FN-LINK™
Innovation For Surfing

6220N-IN

Wi-Fi Single-band 1X1 802.11b/g/n

IOT Module Datasheet

6220N-IN Module Datasheet

FG6220NINX-01

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Customer Approval :

_____ Company

_____ Title

_____ Signature

_____ Date

_____ Fn-Link

Revision History

Version	Date	Revision Content	Draft	Approved
1.0	2019/05/22	Initial release	Wesley	Stone
1.1	2019/06/12	Refine section 1.	Wesley	Stone
1.2	2019/07/16	Modify RF spec and some typos	Wesley	Stone
1.3	2019/07/24	Add description for SPI interface; Modify RF Tx spec according to Realtek's suggestion.	Wesley	Stone
1.4	2019/09/10	Refine section 3,4,5 and 9	Wesley	Stone
1.5	2020/03/25	Refine section 1,3,5 and 9	Wesley	Stone
1.6	2020/08/18	Refine section 1.3 and 4.1	Wesley	Stone

CONTENTS

1 Overview

1.1 Introduction

6220N-IN is a highly integrated IoT module with low power 802.11b/g/n Wireless LAN (WLAN) network controller. It combines a KM4 MCU, WLAN MAC, a 1T1R capable WLAN baseband. It also provides a bunch of configurable GPIOs which are configured as digital peripherals for different applications and control usage.

6220N-IN integrates internal memories for complete Wi-Fi protocol functions. The embedded memory configuration also provides simple application developments.

1.2 Features

Wi-Fi General

- 802.11b/g/n compatible WLAN
- 65Mbps transmit and receive PHY rate using 20MHz bandwidth
- Compatible with 802.11n specification
- Backward compatible with 802.11b/g devices while operating in 802.11n mode

Wi-Fi Standards Supported

- 802.11b/g/n compatible WLAN
- 802.11e QoS Enhancement (WMM)
- 802.11i (WPA, WPA2). Open, shared key, and pair-wise key authentication services
- Wi-Fi Direct support

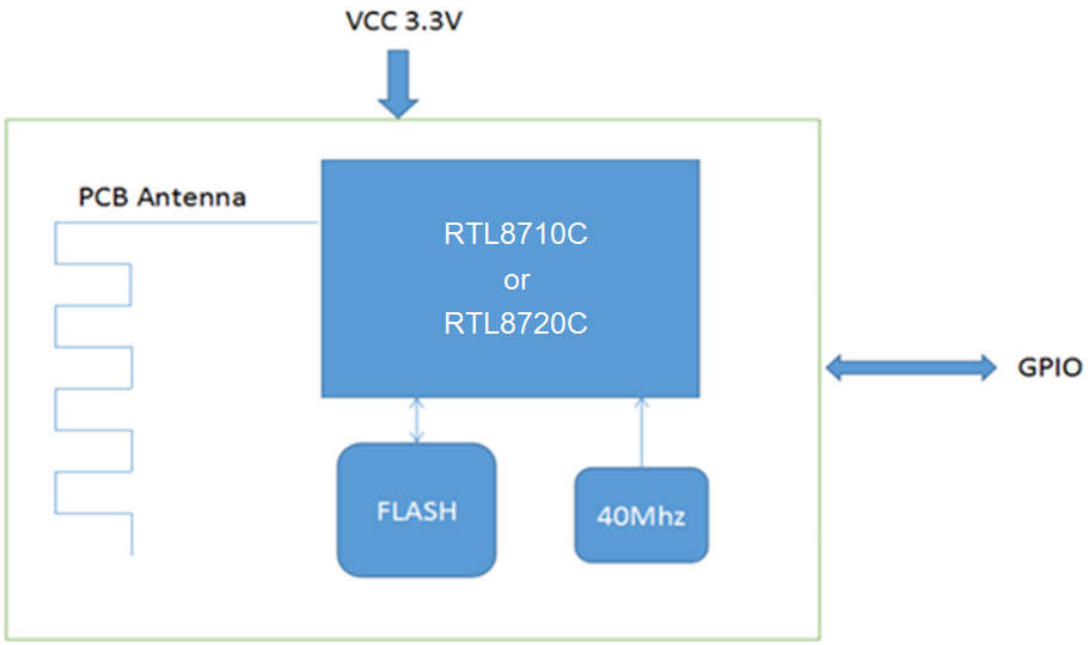
WLAN PHY Features

- 802.11n OFDM
- One Transmit and one Receive path(1T1R)
- 20MHz bandwidth transmission
- DSSS with DBPSK and DQPSK, CCK modulation with long and short preamble

