

PRODUCT SPECIFICATION

6252B-UUB

Wi-Fi Dual-band 2T2R + Bluetooth 5.2

Combo Module

Version:v1.3



6252B-UUB Module Datasheet

Ordering Information	Part NO.	Description
	FG6252BUUB-00	RTL8852BU-VS-CG,a/b/g/n/ac/ax,BLE5.2,2T2R,15X13mm,USB2.0

Customer: _____

Customer P/N: _____

Signature: _____

Date: _____

Office: 14th floor, Block B, phoenix zhigu, Xixiang Street, Baoan District, Shenzhen

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1. General Description

1.1 Introduction

The 6252B-UUB is a highly integrated module that support 2-stream 802.11ax solutions with Multi-user MIMO (Multiple-Input, Multiple-Output) with Wireless LAN (WLAN) and integrated Bluetooth 5 USB network interface controller. It combines a WLAN MAC, a 2T2R capable WLAN baseband, and RF in a single chip. The RTL8852BU-VS-CG provides a complete solution for a high-performance integrated wireless and Bluetooth device.

This compact module is a total solution for a combination of Wi-Fi + BT technologies. The module is specifically developed for Smart phones and Portable devices.

1.2 Description

Model Name	6252B-UUB
Product Description	Support Wi-Fi/Bluetooth functionalities
Dimension	L x W x H: 13 x 15 x 2.3 mm
Wi-Fi Interface	Support USB 2.0
BT Interface	USB 2.0
OS supported	Android /Linux/ iOS /WIN10
Operating temperature	-10°C to 70°C
Storage temperature	-40°C to 85°C

2. Features

General

- Support 802.11ac 2x2, Wave-2 compliant with RX MU-MIMO
- Backward compatible with 802.11a/n/ac devices while operating at 802.11ax data rates.
- IEEE 802.11a/b/g/n/ac/ax compatible WLAN
- IEEE 802.11i (WPA, WPA2, WPA3). Open, shared key, and pair-wise key authentication services
- IEEE 802.11ax MIMO OFDM/OFDMA, IEEE 802.11ac MIMO OFDM, IEEE 802.11n MIMO OFDM

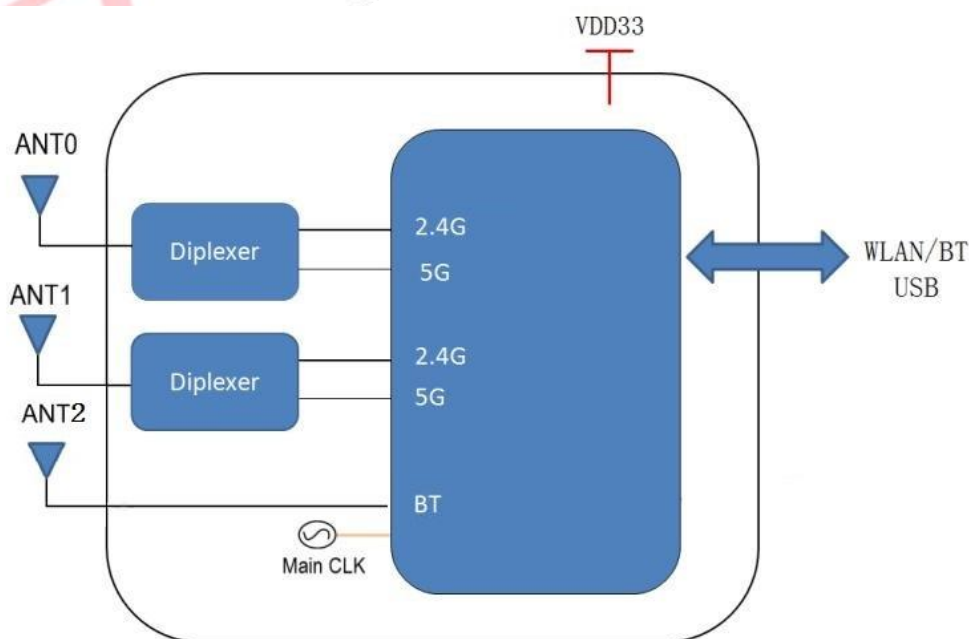
PHY Features

- CMOS MAC, Baseband PHY and RF in a single chip for IEEE 802.11a/b/g/n/ac/ax compatible WLAN
- Maximum PHY data rate up to 286.8 Mbps using 20MHz bandwidth, 573.5Mbps using 40MHz bandwidth, and 1201Mbps using 80MHz bandwidth

Bluetooth Features

- Complies with USB2.0 for WLAN and BT controller
- Compatible with Bluetooth v2.1+EDR
- Support Bluetooth 5 system (BT 5.2 Logo Compliant)
- Dual Mode support: Simultaneous LE and BR/EDR

