



Rechargeable Lithium-ion Battery Specification Approval

DOC NO.: ZJ-PS-02080

REV. : A/0

SHEET : 1 OF 17

对于任何细节和问题，请告诉我们

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VDL SPECIFICATION APPROVAL SHEET

VDL 产品承认书

Customer Name 客户代码: 0609

Customer Product Model 客户产品型号:

Product Model 产品型号: 13315PN3

Product Capacity 产品容量: 580mAh/3.80V

Product Code 产品编码:

Assembly Plant Code 组装厂编码:

Terminal Code 终端编码:

Prepared by 制作	Checked by 审核	Approved by 批准
刘圣军	凌中伦	李可

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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Rechargeable Lithium-ion
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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	刘圣军	李可	2021-7-20

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1. Scope 概述

The specification shall be applied to Lithium-ion Polymer rechargeable battery pack manufactured by **VDL Electronics Co., LTD.** It is the basis for product design, production and inspection. 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聚合物锂电池，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和正确使用方法。

Reference standard 参考标准：

GB/T 31241-2013 中华人民共和国国家标准《蜂窝电话用锂离子电池总规范》

IEC/EN61960 欧盟锂电池标准

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	13315PN3
2	Design scheme 保护电路设计方案	HY2510AS-H6B+DP8205
3	Minimal capacity 最小容量	580mAh (0.2C Standard discharge 0.2C标准放电)
4	Typical capacity 典型容量	600mAh (0.2C Standard discharge 0.2C标准放电)
5	Nominal voltage 标称电压	3.80V
6	Shipment voltage 出货电压	3.95~4.10V(SOC: 65% ~ 80%)
7	Charge ending voltage 充电限制电压	4.35V
8	Discharge ending voltage 放电终止电压	3.00V
9	Over current protection 过电流保护	1.7~5.0A
10	Short circuit protection 短路保护功能	有 Yes
11	AC Impedance 内阻	≤200mΩ (详见9.4项 / Detail in 9.4)
12	Battery Weight 电池组重量	About 约：9.75g
13	Max discharge current 最大放电电流	1.0C (连续放电模式 For continuous discharge mode)
14	Max charge current 最大充电电流	1.0C (连续充电模式 For continuous charge mode)

3 . Battery protection characteristics 电池保护特性(Ta=25°C)

No.	Items 项 目	Parameter 参 数	condition 条件
1	Overcharge protection detection voltage 过充保护检测电压	(4.425±0.020)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	(4.225±0.030)V	
3	Overcharge protection delay time 过充保护延迟时间	700~1300 ms	
4	Overdischarge protection detection voltage 过放保护检测电压	(3.000±0.035)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	(3.200±0.035)V	
6	Over discharge protection delaytime 过放保护延迟时间	115.2~172.8 ms	
7	Overcurrent discharge protection current 放电过流保护电流	1.7~5.0A	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。
8	Overcurrent protection delay time 放电过流保护延时时间	8~16 ms	
9	Current consumption (Operation) of PCM 保护板的正常状态下静态电流	≤6μA	VDD= 3.9V
10	Current consumption (Overdischarge) of PCM 保护板的过放状态下静态电流	≤0.5μA	VDD= 2.0V
11	Load resistance of PCM 保护板的空载内阻	≤70mΩ	VDD= 3.9V
12	0V charge function 0V充电功能	Available允许	
13	Charge overcurrent protection current 充电过流保护电流	1.7~5.0 A	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。
14	Charge overcurrent delay time 充电过流延迟时间	6~10 ms	

