

# Specification Approval Sheet

**Name : Polymer Lithium-Ion Battery**

**Model : LP503040**

**SPEC : 3.7V/ 550mAh**

**Number: 503040**

## Specification Modification Records

Modification Time	Descriptions	Issued Date	Approved By

Content

### 1.Scope:

This specification describes the Product Specification of chargeable Polymer Lithium-Ion LP503040

## 2.Model : LP503040

### 3.Cell parameters Index:

#### 3.1 Single cell parameters

No.	Item	Spec	Note
1	Model Number	503040 / 550mAh	
2	Charge Limited Voltage	4.2V	
3	Nominal Voltage	3.7V	Cell Voltage between 3.6V ~3.9V before shipping
4	Nominal Capacity	550mAh@ 0.2C Discharge	Nominal Capacity refer to the capacity of 0.2C discharge with 2.75V cut-off voltage, after charging with standard method.
5	Cycle Life	300 Times	One cycle refer to one charge period and then one discharge period. Test condition: Charge: 0.2C to 4.2V Discharge: 0.2C to 2.75V The cycle life is the cycle times when the discharge capacity is about 80% of the rated capacity.
6	Self-discharge	Residual Capacity>90%	After standard charging, storied at 25°C±0.5°C for 30 days, then measure the capacity as item 4.
7	Impedance	Typical: 67mΩ	After standard charging, measure the internal resistance with AC1KHz
8	Max. Charge Current	1C	
9	Max. Discharge Current	1C	
10	Discharge Cut-off Voltage	2.75V	
11	Operating Temperature	Discharge:-10°C ~ +55°C Charge: 0 °C ~ +43°C	Cells must be storied at 3.6V-3.9V. During long period storage, cells should be maintained every 90 days. The method is to do a charge-discharge cycle with standard method, then charge to 3.7—3.9V.
12	Storage Temperature	-20 °C ~+45°C	
13	Cell Weight	Approx: 11g	
14	Cell Dimension	Length: 40.5mm Max Width: 30.5mm Max Thickness: 5.5mm Max	Measured with weighting 300gf at 25°C±0.5°C Not including Tabs
15	Connector type	JST SYP-02T-1 + socket	2.54mm*2pins

### 3.2 Parameters of battery

No.	Items	Spec.	Notes
1	<b>Rated Capacity</b>	550mAh	@ 0.2C mA discharging
2	<b>Nominal Voltage</b>	3.7V	The average value of voltage during the discharge period (with standard charge and discharge).
3	<b>Assemblage Dimension</b>	Length: 40.5mm Max Width: 30.5mm Max Thickness: 5.5mm Max	Measured with weighting 300gf at 25°C±0.5°C Not including battery drawing line.

**Note:** if the battery is in series, the internal resistance of PTC will change according to the temperature.

### 4. Electronic Characteristics test and inspection:

#### 4.1 Standard testing environment

Unless special stated, tests should be done within one month of delivery and the charging-recharging times is less than 5 times. The following is test conditions: Ambient Temperature: 25°C±0.5°C

Ambient Humidity: 65 ±20%

#### 4.2 The requirement of measure instrument

- (1) The measure instrument is passed tested by qualified institute.
- (2) The accuracy of the size instrument is not more than 0.01mm.
- (3) The accuracy of multimeter is not less than 0.5%. while measure the voltage, the internal resistance mustn't less than 10KΩ.
- (4) The principal of the internal resistance is 1KHz LCR, the accuracy is 0.2%.
- (5) The internal resistance is changeable, it varies according to the temperature and the charging mode. And it is relevant to the PTC and the length and the Capacity of the drawing line.
- (6) The current accuracy of the battery test system is more than ±0.1%, is obarically accuracy is ±0.5%, timer accuracy is less than ±0.1%.
- (7) The accuracy of the temperature meter is less than ±0.5°C.

#### 4.3 Visual inspection

Any visual inspection defects will affect the electronic characteristics, such as cracks, leakage, and flaw, are not inexistence.

#### 4.4 Charge/Discharge Methods and Test Conditions

No.	Item	Testing Condition and Method	Note
1	<b>Charging Current</b>	Standard CC: 0.2C Quick CC: 0.5C	
2	<b>Standard Charging</b>	Constant Current Charging at 0.2C to 4.2V. Constant Voltage Charging at 4.2V to cut-off current≤0.05C	
3	<b>Quick Charging</b>	Constant Current Charging at 0.5C to 4.2V. Constant Voltage Charging at 4.2V to cut-off current≤0.05C	
4	<b>Standard Discharge</b>	Constant discharge at 0.2C to cut-off voltage of 2.75V.	
5	<b>Charging Time</b>	Standard charging time : 8 hours Quick charging time: 2.5 hours	
6	<b>Temperature &amp; Humidity</b>	Standard charging: 0°C ~ 43 °C 45~85% RH Quick charging: 10 °C ~ 43 °C 45~85%RH Standard discharging: -10 °C ~ 55 °C 45~85% RH	
7	<b>Open Voltage</b>	3.6~3.9V (Before shipping)	

**Notes:** The Max. voltage while charging is not more than 4.25V. The Max. protective voltage designed on PCB board should not more than 4.3V.

