
# Specification Approval Sheet

Name: Li-Poly Battery

Model: 30530

SPEC: 3.7V 150mAh

| Approved By | Checkup | Make |
|---|---|---|
| | | |

| Customer Confirmation | Signature | Date |
|---|---|---|
| | | |
| | Company Name： | |
| | Stamp： | |

436 Kato Terrace, Fremont, CA 94539 U.S.A.

Tel: 510.687.0388 Fax: 510.687-0328

www.TenergyBattery.com

**Tenergy Corporation**
436 Kato Terrace
Fremont, CA 94539
Tel: 510.687-0388 Fax: 510.687.0328
www.TenergyBattery.com email: sales@tenergybattery.com

## 1. Schematic of Battery：


| Item | Cell Max（mm） | Pack Max(mm) |
|---|---|---|
| Thickness | 5.5 | 5.8 |
| Width | 11.5 | 12.5 |
| Length | 41.5 | 43 |
| Plug | Molex51021-2P | |
| | | |
| | | |

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## 2. Specifications：

| Item | | Specifications | Remark |
|---|---|---|---|
| Typical Capacity | | 150mAh | 25°C，0.2C5A discharge |
| Nominal Voltage | | 3.7 V | 25°C，Average Voltage at 0.2C5A discharge |
| Charge Current | Standard | 0.2$C_5$A | Working temperatur：0～40°C |
| | Max | 1.0$C_5$A | Working temperatur：0～40°C |
| Charge cut-off voltage | | 4.2±0.03V | CC/CV |
| Continue discharge current | | 10C 1.5 A | |
| Peak discharge Current | | 20C 3.0 A | Working temperatur：0～60°C |
| Discharge cut-off voltage | | 3.0 V | |
| Impedance | | ≤ 200mΩ | 25°C, AC 1KHz after 50% charge |
| Weight | | ≤ 3.8g | |
| Storage temperature | ≤1month | -20～45°C | Best 20±5°C for long-time storage |
| | ≤3month | 0～30°C | |
| | ≤6month | 20±5°C | |
| Storage humidity | | 65±20% RH | |

## 3. General Performance:

**Definition of Standard charging method**: At 20±5°C, charging the cell initially with constant current 0.2$C_5$A till voltage**4.2**V, then with constant voltage **4.2V** till current declines to 0.05$C_5$A.

| Item | | Test Methods | Performance |
|---|---|---|---|
| 3.1 | 0.2C Capacity | After standard charging, laying the battery 0.5h, then discharging at 0.2$C_5$A to voltage3.0V, recording the discharging time. | ≥300min |
| 3.2 | 10C Discharge | After standard charging, laying the battery 0.5h, then discharging at 5$C_5$A to voltage3.0V, recording the discharging time. | ≥5.4min |
| 3.3 | Cycle Life | Constant current 1$C_5$A charge to 4.2V, then constant voltage charge to current declines to 0.05$C_5$A, stay 5min，constant current 1$C_5$A discharge to3.0V，stay 5min. Repeat above steps till continuously discharging time less than 36min. | ≥300times |
| 3.4 | Capability of keeping electricity | 20±5°C, After standard charging, laying the battery 28days, discharging at 0.2$C_5$A to voltage 3.0V, and recording the discharging time. | ≥240min |

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## 4. Environment Performance:

| Item | | Test Methods | Performance |
|---|---|---|---|
| 4.1 | High temperature | After standard charging, laying the battery 4h at 60℃, then discharging at 0.2$C_5$A to voltage3.0V, recording the discharging time. | ≥240min |
| 4.2 | Low temperature | After standard charging, laying the battery 4h at -20℃, then discharging at 0.2$C_5$A to voltage3.0V, recording the discharging time. | ≥210min |
| 4.3 | Constant humidity and temperature | After standard charging, laying the battery 48h at 40±2℃, RH 93±2%. Recording 0.2$C_5$A discharging time | No distortion<br>No electrolytes leakage<br>≥270 min |
| 4.4 | Temperature shock | After standard charging, battery stored at -20℃ for 2 hours, then stored at 50℃ for 2 hours. Repeat 10 times. | No electrolytes leakage |