Interfaces

- UART
- SPI
- SDIO2.0 device
- I2C
- GPIO
- PWM

Block Diagram:



1.3 General specification

Model Name	6220N-IN
Main Chipset	Realtek Ameba ZII Series, RTL8710CX
Interfaces	UART, SPI, SDIO device, GPIO, PWM, I2C
Wi-Fi Standards	802.11b/g/n
Dimension	L x W x H: 30mm*22mm*3.1mm
RoHS	All hardware components are fully compliant with EU RoHS directive

1.4 Operating Conditions

Operating Voltage	3.3±10% Vdc
Operating Temperature	-20°C to +85°C
Storage Temperature	-40°C to +125°C

※1.5 EEPROM Information

2 RF Specification

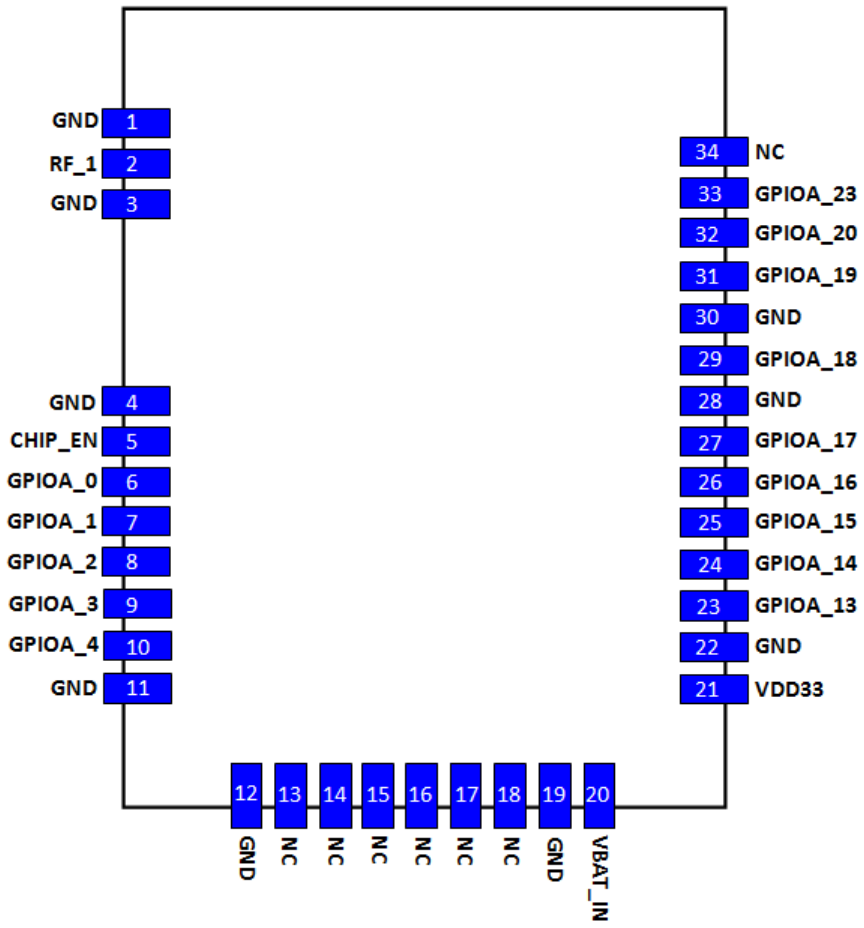
2.1 Wi-Fi 2.4GHz RF Specification

Operating Frequency	2.400～2.4835GHz
Freq. Tolerance	±20 ppm
Channels	**Wi-Fi:** USA/Canada: channel 1~11; Europe/China/Australia: channel 1~13;
Modulation	**Wi-Fi:** 802.11b(DSSS): CCK, DSSS 802.11g(OFDM): BPSK, QPSK,16QAM, 64QAM 802.11n(OFDM): BPSK, QPSK, 16QAM, 64QAM
PHY Data rates	**Wi-Fi:** 802.11b: 11, 5.5, 2, 1Mbps 802.11g: up to 54Mbps 802.11n: up to 65Mbps
Output Power	**Wi-Fi:** 802.11b 17±1.5dBm 802.11g 15±1.5dBm 802.11n 14±1.5dBm
EVM	802.11b EVM≦35% 802.11g EVM≦-25dB 802.11n EVM≦-28dB
Sensitivity	**Wi-Fi:** **802.11b@8% PER** 1Mbps -92dBm 11Mbps -84dBm **802.11g@10% PER** 6Mbps -88dBm 54Mbps -71dBm **802.11n_HT20@10% PER** MCS 0 -87dBm MCS 7 -68dBm
Security	802.11i (WPA, WP2). Open, shared key, and pair-wise key authentication services
Antenna Reference	Small antenna with 0~2dBi peak gain

3 Pin Assignments

3.1 Pin outline

< TOP VIEW >



3.2 Pin Definition

Pin#	Name	Type[Note1]	Description	Voltage
1	GND		Ground connections	
2	RF_1	I/O	WLAN RF signal; NC by default (use printing antenna on module)	
