EEMB BATTERY

Li-ion Battery

Specification

锂离子电池

产品规格书

Model 型号：	**LIR18650**
Capacity 容量：	**3000mAh**

Prepared 编制	Checked 审核	Approved 批准
向娇蓉		

Customer 客户名称：

Customer Approval（Customer confirmation）客户确认:		
Signature 签字	**Checked 审核**	**Approved 批准**

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Catalog

1. Scope 适用范围

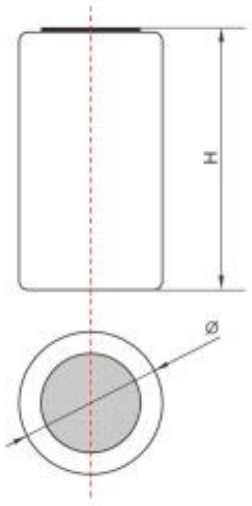
This product specification defines the requirements of the rechargeable Lithium-ion Battery supplied to the customer by EEMB Co., Ltd.
本产品规格书适用于 EEMB 提供的锂离子电池。

2. Battery Cell Basic Characteristics 电芯产品基本特性

No.	Item 项目		Characteristics 性能指标	Remark 备 注
2.1	Model 型 号		LIR18650	
2.2	Capacity 容量	Nominal 标称容量	3000 mAh	0.2C_5A
		Minimum 最小容量	2900 mAh	0.2C_5A
2.3	Nominal Voltage 额定电压		3.7 V	
2.4	Weight 重 量		Approx. 46.50 g	
2.5	Internal Impedance 内 阻		≤ 60 mΩ	AC 1KHz(50% charge) with PTC
2.6	Charge 充 电	Maximum Current 最大充电电流	1500 mA	0.5C_5A（CC&CV）
		Limited Voltage 充电上限电压	4.35±0.005 V	
		End-of Current 充电截至电流	30 mA	
2.7	Discharge 放 电	Maximum Current 最大放电电流	1500 mA	0.5C_5A
		Max. Continuous Current 最大持续放电电流	4500 mA	5~50℃, 1.5C
		Max. Instantaneous Current 最大瞬间放电电流	6000 mA	2.0C
2.8	Operation Temperature 工作温度	Charge 充电温度	0 ~ 45 ℃	
		Discharge 放电温度	-10 ~ +50 ℃	
2.9	Storage Temperature 贮存温度	1 month 1 个月（贮存期）	-20 ~ +50 ℃	
		3 months 3 个月（贮存期）	-20 ~ +45 ℃	
		12 months 12 个月（贮存期）	-20 ~ +20 ℃	

3. Battery Cell Shape and Dimensions（Unit：mm）
产品外形及尺寸（单位：mm）

Item 项目	Specification 规格
Diameter	≤18.40
Height	≤65.00



4. Appearance 外观

It shall be free from any defects such as remarkable scratches, breaks, cracks, discoloration, leakage, or middle deformation.
电池表面无划伤、裂纹、脏点、锈蚀、变形、变色、漏液等缺陷，中间无翘起。

5. Performance Test 电池性能测试规范

5.1 Definition 定义

Standard charge method 标准充电方式：
“Standard charge”shall consist of charging at constant current of 0.3C .The cell shall then be charged at constant voltage of 4.35V while tapering the charge current ,charging shall be terminated when the charging current has tapered to 30mA.For test purpose ,charging shall be performed at 25℃±2 ℃.
指在 25℃±2 ℃环境下，0.3C 恒定的电流充电至 4.35V，再以 4.35V 恒压充电至电流 30mA。

Standard discharge method 标准放电方式：
“Standard Discharge” shall consist of discharging at a constant current of 0.2C to 2.75V. Discharging is to be performed at 25℃±2 ℃ unless otherwise noted (such as capacity versus temperature).
指在 25℃±2 ℃环境下，0.2C 恒流放电至 2.75V。

Fast charge/discharge method 快速充放电方式
Tested at 25℃±2 ℃ Cell shall be charged at constant current of 0.3C to 4.35Vwith end current of 30mA. Cells shall be discharge at constant current of 0.5C to 2.75V. Cells are to rest 10 minutes after charge and 20minutes after discharging.

