PRODUCT SPECIFICATION

6220H-IF

Wi-Fi Single-band 1x1 802.11b/g/n + BLE4.2

Combo Module

Version:V5.1

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

6220H-IF Module Datasheet

	Part NO.	Description
Ordering Information	FG6220HIFX-00	RTL8720CF/802.11b/g/n/WiFi+BLE,1T1R, UART, antenna on board, 18mm*20mm,成品

CONTENTS

Revision History

Version	Date	Contents of Revision Change	Draft	Checked	Approved
V1.0	2021/04/19	Initial Release	wxg	Zzq	Qjp
V2.0	2021/06/17	Add physical picture	wxg	Zzq	Qjp
V3.0	2021/09/01	Change the module image	zzq	Zzq	Qjp
V4.0	2022/03/30	BLE 规格	zzq	Zzq	Qjp
V5.0	2023/07/31	Update the specification format Modify the output power	Lxp	Zzq	Qjp
V5.1	2023/08/10	Update Recommended Reflow Profile	Lxp	Lxy	QJP

1 Overview

1.1 Introduction

6220H-IF is a highly integrated module with single-chip 802.11 /b/g/n 1T1R WLAN and Bluetooth Realtek 8720CF,which combine a Real-M300 (KM4) CPU that is based on ARMv8-M architecture, and integrates a WLAN MAC,an1T1R capable WLAN baseband, an RF circuit, and Bluetooth Low Energy (BLE). They also provide configurable GPIOs that are configured as digital peripherals for various applications and control usage.

The module integrates internal memory for full Wi-Fi protocol functions. The embedded memory configuration also enables simple application development.

1.2 Description

Model Name	6220H-IF
Product Description	Support Wi-Fi/Bluetooth functionalities
Dimension	L x W x H : 20 x 18 x 2.35 mm
Host Interface	UART
Operating temperature	-20°C to 85°C
Storage temperature	-40°C to 80°C

2 Features

General

- 802.11 b/g/n compatible 1x1, 2.4GHz
- Supports low power Tx/Rx for short-range application
- Supports384KB ROM
- Supports256KB RAM
- Supports2MB FLASH
- Bluetooth Low Energy (BLE) 4.2

