



Specification Approval Sheet

Name : Polymer Lithium-Ion Battery

Model : AKYGA 2335

SPEC : 3.6V / 3300mAh

Specification Modification Records

Modification Time	Descriptions	Issued Date	Approved By
	Release 1	2024-12-20	

Content

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1. Scope

This specification describes the basic type and size, performance, technical characteristics, testing method, warning and caution of the lithium-ion rechargeable battery pack. The specification only applies to **INR18650-33M-1P1S (3.6V 3300mAh Cap)** battery pack supplied by Akyga Battery

2. Description and Model

- 2.1 Description: Lithium battery, 3.6V 3300mAh, 18650, top cap.
 2.2 Model: **INR18650-33M-1P1S, (3.6V 3.3Ah)**

3. Battery pack Dimension

<p>Battery pack picture</p> 			
Size (D*H mm)	Diameter 19.0mm Height: 71mm Max	Remark	With PCM
TOP CAP	YES		

4. Product main parameter

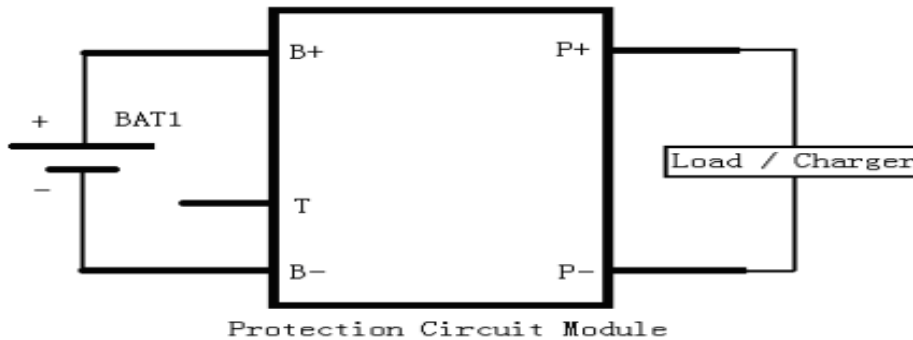
No.	Item	Specifications
4.1	Nominal capacity	3300mAh 0.2C Discharge (Cell INR18650-33M, FEB)
	Min capacity	3200mAh 0.2C Discharge
4.2	Nominal voltage	3.6V
4.3	Standard Charge Current	1650mA, 0.5C
4.4	Max Charge Current	3300mA, 1C
4.5	Standard Charging Method	0.5C CC (constant current) charge to 4.2V, then CV(constant voltage 4.2V)charge till charge current decline to $\leq 0.05C$
4.6	Charging Time	Standard Charging: Approx 3 hours
4.7	Standard Discharge Current	Constant current 1 C, end voltage 2.5V
4.8	Max. Discharge Current	Constant current 3C end voltage 2.5V ($0^{\circ}C \leq T \leq 35^{\circ}C$)
4.9	Discharge cut-off voltage	2.5V (Nominal)
4.10	Charge cut-off Voltage	4.2V $\pm 0.05V$
4.10	Initial Impedance	$\leq 150m\Omega$ (AC Impedance, 1000kHz) (Cell $\leq 25m\Omega$)
4.11	Weight (g)	Approx: 51g
4.12	Operating temperature ($^{\circ}C$)	Charging: $0^{\circ}C \sim 45^{\circ}C$ Discharging: $-20^{\circ}C \sim 60^{\circ}C$
4.13	Storage temperature ($^{\circ}C$)	$-5^{\circ}C \sim 35^{\circ}C$
4.14	Storage Humidity ($^{\circ}C$)	$\leq 75\% RH$
4.15	Appearance	Without scratch, distortion, contamination and leakage
4.16	Standard environmental condition	Temperature: $23 \pm 5^{\circ}C$ Humidity: 45-75%RH Atmospheric Pressure: 86-106 Kpa

4A. Electrical Characteristic (with PCM)

Item Specification	Content	Criterion
4.1 Over charge protection	Over charge detection voltage	4.20V \pm 0.025V
	Over charge detection delay time	0.96-1.4S
	Over charge release voltage	4.300v \pm 0.025