25℃±2 ℃，0.3C 恒流恒压充电到 4.35V，截止电流为 30mA，搁置 10min，然后 0.5C 放电到 2.75V，搁置 20min。

5.2 Electrical Characteristics 电学性能

ITEM 测试项目	CRITERION 性能标准		Specification(标准)
Discharge rate capacity 倍率放电性能	Discharge capacity at 0.5C/discharge capacity at 0.2C. 0.5C 放电容量/0.2C 放电容量。		≥97%
Cycle life 循环寿命	Cells shall be charged and discharged per 5.1 for 300cycles. A cycle is defined as one charge and one . 电池按 5.1 的测试方法进行充放电 300 周，其中 1 周包含 1 个充电和放电。		≥80%
High-Low temperature discharge performance 高低温放电性能	Cells shall be charged per 5.1 at 25℃±2 ℃and discharge per 5.1 at the following temperatures. 在 25℃±2℃ 按照 5.1 放式充满电，在如下的温度下按 5.2 放式放电。		
	Charge 充电	Discharge（放电）	Capacity 容量
		-10℃	≥65%
	25℃	0℃	≥80%
		25℃	≥100%
		50℃	≥95%
Storage characteristic 储存性能	Cells shall be charged per 5.1 and storage in a temperature-controlled environment at 25℃±2℃ for 30 days.After storage,cells shall be discharged per 5.1 to obtain the capacity remaining . 按照 5.1 方式充满电后，在 25℃±2℃环境下，搁置 30 天，储存结束后，按照 5.1 的方式获得残余容量。		Capacity remaining rate ≥92% 容量保持率≥92%
High temperature storage test 高温储存性能	Cells shall be charged per 5.1 and storage in a temperature-controlled environment at 60 ℃ for 1 week. After storage,cells shall be discharged per 5.1 and cycled per 5.1 for 3 cycles to obtain recovered capacity. 按照 5.1 方式充满电后，在 60℃下存放 1 周，1 周后，按照 5.1 放电，并循环 3 周获得恢复容量。		Capacity recovery rate≥90% 容量恢复率≥90%

5.3 Acclimatization Characteristics 环境适应性能

ITEM 测试项目	CRITERION 性能标准	Specification(标准)
Constant Temperature and High Humidity 恒定湿热性能	Cells are charged per 5.1 and stored at ambient temperature of 40℃±5 ℃(95%RH) for 48H,then placed in room temperature for 2h,after that,check its appearance prior to being discharged cut -off voltage at a constant current of 0.2C. 按 5.1 方式充满电后，将电芯放入 40℃±5 ℃ (95%RH)的恒温恒湿箱中搁置 48H，在室温下搁置 2H 后，目测电芯外观，再以 0.2C 放电至终止电压。	1.no distortion,no rust,no fume,no explosion; 2.The discharging time is not less than 180min. 1.电芯外观应无变形，锈蚀，冒烟或爆炸。 2.放电时间应不低于 180min。
Drop test 自由跌落	Cells charge per 5.1 are dropped onto wooden floor from 1.0 meter height for 1 cycle, 2 drops from each cell terminal and 1 drop from the side of cell can (Total number of drops=3). 按照 5.1 充满电后，将电芯从 1.0m 的高度上跌落到电木板上（从头部、尾部、侧面）三个方向跌落 3 次。	No leakage, no fume, no explosion. 电芯应不漏液，冒烟或爆炸。
Vibration Test 振动试验	After Standard charge,cells are fixed on vibration table and subjected to vibration cycling at the rate of 1Hz per minute between 10HZ and 55Hz. The excursion of the vibration is 1.52mm.The test has to be carried out for 90 minutes at x,y and z axes individually. 将充满电的电池以振幅 0.76mm（双振幅为 1.52mm）的正弦振动，振动频率范围为 10Hz-55Hz，频率变化速率 1HZ/min。沿 X、Y、Z 三个方向振动，每个方向振动 90min±5min。	No leakage, fire or explosion. 不漏液，不起火，不爆炸。

