



This specification shall be applied to battery cell supplied by AA Portable Power Corp.

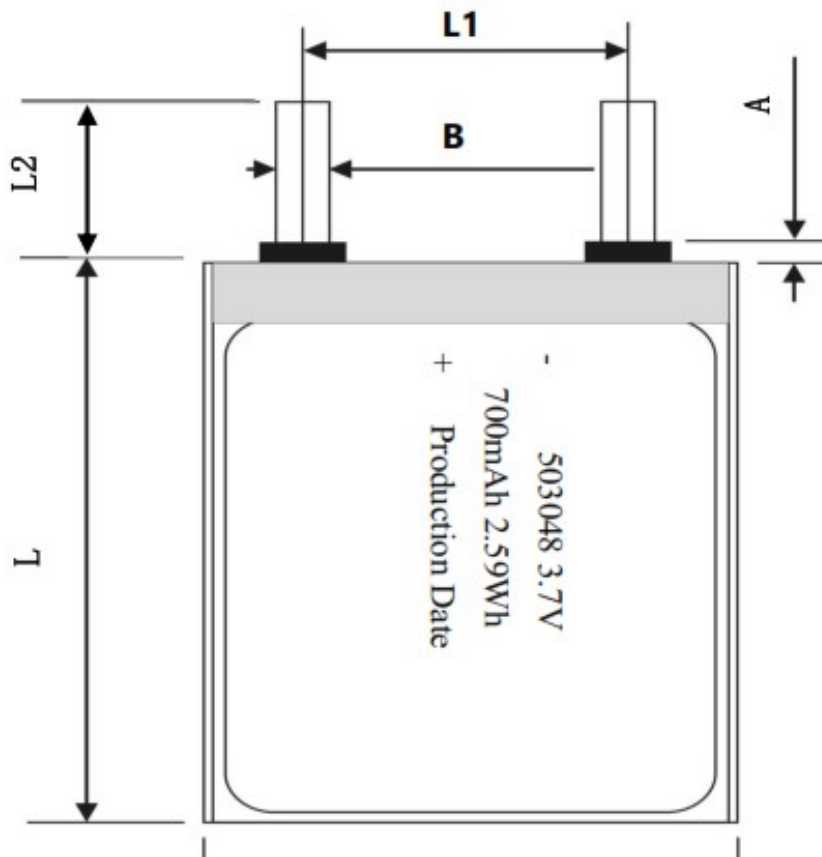
## 1. Product Specification

Type	Lithium Ion Polymer
Model	PL-503048-1C
Voltage	Nominal: 3.7V
Capacity (0.2C discharge)	Nominal: 700 mAh, Typical: 720mAh
Standard Charge	140 mA / 0.2C
Max. Charge	140 mA / 0.2C 0°C to 10°C 210 mA / 0.3C 10°C to 20°C 350 mA / 0.5C 20°C to 45°C
Standard Discharge	140 mA / 0.2C
Max. Discharge	140 mA / 0.2C -20°C to 0°C 350 mA / 0.5C 0°C to 25°C 700 mA / 1.0C 25°C to 60°C
Charge Voltage	4.2V
Discharge cut-off voltage	3.0V
Internal impedance (23±2°C)	≤ 100 mΩ
Dimension	See drawing
Operation temperature	Charge: 0~ 45 °C Discharge: - 20 ~ 60 °C
Storage at 50% state of charge (SOC) and specified temperature, recoverable capacity in % vs time.	1 month, ≥ 90% : -10~ 55 °C 6 months, ≥ 85% : -10~ 45 °C 12 months, ≥ 85% : -10~ 25 °C 20±5°C is the recommended storage temperature
Typical Weight	11.5 g
Visual Inspection	There should not be any remarkable scratches, cracks, bolts, cauterization, deformations, swelling, leakage and so on the surface of the cell.



