	Akku Tronics New Energy Technology Co., Limited TEL:0086-755-85290393 FAX:0086-755-86578846	Type: ICR18650-2-PTLC
		REV: 1.0
		Date: 2019-08-21

Specification Approval Sheet


Model : ICR18650-2-PTLC

Type : Li-ion battery

Specification : 3.6V/5200mAh


signed by client	
Confirmed	
Checked	
Approved	

signed by manufacturer	
Prepared:	Alex Wang
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1. Battery type and scope


This Specification Approval Sheet is for rechargeable Li-ion battery provided by Akku Tronics New Energy Tech. Co., Ltd.

2. Basic characteristic and components of the battery

2.1 Basic performance parameter of the battery

S/N	Details	Parameters		Remarks
1	Rated voltage	3.6V		
2	Rated capacity	5200mAh		discharge with 0.2C to 3.0V After fully charge within 1h, measuring the discharge time.
3	Limited charge voltage	4.2V		
4	Internal resistance	≤180mΩ		
5	charge mode	C.C/C.V.		
6	Charge time	6h		Standard charging 0.2C
7	Max Charge Current	2600mA		
8	Max discharge current	2600mA		
9	Working temperature	charging	0~45°C	
		discharging	-20~55°C	
10	Storage temperature	1 Month	-20~35°C	Charge to 40%~50% of capacity when storage
		6 months	-20~30°C	
11	Storage humidity	45% ~ 75%		relative humidity
12	Weight	Approx. 95.0g		
13	ESD ability	Touch discharge ≥ 6000V		
		Air discharge ≥ 6500V		
14	Cycle life	500 times		Rate 0.2C, capacity ≥ 80%

Note: If you need the battery protection parameters, please refer to PAGE 7.

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2.2 Main components and parts

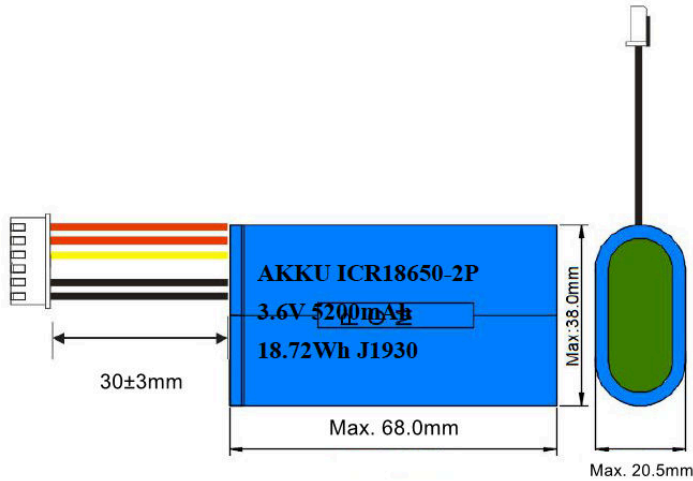
Materials	Model	Quantity	Related technical parameters	Manufacturer
Li-Ion battery cell	ICR18650	2PCS	Please refer to the battery cell specification	/
Protection board	S-8261DAI-M6T1U 10K $\pm 1\%$ B=3435 $\pm 1\%$	1PC	Please refer to the PCM specification	
Wire	UL3302-24 Length 30 ± 3 mm	5PCS		
Connector	JST-XHR-6P	1PC		

