

Li-ion Polymer Battery Specification Model: LP1260110-4S1P



1.Scope

The specification shall be applied to battery Manufactured by Akyga battery.

2. Product Specification

NO	Items	Criteria	Remarks
2.1	Nominal Capacity	10000mAh	Discharge at 0.2C5A afterstandard charge fully.
2.2	Nominal Voltage	14.8V	
2.3	Internal Impedance	≤155mΩ	AC 1KHz after standard charge
2.4	Charge Voltage	16.8V	
2.5	Standard Charge	0.2C5CC/CV→0.02C cutoff	Charge time/充电时间: Approx 6.0h.
2.6	Standard Discharge	0.5C5CC→10.8V cutoff	
2.7	Fast Charge	0.5C5CC/CV→0.05C cutoff	Charge time Approx 2.5h.
2.8	Fast Discharge	1.0C5CC→10.8V cutoff	
2.9	Weight		
2.10	Operating Temperature	0~10°C charging 10~15°C charging 15~45°C charging -10~+60°C Discharging	0.1CMax to 4.1V 0.2CMax to 4.2V 0.5CMax to 4.2V
2.11	Storage Temperature	within 1 month $-20^{\circ}\text{C} \sim +45^{\circ}\text{C}$ within 3 month $-20^{\circ}\text{C} \sim +35^{\circ}\text{C}$ within 6 month $-20^{\circ}\text{C} \sim +30^{\circ}\text{C}$	Relative humidity: ≤75%RH



3. Product Performance

3.1 Standard Testing Conditions

Temperature : $23\pm2^{\circ}$ C

Humidity Range : ≤75%RH

3.2Test method and request

3.2.1 Electrical Characteristic test

Item	Measuring Procedure	Requirements	
Appearance	By sight	No flaw , crack , rust , leakage.	
Nominal Capacity	0.2C5A discharge	Discharge Capacity ≥10000mAh	
Cycle Life	30min rest period after standard charge, 0.5CmA discharge to a cut-off voltage of 3.0V, 10min rest period, the capacity shall be measured after 300 cycles of standard charge and discharge at $23\pm2^{\circ}\text{C}$.	Higher than 80% of the Initial Capacities of the Cell,	
Storage at Normal Temperature	The capacity on 0.2CmA discharge shall be measured after standard charge and then storage at $20\pm5^{\circ}\!$	Remaining Capacity ≥85%	



Storage at High Temperature	The capacity on 0.2CmA discharge shall be measured after standard charge and then storage at $55\pm2^{\circ}\!$	Remaining Capacity
High Temperature test	The capacity on 0.2CmA discharge shall be measured after standard charge and then storage at $55\pm2^{\circ}\!$	Remaining Capacity
Low Temperature Test	The capacity on 0.2CmA discharge shall be measured after standard charge and then storage at -10±2℃ for 4h	Remaining Capacity

3.2.2 Environmental Characteristic

Item	Test method and requirement	Criteria of test
Vibration Test	After standard charge, the battery is to be tested in three directionswhich are mutually perpendicular to each axis (X/Y/Z) with amplitude of 0.8mm.The frequency is to be scannedfrom7to200Hz, and return to 7Hz, the process is in not more than 15 minutes. It should be tested for 12 times in each axis, and total vibration time is not less than 3 hours.	The battery no leakage, smoking, fire and explosion.



Constant Temperature and Constant Humidity Test	After complete standard charge for 1 hour, testvoltage, internal resistance and thickness, thenput the battery in the box of the temperature of $40^\circ\!\!\!\!\mathrm{C}\pm2^\circ\!\!\!\!\mathrm{C}$ and the relative humidity of 90%-95% for 48 hours. Since that, keep the battery at ambient temperature for 1hour, then test voltage, internal resistance and thickness again. Discharge the battery with 0.2CmA to the cut-off voltage of 3.0 V.	Remaining Capacity ≥60%; no leakage, smoking, fire and explosion.	
Humidity Test	battery with 0.2CmA to the cut-off voltage of 3.0 V.		

3.2.3 Safety Performance

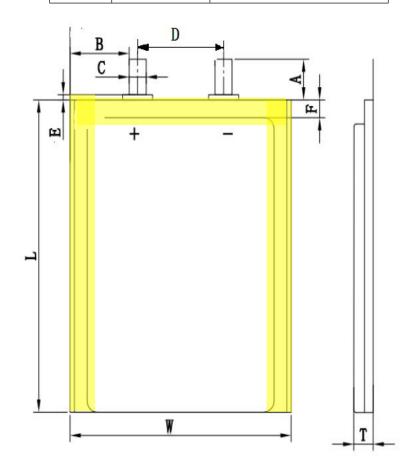
Item	Test method and requirement	Criteria
Low Pressure Test	Put the standard charged cores into the vacuum chamber, vacuum them to 11.6KPa and keep them for 6h.	No fire, no explosion, no leakage
Overcharge test (NO PCM)	At standard testing condition, charging the battery to 4.6V with 3C until the charge current decrease to 0. Stop test until the battery temperature descend for 10 °C than peak value.	The battery no fire and explosion.
Short-circuit Test	After completely standard charged, the battery is to be short-circuited by connecting thepositive and negative terminals with a circuit load having a resistance load of 80 $\pm 20~\text{m}\Omega$. And monitor the temperature. The testing finish when the temperature descend for 10 $^\circ\!\text{C}$ than peak value.	The battery no fire and explosion. surface ≤ 150 °C.



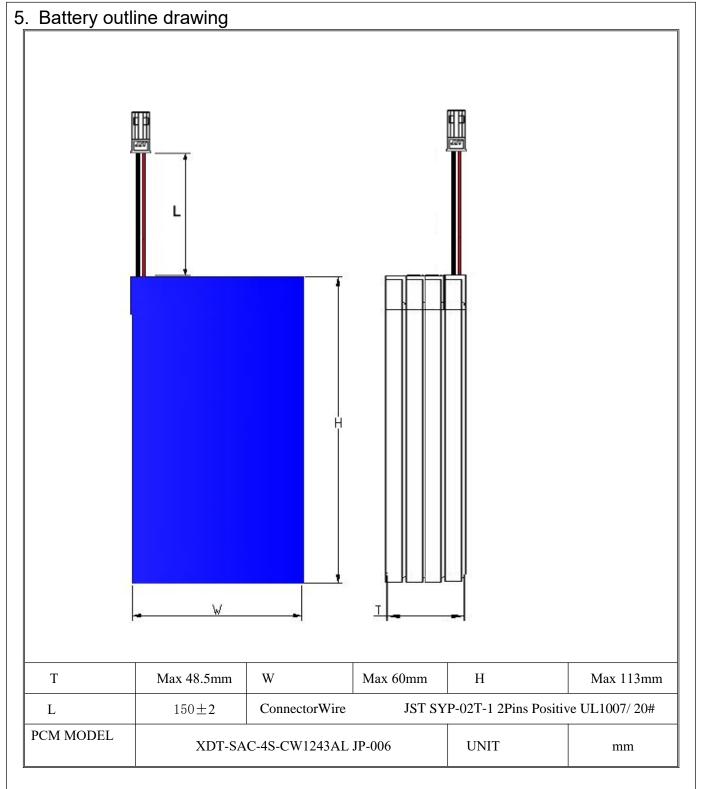
Temperature Impact Test	After completely standard charged, put the battery into the box of temperature of $75^{\circ}\mathrm{C} \pm 5^{\circ}\mathrm{C}$ and keep it for 6 hour. And then transfer it to the box of temperature of -40±2 $^{\circ}\mathrm{C}$ and keep it for 6 hour, repeating the sequence for a further 10 cycles.	The battery no leakage, smoking, fire and explosion.	
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4.Battery graphics

Items	Description	Dimension and Spec
Т		12mm MAX
W		60.0mm MAX
L		110.0mm MAX
D	Tab	30.0±1.5mm
С	Tab	4.0±0.1mm
F		3.5±0.5mm
Е		0.5-2.0mm
Α		8.0±1.0mm
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6. Protection circuit

6.1 PCM Standard

Symbol	Name	MIN.	TYP.	MAX.	Unit
VDET1	Over-Charge detect voltage	4. 23	4. 28	4. 303	V
VDET2	Over-discharge detect voltage	2. 95	3.0	3.05	V
IEC	Excess Current threshold	8	10	16	A
IDD	Supply current			6	μΑ
ISTANDBY	Stand-by			0.2	μА
RD	Internal resistance in normal operation	30	40	65	mΩ
Operating temperature		-40		+85	$^{\circ}$
Recommendatoty storage condition		Temperatu	re range:-5~35	℃ Humidity:	0%~75RH



5. Storage and Transportation

5.1 Storage

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

- The best capacity in storage is 30%-50% (voltage between 3.7-3.9V).
- · The battery should be stored within the proper temperature and humidity range specified by specification.
- · If stored for more than six months or longer, the battery will be suggested to charge.

5. 2 Transportation

- · Forbidden to mix battery with other goods.
- · Forbidden to immerse battery into liquid such as water or soak it with liquid.
- · Forbidden to deposit battery over 6 layers or upside-down.
- \cdot The highest temperature during battery transportation should be lower than 65 $^{\circ}$ C.