## 2. Cell Dimension

Item	Description	Dimension and Spec
T	Thickness	5.0mm max
W	Width	30.5mm max
L	Length	48.5mm max
A	Sealant Length	0.2-2.0mm
B	Tab width	3.0±0.2mm
L1	Distance of tab centers	17.0±2mm
L2	Tab Length	10.0±2.0mm





### 3. Electrical characteristics

No	Items	Test Method	Criteria
1	Standard Charge	Charging the cell initially with constant current at 0.2C and then with constant voltage at 4.2V till charge current declines to 0.02C.	N/A
2	Minimal Capacity	The capacity means the discharge capacity of the cell, which is measured with discharge current of 0.2C with 3.0V cut-off voltage after the standard charge.	$\geq 700\text{mAh}$
3	Charge/Discharge Cycle	The capacity on 0.2C discharge shall be measured after 500 cycles of 0.2C charge and discharge at $23 \pm 2^\circ\text{C}$ .	Capacity $\geq 80\%$
4	Retention Capability	After full charging, storing the cell 28 days with $20 \pm 5^\circ\text{C}$ condition, and then staying 1 hours with discharge current of 0.2C till 3.0V cut-off voltage.	Capacity $\geq 85\%$

The typical capacity means the average discharge capacity of the cell, which is measured with discharge current of 0.2C with 3.0V cut-off voltage after the standard charge at  $23 \pm 2^\circ\text{C}$  environment temperature. Unit : mAh

### 4. Environmental Condition Characteristics

No	Items	Test Method	Criteria
1	Constant temperature and Humidity	After standard charging, put cell into the box that the temperature is $40 \pm 2^\circ\text{C}$ and the humidity ranges between 90% ~95% for 48 hours. then put it at $23 \pm 2^\circ\text{C}$ for 2 hours, then discharge with current of 0.2C to the cut-off voltage.	No distortion, no rust, no leakage, no venting, no rupture, no fire, no explosion, the discharge time is not less than 3hrs.
2	High Temperature Performance Test	After full charging, put the cell into box with high temperature of $55^\circ\text{C} \pm 2^\circ\text{C}$ for 2h, then discharge with current of 1.0C to the cut-off voltage	No distortion, no rupture, no fire, smoke or leakage Discharge time $\geq 1\text{min}$
3	Low Temperature Performance Test	After full charging, put the cell into box with low temperature of $-10^\circ\text{C} \pm 2^\circ\text{C}$ for 16~24h, then discharge with current of 0.2C to the cut-off Voltage.	No distortion, no rupture, no fire, smoke or leakage Discharge time $\geq 3\text{h}$



## 5. Cell safety performance

No	Items	Test Method	Criteria
1	Cell Overcharge	After discharge to limit voltage, charged at constant current of 3C and constant voltage of 4.6V, when voltage reaches to the max, if charging continued over 7 hours or temperature is 20% less than the top, terminate the test.	No explosion and no fire
2	External Short-circuit Test	Cell terminals are short-circuited to discharged state less than 0.1V or longer time with a resistance of 50mΩ or less. Tests are to be conducted at room temperature.	No explosion and no fire
3	Over-Discharge Test	Cell is discharged at a current of 1C rate for 2.5 hours. (If current stops by safety or passive circuit on the cell, test is finished.)	No explosion and no fire
4	Crush Test	Crush between two flat plates. Applied force is about 13KN	No explosion and no fire
5	Impact Test	Impact between bar (15.8mm diameter) and 9.1 Kg falling material (at a height of 6.1cm). Bar is laid across the center of the test sample.	No explosion and no fire
6	Drop Test	After standard charging, the cell is to be dropped from a height of 1.2 meter onto a thickness of 20mm board, dropped once in the positive and negative directions of three mutually perpendicular X, Y, Z axes.	No leakage, no smoke, no fire, no explosion
7	Vibration Test	Fixed the fully charged cell to vibration table and subjected to vibration cycling that the frequency is to be varied at the rate of 1Hz per minute between 10Hz and 55Hz, the excursion of the vibration is 0.8mm. The cell shall be vibrated for 90 ~100minutes per axis of XYZ axes.	No explosion, no fire, no leakage
8	Heating	After standard charging, put cell in the baking oven and start, the temperature of the oven is to be raised at a rate of 5±2 °C per minute to a temperature of 130±2°C, remain for 30minutes at that temperature.	No explosion and no fire

