对于任何细节和问题，请告诉我们
For any details and enquiry, please contact VDL; Tel:0755-29961201,Fax:0755-29961203

VDL SPECIFICATIONAPPROVAL SHEET

VDL 产品承认书

Customer Name 客户代码: 0844

Customer Product Model 客户产品型号: YLLP502728C420WVDL

Product Model 产品型号: 502728

Product Capacity 产品容量: 420mAh/3.8V

Product Code产品编码: 1.11.502728.11

Submit Sample Date 送样日期:

Quantity Of Samples 样品数量:

Prepared by 制作	Checked by 审核	Approved by 批准
李金凤	陈海异、胡继东（电子）刘志豪（电芯）	刘圣军

Approved by customer 客户承认 (Stamp) (盖章)	Tested by 测试	Checked by 审核	Approved by 批准

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VDL® 业界领先的聚合物锂电池制造商

Revision History
版本履历表

Revision 版本	Description 内容描述	Modify 修改人	Approval 审批人	Date 日期
A/0	First Issue 新版发行	杨勇	邱富生	2018-12-12
A/1	Add label 增加电池标签 Thickness 厚度：5.0mm Max→5.12mm Max	杨勇	邱富生	2018-12-19
A/2	导线外露长度：20±3mm→13±3mm 锡线头外露长度：2±0.5mm→1.5~2.0mm	杨勇	刘圣军	2019-03-15
A/3	增加二维码所追溯内容的说明	杨勇	刘圣军	2019-05-07
A/4	更正电路原理图以及相关配置信息，补录 PCB 布线图	肖泽建	刘圣军	2019-07-03
	1，线头绝缘方式更改：8*20 高温胶改用⌀ 1.0 热缩管 2，标签增加中文信息，警示语增加法文 3，包装去掉高温胶固定，增加防滑泡绵（系统 bom 更新）	肖泽建	刘圣军	2019-07-31
A/5	应客户要求，备注电池装盘姿态要求：电池标签面朝下	唐世伟	陈远松	2022-05-06
A/6	应客户要求增加电池锂含量信息，补全电池重量信息 更正成品图黑白线绝缘方式	罗波	刘圣军	2022-11-16
A/7	成品图线头镀锡 1.5-2.0mm 改为 1.2±0.3mm	罗波	刘圣军	2022-12-06
A/8	应客户要求装箱数量按 500PCS/箱，增加包装示意图	罗波	刘圣军	2023-08-14
A/9	首页封面增加客户产品型号	罗波	刘圣军	2023-08-24
A10	1.出货电压由 3.8-4.0V 变更为 3.9-4.05V 2.套管绝缘改为蜂蜡绝缘	李金凤	刘圣军	2024-10-10

Contents 目录

1. Scope 概述

The specification shall be applied to Rechargeable Lithium-ion battery which is manufactured by **VDL Electronics Co., LTD**, which is the basis for product design, production and inspection, and its purpose is to let the customer know the quality standard and the instruction.

本产品承认书描述 VDL 电子有限公司设计制造的可充电锂离子电池，它是产品设计、生产和检验的依据。其作用是让客户了解产品的质量标准及正确使用方法。

Cell 电芯

basic manufactured unit providing a source of electrical energy by direct conversion of chemical energy, that consists of electrodes, separators, electrolyte, container and terminals,and that is designed to be charged electrically.

电芯是直接将化学能量转化为电能的基本可制造的单元，其由电极，隔膜，电解液，电池壳和极耳组成，并且可以进行充电。

Battery 电池

assembly of secondary cell(s) which may include associated safety and control circuits and case, ready for use as a source of electrical energy characterized by its voltage, size, terminal arrangement, capacity and rate capability

电池是将电芯进行组装，还包括安全保护电路，壳体，并且可以作为电源使用，这个电源是有电压，尺寸，端子排列，容量和倍率性能

Reference standard 参考标准：

GB 31241-2022 中华人民共和国国家标准《便携式电子产品用锂离子电池和电池组安全技术规范》

IEC/EN61960 欧盟便携式二次电芯和电池的性能标准

UL1642 美国锂电池安全标准

2.Product basic information 产品基本信息:

No.	Items 项 目	Parameter 参 数
1	Battery model电池型号	502728
2	Design scheme保护电路设计方案	BM192-VFEB-DE+S-8261DAU+DP8205+NTC
3	Minimal capacity最小容量	420mAh (Standard discharge 标准放电 详见9.1.2)
4	Typical capacity典型容量	430mAh (Standard discharge 标准放电 详见9.1.2)
5	Nominal voltage标称电压	3.8V
6	Shipment voltage出货电压	3.9-4.05V（40% ~ 80%）
7	Charge ending voltage充电限制电压	4.35V
8	Discharge ending voltage放电终止电压	3.0V
9	Upper limited charging voltage充电上限电压	4.35V
10	Discharge cut-off voltage放电截止电压	2.8V
11	Over current protection过电流保护	2~5A
12	Short circuit protection短路保护功能	Yes 有
13	AC Impedance内阻	≤240mΩ (Detail in 9.4 详见9.4项)
14	Battery Weight电池组重量	7.5±0.5g
15	Max discharge current最大放电电流	1C (Detail in 9.2 详见9.2项)
16	Max charge current最大充电电流	1C (Detail in 9.3 详见9.3项)
17	Cycle life循环寿命	500次充放电后，电池能恢复80%的初始容量(详见9.7项) After 500cycles charge/discharge, battery can recover 80% of its initial capacity (Detail in 9.7)
18	Lithium Weight电池锂含量	0.195g

