

Li-ion Cylindrical Battery Specification

MODEL :	SHIBA Li-ion Battery
Typical Capacity:	2000mAh
Total Page:	10

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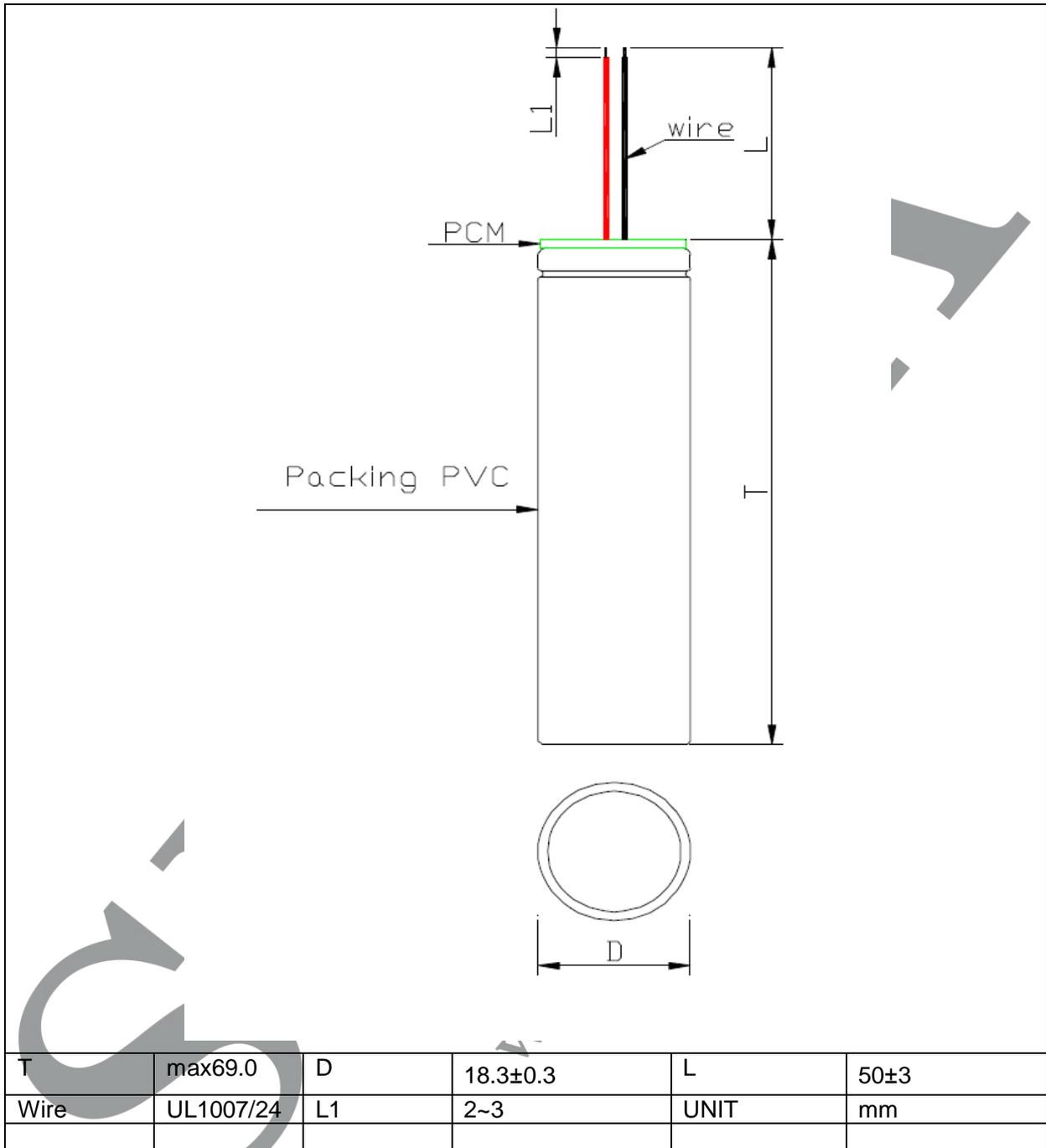
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1. Scope

This specification describes the basic performance, technical requirement, testing method, warning and caution of the Li- ion Cylindrical rechargeable battery .The specification only applies to S.P Electronics Batteries.

