

PRODUCT SPECIFICATION

8274B-PR

Wi-Fi Dual-band 2x2 11ac + Bluetooth 5.0

PCIe/UART Combo Module

Version:v1.6

Customer: _____

Customer P/N: _____

Signature: _____

Date: _____

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8274B-PR Module Datasheet

Ordering Information	Part NO.	Description
	FG8274BPRX-01	QCA6174A-1, a/b/g/n/ac Wi-Fi+BLE5.0, 2T2R, 13X15mm, PCIE+ Uart, PCB Version V5.0

Target power:

2.4G: 16/15/14

5.8G: 11/10/9



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1. General Description

1.1 Introduction

Fn-Link Technology would like to announce a low-cost and low-power consumption module which has all of the Wi-Fi and Bluetooth functionalities. The highly integrated module makes the possibilities of web browsing, VoIP, Bluetooth headsets applications. With seamless roaming capabilities and advanced security, also could interact with different vendors' 802.11a/b/g/n/ac 2x2 Access Points in the wireless LAN.

The wireless module complies with IEEE 802.11 a/b/g/n/ac 2x2 MIMO standard and it can achieve up to a speed of 867Mbps with dual stream in 802.11n to connect the wireless LAN. The integrated module provides PCI-e interface for Wi-Fi, UART / PCM interface for Bluetooth.

This compact module is a total solution for a combination of Wi-Fi and Bluetooth V5.0 technologies. The module is specifically developed for all portable devices.

1.2 Description

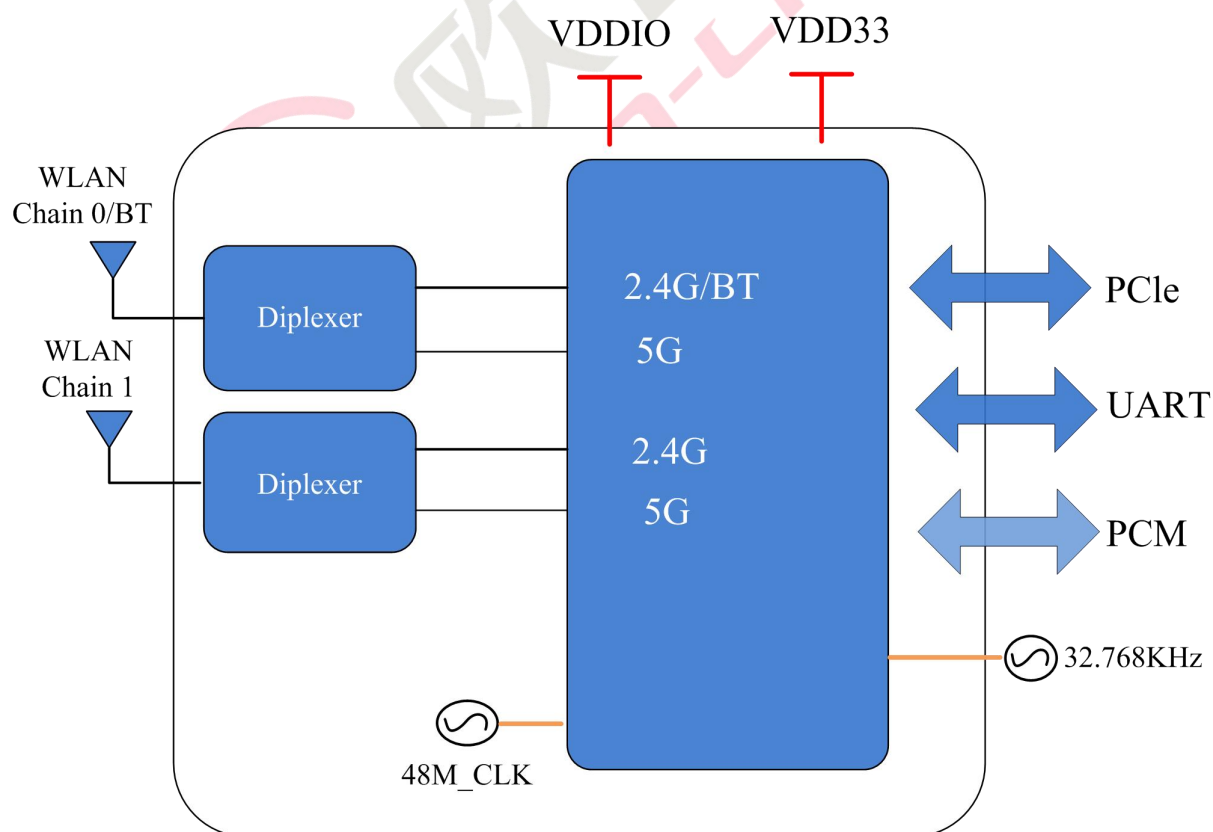
Model Name	8274B-PR
Product Description	Support Wi-Fi/Bluetooth functionalities
Dimension	L x W x H: 15 x 13 x 1.9 (typical) mm
Wi-Fi Interface	Support PCI-e
BT Interface	UART / PCM
Operating temperature	-40°C to 85°C
Storage temperature	-40°C to 125°C

2. Features

General

- Highly integrated wireless local area network(WLAN) system-on-chip (SOC) for 5 GHZ 802.11ac, or 2.4G/5G 802.11n WLAN applications.
- Dual-stream spatial multiplexing up to 867 Mbps data rate.
- Supports 20/40MHz at 2.4GHz and supports 20/40/80MHz at 5GHz
- Supports low power PCI-e interface for WLAN and UART/PCM interface for Bluetooth.
- Supports Bluetooth V5.0, BLE, ANT+ and be backwards compatible with Bluetooth 1.2, 2.X+ enhance data rate.
- Supports WLAN-Bluetooth coexistence.
- Supports Bluetooth for class1 and class2 power level transmissions without requiring an external PA.
- BT host digital interface:
 - HCI UART (up to 3.2 Mbps)
 - PCM for audio data