3 Block Diagram

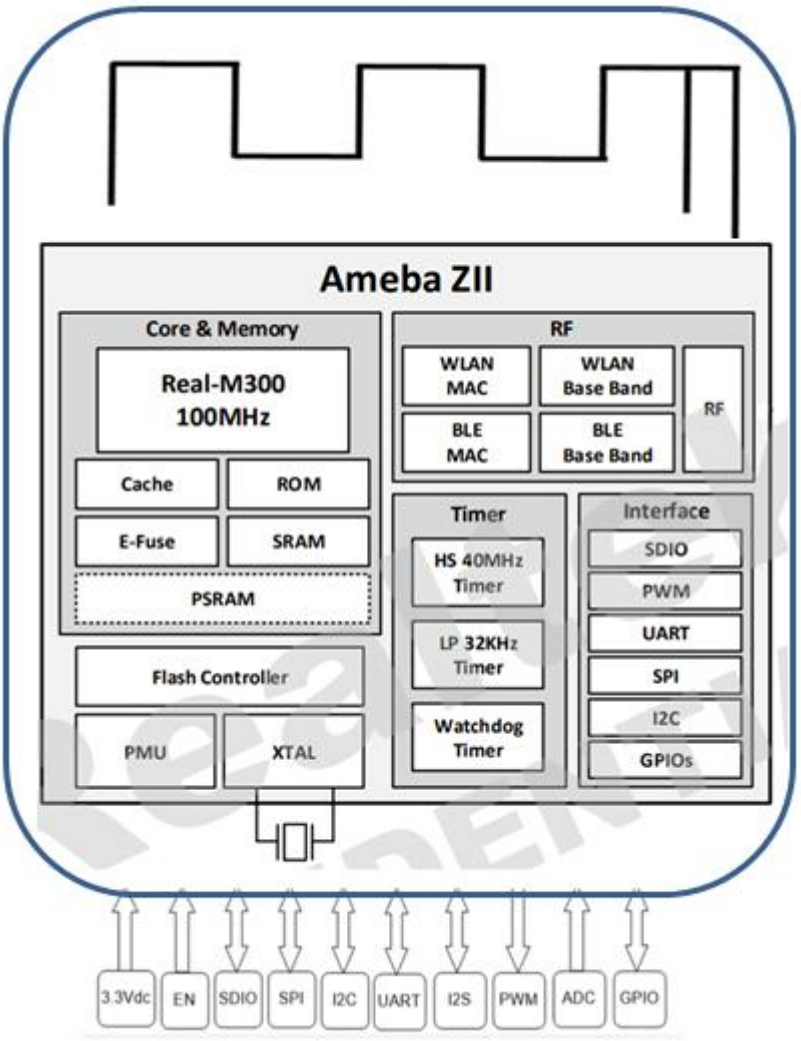


Figure 1-1 Block Diagram

4 Wi-Fi RF Specification

4.1 Wi-Fi 2.4GHz RF Specification

Feature	Description
WLAN Standard	IEEE 802.11 b/g/n 2x2 Wi-Fi compliant

Frequency Range	2.400 GHz ~ 2.4835 GHz(2.4G ISM band)			
Number of Channels	2.4GHz：Ch1 ~ Ch14			
Spectrum Mask	Min. b/g/n	Typ. b/g/n	Max. b/g/n	Unit b/g/n
1st side lobes(to fc ± 11MHZ)	-	-43/-30/-40	-	dBr
2st side lobes(to fc ± 22MHZ)	-	-52/-33/-58	-	dBr
Freq. Tolerance	-20/-20/-20	-	20/20/20	ppm

Test Items	**Typical Value**	**EVM**
Output Power	802.11b / 11M: 17dBm ± 1.5 dB	EVM ≤ -9dB
	802.11g / 54M: 15dBm ± 1.5 dB	EVM ≤ -25dB
	802.11n / MCS7: 14dBm ± 1.5 dB	EVM ≤ -28dB

Test Items	**Typical Value**	**Standard Value**
SISO Receive Sensitivity (11b,20MHz) @8% PER	- 11Mbps ≤ -84 dBm	≤ -76 dBm
SISO Receive Sensitivity (11g,20MHz) @10% PER	- 54Mbps ≤ -71 dBm	≤ -68 dBm
SISO Receive Sensitivity (11n,20MHz) @10% PER	- MCS=7 ≤ -70 dBm	≤ -67 dBm
Maximum Input Level	802.11b: -10 dBm	
	802.11g/n: -20 dBm	
Antenna Reference	Small antennas with 0~2 dBi peak gain	

Note: Other data rates transmit power are controlled by Power-by-Rate function of the driver.

4.2 Bluetooth RF Specification

Feature	**Description**
General Specification	
Bluetooth Standard	Bluetooth V4.2
Host Interface	UART
Antenna Reference	Small antennas with 0~2 dBi peak gain
Frequency Band	2400 MHz ~ 2483.5 MHz
Number of Channels	40 channels
Modulation	GFSK

RF Specification			
	Min.	**Typical.**	**Max.**
Output Power (Class 2)	1dBm	4 dBm	7dBm
Sensitivity @ BLE=30.8%			-88 dBm
Maximum Input Level	-20dBm		

