

PRODUCT SPECIFICATION

6252B-SRB

Wi-Fi Dual-band 2x2 11ax + Bluetooth 5.2

Combo Module

Version:v2.0

Customer: _____

Customer P/N: _____

Signature: _____

Date: _____

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6252B-SRB Module Datasheet

Ordering Information	Part NO.	Description
	FG6252BSRB-01	RTL8852BS-CG,a/b/g/n/ac/ax,Wi-Fi+BT5.2,2T2R,SDIO+UART, 3 Antenna ,no shielding,PCB V2.0
	FG6252BSRB-K1	RTL8852BS-CG,a/b/g/n/ac/ax,Wi-Fi+BT5.2,2T2R,SDIO+UART, 3 Antenna ,no shielding,PCB V2.0(客供主 IC)
	FG6252BSRB-03	RTL8852BS-CG,a/b/g/n/ac/ax,Wi-Fi+BT5.2,2T2R,SDIO+UART, 3 Antenna ,with shielding,PCB V2.0
	FG6252BSRB-C3	RTL8852BS-CG,a/b/g/n/ac/ax,Wi-Fi+BT5.2,2T2R,SDIO+UART, 3 Antenna ,with shielding,PCB V2.0 (only for CW)
	FG6252BSRB-K3	RTL8852BS-CG,a/b/g/n/ac/ax,Wi-Fi+BT5.2,2T2R,SDIO+UART, 3 Antenna ,with shielding,PCB V2.0 (客供主 IC)

Target power:

2.4G: 19/18/17/13

5.8G: 18/17/15/13

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Revision History

[illegible]

1. General Description

1.1 Introduction

Fn-Link Technology would like to announce a low-cost and low-power consumption module which has all of the Wi-Fi functionalities. It is a highly-integrated IEEE 802.11 a/b/g/n/ac/ax MAC/Baseband/RF WLAN single chip. For Wireless LAN operation. The integrated module provides SDIO interface for Wi-Fi. The module provides simple legacy and 20MHz/40MHz/80MHz co-existence mechanism to ensure backward and network compatibility.

The wireless module complies with IEEE 802.11 a/b/g/n/ac/ax 2x2 MIMO standard and the speed can achieve up to 1201Mbps with dual stream in 802.11ax. The integrated module provides SDIO interface for Wi-Fi, UART / PCM interface for Bluetooth.

This combo module is a total solution for a combination of Wi-Fi and Bluetooth V5.2 technologies. The module is specifically developed for all portable devices.

1.2 Description

Model Name	6252B-SRB
Product Description	Support Wi-Fi/Bluetooth functionalities
Dimension	L x W: 15 x 13 mm
Wi-Fi Interface	Support SDIO V1.0/V2.0/V3.0
BT Interface	UART / PCM
OS supported	Android /Linux/iOS /WIN10
Operating temperature	0°C to 70°C
Storage temperature	-40°C to 85°C

2. Features

General

- Highly integrated wireless local area network (WLAN) system-on-chip (SOC) for 802.11a/b/g/n/ac/ax WLAN applications
- Supports Dual band Single concurrent (2.4G/5G).

PHY Features

- Dual-stream spatial multiplexing up to 1201 Mbps data rate.
- Supports 20/40MHz at 2.4GHz and supports 20/40/80MHz at 5GHz
- Supports Transmit Beamforming

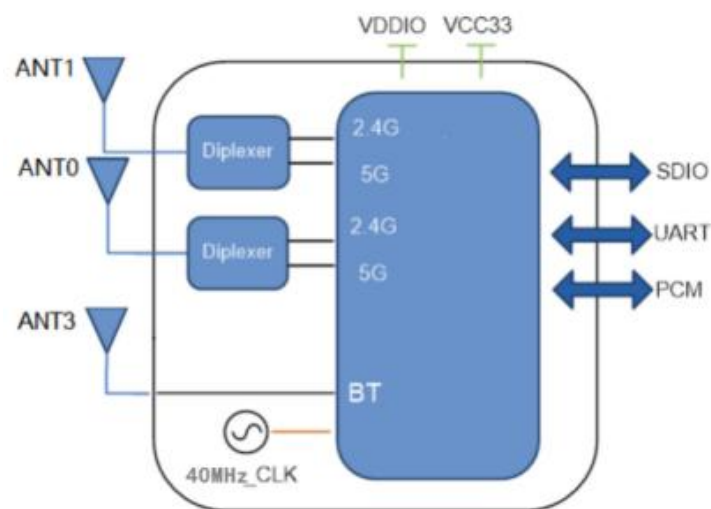
Host Interface

- Supports low power SDIO3.0(complies with SDIO 1.1/2.0) interface for WLAN
- UART/PCM interface for Bluetooth.

Bluetooth Features

- Supports Bluetooth system (BT5.2 Logo Compliant)
- Supports WLAN/Bluetooth coexistence
- Compatible with Bluetooth v2.1+EDR.
- Dual Mode support: Simultaneous LE and BR/EDR
- BT host digital interface:
 - HCI UART
 - PCM for audio data