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 ~ Ch14		
Test Items	Typical Value		EVM
Output Power ¹	802.11b /11Mbps : 16 dBm $\pm$ 2 dB		EVM $\leq$ -9dB
	802.11g /54Mbps : 15 dBm $\pm$ 2 dB		EVM $\leq$ -25dB
	802.11n /MCS7 : 14 dBm $\pm$ 2 dB		EVM $\leq$ -28dB
Spectrum Mask	Meet with IEEE standard		
Freq. Tolerance	$\pm$ 20ppm		
Receive Sensitivity (11b,20MHz) @8% PER	- 1Mbps PER @ -92 dBm, typical		$\leq$ -83
	- 2Mbps PER @ -90 dBm, typical		$\leq$ -80
	- 5.5Mbps PER @ -87 dBm, typical		$\leq$ -79
	- 11Mbps PER @ -85 dBm, typical		$\leq$ -76
Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps PER @ -89 dBm, typical		$\leq$ -85
	- 9Mbps PER @ -88 dBm, typical		$\leq$ -84
	- 12Mbps PER @ -87 dBm, typical		$\leq$ -82
	- 18Mbps PER @ -84 dBm, typical		$\leq$ -80
	- 24Mbps PER @ -81 dBm, typical		$\leq$ -77
	- 36Mbps PER @ -78 dBm, typical		$\leq$ -73
	- 48Mbps PER @ -73 dBm, typical		$\leq$ -69
Receive Sensitivity (11n,20MHz) @10% PER	- 54Mbps PER @ -71 dBm, typical		$\leq$ -68
	- MCS=0 PER @ -89 dBm, typical		$\leq$ -85
	- MCS=1 PER @ -86 dBm, typical		$\leq$ -82
	- MCS=2 PER @ -84 dBm, typical		$\leq$ -80
	- MCS=3 PER @ -80 dBm, typical		$\leq$ -77
	- MCS=4 PER @ -77 dBm, typical		$\leq$ -73
	- MCS=5 PER @ -72 dBm, typical		$\leq$ -69
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=6 PER @ -71 dBm, typical		$\leq$ -68
	- MCS=7 PER @ -69 dBm, typical		$\leq$ -67
	- MCS=0 PER @ -86 dBm, typical		$\leq$ -82
	- MCS=1 PER @ -83 dBm, typical		$\leq$ -79
	- MCS=2 PER @ -81 dBm, typical		$\leq$ -77

	- MCS=3	PER @ -77 dBm, typical	≤-74
	- MCS=4	PER @ -74 dBm, typical	≤-70
	- MCS=5	PER @ -70 dBm, typical	≤-66
	- MCS=6	PER @ -68 dBm, typical	≤-65
	- MCS=7	PER @ -67 dBm, typical	≤-64
Maximum Input Level	802.11b : -10 dBm		
	802.11g/n : -20 dBm		
Antenna Reference	Small antennas with 0~2 dBi peak gain		

4.2 5GHz RF Specification

Feature	Description	
WLAN Standard	IEEE 802.11a/n/ac 2x2, Wi-Fi compliant	
Frequency Range	5.150 GHz ~ 5.850 GHz (5.0 GHz ISM Band)	
Number of Channels	5.0GHz: Please see the table1	
Test Items	Typical Value	EVM
Output Power	802.11a /54Mbps : 11 dBm ± 2 dB	EVM ≤ -25dB
	802.11n /MCS7 : 10 dBm ± 2 dB	EVM ≤ -28dB
	802.11ac /MCS9 : 9 dBm ± 2 dB	EVM ≤ -32dB
Receive Sensitivity (11a,20MHz) @10% PER	- 6Mbps PER @ -88 dBm, typical	≤-85
	- 9Mbps PER @ -87 dBm, typical	≤-84
	- 12Mbps PER @ -86 dBm, typical	≤-82
	- 18Mbps PER @ -83 dBm, typical	≤-80
	- 24Mbps PER @ -80 dBm, typical	≤-77
	- 36Mbps PER @ -77 dBm, typical	≤-73
	- 48Mbps PER @ -72 dBm, typical	≤-69
	- 54Mbps PER @ -70 dBm, typical	≤-68
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -88 dBm, typical	≤-85
	- MCS=1 PER @ -85 dBm, typical	≤-82
	- MCS=2 PER @ -83 dBm, typical	≤-80
	- MCS=3 PER @ -80 dBm, typical	≤-77
	- MCS=4 PER @ -76 dBm, typical	≤-73
	- MCS=5 PER @ -71 dBm, typical	≤-69
	- MCS=6 PER @ -70 dBm, typical	≤-68

