EEMB CO., LTD

Li-ion Battery

Specification

Model:	**LIR123A**
Capacity:	**700mAh**

Prepared	Checked	Approved

Customer:

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

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Catalog

1. Scope

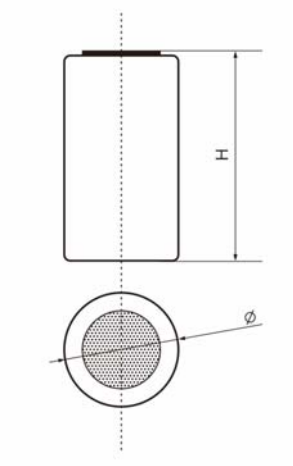
This product specification defines the requirements of the rechargeable lithium-ion battery supplied to the customer by EEMB Co., Ltd.

2. Battery Cell Basic Characteristics

No.	Item		Characteristics		Remark
2.1	Model		LIR123A		
2.2	Capacity	Nominal Capacity	700	mAh	0.2C_5A
		Minimum	700	mAh	0.2C_5A
2.3	Nominal Voltage		3.7	V	
2.4	Weight		Approx.18	g	
2.5	Internal Impedance		≤ 60	mΩ	AC 1KHz(50% charge)
2.6	Dimension (with PVC)	Diameter	≤ 16.8	mm	
		Height	≤ 35	mm	
2.7	Standard Charge	Constant Current	350	mA	0.5C_5A（CC&CV）
		Limited Voltage	4.20±0.05	V	
		End-of Current	7	mA	0.01 C_5A
2.8	Fast Charge	Constant Current	700	mA	1C_5A（CC&CV）
		Limited Voltage	4.20±0.05	V	
		End-of Current	7	mA	0.01 C_5A
2.9	Standard Discharge	Constant current	700	mA	1 C_5A （CC&CV）
		Cut-off Voltage	2.75	V	
2.10	Max. Continuous Discharge Current		700	mA	1C_5A
	Max. Pulse Discharge Current		1400	mA	2C_5A
2.11	Operation Temperature	Charge	0 ~ 45	℃	
		Discharge	-20 ~ +60	℃	
2.12	Storage Temperature	1 month	-20 ~ +45	℃	
		6 month	0 ~ +45	℃	
2.13	Storage Relative Humidity		65±20	%	

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

Item	Specification
Diameter(Ø)	16.8mm
Height(H)	35mm



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	Cycle Life	≥300 cycles（$1C_5A$）		The capacity measured after 300 cycles of complete charge and discharge at 1C current to 2.75V cut-off.
5.1.2	Normal Discharge Performance	0.2C	≥ 100%	Charge the cell with 0.5C to 4.20±0.05V at 23±2℃, rest for 10min; discharge with different currents to 2.75V.
		0.5C	≥ 98%	
		1C	≥ 95%	
		2C	≥ 90%	
5.1.3	Discharge Performance under different Temperatures	60℃	≥95%	Full charge, store at 60±2℃ for 3h, then discharge with $0.5C_5A$ to 2.75V. Full charge at 23±2℃, respectively store at -10℃±2℃, -10℃±2℃ and -10℃±2℃ for 20h, then discharge with $0.5C_5A$ to 2.75V
		0℃	≥ 85%	
		-10℃	≥ 70%	
		-15℃	≥ 60%	
5.1.4	Capacity Retention	Discharge Time≥255min		After full charge, store at 20±5℃for 28 days. Then discharge at 23±2℃with $0.5C_5A$ to 2.75V
5.1.5	Storage	3 months ≥ 4.5h 6 months ≥ 4.25h 12months ≥ 4h		Charge with 40% ~50%, then respectively store 3, 6 and 12 months at 20±5℃ and 45% ~75%RH. Discharge at 23±2℃ with 0.2C to 2.75V

