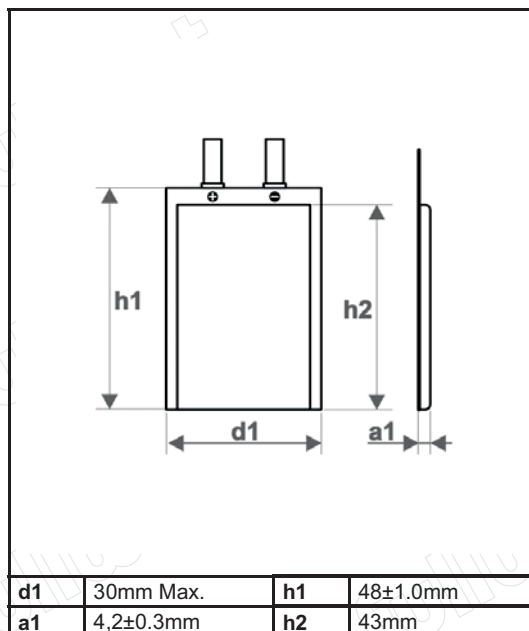


### 1.- Introduction

This specification describes the requirements of the LP423048 lithium ion polymer rechargeable battery.

### 2.- Basic specifications

|                                  |  |
|----------------------------------|--|
| <b>Model</b>                     | LP423048   |
| <b>Nominal capacity</b>          | 600mAh (0.2C discharge)  |
| <b>Minimum capacity</b>          | 580mAh (0.2C discharge)  |
| <b>Nominal voltage</b>           | 3,7V (@0.2C discharge)   |
| <b>Charging voltage</b>          | 4,2V   |
| <b>Standard charge</b>           | Method: CC/CV (Constant current / constant voltage)<br>Current: 0.5C<br>Voltage: 4.2V<br>End current: 0.02C                    |
| <b>Maximum charge current</b>    | 580mAh   |
| <b>Maximum discharge current</b> | 1160mAh  |
| <b>End of discharge voltage</b>  | 2.75V  |
| <b>Weight</b>                    | Approx. 12,5 ± 0.5 grs   |
| <b>Operating temperature</b>     | Charge: 0°C ~ 45°C<br>Discharge: -20°C ~ 60°C  |
| <b>Storage temperature</b>       | -20°C ~ 45°C   |
| <b>Appearance</b>                | There shall be no such defect as scratch, flaw, crack, rust, leakage, which may adversely affect commercial value of the cell. |



### 3.- Technical requirements

**Testing conditions (unless otherwise spicified)**

Temperature: 20 ± 5°C  
 Relativity humidity: 65 ± 20 %RH  
 Accuracy of voltmeters and ammeters used in the test is equal to or better than the grade 0.5

**Electrical characteristics**

| ITEM                       | TESTING INSTRUCTION   | REQUIREMENTS  |
|----------------------------|---|---|
| <b>Standard charge</b>     | Charge the battery with constant current 0.5C to 4.2V, and then charge at constant voltage 4.2V until the current decays to 0.02C during the constant voltage stage.  |   |
| <b>Nominal capacity</b>    | Within one hour after charge according to standard charge, discharge at 0.2C until 2.75V cut-off voltage.   | Capacity ≥ nominal capacity (Minimum 580mAh)              |
| <b>High rate discharge</b> | Within one hour after charge according to standard charge, discharge at constant current 1C until 2.75V cut-off voltage.  | Capacity ≥ 85% of nominal capacity                        |
| <b>Internal resistance</b> | The initial internal resistance shall be measured at AC 1000HZ initially.   | The initial internal resistance ≤ 600mohm                 |
| <b>Cycle life</b>          | After charge according to Standard charge, the battery stays for 1 hour. At 25 ± 5°C, discharge the battery at constant current 0.5C until 2.75V cut-off voltage. Then the battery stays for 1 hour. A cycle defined as one charge and discharge. This charge and discharge circle shall be repeated 300 times. | The capacity at 300th cycle ≥ 80% of the nominal capacity |