2. Initial Dimension

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3. Specification

No.	Item	Specifications
3.1	Nominal capacity	2000mAh (min) @ 0.2C Discharge (0.2C)
3.2	Rated voltage	3.7V

3.3	Charge current	Standard Charge : 0.5C Rapid charge : 1.0C
3.4	Standard Charging method	0.5C CC (constant current) charge to 4.2V,then CV(constant voltage 4.2V)charge till charge current decline to $\leq 0.01C$
3.5	Charging time	Standard Charging: Approx 5 hours Rapid charging: Approx 2 .5hours
3.6	Max.charge current	Constant Current 1C5A Constant Voltage 4.2V 0.01 C5A cut-off
3.7	Max.discharge current	Constant current 1.0C5A end voltage3.0V
3.8	Standard Discharge Current	Standard Discharge Current
3.9	Discharge cut-off voltage	3.0V
3.10	Charge cut-off Voltage	4.20V
3.11	Initial Impedance	$\leq 150m\Omega$
3.12	Weight	Approx : 48g
3.13	Operating temperature	Charging : 0°C~45°C Discharging : -20°C~70°C
3.14	Storage temperature	-5°C~35°C
3.15	Storage Humidity	$\leq 75\%$ RH
3.16	Appearance	Without scratch,distortion,contamination and leakage
3.17	Standard environmental condition	Temperature : 23 \pm 5°C Humidity : 45-75%RH Atmospheric Pressure : 86-106 Kpa

4. General Performance

No.	Item	Test Methods and Condition	Criteria
4.1	0.2C Capacity	After standard charging, laying the battery 5min, then discharging at 0.2C to voltage 3.0V, recording the discharging time.	≥300min
4.2	1C Capacity	After standard charging, laying the battery 5min, then discharging at 1C to voltage 3.0V, recording the discharging time.	≥54min
4.3	Cycle Life	Constant current 0.5C charge to 4.2V, then constant voltage charge to current declines to 0.05C, stay 5min, constant current 0.5C discharge to 3.0V, stay 10min. Repeat above steps till continuously discharging time less than 36min.	≥300 times
4.4	Capability of keeping electricity	20±5°C, After standard charging, laying the battery 28days, discharging at 0.2C to voltage 3.0V, recording the discharging time.	≥240min

5. Environment Performance

No.	Item	Test Methods and Condition	Criteria
5.1	Discharge at high temperature	After standard charging, laying the Cells 4h at 60±2°C, then discharging at 1C to voltage 3.0V, recording the discharging time.	≥54min
5.2	Discharge at low temperature	After standard charging, laying the Cells 16h at -20 ± 2 °C , then discharging at 0.2C to voltage 3.0V, recording the discharging time.	≥210min
5.3	Thermal shock	Put the battery in the oven. The temperature of the oven is to be raised at 5±1°C per minute to a temperature of 130±2°C and remains 30 minutes.	No fire, no smoke

6. Safe Characteristic

No.	Item	Test Methods and Condition	Criteria
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6.1	Over charge testing	At 23 ± 5°C, charging batteries with constant current 3C to voltage 5V, then with constant voltage 5V till current decline to 0. Stop test till batteries' temperature 10°C lower than max temperature	No smoke or fire
6.2	Over discharge testing	At 23 ± 5 °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 smoke, no leakage.
6.3	Short-circuit testing	At 23±5°C, After standard charging, connect batteries' anode and cathode by wire which impedance less than 50m Ω, keep 6h.	No smoke or fire

* ABOVE TESTING OF SAFE CHARACTERISTIC MUST BE WITH PROTECTIVE EQUIPMENT

7. Protection circuit

Symbol	Name	MIN.	TYP.	MAX.	Unit
VDET1	Over-Charge detect voltage	4.3	4.325	4.35	V
VHVS1	Over-Charge reset voltage	4.025	4.075	4.125	V
VDET2	Over-discharge detect voltage	2.4	2.5	2.6	V
IEC	Excess Current threshold	3.0	--	6.0	A
IDD	Supply current	--	--	7	μA
ISTANDBY	Standby current	--	--	0.1	μA
RD	Internal resistance in normal operation	--	--	60	mΩ

8. Cautions in Use

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

- 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.

9. Battery operation instruction

9.1. 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.

9.2. 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.

9.3. Discharge temperature

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

9.4. 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.

9.5. Storing the Batteries

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

10. Other 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.

11. Note:

Any other items which are not covered in this specification shall be agreed by both parties.