3. Block Diagram



4. General Specification

4.1 2.4GHz RF 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	802.11b /11Mbps : 19dBm ± 2 dB	EVM ≤ -10dB
	802.11g /54Mbps : 18dBm ± 2 dB	EVM ≤ -25dB
	802.11n /MCS7 : 17dBm ± 2 dB	EVM ≤ -28dB
	802.11ac VHT20/MCS8: 16dBm ± 2 dB	EVM ≤ -30dB
	802.11ac VHT40/MCS9: 15dBm ± 2 dB	EVM ≤ -32dB
	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	≤-85
	- MCS=8, PER @ -64 dBm	≤-62
SISO Receive Sensitivity (11ac,40MHz) @10% PER	- MCS=0, PER @ -87 dBm	≤-82
	- MCS=9, PER @ -59 dBm	≤-57
SISO Receive Sensitivity (11ax,20MHz) @10% PER	- MCS=0, PER @ -90 dBm	≤-85
	- MCS=11, PER @ -60 dBm	≤-55
SISO Receive Sensitivity (11ax,40MHz) @10% PER	- MCS=0, PER @ -87 dBm	≤-82
	- MCS=11, PER @ -57 dBm	≤-52
Maximum Input Level	802.11b : -10 dBm	
	802.11g/n : -20 dBm	
Antenna Reference	Small antennas with 0~2 dBi peak gain	

Note: The RF specification will be updated in future version

4.2 5GHz RF Specification

Feature	Description		
WLAN Standard	IEEE 802.11a/n/ac/ax, Wi-Fi compliant		
Frequency Range	5.150 GHz ~ 5.850 GHz (5.0 GHz Band)		
Number of Channels	5.0GHz: Please see the table1		
Test Items	Typical Value	EVM	
Output Power	802.11a 54Mbps: 18 ± 2 dBm	EVM ≤ -25dB	
	802.11n MCS7: 17 ± 2 dBm	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 VHT20/MCS11: 13 dBm ± 2 dB	EVM ≤ -35dB	
	802.11ax VHT40/MCS11: 13 dBm ± 2 dB	EVM ≤ -35dB	
Receive Sensitivity (11a,20MHz) @10% PER	- 6Mbps PER @ -89 dBm, typical	≤-85	
	- 54Mbps PER @ -71 dBm, typical	≤-68	
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -89 dBm, typical	≤-85	
	- MCS=7 PER @ -69 dBm, typical	≤-67	
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0 PER @ -87 dBm, typical	≤-82	
	- MCS=7 PER @ -67 dBm, typical	≤-64	
Receive Sensitivity (11ac,20MHz) @10% PER	- MCS=0 PER @ -90 dBm, typical	≤-85	
	- MCS=8 PER @ -66 dBm, typical	≤-62	
Receive Sensitivity (11ac,40MHz) @10% PER	- MCS=0 PER @ -87 dBm, typical	≤-82	
	- MCS=9 PER @ -63 dBm, typical	≤-57	
Receive Sensitivity (11ac,80MHz) @10% PER	- MCS=0 PER @ -84 dBm, typical	≤-79	
	- MCS=9 PER @ -62 dBm, typical	≤-54	
Receive Sensitivity (11ax,20MHz) @10% PER	- MCS=0 PER @ -90 dBm, typical	≤-85	
	- MCS=11 PER @ -60 dBm, typical	≤-55	
Receive Sensitivity (11ax,40MHz) @10% PER	- MCS=0 PER @ -87dBm, typical	≤-82	
	- MCS=11 PER @ -57 dBm, typical	≤-52	
Receive Sensitivity (11ax,80MHz) @10% PER	- MCS=0 PER @ -84 dBm, typical	≤-79	
	- MCS=11 PER @ -54 dBm, typical	≤-49	
Maximum input level	802.11a/n: -30 dBm		
	802.11ac: -30 dBm		
	802.11ax: -30 dBm		

Antenna Reference

Small antennas with 0~2 dBi peak gain

Note: The RF specification will be updated in future version

15GHz(20MHz) Channel table

Band range	Operating Channel Numbers	Channelcenter frequencies(MHz)
5180MHz~5240MHz	36	5180
	40	5200
	44	5220
	48	5240
5260MHz~5320MHz	52	5260
	56	5280
	60	5300
	64	5320
5550MHz~5700MHz	100	5500
	104	5520
	108	5540
	112	5560
	116	5580
	120	5600
	124	5620
	128	5640
	132	5660
	136	5680
	140	5700
	5745MHz~5825MHz	149
153		5765
157		5785
161		5805
165		5825

4.3 Bluetooth Specification

Feature	Description		
General Specification			
Bluetooth Standard	Bluetooth V5.2 of 1, 2 and 3 Mbps.		
Host Interface	USB		
Antenna Reference	Small antennas with 0~2 dBi peak gain		
Frequency Band	2402 MHz ~ 2480 MHz		
Number of Channels	79 channels		
Modulation	GFSK, $\pi/4$ -DQPSK, 8-DPSK		
RF Specification			
	Min(dBm)	Typical(dBm)	Max(dBm)
Output Power (Class 1)	2	5	8
Sensitivity @ BER=0.1% for GFSK (1Mbps)		-82	
Sensitivity @ BER=0.01% for $\pi/4$ -DQPSK (2Mbps)		-80	
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)		-80	
Maximum Input Level	GFSK (1Mbps):-20dBm		
	$\pi/4$ -DQPSK (2Mbps) :-20dBm		
	8DPSK (3Mbps) :-20dBm		

