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Lithium-ion Polymer Battery Specification

Model: JA-301730P

Draft	Examine	Approve

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AMENDMENT RECORDS

Revision	Description	Date	Approval
A/0	New release	2017-01-12	Henry Huang

Content

1. Scope

This document describes the Product Specification of the Lithium-ion Polymer (LIPB) Battery supplied by J & A ELECTRONICS.

2. Model: JA-301730P

3. Specification

No.	Items	Specifications
1	Charge voltage	4.2V
2	Nominal voltage	3.7V
3	Nominal Rated capacity	110mAh @ 0.2 C discharge
	Minimum Rated capacity	105mAh @ 0.2 C discharge
4	Charge current	Standard charge : 0.5 C Rapid charge : 1.0 C
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 ≤ 0.05C .
6	Charging time	Standard charge : 3.0 hours (Ref.) Rapid charge : 2.0 hours (Ref.)
7	Max. charge current	1.0C
8	Max. discharge current	1.0C
9	Discharge cut-off voltage	2.8V
10	Operating temperature	Charging : 0°C ~45°C Discharging : 0°C ~45°C
11	Storage temperature	Less than 1 month: -10°C ~ 45°C Less than 6 month: -10°C ~ 35°C
12	Cell Weight	Approx. 4.2 g
13	Cell Dimension (Without PCM)	Thickness : 3.0mm Max. Width : 17.5mm max. Length : 30.5mm max (without tab)

4. Cell Performance Criteria

4．1 Visual inspection

There shall be no such defect as scratch, flaw, crack, and leakage, which may adversely affect commercial value of the cell.

4．2 Standard environmental test condition

Unless otherwise specified, all tests stated in this Product Specification are conducted at below condition:

Temperature: 23 ± 5°C

Humidity : 65 ± 20% RH

4．3 Electrical characteristics

No.	Items	Test Method and Condition	Criteria
1	Standard Charge	Charging the cell initially with constant current at 0.5C, after cell voltage reach to 4.2V then Charge with constant voltage at 4.2V (accuracy 4.20 ± 0.05V) till charge current declines to 0.05C .	N.A.
2	Minimum Rated Capacity	The capacity means the discharge capacity of the cell, which is measured with discharge current of 0.2C with 2.8V cut-off voltage after the standard charge.	≥ 110mAh
3	Cycle Life	Test condition: Step1: Charged the cell at 0.5C; Step2: Discharge the cell at 0.5C to 2.8V; Step3: Repeat step1 and step2 for 300 times. Measure the capacity of 1st cycle capacity at 0.5C discharge of Operation	300cycles: ≥ 80%
4	Self-discharge	Capacity after 30 days storage, measured under the same condition as Item.4.2	Residual capacity > 90%
5	Initial Impedance	Internal resistance measured at AC 1KHz after 50% SOC (status of charge)	≤ 200 mΩ (Cell only)
6	Cell Voltage	As required	3.6V ~ 3.9 V
7	High Temperature Performance	The charger supplies standard charge constant current at 20+5℃until cell cut-off，and stored in an ambient temperature of 85℃±2℃ for 40h. Then fetch out the cell in the ambient temperature of 20℃±5℃ and measure the thickness and discharged to cut-off voltage at a constant current of 0.2C. Then check its appearance immediately.	The variation of thickness and Capacity is less than or equal to10%

4. 4 Mechanical characteristics

No.	Items	Test Method and Condition	Criteria
1	Vibration Test	Cell (as of shipment) vibrated for 30 minutes for each of the three mutually perpendicular planes with total excursion of 1.60mm and with frequency of 10 Hz to 55 Hz	No leakage, No fire
2	Drop Test	The cell is to be dropped from a height of 1 meter 2 times onto concrete ground.	No explosion, no fire, no leakage.