3	GND		Ground connections	
4	GND		Ground connections	
5	CHIP_EN	I	Enable Chip (1: enable; 0: shutdown)	3.3V
6	GPIOA_0[Note2,3]	I/O	GPIO Pin, refer to Pin Function Table	3.3V
7	GPIOA_1[Note3]	I/O	GPIO Pin, refer to Pin Function Table	3.3V

8	GPIOA_2	I/O	GPIO Pin, refer to Pin Function Table	3.3V
9	GPIOA_3	I/O	GPIO Pin, refer to Pin Function Table	3.3V
10	GPIOA_4	I/O	GPIO Pin, refer to Pin Function Table	3.3V
11	GND		Ground connections	
12	GND		Ground connections	
13~18	NC		No connected	
19	GND		Ground connections	
20	VBAT_IN	P	3.3V±10% power supply	3.3V
21	VD33	P	NC, internally connected to VBAT_IN for 3.3V power supply	3.3V
22	GND		Ground connections	
23	GPIOA_13Note2	I/O	GPIO Pin, refer to Pin Function Table	3.3V
24	GPIOA_14	I/O	GPIO Pin, refer to Pin Function Table	3.3V
25	GPIOA_15	I/O	GPIO pin, refer to Pin Function Table	3.3V
26	GPIOA_16	I/O	GPIO pin, refer to Pin Function Table	3.3V
27	GPIOA_17	I/O	GPIO pin, refer to Pin Function Table	3.3V
28	GND		Ground connections	
29	GPIOA_18	I/O	GPIO pin, refer to Pin Function Table	3.3V
30	GND		Ground connections	
31	GPIOA_19	I/O	GPIO pin, refer to Pin Function Table	3.3V
32	GPIOA_20	I/O	GPIO pin, refer to Pin Function Table	3.3V
33	GPIOA_23Note3	I/O	GPIO Pin, refer to Pin Function Table	3.3V
34	NC		No connected	

Note1: P for POWER, I for INPUT, O for OUTPUT

Note2: Make sure GPIOA_0 and GPIOA_13 won't be both pulled up when power-on.

Note3: GPIOA_0, GPIOA_1 and GPIOA_23 are power on trap pins with internal 10Kohm pull-low. We suggest keep them not connected, please contact us for support if customer really have to use them.

