- -		
Customer:		
Model number:	<u>NL1835</u>	
Revision:	A/0	
Date:	2016-11-18	
Customer ap	proval	
Remarks [.]		

Prepared	Checked	Approved





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1.Scope

This specification describes the rechargeable lithium ion battery performance indexes.

2. Adopted Standard

GB/T18287-2013, The People's Republic of China General Regulations of Lithium Ion Battery for Cellular Phone. 3.Dimensions of battery pack:T:≤18.7mm * W:18.7mm * L :69.2mm





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4. Battery pack configuration

4. 1 BOM(Bill of Materials) of battery pack

No.	Item	Criteria	Remarks
1	Battery cell model	18650 /3.6V/Sanyo/3500	3500mAh
2	РСМ	MAS-1488 PCM	3.7V
3	label	NL1835-3500mAh	yellow
4	/	/	/
5	/	/	/
7	/	/	/
8	/	/	/





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4. 2 Battery pack specifications

No.	Item	Specifications	Comments
1	Assemble way	18650-1P1S-3.5Ah	3500mAh
2	Nominal Capacity	3.5Ah	
3	Internal resistance	$\leq 130 \text{m}\Omega(\text{Added after the board}) \text{ at } 25 ^{\circ}\text{C}$	
4	Weight	Approx: 58 g	
5	Overcharge protection voltage	4.325±0.025V	Per cell
6	Max. charge current	0.2C	
7	Over discharge protection voltage	2.500±0.050V	Per cell
8	Max discharge current	1C	
9	Charge temperature	0° C \sim +45 $^{\circ}$ C	
10	Discharge temperature	-20°C ∼ +55°C	
		less than 1 month	-10~+55℃
11	Storage temperature	less than 3 month	-10~+40°C
		less than 1 year	0~+25℃
12	Storage humidity	≤ 75%	



5.Battery	performance test		
5.1 Charg	e and discharge perf	formance	
No.	Items	Test ways and conditions	Standard
5.1.1	Standard Charge	at 23 °C \pm 2 °C, the 0.2ItA charges, when the battery or battery pack terminal voltage reaches the limit voltage, the constant voltage charging, until the charge current is less than or equal to 0.02ItA, the longest charge time is no more than 8h, stop charging. The charging method for the test of the charging method.	
5.1.2	First Discharge Capacity	The battery or battery pack is charged by 5.1.1, and the 1H ~ 0.5h is used to discharge the 0.2ltA current at the ambient temperature at $23 \degree \pm 2 \degree C$. The above test can be repeated 5 times.	When there is a battery discharge capacity to meet the discharge time is not less than 5h.
5.1.3	Cycle Life	The test should be carried out in the ambient temperature at 23 $^{\circ}C \pm 2 ^{\circ}C$, and the test process, every 50 cycles to do a capacity check, battery or battery life to 50 times, said the steps in table 1. Repeat 1 to 50 cycles, the charge and discharge between 1H ~ 0.5h, until either fiftieth cycles of discharge time is less than 3h, according to the provisions of the fiftieth cycle of a cycle, if the discharge time is still less than 3h, then that the life termination	≥300(cycle)
5.1.4	Electrical load maintenance ability	1, the battery or battery pack according to the 5.1.1 charging, at 20 °C \pm 5 °C, the battery or battery pack open circuit on the 28d, the 0.2ItA current at 23 °C \pm 2 °C 2, and then charged by 5.1.1, then the 0.2ItA discharge to the termination voltage at 23 °C \pm 2 °C	 discharge time should be no less than 4.25h; the discharge time of the charge after the discharge of the discharge time should be no less than 4.5h.
5.1.5	Initial internal resistance	Internal resistance measured at AC 1KHz after 50% charge $\ $, at 25 $^\circ \!\! \mathbb{C}$.	≤130mΩ
5.1.6	Temperature Characteristics	 According to item5.1.1, at 25±5°C. Capacity comparison at each temperature, measured with constant discharge current 0.2 ItA with 3.0V cut-off. Percentage as an index of the capacity compared with 100% at 25°C 	-10°C:≥50% 25°C:100% 40°C:≥80%

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5.1.7	Constant humidity and temperature	After standard charging, laying the battery 48h at 40±2°C, RH 93±2%. Recording 0.2ItA discharging time	No distortion No electrolytes leakage



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5.2 Mechanical characteristics No. Items Test Method and Condition Criteria After standard charging, fixed the cell to vibration table and subjected to vibration cycling that the frequency is to be varied at the No leakage rate of 1Hz per minute between 10Hz and Vibration Test 1 No fire 55Hz, the excursion of the vibration is 1.6mm.The cell shall be vibrated for 30 minutes per axis of XYZ axes. The cell is to be dropped from a height of No fire, no leakage. Drop Test 2 meter twice onto concrete ground.