5.3 Pin Function Group Table

Pin#	Name	Digital	SPIC-Flash/SDIO	JTAG	UART	SPI/WL_LED	I2C	PWM
3	IO1	GPIOA_3/PWM0		JTAG_TDI	UART1_OUTS	PI_SCL	I2C_SDA	PWM[3]
4	IO2	GPIOA_20/PWM1	SD_D[1]		UART2_RTS	SPI_MISO	I2C_SDA	PWM[0]
5	IO3	GPIOA_10/UART0_CTS	SPI_M_DATA[1]		UART0_CTS	SPI_MISO		
6	IO4	GPIOA_9/UART0_RTS	SPI_M_DATA[2]		UART0_RTS	SPI_MOSI		
7	IO5	GPIOA_16/UART2_OUT	SD_D[3]		UART2_OUT	SPI_SCL	I2C_SDA	PWM[4]
8	IO6	GPIOA_15/UART2_IN	SD_D[2]		UART2_IN	SPI_CSn	I2C_SCL	PWM[3]
10	IO7	GPIOA_17/PWM4	SD_CMD					PWM[5]
11	IO8	GPIOA_12/UART0_RXD	SPI_M_DATA[3]		UART0_IN		I2C_SDA	PWM[1]
12	IO9	GPIOA_11/UART0_TXD	SPI_M_DATA[0]		UART0_OUT		I2C_SCL	PWM[0]
14	IO10	GPIOA_2/PWM5		JTAG_TDO	UART1_IN	SPI_CSn	I2C_SCL	PWM[2]
15	IO11	GPIOA_18/PWM3	SD_CLK					PWM[6]
16	IO12	GPIOA_19/PWM2	SD_D[0]		UART2_CTS	SPI_MOSI	I2C_SCL	PWM[7]
17	IO13	GPIOA_14	SDIO_INT		UART0_OUT			PWM[2]

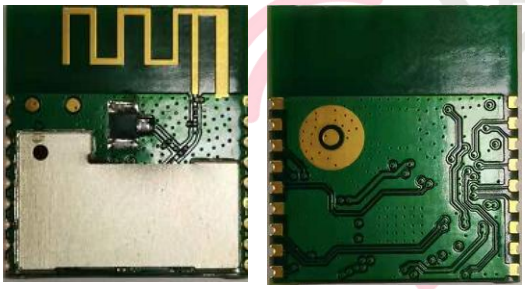
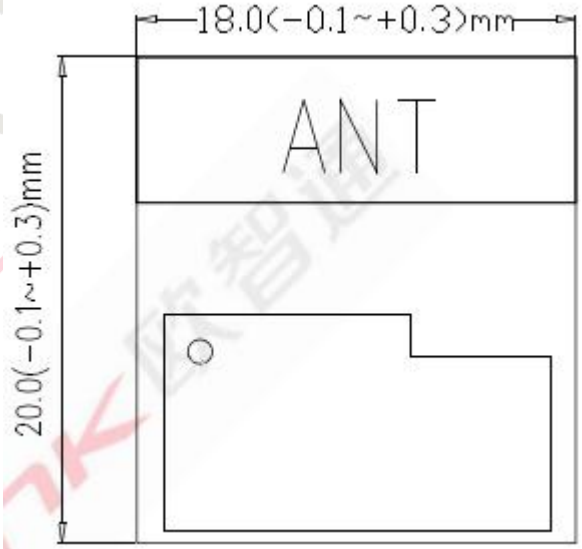
6 Recommended Operating Rating

	Min.	Typ.	Max.	Unit
Operating Temperature	-20	25	85	deg.C
VDD33	3.0	3.3	3.6	V

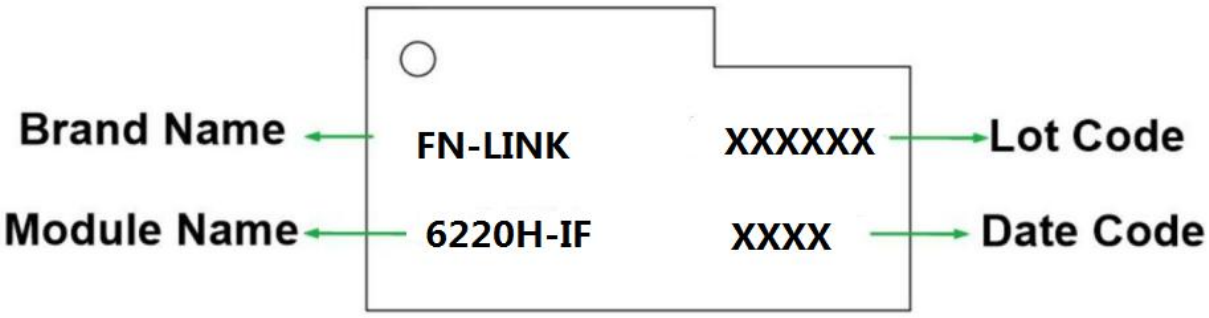
7 Dimensionss

7.1 Physical Dimensions and Module Photo

(Unit: mm)

