PRODUCT SPECIFICATION

6161C-IC

Bluetooth 5.0 Module Datasheet

Version:v7.3

Customer: _____

Customer P/N:_____

Signature:_____

Date:_____

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

Factory: NO.8, Litong RD., Liuyang Economic & Technical Development Zone, Changsha, CHINA

TEL:+86-755-2955-8186 Website:www.fn-link.com

6161C-IC Module Datasheet

	Part NO.	Description
Ordering Information	FG6161CICX-00	RTL8762CMF QFN40_5x5 BT5.0+UART PCB V1.0

CONTENTS

Revision History

Version	Date	Contents of Revision Change	Draft	Checked	Approved
V1.0	2019/12/10	New version	Lgp	Lgp	Szs
V2.0	2020/3/16	Add module pictures Correct UART pin description	Lgp	Lgp	Szs
V3.0	2020/4/23	Add packaging information	Lgp	Lgp	Szs
V4.0	2020/12/18	Renew module pictures,add label information, firmware version information, Renew The Key Material List,	Lgp	Lgp	Szs
V5.0	2021/01/19	Renew label information and The Key Material List	Lgp	Lgp	Szs
V6.0	2021/01/23	Renew label information, Correct typo	Lgp	Lgp	Szs
V7.0	2020/8/24	Add features functions	Zzq	Zzq	Qjp
V7.1	2022/01/13	Update the specification format Chinese-English translation	FC	Zzq	Qjp
V7.2	2023/07/31	Update the specification format Modify the frequency band range Modify the center-frequency error Modify the output power	Lxp	Zzq	Qjp
V7.3	2023/08/17	Update Recommended Reflow Profile Delete firmware version	Lxp	Zzq	Qjp

1. General Description

1.1 Introduction

Fn-link has released a low-cost, low-power Bluetooth 5.0 module, Support Mesh function .It is highly integrated internally with an ARM Cortex-M4F 32-bit MCU with 160kByte RAM and 512kByte Flash, as well as a Bluetooth 5.0 LE transceiver.

The Bluetooth wireless module conforms to bluetooth 5.0 LE standard and provides UART, SPI, I2C, ADC and other interfaces for Bluetooth. Module size is moderate, suitable for intelligent LED applications, can effectively solve the emergency communication problems in high-rise, underground, tunnel, large complex and other complex environment.

1.2 Description

Model Name	6161C-IC
Product Description	Support Bluetooth functionalities
Dimension	L x W x H: 16.5x13.3x2.3 mm (typical)
BT Interface	UART
Operating temperature	-40° C to 85° C
Storage temperature	-40° C to 125° C