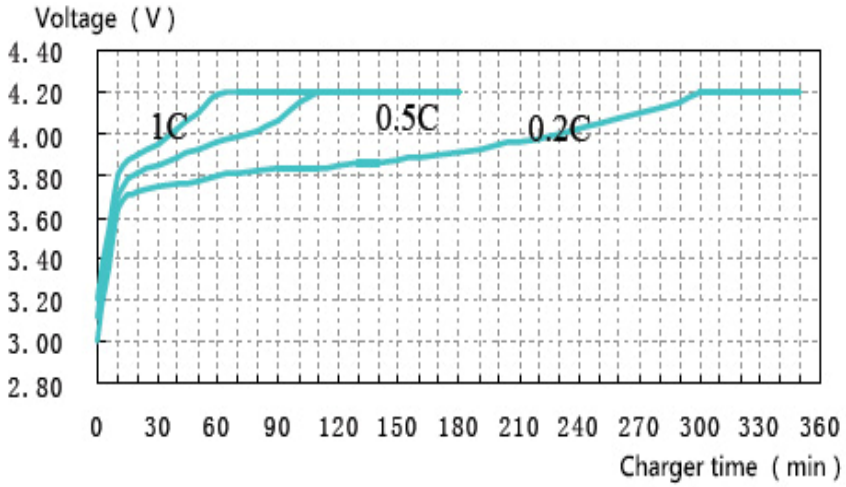
5.2 Acclimatization Characteristics

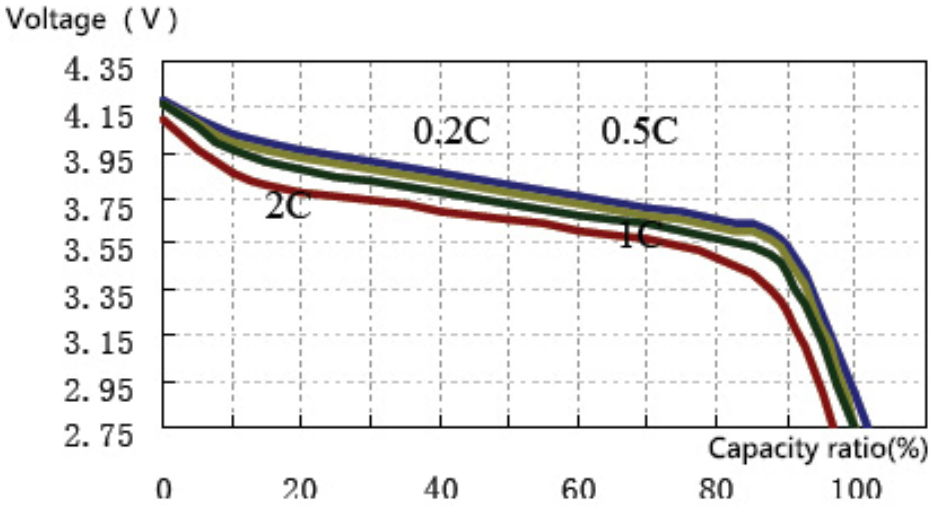
No.	Item	Criteria	Test Instructions
5.2.1	High Temp. and High Humidity	No deformation, no rust, no fire or explosion;	After full charge, store at 40℃±2℃(90%~95%RH) for 168h. After test, place at 20℃±5℃ for 2h and then discharge with $1C_5A$ to 2.75
5.2.2	Vibration	No damnification, leakage, no fire or explosion; Battery Voltage≥3.7V	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
5.2.3	Drop	No damnification, leakage, no fire or explosion;	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 $1C_5A$ to 3.0V

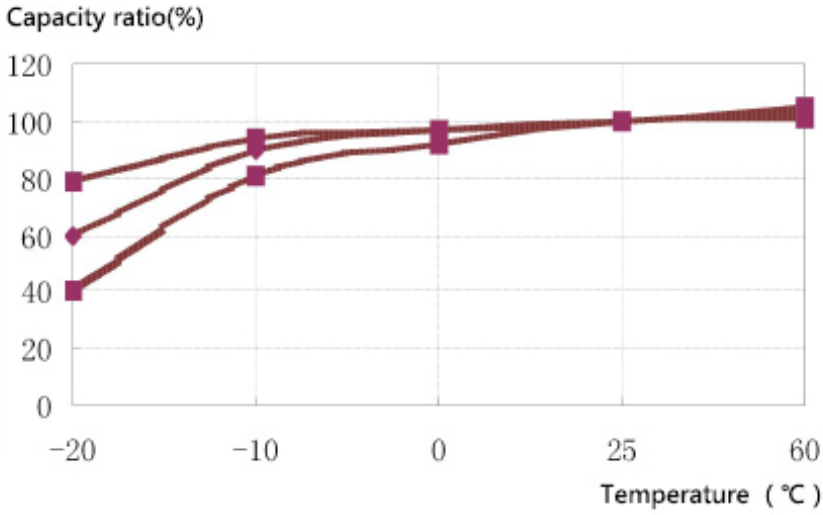
5.3 Safety Characteristics

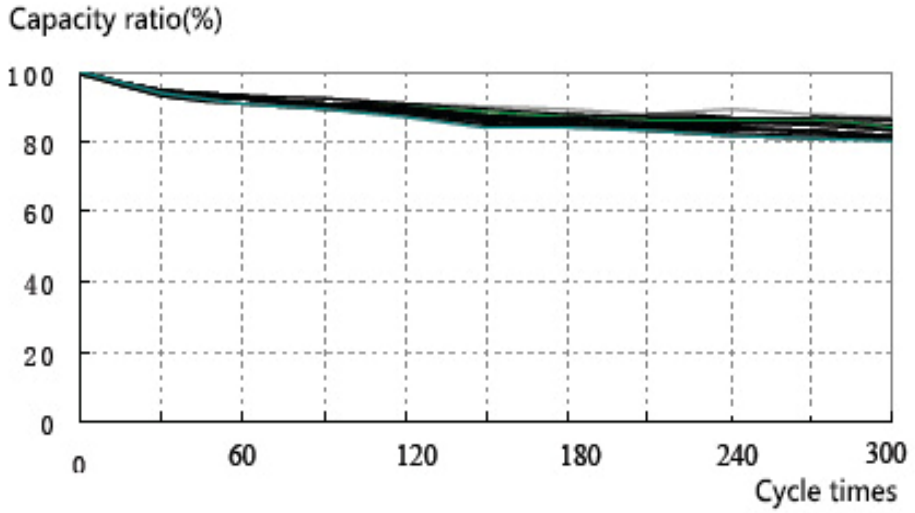
No.	Item	Criteria	Test Instructions
2.3.1	Short Circuit	No fire or explosion; Temperature<130℃	Place the battery with thermocouple into a fume hood, and short-circuit by connecting the positive and negative terminals (resistance load of 50mΩ), monitoring the battery temperature changes in the course of test. End the test when the battery temperature drops to about 10℃ lower than peak value.
2.3.2	Overcharge	No smoke or fire Temperature<130℃	Charged the cells at $1C_5A$ current 23±2℃ with a voltage limit of 4.8V and end the test when current drops close to 0.01C
2.3.3	Overdischarge	No smoke or fire	Charged the cells at $1C_5A$ current 23±2℃ with a voltage limit of 2.75V; then store for 14 days with 10Ω load
2.3.4	Impact	No smoke or fire	After full charge, a 15.8mm diameter bar is inlayed into the bottom of a 9.1kg weight and the weight is to be dropped from a height of 0.61m onto a sample battery and then the bar will be across the center of the battery.
2.3.5	Compression	No smoke or fire Temperature<130℃	After full charge, connect to the thermocouple; placed it between two iron flat mould, quickly compress the battery with 13 KN.
2.3.6	Heating	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 30 minutes at 130±2℃

6. Curves


Voltage（V）
4. 40
4. 20
4. 00
3. 80
3. 60
3. 40
3. 20
3. 00
2. 80
1C
0.5C
0.2C
0 30 60 90 120 150 180 210 240 270 300 330 360
Charger time（min）


Voltage（V）
4. 35
4. 15
3. 95
3. 75
3. 55
3. 35
3. 15
2. 95
2. 75
0.2C
0.5C
2C
1C
Capacity ratio(%)
0 20 40 60 80 100


Capacity ratio(%)
120
100
80
60
40
20
0
−20 −10 0 25 60
Temperature（℃）



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 : -10℃ to 60℃.
  Store less than 1 month : -5℃ - +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.