Battery Specification

电池规格书

In compliance with OPPO standard

供货满足 OPPO 企业标准

Customer Name/客户名称:	OPPO
Product Name/产品名称:	Lithium-ion Polymer battery/聚合物锂离子电池
Product Model/产品型号:	BLP705
TWS P/N /明美 P/N:	
Customer P/N /客户 P/N:	
Cell Model/电芯型号:	ATL GC -SDC -536566-020L
Document No./文件编号:	RD-PSP-BLP705-01
Revision Level/文件版本:	02

Customer Approval 客户承认栏

广州明美新能源有限公司
TWS TECHNOLOGY (GUANGZHOU) LIMITED

Prepared by/拟制	Reviewed by/审核	Approved by/审批
Wilson. Wu/ Junco. Huang		
2018-10-25		

History of Change

修订履历表

NO/ 序号	Rev/ 版本	ECN NO./ ECN 编号	Content of Change/修订内容	Date/日期	Prepared by/ 修订者
1	00	\	First draft/初版	2018-10-25	Wilson. Wu/ Junco. Huang
2	01	\	增加丝印	2018-11-12	Wilson. Wu/ Junco. Huang
3	02	\	更新充电电压上限 修正标称电压，电芯额定电压	2018-12-09	Legen Lau

Table of Contents/目录

1 Scope/适用范围

This specification applies to the BLP705 battery designed and manufactured for OPPO by TWS TECHNOLOGY (GUANGZHOU) LIMITED. /本规格书适用于广州明美新能源有限公司为广东欧珀移动通信有限公司设计和生产的 BLP705 电池产品。

2 Test reference standard/测试参考标准

The battery is tested in reference to the standard of GB 31241-2014 “General specification of lithium-ion cells and batteries for mobile phone”. /本产品测试参考标准：GB31241-2014《便携式电子产品用锂离子电池和电池组安全要求》。

3 Product name and model/产品名称及型号

Product Name/产品名称: Lithium-ion Polymer Battery/聚合物锂离子电池
Product Model/产品型号: BLP705
Configuration/结构: 1S1P

4 Key parameters/主要参数

4.1 Cell characteristics /电芯特性

Cell maker/ 电芯制造商	Cell model/ 电芯型号	Rated voltage (V)/ 额定电压(V)	Min.Capacity(mAh)/ 额定容量(mAh)
ATL	GC -SDC -536566-020L	3.87V	4005mAh

4.2 Battery characteristics/电池特性

No/序号	Item/项目	Battery Specification/电池规格	Notes/备注
4.2.1	Typical capacity/典型容量	4065 mAh	
4.2.2	Rated capacity/额定容量	3975 mAh	
4.2.3	Nominal voltage/标称电压	3.87V	Measure with multimeter HP34401/ HP34401 万用表测量
4.2.4	Charge method/充电方式	CC / CV	
4.2.5	Limited charge voltage Ucr/ 充电限制电压	4.45V	
4.2.6	Upper limit charge voltage Uup/ 充电上限电压	4.5V	
4.2.7	Discharge cut-off voltage Udo/ 放电截止电压	2.5V	
4.2.8	Recommended charge current Icr/ 推荐充电电流	0.2C	
4.2.9	Cell Max. continuouscharge current Icm1/ 最大充电电流	4500mA	
4.2.10	Upper limit charge temperature Tcm/上限充电温度	0℃~10℃ 0.3 C_{min}Max to 4.4V	
		10℃~15℃ 1C_{min}Max to 4.4V	
		15℃~45℃ 4500mAC_{min}Max to	

		4.5V	
		45 ℃ ~ 55 ℃ 0.6C_{min} Max to 4.1V	
4.2.11	Lower limit charge temperature Tlm/ 下限充电温度	0 ℃	
4.2.12	Upper limit discharge temperature Tdm/上限放电温度	60℃	
4.2.13	Lower limit discahrge temperature Tlm/下限放电温度	-20℃	
4.2.14	Cycle life/循环寿命	>500cycles	
4.2.15	Length/长度尺寸	68(max)mm	Measure with Caliper/ 卡尺测量
	Width/宽度尺寸	65.5(max)mm	
	Thickness/厚度尺寸	5.48(max)mm	
4.2.16	Weight/重量	About 53.5g/约 53.5g	Measure with Electronic scale/ 电子秤称量

4.3 PCM specification（at 25℃）/保护板规格(在 25℃)

NO./序号	Item/项目	Min/最小值	Typ/典型值	Max/最大值
*4.3.1	Overcharge protection voltage 1(V)/ 过充保护电压 1(V)	4.525	4.55	4.575
4.3.2	Overcharge protection delay time(s)/ 过充保护延迟时间(s)	0.7	1	1.3
*4.3.3	Overcharge protection voltage release (V)/ 过充保护恢复电压(V)	4.32	4.35	4.38
*4.3.4	Overdischarge protection voltage(V)/ 过放保护电压(V)	2.565	2.6	2.635
4.3.5	Overcurrent protection delay time (ms)/ 过放保护延迟时间(ms)	14	20	26
*4.3.6	Gauge OCV accuracy for pack/ 电池电压精度（mV）	OCV-3	OCV+0	OCV+3
*4.3.7	Gauge current accuracy/充放电流精度（mA）	995	1000	1005
*4.3.8	Gauge Temp accuracy/温度精度（℃）	-5	0	+5
*4.3.9	CHEM ID/电芯化学 ID	1707		
*4.3.10	Charge current/充电电流（A）	0.8	1	1.2
*4.3.11	discharge current/放电电流（A）	1.8	2	2.2
*4.3.12	PCM current consumption (μA)/ 保护板消耗电流(μA)	-	-	200uA,Max

	Operating mode/工作模式			
	Sleep mose/睡眠模式	-	-	130uA,Max

*为生产测试工位的测试项目

4.4 Battery specification（at 25℃）/电池规格(在 25℃)

NO./序号	Item/项目	Min/最小值	Typ/典型值	Max/最大值
*4.4.1	Open Circuit Voltage/出货电压（V）	3.88~4.0		
		3.68~3.78（for IATA）		
*4.4.2	Battery impedance/电池内阻（mΩ）	≤70		
*4.4.3	Charge current/充电电流（A）	3.6	4	4.4
*4.4.4	discharge current/放电电流（A）	1.8	2	2.2
4.4.5	Overdischarge current protection (A)/ 过放电流保护(A)	6.87	8	9.11
4.4.6	Discharging overcurrent detection delay time（ms） 过放电流保护延迟时间（ms）	8	12	16
4.4.7	Overcharge current protection (A)/ 过充电流保护(A)	5.15	6	6.83
4.4.8	Charging overcurrent detection delay time（ms） 过充电流保护延时时间（ms）	11	16	21
*4.4.9	Short Circuit in Discharge ASCD1 (A)/ 短路保护 (A)	24.24	36	47.52
4.4.10	Short Circuit in Discharge detection delay time（us） 短路保护延时时间（us）	175	250	425
*4.4.11	State of charge/电量计 SOC	40%	50%	60%
		≤30%（for IATA）		
*4.4.12	Full Charge Capacity/电量计满充容量			4065
*4.4.13	CHEM ID/电芯化学ID	1707		
*4.4.14	Gauge OCV accuracy/电压精度（mV）	OCV-3	OCV+0	OCV+3
*4.4.15	Gauge current accuracy/充放电流精度（mA）	995	1000	1005
*4.4.16	Gauge Temp accuracy/温度精度（℃）	-5	0	+5