		- MCS=7 PER @ -68 dBm, typical	≤-67
Receive Sensitivity (11n,40MHz) @10% PER		- MCS=0 PER @ -85 dBm, typical	≤-82
		- MCS=1 PER @ -82 dBm, typical	≤-79
		- MCS=2 PER @ -80 dBm, typical	≤-77
		- MCS=3 PER @ -77 dBm, typical	≤-74
		- MCS=4 PER @ -73 dBm, typical	≤-70
		- MCS=5 PER @ -69 dBm, typical	≤-66
		- MCS=6 PER @ -68 dBm, typical	≤-65
		- MCS=7 PER @ -67 dBm, typical	≤-64
Receive Sensitivity (11ac,20MHz) @10% PER		- MCS=0, NSS1 PER @ -86 dBm, typical	≤-82
		- MCS=1, NSS1 PER @ -84 dBm, typical	≤-80
		- MCS=2, NSS1 PER @ -82 dBm, typical	≤-77
		- MCS=3, NSS1 PER @ -79 dBm, typical	≤-73
		- MCS=4, NSS1 PER @ -75 dBm, typical	≤-69
		- MCS=5, NSS1 PER @ -70 dBm, typical	≤-68
		- MCS=6, NSS1 PER @ -69 dBm, typical	≤-67
		- MCS=7, NSS1 PER @ -68 dBm, typical	≤-62
Receive Sensitivity (11ac,40MHz) @10% PER		- MCS=8, NSS1 PER @ -67 dBm, typical	≤-60
		- MCS=0, NSS1 PER @ -84 dBm, typical	≤-79
		- MCS=1, NSS1 PER @ -81 dBm, typical	≤-77
		- MCS=2, NSS1 PER @ -79 dBm, typical	≤-74
		- MCS=3, NSS1 PER @ -76 dBm, typical	≤-70
		- MCS=4, NSS1 PER @ -73 dBm, typical	≤-66
		- MCS=5, NSS1 PER @ -68 dBm, typical	≤-65
		- MCS=6, NSS1 PER @ -67 dBm, typical	≤-64
		- MCS=7, NSS1 PER @ -66 dBm, typical	≤-59
		- MCS=8, NSS1 PER @ -64 dBm, typical	≤-57
Receive Sensitivity (11ac,80MHz) @10% PER		- MCS=9, NSS1 PER @ -62 dBm, typical	≤-55
		- MCS=0, NSS1 PER @ -81 dBm, typical	≤-79
		- MCS=1, NSS1 PER @ -78 dBm, typical	≤-76
		- MCS=2, NSS1 PER @ -76 dBm, typical	≤-74
		- MCS=3, NSS1 PER @ -72 dBm, typical	≤-71
		- MCS=4, NSS1 PER @ -69 dBm, typical	≤-67
		- MCS=5, NSS1 PER @ -66 dBm, typical	≤-63
		- MCS=6, NSS1 PER @ -64 dBm, typical	≤-62
		- MCS=7, NSS1 PER @ -59 dBm, typical	≤-61
		- MCS=8, NSS1 PER @ -58 dBm, typical	≤-56

	- MCS=9, NSS1 PER @ -56 dBm, typical	≤-54
Maximum Input Level	802.11a/n : -30 dBm	
Antenna Reference	Small antennas with 0~2 dBi peak gain	

15GHz(20MHz) Channel table

Band range	Operating Channel Numbers	Channel center frequencies(MHz)
5150MHz~5250MHz	36	5180
	40	5200
	44	5220
	48	5240
5250MHz~5350MHz	52	5260
	56	5280
	60	5300
	64	5320
5470MHz~5725MHz	100	5500
	104	5520
	108	5540
	112	5560
	116	5580
	120	5600
	124	5620
	128	5640
	132	5660
	136	5680
	140	5700
5725MHz~5850MHz	149	5745
	153	5765
	157	5785
	161	5805
	165	5825

4.3 Bluetooth Specification

Feature	Description		
General Specification			
Bluetooth Standard	Bluetooth V5.0		
Host Interface	UART		
Antenna Reference	Small antennas with 0~2 dBi peak gain		
Frequency Band	2400 MHz ~ 2483.5 MHz		
Number of Channels	79 channels		
Modulation	GFSK, $\pi/4$ -DQPSK, 8DPSK		
RF Specification			
	Min(dBm)	Typical(dBm)	Max(dBm)
Output Power (Class 1)		10	
Output Power (Class 2)		2	
Sensitivity @ BER=0.1% for GFSK (1Mbps)		-92	
Sensitivity @ BER=0.01% for $\pi/4$ -DQPSK (2Mbps)		-92	
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)		-85	
Maximum Input Level	GFSK (1Mbps):-20dBm		
	$\pi/4$ -DQPSK (2Mbps) :-20dBm		
	8DPSK (3Mbps) :-20dBm		

