Li-ion Cylindrical Battery Cell

Specification

Model: ICR18650-2900mAh

1. Scope

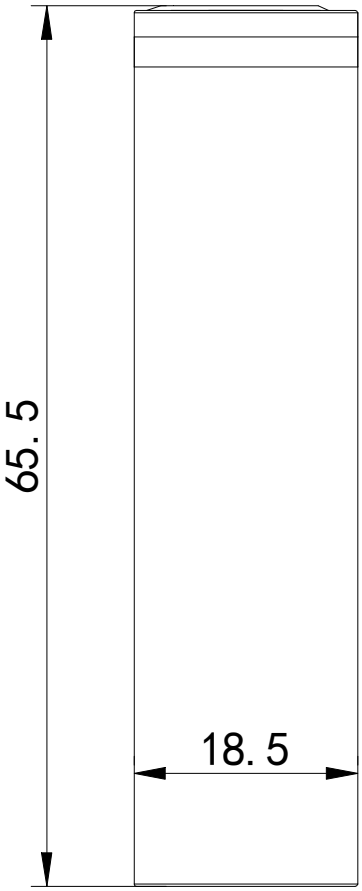
This specification is applied to ICR18650-2900mAh battery Manufactured by Akyga battery.

2. Product Configuration

No	Item	Criteria	Remark
1	Li-ion Cylindrical Cell	ICR18650-2900mAh	
2	PVC		

3.Product Dimension

3.1Pack Dimension



4.Product Specification

Table 1:

No	Item	Rated Performance		Remark
1	Rated Capacity	Typical	2900mAh	Discharge at $0.2C_5A$ after standard charge fully.
		Minimum	2800mAh	
2	Nominal Voltage	3.6V		Mean operation voltage during standard discharge.
3	OCV	≥3.5V		The battery power with 30%-50%
4	Voltage at end of Dischargr	2.75V		Discharge cut-off voltage.
5	Charging Voltage	4.2±0.03V		
6	AC (1KHz) Impedance New Cell Max.(mΩ)	≤25mΩ		
7	Standard Charge	Constant Current $0.2C_5A$ Constant Voltage4.2V $0.02C_5A$ cut-off		Charge time : Approx 8.0h.
8	Standard Discharge	Constant current $0.2C_5A$ end voltage 2.75V		
9	Fast Charge	Constant Current $0.5C_5A$ Constant Voltage 4.2V $0.02C_5A$ cut-off		Charge time : Approx 4h.
10	Fast Discharge	Constant current $1.0C_5A$ end voltage 2.75V		
11	Maximum Continuous Charge Current	0.5C		

12	Maximum Continuous Discharge Current	10A	
13	Operation Temperature Range	Charge: -20~60℃	60±25%RH.Bare Cell.
		Discharge: -40~85℃	
14	Storage Temperature Range	Less than 1 year: -20~25℃	60±25%RH.
		Less than 3 months: -40~60℃	
15	Storage Humidity Range	60±25%RH.	
16	Weight	Approx: 44g	Whole product
17	Product Dimension	Highly: 65.5±0.2mm	
		Diameter: 18.5±0.2mm	

5.Product Performance

5.1 Standard Testing Conditions

Test should be conducted with new batteries within one week after shipment from our factory and the cells shall not be cycled more than five times before the test. Unless otherwise defined, test and measurement shall be done under temperature of 23±2℃ and relative humidity of 45~85%. If it is judged that the test results are not affected by such conditions, the tests may be conducted at temperature 15~30℃ and humidity 25~85%RH.

5.2 Measuring Instrument or Apparatus

5.2.1 Dimension Measuring Instrument

The dimension measurement shall be implemented by instruments with equal or more precision scale of 0.01mm.

5.2.2 Voltmeter

Standard class specified in the national standard or more sensitive class having inner impedance more than 10kΩ/V

5.2.3 Ammeter

Standard class specified in the national standard or more sensitive class. Total external resistance including ammeter and wire is less than 0.01Ω.

5.2.4 Impedance Meter

Impedance shall be measured by a sinusoidal alternating current method (1kHz LCR meter).

5.3 Standard Charge\Discharge

5.3 1 Standard Charge ： Test procedure and its criteria are referred as follows:

$0.2C_5A$ =560mA

Charging shall consist of charging at a $0.2C_5A$ constant current rate until the cell reaches 4.2V. The cell shall then be charged at constant voltage of 4.2V while tapering the charge current. Charging shall be terminated when the charging current has tapered to $0.02C_5A$. Charge time : Approx 8.0h, The cell shall demonstrate no permanent degradation when charged between 0 and 50 ℃.

5.3.2 Standard Discharge

0.2C_5A =560mA

Cells shall be discharged at a constant current of 0 2 C_5A to 2 75V @ 23±2 ℃.

5.4 Appearance

There shall be no such defect as flaw, crack, rust, leakage, which may adversely affect commercial value of battery.

