

Specification Approval Sheet

产品规格确认书

Model: DNK-LTB1S1PC18M-30Q

型号: DNK-LTB1S1PC18M-30Q

样品编号:

Customer P/N:

客户编码:

核准 APPROVED BY	确认 CHECKED BY	准备 PREPARED BY
文佩颖	陈俊仪	林豪宇

客户认可

承认单位 DEPT	采购 PURCHASE	品管 Q.C.	工程 R&D
确认 CHECKED BY			

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Remark: DNK Power may, at any time, at its sole discretion, make changes to the technical and functional specifications, the design, process, materials or other features of any of the batteries.

确认后请回传

地址: 广东省深圳市龙华新区大浪街道华荣路同富裕工业区32栋

电话(Tel): 86-755-36827358

传真(Fax): 86-755-61605250

网址(Web): <http://www.dnkpower.com>

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1 Scope

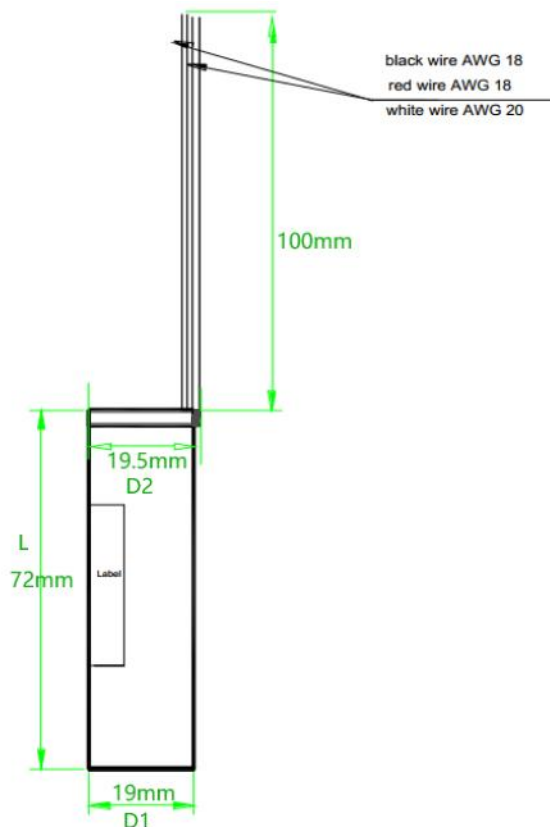
This document describes the Product Specification of the 18650 lithium Battery Pack supplied by DNK Power CO., LTD. 适用范围:本规格说明书描述了深圳市德博电源有限公司（以下简称德博电源）生产的可充电 18650 锂离子电芯的产品性能指标

2 电池组成 Battery Constitution

NO.	名称 Name	型号 Model	备注 Remark
1	1 支锂离子电芯 1 piece of cell	18650 Samsung 30Q 电池 18650 Samsung 30Q 3000mah cell	聚合物锂离子电芯 Lithium Ion Cell
2	1 个电池保护板 One piece of protection board	IC: G3P MOSFET: DP8204	
3	蓝色 Blue PVC	蓝色 Blue PVC	
4	接头 Connector	“2029102-3” connector  “1-794610-2” points	
5	导线 Lead wire	1: Black Wire: 18AWG, 100m length 2: White Wire(NTC): 18AWG, 100m length 3: Red Wire: 18AWG, 100m length	

3 Dimensions of Battery Pack 电池尺寸

Dimension: Max 19(D1)*Max19.5(D2) *Max 72(L) (mm)