#### 4.5 Mechanical Characteristics

No.	Item	Testing Conditions and Method	Standard
1	<b>Vibration Test</b>	After standard charging, fixed the cell to vibration table and subjected to vibration cycling that the frequency is to be varied at the rate of 1Hz per minutes between 10Hz and 55Hz, the excursion of the vibration is 0.38mm. The cell shall be vibrated for 30 minutes for three axis of XYZ axes.	No leakage. Left Capacity $\geq$ 90%, after 3 hours.
2	<b>Drop Test</b>	Drop the cell from 1meter height onto the concrete ground twice.	No explore, no fire and no leakage

#### 4.6 Safety Test

No.	Item	Testing Conditions and Method	Standard
1	<b>Over-charge</b>	Charge is conducted for 8 hours while the invariable voltage is 4.30V.	No deformation and leakage
2	<b>Short-circuit</b>	The charged battery is short-circuited for 1 hour at 100 m $\Omega$ .	No explode or fire
3	<b>Heat shock</b>	Put the battery into the heat box, the temperature is rising to 120 $\pm$ 2 $^{\circ}$ C at the rate of (5 $\pm$ 2 $^{\circ}$ C /min and maintain for 10 minutes. Then cool down to room temperature at the rate of 5 $\pm$ 2 $^{\circ}$ C /min.	No explode or fire
4	<b>Humid and heat test</b>	Put the charged battery into box for 48 hours, the temperature is 40 $^{\circ}$ C $\pm$ 2 $^{\circ}$ C and the relative humidity is 90%~95% .	No smoke or explode

#### 4.7 High and low temperature test

No	Item	Testing Conditions and Method	Standard
1	<b>High Temperature</b>	Put the charged battery into the high temperature box for 2 hours at 55 $^{\circ}$ C $\pm$ 2 $^{\circ}$ C. And discharge the battery at 0.5C current until the voltage is 2.75V.	Discharge 90 percent of the original capacity.
2	<b>Low Temperature</b>	Put the charged battery into the low temperature box for 16 hours~24 hours at -10 $^{\circ}$ C $\pm$ 2 $^{\circ}$ C. And then discharge the battery at 0.1C until the voltage is 2.75V	Discharge more than 45 percent of the original capacity.

#### 4.8 Electricity maintenance

No	Item	Testing Conditions and Method	Standard
1	<b>Electricity maintenance</b>	Rest the charge battery for 28 days at the ambient temperature of 25 $^{\circ}$ C $\pm$ 0.5 $^{\circ}$ C. And then discharge the battery until the voltage is ended.	Discharge more than 85 percent of the original capacity.