2.3 Reliable performance test

S/N	Inspection item	Standard	Testing Method
1	High temperature	No deformation, no rust, no fire or explosion; Discharge time ≥ 4.25 hours with 0.2C5A discharge	Place the battery in the environment of 55 $\pm 2^{\circ}\text{C}$ for 2 hours after fully charge, then discharge with 0.2C5A to cut-off voltage.
2	Low temperature	No deformation, no rust, no fire or explosion; Discharge time ≥ 3 hours with 0.2C5A discharge at -10 $\pm 2^{\circ}\text{C}$	After fully charge, place the battery in the environment of -10 $\pm 2^{\circ}\text{C}$ for 16-24h, then discharge with 0.2C5A to cut-off voltage. Then display the battery in 20 $\pm 5^{\circ}\text{C}$ for 2 hours, observe the appearance of the battery.
3	Capability Retention	Discharge time ≥ 4.5 h	After the standard charging, storied the cells under the condition 25.0 $\pm 5.0^{\circ}\text{C}$ (Temperature) $\leq 75.0\%$ RH (Humidity) for 28 days, then measured the capacity with 0.2 C till 3.0V with previous standard discharge capacity of the ratio.
4	Constant humidity and heat	No deformation, no rust, no smoke or explosion. Discharge time ≥ 36 mins	After fully charge, place the battery in the environment of 40 $\pm 2^{\circ}\text{C}$ and 90% - 95% Relative humidity for 48 hours, then place it in 20 $\pm 5^{\circ}\text{C}$ for 2 hours, later, discharge with 1C5A to cut-off voltage.

5	Vibration	No leakage No fire	After standard charging, fixed the cell to 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, the excursion of the vibration is 1.6mm. The cell shall be vibrated for 30 minutes per axis of XYZ axes.
6	Drop test	No fire, no leakage.	The cell is to be dropped from a height of meter twice onto concrete ground.
7	Over-charge testing	No fire or explosion	At $20 \pm 5^{\circ}\text{C}$, charging batteries with constant current 1C to voltage 4.8V, then with constant voltage 4.8V till current decline to 0A. Stop test till batteries' temperature 10°C lower than max temperature.
8	Short-circuit testing	No fire or explosion.	At $20 \pm 5^{\circ}\text{C}$, After standard charging, connect batteries' anode and cathode by wire which impedance less than $50\text{m}\Omega$, Stop test till batteries' temperature 10°C lower than max temperature.
9	Thermal Shock	No fire, No explosion	Put the Cell in a circulating air oven, at a rate of ($5^{\circ}\text{C} \pm 2^{\circ}\text{C}$) per minute to 130°C , and then placed 30 minutes at 130°C .
10	Cycle life	Cycle life ≥ 500	At $20 \pm 5^{\circ}\text{C}$, charge battery with 0.2 C5A to 4.2V and then charge it with constant voltage to the current less than 0.01C. Stop charge and idle for 0.5~1 hour. Then discharge it with 0.2 C5A to cut-off voltage. Idle for 0.5 ~1 hour, do next charge and discharge cycle. Repeat these steps. Stop it until the continuous two cycle discharge time is less than 4 hours.

2.4 Dimension of the battery

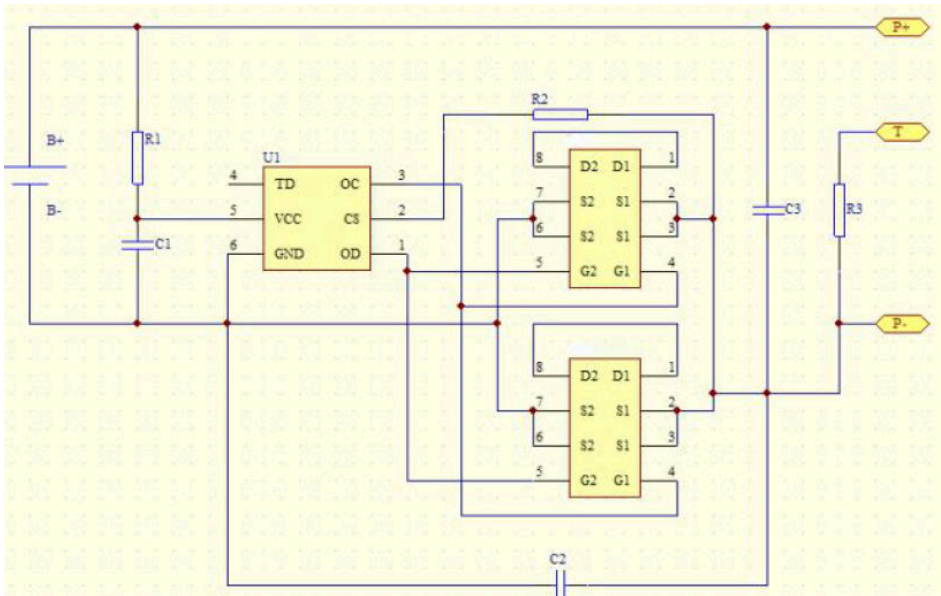


3. Specification of PCM

3.1 General electric characteristic

Items	Specification	Remarks
Over-charging Protection Voltage	4.28V ± 0.05V	
Over-charging Return Voltage	4.08V ± 0.1V	
Over-discharge Protection Voltage	3.0V ± 0.1V	
Over-discharge Return Voltage	3.0 ± 0.10V	
Over-current Protection	MIN: 5.0A MAX: 10.0A	
Over-current Protection Voltage	180mV ± 30mV	
Detection Delay Time of Over-charging Protection	1.3S(MAX)	
Detection Delay Time of Over-discharging Protection	333ms (MAX)	
Detection Delay Time of Over-current Protection	32ms (MAX)	
Short circuit Protection condition	Exterior short circuit	
Short circuit Protection Release condition	Cut short circuit	
Internal Resistance of Proper Functioning	B- to P- RDS ≤ 40m Ω	
Consume Current	MIN: 0.3 μ A MAX: 10.0 μ A	

3.2 Electric schematic diagram of battery (for reference only)



Attentions

Danger

To prevent battery from weeping, fever, exploding, please obeys the rules as follows:

Do not immerse the battery into the water or the sea, Guard against Damp;

Do not approach the heat source, like fire or heater;

Please use the appointed charger when charging;

Do not transposition the +.- poles of the battery to charge;

Do not direct-connected the battery to alternating current power supply, or auto-ignition of the vehicle;

Do not discard the battery to the fire or hyperpyretic objects;

Do not use the conductor to lead the short circuit of the + -poles of the battery. Do not put the battery with metallic conductors to transport or store, like necklace, hairpin and so on;

Do not beat or throw the battery;


Do not impale the battery with needle or some other sharp things, do not strike it with weight;

As installed safety device in the battery, please do not resolve or change any other sections of the battery to protect the inherent safety functions.

Warnings

Do not put the battery to the microwave oven or pressure tank;

Do not use the battery with some chemical batteries (like dry battery) or different capacities and brands battery together, if the battery emits the smell, heat, changes color, be out of shape or appears any other abnormal phenomena during the charging or stored procedures, please get out the battery from the device or charger and stop using;

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If cannot recharge within the charging period, please not continue charging;
 Put the battery to where the kids can not touch, if the kids swallow the battery, please seeing the doctor soon;
 If the electrolyte of the battery into the eyes, do not rub, should wash the eyes first, then see the doctor.

Announcements

Do not put the battery under the high temperature places (like sunshine irradiation or car in the hot weather), or it will catch fire for the heat, reduce the performance and loss the life;

To ensure the safety, the battery should install the safety device, please not use when the static electricity is more than we need when produce, or the safety device will lose efficacy and lead the overheating, fracture, exploding and catching fire;

Please use the battery in normal as follows, or it will be overheating, caught fire, reduced performance and shorten the life;

Environment condition

(Temperature) Charging: 0~+45⁰C

Discharging: -20~+60⁰C

Store within 30 days: -20~+35⁰C

Store within 90 days: -20~+30⁰C

If the kids use the battery, they should use as the operation instruction manual and guarantee that it must be use in normal at any time;

If the battery weeps, the electrolytes stick on the skin or cloth, use the water to wash or running water to wash

To insure not install the battery wrong or wastage of the battery, please read the instruction carefully to install and dismounting;

If the battery will not be used for a long time, please take out of the battery from the device and store in dry and shady places;

If there is sludge on the surface of the battery, please wipe up clean before using, or it will lead bad contact with the device.

! Special Notice

Keep the cells in **50% charged state** during long period storage. We recommend to charge the battery up to 50% of the total capacity every 3 months after receipt of the battery and maintain the voltage 3.7V~4.1V. And store the battery in cool and dry place.