5. Storage and others

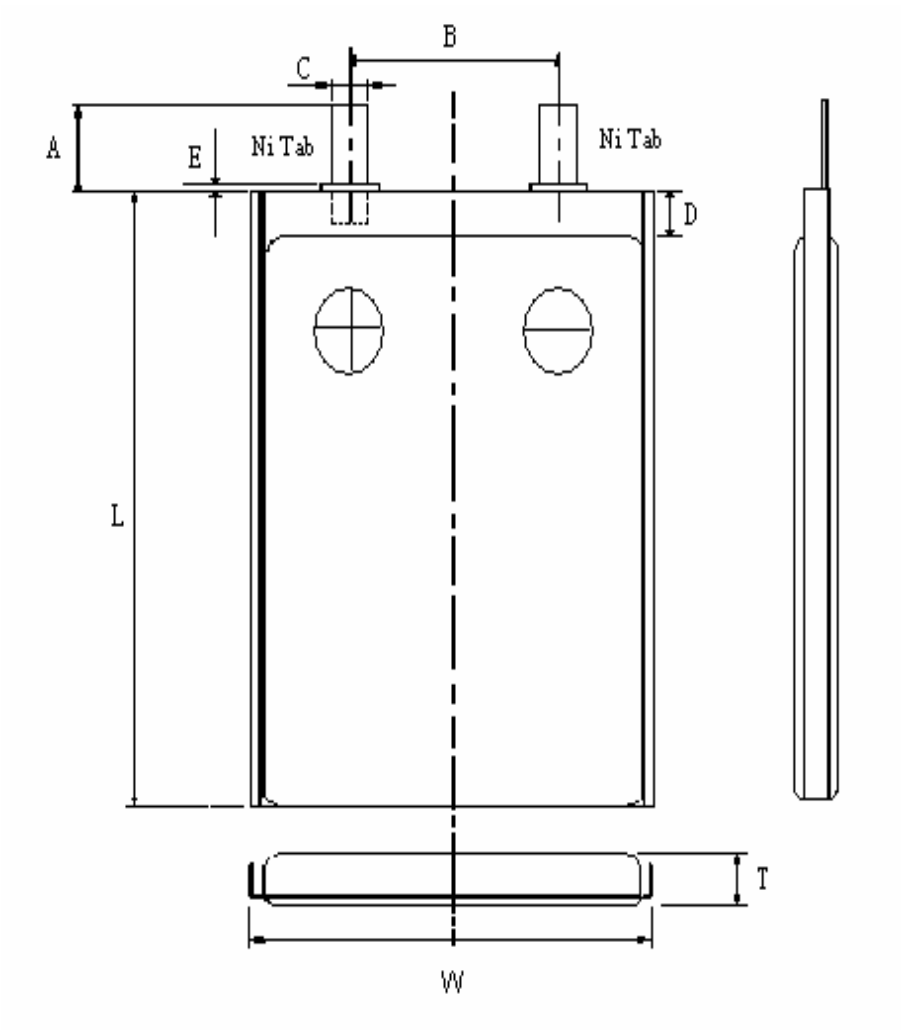
5.1 Long Time Storage

If the Cell is stored for a long time, the cell's storage voltage should be 3.6~3.9V and the cell is to be stored in a condition as Item. 4.2.

5.2 Others

Any matters that this specification does not cover should be conferred between the customer and J & A ELECTRONICS