3．Battery protection characteristics 电池保护特性(Ta=25℃±3℃)

No.	Items 项 目	Parameter 参 数	condition 条件
1	Overcharge protection detection voltage 过充保护检测电压	1st: (4.425±0.025)V 2st: (4.425±0.050)V	Battery voltage is greater than the protection voltage, and the delay time to reach, then the state of the battery into overcharge protection. 电池电压大于过充保护电压，且延时时间达到，则电池进入过充电保护状态。
2	Overcharge release voltage 过充保护恢复电压	1st: (4.225±0.050)V 2st: (4.225±0.050)V	
3	Overcharge protection delay time 过充保护延迟时间	1st: 700~1300 ms 2st: 600~1800 ms	
4	Overdischarge protection detection voltage 过放保护检测电压	1st: (2.50±0.050)V 2st: (2.80±0.100)V	Battery voltage is less than the protection voltage, and the delaytime to reach, then the state of the battery into overdischarge protection. 电池电压小于过放保护电压，且延时时间达到，则电池进入过放电保护状态。
5	Overdischarge release voltage 过放保护恢复电压	1st: (2.90±0.100)V 2st: (3.20±0.100)V	
6	Over discharge protection delaytime 过放保护延迟时间	1st: 22~42 ms 2st: 36~108 ms	
7	Charge overcurrent protection current 充电过流保护电流	1st: 1.5~5.5A 2st: 3~9A	If shall stop charging for an excessive charge current at Over Current Protection current lasts for delay time 电池充电电流大于充电过流保护电流，且延时时间达到，则电池进入充电过流保护状态。
8	Charge overcurrent delay time 充电过流延迟时间	1st: 5.6~11 ms 2st: 5~15 ms	
9	Overcurrent discharge protection current 放电过流保护电流	1st: 2~5A 2st: 3~9A	Battery discharge current is greater than the protection current, and the delay time to reach, then the state of the battery into overcurrent protection 电池放电电流大于过流保护，且延时时间达到，则电池进入放电过流保护状态。
10	Overcurrent protection delay time 放电过流保护延时时间	1st: 5.6~11 ms 2st: 5~15 ms	
11	Current consumption (Operation) of PCM 保护板的正常状态下静态电流	≤10μA	VDD= 3.9V
12	Load resistance of PCM 保护板的空载内阻	≤100mΩ	VDD= 3.9V
13	0V charge function 0V充电功能	Available允许	当Cell过放到0V时，正极表面会有析铜现象，再次充放电，会对电池的可靠性和寿命有一定的影响

4. Condition adapting characteristics 环境适应性（n=1）

No.	Items 项目	Test Method 测试方法	Criteria 标准
1	**High/Low Temperature Test 高/低温测试**	After the battery full charging at 25℃±3℃, measure the discharging capacity with discharging current 0.2Ctill 3.0 (V) cut off voltage at different temperature.（as compared with initial capacity） 在 25℃±3℃条件下满充电后，测量电池在不同温度下用 0.2 C_5A 电流放电至 3.0 (V)所放出的容量（与初始容量作为比较）	在-10℃时 ≥70% At -10℃is ≥70% 在 55℃时 ≥95% At 55℃is ≥95%
2	**High Humidity and High Temperature Test 高温高湿测试**	After put the battery in the high humidity and high temperature of 40℃±2℃ and relative humidity of 90～95% for 48 hours, and with discharging current 0.2C till 3.0*n(V) cut off voltage. 将电池放入 40℃±2℃及相对湿度为 90～95%的恒温恒湿箱中 48 小时后，再以 0.2C 电流放电至 3.0*n(V)。	No visible distortion, fire or explosion, the discharging time ≥3h. 无泄漏、冒烟、起火或爆炸；放电时间≥3h。
3	**Free Fall Test 自由跌落测试**	Free fall test is conducted at an ambient temperature of 20 °C ± 5 °C, by using cells or batteries that are charged to a fully charged state, Each cell or battery is dropped three times from a height of 1,0 m onto a flat oncrete floor or metal floor. The cells or batteries are dropped so as to obtain impacts in random orientations. After the test, the cell or battery shall be put on rest for a minimum of 1 h and then a visual inspection shall be performed. 自由跌落测试是在 20 °C ± 5 °C 环境中进行，电池或电芯处于满电状态，电池或电芯从 1 米的高度，跌落到水泥或金属地面上任意方向三次，跌落后电池静置 1 小时候观察电池的外观。	The battery or cell has no fire or explosion 电池或电芯无起火、无爆炸