3. Block Diagram



4. General Specification

4.1 WI-FI 2.4GHz Specification

Feature	Description		
WLAN Standard	IEEE 802.11 b/g/n/ac/ax Wi-Fi compliant		
Frequency Range	2.400 GHz ~ 2.4835 GHz (2.4 GHz ISM Band)		
Number of Channels	2.4GHz: Ch1 ~ Ch14		
Test Items	Typical Value		EVM
Output Power ¹	802.11b /11Mbps : 19dBm ± 2 dB		EVM ≤ -10dB
	802.11g /54Mbps : 18dBm ± 2 dB		EVM ≤ -25dB
	802.11n /MCS7 : 17dBm ± 2 dB		EVM ≤ -28dB
	802.11ax HE20 MCS11: 13dBm ± 2 dB		EVM ≤ -35dB
	802.11ax HE40 MCS11: 13dBm ± 2 dB		EVM ≤ -35dB
Spectrum Mask	Meet with IEEE standard		
Freq. Tolerance	± 20ppm		
SISO Receive Sensitivity (11b,20MHz) @8% PER	- 1Mbps PER @ -94 dBm		≤-83
	- 11Mbps PER @ -85 dBm		≤-76
SISO Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps PER @ -90 dBm		≤-85
	- 54Mbps PER @ -71 dBm		≤-68
SISO Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -90 dBm		≤-85
	- MCS=7 PER @ -69 dBm		≤-67
SISO Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0 PER @ -87 dBm		≤-82
	- MCS=7 PER @ -66 dBm		≤-64
SISO Receive Sensitivity (11ac,20MHz) @10% PER	- MCS=0 PER @ -90 dBm		≤ -82
	- MCS=8 PER @ -66 dBm		≤ -60
SISO Receive Sensitivity (11ac ,40MHz) @10% PER	- MCS=0 PER @ -87 dBm		≤ -79
	- MCS=9 PER @ -59 dBm		≤ -55
SISO Receive Sensitivity (11ax,20MHz) @10% PER	- MCS=0 PER @ -90 dBm		≤-74
	- MCS=11 PER @ -60 dBm		≤-52
SISO Receive Sensitivity (11ax ,40MHz) @10% PER	- MCS=0 PER @ -87 dBm		≤-71
	- MCS=11 PER @ -57 dBm		≤-49
Maximum Input Level	802.11b : -10 dBm		
	802.11g/n : -20 dBm		
Antenna Reference	Small antennas with 0~2 dBi peak gain		

4.2 WI-FI 5GHz Specification

Feature	Description		
WLAN Standard	IEEE 802.11a/n/ac/ax, Wi-Fi compliant		
Frequency Range	5.15 GHz ~ 5.850 GHz(5.0 GHz ISM Band)		
Test Items	Typical Value		EVM
Output Power ¹	802.11a /54Mbps:	18 dBm ± 2 dB	EVM ≤ -25dB
	802.11n /MCS7:	17 dBm ± 2 dB	EVM ≤ -28dB
	802.11ac vHT20 MCS8:	16 dBm ± 2 dB	EVM ≤ -30dB
	802.11ac vHT40 MCS9:	15 dBm ± 2 dB	EVM ≤ -32dB
	802.11ac vHT80 MCS9:	15 dBm ± 2 dB	EVM ≤ -32dB
	802.11ax HE20 MCS11:	13 dBm ± 2 dB	EVM ≤ -35dB
	802.11ax HE40 MCS11:	13 dBm ± 2 dB	EVM ≤ -35dB
	802.11ax HE80 MCS11:	13 dBm ± 2 dB	EVM ≤ -35dB
Spectrum Mask	Meet with IEEE standard		
Freq. Tolerance	± 20ppm		
SISO Receive Sensitivity (11a,20MHz) @10% PER	- 6Mbps	PER @ -90 dBm	≤-85
	- 54Mbps	PER @ -71 dBm	≤-68
SISO Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0	PER @ -90 dBm	≤-85
	- MCS=7	PER @ -69 dBm	≤-67
SISO Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0	PER @ -87 dBm	≤-82
	- MCS=7	PER @ -66 dBm	≤-64
SISO Receive Sensitivity (11ac,20MHz) @10% PER	- MCS=0, NSS1	PER @ -90 dBm	≤ -82
	- MCS=8, NSS1	PER @ -66 dBm	≤ -60
SISO Receive Sensitivity (11ac ,40MHz) @10% PER	- MCS=0, NSS1	PER @ -87 dBm	≤ -79
	- MCS=9, NSS1	PER @ -59 dBm	≤ -55
SISO Receive Sensitivity (11ac,80MHz) @10% PER	- MCS=0, NSS1	PER @ -84 dBm	≤-79
	- MCS=9, NSS1	PER @ -56 dBm	≤-54
SISO Receive Sensitivity (11ax,20MHz) @10% PER	- MCS=0	PER @ -90 dBm	≤-74
	- MCS=11	PER @ -60 dBm	≤-52
SISO Receive Sensitivity (11ax ,40MHz) @10% PER	- MCS=0	PER @ -87 dBm	≤-71
	- MCS=11	PER @ -57 dBm	≤-49
SISO Receive Sensitivity (11ax,80MHz) @10% PER	- MCS=0	PER @ -84 dBm	≤-68
	- MCS=11	PER @ -54 dBm	≤-46
Maximum Input Level	802.11a/n: -30 dBm		
Antenna Reference	Small antennas with 0~2 dBi peak gain		

1. 2.4G,5G output power control by firmware power by rate table.

15GHz(20MHz) Channel table

Band range	Operating Channel Numbers	Channel center frequencies(MHz)
5150MHz~5250MHz	36	5180
	40	5200
	44	5220
	48	5240
5250MHz~5350MHz	52	5260
	56	5280
	60	5300
	64	5320
5470MHz~5725MHz	100	5500
	104	5520
	108	5540
	112	5560
	116	5580
	120	5600
	124	5620
	128	5640
	132	5660
	136	5680
	140	5700
5725MHz~5850MHz	149	5745
	153	5765
	157	5785
	161	5805
	165	5825

Note: The Wi-Fi RF specification data will be updated in future version.

4.3 Bluetooth Specification

Feature	Description
General Specification	
Bluetooth Standard	BDR,EDR(1Mbps & 2Mbps & 3Mbps),LE(1Mbps),2LE(2Mbps)
Host Interface	UART
Frequency Band	2400 MHz ~ 2483.5 MHz
Number of Channels	79 channels for classic,40 channels for BLE
Modulation	GFSK, $\pi/4$ -DQPSK,8DPSK
RF Specification	
Output Power , tolerance ± 3 dB	
	CL1(dBm)
BDR Output Power	5
EDR Output Power	5
BLE Output Power	5
Sensitivity, tolerance : /	
Sensitivity @ BER=0.1% for GFSK (1Mbps)	-92
Sensitivity @ BER=0.01% for $\pi/4$ -DQPSK (2Mbps)	-86
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)	-85
Sensitivity @ BLE=30.8% for LE (1Mbps)	-95
Sensitivity @ BLE=30.8% for 2LE (2Mbps)	-93
Maximum Input Level	GFSK (1Mbps):-20dBm
	$\pi/4$ -DQPSK (2Mbps) :-20dBm
	8DPSK (3Mbps) :-20dBm

Note: The Bluetooth Specification may updated in future version.

