

# 锂离子电池规格书

## Specification for Lithium-ion Rechargeable Cell

电池型号: 32140FS

Cell Type: 32140FS

|             |            |                |          |
|-------------|------------|----------------|----------|
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#### 4. Construction 电池结构

A cell is made of cathode, anode, separator, steel can and cap, etc.

电池由正极、负极、隔膜、钢壳和盖帽等组成。

#### 5. Parameters 电池参数

##### 5.1. Summary 概要

| Project 项目                  |                            | Specification 规格                                                                            | Condition 条件                                                                                                                                                                                              |
|-----------------------------|----------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nominal Capacity 标称容量       |                            | 15Ah                                                                                        | 25±2°C, 0.5C/0.5C                                                                                                                                                                                         |
| Minimum Capacity 最小容量       |                            | 14.5Ah                                                                                      |                                                                                                                                                                                                           |
| Operating Voltage 工作电压      |                            | 2.0~3.6V                                                                                    | /                                                                                                                                                                                                         |
| Nominal Voltage 标称电压        |                            | 3.2V                                                                                        | /                                                                                                                                                                                                         |
| AC Internal Resistance 交流内阻 |                            | $1.0\text{m}\Omega \leq \text{IR} < 3.0\text{m}\Omega$                                      | AC 1kHz, 30% SOC<br>Standard Deviation ≤ 0.2mΩ 标准差 ≤ 0.2mΩ                                                                                                                                                |
| Cell Weight 电池重量            |                            | 295±10g                                                                                     | contain package 包含外包装                                                                                                                                                                                     |
| Energy Density 能量密度         |                            | 162Wh/kg                                                                                    | /                                                                                                                                                                                                         |
| Operating Temperature 工作温度  | Charging Temperature 充电温度  | -10~60°C                                                                                    | No matter what charging and discharging mode the cell is in, once the cell surface temperature exceeds this range, the charging and discharging should be stopped.<br>无论电池处在何种充放电模式，一旦发现电池表面温度超过此范围即停止充放电 |
|                             | Discharge Temperature 放电温度 | -30~60°C                                                                                    |                                                                                                                                                                                                           |
| Storage Temperature 存储温度    |                            | -20~45°C                                                                                    | 3 months (3 个月)                                                                                                                                                                                           |
|                             |                            | -10~25°C                                                                                    | 6 months (6 个月)                                                                                                                                                                                           |
| Cycle Life 循环寿命             | Standard Cycle 标准循环        | ≥2500 cycles                                                                                | 25±2°C, 0.5C/0.5C, 80% SOH                                                                                                                                                                                |
|                             | Fast Charge Cycle 快充循环     | ≥3000 cycles                                                                                | 25±2°C, fast charge/1C discharge, 70% SOH<br>25±2°C, 快充充电方案/1C 放电, 70% SOH                                                                                                                                |
| Appearance 外观               |                            | Without break, scratch, distortion, contamination, leakage and so on<br>无破裂、划痕、变形、污迹、电解液泄露等 |                                                                                                                                                                                                           |



## 5.2. Charging Parameters 充电参数

| Project 项目                                     | Specification 规格                                             |       | Condition 条件                                                                                                                                                            |        |        |        |
|------------------------------------------------|--------------------------------------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|--------|
| Standard Charging Mode<br>标准充电模式               | 0.5C CC/CV, cut off 3.6V/0.05C<br>0.5C 恒流恒压充电至 3.6V/0.05C 截止 |       |                                                                                                                                                                         |        |        |        |
| Standard Charging Current<br>标准充电电流            | 0.5C                                                         |       | /                                                                                                                                                                       |        |        |        |
| Max. Continuous Charging Current<br>最大持续充电电流   | -10~0℃                                                       | 0~10℃ | 10~20℃                                                                                                                                                                  | 20~45℃ | 45~50℃ | 50~60℃ |
|                                                | 0.2C                                                         | 0.33C | 0.5C                                                                                                                                                                    | 1C     | 0.5C   | 0.2C   |
| Standard End-of-charge Voltage<br>标准充电截止电压     | 3.6V                                                         |       | /                                                                                                                                                                       |        |        |        |
| Max. End-of-charge Voltage<br>最大充电截止电压         | 3.8V                                                         |       | No matter what charging mode the cell is in, once the cell voltage exceeds this range, the charging should be stopped.<br>无论电池处在何种充电模式，一旦发现电池电压超过此范围即停止充电               |        |        |        |
| Fast Charge Charging Time<br>快充充电时间            | 30min                                                        |       | 30%~80% SOC, 25℃                                                                                                                                                        |        |        |        |
| Optimum Charging Temperature Range<br>最佳充电温度范围 | 15~40℃                                                       |       | cell surface temperature<br>电池表面温度                                                                                                                                      |        |        |        |
| Max. Charging Temperature Range<br>最大允许充电温度范围  | -10~60℃                                                      |       | No matter what charging mode the cell is in, once the cell surface temperature exceeds this range, the charging should be stopped.<br>无论电池处在何种充电模式，一旦发现电池表面温度超过此范围即停止充电 |        |        |        |

