

## Li-ion Cylindrical Battery

Customer No:KH00000943

Part No.: YT18500 3.7V 1500mAh

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Prepared by	Review by	Approved by
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Customer Acknowledge:	
Signature:	
Date:	





### 3. Specification

NO.	Items	standard	Remarks
1.	Typical capacity	1500mAh	Discharge Current:0.2C Cut-off voltage:3.0V/cell
2.	Minimum capacity	1350mAh	
3.	Charge voltage	4.2V/set	
4.	Nominal voltage	3.7V/set	
5.	Discharge cut-off voltage	3.0V/set	
6	Charge current	Standard: 0.2C	
		Rapid: 1C	
7	Discharge current	Standard: 0.2C	Continue discharge
		Max: 3C	Continue discharge
8	Standard charge	0.2C CC(constant current) charge to 4.2V/cell, then CV(constant voltage) 4.2V/cell charge 3.5hours or 30mA (0.02C) cut off.	
9	Rapid charge	1C CC(constant current) charge to 4.2V/cell, then CV(constant voltage) 4.2V/cell charge 3.0hours or 30mA (0.02C) cut off.	
10	Max. charge current	1500mA	
11	Internal Impedance	Max: 56mΩ	AC 1KHz after standard charge
12	Energy	5.55Wh	
13	Weight	Approx: 35g	
14	Operating Temperature.	Charge: 0 ~ 45°C	Forbid to outrun provision scope a work.
		Discharge: -20 ~ 60°C	
15	Storage Temperature	-5 ~ 35°C	See the section 5 <sup>th</sup> .

## 4. Battery Cell Performance Check and Test

### Require

- Visual in spection.: There shall be no such defect as scratch, flaw, crack, and leakage, which may adversely affect commercial value of the cell.
- Standard environmental test condition  
 Humidity:  $65 \pm 20 \%$                       Temperature:  $20 \pm 5^{\circ}\text{C}$

### 4.1 Common Performance

NO	Items	Test Method and Condition	standard
1	Charge Performance.	The battery can be charged when using the original charger. The standard charge mode :under the temperature of $20 \pm 5^{\circ}\text{C}$ , Charge the cell to 4.2V/cell initially with constant current at 0.2C and then with constant voltage at 4.2V/cell (accuracy $4.20 \pm 0.05\text{V}$ )/cell charge 3.5hours or 30mA(0.02C) cut off.	N.A.
2	Discharge performance.	The capacity means the discharge capacity of the cell, which is measured with discharge current of 0.2C with 3.0V/cell cut-off voltage after the standard charge.	$\geq 1350\text{mAh}$
3	Cycle Life	The cycle life shall be conducted as the following procedures: Step 1:charge the cell with the standard charge Step 2:discharge the cell at 0.2C to 3.0V; Step 3: repeat Step 1 and Step 2 for 300 times. The capacity after 300 cycles is expected to be equal to or more than 80% of the rated capacity.	$\geq 300$
4	Temperature Dependence of Capacity	Capacity comparison at each temperature, measured with constant discharge current 0.2C with 3.0V/cell cut-off after Standard Charge shown below. If charge temperature and discharge temperature are not the same, the interval for temperature charge comes to 3 hours. Charge Temp: $20 \pm 5^{\circ}\text{C}$	Discharge Temp. As capacity $-10^{\circ}\text{C}$ : 50% $0^{\circ}\text{C}$ : 80% $15^{\circ}\text{C}$ : 90% $25 \sim 40^{\circ}\text{C}$ : 95%
5	Charged Storage Characteristics	Capacity after 28 days storage at $20 \pm 5^{\circ}\text{C}$ , from Standard Charge, measured under the same conditions stated No. 2	Remaining capacity (after $25^{\circ}\text{C}$ storage) $\geq 1200\text{mAh}$
6	Battery Voltage	As of shipment.	$\geq 3.7\text{V}$

## 4.2 Safety Performance

NO.	Items.	Test Methods and Condition.	standard
1	Short-circuit testing	At $20 \pm 5^{\circ}\text{C}$ , After standard charging, connect batteries' anode and cathode by wire which impedance less than $50\text{m}\Omega$ , keep 6h	No explosion, no fire;
2	Drop Test	Under the temperature of $20 \pm 5^{\circ}\text{C}$ , after full-charging the battery with 0.2C, then drop it freely from 1.2 meter height onto the hard 18~20mm board. Do it 2 times.	No explosion, no fire, no leakage.
3	High Temperature Characteristics	Under the temperature of $20 \pm 5^{\circ}\text{C}$ , after charging the battery with 1C/0.2C then put the battery into the constant temperature and humidity oven with $55 \pm 2^{\circ}\text{C}$ for 2h, then discharge with 0.5C to 3.0V. The discharge time is required $\geq 108\text{min}$ and the battery should no deformation and smoking.	No deformation, no smoking.
4	Low Temperature Characteristics	Under the temperature of $20 \pm 5^{\circ}\text{C}$ , after charging the battery with 1C/0.2C, then put the battery into the constant temperature and humidity oven with $-10 \pm 2^{\circ}\text{C}$ for 16~24h, then discharge with 0.2C to 3.0V. The discharge time is required $\geq 3\text{h}$ and the battery should no deformation and smoking.	No deformation, no smoking.
5	Over charge testing	At $20 \pm 5^{\circ}\text{C}$ , charging batteries with constant current 1C to voltage 4.8V, then with constant voltage 4.8V till current decline to 0. Stop test till batteries' temperature $10^{\circ}\text{C}$ lower than max temperature.	No fire or explosion
6	Over discharge testing	At $20 \pm 5^{\circ}\text{C}$ , According to the requirements of standard charge, the battery will be discharge to cut-off voltage, then connect with external load of 30 ohm for 24 hours.	No fire, no explosion, no leakage.

※ Above testing of safe characteristic must be with protective equipment.

## 5. Storage and Shipment Requirement

Item.		Requirement.
Storage temperature	Short period less than 1 month	$-5^{\circ}\text{C} \sim +35^{\circ}\text{C}$
	Long period less than 6 month	$10^{\circ}\text{C} \sim +25^{\circ}\text{C}$
Humidity	$60 \pm 15\% \text{RH}$	
During long storage, please refresh the battery every 3 months, which charging battery fully, discharging battery to empty and then charging battery with 50% capacity.		
Voltage	3.7V~3.95V	

## 6. Scope:

All data involves voltage and weight to stack-up battery are equal to the value of unit cell time the number of unit cell which consisted in the stack-up batteries

Example: Stack-up batteries consisting E unit cells series

Nominal voltage of unit cell=3.7V

Nominal voltage of stack-up batteries = $3.7V \times 1 = 3.7V$

## 7. Warranty Time.

Warranty time is six (6) months from the date when the Li-ion Cylindrical rechargeable battery ship out from YUNTONG factory. But If the LiPo battery is found to have a problem due to use outside of YUNTONG recommended specification, YUNTONG will have no responsibility for the battery.

## 8. Others.

Any matters that this specification does not cover should be conferred between both parties.

## Handling Precautions and Guideline

### 1. Cautions in use

To ensure proper use of the battery please read the manual carefully before using it.

Do not expose to, dispose of the battery in fire.

Do not put the battery in a charger or equipment with wrong terminals connected.

Avoid shorting the battery

Avoid excessive physical shock or vibration.

Do not disassemble or deform the battery.

Do not immerse in water.

Do not use the battery mixed with other different make, type, or model batteries.

Keep out of the reach of children.

Charge and Discharge

Battery must be charged in appropriate charger only.

Never use a modified or damaged charger.

Do not leave battery in charger over 24 hours.

Storage

Store the battery in a cool, dry and well-ventilated area.

Disposal

Regulations vary for different countries. Dispose of in accordance with local regulations.

### 2. Battery operation instruction

#### 2.1 Charging

Charging current: Cannot surpass the biggest charging current which in this specification book stipulated.

Charging voltage: Does not have to surpass the highest amount which in this specification book stipulated to decide the voltage.

Charge temperature: The battery must carry on the charge in the ambient temperature scope which this specification book stipulated.

Uses the constant electric current and the constant voltage way charge, the prohibition reverse charges. If the battery positive electrode and the cathode meet instead, can damage the battery.

#### 2.2 Discharging current

The discharging current does not have to surpass this specification book stipulation the biggest discharging current, the oversized electric current electric discharge can cause the battery capacity play to reduce and to cause the battery heat.

#### 2.3 Discharge temperature

The battery discharge must carry on in the ambient temperature scope which this specification book

stipulated.

2.4 Over-discharges After the short time excessively discharges charges immediately cannot affect the use, but the long time excessively discharges can cause the battery the performance, battery function losing. The battery long-term has not used, has the possibility to be able to be at because of its automatic flashover characteristic certain excessively discharges the condition, for prevented excessively discharges the occurrence, the battery should maintain the certain electric quantity.

#### 2.5 Storing the Batteries

The battery should store in the product specification book stipulation temperature range. If has surpasses above for threemonths the long time storage, suggested you should carry on additional charge to the battery.

### 3. Other The Chemical Reaction

Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage. If the batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may indicate it is time to change the battery.

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