RAK-WiFi-Module

SDWF-23BS

Product Specification

IEEE 802.11 b/g/n 2.4GHz 1T1R WiFi with Bluetooth v2.1+EDR/Bluetooth 3.0/3.0+HS/4.0

深圳市瑞科慧联科技有限公司
Shenzhen Rakwireless Technology Co., Ltd
深圳市南山区科技园北区清华信息港综合楼406室 ,518057
Room 406, R&D Building of Tsinghua Hi-Tech Park, Shenzhen, 518057,China
TEL:+755-26506594 FAX：+755-86152201
Email: info@rakwireless.com

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0. Revision History

REV NO	Date	Modifications	Draft	Approved
Rev0.1	2013-7-10	First Released		
Rev0.2	2013-10-7	Update PCB Layout Package		

1. Introduction

1.1 Over view

SDWF-23BS is a small size and low profile of WiFi + BT Combo module with LGA (Land-Grid Array) footprint, board size is 12mm*12mm with module thickness of 2mm. It can be easily manufactured on SMT process and highly suitable for tablet PC, ultra book, mobile device and consumer products. It provides SDIO interface for WiFi to connect with host processor and high speed UART interface for BT. It also has a PCM interface for audio data transmission with direct link to external audio codec via BT controller. The WiFi throughput can go up to 150Mbps in theory by using 1x1 802.11n b/g/n MIMO technology and Bluetooth can support BT2.1+EDR/BT3.0 and BT4.0.

SDWF-23BS uses Realtek RTL8723BS, a highly integrated WiFi/BT single chip based on advanced COMS process. RTL8723BS integrates whole WiFi/BT function blocks into a chip, such as SDIO/UART, MAC, BB, AFE, RFE, PA, EEPROM and LDO/SWR, except fewer passive components remained on PCB. The general block diagram for the module is shown in Figure 1