3.3 Pin Function Table

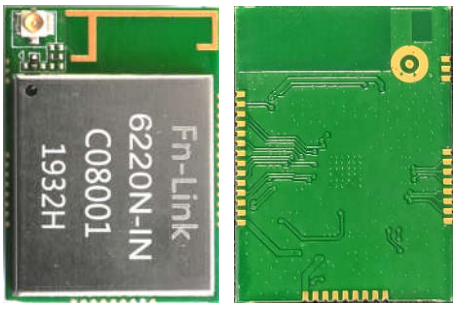
Module Pin#	IC Pin Name	SDIO	JTAG	UART	SPI/WL_LED /EXT_32K	I2C	PWM
6	GPIOA_0		JTAG_CLK	UART1_IN	EXT_32K		PWM[0]
7	GPIOA_1		JTAG_TMS	UART1_OUT			PWM[1]
8	GPIOA_2		JTAG_TDO	UART1_IN	SPI_CSn	I2C_SCL	PWM[2]
9	GPIOA_3		JTAG_TDI	UART1_OUT	SPI_SCL	I2C_SDA	PWM[3]
10	GPIOA_4		JTAG_TRST	UART1_CTS	SPI_MOSI		PWM[4]
23	GPIOA_13			UART0_IN			PWM[7]
24	GPIOA_14			UART0_OUT			PWM[2]
25	GPIOA_15	SD_D2		UART2_IN	SPI_CSn	I2C_SCL	PWM[3]
26	GPIOA_16	SD_D3		UART2_OUT	SPI_SCL	I2C_SDA	PWM[4]
27	GPIOA_17	SD_CMD					PWM[5]
29	GPIOA_18	SD_CLK					PWM[6]
31	GPIOA_19	SD_D0		UART2_CTS	SPI_MOSI	I2C_SCL	PWM[7]
32	GPIOA_20	SD_D1		UART2_RTS	SPI_MISO	I2C_SDA	PWM[0]
33	GPIOA_23				LED_0		PWM[7]

Note: Please contact Fn-Link for SW feasibility once you confirm GPIO configuration.

4 Dimensions

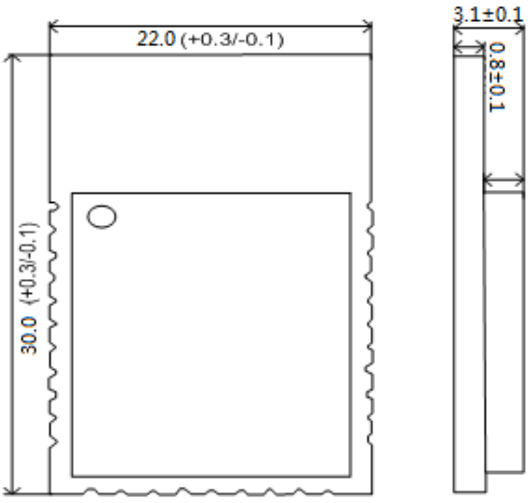
4.1 Module Picture

L x W : 30 x 22 (+0.3-0.1) mm



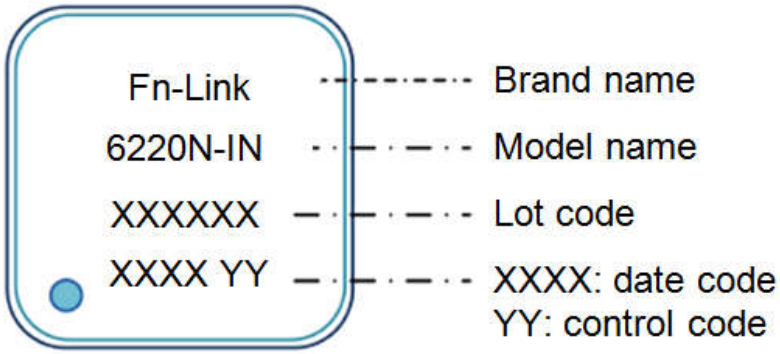
Refer to section 4.2 for detailed marking info.