4 Specifications of Battery Pack

电池规格

NO.	Items 项目	Specifications 规格		Test tools 测试工具	Comments 备注
4.1	Charge voltage 充电电压	4.2V		Electronic voltage meter 数字电压表	Exactitude±0.1V 数字电压表 用最少 3 位 显示 20V 以 下, 精度到 ±0.1V
4.2	Nominal voltage 标称电压	3.6V			
4.3	Nominal capacity 标称容量	3000mAh 0.2C Discharge (0.2C 放电)		Secondary batteries test equipment 二次电池检测设备	(min100mAh @0.5C Discharge)
4.4	Charge current 充电电流	Standard Charging: 1A Rapid charge: 2A		Secondary batteries test equipment 二次电池检测设备	
4.5	Standard Charging method 标准充电方法	0.2C CC (constant current) charge to 4.2V, then CV (constant voltage 4.2V) charge till charge current decline to ≤0.01C 0.2C CC (恒流) 充电至 4.2V, 再 CV (恒 压 4.2V) 充电直至充电电流≤0.01C		Electronic voltage meter 数字电压表 Secondary batteries test equipment 二次电池检测设备	
4.6	Charging time 充电时间	Standard Charging: 3.5 hours (Ref.) 标准充电: 3.5 小时 (参考值) Rapid charge: 2.5 hours (Ref.) 快速充电: 2.5 小时 (参考值)		Secondary batteries test equipment 二次电池检测设备	
4.7	Pack Max. discharge current 电池包最大放 电电流	6A continuous discharge current 10A discharge for max current (3-5seconds)			
4.8	Discharge cut-off voltage 放电截止电压	2.8V		Electronic voltage meter Secondary batteries test equipment 数字电压表 二次电池检测设备	
4.9	电芯工作温度 Cell Operating Temperature	0°C~+45°C	Max Charging 2A 最大充电 2A		
		-20°C~+65°C	最大放电 6A Max Discharging 6A	10A discharge for max current (3-5seconds)	
4.10	贮存温度 Storage Temperature	-10°C / +45°C	小于 1 个月 Less than 1 months		
		-10°C / +35°C	小于六个月 Less than 6 months		

5 Battery Pack Performance Criteria

电芯性能检查及测试

5.1 Electrical characteristics 充放电性能

NO.	Items 项目	Test Method and Condition 测试环境和方法	Test tools 测试工具	Criteria 标准
5.1.1	Standard Charge 标准充电	Charging the cell initially with constant current at 0.2C and then with constant voltage at 4.2V till charge current declines to 0.01C 先用 0.2C 恒流充电至 4.2V, 再恒压 4.2V 充电直至充电电流 $\leq 0.01C$	Electronic voltage meter 数字电压表 Secondary batteries test equipment 二次电池检测设备	
5.1.2	Rated Capacity 初始容量	The capacity means the discharge capacity of the cell, which is measured with discharge current of 0.2C with 2.8V cut-off voltage after standard charge. 该容量是指标准充电后, 0.2C 放电至 2.8V 截止电压所放出的容量。 The capacity of 2C charge and 1C discharge		$\geq 3000mAh$ $\geq 94\%$
5.1.3	Cycle Life 循环寿命	A battery unit shall be repeated 100 charge/discharge cycles, charged at CC-CV 0.2C to 4.20V, laying the battery 5min, discharged at 0.2C to 2.8V end voltage, After 100 cycles, recording the discharging capacity 电池用 0.2C 恒流恒压充饱电至 4.2V, 搁置 5min, 用 0.2C 电流放电到 2.8V, 记录放电容量, 循环 100 次。	Electronic voltage meter 数字电压表 Secondary batteries test equipment 二次电池检测设备	100 time of discharging capacities keep 90% 100 次放电容量率: 90% 500 time of discharging capacities keep 500 次放电容量率: 80%
5.1.4	Self-discharge 自放电	After the standard charging, storied the cells under the condition as No.5.4 for 28 days, then measured the capacity with 0.2C till 6.0V 标准充电后, 在 No.5.4 条件下贮存 28 天, 再以 0.2C 放电至 2.8V 所放出的容量。		Residual capacity: $>85\%$ 余容量: $>85\%$
5.1.5	Initial impedance of battery pack 电池初始内阻	Internal resistance measured at AC 1KHz after 50% charge 半充状态下, 测量其 AC 1KHz 下的交流阻抗	IR test equipment 内阻测试仪	$\leq 150m\Omega$
5.1.6	Cell Voltage 电芯电压	As of shipment. 出货状态	Electronic voltage meter 数字电压表	$\geq 3.6V$
5.1.7	Temperature Characteristics 温度特性	1. According to item 4.5, at $20\pm 5^{\circ}C$. 2. Capacity comparison at each temperature, measured with constant discharge current 1C with 6.0V cut-off. Percentage as an index of the capacity compared with 100% at $20^{\circ}C$ 1. 在 $20\pm 5^{\circ}C$ 条件下, 用 4.5 方法将电池充电。 2. 在不同温度条件下, 用 0.2C 的电流恒流放电至截止电压 6.0V。以	Electronic voltage meter 数字电压表 Secondary batteries test equipment 二次电池检测设备	$-10^{\circ}C$: $\geq 60\%$ $20^{\circ}C$: 100% $50^{\circ}C$: $\geq 85\%$

