FN-LINK 欧智通

PRODUCT SPECIFICATION

6223H-SRD

Wi-Fi Single-band 1x1 + Bluetooth 4.2 Combo Module

Version: v1.0

6223H-SRD Module Datasheet

	Part NO.	Description
Ordering Information	FG6223HSRD-00	RTL8723DS,b/g/n,Wi-Fi+BT4.2,1T1R,18X20mm,SDIO+Uart with shielding,PCB V1.0

Customer: _____

Customer P/N:_____

Signature:_____

Date:_____

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

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CONTENTS

Revision History

Version	Date	Contents of Revision Change	Draft	Checked	Approved
V1.0	2022/02/24	New version	FC	Tzq	Qjp

1. General Description

1.1 Introduction

6223H-SRD is a high-performance WiFi & BT dual-mode transparent transmission module based on RTL8723DS-CG scheme. The module WiFi supports IEEE 802.11b/g/n standard, BT part supports br / EDR 4.2 standard and ble4 0. The WiFi part integrates WLAN Mac, 1t1r baseband and and WLAN RF, supports 40m bandwidth, and the physical rate can be up to 150Mbps; BT part integrates BT protocol stack, BT baseband and BT RF. The data transmission interface supports sdio1 1 / 2.0 interface and hs-uart interface. It is suitable for many application scenarios such as smart home, smart building, smart security, smart medicine, industrial Internet of things and so on.

1.2 Description

Model Name	6223H-SRD
Product Description	Support Wi-Fi/Bluetooth functionalities
Dimension	L x W x H: 18 x 20 x2.5 mm
Wi-Fi Interface	Support SDIO2.0
BT Interface	UART
OS supported	Android /Linux/ Win CE /iOS /XP/WIN7/WIN10
Operating temperature	0°C to 70°C
Storage temperature	-40°C to 85°C

2. Features

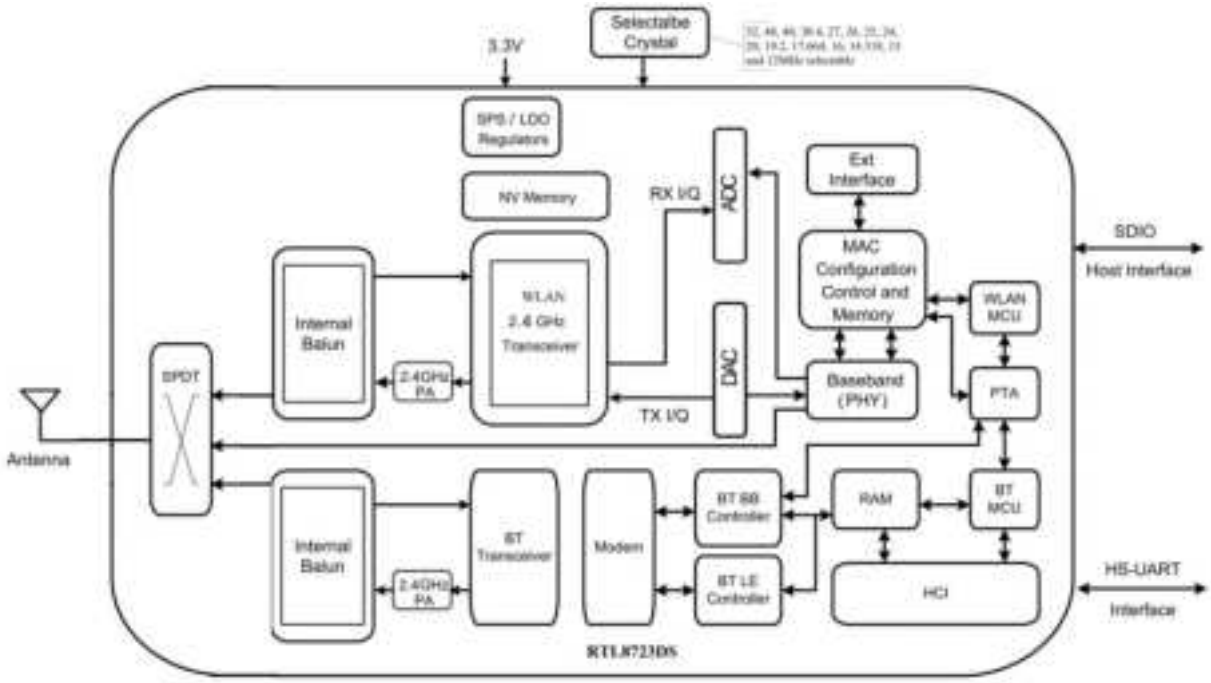
General Features

- Support 20M and 40M bandwidth
- 2.4~2.4835GHz ISM band，supporting IEEE 802.11b/g/n
- 1T1R，Maximum physical rate150Mbps（40MHz bandwidth）
- support 802.11i（WPA，WPA2），802.11e QoS Enhancement（WMM）