5．Safety performance 安全性能（n=1）

No.	Items 项目	Test Method 测试方法	Criteria 标准
1	Forced discharge test 强制放电	A discharged cell is subjected to a reverse charge at 1C for 90 min. 电池先以 0.2C 放电至终止电压，再以 1C 电流，对电池进行反向充电，90min 以上	No fire, No explosion 无起火，无爆炸
2	Overcharge Test 过充电测试	After discharged at a constant current of 0.2C5A to the cut-off voltage, the battery shall be charged at 3.0C/4.6V for 7.0hrs. (0.2C 放电至截止电压后，电池用 3.0C/4.6V 恒流恒压充电 7.0h)	No fire, No explosion 无起火，无爆炸
3	Low pressure 低气压测试	Each fully charged cell is placed in a vacuum chamber, in an ambient temperature of 20~25 ℃. Once the chamber has been sealed, its internal pressure is gradually reduced to a pressure equal to or less than 11.6 kPa (this simulates an altitude of 15240 m) held at that value for 6 h. 电池放在一个模拟真空的空间放置 6 小时，环境温度为 20~25℃，真空环境压力≤11.6kpa，模拟 15240m 高空低压环境	No leakage, No fire, No explosion 无泄漏，不起火，不爆炸
4	Short test 短路测试	The fully charged battery is to be short-circuited by connecting the positive and negative terminals of the battery with resistance load 80 ± 20 m Ω Tests are to be conducted at room temperature 20~25℃. 在室 温 20~25℃ 把充满电的电池的正负极用 80±20 m Ω的负载连接起来，连接起来使电池外部短路	No fire, No explosion The Temperature of the Battery surface not exceeded than 150℃ 无起火，无爆炸 电池表面温度不超过 150℃

5	Projectile Test 焚烧试验	In the ambient temperature, the battery is placed on the wire net of the alcohol lamp burning, until the battery is completely destroyed or the fire explodes. 在环境温度下，将电池放在用酒精灯烧红的钢丝网上观察，直到电池完全烧毁或起火爆炸。	Any part of the octagon eight aluminum mesh is not damaged, not out of the battery eight aluminum mesh. 八角笼的八面铝网不得破损、电池的任何部分不得穿出此八面铝网。
6	Soak Test 浸泡测试	Put the fully charged batteries into clean water, be soaked for 24 hours. 把满充电的电池放进清水中浸泡 24 小时	No break, No fire 无破裂，无起火
7	Crush test 挤压测试	Fully charged the battery in accordance with standard charge condition, the battery is to be crushed between two flat plates. Continuous to applied force on battery of 13kN(17.2Mpa),stopped until a pressure reading of 17.2Mpa is reached on the hydraulic ram 电池按标准充电条件充满电，放置在两块平面金属板 间，持续施加 13KN （17.2Mpa ）的压力，直到液压 油缸施加的压力达到 13KN（17.2Mpa）时停止。	No fire, No explosion 无起火，无爆炸
8	Shock test 撞击测试	The fully charged battery is secured to the testing machine by means of a rigid mount which will support all mounting surfaces of the cell or battery. The battery is subjected to a total of three shocks of equal magnitude. The shocks are applied in each of three mutually perpendicular directions. At least one of them shall be perpendicular to a flat face. For each shock the cell or battery is accelerated in such a manner that during the initial 3 milliseconds the minimum average acceleration is 75g. The peak acceleration shall be between 125 g and 175 g. Cells or batteries are tested in an ambient temperature of 20~25℃ 在环境温度下，将电池分别按三个轴向固定在测试台面上，前 3ms 内平均加速度最少达到 75g（g 为重力加速度），峰值加速度达 125g 至 175g。测试后观察 6h。	No leakage, No fire, No explosion 无泄漏，不起火，不爆炸

6. Testing requirements 测试要求

6.1 Battery test environment 电池试验环境（无特别注明时，试验环境应符合此项要求）

Temperature 温度：25℃±3℃

Relative humidity 相对湿度： 45～85% RH

Atmospheric pressure 大气压力： 86～106 kPa

6.2 Measuring instrumentation requirements 测量仪表要求

Voltage instrumentation requirements: Measuring the voltage meter accuracy no less than 0.5 magnitude

电压仪表要求：测量电压的仪表的精确度不低于 0.5 级

Current instrumentation requirements: Measuring the current meter accuracy no less than 0.5 magnitude

电流仪表要求：测量电流的仪表精确度不低于 0.5 级

Time instrumentation requirements: Measuring the time meter accuracy no less than 0.1%

时间仪表要求：测量时间的仪表精确度不低于 0.1%

Temperature instrumentation requirements: Measuring the temperature meter accuracy no less than 0.5 ℃

温度仪表要求：测量温度的仪表准确度不低于 0.5℃

Impedance instrumentation requirements: Measuring impedance should by sinusoidal alternating (1 KHZ) test

内阻仪表要求：测量内阻应由正弦交变(1KHZ)进行测试

7．Operation temperature and humidity range 运行温湿度范围

7.1 Charging temperature and the Current requirements 充电环境温度及电流要求:

Temperature 温度	Max charge current 允许最大充电电流	Maximum relative humidity 最大相对湿度
0℃≤T≤25℃	0.5C	90%
25℃<T≤45℃	1C	90%

7.2 Discharge temperature 放电环境温度:

-20℃ ～ +60℃，Maximum relative humidity：90%

-20℃ ～ +60℃，最大相对湿度：90%

8．Storage temperature and humidity range(At 50% SOC)存储温湿度范围(在 50% SOC 条件下)

