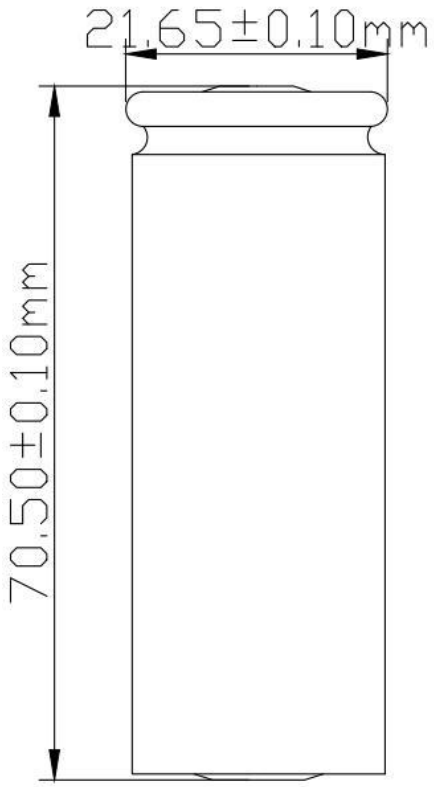
CKAA21700P Fast charge

Item 项目		Specification 标准	Explain 备注
1	Capacitance 额定容量	4200mAh	
2	Minimum capacity 最低容量	4100mAh	
3	Nominal voltage 标称电压	3.6V	
4	Maximum working voltage 最大工作电压	4.2V	
5	Minimum operating voltage 最小工作电压	2.5V	
6	Direct Current Resistance 直流内阻	≤9mΩ	(10ms) 4.2V@25±3℃
7	Alternating Current Resistance 交流内阻	≤8mΩ	(1kHz) 4.2V@25±3℃
8	Standard charge current 标准充电电流	2.1A	
9	Maximum charging current 最大充电电流	6.3A	
10	Rated current 额定放电电流	2.1A	25±3℃
11	Max Continuous Discharge Current 最大持续放电电流	45A（80℃截止Cut-off）	
12	Maximum pulse discharge current 最大脉冲放电电流	62A	
13	Charging temperature range 充电温度范围	0~45℃	

14	Discharge temperature range 放电温度范围	-40~60℃	
15	Storage Temperature Range 存储温度范围	-20~45℃	1 year
16	Fast charging cycle life 快充循环寿命（1C 充 1C 放）	≥500 次	@25±3℃
17	Standard cycle life 标准循环寿命（0.5C 充 0.5C 放）	≥700 次	@25±3℃
18	Cell Weight 电池重量	≤69.0g	
19	Cell Dimensions 电池尺寸	Φ21.65×70.50 ±(0.1mm)	直径×高度 D*L

Product structure and size 产品结构、尺寸



产品直径 D	产品高度 L
21.65±0.10mm	70.50±0.10mm
带套管状态 Case included	

Testing Methods 产品测试方法

Testing Conditions 测试条件

The standard testing conditions of this product specification are: under standard atmospheric pressure, temperature 25±3℃, relative humidity less than 65%.

本产品规格书标准测试条件为：标准大气压下，温度 25±3℃，相对湿度小于 65%。

Test equipment 测试设备

(1) Vernier Scale 游标卡尺

The slide caliper should have 0.01mm scale.

游标卡尺的测试精度应为 0.01mm。

(2) Ammeters and Voltmeters 电流表和电压表

The ammeters and voltmeters should have an accuracy ofthe grade 0.5mAand 0.5mV or higher