4.2 Over discharge protection	Over discharge detection voltage	2.80V+/-0.1V
	Over discharge detection delay time	115-173ms
	Over discharge release voltage	2.5 v+/-0.05v
4.3 Over current Protection	Over current detection voltage	0.150v+/-0.015v
	Over current detection current	6A (uPA1870 30-40mohm)
	Detection delay time	7.2-11ms
	Release condition	Cut load
4.4 Short protection	Detection condition	Exterior short circuit
	Detection delay time	150-540us
	Release condition	Cut short circuit
4.5 Interior resistance	Main loops electrify resistance	$V_c=4.2V$; $R_{DS} \leq 200m\Omega$
4.6 Current consumption	Current consumes in normal operation	less than 10uA

4. B Circuit Diagram



5. General Performance

No.	Item	Test Methods and Condition	Criteria
5.1	Cycle Life	Constant current 0.5C charge to 4.2V, then constant voltage charge to current declines to 0.05C, rest 10min, constant current 0.5C discharge to 2.5V, rest 15min. Repeat above steps till continuously discharging capacity Higher than 80% of the Initial Capacities of the Cells	≥ 300 times(DOD80%) Cell ≥ 800 times(DOD70%)
5.2	Capability of keeping electricity	$20 \pm 5^\circ C$, After standard charging, rest the battery 28days, discharging at 0.5C to capacity Higher than 80% recording the discharging time.	≥ 240 min

6. Environment Performance

No.	Item	Test Methods and Condition	Criteria
6.1	Discharge at high temperature	After standard charging, rest the Cells 4h at $60 \pm 2^\circ C$, then discharging at 1C to voltage 2.5V, recording the discharging time.	≥ 54 min
6.2	Discharge at low	After standard charging, rest the Cells 16h at $-20 \pm 2^\circ C$, then discharging at 1C to voltage 2.2V, recording the discharging	≥ 40 min

	temperature	time.	
6.3	Thermal shock	Put the battery in the oven. The temperature of the oven is to be raised at $5 \pm 2^\circ\text{C}$ per minute to a temperature of $130 \pm 2^\circ\text{C}$ and remains 30 minutes.	No fire, no smoke
6.4	Vibration	After fully charged standard, cells shall be attached to a vibration table directly and subjected to vibration that consists of 10 Hz to 30 Hz to 55 Hz at the speed of 1Hz/min in 30mins. The total excursion of the vibration is 0.38mm. The cells shall be vibrated in each direction along axis of the cylinder and the vertical directions of axis of the cylinder.	There shall be no electrolyte leakage

7. Safe Characteristic

No.	Item	Test Methods and Condition	Criteria
7.1	Overcharge testing	At $23 \pm 5^\circ\text{C}$, charging batteries with constant current 3C to voltage 10V, then with constant voltage 10V till current decline to 0. Stop test till batteries' temperature 10°C lower than max temperature.	No smoke or fire
7.2	Over discharge testing	At $23 \pm 5^\circ\text{C}$, 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 smoke, no leakage.
7.3	Short-circuit testing	At $23 \pm 5^\circ\text{C}$, After standard charging, connect batteries' anode and cathode by wire which impedance less than $50\text{m}\Omega$, keep 6h.	No smoke or fire
7.4	Crush test	After charging a cell following the standard charge method, the cell shall be crushed between two flat surfaces. The direction of the crushing force shall be vertical to axis of the cylinder. The crushing force is to be applied by a hydraulic ram with a 32mm diameter piston. Crushing force is approximately 13 KN. Once the maximum pressure has been obtained it is to be released.	No fire, No explode
7.5	Impact test	Cell shall first be charged according to standard charge method, then the battery cell was placed on a flat surface so that the longitudinal axis of the battery cell shall be parallel with it. A 15.8mm diameter bar is to be placed across the center of the sample. A 9.1kg weight is to be dropped from a height of 61cm on the sample.	No flame, No fire, No explode

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

8. Cautions in use

8.1 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.

8.2 Charge and discharge

- Battery must be charged in appropriate charger only.
- Never use a modified or damaged charger.
- Do not leave the battery in charger over 24 hours.

8.3 Storage

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

8.4 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 a short time excessively discharges charges immediately cannot affect the use, but the long time excessively discharges can cause the battery performance, battery function losing. The battery long-term has not been 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.

9.5 Storing the Batteries

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

10. Period of Warranty

The warranty period is half a 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.

11. 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.

12. Note:

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