

# 深圳市中美通用科技有限公司

公司地址:深圳市龙华区大浪街道华昌路 38 号明坤埕工业园 5 栋 4 楼

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## Li-ion lindrical Battery Specification

### 圆柱电池规格书

**Model: 18650 20C**

**型号: 18650 20C**

**Voltage: 7.4V**

**电压: 7.4V**

**Nominal Capacity: 1500mAh**

**标称容量: 1500mAh**

**Revision: A**

**版本: A**

**Date: 2021-08-26**

**日期: 2021-08-26**

**Customer:**

**客户:**

Registered 编制	Checked 审核	Approved 批准
王杰		丁文杰
2021.08.26		2021.08.26

Customer Approved 客户确认		
Dept. 部门	Signature 签名	Date 日期
QA Dept 品质		
R&D Dept 研发		
Approved 批准		

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## History of specification

### 规格书修订记录

Date 日期	Contents 内容	Remarks 备注
2021-08-26	First issue 初版发行	A 版

## 1. Scope 适用范围

The specification shall be applied to Li-ion polymer rechargeable battery pack of 18650 which is

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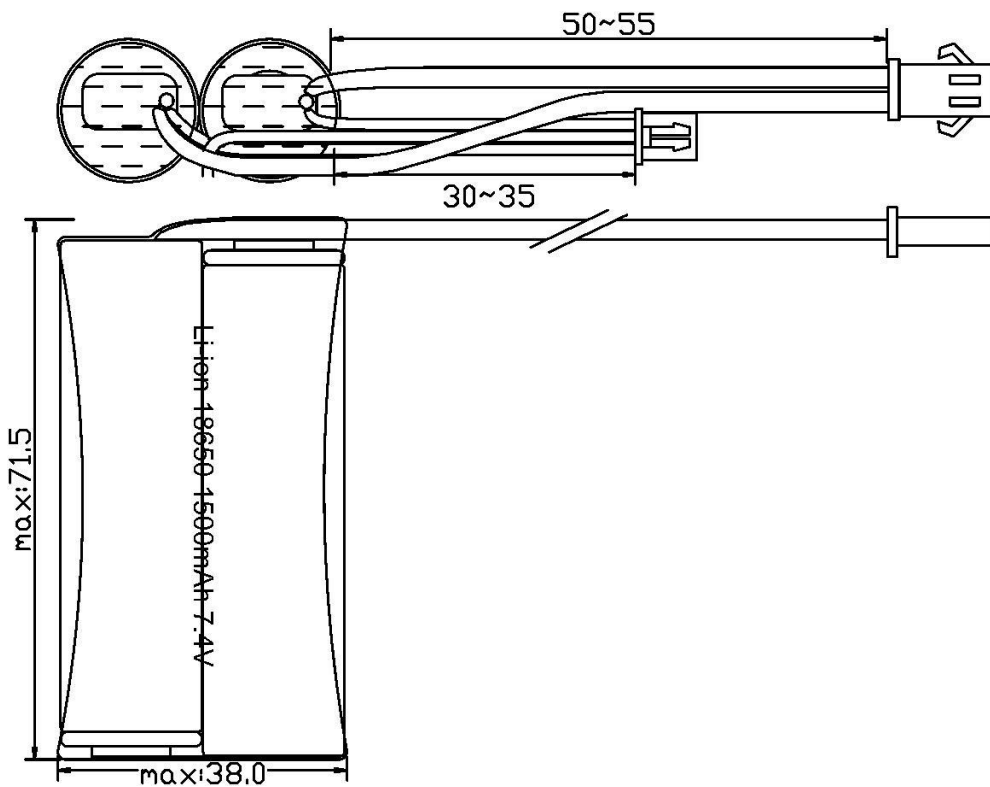
manufactured by SHENZHEN General Electronics Technology CO.,LTD. The product is ROHS compliant.