电流表和电压表的精度应分别为 0.5mA 和 0.5mV 或以上。

(3) Impedance Meter 电压内阻测试仪

AC Impedance 1000 Hz

交流阻抗测量频率：1000 Hz

(4) Other information 其他信息

- Temperature meter：Precision ≤ 0.5℃

  温度仪表要求：精度为≤0.5℃
- Time measurement tolerance：±0.1%

  时间测试公差：±0.1%
- The size measurement tolerance；±0.1%

  尺寸测量公差：±0.1%
- The quality measurement tolerance 0.1%

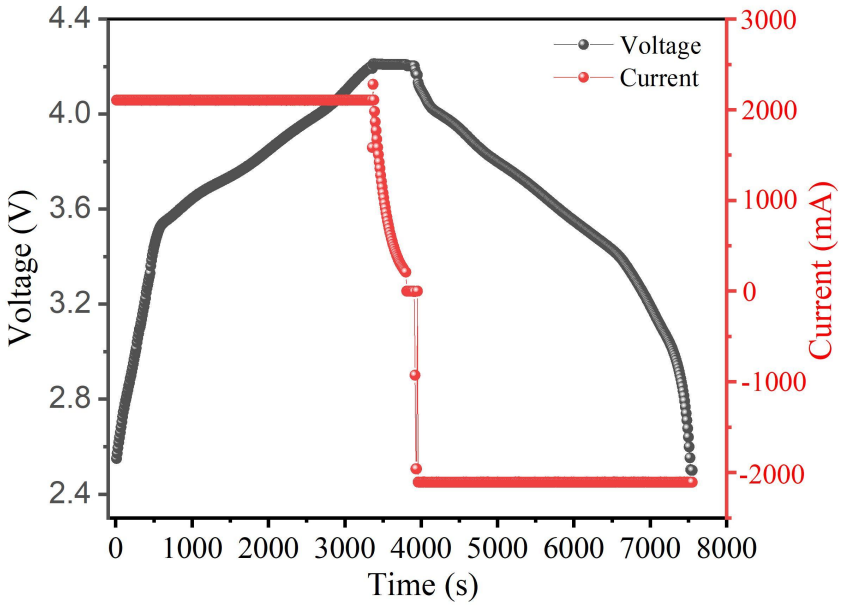
  质量测量公差：±0.1%

Test for Capacitance 容量测试

At 25±3℃, discharge the battery with a constant current I to U_{min} before testing. Charge the product at 0.5C to the set voltage of 4.2V, then charge it at constant voltage to 0.2A and cut off the

current. Then, discharge the product at 0.5C to 2.5V. After standing for 30 seconds, repeat the above process again, and take the capacity value (mAh) after the second discharge as the capacity value of the product.

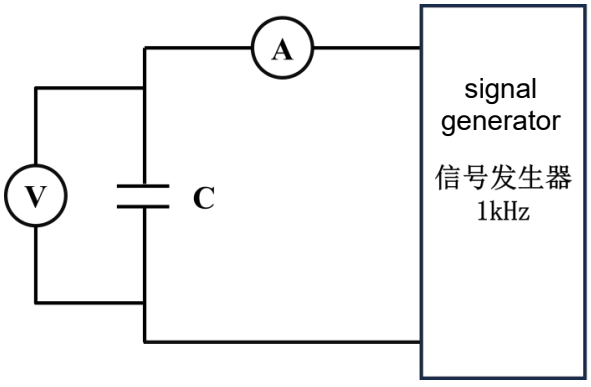
在 25±3℃条件下，在测试前，先将电池用恒定电流 I 放电至 U_{min}。将产品以 0.5C 充电至设定电压 4.2V 后恒压充电至 0.2A 电流截止，紧接着，以 0.5C 电流将产品放电至 2.5V。静置 30s 后，再次重复上述过程，取第 2 次放电后的容量值(mAh)为产品的容量值。



6.4 Alternating Current Resistance(ACR) 交流内阻

Charge the cell to 3.5 ± 0.05V and keep this voltage for 30min, then using the AC Internal resistance to test its AC Resistance at 1kHz.

常温下，将单体充电至 3.5±0.05V 并恒压充电 30min 后，在 1kHz 条件下，采用交流阻抗仪进行交流内阻测试。



Direct Current Resistance(DCR) 直流内阻

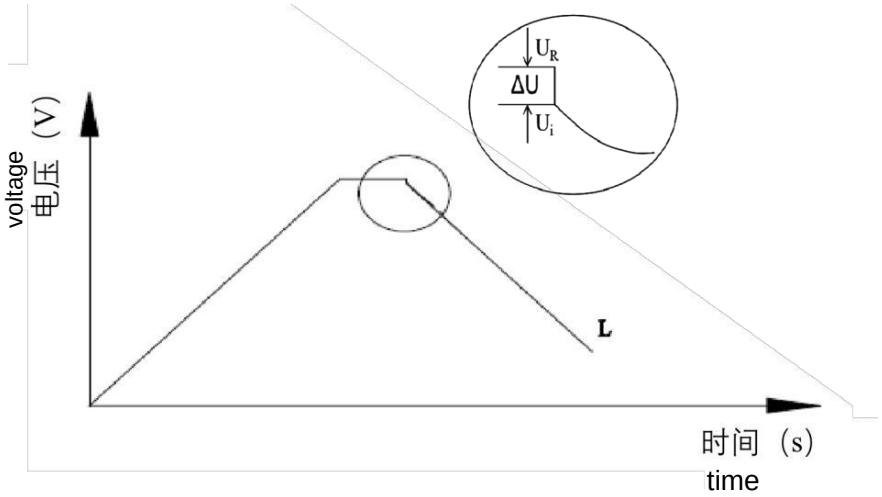
At 25±3℃, discharge the battery with a constant current I to U_{min} before testing. Charge the product at 1C to the set voltage U_R, and then charge it at a constant voltage until the current stops at 0.2A. Record the end time as t_0.