8.1 Three months三个月内：

- 20℃ ～ + 40℃, humidity 45 to 85%

- 20℃ ～ + 40℃，湿度 45 ～ 85%

8.2 Six months 六个月内:

- 20℃ ~ + 35 ℃, humidity 45 to 85%
- 20℃ ~ + 35℃，湿度 45 ~ 85%

8.3 Long-term storage 长期存储:

- 20℃ ~ + 30℃, humidity 45 to 85%
- 20℃ ~ + 30℃，湿度 45 ~ 85%

9．Electrical Characteristics 电气特性

9.1 Battery standard charge/discharge 电池组标准充/放电

9.1.1 standard charge 标准充电

At 25℃±3℃ conditions, CC 0.5C/CV 4.35V, when charging current drops to 0.02Ccharging is terminated, The charging time limited 3h.

在25℃±3℃条件下，以0.5C恒电流，4.35V恒电压充电至电流降到0.02C截止，限时3小时。

9.1.2 Standard Discharge标准放电

Standard discharge current 0.2Cfor continuous discharge, when the voltage drops to discharge cut-off voltage 3.0V discharge is terminated, shall be full discharged.

以标准放电电流 0.2C 进行持续放电，当电压降至放电截止电压 3.0V 时放电被终止，即为放空。

9.2 Maximum charge current 最大充电电流

At 25℃±3℃ conditions, CC 1C/CV 4.35V, when charging current drops to 0.02Ccharging is terminated, The charging time limited 2h.

在25℃±3℃条件下，以1C恒电流，4.35V恒压，充电至电流降到0.02C截止，限时2小时。

9.3Maximum discharge current 最大放电电流

At 25℃±3℃ conditions, with 1C discharge the battery pack.

在25℃±3℃条件下，以1C对电池进行放电。

9.4 Initial impedance 初始内阻

At25℃±3℃ ambient temperature, after standard charged battery pack, AC impedance tester(1KHz) measuring the initial impedance should be**≤240mΩ.**

在 25℃±3℃环境温度下，经过标准充电的电池，使用交流阻抗测试仪（1KHz）测量初始内阻应**≤240mΩ.**

9.5 Initial capacity 初始容量

The initial capacity is for standard charge to full, in 1 hour, the capacity measured at 25℃±3℃ conditions with discharge current of 0.2C till 3.0V cut-off voltage.

The initial capacity**≥**420mAh**.**

电池初始容量为电池以标准充电方式满充，1 小时内，在 25℃±3℃条件下以 0.2C 电流放电至 3.0V 截止所放出的容量，初始容量**≥**420mAh**.**

9.6 Retention Capability 荷电保持能力

After full charging, storing the battery 28 days with20±5°C condition, and then discharge with discharge current of 0.2C till 3.0V cut-off voltage, discharge time should be≥255min

电池满充电后，在 20±5℃的环境条件下存放 28 天，然后以 0.2C 电流连续放电至 3.0V 终止电压，放电时间≥255min

9.7 cycle life 循环寿命

Battery cycle life is tested at 25℃±3℃. For each cycle test, battery is charged using 0.5C constant current until battery voltage meet 4.35V. Then, battery is charged by constant voltage until battery charging current drop to 0.1C. After that, battery is discharged by 0.5C constant current until battery voltage drop to 3V. Repeat until each 50th cycle.

At each 50 cycle, battery capacity will be tested. The test condition is that the battery is charged using 0.5C constant current until the battery voltage meet 4.35V. Then, battery is charged by constant voltage until the charging current drop to 0.02C. After that, battery is discharged by 0.2C constant current until battery voltage drop to 3V.

If the discharge time is more than or equal to 4hours (80% of initial battery capacity), battery need to repeat above 50cycles charge/discharge test. If not, cycle life test is completed.

Cycle life should be 500cycles or above.

电池在温度 25℃±3℃条件下循环测试，以 0.5C 恒流充电到电压 4.35V，然后恒压充电到截止电流 0.1C。再以 0.5C 恒流放电到 3.0V，为 1 个循环周期。这样重复 50 次。

每 50 次做一次容量检测。以 0.5C 恒流充电到 4.35V，然后恒压充电到截止电流 0.02C。再以 0.2C 恒流放电到 3.0V。如果放电时间小于等于 4 小时（80%初始容量），电池必须再重复 50 次充放电测试。否则，循环寿命测试结束。循环寿命应该大于等于 500 次。

9.8 Shipments battery capacity 电池出货容量

Shipments battery capacity is 40% ~ 80%.

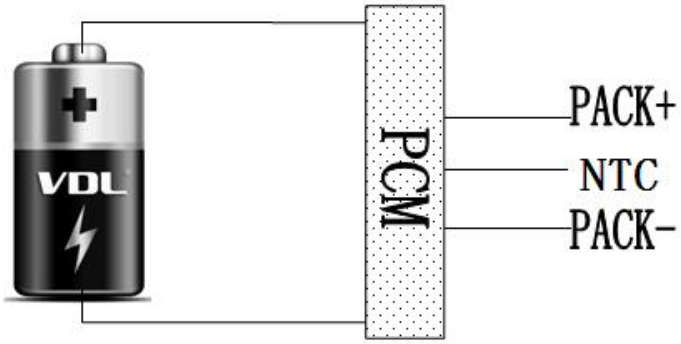
电池的出货容量为40%～80%.

