BatterySpace.com / AA Portable Power Corp

Date：2006.10.21

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SPECIFICATION OF PRODUCT

Products Name: Li-ion Rechargeable Battery Pack

Battery Model: For apple iPod 4G

Customer:

Prepared By	Checked By
Ampere	Wilstar

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1. Outside appearance and basic characteristics

NO.	ITEM	SPECIFICATION	REMARK
1.1	Outside appearance	surface colour and lustre shall uniformity，clean，No scratches or damage，metal contact not rusted，fit to phone and operating in gear	Visual check
1.2	Pack weight	Below 20.5g	
1.3	Case Color	Black	
1.4	MP3 Player fit	Apple iPod 4G	

2. Electrical characteristics

NO.	ITEM	SPECIFICATION	备注 REMARK
2.1	Cell	043450A	
2.2	Rated Capacity	750mAh	Test By Xin Wei Battery Testing System
2.3	Internal resistance	＜160mΩ	Test by Qin Tian Internal Resistance Testing Machine
2.4	Cycle Life	＞300 Cycle	Test By Xin Wei Battery Testing System
2.5	Nominal Voltage	3.7V	
2.6	Max. Charge Voltage	4.2V	
2.7	Discharge Cut-off Voltage	2.75V	
2.8	Over-charge Protection	4.35V±0.05V	Test by CS583M+ Lithium-ion Battery Protection Board checker
2.9	Over-discharge Protection	2.4V±0.1V	Test by CS583M+ Lithium-ion Battery Protection Board checker
2.10	Supply current	＜6uA	Test by CS583M+ Lithium-ion Battery Protection Board checker
2.11	Protection IC	DW01	Test by CS583M+ Lithium-ion Battery Protection Board checker
2.12	MOSFET	5NF20V	Test by CS583M+ Lithium-ion Battery Protection Board checker
2.13	Operating temperature	Charging Temperature: 0~ +45℃ Discharging Temperature: −20~ +60℃	
2.14	Storage temperature	1 month: −20 ~ 60℃ 3 month : −20 ~ 45℃ 1 year : −20 ~ 25℃	

3. Specification For Lithium Ion Rechargeable Battery

3.1 SCOPE AND APPLICATION

This specification describes the definition, technical requirement, testing method, warning and caution of the lithium ion rechargeable battery.

3.2 DEFINITION

3.2.1 Rated Capacity : Under 20+5℃, 65±5%RH, it means the capacity value of being discharged by 5hrs ratio to End Voltage. The capacity value can be expressed with code C5.

3.2.2 End Voltage : The end voltage of discharge is 2.75V, which is defined specially.

3.2.3 Standard Charge : Under 20+5℃, 65±5%RH, it can be charged to 4.2V with constant current of 0.2 C5 mA,and then , charged continuously with constant voltage of 4.2V until the charged current is less than 0.01 C5 mA.

3.2.4 Quick Charge : Under 20+5℃, 65±5%RH, it can be charged to 4.2V with constant current of 1 C5 mA, and then , charged continuously with constant voltage of 4.2V until the charged current is less than 0.01 C5 mA.

3.2.5 Standard Discharge : Under 20+5℃, 65±5%RH, it can be discharged to the voltage of 2.75V with constant current 0.2 C5 mA.

3.2.6 Quick Discharge : Under 20+5℃, 65±5%RH, it can be discharged to the voltage of 2.75V with constant current 1 C5 mA.

3.3 NAMING INSTRUCTION

3.3.1 Naming instruction of product is shown as Fig. 1

H T ---------- 04 34 50

Manufacturing Plant Physical Dimension: Thickness, Width, Height, and Special property

Fig. 1 Naming Instruction for Produc

3.3.2 Shape and Physical Dimension

$4.0^{\ 0.3}_{-0.3}$ mm× $34.0^{\ 0}_{-0.5}$ mm×$50^{\ 0}_{-1.5}$ mm

3.4 TECHNICAL REQUIREMENT

3.4.1 Usage Conditions

Charging Temperature: 0~45℃

Discharging Temperature: -20~60℃

Related Humidity: <93%

Atmospheric Pressure: 86~106Kpa

3.4.2 Appearance : without break, scratch, distortion, contamination and leakage.

3.4.3 Rated Capacity : 750 mAh

3.4.4 Internal resistance : ＜160 m Ω

3.4.5 Rated Voltage : 3.7V

3.4.6 Discharged Characteristic

Time of Standard Discharge should be not less than 5hrs.

Time of Quick Discharge should be not less than 1.0hrs.

3.4.7 Charge Retention : Time of Standard Discharge should be not less than 4.25hrs.

3.4.8 Cycle Life: more than 300 cycles

3.4.10 Environmental Characteristic

3.4.10.1 Hi-temperature testing: discharging time is not less than 51 minutes and Visual inspection can meet item 3.4.2 after testing.

3.4.10.2 Low-temperature testing: discharging time is not less than 3.5 hours and Visual inspection can meet item 3.4.2 after testing.

3.4.10.3 Constant temperature and constant humidity testing: discharging time is not less than 36 minutes and Visual inspection can meet item 3.4.2 after testing.

3.4.10.4 Vibration : Voltage is not less than 3.7V and Visual inspection can meet item 3.4.2 after testing.

3.4.10.5 Impacting testing : Voltage is not less than 3.7V and Visual inspection can meet item 3.4.2 after testing.

3.4.10.6 Free fall : discharging time is not less than 51 minutes and Visual inspection can meet item 3.4.2 after testing.

3.4.11 Safe Characteristic

3.4.11.1 Over charge testing : without break, leakage after testing.

3.4.11.2 Over discharge testing : without break, leakage after testing.
3.4.11.3 Short Protecting Testing : without explosion, fire,fume and leakage. Voltage of the battery should be not less than 3.7V afer being charged instantaneously.
3.4.11.4 Heat impact testing : without explosion, fire,fume.

3.5. TESTING METHODS
3.5.1 Testing conditions
Temperature: 15-35℃
Relative Humidity: 45-75%
Atmospheric pressure: 86-106Kpa
3.5.2 Requirement of the Testing Equipment
Voltage instrument : the precision of voltage tester is no less than degree 0.5 , the internal resistance is not less than 10KΩ/V.
Current instrument : the precision is no less than degree 0.5.
Stopwatch: the precision is not more than degree 0.1%.
3.5.3 Visual inspection
Eyeballing will be used to inspect the appearance, construction and marking of the battery. And also its result can meet Item 3.4.2.
3.5.4 Rated capacity testing
Under 20±5℃, the battery will be charged according to the requirement of standard charge, after keeping the battery for 1~12hrs., The battery will be discharged until the voltage reaches end voltage,according to the requirement of standard discharge. The discharging time is not less then 5 hours.
3.5.5 Charge retention Testing
At average temperature 20±5℃, the battery will be charged according to the requirement of standard charge after being past item 3.5.4, and to keep the battery open-circuit 28 days , then the battery will be discharged according to the requirement of standard discharge . The discharging time can meet the requirement of item 3.4.7.
3.5.6 Cycle life testing
The battery will be discharged according to the requirement of standard discharge before cycle life testing. At average temperature 20±5 ℃, the battery will be charged for 2.5hrs, according to the requirement of quick charge, after 30 minutes, then it will be discharged with current 1C5 mA until the voltage reaches the end voltage. So one cycle will be finished. To do the cycle continuously, consecutive two times the discharge time of any cycles is less than 36 min., the cycle life testing will be stopped.
3.5.7 Environment Characteristic
3.5.7.1 Hi-temperature testing
a) At room temperature （20±5℃） and normal atmospheric pressure , to inspect the sample battery visually ,then the battery will be charged according to standard charge.
b) Keeping the battery in the oven of 55±2℃ for 2hrs. , then the battery will be discharged according to the requirement of quick discharge, the discharging time is not less than 51 minutes.
c) After above testing, to keep the battery at 20±5℃ and the environment of normal atmospheric pressure for 1~2hrs. , the result of visual inspection can meet item 3.4.2.
3.5.7.2 Low temperature testing
a) At room temperature （20±5℃） and normal atmospheric pressure , to inspect the sample battery visually ,then the battery will be charged according to standard charge.
b) To keep the battery in the oven of -20±2℃ for 16～24 hrs., Then the battery will be discharged according to standard discharge, and the time of Standard Discharge should be not less than 3.5hrs.. After above testing , to keep the battery at 20±5 ℃ and the environment of normal atmospheric pressure for 1~2hrs. The result of visual inspection can meet item 3.4.2
3.5.7.3 Constant temperature and constant humidity testing
a) At room temperature （20±5℃） and normal atmospheric pressure , to inspect the sample battery visually ,then the battery will be charged according to standard charge.
b) To keep the battery in the case of 40±2℃, 90~95%RH for 48hrs.. After above testing , to keep the battery at 20±5℃ and the environment of normal atmospheric pressure for 2hrs.The result of visual inspection can meet item 3.4.2.
c) According to the requirement of quick discharge, the time discharge is not less than 36 minutes.
3.5.7.4 Vibration testing
a)At room temperature （20±5℃） and normal atmospheric pressure , to inspect the sample battery visually ,then the battery will be charged according to standard charge.

b) The battery will be vibrated 10 times in each direction of X, Y, Z with changing frequency of 10~55HZ and amplitude of 0.35mm. The rate of scan frequency is from 10~55HZ per min.
c) After above testing , to keep the battery at 20±5℃ and the environment of normal atmospheric pressure for 1~2hrs. , The result of visual inspection can meet item 3.4.2
d) Voltage is not less than 3.7V.
3.5.7.5 碰撞实验 Impact Testing
a) At the temperature of （20±5）℃ and the normal atmospheric pressure ,to inspect the sample battery visually . And the battery will be charged according to the requirement of standard charge.
b) The battery will be impacted 1000±10 times with the acceleration of 100m/s2 and pulse lasting time 16ms.
c) After above testing, to keep the battery at （20±5）℃ and the environment of normal atmospheric pressure for 1-2hrs.The result of Visual inspection can meet item 3.4.2.
d) Voltage is not less than 3.7V.
3.5.7.6 Free fall testing
a) At the temperature of （20±5）℃ and the normal atmospheric pressure, to inspect the sample battery visually . And the battery will be charged according to the requirement of standard charge.
b) The battery will be dropped free six times in each direction of X, Y, Z from the height of 1000mm onto the hard board with the thickness of 20mm.
c) After above testing, to keep the battery at (20±5)℃ and the environment of normal atmospheric pressure for 1-2hrs. The result of Visual inspection can meet item 3.4.2.
d) According to the requirement of standard discharge, the battery will discharged and the discharge time is not less than 51 minutes.
3.5.8 Safe Characteristic
3.5.8.1 Over charge Testing
a) At the temperature of （20±5）℃ and the normal atmospheric pressure, to inspect the sample battery visually . And the battery will be charged according to the requirement of standard charge.
b) The battery charged completely will be charged continuously at 1C current to 4.8V, and then , charged continuously with constant voltage of 4.8V for 2h. The result of Visual inspection can meet item 3.4.11.1.
3.5.8.2 Over Discharge Testing
a) At the temperature of （20±5）℃ and the normal atmospheric pressure, to inspect the sample battery visually . And the battery will be charged according to the requirement of standard charge.
b) According to the requirement of standard discharge, the battery will be discharged to end voltage, then connected with external load of 30Ω for 24hrs. The result of Visual inspection can meet item 3.4.11.2.
3.5.8.3 Short Protecting Testing
a) At the temperature of （20±5）℃ and the normal atmospheric pressure, to inspect the sample battery visually . And the battery will be charged according to the requirement of standard charge.
b) After standard charge, connect with the positive electrode and the cathode electrode, after being shorted by resistance of 0.2 Ω for 1hrs., then disconnect. Being changed instantaneously , then measure the battery voltage. The result of visual inspection can meet item 3.4.11.3.
3.5.8.4 Heat impact testing
Put a battery into a ain oven .The temperature in the oven should rise at the rate of speed of(5±2℃)/min to be 130℃±2℃ (Holding the Temperature for 30 min).The battery should be up to standard of 3.4.11.4.
Note: Above testing of safe characteristic must be with protective equipment.

3.6 WARNINGS AND CAUTIONS IN HANDING THE LITHIUM-ION BATTERY

Warning

Danger warning (it should be described in manual or instruction for users, indicated especially)
To prevent the possibility of the battery from leaking, heating, explosion. Please observe the following precautions:

- Don’t immerse the battery in water and seawater. Please put it in cool and dry entironment if no using.
- Do not use and leave the battery near a heat source as fire or heater
- Being charged, using the battery charger specifically for that purpose
- Don’t reverse the positive and negative terminals
- Don’t connect the battery to an electrical outlet directly.
- Don’t discard the battery in fire or heater.
- Don’t connect the positive and negative terminal directly with metal objects such as wire.
- Do not transport and store the battery together with metal objects such as necklaces, hairpins.

● Do not strike , throw or trample the battery.

● Do not directly solder the battery and pierce the battery with a nail or other sharp object.

Caution

◆ Do not use or leave the battery at very high temperature conditions(for example, strong direct sunlight or a vehicle in extremely hot conditions). Otherwise, it can overheat or fire or its performance will be degenerate and its service life will be decreased.

◆ Do not use it in a location where is electrostatic and magnetic greatly, otherwise, the safety devices may be damaged, causing hidden trouble of safety.

◆ If the battery leaks, and the electrolyte get into the eyes. Do not wipe eyes, instead, rinse the eyes with clean running water, and immediately seek medical attention. Otherwise, eyes injury can result.

◆ If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, immediately remove it from the device or battery charge and stop using it.

◆ In case the battery terminals are dirt, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection with the instrument.

◆ Be aware discharged batteries may cause fire; tape the terminals to insulate them.

4. Picture for battery pack :

Dimension：50.5×36.5 ×4.3mm