5. ID setting information

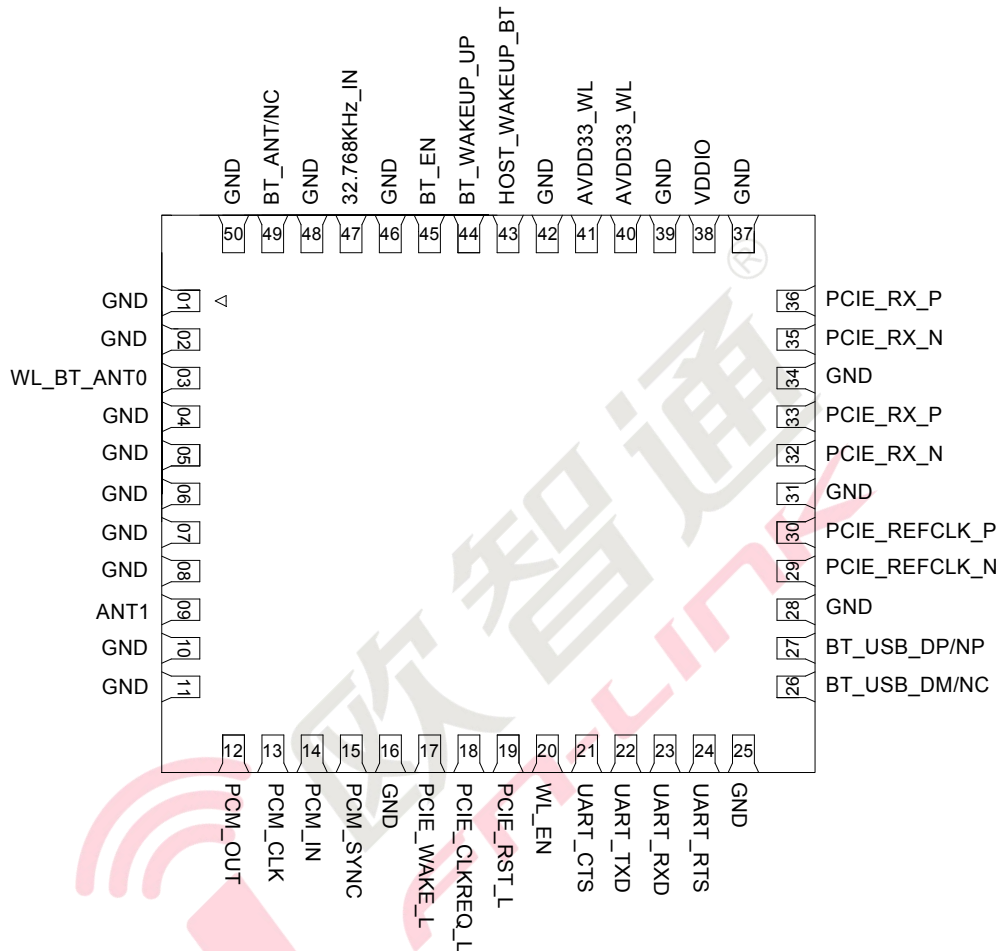
WI-FI

Vendor ID	168C
Product ID	003E

6. Pin Definition

6.1 Pin Outline

< TOP VIEW >



6.2 Pin Definition details

NO.	Name	Type	Description	Voltage
1、 2	GND	—	Ground connections	
3	WL_BT_ANT0	—	WL_BT_ANT0 RF output	
4~8	GND	—	Ground connections	
9	ANT1	P	ANT1 RF output	
10、 11	GND	—	Ground connections	
12	PCM_OUT	O	PCM Data output	3.3V or 1.8V
13	PCM_CLK	I/O	PCM clock	3.3V or 1.8V

14	PCM_IN	I	PCM data input	3.3V or 1.8V
15	PCM_SYNC	I/O	PCM sync signal	3.3V or 1.8V
16	GND	—	Ground connections	
17	PCIE_WAKE_L	O	PCI-e wake up host, open drain, active low.	3.3V or 1.8V
18	PCIE_CLKREQ_L	O	PCI-e reference clock request signal, open drain, active low .	3.3V or 1.8V
19	PCIE_RST_L	PD	PCI-e reset module, internal weak pull down.	3.3V or 1.8V
20	WL_EN	PD	WLAN enable signal, active high.	3.3V or 1.8V
21	UART_CTS	I	Bluetooth UART interface	3.3V or 1.8V
22	UART_TXD	O	Bluetooth UART interface	3.3V or 1.8V
23	UART_RXD	I	Bluetooth UART interface	3.3V or 1.8V
24	UART_RTS	O	Bluetooth UART interface	3.3V or 1.8V
25	GND	—	Ground connections	
26	BT_USB_DM/NC	—	No connection	
27	BT_USB_DP/NC	—	No connection	
28	GND	—	Ground connections	
29	PCIE_REFCLK_N	I	PCI-E CLK Difference -	
30	PCIE_REFCLK_P	I	PCI-E CLK Difference +	
31	GND	—	Ground connections	
32	PCIE_TX_N	O	PCI-E Data Out Difference -	
33	PCIE_TX_P	O	PCI-E Data Out Difference +	
34	GND	—	Ground connections	
35	PCIE_RX_N	I	PCI-E Data IN Difference -	
36	PCIE_RX_P	I	PCI-E Data IN Difference +	
37	GND	—	Ground connections	
38	VDDIO	—	External power source input for VDDIO domain	3.3V or 1.8V
39	GND	—	Ground connections	
40	AVDD33_WL	P	Main power source input	3.3V
41	AVDD33_WL	P	Main power source input	3.3V
42	GND	—	Ground connections	
43	HOST_WAKEUP_BT	I	Host wake up Bluetooth, active high.	3.3V or 1.8V
44	BT_WAKEUP_HOST	O	Bluetooth wake up host signal, active high.	3.3V or 1.8V
45	BT_EN	PD	Bluetooth enable signal, active high.	3.3V or 1.8V
46	GND	—	Ground connections	
47	32.768KHz_IN	I	External sleep clock input(32.768kHz) .	3.3V or 1.8V
48	GND	—	Ground connections	
49	BT_ANT/NC		Bluetooth Antenna (no connection for optional)	

50	GND	—	Ground connections	
51~56	GND	—	Ground connections	

P:POWER I:INPUT O:OUTPUT

7. Electrical Specifications

7.1 Power Supply DC Characteristics

	Min.	Typ.	Max.	Unit
Operating Temperature	-40	25	85	deg.C
VDD	3.15	3.3	3.45	V
VDDIO	1.7	1.8 or 3.3	3.45	V

