EEMB CO., LTD

Li-ion Battery

Specification

Model:	**LIR18650**
Capacity:	**2200mAh**

Prepared	Checked	Approved

Customer:

Customer Approval（Customer confirmation）:		
Signature	**Checked**	**Approved**

Address: Room ABCD,25/F, Block A, Fortune Plaza, NO.7060 Shennan Road Shenzhen, China

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Catalog

1. Scope

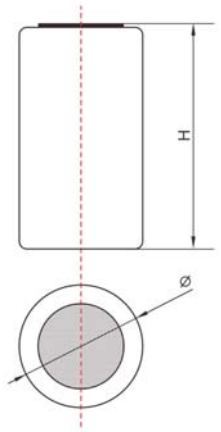
This product specification defines the requirements of the rechargeable lithium-ion battery supplied to the customer by EEMB Co., Ltd.

2. Battery Cell Basic Characteristics

No.	Item		Characteristics		Remark
2.1	Model		LIR18650		
2.2	Capacity	Nominal Capacity	2200	mAh	$0.2C_5A$
		Minimum	2150	mAh	$0.2C_5A$
2.3	Nominal Voltage		3.7	V	
2.4	Weight		Approx.47.0±1	g	
2.5	Internal Impedance		≤ 80	mΩ	AC 1KHz(50% charge)
2.6	Dimension	Diameter	≤ 18.6	mm	
		Height	≤ 65.3	mm	
2.7	Standard Charge	Constant Current	1100	mA	$0.5C_5A$（CC&CV）
		Limited Voltage	4.20±0.05	V	
		End-of Current	20	mA	
2.8	Standard Discharge	Constant current	440	mA	$0.2\ C_5A$ （CC&CV）
		Cut-off Voltage	2.75	V	
2.9	Max. Charge Current		1760	mA	
	Max. Pulse Discharge Current		4400	mA	$2C_5A$
2.10	Operation Temperature	Charge	0 ~ 45	℃	
		Discharge	-20 ~ +60	℃	
2.11	Storage Temperature	1 month	-20 ~ +45	℃	
		6 month	0 ~ +45	℃	
2.12	Storage Relative Humidity		60±20	%	

3. Battery Cell Shape and Dimensions（Unit：mm）

Item	Specification
Diameter	18.6mm
Height	65.3mm



4. Appearance

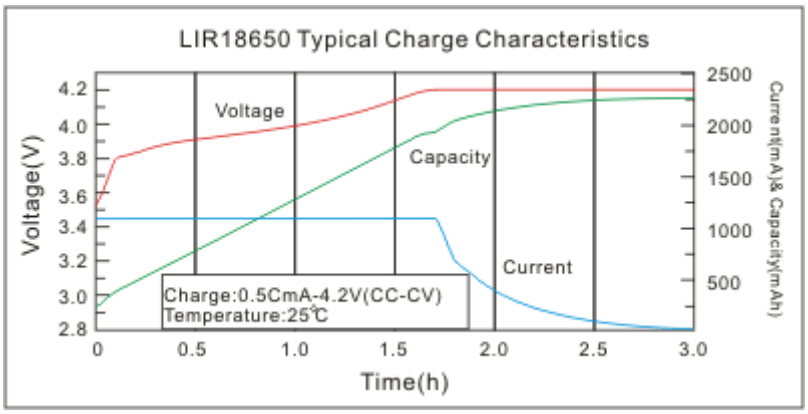
It shall be free from any defects such as remarkable scratches, breaks, cracks, discoloration, leakage, or middle deformation.