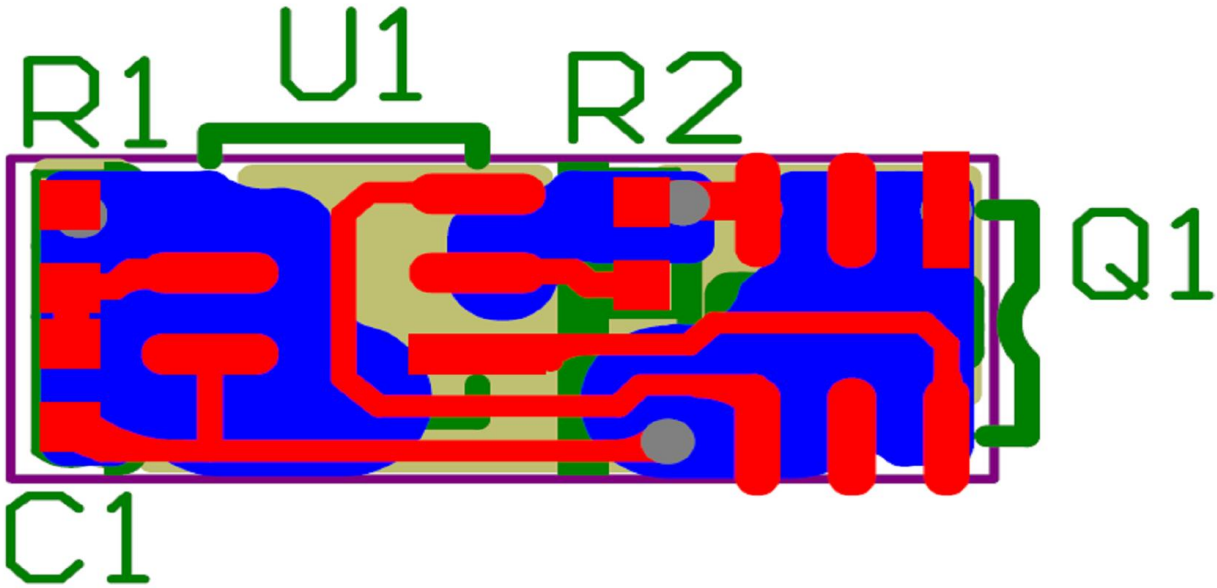
6. Drawing (all unit in mm, not in scale)



Items	Description	Dimension and Spec
T	Thickness	3.0mm max
W	Width	17.5mm max
L	Length	30.5mm max
A	Tab length	6.0±1.0 mm
B	Distance between 2 tabs	6.0±0.5 mm
C	Tab width	2/3±0.5 mm
D	Top sealing Width	3.5±0.5mm
E	Sealant Length	0.2 ~ 2.0 mm

7. Protection Circuit Module (PCM)

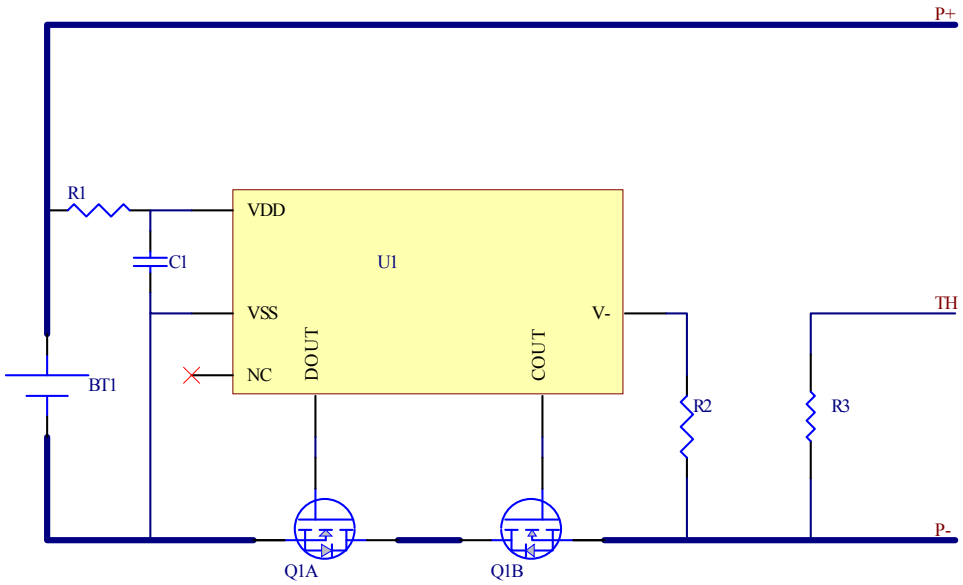
7.1 Dimension



7.2. Major Parameter

NO:	Item	Spec	Unit
1	Working Voltage of controlling IC	1.0～9.0	V
2	Over-charge detection Voltage	4.250±0.025	V
3	Over-charge release Voltage	4.05±0.05	V
4	Over-charge delay time	50～150（Typical 100）	ms
5	Over-discharge detection Voltage	2.8±0.08	V
6	Over-discharge delay time	5～30（Typical 17）	ms
7	Over-Current detection Voltage	0.15±0.03	V
8	Over-Current delay time	2～10（Typical 5）	ms
9	Short-circuited protection delay time	10～50（Typical 10）	us
10	Self-Discharge Current	3.0～6.0	uA
11	Over-Current Current	2.0～6.0	A