5.3 Visual inspection

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

5.4 Standard test condition

Unless otherwise specified, all tests stated in this Product Specification are conducted at below condition: Temperature: 25.0 ± 5.0 °C

Humidity: $\leq 75.0\%$ RH

Item	Symbol	Content	Criteria
Over charge Protection	V _{DET1}	Over charge detection voltage	4.325±0.025V
	tV _{DET1}	Over charge detection delay time	0.96~1.4S
	V _{REL1}	Over charge release voltage	4.075±0.025V
Over discharge	V _{DET2}	Over discharge detection voltage	2.500±0.050V
	tV _{DET2}	Over discharge detection delay time	144±29mS
	V _{REL2}	Over discharge release voltage	2.900±0.050V
Over current protection	V _{DET3}	max continuous charge/discharge current	2.50A
	I _{DP}	Over current detection current	3.00~9.00A
	tV _{DET3}	Detection delay time	7.2~11mS
		Release condition	Cut off load
Short protection		Detection condition	Exterior short circuit
	T _{SHORT}	Detection delay time	220~380uS
		Release condition	Cut off load
Interior resistance	R _{DS}	Main loop electrify resistance(Battery Vol=4.2V)	≤65.00 mΩ
Current consumption	I _{DD}	Current consume in normal operation	Max 7.00uA
Battery Vo1=0V charge		Battery Vo1=0V charge	YES



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7.2 Storag:

- 7.2.1 The Li-ion battery pack should be stored in a cool, dry and well-ventilated area, and should be far from the fire and the high temperature.
- 7.2.2 The battery should store in the product specification book stipulation temperature range, the best storage temp. is 25 ± 5 °C. The best humidity is $60\pm15\%$.

7.2.3 The battery should be stored within room temperature, and charged to 40%~60% electric quantity(3.85V). In order to avoid over-discharge, we suggest charge and discharge the batteries every three months.,Then charge to40%~60% electric quantity(3.85V).

- 7.3 Transportation:
- 7.3.1 Do not mix the battery products with other car gos.
- 7.3.2 Do not immerse the battery products in water or allow it to get wet.

7.3.3 Do not over 7 layers staking and upside-down.

- 7.3.4 The highest temperature in transportation is lower than 65° C.
- 8. Use Attentions:

To ensure proper use of the battery please read the manual carefully before using it.

8.1 Warnings:

- 8.1.1 Do not expose to, dispose of the battery in fire.
- 8.1.2 Do not put the battery in a charger or equipment with wrong terminals connected.
 - 8.1.3 Avoid shorting the battery.
 - 8.1.4 Avoid excessive physical shock or vibration.
 - 8.1.5 Do not disassemble or deform the battery.
- 8.1.6 Do not immerse in water.

8.1.7 Do not use the battery mixed with other different type or model batteries.

- 8.1.8 Keep out of the reach of children.
- 8.2 Charge:
- 8.2.1 Battery must be charged in appropriate charger only.
- 8.2.2 Never use a modified or damaged charger.8.2.3 Do not leave battery in charger over 24 hours.

8.2.4 Charging current: Can not surpass the biggest charging current which in this specification book stipulated.



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- 8.2.5 Charging voltage: Does not have to surpass the highest amount which in this specification book stipulated to decide the voltage.
- 8.2.6 Charge temperature: The battery must carry on the charge in the ambient temperature scope which this specification book stipulated.
- 8.2.7 Uses constant current and constant voltage way charge. PLS connect the positive and negative terminals in right way, or the battery may be damaged.
- 8.3 Discharge:
- 8.3.1 The discharging current should not surpass the biggest discharging current this specification book stipulation, The large discharge current can cause heat and lower capacity.
- 8.3.2 Discharge temperature: The battery discharge must carry on in the ambient temperature scope which this specification book stipulated.

8.3.3 Over-discharge: After short time over discharge, then charge immediately won't damage the battery. But the battery will be damaged for being long time over discharged. During long-term storage, the battery may be within over-discharging condition for self discharge. To prevent the occurrence of over discharging, the battery should maintain the certain capacity when storage.

- 8.4 Handling of Cells
 - 1 Soft Al foil
 - •Don't strike battery with any sharp edge parts.
 - •Trim your nail or wear glove before taking battery.
 - •Clean worktable to make sure no any sharp particle.
 - 2 Sealed edge may be damaged by heat above 100°C, bend or fold sealed edge.
 - 3 Handling of Tabs

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

Do not bend tabs unnecessarily.

4 Tab Connection

Ultrasonic welding or spot welding is recommended for LIP • connection method.

Battery pack should be designed that shear force are not applied to the LIP tabs.

If apply manual solder method to connect tab with PCM, below notice is very important to ensure battery performance:

- The solder iron should be temperature controlled and ESD safe;
- Soldering temperature should not exceed 370°C;
- Soldering time should not be longer than 3s;
- Soldering times should not exceed 5 times, Keep battery tab cold down before next time soldering;
- Directly heat cell body is strictly prohibited, Battery may be damaged by heat above approx. 100°C

8.5 Disposal:

Regulations vary for different countries. Dispose of in accordance with local regulations.

8.6 Note:





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