5 Test methods and definitions/测试方法和定义

5.1 Test conditions/测试条件

5.1.1 Unless otherwise specified, tests in this specification should be conducted at the following atmospheric conditions:/除非另有规定，本规格书中各项试验应在以下大气条件下进行：

5.1.2Temperature/温度: 20℃ ±5℃;

5.1.3Relative humidity/相对湿度: no greater than 75% /不大于 75%;

5.1.4Atmospheric pressure/大气压力：86 kPa-106 kPa.

5.2 Test instruments requirements/测试仪器要求

5.2.1 The precision of voltage measuring instrument should not be lower than ±0.5%. /
电压测量仪器的精度不应低于 0.5%。

5.2.2 The precision of current measuring instrument should not be lower than±0.5％. /
电流测量仪器的精度不应低于 0.5%。

5.2.3 The precision of time measuring instrument should not be lower than ±0.1％. /
时间测量仪器的精度不应低于 0.1%。

5.2.4 The precision of temperature measuring instrument should not be lower than ±0.5℃. /
温度测量仪器的精度不应低于 0.5℃。

5.2.5 The current of the constant current power supply can be adjusted; the relative variation of its current should be in the range of ±1% at constant charge or discharge. /
恒流电源的电流可以调整，电流的相对变化应 1%范围内。

5.2.6 The voltage of the constant current power supply can be adjusted; the relative variation of its voltage should be in the range of ±1% at constant charge. /
恒流电源的电压可以调整，电压的相对变化应在 1%范围内。

6 Performance/基本性能

C_5 is the battery capacity indicated by the manufacturer. It is the capacity that a battery should have when it is discharged to the cut-off voltage by 5-hour ratio at the ambient temperature of 23℃ ±5℃.

ItA is referential test current and ItA is equal to C_5Ah/1h.

C_5：生产厂标明的电池容量，指电池在环境温度为 23℃±5℃条件下，以 5h 率放电至 6.0V 时所应提供的电量，用 C_5表示。

ItA：参考试验电流用 ItA 表示，ItA=C_5Ah/1h

No.	Test item	Test method	Criteria
6.1	Charge method/充电方式 a standard charge/ a 标准充电 b fast charge b 快充 The battery may be charged by method a or b.	Standard charge : At ambient temperature of （23±5）℃, charge the battery at 0.2ItA until the battery terminal voltage reaches charge limit voltage, then charge at constant voltage until charge current no greater than 0.02ItA, the maximum charge time should not be greater than 8 h. Stop the charging./ 在环境温度为（23±5）℃条件下，以 0.2ItA 充电，当电池端电压达到充电限制电压时，改为恒压充电，直到充电电流不大于 0.02ItA，最长充电时间不大于 8h，停止充电。	
		fast charge: At ambient temperature of （23±5）℃, charge the battery at 1 ItA until the battery terminal voltage reaches charge limit voltage, then charge at constant voltage until charge current no greater than 0.02ItA, the maximum	

	电池可以使用 a 或 b 方式充电	charge time should not be greater than 8 h. Stop the charging. 在环境温度为（23±5）℃条件下，以 1ItA 充电，当电池端电压达到充电限制电压时，改为恒压充电，直到充电电流不大于 0.02ItA，最长充电时间不大于 8h，停止充电。	
6.2	Standard discharge/ 标准放电	a. Charge as per section 6.1 then store the battery for 0.5-1hour, discharge the battery at constant current of 0.2ItA to cut-off voltage at ambient temperature of（23±5）℃. The test may be cycled for 5 times. Stop the test when the battery capacity meets the criteria in any one of the cycles. a. 电池按 6.1 规定充电结束后搁置 0.5h～1h，在环境温度为（23±5）℃的条件下以 0.2ItA 电流恒流放电至 6.0V。上述实验可重复循环 5 次，当有一次循环的电池容量符合规定时试验即可停止。	The discharge time shall not be less than 5 hours. /放电时间不能少于 5 小时。
	Fast discharge/ 快速放电	b. Charge as per section 6.1 then store the battery for 0.5-1hour, discharge the battery at constant current of 1ItA to cut-off voltage at ambient temperature of（23±5）℃. b. 电池按 6.1 规定充电结束后搁置 0.5h～1h，在环境温度为（23±5）℃的条件下以 1ItA 电流恒流放电至 6.0V。	The discharge time shall not be less than 51 minutes. /放电时间不能少于 51 分钟。
6.3	High temperature performance/ 高温性能	Charge the battery per section 6.1, then place at 55℃±2℃ high temperature chamber and keep at that temperature for 2 hours and discharge at 0.2ItA to the cut-off voltage. The discharging time should meet the criteria./ 电池按 6.1 规定充电结束后，放入 55℃±2℃的高温箱中恒温 2h，然后以 0.2 ItA 电流放电至截止电压，放电时间应符合判定标准 After the test, take out the battery and place at ambient temperature of 23℃±5℃ for 2 hours. Visually inspect the battery and the battery should meet the criteria./ 该试验结束后，将电池取出在环境温度 20℃±5℃的条件下搁置 2h，然后目测电池外观，应符合判定标准。	1. The discharging time should not be less than 5 hours/ 放电时间应不低于5h 2. No cosmetic deformation，no rupture./ 电池外观应无变形、无爆裂。
	Low temperature performance/ 低温性能	Charge the battery per section 6.1, then place at -10℃±2℃ low temperature chamber and keep at that temperature for 4 hours and discharge at 0.2ItA to the cut-off voltage. The discharging time should meet the criteria. /电池按 6.1 规定充电结束后，放入-10℃±2℃的低温箱中恒温 4h，然后以 0.2ItA 电流放电至截止电压，放电时间应符合判定标准。 After the test, take out the battery and place at ambient temperature of 23℃±5℃ for 2 hours. Visually inspect the battery and the battery should meet the criteria. /该试验结束后，将电池取出在环境温度 20℃±5℃的条件下搁置 2h，然后目测电池外观，应符合判定标准。	1. The discharging time should not be less than 3 hours./ 放电时间不低于 3h。 2. No cosmetic deformation, no rupture./ 电池外观应无变形、无爆裂。