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 高/低温性能	After the cell fully charged at $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$, measure the discharging capacity with discharging current 0.2C till 3.0 (V) cut off voltage at different temperature. (as compared with initial capacity) 在 $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 条件下满充电后 ,测量电池在不同温度下用 0.2 C ₅ A 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℃: ≥70% 在 55℃时 ≥95% At 55℃:≥95%
2	Invariableness humid and hot 恒定湿热	After putting the cell in the invariableness humid and hot box of $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and relative humidity of 90 ~ 95% for 48 hours. Discharge the cell to 3.0*n(V) cut-off voltage at 0.2C current. 将电池放入 $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 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 leakage, no fire, no explosion. The discharging time ≥3h. 无泄漏, 无起火, 无爆炸。 放电时间≥3h。
3	Vibration 振动	The fully charged cell is vibrated from 90 to 100 minutes at three mutually perpendicular planes with excursion of 0.8mm, and change the frequency from 10 to 55 HZ with 1Hz/min speed. 满充电后的电池在三个相互垂直的方向按振幅 0.8mm 的谐振形式进行振动, 频率在 10-55HZ 以 1Hz/min 的速率变化, 往复振动 90 至 100min.	No leakage, no fire, no explosion. 电池无漏液,无冒烟, 无起火, 无爆炸
4	Free fall 自由跌落	The cell free falls from a height of 1m into the cement floor from X,Y,Z front and opposite direction of each direction. Then discharge the cell to 3.0*n(V) cut-off voltage with 1.0C current. 电池将从 1 米高处自由跌落到水泥地板上, 从 X、Y、Z 正反方向每个方向自由跌落一次,再以 1.0C 放电至 3.0 (V)	No leakage, no fire, no explosion. 电池无漏液,无冒烟, 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 强制放电	Discharge the cell to the cut-off voltage with 0.2C current and then reverse charge the cell for more than 90 mins with 1C current. 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 过充电	After discharged with 0.2C to the cut-off voltage, charge the cell with 3.0C/4.6V for 7.0hrs. 0.2C 放电至截止电压后，电池用 3C /4.6V 恒流恒压充电 7.0h	No explosion, no fire 无起火、无爆炸
3	Low pressure 低气压	Put the fully charged cell in a vacuum chamber at ambient temperature 20~25°C for 6 hrs. The vacuum environment pressure is set to be less than 11.6kPa, simulating an altitude of 15240m. 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°C，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	Short circuit the fully charged cell by connecting the positive and negative terminals with resistance load 80±20 mΩ at room temperature 20~25°C. The cell remains on test for 24 hrs or until the surface temperature declines by 20 % of the maximum temperature rise, whichever is the sooner. 在室温 20~25°C 下，把充满电电池的正负极用 80±20 mΩ 的负载连接起来，使电池外部短路。结束条件：测试时间 24 小时或者表面温度下降到最高温度的 20%。	No fire, no explosion. The temperature of the cell surface not exceeds 150°C. 无起火，无爆炸 电池表面温度不超过 150°C。

5	Soak test 浸泡测试	Put the fully charged cell into pure water, soaked for 24 hours. 把满充电的电池放进清水中浸泡 24 小时	No broken, no fire 无破裂，无起火
6	Crush test 挤压测试	A fully charged cell is to be crushed between two flat surfaces. The force for the crushing is to be applied by a hydraulic ram or similar force mechanism. The flat surfaces are to be brought in contact with the cell and the crushing is to be continued until an applied force of $13 \pm 1\text{kN}$ is reached. Once the maximum force has been obtained it is to be released. 满充电电池，放置在两块平面金属板间，持续施压 $13 \pm 1\text{kN}$ 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
7	Shock test 撞击测试	The cell is to be secured to the testing machine by means of a rigid mount which supports all mounting surfaces of the cell. Each cell shall be subjected to a total of three shocks of equal magnitude. The shocks are to be applied in each of three mutually perpendicular directions unless it has only two axes of symmetry in which case only two directions shall be tested. Each shock is to be applied in a direction normal to the face of the cell. For each shock the cell is to be accelerated in such a manner that during the initial 3ms the minimum average acceleration is 75 g (where g is the local acceleration due to gravity). The peak acceleration shall be between 125 and 175 g. 在环境温度下，将电池分别按三个轴向固定在测试台面上，每个面经受等量的冲击，每一次冲击前 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。	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°C±3°C

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 °C

温度仪表要求：测量温度的仪表准确度不低于 0.5°C

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°C ≤ T ≤ 15°C	0.2C(截止电压4.35V)	90%
15°C < T ≤ 45°C	1.0C(截止电压4.35V)	90%
45°C < T ≤ 55°C	0.2C(截止电压4.25V) 注意：长期高温4.25V会影响循环性能	90%

7.2 Discharge temperature 放电环境温度:

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

-20°C ~ +60°C , 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 Environmental conditions 存放条件 ; ;

Unless otherwise specified , Cells shall to be tested within one month after shipment and not be cycled (charge/discharge) over one time before the test. All tests shall be performed at $23\pm 2^{\circ}\text{C}$ and humidity of $65\pm 20\%$ RH.