## 5.3. Discharge Parameters 放电参数

| Project 项目                                     | Specification 规格                            | Condition 条件                                                                                                                                                              |
|------------------------------------------------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standard Discharge Mode<br>标准放电模式              | 0.5C CC, cut off 2.0V<br>0.5C 恒流放电至 2.0V 截止 |                                                                                                                                                                           |
| Standard Discharge Current<br>标准放电电流           | 0.5C                                        | /                                                                                                                                                                         |
| Max. Continuous Discharge Current<br>最大持续放电电流  | 2C                                          | 15~45°C                                                                                                                                                                   |
| Max. Discharge Pulse Current<br>最大脉冲放电电流       | 6C (10s)                                    | 15~45°C                                                                                                                                                                   |
| End-of-discharge Voltage<br>放电截止电压             | 2.0V                                        | /                                                                                                                                                                         |
| Max. Discharge Temperature Range<br>最大允许放电温度范围 | -30~60°C                                    | No matter what discharge mode the cell is in, once the cell surface temperature exceeds this range, the discharge should be stopped.<br>无论电池处在何种放电模式，一旦发现电池表面温度超过此范围即停止放电 |



## 6. Electrical Performance 电性能

| Project 项目                                                           |                                 | Specification 规格 | Condition 条件                |
|----------------------------------------------------------------------|---------------------------------|------------------|-----------------------------|
| Discharge Capacity Retention Rate at Different Temperatures<br>高低温性能 | 55°C/25°C                       | ≥100%            | 55±2°C, 0.5C, cut off 2.0V  |
|                                                                      | 0°C/25°C                        | ≥85%             | 0±2°C, 0.5C, cut off 2.0V   |
|                                                                      | -10°C/25°C                      | ≥75%             | -10±2°C, 0.5C, cut off 1.8V |
| Discharge Capacity Retention Rate at Different Rates<br>倍率性能         | 1C/0.5C                         | ≥98%             | 25±2°C, 1C                  |
|                                                                      | 2C/0.5C                         | ≥98%             | 25±2°C, 2C                  |
| High Temperature Storage<br>高温存储                                     | Charge Retention Rate<br>荷电保持率  | ≥95%             | 55±2°C, 7 days, 0.5C/0.5C   |
|                                                                      | Capacity Recovery Rate<br>容量恢复率 | ≥96%             |                             |
| Normal Temperature Storage<br>常温存储                                   | Charge Retention Rate<br>荷电保持率  | ≥96%             | 25±2°C, 28 days, 0.5C/0.5C  |
|                                                                      | Capacity Recovery Rate<br>容量恢复率 | ≥97%             |                             |

## 7. Safety Performance 安全性能

| Project 项目                   | Test Method 测试方法            | Inspection Standard 检验标准                            |
|------------------------------|-----------------------------|-----------------------------------------------------|
| Forced-discharge Test<br>过放电 | 详见 8.4.1 (GB 38031 8.1.2)   | No fire, no explosion.<br>电池应不起火、不爆炸                |
| Overcharge Test<br>过充电       | 详见 8.4.2 (GB 38031 8.1.3)   | No fire, no explosion.<br>电池应不起火、不爆炸                |
| Short-circuit Test<br>外部短路测试 | 详见 8.4.3 (GB 38031 8.1.4)   | No fire, no explosion.<br>电池应不起火、不爆炸                |
| Heating Test<br>加热测试         | 详见 8.4.4 (GB 38031 8.1.5)   | No fire, no explosion.<br>电池应不起火、不爆炸                |
| Temperature Test<br>温度循环测试   | 详见 8.4.5 (GB 38031 8.1.6)   | No fire, no explosion.<br>电池应不起火、不爆炸                |
| Crush Test<br>挤压测试           | 详见 8.4.6 (GB 38031 8.1.7)   | No fire, no explosion.<br>电池应不起火、不爆炸                |
| Drop Test<br>跌落测试            | 详见 8.4.7 (GB/T 31485 6.2.5) | No leakage, no fire, no explosion<br>电池应不漏液、不起火、不爆炸 |
| Impact Test<br>重物冲击测试        | 详见 8.4.8 (UL 1642 14)       | No fire, no explosion.<br>电池应不起火、不爆炸                |
| Vibration Test<br>振动测试       | 详见 8.4.9 (UL 1642 16)       | No leakage, no fire, no explosion<br>电池应不漏液、不起火、不爆炸 |
| Low-pressure Test<br>低气压测试   | 详见 8.4.10 (UL1642 19)       | No leakage, no fire, no explosion<br>电池应不漏液、不起火、不爆炸 |

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