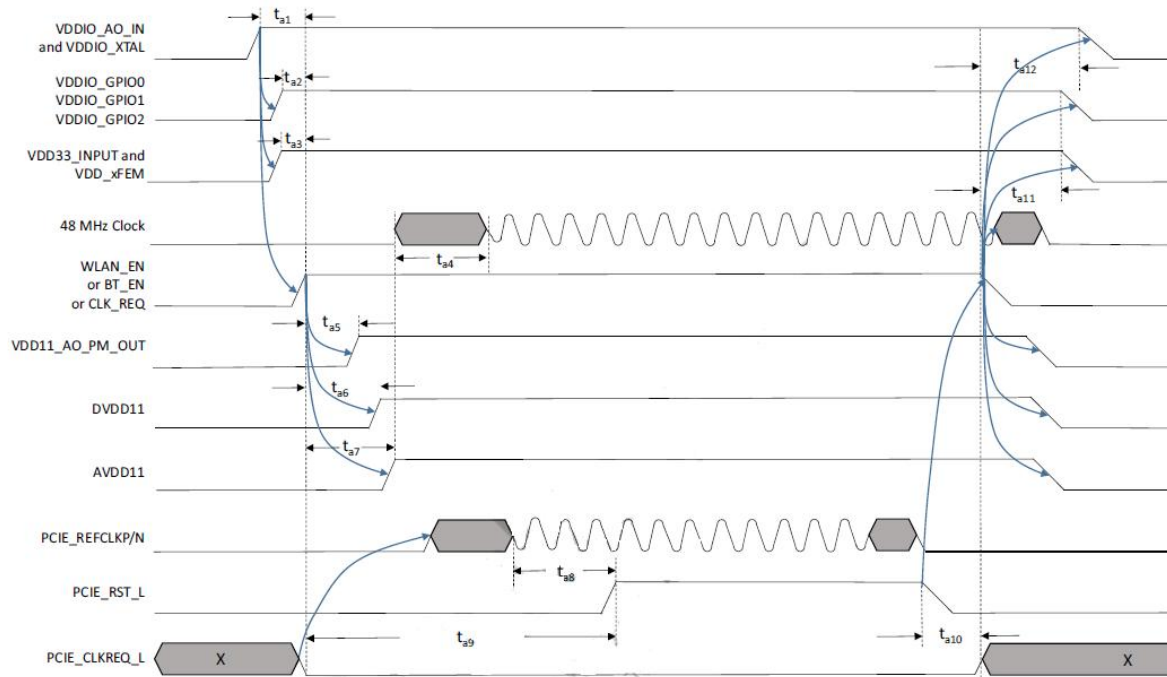
7.2 Power Consumption

Power Consumption		VCC33 = 3.3V(Unit:mA)
	Wi-Fi on Mode	106
	TX (2.4G mode HT20)	420
	RX (2.4G mode HT20)	151
	TX (5G mode HT80)	484
	RX (5G mode HT80)	249

7.3 Interface Circuit time series

7.3.1 PCIe powerup sequence timing

PCIe powerup sequence timing

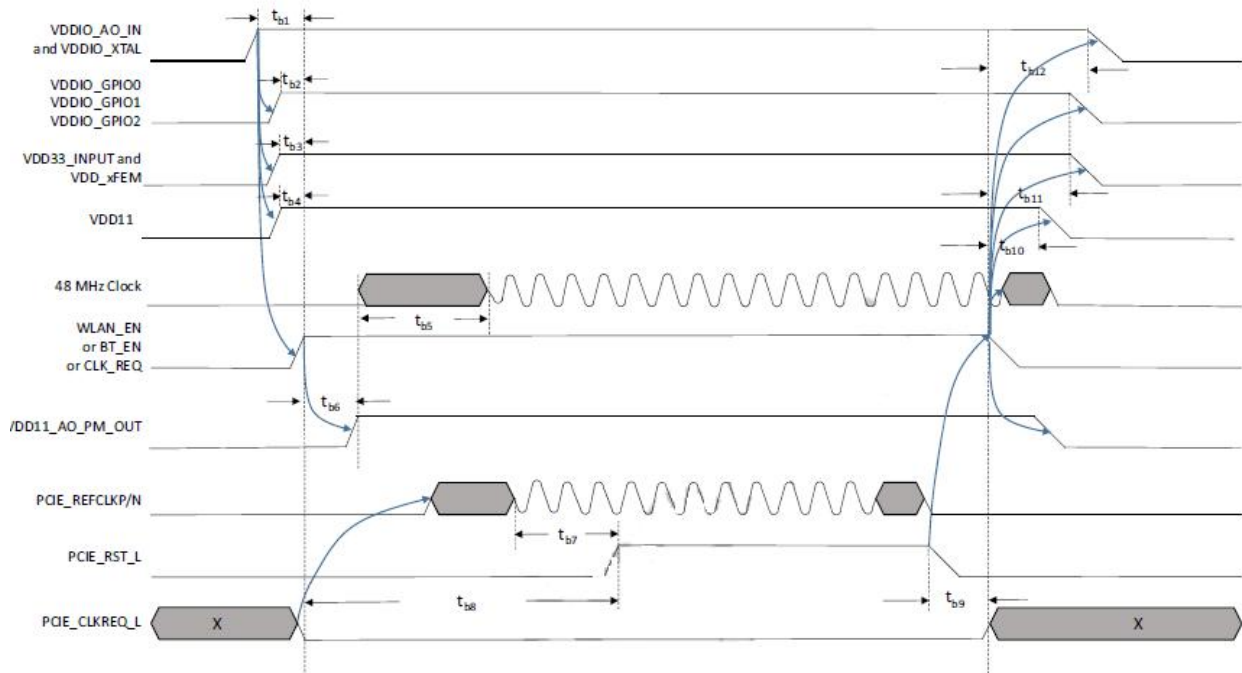


PCIe power sequence timing diagram (internal 1.1 V)

PCIe power sequence timing requirements (internal 1.1 V)

Symbol	Parameter	Min	Max	Units
t_{a1}	VDDIO_AO valid to WL_EN input active ^{1,2}	12	—	μ s
t_{a2}	VDDIO_XXX valid to WL_EN input active	10	—	μ s
t_{a3}	VDD33 valid to WL_EN input active	10	—	μ s
t_{a4}	48 MHz clock stabilization time	1	—	ms
t_{a5}	WL_EN valid to AO 1.1 V established	—	500	μ s
t_{a6}	WL_EN valid to DVDD11 established	—	3.5	ms
t_{a7}	WL_EN valid to AVDD11 established	—	4	ms
t_{a8}	REFCLK stable before PCIE_RST_L de-assert	100	—	μ s
t_{a9}	WL_EN valid to PCIE_RST_L de-assert	10	—	ms
t_{a10}	PCIE_RST_L assert to WL_EN de-assert	10	—	μ s
t_{a11}	WL_EN de-assert to VDDIO_XXX and VDD33 ramping down	10	—	μ s
t_{a12}	WL_EN de-assert to VDDIO_AO ramping down ¹	12	—	μ s

- VDDIO_AO must be on first and off last. VDDIO_AO must also be >1.62 V at all times when VDD33 > 1 V.
- VDDIO_XTAL may be on before or at the same time as VDDIO_GPIOx. VDDIO_XTAL must not be on before VDDIO_AO.



