

## 锂离子 4000mAh 7.4V POS 机电池组（带通讯协议）

### 1、Basic Performance 基本性能

额定容量：4000mAh ， 0.2C 放电

最小容量：3600mAh ， 0.2 C 放电

标称电压：7.4V

出厂电压：7.2~7.6V

充电截止电压：8.5V±0.05V

放电截止电压：4.8V±0.10V

标准充电方式：0℃~45℃ 0.2C constant current charge to 4.2V, then constant voltage 4.2V charge till charged current declines to  $\leq 0.02C$

充电电流：Standard charge:0.2C、Rapid charge:1C

充电时间：Standard charge:5.5~6.5 h、Rapid charge:1.5~2.5 h

最大充电电流：1C (5℃~+45℃)

标准放电电流：-20℃~+60℃ 0.2C constant current discharge to 3.0V.

最大放电电流：1C(-10℃~+60℃)

工作环境：Charging: 0℃-45℃, max.90%RH、Discharging: -20℃-60℃, max.90%RH

初始内阻：<70mΩ, (4.2V AC 1KHz measured)

成品内阻：<180mΩ, (8.4V AC 1KHz measured)

电池重量：About 190g (Include PCB)



### 2、PCM Specification PCM 规格

#### 2.1 电性能 (Normal temperature, Relative humidity $\leq$ 90%)(室温, 湿度 $\leq$ 90%)

过充检测电压：4.25±0.025V

过充保护延时：1.0~1.2S

过放检测电压：2.4±0.05V

过放保护延时：36~200 mS

过流保护电流：6~9A

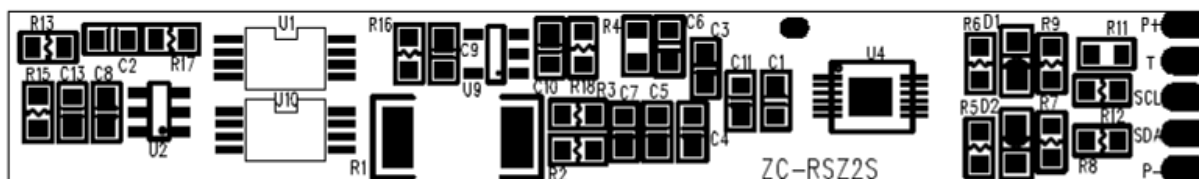
过流保护延时：4.5~20mS

正常工作时导通内阻： $\leq$ 30mΩ

工作状态消耗电流： $\leq$ 6.0uA

休眠状态消耗电流： $\leq$ 0.2uA

#### 2.2 焊盘说明



P+: 接电池输出/充电输入的正端

P-: 接电池输出/充电输入的负端

B+: 接电芯负极

B-: 接电芯正极

BM: 接电芯B1正极

T: T=10KΩ 1%/热敏电阻(白色线)

SCL: 通讯时钟线(蓝色线)

SDA: 通讯数据线(绿色线)

### 2.3 保护板物料主要清单:

NTC: 10K (R4、R11)

IC: BQ-27541 (U4)

MOS管: AO8814 (U1)

## 4000mAh 7.4V Lithium Battery for POS Machine

### 1、Basic Performance

**Rated Capacity min:** 4000mAh ,0.2 C discharging

Minimum Capacity: 3600mAh ,0.2 C discharging

Normal Voltage: 7.4V

O.C.V: 7.2~7.6V

Charge Ending Voltage : 8.5V±0.05V

Discharge Ending Voltage: 4.8V±0.10V

Standard charging method : 0℃~45℃ 0.2C constant current charge to 4.2V, then constant voltage 4.2V charge till charged current declines to ≤ 0.02C

Charge current : Standard charge:0.2C、Rapid charge:1C

charging Time : Standard charge:5.5~6.5 h、Rapid charge:1.5~2.5 h

Max. Charging Current : 1C (5℃~+45℃)

Standard discharging Current : -20℃~+60℃ 0.2C constant current discharge to 3.0V.

Max. Discharging Current : 1C(-10℃~+60℃)

Operating environment : Charging: 0℃-45℃, max.90%RH、Discharging: -20℃-60℃, max.90%RH

Cell Initial Impedance : <70mΩ, (4.2V AC 1KHz measured)

battery pack Production Impedance : <180mΩ, (8.4V AC 1KHz measured)

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Add: 19F, Unit 2, Nanguo Building, Hongling Road, Futian District, Shenzhen, China.

