

Li-ion Cylindrical Battery

Customer No: KH0000943-001

Part No: YT18650H 3.7V 2600mAh

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Document Revision History

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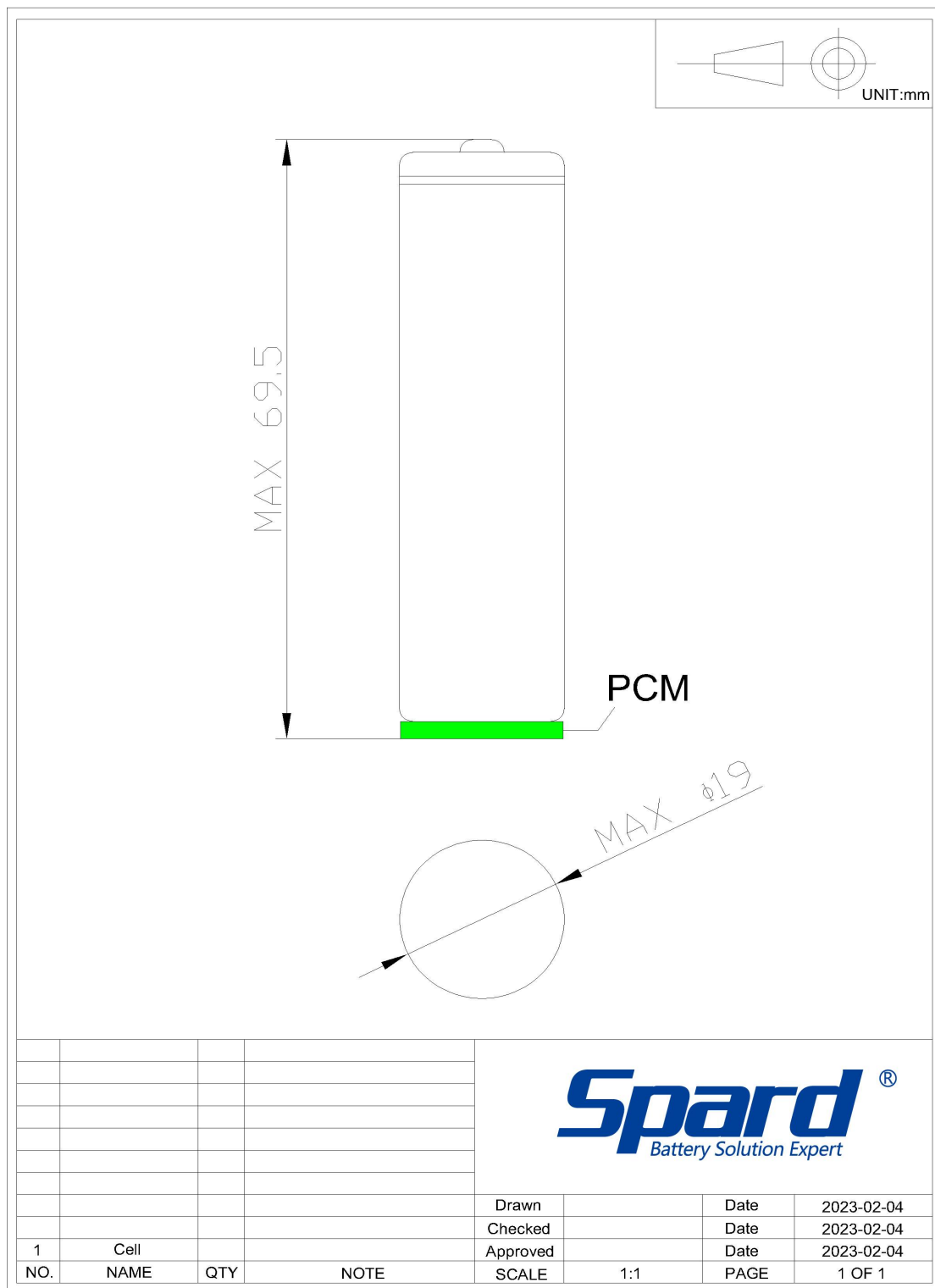
1. Preface

This document describes the Product Specification of the Li-ion rechargeable battery supplied by YUNTONG.

2.Battery configuration.

2.1 Model. : YT18650H 3.7V 2600mAh

2.2 Assembly Drawing.



3. Specification

NO.	Items	standard	Remarks
1.	Typical capacity	2600mAh	Discharge Current:0.2C Cut-off voltage:2.4V/set
2	Minimum capacity	2340mAh	
3	Charging voltage	4.2V/set	
4	Nominal voltage	3.7V/set	
5	Discharge cut-off voltage	2.4V/set	PCM cut-off voltage
6	Charge current	Standard: 0.2C	
		Rapid: 0.5C	
7	Discharge current	Standard: 0.2C	Continuous discharge
		Max: 1C	Continuous 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 52mA (0.02C) cut off.	
9	Rapid charge	0.5C CC(constant current) charge to 4.2V/cell, then CV(constant voltage) 4.2V/cell charge 3.0hours or 52mA (0.02C) cut off.	
10	Max. charge current	0.5C(1.3A)	
11	Internal Impedance	,Max: 180mΩ	AC 1KHz after standard charge
12	Energy	9.62Wh	
13	Weight	Approx:48g	
14	Operating Temperature.	Charge: 0 ~ +45°C	Forbid to outrun provision scope a work.
		Discharge: -10 ~ +60°C	
15	Storage Temperature	-5~ +35°C	See the section 5 th .

