Li-ion Cylindrical Battery Specification

Model: EWJP-18650MP

Nominal Capacity: 2200mAh

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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 Eaglewood Japan Co., Ltd.

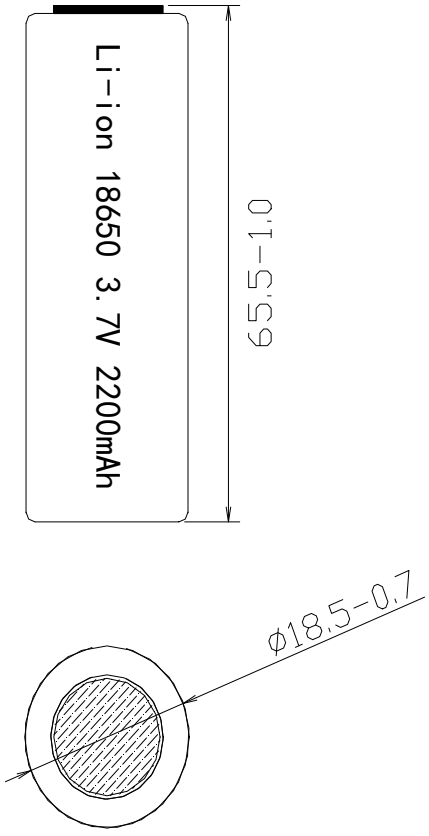
2.Description and Model

2.1 Description Cell（Cylindrical Lithium-Ion Cell)

2.2 Model INR18650MP-2200

3. Products assembly drawing and size refers to picture

Product assembly and size reference drawings



4.Pecification

NO.	Item	Specifications
4.1	Typical Capacity	2200mAh @ 0.2C Discharge
	Minimum capacity	2150mAh @0.2C (Discharge the cell from 4.2V to 3.0V by 0.2C current)
4.2	Nominal voltage	3.7V
4.3	Standard Charge	CC/CV,0.2C5A, 4.20V
4.4	Standard Discharge	CC,0.2C5A, 3.0V
4.5	End-of-charge Voltage	4.20V±0.05V
4.6	End-of-charge Current	0.02C5A （At CV mode）
4.7	End-of-discharge Voltage	3.00 V
4.8	Charging Time	3.0 hours（standard charge）
4.9	Max charge current （continuous）	2.2A(50℃>T≥20℃) 1.1A(20℃>T≥10℃) 0.44A(10℃>T≥0℃)
4.10	Max discharge current（continuous）	11A(50℃>T≥20℃) 6.6A (20℃>T≥10℃) 2.2A (10℃>T≥0℃)
4.11	Max pulse discharge current (<10s)	22A(25±3℃)
4.12	Initial Impedance	Max: 20mΩ
4.13	Weight	Approx：44.0g
4.14	Operating temperature	Charging： 0℃~45℃ Discharging：-20℃~60℃
4.15	Storage temperature	-5℃~35℃
4.16	Storage Humidity	≤75% RH
4.17	Appearance	Without scratch, distortion, contamination and leakage
4.18	Standard environmental condition	Temperature： 25±2℃ Humidity：45-75%RH Atmospheric Pressure： 86-106 KPA

5.Technical characteristics

5.1Cell testing conditions

Unless otherwise specified, all tests stated according to following: Temperature： 25±3℃.

5.2. Measuring equipment

1. Amp-meter and volt-meter

The amp-meter and volt-meter should have an accuracy of the grade 0.5mA and mV or higher.

2. Slide caliper

The slide caliper should have 0.01 mm scale.

3. Impedance meter

The impedance meter with AC 1kHz should be used.

5.3 Electronic performance

5.3.1 Standard charge

This "Standard charge" means charging the cell with constant current 0.5C and then with constant voltage 4.2V, 0.02C cut-off at 25±3℃.

5.3.2 Standard discharge capacity

The standard discharge capacity is the initial discharge capacity of the cell, which is measured with discharge current of 0.2C with 3.0V cut-off at 25±3℃ after the standard charge.

