容量</td>
<td>Full charge at 23±2℃, rest for 60 min, then discharge at the same temperature with 1.0C5A to 2.75V. 电池在 23±2℃完全充电后放置 1 小时后用 1C5A 恒流放电至电池两端电压为 2.75V 时止记录放电容量。</td>
</tr>
<tr>
<td>8.2</td>
<td>High temp. discharge capacity 高温性能</td>
<td>Discharge Time ≥ 54min 放电时间≥54min</td>
<td>Full charge at 23±2℃, store at 55±2℃ for 2h, then discharge at the same temperature with 1.0C5A to 2.75V. 电池在 23±2℃完全充电后放入 55±2℃的高温箱中恒温 2h，然后在同一温度下以 1.0C5A 电流放电至 2.75V 记录放电时间。</td>
</tr>
<tr>
<td>8.3</td>
<td>Low temp. discharge capacity 低温性能</td>
<td>Discharge Time ≥ 4.25h 放电时间≥4.25h</td>
<td>Full charge at 23±2℃, store at -10℃±2℃ for 16h<del>24h, then discharge at the same temperature with 0.2C5A to 2.75V. 电池在 23±2℃完全充电后放入-10℃±2℃的低温箱中恒温 16</del>24h，然后在同一温度下以 0.2C5A 电流放电至 2.75V 记录放电时间。</td>
</tr>
<tr>
<td>8.4</td>
<td>Cycle life 循环寿命</td>
<td>≥ 500 cycles (0.5C5A) ≥ 500 次 (0.5C5A)  ≥ 800 cycles (0.2C5A) ≥ 800 次 (0.2C5A)</td>
<td>After full charge, rest for 10 min, then discharge at constant current to 2.75V, rest for 10 minutes. Repeat above steps until the two consecutive cycles of discharge time is less than the specified time. (500 cycles ≥ 96min, 800 cycles ≥ 240min) 电池完全充电后搁置 10min，然后以规定电流恒流放电至 2.75V，搁置 10min。重复上述步骤直到连续两次循环的放电时间均少于规定的时间时寿命即为终止。(500 次≥96min ,800 次≥240min)</td>
</tr>
<tr>
<td>8.5</td>
<td>Capacity Retention 荷电保持能力</td>
<td>Discharge Time ≥ 4.5h 放电时间≥4.5h</td>
<td>After full charge, store at 23±2℃ for 28 days. Then discharge with 0.2C5A to 2.75V. 电池完全充电后在温度为 23±2℃条件下将电池开路搁置 28 天后，以 0.2C5A 电流放电至 2.75V 记录放电时间。</td>
</tr>
</tbody>
</table>

### 9. Battery Cell Acclimatization Characteristics 电芯环境适应性能

<table>
<thead>
<tr>
<th>No.</th>
<th>Item 项目</th>
<th>Criteria 标准</th>
<th>Test Instructions 测试方法</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.1</td>
<td>High Temp. And High Humidity 恒定湿热性能</td>
<td>No deformation, no rust, no fire or explosion; Discharge time ≥ 36min 电池外观应无明显变形、锈蚀、冒烟或爆炸，放电时间应不低于 36min.</td>
<td>After full charge, store at 40℃±2℃(90%~95%RH) for 48h. After test, place at 23±2℃ for 2h and then discharge with 1C5A to end-voltage 电池完全充电后在 40℃±2℃，相对湿度为 90%~95%的恒温恒湿箱中搁置 48h 后，将电池取出在环境温度 23±2℃的条件下搁置 2h，然后</td>
</tr>
<tr>
<td>No.</td>
<td>Item</td>
<td>Criteria</td>
<td>Test Instructions</td>
</tr>
<tr>
<td>-----</td>
<td>------</td>
<td>----------</td>
<td>-------------------</td>
</tr>
<tr>
<td>10.1</td>
<td>Overcharge</td>
<td>No fire or explosion; battery should not explode or catch fire.</td>
<td>Charged the cells at 3C5A current 23±2°C with a voltage limit of 4.8V and end the test when current drops close to 0A. The battery was placed in a fume hood and the temperature was kept at 23±2°C.</td>
</tr>
<tr>
<td>10.2</td>
<td>Short-Circuit</td>
<td>No fire or explosion; temperature: 150°C; battery should not explode or catch fire. Battery temperature should not exceed 150°C.</td>
<td>Place the battery with a temperature sensor into a fume hood and short-circuit by connecting the positive and negative terminals. The battery temperature should be monitored and recorded during the test. The test should be terminated when the battery temperature drops to about 10°C lower than the peak value.</td>
</tr>
<tr>
<td>10.3</td>
<td>Thermal abuse</td>
<td>No fire or explosion; battery should not explode or catch fire.</td>
<td>Cell is heated in a circulating air oven at a rate of (5±2)°C per minute to 130±2°C, and then placed for 30 minutes at 130±2°C. The battery temperature should not exceed 130±2°C.</td>
</tr>
</tbody>
</table>
After full charge, place the battery in the temperature control box of 23±2℃, do the following steps:
(1) Put the battery into test chamber of 75℃ ±2℃ and keep for 6h.
(2) Lower the temperature to -40±2℃ and keep for 6h.
(3) Temperature conversion time is no longer than 30 min.
(4) Repeat the above three steps for 10 cycles.

