Products Specified

Type： Cylindrical Lithium Ion Rechargeable Cell

Name：GGEICR18650 2500mAh 20A

Basic Characteristics

3.1 Nominal Capacity	Nominal Capacity(discharge with 1C to 2.75V)	2500mAh(4.2V) 2300mAh(4.1V)
	Minimum Capacity(discharge With 0.2C to 2.75V)	2500mAh(4.2V) 2300mAh(4.1V)
	Charging Method	Charge with constant current 0.2C and constant voltage (CC/CV) of 4.20+/-0.05V. Cut -off at the current of 0.05C .
3.2 Nominal Voltage	3.6 V	
3.3 Internal Impedance	≤ 25mΩ	
3.4 Discharge Cut-off Voltage	2.75V	
3.5 Max Charge Voltage	4.20±0.05V	
3.6 Standard Charge Current	0.5 C	
3.7 Standard Discharge Current	1 C	
3.8 Max Continuous Discharge Current	8 C	
3.9 Max Pulse Discharge Current	35A (<200ms)	
3.10 Weight	46.0±1.5 g	
3.11 Max. Dimension	Diameter (φ):18.6mm Height (H) :65.2mm	
3.12 Operating Temperature(Charge)	Temperature	Max Continuous Charge Rate
	0 ≤ T ≤ 10	0.2C
	10 <T ≤ 45	0.5C
	45 <T ≤ 55	0.1C

	Temperature	Max Continuous Discharge Rate
3.13 Operating Temperature(Discharge)	-20 ≤ T ≤-10	0.5C
	-10 < T ≤ 20	1C
	20 < T ≤ 60	3C
3.14 Storage Temperature	within 1 month: -20 ~ 60 , 90% RH Max within 3 months: -20 ~ 45 , 90% RH Max within12 months: 0 ~ 25 , 80% RH Max	

Standard Test Conditions

All the tests need to be done under the following conditions: Ambient Temperature: 25±2 ;

Relative Humidity: 15%~90%;

4.1 Standard Charge	Charge with constant current 0.5C and constant voltage (CC/CV) of 4.20+/-0.05V. Cut -off at the current of 0.05C .
4.2 Standard Discharge	Discharge with constant current 1C and cut-off at the voltage of 2.75V.

Characteristics

5.1 Electrical Characteristics

Items	Test Procedure	Requirement	
5.1.1 Nominal Voltage	The average value of working voltage during discharge with the current of 1C, after charged under the condition of 4.1.	3.6V	
5.1.2 Cycle Life	At the ambient temperature of 25±2 , charge with constant current 0.5C to 4.10+/-0.05V,and charge with constant voltage to 0.05C.Rest 10 minutes. Discharge with 1C and cut-off at 3.0V. Rest 10 minutes. This is a cycle life. If discharge capacity is lower than 80% of that of the first cycle twice in series, cycle life test is over.	≥ 1200 Cycles	
5.1.3 Rate Character	At the ambient temperature of 25±2 , charge under the condition of 4.1. Rest 10 minutes. Discharge to 2.75V at different currents.	0.5C	=100%
		1C	≥96%
		2C	≥94%
		3C	≥90%
5.1.4 Rate Charging Performance at Room	At the ambient temperature of 25±2 , charged under the condition of 4.1 and dischargeunder the condition of 4.2. Rest 10 minutes. Charge at constant current of 2C to 4.20+/-0.05 V and then cut off at 0.05C. Rest 10 minutes.	Capacity ≥80%	

Temperature	Discharge with 1C to 2.75V.	
5.1.5 Temperature Dependence of Discharge Capacity	After charged the cell under the condition of 4.1. Rest 5 hours at the defferent temperature(Rest 24 hours at-20), and discharge with 1C to 2.75V(Discharge to 2.5V at-20). Compare discharge capacity with that at room temperature of 25 ± 2 .	-20 ≥70% 0 ≥85% 10 ≥90% 25 =100% 55 ≥95%
5.1.6 Charge Retention at Room Temperature	Charge the cell under the condition of 4.1. Store 28 days at the ambient temperature of 25±2 . Discharge with 1C to 2.75V at the temperature of 25±2 . This is the capacity retention. Then charge the cell under the condition of 4.1 again, and discharge with 1C to 2.75V at 25±2 , to get the capacity recovery.	Retention ≥90% Recovery ≥95%
5.1.7 Charge Retention at High Temperature	Charge the cell under the condition of 4.1. Store 7 days at the ambient temperature of 55±2 . Discharge with 1C to 2.75V after staying at room temperature for 5h. This is the capacity retention. Then charge the cell under the condition of 4.1 again, and discharge with 1C to 2.75V at 25±2 , to get the capacity recovery.	Retention ≥90% Recovery ≥95%
5.1.10 Storage	(Manufactured within 3 months) Charge the cell under the condition of 4.1 and discharge at room temperature for 30 min with the current of 1C. Store at the ambient temperature of 45±2 for 28 days. Then put the cell at room temperature for 5h. Fully charged under the condition of 4.1 and discharge with 0.2C to 2.75V cut-off.	Capacity ≥90%

