受控文件

SUNWODA 欣旺达

SPECIFICATION

规格书

记录代码：F-SUN0-10.2.7/A1

CONFIDENTIAL

Model Name： V35 Battery Pack

Sunwoda Part No. 1001000017721

Description： 力神 523450 1100mAH Li-ion battery pack

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SUNWODA 欣旺达

1. Revision History / 版本更改记录

No.	Date/日期	Revision/版本	Remark/备注
1.	2010/3/20	A	
2.	2010/6/24	B	更新尺寸图
3.	2010/7/01	C	更新尺寸图

2. Application Scope / 适用范围

The product specification describes the requirements on technical specifications of Li-Ion Prismatic battery that mates V35 designed by SUNWODA including the battery's nominal parameters, electrical characteristics, safety performances,environmental adaptation, testing method and decision rule, operating instruction and safety regulations, quality decision and packaging, marks, storage, and transportation etc.

本规格书描述了由SUNWODA 设计的V35 相配套的锂离子电池的技术规格需求。包括电池之标称参数、电气特性、安全性能、环境适应性及其实验和判定、使用说明和安全规则、质量评定及包装、标志、贮存、运输等。

3. Applicable standards/引用标准

"General Rule on Li-Ion Batteries for Mobile Telephones in P.R.C." GB/T 18287—2000

GB/T 18287--2000 中华人民共和国移动电话用锂离子电池总规范

4. Description of electrical characteristics of battery/电气特性描述

4.1 General descriptions /概括描述

The built-in protection circuit in the battery realizes the electrical reliability of the battery. Its cell and protection board are fixed within the plastic housing.

电池内置保护电路实现了电池的电气可靠性。它的电芯及保护板固定在胶壳内部。

4.2Reference to material no. /参考材料

Model /型号	Part /部件	Cell Maker /电芯制造商	Cell Model /电芯型号	NominalCapacity 电芯标称容量
V35	CELL	力神	523450	1100mAH

4.3 Basic electrical parameters /基本电气参数

4.3.1	Charge voltage /充电电压	4.20V
4.3.2	Nominal voltage /标称电压	3.70V
4.3.3	Nominal capacity /标称容量	1100mAh (at 0.2C Discharge)
4.3.4	Minimum capacity /最小容量	1080mAh (at 0.2C Discharge)
4.3.5	Internal resistance of battery /电池内阻	≤160mΩ
4.3.6	Overcharge protection voltage 过充电保护电压	4.300V±0.050V
4.3.7	Overcharge protection release voltage 过充电保护释放电压	4.100V±0.10V
4.3.8	Overdischarge protection voltage 过放电保护电压	2.4V±0.1V
4.3.9	Overdischarge protection release voltage 过放电保护释放电压	3.0V±0.1V
4.3.10	Overcurrent protection testing values 过流保护测试值	3.0A ±1.5A
4.3.11	Delay time for overcharge protection 过充电保护延时	80-200mS
4.3.12	Delay time for overdischarge protection 过放电保护延时	40-100mS
4.3.13	Delay time for overcurrent protection 过电流保护延时	10-20mS
4.3.14	Delay time for short circuit protection 短路保护延时	5uS-50uS
4.3.15	Power consumption of protection circuit 保护电路功率消耗	static state: ⩽0.1μA /operation: ⩽6μA
4.3.16	ID resistance value /ID 电阻值	NC
4.3.17	NTC thermistor value /NTC电阻值	10K±1% @25℃
4.3.18	Cycle life /循环寿命	≥300Cycles(Capacity retention ≥80%) (测试方法参考电芯规格书中的循环寿命章节)
4.3.19	Maximum charge current /最大充电电流	1100mA
4.3.20	Maximum discharge current /最大放电电流	1100mA
4.3.21	ESD static test /静电测试	air discharge ±15KV /contact discharge ±8KV
4.3.22	storage temperature /存储温度	1 month: -20℃ ~ +45℃ 3 months: -10℃ ~ +45℃ 1 year: -10℃ ~ + 35℃
4.3.23	operating temperature/工作温度	In standard charging: 0 to 45℃, 45 to 85%RH (0.2C) In quick charging: 10 to 45℃, 45 to 85%RH (1C) In standard discharging: -20 to 50℃, 45 to 85%RH(0.2C)

4.4 Charge and discharge mode /充电和放电模式

4.4.1 Charge mode /充电模式

Constant current-constant voltage /恒流电压充电

4.4.2 Discharge mode /放电模式

Constant-current discharge /恒流放电

4.5 Battery failure-protection mechanism /电池失败保护装置

a: When battery's discharge voltage is lower than 2.4V ± 0.1V, protection IC will automatically cut off the discharge circuit in order to prevent battery overdischarge. Remove the load and restore the battery by charge.当电池放电电压低于 2.4V ± 0.1V 时，为了防止电池过量放电，保护 IC 将自动切断放电电路，断开负载经充电恢复。

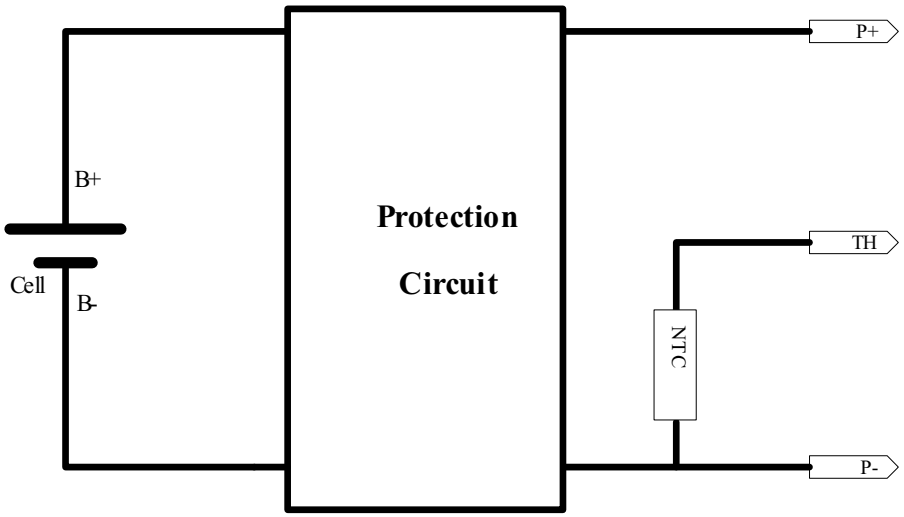
b: When battery's charge voltage ≥4.300V ± 0.05V, the protection IC will automatically cut off the charge circuit so as to prevent the battery from overcharging.