		20℃时放电容量为基准计算百分比	
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5.2 Mechanical characteristics
机械特性

NO.	Items 项目	Test Method and Condition 测试环境和方法	Test tools 测试工具	Criteria 标准
5.2.1	Vibration Test 振动测试	After Standard Charging, fixed the cell to vibration table, then subjected to vibration test for 3hours per axis of XYZ axes. Frequency change time: 15 min Vibration frequency: 7Hz~200Hz~7Hz Excursion (single amplitude): 0.8mm 电芯按标准充电后,固定在振动台上,然后沿XYZ每个坐标方向振动3h. 频率变化时间: 15 min 振动频率: 7Hz~200Hz~7Hz 位移幅值(单振幅): 0.9mm	Secondary batteries test equipment、Vibration platform 二次电池检测设备、振动台	Allowed Leakage. 允许泄漏 No fire 不起火 No smoke 不冒烟 No explosion 不爆炸
5.2.2	Drop Test 跌落测试	The battery to be fully charged with standard charging condition ,then fall from height of 1.0m and hit onto concrete ground. Drop every surface, a total of 6times. 电池标准充电后,让其从1.0m 高处自由落下,跌落在混凝土。每面跌了一次,共6次。	Electronic voltage meter 数字电压表、	
5.2.3	Over charge 过充测试	Battery charged at 3C ₅ A current with a voltage limit of 8.8V.charging is continued for 7 hours. 标准充电后,恒流恒压源设定为 4.3V,以 3C ₅ A 的电流持续充电 7H	Secondary batteries test equipment 二次电池检测设备	
5.2.4	Over discharge 过放测试	Battery discharged continuously at the constant current of 0.2C ₅ A to 2.8V,then connect cells terminals with 30Ω,Discharging is continued for 24 hours 0.2 C ₅ A 放电至 2.8V,然后只外接 30Ω的负载放电 24h		Allowed Leakage. 允许泄漏 No fire 不起火 No smoke 不冒烟 No explosion 不爆炸
5.2.5	Heating Test 热冲击测试	Put cell into an hot box, test condition: Temperature Rate : 5±2℃ /min Ending temperature :130℃±2℃ Keep temperature for 10 minutes , Then stop testing. 将电芯放置于热箱中,测试条件如下: 升温速率: 5±2℃/min 终止温度: 130℃±2℃ 保持此温度 10min, 然后停止测试。	Electronic voltage meter 数字电压表、 Secondary batteries test equipment Hot box 二次电池检测设备、热箱	

5.2.6	Short-circuit Test 短路保护测试	<p>After Standard Charging, Short circuit the positive and negative, and the resistance of copper wire is $80 \pm 20 \Omega$,When the temperature falls 20% lower than the peak ,Stop testing or Short circuit time reached 24hours.</p> <p>标准充电后,使用总内阻$80 \pm 20 \Omega$ 的导线短路正负极,当电池温度下降到比峰值低约20%时或者短路时间达到24h,结束试验。</p>	Electronic voltage meter 数字电压表、 Secondary batteries test equipment 二次电池检测设备	<p>Allowed leakage. 允许泄漏 No fire 不起火 No smoke 不冒烟 No explosion 不爆炸 After instantaneous charge voltage $\geq 3.6V$ 瞬时充电后电压 $\geq 3.6V$</p>
5.2.7	High temperature and high humidity test 高温高湿测试	<p>After Standard Charging, test condition: Temperature: $40 \pm 5^\circ C$ Relative Humidity: $90 \sim 95\%RH$ Storage Time: 48 hours</p> <p>Then return to room temperature for 2 hours, Then 0.2C discharged to ending voltage.</p> <p>标准充电后,测试条件如下: 温度: $40 \pm 5^\circ C$ 相对湿度: $90 \sim 95\%$ 放置时间: 48 小时 电芯取出在室温下放置2 小时,然后以0.2C 电流放电至终止电压。</p>	Thermometer Hygrometer 量温仪,湿度计	<p>Discharge time ≥ 3hours 放电时间 ≥ 3hours No distortion 不变形, No smoke 不冒烟 No explosion 不爆炸</p>