PCle power sequence timing diagram (external 1.1 V)

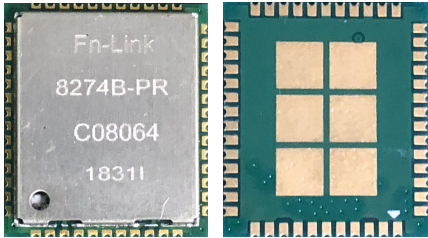
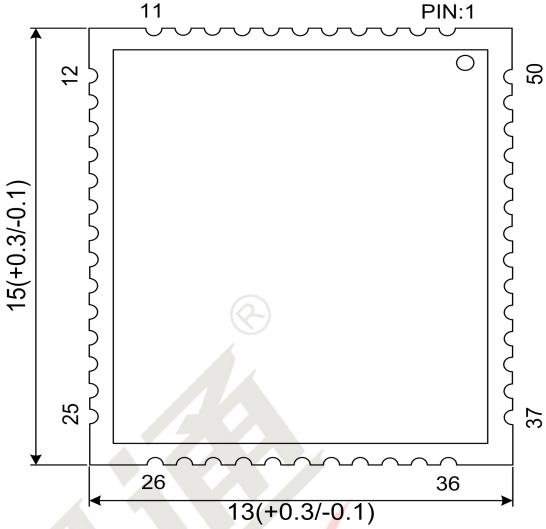
PCle power sequence timing requirements (external 1.1 V)

Symbol	Parameter	Min	Max	Units
t_{b1}	VDDIO_AO valid to WL_EN input active ^{1,2}	12	—	μs
t_{b2}	VDDIO_XXX valid to WL_EN input active	10	—	μs
t_{b3}	VDD33 valid to WL_EN input active	10	—	μs
t_{b4}	WL_EN valid to VDD11 external 1.1V established	8	—	μs
t_{b5}	48 MHz clock stabilization time	1	—	ms
t_{b6}	WL_EN valid to AO 1.1V established	—	500	μs
t_{b7}	REFCLK stable before PCIE_RST_L de-assert	100	—	μs
t_{b8}	WL_EN valid to PCIE_RST_L de-assert ³	10	—	μs
t_{b9}	PCIE_RST_L assert to WL_EN de-assert	10	—	μs
t_{b10}	WL_EN de-assert to VDD11 ramping down	8	—	μs
t_{b11}	WL_EN de-assert to VDDIO_XXX and VDD33 ramping down	10	—	μs
t_{b12}	WL_EN de-assert to VDDIO_AO ramping down ¹	12	—	μs

1. VDDIO_AO must be on first and off last. VDDIO_AO must also be $>1.62\text{ V}$ at all times when $\text{VDD33} > 1\text{V}$.
2. VDDIO_XTAL may be on before or at the same time as VDDIO_GPIOx. VDDIO_XTAL must not be on before VDDIO_AO.
3. PCIe should enter LTSSM detect state within 20 ms of the end of fundamental reset.

8. Size reference

8.1 Module Picture

L x W : 15 x 13 (+0.3/-0.1) mm  The screen print content will be updated in the next version	
H: 1.9 (±0.2) mm	
Weight	0.71g

8.2 Marking Description

< TOP VIEW >



备注：

二维码内容：112233445566;FG8274BPRX-01

1. Fn-Link 商标 logo

2. 机型：8274B-PR

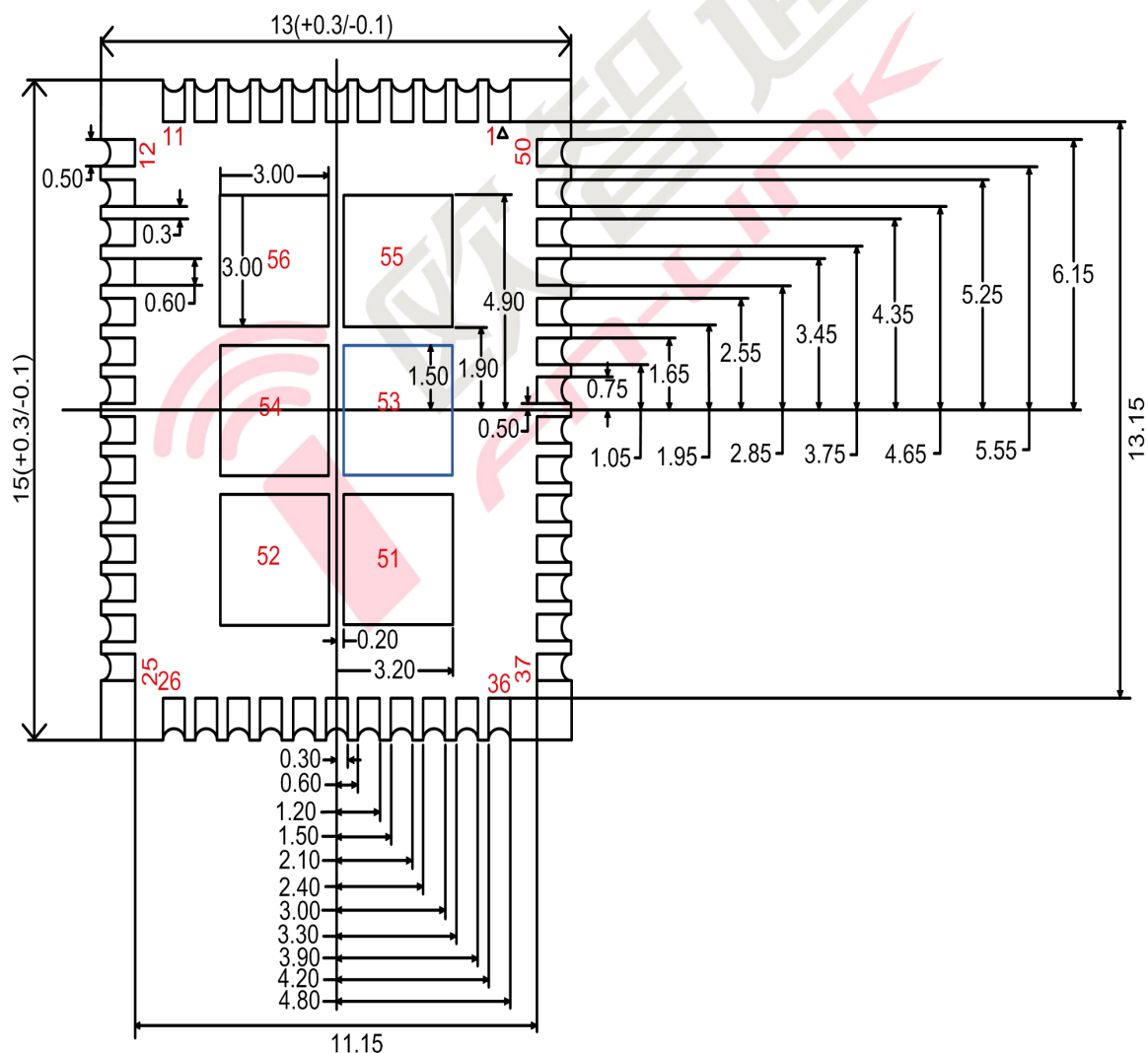
3. 二维码：编码规则为“wifi mac 地址;成品料号”