当电池充电电压≥4.300V ± 0.05V 时，那么同样为了防止电池过度充电,保护 IC 将自动切断充电电路。

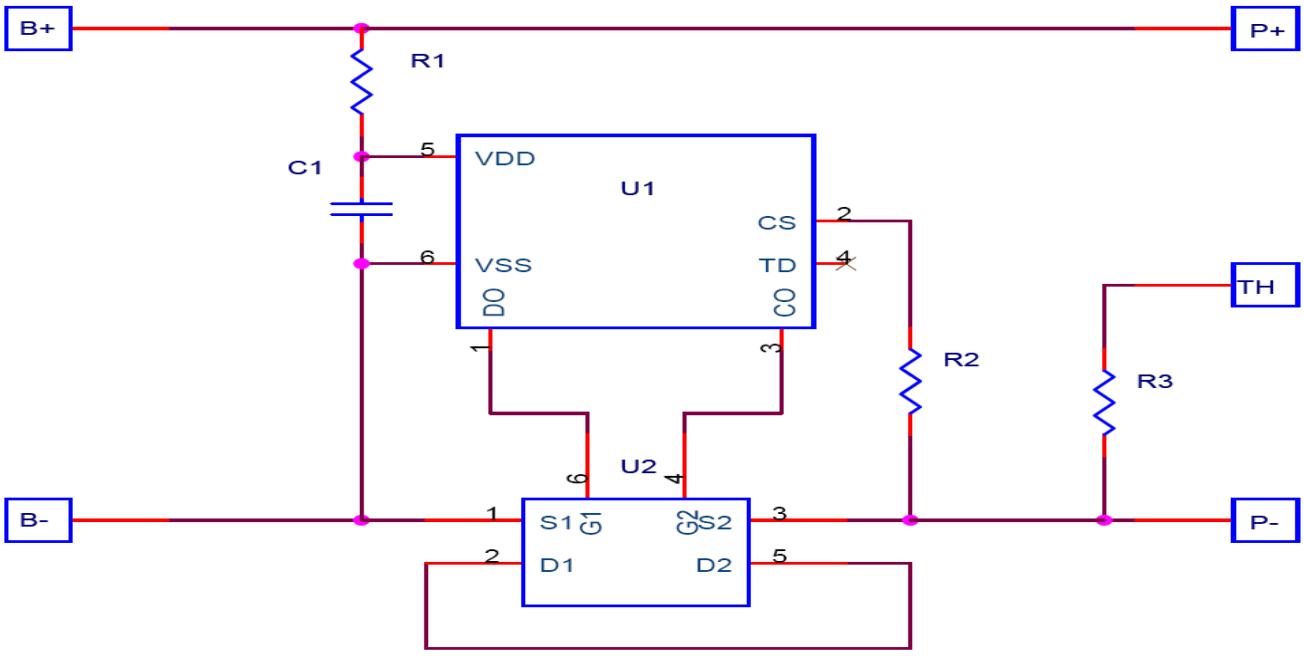
c: When external load's discharge current is ≥3.0A ±1.5A, protection IC will automatically cut off the discharge circuit in order to prevent the battery from damage caused by heavy-current discharge.

当外用负载放电电流≥3.0A ±1.5A 时,保护 IC 将自动切断放电电路，为了防止电池因放电电流过大而造成的损坏.

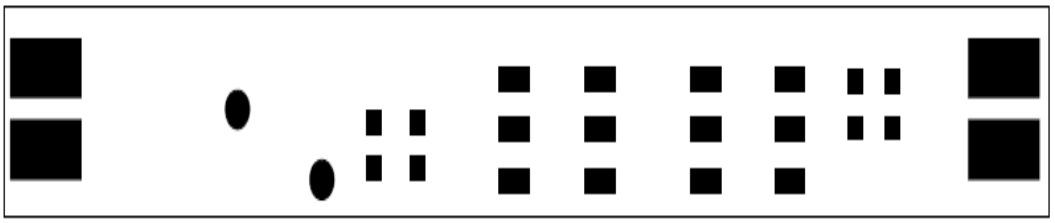
4.6 Block diagram of battery pack /电池组方快图