## 5. Mechanical Performance:

| Item | | Test Methods | Performance |
|---|---|---|---|
| 5.1 | Vibration | 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. | No influence to batteries' electrical performance and appearance. |
| 5.2 | Collision | After vibration test, batteries were laying on the vibration table about X, Y, Z axis. Max frequency acceleration: 100m/$s^2$; collision times per minutes: 40~80; frequency keeping time 16ms; all collision times 1000±10. | No influence to batteries' electrical performance and appearance. |
| 5.3 | Drop | Random drop the battery from 10m height onto concrete one times. | No explosion or fire |

## 6. 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.

| Item | | Test Methods | Performance |
|---|---|---|---|
| 6.1 | Over charge | At 20±5℃, charging batteries with constant current 3$C_5$A to voltage 4.2V, then with constant voltage 4.8V till current decline to 0. Stop test till batteries temperature 10℃ lower than max temperature. | No explosion or fire |
| 6.2 | Over discharge | At 20±5℃, discharge battery with 0.2$C_5$A continuously 12.5h. | No explosion or fire |
| 6.3 | Short-circuit | At 20±5℃, connect batteries anode and cathode by wire which impedance less than 50mΩ, keep 6h. | No explosion or fire |

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| | | | |
|---|---|---|---|
| 6.4 | Extrusion | At 20±5℃, put the battery in two parallel steal broad, add pressure 13kN. | No explosion or fire |
| 6.5 | Thermal shock | 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. | No explosion or fire |

## 7 Cautions of charge & discharge

7.1 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 heat generation or leakage.

(1) Batteries charger should charge with constant current and constant voltage mode;
(2) Charging current should be lower than (or equal to) 1C5A;
(3) Temperature 0～45°C is preferred when charging;
(4) Charging voltage must be lower than **4.2V.**

7.2 discharge

(1) Temperature 0～60℃ is preferred when discharging;
(2) Discharging voltage must not be lower than3.0V**.**

7.3 over-discharge

It should be noted that the cell would be at an over-discharge state by its self-discharge. In order to prevent over-discharge, the cell shall be charged periodically to keeping voltage between 3.6-3.9V. Over-discharge may cause loss of cell performance. It should be noted that the cell would not discharge till voltage lower than2.5V.

## 8. Storage of polymer lithium-ion batteries

The environment of long-time storage:
Temperature: 20±5°C;
Humidity: 45-85%;
Batteries were 40～60% charged.

The battery had better charge a time per three month during its storage for avoiding over discharge. If storage is long time, please charge the battery with constant current $0.5C_5A$ for 1 hour so that it has some storage of charge for properly using.

Charge and discharge afresh to active and renew battery energy after storage above 1 year.

In case of over-discharge, batteries should be charged for one time every 3 months while storing. Batteries should be discharged and charged after being stored more than a year in order to activate it and restore energy.

## 9. Transportation of polymer lithium-ion batteries

The batteries should transportation with 10～50% charged states.

Batteries must be properly packed to avoid short circuiting

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## 10. Others

Short-circuit is strictly prohibited. It should damage batteries badly.

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

The cell replacement should be done by professional people. Prohibit short-circuit between cells' Al package and exterior component.

The batteries must be careful of proceed the operation for it's soft package. Please note cautions below to prevent cells' leakage, heat generation and explosion.

Prohibition of disassembly pack and cells;

Prohibition of pack and cells immersion into liquid such as water or seawater;

Prohibition of dumping pack and cells into fire;

Prohibition of using damaged cells. The cells with a smell of electrolyte or leakage must be placed away from fire to avoid firing.

In case of electrolyte leakage contact with skin, eye, and physicians shall flush the electrolyte immediately with fresh water and medical advice is to be sought.

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