Cylindrical Li-ion battery

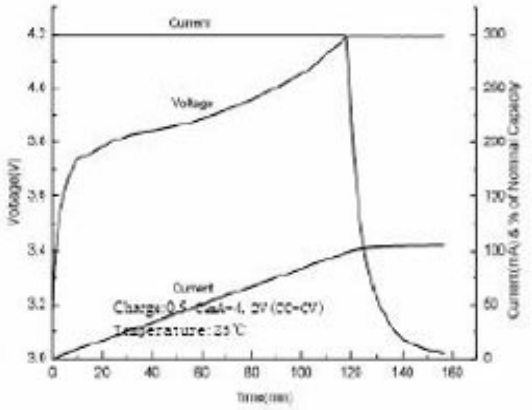
Specification

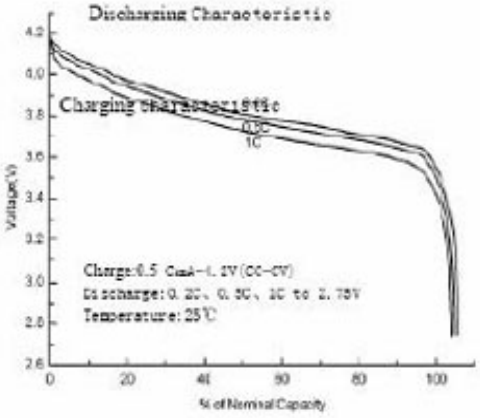
Type: ICR16340

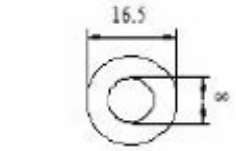
Prepared	Auditing	Approved

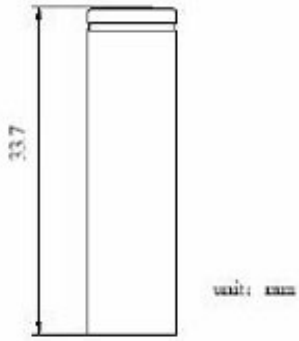
1. Primary technical Parameters

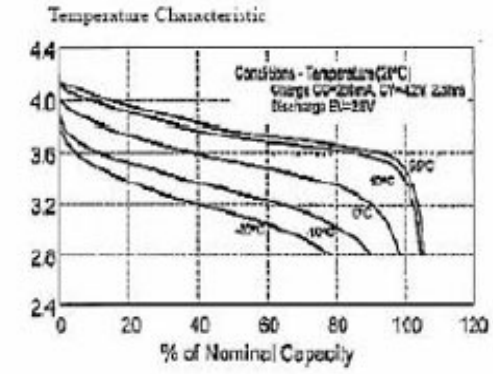
Type	:	Rechargeable Lithium-ion Cylindrical Cell
Dimension	:	Φ=16.5±0.2mm
	:	H=33.7±0.5mm
CsmAh	:	600
CsmA	:	600
Nominal Voltage	:	**3.6V**
Capacity	:	**Typical: 650mAh** Minimum 600mAh when discharged at 0.2CsmA to 2.75V
Recommended Charging Conditions	:	120～600mA charge termination control parameters taper current 6mA at 4.2V
Maximum continuous discharge current	:	1200mA
Service Life	:	300cycles (≥80% CsmAh)
Weight	:	Approx. 17g
Internal Resistance	:	90mΩ max. at 1000Hz
Charging Voltage	:	4.200±0.05V
Ambient Temperature Range	:	Charging : 0～+45℃
		Discharging : -20～+60℃
		Storage : -5～+35℃











Note:

1、C_5: the rated capacity, unit: Ah or mAh.

2. Performance

Test item	Test conditions	Requirements
(1)Outside Appearance	Visual check	No abnormal stain, Deformation nor damage
(2)Standard test conditions	Measurements are carried out at 20±5℃and relative humidity of 65 ± 20% without other specified condition. Accuracy of voltmeters and ammeters used in test is equal to or better than the grade 0.5.	
(3)Standard charge	Cells shall be charged continuously at the constant current of 0.5 CsmA to 4.2V, then charge at the constant voltage of 4.2V until the end current of 6mA	
(4)Standard discharge	Cells shall be discharged continuously at the constant current of 0.2 CsmA to 2.75V	
(5)Fast charge	Cells shall be charged continuously at the constant current of 1 CsmA to 4.2V, then charge at the constant voltage of 4.2V until the end current of 6mA	
(6)Open-circuit voltage (OCV)		≥3.75V
(7)Rated Capacity	Cells shall be charged in Item (3) and discharged in Item (4) within 30minutes after full charged. If the discharge duration does not reach the specified value, the test may be repeated up to three times in total.	Rated capacity: ≥100%CsmAh
(8)high-rate discharged Capacity	Cells shall be charged in Item (3) and discharged continuously at the constant current of 1 CsmA to 2.75V within 30minutes after full charged. If the discharge duration does not reach the specified value, the test may be repeated up to three times in total.	Discharge capacity: ≥95%CsmAh
(9)Cycle Life (20℃)	Cells shall be charged continuously at the constant current of 0.5CsmA to 4.2V and discharged continuously at the constant current of 0.5CsmA to 2.75V. A cycles defined as one charge and discharge . carry out cycles until discharge capacity <80% CsmAh	≥300 cycles
(10)Low temperature discharge	Cells shall be stored under -20℃±2℃ for 16h～24h after charged in Item (3), then discharged at constant current of 0.2 CsmA to 2.75V	Discharge capacity: ≥60%CsmAh
(11)Storage characteristics	Cell shall be charged in Item (3) , and stored in a temperature-controlled environment at 20±5℃ for 28 days. After storage, cell shall be discharged in Item (4) to obtain the remaining capacity.	Remaining capacity ≥ 90%CsmAh

3. Mechanical test

Test Item	Test Conditions	Requirements
(1)Vibration Test	Vibrate test sample for 90minutes per each of the three mutually perpendicular axis(x, y, z)after rated charge. Amplitude: 0.38mm(10-30Hz); 0.19mm (30-55Hz) Frequency: 10-55Hz(1oct/min) Direction: X, Y After test , cells are discharge at constant current of0.2 C_5mA, and cycles per 1(3)and 1(4)for 3 cycles to obtain recovered capacity	No rupture, fire, smoke, Nor critical damage ≧90% C_5mAh
(2) Drop Test	Drop 100% charged test sample from 1 meter above onto concrete board with more than 5cm thickness two times each for every direction after rated charge. After test , cells are discharge at constant current of 0.2 C_5mA, and cycles per 1(3)and 1(4)for 3 cycles to obtain recovered capacity	No rupture, fire, smoke, Nor critical damage ≧90% C_5mAh

4. Safety Evaluation

Test Item	Test Conditions	Requirements
(1)Hot Oven Test	The charged batteries are to be heated in a gravity convection or circulating air oven. The temperature of the oven is to be raised at a rate of 5±2℃ per minute. The oven is to remain for 30 minutes at 130 ± 2 ℃ before the test is discontinued.	No fire, Nor explosion
(2)Short Circuit Test	After fast charge at 20±2℃, Connect battery terminals with electric wire (electric resistance: 50mΩ or less). And stop the test when the temperature of battery is 10℃ lower than peak temperature.	No fire, Nor explosion
(3)Overcharge	After discharged at 1 C_5mA and to 2.75V, the batteries shall be charged at 3 C_5mA current with a voltage limit of 4.6V. chargeing is continued for 8 hours	No fire, Nor explosion
(4)Overdischarge	Cells are discharged at constant current 0.2C5 mA to 0V	No fire, Nor explosion
(5) Impact	A test sample battery is to be placed on a flat surface. A 5/8 inch (15.8 mm) diameter bar is to be placed across the center of the sample. A 20 pound (9.1 kg) weight is to be dropped from a height of	No fire, Nor explosion

	24± 1 inch (610 ± 25 mm) onto the sample.	
(6)Crush test	A battery is to be crushed between two flat surfaces. The force for the crushing is to be applied by a hydraulic ram with a 1.25 inch (32 mm) diameter piston. The crushing is to be continued until a pressure reading of 2500 psig (17.2 MPa) is reached on the hydraulic ram, applied force of 3000 pounds (13 kN). Once the maximum pressure has been obtained it is to be released.	No fire, Nor explosion

5. Charge State of Battery before shipment

To be determined.(Recommendation Approx. 3.75 - 3.85V 30% charge)

6. Duration of guarantee the product

Handling Precaution and Prohibitions of Lithium Ion Rechargeable Cells and Batteries

Inaccurate handling of lithium ion rechargeable battery may cause leakage, heat, smoke, an explosion, or fire. This could cause deterioration of performance or failure. Please be sure to follow instructions carefully.