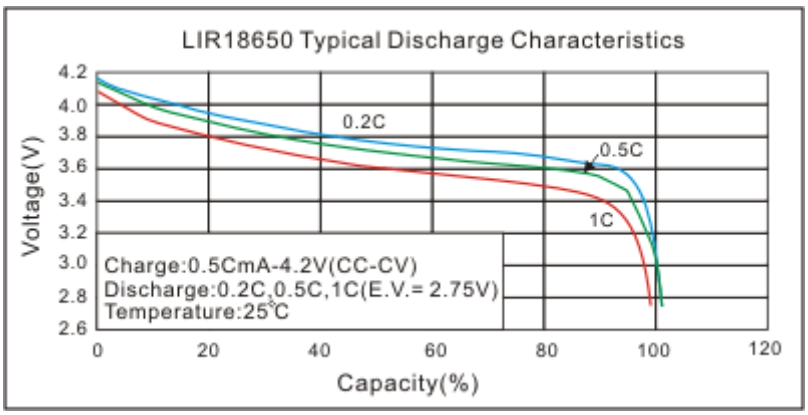
5. Battery Cell Specification

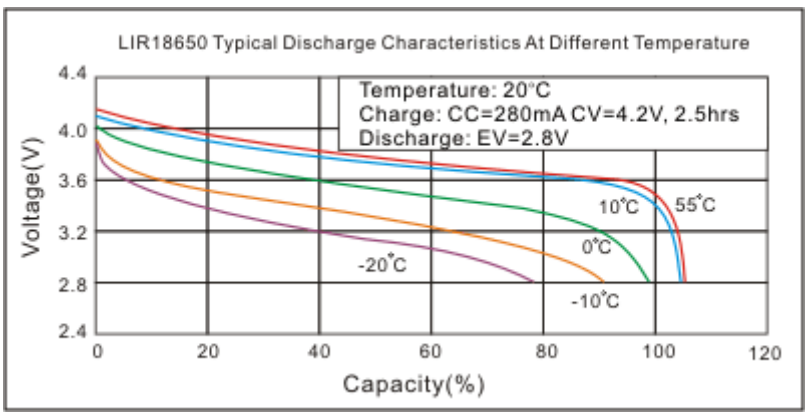
No	Item	Testing Instruction	Requirements
5.1	Charge Condition	Charge the battery with constant current 0.5C to 4.2V, and then charge at constant voltage 4.2V until the current decays to 20mA during the constant voltage stage.	
5.2	Nominal Capacity	Within 1h after standard charge, then discharge at 0.2C until 2.75V cut-off voltage.	Capacity ≥ nominal capacity
5.3	1C discharge	Within 1h after standard charge, discharge at constant current 1C until 2.75V cut-off voltage. If the discharge duration does not reach specified value, the test may be repeated up to three times in total.	
5.4	Internal Resistance	The initial internal resistance shall be measured at AC 1000Hz initially.	The initial internal resistance≤80mΩ
5.5	Cycle Life	Within 1h after standard charge, at 20±5℃, discharge the battery at constant current 0.5C until 2.75V. Then the battery stays for 1h. A cycle defined as one charge and discharge. This charge and discharge circle shall be repeated 300 times.	The capacity at 300th cycle ≥ 80% of the nominal capacity
5.6	Electricity Preservation	After standard charge, the battery stays at 20±5℃ for 28 days and then discharge at 0.2C to 2.75V cut-off.	The discharge capacity 90% of the nominal capacity
5.7	High Temperature Performance	After standard charge, store the testing cells at 60±2℃ for 4 hours. Then discharge at 1C until 2.75V cut-off voltage.	The discharge capacity 90% of the nominal capacity
	Low Temperature Performance	After standard charge, store the testing cells at -20±2℃ for 16-24 hours. Then discharge at 0.2C until 2.75V cut-off voltage	The discharge capacity 60% of the nominal capacity
5.8	Short-circuit	After standard charge, short circuit the cathode and anode. Stop testing when battery temperature decays to about 10℃ from the maximum temperature.	No fire, no explosion
5.9	Overcharge	Put the testing batteries connecting with thermocouple in ventilated cabinet; connect the cathode and anode to a power supply with CC/CV function. Adjust the current to 3C and voltage to 4.6V. Then charge the battery at 3C until the limit voltage reaches 4.6V. The charging continued for 8 hours.	No fire, no explosion