**Electrical characteristics**

| ITEM                                | TESTING INSTRUCTION   | REQUIREMENTS  |
|-------------------------------------|---|---|
| <b>Storage characteristic</b>       | After charge according to Standard charge, the battery stays at $20 \pm 5^{\circ}\text{C}$ for 28 days and then discharge at 0.2C to 2.75V cut-off.   | Capacity retention $\geq 85\%$ of nominal capacity.<br>Capacity recovery $\geq 90\%$ of nominal capacity. |
|                                     | After charge according to Standard charge, the battery stays at $45 \pm 5^{\circ}\text{C}$ for 28 days and then discharge at 0.2C to 2.75V cut-off.   | Capacity retention $\geq 60\%$ of nominal capacity.<br>Capacity recovery $\geq 70\%$ of nominal capacity. |
| <b>High temperature performance</b> | After charge according to Standard charge, store the testing cells at $60 \pm 2^{\circ}\text{C}$ for 4 hours. Then discharge at 0.2C until 2.75V cut-off voltage.   | The discharge capacity 90% of the nominal capacity.   |
| <b>Low temperature performance</b>  | After charge according to Standard charge, store the testing cells at $-10 \pm 2^{\circ}\text{C}$ for 4 hours. Then discharge at 0.2C until 2.75V cut-off voltage.  | The discharge capacity 70% of the nominal capacity.   |
|                                     | After charge according to Standard charge, store the testing cells at $0 \pm 2^{\circ}\text{C}$ for 4 hours. Then discharge at 0.2C until 2.75V cut-off voltage.  | The discharge capacity 80% of the nominal capacity.   |
| <b>Short-circuit</b>                | After charge according to Standard charge, shortcircuit the cathode and anode with a wire of resistance less than 50 mohms for 1 hour.  | No fire, no explosion.  |
| <b>Overcharge</b>                   | After charge according to Standard charge, charge the battery at 1C to 12V for 2.5 hours.   | No fire, no explosion.  |
| <b>Hot box test</b>                 | Put the testing batteries connecting with thermocouple in constant temperature box. Heat the batteries and box (speed of ascending temperature is $5 \pm 2^{\circ}\text{C}$ at room temperature simultaneously. Monitor the temperature change of the box. Keep for 60 minutes after the box temperature reaches $130 \pm 2^{\circ}\text{C}$ , then stop the test.)   | No fire, no explosion.  |
| <b>Vibration test</b>               | After charge according to Standard charge, put the testing batteries on the vibration testing equipment. Vibrate it from X, Y, Z three mutually perpendicular directions for 60 minutes (Frequency of vibration: 10Hz - 30Hz, displacement of single swing: 0.38mm; Frequency of vibration: 30Hz - 55Hz, displace of single swing: 0.19mm) in swept vibration from 10Hz to 50Hz. The swept rate is 1Hz/min. | No fire, no explosion $\geq 95\%$ of the nominal capacity   |
| <b>Thermal shock test</b>           | Stay the testing battery at $75^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for 48 hours, and then move to a temperature of $-20 \pm 5^{\circ}\text{C}$ with 5 minutes and stored for 6 hours.   | No fire, no explosion.  |
| <b>Delivery condition</b>           | About 50% charged.  |   |

#### 4.- WARNINGS AND CAUTIONS

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To prevent a possibility of the battery from leaking, heating or explosion please observe the following precautions:

##### WARNINGS

- 1.- Do not immerse the battery in water or seawater, and keep the battery in a cool dry surrounding if it stands by.
- 2.- Do not use or leave the battery near a heat source as fire or heater.
- 3.- When recharging, use the battery charger specifically for that purpose.
- 4.- Do not reverse the positive (+) and negative (-) terminals.
- 5.- Do not connect the battery to an electrical outlet.
- 6.- Do not discard the battery in fire or heat it.
- 7.- Do not short-circuit the battery by directly connecting the positive (+) and negative (-) terminal with metal objects such as wire.
- 8.- Do not transport or store the battery together with metal object such as necklaces, hairpins, etc...
- 9.- Do not strike or throw the battery.
- 10.- Do not directly solder the battery and pierce the battery with a nail or other sharp object.

##### CAUTIONS

- 1.- Do not use or leave the battery at very high temperature (for example, at strong direct sunlight or in a vehicle in extremely hot weather). Otherwise, it can overheat or fire or its performance will be degenerate and its service life will be decreased.
- 2.- Do not use it in a location where static electricity is great, otherwise, the safety devices may be damaged, causing hidden trouble of safety.
- 3.- If the battery leaks, and the electrolyte get into the eyes. DO not rub eyes, instead, rinse the eyes with clean running water, and immediately seek medical attention. Otherwise, it may injure eyes or cause a loss of sight.
- 4.- If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, immediately remove it from the device or battery charger and stop using it.
- 5.- In case the battery terminals are dirt, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection with the instrument.
- 6.- Be aware discarded batteries may cause fire, tape the battery terminals to insulate them.

##### NOTE

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