Note: The RF specification will be updated in future version

5. ID setting information

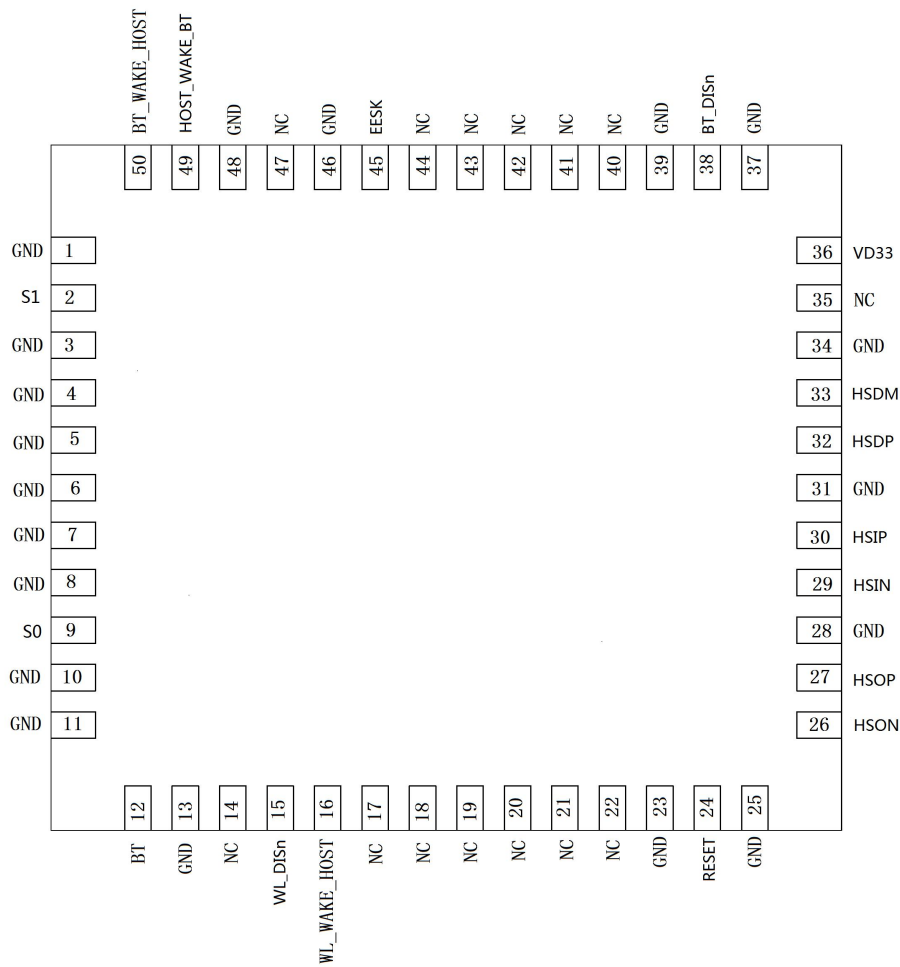
WI-FI

Vendor ID	0BDA
Product ID	A85B

6. Pin Definition

6.1 Pin Outline

< TOP VIEW >



6.2 Pin Definition details

NO.	Name	Type	Description	Voltage
1	GND		Ground connections	
2	S1	I/O	RF I/O 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	S0	I/O	RF I/O chain0, dual band Wi-Fi	
10	GND		Ground connections	
11	GND		Ground connections	
12	BT		RF BT	
13	GND		Ground connections	
14	NC		Floating (NC)	
15	WL_DISn	I	Enable pin for WLAN device ON: pull high ; OFF: pull low	VDDIO
16	WL_WAKE_HOST	O	WLAN to wake up HOST	VDDIO
17	NC		Floating (NC)	
18	NC		Floating (NC)	
19	NC		Floating (NC)	
20	NC		Floating (NC)	
21	NC		Floating (NC)	
22	NC		Floating (NC)	
23	GND		Ground connections	
24	RESET	I/O	Enable pin for chipset. Pull low to shut down RTL8852BU. (Internal 47Kohm pull-high to 3.3V)	VDDIO
25	GND		Ground connections	
26	HS0N		USB 3.0 Transmit Differential Pair	
27	HS0P		USB 3.0 Transmit Differential Pair	
28	GND		Ground connections	
29	HS1N		USB 3.0 Receive Differential Pair	
30	HS1P		USB 3.0 Receive Differential Pair	
31	GND		Ground connections	
32	HSDP	I/O	USB2.0 differential pair D+	
33	HSDM	I/O	USB2.0 differential pair D-	
34	GND		Ground connections	
35	NC		Floating (NC)	
36	VD33	P	Main power input 3.3V	3.3V
37	GND		Ground connections	
38	BT_DISn		Enable pin for BT device	

			ON: pull high ; OFF: pull low	
39	GND		Ground connections	
40	NC		Floating (NC)	
41	NC		Floating (NC)	
42	NC		Floating (NC)	
43	NC		Floating (NC)	
44	NC		Floating (NC)	
45	EESK		BT FW log	
46	GND		Ground connections	
47	NC		Floating (NC)	
48	GND		Ground connections	
49	HOST_WAKE_BT	I	Host to wake up Bluetooth device	VDDIO
50	BT_WAKE_HOST	O	Bluetooth device to wake up host.	VDDIO

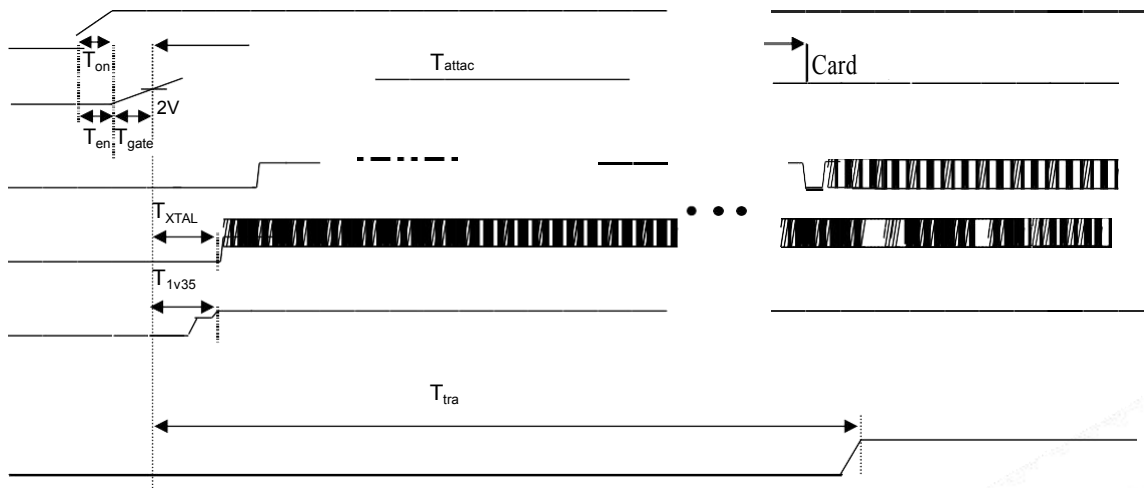
P:POWER I:INPUT O:OUTPUT VDDIO:3.3V

7. Electrical Specifications

7.1 Power Supply DC Characteristics

	MIN	TYP	MAX	Unit
Operating Temperature	-10	25	70	deg.C
VCC33	3.0	3.3	3.6	V

7.2 USB Bus during power on Sequence



T_{on}: The main power ramp up duration

T_{en}: Interval between the rising point of 3.3V and chip_en

T_{gate}: Interval of 3.3V to be gated when chip_en voltage level < 2V

T_{attach}: USB attach state. The duration from resistor attached to USB host starting card detection procedure

T_{xtal}: XTAL starts

T_{trap}: Power on trap duration. In back of this duration if pull high GPIO4, GPIO5 and EESK are necessary.

Power on Flow Description

After the main 3.3V ramp up, the internal power on reset is released by the power ready detection circuit and the power management unit is enabled. The power management unit enables the internal regulator and clock circuits.

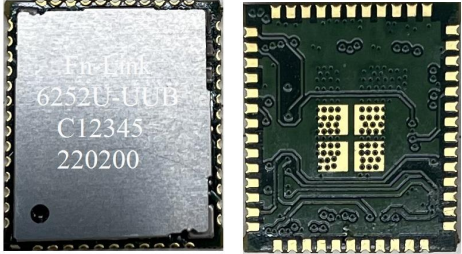
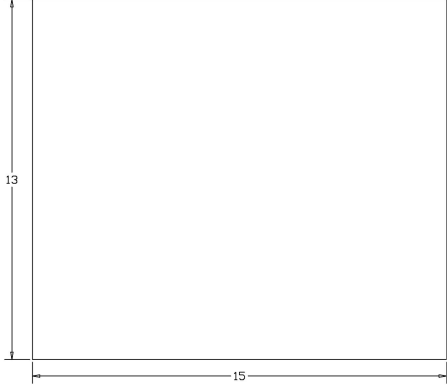
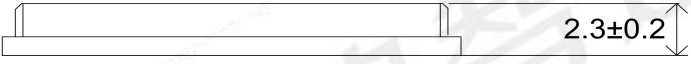
The power management unit also enables the USB circuits.

USB analog circuits attach resistors to indicate the insertion of the USB device.

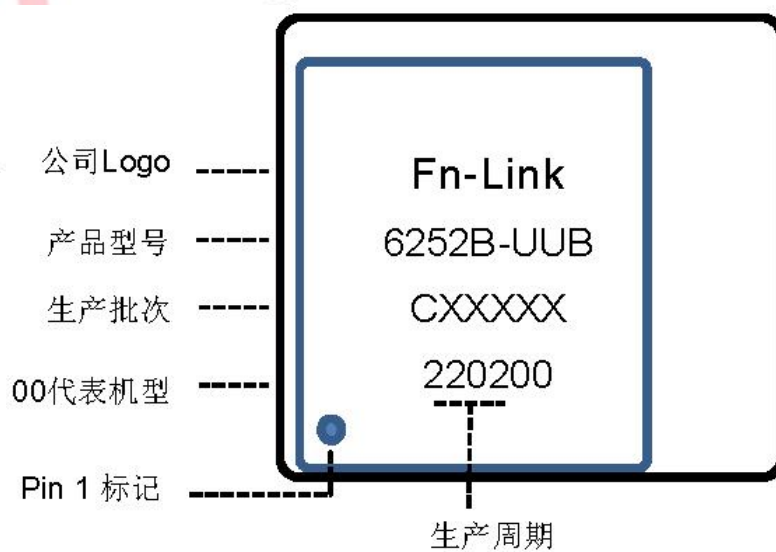
	Unit	Min.	Typical	Max.
T_{on}	ms	-	1.5	5
T_{en}	ms	0	0	5
T_{gate}	ms	0	1.5	8
T_{attach}	ms	100	250	-
T_{xtal}	ms	-	1.5	8
T_{1v35}	ms	-	3	11
T_{trap}	ms	400	500	-

8. Size reference

8.1 Module Picture

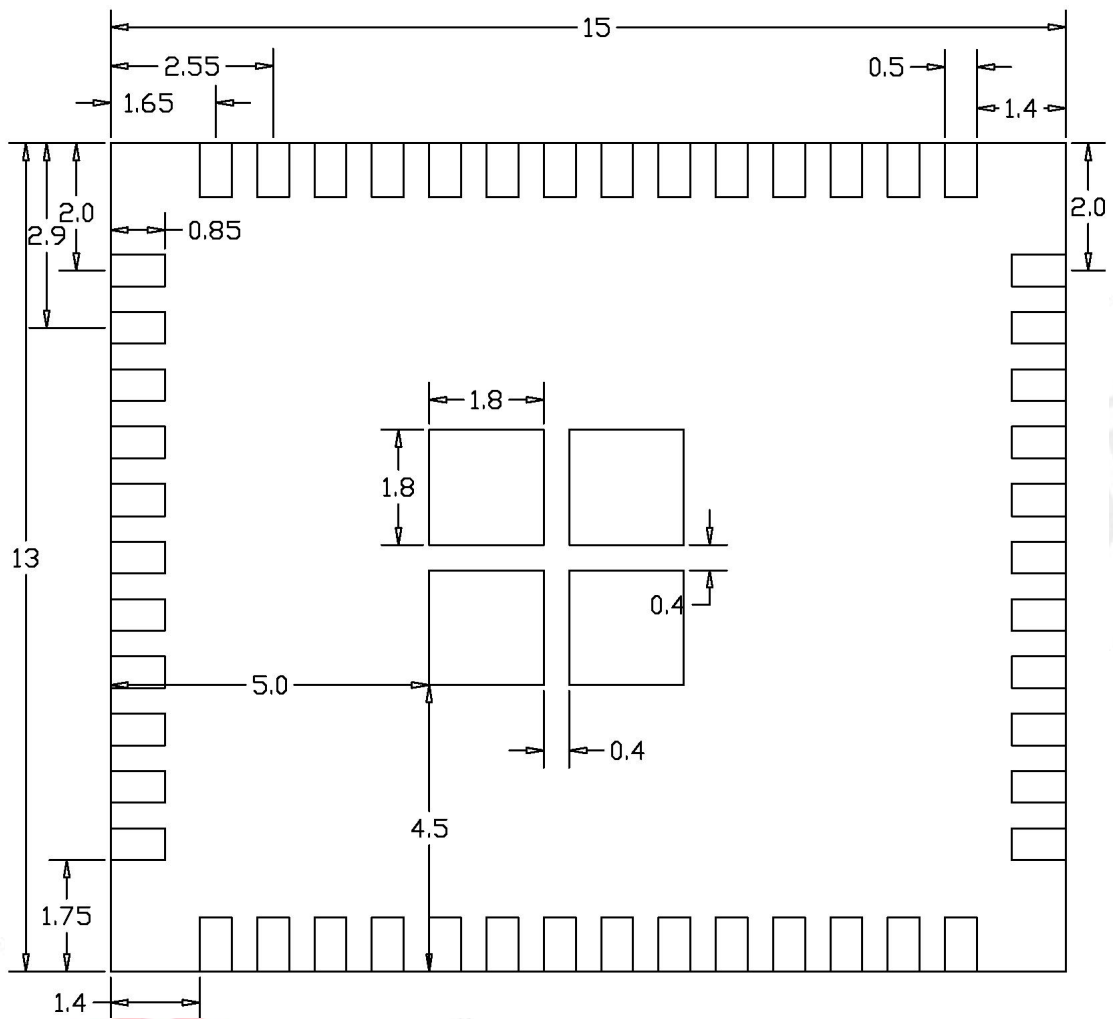
<p>L x W : 13 x 15 (+0.3/-0.1) mm</p> 	
<p>H: 2.3 (±0.2) mm</p>	
<p>Weight</p>	<p>0.91g</p>

8.2 Marking Description

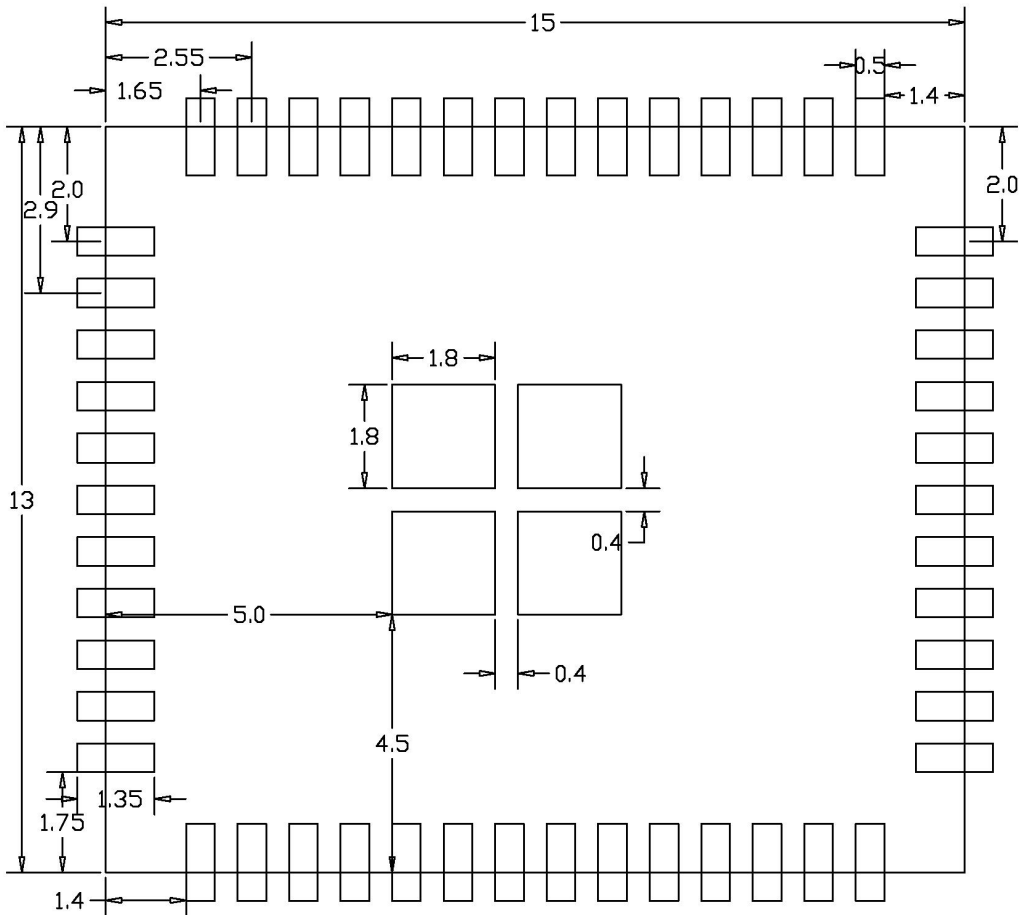


8.3 Physical Dimensions

<TOP View>



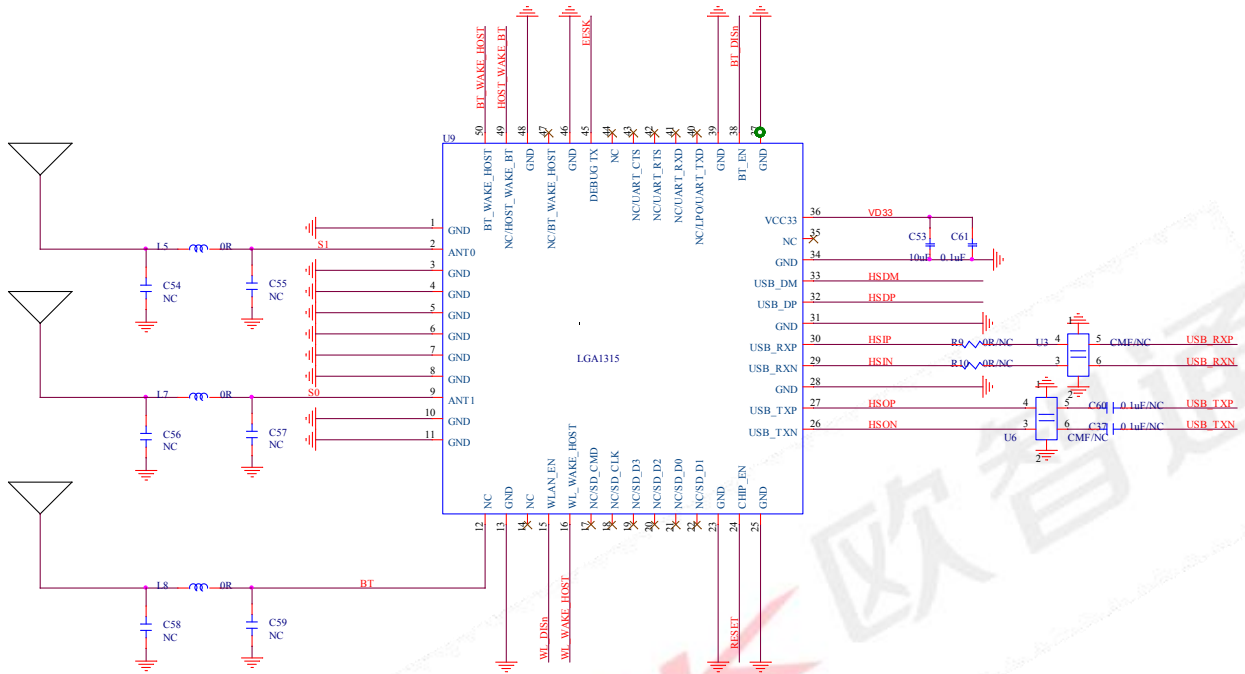
8.4 Layout Recommendation



9. The Key Material List

Item	Part Name	Description	Manufacturer
1	PCB	6252B-UUB 深绿色,4L,15X13X0.8mm	XY-PCB, GDKX, Sunlord, SLPCB KX-PCB,
2	Crystal	2016 40MHz ±10ppm 12pF	ECEC, Hosonic, TKD, JWT
3	Chipset	RTL8852BU-VS-CG QFN-76	Realtek
4	Shielding	6252B-UUB Shielding	信太, 精力通

10. Reference Design

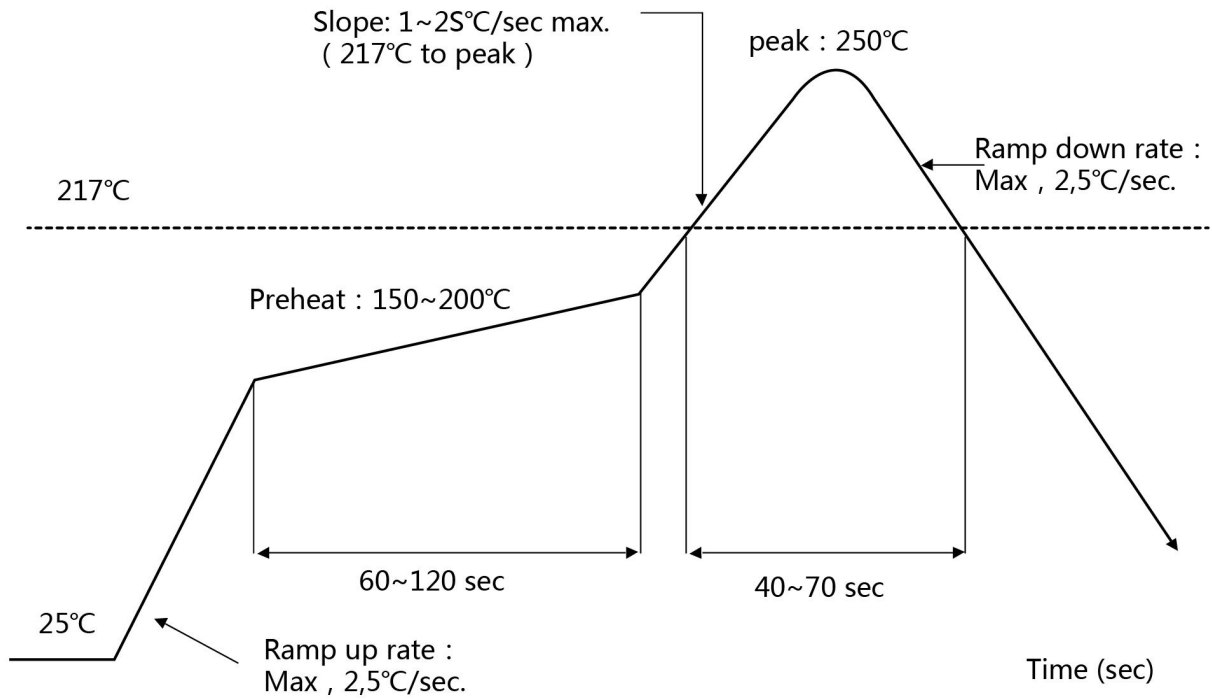


11. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <math><250^{\circ}\text{C}</math>

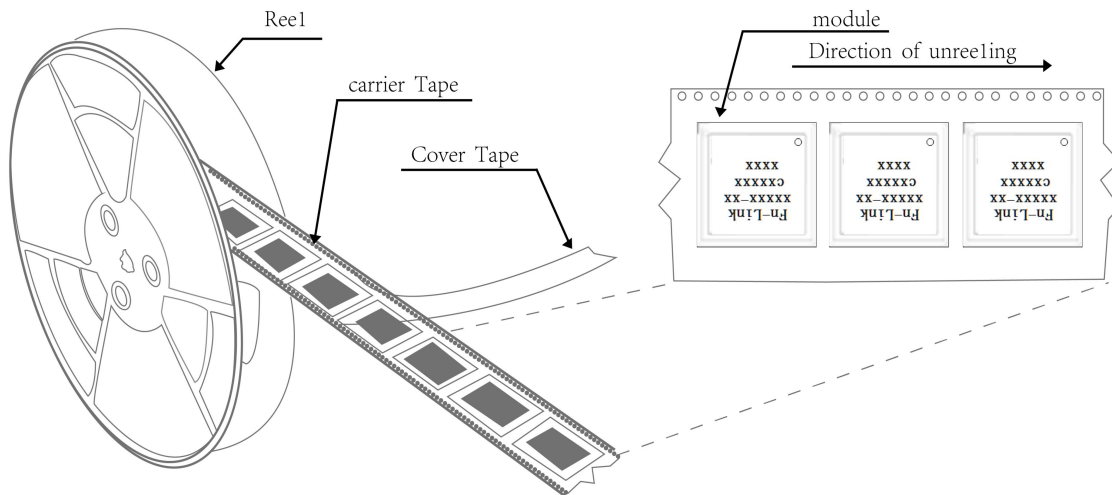
Number of Times : ≤ 2 times



12. Package

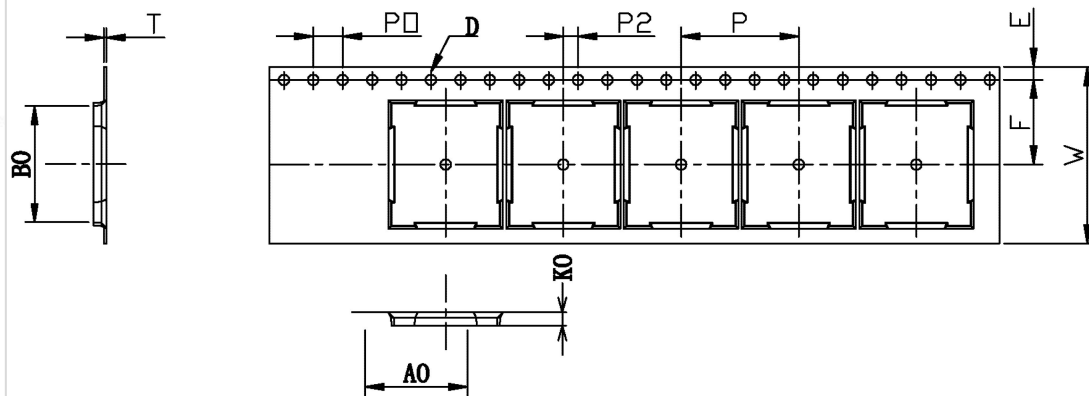
12.1 Reel

A roll of 1500pcs



12.2 Carrier Tape Detail

ITEM	W	A0	B0	D	F	E	K0	P0	P2	P	T
DIM	24	13.40	15.40	1.50	11.5	1.75	2.65	4.0	2.0	16.0	0.30
TOLE	+0.3 -0.3	±0.15	±0.15	+0.1 -0.0	+0.1 -0.1	±0.1	±0.10	±0.1	±0.1	±0.1	±0.05



12.3 Packaging Detail

the take-up package



Using self-adhesive tape

Size of black tape: 24mm*24.4m the cover tape :21.3mm*32.6m

Color of plastic disc: blue



NY bag size:450mm*415mm



size : 350*350*35mm



The packing case size:360*210*370mmg

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 <math><40^{\circ}\text{C}</math> and <math><90\%</math> relative humidity (RH)
- b) Environmental condition during the production: - c) The maximum time between the opening of the sealed bag and the reflow process must be 168 hours if condition
- d) "IPC/JEDEC J-STD-033A paragraph 5.2" is respected
- e) Baking is required if conditions b) or c) are not respected
- f) Baking is required if the humidity indicator inside the bag indicates 10% RH or more