例如：112233445566;FG8274BPRX-01（MAC 地址以实际为准）

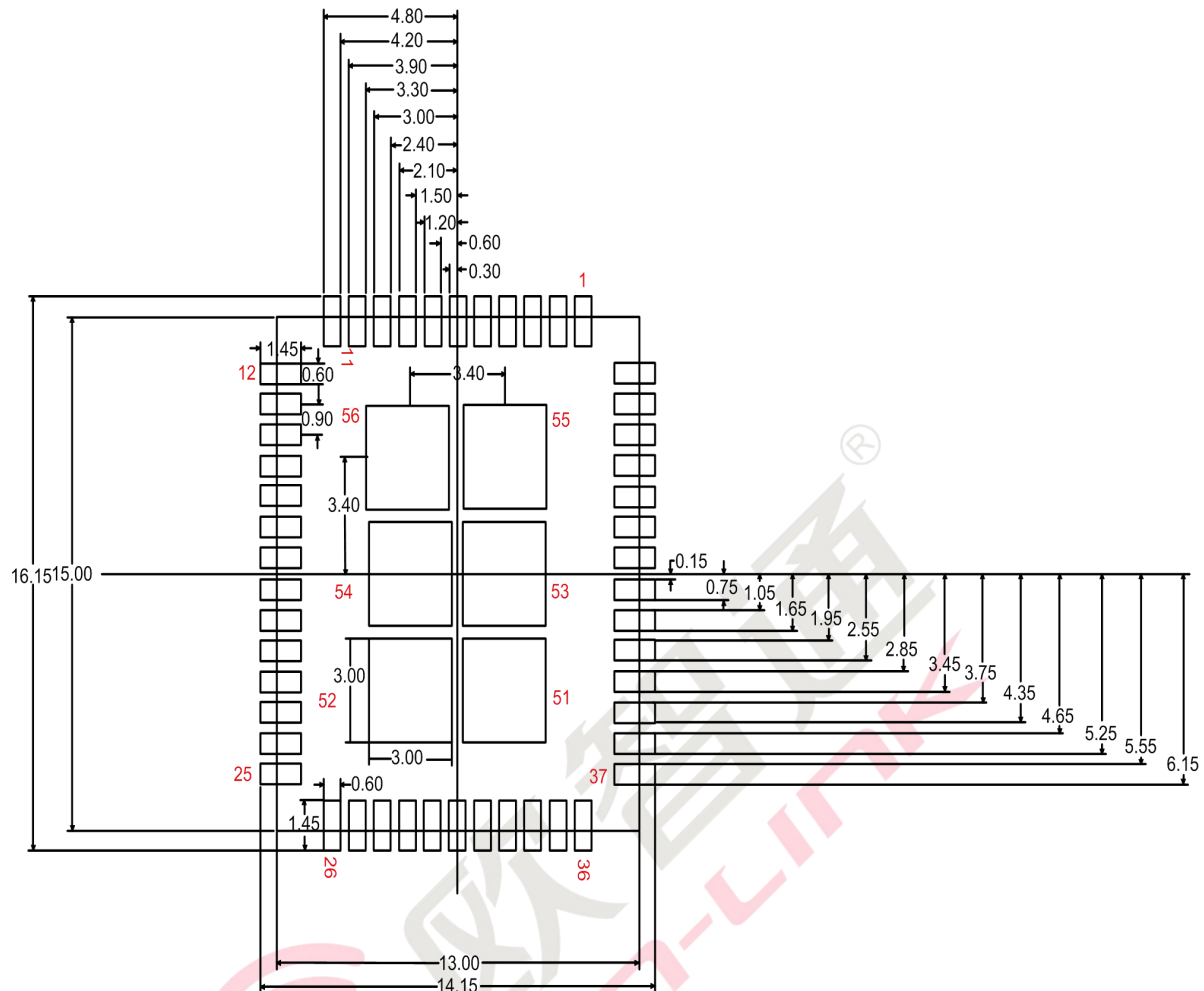
---BT MAC 在 WIFI MAC 基础上+1(WIFI 地址需跳 1，不能与 BT 地址重复)，二维码中不显示此内容。