Host Interface

- WLAN support SDIO Interface

3. Block Diagram



4. General Specification

4.1 2.4GHZ RF Specification

Feature	Description	
WLAN Standard	IEEE 802.11 b/g/n Wi-Fi compliant	
Frequency Range	2.400 GHz ~ 2.4835 GHz (2.4 GHz ISM Band)	
Number of Channels	2.4GHz：Ch1 ~ Ch11	
Test Items	**Typical Value**	**EVM**
Output Power	802.11b /11Mbps : 18dBm ± 2 dB	EVM ≤ -10dB
	802.11g /54Mbps : 18dBm ± 2 dB	EVM ≤ -25dB
	802.11n /MCS7 : 18dBm ± 2 dB	EVM ≤ -28dB
Spectrum Mask	Meet with IEEE standard	
Freq. Tolerance	±20ppm	
Test Items	**TYP Test Value**	**Standard Value**
Receive Sensitivity (11b,20MHz) @8% PER	- 11Mbps PER @ -87 dBm	≤-76
Receive Sensitivity (11g,20MHz) @10% PER	- 54Mbps PER @ -73 dBm	≤-65
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=7 PER @ -70 dBm	≤-64
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=7, PER @ -67 dBm	≤-61

4.2 Bluetooth Specification

Feature	Description		
General Specification			
Bluetooth Standard	Bluetooth 2.1/4.2；v4.2 BR/EDR，v4.0 BLE		
Host Interface	UART		
Frequency Band	2402 MHz ~ 2480 MHz		
Number of Channels	79 channels		
Modulation	GFSK, π/4-DQPSK, 8-DPSK		
RF Specification			
	Min(dBm)	**Typical**(dBm)	**Max**(dBm)
Output Power (BR/EDR/BLE)		7.9	
Sensitivity @ BER=0.1% for GFSK (1Mbps)		-86	
Sensitivity @ BER=0.01% for π/4-DQPSK (2Mbps)		-78	
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)		-75	
Sensitivity @PER=30.8% FOR BLE		-95	
Maximum Input Level	GFSK (1Mbps):-20dBm		
	π/4-DQPSK (2Mbps) :-20dBm		
	8DPSK (3Mbps) :-20dBm		

5. ID setting information

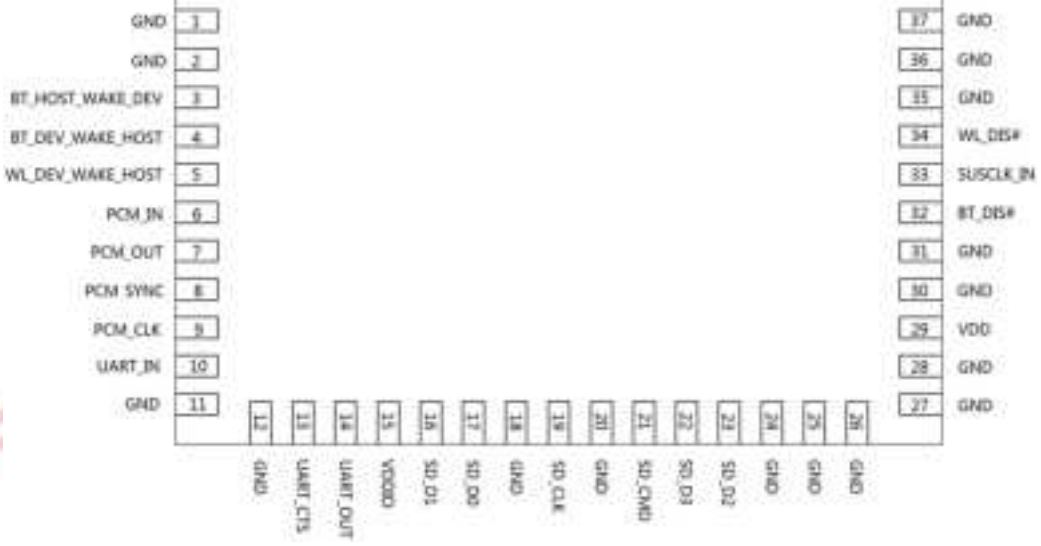
WI-FI

Vendor ID	-
Product ID	-

6. Pin Definition

6.1 Pin Outline

< TOP VIEW >



6.2 Pin Definition details

NO.	Name	Type	Description	Voltage
1	GND		Ground connections	
2	GND		Ground connections	
3	BT_HOST_WAKE_DEV	I	BT host wake-up device	
4	BT_DEV_WAKE_HOST	O	BT device wake-up host	
5	WL_DEV_WAKE_HOST	I	WiFi device wake-up host	
6	PCM_IN	I	PCM Input	VDDIO
7	PCM_OUT	O	PCM Output	VDDIO
8	PCM_SYNC	O	PCM Sync	VDDIO