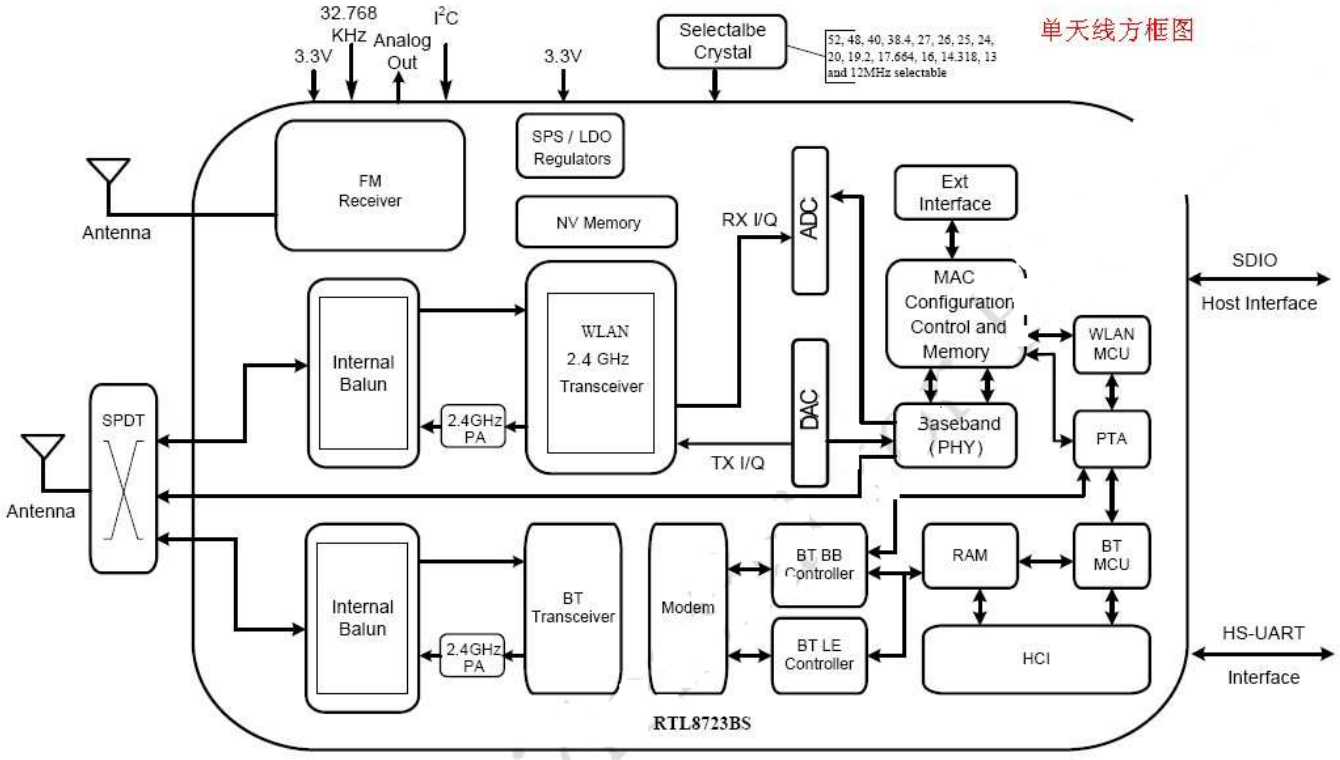


Figure 1

1.2 Product Features

- Operate at ISM frequency bands (2.4GHz)
- SDIO for WiFi and UART for Bluetooth
- IEEE standards support: IEEE 802.11b, IEEE 802.11g, IEEE 802.11n, IEEE 802.11d, IEEE 802.11e, IEEE 802.11h, IEEE 802.11i
- Fully Qualified for Bluetooth 2.1+EDR specification including both 2Mbps and 3Mbps modulation mode
- Fully qualified for Bluetooth 3.0
- Fully qualified for Bluetooth 4.0 Dual mode
- Full–speed Bluetooth operation with Piconet and Scatternet support
- Enterprise level security which can apply WPA/WPA2 certification for WiFi.
- WiFi 1 transmitter and 1 receiver allow data rates supporting up to 150 Mbps downstream and 150 Mbps upstream PHY rates

2. GENERAL SPECIFICATION

2.1 WiFi RF Specifications

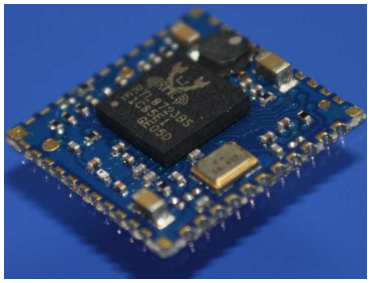
Main Chipset	Realtek RTL8723BS-VD
Operating Frequency	2.400～2.4835GHz
Standards	**WiFi:** IEEE 802.11b, IEEE 802.11g, IEEE 802.11n, IEEE 802.11d, IEEE 802.11e, IEEE 802.11h, IEEE 802.11i **BT:** V2.1+EDR/BT v3.0/BT v3.0+HS/BT v4.0
Modulation	**WiFi:** 802.11b: CCK(11, 5.5Mbps), QPSK(2Mbps), BPSK(1Mbps), 802.11 g/n: OFDM **BT:** 8DPSK, π/4 DQPSK, GFSK
PHY Data rates	**WiFi:** 802.11b: 11,5.5,2,1 Mbps 802.11g: 54,48,36,24,18,12,9,6 Mbps 802.11n: up to 150Mbps **BT:** 1 Mbps for Basic Rate 2,3 Mbps for Enhanced Data Rate 6,9,12,18,24,36,48,54 Mbps for High Speed
Transmit Output Power (Tolerance: ±2.0dBm)	**WiFi:** 802.11b@11Mbps 16dBm 802.11g@6Mbps 15dBm 802.11g@54Mbps 14dBm 802.11n 13dBm (MCS 0_HT20) 13dBm (MCS 7_HT20) 12dBm (MCS 0_HT40) 12dBm (MCS 7_HT40) **BT:** Max +10dBm
Receiver Sensitivity	802.11b@11Mbps -82±1dBm 802.11g@54Mbps -71±1dBm 802.11n -67±1dBm (MCS 7_HT20) -64±1dBm (MCS 7_HT40)
Operating Channel	**WiFi 2.4GHz:** 11: (Ch. 1-11) – United States 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan **BT 2.4GHz:** Ch. 0 ~78
Media Access Control	**WiFi:** CSMA/CA with ACK **BT:** AFH, Time Division
Antenna	External Antenna
Network Architecture	**WiFi:** Ad-hoc mode (Peer-to-Peer) Infrastructure mode Software AP WiFi Direct **BT:** Pico Net, Scatter Net
Security	**WiFi:** WPA, WPA-PSK, WPA2, WPA2-PSK, WEP 64bit & 128bit, IEEE 802.11x, IEEE 802.11i **BT:** Simple Paring
OS Supported	Android /Linux
Host Interface	**WiFi:** SDIO **BT:** UART
Operating Voltage	3.3Vdc I/O supply voltage
Dimension	Typical L12.0*W12.0*H1.6mm