2. Features

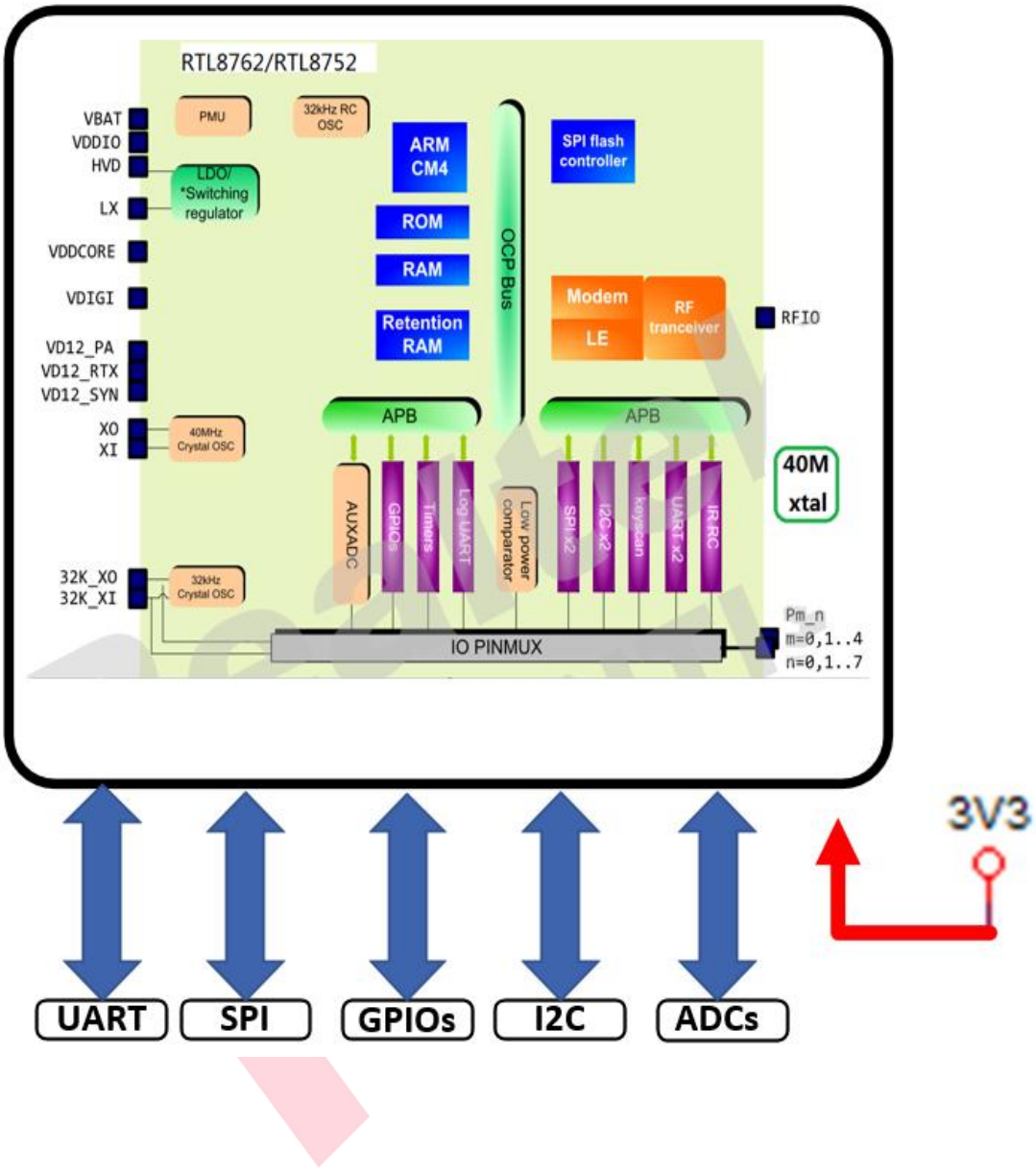
General

- Supports 2Mbps LE
- Support OTA control upgrade
- Supports four-wire SPI
- Supports one I2C
- multiple configurable GPIO
- It supports master-slave integration,both host roles and slave roles, and supports the establishment of 9 links, one host link and eight slave links at the same time
- Package size:16.5X13.3X2.3 mm