9.9 Agency approvals 承认机构

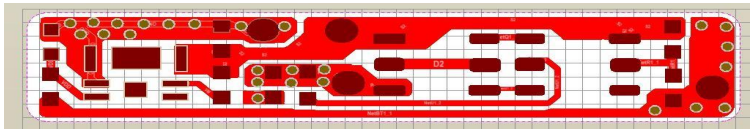
VDL battery safety performance is designed according to UL1642 standard and CE Directive requirement, the product's safety performance is conforming to UL1642 standard and CE Directive requirement.

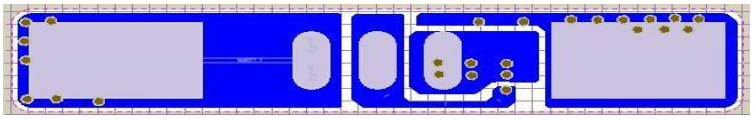
VDL 电池的安全性能是根据 UL1642 标准和 CE 指令要求制定.产品的安全特性与 UL1642 标准和 CE 指令要的要求是一致的.

10. Battery structure diagram 电池架构图(Sketch map 示意图)

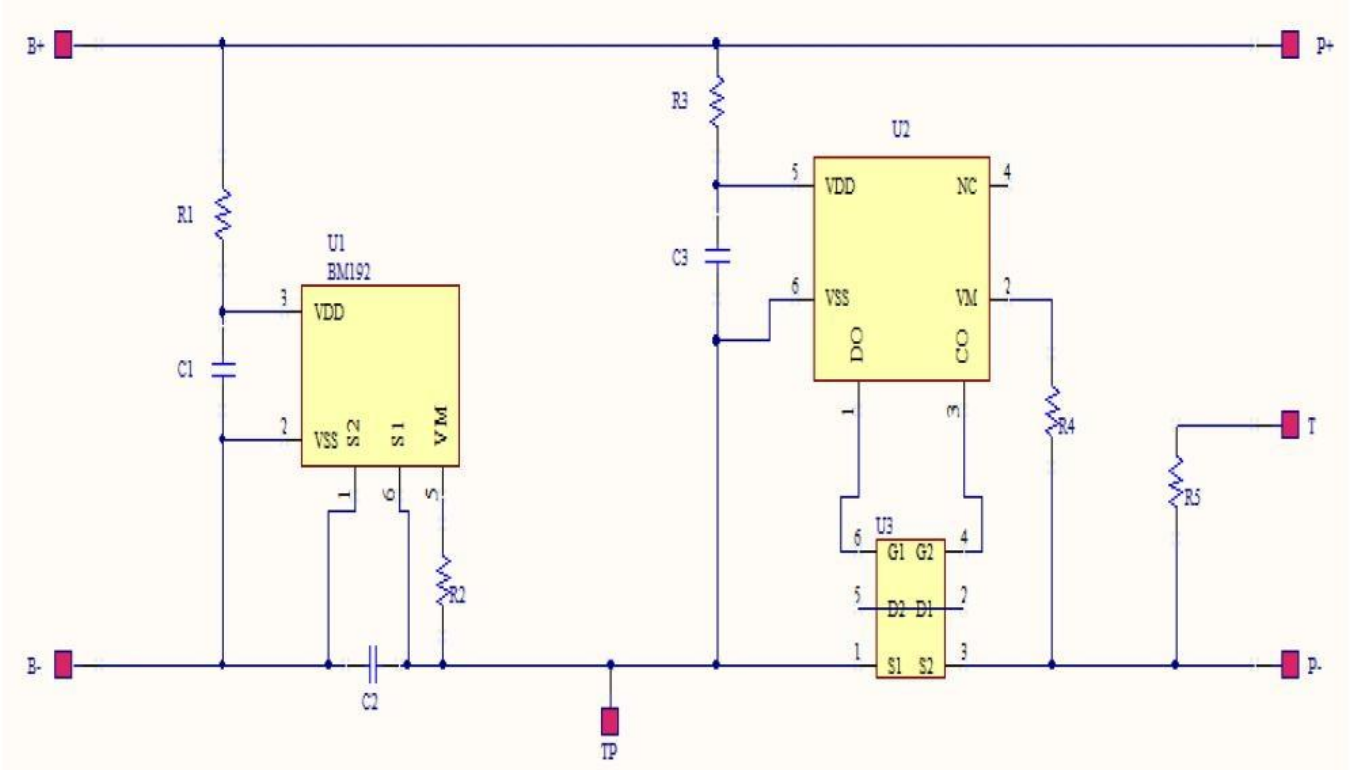


11. PCB Layout PCB 布线图





12. Schematic circuit diagram 电路原理图

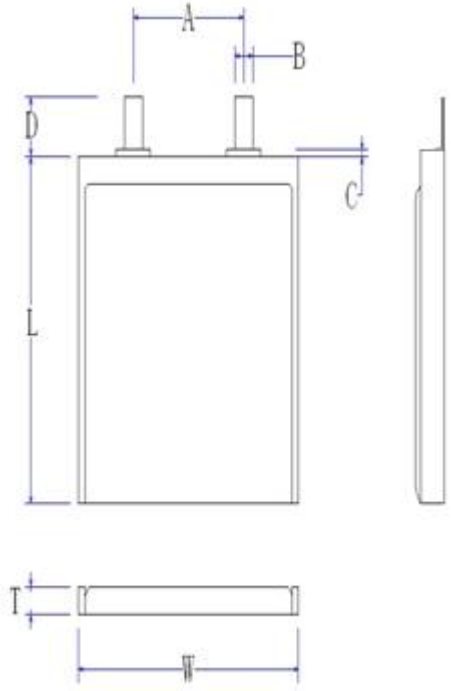


13.Cell 电芯

13.1 Cell Performance parameters 电芯性能参数

编号	项目		规格	备注
1	Initial impedance 初始内阻		≤120mΩ	1kHz AC Impedance 交流阻抗 AC 1kHz
2	Nominal voltage 标称电压		3.8V	/
3	Dimensions 外形尺寸	T	5.0 mm Max	Thickness 厚度
		W	27.0 mm Max	Width 宽度
		L	28.0 mm Max	Cell length(not include Tab sealant) 电芯长度(不含极耳胶)
		A	15.0±1.5 mm	Tab center distance极耳中心距
		B	3.0±0.2 mm	Tab width 极耳宽度
		C	0.5~2.0 mm	Tab exposed size 极耳胶外露尺寸

13.2 Cell outline drawing 电芯外形尺寸(Not In Scale 未按比例)



13.3 Spray Content 电池喷码:

正面喷码 –VDL 502728 3.8V
+420mAh 1.596Wh
1ICP5/27/28 XXXXXX

背面喷二维码（详见14.1项）

Remark: XXXXXX -- YYMMDD (Date 日期)

13.4 Label 电池标签:

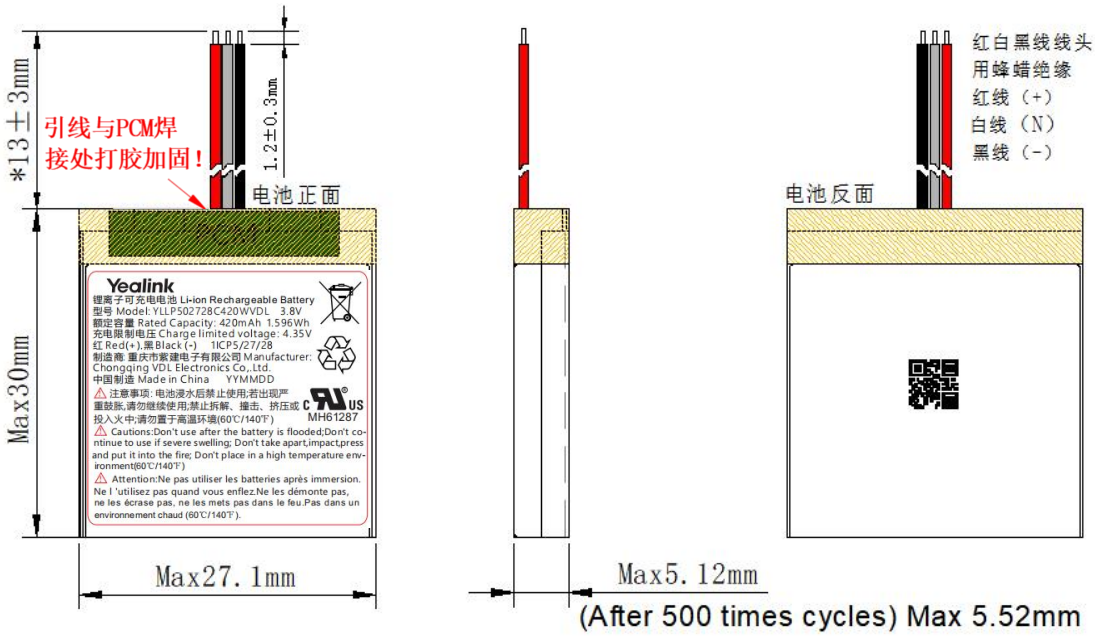
技术要求:
1.材质要求: 合成纸，表面加哑膜处理;
2.印刷颜色: 白色底黑色字; 标贴边缘红色线框为刀模线，无需印刷;
3.外观要求: 印刷内容准确无误，文字清晰易读，不能有模糊、断线、重影斑点、色差等印刷缺陷，版面无脏污、无划痕、无折皱，切边无毛边，整体内容无偏位;
4.尺寸要求: 参照电子档实际尺寸，符合公差要求; 厚度(含背胶不含离型纸)0.085±0.02mm,未注公差±0.3mm;
5.粘性要求: 粘性良好，初粘力: 6#球; 保持力≥24h; 剥离力≥9N;
6.环保要求: 符合RoHS2.0、REACH、HF要求;
7.包装要求: 密封包装，注意防水、防潮、防划伤，产品标示卡按要求填写清楚，须注明型号、数量、订单号等其它相关信息;
8.YYMMDD为生产日期，YY为生产年份(取年份尾数两位)，MM为生产月，DD为生产日.生产日期随订单实时更新,由我司PMC提供
例如: 210706，即为2021年07月06日;
9.产品适用温度范围:-20摄氏度至+60摄氏度;
10.电池贴纸印刷耐磨测试标准:
耐酒精/化妆品刷拭:
纯度99%的酒精或化妆品完全浸润的羊毛块用500g力度在贴纸表面来回摩擦50次(来回为1次)字体等无明显或轻微变化能正常识别
RAC耐磨性测试:
用RAC耐磨仪，根据急速标准要求选取175g力度，进行30圈试验，测试后油墨不掉、不露底色。
橡皮耐磨性测试:
笔状绘图橡皮以1000g力度摩擦贴纸表面150次(来回为1次)，标贴不脱色。
Made in China 中China 的首字母"C" 必须大写

单位:mm

转曲放大3倍后如下图:

14. Battery Outline Drawing 电池组外形尺寸

14.1Battery Outline Drawing 电池组外形尺寸(Not In Scale 未按比例)



二维码组成：批次号+流水码
批次号是7位：YYMMLLL(例如1903001,19年03月 第001批次)
流水码6位：XXXXXX（纯数字）
二维码体现于电池背面居中位置，二维码尺寸：5.0±0.5mm

二维码追溯系统须做追溯的内容有：电压、内阻、k 值；成品电池出货的电压、成品电池内阻

注：电池放入吸塑盒时，标签面朝下

Wiring method 出线方式	Middle 中间
Remark 备注	1、Energy storage welding or laser welding 储能焊或激光焊 电池正面喷码，正面贴标签允许盖住喷码 2、Note: When the battery is placed in the suction box, the label is face down.注意：电池放入吸塑盒时，标签面朝下。

15. Reminder 关于电池折边面注意事项的温馨提示

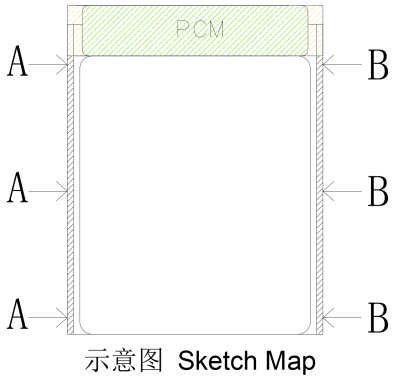


示意图 Sketch Map

温馨提示客户：

电池折边面(图示A&B指示填充区域)严禁与导体接触；电池包边若已绝缘，此点可忽略。

Caution:

The folded edge surface of the battery (the filling area indicated by A & B in the figure) is strictly prohibited from contacting with the conductor; If the battery edge is insulated, this point can be ignored.

16. BOM 1(Bill of materials)电池物料清单

NO.(项次)	Material Name (零件名称)	Specification(规格型号)	Qty (用量)
1	Cell 电芯	502728/420mAh	1
2	Protection board 保护板	BM192-VFEB-DE+S-8261DAU+DP8205+NTC	1
3	Brown Tape 茶色高温胶	T*W*L=0.05*25*25mm	1
4	Brown Tape 茶色高温胶	T*W*L=0.05*5*95mm	1
5	Insulating sleeve 绝缘套管	Φ1.0*15mm 黑色热缩套管(套负极+ntc 导线)	1
6	Label 标签	0.085*22*20mm,白底黑字,合成纸+哑膜标签	1