本规格书适用于深圳市中美通用科技有限公司生产的 18650 可充电锂离子电池, 产品满足 ROHS 要求。

## 2.Battery configuration 电池组成

2.1 Model 电池组总体规格: 7.4V/1500mAh

2.2 Cell 电芯 : 18650/1500mAh



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## 3. Specification 主要技术参数

No.	Items	Criteria	Remarks
3.1	Typical Capacity 典型容量	1500mAh	Discharge:0.2CmA cut-off voltage:8.1V 0.2C 放电至 8.1V 截止
	Minimum Capacity 最小容量	1500mAh	
3.2	Energy 能量	11.1Wh	
3.3	Nominal Voltage 标称电压	7.4V	
3.4	Open Circuit Voltage 出厂电压	≥7.4V	
3.5	Load Voltage 负载电压(33Ω)	≥10.8V	
3.6	Internal Impedance 内阻	Max: 70m Ω	AC 1KHz after standard charge 标准充电后 AC 1KHz 测试
3.7	Charge voltage 充电电压	12.6V	
3.8	Standard charge 标准充	CC/CV, 0. 2C5A, 8. 40V	
3.9	Quick. charge current 快速充电电流	3000mA	1C
3.10	Quick discharge current 快速放电电流	3000mA	2C
3.11	Max. discharge current 最大放电电流	15000mA	10C
3.12	Discharge cut-off voltage 放电截止电压	6.0V	
3.13	Operating Temperature 工作温度	-10~+45°C	Charging 充电
		-10~+45°C	Discharging 放电
3.14	Storage Temperature 贮存温度	23±5°C	Less than 6 months 小于六个月
3.15	Weight 重量	Approx: 84±2g	

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## 4. General Performance 常规性能

### 4.1 Common Performance 产品的常规性能

No.	Items/项目	Testing method and determinant standard /测试方法和判定标准		
1	Charge Performance 充电性能	The battery can be charged when using the original charger. The standard charge mode :under the temperature of 20±5°C,charge the battery with the current of 0.2C until the voltage reaches up to 6V. 使用原装充电器,能够充电。标准充电模式:在20±5°C条件下,电池用0.2C 充电,当电池电压达到6V 时转为恒压充电		
3	Cycle Performance 循环寿命	Constant current 0.5C charge to 8.4V, then constant voltage charge to current declines to 0.01C, rest 10min , constant current 0.5C discharge to 6.0V , rest 10min. Repeat above steps till continuously discharging capacity Higher than 80% of the Initial Capacities of the Cells 先用 0.5 C 恒流充电至 8.4V,再恒压 8.4V 充电直至充电 电流≤0.01C,搁置 10 分钟,再用 0.5C 电流放电至 6.0V;又搁置 10 分钟,再用 0.5C 电流放电至 6.0V;又搁置 10 分钟,重复以上步骤,直到放电容量是初始容量的80%		
4	Charged Storage Characteristics 荷电保持能力	Charge the battery with 0.2C, then shift to charge with constant voltage until thevoltage reaches up to 6.0V, when the charge current ≤0.01C stop charging;rest under the temperature of 20±5°C for 28d then discharge with 0.2C to 6.0V. Recording to the discharging time. 电池按0.2C 充电,当端电压达到6.0V 时改为恒压充电,充电电流小于或等于0.01C时,充电停止;将电池开路放置在20±5°C条件下28 天后,以0.2C 放电至6.0V, 所记录放电时间。		
5	Storage Characteristics 存放性能	Charge the battery ,which is new manufactured shorter than 3 months, with 0.2C until the capacity reaches to 40~50%, after resting for 6 months under the temperature of 20±5°C and the humidity of 45~75%, then charge with 0.2C to 6.0V then shift to charge with constant voltage, after full-charge rest for 0.5h,then discharge with 0.2C to 6.0V. The discharge time required ≥4 h. 将生产日期到实验日期不足3 个月的电池按0.2C 充入40~50%容量后,放置在温度20±5°C、湿度为45~75%的环境中开路存放6个月,电池按0.2C 充电至6.0V 时改为恒压充电, 充饱后;静置0.5h,再以0.2C 放电至6.0V, 要求放电时间≥4h。		
6	Temperature Dependence	35°C~45°C	≥90%	Charge:0.2C,CC/CV,12.6V, current ≤ 0.01C cut-off , at 23±3°C