在 25±3℃条件下，在测试前，先将电池用恒定电流 I 放电至 U_{min}。再将产品以 1C 充电至设定电压 U_R 后恒压充电至 0.2A 电流截止，记录结束时刻为 t_0。

Afterwards, discharge the product to 2.5V with a 1C current and record the voltage U_i at t_0+10ms. After standing for 30 seconds, repeat the above process again and calculate the DC internal resistance of the second cycle according to formula (2) as the DC internal resistance of the battery.

后以 1C 电流将产品放电至 2.5V，记录 t_0+10ms 时的电压 U_i。静置 30s 后，再次重复上述过程，按公式(2)计算第 2 次循环的直流内阻，作为电池的直流内阻。

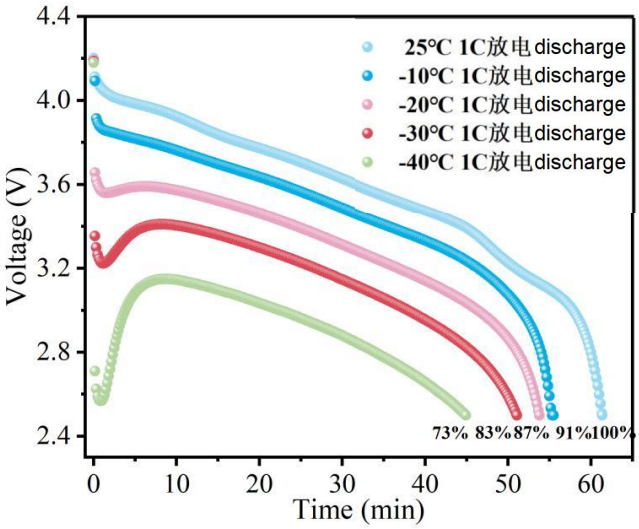
$$DCR= \Delta U/I$$



Test for Low Temperature 低温性能测试

Under the ordered temperature, constant charge the cell to 4.2V and then end it at 0.2A byconstant voltage. After this, remove the cell to different temperature condition (keep 2h) anddischarge it to 2.5V at 1C current, record its discharge capacitance.

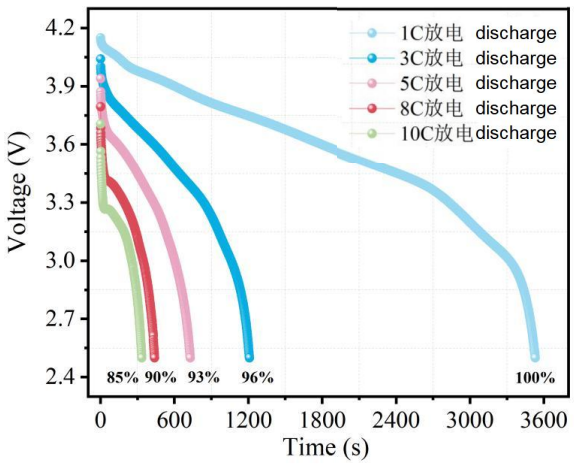
在设定温度条件下，将单体充电至 4.2V 后恒压充电至 0.2A 截止，放入不同温度并保持 2h 后，以 1C 电流将单体放电至 2.5V，记录单体放电过程的容量。