<table>
<tr><td>L x W : 20mm*18mm (+0.3/-0.1) mm
  </td><td>< TOP VIEW >
 
</td></tr>
<tr><td>H: 2.35(+0.2/-0.2)mm</td><td>< Side View >
 
</td></tr>
<tr><td>Weight</td><td>1.05g(+0.02/-0.02)</td></tr>
</table>

7.2 Marking Description



7.3 Module Physical Dimensions

(Unit:mm)

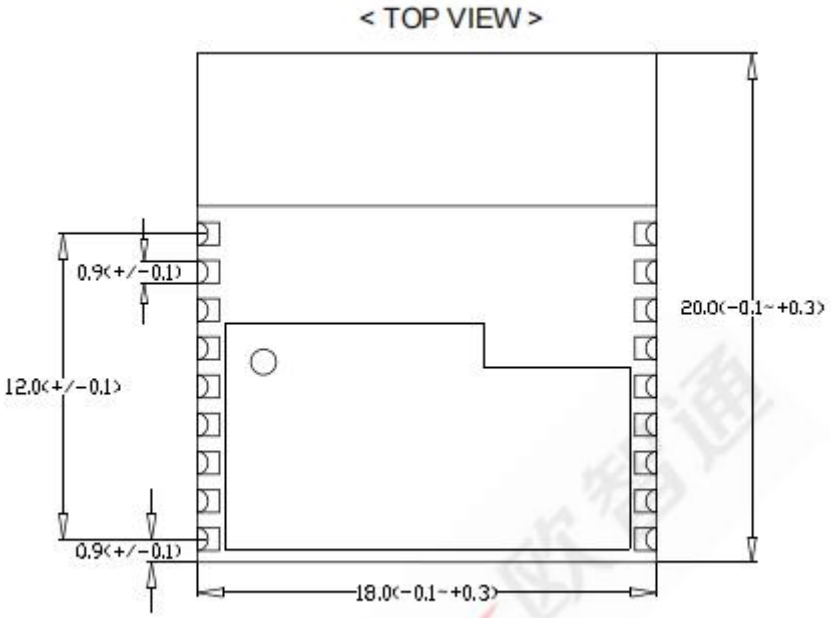


Figure 4-1 Module physical dimensions

7.4 Layout Recommendation

(Unit: mm)

