TO:_____

DATE:_____

超快充锂离子电池产品规格书

FLASH CHARGE LITHIUM ION BATTERY SPECIFICATION

型号 MODEL: FCB 18650 L 4R2 C1500

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1. 前言 Preface

本标准描述了圆柱形锂离子电芯的型号、尺寸、特性、技术要求及注意事项。本标准仅适用于东莞市科尼盛电子有限公司开发的圆柱形FCB 18650 L 4R2 C1500超快充锂离子电池。

This specification describes the type， dimension， performance， technical characteristics， warning and cautions of the lithium-ion rechargeable cell. The specification only applies to FCB 18650 L 4R2 C1500 Flash Charge Lithium ion Battery developed by KNSCHA

2. 定义 Definition

2.1 标准充电方式 Standard charge method

在25±2℃下，电芯以3C(4500mA)恒流充电至4.2V，以4.2V恒压充电至0.1C（150mA）。

At 25±2℃, the cell is charge to 4.2V under 3C(4500mA) constant current, then charged under 4.2V constant voltage until the current tapers to 0.1C(150mA).

2.2 标准放电方式 Standard discharge method

在25±2℃下，电芯以1C(1500mA)恒流放电至2.5V。

At25±2℃，the cell is discharged to 2.5V under 1C(1500mA) constant current.

2.3 标称容量 Nominal capacity

电芯标称容量以Cap表示，单位为毫安时（mAh），是指电芯标准充电方式充电后，按标准放电方式放电得到的容量。

The cell nominal capacity，signed as Cap and using mAh as unit, is obtained per standard charge followed by standard discharge.

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 Series	特性 Merits	数值 Values
1	额定容量	1500mAh
2	最低容量	1400mAh
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)	≤15mΩ
7	标准充电电流	4.5A
8	快速充电电流	12A
9	额定放电电流	1.1A
10	最大持续放电电流	15A
11	最大放电持续时间	5min
12	最大脉冲放电电流(10s)	40A
13	充放电温度范围	-40~55℃
14	存储温度范围	-40~45℃
15	快充循环寿命(5C 充 3C 放)	≥6000 次@25±2℃
16	重量	≤45.0g
17	尺寸(直径 D×高度 H)	Φ18.0mm×65.5mm

5. 技术要求 Technical requirements

5.1 电芯使用环境 Cell usage conditions

充电温度 Charge temperature ： -40~55℃

放电温度 Discharge temperature ： -40~55℃

5.2 电芯试验环境 Cell testing conditions

除非有特殊说明，所有测试必须在25±2℃下完成。

Unless otherwise specified，all tests stated should be done at 25±2℃.

5.3 测量仪表要求 Requirement of the testing equipment

电压测量装置 ：不低于0.5级

The voltage measurement device：not less than 0.5 grade

电流测试装置：不低于0.5级

The current measurement device：not less 0.5 grade

交流阻抗测量频率：1000 Hz

AC Impedance 1000 Hz

温度仪表要求：精度为≤0.5℃

Temperature meter：Precision ≤ 0.5℃

时间测试公差：±0.1%

Time measurement tolerance：±0.1%

尺寸测量公差：±0.1%

The size measurement tolerance；±0.1%

质量测量公差：±0.1%

The quality measurement tolerance 0.1%

5.4 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. 序号	Item 测试项目	Test method and conditions 测试方法与条件	Criterion 性能标准

5.4.1	倍率放电性能 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℃.	$\text{容量保持率} = \frac{\text{N C放电容量}}{\text{1C 放电容量}} \times 100\%$ $\geq 80\%$ $\text{Capacity Retension} = \frac{\text{discharge capacity at N C}}{\text{discharge capacity at 1C}} \geq 80\%$
5.4.2	快充循环寿命 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6次上述周期，最终实现6000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, discharge it to 2.5V at 3C constant current, after this rest 5min, cycle this	$\text{容量保持率} = \frac{\text{第6000次循环的放电容量}}{\text{初始放电容量}}$ $\geq 80\%$ $\text{Capacity Retension} = \frac{\text{discharge capacity of 6000th cycel}}{\text{original discharge capacity}}$ $\geq 80\%$

		processes 1000. Regarded the testing process at one cycle, and repeated it 6 times, until it reached 6000 times.	
5.4.3	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（1500mA）恒流放电截至到2.5V。 Standard charge， and discharge to 2.5V at 1C(1500mA) current under specified temperature.	-20℃：容量保持率≥80% -30℃：容量保持率≥75% -40℃: 容量保持率≥65% -20℃：Capacity retention≥80% -30℃：Capacity retention≥75% -40℃：Capacity retention≥65%
5.4.4	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 $= \frac{\text{存储30天剩余容量}}{\text{初始容量}} \geq 85\%$ Capacity Retension $= \frac{\text{Residual capacity after 30 days storage}}{\text{original discharge capacity}} \geq 85\%$ 容量恢复率 $= \frac{\text{存储28天恢复容量}}{\text{初始容量}} \geq 90\%$ $\frac{\text{Recover capacity after 30 days storage}}{\text{original discharge capacity}} = 90\%$
5.4.5	高温存储性能 Storage performance at	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	容量保持率 $= \frac{\text{存储7天剩余容量}}{\text{初始容量}} \geq 85\%$ Capacity Retension $= \frac{\text{Residual capacity after 7days storage}}{\text{original discharge capacity}} \geq 85\%$

	high temperature.	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	容量恢复率 $=\frac{\text{存储7天恢复容量}}{\text{初始容量}}\geq 90\%$ Capacity Retension $=\frac{\text{Recover capacity after 7days storage}}{\text{original discharge capacity}}$ $=90\%$
5.4.6	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 $=\frac{\text{存储7天恢复容量}}{\text{初始容量}}\geq 90\%$ Capacity Retension $=\frac{\text{Recover capacity after 7days storage}}{\text{original discharge capacity}}$ $=90\%$

5.5 环境适应性能和安全性能 Environmental characteristics and safety characteristics

NO. 序号	Item 测试项目	测试条件与方法 Testing method	性能标准 Criterion
5.5.1	过充测试 Overcharge	电芯以标准充电方式充满电，然后以1C充电至电压达到充电终止电压的1.1倍或充电时间达60min后	电芯不起火、不爆炸 No fire, no

	test	停止充电，观察60min。After fully charged according to the standard charge method，the cell is charged at 1C till the ending conditions: Cell’s voltage reaches 1.1 times of the cut-off voltage or the charge time reaches 60min.The cell is observed for 60min afterwards.	explosion
5.5.2	130℃ 热箱测试 130℃ hot oven test	按照标准充电方式充满电后，将电芯放进烘箱内，然后将烘箱按5℃/min升温到130℃，当电芯的温度也达到130℃时，电芯在烘箱130℃环境下保持30min或者电芯起火爆炸为止。 After fully charged according to the standard charge method, the cell is put in an oven at heating speed of 5℃ per minute until the temperatures of both the cell and the oven reach 130℃,The cell shall be maintained at 130℃ for 30 min until a fire or explosion is obtained.	电芯不起火、不爆炸 No fire , no explosion
5.5.3	挤压测试 Cruse test	电芯以标准充电方式充满电后，按垂直于电芯极板方向施压，挤压头为半径75mm的半圆柱体，半圆柱体长度（L）大于被挤压电池的尺寸，当受挤压电芯电压达到0V或变形量达到30%或挤压压力达到200kN后停止挤压，观察1h。After fully charged	电芯不起火、不爆炸 No fire.no explosion

		according to the standard method, the cell is crushed with a half cylinder, of which the radius is 75mm and which is longer than the cell. The direction of the crushing force shall be vertical to axis of the cylinder, stop testing when the cell voltage reaches 0V or the deformation extent reaches 30% or the crushing 200kN, and observed for 1h.	
5.5.4	短路测试 Short circuit test	以标准充电方式充满电后，用内阻小于5mΩ的电线将电芯正负极外部短路10min，观察1h。After fully charged according to the standard charge method, the cell is short-circuited by connecting the positive and negative terminals with a copper wire for 10min,The wire resistance shall be less than 5mΩ.The cell is observed for 1h after test.	电芯不起火、不爆炸 No fire.no explosion
5.5.5	过放测试 Over discharge test	电芯按照标准充电后1C放电90mins观察1h。After fully charged according to the standard charge method, and then discharge at 1C for 90min. Finally, observe for 1h.	电芯不起火、不爆炸、不漏液 No fire, no explosion.no leak
5.5.6	跌落测试 Drop test	电芯按标准充电方式充电后分别以正负极端子两个方向从1.5m高度处自由跌落到水泥地面上。After	电芯不起火、不爆炸、不漏液

		fully charged according to the standard charge method, the cell is dropped with both ends from a height of 1.5m onto the cement floor, Afterwards, the cell is observed for 1h.	No fire no explosion. no leakage
5.5.7	海水浸泡 Seawater immersion	电芯按标准充电后完全浸入3.5%NaCl溶液(质量百分比，模拟常温下的海水成分）中2h，并观察1h。 After fully charged according to the standard charge method, the cell is immersed in sea water (3.5wt% of NaCl) for 2 h, Afterwards, the cell is observed for 1h.	电芯不起火、不爆炸 No fire.no explosion
5.5.8	温度循环 Thermal cycling	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。 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	电芯不起火、不爆炸 No fire.no explosion

		RT to -40℃ within 60 min and keep the cell under -40℃ for 90 min; (2) Raise the chamber temperature from -40℃ to 25℃ 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 85℃to 25℃ within 70 min; (5) Repeat the sequence for a further 4 cycles. Afterwards, the cell is observed for 1 h.	
5.3.9	低气压测试 Low pressure	电芯以标准充电方式充满电后将其放入低气压箱中，调节试验箱中气压为11.6kPa，温度为室温，静置6h，之后观察1h。 After fully charged according to the standard charge method, the cell is put in at the pressure of 11.6kPa for 6 h, Afterwards, the cell is observed for 1h.	电芯不起火、不爆炸、不漏液 No fire no explosion.no leak
备注 Note	除特殊说明，以上安全测试均应在25±2 ℃通风橱中，且附带有保护装置的条件下进行。 Unless otherwise specified, all safety tests above shall be conducted in ventilated environment at 25 ± 2 ℃ and under protective equipment.		

6 包装、存储及运输要求 Package And Storage & Transport

6.1 包装照片 Package Picture

Small box

big box

(100pcs cells in a small box, 4 small boxes in a big box)

6.2 存储及运输要求 Package And Storage & Transport

❖ 存储要求应保持在温度 25±5℃及最大湿度要求 60%。

Storage requirements should be maintained at a temperature of 25±5℃ and a maximum humidity of 60%.

❖ 运输过程中注意轻拿轻放，不要堆叠重物。

During transportation, handle with care and do not stack heavy objects.

7 注意事项 Notice

7.1 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 FCB 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。

FCB 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 FCB 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 FCB away from heat. The temperature has a big influence on the working life of FCB.

❖ 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 LIB.

- ❖ 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 FCB 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.

7.2 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-20~45℃，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 -20 to 45℃, with a relative humidity below 60%. Forbidden to sun directly.

如有任何关于BT LIC超快充锂离子电池的问题，请与我们联系。

If you have any questions about the BT ＬＩＣ FCB, please contact us.