5.3.3 Temperature dependence of discharge capacity

Capacity comparison at each temperature, measured with discharge constant current 0.2C and 3.0V cut-off after the standard charge is as follows.

Discharge temperature					
-20℃	-10℃	0℃	15℃	25℃	40℃
≥60%	≥70%	≥80%	≥90%	≥100%	≥100%

5.3.4 Discharge rate capabilities

The standard discharge capacity is the initial discharge capacity of the cell, which is measured with discharge current of 0.44A、1.1A、2.2A、6.6A、11A at 25±3℃ after the standard charge.

Discharge condition					
Current	0.44A	1.1A	2.2A	6.6A	11A
Relative Capacity	≥100%	≥98%	≥96%	≥95%	≥95%

6. General Performance

No.	Item	Test Methods and Condition	Criteria
6.1	0.2C Capacity	After standard charging, rest battery for 10min, then discharging at 0.2C to voltage 3.0V, recording the discharging time.	≥294min
6.2	Cycle Life	Constant current 1C charge to 4.2V, then constant voltage charge to current declines to 0.01C, rest 10min，constant current 5C discharge to 3.0V ， rest 30min. Repeat above steps till continuously discharging capacity Higher than 80% of the Initial Capacities of the Cells.	≥300cycles
6.3	Capability of keeping electricity	25±3℃, After standard charging, rest the battery 28days, discharging at 0.2C to voltage 3.0V, recording the discharging time.	≥240min

7. Environment Performance

No.	Item	Test Methods and Condition	Criteria
7.1	Discharge at high temperature	After standard charging, rest the cells 4h at 60 ± 2 ℃ , then discharging at 1C to voltage 3.0V, recording the discharging time.	≥54min
7.2	Discharge at low temperature	After standard charging, rest the cells for 16h at -20±2℃, then discharging at 0.2C to voltage 3.0V, recording the discharging time.	≥180min
7.3	Thermal shock	Put the cells in the oven. The temperature of the oven is to be raised at 5±2℃ per minute to a temperature of 130±2℃ and remains 30 minutes.	No fire or explosion

8. Safe Characteristic

No.	Item	Test Methods and Condition	Criteria
8.1	Over charge testing	At 25±3℃ , charging cells with constant current 3C to voltage 10V, Stop test till cells temperature 10℃ lower than max temperature.	No fire or explosion
8.2	Forced discharge	At 25±3℃, discharge to the termination voltage according to the standard discharge requirements, and then reverse charge at 1C current for 90 minutes.	No fire or explosion
8.3	Short-circuit testing	After being charged according to standard, place it in an environment of 25±5℃ and 55±5℃, and then connect the positive and negative extremes with a wire to ensure that all the external resistance is 80±20mΩ. The battery temperature drops to 20% lower than the peak value or the short circuit time reaches 24h.	No fire or explosion
8.4	Vibration test	Standard charged and fixed on the vibration table and subjected to vibration cycling that the frequency is to be varied at the rate of 1Hz per minute between 10Hz and 55Hz, battery is to be subjected to simple harmonic motion with an amplitude of 0.8 mm (0.03 in) [1.6mm (0.06 in) total maximum excursion]The cells shall be vibrated for 90 -100minutes per axis of X, Y axes.	No remarkable damage、No smoking 、No explosion
8.5	Free drop test	Each fully charged cell is dropped three times from a height of 1,0m onto aconcrete floor. The cells are dropped so as to obtain impacts in randomorientations.	No fire No explosion
8.6	Altitude/Low Pressure simulation test	Standard charged and stored for 6 hours in an vacuum environment with pressure of less than 11.6kPa and temperature of 25±3℃.	no leakage, no fire, no explosion

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

9. Caution 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.

10. Battery operation instruction

10.1 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.

10.2 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.

10.3 Discharge temperature

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

10.4 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 flash over characteristic certain excessively discharges the condition, for prevented excessively discharges the occurrence, the battery should maintain the certain electric quantity.

10.5 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.

11. Period of Warranty

The period of warranty is one year from the date of shipment. guarantees to give a replacement in case of cells with defects proven due to manufacturing process instead of the customers abuse and misuse.

12. 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.