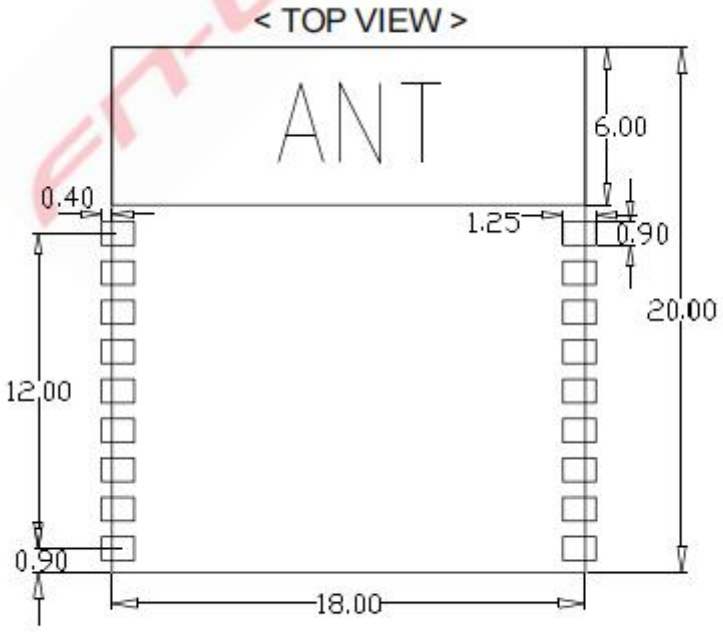


Figure 4-2 Layout footprint recommendation

8 RF connector for external antenna

Unite:mm

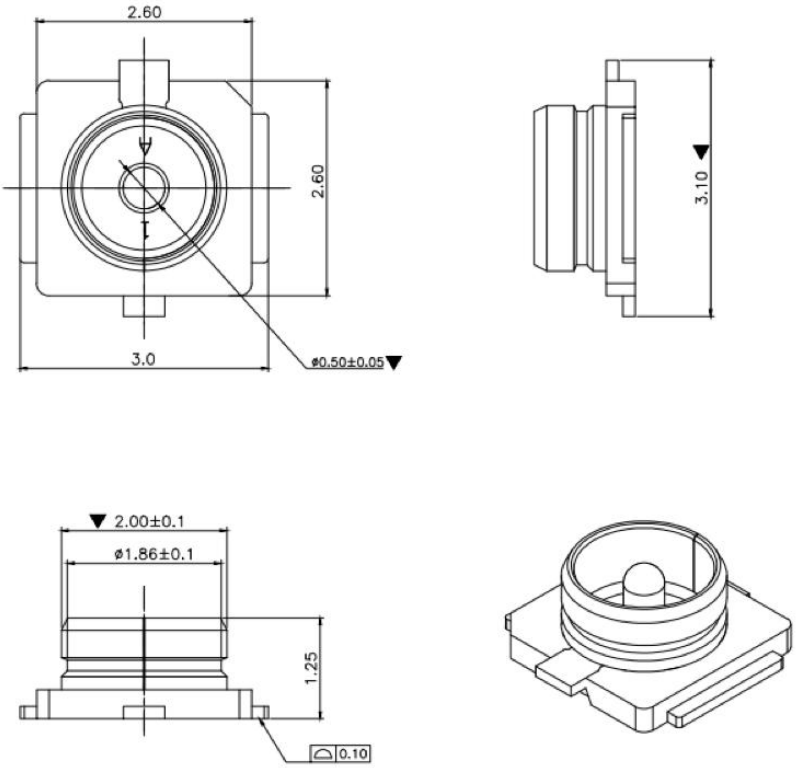
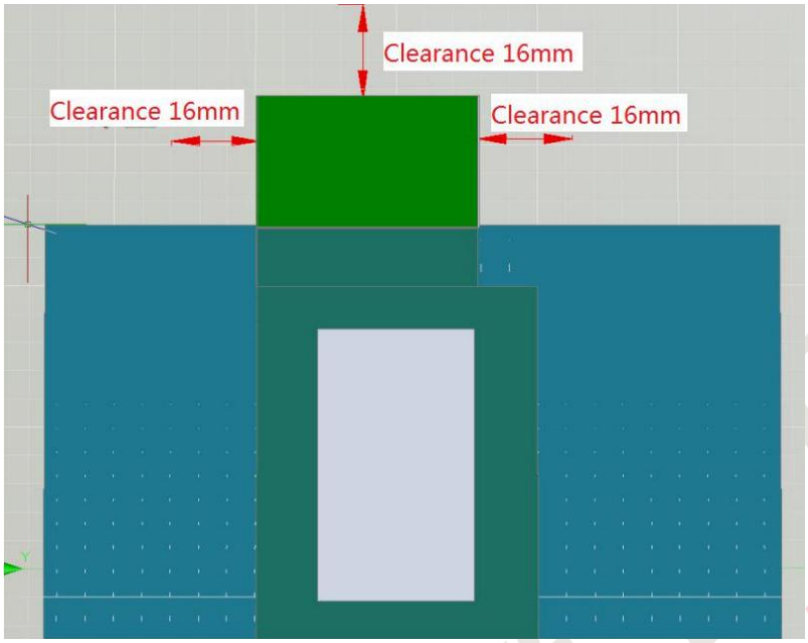
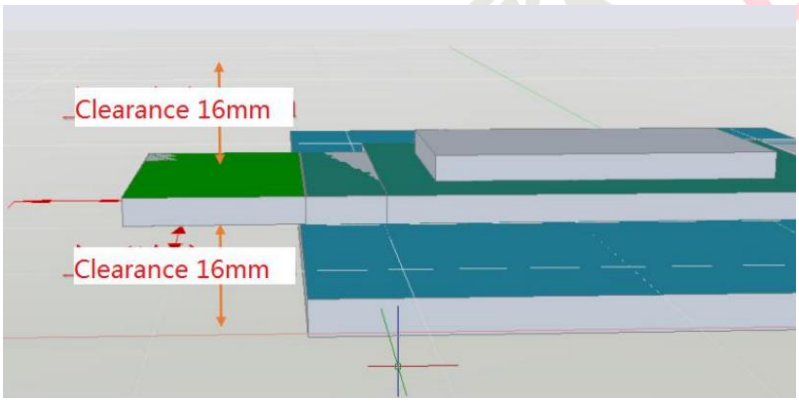


Figure 5-3 RF connector for external antenna

9 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.