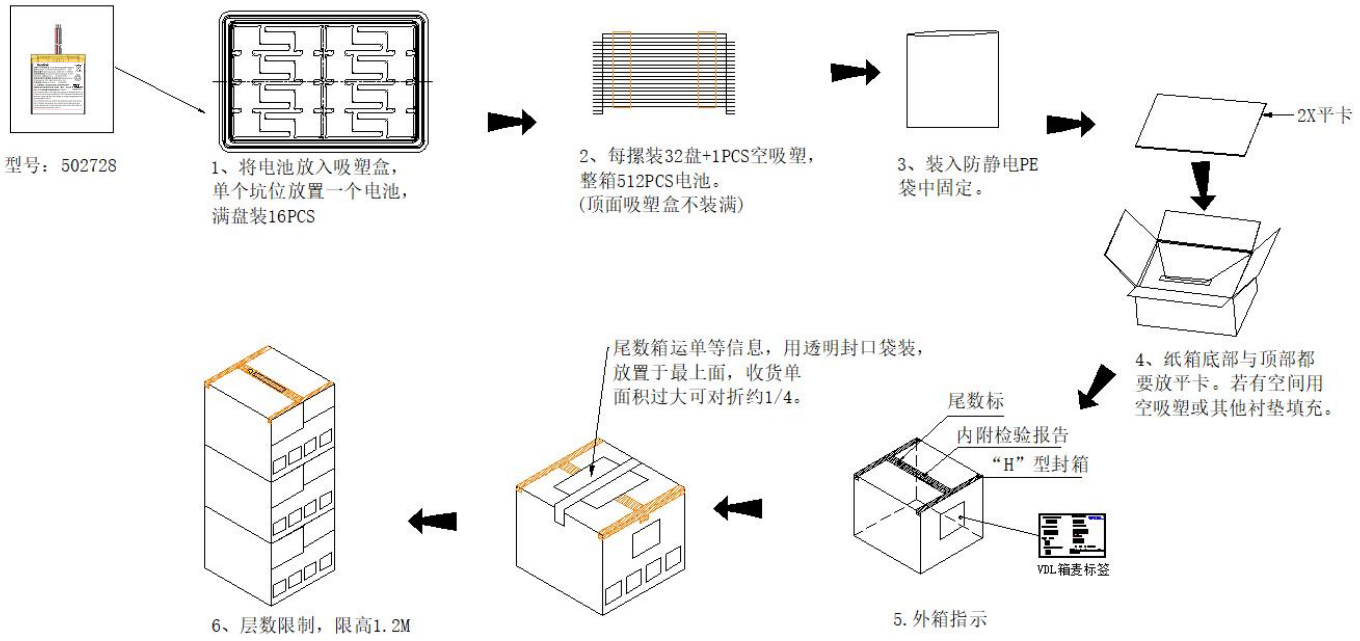
PCM BOM 2

Material Name (零件名称)	Specification (规格型号)	Position (零件位置)	Qty (用量)
PCBA	HFDUB4021T-Ni	/	1
PCB	PCB , 21*4*0.8mm	/	1
IC	BM192-VFEB-DE	U1	1
IC	S-8261DAU , SOT-23-6	U2	1
MOSFET	8205 , SOT-23-6	U3	1
Chip resistor 贴片电阻	SMD 470R,±5% 0402	R1,R4	2
Chip resistor 贴片电阻	330Ω±5%，SMD-0402	R3	1
Chip resistor 贴片电阻	2.7KΩ±5%，SMD-0402	R2	1
NTC 热敏电阻	10KΩ±1%，B=3435 , SMD-0402	R5	1
Chip capacitors 贴片电容	0.1uF，16V, SMD-0402	C1,C2,C3	3
Red wire 红色导线	UL3302-28#	/	1
Black wire 黑色导线	UL3302-28#	/	1
White wire 白色导线	UL3302-28#	/	1
Nickel 镍片	H*W*L=0.3*3*5mm	B+ B-	2

Note：The battery of materials should be consistent with the requirements of the RoHS&REACH&HF.

注：电池组所使用的材料应符合RoHS&REACH&无卤的要求.

Package figure 包装示意图:



17. Battery Precautions and Safety Instructions 电池组使用注意事项及安全说明

Please be sure to take to comply with the specifications and the following precautions to use with batteries, did not follow the specifications for the operation caused any accidents, VDL Electronics Co., Ltd. will not accept any responsibility.

请您务必需遵守本规格书和以下使用注意事项使用电池，对于没有按照规格书进行操作所造成的任何意外事故，VDL 电子有限公司将不承担任何责任.

- Guarantee to keep the battery in good repair in 12 months from the shipment.
  从出厂代码日起 12 个月内保修.
- Please use 0.5C current to charge up 50% capacity after the battery placed 3 months.
  电池每放置三个月,请预先以 0.5C 充电 1 次,即让电池具备 50%以上的电量.
- Before Use the battery, carefully read the instruction manual and battery labels on the surface.
  使用电池前，请仔细阅读使用说明书和电池表面标识.
- Need to use the original battery charger, and should be placed in a dry ventilated place.
  电池需使用原装充电器充电，并应放置在干燥通风场所.
- Such as long-term when not in use, the battery charger to charge state half full, remove the battery from the device and separated, to avoid metal contact with the battery, causing short-circuit or damage to the phenomenon.
  如长期不使用时，请将电池充电至半满电荷状态，把电池从设备中拆除并分开放置，避免金属接触电池，造成短路或损坏现象.
- In use or during storage, battery found there has been high fever, leakage, odor, distortion and other anomalies, please stop using it immediately and stay away from the battery.
  在使用或储存期间，如发现电池有出现高温发热、漏液、散发异味、变形及其它异常现象时，请立即停止使用并远离电池.
- Do not short-circuit the battery positive and negative, and careful not to allow the battery to moisture, to avoid danger.
  切勿将电池正负极短路，并注意不可让电池受潮，以免发生危险.
- Using，keep away from heat, High pressure place, and do not beat, hit the battery.
  使用过程中，应远离热源、高压场所，并勿摔打、撞击电池.
- Please dispose the waste battery properly. Do not put it into fire or water.
  废弃电池请安全妥善处理，切勿投入火中或水中.

18. Customer Inquiry

客户要求

Model 型号：**502728/420mAh**

1、IF clientele ratify specification and showpiece, please sign back specification to VDL in 1 week, or else blank out it.

如果客户认可本承认书和样品，请于一周内回签本承认书给 VDL 电子有限公司，过期视为无效。

2、The customer is requested to write down your information and contact VDL Electronics Co.,Ltd. in advance, if and when the customer needs applications or operating conditions other than those described in this document. VDL Electronics Co.,Ltd. could design and build such products according to your special request.

如果客户需要其他方面的说明或工作条件与规格书内容不一致,请客户提前和 VDL 电子有限公司联系. VDL 电子有限公司将按照贵公司特殊要求设计和开发产品.特殊要求标准:

项 目 / 序号	Special Request 特殊要求	Criteria 标准
1		
2		
3		
4		
5		
6		

Company Name : Signature : Date:

公司名称: 签名: 日期: