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Innovation For Surfing

6220N-IN

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

IOT Module Datasheet

6220N-IN Module Datasheet

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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	Correct BT from 4.0 to 4.2	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, RF, and Bluetooth (excluding models with RTL871x chipset). 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, WP2). 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

Bluetooth Features

- RTL8720Cx series supports Bluetooth 4.2 Low Energy (BLE)

Host Interface

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

Block Diagram:

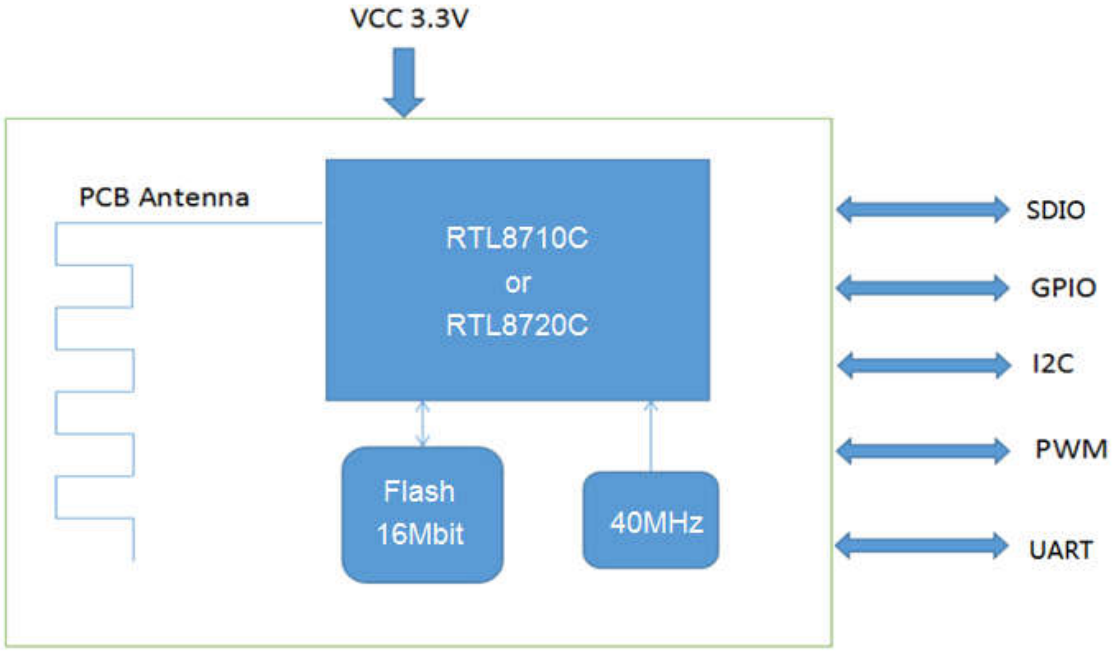


Figure 1

1.3 General specification

Model Name	6220N-IN
Main Chipset	Realtek RTL8720CN/RTL8710CX
Host Interface	SDIO,UART, GPIO, PWM, I2C
Wi-Fi Standards	802.11b/g/n
Dimension	L x W x H: 30mm*22mm*2.9mm
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 Wi-Fi RF Specification

2.1 2.4GHz RF Specification[Note1]

Operating Frequency	2.400～2.4835GHz			
Spectrum Mask	Min. b/g/n	Typ. b/g/n	Max. b/g/n	Unit b/g/n
1st side lobes(to fc ± 11MHZ)	-	TBD	-	dBr
2st side lobes(to fc ± 22MHZ)	-	TBD	-	dBr
Freq. Tolerance	-20/-20/-20	-	20/20/20	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**±1.5**dBm 802.11g 15**±1.5**dBm 802.11n 13**±1.5**dBm			
EVM	802.11b EVM≦35% 802.11g EVM≦-25dB 802.11n EVM≦-28dB			
Sensitivity	**Wi-Fi:** **802.11b@8% PER** 1Mbps -88dBm 2Mbps -87dBm 5.5Mbps -85dBm 11Mbps -82dBm **802.11g@10% PER** 6Mbps -86dBm 9Mbps -85dBm			

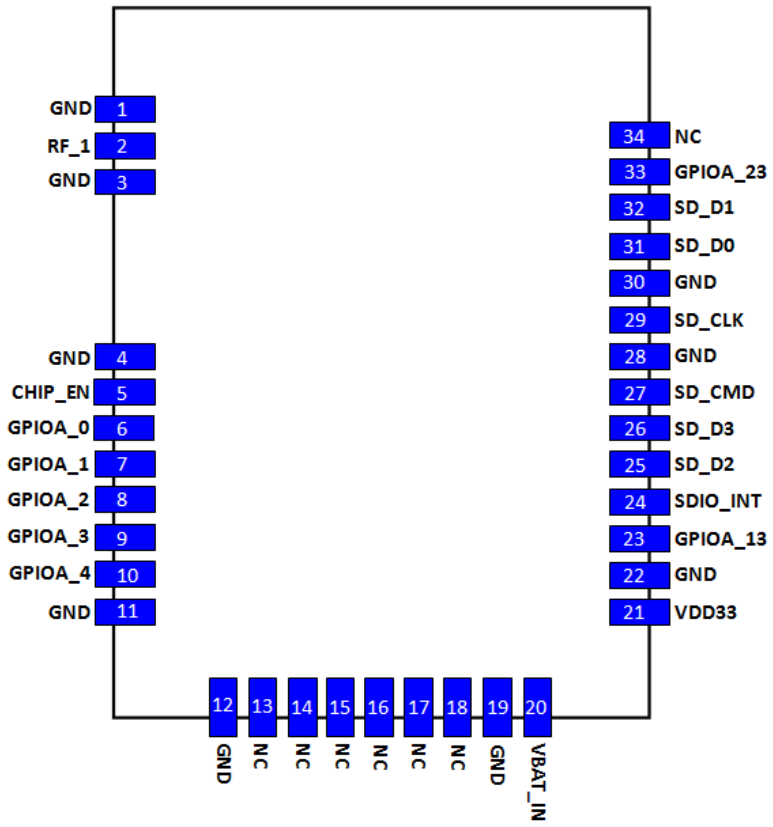
	12Mbps -84dBm 18Mbps -82dBm 24Mbps -80dBm 36Mbps -77dBm 48Mbps -73dBm 54Mbps -71dBm **802.11n_HT20@10% PER** MCS 0 -85dBm MCS 1 -82dBm MCS 2 -80dBm MCS 3 -78dBm MCS 4 -75dBm MCS 5 -71dBm MCS 6 -69dBm MCS 7 -67dBm
Security	802.11i (WPA, WP2). Open, shared key, and pair-wise key authentication services
Antenna Reference	Small antenna with 0~2 dBi peak gain

Note1: Data referred to Realtek DVT test result with RTL8710C model.

3 Pin Assignments

3.1 Pin outline

< TOP VIEW >



3.2 Pin Definition

Pin#	Name	Type	Description	Voltage
1	GND		Ground connections	
2	RF_1	I/O	WL 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	I/O	GPIO Pin, refer to Pin Function Table	3.3V
7	GPIOA_1	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	NC		No connected	
14	NC		No connected	
15	NC		No connected	
16	NC		No connected	
17	NC		No connected	
18	NC		No connected	
19	GND		Ground connections	
20	VBAT_IN	P	3.3V±10% input	3.3V
21	VD33	P	NC, internally connected to VBAT_IN	3.3V
22	GND		Ground connections	
23	GPIOA_13	I/O	GPIO Pin, refer to Pin Function Table	3.3V
24	SDIO_INT	I/O	SDIO Interrupt Host	
25	SD_D2	I/O	SDIO data line 2	
26	SD_D3	I/O	SDIO data line 3	
27	SD_CMD	I/O	SDIO command line	
28	GND		Ground connections	
29	SD_CLK	I/O	SDIO clock line	
30	GND		Ground connections	
31	SD_D0	I/O	SDIO data line 0	
32	SD_D1	I/O	SDIO data line 1	
33	GPIOA_23	I/O	GPIO Pin, refer to Pin Function Table	3.3V
34	NC		No connected	

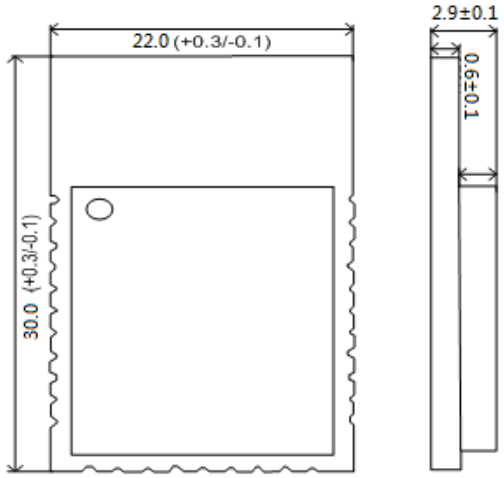
P:POWER I:INPUT O:OUTPUT

3.3 Pin Function Table

GPIOA_0	JTAG_CLK	UART1_IN	EXT_32K		PWM[0]
GPIOA_1	JTAG_TMS	UART1_OUT	BT_LED		PWM[1]
GPIOA_2	JTAG_TDO	UART1_IN		I2C_SCL	PWM[2]
GPIOA_3	JTAG_TDI	UART1_OUT		I2C_SDA	PWM[3]
GPIOA_4	JTAG_TRST	UART1_CTS			PWM[4]
GPIOA_13					PWM[7]
GPIOA_23			LED_0		PWM[7]

4 Dimensions

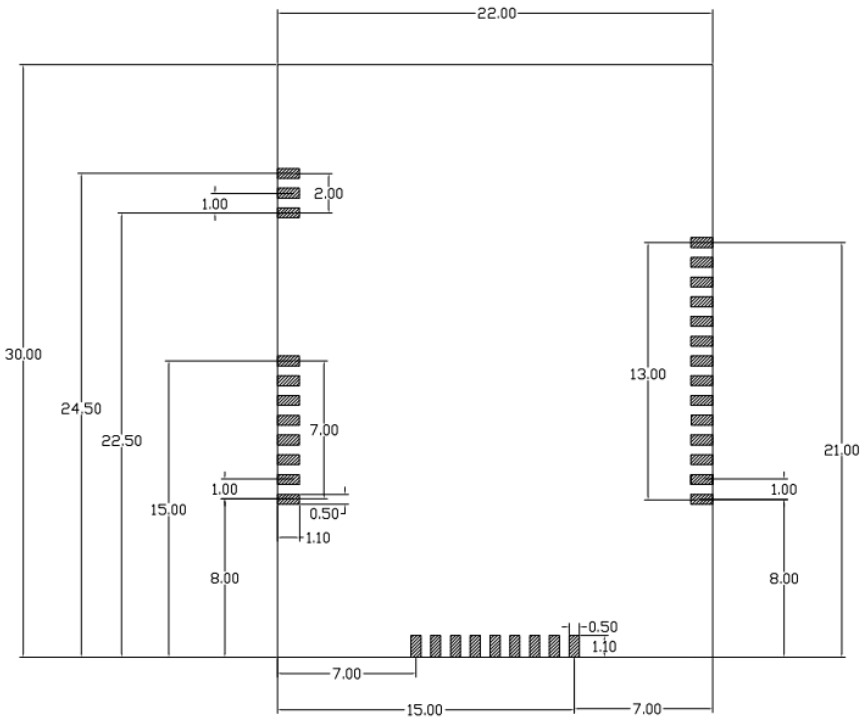
4.1 Module Picture

L x W : 30 x 22 (+0.3-0.1) mm	
H: 2.9 (±0.1) mm	
Weight	TBD

4.2 Physical Dimensions

(unit: mm)

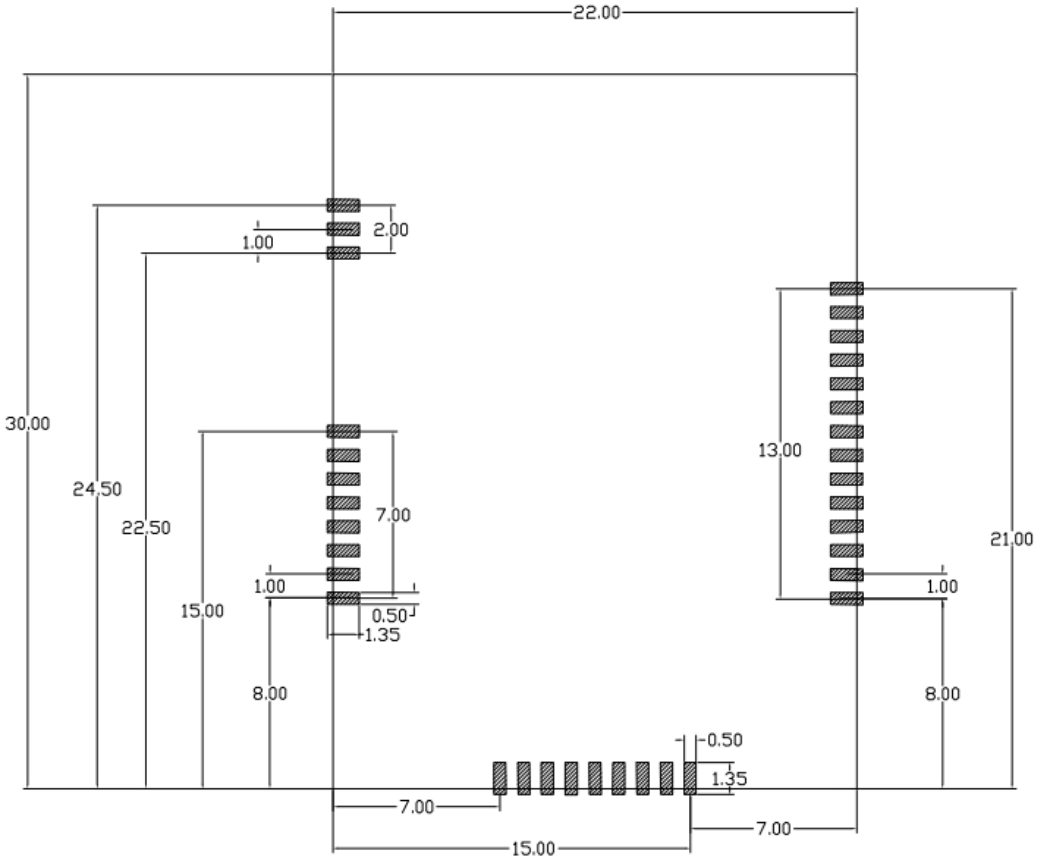
< TOP VIEW >



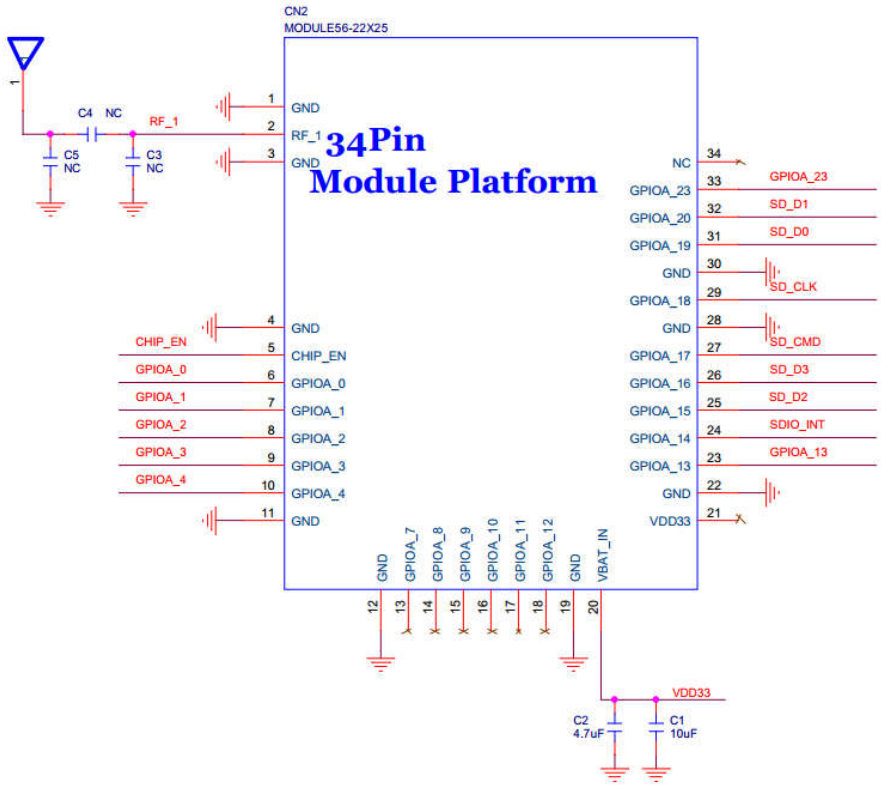
4.3 Layout Recommendation

(unit: mm)

< TOP VIEW >



5 Reference Design



6 Ordering Information

Part NO.	Description
FG6220NINX-00	Main Chip RTL8720CN-VA1, Wi-Fi 1T1R, Bluetooth 4.2
FG6220NINX-01	Main Chip RTL8710CX-VA1, Wi-Fi 1T1R

7 The Key Material List

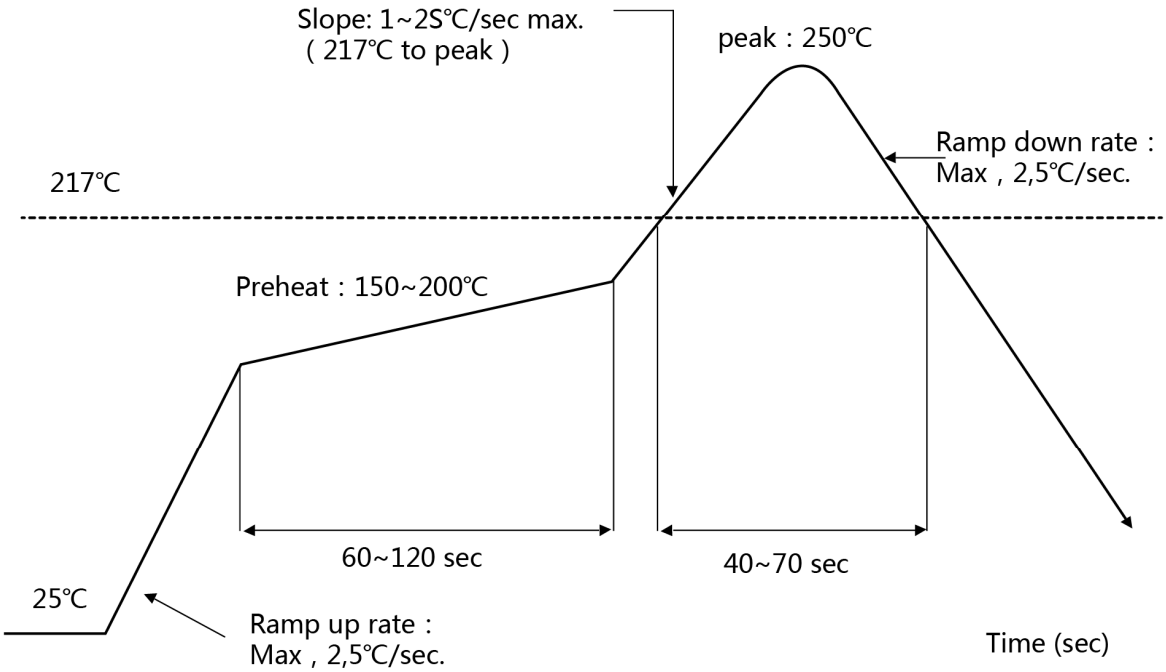
Main	Shielding cover	6220N-IN V1.0 Shielding cover Non-positioning foot (material: copper)
Main	Crystal	3225　40MHz, ±10ppm, 12pF, 7M40000010(TXC)
Alternative	Crystal	XTAL-SMD3.2X2.5, 40MHz, E3SB40E000900E(HOSONIC)
Main	Chipset	RTL8720CN-VA1 / RTL8710CX-VA1 QFN40 5X5 (Realtek)
Main	Flash	MX25L1606EM1I-12G　SOP8-150MIL（MXIC）

8 Recommended Reflow Profile

Refer to IPC/JEDEC standard.

Peak Temperature : <250°C

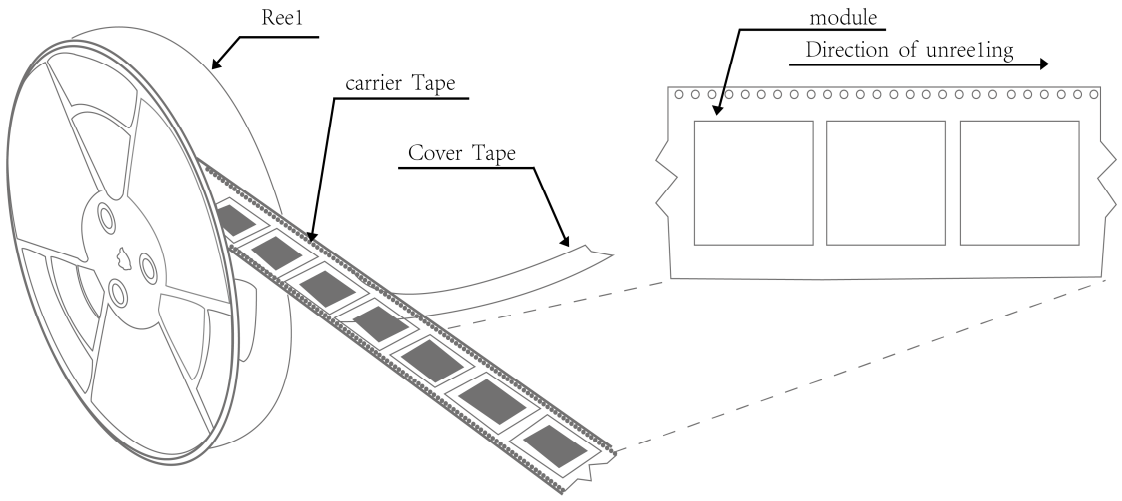
Number of Times: ≤2 times



9 Package Information

9.1 Reel

(picture for reference only)



9.2 Packaging Detail

The take-up package (picture for reference only)

9.3 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