## 6. Testing requirements

### 6.1 Cell test environment

- Temperature: 23±2°C
- Relative humidity: 60± 20% RH
- Atmospheric pressure: 6~106 KPa



## 6.2 Measuring instrumentation requirements

- Voltage instrumentation requirements: Measuring the voltage meter accuracy no less than 0.5 magnitude
- Current instrumentation requirements: Measuring the current meter accuracy no less than 0.5 magnitude
- Time instrumentation requirements: Measuring the time meter accuracy no less than 0.1%
- Temperature instrumentation requirements: Measuring the temperature meter accuracy no less than 0.5°C
- Impedance instrumentation requirements: Measuring impedance should by sinusoidal alternating (1 KHZ) test
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## 7. Electrical Characteristics

### Cell charge/discharge

- Full charged definition: With charging voltage 4.2V, current 0.2C continued to charge the cell, when charging current drops to 0.02C charging is terminated, shall be full charged.
- Full discharged definition: Standard discharge current 0.2 C for continuous discharge, when the voltage drops to discharge cut-off voltage 3.0V discharge is terminated, shall be full discharged.

### 8. Storage

- The Li-ion cell should be stored in a cool, dry and well-ventilated area, and should be far away from the fire and the high temperature.
- The cell should store in the product specification book stipulation temperature range, the best storage temp. is  $25\pm 5^{\circ}\text{C}$ . The best humidity is  $60\pm 15\%$ .
- The cell should be stored within room temperature, and charged to 40%~60% electric quantity (3.85V). In order to avoid over-discharge, we suggest charge and discharge the cell every three months. Then charge to 40%~60% electric quantity(3.85V).



## 9. Transpiration

- Do not mix the cell products with other cargos
- Do not immerse the cell products in water or allow it to get wet
- The highest temperature in transportation is lower than 65°C

## 10. Precautions

- Batteries should be charged prior to use.
- When using a new battery for the first time or after long term storage, please fully charge the battery before use.
- For charging methods please refer to our technical handbook.
- Use the correct charger for Ni-Cd or Ni-MH batteries.
- Do not reverse charge batteries.
- Do not short circuit batteries, permanent damage to batteries may result.
- Do not incinerate or mutilate batteries, may burst or release toxic material.
- Do not solder directly to cells or batteries.
- Do not subject batteries to adverse condition such as extreme temperature, deep cycling and excessive overcharge/ over discharge.
- Store batteries in a cool dry place.
- Do not mix AA Portable Power batteries with other battery brands or batteries of a different chemistry such as alkaline and zinc carbon.
- Do not mix new batteries in use with semi-used batteries, over-discharge may occur.
- Avoid batteries being used in an airtight compartment. Ventilation should be provided inside the battery compartment; otherwise batteries may generate hydrogen gas, which could cause an explosion if exposed to an ignition source.
- When connecting a battery pack to a charger, ensure correct polarity.
- If find any noise, excessive temperature or leakage from a battery, please stop its use.
- When the battery is hot, please do not touch it and handle it, until it has cooled down.



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- Do not remove the outer sleeve from a battery pack nor cut into its housing.
- When find battery power down during use, please switch off the device to avoid over discharge.
- When not using a battery, disconnect it from the device.
- Unplug a battery by holding the connector itself and not by pulling at its cord.
- After use, if the battery is hot, before recharging it, allow it to cool in a well-ventilated place out of direct sunlight.
- Never put a battery into water or seawater.
- During long term storage, battery should be charged and discharged once every 3 months.
- Do not attempt to take batteries apart or subject them to pressure or impact. Heat may be generated or fire may result. The alkaline electrolyte is harmful to eyes and skin, and it may damage clothing upon contact.
- Keep away from children. If swallowed, contact a physician at once.
- Battery failure, may not be thrown away, please recycling.
- During transport and storage, please separate the battery apart, to prevent external short circuit.

**Please contact us when you need any help for custom battery packs and safety concerns**

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