10 The Key Material List

Item	Part Name	Description	Manufacturer
1	Inductor	2016,2.2uH,2x1.6x1mm	Cenker, Sunlord, Ceaiya
2	Crystal	3225 40MHz 14pF	ECEC, TKD, Hosonic, JWT, TXC
3	Chipset	RTL8720CF	Realtek
4	PCB	FR4, 4 LAYER, GREEN	XY-PCB, GDKX, Sunlord, SLPCB

11 Reference Design

11.1 Reference Schematic

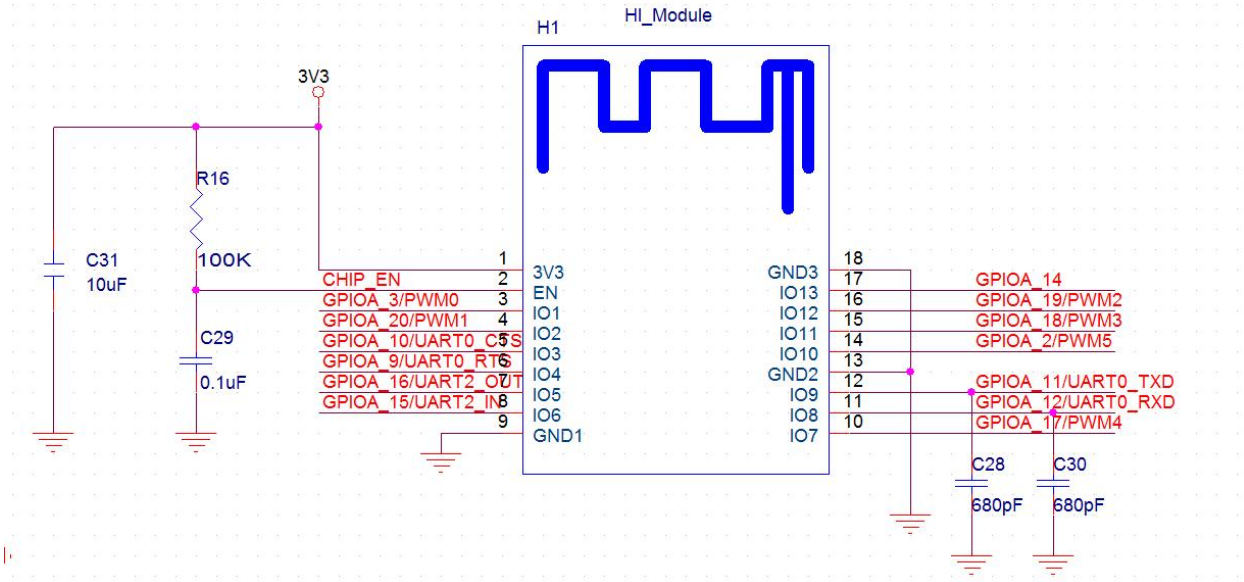


Figure 6-1 Reference Schematic

Note: Module requires independent power supply , supply capacity ⩾ 1200mA and ripple less than 100mV; Do not share power with amplifier, infrared device, camera, etc. USB differential trace, please keep 90 ohm.

12 Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <260°C

Number of Times : ≤2 times

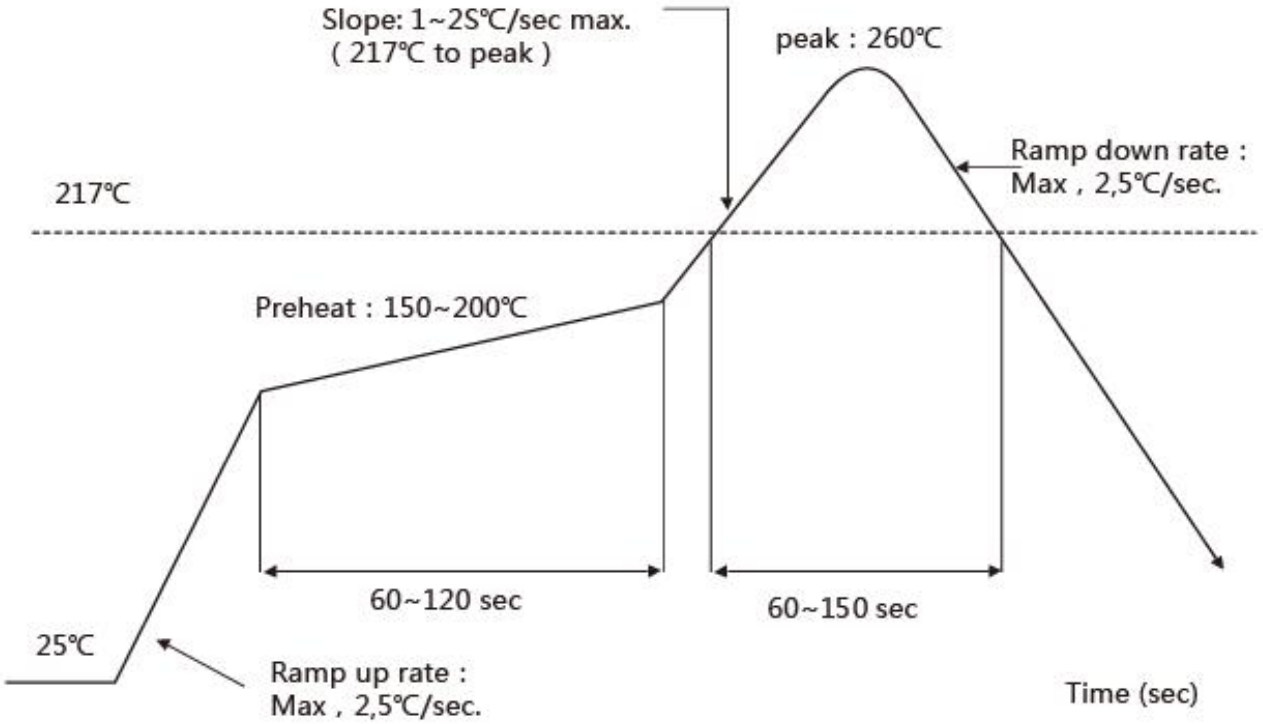


Figure 9-1 Recommended reflow profile

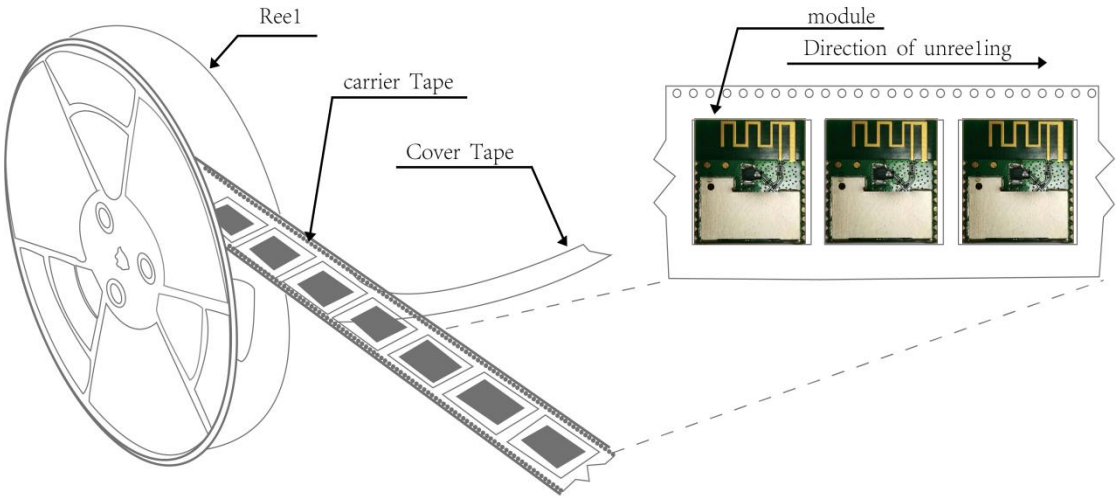
13 RoHS compliance

All hardware components are fully compliant with EU RoHS directive

14 Package Information

14.1 Reel

A roll of 800pcs



14.2 Packaging Details

The take-up package:

Using self-adhesive tape

Color of plastic disc: blue

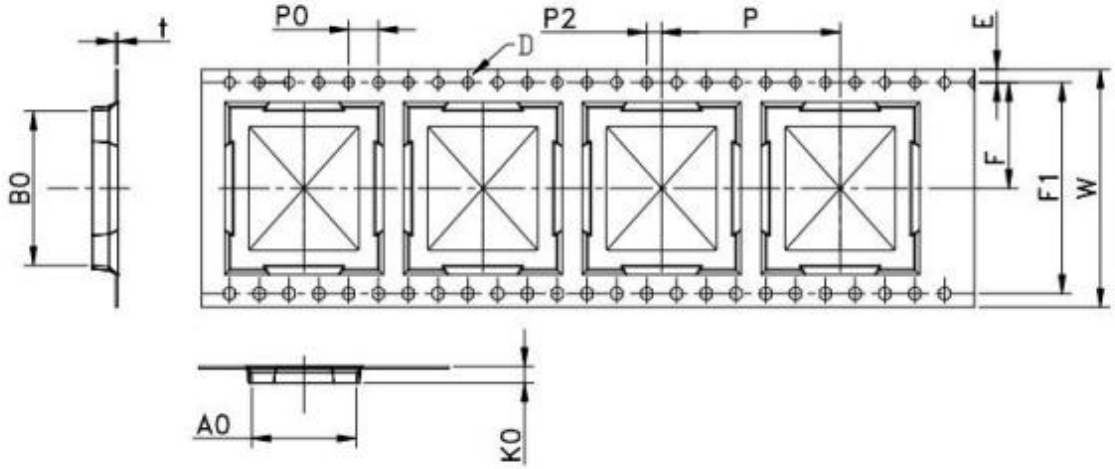
NY bag size: 500mm*420mm

Internal box size: 335*335*55mm

Carton size: 360*210*370mm

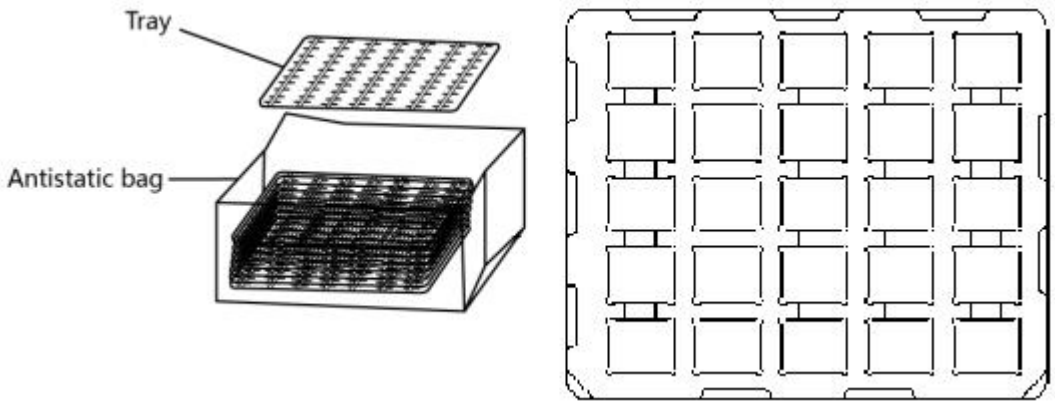
14.3 Carrier Tape Detail

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



14.4 Tray

Use pallet packaging for less than 300 pieces



15 Moisture Sensitivity

The modules is a Moisture Sensitive Level 3 device, in according with standard IPC/JEDEC J-STD-020, take care of all the requirements for this kind of components.

Moreover, please pay attention to following conditions:

a) Calculated shelf life in sealed bag: 12 months at <40°C and <90% 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 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