5.3 Visual inspection

There shall be no such defect as scratch, flaw, crack, and leakage, which may adversely affect commercial value of the cell.

外观检查

不允许有任何影响电池性能的外观缺陷, 诸如裂纹、裂缝、泄漏等。

5.4 Standard environmental test condition

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

Temperature: $20 \pm 5^\circ C$

Humidity: $60 \pm 15\%RH$

Barometric: $86kpa-106kpa$

标准测试环境

除非特别说明, 本标准书中所有测试均在以下环境条件下进行:

温度: $20 \pm 5^\circ C$

湿度: $60 \pm 15\%RH$

大气压: $86kpa-106kpa$

6 Pack

包装:

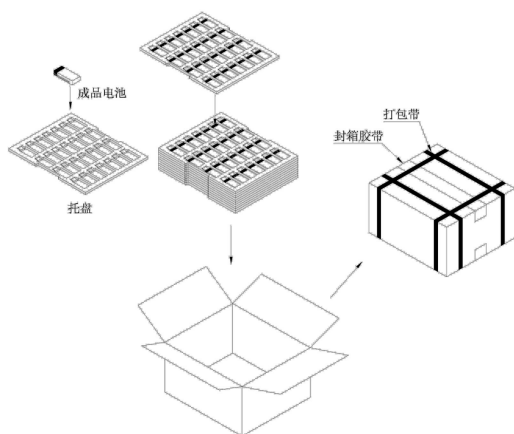
The sketch, size, color of marking should match GB/T191-2000 requests.

标志的图形、尺寸、颜色应符合 GB/T 191—2000 的要求

6.1 Model and specification of product;

产品的名称和型号及规格;

- 6.2 Quantity;
数量;
- 6.3 Measure up marking;
合格品标识;
- 6.4 Make date;
制造日期;
- 6.5 Other markings, like color.
其他标识, 如颜色。



7 Storage

贮存

Long Time Storage

If the battery pack is stored for a long time, the cell's storage should be 3.6-4.2V and the battery pack is to be stored in a condition as No.5.4.

Strongly recommend that every six months the stock battery make charging at least one time.

长期贮存

长期贮存的电池（超过 3 个月）须置于干燥、凉爽处。贮存电压为 3.6-4.2V 且贮存环境要求如 5.4。
强烈建议每六个月对库存电池充电一次

8 Dangers

危险

8.1 Don't disassemble or modify the battery.

DNK battery pack is packaged by Aluminum laminated plastic film which is easy to be damaged by sharp edge such as pin, needle, edge of devices like nickel tabs, etc. If they have serious damage, electrolyte leakage, short-circuit between positive and negative tabs, etc. It would cause the generation, smoke, rupture, or flaming with mishandling.

禁止分解或修改电池。

元科电池外层的铝塑膜包装很容易被锋利的东西损害，如钉、针、像定位镍片的装置等。如果电池有严重的损害，如电解液泄露，在正极片与负极片之间发生短路等，会引起冒烟，破裂，燃烧等不正常现象。

8.2 Don't incinerate or heat the battery pack

Don't use or leave battery nearby fire, stove or heated place (more than 130°C). These occur the melting of insulator, damage of safety function, or ignition on electrolyte. In case that separator made of polymer is melted by high temperature, the internal short-circuit occurs in individual cells and then it would cause the generating, smoke, rupture or flaming.