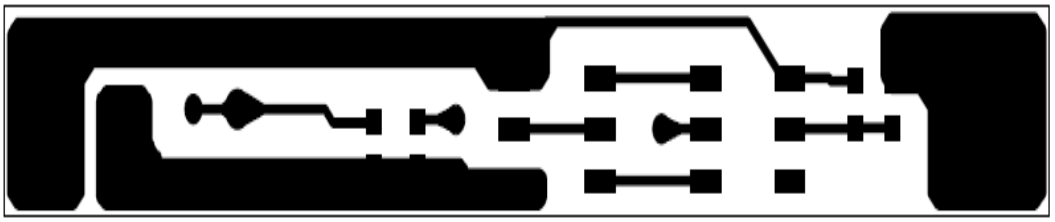
4.7 Protection circuit diagram /保护板电路图



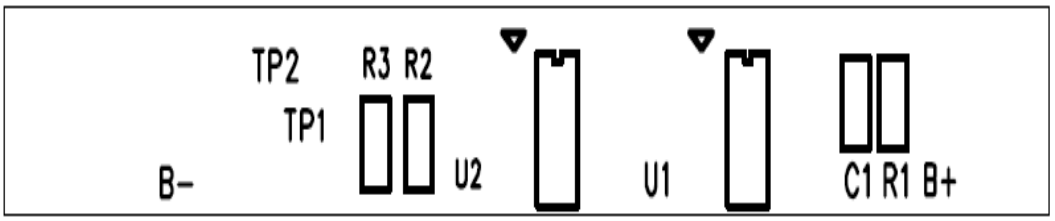
4.8 PCB LAYOUT /PCB 线路图



顶层焊盘

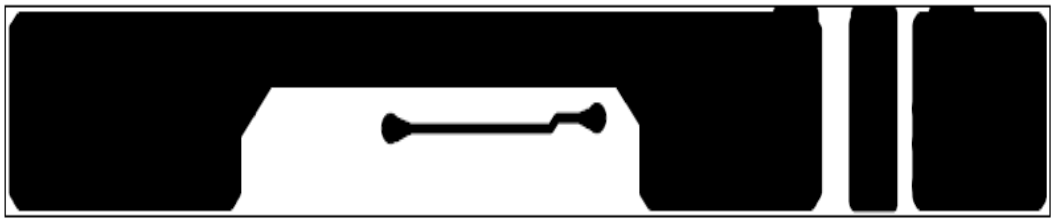


顶层线路

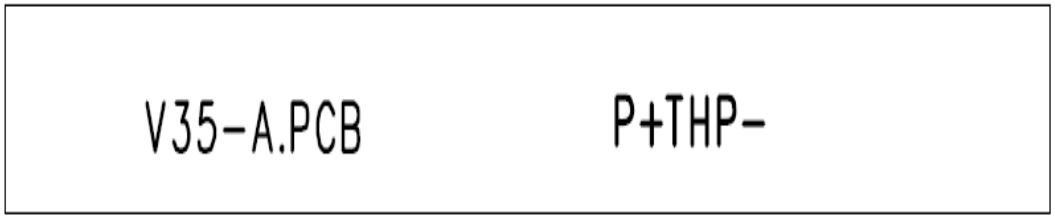


顶层丝印

底层焊盘



底层线路



底层丝印

5. Description of mechanical characteristics of battery/电池的机械特性描述

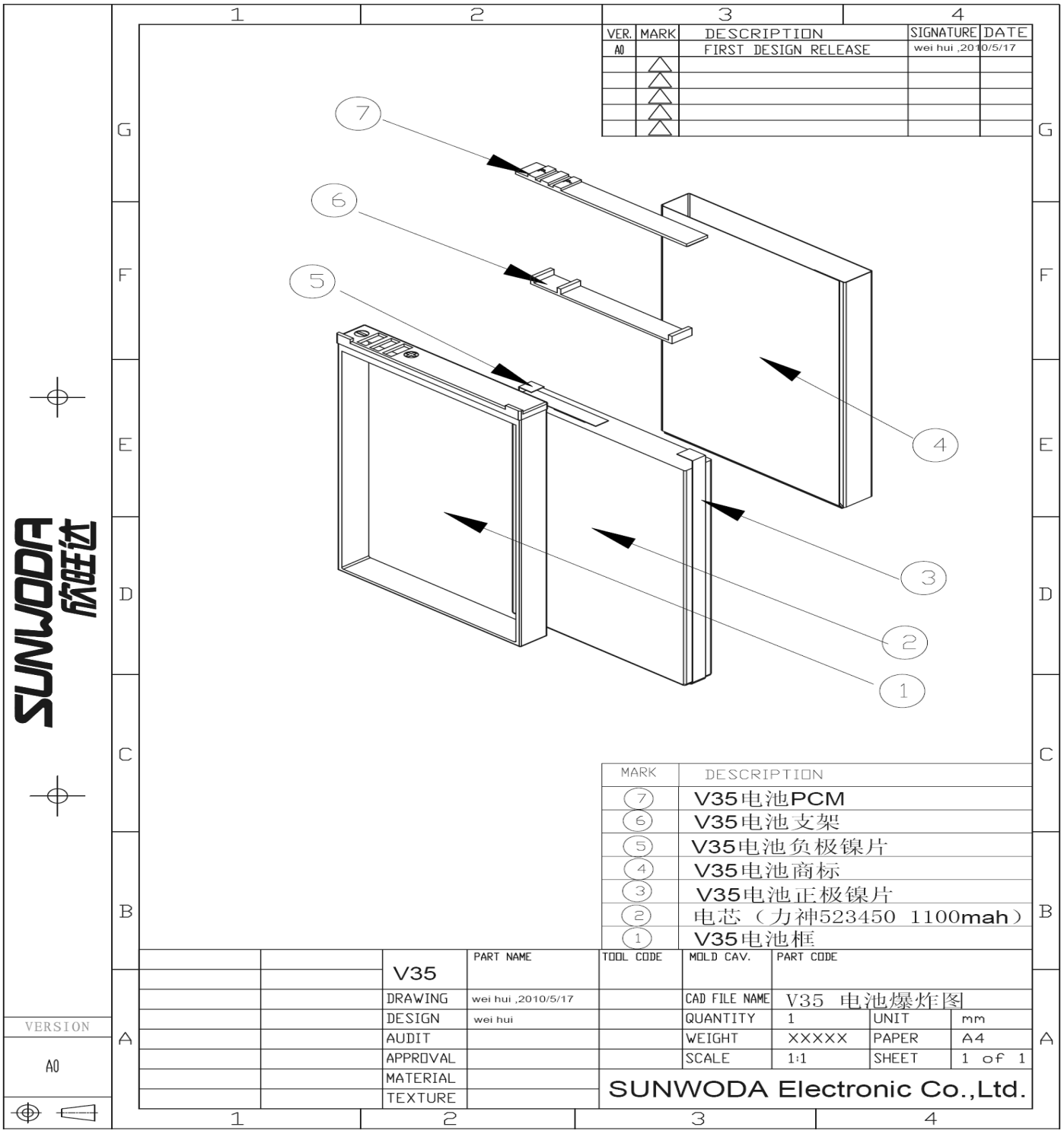
5.1 Weight /重量 24 约/g

5.2 Plastic articles and hardware material /塑胶成分和五金材料

a: Plastic material:/ 塑胶材料 black ABS + PC /黑色 ABS +PC

b: Hardware material:/五金材料 surface gilded , plating thickness0.25um gold./表面镀金,电镀厚 0.25um 黄金。

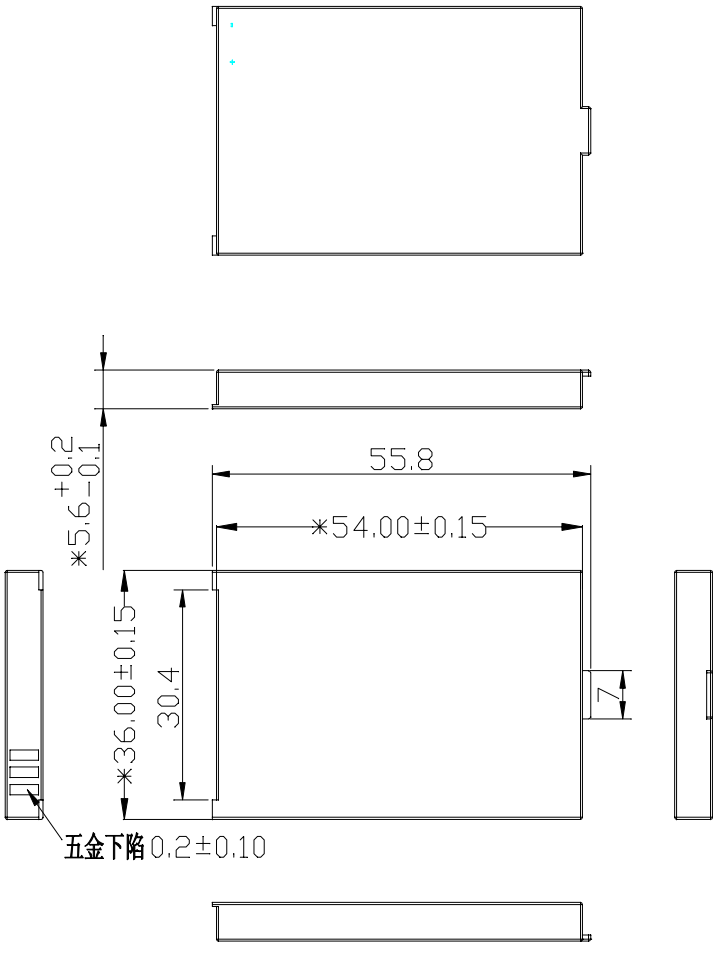
5.3 Battery assembly diagram /电池装配图



NOTE:

1: 未标注尺寸公差：±0.1mm

VER.	MARK	DESCRIPTION	SIGNATURE	DATE
A0		FIRST DESIGN RELEASE		



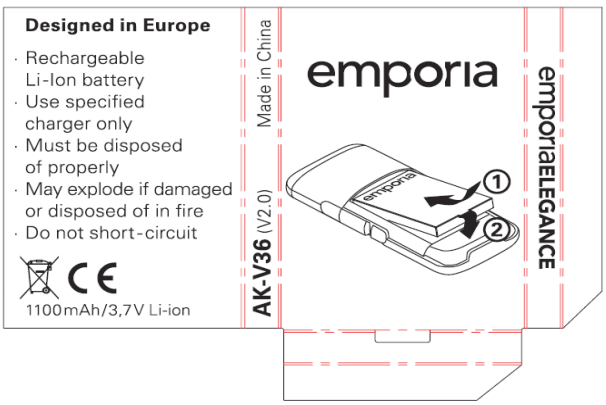
100≤	±0.18	MODEL	PART NAME	TOOL CODE	MOLD CAV.	PART CODE	
80≤&<100	±0.15	V35					
50≤&<80	±0.14	DRAWING			CAD FILE NAME	V35电池尺寸图	
30≤&<50	±0.12	DESIGN			QUANTITY	1	UNIT mm
15≤&<30	±0.10	AUDIT			WEIGHT	XXXXX	PAPER A4
5.0≤&<15	±0.08	APPROVAL			SCALE	1:1	SHEET 1 of 1
0.0≤&<5.0	±0.05	MATERIAL		SUNWODA Electronic Co.,Ltd.			
DIM SCOPE	TOLERANCE	TEXTURE					

VERSION

A0

5.5 Label figure /商标图

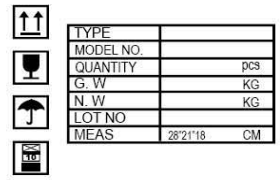
NO:	MARK	DESCRIPTION	SIGN	DATE

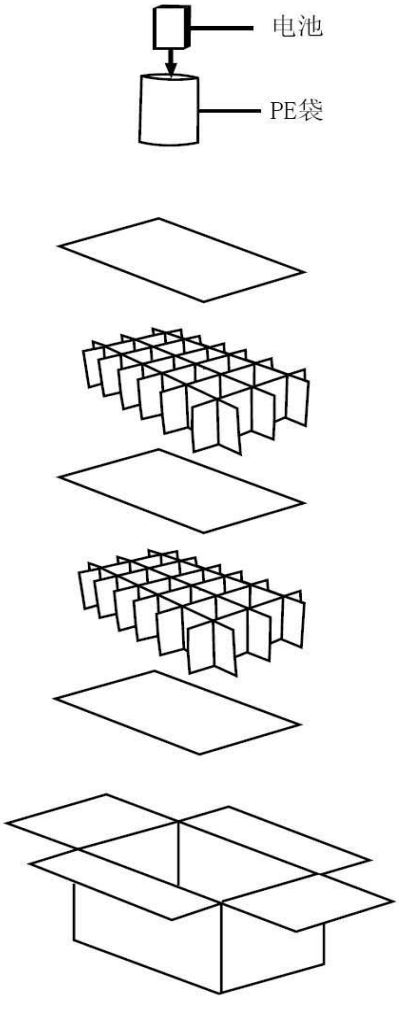


MATERIAL			QUANTITY		UNTI	mm
DRAWING			WEIGHT		DRAFT	A4
DESIGN			SCALE	1:1	SHEET	1/1
AUDIT						
APPROVAL						

version A

5.6 Packaging diagram and plastic tray dimension. /包装图和尺寸





注：
1，每个电池装入1PCS PE袋。

2，平卡3块，方格2层
（长刀卡：22块，短刀卡12块）。
3，每个方格放2个电池，
共200PCS/箱。

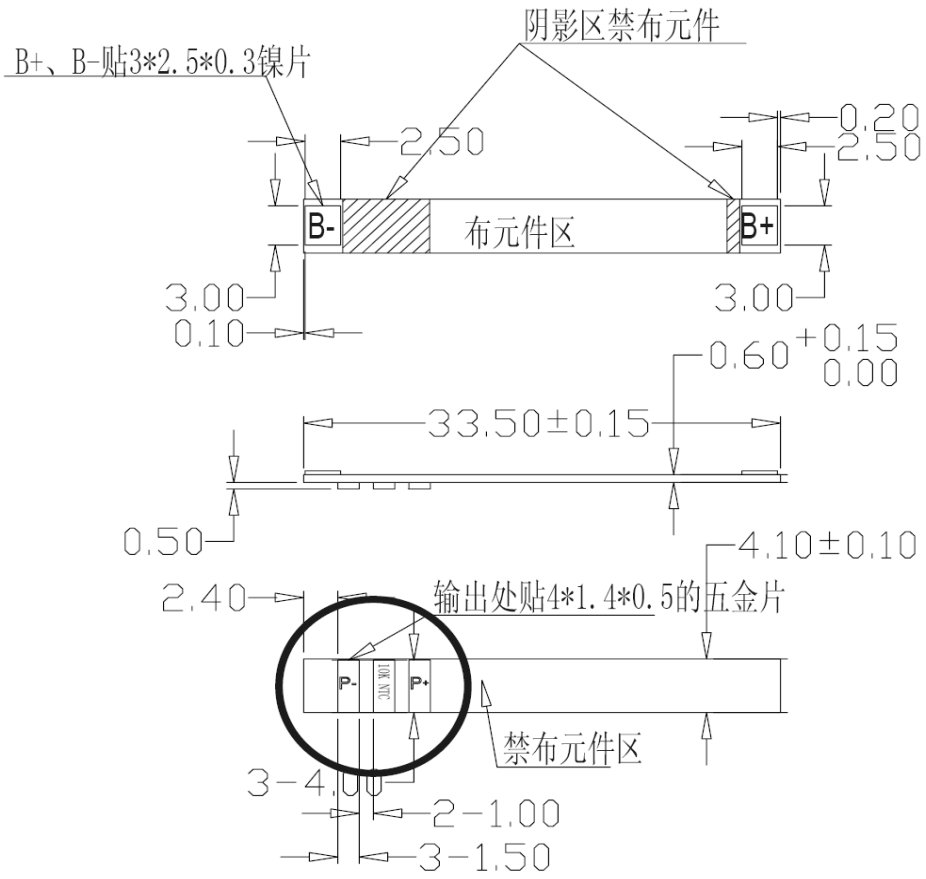
			共 页	第 页	
			标 记	图 样	数 量	重 量
设 计			比 例		
审 核			欣旺达电子股份有限公司		
批 准					

版 本

5.7 Appearance and dimension figure of the PCB (Unit: mm)/PCB外观和尺寸图(单位:毫米)

VER.	MARK	DESCRIPTION	SIGNATURE	DATE
A0		FIRST DESIGN RELEASE		
			wei hui	2010-05-12

NOTE:
1、未注公差见公差表;
2、带*尺寸量产管控尺寸，要求CPK>1.33;
3、产品符合HSF要求;
4、黑色板材。



未注公差：±0.1mm

	PART NAME	TOOL CODE	MOLD CAV.	PART CODE		
	V35-PCB单板图					
DRAWING	杨建国	2010-03-10	CAD FILE NAME			
DESIGN			QUANTITY	1	UNIT	mm
AUDIT			WEIGHT	XXXXX	PAPER	A4
APPROVAL			SCALE	2:1	SHEET	1 of 1
MATERIAL	FR4	SUNWODA Electronic Co.,Ltd.				
TEXTURE						