Bluetooth Features

- Support Bluetooth 5.0 LE standard
- Supports UART communication

3. Block Diagram



4. General Specification

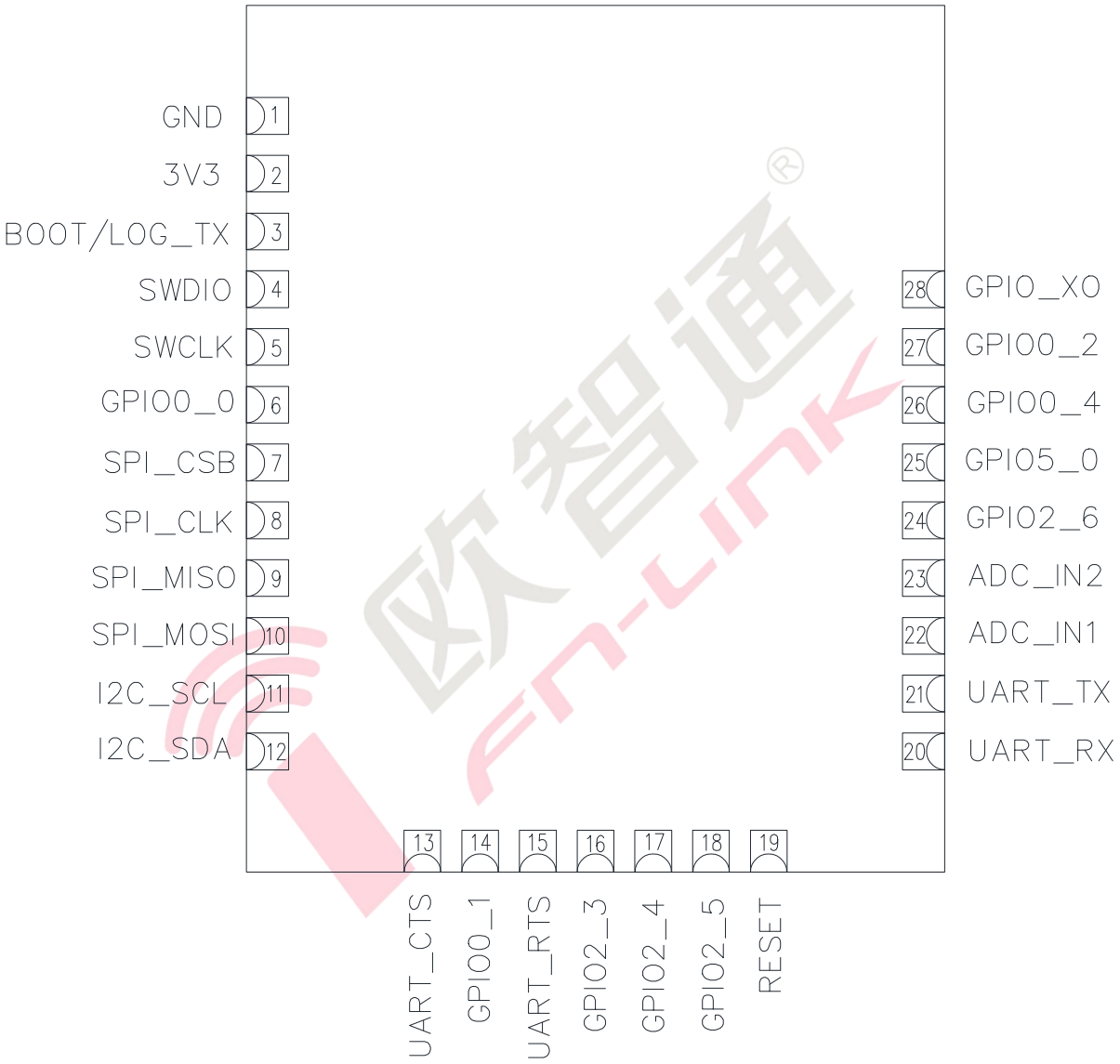
4.1 Bluetooth Specification

Feature	Description		
General Specification			
Bluetooth Standard	Bluetooth V5.0 LE		
Host Interface	UART		
Antenna Reference	On board antenna		
Frequency Band	2400 MHz ~ 2483.5 MHz		
Number of Channels	40（3 Advertising + 37 Data)		
Modulation	GFSK		
RF Specification			
	Min	**Typical**	**Max**
Output Power	4dBm	7dBm	10dBm
Center Frequency Error Fn	-75KHz		75KHz
Sensitivity @ PER<=30.8% for LE 1Mbps		-95dBm	
Maximum Input Level	LE 1Mbps: -20dBm		
	LE 2Mbps: -20dBm		

5. Pin Definition

5.1 Pin Outline

< TOP VIEW >



5.2 Pin Definition details

NO.	Name	Type	Description	Voltage
1	GND		Ground connections	
2	3V3	P	+3.3V power supply	DC 3.3V
3	LOG_TX		Pull down,Enter burning mode, suspended as the log output port	
4	SWDIO		Debugging port：SWDIO data cable	
5	SWCLK		Debugging port：SWCLK clock line	
6	GPIO0_0	I/O	Universal GPIO port，configurable	
7	SPI_CSB		SPI communication port	
8	SPI_CLK		SPI communication port	
9	SPI_MISO		SPI communication port	
10	SPI_MOSI		SPI communication port	
11	I2C_SCL		I2C communication port	
12	I2C_SDA		I2C communication port	
13	UART_CTS		clear-to-send （Low level enables to send）	
14	GPIO0_1	I/O	Universal GPIO port，configurable	
15	UART_RTS		request to sand（Low level Enables receiving）	
16	GPIO2_3	I/O	Universal GPIO port，configurable	
17	GPIO2_4	I/O	Universal GPIO port，configurable	
18	GPIO2_5	I/O	Universal GPIO port，configurable	
19	RESET		module reset pin (Vil reset module，internal pull-up）	
20	UART_RX		UART RXD	
21	UART_TX		UART TXD	
22	ADC_IN1		Module conversion acquisition pin	
23	ADC_IN2		Module conversion acquisition pin	
24	GPIO2_6	I/O	Universal GPIO port，configurable	
25	GPIO5_0	O	journal output （ Customize support according to firmware）	
26	GPIO0_4	I/O	Universal GPIO port，configurable	
27	GPIO0_2	I/O	Universal GPIO port，configurable	
28	GPIO_XO	I/O	Universal GPIO port，configurable	

P:POWER I:INPUT O:OUTPUT

6. Electrical Specifications

6.1 Power Supply DC Characteristics

The digital IO supports VDD33 or VDD18 application.

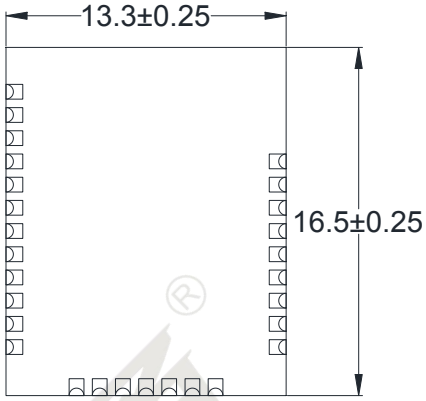
	MIN	TYP	MAX	Unit
Operating Temperature	-40	25	85	deg.C
Operating VDC	2.7	3.0	3.6	V

6.2 Power Consumption

功耗@VBAT=3V	Power Down		450		nA
	深度睡眠		2.5		uA
	TX(7.5dBm)		11.3		mA
	TX(4dBm)		9.6		mA
	TX(0dBm)		7.9		mA
	RX		7.3		mA