6.4	Capacity retention/ 容量保持能力	Charge each sample battery per section 6.1, and then store the battery for 28 days at ambient temperature of 20℃±5℃ and discharge at constant current of 0.2 ItA to cut-off voltage. /每个电池按 6.1 规定充电结束后，在环境温度为 20℃±5℃条件下，将电池开路搁置 28 天，在环境温度为 23℃±2℃条件下在再以 0. 2ItA 放电至截止电压。	The discharge time should not be less than 4.5h. /放电时间不低于 4.5h。
6.5	Cycle life/ 循环寿命	At the ambient temperature of （23±5）℃, check the capacity every 50 cycles, the cycle life indicates at the rate of 50, the test should be conducted as follows. Repeat the 1-50 cycles. Charge and discharge, store for 0.5h~1h,until the discharge time of any one of the 50th cycle is less than 3h, subject to one cycle per the 50th cycling instruction, if the discharge time is still lower than 3h, this should be deemed the end of life of the battery. 在环境温度为（23±5）℃条件下，试验过程中，每 50 次循环做一次容量检查，电池寿命以 50 的倍数表示，步骤按下表进行。重复进行 1~50 次循环，充放电直接搁置 0.5h~1h，直至任一个第 50 次循环放电时间低于 3h 时，按照第 50 次循环的规定再进行一次循环，如果放电时间仍然低于 3h 时，则认为寿命截止。	Cycle life should not be less than 500 cycles./循环次数不低于 500 次。

No. of cycles/ 循环次数	Charge/充电			Discharge/放电	
	Charge current/ 充电电流	Charge limit voltage/ 充电限制电压	Cut-off current/ 截止电流	Discharge current/ 放电电流	Cut off voltage/ 截止电压
1~49	1ItA	8.8V	0.1ItA	1ItA	6V
50	0.2ItA	8.8V	0.02ItA	0.2ItA	6V

7 Environmental Adaptability/环境适应性

No./序号	Test item/ 测试项目	Test method/测试方法	Criteria/判定标准
7.1	Constant Humidity and Temperature Characteristics/ 恒温恒湿性能	Place a fully charge battery to constant humidity chamber with RH of 90%～95% and temperature of 40℃±2℃ for 48 h. /将满电电池放入温度40℃±2℃、相对湿度90%～95%恒湿箱中试验48h; Take out the battery from the constant humidity chamber and place them at ambient temperature of 23℃±2℃ for 2 hours, visually inspect the battery appearance. /从恒湿箱中取出电池，在23℃±2℃的环境温度下搁置2h，目测电池组外观，以0.2ItA放电至6V	1. discharge time≥3h/放电时间大于3h。 2. There should be no deformation, no rust, no leakage, n rupture, no fire and no explosion./电池应不破损、不生锈、不起火、不爆炸、不漏液。
7.2	Vibration/震动	After charging the battery, and secure the battery on the top of vibration table without distorting the battery. the vibration	1. The open circuit voltage should not

		should be a sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15minutes. This cycle should be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the battery. One of the directions of vibration must be perpendicular to the terminal face. / 电池充满电后，将电池固定在振动台上，不可使电池变形。采用正弦波进行振动，并以对数扫频方式在 15min 内从 7Hz 扫频到 200Hz 并返回到 7Hz。振动沿样品互相垂直的三个方向（其中一个方向必须与样品正负极所在平面垂直）进行，每个方向按上述对数扫频方式重复 12 次，振动 3h。 The logarithmic frequency sweep is as follows: from 7 Hz a peak acceleration of 9.8m/s2 is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of 78.4m/s2 occurs (approximately 50 Hz). A peak acceleration of 78.4m/s2 is then maintained until the frequency is increased to 200 Hz./ 对数扫频方式如下：7Hz～18Hz保持9.8m/s2的峰值加速度。将振幅保持在0.8mm（位移为1.6mm）直至峰值加速度达到78.4m/s2（频率约为50Hz）。保持78.4m/s2的峰值加速度直到频率增长到200Hz。	be lower than 90% of the initial voltage. There should be no leakage, no rupture, no fire and no explosion./ 电池开路电压不小于规格的90%。电池应不起火、不爆炸、不漏液。 2. Battery thickness variation rate≤5%; / 电池厚度变化≤5%。 3. After the test, the battery should present no obvious cosmetic difference./ 测试后，电池表面无明显变化。
7.3	Shock/冲击	Secure a battery on table top in each of the three mutually perpendicular directions (X, Y and Z). Set the Peak acceleration to 100 m/s2; Subject the battery to 40 to 80 times of shock per minute. Impulse duration is 16ms and the total number of shocks is 1000±10 times. Take off the battery from the test table, the appearance and the battery voltage should meet the criteria. /将电池平均按 X、Y、Z 相互垂直轴向直接或通过夹具坚固在台面上，按下述要求调好加速度、脉冲持续时间，进行碰撞试验：脉冲峰值加速度 100 m/s^2；每分钟碰撞次数 40～80；脉冲持续时间 16ms；碰撞次数 1000±10 次。碰撞结束后将电池自实验台取下，电池外观及电池电压应符合判定标准。	1. No obvious cosmetic damage, no leakage, no smoke or no explosion./电池无明显破损，不冒烟、不爆炸、不漏液。 2. Battery voltage should not be lower than 3.6V./电池电压不低于3.6V。
7.4	Drop/跌落	Drop a battery from a height of 1 m to concrete floor. Each battery face is subject to one fall, total six tests. /将电池从 1m 处自由落体跌落于混凝土板上，每个面各跌落 1 次，总共 6 次。	No drop test request./ 无跌落要求

8 Safety and protection performance/安全保护性能

Note: Adequate safeguard should be employed in conducting the following tests. /注：以下安全性能试验应在有保护措施的条件下进行。

No./序号	Test item/ 测试项目	Test method/测试方法	Criteria/判定标准
8.1	Overcharge Protection/ 过充保护	Charge each sample battery per section 6.1 , and then charge the battery at voltage 2 times of the rated voltage and at constant current of 2C for 7 hours. After the test. The test result should be in conformance with the criteria. 电池按 6.1 规定充电结束后，将电池以 2 倍标称电压、2C 电流恒流恒压充电 7h，电池应符合判定标准。	The battery should not explode, catch fire, smoke or leak. / 电池应不爆炸、不起火、不冒烟、不漏液。
8.2	Overdischarge Protection/ 过放保护	Discharge each sample battery at 0.2ItA to the cut-off voltage, and then discharge the battery by connecting the battery to a load of 30Ω for 7 hours. The test should be performed at ambient temperature of 23℃±5℃.The battery should be in conformance with the criteria. 电池在环境温度为(23±5)℃条件下，以 0.2ItA 放电至 6.0V 后，外接 30Ω 负载放电 7h，电池应符合判定标准。	The battery should not explode, catch fire, smoke or leak. / 电池应不爆炸、不起火、不冒烟、不漏液。
8.3	Short-circuit Protection/ 短路保护	Charge each sample battery per section 6.1 , and then short-circuit the battery for 1 hour by connecting the positive and negative terminals with a resistor of 80mΩ±20 mΩ. After the test, the battery should be in conformance with the criteria. /电池按 6.1 规定充满电后，短路电池的正负极短路 1h，外部短路总电阻为 80mΩ±20 mΩ。测试后，电池应符合判定标准。	The battery should not explode, catch fire, smoke or leak. / 电池应不爆炸、不起火、不冒烟、不漏液。

9 Storage performance /贮存性能

No./序号	Test item/ 测试项目	Test method/测试方法	Criteria/判定标准
9.1	Storage performance/ 贮存性能	The batteries used for storage test should be less than 3 month old from production date. Before storage, charge the battery to 40% to 50% capacity as per section 6.1. After that, store the batteries at the ambient temperature of （23±5）℃ and relative humidity of 45% to 85% for 12 months and charge as per section 6.1 and discharge at 0.2ItA. The discharge time should be in conformance with the criteria./ 储存测试需要使用生产三个月以内的电池。储存之前需要按 6.1 规定的方法给电池充入 40%～45%的容量，然后在环境温度 23℃±5℃，相对湿度 45%～85%的环境中储存 12 个月。然后再按 6.1 规定充电后，在 23℃±5℃的温度环境下以 0.2ItA 放电至截止电压。放电时间应符合判定标准	The discharge time should not be less than 4 hours./放电时间不低于 4h。

10 Battery key component list and Spec/电池主要零件清单及规格

10.1 Battery key component list/电池主要零件清单

No./序号	Name/名称	Qty./数量
1	Lithium-ion polymer cell ATL 536566H /锂离子聚合物电芯 ATL 536566H	1EA
2	BLP705_PCM	1EA
3	FPC+ Connector/FPC+连接器	1EA
4	Multi language label/多国语言标签	1EA

11 PCMparameters/保护板主要零件清单

11.1 PCM key component list/PCM 关键零件清单

描述	位号	数量	品牌
IC SN27546YPHR-B1 DSBAG-15 无卤	U2	1	TI
电容 0201 0.1uF ±10% 10V X5R 无卤	C1-5 C7 C12-13 C16 C21 C18 C20	12	村田、太誘、三星
电容 0201 0.47uF ±20% 6.3V X5R 无卤	C19	1	村田、太誘、三星
电容 0201 1uF ±20% 6.3V X5R 无卤	C17	1	村田、太誘
MOSFET N 型 MTM78E2B0LBF WSMini8-F1-B 无卤	Q2	1	松下
MOSFET N 型 EMH2418R-TL-H EMH8 无卤			Onsemi
MOSFET N 型 FCAB21570L CSP 无卤	Q1	1	松下
MOSFET N 型 FCAB21490L CSP 无卤			
MOSFET N 型 AOC3870			AOS
NTC 0201 10K±1% 3380K±1% 无卤	RT2	1	村田
NTC 0201 10K±1% 3435K±1% 无卤			TDK
连接片-特 S BLP651X NI200 L8W3H3T0.127	B+ B-	2	
IC MM3722AM8RRE SSON6J 无卤	U5	1	美上美
IC R5486K537CM-TR DFN1414-6 无卤			理光
电阻 0201 4.7MΩ ±5% 1/20W 400PPM 无卤	R22	1	大毅、国巨、旺诠
电阻 0201 470KΩ ±5% 1/20W 无卤	R4	1	大毅、国巨、旺诠
电阻 1206 5mΩ ±1% 1W ±50PPM 无卤	R5	1	大毅、国巨
电阻 0201 100Ω ±5% 1/20W 无卤	R10 R14 R20	3	大毅、国巨、旺诠
电阻 0201 10Ω ±5% 1/20W 无卤	R19	1	大毅、国巨、旺诠
电阻 0201 1KΩ ±5% 1/20W 无卤	R2 R21	2	大毅、国巨、旺诠
电阻 0201 330Ω ±5% 1/20W 无卤	R1 R3	2	大毅、国巨、旺诠
电阻 大毅 0201 33Ω ±5% 1/20W 无卤	R15-18	4	大毅、国巨、旺诠
IC R5458L104AA-TR DFN1814-6C 无卤	U1	1	理光
IC MM3734AP5YRE SON6C 无卤			美上美
Fuse D6SC1-12 12A 36V 无卤	F1	1	NEC
Fuse FA-4030-12A-C1-C 12A 35V 4030 无卤			乾坤
MOSFET P 型 SSM3J35CT CST3 无卤	Q3	1	东芝
MOSFET P 型 NTNS3A65PZT5G SOT-883 无卤			Onsemi
二极管 ESD LESD8D5.0CT5G SOD882 无卤	D3-4	2	LRC
二极管 ESD PESD5V0V1BL SOD882 无卤			NXP
PCB BLP705 R01 FR4 6 层 OSP HDI 无卤		1	超声、生益
FPC 705 R00 PI 2 层 OSP 无卤		1	红板、深联
连接器 JAE WP10-P004VA10 8P SMD 无卤	T1	1	

12 Environmental requirements/环保要求

This product is ROHS HF& REACH compliant. /本电池产品符合 ROHS 无卤和 REACH 要求

13 Cosmetic requirements/外观要求

13.1 If the customer has specific cosmetic requirements, the customer's requirement should be executed; otherwise, TWS Quality Criteria for PCM and Assembled Product (QA-MR-3005-01) should be executed. /如果客户对外观有明确要求，按客户标准执行，否则按 TWS 之《PCM 及组装品通用品质判定标准》（QA-MR-3005-01）执行。

13.2 Visually inspect the battery appearance and check the fit between the battery and the mobile phone or simulator device. The result should be in conformance with the following requirements:/用目测法检验被测电池外观，并检查电池与移动电话或模拟装置配合情况，应符合以下要求：

13.2.1The battery surface should be even, clean and free from mechanical damage; the spray painting effect should be even and colour-conforming; the text on label should be correct, clear and complete. Identifications and metal contacts should be well plated and free from rust, scratches and deformation. /电池表面平整、清洁、无机械损伤；喷涂效果均匀、无色差；标签内容正确、字迹清晰、无遗漏、有相关标识，五金端子无锈蚀、镀金良好、无划伤变形。

13.2.2The surface of battery should bear necessary product identifications. These include product name, model, nominal voltage, capacity, maximum charge voltage, reference standard, positive and negative polarities, serial number, manufacturer's name, trademark, warnings, etc. /电池表面应有必须的产品标识：含产品名称、型号、标称电压、额定容量、充电限制电压、执行标准编号、正负极性、序列号、制造厂名、商标和警告语等。

13.2.3 The battery is well sealed and margined, free from excess glue. The battery fits well with the mobile phone or simulator device. The battery can be inserted and removed smoothly. The latch is reliable. Battery shall function properly when the device is powered on. /封装效果良好，间隙均匀、无明显溢胶，移动电话或模拟装置配机效果良好，拆卸顺利、锁扣可靠、开机能工作正常。

14 Battery outlines and dimensions/外形结构接尺寸规格

Please see battery drawing in the drawing section for battery outlines, dimensions specification and PIN definitions. Use callipers with 0.02mm precision or higher precision measuring instruments for dimension measurement. /电池成品外形、结构尺寸规格及端子脚位定义请参见附图 0，尺寸测量工具用精度为 0.02mm 的游标卡尺或更高级别的测量仪器。

15 Transportation and storage/运输、贮存

15.1Transportation/运输

The battery should be packaged into boxes for transportation. Excess vibration, shock, crush, direct sunlight and drenching should be avoided in transit. The battery must not ship together with things that are flammable, explosive or corrosive on the same vehicle. The battery can be transported on trucks, trains, ships, aircrafts or other transportation vehicles. /电池应包装成箱进行运输，在运输过程中应防止剧烈振动、冲击或挤压，防止日晒雨淋，严禁与易燃、易爆、易腐蚀的物品同车装运，可使用汽车、火车、轮船、飞机等交通工具进行运输。

15.2 Storage/贮存

The battery should be kept in their original package and stored in a warehouse with ambient temperature in the range between -5℃ and +35℃，and relative humidity no more than 75%. The battery should be kept indoors in a place that is clean, dry, ventilated and equipped with measures against moisture, dust, vibration and corrosion, and kept from contact with corrosive substance and sources of ignition and heating./ 电池贮存应保持原有包装，存放产品仓库环境温度为-5℃～+35℃，相对湿度不大于 75%的清洁、干燥、通风并设有防潮、防尘、防震、防腐蚀措施的室内，避免与腐蚀性物质接触，应远离火源及热源。

16 Safeguard and instruction/安全规程和使用说明

16.1 Recommendations/推荐使用事项

16.1.1 Please read the instruction manual and the markings on the battery package carefully before using the battery. /使用电池前，请仔细阅读使用说明书和电池表面标识。

16.1.2 Please use batteries in normal indoor environment with temperature of -20℃ - + 35℃ and relative humidity of 65% ±5%. /请在正常的室内环境中使用电池：温度：-20℃～+35℃，相对湿度：65±5%。

16.1.3 Stay away from heating sources, high pressure when using the battery. Keep the battery out of reach of children. Do not strike the battery. /在使用过程中，应远离热源、高压，避免儿童玩弄电池，切勿摔打电池。

16.1.4 Charge the battery with the specified charger only. Do not charge the battery in the charger for more than 24 hours. /本电池只能使用配套充电器充电。不要将电池放在充电器中充电超过 24h。

16.1.5 Store the battery in a good condition when do not use for an extended period of time. Store the battery in a half charged state. This means do not completely charge and discharge the battery. /长期不用时，请将电池储存完好。让电池处于半荷电状态，即不充满，也别放完。

16.1.6 Package the battery with non-conductive material to avoid direct contact with metal objects and resultant damage. Store the battery in a cool and dry place. /请用不导电材料包裹电池，以避免金属直接接触电池，造成电池损坏。将电池保存在阴凉干燥处。

16.1.7 Please dispose of depleted batteries in a safe and proper way. Do not throw the battery into fire or water. /废弃电池请安全妥当处理，不要投入火中或水中。

16.2 Warning/危险警告

16.2.1 Do not dissemble or assemble the battery/禁止拆装电池

Protection structures and circuits contained in the battery can prevent occurrence of dangers. Incorrect dissembling and assembling will damage the protection functions and cause heat generation, smoking, deformation or burning. /电池内部具有保护结构和保护电路可以避免发生危险。不合适的拆装将会损坏保护功能，将会造成电池发热、冒烟、变形或燃烧。

16.2.2 Do not short-circuit the battery/禁止让电池短路

Do not connect the positive and negative terminals of the battery with metal object. Do not store and carry the battery together with metal objects. If the battery is short-circuited, the generated excessively large current may damage the battery and the short-circuit may also cause heat generation, smoking, deformation or burning. /不要将电池的正负极用金属连接，也不要将电池与金属放在一起存贮移动。如果电池被短路，将会有超大电流流过，将会损坏电池，造成电池发热、冒烟、变形或燃烧。

16.2.3 Do not heat or burn the battery/严禁加热和焚烧电池

Heating or burning the battery will result in the melting of the battery separator, loss of safety protection functions or burning of electrolyte. Over-heat may lead to the battery heating, smoking, deformation or burning. /加热和焚烧电池将会造成电池隔离物的熔化，安全功能丧失或电解质燃烧。过热就会使电池发热、冒烟、变形或燃烧。

16.2.4 Do not use the battery near a heat source/避免在热源附近使用电池

Do not use the battery near fire or an oven, or in an ambient temperature exceeding 80℃. Over-heat may cause internal short-circuit, heat generation, smoking, deformation or burning. /不要在火源，烤炉附近或超过 80℃的环境中使用电池 ，过热将会导致电池内部短路，使电池发热、冒烟、变形或燃烧。

16.2.5 Do not wet the battery/禁止弄湿电池

Do not wet the battery and do not throw it into water. Otherwise, it may damage the battery's circuit protection function, create abnormal chemical reaction, and even cause heating, smoking, deformation or burning. /不要弄湿电池，更不能将电池投入水中。否则会造成电池内部保护电路功能丧失和发生不正常的化学反应，电池有可能发热、冒烟、变形或燃烧

16.2.6 Do not charge the battery near the fire or in direct sunlight/避免在火源附近或阳光直射下充电

Charging the battery in direct sunlight may destroy the battery's circuit protection function, create abnormal chemical reaction, and may even result in heat generation, smoking, deformation or burning. /阳光直射下充电会造成电池内部保护电路功能丧失和发生不正常的化学反应，电池有可能发热、冒烟、变形或燃烧。

16.2.7 Charge the battery with a dedicated charger and charge correctly/使用专用充电器和正确充电

If the battery is charged under abnormal conditions, it can destroy the battery's circuit protection function and create some abnormal chemical reaction. This may result in heat generation, smoking, deformation or burning. /不正确的充电会造成电池内部保护电路功能丧失和发生不正常的化学反应，电池有可能发热、冒烟、变形或燃烧。

16.2.8 Do not damage batteries/禁止破坏电池

Do not damage the battery by driving in a piece a metal, hammering, striking or by other means, otherwise it can result in heat generation, smoking, deformation or burning. /禁止用金属凿入电池，锤打或摔打电池，或其它方法破坏电池，否则会造成电池发热、冒烟、变形或燃烧，甚至会发生危险。

16.2.9 Do not solder directly on batteries/禁止在电池上直接焊接

Overheat will cause the melting of the battery separator, failure of safety protection functions. This may result in heat generation, smoking, deformation or burning. /过热将会造成电池隔离物的熔化，安全保护功能丧失，使电池发热、冒烟、变形或燃烧。

16.2.10 Do not plug the battery directly into a power supply socket or automobile cigarette lighter/严禁将电池直接接在电源插座或车载点烟器上充电

High voltage or excess current will run through and damage the battery. This may cause heat generation, smoking, deformation or burning. /高压、大电流将会流过电池而使其损坏，或使电池发热、冒烟、变形或燃烧。

16.2.11 Do not use batteries to power other devices/不可将电池用于其它设备

Unusual operating conditions may damage the battery performance, reduce life cycle and even cause heat generation, smoking, deformation or burning. /不合适的使用条件会损坏电池的性能，降低寿命，甚至会使电池发热、冒烟、变形或燃烧。

16.2.12 Do not make direct contact with leaking batteries/不要直接接触漏液电池

The leaked electrolyte may cause skin irritation. If electrolyte gets into your eyes, rinse your eyes with fresh water immediately. Do not rub your eyes and immediately go to hospital for medical attention. /渗漏的电解液会造成皮肤不适。万一电解液进入眼睛，尽快用清水冲洗，不可揉眼，并迅速送医院处理。

16.3 Warning/警告

16.3.1 Do not mix the use of different types of batteries/不可与其它电池混用

The battery should not be used together with other types of primary or secondary batteries, otherwise, the abnormal charging and discharging may cause heat generation, smoking, deformation or burning. /电池不可与其它类型的一次或二次电池混用，否则会因为不正常的充、放电造成电池发热、冒烟、变形或燃烧。

16.3.2 Keep the battery away from small children/将电池远离孩童

Keep the battery out of reach of children to prevent the children from swallowing or biting the battery. If the battery is swallowed, go to hospital immediately and get medical attention. /将电池置于孩童不能得到的地方，以避免孩童噬咬或吞咽电池。如果吞咽了电池，应迅速送医院处理。

16.3.3 Do not put the battery into a micro-wave oven or other pressure vessels/不可置于微波炉或其它压力容器中

Doing so, the structural damages from instantaneous heating may cause heat generation, smoking, deformation or burning. /瞬间加热后结构损坏会使电池发热、冒烟、变形或燃烧。

16.3.4 Do not put leaking battery near the fire/漏液电池不可近火

Keep the battery away from a heat source if it leaks and/or generates odor. Otherwise, the electrolyte leakage may catch fire and even cause other dangers. /假如发现电池漏液（或有异味），应让电池远离火源。否则，渗漏的电解液会着火，甚至造成其它危险。

16.3.5 Do not use abnormal batteries/不可使用不正常电池

Remove the battery from mobile phone or charger and dispose the battery if it has odor, deformation, color change or distortion. Using abnormal battery can cause heat generation, smoking, deformation or burning. /假如发现电池有异味、变形、变色或扭曲，应让电池离开手机或充电器并弃用。使用不正常的电池会发热、冒烟、变形或燃烧。

16.4 Caution/注意事项

16.4.1 Using the battery in strong sunlight/在强阳光下使用电池

Do not use the battery in an environment with strong sunlight to avoid heat generation, deformation and smoking, and at least the deterioration of battery performance and the reduction of shelf life./ 请不要在强阳光爆晒的环境下使用电池，以免发热、变形、冒烟。至少避免电池性能下降、减少寿命。

16.4.2 Electric static discharge (ESD) Prevention/防静电

The protection circuits installed in batteries can prevent accidents. Do not use the battery near a place that can generate static. Static may easily damage the protection circuits and subsequently lead to abnormal working order, heat generation, deformation, smoking or inflammation. /电池中装有保护电路可以避免各种意外情况的发生。不要在产生静电的场所使用电池，因为静电容易损坏保护板，而导致电池工作不正常，发热、变形、冒烟或起火燃烧。

16.4.3 The charging temperature range/充电温度范围

The recommended charging temperature range is between 0℃ and 45℃. Charging the battery outside the range may cause performance deterioration and reduction of shelf life. /推荐的充电温度范围是 0℃~45℃。在超出此范围的环境中充电有可能造成电池性能下降、减少寿命。

16.4.4 User manual/使用手册

Please read the user manual carefully before using the battery and read it as often as needed. /在使用电池之前，请仔细阅读使用手册并经常在需要时阅读。

16.4.5 Charging Method/充电方式

Please charge the battery with specified charger and recommended charging method in recommended ambient conditions. /请使用专用充电器和推荐的充电方式，在推荐的环境条件下给电池充电。

16.4.6 Using new battery/第一次使用

If a new battery has cosmetic unevenness, odor or other abnormalities, do not use it in mobile phone or other devices and return the battery to the vendor. /第一次使用电池时，若发现电池不整洁或有异味等不正常现象，不可继续将电池用于手机或其它设备，应将电池返回销售商。

16.4.7 Children operation/儿童使用

Parents shall instruct their children before the children using the battery and supervise them for correct operation. /儿童使用电池前，应受父母指导，并在使用中受监督是否正确。

16.4.8 Keep the battery out of reach of small children/避免孩童接触电池

Store the battery in a place out of the reach of children. Prevent children from removing the battery from a charger or mobile phone for playing. /电池应放在孩童不能得到的位置。应避免孩童将电池从充电器或手机取出、玩弄。

16.4.9 Be cautious of leakage/注意漏液

If battery leakage gets into contact with your skin or clothes, please rinse with fresh water otherwise it may cause skin irritation. /假如电池漏液粘在皮肤或衣物上，请用清水冲洗，以免造成皮肤不适。

16.4.10 Inquiry/咨询

Please pay attention to the contact information of the vendor when purchasing the battery so that you can contact the vendor timely when in need. /购买电池时，请注意销售商联络方法。以便在需要时及时与销售商取得联系，得到咨询。

16.4.11 Warranty/保用期

The warranty period is half year from the factory date. Cycle life should be more than the number of cycle specified herein. /保用期是自出厂之日起半年。寿命为充放电循环大于本规格书规定次数。

The warranty become void if a battery fails to operate due to mishandling rather than quality defect. The manufacturer should not replace the battery in question with a new battery at no charge even if the battery is still within warranty period. /但是，属于使用不正当而非质量问题，即使在保用期内生产厂家也不会无偿更换新电池。

16.4.12 Safe operation/安全使用保障

If the battery is to be used in other equipments, please consult with the supplier respecting the integrity of the battery's protection functions. And at a minimum consult on the large current, fast charge and special application. / 如果将电池用于其它设备，请与供应商讨论保护功能的完善性。至少应该咨询电池的大电流、快速充电、特殊应用的问题。

17 Quality Assessment Procedures/质量评定程序

Quality inspection is divided into identification inspection and quality conformance inspection. /质量检验分为鉴定检验和质量一致性检验。

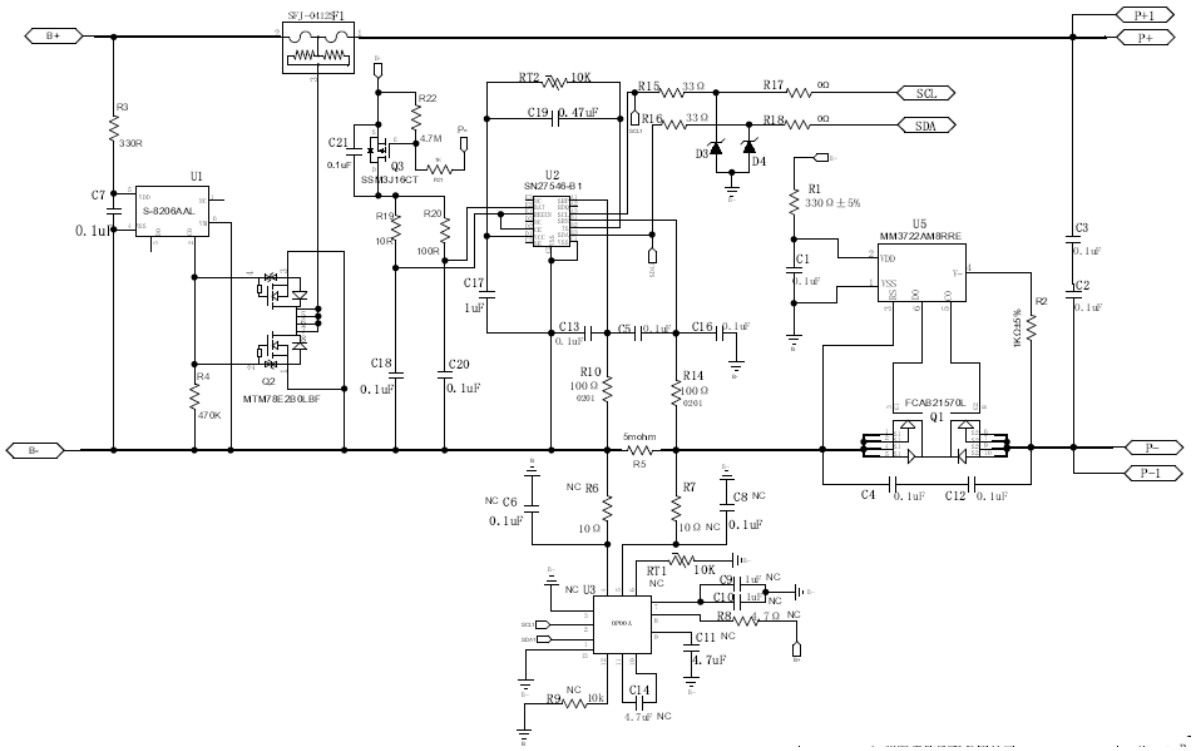
Identification test is generally conducted in the design approval, change of design and production. Sampling scheme, inspection items, inspection sequence, rules of judgment, etc. should be determined by consultation between the supplier and the customer. In principle, all the tests aforementioned should be included. Quality conformance inspection is divided into lot by lot inspection and periodic inspection. These inspections are used to judge whether the production process can ensure the sustaining stability of product quality. Refer to national standard GB2828.1-2003 and GB2829-2002 for implementation. Specific sampling scheme, inspection items, inspection sequence, rules of judgment, etc. should be determined by consultation between the supplier and the customer. In principle, the lot-by-lot inspection items should include appearance, internal impedance, rated capacity or $1C_5A$ discharge capacity. /鉴定检验一般在设计定型、更改设计和生产定型时进行。抽样方案、检验项目、顺序以及判定规则等事宜由供需双方协商确定。原则上应包括以上各项性能试验。质量一致性检验分为逐批检查和周期检查，用以判定产品生产过程中能否合格保证产品质量的持续稳定。可以参照 GB2828.1-2003、GB2829-2002 标准执行。具体抽样方案、检验项目、顺序以及判定规则等事宜由供需双方协商确定。原则上，逐批检查的检验项目应包括外观、内阻、额定容量或 $1C_5A$ 放电容量等。

18 Miscellaneous/其他事项

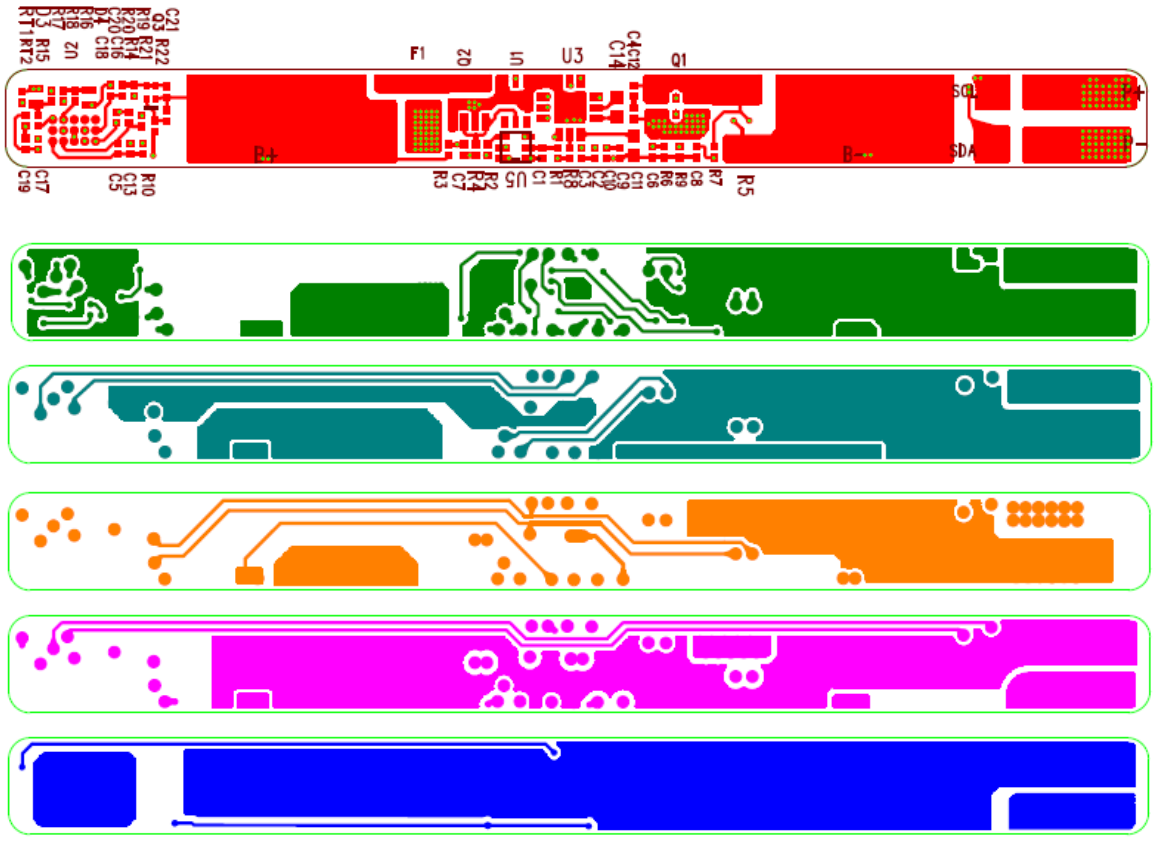
The aforementioned could be used as agreed framework by both parties for battery performance and inspection specifications. It should be implemented if there is no new written agreement or change notice. /以上所述，可以作为供需双方对电池产品性能和检验规则的约定框架。如果没有新的书面约定或更改通 知，即可按此执行。

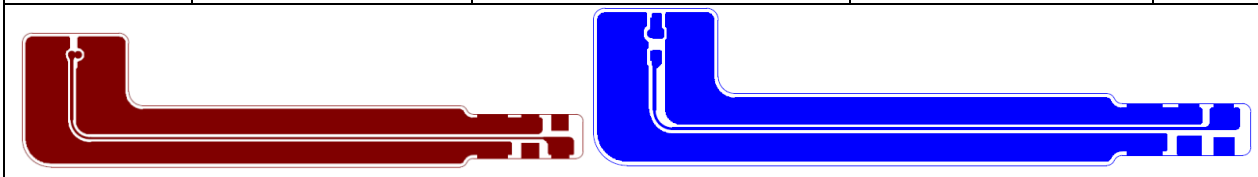
19 Drawing/附图

19.1 Circuit Diagram/电路原理图

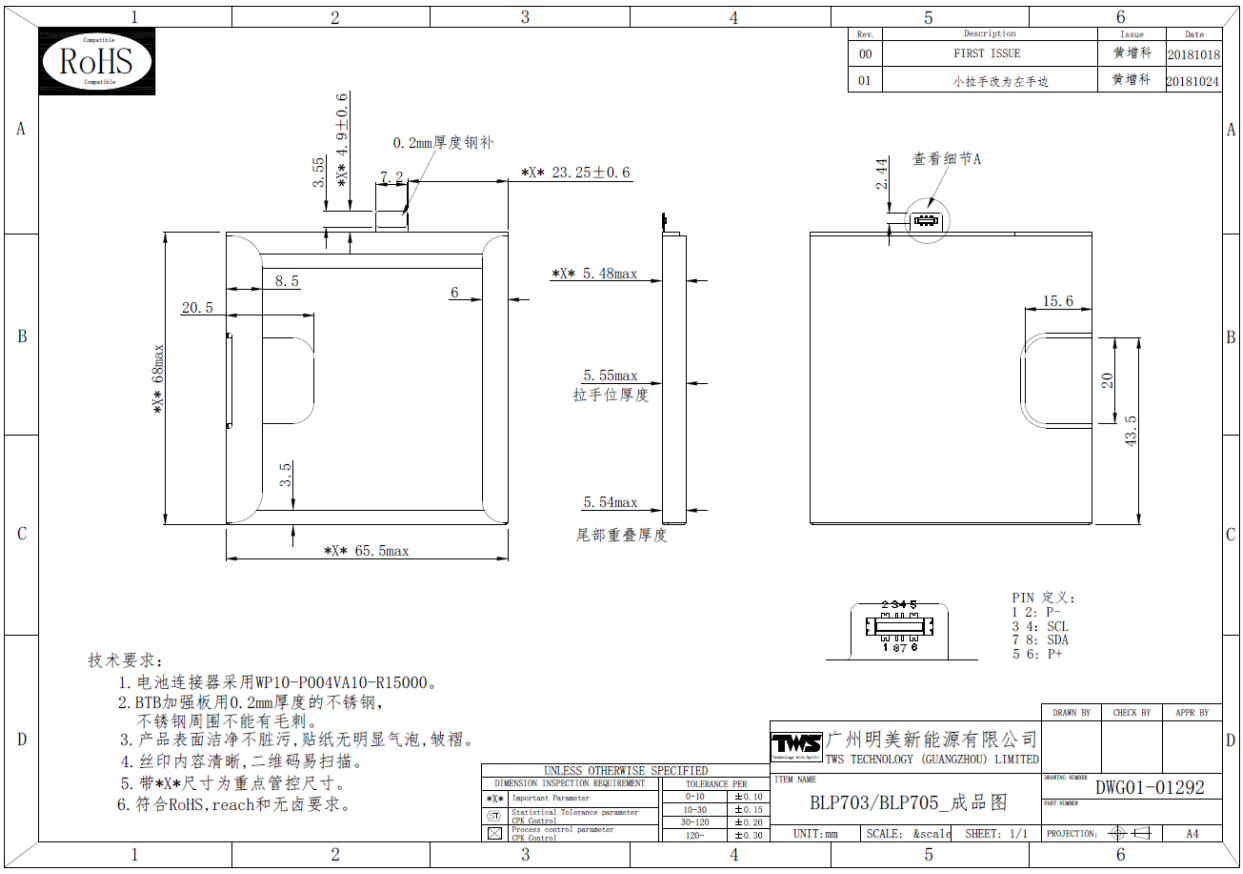


19.2 PCB Layout drawing/PCB 布线图





19.3Battery Drawing/电池尺寸图



19.4 Label drawing/标签示意图

聚合物锂离子电池组/二次鋰電池組/Li-ion Polymer Battery
型号/型號/Model:BLP705　1ICP6/66/66
充电限制电压/充電限制電壓/Limited Charge Voltage:4 45Vdc
额定容量/額定電容量/Rated Capacity:3975mAh/15.38Wh
标称电压/標稱電壓/Nominal Voltage:3.87Vdc
电池典型容量/Typical Capacity:4065mAh/15.73Wh
执行标准:GB 31241-2014

警告/Warning
仅可使用OPPO认可的充电器。禁止拆解、刺破、撞击、挤压或投入火中。若出现鼓胀或浸水后禁止使用。请勿置于高温环境中。
僅可使用OPPO認可的充電器。禁止拆解、刺破、擠壓、加熱或燃燒。若出現鼓脹或浸水後禁止使用。請勿置于高温環境中。
Use specified OPPO charger only. Do not disassemble, puncture, crush, heat, or burn.

YYYY/MM/DD
MA-P705-706100002700

OPPO广东移动通信有限公司　OPPO廣東移動通信有限公司
MADE FOR GUANGDONG OPPO MOBILE TELECOMMUNICATIONS CORP.,LTD
中国制造　中國製造　MADE IN CHINA

Li-ion 00　廢電池請回收　TIS 2217-2548 Thai OPPO Co.,Ltd.　IS 16046/IEC 62133　R-41073865 www.bis.gov.in　R39518　オッポジャパン株式会社

19.5 Packaging schematic/包装示意图

每层托盘放6PCS电池,共18层,从下往上第18层托盘
为空托盘,第17层放四个成品电池
即每箱装100pcs成品电池