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Specification Approval Sheet

MODEL: AKY102040

（700mAh　3.7V）

Prepared By/Date	Checked By/Date	Checked By/Date	Approved By/Date
Paul/8-14			

Customer Approval	Signature	Date
	Company Name	
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Amendment Records

Revision	Description	Prepared by	Approved by	Date
B	First Publish	Paul		2013-8-14

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1 Scope This specification is applies to describe the related Battery product in this Specification and the Battery/cell supplied by Ropla Elektronik Sp. z o.o. only.

2 Model：AKY102040

3 Cell Specification

No.	Items	Specifications		Remark
1	Nominal Capacity	700mAh		0.2C Standard discharge
2	Minimum Capacity	660mAh		
3	Nominal Voltage	3.7V		Mean Operation Voltage
4	Delivery voltage	≥3.8V		Within 10 days from Factory
5	Charge Voltage	4.2V±0.03V		By standard charge method
6	Standard charging method	0.5C constant current,4.2V constant voltage charge to 4.2V,continue charging till current delaine to ≤0.01C		Time 2.0h(Ref)
7	Charge current	0.5C	350mA	Standard charge, charge time:2.0h(Ref)
		1.0C	700mA	Rapid Charge, charge time:1.0h(Ref)
8	Standard discharging method	0.2C constant current discharge to 3.0V,		/
9	Cell Internal Impedance	≤55mΩ		Internal resistance measured at AC 1KHz after 50% charge
10	Weight	≤12.1g		/

3 Cell Specification (continuous)

No.	Items	Specifications		Remark
11	Maximum charge current	1C	700mA	For continuous charging mod
12	Maximum discharge current	1C	700mA	For continuous discharge mod
13	Operation Temperature and relative humidity Range	Charge	0~45℃ 60±25%R.H.	Charge at a very low temperature such as blew 0℃,will be get a lower capacity and reduce cycle life of the battery
		Discharge	-20~60℃ 60±25%R.H.	
14	Storage temperature for a long time	-20~25℃ 60±25%R.H.		Do not storage exceed half year. Must charge once when storage for half year. Must charge the battery which with protect circuit when storage for three mouthed.

4 Battery/Cell performance test Criteria

4.1 Appearance inspection by visual

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

4.2 Environmental test condition

Unless otherwise specified, all test stated in this product specification are conduct at below test condition

Temperature: 20℃~25℃

Relative Humidity:60%±25% R.H.

4.3 Cell Electrical characteristics

No.	Item	Testing Method	Requirements
1	Fully Charged State	CCCV or Constant current charge to 4.2V @1C follow by a constant voltage holding at 4.2V until current drops below 20±5mA.	
2	Rated Capacity	CCCV at 4.2V (per 6.1.1) at room temp. (20±5℃), rest for 1-2 hrs then discharge at a constant current of 0.2C to 3.0V, testing will be terminated by either 5 cycles or any one discharge time exceeds 5 hrs	≥700mAh
3	Cycle Life @25℃	Measure the capacity after 500 cycles with standard charge/discharge method at 0.25C to 3.0V cut-off voltage.	≥80%
4	Internal Impedance	Internal impedance is measured on a 50% charged battery at 1KHz AC at ambient temperature（20±2）℃。	≤55mΩ
5	Capacity Retention	Fully charge cells per 6.1.1, store them at (20±2)℃ for 28 days, then discharge the cells to 3.0V at 0.2C.	Discharge capacity ≥600mAh
6	High Temperature Characteristics	Fully charge cells per 6.1.1, store them at (55±2)℃ for 2 hours, then discharge the cells to 3.0V at 0.2C.	Discharge capacity ≥600mAh
7	Low Temperature Characteristics	Fully charge cells per 6.1.1, store them at (-10±2)℃ for 16~24 hours, then discharge the cells to 3.0V at 0.2C.	Discharge capacity ≥420mAh
8	Cell Voltage during Transportation	Check open circuit voltage (OCV) of cells prior to the delivery to customers.	≥3.75V

4.4 Mechanical characteristics

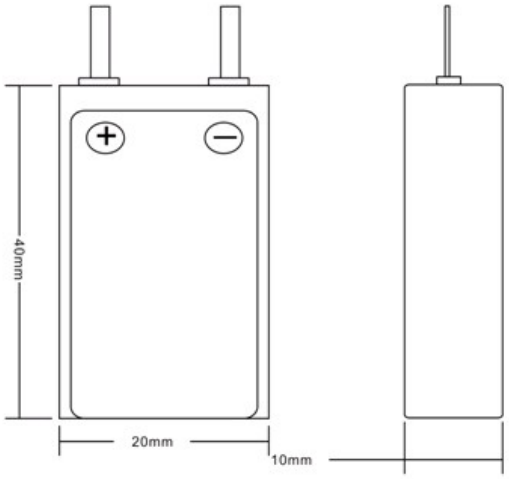
No	Items	Test Method and Condition	Criteria
1	Free fall test	The battery to be fully charged in accordance with standard charge condition, then drop the battery three times from a height of 1,0 m onto a concrete floor. The batteries are dropped so as to obtain impacts in random orientations.	No Fire,
2	Vibration test	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.	No explosion, No leakage, No fire
3	Crush test	Fully charged the battery in accordance with standard charge condition, the battery is to be crushed between two flat plates. Continuous to applied force on battery of 13kN(17.2Mpa),stopped until a pressure reading of 17.2Mpa is reached on the hydraulic ram	No explosion, No fire
4	Shock test	The fully charged battery is secured to the testing machine by means of a rigid mount which will support all mounting surfaces of the cell or battery. The battery is subjected to a total of three shocks of equal magnitude. The shocks are applied in each of three mutually perpendicular directions. At least one of them shall be perpendicular to a flat face. For each shock the cell or battery is accelerated in such a manner that during the initial 3 milliseconds the minimum average acceleration is 75 gn. The peak acceleration shall be between 125 gn and 175 gn. Cells or batteries are tested in an ambient temperature of 20~25℃	No explosion, No leakage, No fire

4.5 **Safety performance**

No	Items	Test Method and Condition	Criteria
1	Thermal exposure test	Each fully charged cell, stabilized at room temperature, is placed in a circulating air-convection oven. The oven temperature is raised at a rate of 5 °C/min ± 2 °C/min to a temperature of 130 °C ± 2 °C. The cell remains at this temperature for 10 min before the test is discontinued.	No explosion, No fire
2	Low pressure	Each fully charged cell is placed in a vacuum chamber, in an ambient temperature of 20~25℃. Once the chamber has been sealed, its internal pressure is gradually reduced to a pressure equal to or less than 11,6 k Pa (this simulates an altitude of 15240 m) held at that value for 6 h.	No explosion, No leakage, No fire
3.	Short test	The fully charged battery is to be short-circuited by connecting the positive and negative terminals of the battery with resistance load not exceed 100mΩ.Tests are to be conducted at room temperature 20~25℃.	No explosion, No fire The Temperature of the Battery surface not exceeded than 150℃
4	Forced discharge test	A discharged cell is subjected to a reverse charge at 1C for 90 min.	No explosion, No fire
5	Over charge test	After standard charge, continue to charge with a constant voltage 4.6V per a cell, holding 8h.	No explosion, No fire, No leakage
6	Soak Test	Put the batteries into clean water, be soaked for 24 hours.	No break, No fire

5 Cell initial Dimensions

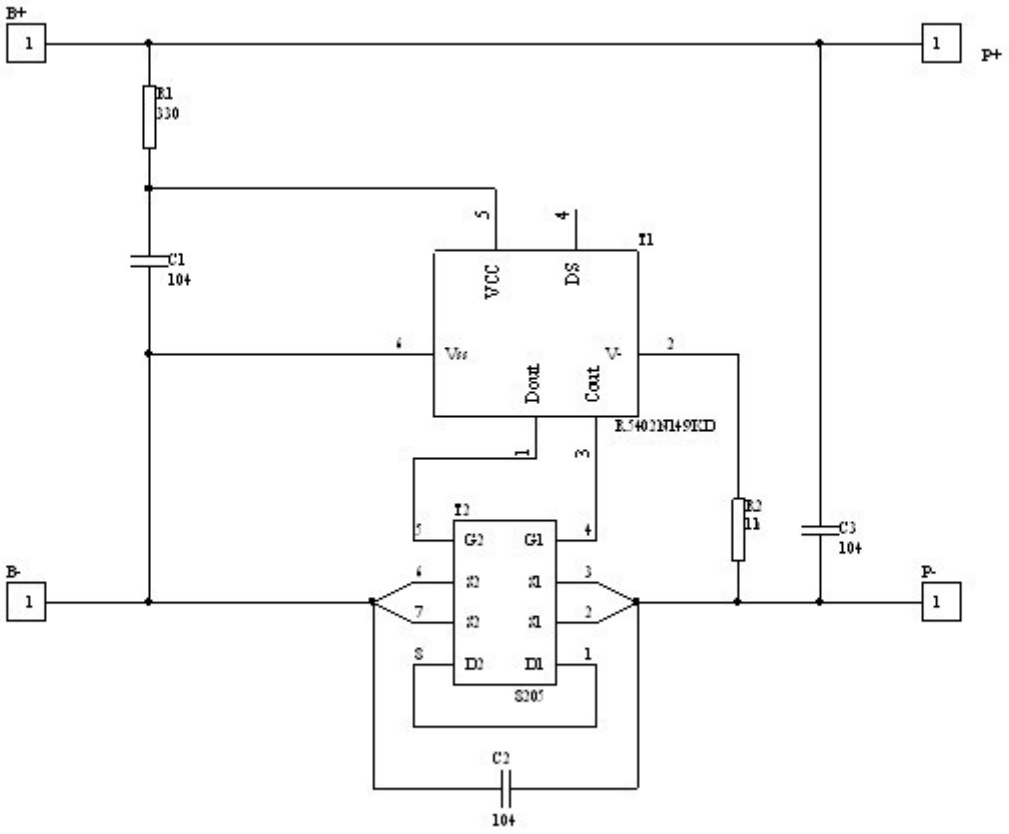
NO	Items	Units: mm	Remark
1	Thickness	10.0	Max.
2	Width	20.5	Max.
3	Height	40.5	Max.



6 Battery specifications

No.	Items	Specifications	Remark
1	Capacity for assembled cell discharging by 0.2C	≥700mAh	Standard discharging method
2	Battery Voltage	≥3.8V	Delivery voltage, Within 10 days from Factory
3	Standard charge condition	Charge with 0.5C constant current and 4.2V constant voltage, charge to 4.2V,continue charging till current delaine to ≤0.01C	Charge volage:4.2V±0.02V Charge current:0.5C
4	Standard discharging method	0.2C constant current discharge to 3.0V,	/
5	Internal Impedance	Assemblage Impedance≤55mΩ	Measure two sides of the drawing line after assembling.

7 Application Circuit



8 Handling of Cells

8.1 Consideration of strength of film package

1) Soft Aluminium foil

Easily damaged by sharp edge parts such as pins and needles, Ni-tabs, so don't strike by those sharp parts.

2) Sealed edge may be damaged by heat above 100°C, bend or fold sealed edge.

8.2 Prohibition short circuit

Never make short circuit cell. It generates very high current which causes heating of the cells and may cause electrolyte leakage, gassing or explosion that is very dangerous.

The LIP tabs may be easily short-circuited by putting them on conductive surface.

Such outer short circuit may lead to heat generation and damage of the cell.

An appropriate circuitry with PCM shall be employed to protect accidental short circuit of the battery pack.

8.3.Mechanical shock

LIP cells have less mechanical endurance than metal-can-cased LIB.

Falling, hitting, bending, etc. may cause degradation of LIP characteristics.

8.4 Handling of tabs

The battery tabs are not so stubborn especially for aluminium tab.

Don't bend tab.

Do not bend tabs unnecessarily.

9 Others

9.1 Cell connection

1) Direct soldering of wire leads or devices to the cell is strictly prohibited.

2) Lead tabs with pre-soldered wiring shall be spot welded to the cells.

Direct soldering may cause damage of components, such as separator and insulator, by heat generation.

9.2 Prevention of short circuit within a battery pack

Enough insulation layers between wiring and the cells shall be used to maintain extra safety protection. The battery pack shall be structured with no short circuit within the battery pack, which may cause generation of smoke or firing.

9.3 Prohibition of disassembly

1) Never disassemble the cells

The disassembling may generate internal short circuit in the cell, which may cause gassing, firing, explosion, or other problems.

2) Electrolyte is harmful

LIP battery should not have liquid from electrolyte flowing, but in case the electrolyte come into contact with the skin, or eyes, physicians shall flush the electrolyte immediately with fresh water and medical advice is to be sought.

9.4 Prohibition of dumping of cells into fire

Never incinerate nor dispose the cells in fire. These may cause explosion of the cells, which is very dangerous and is prohibited.

9.5 Prohibition of cells immersion into liquid such as water

The cells shall never be soaked with liquids such as water, seawater, drinks such as soft drinks, juices, coffee or others.

9.6 Battery cells replacement

The battery replacement shall be done only by either cells supplier or device supplier and never be done by the user.

9.7 Prohibition of use of damaged cells

The cells might be damaged during shipping by shock. If any abnormal features of the cells are found such as damages in a plastic envelop of the cell, deformation of the cell package, smelling of an electrolyte, an electrolyte leakage and others, the cells shall never be used any more.

The Cells with a smell of the electrolyte or a leakage shall be placed away from fire to avoid firing or explosion.

10 Storage of the Batteries

The batteries should be stored at room temperature, charged to about 30% to 50% of capacity.

We recommend that batteries be charged about once per half a year to prevent over discharge.

11 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.

12 Note

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