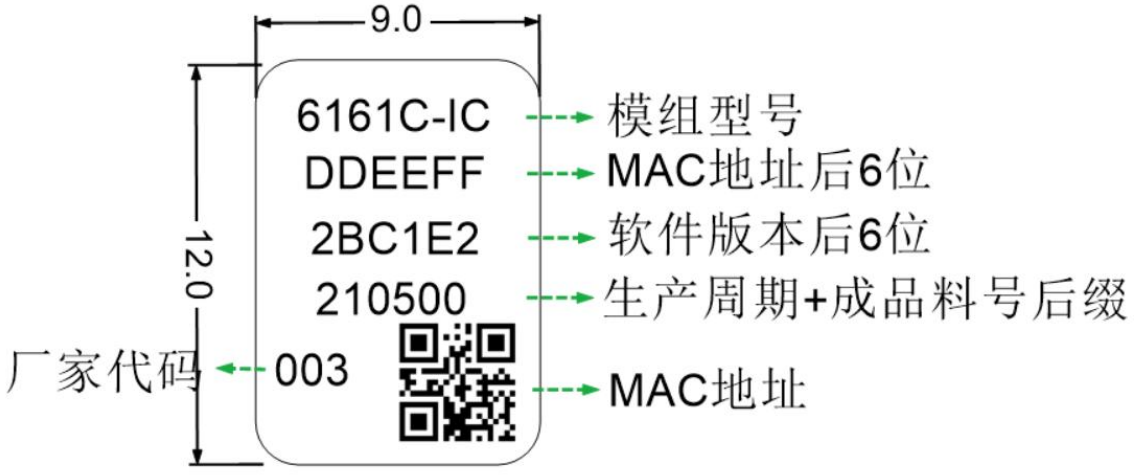
7. Size reference

7.1 Module Picture

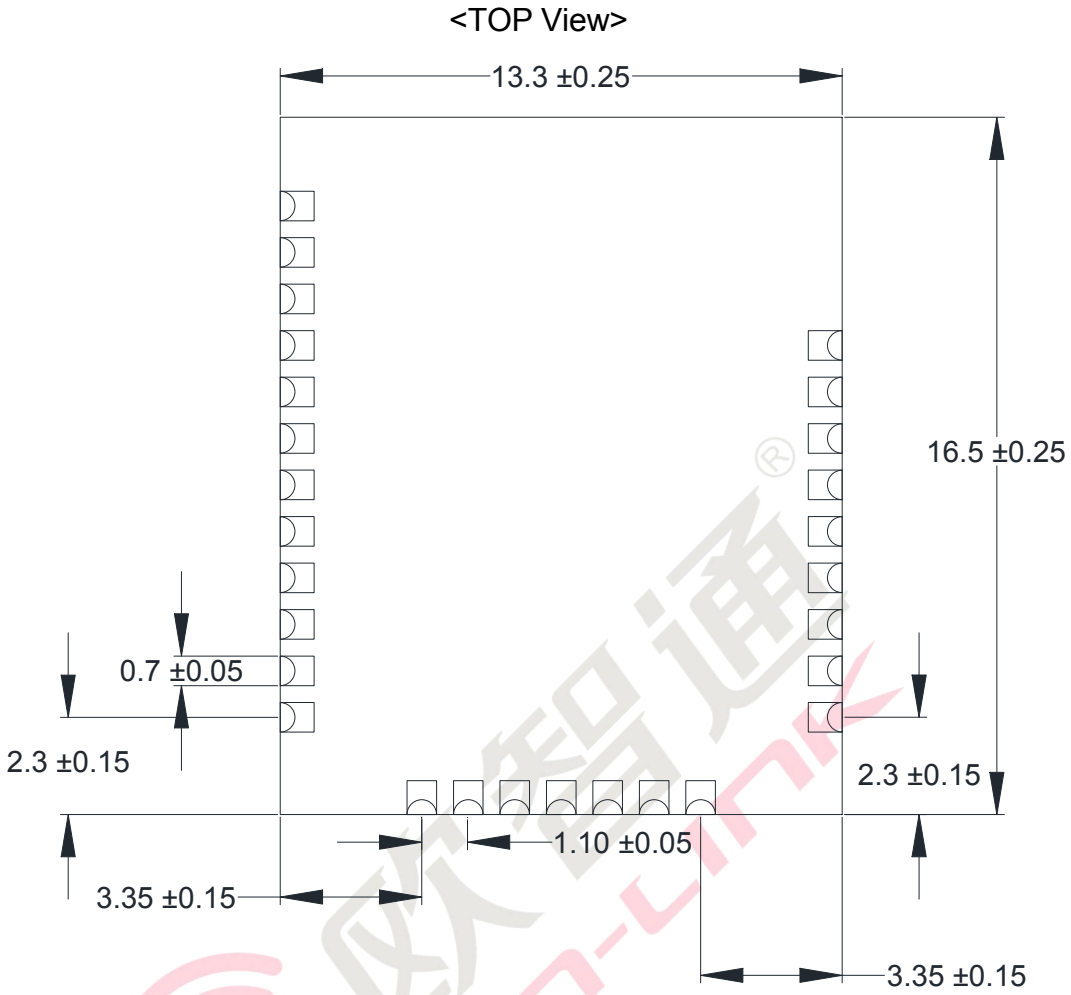
L x W : 16.5 x 13.3 (+0.3/-0.1) mm 	
H: 2.3 (±0.2) mm	
Weight	0.8g(±0.1)g

7.2 Marking Description

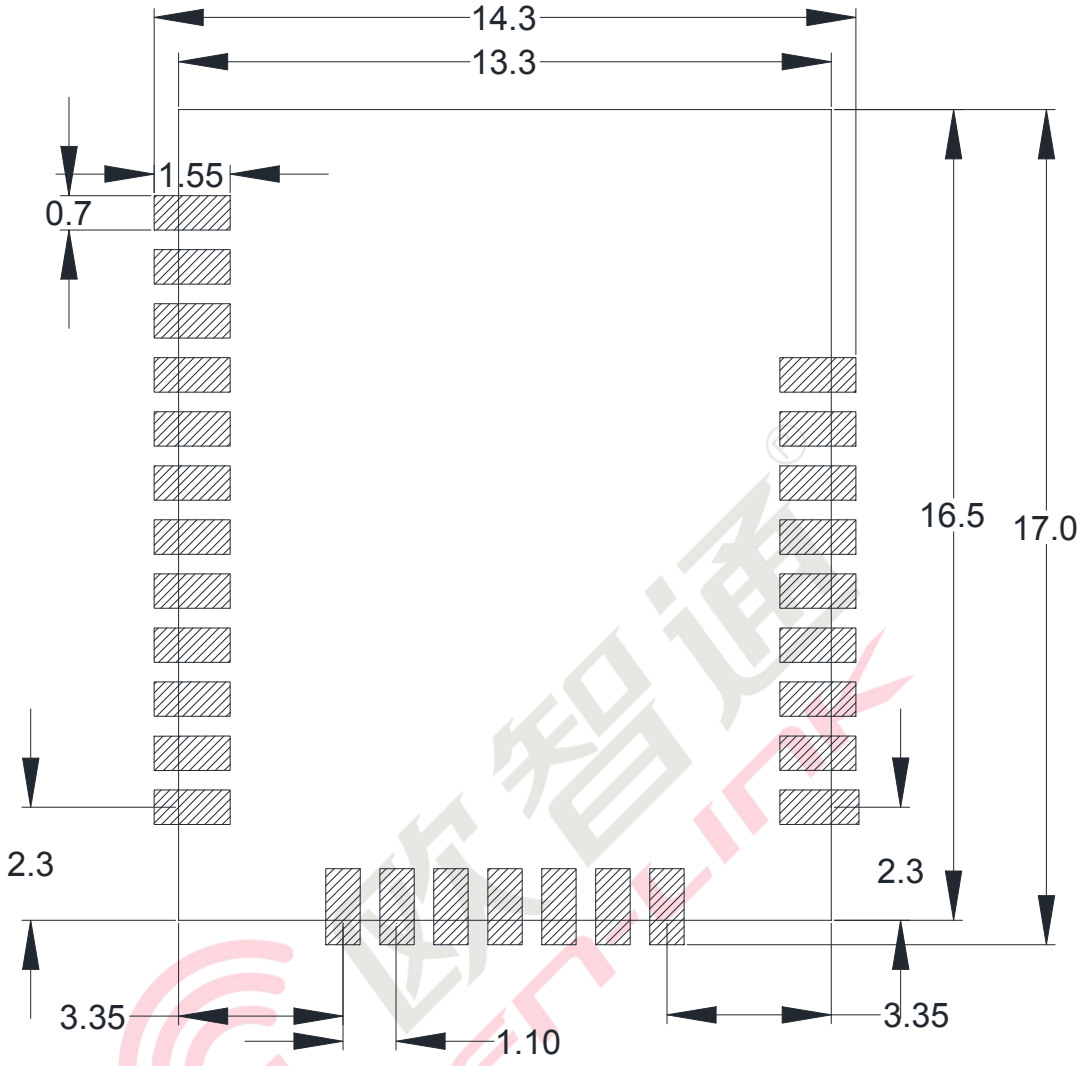
< TOP VIEW >



7.3 Physical Dimensions



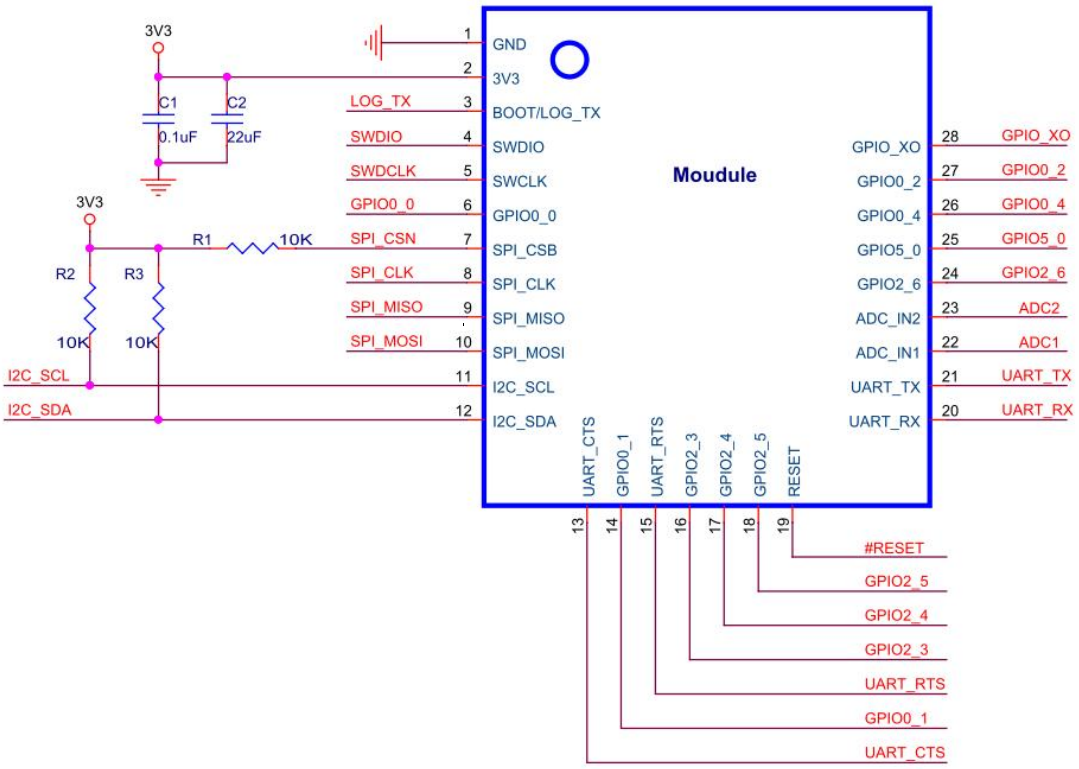
7.4 Layout Recommendation



8. The Key Material List

Item	Part Name	Description	Manufacturer
1	Crystal	3225 40MHz 9pF +/-10ppm	ECEC, TKD, Hosonic, JWT, TXC
2	Chipset	RTL8762CMF	Realtek
3	PCB	FR4, 2 LAYER, GREEN	XY-PCB, GDKX, Sunlord, SLPCB
4	Inductor	Power Inductor, 2.2uH, 0603	Sunlord, Ceaiya, Cenker, Fangci
5	Inductor	RF Inductor	Sunlord, Murata, Chilisin

9. Reference Design



Note:

1, C1, C2 is as close to module 2 pin as possible;

2, The UART interface level of the module is 3.3V. If 5V equipment needs to be connected externally, the peripheral level conversion circuit should be added

10. Antenna clearance area requirements

When using PCB antenna on Wi-Fi module, make sure the distance between PCB on motherboard and other metal devices is at least 16mm.The shaded areas in the figure below need to be marked away from metal devices, sensors, interference sources, and other materials that may interfere with the signal.

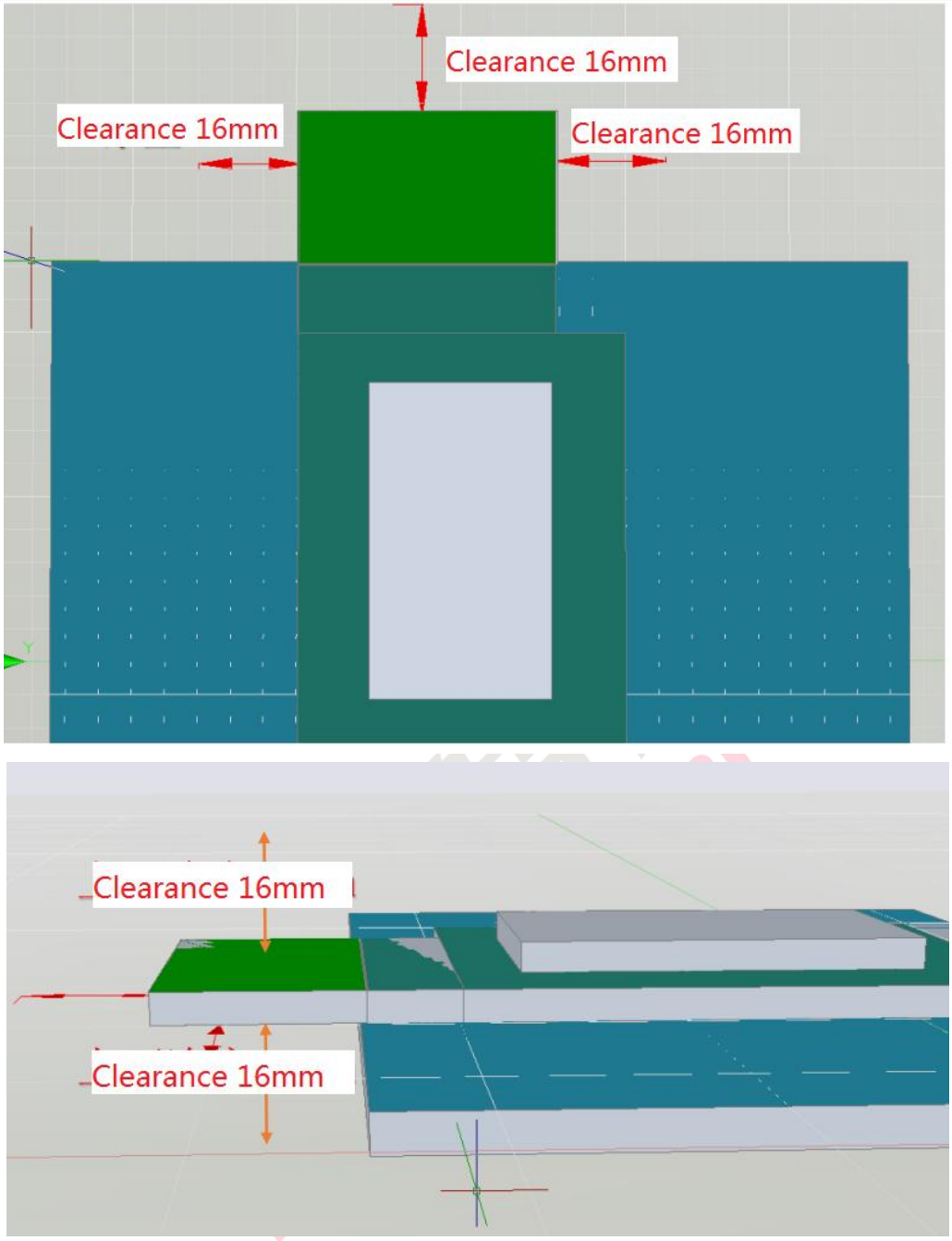


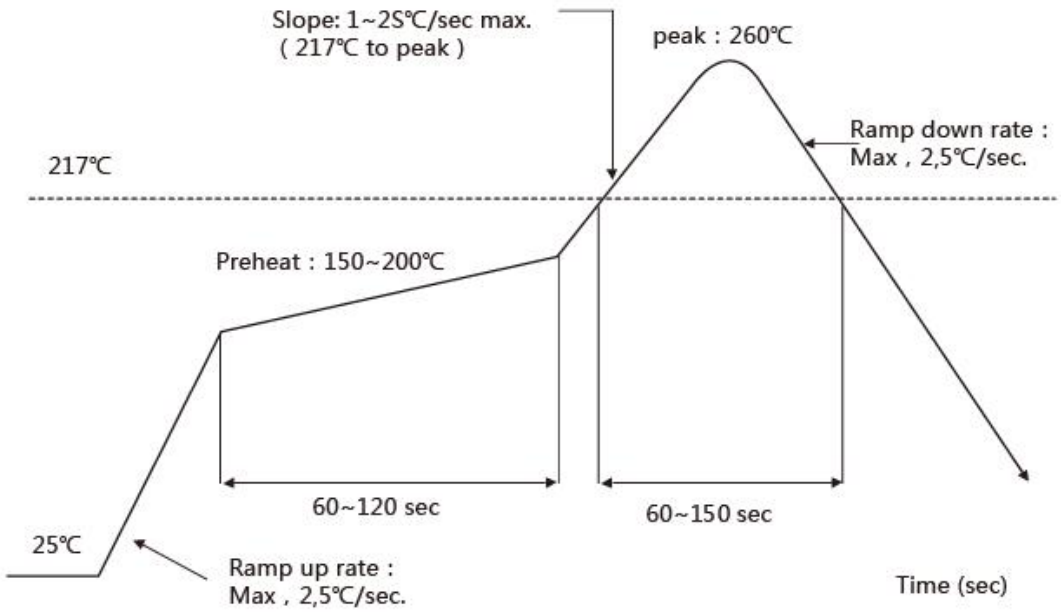
Figure 6-2 Antenna clearance reference

11. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <260°C

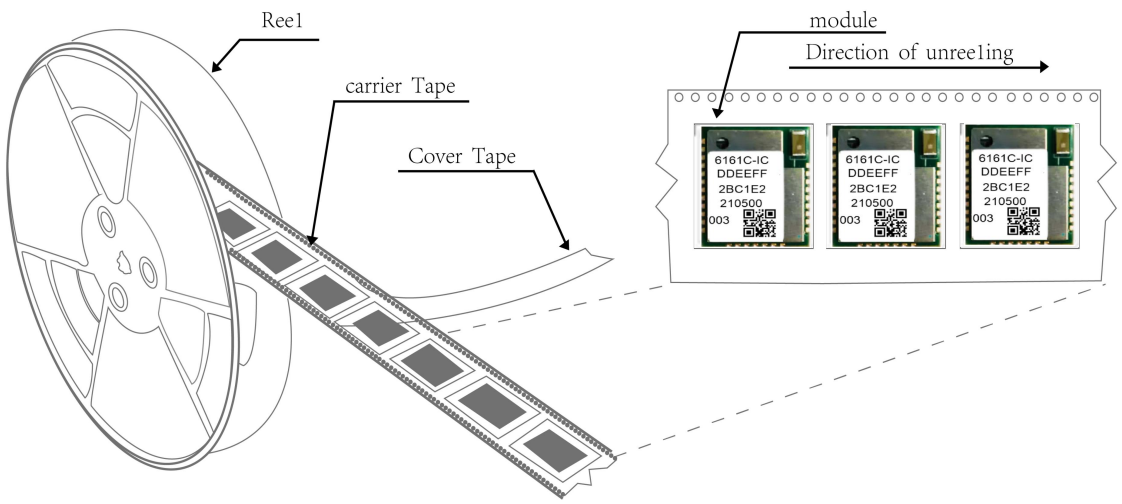
Number of Times : ≤2 times



12. Package

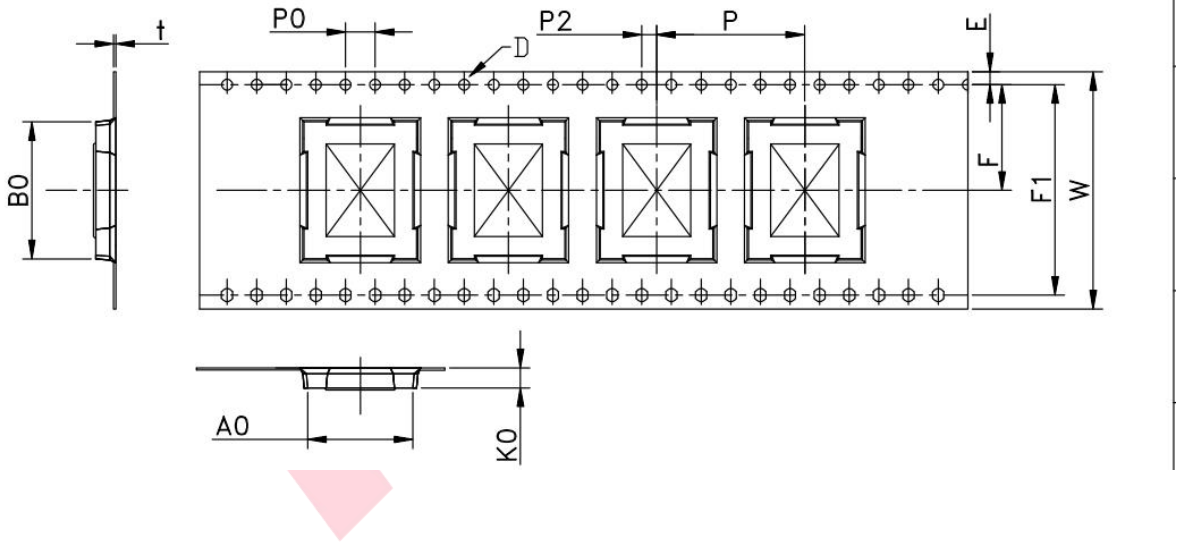
12.1 Reel

A roll of 1000pcs



12.2 Carrier Tape Detail

ITEM	W	A0	B0	D	E	F	F1	K0	P0	P2	P	T
DIM	32	13.75	17.05	1.5	1.75	14.20	28.4	2.80	4.0	2.0	20.0	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

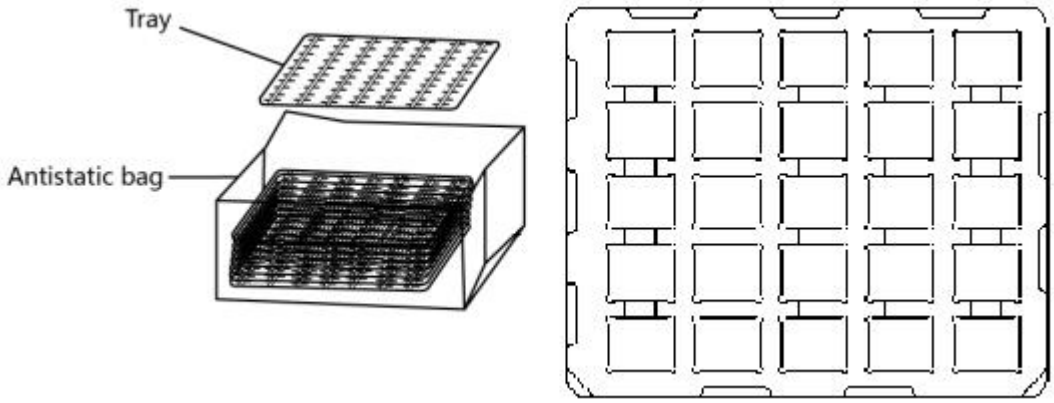
NY bag size:450X415mm

size ： 350*350*35mm

The packing case size:360X210X370mm

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

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