5. ID setting information

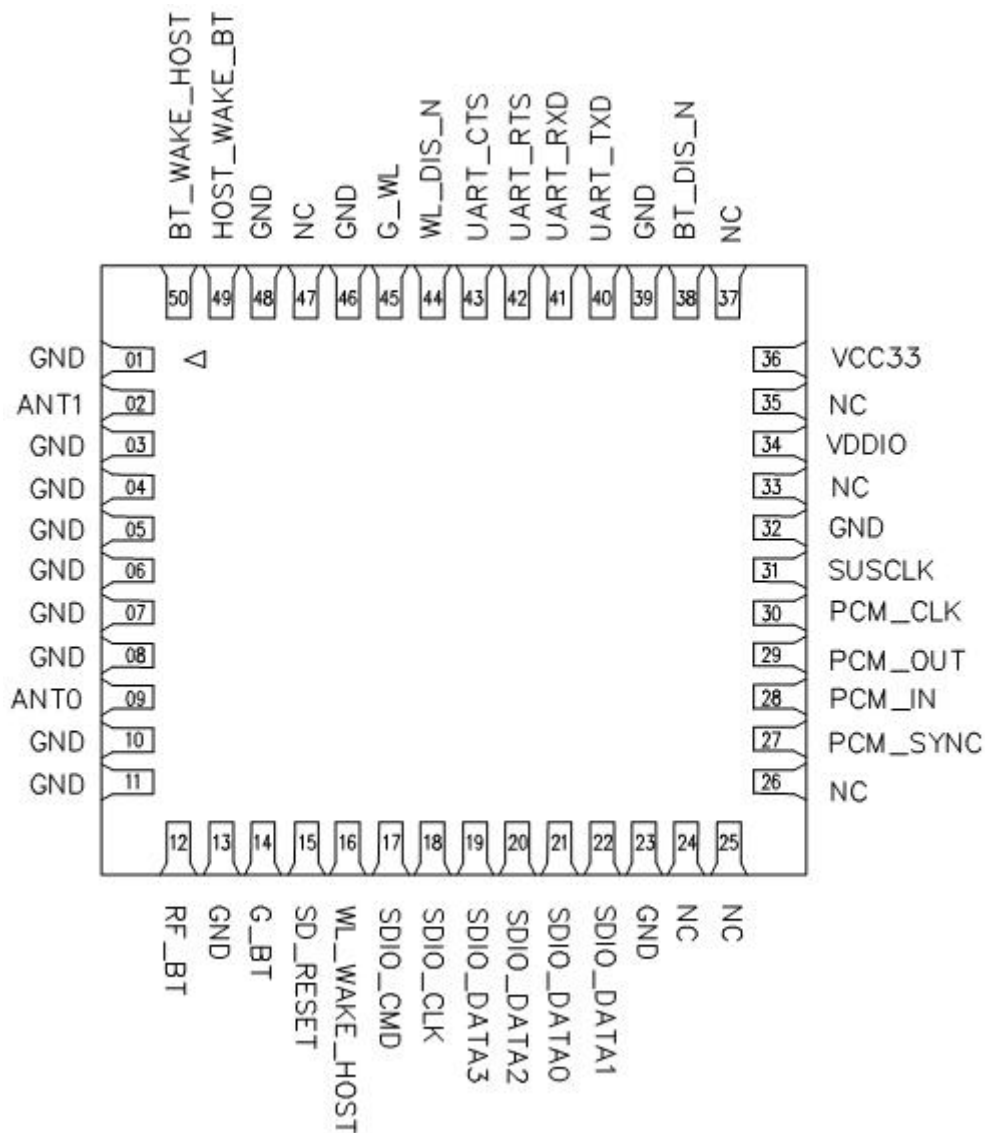
WI-FI

Vendor ID	024C
Product ID	B852

6. Pin Definition

6.1 Pin Outline

< TOP VIEW >



6.2 Pin Definition details

NO.	Name	Type	Description	Voltage
1	GND	—	Ground connections	
2	ANT1	I/O	RF I/O port chain1, dual band Wi-Fi	
3	GND	—	Ground connections	
4	GND	—	Ground connections	
5	GND	—	Ground connections	
6	GND	—	Ground connections	
7	GND	—	Ground connections	
8	GND	—	Ground connections	
9	ANT0	I/O	RF I/O port chain0, dual band Wi-Fi	
10	GND	—	Ground connections	
11	GND	—	Ground connections	
12	BT_TRX	I/O	BT RF I/O port	
13	GND	—	Ground connections	
14	G_BT	I/O/PD	GPIO5. G_BT If not used keep NC. Do not connect to GND.	VDDIO
15	SD_RESET	I/PU	Reset Pin for SDIO interface ON: pull high; OFF: pull low Low for disable SDIO interface	VDDIO
16	WL_WAKE_HOST	O	GPIO10. WLAN to wake-up HOST	VDDIO
17	SDIO_CMD	I/O	SDIO command line	VDDIO
18	SDIO_CLK	I/O	SDIO clock line	VDDIO
19	SDIO_DATA3	I/O	SDIO data line 3	VDDIO
20	SDIO_DATA2	I/O	SDIO data line 2	VDDIO
21	SDIO_DATA0	I/O	SDIO data line 0	VDDIO
22	SDIO_DATA1	I/O	SDIO data line 1	VDDIO
23	GND	—	Ground connections	
24	NC	—	No connect	
25	NC	—	No connect	
26	NC	—	No connect	
27	PCM_SYNC	I/O	PCM sync signal	VDDIO
28	PCM_IN	I	PCM data input	VDDIO
29	PCM_OUT	O	PCM Data output	VDDIO
30	PCM_CLK	I/O	PCM clock	VDDIO

31	SUSCLK	I/PD	External Low Power Clock input (32.768KHz) If not used keep NC	
32	GND	—	Ground connections	
33	NC	—	No connect	
34	VDDIO	P	I/O Voltage supply input 1.8V or 3.3V	1.8V or 3.3V
35	NC	—	No connect	
36	VCC33	P	Main power voltage source input 3.3V	3.3V
37	NC	—	No connect	
38	BT_DIS_N	I/PU	Enable pin for Bluetooth device ON: pull high; OFF: pull low External pull low to shut down BT, recommended 10K pull high.	VDDIO
39	GND	—	Ground connections	
40	UART_TXD	O	Bluetooth UART interface	VDDIO
41	UART_RXD	I	Bluetooth UART interface	VDDIO
42	UART_RTS	O	Bluetooth UART interface	VDDIO
43	UART_CTS	I	Bluetooth UART interface	VDDIO
44	WL_DIS_N	—	Enable pin for WLAN Radio ON: pull high; OFF: pull low External pull low to disable WLAN Radio	VDDIO
45	G_WL	I/O/PD	GPIO4, G_WL If not used keep NC. Do not pull high on this pin.	VDDIO
46	GND	—	Ground connections	
47	NC	—	No connect	
48	GND	—	Ground connections	
49	HOST_WAKE_BT	I	HOST wake-up Bluetooth device	VDDIO
50	BT_WAKE_HOST	O	Bluetooth device to wake-up HOST	VDDIO

P:POWER I:INPUT O:OUTPUT VDDIO:3.3V

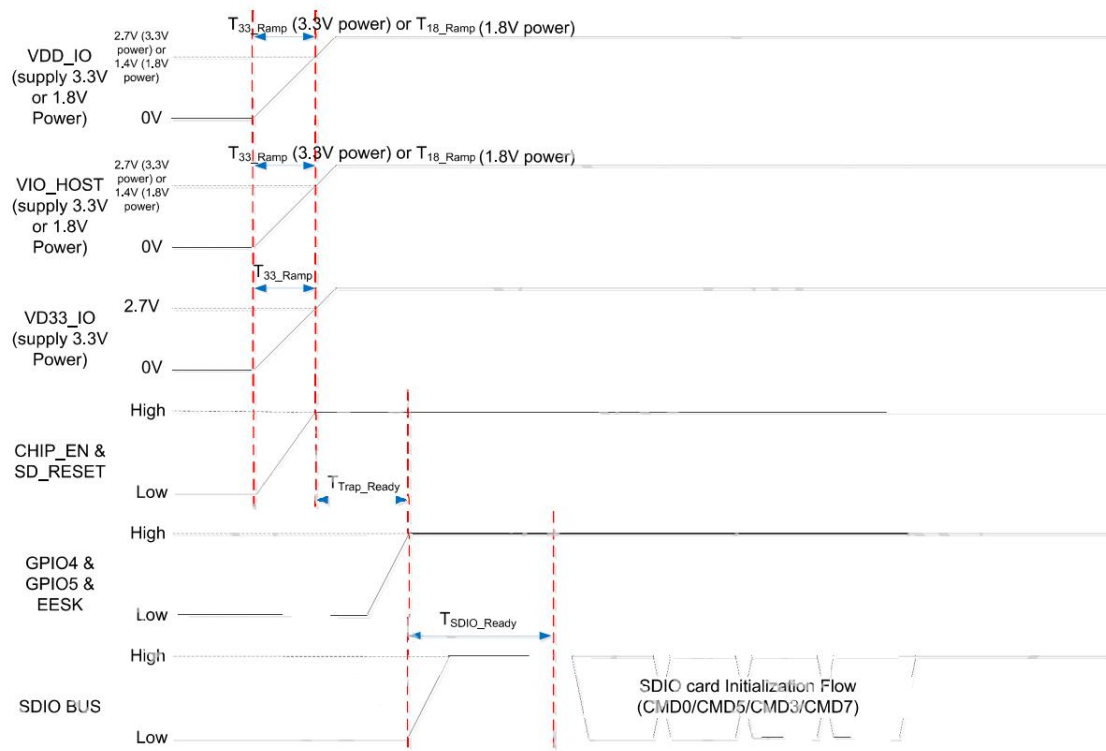
7. Electrical Specifications

7.1 Power Supply DC Characteristics

	Min.	Typ.	Max.	Unit
Operating Temperature	0	25	70	deg.C
VCC33	3.15	3.3	3.6	V
VDDIO (3.3V)	-	3.3	3.6	V
VDDIO (1.8V)	1.62	1.8	1.98	V

7.2 Interface Circuit time series

7.2.1 Power on sequence



	Min.	Typical	Max.	Unit	Description
T18_Ramp	0.5	1.5	5	ms	The 1.8V power ramp up duration.
T33_Ramp	0.5	1.5	5	ms	The 3.3V power ramp up duration.
TTrap_Ready	400	500	X	ms	WLAN eFuse autoload. TTrap_Ready = 500ms (Typical)
TSDIO_Ready	10	20	X	ms	SDIO Not Ready Duration. In this state, the RTL8852BS may respond to commands without the ready bit being set. After the ready bit is set, the host will initiate complete card detection procedure.

7.2.2 SDIO Pin Description

Module supports SDIO version 3.0. SDIO Pin Description as below.

SDIO Pin Description

SD 4-Bit Mode	
DATA0	Data Line 0
DATA1	Data Line 1 or Interrupt
DATA2	Data Line 2 or Read Wait
DATA3	Data Line 3
CLK	Clock
CMD	Command Line

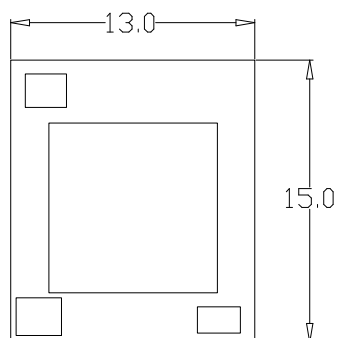
7.2.3 SDIO Timing Diagram

For timing criteria, please check specification in “SD specification Part1 Physical Layer Specification Version 3.01”

8. Size reference

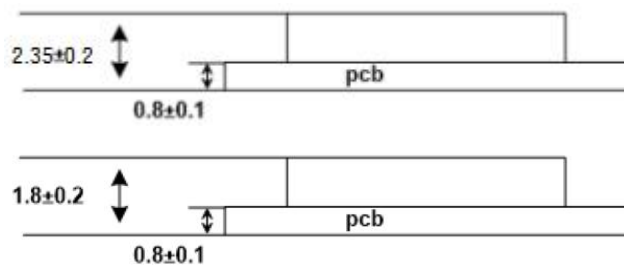
8.1 Module Picture

L x W : 15 x 13 (+0.3/-0.1) mm



With shielding H: 2.35 (± 0.2) mm

No shielding H: 1.8 (± 0.2) mm



Weight

With shielding: 0.8g

No shielding: 0.67g

8.2 Marking Description



备注：

二维码内容：112233445566;FG6252BSRB-03

1. Fn-Link 商标 logo
2. 机型：6252B-SRB
3. 二维码：编码规则为“wifi mac 地址;成品料号”

例如：112233445566;FG6252BSRB-03（MAC 地址以实际为准。）

-----BT MAC 在 WIFI MAC 基础上+1（WIFI 地址需跳 1，不能与 BT 地址重复），二维码中不显示此内容。

4.V/N 03（V/N 到 03 之间是两个空格，03 为成品料号后缀，与二维码右对齐）

5.屏蔽盖镭雕丝印居中放置。



备注：

二维码内容：112233445566;FG6252BSRB-01

1. 二维码：编码规则为“wifi mac 地址;成品料号”

例如：112233445566;FG6252BSRB-01（MAC 地址以实际为准）。

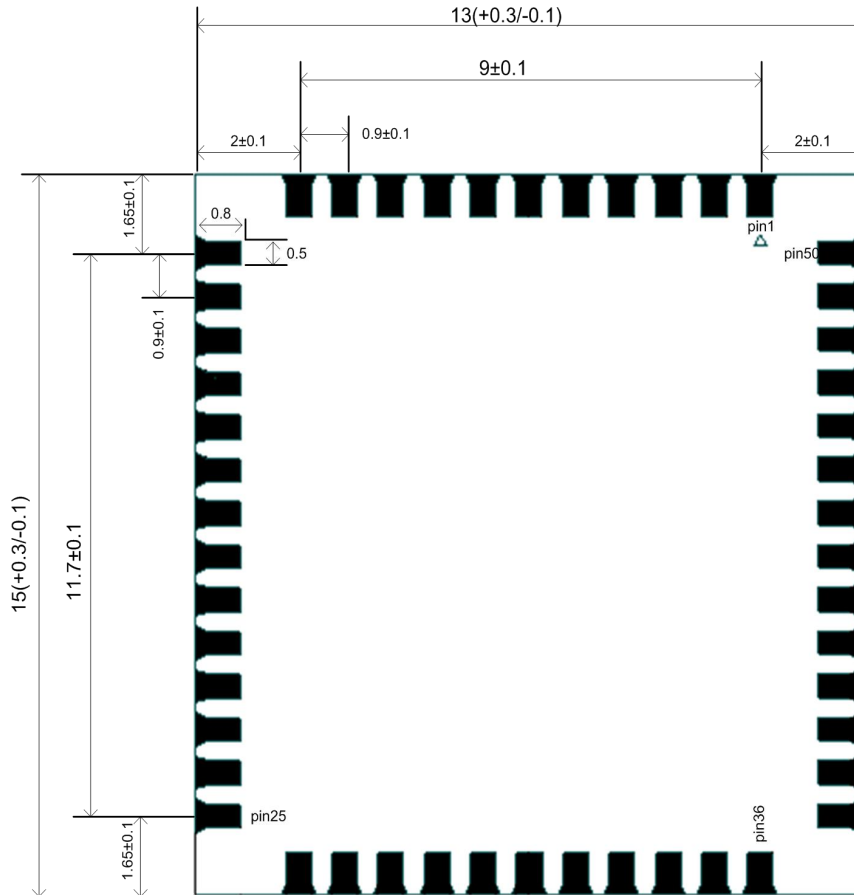
-----BT MAC 在 WIFI MAC 基础上+1（WIFI 地址需跳 1，不能与 BT 地址重复），二维码中不显示此内容。

8.3 List of certified information

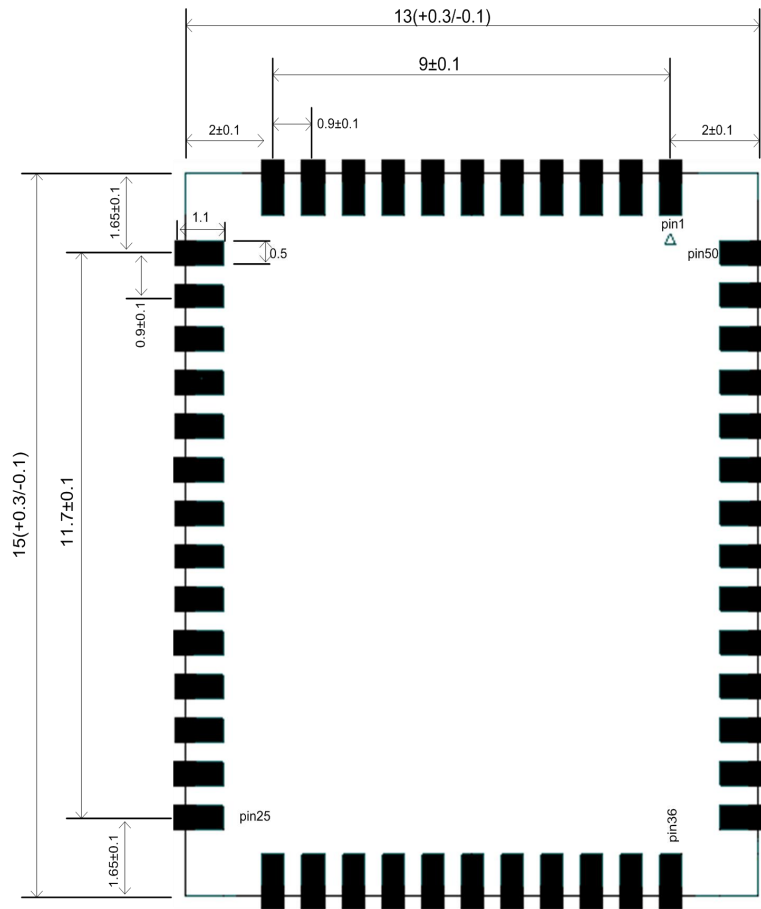
Certification project	Certificate number
SRRC	CMIIT ID:23J43T23A001
FCC	TBD
CE	TBD
IC	TBD
NCC	TBD
KCC	TBD
TELEC	TBD
Brazil	TBD

8.4 Physical Dimensions

<TOP View>



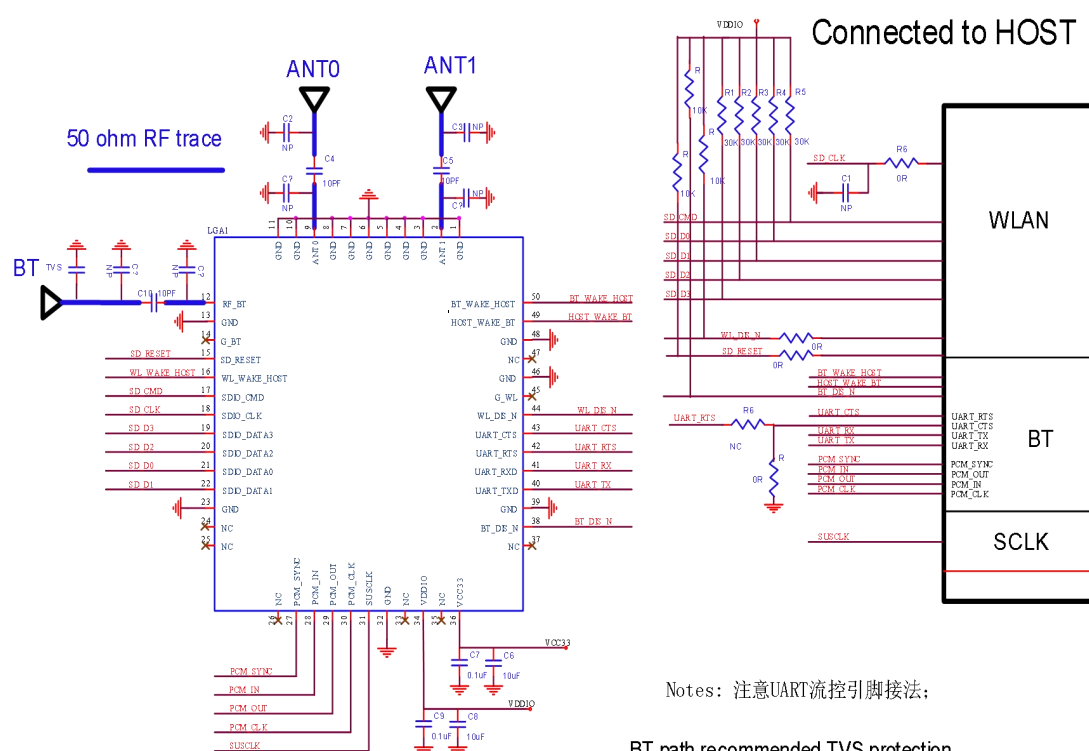
8.5 Layout Recommendation



9. The Key Material List

Chipset	RTL8852BS-CG	Realtek
PCB	13x15-0.8mm, FR4, 4 LAYER, GREEN	XY-PCB, GDKX, Sunlord, SLPCB, TRULY
Crystal	2016 40MHz ±10ppm	ECEC, TKD, Hosonic, JWT, TXC
Inductor	2016 1.0uH, ±20%	Sunlord, Ceaiya, Cenker, Chilisin, INPAQ
Inductor	0603 2.2UH, ±10%	Sunlord, Ceaiya, Cenker, Chilisin, INPAQ
Diplexer	1608 Dual-band, dual-mode 2.4GHz/5GHz WLAN	Glead, Walsin, ACX, Murata, MAG.LAYERS, TDK, FTR
Shielding	6252BA-SR-V1.0, 屏蔽盖	信太, 精力通, 卓益

10. Reference Design



BT antenna only for 3antenna type module application.

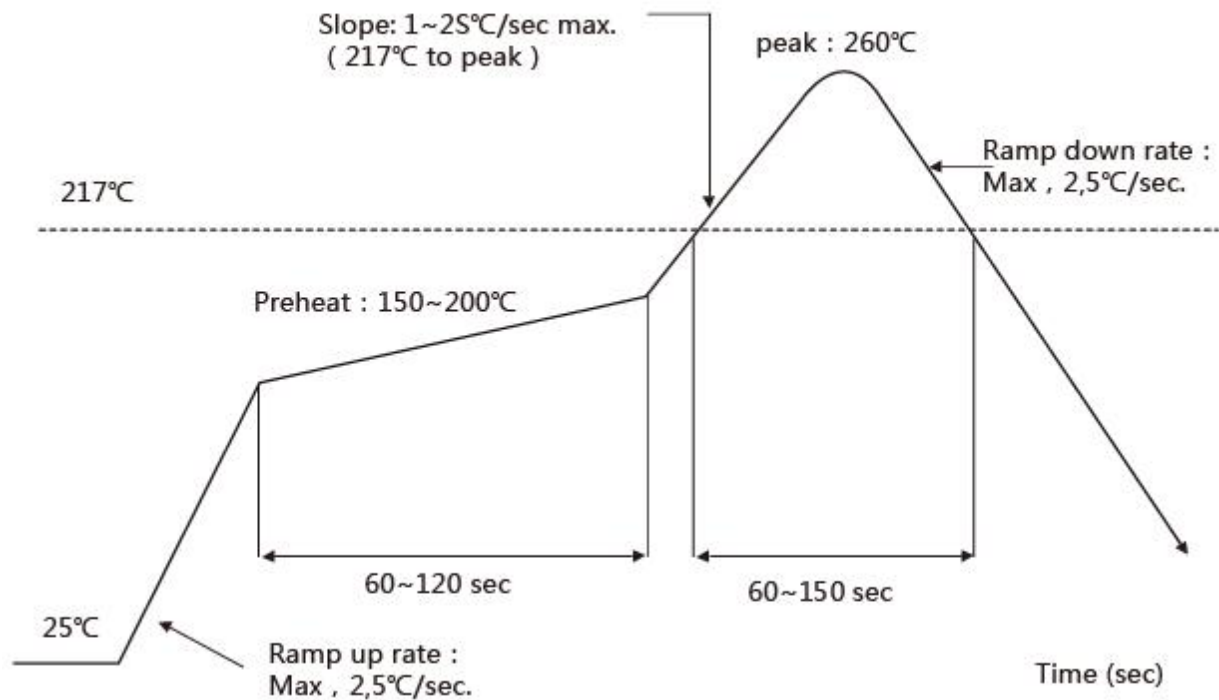
11. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : $<260^{\circ}\text{C}$

Time within 5°C of peak temperature: $\geq 10\text{s}$

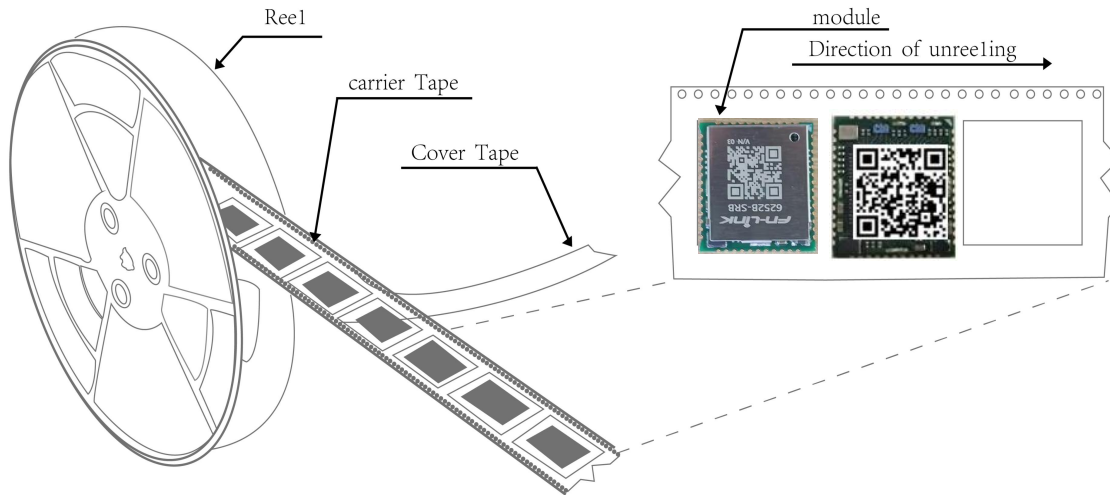
Number of Times : ≤ 2 times



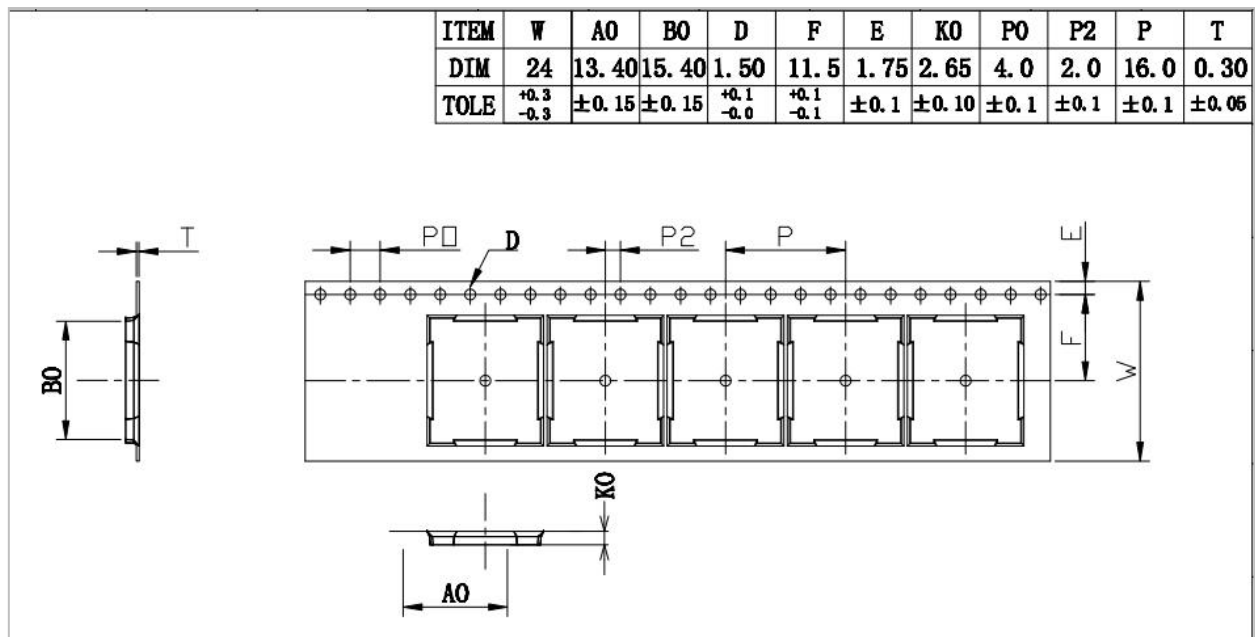
12. Package

12.1 Reel

A roll of 1500pcs

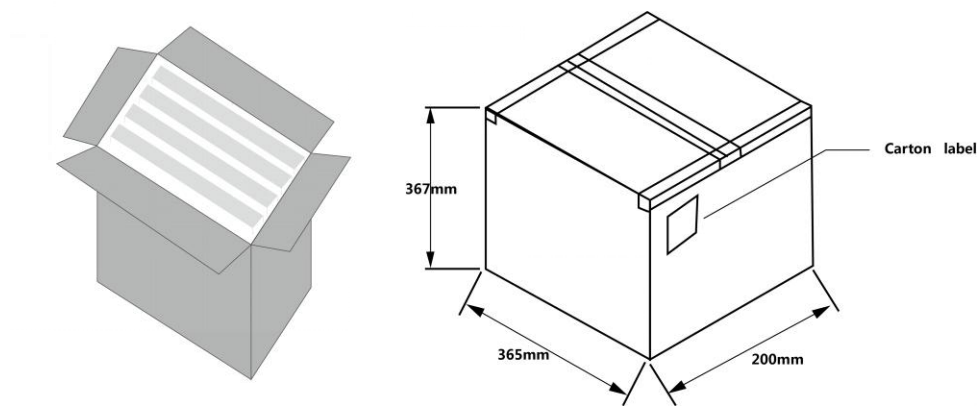
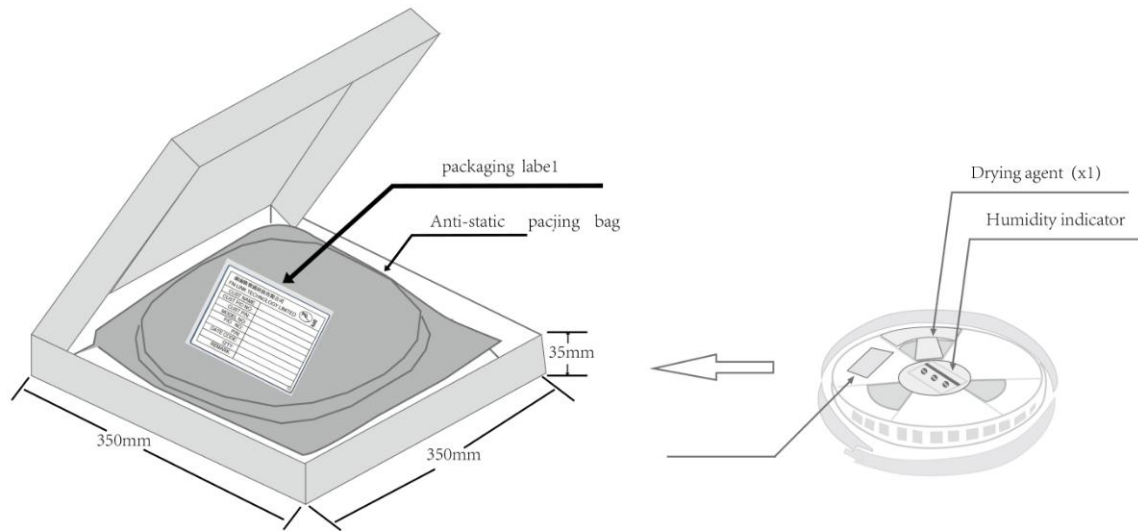


12.2 Carrier Tape Detail



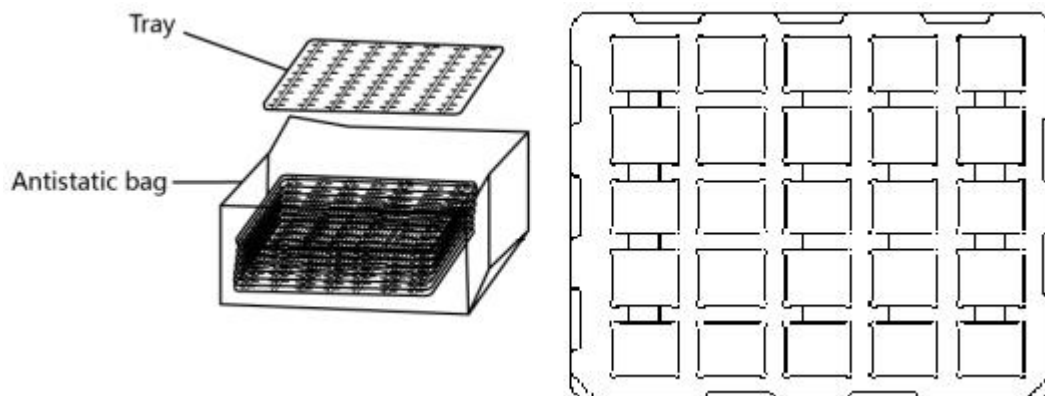
12.3 Packaging Detail

the take-up package



12.4 Tray

Use pallet packaging for less than 300 pieces



13. Moisture sensitivity

The Modules is a Moisture Sensitive Device level 3, in according with standard IPC/JEDEC J-STD-020, take care all the relatives requirements for using this kind of components.

Moreover, the customer has to take care of the following conditions:

- a) Calculated shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH).
- b) Environmental condition during the production: 30°C / 60% RH according to IPC/JEDEC J-STD-033A paragraph 5.
- c) The maximum time between the opening of the sealed bag and the reflow process must be 168 hours if condition b) “IPC/JEDEC J-STD-033A paragraph 5.2” is respected
- d) Baking is required if conditions b) or c) are not respected
- e) Baking is required if the humidity indicator inside the bag indicates 10% RH or more