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of Capacity 容量温度特性	25°C~35°C	≥98%	Discharge:at setting temperature 0.2C,CC, 6.0V cut-off (Interval for temperature change is 2 ho 6.0V 电流≤0.01C 截止 放电: 指定温度下, 0.2C 恒流放电至 6.0V 截止
	-10°C~25°C	≥80%	

## 4.2 Safety Performance 产品可靠性

No.	Items/项目	Testing method and determinant standard /测试方法和判定标准
1	High Temperature Characteristics 高温性能	After standard charging, rest the cells 4h at $60 \pm 2^\circ\text{C}$ , then discharging at 1C to voltage 6.0V, recording the discharging time. 标准充电后, 在 $60 \pm 2^\circ\text{C}$ 条件下贮存 4h, 然后用 1C 放电至 6.0V, 所记录放电时间.
2	Low Temperature Characteristics 低温性能	After standard charging, rest the cells for 16h at $-20 \pm 2^\circ\text{C}$ , then discharging at 0.2C to voltage 6.0V, recording the discharging time. 标准充电后, 在 $-20 \pm 2^\circ\text{C}$ 条件下贮存 16h, 然后用 0.2C 放电至 6.0V, 所记录放电时间
3	Drop Test 跌落实验	Put the cells in the oven. The temperature of the oven is to be raised at $5 \pm 2^\circ\text{C}$ per minute to a temperature of $130 \pm 2^\circ\text{C}$ and remains 30 minutes. 将电池放进烘箱内, 以 $5 \pm 2^\circ\text{C}/\text{min}$ 速度升高烘箱内温度至 $130 \pm 2^\circ\text{C}$ 后, 恒温 30min.

## 4.3 Safe Characteristic 安全性能

No.	Item 项目	Test Methods and Condition 测试方法和条件	Criteria 标准
1	Over charge testing 过充测试	At $20 \pm 5^\circ\text{C}$ , charging cells with constant current 2C to voltage 5.0V, Stop test till cells temperature $10^\circ\text{C}$ lower than max temperature. 在 $20 \pm 5^\circ\text{C}$ 状态下, 电池用 2C 电流充电至 5.0V, 监视电池温度变化, 当电池温度下降一峰值低约 $10^\circ\text{C}$ 时, 停止实验	No fire or explosion 不起火, 不爆炸

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2	Over discharge testing 过放测试	At 20±5°C, According to the requirements of standard charge, the cells will be discharge to cut-off voltage, then The discharged cell is then subjected to a forced discharge at constant current 1C to -4.2V. The total duration for the forced discharge testing is 90 min. 在 20±5°C状态下, 按标准放电的要求放电至终止电压后, 然后以 1C 电流强制放电至 -4.2V,持续强制放电 90 分	No explosion, no fire, no leakage. 不爆炸,不起火,无泄液
3	Short-circuit testing 短路测试	At 55±5°C, After standard charging, connect cells anode and cathode by wire which impedance less than 80±20mΩ, The cell remains on test for 24 h or until the surface temperature declines by 20 % of the maximum temperature rise, whichever is the sooner. 在 55±5°C状态下,标准充电后,将电池的正负极用一根小于 80±20mΩ的导线连接,放置 24 小时或电池显示温度是最高温升的 20%	No fire or explosion, no leakage. 不起火,不爆炸,无泄液

※ Above testing of safe characteristic must be with protective equipment.(安全性能测试应在有保护措施下进行)

## 5. Storage and Shipment Requirement 存储及运输要求

Item 项目		Requirement 需求
Storage temperature 储存温度	Long period less than 6 month 不超过 6 个月的长期存放	23±5°C
Humidity 湿度	65±20%RH	
Voltage 电压	11.40V~11.85V	

## 6. CAUTIONS IN USE 使用警告

To ensure proper use of the battery please read the manual carefully before using it. Handling  
为了使电池安全的使用及处理请在使用前认真的阅读操作说明

- Do not expose to, dispose of the battery in fire.
- 不能把电池曝晒或丢在火中
- Do not put the battery in a charger or equipment with wrong terminals connected.
- 电池充电时不能把正负极性装反

