EEMB CO., LTD

Lithium Iron Phosphate Battery

Specification

Model:	**LIP26650**
Capacity:	**3200mAh**

Prepared	Checked	Approved

Customer：

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

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Catalog

1. Scope

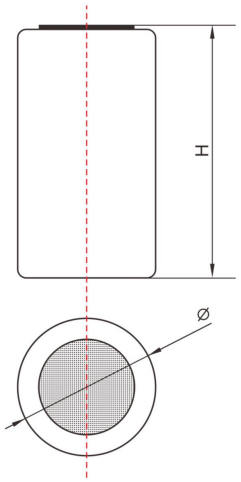
This product specification defines the requirements of the rechargeable lithium-ion battery supplied to the customer by EEMB Co., Ltd.

2. Battery Cell Basic Characteristics

No.	Item		Characteristics		Remark
2.1	Model		LIP26650		
2.2	Nominal Capacity		3200	mAh	$0.5C_5A$
2.3	Minimum Capacity		3200	mAh	
2.4	Nominal Voltage		3.2	V	
2.5	Weight		Approx. 90	g	
2.6	Dimension	Diameter	≤ 26.50	mm	PVC cover Included
		Height	≤ 66.0	mm	PVC cover Included
2.7	Charge	Standard Current	$0.5C_5A$		$0.5C_5A$（CC&CV）
			7.5	hrs	
		Fast Current	$1\ C_5A$		$1\ C_5A$（CC&CV）
			2.5	hrs	
		End-off Voltage	3.65	V	
2.8	Discharge	Standard Current	$0.5C_5A$		
		Cut-off Voltage	2.0	V	
2.9	Internal Impedance		≤50	mΩ	Charging state Max. At 1000Hz
2.10	Maximum Charge Current		$1C_5A$		
2.11	Maximum Pulse Discharge Current		$2C_5A$		
2.12	Operation Temperature	Charge	0 ~ 45	℃	
		Discharge	-20 ~ +60	℃	
2.13	Storage Temperature		-20 ~ +45	℃	
2.14	Storage Relative Humidity		60±15	%	

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

Item	Specification
Diameter (Φ)	26.5
Height (H)	66.0



4. Appearance

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

5. Battery Cell Specification

5.1 Electrical Characteristics

No.	Item	Criteria		Test Instructions
5.1.1	Discharge performance (normal temp.)	Discharge capacity/Nominal capacity *100%		In standard atmospheric pressure, ambient temperature of 25±2℃, relative humidity of 45%-80%, standard charge with 0.5C, rest for 10min, discharge with 0.2 C_5A, 0.5 C_5A, 1C_5A, 2C_5A to 2.0V. Recycled 3 times, when once reach standard, namely to meet the standard requirements.
		0.2 C_5A	≥ 100%	
		0.5 C_5A	≥ 98%	
		1 C_5A	≥ 95%	
		2 C_5A	≥ 90%	
		Charging and discharging curves shall be smooth and stable.		
5.1.2	Charge retention (normal temp.)	Residual capacity≥ nominal capacity * 85% Recovery capacity≥ nominal capacity* 90% Open-circuit voltage decreasing rate ≤ 3% Internal resistance increasing rate ≤ 20%		Measure the initial state and initial capacity of the battery, battery charging standards, Open place for 30 days, measuring battery final state; In 0.5C_5A discharge to 2.0V, measuring the residual capacity of battery; 0.5C/0.5C electrical measurement Pool recovery capacity. Recycled 3 times, when once reach standard, namely to meet the standard requirements.
5.1.3	Cycle Life	Capacity≥ Nominal capacity*80%		Measuring battery's initial state and initial capacity. Measuring the final state after 150 times 1C/1C charging and discharging cycles.
5.1.4	Storage performance	0.2C_5A discharging time		After charged to 3.20 ± 0.02V, respectively store for 3 months, 6 months and 12 months, measuring the final state of the battery; then charge and discharge for 3 times at 0.5C/0.2C, record the discharge time of battery.
		3 months	≥ 4.5h	
		6 months	≥ 4.25h	
		12 months	≥ 4h	

5.2 Acclimatization Characteristics

No.	Item	Criteria		Test Instructions
5.2.1	Thermal cycling performance	No smoke, no fire, no explosion		After standard charge, rest for 48h at 75±2℃, then rest for 6h at -20 ℃, last rest for 24h at room temperature; watch battery appearance change.
5.2.2	A constant humid performance	Residual capacity / nominal capacity × 100% > 60% No deformation, no rust, no smoke, explosion vent is not open, no explosion		After standard charge, place the cell in a 40±5 ℃ and RH 95% constant temperature and humidity box for 168h, take out and aside 2h, discharge at 1C_5A to 2.0V.
5.2.3	Drop	Discharge Time ≥ 51min; No leakage, no explosion, no fire		After standard charge, measuring the initial state. The cell drop onto a hard board with the thickness of 20mm from 1m in six directions, test the final state of the cell; then discharge at 1C_5A to 2.0V, test discharge time.
5.2.4	Discharge performance under different temperatures	60℃	≥ 95%	Measuring cell initial capacity and initial state. After standard charge, rest for 3h at 60± 2 ℃, 0.5C_5A discharge to 2.0V. Then after standard charge at room temperature, respectively rest for 20h at 0±2℃, -10±2℃ and -15±2℃, 0.5C_5A discharge to 2.0V and measuring final capacity. Finally put aside at room temperature for 2h, measuring the final state of the battery and observe the battery appearance change.
		0℃	≥ 85%	
		-10℃	≥ 70%	
		-15℃	≥ 60%	
		No smoke, explosion and fire		
5.2.5	Vibration	Residual capacity ≥ nominal capacity * 95% Voltage decay rate ≤ 0.5% Internal resistance increasing rate ≤ 20% No obvious damage, no smoke, no explosion		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

5.3 Safety Characteristics

No.	Item	Criteria	Test Instructions
5.3.1	Overcharge	No explosion or fire Max. temperature<130℃	After standard charge, charging with 1C_5A to 4.8V; then CV charging with 0.01C_5A, observe the temperature and the appearance of the cell.
5.3.2	Over discharge	No fire or explosion;	After standard charge, discharge with 1C_5A to 2.0V, then connect the cathode with 10Ω resistance, rest for 14 days. Measuring the final state of the cell.

5.3.3	Short-circuit at normal temperature	No explosion or fire Max. temperature<130℃	After standard charge, place the battery with thermocouple into an explosion-proof glass cover, and short-circuit by connecting the positive and negative terminals (resistance load of 50mΩ), end the test when the battery temperature drops to about 10℃ lower than peak value.
5.3.4	Impact	No fire or explosion	After full charge, test the initial state of battery, place it on the flat and connect to the thermocouple, put a bar with 15.8 mm diameter to the middle of the cell, a 9.1kg weight drop from 610mm height to the table, watch battery appearance and temperature changes.
5.3.5	Compression	No explosion or fire Max. temperature<130℃	After full charge, test the initial state of cell, place it on the flat and connect to the thermocouple, placed it between two iron flat mould, quickly compress the battery with 13KN. Observe the temperature of the cell and appearance change.
5.3.6	Thermal shock	No fire or explosion;	Cell is heated in a circulating air oven at a rate of (5±2)℃ per minute to 130±2℃, and then placed for 10min at 130±2℃, Observe appearance change of the cell.

6. Warranty

One year warranty after the date of production.

7. 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 microwave 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 3.2~3.4V.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: -10℃ to 60℃.

  Storage temperature range: -20℃ to 40℃

! 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 3.2~3.4V. And store the battery in cool and dry place.