5.10	Hot box test	Put the testing batteries connecting with thermocouple in constant temperature box. Heat the batteries and box (speed of ascending temperature is 5±2°C at room temperature simultaneously. Monitor the temperature change of the box. Keep for 10 minutes after the box temperature reaches 150±2°C, then stop the test.	No fire, no explosion
5.11	Vibration test	Batteries are vibrated 30 min in three mutually perpendicular directions with amplitude of 0.38mm (10~30Hz) or 0.19mm (30~55Hz) and the scanning rate of 1oct per min	No fire, no explosion
5.12	Drop test	Batteries are dropped onto a hard board with the thickness of 18~20mm from 1meter from X, Y, Z direction of the positive and negative (six directions) and then discharge with 0.2C_5A to 3.0V	No fire, no explosion

6. Curves







7. Warranty

One year warranty after the date of production

8. Matters Needing Attention

Strictly observes the following needing attention. EEMB will not be responsible for any accident occurred by handling outside of the precautions in this specification.

! Danger

- Strictly prohibits heat or throw cell into fire.
- Strictly prohibits throw and wet cell in liquid such as water、gasoline or drink etc.
- Strictly prohibits use leave cell close to fire or inside of a car where temperature may be above 60℃. Also do not charge / discharge in such conditions.
- Strictly prohibits put batteries in your pockets or a bag together with metal objects such as necklaces. Hairpins, coins, or screws. Do not store or transportation batteries with such objects.
- Strictly prohibits short circuit the (+) and (-) terminals with other metals.
- Do not place Cell in a device with the (+) and (-) in the wrong way around.
- Strictly prohibits pierce Cell with a sharp object such as a needle.
- Strictly prohibits disassemble or modify the cell.
- Strictly prohibits welding a cell directly.
- Do not use a Cell with serious scar or deformation.
- Thoroughly read the user's manual before use, inaccurate handling of lithium ion rechargeable cell may cause leakage, heat, smoke, an explosion, or fire, capacity decreasing.

! Warning

- Strictly prohibits put cell into a microware oven, dryer, or high-pressure container.
- Strictly prohibits use cell with dry cells and other primary batteries, or new and old battery or batteries of a different package, type, or brand.
- Stop charging the Cell if charging is not completed within the specified time.
- Stop using the Cell if abnormal heat, odor, discoloration, deformation or abnormal condition is detected during use, charge, or storage.
- Keep away from fire immediately when leakage or foul odor is detected.
- If liquid leaks onto your skin or clothes, wash well with fresh water immediately.
- If liquid leaking from the Cell gets into your eyes, do not rub your eyes. Wash them well with clean edible oil and go to see a doctor immediately.

! Caution

- Before using the Cell, be sure to read the user's manual and cautions on handling thoroughly.
- Charging with specific charger according to product specification. Charge with CC/CV method. Strictly prohibits revered charging. Connect cell reverse will not charge the cell. At the same time, it will reduce the charge-discharge characteristics and safety characteristics; this will lead to product heat and leakage.
- Store batteries out of reach of children so that they are not accidentally swallowed.
- If younger children use the Cell, their guardians should explain the proper handling.
- Before using the Cell, be sure to read the user's manual and cautions on handling thoroughly.

- Batteries have life cycles. If the time that the Cell powers equipment becomes much shorter than usual, the Cell life is at an end. Replace the Cell with a new same one.
- When not using Cell for an extended period, remove it from the equipment and store in a place with low humidity and low temperature.
- While the Cell pack is charged, used and stored, keep it away from objects or materials with static electric charges.
- If the terminals of the Cell become dirty, wipe with a dry clothe before using the Cell.
- Storage the cells in storage temperature range as the specifications. After full discharged, we suggest that charging to 3.6~4.0V.with no using for a long time.
- Battery should be charged and discharged every 3 months at 0.2 C during long term storage, and then charge to 50-70% of the capacity for storage.
- Do not exceed these ranges of the following temperature ranges：

  Charge temperature range : 0℃ to 45℃;
  Discharge temperature range : -20℃ to 60℃.
  Store less than 1 month : -20℃ - +45℃
  Store less than 6 months : 0℃ - +45℃

! Special Notice

Keep the cells in 50% charged state during long period storage. We recommend to charge the battery up to 50% of the total capacity every 3 months after receipt of the battery and maintain the voltage 3.6~4.0V. And store the battery in cool and dry place.