The lithium iron cell impedance would increase in whole storage process, while the capacity would decrease, cell would be charged in 9.1.1 and discharged in 9.1.2

除非另有规定,电池应在装运后一个月进行测试,且在测试前一段时间内不得循环(充放电)。所有试验均在 $23\pm 2^{\circ}\text{C}$ 、 $65\pm 20\%$ RH 湿度下进行。锂电池在整个存储过程中阻抗会增大,容量会减小,电池在 9.1.1 条件下进行充电,在 9.1.2 条件下进行放电。

Storage Temperature	23°C	23°C	23°C	23°C	60°C	60°C
Storage Duration	1 Year	1 Year	90 Days	90 Days	1 Week	1 Week
Storage Charge State	As received	100%	As received	100%	As received	100%
Recovered Capacity	90%	80%	95%	90%	85%	80%
Recovered Impedance @100% Charge State	150%	150%	120%	150%	150%	160%

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 $25^{\circ}\text{C}\pm 3^{\circ}\text{C}$ conditions, CC 0.5C/CV 4.35V, when charging current drops to 0.02C charging is terminated, The charging time limited 4hrs.

在 $25^{\circ}\text{C}\pm 3^{\circ}\text{C}$ 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 4 小时。

9.1.2 Standard Discharge 标准放电

Standard discharge current 0.2C for continuous discharge, when the voltage drops to discharge cut-off voltage 3.00V 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 3.00V 时放电被终止, 即为放空。

9.2 Maximum charge current 最大充电电流

At $25^{\circ}\text{C}\pm 3^{\circ}\text{C}$ conditions, CC 1.0C/CV 4.35V, when charging current drops to 0.02C charging is terminated, The charging time limited 2h.

在 $25^{\circ}\text{C}\pm 3^{\circ}\text{C}$ 条件下,以 1.0C 恒电流, 4.35V 恒压, 充电至电流降到 0.02C 截止, 限时 2 小时。

9.3 Maximum discharge current 最大放电电流

At $23^{\circ}\text{C}\pm 2^{\circ}\text{C}$ condition, discharge the cell with 1.0C.

在 $23^{\circ}\text{C}\pm 2^{\circ}\text{C}$ 条件下,以 1.0C 对电池进行放电。

9.4 Initial impedance 初始内阻

At $25^{\circ}\text{C}\pm 3^{\circ}\text{C}$ ambient temperature, after standard charged battery pack, AC impedance tester (1KHz) measuring the initial impedance should be $\leq 200\text{m}\Omega$.

在 $25^{\circ}\text{C}\pm 3^{\circ}\text{C}$ 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 $\leq 200\text{m}\Omega$ 。



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9.5 Initial capacity 初始容量

The initial capacity is for standard charge to full, in 1 hour, the capacity measured at $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ conditions with discharge current of 0.2C till 3.00V cut-off voltage.

The initial capacity $\geq 580\text{mAh}$.

电池初始容量为电池以标准充电方式满充, 1 小时内, 在 $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 条件下以 0.2C 电流放电至 3.00V 截止所放出的容量, 初始容量 $\geq 580\text{mAh}$.

9.6 Retention Capability 荷电保持能力

After full charging, storing the battery 28 days with $20 \pm 5^{\circ}\text{C}$ condition, and then discharge with discharge current of 0.2C till 3.00V cut-off voltage, discharge time should be $\geq 255\text{min}$

电池满充电后, 在 $20 \pm 5^{\circ}\text{C}$ 的环境条件下存放 28 天, 然后以 0.2C 电流连续放电至 3.00V 终止电压, 放电时间 $\geq 255\text{min}$

9.7 Cycle life 循环寿命

Battery cycle life is tested at $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$. 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 0.02C. 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 400cycles or above. the diameter after swelling will be less than 104%.

电池在温度 $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 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 0.02C。再以 0.5C 恒流放电到 3.00V, 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 3.00V。如果放电时间大于等于 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 400 次。膨胀后直径 $\leq 104\%$ 。

9.8 Shipments battery capacity 电池出货容量

Shipments battery capacity is 65% ~ 80%.

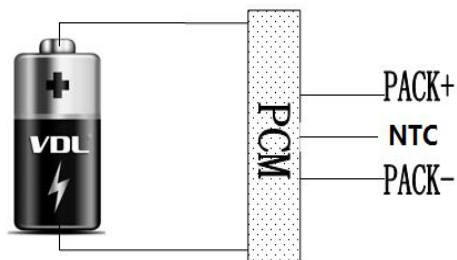
电池的出货容量为 65% ~ 80%.

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.

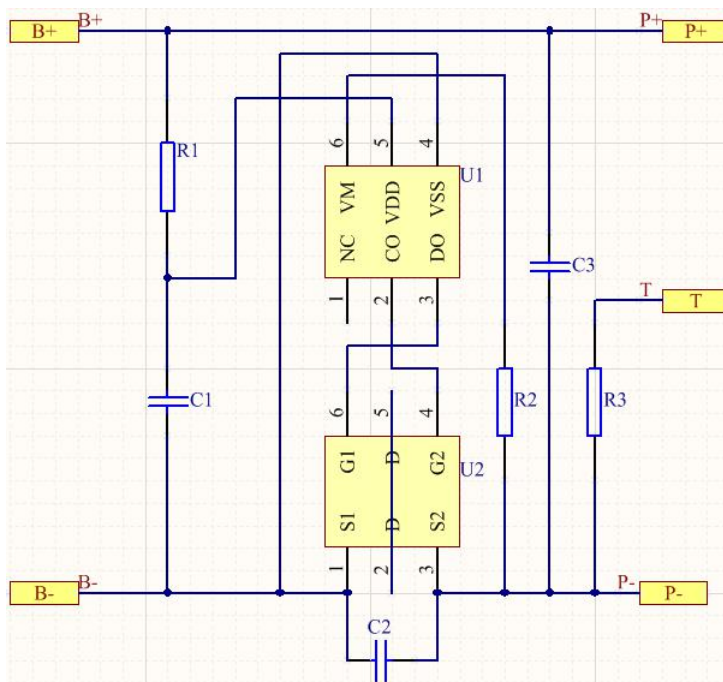
10 . Battery structure diagram 电池架构图(Sketch map 示意图)



11 . PCB Layout PCB 布线图

TBD

12 . Schematic circuit diagram 电路原理图

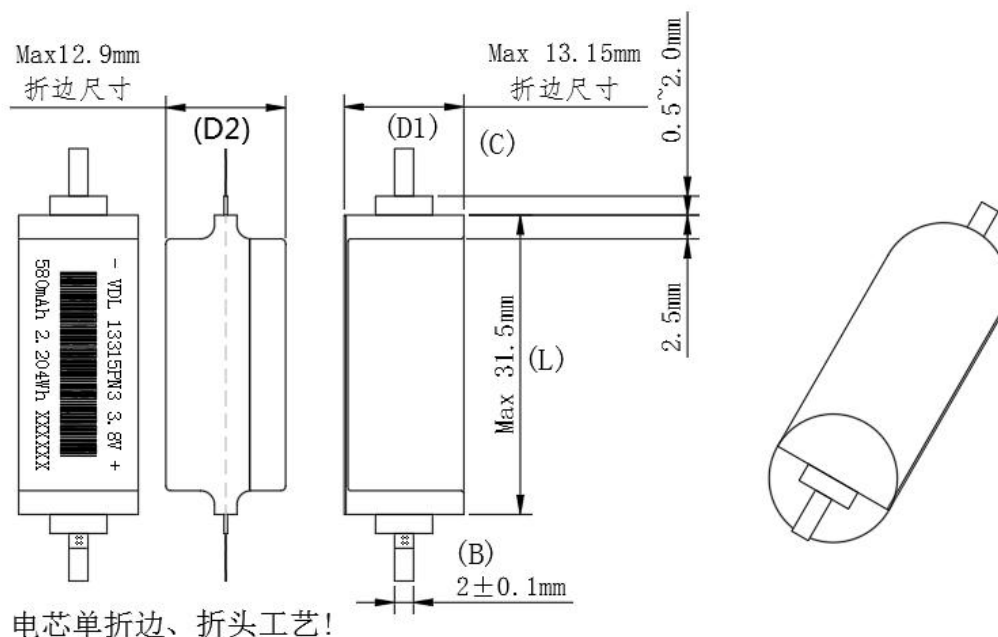


13.Cell 电芯

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	$\leq 100\text{m}\Omega$	1kHz AC Impedance 交流阻抗 AC 1kHz
2	Nominal voltage 标称电压	3.80V	/
3	Dimensions 外形尺寸	D1	13.15mm Max (折边) Diameter 直径(受 300gf 力测量)
		D2	12.9 mm Max(非折边) Diameter 直径(受 300gf 力测量)
		L	31.5 mm Max(折头后) Cell length(not include Tab sealant) 电芯长度(不含极耳胶) (受 300gf 力测量)
		B	$2.0\pm 0.1\text{ mm}$ Tab width 极耳宽度
		C	0.2~2.0 mm Tab exposed size 极耳胶外露尺寸
		两头是否折头	折头工艺

1:



13.3 Spray Content 电池喷码:

- VDL 13315PN3 3.8V +



580mAh 2.204Wh XXXXXX

Remark: XXXXXX -- YYYYMM (Date日期)

喷码整体位于电池主体中心即可

条码规则: YMLLLXXXXX

其中 YM 表生产年月,

Y 取年份末尾数字

M 为: 1-9, A, B, C 代表 1-12 月份

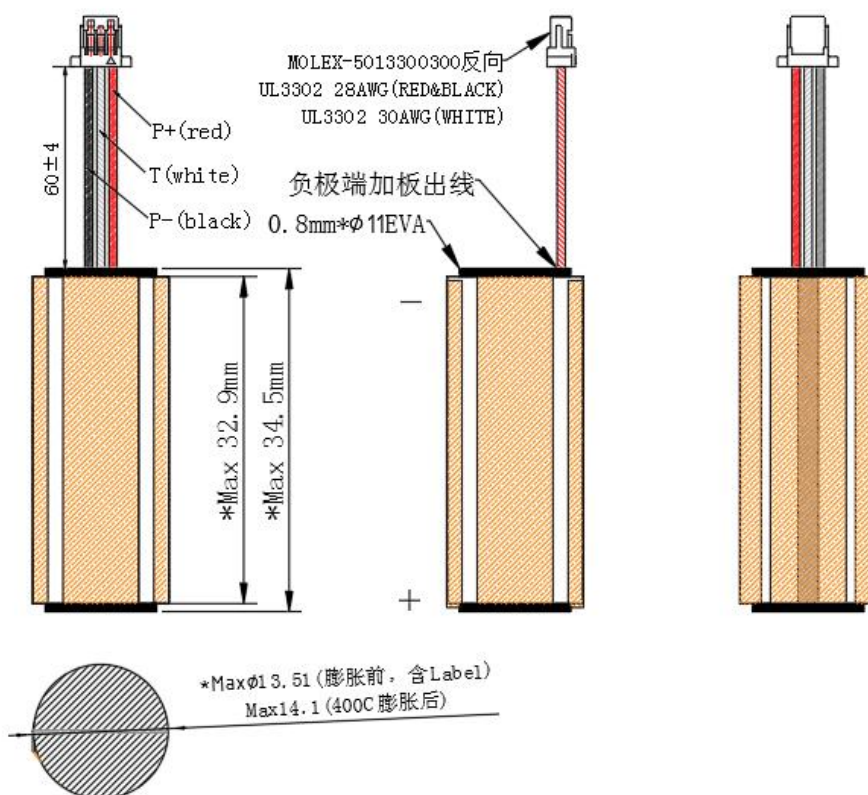
LLL 为生产批次号

XXXXXX 为生产流水号, 随日期清零, 喷码不能重复

条码年月与明码年月时间一致

14 . Battery Outline Drawing 电池组外形尺寸

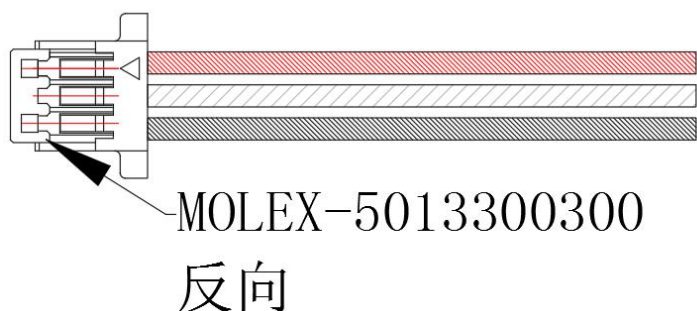
14.1 Battery Outline Drawing 电池组外形尺寸(Not In Scale 未按比例)



14.2 Battery size parameters 电池组尺寸参数

Wiring method 出线方式	Negative leads 负极出线
Remark 备注	1、Energy storage welding protective circuit , 保护板储能焊 ; 2、Protect circuit components facing inside , 保护电路元器件朝内 ; 3、The thickness of the finished product is measured by the force of 500gf, and the width and length of the finished product are measured by the force of 300gf. 成品厚度受 500gf 的力测量, 宽度、长度尺寸, 需受 300gf 的力测量 ;

15 . Terminal wire 端子线





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16.Label 标签

The following labels are pasted on the battery body.以下标签贴于电池本体上：
TBD

17. 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)	备注
1	Cell 电芯	13315PN3/580mAh	1	
2	Protection board 保护板	HY2510AS-H6B+DP8205+NTC	1	
3	端子线	TBD	1	
4	Brown Tape 茶色高温胶	T*W*L=0.05*15*35mm	1	隔离电芯与镍片
5	Brown Tape 茶色高温胶	T*W*L=0.05*8*100mm	1	绝缘镍片
6	Label 标签	TBD	1	
7	White Tape 成型杜邦纸	HFPTC13315T-Ni 专用,0.1x9.3x9.6mm,白色,高粘,单面背胶	1	绝缘保护板与电芯
8	White Tape 成型杜邦纸	月牙形杜邦纸,0.1x4.5x10.39mm,白色,强粘,单面背胶	2	绝缘电芯正负极
9	Nickel 镍片	T*W*L=0.1*3*40mm	1	

PCM BOM 2

Material Name (零件名称)	Specification (规格型号)	Position (零件位置)	Qty (用量)
PCBA	HF9396T-Ni	/	1
PCB	9.6*9.3*0.6mm	/	1
IC	HY2510AS-H6B	U1	1
MOSFET	DP8205	Q1	1
贴片电阻 Chip resistor	100Ω±5%	R1	1
贴片电阻 Chip resistor	2KΩ±5%	R2	1
NTC	100KΩ±1%, B=4250K	R3	1
贴片电容 Chip capacitors	0.1μF/-20%~+80%/16V	C1,C2,C3	3
镍片	3.5*3*0.3mm	B+	1
镍片	8.3*3*0.1mm	B-	1

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

注：电池组所使用的材料应符合RoHS& REACH&低卤的要求。

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

Please be sure to comply with the specifications and the following precautions to use with batteries. For any accident caused by operation not following the specifications, VDL Electronics Co., Ltd will not take any responsibility

请您务必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.

- ◆ Warranty period is 12 months after shipment date.

从出厂代码日起 12 个月内保修.

- ◆ When the battery is stored for 3 months, it should be charged with 0.5C current to 50% SOC.

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 using 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.

- ◆ Please use the original battery charger. The battery should be placed in a dry and 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.

- ◆ If the battery is not used for a long time, please charge the battery to 50% SOC status. Remove the battery from the device and place it separately, to avoid the short-circuit and damage caused by contacting metal.

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.

- ◆ When using or during storage, if the battery is hot, with leakage, odor, distortion or 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 terminals. Do not damp the battery to avoid any 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.

- ◆ Please keep the battery away from heat, high voltage place. Please do not beat or 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.

- ◆ Remove the battery immediately from the device when the battery life ends. Please dispose the waste battery properly. Do not put it into fire or water.

电池寿命终止应立刻从设备中取出,废弃电池请安全妥善处理，切勿投入火中或水中.



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18 . Customer Inquiry

客户要求

Model 型号 : 13315PN3/580mAh

1.If the customer approves the specification and samples, please sign the specification back to VDL within 1 week. It is invalid when expires.

如果客户认可本承认书和样品，请于 7 天内回签本承认书给 VDL 电子有限公司，过期视为无效。

2. If the customer requires more explanation or the operating conditions are different from the specification content, please write down your information and contact VDL Electronics Co., Ltd in advance. VDL Electronics Co., Ltd could design and build 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: