

锂电池组规格书

Lithium Battery Specification

MODEL NO.: 26650 4S3P

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1. Modified List 修订履历

Product Modified Record List

产品变更履历表

Revision 版本	Date 日期	Mark 标记	Modified content 变更内容	Approved by 批准
A1	<u>2018.07.24</u>	-	FIRST RELEASE	zhangniangen

2. Scope 适用范围

This specification describes the basic performance, technical requirement, testing method, warning and caution of the Lithium Ion rechargeable battery packs, the specification only applies to the Lithium battery produced by Shenzhen Kunteng Co., Ltd.

本标准规定了锂离子可充电电池组的基本性能、技术要求、测试方法及注意事项，本标准只适用于深圳市昆腾实业有限公司所提供的锂电池产品。

3. Battery and PCM's specifications 电池及保护板参数

3.1 Battery's specifications 电池参数

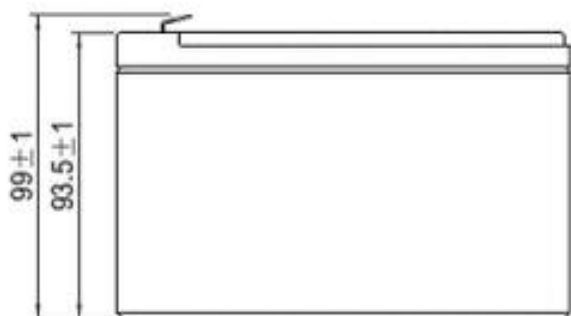
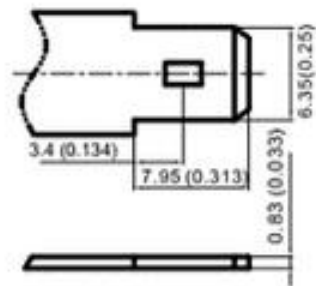
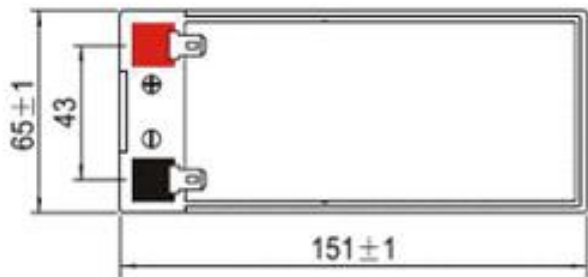
Cell 电芯	Model 规格型号		26650 3000mAh
	Nominal Capacity 标称容量		3000mAh
	Nominal Voltage 标称电压		3.20V
	Matching Standard 配组标准		A. 容差 Capacity Difference ≤ 5% B. 内阻偏差 Resistance Difference ≤ 3mΩ C. 电压偏差 Voltage deviation ≤ 10 mV
Pack Specs 成品参数	Assembly 组合方式		4S3P
	Nominal Capacity 标称容量		9Ah
	Minimum Capacity 最小容量 (0.2C5A)		9Ah
	Nominal Voltage 标称电压		12.8V
	Internal Resistance 内阻		≤ 200mΩ
	Max. Charge Voltage 最大充电电压 (单节)		3.65V
	Charge Current 充电电流		5Ah
	Cut Off Voltage 放电截止电压 (单节)		2.0V
	Maximum Continuous Discharge Current 最大持续放电电流		12A
	Over Current Protection Delay 过流保护延时		100ms
	Over Current Value 过流值		22±2A
	Short Circuit Protection 短路保护时间		70μs
	Short Circuit Recovery Condition 短路恢复条件		Disconnect the load 断开负载恢复
	Max Dimension 最大外形尺寸 (LxWxH) Size without plastic casing		Based on type
	充/放电端口 (charge/discharge port)		
	通讯端口 (communication port)		
	充电器 (Charger)		
Operating Temperature 适用温度	Charge 充电	-0°C ~ +45°C	
	Discharge 放电	-20°C ~ +60°C	

3.2 PCM's specifications 保护板参数

项目	符号	详细内容	标准
电压 Voltage		充电电压 Charge Voltage	DC14.6V CC/CV
电流 Current		最大充电电流 Max. Charge Current	5A
		最大放电电流 Max. Discharge Current	12A
过充保护 Over Charge Protection	V _{DET1}	过充电检测电压(单体) Over charge detection voltage	3.750±0.08V
	t _{VDET1}	过充电检测延迟时间 Over charge detection delay time	0.5--2s
	V _{REL1}	过充电解除电压 (单体) Over charge release voltage	3.60±0.05V
过放保护 Over Discharge Protection	V _{DET2}	过放电检测电压 (单体) Over discharge detection voltage	2.1±0.1V
	t _{VDET2}	过放电检测延迟时间 Over discharge detection delay time	4s
	V _{REL2}	过放电解除电压 (单体) Over discharge release voltage	2.3±0.05V
过流保护 Over Current Protection	I _{DP}	过电流保护电流 (电池电压=3.2V) Over current detection current	22±2A
	t _{VDET3}	检测延迟时间 Over current detection delay time	160ms
		保护解除条件 Release condition	Disconnect the load 断开负载恢复
短路保护 Short Protection		保护条件 Detection Condition	外部电路短路 Exterior short circuit
	T _{SHORT}	检测延迟时间 Shot circuit detection delay time	70us
		保护解除条件 Release condition	Disconnect the load 断开负载恢复
内阻 Interior Resistance	R _{DS}	主回路通态电阻 (电池电压=3.5V) Main loop electrify resistance	≤60mΩ
消耗电流 Current Consumption	I _{DD}	工作时电路内部消耗 Current consume in normal operation	<800uA

3.3 Outline Dimensions 尺寸简图

151mm x 65mm x 99mm (LxWxH) Tolerance: +/- 1mm



4. Battery performance 电池性能

4.1 Electric characteristics 电池性能

No 序号	Item 项目	Standard 标准	Test method 测试方法
1	Discharge characteristics 倍率放电性能	0.2C≥100% 2C ≥90%	<p>a) After standard charged, rest for 30min and then discharge at 0.2C and 2C to the end-off discharge voltage respectively. 电池标准充电后，搁置 30 分钟，然后分别以 0.2C 和 2C 电流对放电至截止电压。</p> <p>b) Capacity (Ah) can be calculated by Discharging current and discharging time, and expressed as the percentage of nominal capacity. (Cycled by 3 times, when one of the three reaches the standard, it will meet the standard.) 放电电流值和放电时间数据计算容量（以 Ah 计），并表达为额定容量的百分数。（以循环三次，当有一次达到标准，即达到标准要求）</p>
2	Normal Storage Performance 常温荷电保持能力	Residual capacity≥ nominal capacity×80% 剩余容量≥标称容量×80% Recovery capacity≥ nominal capacity×90% 恢复容量≥标称容量×90%	<p>Stored for 28 days after standard charge, discharge at 0.2C to the end-off discharge voltage, then test the residual capacity. Test the recovery capacity at 0.2C, if one of the three cycles can reach the standard, it represents the battery has reached the standard. 电池标准充电后，开路放置 28 天，以 0.2C 放电至放电截止电压，测量电池的剩余容量。0.2C 测量电池的恢复容量，可循环三次，当有一次达到标准，即达到标准要求。</p>
3	Cycle life 循环寿命	capacity≥ nominal capacity×80% 容量≥标称容量×80%	<p>Conduct 1C charge/1C discharge for 1000 continuous cycles, and then test capacity. 以 0.2C 进行充放电循环，记录 1000 次循环后的电池容量。</p>
4	Storage Performance 贮存性能	Recovery capacity≥ nominal capacity×90% 恢复容量≥标称容量×90%	<p>Stored for 1 hour after standard charge, discharge at 0.2C for 2 hours, store the battery for 90 days at 20°C±5°C. Stored for 1 hour after standard charge, then discharge at 0.2C, at least 5 cycles, one of the 5 cycles reaches the standard means the battery has reached the standard. 将电池以标准充电方式充满电后搁置 1 小时，然后以 0.2C 的电流放电 2 小时，在 20°C±5°C 的条件下储存 90 天。将电池以标准充电方式充满电后搁置 1 小时，再以 0.2C 的电流放电，至少循环 5 次，当有一次达到标准，即达到标准要求。</p>

4.2 Mechanical characteristics 机械性能

NO 序号	Item 项目	Standard 标准	Test method 测试方法
1	Vibration 振动	The battery shall not rupture, smoke, catch fire, vent or leak and voltage of each cell should not be lower than 3.0V.	After standard charge, fixed the cell in vibration table and subjected to vibration cycling that the frequency is at the rate of 1Hz per minute between 10Hz~55Hz, the excursion of the vibration is 1.6mm. The cell shall be vibrated for 30 minutes per axis of XYZ axes. The change of vibration frequency is 1Hz per minute.
2	Impacting Testina	电池应无破裂、冒烟、着火、泄漏或	将标准充电后的电芯固定在振动台上，沿 X、Y、Z 三个方向各振动 30 分钟，振幅 1.6 mm，振动频率为 10Hz~55Hz，每分钟变化为 1Hz。After vibration, the battery will be impacted 1000±10 times (60±20 times per minute) with the acceleration of 100m/s ² and the pulse lasting time is 16ms. 将振动后的电池以峰值加速度为 100m/s ² 的脉冲撞击 1000±10 次(平

4.3 safety characteristics 安全性能

No 序号	Item 项目	Standard 标准	Test method 测试方法
1	Overcharge Performance 过充性能	No fire, No explosion 不起火、不	Charge is conducted for 8 hours while the invariable voltage is 3.65V. 恒定 3.65V 对电池充电 8 小时。
2	Over Discharge Performance 过放性能		Store the battery at 20°C±5°C after standard charge, discharge at 0.2C till the voltage reaches 0V. 在 20°C±5°C下标准充电后，以 0.2C 电流放电，直至电池电压 0V。
3	Short Circuit at Room Temperature 常温短路性能		After standard charge, let the battery be located in a fume hood and short-circuited by connecting the positive and negative terminals with an external load of less than 50mΩ till the battery case temperature has returned to near ambient temperature. 将标准充电后的电池置于通风橱中，短路其正负极（线路总电阻不大于 50mΩ），实验过程中监视电池温度变化，当电池温度下降到接近初始室温时，结束实验。

4.4 Adaptation to Environment Characteristic 环境适应性性能

NO 序号	Item 项目	Standard 标准	Test method 测试方法
1	Low and high temperature testing 高低温测试	45% at 0°C 100% at 25°C 90% at 55°C	Measure capacity with constant discharge current 0.2C to each cell 3.0V cut-off at each temperature after standard charge at 25°C, Percentage as an index of the capacity compared with 100% at 25°C 25°C下标准充电方式充电后，在指定温度下 0.2C 放电至每颗电芯至 2.0V 时的容量，并以 25°C时放电容量为基准计算百分率。

2	Constant humidity temperature	Recovery capacity ≥ 85% 恢复容量 ≥ 85%	Keep the battery at 40°C and 90%RH for 72 hours. 将电池放入温度为 40°C，相对湿度为 90%的条件下搁置 72 小时。
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Note: The definitions of some nomenclatures of this specification

备注：以上标准中的一些术语的定义：

(1) **Standard charge:** 0.2C charge at 20°C±5°C to the limit voltage, then change to charge with constant voltage till the current less than or equal to 0.02C

标准充电：在环境温度 20°C±5°C 的条件下，以 0.2C 充电，当电池端电压达到充电限制电压时，改为恒压充电，直到充电电流小于或等于 0.02C 后停止充电；

(2) **Residual Capacity:** The first discharge capacity after being tested by the specific procedure.

剩余容量：电池经过特定的检测程序后的首次放电容量；

(3) **Standard cycle:** charge at 0.2C then rest for 60 min, discharge at 0.2C to the cut-off voltage.

标准循环：电池以 0.2C 标准充电后，搁置 60 min，以 0.2C 放电至放电截止电压；

(4) **Recovery Capacity:** The discharge capacity by implementing charge-discharge cycle repeatedly after being tested by the specific procedure.

恢复容量：电池经过特定的检测程序后，通过反复充放电使状态恢复后的放电容量；

(5) All batteries tested above are within a month after delivery unless there are other regulations.

用于上述测试的电池必须是交货一个月内的电池，除非另有规定。

5. Standard environmental test condition 标准测试环境

Unless otherwise specified, all tests stated in this Product Specification are conducted at below conditions:

除非特别说明，本规格书中所有测试均在以下环境条件下进行：

Temperature: 20±5°C

温度：20±5°C

Humidity: 25-85 % RH

湿度：25-85 % RH

Air pressure: 86 KPa~106 KPa

大气压：86 KPa~106 KPa

6. Battery Required Protection Functions 电池组保护功能要求

To insure the safety, charger and the protection circuit should be satisfied the items below. Please use safety device with the temperature fuse at the same time. The standard charge method is CC/CV (constant current/constant voltage).

为确保安全，充电器和保护电路应符合以下要求，同时请使用装有热熔保险丝的安全装置。标准充电方法为 CC/CV（恒流/恒压）。

7. Use of Battery 电池使用

(1) Before using it, you should read the battery and charger specification carefully to prevent the risk caused by battery and charger.

在使用电池前，先仔细阅读电池规格书及充电器规格书，以防止损坏电池和充电器而导致危险。

(2) Battery used as storage power should be matched with controller or related equipment. Because the battery pack is matched with protection board, you cannot drive the pure inductance equipment (applied equipment or testing equipment) otherwise you could damage the whole system.

电池做为备用电源使用，与负载的控制器或装置配套使用；因电池组配有管理电路板不可驱动纯电感负载（应用负载或测试负载），否则会损坏系统。

8. Battery charging 电池充电

When charging the battery, please use specified chargers.

对电池组进行充电时请使用为此型号电池组配备的专用充电器。

The output of the charger must meet the parameter requirement of the battery pack.

充电器输出需符合此电池组充电参数要求。

9. Storage and Others 储存及其它事项

(1) Long time storage 长期储存

If the cell is stored for a long time(exceed three months, the cell should be stored in drying and cooling place). The cell should be charged and discharged each six months. The cell's storage voltage should be 3.6-3.9V and the cell is to be stored in a condition as item 5.

长期储存的电池（超过 3 个月须置于干燥、阴凉处。每 6 个月对电池进行一次充放电，储存电压 3.6~3.9V(电池组中串联的每节电池)且储存环境要求如上述第 5 项。

(2) others 其它事项

Any matters in this specification does not cover should be negotiated between the customer and DongGuan FunSong Electronics CO., LTD

本规格书中未提及的事项，须经双方协商确定。

10. Warranty period& Product Liability 保质期及产品责任

arranty period begins from the delivery date, and is exclusively made in the sale contract.

保质期是从出厂日期（喷码/标示）开始起，质保期在销售合同中另定；

DongGuan FunSong Electronics Co., Ltd. is not responsible for the incident caused by not obeying the specifications.

东莞市丰颂电子有限公司对因没有按本规格书规定操作而导致的意外不负责任。

11. Labels on the battery package 包装电池上的标识

All the cautions should be written on the packed battery.

以下警告应注明在包装后的电池上

Before using the battery, you should read the specifications of battery and charger carefully.

使用电池前，先仔细阅读电池规格书及充电器规格书；

When the voltage between two electrodes is beyond 36V, the safe voltage of human beings, you should not touch the two electrodes with your body.

当电池组两端电压超过人体安全电压 36V 时，禁止用身体直接接触电池组正负端；

Use specified charger

使用规定的充电器；

Do not throw the battery into fire or heat it.

不要将电池投入火中或加热；

Do not short-circuit the two electrodes.

不要将电池正负极两端短路；

Do not disassemble and break up the battery.

不 散。

12. Cautions in using battery 电池使用时警告事项及注意事项

Caution

警告

When the voltage between the two electrodes is over 36V, the safe voltage of human beings, you should not touch them with your body.

当电池组两端电压超过人体安全电压 36V 时，禁止用身体直接接触电池组正负端；

Do not immerse the battery in water or seawater, and keep the battery in a cool dry surrounding if it stands by.

严禁将电池浸入海水或水中，保存不用时，应放置于阴凉干燥的环境中；

Do not use or leave the battery near a heat source as fire or heater

禁止将电池在热高温源旁，如火、加热器等使用和留置；

Use the battery charger specifically for that purpose when recharging.

充电时请使用为此型号电池组配备的专用充电器；

Do not reverse the positive and negative terminals when using.

严禁颠倒正负极使用电池；

Do not connect the battery electrodes to an electrical outlet.

严禁将电池正负端直接插入电源插座；

Do not discard the battery in fire or a heater.

禁止将电池丢于火或加热器中；

Do not short-circuit the battery by directly connecting the positive and negative terminals with metal objects.

禁止用金属直接连接电池正负极短路；

Do not transport or store the battery together with metal objects such as hairpins, necklaces, etc.

禁止将电池与金属，如发夹、项链等一起运输或贮存；

Do not strike, trample or throw the battery.

禁止敲击或抛掷、踩踏电池等；

Do not directly solder the battery and pierce the battery with a nail or other sharp objects.

禁止直接焊接电池和用钉子或其它利器刺穿电池。

Special Cautions

特别警告

Due to the voltage between two electrodes over the safe voltage of human beings, nobody should touch the two electrodes by his body in case of his safety. During using the battery, you need insulate the two electrode terminals and also the part outside the metal conductor, in order to prevent the short-circuit incident. You should do the related safety-prevention work well.

电池组两端电压已超过人体安全电压，为安全起见，禁此用身体同时接触电池组正负极两端，在电池组使用过程中，需将电池组正负极两端及金属导体外露部分做好绝缘处理，防止任何有可能发生短路的情况出现，且做好安全防范的相关工作。

Be Careful

小心

Do not use or leave the battery at high temperature (for example, at strong direct sunlight or in a vehicle in extremely hot weather). 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（炙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；

Do not use the battery in a location where static electricity and magnetic field is great, 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；

If the battery leaks and the electrolyte gets into the eyes, do not rub the eyes, instead, rinse the eyes with clean water, and immediately seek medical attention. Otherwise, it may injure eyes.

如果电池发生泄露，电解液进入眼睛，请不要揉擦，应用清水冲洗眼睛并立即送医治疗，否则会伤害眼睛；

If the battery gives off strange 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 charger 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，立即将电池从装置或充电器中移离并停用；

In case the battery terminals are dirty, clean the terminals with a dry cloth before use. Otherwise poor performance may occur due to the poor connection with the instrument.

如果电极弄脏，使用前应用干布抹净，否则可能会导致接触不良功能失效；

Be aware discarded batteries may cause fire or explosion; tape the battery terminals to insulate them. 废弃之电池应用绝缘纸包住电极，以防起火、爆炸。

13. Free-responsibility declaration 免责声明

efore using the battery, you should read the specifications, usage instruction and some attentions carefully to learn its application method and areas. If the phenomenon such as error using method or wrong circuit connection, or input power data, working index are in consisted with the specifications happen and cause damage to production ,circuit and its accessories , we are not responsible for it.

产品使用前，请用户说细阅读产品规格书、使用说明书及使用注意事项等，了解产品的使用方法及应用范围；若出现产品使用方法错误、电路连接不对或采用的输入电源、负载功能参数与产品规格书所标性能参数不符等现象均属使用不当，由使用不当造成产品、负载及周边连接件的损坏，本公司均不承担任何责任。 Any matters that this specification does not cover should be conferred between the customer.

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