4. Battery Cell Performance Check and Test

Require

- (1) Visual inspection.: There shall be no such defect as scratch, flaw, crack, and leakage, which may adversely affect commercial value of the cell.
- (2) Standard environmental test condition

Humidity: $65 \pm 20\%$

Temperature: $25 \pm 2^\circ\text{C}$

4.1 Common Performance

NO	Items	Test Method and Condition	standard
1	Charging Performance.	The battery can be charged when using the original charger. The standard charge mode :under the temperature of $25 \pm 2^\circ\text{C}$, 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 52mA(0.02C) cut off.	N.A.
2	Discharging performance.	The capacity means the discharge capacity of the cell, which is measured with discharge current of 0.2C with 2.4V/cell cut-off voltage after the standard charge.	$\geq 2340\text{mAh}$
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. (Remark: single cell).	≥ 300
4	Temperature Dependence of Capacity	Capacity comparison at each temperature, measured with constant discharge current 0.2C with 2.5V/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: $25 \pm 2^\circ\text{C}$	Discharge Temp. As capacity -10 ~0°C: 45% 0~+15°C: 80% +15~+25°C: 90% +25~+40°C: 100%
5	Charged Storage Characteristics	Capacity after 28 days storage at $25 \pm 2^\circ\text{C}$, from Standard Charge, measured under the same conditions stated No. 2	Remaining capacity (after 25°C storage) $\geq 80\%$
6	Capacity instauration characteristics	Battery after 28 days storage at $25 \pm 2^\circ\text{C}$. From Standard Charge, then measured under the same conditions stated No. 2	Recovery capacity $\geq 90\%$
7	Battery Voltage	As of shipment.	3.6V~3.9V

4.2 Safety Performance

NO.	Items.	Test Methods and Condition.	standard
1	Vibration Test	Cell (as of shipment) vibrated for 90 minutes for each of the three mutually perpendicular planes with total excursion of 1.6mm and with frequency of 10 Hz to 55 Hz at the sweep rate of 1 Hz per minute.	No explosion, no fire, no leakage.
2	Drop Test	Under the temperature of $25 \pm 2^{\circ}\text{C}$, 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.

※ 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°C~+35°C
	Long period less than 6 months	0°C~+35°C
	Long period less than 1 year	0°C~+25°C
Humidity	60±15%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	~3.8V	

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 = $3.7\text{V} \times 1 = 3.7\text{V}$

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.

PCM

1). Outline:

This specification shall be applied to Lithium-ion polymer battery protection circuit manufactured by YUNTONG.

2). Electrical Characteristics

Item	Symbol	Content	Criterion
Charging Voltage		Charging Input Voltage	4.2V
Current		Max. Continuous Discharge Current	3A
Over charge Protection	VDET1	Over charge detection voltage	4.300±0.050V
	tVDET1	Over charge detection delay time	1.0±0.5s
	VREL1	Over charge release voltage	4.100±0.06V
Over discharge protection	VDET2	Over discharge detection voltage	2.4V±0.100V
	tVDET2	Over discharge detection delay time	20±6 ms
	VREL2	Over discharge release voltage	3.000±0.10V
Over current protection	VDET3	Over current detection voltage	--
	IDP	Over current detection current	4-10A
	tVDET3	Detection delay time	12±4ms
		Release condition	Cut load
Short protection		Detection condition	Exterior short circuit
		Release condition	Cut short circuit
Interior resistance	R _{DS}	Main loop electrify resistance	VGS=4.5V; R _{DS} ≤50mΩ
consumption Current	IDD	Current consume in normal operation	Type .4μA , Max .8μA

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 three months 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.

4. Protection Circuit Module (PCM) 1) The cell/battery pack shall be with a PCM which can protect cell/battery pack properly. PCM shall have functions of (i) overcharging prevention, (ii) over-discharging prevention, (iii) over current prevention to maintain safety and prevent significant deterioration of cell performance. The over current can occur by external short circuit. 2) Overcharging prohibition: Overcharging prevention function shall stop charging if any one of the cells of the battery pack reaches 4.25V. 3) Over-discharge prohibition: Over-discharging prevention function shall work to minimize a dissipation current to avoid further drop in cell voltage of 2.7V or less per cell in any cell of the battery pack. It is recommended that the dissipation current of PCM shall be minimized to 0.5uA or less with the over-discharge prevention. The protection function shall monitor each bank of the battery pack and control the current all the time.

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