Factory: Chuangyi Road, Longhua Village, Bao An District, Shenzhen P.R. China.

Tel: 86-755-22209901 Fax: 86 -755-22219161 Zip Code: 518031 Email: info@yinyoo.com

Website builder: Sunher New Media

battery pack Weight : About 190g (Include PCB)

## 2、PCM Specification

2.1 Electrical Characteristics 电性能 (Normal temperature, Relative humidity≤90%)(室温, 湿度≤90%)

Over-charging Protection : 4.25±0.025V

Over-charging Protection Delay : 1.0~1.2S

Over-discharging Protection : 2.4±0.05V

Over-discharging Protection Delay : 36~200 mS

Discharge Current Protection : 6~9A

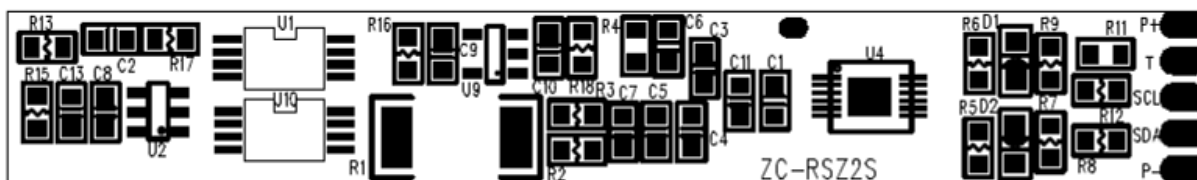
Discharge Current Protection Delay : 4.5~20mS

Internal Resistance : ≤30mΩ

Operation Static Current : ≤6.0uA

Storage Wasting Current : ≤0.2uA

### 2.2 PIN Explanation



P+: Battery pack output/charging positive pole

P-: Battery pack output/charging negative pole

B+: Cell negative pole

B-: Cell positive pole

BM: Cell B1 positive pole

T: T=10KΩ 1%/

SCL: The serial clock line

SDA: The serial data line

### 2.3 PCM BOM:

NTC: 10K (R4、R11)

IC: BQ-27541 (U4)

MOS管: AO8814 (U1)

## POS Machine

### Smart Battery Solution for POS Machine

In recent years, due to rapid development of lithium battery, remaining battery capacity on portable products has been evaluated by voltage measurements, however, their relationship varies according to discharge rate, temperature and battery's aging degree. In this

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way, error rate can reach 50%. Because of growing market demand for longer use time, more precise solutions are required during design. Using smart battery fuel gauge IC to measure battery's charge or discharge capacity is able to precisely evaluate battery level.

1. **Design requirements of smart battery for POS machine**

Based on customers' requirements and specifications, information share between smart lithium battery pack and POS host devices can be achieved by integrating smart battery fuel gauge of communication protocols, lithium battery and safety protection performance into solution. In this way, reasonable, efficient and safe battery management solution can come true. The whole solution's design should be aimed at most perfect integration with main units, and conditioned on safety guarantee of battery, batteries and the whole system, together with compliance with relevant design and certificate regulations. Meanwhile, in order to ensure safety and reliability of the lithium battery, multi-layer protection should be taken on interior battery pack to prevent them from damages arising from overcharge, over discharge or short circuit.

2. **Smart battery solution for POS machine**

- A. **PCM:** a protection circuit designed mainly for rechargeable smart battery pack. Because of chemical characteristics of lithium battery, protection functions like smart battery level calculate, overcharge, over discharge, short circuit, over current, etc should be provided to avoid fire and explosion.
- B. **Protection IC:** constantly monitors cells' overcharge, over discharge, short circuit, and over current to ensure cell's safe, stable and efficient work.
- C. **Over current protection (PTC):** mainly target for secondary protection function. PTC can recover fuse and has dual functions of over current protection and auto recovery. PTC can avoid battery from over heat discharge and occurrence of unsafe high current.
- D. **103450 Li-ion cell(SANYO)**
- E. **MOSFET:** play the role of switch during circuit protection to guarantee load voltage can neither rise nor drop.
- F. **Capacity management chip (BQ26500):**  
A fully functional capacity test gauge has two ADC, one testing voltage and temperature, and the other testing capacity and charge sensor. In addition, it has a mini processor responsible for indicating the remaining state of capacity and run time to empty. Main unit can always seek these information from capacity fuel gauge and inform users of the battery information.
- G. **Battery package: plastic enclosure**
- H. **Diagram of smart battery solution for POS machine:**