H: 3.1 (±0.1) mm



4.2 Marking Description

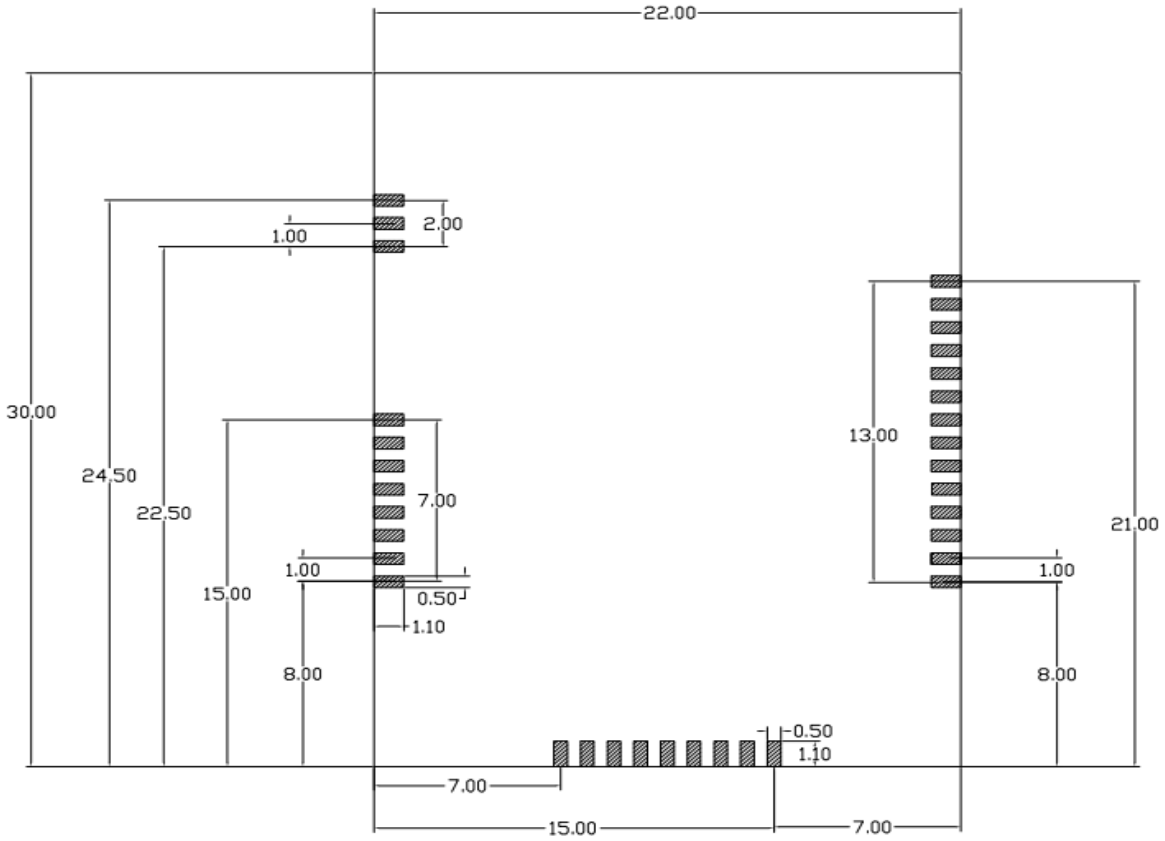
< TOP VIEW >



4.3 Physical Dimensions

(unit: mm)

< TOP VIEW >



4.4 Layout Recommendation

(unit: mm)

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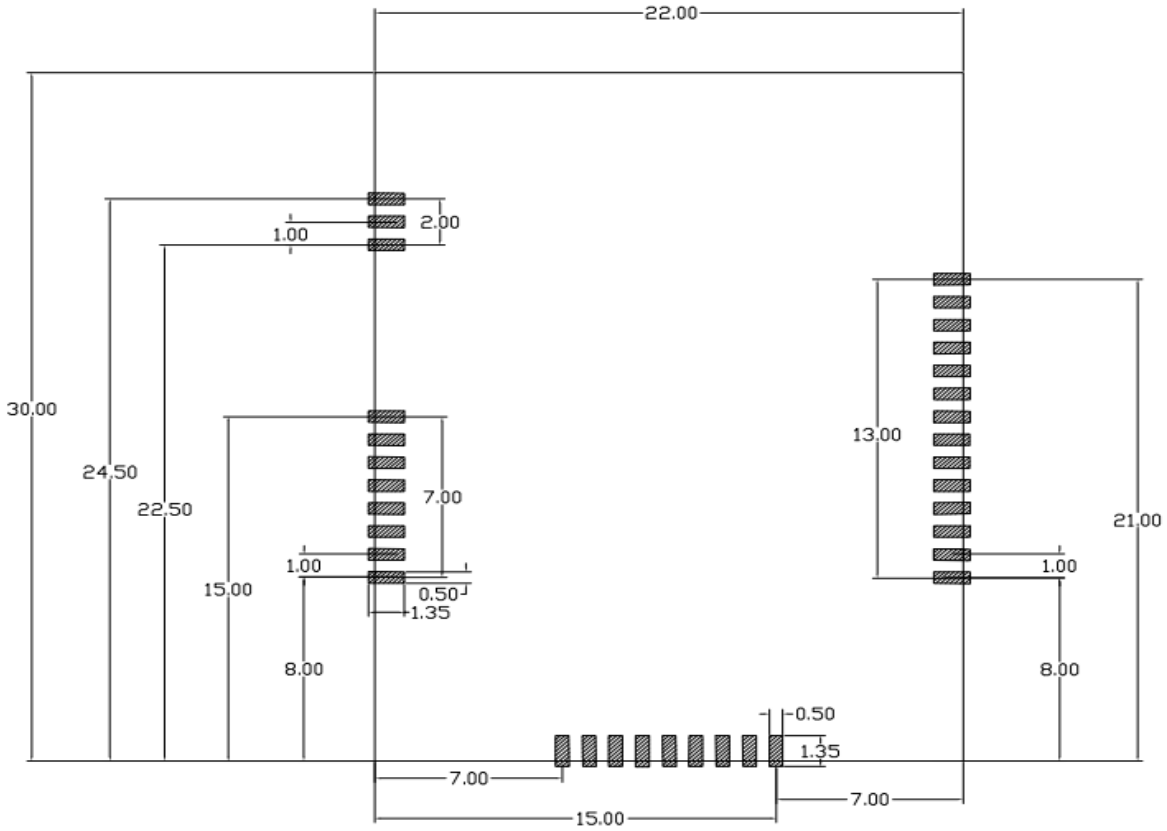
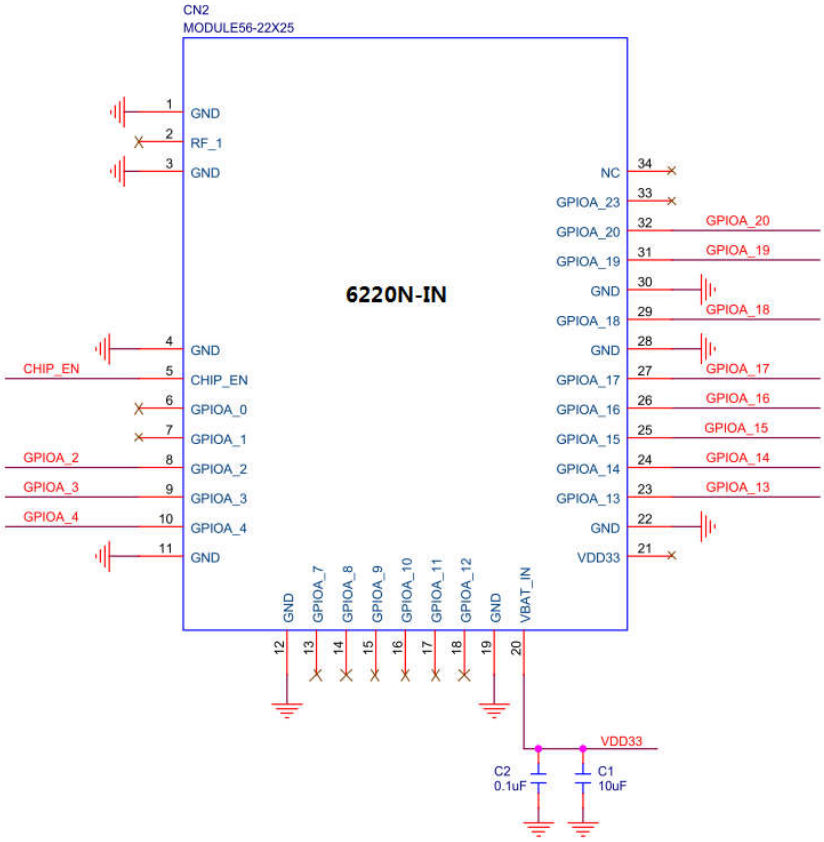


5 Reference Design



Note: Use on-board printing antenna by default. Contact Fn-Link for technical support if you want to use reserved pin2 or IPEX connector for external antenna design.

6 Ordering Information

Part NO.	Description
FG6220NINX-01	RTL8710CX-VA1, Wi-Fi 1T1R, Printing Antenna

7 The Key Material List

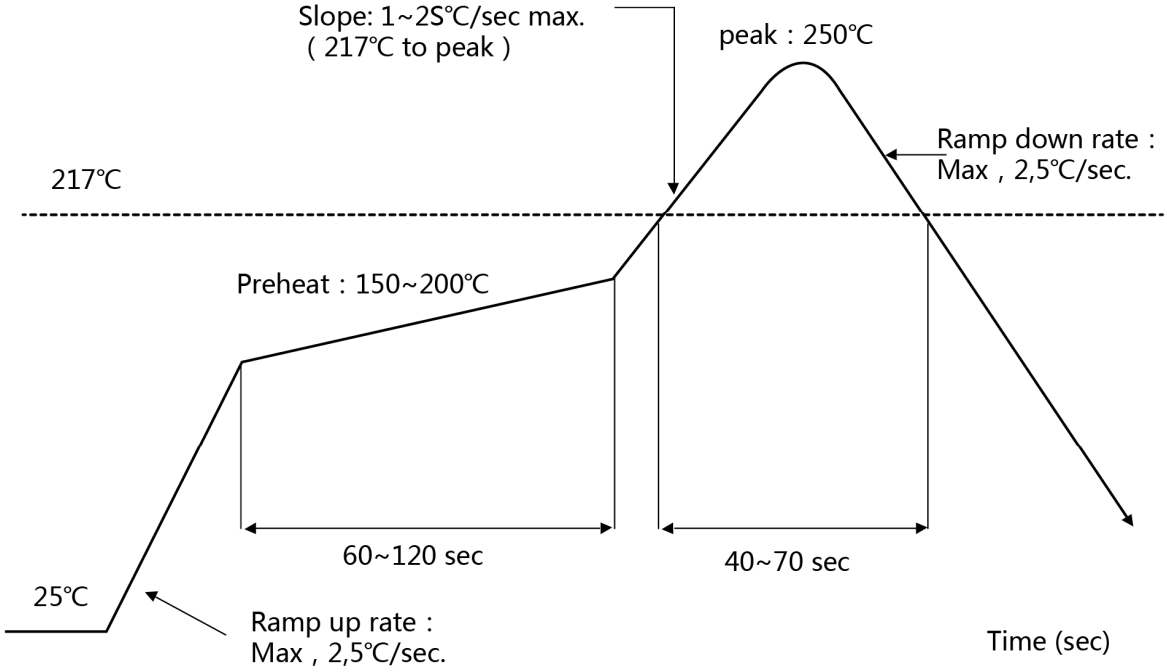
Main	Shielding cover	6220N-IN V1.0 Shielding cover Non-positioning foot (material: copper)
Main	Crystal	3225 40MHz, ±10ppm, 12pF, 7M40000010(TXC)
Alternative	Crystal	3225 40MHz, E3SB40E000900E(HOSONIC)
Alternative	Crystal	3225 40MHz, ±10ppm, 12pF (ECEC)
Main	Chipset	RTL8710CX-VA1 QFN40 5X5 (Realtek)
Main	Flash	MX25L1606EM1I-12G SOP8-150MIL（MXIC）

8 Recommended Reflow Profile

Refer to IPC/JEDEC standard.

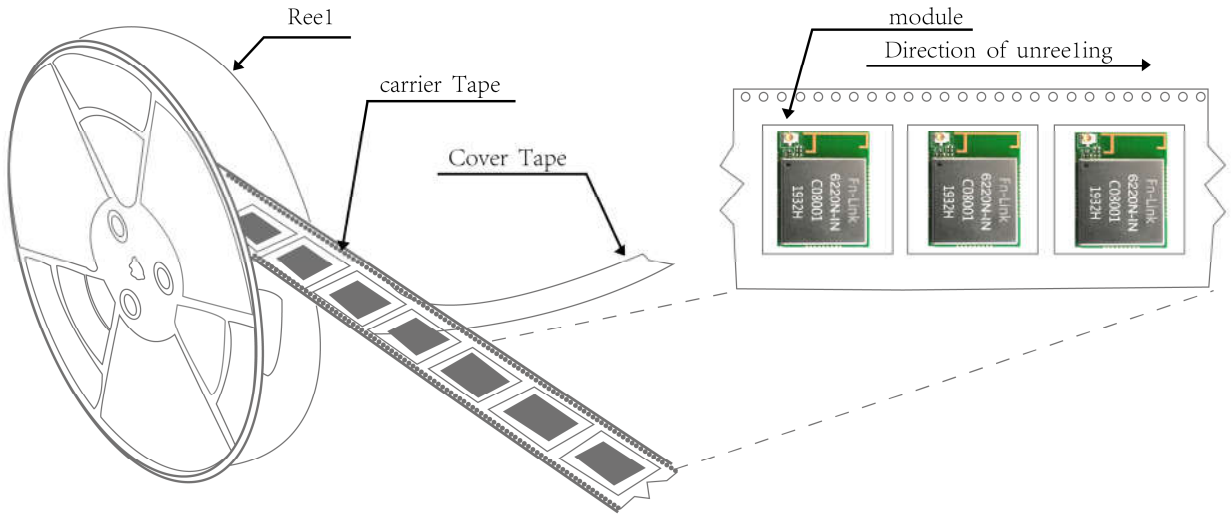
Peak Temperature : <250°C

Number of Times: ≤2 times



9 Package Information

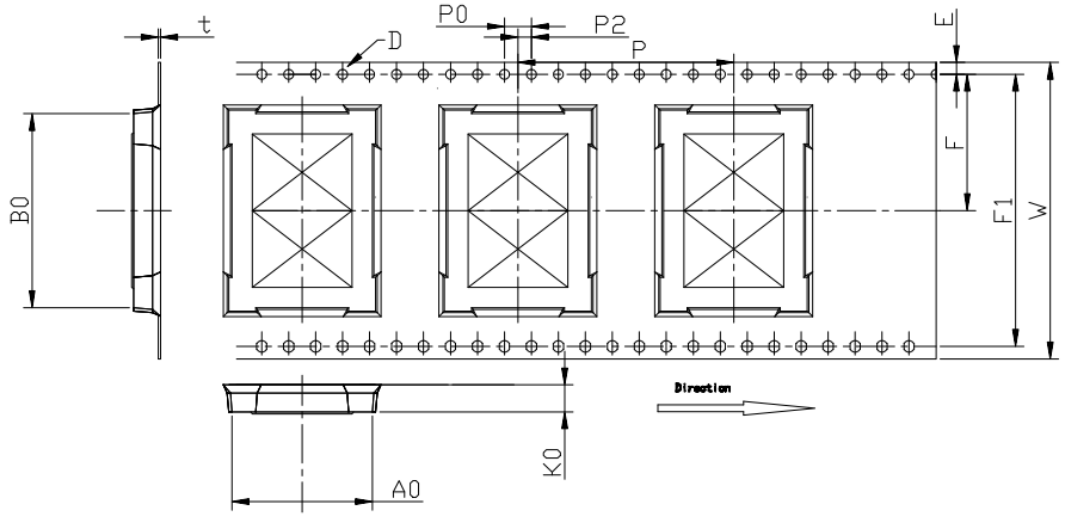
9.1 Reel



Reel Dimension: 13".

9.2 Tape Details

ITEM	W	A0	B0	D	E	F	F1	K0	P0	P2	P	T
DIM	44	22.45	30.40	1.5	1.75	20.2	40.4	3.15	4.0	2.0	32.0	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



Total length per 13" Reel: 16.5m.

Component load per 13" Reel: 500pcs.

Use hot sealing tape.

9.3 Package Details

NY bag size: 460mm*385mm

Internal size: 350*350*35mm

Carton size: 350*210*370mm

9.4 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, please take care of 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

10 Certification Information

10.1 EU Regulatory RED Declaration of Conformance

Hereby, we (Fn-Link) declared that this device is in compliance with the essential requirements and other relevant provisions of Directive2014/53/EU

BE	BG	CZ
DK	DE	EE
IE	EL	ES
FR	HR	IT
CY	LV	LT
LU	HU	MT
NL	AT	PL
PT	RO	SI
SK	FI	SE
UK		