5.4 Safety Characteristics 安全性能

ITEM 测试项目	CRITERION 性能标准	Specification(标准)
Crush Test 挤压测试	A cell is to be placed on the crush flat,the axis is parallel to the crush flat,it is to be crushed between two flat surfaces.Crushing force is approximately 13KN and hold for 1 min. 电芯放在挤压设备的两个挤压表面之间，圆柱电芯轴平行于挤压平面，逐渐增加压力至 13KN，保持压力 1min。	No fire,no explosion. 电芯不起火，不爆炸。
Impact Test 重物冲击	Cells charge per 5.1 are impacted with their longitudinal axis parallel to the flat surface to the flat surface and perpendicular to the longitudinal axis of the 15.8±0.2 mm diameter bar. A 9.1±0.1 Kg weight is to be dropped from a height of 610±25 mm onto the cell. 将电池充满电后，将电池置于平台表面，使其纵轴向与重物表面平行，将直径为 15.8±0.2 的金属棒横置在电池的几何中心上表面，将重量为 9.1±0.1Kg 的重物从 610±25mm 高处自	No fume,no explosion. 电芯不冒烟或爆炸。

	由落体状态撞击在电池表面。	
Heating Test 热冲击	Cells are charged per 5.1 heated in a circulation air oven at a rate of (5±2)℃ per minute to (130±2)℃. At 130℃ oven is to remain for 10 minutes before test is discontinued 电池按照 5.1 方式充满电后，将电芯放在电热鼓风干燥箱中，温度以(5±2)℃/min 的速率由室温升至(130±2)℃，并保持 30min。	No fire or explosion. 不起火，不爆炸。
Overcharge Test 过充电	A cell is discharged to cut-off voltage at CC of 0.2C ,then it is to be subjected to CC/CV power by connecting its positive & negative terminal,then set the current of 3 times the max.set the voltage as 10V,after that ,charge the cell up to 10V at 3 times current at the max,until that last 7h at the voltage of 10V or the voltage in no more increased. 先将电池 0.2C 放电至终止电压，然后将电芯正负极连接于恒压电源，调整电流至 3 倍电流中的最大值，电压为 10V，然后对电芯以 3 倍电流中的最大值，直到输出的电压不低于 10V，持续充电 7H 或者电压不再增加。	No fire,no explosion. 电芯不起火，不爆炸。
Short-circuit test 短路测试	Cell are charged per 5.1. and the positive and negative terminal is connected by a (80±20)mΩ-wire. Monitor its temperature while testing, the cell is to be discharged until the cell case temperature has returned to be 20% less then peak temperature. 按照 5.1 的方式充满电后，将正负极用（80±20）mΩ的导线连接起来，实验过程监控电芯温度变化，当电芯温度下降到比峰值低约 20%，结束实验。	1.No fire ,no explosion. 2.Max.temp.<150℃. 1.电芯不起火，不爆炸。 2.最高温度<150℃。

6. Warranty 保质期

6 months warranty for sample battery after date of production. One year warranty for finished battery after the date of production.
样品电池保质期为（出厂之日起）半年；产品电池保质期为（出厂之日起）1 年。

7. Matters Needing Attention 注意事项

Strictly observes the following needing attention. EEMB will not be responsible for any accident occurred by handling outside of the precautions in this specification.
您必须严格遵守下述电池使用注意事项。对于没有按照以下注意事项所造成的任何意外事故，EEMB 不负担任何责任。

! Danger 危险

- Strictly prohibits heat or throw cell into fire.
  严禁把将电池投进火中或进行加热。

- Strictly prohibits throw and wet cell in liquid such as water、gasoline or drink etc.
  严禁把电池投入液体中，如水、汽油、饮料等，也不要把电池弄湿。
- 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.
  禁止在火源附近或温度超过 60℃的轿车中使用或遗留电池，也不要在这些环境中进行充放电。
- 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.
  禁止把电池同项链、发夹、硬币或螺钉等金属品一起放在兜中或包中，也不要把电池同上述物品一起储存或运输。
- Strictly prohibits short circuit the (+) and (-) terminals with other metals.
  禁止使用金属导体短路电池的正负极。
- Do not place Cell in a device with the (+) and (-) in the wrong way around.
  在装入设备时注意电池的正负极不要反装。
- Strictly prohibits pierce Cell with a sharp object such as a needle.
  禁止使用锐利的物品刺穿电池。
- Strictly prohibits disassemble or modify the cell.
  禁止对电池进行分解。
- Strictly prohibits welding a cell directly.
  禁止直接对电池进行焊接。
- Do not use a Cell with serious scar or deformation.
  禁止使用已经损坏的电池。
- 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.
  在使用之前请详细阅读操作说明书，不适当的操作可能引起电池变热、着火、爆炸、毁坏或电池容量的衰减。

