

POLYMER LI-ION BATTERY PRODUCT SPECIFICATIONS

Model: P14600D
Capacity: $\geq 1000\text{mAh}$
Date: 2015-5-18

Customer Approval

Comment: (Please return one copy with your approval signature)

Customer's Signature:

Approved	Checked	Draft

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1. Scope

This description defines the general requirements for the battery's rating parameter, electrical requirement, safety requirement, environmental compatibility, test and judgment, usage instructions, safety regulation, quality evaluation and packaging, marking, storage, shipment and handling, which cellular phone battery with **14600D** rechargeable battery cell, adapted for **14600D** Digital products.

2. Adopted Standard

GB/T18287-2000, The People's Republic of China General Regulations of Lithium Ion Battery for Cellular Phone.

GB/T 18287-2000.

3. Electrical Characteristics

No	Item	Parameter		Remark
1	Rating Voltage	3.7V		
2	Capacity	Minimum: 1000mAh		Discharge: 0.2CmA (200mA)
		Minimum: 900mAh (5C)		Discharge: 4.5A (4500mA)
3	Charge Voltage	4.2V±0.05V		
4	Impedance	150mΩ (Max)		
5	Charging Mode	C.C/C.V.		Constant Current /Constant Voltage
6	Charging Metho	Standard Charging 0.2C		Charging Current 200mA
		Fast Charging 0.5C		Charging Current 500mA
7	Charging Time	Standard Charging	8Hours	
		Fast Charging	3Hours	
8	Discharge current	Standard discharge current 0.2C		Discharge current 200mA
		Max discharge current 5C		Discharge current 4500mA
8	End of Discharge Voltage	2.75±0.05V		
9	Overcharge Voltage	4.35±0.025V		
10	Over Discharge Cut Off Voltage	2.5±0.025V		
11	OverCurrent	4A		
12	Short Circuit	Recover after removing the short circuit load		
13	Operating Consumption Current	10uA (Max)		
14	Operating Temperature	Charging	0~45℃	
		Discharging	-20~60℃	
15	Storage Temperature	-5℃-35℃ Recommend (25±5℃)		Storage capacity should be 40%~50% full charge capacity

16	ID Resistor	/	
17	NTC Resistor	/	
18	ESD Test	±4KV	
19	Cycle Life	300 cycle	

4. Battery

Configuration

No.	Item	Type	Qty
1	Cell	14600D/1000mAh3.7V	1PCS
2	PCM	FR-14600-AO-AB (R5478N102CD+8205*2)	1PCS
3	Wire		

5. Battery Performances Test Criterion

5.1 Appearance

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

5.2 Measurement Apparatus、

(1) Dimension Measuring Instrument

The dimension measurement shall be implemented by instruments with equal or more precision scale of 0.01mm.

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(2) Voltmeter

Standard class specified in the national standard or more sensitive class having inner impedance not less than 10 K Ω /V.

(3) Ammeter

Standard class specified in the national standard or more sensitive class. Total external resistance including ammeter and wire is less than 0.01 Ω .

(4) Impedance Meter

Impedance shall be measured by a sinusoidal alternating current method(AC 1kHz LCR meter).

5.3 Testing Condition (unless otherwise specified)

Temperature 20 $^{\circ}$ C \pm 5 $^{\circ}$ C, Relative humidity : 60 \pm 20%, Atmosphere pressure : 86 \sim 106Kpa.