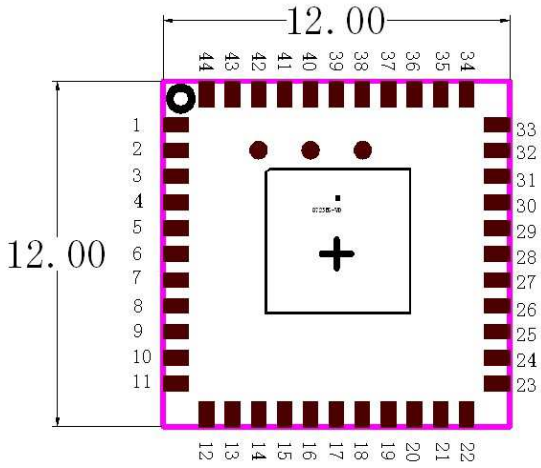
2.2 Power Consumption

Power Consumption (Typical by using SWR)	**WiFi only:** TX Mode: (Throughput mode) 170mA (MCS7/BW40/13dBm) RX Mode: (Throughput mode) 130mA (MCS7/BW40/-60dBm) Associated Idle power saving with DTIM=3 2.1mA Unassociated Idle: 0.1mA RF disable Mode: 0.1mA **BT:** Inquiry & Page Scan: 0.9 mA ACL no traffic: 7.5mA SCO HV3: 15.0mA

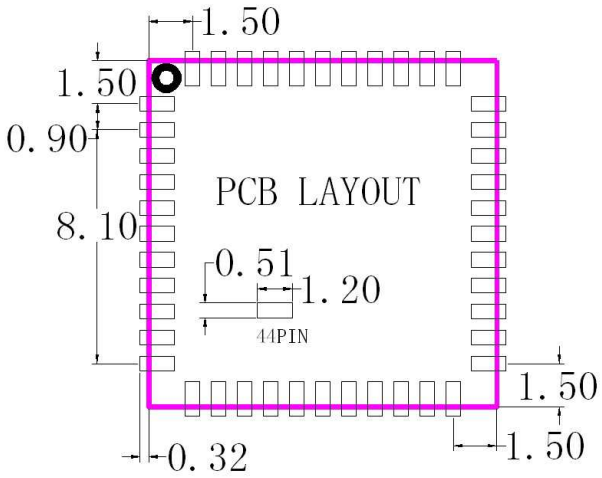
3. Mechanical Specification

3.1 Outline Drawing (Unit: ±0.15mm)

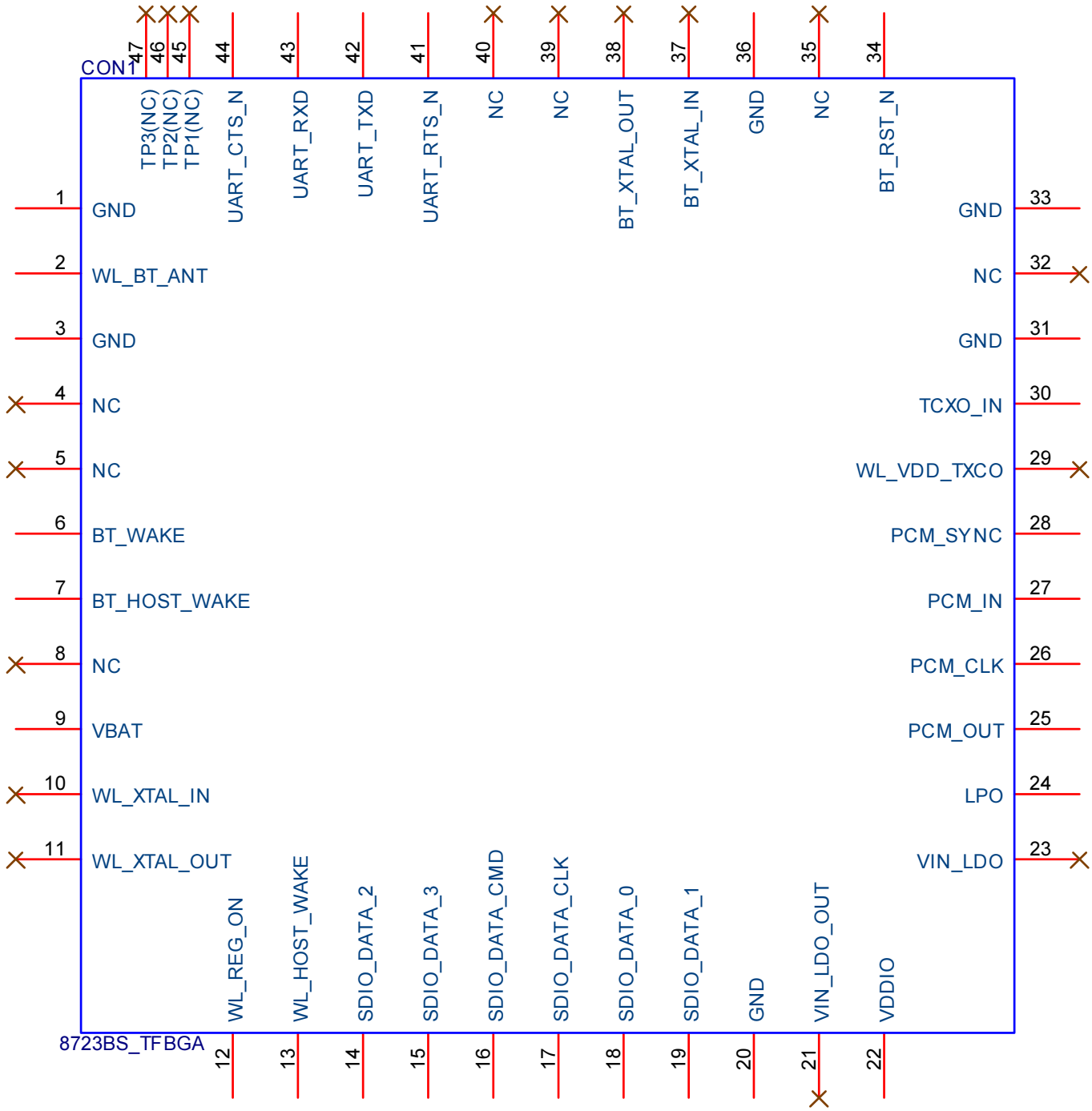




3.2 Recommended Footprint



3.3 Pin Definition



PIN Assignment

Pin #	Name	Description
1	GND	Ground connection
2	WL_BT_ANT	RF I/O port
3	GND	Ground connection
4	NC	Floating (NC)
5	NC	Floating (NC)
6	BT_WAKE	Wake-up BT
7	BT_HOST_WAKE	BT wake-up BT
8	NC	Floating (NC)
9	VBAT	3.3V **±10%** power supply
10	WL_XTAL_IN	Floating (NC)
11	WL_XTAL_OUT	Floating (NC)

12	WL_REG_ON	Internal regulators power enable/disable
13	WL_HOST_WAKE	WLAN wake-up HOST
14	SDIO_DATA_2	SDIO data line 2
15	SDIO_DATA_3	SDIO data line 3
16	SDIO_DATA_CMD	SDIO command line
17	SDIO_DATA_CLK	SDIO clock line
18	SDIO_DATA_0	SDIO data line 0
19	SDIO_DATA_1	SDIO data line 1
20	GND	Ground
21	VIN_LDO_OUT	Floating(NC)
22	VDDIO	I/O Voltage supply input
23	VIN_LDO	Floating (NC)
24	LPO	External Low Power Clock input
25	PCM_OUT	PCM Output
26	PCM_CLK	PCM Clock
27	PCM_IN	PCM Input
28	PCM_SYNC	PCM Sync
29	WL_VDD_TXCO	Floating (NC)
30	TCXO_IN	Floating (NC)
31	GND	Ground
32	NC	Floating (NC)
33	GND	Ground
34	BT_RST_N	BT Reset IN
35	NC	Floating (NC)
36	GND	Ground
37	BT_XTAL_IN	Floating (NC)
38	BT_XTAL_OUT	Floating (NC)
39	NC	Floating (NC)
40	NC	Floating (NC)
41	UART_RTS_N	UART RTS
42	UART_TXD	UART Output
43	UART_RXD	UART Input
44	UART_CTS_N	UART CTS
45~47	TP1~TP3	Test point1~3 Floating (NC)
Total	47PINS	12.0*12.0*1.6mm LGA Package

4. Environmental Requirements

4.1

Operating Condition:

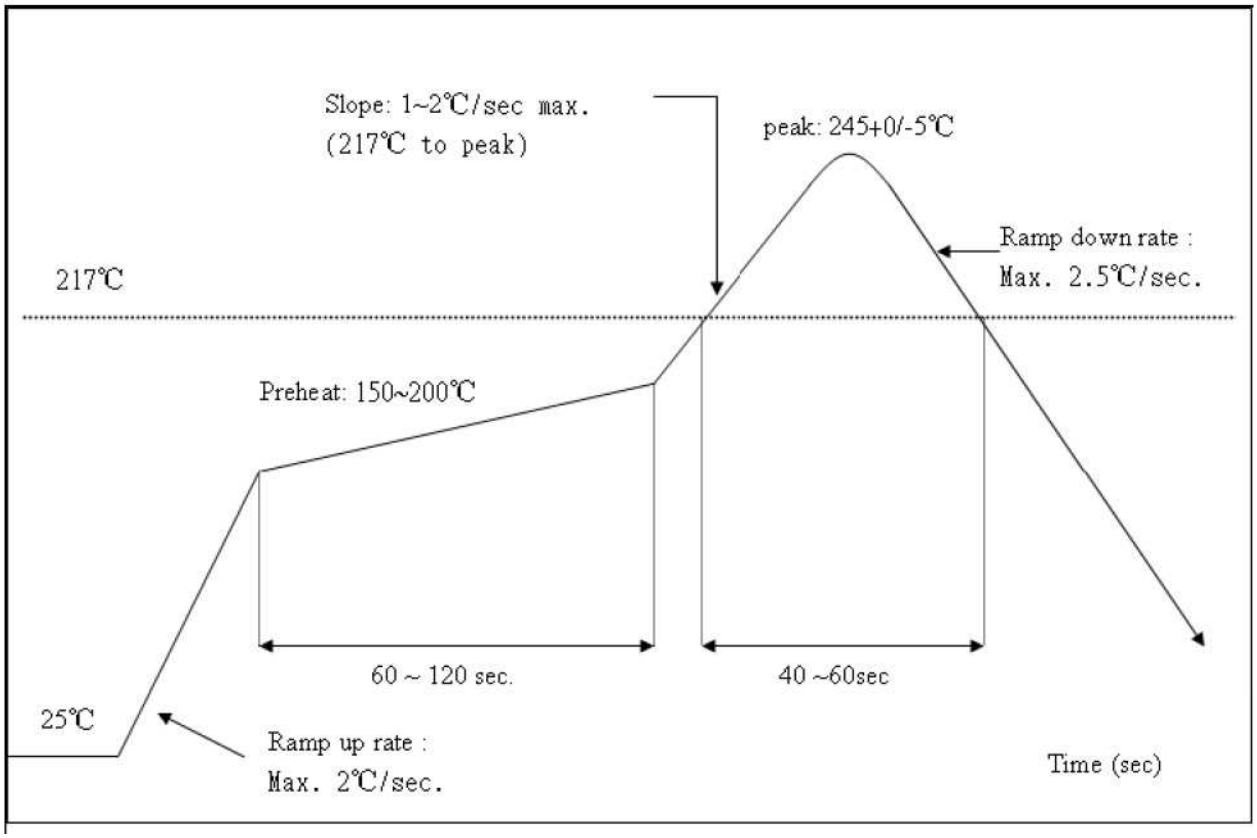
Operating Temperature: 0°C to +55 °C
Relative Humidity: 10-90% (non-condensing)

Storage Condition:

Temperature: -40°C to +80°C (non-operating)
Relative Humidity: 5-90% (non-condensing)

MTBF: Over 150,000hours

4.2 Recommended Reflow Profile
Referred to IPC/JEDEC standard.
Peak Temperature : <250°C
Number of Times : ≤2 times



4.3 Patch WIFI modules installed before the notice:

WIFI module installed note:
1. Please press 1 : 1 and then expand outward proportion to 0.7 mm, 0.12 mm thickness When open a stencil
2. Take and use the WIFI module, please insure the electrostatic protective measures.
3. Reflow soldering temperature should be according to the customer the main size of the products, such as the temperature set at 250 + 5 ℃ for the MID motherboard.

About the module packaging, storage and use of matters needing attention are as follows:
1. The module of the reel and storage life of vacuum packing: 1). Shelf life: 8 months, storage environment conditions: temperature in: < 40 ℃, relative humidity: < 90% r.h.
2. The module vacuum packing once opened, time limit of the assembly:
Card: 1) check the humidity display value should be less than 30% (in blue), such as: 30% ~ 40% (pink) or greater than 40% (red) the module have been moisture absorption.
2.) factory environmental temperature humidity control: ≦ 30℃, ≦ 60% r.h..
3). Once opened, the workshop the preservation of life for 168 hours.
3. Once opened, such as when not used up within 168 hours:
1). The module must be again to remove the module moisture absorption.
2). The baking temperature: 125 ℃, 8 hours.
3.) After baking, put the right amount of desiccant to seal packages.

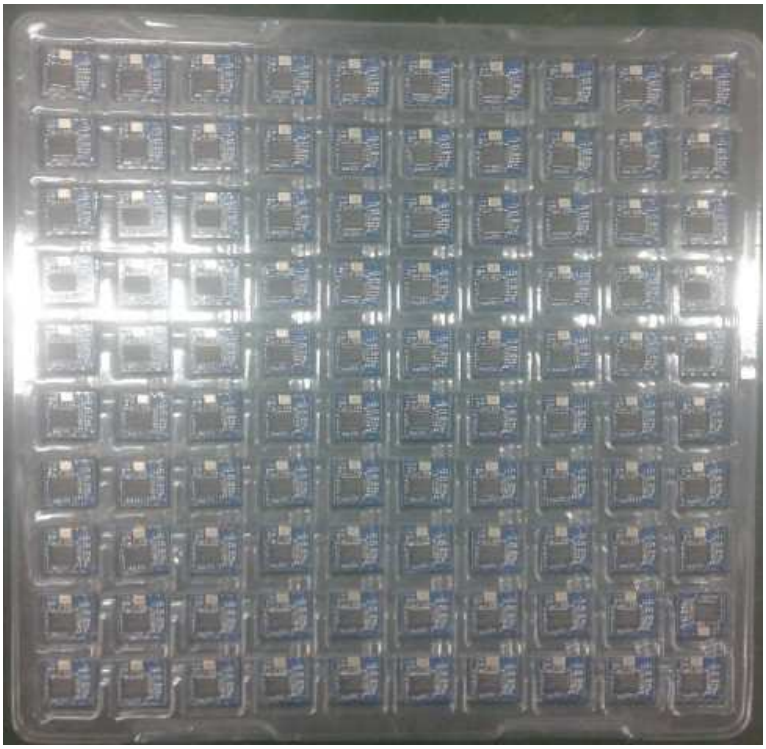
贴片 WIFI 模块装机的前注意事项：

1、 客户在开钢网时一定要将 WIFI 模块焊盘的孔开大，请按 1 比 1 再向外扩大 0.7mm 比例来开，厚度按 0.12mm。
2、有需要拿 WIFI 模时一定不要光着手去拿 WIFI 模块，一定要戴上手套及静电环。
3、过炉温度要根据客户主板的大小而定，一般像贴在平板电脑上 250+-5 度。

关于模块包装，储存以及使用管制应注意事项如下：
1.模块的卷盘加真空包装之储存期限：1）.保存期限：8 个月，储存环境条件：温度在：<40℃，相对湿度：<90%R.H
2.模块真空包装拆封后，组装之时限：
1）.检查湿度卡：显示值应小于 30%（蓝色），如：30%~40%(粉红色）或者大于 40%（红色）表示模块已吸湿气。

2）.工厂环境温度湿度管制：≦30℃，≦60%R.H。3）.拆封后，车间的保存寿命为 168 小时。
3.拆封后，如未在 168 小时内使用完时：
1）.模块须重新烘烤，以除去模块吸湿问题。
2）.烘烤温度条件：125℃，8 小时。
3）.烘烤后，放入适量的干燥剂再密封包装。

5.0 Package (Optional Pallet or Carrier tape package)
5.1 Pallet package　托盘包装



Remark: 100pcs/Layer, 10Layer/Bag, 1,000pcs/Bag

5.2 Carrier tape package 载带包装

2,000pcs/Reel