! Warning 警　告

- Strictly prohibits put cell into a micro-ware oven, dryer, or high-pressure container.
  禁止把电池放加热器皿、洗衣机或高压容器中。
- 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.
  禁止把电池同干电池或其它原电池或者新旧电池一起使用，也不要同不同包装、不同型号或不同品牌的电池一起使用。
- Stop charging the Cell if charging is not completed within the specified time.
  如果在规定的充电时间内充电没有结束，停止充电。
- Stop using the Cell if abnormal heat, odor, discoloration, deformation or abnormal condition is detected during use, charge, or storage.
  在使用、充电或储存期间如发现电池有变热、散发气味、变色、变形或其它反常之处停止使用。
- Keep away from fire immediately when leakage or foul odor is detected.
  当发现电池漏液或散发出难闻的气味时立即远离。
- If liquid leaks onto your skin or clothes, wash well with fresh water immediately.
  如果电解液渗漏到您的皮肤或衣服上，立刻用大量清水冲洗。
- If liquid leaking from the Cell gets into your eyes, do not rub your eyes. Wash them well with plenty of

clean flowing water and go to see a doctor immediately.
如果电解液渗出并进入您的眼睛里，不要揉擦您的眼睛，立刻用大量清水清洗眼睛并就医。

! Caution 注　意

- Before using the Cell, be sure to read the user's manual and cautions on handling thoroughly.
  在使用电池之前，应详细阅读操作指南并对使用中的注意事项有足够深刻的理解。
- 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.
  充电时请使用指定的充电器并按照本规格书的要求进行充电。采用恒流恒压方式充电，禁止反向充电。若电池正负极接反，将无法对电芯进行充电；同时，反向充电会降低电芯的充放电性能和安全性，并会导致发热和泄漏。
- Store batteries out of reach of children so that they are not accidentally swallowed.
  把电池放到小孩够不到的地方以免吞服。
- If younger children use the Cell, their guardians should explain the proper handling.
  小孩使用电池时，监护人应详细解释操作方法。
- Before using the Cell, be sure to read the user's manual and cautions on handling thoroughly.
  在将电池装入设备或从设备中取出之前详细阅读设备操作手册。
- 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.
  电池具有使用寿命，如果使用电池的设备的工作时间比平常少的多，请更换新电池。
- When not using Cell for an extended period, remove it from the equipment and store in a place with low humidity and low temperature.
  当长期不用时，要将电池从设备中取出并放在低温低湿的环境中保存。
- While the Cell pack is charged, used and stored, keep it away from objects or materials with static electric charges.
  电池应在远离静电的场所进行充电、使用和储存。
- If the terminals of the Cell become dirty, wipe with a dry clothe before using the Cell.
  如果电池的接线端变脏，在使用之前用干布擦净。
- Storage the cells in storage temperature range as the specifications. After full discharged, we suggest that charging to 3.7~4.0V.with no using for a long time.
  电芯应贮存在产品规格书规定的温度范围内，电芯放电放完后，如果长期不使用，建议充电至3.7~4.0V 贮存。
- 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.
- 电池在长期贮存过程中，必须每 3 个月 0.2C 进行充放电一次，然后充电至 50~70%的容量进行贮存。
- Do not exceed these ranges of the following temperature ranges：
  电池在使用和贮存时的温度不能超出下面的要求：

Charge temperature range 充电 : 0℃ to 45℃;
Discharge temperature range 放电 : -20℃ to 60℃.
Store less than 1 month 贮存 1 个月 : -20℃ - +60℃
Store less than 3 months 贮存 3 个月 : -20℃ - +45℃
Store less than 1 year 贮存 12 个月 : -20℃ - +25

! Special Notice 特别注意

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 3.7~4.0V. And store the battery in cool and dry place.
电池在长时间储存的过程中保持带电量为 50%。我们建议每 3 个月充电至 50%以上容量，保持电压在 3.7~4.0V。将电池存储在阴凉干燥的地方。