Use Attentions

1 Charging

1.1 Charging Current

Charging current should be less than maximum charge current specified in the Product Specification. Charging with higher current than recommended value may cause damage to cell electrical, mechanical and safety performance and could lead to heat generation or leakage.

1.2 Charging Voltage

Charging shall be done by voltage less than that specified in the Product Specification (4.20V/cell). Charging beyond 4.20V, which is the absolute maximum voltage, must be strictly prohibited. The charger shall be designed to comply with this condition.

It is very dangerous that charging with higher voltage than maximum voltage may cause damage to the cell electrical, mechanical safety performance and could lead to heat generation or leakage.



1.3 Charging Temperature

The cell shall be charged within 0°C~45°C range in the Product Specification.

1.4 Prohibition of Reverse Charging

Reverse charging is prohibited. The cell shall be connected correctly. The polarity has to be confirmed before wiring. In case of the cell is connected improperly, the cell cannot be charged. Simultaneously, the reverse charging may cause damaging to the cell which may lead to degradation of cell performance and damage the cell safety, and could cause heat generation or leakage.

2 Discharging

2.1 Discharging Current

The cell shall be discharged at less than the maximum discharge current specified in the Product Specification. High discharging current may reduce the discharging capacity significantly or cause over-heat.

2.2 Discharging Temperature

The cell shall be discharged within-20 °C ~60 °C range specified in the Product Specification.

2.3 Over-discharging

It should be noted that the cell would be at an over-discharged state by its self-discharge characteristics in case the cell is not used for long time. In order to prevent over-discharging, the cell shall be charged periodically to maintain between 3.7V and 3.9V.

Over-discharging may causes loss of cell performance, characteristics, or battery functions.

The charger shall be equipped with a device to prevent further discharging exceeding a cut-off voyage specified in the Product Specification. Also the charger shall be equipped with a device to control the recharging procedures as follows: The cell battery pack shall start with a low current (0.01C) for 15 - 30



minutes, i.e. pre-charging, before rapid charging starts. The rapid charging shall be started after the (individual) cell voltage has been reached above 3V within 15 - 30 minutes that can be determined with the use of an appropriate timer for pre-charging. In case the (individual) cell voltage does not rise to 3V within the pre-charging time, then the charger shall have functions to stop further charging and display the cell/pack is at abnormal state.

3. Handling Instructions

Read and observe the following warnings and precautions to ensure correct and safe use of Li-ion batteries.

Danger!

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	Do not immerse the battery in water or allow it to get wet.
	Do not use or store the battery near sources of heat such as a fire or heater.
	Do not use any chargers other than those recommended by AKYGA .
—	Do not reverse the positive(+) and negative(-) terminals.
	Do not connect the battery directly to wall outlets or car cigarette-lighter sockets.
	Do not put the battery into a fire or apply direct heat to it.
	Do not short-circuit the battery by connecting wires or other metal objects to the positive(+) and negative(-) terminals.
	Do not pierce the battery casing with a nail or other sharp object, break it open with a hammer, or step on it.
	Do not strike, throw or subject the battery to sever physical shock.
	Do not directly solder the battery terminals.

Do not attempt to disassemble or modify the battery in any way.



- Do not place the battery in a microwave oven or pressurized container.
- Do not use the battery in combination with primary batteries(such as dry-cell batteries) or batteries of different capacity, type or brand.
- —Do not use the battery if it gives off an odor, generates heat, becomes discolored or deformed, or appears abnormal in any way. If the battery is in use or being recharged, remove it from the device or charger immediately and discontinue use.

Caution!

Do not use or store the battery where is exposed to extremely hot, such as under window of a car in direct sunlight in a hot day. Otherwise, the battery may be overheated. This can also reduce battery performance and/or shorten service life.

If the battery leaks and electrolyte gets in your eyes, do not rub them. Instead, rinse them with clean running water and immediately seek medical attention. If left as is, electrolyte can cause eye injury.

Use the battery only under the following environmental conditions. Failure to do so can result in reduced performance or a shorten service life. Recharging the battery outside of these temperatures can cause the battery to overheat, explode or catch fire.

Operating environment:

When charging the battery: 0 °C ~45 °C

0℃~45℃

When discharging the battery: -20 ℃ ~60 ℃

-10℃~55℃

When stored up to 30 days: -20 $^{\circ}$ C $^{\sim}$ +45 $^{\circ}$ C

-20℃~+45℃

When stored up to 90 days: $-20^{\circ}\text{C} \sim +35^{\circ}\text{C}$

-20℃~+35℃

When stored up to 180 days: -20 °C ~+35 °C

-20℃~+35℃

5.Others

This specification is subject to change with prior notice.

Any matters that this specification does not cover should be conferred between the customer and AKYGA.