5.5 Initial Performance Test

Table 2:

Item	Measuring Procedure	Requirements
(1) Open-Circuit Voltage	The open-circuit voltage shall be measured within 24 hours after standard charge	≥4.08V
(2) AC Impedance Resistance	The Impedance shall be measured in an alternating current method (1kHz LCR meter) after standard charge at 23±2℃.	≤25mΩ
(3) Nominal Capacity	The capacity on 0.2C_5A discharge shall be measured after standard charge at 23±2℃.	Discharge Capacity ≥2800mAh

5.6 Temperature Dependence of Capacity (Discharge)

Cells shall be charged per 5.3.1. and discharged @0.2C_5A to 2.5 V, except to be discharged at temperatures per Table 3. Cells shall be stored for 3 hours at the test temperature prior to discharging and then shall be discharged at the test temperature. The capacity of a cell at each temperature shall be compared to the capacity achieved at 23℃ and the percentage shall be calculated. Each cell shall meet or exceed the requirements of Table 3.

Table 3:

Discharge Temperature	-40℃	-20℃	0℃	25℃	85℃
Discharge Capacity （0.2C_5A）	60%	75%	80%	100%	95%

5.7 Cycle Life and Leakage-Proof

Table 4:

No.	Item	Criteria	Test Conditions
1	Cycle Life	Higher than 70% of the Initial Capacities of the Cells	Carry out 500 cycle charging/ ◆Charge: 0.5C_5A Charge to 4.2V, 0.05C_5A cut-off ◆Discharge:1.0C_5A to 2.75V ◆Rest Time between charge/discharge:30min. ◆Temperature:23±2℃
2	Leakage-Proof	No leakage (visual inspection)	After full charge, store at 60±3℃ 60±10%RH for 1month.

6. Mechanical characteristies and Safety Test

Item	Battery Condition	Test Method	Requirements
Over charge test	Fresh,Fully Charged	Standard charged. Charged at 1.0C_5A to 6V or 90 min. Observe the variation of the cell's appearance and temperature.	No explode No fire
Over discharge test	Fresh,Fully Charged	Cell be discharged at constant current 0.5C_5A to 2.75V, then discharged at 0.2C_5A to 0V.	No explode no fire,nor smoke
Heat shock test	Fresh, Fully Charged	Put the cell in hot box ,then heat up to 130℃ in1 minute, remain for 10 minutes.	No explode No fire
Impact test	Fresh, Fully Charged	A 9.1kg weight to be dropped from 610mm height onto the cell center	Noexplode No fire

Crush	Fresh, Fully Charged	Crush between two flat plates. Applied force is about 13kN(1.72Mpa) for 10min.	No explode, No fire
Short Circuit test	Fresh, Fully Charged	make short-circuited by connecting the (+) and (-) terminals of the cell with a Cu wire having a maximum resistance load of 0.1Ω.Tests are to be conducted at room temperature(23±2℃).	No explode, No fire Top temperature no exceed 150℃
Rate test	Fresh, Fully Charged	0.2C/0.5C/1C charge & discharge.	
Low temperature discharge test	Fresh, Fully Charged	put the cell in -20℃ for 1h, then discharge at 0.2C to 2.75V.	Discharge capacity ≥70%
High temperature discharge test	Fresh, Fully Charged	Put the cell in 60℃ for 1h, then discharge at 0 2C to 2 75V	Discharge capacity ≥100%
Vibrate test	Fresh, Fully Charged	Vibrate the cell for 30 minutes per each of the three mutually perpendicular axis (X,Y,Z) after rated charge	No rupture, no fire Nor critical damage
Drop test	Fresh, Fully Charged	Drop the cell from 1m above onto concrete board with 18~20mm thickness for one time each fro every direction after rated charge. After test, cells are discharged at 1C and charged at 1C,cycles 3times to obtain the time of discharging.	No rupture, no fire Nor critical damage ≥51min

6. Storage and Transportation

6.1 Storage:

6.1.1 The Li-ion battery pack should be stored in a cool, dry and well-ventilated area. and should be far from the fire and the high temperature.

6.1.2 The best capacity in storage is 30%-50% .

6.1.3 The battery should store in the product specification book stipulation temperature range. the best storage temp. is -20 to 25℃. The best humidity is 60±25%.

6.1.4 If has surpasses above for six months the long time storage, suggested you should carry on additional charge to the battery.

6.2 Transportation:

6.2.1 Do not mix the battery products with other cargoes.

6.2.2 Do not immerse the battery products in water or allow it to get wet.

6.2 3 Do not over 7 layers staking and upside-down.

6.2.4 The highest temperature in transportation is lower than 65℃.

7. Use Attentions:

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

7.1 Handling:

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

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

7.1.3 Avoid shorting the battery

7.1 4 Avoid excessive physical shock or vibration.

7 1 5 Do not disassemble or deform the battery.

7.1.6 Do not immerse in water.

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

7.1.8 Keep out of the reach of children.

7.2 Charge:

7.2.1 Battery must be charged in appropriate charger only.

7.2.2 Never use a modified or damaged charger.

7.2.3 Do not leave battery in charger over 24 hours.

7.2.4 Charging current：Can not surpass the biggest charging current which in this specification book stipulated.

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

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

7.2.7 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.

7.2.7 Storage battery storage, it must be charged state, and requires every 3 months on a charge and discharge.

7.3 Discharge:

7.3.1 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。

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

7.3.3 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.

7.4 Disposal:

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

8. Period of Warranty

There is a six-month warranty for our export batteries from the date of shipment. If the problem happened during the warranty period, we are responsible to replace the defective ones according to the accurate analysis results. However, we won't take any responsibility if the problem is caused by the battery-related applications and related products.

9. Others

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.

10. Note:

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