11. Warranty 保质期
6 months warranty for sample battery after date of production. One year warranty for finished battery after the date of production.
样品电池保质期为（出厂之日起）半年；产品电池保质期为（出厂之日起）1年。

12. Matters Needing Attention 注意事项
Strictly observes the following needing attention. EEMB will not be responsible for any accident occurred by handling outside of the precautions in this specification.
您必须严格遵守下述电池使用注意事项。对于没有按照以下注意事项所造成的任何意外事故，EEMB 不负担任何责任。

! Danger 危险
- Strictly prohibits heat or throw cell into fire.
- Strictly prohibits throw and wet cell in liquid such as water, gasoline or drink etc.
- Strictly prohibits use leave cell close to fire or inside of a car where temperature may be above 60℃. Also do not charge / discharge in such conditions.
- Strictly prohibits put batteries in your pockets or a bag together with metal objects such as necklaces. Hairpins, coins, or screws. Do not store or transportation batteries with such objects.
- Strictly prohibits short circuit by any way.
- Do not place Cell in a device with the (+) and (-) in the wrong way around.
- Strictly prohibits pierce Cell with a sharp object such as a needle.
● Strictly prohibits disassemble or modify the cell.
禁止对电池进行分解。
● Strictly prohibits welding a cell directly.
禁止直接对电池进行焊接。
● Do not use a Cell with serious scar or deformation.
禁止使用已经损坏的电池。
● Thoroughly read the user’s manual before use, inaccurate handling of lithium ion rechargeable cell may cause leakage, heat, smoke, an explosion, or fire, capacity decreasing.
在使用之前请详细阅读操作说明书，不适当的操作可能引起电池变热、着火、爆炸、毁坏或电池容量的衰减。

! Warning 警告

● Strictly prohibits put cell into a microwave oven, dryer, or high-pressure container.
禁止把电池放加热器皿、洗衣机或高压容器中。
● Strictly prohibits use cell with dry cells and other primary batteries, or new and old battery or batteries of a different package, type, or brand.
禁止把电池同干电池或其它原电池或者新旧电池一起使用,也不要同不同包装、不同型号或不同品牌的电池一起使用。
● Stop charging the Cell if charging is not completed within the specified time.
如果在规定的充电时间内充电没有结束，停止充电。
● Stop using the Cell if abnormal heat, odor, discoloration, deformation or abnormal condition is detected during use, charge, or storage.
在使用、充电或储存期间如发现电池有变热、散发气味、变色、变形或其它反常之处停止使用。
● Keep away from fire immediately when leakage or foul odor is detected.
当发现电池漏液或散发出难闻的气味时立即远离。
● If liquid leaks onto your skin or clothes, wash well with fresh water immediately.
如果电解液渗漏到您的皮肤或衣服上，立刻用大量清水冲洗。
● If liquid leaking from the Cell gets into your eyes, do not rub your eyes. Wash them well with clean edible oil and go to see a doctor immediately.
如果电解液渗出并进入您的眼睛里，不要揉擦您的眼睛，立刻用食用油清洗眼睛并就医。