7.3 Circuit Diagram



7.4.BOM of PCM

NO	Location	Spec	Qty	Brand
1	U1	FS312/SOT-23-6	1	SEIKO
2	Q1	8205/SOT-23-6	1	
3	C1	0.1μF / 0402	1	
4	R1	100Ω/ 0402	1	
5	R2	1KΩ/ 0402	1	
6	PCB	99-L074	1	

8. Specification of Battery Pack:

8.1 Dimension

Omitted

8.2 Label

Omitted

8.3 Parameter

No	Item	Spec	Note
1	Cell Model	301730	
2	Nominal Capacity	110mAh	
3	Open-Circuit Voltage	3.75～3.90V	
4	Over-charge protection Voltage	4.250±0.025V	
5	Over-discharge Protection Voltage	2.80±0.05V	
7	Internal resistance	≤400mΩ	

8.4.BOM of battery Pack

No	Material	Spec	Unit	Qty	Note
1	Cell	301730	PCS	1	
2	Red Wire	#26 AWG (UL1007, 50 +2/ -0mm)	PCS	1	
3	Black Wire	#26 AWG (UL1007, 50 +2/ -0mm)	PCS	1	
4	Connector	JST 2PIN	PCS	1	
5	PCB	99-L074	PCS	1	

Appendix

Handling Precautions and Guideline

For LIPB (Lithium-Ion Polymer Batteries)

Subject to change without notice

Preface

This document of 'Handling Precautions and Guideline LIPB shall be applied to the cells manufactured by J & A ELECTRONICS.

Note (1):

The customer is requested to contact J & A in advance, if and when the customer needs other applications or operating conditions than those described in this document. Additional experimentation may be required to verify performance and safety under such conditions.

Note (2):

J & A will take no responsibility for any accident when the cell is used under other conditions than those described in this Document.

Note (3):

J & A will inform, in a written form, the customer of improvement(s) regarding proper use and handling of the cell, if it is deemed necessary.

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 (4.2V/cell). Charging beyond 4.25V, 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 specified value 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 the specified temperature 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 the temperature 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 and3.9V. Over-discharging may causes loss of cell performance, characteristics, or cell 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 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. Storage

The cell should be stored within the proper voltage and temperature range specified in the Product Specification.

4. Handling of Cells

Since the cell is packed in soft package, to ensure its better performance, it's very important to carefully handle the cell

4.1 Soft Aluminium foil

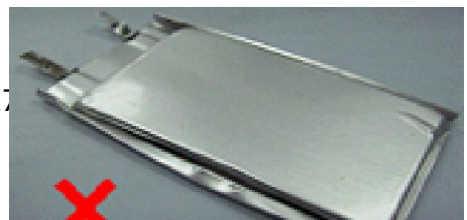
Sharp edge parts such as Ni-tabs, pins and needles, very easily damage the soft aluminum packing foil.

- Don't strike cell with any sharp edge parts
- Trim your nail or wear glove before taking cell
- Clean worktable to make sure no any sharp particle

4.2 Sealed edge

Sealing edge is very flimsy.

- Don't bend or fold sealing edge



4.3 Folding edge

The folding edge is formed in cell process and passed all hermetic test

● Don't open or deform folding edge

4.4 Tabs

The cell tabs are not so stubborn especially for aluminum tab.

● Don't bend tab.

4.5 Mechanical shock

● Don't Fall, hit, bend cell body.

4.6 Short

● Short terminals of cell is strictly prohibited, it may damage cell.

5. Others

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.

Prohibition of disassembly

Never disassemble the cells. The disassembling may generate internal short circuit in the cell, which may cause gassing, fining, explosion, or other problems.

Electrolyte is harmful

LIPB 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.

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.

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.

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.