9	PCM_CLK	I/O	PCM Clock	VDDIO
10	UART_IN	I	UART Input	VDDIO
11	GND		Ground connections	
12	UART_RTS	O	UART_RTS	
13	UART_CTS	I	UART_CTS	VDDIO
14	UART_OUT	O	UART Output	VDDIO
15	VDDIO		IO 口电源	
16	SD_D1	I/O	SDIO data line 1	
17	SD_D0	I/O	SDIO data line 0	
18	GND		Ground connections	
19	SD_CLK	I	SDIO clock line	
20	GND		Ground connections	
21	SD_CMD	I/O	SDIO command line	
22	SD_D3	I/O	SDIO data line 3	
23	SD_D2	I/O	SDIO data line 2	
24	GND		Ground connections	
25	GND		Ground connections	
26	GND		Ground connections	
27	GND		Ground connections	
28	GND		Ground connections	
29	VDD			
30	GND		Ground connections	
31	GND		Ground connections	
32	BT_DIS#	I	Pull high: ON , Pull low: OFF External pull low can disable BT	3.3V
33	SUSCLK_IN	I	External Clock input(32.768kHz). Can keep NC.	
34	WL_DIS#	I	Pull high: ON , Pull low: OFF External pull low can disable WL	3.3V
35	GND		Ground connections	
36	GND		Ground connections	
37	GND		Ground connections	

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	3.0	3.3	3.6	V
VDDIO	1.62	1.8 or 3.3	3.6	V

7.2 Power Consumption

Power Consumption (Typical by using SWR)	Wi-Fi only: TBD

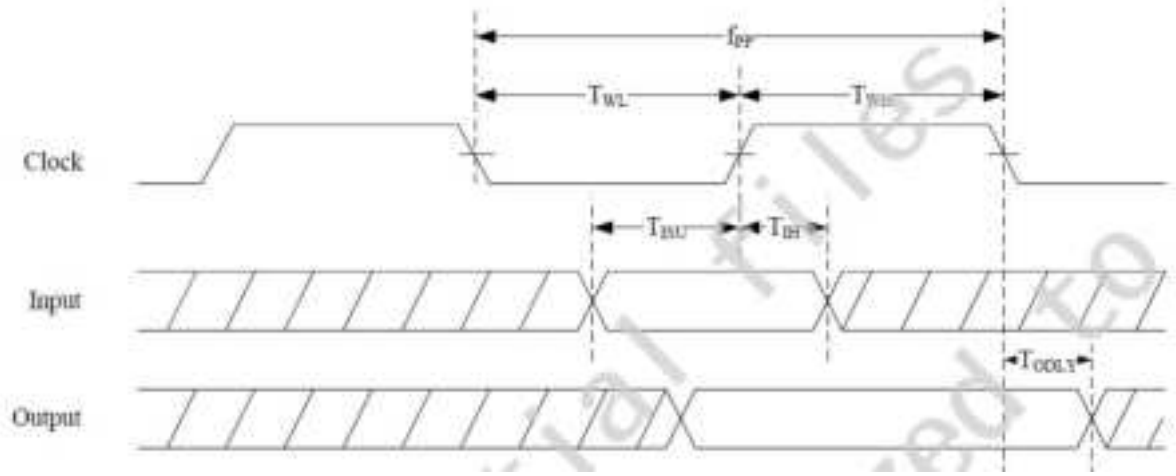
7.3 Interface Circuit time series

7.3.1 SDIO interface features

PIN4 BT_DEV_WAKE_HOSTD suggests to do drop-down processing，When the module is powered on, the low-level holding time shall be ≥ 200ms。

SDIO routing requirements:1. SDIO CLK routing shall surround the ground wire and be far away from CMD and data routing; 2. The number of via of SDIO routing layer shall be less than 4; 3. The length error of each routing line of SDIO shall be less than + / - 100mil, and the total length shall be less than 2.5inches;

SDIO interface characteristic requirements:



NO	Parameter	Mode	MIN	MAX	Unit
f_{PP}	Clock Frequency	Default	0	25	MHz
		HS	0	50	MHz
T_{WL}	Clock Low Time	DEF	10	-	ns
		HS	7	-	ns
T_{WH}	Clock High Time	DEF	10	-	ns
		HS	7	-	ns
T_{ISU}	Input Setup Time	DEF	5	-	ns
		HS	6	-	ns
T_{IH}	Input Hold Time	DEF	5	-	ns
		HS	2	-	ns
T_{ODLY}	Output Delay Time	DEF	-	14	ns
		HS	-	14	ns

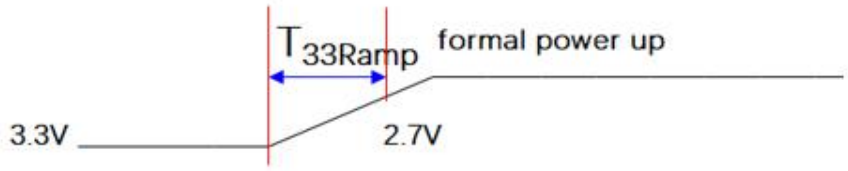
7.3.2 SDIO Power-on sequence

	Min	Typical	Max	Unit
T33ramp	0.2	0.5	2.5	ms
T18ramp	0.2	0.5	2.5	ms
Tnon-rdy	1	2	10	ms

Symbol	Description
T_{33ramp}	The 3.3V main power ramp up duration.
T_{18ramp}	The 1.8V main power ramp up duration.
T_{non_rdy}	SDIO Not Ready Duration. In this state, the RTL8723DS may respond to commands without the ready bit being set. After the ready bit is set, the host will initiate complete card detection procedure.

7.3.2 module power-on&off time sequence

	Min	Typical	Max	Unit
T33 power on ramp	0.2	0.5	2.5	ms
T33 power off ramp	0.2	5	10	ms



Note:

1.上下电时序请满足表格要求；

The power up ramp and power down ramp must meet the following table.

2.上下电过程如有较长时间中间电压停留都会有几率导致 efuse 被窜写；

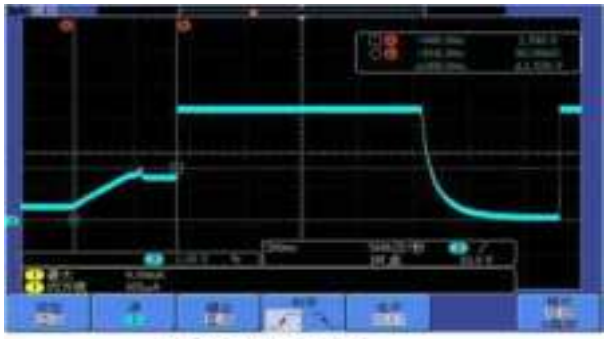
If climbing process for a long time during power-on and power-off , It may cause efuse to be overwritten.

3.建议主芯片上电完成后，再给模组上电；

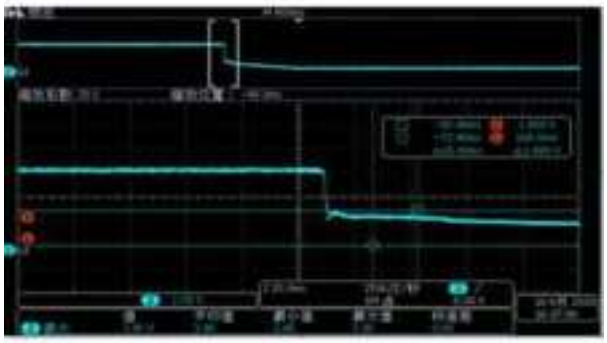
it is recommended to power on the module after platform side.

4.如有下图所示异常上下电时序，务必做相应调整符合时序规格；

If your power on/off timing as below shown, must modify to meet the timing specification.