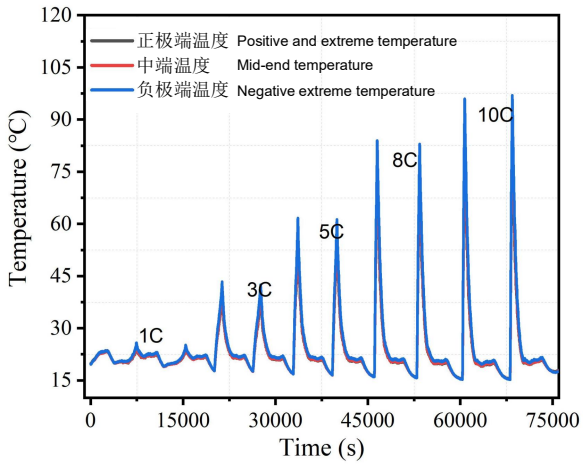


Rate discharge

Under 25±3℃, test the cell's original performance by "Capacitance/resistance method", Aftercharging according to the standard charging method， followed by constant current (N C) dischargeto 2.5V at specified discharge rates at 25±3℃.

在 25±3℃条件下，按照"容量/内阻测试"方法测完初始性能后，按标准充电方式充电后，在 25±3℃下以给定放电倍率 N C 恒流放电至 2.5V。





Charging Method 充电方法

Standard Charge 标准充电

Standard Charge refers to charging at a constant current of 2.1A (0.5C) to 4.2V at an ambient temperature of 25±3℃, and then charging at a constant voltage until the current is less than 0.2A.

标准充电即在环境温度为 25±3℃的条件下，先以恒定电流 2.1A(0.5C)充电至 4.2V，然后恒压充电至电流小于 0.2A。

Rapid Charge 快速充电

Rapid Charge refers to charging at a constant current of 4.2A (1C) to 4.2V at an ambient temperature of 25±3℃, and then charging at a constant voltage until the current is less than 0.2A.

快速充电即在环境温度为 25±3℃的条件下，先以恒定电流 4.2A(1C)充电至 4.2V，然后恒压充电至电流小于 0.2A。

Electrochemical Characteristics 电化学性能

Test Item 测试项目		Test Condition 测试条件	Criteria 检验标准
1	Standard discharge capacity 标准放电容量	At 25±3℃, fully charge the product with standard charging method, and then discharge it at0.5C to a capacity of 2.50V. 在25±3℃条件下，将产品以标准充电方式充满电，然后以0.5C放电至2.50V截止的容量。	Standard discharge capacity ≥4100mAh 标准放电容量≥4100mAh
2	DCR 直流内阻	Charge the product at 1C to the set voltage U_R, then charge it at a constant voltage until the current cutoff is 0.2A, and record the end time as t0. Afterwards, discharge the product to 2.5V with a 1C current and record the voltage U_i at t_0+10ms. After standing for 30 seconds, repeat the above process again and calculate the DC internal resistance of the second cycle using the formula DCR=Δ U/I as the DC internal resistance of the battery.	≤9mΩ

		将产品以1C充电至设定电压UR后恒压充电至0.2A电流截止，记录结束时刻为t_0。后以1C电流将产品放电至2.5V，记录t_0+10ms时的电压U_i。静置30s后，再次重复上述过程，按公式DCR= ΔU/I计算第2次循环的直流内阻，作为电池的直流阻。	
3	Rate discharge performance 倍率放电性能	Standard charge followed by constant current(N C) discharge to 2.5V at specified discharge rates at 25±3℃ . 按标准充电方式充电后，在25±3℃下以给定放电倍率NC恒流放电至2.5V。	Capacity Retension $= \frac{\text{NC discharge capacity}}{\text{1C discharge capacity}} \times 100\%$ 容量保持率 $= \frac{\text{NC 放电容量}}{\text{1C 放电容量}} \times 100\%$
4	Fast charging cycle life 快充循环寿命	Under the condition of 25±3℃, the voltage is cyclically charged and discharged at 1C current between 4.2V~2.5V, and it is allowed to stand for 30min after each cycle. After completing 500 charge-discharge cycles, let stand for 1 hour, and then use standard charge-discharge to test the current capacity of the battery. 在25±3℃条件下，以1C电流在4.2V~2.5V电压间循环充放电，每次循环后静置30min。完成充放电循环500次后，静置1小时，再使用标准充放电测试电池容量。	Capacity Retension $= \frac{\text{discharge capacity of 501th cycel}}{\text{original discharge capacity}}$ $\geq 80\%$ 容量保持率 $= \frac{\text{第 501 次循环的放电容量}}{\text{初始放电容量}} \geq 80\%$
5	Standard cycle life 标准循环寿命	Under the condition of 25±3℃,the voltage is cyclically charged and discharged at 0.5C current between 4.2V~2.5V, and it is allowed to stand for 30s after each cycle. After completing 700 charge-discharge cycles, let stand for 1 hour, and then use standard charge-discharge to test the current capacity of the battery.	Capacity change rate≤-20% 容量变化率≤-20%