禁止将电池投入火中或加热

禁止在火、火炉附近或热的地方使用(超过 130℃)。以免熔化绝缘层, 损害电路保护功能, 或使电解液着火, 以防万一聚合物被高温熔化, 使电池内发生短路, 然后会引起冒烟, 破裂或燃烧。

8.3 Don't use any damage battery pack

Don't use the battery that are dented or bent on their edge part. DNK batteries are possible to be damaged by strong mechanical shock and it would cause wire break, short-circuit inside the cell, leakage of electrolyte, etc.

禁止使用任何损坏的电池

不要使用有凹痕或被零件弯曲的电池, 电池可能是被强裂的机械冲击所损害的, 而且会引起电线断开, 内部发生短路, 电解液泄露等。

8.4 Don't drive a nail into a battery pack, strike it by hammer, or tread it.

As the battery might be broken or deformed and then it will be short-circuited, it would cause the generating, smoke, rupture or flaming.

禁止在电池上面钉入钉子, 或锤击, 踩踏电池。

当电池打折或变形时, 将会发生短路, 引起冒烟、存裂、燃烧。

8.5 Don't give battery pack impact or fling it

If the battery is broken, the battery will be charged at abnormal voltage or current and abnormal chemical reaction will occur. It may cause the generating, smoke, rupture or flaming.

禁止冲击或抛掷电池

如果电池被破坏, 电池将会出现不正常的电压和电流和电池内部出现不正常的化学反应。它可能会引也冒烟, 破裂或燃烧。

8.6 Don't make the direct ultrasonic wave power to the battery or soldering near the battery

It may cause serious damage to the batteries. Soldering near the battery may cause damage of the components, such as separator and insulator, are melted by heat, it would cause the gas generating, smoke, rupture or flaming.

禁止在电池上直接做超声波或电池旁边焊接

它会对电池造成严重的伤害, 在电池旁边焊接可能会导致电池成分破坏, 隔离层和绝缘体被热融化, 会引气体产生、冒烟、破裂或燃烧。

8.7 Don't use battery nearby the high temperature place or under the blazing sun.

DNK batteries have possibility to be degraded its performance such as capacity, thickness increase, impedance, etc. The battery will be charged at the abnormal chemical reaction occurs in the high temperature place. The thickness change may lead to stressing on battery case/ device, wiring or cell which may have possibility to lead to damage performance.

禁止将电池放在高温或阳光直射的地方

在阳光下可能会使元科电池的寿命、性能和容量缩短, 厚度增加等, 在高温的地方电池内部可能会发生不正常的化学反应。厚度改变可能导致压力在电池/装置上, 可能导致线路或电池性能损坏。

8.8 Don't use the unspecified charger.

If the battery is charged with unspecified condition, there are causes that it will be overcharged or the abnormal chemical reaction will occur in cells. It causes the gas generating, smoke, rupture or flaming.

禁止使用未经指定的充电器

如果电池与未经指定的充电器会使电池充完后, 可能会导致不正常的化学反映在电池内发生, 将会产生气体、冒烟、破裂或燃烧。

8.9 Don't reverse polarity (and terminals)

On charging, the battery is reversed-charged and abnormal chemical reaction occurs. There may be case that unexpected large current flows on discharging.

There causes the generating, smoke, rupture or flaming.

禁止将正负极接反 (和接线端)

在充电, 电池在接反时充电电池将发生不正常的反学反应, 那种情况有可能会产生意想不到的大电流放电。那种原因可能会使电池冒烟、破裂、燃烧。

8.10 Don't reverse-charge or reverse-connect

The battery has polarity. In case the battery is not connected with charger or equipment smoothly do not force them to connect and do check polarity of battery. If the battery is connected to opposite polarity with charger. It will be reverse-charged and abnormal chemical reaction will occur. It would cause the generating, swelling, smoke, rupture or flaming.