Safety Performances

5.2.1 Short Circuit	To short-circuit the standard charged cell under the condition of 4.1 by connecting positive and negative terminals directly with a copper wire, which resistance is no higher than 5mΩ, for 10min. Monitor the temperature of the cell.	No fire; No explosion.
5.2.2 Over-charge	To connect the standard charged cell under the condition of 4.1 by a thermocouple in a fume hood. The positive and negative terminals are connected to a DC power supply set at current of 1C and voltage of 6.3V until the cell is charged to 6.3V and the current drops to approximately 0A. Monitor the temperature of the cell. When the temperature is 10 lower than that of the peak value, the	No fire; No explosion.

	test is completed.	
5.2.3 Over-discharge	To connect the standard charged cell under the condition of 4.1 by a thermocouple in a fume hood. The positive and negative terminals are connected to a DC power supply set. Discharge the cell at a current of 1C for 90min. Put it under observation for 1 hour.	No fire; No leakage; No explosion.
5.2.4 Crush	After fully standard charge under the condition of 4.1, the cell is put perpendicular to a half-cylindrical plate with a radius of 75mm, and no shorter than the length of the cell. Crush the cell under a pace of (5±1)mm/s, until voltage is 0V, or shape changes 30%, or the crushing strength reaches 200kN. Put it under observation for 1 hour.	No fire; No explosion.
5.2.5 Thermal Shock	After standard charge under the condition of 4.1, the cell is heated to 130±2 at a rate of 5±2 /min, and keep it at this temperature for 30 minutes. Put it under observation for 1 hour.	No fire; No explosion.
5.2.6 Seawater Immersion	After standard charge under the condition of 4.1, the cell is fully immerged into 3.5% wt% NaCl for 2 hours.	No fire; No explosion.
5.2.7 Low Pressure Test	After standard charge under the condition of 4.1, the cell is put into a low-pressure test case of 11.6kPa, for 6 hours. Put it under observation for 1 hour.	No fire; No leakage; No explosion.
5.2.8 Drop test	After standard charge under the condition of 4.1, the cell is placed perpendicularly and dropped from a height of 1.5m, onto a concrete floor. Put the cell under observation for 1 hour.	No fire; No explosion.
5.2.9 Temperature Cycle	After standard charge under the condition of 4.1, put the cell into a thermal case at ambient temperature of 25±2 . Within 60min, lower the temperature to -40 at the rate of 13 /12min, and hold for 90 min. Raise the temperature to 25±2 within 60 min at the same rate. Continue raising the temperature to 85 within 90 min at the rate of 2 /3min, and hold for 110min. Then cool the temperature to 25±2 in 70 min at a rate of 6 /7min to complete a full temperature cycle. Repeat this whole temperature cycle for 5 times, and put the cell under observation for 1 hour.	No fire; no leakage; No explosion.

Caution

6.1 Please read this specification carefully before testing or using the cell since improper handling of a Li-ion cell may lead to loss of efficiency, heating, ignition, electrolyte leakage and explosion.

6.2 When testing the cells by charging or discharging, please use professional test equipments specially designed for Li-ion batteries. Do not use ordinary constant current or constant voltage (CC/CV) power supplies. These do not protect the cell from being overcharged and over-discharged, and

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may lead to possible loss of efficiency or danger.

6.3 When charging or discharging, or assembling, reversing the positive and negative terminals would lead to overcharge and over-discharge of the cell(s). This could lead to serious loss of efficiency and even explosions.

6.4 Do not solder the cell directly. Do not resolve the cell.

6.5 Do not put the cell(s) in pockets or bags with metal products, such as necklaces, hairpins, coins, screws, etc. Neither storing them without proper isolation. Do not connect the positive and negative electrodes directly with conductive materials. This could lead to a short-circuit of the cell.

6.6 Do not hammer, throw or trample the cell. Do not put the cell into washing machines or high-pressure containers.

6.7 Keep the cells away from heat sources, such as fires, heaters, etc. Do not use or store cell(s) at locations where the temperature could exceed 60 , such as in direct sunlights. This may lead to the generation of excessive heat, ignition and lose of efficiency.

6.8 Do not get the cells wet or throw them into water. When not in use, place the cells in a dry environment at low temperatures.

6.9 When in use, testing or storing, if the cells become hot, distributing a smell, changing color, deformation or showing any other abnormalities, please stop using or testing immediately. Attempt to isolate the cell and keep it away from other cells.

6.10 Should electrolyte get into the eyes, do not rub the eyes. Rinse the eyes with clean water and seek medical attention if problems remain. If electrolyte gets onto the skin or clothing, wash with clean water immediately.

7. Packing

Batteries are at half-charged state when packed. The surface of the packing boxes contain the following information: name, type, nominal voltage, quantity, gross weight, date, capacity and impedance.

8. Transportation

During transportation, do not subject the cell(s) or the box (es) to violent shaking, bumps, rain or direct sunlights. Keep the cell(s) at half-charged state.

9. Long-term Storage

The cell should be used within a short period after charging, because long-term storage may cause loss of capacity due to self-discharging. If the cell is kept for a long period (3 months or more), it is highly

recommended that the cell is stored at a dry and low-temperature environment and at half-charged state. Our shipping voltage is 3.60-4.00V, because storage at higher voltage may cause loss of performances. Usage under the condition of overdischarge is strictly forbidden.

(Fig. 1: The dimensions of the cell) Unit(mm)