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- Avoid shorting the battery
- 避免短路电池
- Avoid excessive physical shock or vibration.
- 避免过分的物理震动和冲击电池
- Do not disassemble or deform the battery.
- 不能拆解或使电池变形
- Do not immerse in water.
- 不能将电池浸入水中
- Do not use the battery mixed with other different make, type, or model batteries.
- 不能将其它不同厂家, 类型, 型号的电池混合使用
- Keep out of the reach of children.
- 禁止小孩接触电池
- . charge and discharge 充放电
  - Battery must be charged in appropriate charger only.
  - 电池必须在合适的条件下充电
  - Never use a modified or damaged charger.
  - 决不能用故障的充电器给电池充电
  - Do not leave battery in charger over 24 hours.
  - 电池持续充电不能超过 24H
- . storage 贮存
  - Store the battery in a cool, dry and well-ventilated area.
  - 电池贮藏在通风干燥的环境中
- . disposal 处理
  - Regulations vary for different countries. Dispose of in accordance with local regulations.
  - 不同国家法规的不同, 处理时根据当地的法规。

## 7. Battery operation instruction 电池操作说明

### 7.1 Charging 充电

Charging current: Cannot surpass the biggest charging current which in this specification book stipulated.

充电电流: 不能超过规格书规定的最大的充电电流

Charging voltage: Does not have to surpass the highest amount which in this specification book stipulated to decide the voltage.

充电电压: 不能超过规格书规定的最高的限制电压

Charge temperature: The battery must carry on the charge in the ambient temperature scope which this specification book stipulated.

充电温度: 电池充电温度必须按照规格书的温度范围执行

Uses the constant electric current and the constant voltage way charge, the prohibition reverse charges. If the battery positive electrode and the cathode meet instead, can damage the battery.

先恒流后恒压方式充电, 禁止颠倒的方式充电。如果电池正负极颠倒充电会带来危险。

### 7.2 Discharging current 放电电流

The discharging current does not have to surpass this specification book stipulation the biggest discharging



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current, the oversized electric current electric discharge can cause the battery capacity play to reduce and to cause the battery heat.

电池放电电流不能超过规格书规定的最大放电电流, 过大的电流放电会造成电池发热和容量衰减。

## 7.3 discharge temperature 放电温度

The battery discharge must carry on in the ambient temperature scope which this specification book stipulated

电池放电温度必须按照规格书的温度范围执行

## 7.4 Over-discharges 过放电

After the short time excessively discharges charges immediately cannot affect the use, but the long time excessively discharges can cause the battery the performance, battery function losing. The battery long-term has not used, has the possibility to be able to be at because of its automatic flashover characteristic certain excessively discharges the condition, for prevented excessively discharges the occurrence, the battery should maintain the certain electric quantity.

短时间的的过充过放不影响电池的使用, 但是长时间的过放电会影响到电池的功能失效, 电池永久性不能适用, 可能电池过放还有一个原因是自动能量的消失。预防电池过放的出现方法电池应保持一定的电量。

## 7.5 Storing the Batteries 贮存电池。

The battery should store in the product specification book stipulation temperature range. If has surpasses above for six months the long time storage, suggested you should carry on additional charge to the battery.

电池贮存在规格书规定的温度范围内, 如果电池贮存超过六个月, 建议你开始给电池充电。

## 8. Period of Warranty 保质期

The period of warranty is half a year from the date of shipment. guarantees to give a replacement in case of cells with defects proven due to manufacturing process instead of the customers abuse and misuse.

电池的保质期从出货之日算起为半年。如果证明电池的缺陷是在制造过程中形成的而不是由于用户滥用及错误使用造成, 本公司负责退换电池。

## 9. Other The Chemical Reaction 其它化学反应

Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage. If the batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may indicate it is time to change the battery.

由于电池是利用化学反应的原理, 所以随时间的增加电池的性能会降低, 即使是存放很长一段时间而不使用。如果使用条件如充电、放电及周围环境温度等情形不在指定的使用范围内, 也会缩短电池的使用寿命, 或者产生漏液导致设备损坏。如果电池长周期不能充电, 即使充电方法正确, 这样需要更换电池了。

## 10. Note: 备注

Any other items which are not covered in this specification shall be agreed by both parties.

本说明书未包括事项应由双方协议确定。