VERSION
A0

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6. Table of major materials for battery pack /电池组主要物料表

Symbol/代码	Part name/部件名称	Type / value 类别/评价	Qty	Manufacturer/制造商
PCB	PCB	FR4-A1/2 Lays/Green Oil/Usual Gilt	1	JRD /any certified supplier
R1	电阻	100OHM, ± 5%,1/16W ,0402，国巨	1	YAGEO
R2	电阻	1K, ± 5%,1/16W ,0402，国巨	1	YAGEO
R3	NTC	10K, ± 5% ,0402,村田	1	YAGEO
C1	电容	0.1uF, +/-10%,0402 村田	1	TDK
U1	IC	DW01B SOT-23-6 富晶 环保	1	富晶
U1/备料	IC	HY2110CB SOT-23-6 环保 HYCON	1	HYCON
U2	MOS	FS8205 SOT23-6(环保）	1	富晶
U2/备料	MOS	SSF2418E SOT-23-6 环保	1	苏州硅能

7.2.3 Charging ability /充电能力

This test is performed at 0°C, + 25°C and + 45°C.该测试要求在 0°C, + 25°C 及 + 45°C 进行。

Discharge at 0.2C down to 2.75V at +25°C. 在+25°C 下以 0.2C 放电至 2.75V。

↓

Rest of 15 minutes at +25°C. 在+25°C 下静置 15 分钟。

↓

Charge at 1C, 4.2V until I < 10mA at +25°C. 在+25°C 下以 1C，4.2V 充电直到电流小于 10 mA。

↓

Rest of 1 hour at test temperature. 在测试温度下静置 1 小时。

↓

Discharge at 0.2C down 2.75V at test temperature. 在测试温度下以 0.2C 放电至 2.75V。

7.2.4 Half capacity voltage /不完全容量电压

This test is performed at 0°C and + 25°C. 该测试要求在 0°C 和 + 25°C 进行。

Discharge at 0.2C down to 2.75V at +25°C. 在+25°C 下以 0.2C 放电至 2.75V。

↓

Rest of 15 minutes at +25°C. 在+25°C 下静置 15 分钟。

↓

Charge at 1C, 4.2V until I < 10mA at + 25°C.在+25°C 下以 1C，4.2V 充电直到电流小于 10 mA。

↓

Rest of 1 hour at test temperature. 在测试温度下静置 1 小时。

↓

Discharge at 0.2C at test temperature for 2h. 在测试温度下以 0.2C 放电 2 小时。

↓

Rest of 1 hour at test temperature given 在设定的测试温度下静置 1 小时。

↓

Measuring of the OCV. OCV 之测量。

This test also can be done by using the charging ability test procedure in order to gain time.
为了节省时间，此测试也可以通过充电能力测试过程来完成。

7.2.5 Self discharge characteristic /自放电特性

This test is performed at + 25°C, 45°C and 60°C for different storage period (see table below).

该测试要求在+ 25°C, 45°C 及 60°C 不同的储存环境来完成.(请参照下表)。

Discharge at 0.2C down to 2.75V at + 25°C. 在+25°C 下以 0.2C 放电至 2.75V。

↓

Rest of 15 minutes at +25°C. 在+25°C 下静置 15 分钟。

↓

Charge at 0.5C, 4.2V for 5 hours at + 25°C. 在+25°C 下以 0.5C，4.2V 充电 5 小时。

↓

Storage of different storage period (see table below) at test temperature given. 在特定测试温度下,对于不同储存环境的剩余电量(见下表)。

↓

Discharge at 0.2C down to 2.75V at + 25°C. 在+ 25°C 下以 0.2C 放电直到下降至 2.75V。

Storage temperature/储存温度	25ºC	60ºC	45ºC
Storage duration/储存时间	1 month	1 month	3 months
Residual capacity (min)/剩余容量(最小)	90%	70%	70%

7.3Phone simulation /电话机模拟

7.3.1Communication mode discharge /通话模式放电

This test is performed at -10°C, 0°C, +25°C and +60°C. The results at -10°C are only informativ
此测试要求在-10°C, 0°C, +25°C 及 +60°C 完成. 在-10°C 的测试结果仅供参考。

Discharge at 0.2C down to 2.75V at +25°C. 在+ 25°C 下以 0.2C 放电至 2.75V。

↓

rest of 15 minutes at +25°C. 在+25°C 下静置 15 分钟。

↓

Charge at 0.5C, 4.2V for 5 hours at +25°C. 在+25°C 下以 0.5C，4.2V 充电 5 小时。

↓

Rest of 30 minutes at test temperature. 在测试温度下静置 30 分钟。

↓

Pulsed discharge at test temperature : 1.0 A for 0.55 ms + 100mA for 4.05 ms down to 2.75V in voltage drop during the pulse

在测试温度下进行脉冲放电：1.0A 为 0.55 ms+100mA 为 4.05 ms 降到 2.75V,在电压下降期间的脉冲。

7.3.2 Idle mode discharge /待机模式放电

This test is performed at 0°C, + 25°C and + 60°C. 此测试要求在 0°C, +25°C 及 +60°C 完成。

Discharge at 0.2C down to 2.75V at +25°C. 在+ 25°C 下以 0.2C 放电直到降至 2.75V。

↓

Rest of 15 minutes at +25°C. 在+25°C 下静置 15 分钟。

↓

Charge at 0.5C, 4.2V for 5 hours at +25°C. 在+25°C 下以 0.5C，4.2V 充电 5 小时。

↓

Rest of 30 minutes at test temperature. 在测试温度下静置 30 分钟。

↓

Discharge at 50mA down to 2.75V at test temperature. 在测试温度下以 50mA 放电至 2.75V。

The results at 0°C and +60°C are only informative 在 0°C 和+60°C 的测试结果仅供参考。

7.4 Internal resistance measurement / 内阻测量法

7.4.1 AC Method / AC 检测方法

Discharge at 0.2C down to 2.75V. 在 0.2C 放电至 2.75V。

↓

Rest of 15 minutes. 静置 15 分钟。

↓

Charge at 0.5C, 4.2V for 5 hours. 以 0.5C，4.2V 充电 5 小时。

↓

Measure internal resistance with appropriate equipment. 用适当的设备测量内阻。

↓

Discharge at 0.2C for 2h 30min. 以 0.2C 放电 2 小时 30 分。

↓

Measure internal resistance. 测量内阻。

↓

Discharge at 0.2C down to 2.75V. 以 0.2C 放电至 2.75V。

↓

Measure internal resistance. 测量内阻。

Measurement: apply a 1kHz signal on pack connections (V_{max} < 20mV), and measure U_{eff} and I_{eff} over a period of 1 to 5seconds. The internal resistance is given by: $R_{int} = U_{eff} / I_{eff}$. The test is performed with a battery fully charged, half charged and fully discharged. The internal resistance is the average of the three measurements. 测量方法：使用一 1KHZ 的信号与电池组连接(V_{max} < 20mV),测量 U_{eff} 和 I_{eff} 越过一周期 1 到 5s，内阻计算依据 $R_{int} = U_{eff} / I_{eff}$ 。此测试要求使用一个完全充饱状态，半饱状态和完全放完电状态的电池来完成，对于三次测量的内阻平均值。

7.5Safety behavior /安全性能

7.5.1 Short circuit behavior /短路电路性能

The battery pack is short circuited with a 200 mΩ load. 电池用一 200 mΩ 负载短路。

The battery current must not exceed 30 A and the link must be cut in less than 20 ms. 电池电流必须不超过 30A，并且在 20 ms 内必须切断连接。

7.5.2 Over charge protection /过充保护

The battery is charged at 1C without voltage regulation. The safety IC of the battery must cut the link when battery voltage reaches 4.300 V ± 0.05 V (safety IC: W01B). 电池以 1C 无稳压条件充满.，当电池电压达到 4.300V ± 0.05 V 时电池保护 IC 必须切断连接(保护 IC: W01B)。The Safety IC must keep the link cut until battery voltage becomes lower than 4.10V ± 0.10V. Then the charge must be possible. 断开到电池电压低于 4.10V ± 0.10V 时保护板必须恢复连接，然后必须能够充电。

7.5.3 Over discharge protection /过放保护

The battery is discharged at 1C until 2.4V / cell. The safety IC of the battery must cut the link when battery voltage reaches 2.4V ± 0.1V. 电池以 1C 放电直到 2.4V/电芯. 当电池电压到达 2.4V ± 0.1V 时电池保护 IC 必须断开连接。

The MOSFET will remain closed until the battery voltage rises above the value of 3.0V ± 0.1V and a charge current is detected. MOSFET 必须停止关闭状态，直到电池电压升到 3.0V ± 0.10V,且一充电电流激活。

7.5.4Over current protection /过流保护

The aim of this test is to check the Over current protection when there is a excess discharge current.

该测试的目的是当在放电电流过大时控制过流保护。

The safety IC (protection circuit) should trip at 3.0A± 1.5A (depending to the IC used). 保护 IC(保护线路)应该在 3.0A± 1.5A 保护。

The battery resets after load if removed. 在负载拿开后电池将恢复。

7.6Environmental testing /环境测试

Note: Tests shall be carried out on batteries only, unless specified otherwise. Batteries that have been fully charged shall be tested according to the conditions below. 注意：测试只靠近在电池上进行，除非有其他特殊要求，必须使用已完全充饱的电池依照以下条件测试。

7.6.1Temperature Shock /温度冲击

7.6.1.1 Procedure: Batteries are to undergo 24 hours of thermal shock testing. The test is to

start by allowing the chambers to stabilize at their respective temperatures. The batteries shall be placed in the cold chamber for the initial hour. In this test, the units are to be transported between -10°C and +60°C environments with a transition time of no greater than 3 minutes. The units are to remain in each temperature extreme for half hour and complete 12 cycles.

程序：电池要承受 24 小时热冲击测试，经确认各自的恒温室温稳定后开始，电池首先时间要放在冷温室里，在测试中，变化范围在-10°C 至 +60°C 环境之间，用不超过 3 分钟内变化一次，在每种温度末端保持半小时并且完成 12 个循环。

7.6.1.2 Measurement: Following temperature testing, the units are allowed to settle for 1 hour and then the units will be tested for functionality. The function test shall measure the following:

测试方法:下列温度测试，允许安放 1 小时然后测试功能。功能测试将测量出以下:

- battery OCV min voltage 3.70V 电池 OCV 最小电压 3.7V
- AC Impedance, max 160mOhm AC 内阻最大 160 毫欧。
- Safety circuit as per section 7.5 保护电路同 7.5 项

7.6.1.3 Pass/Fail Criteria: 合格/不合格标准:

7.6.1.3.1 Electrically passes the functional tests as specified in 7.6.1.2. 电性功能测试合格与说明 7.6.1.2 里一样。

7.6.1.3.2 Mechanical Inspection: The product shall still be mechanically operable. 机械检测：产品仍具有原来的机械性能。

7.6.2 Drop Test Standalone／单机跌落测试

7.6.2.1 Batteries shall be drop tested from 1.0m onto smooth concrete onto all 6 sides (1 cycle). 将电池从高 1.0m 跌落至平滑的水泥板上，从电池的六个面（1 周期）。

7.6.2.2 Measurement: Take measurements as per section 7.6.1.2. 测试方法：取测量值参考 7.6.1.2 项。

7.6.2.3 Pass/Fail Criteria: 合格/不合格标准:

7.6.2.3.1 Electrically passes the functional tests as specified in 7.6.1.2. 电性能测试合格参考 7.6.1.2 说明。

7.6.2.3.2 Mechanical inspection: The product shall still be mechanically operable. 机械检测：产品仍具有原来的机械性能。

7.6.3 Random Vibration Test /随意振动测试

7.6.3.1 Procedure: The batteries shall be attached to the vibration table, either directly or through a transition structure capable of transmitting the specified vibration input without introduction of extraneous response. The orientation of the product shall expose the product to vibration excitation along three (3) mutually orthogonal axes (not simultaneously). The product shall be located to distribute the load on the vibration exciter as evenly as possible to minimize the effects of an unbalanced load. In addition, the input control-sensing device (feedback accelerometer) shall be rigidly attached to the vibration exciter table as near as possible to the attachment points of the product under test. Product to be run 2 hours on each axis as per 3G's RMS of acceleration between 20 and 500 Hz. 程序：将电池固定在振动台上，直接的或通过过渡装置完成，在没有外来响应时进行限定振动输入的传输.将电池固定在振动式励磁机的三个相互的直角轴线处（不同时）。产品放入振动式励磁机固定时应尽可能的减小不平衡负载带来的影响。另外，加速度感应器应牢固地固定在振动式励磁机台上，尽可能的靠近产品的测试位置。电池要在 20~50Hz 的频率下，每个轴向都要测试两个小时。

7.6.3.2 Measurement: Take measurements as per section 7.6.1.2. 测试方法：取测量值参考 7.6.1.2 部分。

7.6.3.3 Pass/Fail Criteria: 合格/不合格标准：

7.6.3.3.1 Electrically passes the functional tests as specified in 7.6.1.2. 电性能测试合格参考 7.6.1.2 部分。

7.6.3.3.2 Mechanical inspection: The product shall still be mechanically operable. 机械检测：产品仍具有原来的机械性能。

7.6.4 Mechanical Shock／机械振动

7.6.4.1 Procedure: Divide the units into three lots, and place loosely in the vibration box, Each unit should be placed in a separate partition. Place each of the three lot in a separate orientation, i.e. top-up, side-up, and front-up. Perform sinusoidal vibration at a frequency of 30 Hz with a 60 mils Peak to Peak displacement for 30 minutes. The vibration box size should have removable and adjustable dividers. 程序：将电池分成 3 组，并且分散放到振动箱内，每个电池必须分开放置。将三组电池分别放到不同的方向，也就是顶面向上，侧面向上，前面向上。要求以 30 Hz 的正弦振动 30 分钟。振动箱的规格应该时可移动和可调节的。

7.6.4.2 Measurement: Take measurements as per section 7.6.1.2. 测试方法：取测量值参考 7.6.1.2 部分。

7.6.4.3 Pass/Fail Criteria: 合格/不合格标准：

7.6.4.3.1 Electrically passes the functional tests as specified in 7.6.1.2.电性能测试合格参考 7.6.1.2 部分。

7.6.4.3.2 Mechanical inspection: The product shall still be mechanically operable. 机械检测：产品仍具有原来的机械性能。

7.6.5 Humidity Test /潮湿测试

7.6.5.1 Procedure: The batteries will be subjected to +40°C at 90% relative humidity for 48 hours. 程序：电池必须放在+40±2°C ,相对湿度为 90%条件下 48 小时。

7.6.5.2 Measurement: Take measurements as per section 7.6.1.2. 测试方法：取测量值参考 7.6.1.2 部分。

7.6.5.3 Pass/Fail Criteria: 合格/不合格标准：

7.6.5.3.1 Electrically passes the functional tests as specified in 7.6.1.2. 电性能测试合格参考 7.6.1.2 部分。

7.6.5.3.2 Mechanical inspection: The product shall still be mechanically operable. 机械检测：产品仍具有原来的机械性能。

7.6.7 ESD Testing / 静电测试

7.7.7.1 ESD testing shall be performed as per IEC 61000-4-2. Battery shall be subjected to +/-8kV contact discharge at each of the contacts and +/-15kV air discharge at each pack corner, up to a maximum of 10 discharges per location.Manual intervention to reset function allowed but no permanent loss of any function and no catastrophic failures are allowed.

ESD 测试要参照 IEC 61000-4-2 完成.，将电池在+/-8kV 条件下接触放电和在+/-15kV 条件下空气中放电，10 次放电的最大值，允许手动复位功能，但是不允许有任何功能永久的损坏。

7.7.7.2 Pass/Fail Criteria: 合格/不合格标准:

Manual intervention to reset function allowed but no permanent loss of any function and no catastrophic failures are allowed. 允许手动复位功能，但是不允许有任何功能永久的损坏。

7.8 Label quality test / 商标质量测试

7.8.1 Abrasion test / 耐磨测试

Test method: the label is rubbed according to the RCA Abrasive Resistance test method with the RCA#7IBB machine of NORMAN tool Inc. (Evansville IN, USA) applied load on test surface = 175g, abrasive paper of 11/16" width of NTI, 17 cycles/min, 16cm cycle length. 测试方法:商标的耐磨性测试是依照 RCA Abrasive Resistance 方法进行,用 NORMAN 工具公司的 RCA#7IBB 机器. (Evansville IN, USA)在测试表面的载重为 175g,用宽度 11/16"砂纸,每分钟 17 个循环的速度，16cm 的行程进行测试。

RCA cycles number requested: 20 RCA cycles minimum for label in continuous mode. RCA 周期数据要求: 商标必须连续做 20 RCA 循环。

Acceptance criteria: /判定标准:

The test results is Fail if clearly the text (Characters) is not visible. 如果明显的出现文字模糊，则测试结果是不合格。

7.8.2 Adhesion test /粘贴力测试

No destructive adhesion test on full and clean surface. 没有破坏的粘贴力测试要求在整洁的表面上进行。

Strips self-adhesive tape of about 5cm length are firmly pressed onto the label, and immediately removed with a jerk, perpendicularly to the surface, according to ISO 2409:1992. 贴大约 5CM 带粘性的胶纸在商标上，然后以垂直表面立即用力撕掉，参照 ISO 2409:1992。

Properties of used tape: / 使用贴纸说明:

Width 25mm, thickness (milor and layer): 0.06 +/-0.003mm, tensile break > 3.5daN/cm, elongation at rupture: 15-30% adhesive steel: 10 +/-1N/25mm Tape which fulfils these requirements is 3M ref. 595 or PERMACELL P99. 宽度为 25mm,厚度为 0.06 +/-0.003mm，拉伸系数> 3.5daN/cm，极限延伸率为 15-30%，粘力为 10 +/-1N/25mm，符合 3M ref. 595 或 PERMACELL P99 标准的胶纸。

Acceptance criteria: No text (Characters) shall be removed from the label. 判定标准：商标内容无损伤。

7.8.3 Resistance to house hold cleaning agents/耐醇性测试

Ethanol 96%, technical, denatured with 5% methanol, formula: C2H2n+2 density at 20°C: 790Kg/m3, boiling point/range: +65/-78°C, melting point +98/-114°C such as alcohol. 用 96%的乙醇添加 5%的甲醇，公式：C2H2n+2，在 20°C 的密度为 790Kg/m3，沸点：+65/-78°C,熔点：+98/-114°C 类似酒精的混合物。

The label is rubbed in groups of 25 rubbing cycles (on cycle = one complete to and from movement), with a hand tool with an average speed of 2m/min immediately after the 25 cycles of cleaning agent shall be wiped off with soft cloth. 用专用工具以 2m/min 的均匀速度擦拭商标的表面 25 个循环（每个循环为从一个点开始到这个点结束），每 25 个循环后要用软布蘸取酒精一次。

Acceptance criteria: After the test, the label not be discolored or attacked visibly. A small change of gloss is allowed. 判定标准：做完测试后，商标不能脱色和明显的损伤。小面积的光泽改变是被允许的。

7.9 Agency approvals/承认机构

Batteries will be tested to be compliant with the CE Directive. 电池测试必须符合 CE Directive 要求。

Cells used must meet the UL1642 standard. 电芯必须符合 UL1642 标准。

8. Operating instruction and safety regulations/操作说明和安全规则

8.1 Recommended methods of application/推荐使用事项

8.1.1 Before using the batteries, carefully read the service manual and the identification on the surface of the batteries.

使用电池前，请仔细阅读电池服务手册。

8.1.2 Please use the batteries in a normal environment, of which the temperature is -10℃ to 45℃ and the relative humidity is 65%±20%.

请在正常的环境中使用电池，温度-10℃~45℃，相对温度：65±20%

8.1.3 During their use, the batteries should be kept away from heat sources and high voltages, children should not be allowed to play with them, and they should not be knocked violently.

在使用过程中，电池应远离热源、高压，避免儿童玩弄电池，切勿摔打电池。

8.1.4 The batteries should only be charged with a matching charger. Remember not to place the batteries in the charger for over 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超过 24 小时。

8.1.5 In no circumstance should the positive and negative poles of the battery be short circuited. Do not disassemble or assemble the batteries yourself and do not place the batteries in a damp place in orde to avoid danger.