禁止将充电接反或连接接反

电池有两极，如果电池没有平稳的与充电器或设备连接，将不会做强制他们连接而且检查正负极与充电器是否一致，如果电池与充电器接反，它接会反向充电，而且会引起发生不正常的化学反应。它将会引起膨胀、冒烟、破裂或燃烧。

8.11 Don't connect battery to the plug socket or car-cigarette-plug

Added high voltage to the battery, the excessive current will flow in it and then it may cause the generating, swelling, smoke, rupture or flaming.

禁止将电池连接到插座或汽车的点烟器

更多的高压电流入电池，过多的电流将会产生膨胀、冒烟、破裂或燃烧。

8.12 Don't use battery for another equipment

If the battery is used for unspecified equipment, it will deteriorate its performance and cycle-life.

禁止使电池用不同的设备上

如果电池用在未指定的设备上，它将会缩短电池的周期和寿命。

8.13 Don't touch a leaked battery directly

In case the leaked electrolyte gets into eyes, wash them with fresh water as soon as possible without rubbing eyes. And then, see a doctor immediately. If leave damaged eyes undone, it will cause eye-trouble.

禁止直接碰触漏液的电池

万一泄漏的电解液进入眼睛，应尽快用清水冲洗眼睛，然后，立刻去看医生。如果眼睛被伤害，将会引起眼睛疾病。

9 Warnings

警告

9.1 Keep the battery away from babies

Keep the little battery out of the reach of babies in order to avoid troubles by swallowing. In case of swallowing the battery, see a doctor immediately.

电池应远离小孩

以免小孩吞下电池，出现不必要的麻烦，应该将电池放到小孩接触不到的地方。如果吞下电池，请立刻看医生。

9.2 Don't get into a microwave or a high pressure container

Because of sudden heat or damage of sealing condition of battery, it may cause the generating, smoke, rupture or flaming.

禁止将电池放入微波炉或高压容器中

因为在密封的情况下突然受热，可能会引起冒烟、破裂、燃烧。

9.3 Don't use a leaked battery nearby fire

If the liquid leaks from the battery (or the battery gives out bad smell), let the battery leave from flammable objects immediately. Unless do that, the electrolyte leaked from battery may catch fire and it would cause the smoke, flaming or rupture of it.

禁止将漏液的电池放到火的旁边

如果液体从电池（或者电池发出有害的气体）泄漏，假设将电池直接遗弃于易燃物体旁，如果那样做，从电池泄露出来的电解液可能会着火，而且会引也冒烟、燃烧或破裂。

9.4 Don't use an abnormal battery, such as leakage, swelling, deformation, etc.

In case the battery has bad smell, it generates, its color change or it is warped in using (includes charging and storage), let it take out from equipment or charger and do not use it. If an abnormal battery is used, it may

generate bad performance or damage the device or pack.

禁止使用一个不正常的电池，像漏液、膨胀、毁坏等

万一电池有有害的气味产生，电池的颜色发生变化或电池在（包括充电和贮藏）方面被弄歪，应让电池从设备或充电器中取出并且不使用它。如果一个不正常的电池被使用，电池可能严重的损害设备包装。

10 Cautions:

注意

10.1 Don't use or leave the battery under the blazing sun (or in heated car by sunshine)

The battery may smoke, heat or flame. And also, it might cause the deterioration of battery's characteristics or cycle life.

禁止在高温下使用电池（或很热的汽车中）

电池可能会冒烟，过热或燃烧，它可能引起功能失效失、寿命减短。

10.2 Manual

Please read the manual before using the battery and let it keep after reading. And also, please read it necessary.

手册

请在使用电池之前详细阅读，并保存好。请务必阅读它。

10.3 Charging Method

Please read the manual of specific charger about charging method.

充电方法

请阅读充电器手册和使用指定的充电器。

10.4 First time use

When the battery has rust, bad smell or something abnormal at first-time-using, do not use the equipment and go to the shop which it was bought.

第一使用时间

当电池有锈迹、有害的气味或者不正常的事物在第一次使用时出现，请不要使用并且去商店那买一个。

11 quality guarantee period

保质期

One year (12 months)

一年（12个月）

12 Others

其它

Any matters that this specification does not cover should be conferred between the customer and DNK.

本说明书中未提及的事项，须经双方协商确定。

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