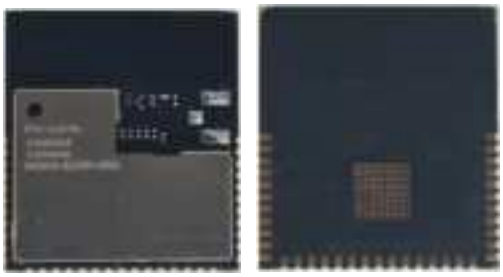
异常上电时序



异常下电时序

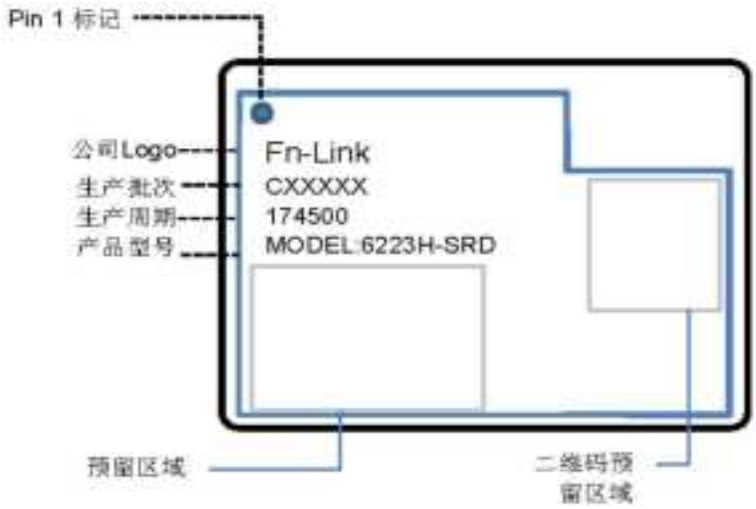
8. Size reference

8.1 Module Picture

L x W : 18 x 20 (+0.3/-0.1) mm 	
H: 2.5 (±0.2) mm	
Weight	1.25g

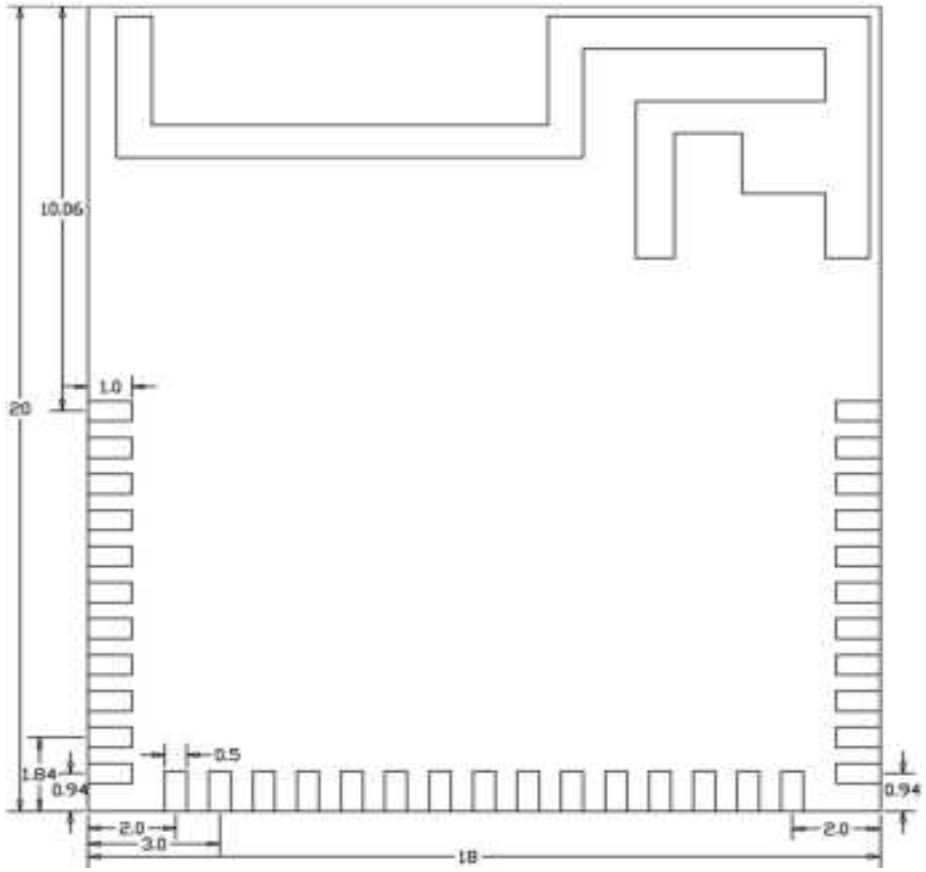
8.2 Marking Description

< TOP VIEW >

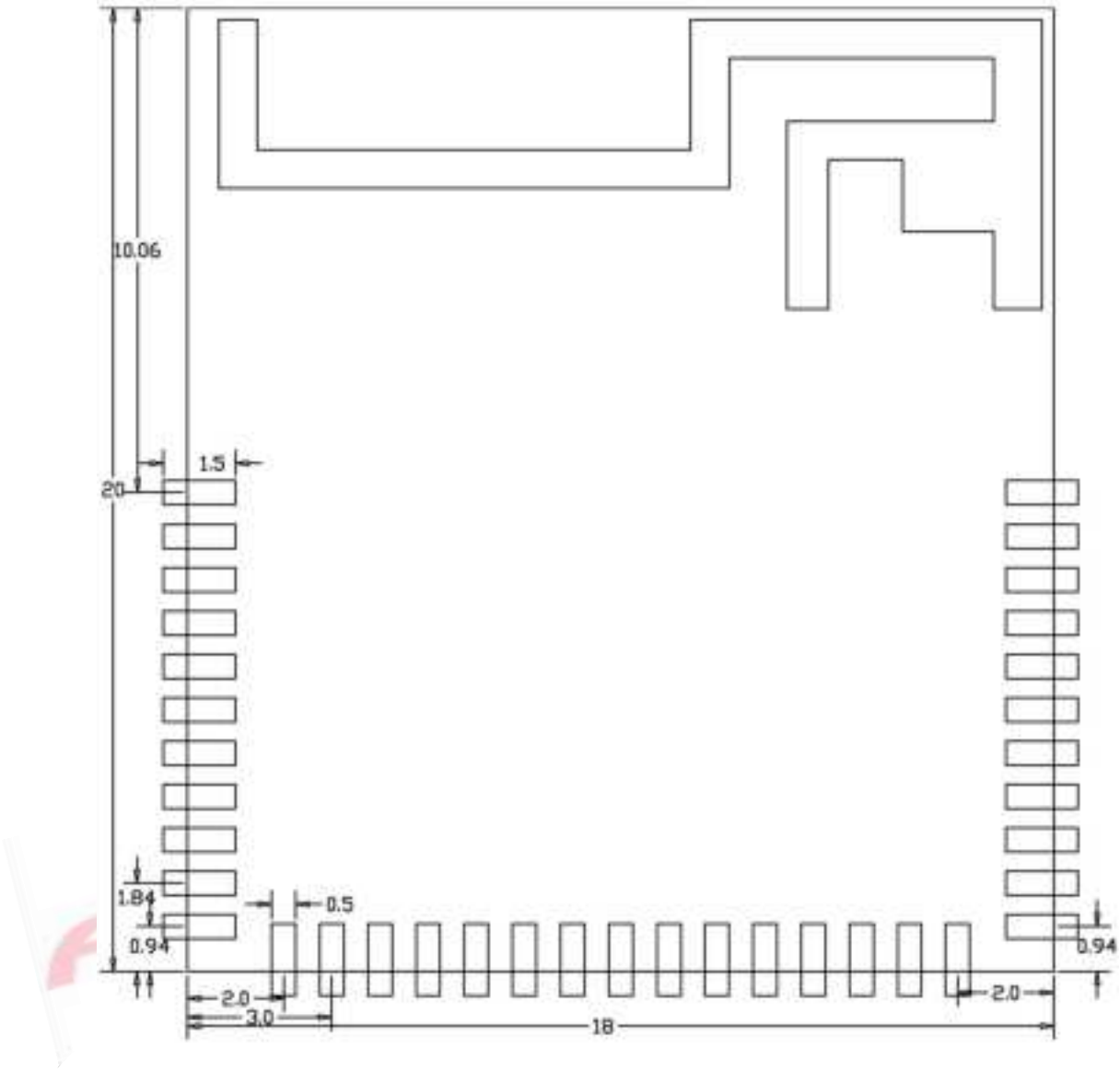


8.3 Physical Dimensions

<TOP View>



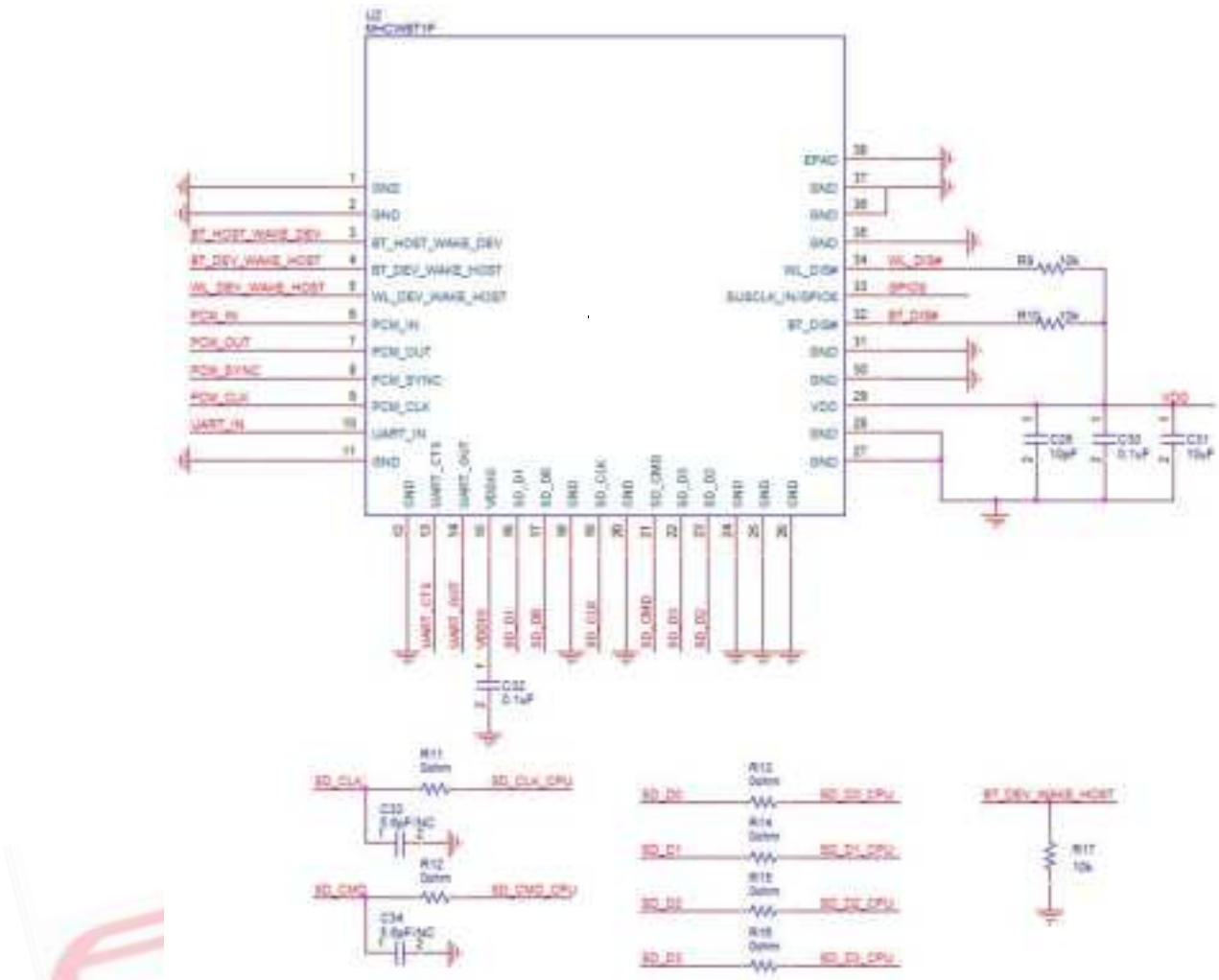
8.4 Layout Recommendation



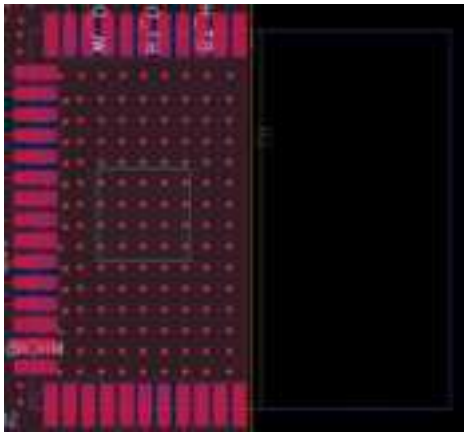
9. The Key Material List

Item	Part Name	Description	Manufacturer
1	PCB	6223H-SRD 4L,FR4,18X20X0.8mm	XY-PCB, GDKX, Sunlord, SLPCB
2	Crystal	2520 24MHz 10pF ±10ppm	ECEC, Hosonic, TKD, JWT
3	Chipset	RTL8723DS-CG QFN48	Realtek
4	Shielding	6223H-SRD Shielding	信太，精力通

10. Reference Design



Design requirements for the relative position between mhcwbt1p-b onboard antenna and the backplane: the module pin is placed close to the edge of the backplane, as shown in the figure below:



Note：1. The distance between the module peripheral device pad and the module pad shall be at least greater than 1mm.

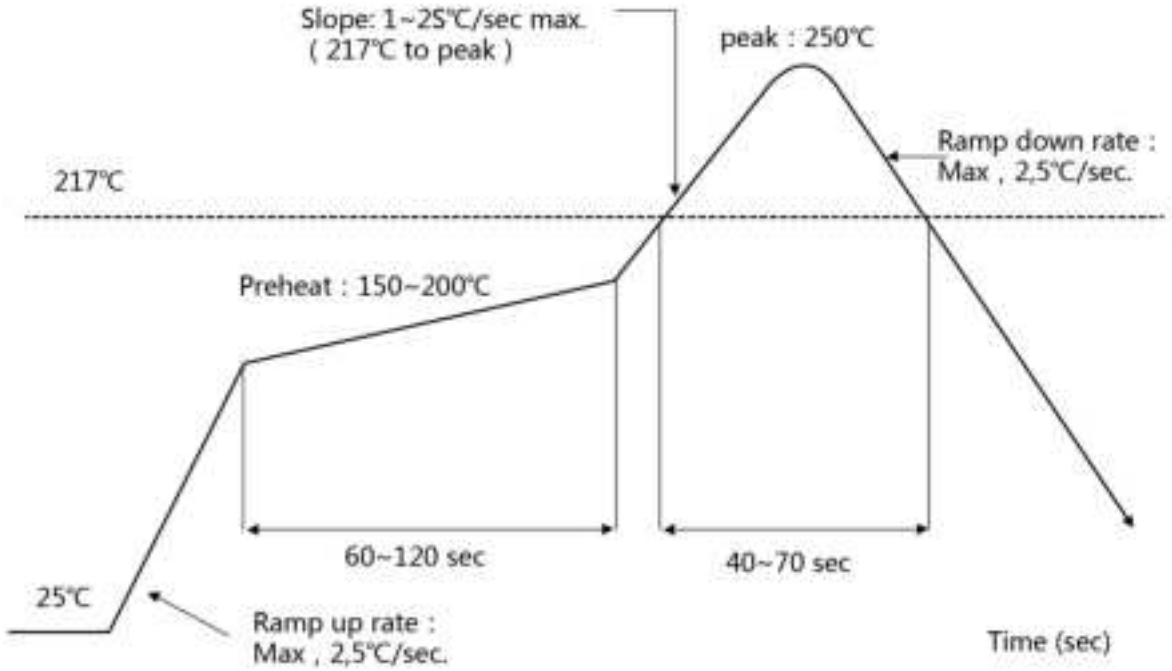
2. It is recommended that the module pad be made of stepped steel mesh.

11. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

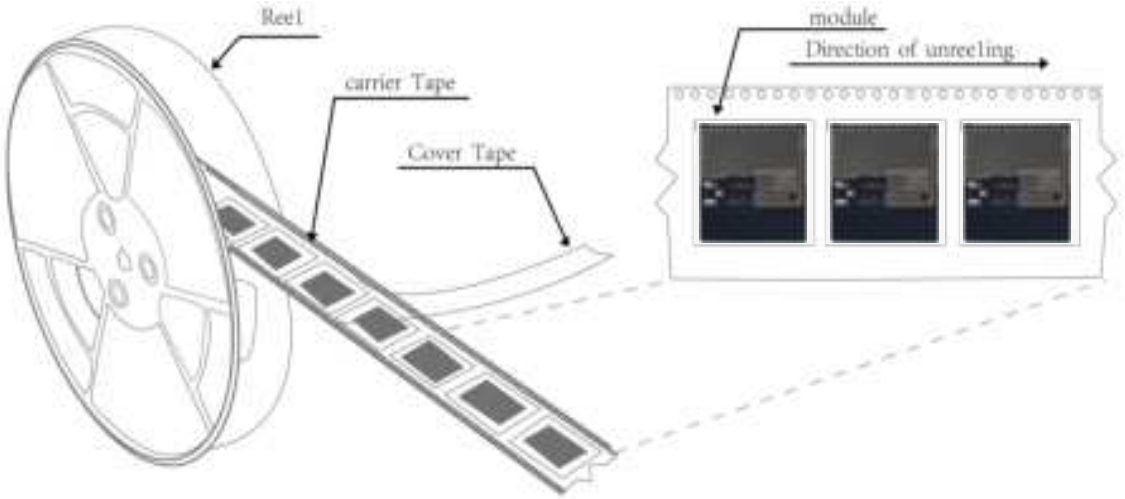
Number of Times : ≤2 times



12. Package

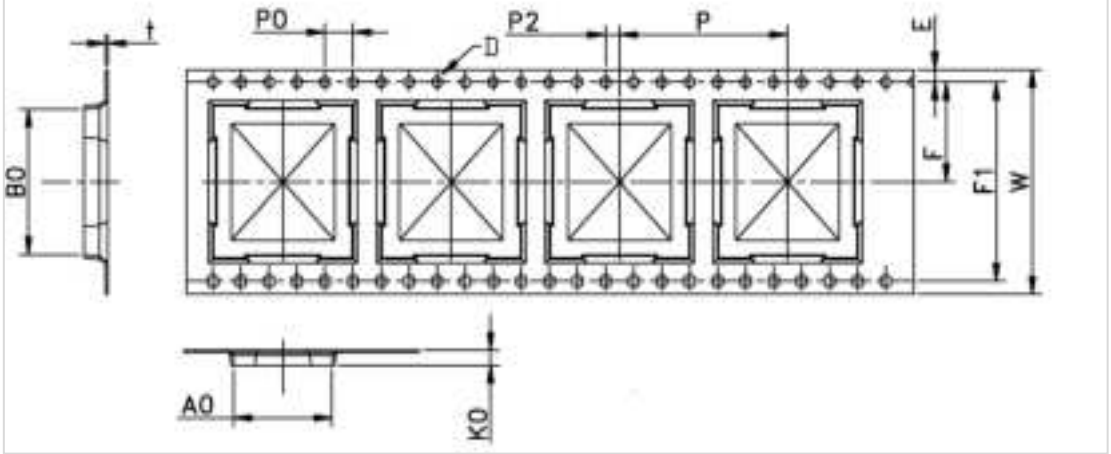
12.1 Reel

A roll of 800 pcs



12.2 Carrier Tape Detail

ITEM	W	A0	B0	D	E	F	F1	K0	P0	P2	P	T
DIM	32	18.40	20.30	1.5	1.75	14.20	28.4	3.50	4.0	2.0	24.0	0.30
TOLE	+0.3 -0.3	±0.15	±0.15	+0.1 -0.0	±0.1	±0.15	±0.10	±0.10	±0.1	±0.15	±0.1	±0.05



12.3 Packaging Detail

the take-up package

Using self-adhesive tape

Color of plastic disc: blue

NY bag size:*******

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 <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

FCC Statements:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

--- Reorient or relocate the receiving antenna.
--- Increase the separation between the equipment and receiver.
---Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
--- Consult the dealer or an experienced radio/TV technician for help.

Warning: Changes or modifications to this unit not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

LABELING AND USER INFORMATION REQUIREMENTS OF THE END PRODUCT:
The final end product must be labelled in a visible area with the following "Contains TX FCC ID: 2AATL-6223H-SRD" or "Contains Transmitter Module FCC ID: 2AATL-6223H-SRD. If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users' manual: This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

A user's manual for the finished product should include one of the following statements:- For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

- For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.
However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
--- Reorient or relocate the receiving antenna.
--- Increase the separation between the equipment and receiver.
---Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
--- Consult the dealer or an experienced radio/TV technician for help.

The User's Manual for The finished product should include the following statements:

Any changes or modifications to this equipment not expressly approved by the OEM/Integrator may cause harmful interference and void the user's authority to operate this equipment.

RF Exposure
This device has been evaluated and shown compliant with the FCC RF Exposure limits under fixed exposure conditions (antennas are greater than 20cm from a person’s body) when installed in certain specific OEM configurations.

General Statements

The module is limited to OEM installation only.

The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.

This module should be installed and operated with a minimum distance 20cm between the radiator and your body. OEM integrator shall equipped the antenna to compliance with antenna requirement part 15.203& 15.204 and must not be co-located or operating in conjunction with any other antenna or transmitters. And OEM host shall implement a Class II Permissive Change (C2PC) or a new FCC ID to demonstrate complied with FCC standard.

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the module.

The OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

This module support Bluetooth 2402-2480MHz & 2.4G WLAN 2412-2462MHz which compliance with part 15.247.