切勿将电池正负极短路，切勿自己拆装电池，也勿让电池放在受潮处，以免发生危险。

8.1.6 When the batteries are not to be used for a long time, please store them safely so that they will stay in a half-charged state. Please wrap the batteries with non-conductive materials in order that metallic materials will not contact the batteries directly, which may result in damage to the batteries. Keep the batteries in a cool and dry place.

长期不用时，请将电池储存完好，让电池处于半荷电状态。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，将电池保存阴凉干燥处。

8.1.7 Please dispose of the used batteries properly. Do not throw them in fire or water.

废弃电池请安全妥当处理，不要投入火中或水中。

8.2 Cautions /注意事项

8.2.1 Temperature range during charging/充电温度范围

The recommended temperature range for battery charging is between 0℃ and 40℃. Charging of the batteries out of that temperature range will cause the performance of the batteries to decrease and their life to shorten.

推荐的充电温度范围是 0-40℃。在超出此范围的环境中充电会造成电池性能下降、减少寿命。

8.2.2 Before using the batteries, carefully read the service manual and reread it often when needed.

电池使用前，请仔细阅读使用说明书

8.2.3 Mode of charging/充电方式

Please use the dedicated charger and the recommended mode of charging in the recommended environment during the charging of the batteries.

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。

8.2.4 The use of the batteries by children/儿童使用

Before a child use the batteries, its use of the batteries should be under the guidance of the parents and the use of the batteries should be monitored all the time.

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。

8.2.6 Consultation/咨询

When purchasing the batteries, be careful to remember the way to stay in contact with the seller so that you can contact the seller and have consultation with it when needed.

购买电池时，请注意销售商联络方法，以便需要时及进与销售商取得联系，得到咨询。

8.2.7 Warranty period/保用期

The warranty period is one year from the date of ex-factory. The service life of the battery is: charging and discharging circularly for 300 times. However, the manufacturer will not replace the battery free of charge even in the warranty period if the problem with the battery results from misuse rather than bad quality.

保用期是自出厂之日起一年，寿命为：充放电循环 300 次。但是属于使用不当而非质量问题，即使在保用期内，生产厂家也不会无偿更换新电池。

8.2.8 Safety use guaranteed/安全使用保障

If the battery is to be used in other devices, please consult with the supplier about the degree of perfection of its protective function. You should at least have a clear knowledge of such issues as the heavy current, fast charging and special application of the battery.

如果将电池用于其他设备，请与供应商讨保护功能的完善性。至少应该咨询电池的大电流、快速充电、特殊应用的问题。

8.3 Warning against risk/**危险警告**

8.3.1 Do not disassemble the batteries/禁止拆装电池

There are a protective mechanism and a protective circuit inside the battery, which helps prevent danger. Improper disassembly of the battery can damage the protective function of the battery and therefore causes the battery to heat, smoke, deform or even burn.

电池内部具有保护机构和保护电路可以避免发生危险。不合适的拆装会损坏保护功能，将会造成让电池发热、冒烟、变形或燃烧。

8.3.2 Short circuit of the battery is prohibited/禁止让电池短路

Do not short circuit the positive and negative poles of the battery with metal and do not store or move the batteries together with metal sheets either. If the battery is short circuited, a heavy current will run through the battery, which will damage it and cause it to heat, smoke, deform and even burn.

不要将电池的正负极用金属连接，也不要将电池与金属片放在一起存储和移动。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。

8.3.3 Heating and burning of the battery is prohibited /严禁加热和焚烧电池

Heating and burning of the battery causes its separator to melt, its safety function to lose or its electrolyte to burn. Overheating of the battery will cause it to heat, smoke, deform and burn.

加热和焚烧电池将会造成电池隔离物的溶化、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。

8.3.4 Avoidance of use of the batteries near a heat source/避免在热源附近使用电池

Do not use the batteries near a fire source, a furnace or in an environment of which the ambient temperature exceeds 80℃. Excessively high temperature will cause a short circuit to occur within the battery, which will cause the battery to heat, smoke, deform or burn.

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。

8.3.5 Damping of the battery is prohibited/禁止弄湿电池

Do not moisten the battery and throwing of the battery into water is even more prohibited. Otherwise the inner protective circuit within and the protective function of the battery may be lost and abnormal chemical reactions may occur, and as a consequence the battery may heat, smoke, deform or burn

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和功能丧失及发生不正常的化学反应，电池有可能发热、冒烟、变形或燃烧。

8.3.6 Avoidance of charging of the battery near a fire source or in direct sunlight

避免在火源附近或阳光直射下充电

If the principle is violated, the inner protective circuit within and the protective function of the battery may be lost and abnormal chemical reactions may occur, and as a consequence the battery may heat, smoke, deform or burn.

否则会造成电池内部保护电路和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。

8.3.7 Dangers may occur if the battery is charged with an undedicated charger.

使用非专用充电器给电池充电，会发生危险。

When the battery is being charged in an abnormal situation, the inner protective circuit within and the protective function of the battery may be lost and abnormal chemical reactions may occur, and as a consequence the battery may heat, smoke, deform or burn.

在非正常的条件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。

8.3.8 Damage of the battery is prohibited/禁止破坏电池

The battery should not be damaged by means of methods like knocking metallic things into the battery, hammering the battery, knocking it violent or etc. Otherwise the battery may heat, smoke, deform or burn, and even dangers may happen sometimes.

禁止用金属凿入电池、锤打或摔打电池或其他方法破坏电池，否则会造成电池发热、冒烟、变形或燃烧，甚至会发生危险。

8.3.9 Welding is not allowed to be conducted on the battery/禁止在电池上直接焊

Overheating causes the separator of the battery to melt and the safety protection function to be lost, which will lead to the heating, smoking, deforming or burning of the battery.

过热将会造成电池隔离物的溶化、安全保护功能丧失，使电池发热、冒烟、变形或燃烧。

8.3.10 Direct charging of the battery at a power socket or a vehicle-mounted cigarette lighter is strictly prohibited.

严禁将电池直接在电源插座上或车载点烟器上充电

High voltages or heavy currents may damage the battery or make it heat, smoke, deform or burn.

高压、大电流将会过电池而使其损坏，或使电池发热、冒烟、变形或燃烧。

8.3.11 The battery cannot be used in other devices/不可将电池用于其他设备

Improper use may affect the performance of the battery or shorten its life, and sometimes it may even cause the battery to heat, smoke, deform or burn.

不恰当使用会损坏电池的性能、降低寿命，甚至会使电池发热、冒烟、变形或燃烧。

8.3.12 Direct contact with the leaking battery is prohibited

不要直接触及漏液电池

The electrolyte that has leaked out may injure the skin. Flush the eye with clear water immediately in case the electrolyte goes into it accidentally. Do not knead the eye and go to hospital for further medical treatment immediately.

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。

9. Remark/备注

What has been mentioned above can be regarded as the conventional framework between the supplying and requisitioning parties in respect to the product performance and examination rule of the battery. It shall be executed if there are not any written agreements or notice of change.

以上述，可以作为供需双方对于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。

10. Appurtenance/附件

Appurtenance A	Main Electrical Components Specifications
附件 A	主要电子元件规格书