1.1 Storage

Store the battery at low temperature (below 20℃ is recommended), low humidity, no dust and no corrosive gas atmosphere.

1.2 Safety precaution and prohibitions

To assure product safety, describe the following precautions in the instruction manual of the application.

[Danger!]

- Electrical misusage
  - Use dedicated charger.
  - Use or charge the battery only in the dedicated application.
  - Don't charge the battery by an electric outlet directly or a cigarette lighter charger.
  - Don't charge the battery reversely.
- Environmental misusage
  - Don't leave the battery near the fire or a heated source.
  - Don't throw the battery into the fire.
  - Don't leave, charge or use the battery in a car or similar place where inside of temperature may be over 60℃.
  - Don't immerse, throw, wet the battery in water / seawater.
- Others
  - Don't store the battery in a pocket or a bag together with metallic objects such as keys, necklaces, hairpins, coins, or screws.
  - Don't short circuit (+) and (-) terminals with metallic object intentionally.
  - Don't heat partial area of the battery with heated objects such as soldering iron.
  - Don't hit with heavy objects such as a hammer, weight.
  - Don't step on the battery and throw or drop the battery on the hard floor to avoid mechanical shock.
  - Don't disassemble the battery or modify the battery design including electric circuit.

Don't use seriously scared or deformed battery.
Don't put the battery into a microwave oven, dryer ,or high-pressure container.
Don't use or assemble the battery with other makers' batteries, different types and/or models of batteries such as dry batteries, nickel-metal hydride batteries, or nickel-cadmium batteries.

[Warning!]

Don't use or assemble old and new batteries together.
Stop charging the battery if charging isn't completed within the specified time.
Stop using the battery if the battery becomes abnormally hot, discoloration, deformation, or abnormal conditions is detected during use, charge, or storage.
Keep away from fire immediately when leakage or foul odors are detected.
If liquid leaks onto your skin or cloths, wash well with fresh water immediately. If liquid leaking from the battery gets into your eyes, don't rub your eyes and wash them with clean water and go to see a doctor immediately.
If the terminals of the battery become dirty, wipe with a dry cloth before using the battery. The battery can be used within the following temperature ranges. Don't exceed these ranges.
Charge temperature ranges: 0- 45℃
Discharge Temperature ranges: -20-60℃
Store the battery at temperature below 60℃

[Caution!]

■ Electrical misusage

Battery must be charge with constant current-constant voltage (CC/CV).
Charge current must be controlled by specified value in Cell specification.
Cut-off Voltage of charging must be 4.20V/cell. Charger must stop charging battery by detecting either charging time or current specified in Cell's specification.
Discharge current must be controlled by specified value in Cell's specification.
Cut-off Voltage of discharging must be over 2.5V/cell.
Keep the battery away from babies and children to avoid any accidents such as swallow. If younger children use the battery, their guardians should explain the proper handling method and precaution before using.
Before using the battery, be sure to read the user's manual and precaution of it's handling.
Before using charger, be sure to read the user's manual of the charger.
Before installing and removing the battery from application, be sure to read user's manual of the application.
Replace the battery when using time of battery becomes much shorter than usual.
Cover terminals with insulating tape before proper disposal. If the battery is needed to be stored for an long period, battery should be removed from the application and stored in a place where humidity and temperature are low. While the battery is charged, used and stored, keep it away from object materials with static electric chargers.

Safety Handling Procedure for the Transporter

■ Quarantine : Packages that are crushed, punctured or torn open to reveal contents should not be transported. Such packages should be isolated until the shipper has been consulted, provided instructions and, if appropriate, arranged to have the product inspected and repacked.

- Spilled Product : In the event that damage to packaging results in the release of cells or batteries, the spilled products should be promptly collected and segregated and the shipper should be contacted for instructions.

Design of positioning the battery pack in application and charger

To prevent the deterioration of the battery performance caused by heat, battery shall be positioned away from the area where heat is generated in the application and the charger.

Please contact us when you need any help including safety concerns.