		在25±3℃条件下，以0.5C电流在4.2V~2.5V电压间循环充放电，每次循环后静置30s。完成充放电循环700次后，静置1小时，再使用标准充放电测试电池容量。	
6	Discharge temperature performance test 放电温度性能测试	Under the condition of 25±3℃, fully charge the product with standard charging method, and discharge it to 2.5V at a constant current of 1C (4200mA) at the specified temperature. 25±3℃条件下，将产品以标准充电方式充满电后，在指定温度下以1C（4200mA）恒流放电截至到2.5V。	-40℃: Capacity retention≥70% 0℃: Capacity retention≥90% 60℃:Capacity retention≥100% -40℃：容量保持率≥70% 0℃：容量保持率≥90% 60℃：容量保持率≥100%
7	25 ℃ storage performance 25 ℃存储性能	After charge at standard condition, and then stored at 25±3℃ for 30 days. After this, discharge to 2.5V by standard condition. 标准充电方式充满电后25±3℃下存储30天，以标准放电方式放电至2.5V。	Capacity Retension $=\frac{\text{Residual capacity after 30 days storage}}{\text{original discharge capacity}}$ ≥ 95% 容量保持率 $=\frac{\text{存储 30 天剩余容量}}{\text{初始容量}}$ ≥ 95% Capacity recovery rate= $\frac{\text{Recover capacity after 30 days storage}}{\text{original discharge capacity}}$ =98% 容量恢复率 $=\frac{\text{存储 30 天恢复容量}}{\text{初始容量}}$ ≥ 98%
8	High temperature storage performance 高温储存性能	Standard charge to 4.2V and stored at 55℃ for 7 days, and then rest at 25±3℃ for 5 hours, after this, discharge to 2.5V by 1C current. 55℃下以标准充电方式充电至4.2V并存储7天，后在25±3℃下搁置5小时，并以标准放电方式放电至2.5V。	Capacity Retension $=\frac{\text{Residual capacity after 7days storage}}{\text{original discharge capacity}}$ ≥ 95% 容量保持率 $=\frac{\text{存储 7 天剩余容量}}{\text{初始容量}}$ ≥ 95% Capacity recovery rate $=\frac{\text{Recover capacity after 7 days storage}}{\text{original discharge capacity}}$ ≥98% 容量恢复率 $=\frac{\text{存储 7 天恢复容量}}{\text{初始容量}}$ ≥ 98%

Test Item 测试项目		Test Condition 测试条件	Criteria 检验标准
1	Drop Test 跌落测试	Under normal temperature conditions, fully charge the battery to 4.2V, and drop the battery cell from a height of 1.5m in the direction of positive and negative poles to the cement floor. After the experiment, place it for at least 1 hour and conduct a visual inspection. 常温条件下，将电池充满电至 4.2V状态，电芯从1.5m的高度以正负极柱的方向跌落至水泥地面，实验后放置至少1h后进行外观检查。	No explosion, no fire 不爆炸、不起火
2	Vibration Test 振动测试	At room temperature, fix the fully charged battery cell with standard charging method on the vibration table, increase the vibration frequency from 7Hz to 200Hz within 15 minutes, and then reduce it to 7Hz. Repeat the above steps for 3 hours. Maintain an acceleration of 1g during the process of increasing from 7Hz to 18Hz, and maintain an acceleration of 8g during the process of increasing from 18Hz to 200Hz. 在室温条件下，将以标准充电方式充满电的电芯固定在振动台上，在15分钟内将振动频率由7Hz增加到200Hz后再降低至7Hz，重复上述步骤实验3h。7Hz增加到18Hz的过程中保持1g的加速度，18Hz增加到200Hz的过程中保持8g的加速度。	No explosion, no fire, no leakage,Voltage drop less than 5% 不爆炸、不起火、不漏液、电压下降小于5%

