锂离子电芯规格书

Specification
For
Lithium-ion Rechargeable Cell

电芯型号: H18650CIL

Cell Type: H18650CIL

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Approved	**Checked**	**Designed**
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Contents 目录

1 Preface 前言

This specification describes the type and dimension, performance, technical characteristics, warning and caution of the lithium ion rechargeable cell. The specification only applies to H18650CIL cell supplied by Shenzhen BAK Power Battery Co., Ltd.

本标准描述了圆柱型锂离子电芯的外型尺寸、特性、技术要求及注意事项。本标准适用于深圳市比克动力电池有限公司生产的圆柱型 H18650CIL 锂离子电芯。

2 Definition 定义

2.1 Rated capacity:

标称容量：

Rated capacity Cap=2400mAh. Under 25±2℃, the capacity obtained when a cell is discharged at 1-hours rateto voltage 2.75 V，which is signed Cap, the unit is mAh.。

标称容量 Cap=2400mAh，指在 25±2℃环境下，以 1 小时率放电至终止电压 2.75V 时的容量.，以 Cap 表示，单位为毫安培时(mAh)。

2.2 Standard charge method

标准充电方式：

Under 25±2℃, it can be charged to 4.2V with constant current of 0.5C（1200mA）, and then, charged continuously with constant voltage of 4.2V until the charged current is0.01C（24mA）.

指在 25±2℃环境下，以 0.5C（1200mA）的电流恒流充电至单体电芯电压 4.2 V 后，转为恒压 4.2 V 充电，至充电电流小于 0.01C（24mA）时，停止充电。

2.3 Standard discharge method:

标准放电方式：

Under 25±2℃, it can be discharged to 2.75 V with constant current of 1C（2400mA）。.

指在 25±2℃环境下，以 1C（2400mA）的电流恒流放电至单体电芯电压 2.75 V。

3 Cell type and dimension电芯型号及尺寸

3.1 Description and model 电芯说明及型号

Description: Cylindrical Li-ion rechargeable cell

Model: H18650CIL-2400mAh

H18650CIL 型号的圆柱锂离子二次电芯

3.2 Cell dimension 电芯尺寸

Cell physical dimension listed in Figure 1(unit: mm).

电芯尺寸示意图如图 1 所示（单位：mm）。

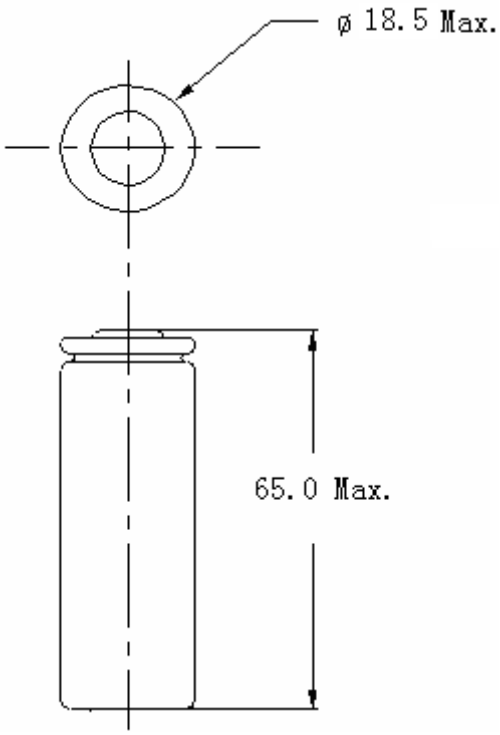

Figure 1/ 图 1

4 Cell characteristicsfresh cell tested at 25±2℃, standard charge and discharge unless otherwise specified

电芯特性（除非有特殊说明，否则所有测试要求为：温度在 25±2℃条件下，样品为新电池，充放电制度为标准充电和标准放电）

ITEM 项目		**SPECIFICATION 规格**
Capacity 容量	Nominal capacity 标称容量	2400 mAh@1C
	Typical capacity 典型容量	2500 mAh@0.2C
Nominal voltage 标称电压		3.6 V
Charge voltage 充电电压		4.2±0.05V
Discharge ending voltage 放电终止电压		2.75±0.05 V
Energy density 能量密度		184Wh/Kg（1C）
Max charge current 最大充电电流		1C（2400mA） 25℃(not for cycle life)
Max discharge current 最大放电电流		3C （7200mA）25℃(not for cycle life)

Storage temperature and time 存储温度和时间	1month（1 个月）：-20～60℃ 3months（3 个月）：-20～45℃ 12months（12 个月）：-20～25℃
Humidity range 湿度范围	0～90%RH (non-condensing 不冷凝)
Internal resistance 内阻	≤35 mΩ(AC Impedance, 1000 Hz)
Cell dimension 电芯尺寸	Height ： 65.0 mm Max 最大高度：65.0 mm Diameter ： 18.5mm Max 最大直径：18.5mm
Weight 重量	≤ 49g

5 Technical requirements技术要求

5.1 Cell usage conditions 电芯使用环境

Temperature of charge 充电温度： 0～45℃

Temperature of discharge 放电温度： -20～60℃

5.2 Cell testing conditions 电芯试验环境

Unless otherwise specified, all tests stated according to following:

除非有特殊说明，所有测试的环境条件要求如下：

Temperature 温度： 25±2℃

5.3 Requirement of the testing equipment 测量仪表要求

The voltage measurement device: Not less than 0.5 grade

电压测量装置：不低于 0.5 级

The current measurement device: Not less than 0.5 grade

电流测量装置：不低于 0.5 级

AC Impedance,:1000 Hz

交流阻抗测量频率：1000Hz

Temperature meter: The precision is ≤0.5℃

温度仪表要求：测量温度的仪表精度不低于 0.5℃

Time measurement unit: ±0.1%

时间测量装置：±0.1%

The size measurement device: ±0.1%

尺寸测量装置：±0.1%

The quality measurement device: ±0.1%

质量测量装置：±0.1%

5.4 Electrochemical Characteristics 电化学特性

(Fresh cells, tested at 25±2℃, standard charge and discharge unless otherwise specified.

（除非有特殊说明，否则所有测试要求为：温度在 25±2℃条件下，样品为新电池，充放电制度为标准充电和标准放电）

NO. 序号	ITEM 测试项目	CRITERION 性能标准
5.4.1	Discharge rate capability 倍率放电性能	Test condition: Temperature : 25±2℃ Charge: CC/CV 0.5C（1200mA） 4.2V cut off current: 0.01C（24mA） Discharge: CC variable values; End-of-discharge Voltage: 2.75V $\frac{\text{discharge capacity at 3C}}{\text{discharge capacity at 1C}} \geq 90\%$; $\frac{\text{3C放电容量}}{\text{1C放电容量}} \geq 90\%$
5.4.2	Cycle life 循环寿命	Test condition: Temperature : 25±2℃ Charge: CC/CV 0.5C（1200mA） 4.2V cut off current: 0.01C Discharge: CC 1C（2400mA）; End-of-discharge Voltage: 2.75V $\frac{\text{Discharge capacity of 501th cycle}}{\text{Original discharge capacity}} \geq 90\%$; $\frac{\text{第501次循环的放电容量}}{\text{初始放电容量}} \geq 90\%$ or $\frac{\text{Discharge capacity of 1001th cycle}}{\text{Original discharge capacity}} \geq 80\%$; $\frac{\text{第1001次循环的放电容量}}{\text{初始放电容量}} \geq 80\%$
5.4.3	High-Low temperature discharge performance 高低温放电性能	Test condition: Charge: CC/CV 0.5C（1200mA）4.2V cut off current: 0.01C（24mA）， at room temperature. Discharge: CC 1C(2400mA) at various temperature; End-of-discharge Voltage: 2.75V，2. 5V (-20℃) $\frac{\text{discharge capacity at -20}^{O}\text{C}}{\text{discharge capacity at 25}^{O}\text{C}} \geq 70\%$; $\frac{\text{-20}^{O}\text{C放电容量}}{\text{25}^{O}\text{C放电容量}} \geq 70\%$ $\frac{\text{discharge capacity at 60}^{O}\text{C}}{\text{discharge capacity at 25}^{O}\text{C}} \geq 90\%$; $\frac{\text{60}^{O}\text{C放电容量}}{\text{25}^{O}\text{C放电容量}} \geq 90\%$
5.4.4	Storage performance 存储性能	5.4.4.1 RT Storage Performance (100%SOC) Test condition: Charge: CC/CV 0.5C(1200mA) 4.2V cut off current: 0.01C(24mA); stored at 25℃for 28 days Discharge: CC 1C(2400mA); End-of-discharge Voltage: 2.75V $\frac{\text{Residual capacity after 28days storage}}{\text{Original discharge Capacity}} \geq 85\%$; $\frac{\text{存储28天后残余容量}}{\text{初始放电容量}} \geq 85\%$ $\frac{\text{Recover capacity after 28days storage}}{\text{Original discharge Capacity}} \geq 90\%$; $\frac{\text{存储28天后恢复容量}}{\text{初始放电容量}} \geq 90\%$

5.4.4.2 High Temperature Storage Performance (100%SOC)

Test condition:

Charge: CC/CV 0.5C(1200mA) 4.2V cut off current: 0.01C(24mA);

stored at 60℃for 7 days

Discharge: CC 1C(2400mA); End-of-discharge Voltage: 2.75V

$$\frac{\text{Residual capacity after 7days storage}}{\text{Original discharge Capacity}} \geq 85\%; \quad \frac{\text{存储7天后残余容量}}{\text{初始放电容量}} \geq 85\%$$

$$\frac{\text{Recover capacity after 7days storage}}{\text{Original discharge Capacity}} \geq 90\%; \quad \frac{\text{存储7天后恢复容量}}{\text{初始放电容量}} \geq 90\%$$

5.4.4.3 High Temperature Storage Performance(50%SOC)

Test condition:

Charge: CC/CV 0.5C(1200mA) 4.2V, cut off current: 0.01C(24mA);

Discharge: CC 1C (2400 mA) for 30min

stored at 45℃ for 28 days

Charge: CC/CV 0.5C(1200mA) 4.2V, cut off current: 0.01C(24mA) after RT kept for 5H.

Discharge: CC 1C(2400 mA); End-of-discharge Voltage: 2.75V

$$\frac{\text{Recovery capacity after 28days strorgge}}{\text{Original discharge capacity}} \geq 90\%; \quad \frac{\text{存储28天恢复容量}}{\text{初始容量}} \geq 90\%$$

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

Meets GB/T31485-2015（QD16E12PB2221）, QCT/743-2006 （QA15E11EB3861）, UL1642（MH29353）and ROHS

Package picture 包装图片

Small box **big box** **pallet**

(100pcs cells in a small box, 2 small boxes in a big box)

6 Shipment 出货

The Cell shall be shipped in voltage range of 3.6 ~ 3.9 V or in accordance with customers' requirement.The remaining capacity before charging shall be changed depending on the storage time and conditions.

单体电芯按 3.6～3.9V 的充电电压或客户要求出货,电芯出货后充电前的剩余容量取决于储存时间和条件.

7 Warranty 质量保证

The Warranty period of cell is made according to business contract. However, even though the problemoccurs within this period, BAK won't replace a new cell for free as long as the problem is not due tothe failure of BAK manufacturing process or is due to customer's abuse or misuse.

自出货之日起.电芯的保质期限依合同而定.但是,在此期限内,如果非比克公司的制程原因。而是客户的误用造成的电芯质量问题,比克公司不承诺免费更换.

BAK will not be responsible for trouble occurred by handling outside of the precautions in instructions.

比克公司对违反安全守则操作所产生的问题不承担任何责任.

BAK will not be responsible for trouble occurred by matching electric circuit, cell pack and charger.

比克公司对与电路,电池组,充电器搭配使用所产生的问题不承担任何责任.

BAK will be exempt from warrantee any defect cells during assembling after acceptance.

出货后客户在电芯组装过程中产生的不良电芯不在比克公司质量保证的范围之列.

8 Storage and Shipment Requirement 存储及运输要求

Item 项目		Requirement 要求
Storage environment 储存环境	Short period less than 1 month 短期少于 1 个月	-20℃ ~ +60℃，90％RH Max
	Long period more than 3 month 长期超过 3 个月	-20℃ ~ + 45℃，90％RH Max
	Recommend storage 推荐存储	-20℃ ~ + 25℃ ，85％RH Max
Long time storage : If the cell is stored for a long time, the cell's storage voltage should be 3.6-3.9V .Also, it is recommended to charge the cell every six months.		

9 Warning and cautions in handling the lithium-ion cell 电芯使用时警告事项及注意事项

Lithium-Ion rechargeable batteries subject to abusive conditions can cause damage to the cell and/or personal injury. Please read and observe the standard cell precautions below before using utilization.

滥用锂离子充电电芯可能会造成电芯的损害或人身的伤害. 在使用锂离子充电电芯以前, 请仔细阅读以下的安全守则：

Note 1. The customer is required to contact BAK in advance, if and when the customer needs other applications or operating conditions than those described in this document.

注释 1. 如果客户需要其它应用程序或本文档中描述之外的操作条件，客户需要提前联系比克。

Note 2. BAK will take no responsibility for any accident when the cell is used under other conditions than those described in this Document.

注释 2.在该文件说明的条件之外使用该电芯而产生的事故，比克公司不承担任何责任.

Warning 警告

Danger warning (it should be described in manual or instruction for users, indicated especially) to prevent the possibility of the battery from leaking, heating, explosion. Please observe the following precautions:

危险警告:（应在使用说明手册或说明书中，特别注明）为防止电池可能发生泄漏，发热，爆炸，请注意以下预防措施:

1	Don't use and leave the cell near a heat source such as fire or heater.
	禁止将电芯在热高温源旁，如火，加热器等旁边使用和留置。
2	Do not use or leave the cell under the blazing sun (or in heated car by sunshine).
	不要将电芯放置在太阳光直射的地方.
3	Do not use or leave the battery at very high temperature conditions (for example, strong direct sunlight or a vehicle in extremely hot conditions). Otherwise, it can overheat or fire or its performance will be degenerate and its service life will be decreased.
	禁止在高温下（直热的阳光下或很热的汽车中）使用或放置电池，否则可能会引起电池过热，起火或功能失效，寿命减短。
4	Do not short circuit, over-charge or over-discharge the cell.
	不要将电芯短路,过充或过放.
5	Don't immerse the battery in water and seawater. Please put it in cool and dry environment if no using.
	严禁将电池浸入海水或水中，保存不用时，应放置在阴凉干燥的环境中
6	Don't reverse the positive and negative terminals
	严禁颠倒正负极使用电池。
7	Do not disassemble or modify the cell.
	不要拆卸或修整电芯.
8	Do not transport and store the battery together with metal objects such as necklaces, hairpins, coins, etc.
	禁止将电池与金属，如发夹，项链等一起运输或贮存。
9	Do not use the cell with conspicuous damage or deformation.
	不要使电芯受到明显的损害或变形.
10	Don't connect the cell to an electrical outlet directly.
	严禁将电芯直接插入电源插座。
11	If the cell leaks and the electrolyte get into the eyes, don't wipe eyes, instead, thoroughly rinse the eyes with clean running water for at least 15 minutes, and immediately seek medical attention. Otherwise, eyes injury can result.
	如果电芯发生泄露，电解液进入眼睛，请不要搓揉，应用清水冲洗眼睛，必要时请立即前往医院接受治疗，否则会伤害眼睛。
12	Do not use lithium ion battery and others different lithium battery model in mixture
	禁止与液态锂离子或不同型号的锂电池混合使用
13	Keep the battery away from babies.
	电池应远离小孩.
14	Do not directly solder the battery and pierce the battery with a nail or other sharp object
	禁止直接焊接电池和用钉子或其它利器刺穿电池。

15	Do not strike , throw or trample the battery.
	禁止敲击或抛掷，踩踏电池等。
16	Being charged, using the battery charger specifically for that purpose
	充电时请选用锂离子电池专用充电器。
17	When disposing of secondary cells, keep cells of different electrochemical systems separate from each other.
	二次电池处理时，请将电池和其他电化学体系的产品分开。
18	In case the battery terminals are dirt, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection with the instrument.
	如果电池弄脏，使用前应用干布抹净，否则可能会导致接触不良功能失效。
19	If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, immediately remove it from the device or battery charge and stop using it.
	如果电池发出异味，发热，变色，变形或使用，贮存，充电过程中出现任何异常现象，立即将电池从装置或充电器中移离并停用。
20	The battery replacement shall be done only by either cells supplier or device supplier and never be done by the user.
	更换电芯应由电芯供应商或设备供应商完成，用户不得自行更换。
21	Be aware discharged batteries may cause fire; tape the terminals to insulate them.
	废弃之电池应用绝缘纸包住电极，以防起火，爆炸。
22	Do not use it in a location where is electrostatic and magnetic greatly, otherwise, the safety devices may be damaged, causing hidden trouble of safety.
	禁止在强静电和强磁场的地方使用，否则易破坏电池安全保护装置，带来不安全的隐患。
23	Prohibition of use of damaged cells
	禁止使用已损坏的电芯。
24	Battery pack designing and packing Prohibition injury batteries.
	电池外壳设计和包装禁止损伤电池。
25	Battery pack should be according to rated range ,any misuse among different rates should not be permitted.
	电池配组时需严格按等级执行，不能跨等级成组。
26	Cell disassemble from pack or module was not permitted, ,unless under the guidance of professional technicians
	严禁将电池从电池包或电池模组中拆卸，除非在专业技术人员的指导下进行。

10 The restriction of the use of hazardous substances 有害物质控制要求

11 This model of lithium-ion cell is in accordance with our company's request of "The hazardous substances and material management standard" or customer's requirements.
本型号锂离子电芯符合本公司《有害物质与材料管理规范》要求或参照客户要求执行！

12 Contact information 联系方式

If you have any questions regarding the cell, please contact the following address:
如有疑问，请按以下地址联系：

Headquarter：BAK Industrial Park on Kuichong Road, Longgang District, Shenzhen. (518119)
厂址：深圳市龙岗区葵涌街道比克工业园(518119)
Tel ：+86-755-61886818-7708（庄生） Fax ：+86-755-84208691
电话：+86-755-61886818-7708 （庄生） 传真：+86-755-84208691

Version change record 修订履历

版次 Version	修改内容 Change Content	页码 Page	修改人 PIC	修改日期 Date
A/00	初版发行		王世珍	2014-3-20
A/01	全部		孙新科	2015-7-30
A/02	2.1.标称容量中，删除“min”	1	孙新科	2015-11-13
A/03	4 充放电截止电压精度改为 0.05； 重量修订为≤49g； 增加典型容量规格； 5.3 修订测量仪表要求； 5.4.2 循环寿命中增加 500 次标准，删除其余标准； 5.4.3 高低温性能中-20℃放电容量标准更改为≥70%； 5.4.4 存储性能中增加 45℃ 28d 50%SOC 存储标准； 5.5 环境性能和安全性能中增加“GB/T31485-2015（QD16E12PB2221）”； 9 修订“危险警告”； 12 修改“联系方式”	2 3 4 5 7 8	滕晓波	2016-6-13