5.4 Reliability Test

Item	Inspecting Method	Standard
High temperature performance	When the battery is standard charged, it shall be put into a chamber at (55 \pm 2) $^{\circ}$ Cfor 2h, then discharged at 1.0C $_5$ A constant current to 3.00V.	Discharging shall not be less than 51 minutes; and the battery appearance has no deform, no leak-out and no explosion.
Low temperature performance	When the battery is standard charged, it shall be put into chamber at (-20 \pm 2) $^{\circ}$ Cfor 16-24h,then discharged at 0.2C $_5$ A constant current to 3.00V before it is taken out and put into the temperature of (20 \pm 5) $^{\circ}$ Cfor 2h for its appearance check with eyes.	Discharging shall not be less than 3 hours; and the battery appearance has no deform, no leak-out and no explosion.
Electrical load maintenance ability	When the battery has completed standard charged, it shall be disconnected and put aside for 28 Days at (20 \pm 5) $^{\circ}$ C,then discharged at 0.2C $_5$ A.	Discharging shall not be less than 4.25 hours
Constant Humidity & Heat Requirement	As the battery has completed fast charging with constant current,it shall be put into the (40 \pm 5) $^{\circ}$ C,90%-95%RH thermos humidistat for 48h; then taken out at (20 \pm 5) $^{\circ}$ Cfor 2h. Check its appearance with eyes. Obtain its discharging time after it is discharged at 1C $_5$ A to its final voltage 3.00V.	The battery appearance shall have no distortion, no explosion, no fire, no smoke and no leak-out, and its discharging time should not be less than 36 minutes.

Vibration	After fully charging, fixing the battery onto the vibration platform. with amplitude 0.38mm circularly scanning vibrating in the frequency of 10HZ-55HZ from three directions X、Y、Z for 30min respectively in its scanning frequency velocity 10CT/min.。	The battery appearance has no distortion, no explosion, no fire, no smoke and no leak-out. Battery open voltage should be over 3.6V.
Bump	After vibration testing, use a clip or directly fix the battery on to the platform in the direction of X、Y、Z vertical complementary axis, then adjust its acceleration and pulse duration as below to have a bump test. Pulse peak acceleration 100m/s ² . Bumps per minute 40-80.Pulse duration 16ms. Bump times 1000±10.	The battery appearance has no distortion, no explosion, no fire, no smoke and no leak-out. Battery open voltage should be over 3.6V.
Free Drop	After bump testing, the battery shall be immediately dropped from the height of 1000mm (minimum height) onto a 18mm~20mm hard board on the cement floor. Free drop one time respectively from X、Y、Z positive and negative axis(six directions). After that, the battery is discharged at 1C _{5A} to its final voltage.	The battery appearance has no distortion, no explosion, no fire, no smoke and no leak-out. Its internal construction nloosened discharging shall not be less than 51 minutes.
Overcharge Protection	When the battery is fully charged, go on loading for 8h with a twice rating voltage, 2.0C _{5A} out put current, it starts the over charge protection function.	The battery appearance has no distortion, no explosion, no fire, no smoke and no leak-out.
Over discharge Protection	The battery is discharged at 0.2C _{5A} in the constant current till it reaches over discharge protection voltage at (20±5)°C, connected with a 30Ω lead and discharged for 24h	The battery appearance has no distortion, no explosion, no fire, no smoke and no leak-out.
Short-circuit Protection	As the battery has completed charging, short circuit the positive and negative contacts with 0.1Ω resistor for 1h for appearance check, then disconnect the resistor between the contacts, the battery shall be charged at 1.0C _{5A} mA in the constant current for 5S	The battery appearance has no distortion, no explosion, no fire, no smoke and no leak-out. Battery voltage should not be less than N*3.6V.
Heavy Collision	Putting the battery on the platform, using 9.1KG heavy hammer free drop from 0.61M height onto the fixed battery.	Allowing the battery to be deformed, but no explosion and no fire
Cycle Life	The battery shall be constantly charged at 0.2C _{5A} in the temperature of (20±5°C). When its voltage reaches 4.20V, it shall be charged to constant voltage charging. It shall not stop charging until its current is no more than 0.01C _{5A} .Put it aside for 0.5h-1h then discharge with 1.0C _{5A} in the constant current to its final voltage3.00V. When the discharging is finished, the battery shall be put aside for 0.5h-1h and has the next charge and discharge recycle. The above recycle test shall be continued unless there are two continuous discharging capacity less than 80%, which is taken as the end of the life.	Its cycles shall be over 300 times.

6. Shipment

The battery should be packed in cartons under the condition of half capacity 20-50% for shipment. The violent vibration,impaction or squeezing should be avoided in the transport process; neither is exposed in the sunlight nor rain. The batteries shall be shipped by normal transportation such as by road, by train, by ocean or by air.

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7. Storage

The battery storage shall be in the clean and dry ventilation room at the temperature of -5~35°C and shall keep out of fire or heat and avoid touching corrosion elements. The batteries shall be charged every 6 months during storage. Both the stored cells in the process of the battery and the batteries in delivery shall be “first come, first use”. The battery storage period is 12 months when into the warehouse. Batteries expired must have a thorough check. Only the applicable batteries can be dispatched to the purchaser; the inapplicable ones shall be rechecked, if it remains, the purchaser shall have the right to dispose bad ones.

8. Package and Marking

8.1 Package

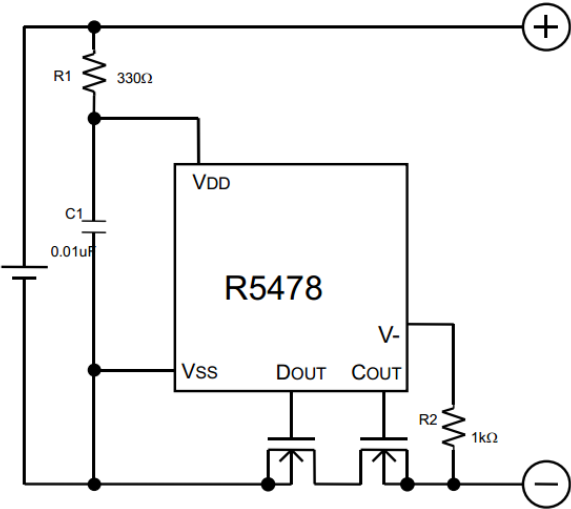
According to the attached.

8.2 Marking

Every battery shall have the following Chinese characters: Product、type、rating voltage 3.6V、rating capacity、contacts plus or minus and warnings、produce date、lot No.、manufacturer、(or the marks of the above characters)。

9 PCM

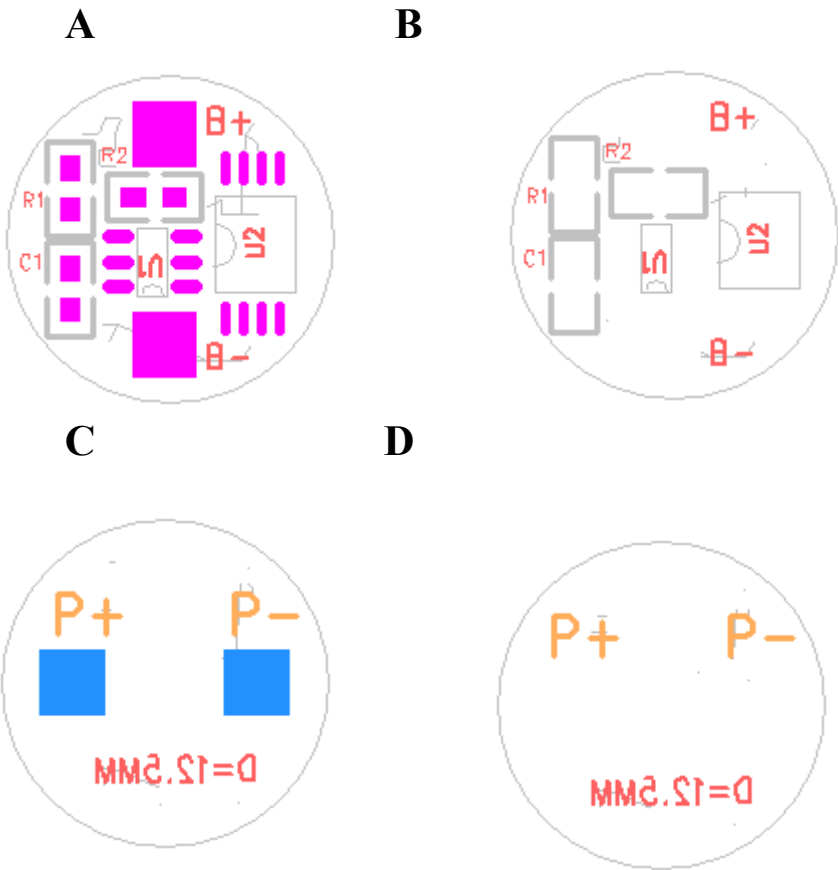
9.1 Schematic of the PCB



9.2 PCM Parameter PCM(25°C)

NO	Item	Criteria
1	Over-charge Protection Voltage	4.35±0.025V
2	Over-charge detection delay time	0.08-0.20s
3	Over-discharge Protection Voltage	2.5±0.025V
4	Over-discharge detection delay time	40-100ms
5	Over-current	4A
6	Overcurrent detection delay time	12-20ms
7	Load short-circuiting detection delay time	5-50us
8	Current consumption in normal operation	≤10uA

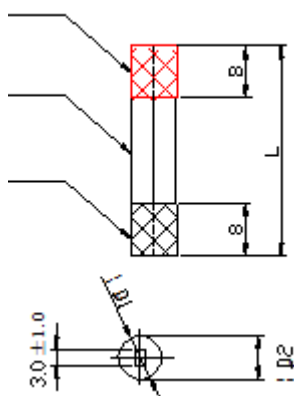
9.3 PCB LAYOUT



9.4 PCM BOM

No.	Location	Part name	Specification	Package	Qty	Supplier/Remark
1	U1	Protection IC	S8261G2J	6Pin-RTSOP	1	SII
2	Q1	Silicon MOSFET	8205A*2	TSOP-8	1	SSG
3	R1	Resistor	SMD100Ω±5%	0603	1	SKYWELL
4	R2	Resistor	SMD1KΩ±5%	0603	1	SKYWELL
6	C1	Capacitor	SMD 0.1uF/50V	0603	1	SKYWELL
7	PCB	PCB	T=0.4mm D=13.5mm	2.6*0.32	1	ASSUN/FR4

10. Outline Drawing



D1=14.5mm max

D2=13.8mm max

Length=62MM

Unit: mm

11. Appendix

11.1 Instructions and Safety Requirement

11.1.1 Recommending Usage

- 1 Please read the battery instructions and the label on its surface before use.
- 2 Use the battery indoors under normal condition, temperature: (20±5)°C, absolute humidity: 65±20%.
- 3 When in use, the battery shall be kept out of heat, high voltage and avoided children's touching. Do not drop the battery.
- 4 Use the compatible charger. Do not put the battery into the charger over 24hours.
- 5 Do not touch contacts together. Do not demolish or assembly the battery by yourself. Do not put the battery in the damp place to avoid danger.
- 6 When the battery was stored for a long period, put it well in its half capacity. Do not wrap it with conduct material to avoid the damage caused by the direct contact between the metal and battery. Keep the battery in day places.
- 7 Well disposed the disused battery. Do not put it into fire or water.

11.1.2 Hazard Warning

1 Forbid Disassemble Batteries

The battery has protective component and circuit internally to avoid danger. Mishandling such as improper disassembly will destroy its protective function and make it heat, smoke, distort or burning.

2 Forbid Short-circuit Batteries

Do not touch the plus and minus contacts with metals. Do not put the battery with metal element together in either storage or movement. If the battery is short-circuit, it carries magnified current, which will cause damage and make the battery heat, smoke, distort or burning.

3 Forbid heat and burn the battery

If heating or burning the battery, it will cause the isolated element in the battery dissolved, protection function stopped or the electrode burning, over heated, which will make the battery heat, smoke, distort or burning.

4 To avoid use the battery near the heat

Do not use the battery near the fire and stove, or over 80°C, and over heating will cause the battery internal short-circuit and make it heat, smoke, distort or burning.

5 Forbid bathing the battery

Do not dampen the battery, or even immerse it in the water, which will cause internal protection circuit and its function lost or abnormal chemical reactions, which will lead to heating, smoking, distortion or burning.

6 Avoid charging near fire or in the sunlight

Otherwise, it will cause internal protection circuit and its function lost or abnormal chemical reactions, which will lead to heating, smoking, distortion or burning.

7 Danger in using non-indicated chargers in

Charging in abnormal condition, the battery will cause internal protection circuit and its function lost or abnormal chemical reactions, which will lead to heating, smoking, distortion or burning.

8 Forbid Damage Battery

Do not allow damage the battery with the metals gouged, forged or dropped etc., otherwise, it will cause over-heated, distort, smoke or burning, even in danger.

9 Forbid directly welding on the battery

Over-heated will cause the isolated element dissolved in the battery and losing protective function its cycle life, even will cause over-heated, distort, smoke or burning.

10 Forbid directly charging on the power socket or car kit cigarette

High voltage and amplified current will damage the battery and reduce its cycle life, even will cause over-heated, distort, smoke or burning.

11 Do not use this battery for other equipment

Improprate usage will damage the battery and reduce its cycle life, even will cause over-heated, distort, smoke or burning.

12 Do not touch the leak-out battery

The leak-out electrolyte will cause the skin uncomfortable. If it drops into eyes, do not rob the eyes but wash in time, and go to hospital for treatment.

11.1.3 Warning

- 1 This battery cannot mix with disposal or twice- recycled batteries in use. Otherwise, for its abnormal charge and discharge, it will cause over-heated, distort, smoke or burning.
- 2 Keep the battery out of children's reach and prevent them biting or swallowing the battery.
- 3 Do not insert the battery onto the charger for a long time If charging beyond the normal time, the battery is still in the charger, please stop charging. The abnormal charging will cause battery over-heated, distort, smoke or burning.
- 4 Do not put into microwave stove or any other pressure apparatus. Take the battery away from the cellular phone or the charger if it is instant heated or leak-out (or odors) and dispose it. The bad battery will cause over-heated, smoke or burning.

11.1.4 Cautions

1 Notice

The battery shall be prevented to be exposed in effulgence so as not to cause over-heated, distort, smoke and weaken its performance and cycle life.

2 Electro Static-free

There is a protective circuit inside the battery to prevent contingency. Do not use the battery in the Electro static circumstances, (above 1000V), for it is easily destroyed the circuit board so that the battery does not work and causes over-heated, distort, smoke or burning.

3 Discharging Temperature Range

Recommended discharging temperature range is 0-40°C, beyond which it will result in decadence of the battery performance and shortness of its life.

4 Read carefully the manual before use or whenever in need.

5 Charging Method

Use the special chargers in the recommended charging method to charge the battery.

6 First Usage

When you use the battery for its first time, do not put it into the cellular phone or any other equipment once you find it in unusual conditions such as uncleaness or odors. The battery should be returned to the vendor.

7 Children Use

When Children use the battery, they should be under their parents' instructions and superintend in use.

8 Avoid Children's Touch

Battery should keep out of the place where children in reach. Prevent children taking the battery out of the charger or the cellular phone to play.

9 Touch

To avoid the leak-out liquid be exposed to the skin or clothes. If touched, please wash by clean water so as not to cause the skin uncomfortable

10 Consultation

When you buy the battery, please note how to contact with the vendors, so that you may get intouch with vendors for consultation whenever in need.

11 Guarantee period

Guarantee is half a year since it is out of the factory. Life time:300 cycles. Any damage by incorrect use and not quality problem, even in its guarantee period, free service won't be provided by the manufacture.

12 Safety Usage Guarantee

If the battery is used on other instruments, please contact with your manufacturer for how to get the best performance, at least consult its maximum current, fast charge and special application.

11.2 Quality Evaluation Programme

Quality evaluation composes of authoritative check and quality consistence check. Authoritative check is carried out on design decision, emended design and production decision. It should be confirmed by both Purchaser and Vendor on sampling proposal, check project, sequence and judgment etc., which in principle, should be all included. Quality consistence check should be divided into lot by lot check-up and periodical check-up, as to test the quality steadiness during the products in production (refer to GB2828—1987 standard). The detailed check-ups compose of appearance, internal resistance, rating capacity or 1C5A discharging capacity etc.

11.3 Environment Protection

This product accord with requirement.

11.4 Others

All the above are the agreed the battery descriptions and test regulation between Purchaser and Vendor. It can be carried out if there is no any new written agreement or modification notice occurred.