! Caution 注意

● Before using the Cell, be sure to read the user’s manual and cautions on handling thoroughly.
在使用电池之前，应详细阅读操作指南并对使用中的注意事项有足够深刻的理解。
● Charging with specific charger according to product specification. Charge with CC/CV method.
Strictly prohibits revered charging. Connect cell reverse will not charge the cell. At the same time, it will reduce the charge-discharge characteristics and safety characteristics; this will lead to product heat and leakage.
充电时请使用指定的充电器并按照本规格书的要求进行充电。采用恒流恒压方式充电，禁止反向充电。若电池正负极接反，将无法对电芯进行充电；同时，反向充电会降低电芯的充放电性能和安全性，并会导致发热和泄漏。
● Store batteries out of reach of children so that they are not accidentally swallowed.
把电池放到小孩够不到的地方以免吞服。
● If younger children use the Cell, their guardians should explain the proper handling.
小孩使用电池时，监护人应详细解释操作方法。

- Before using the Cell, be sure to read the user’s manual and cautions on handling thoroughly.
  在将电池装入设备或从设备中取出之前详细阅读设备操作手册。

- Batteries have life cycles. If the time that the Cell powers equipment becomes much shorter than usual, the Cell life is at an end. Replace the Cell with a new same one.
  电池具有使用寿命，如果使用电池的工作时间比平常少的多，请更换新电池。

- When not using Cell for an extended period, remove it from the equipment and store in a place with low humidity and low temperature.
  当长期不用时，要将电池从设备中取出并放在低温低湿的环境中保存。

- While the Cell pack is charged, used, and stored, keep it away from objects or materials with static electric charges.
  电池应在远离静电的场所进行充电、使用和储存。

- If the terminals of the Cell become dirty, wipe with a dry clothe before using the Cell.
  如果电池的接线端变脏，在使用之前用干布擦净。

- Storage the cells in storage temperature range as the specifications. After full discharged, we suggest that charging to 3.7~4.0V with no using for a long time.
  电芯应贮存在产品规格书规定的温度范围内，电芯放电放完后，如果长期不使用，建议充电至3.7~4.0V贮存。

- Battery should be charged and discharged every 3 months at 0.2 C during long term storage, and then charge to 50-70% of the capacity for storage.
  电池在长期贮存过程中，必须每 3 个月 0.2C 进行充放电一次，然后充电至 50~70%的容量进行贮存。

- Do not exceed these ranges of the following temperature ranges:
  电池在使用和贮存时的温度不能超出下面的要求：
  - Charge temperature range 充电：0℃ to 45℃;
  - Discharge temperature range 放电：-20℃ to 60℃.
  - Store less than 1 month 贮存 1 个月：-20℃ - +60℃
  - Store less than 3 months 贮存 3 个月：-20℃ - +45℃
  - Store less than 1 year 贮存 12 个月：-20℃ - +25℃

! Special Notice 特别注意

Keep the cells in 50% charged state during long period storage. We recommend to charge the battery up to 50% of the total capacity every 3 months after receipt of the battery and maintain the voltage 3.7~4.0V. And store the battery in cool and dry place.

电池在长时间储存的过程中保持带电量为 50%。我们建议每 3 个月充电至 50%以上容量，保持电压在 3.7~4.0V。将电池贮存在阴凉干燥的地方。

EEMB reserves the final explanation. Please use battery strictly according to specification. EEMB will not be responsible for any inappropriate operation. EEMB keeps the right to change product specifications without previous notice. If any question, please consult with the manufacturer.

EEMB 保留最终解释权。请严格按规范使用电池。EEMB 对任何不当操作将不负责。EEMB 保留修改产品规格书不另行通知的权利。如有任何问题，请咨询制造商。