**No.**

# 合盛新能（宁波）科技有限公司
# 60140 L 18Ah 电池产品规格书

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# 超快充锂离子电池产品规格书

# Flash CHARGE LITHIUM ION BATTERY SPECIFICATION

## 型号 MODEL: FCB 60140L-18Ah

合盛新能（宁波）科技有限公司

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# 目录 CONTENDS

## 1. 概述 Introduction

本产品规格书对合盛新能（宁波）科技有限公司开发的60140超快充锂离子电池产品的性能、测试方法及注意事项等进行了说明。

This specification describes the properties, testing methods and notice of the 60140 Flash Charge Lithium ion capacitors developed by HESHENG ALTERNATIVE ENERGY TECHNOLOGY CO., LTD.

## 2. 产品通用特性 General Features

### 2.1 特点与优势 Features and Advantages

- 充放电速度快 Fast charge and discharge
- 循环寿命长 Long cycle life
- 低温性能好 Good low temperature performance
- 能量密度高 High energy density

### 2.2 典型应用领域 Typical Applications

适用于乘用车储能、乘用车起停、智能电网、港口和重型机械、备用电源等功率型电源系统领域。

Using at Energy storage, Start and stop system, smart grid, harbor machinery UPS and other power system.

## 3. 产品外观和尺寸 Product Appearance & Dimensions

### 3.1 结构及外观 Structure & Appearance

# 4. 产品技术指标 Product Technical Index

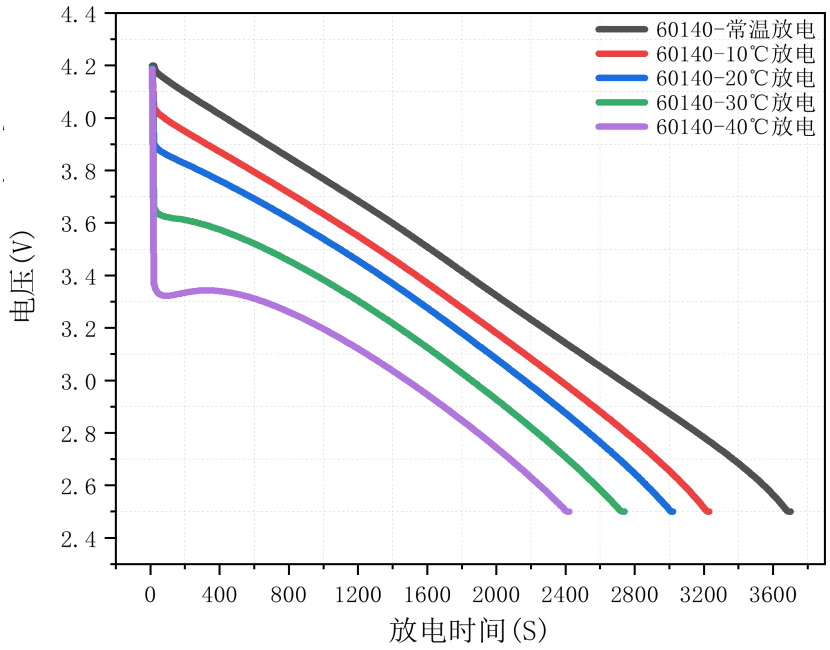
## 4.1 主要参数 Main Parameters

| 序号<br>Series | 特性<br>Merits | 数值<br>Values |
|---|---|---|
| *1* | 额定容量 | 18Ah |
| *2* | 电池能量 | 65wh |
| *3* | 标称电压 | 3.6V |
| *4* | 上限电压 | 4.2V |
| *5* | 下限电压 | 2.5V |
| *6* | 直流内阻(10ms) | ≤0.5mΩ |
| *7* | 标准充电电流 | 54A(3C) |
| *8* | 快速充电电流 | 180A(10C) |
| *9* | 额定放电电流 | 54A(3C) |
| *10* | 最大持续放电电流 | 540A(30C) |
| *11* | 最大放电持续时间 | 90S |
| *12* | 最大温升 | 55±5℃ |
| *13* | 安全性 | 参照 GB/T 31485-2015《电动汽车用动力蓄电池安全要求及试验方法》 |
| *14* | 充放电温度范围 | -40~85℃ |
| *15* | 存储温度范围 | -20~45℃ |
| *16* | 快充循环寿命(@25±5℃，强制散热) | ≥8 千次(5C) |
| *17* | 慢充循环寿命 | ≥2 万次(1C) |
| *18* | 重量 | ≤850g |
| *19* | 尺寸(直径 D×高度 H) | Φ60.5mm×144.5mm（±0.5mm） |

## 4.2 其它信息 Other Technical Information

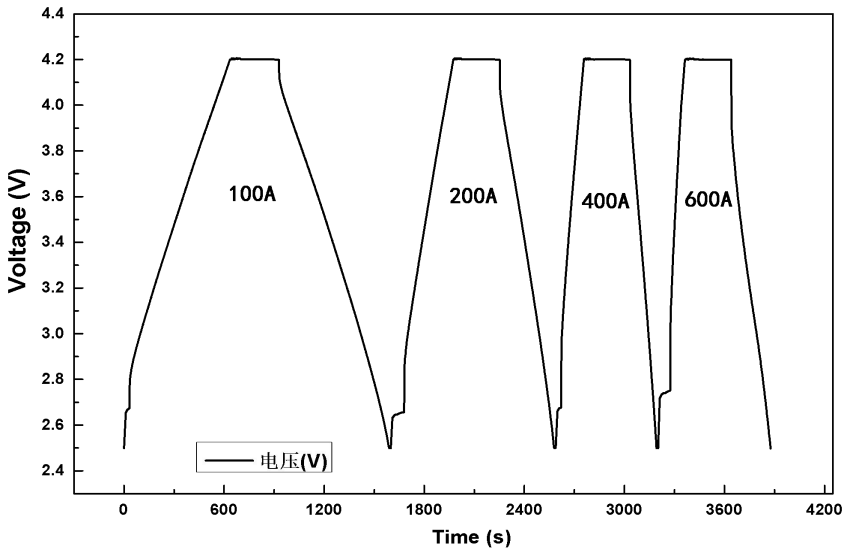
❖ **低温放电性能测试 Low temperature discharge performance**

低温放电曲线 Low temperature discharge curves




❖ **倍率充放电性能测试 Charge/discharge at different rate**

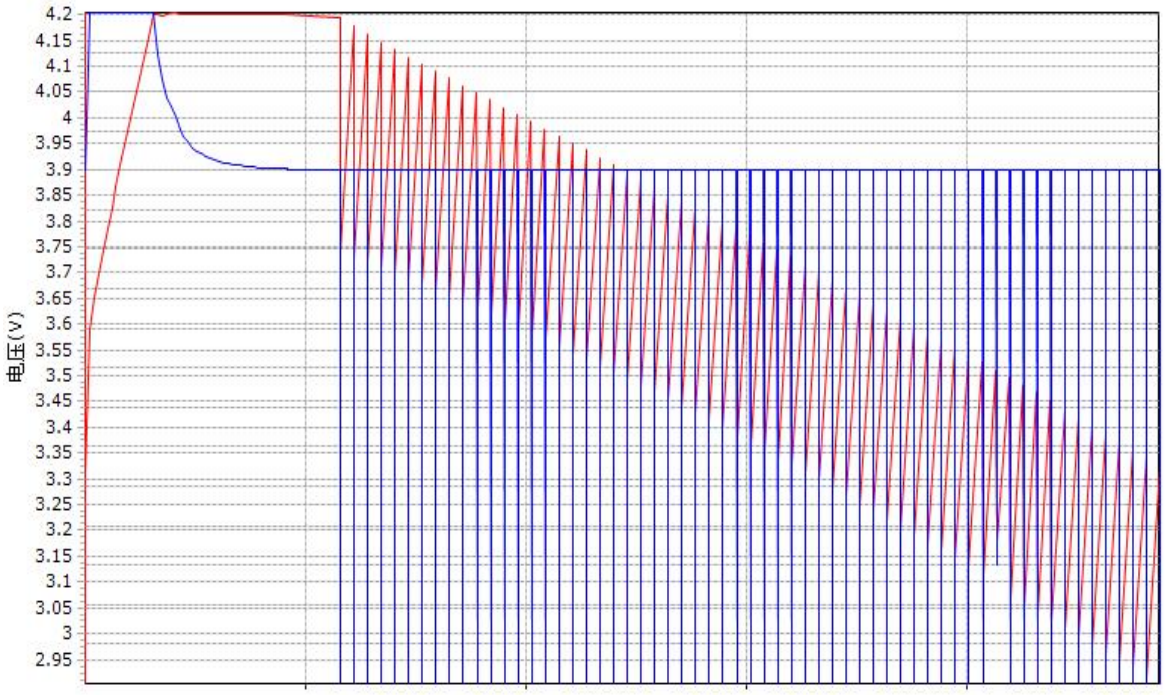
倍率充放电曲线 Rate charge/discharge curves




| 放电电流 | 保持率（%） |
|---|---|
| **20A** | 100% |
| **100A** | 94 |
| **200A** | 92 |
| **400A** | 90 |
| **600A** | 80 |

❖ **脉冲放电性能测试 Pulse discharge performance**

脉冲放电 Pulse discharge @25℃ 1000A/1S




**测试方法：**常温下，10C恒流充电至4.2V，恒压至0.1C截止，搁置2min，以1000A/1s脉冲电流循环放电至2.5V截止，每次循环搁置30s。

## 5 产品测试方法 Testing Methods

### 5.1 测试条件 Testing Conditions

本产品规格书标准测试条件为：标准大气压下，温度25±2℃，相对湿度小于65%。

This specification followed the standard testing criteria: 1 atm, 25±2 ℃ and a relative humidity < 65%.

### 5.2 容量/内阻测试 Test for Capacitance/Internal resistance

容量测试：在 25±5℃条件下，将产品以 1C 充电至设定电压 4.2V 后恒压充电至 0.1C 电流截止，紧接着，以 1C 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(Ah)为产品的容量值。

Capacitance Test: Charge the cell to 4.2V by 1C current and the charge it by constant voltage until the current reached 0.1C. And then, discharge the cell to 2.5V at 1C current. After rested 30s，repeated the last processes and regarded the second capacitance as cell’ s capacitance.

内阻测试：以 3C 电流将产品充电至 4.2V，稳压充电至 0.1C 截止电流后，将其在 1kHz 的交

流阻抗仪上读取其交流内阻值(ACR)。当测量产品的容量时，需在放电过程记录样品从放电开始至放电 10ms 内的电压差，通过 R=ΔU/I 计算产品的直流内阻值(DCR)。注意：“容量与内阻”测试过程，数据采集点的记录时间设为 1s。

Resistance test: Charge the cell to 4.2V by 3C current and charge until 0.1C current by constant voltage, test it’ s ACR at 1kHZ Ac impedance meter. By the way, once test its capacitance, recorded its 10ms voltage difference during the discharge process, and the calculated its DCR by R=ΔU/I. Note: the mix record time is 1s during the “Capacitance and resistance test” process.

**5.3 低温性能测试 Test for Low Temperature**

在设定温度条件下，将单体充电至4.2V后恒压充电至0.1C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。

Under the ordered temperature, constant charge the cell to 4.2V and then end it at 0.1C by constant voltage. After this, remove the cell to different temperature condition (keep 2h) and discharge it to 2.5V at 1C current, record its discharge capacitance.

**5.4 循环寿命 Cycle life test**

在 25±5℃条件下，按照“容量/内阻测试”方法测完初始性能后，产品以 5C 电流将其充电至 4.0V，以 2C 电流恒流放电至 2.5V 并静置 5min，循环测试 2000 周后。上述测试过程为一个周期，测试过程需重复上述 15 次上述周期，最终实现 3 万次寿命测试。

Under 25±5℃, test the cell’ s original performance by “Capacitance/resistance method”, and then charge it to 4.0V by 5C current, discharge it to 2.5V at 2Cconstant current, after this rest 5min, cycle this processes 2000. Regarded the testing process at one cycle, and repeated it 15 times, until it reached 30000 times.

**5.5 电化学性能 Electrochemical Characteristics**

除非有特殊说明，否则所有样品均为新鲜电芯，且按标准充电和标准放电方式进行测试。

Unless otherwise specified, the cell should be fresh cell and tested by standard charge and standard discharge.

| No.<br>序号 | Item<br>测试项目 | Test method and conditions<br>测试方法与条件 | Criterion<br>性能标准 |
|---|---|---|---|
| 5.51 | 倍率放电性能<br>Rate discharge capability | 按标准充电方式充电后，在25±2℃下以给定放电倍率N C恒流放电至2.5V。Standard charge followed by constant current (N C) discharge to 2.5V at specified discharge rates at 25±2℃. | 容量保持率 $=\frac{\text{N C放电容量}}{\text{1C 放电容量}}\times 100\%$<br>$\geq 85\%$<br>Capacity Retension<br>$=\frac{\text{discharge capacity at N C}}{\text{discharge capacity at 1C}}\geq 85\%$ |
| 5.5.2 | 快充循环寿命<br>Quick charge cycle life | 在25±2℃条件下，按照“2.1和2.2”方法测完初始性能后，产品以5C将其充电至4.2V，以3C恒流放电至2.5V并静置5min，循环测试1000周后。上述测试过程为一个周期，测试过程需重复上述8次上述周期，最终实现8000次寿命测试。Under 25±2℃, test the cell’ s original performance by “2.1 and 2.2 methods”, and then charge it to 4.2V by 5C current, | 容量保持率 $=\frac{\text{第8000次循环的放电容量}}{\text{初始放电容量}}$<br>$\geq 80\%$<br>Capacity Retension<br>$=\frac{\text{discharge capacity of 8000th cycel}}{\text{original discharge capacity}}$<br>$\geq 80\%$ |

| | | | |
|---|---|---|---|
| | | discharge it to 2.5V at 3C constant current, after this rest 5min, cycle this processes 1000. Regarded the testing process at one cycle, and repeated it 8 times, until it reached 8000 times. | |
| 5.5.3 | 低温性能测试Low temperature performance | 按标准充电方式充电后，在指定温度下以1C (2500mA) 恒流放电截至到2.5V。Standard charge, and discharge to 2.5V at 1C(2500mA) current under specified temperature. | -20℃：容量保持率≥85%<br>-30℃：容量保持率≥75%<br>-40℃: 容量保持率≥70%<br>-20℃：Capacity retention≥85%<br>-30℃：Capacity retention≥75%<br>-40℃：Capacity retention≥70% |
| 5.5.4 | 25℃存储性能 Storage performance at full charge station under 25℃ | 标准充电方式充满电后25℃下存储30天，以标准放电方式放电至2.5V。After charge at standard condition, and then stored at 25℃ for 30days. After this, discharge to 2.5V by standard condition. | 容量保持率 $= \frac{\text{存储30天剩余容量}}{\text{初始容量}} \geq 90\%$<br>Capacity Retension $= \frac{\text{Residual capacity after 30 days storage}}{\text{original discharge capacity}} \geq 90\%$<br>容量恢复率 $= \frac{\text{存储30天恢复容量}}{\text{初始容量}} \geq 95\%$<br>$\frac{\text{Recover capacity after 30 days storage}}{\text{original discharge capacity}} = 95\%$ |

| | | | |
|---|---|---|---|
| 5.5.5 | 高温存储性能 Storage performance at high temperature. | 55℃下以标准充电方式充电至4.2V并存储7天，后在25℃下搁置5小时，并以标准放电方式放电至2.5V。Standard charge to 4.2V and stored at 55℃ for 7days, and then rest at 25℃ for 5 hours, after this, discharge to 2.5V by 1C current | 容量保持率 $= \frac{\text{存储7天剩余容量}}{\text{初始容量}} \geq 92\%$<br>Capacity Retension $= \frac{\text{Residual capacity after 7days storage}}{\text{original discharge capacity}} \geq 92\%$<br>容量恢复率 $= \frac{\text{存储7天恢复容量}}{\text{初始容量}} \geq 96\%$<br>Capacity Retension $= \frac{\text{Recover capacity after 7days storage}}{\text{original discharge capacity}} = 96\%$ |
| 5.5.6 | 45℃半电存储性能 Storage performance at 45 ℃ and 50%SOC | 室温条件下，以标准充电方式充电至4.2V后以1C放电30min，将电池转移并45℃环境下存储28天，后在25℃下搁置5小时，并以标准充放电方式复测容量。Standard charge to 4.2V and stored at 45℃ for 28 days, and then rest at 25℃ for 5 hours, after this re-test its capacity by standard charge/discharge method. | 容量恢复率 $= \frac{\text{存储28天恢复容量}}{\text{初始容量}} \geq 95\%$<br>Capacity Retension $= \frac{\text{Recover capacity after 28days storage}}{\text{original discharge capacity}} = 95\%$ |

# 6 注意事项 Notice

## 6.1 使用 During Operation

- 超快充锂离子电池的使用温度不宜超过额定温度上限或下限。
  Working temperature of LIB should not exceed the upper and lower limits of the rated temperature.
- 超快充锂离子电池应在额定电压区间下使用。
  LIB should be used at rated voltage.
- 超快充锂离子电池在使用之前请确认极性，禁止反接。
  Check the polarity of LIB before power on. No reverse connecting.
- 外界环境温度对超快充锂离子电池的寿命具有重要影响，请远离热源。
  Keep LIB away from heat. The temperature has a big influence on the working life of LIB.
- 超快充锂离子电池请勿直接接触水、油、酸或碱。
  No direct contacting with water, oil, acid or alkaline.
- 请勿挤压、钉刺或拆解超快充锂离子电池。
  No crushing, nail penetrating or disassembling FCB.
- 请勿随意丢弃超快充锂离子电池，废弃时请根据国家环保标准进行处理。
  No discarding. Dispose LIB based on the State Environmental-protection Standard.
- 本产品发货前已具有一定电压值，使用过程切勿使正负极端子短路。
  The cell embraced constant voltage before shipment, therefore, the short circuit should be extremely forbidden.

## 6.2 储存 Storage

- 超快充锂离子电池不可处于相对湿度为85%以上或含有有毒气体的场所，该种环境下引线及壳体易受潮及腐蚀，导致锂离子电池断路。
  No storage in a condition with a relative humidity exceeding 85% or with toxic gases. It is easy to cause the damage and corrosion of the terminals and case, resulting in disconnection.
- 超快充锂离子电池若需长期储存，请在温度25±5℃，相对湿度60%以下，通风良好的场所存放，严禁暴晒。
  For Long-term storage, place FCB in a well-ventilated condition at 25±5℃, with a

relative humidity below 60%. Forbidden to sun directly.

如有任何关于BTcap超快充锂离子电池的问题，请与我们联系。

If you have any questions about the BTcap LIB, please contact us.