### 5. Storage and others

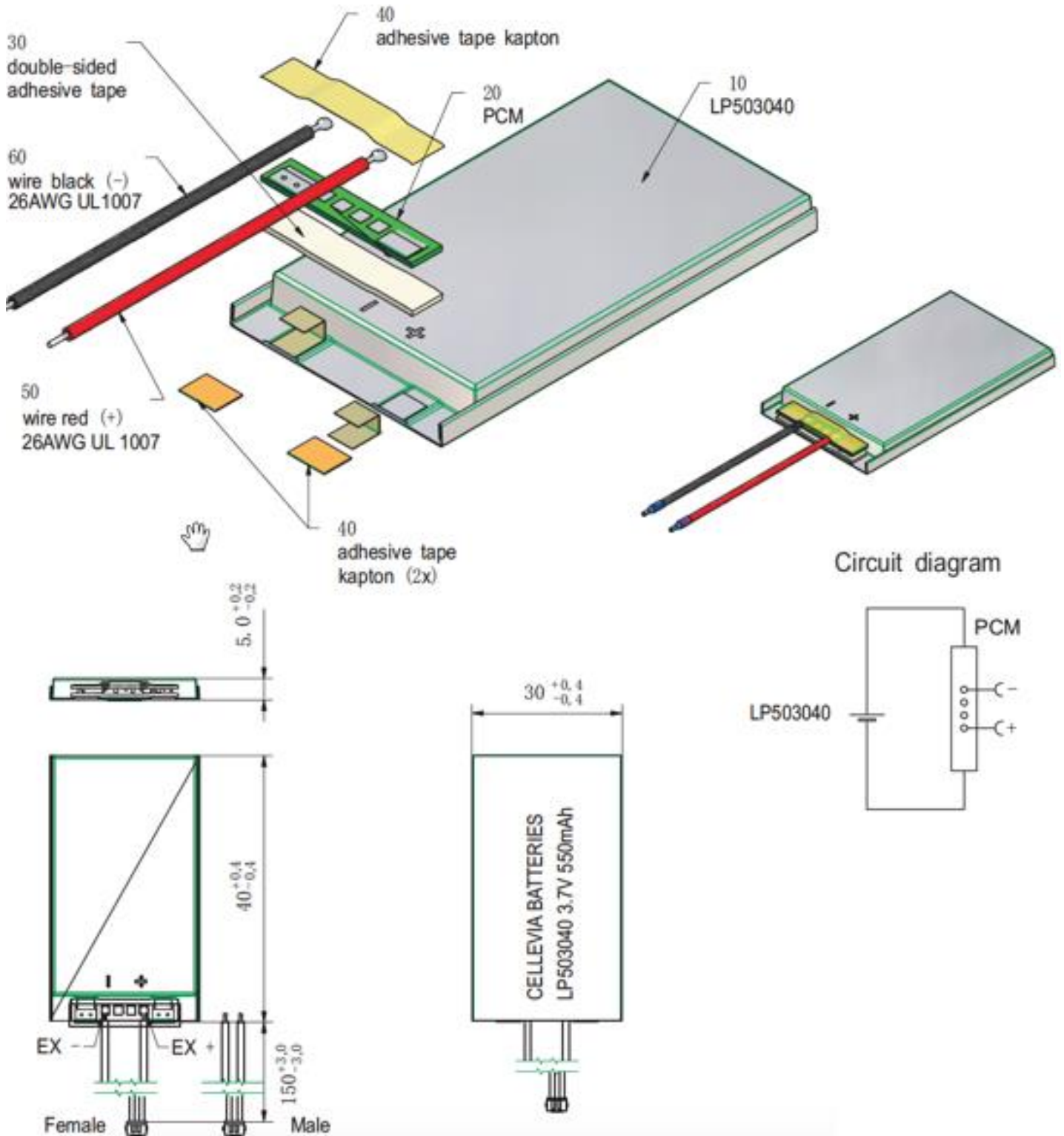
#### 5.1 Long Period Storage

If the cell has been stored for 3 month, it should be transfer to a **dry and cool** environment. Storage Voltage is between 3.6V and 3.9V and the storage conditions as Item 4.1.

## 6.Drawing

### 6.1 Assembly diagram(not in scale)

Model: LP503040



### **! Danger**

- 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°C. 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 the (+) and (-) terminals with other metals.
- 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.
- Strictly prohibits welding a cell directly.
- Do not use a Cell with serious scar or deformation.
- 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.

### **! Warning**

- Strictly prohibits put cell into a microwave oven, dryer, or high-pressure container.
- 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.
- Stop charging the Cell if charging is not completed within the specified time.
- Stop using the Cell if abnormal heat, odor, discoloration, deformation or abnormal condition is detected during use, charge, or storage.
- Keep away from fire immediately when leakage or foul odor is detected.
- If liquid leaks onto your skin or clothes, wash well with fresh water immediately.
- 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.

### **! Caution**

- Before using the Cell, be sure to read the user's manual and cautions on handling thoroughly.
- Charging with specific charger according to product specification. Charge with CC/CV method. Strictly prohibits reversed charging. Connect cell reverse will not charge the cel. At the same time, it will reduce the charge-discharge characteristics and safety characteristics, this will lead to product heat and leakage.
- Store batteries out of reach of children so that they are not accidentally swallowed.
- If younger children use the Cell, their guardians should explain the proper handling.
- Before using the Cell, be sure to read the user's manual and cautions on handling thoroughly.
- 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.
- When not using Cell for an extended period, remove it from the equipment and store in a place with low humidity and low temperature.
- While the Cell pack is charged, used and stored, keep it away from objects or materials with static electric charges.
- If the terminals of the Cell become dirty, wipe with a dry clothe before using the Cell.
- Storage the cells in storage temperature range as the specifications, After full discharged, we suggest that charging to 3.9~4.0V with no using for a long time.
- Do not exceed these ranges of the following temperature ranges.

Charge temperature range : 0 °C to 45 °C; Discharge temperature range : -20 °C to 60 °C.(When using equipment)