Safety 安全性能

Test Item 测试项目		Test Condition 测试条件	Criteria 检验标准
1	Hot Test 高温测试	Under normal temperature conditions, fully charge the battery to 4.2V, and drop the battery cell from a height of 1.5m in the direction of positive and negative poles to the cement floor. After the experiment, place it for at least 1 hour and conduct a visual inspection. 常温条件下，将电池充满电至4.2V状态，电芯从1.5m的高度以正负极柱的方向跌落至水泥地面，实验后放置至少1h后进行外观检查。	No explosion, no fire 不爆炸、不起火
2	Sea Water Immersion Test 海水浸泡	The cell was immersed in 3.5%Nacl solution (mass fraction, simulated seawater composition at normal temperature)for 2h. 将电芯完全浸入3.5%Nacl溶液(质量分数,模拟常温下的海水成分)中搁置2h.	No explosion, no fire 不爆炸、不起火
3	Over-discharge Test 过放电	Constant discharge with 1C current for 90min, then observed for Ih. 以1C电流恒流放电90min,观察1h.	No explosion, no fire,no leakage 不爆炸、不起火、不漏液
4	Over-charge Test 过充电	Charge the battery at 1C to 4.2V and cut off the current at 0. 1C, then charge at 0.5C until the voltage reaches 4.85V or the charging time reaches 60min, and then stop charging Observe the status of the battery for 60min. 电池以1C充满电至4.2V且截至电流0.1C,然后以0.5C充电至电压达到4.85V或充电时间达60min后停止充电,观察60min电池的状态	No explosion, no fire 不爆炸、不起火

5	Short-circuit Test 短路测试	Short-circuit the standard charged cell by connecting positive and negative terminal by less 5 m wire, until the cell case temperature has returned to be 20% less then peak temperature. 短接电芯的正负极,外部线路总电阻<5mQ，当电芯温度下降到比峰值低约20%，结束实验	No explosion, no fire 不爆炸、不起火
6	Thermal Shock Test 热冲击测试	After fully charged according to the standard charge method, the cell is put in an oven. Then set the oven temperature as follows: (1)Decrease the chamber temperature from RT to-40C within 60 min and keep the cell under -40C for 90 min; (2)Raise the chamber temperature from -40℃ to 25C within 60min; (3)Raise the chamber temperature from 25℃ to 85℃ within 90 min and keep the cell under 85℃ for 110 min; (4)Decrease the chamber temperature from 85Cto 25℃ within 70 min; (5)Repeat the sequence for a further 4 cycles. Afterwards, the cell is observed for 1h. 电芯按标准充电方式充电后放入温度箱中，然后按以下步骤调节温度箱的温度： (1)在60min内由25℃降温至-40℃,保持90min； (2)在60min内温度升至25℃； (3)在90min内温度升至85℃，保持110min； (4)在70min内温度降至25℃； (5)循环上述步骤4次。结束后观察1h。	No explosion, no fire 不爆炸、不起火

7	Low Pressure Test 低气压测试	After charging according to the standard charging method, the battery cell is stored for 6 hours at 25+3C and an absolute pressure of 11.6kPa. Low-pressure area test shall be carried out according to UN38.3 standard. 电芯按标准充电方式充电后,在25±3℃、绝对压力为11.6kPa条件下存储6小时.低气压测试按照UN38.3标准执行.	No explosion, no fire, no leakage 不爆炸、不起火、不漏液

Satus of the Cell as of Ex-factory 电芯出厂状态

The battery cell should ensure transportation within the range of 3.30V to 3.50V (20-35%SOC).

电芯应保证在 3.30V 至 3.50V(20~35%SOC)范围内转运。

Instructions and precautions 使用指导和注意事项

Instructions 使用指导

- The operating temperature of lithium-ion batteries should not exceed the upper or lower limit of rated temperature.
  锂离子电池的使用温度不宜超过额定温度上限或下限。
- Lithium-ion batteries should be used within the rated voltage range.
  锂离子电池应在额定电压区间下使用。
- Please confirm the polarity of the lithium-ion battery before use, and reverse connection is prohibited.
  锂离子电池在使用之前请确认极性，禁止反接。
- The external environmental temperature has a significant impact on the lifespan of lithium-ion batteries. Please stay away from heat sources.
  外界环境温度对锂离子电池的寿命具有重要影响，请远离热源。
- Do not come into direct contact with water, oil, acid, or alkali for lithium-ion batteries.
  锂离子电池请勿直接接触水、油、酸或碱。
- Do not squeeze, nail or disassemble lithium-ion batteries.
  请勿挤压、钉刺或拆解锂离子电池。