8.3 Physical Dimensions

<TOP View>



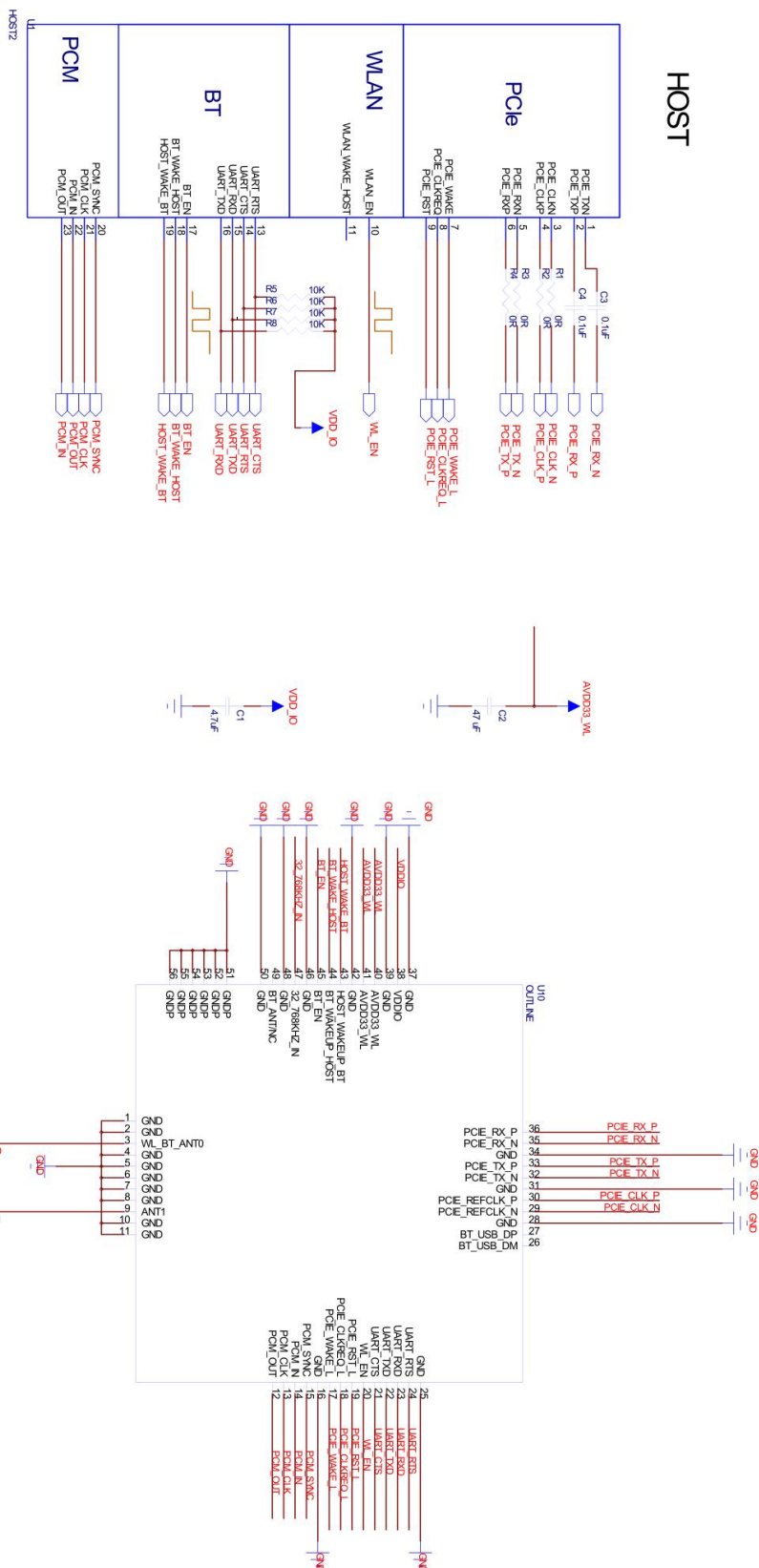
8.4 Layout Recommendation



9. The Key Material List

Item	Part Name	Description	Manufacturer
1	Chipset	QCA-6174A-1-172BWLNSP-TR-0C-0	Qualcomm
2	PCB	8274B-PR green 6L,13x15x0.6mm	XY-PCB,KX-PCB,SL-PCB,Sunlord, TRULY
3	Crystal	2016 48MHZ 10ppm , 8.8pF	TST,HOSONIC,TKD,ECEC,JWT
4	Shielding	8274B-PR shielding	信太,精力通,卓益
5	Diplexer	1608,2.4G and 5G	MAG,Microgate,FTR,ACX,Walsin

10. Reference Design



C1 should be closed to pin38 of the module

C2 should be closed to pin40 and pin41 of the module

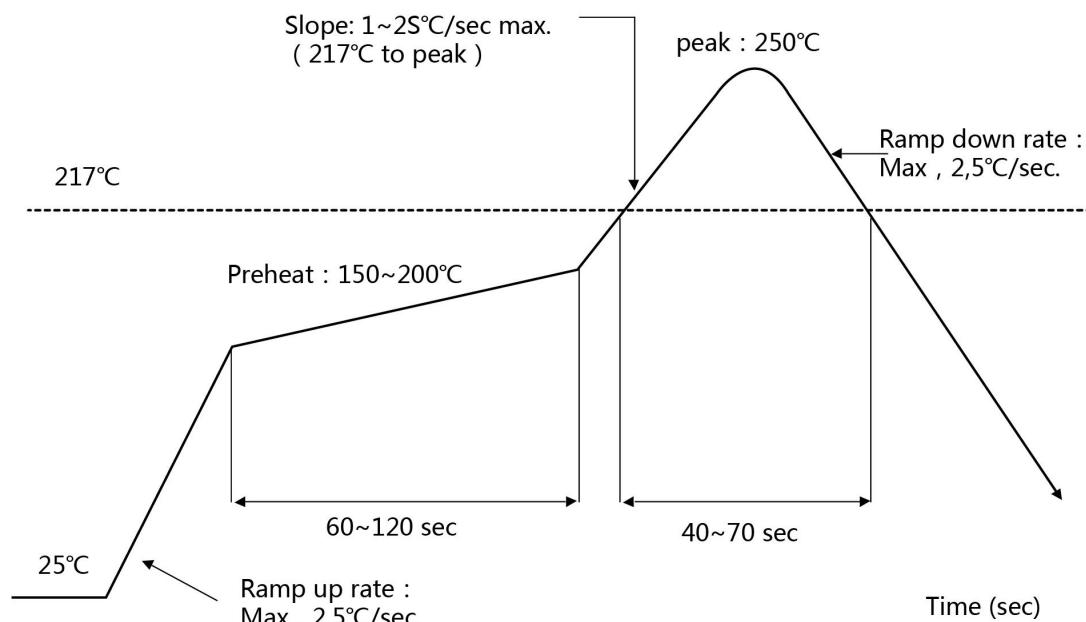
PCle layout should be followed to end impedance 60 Ohm and difference impedance 100 Ohm.

11. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

Number of Times : ≤2 times

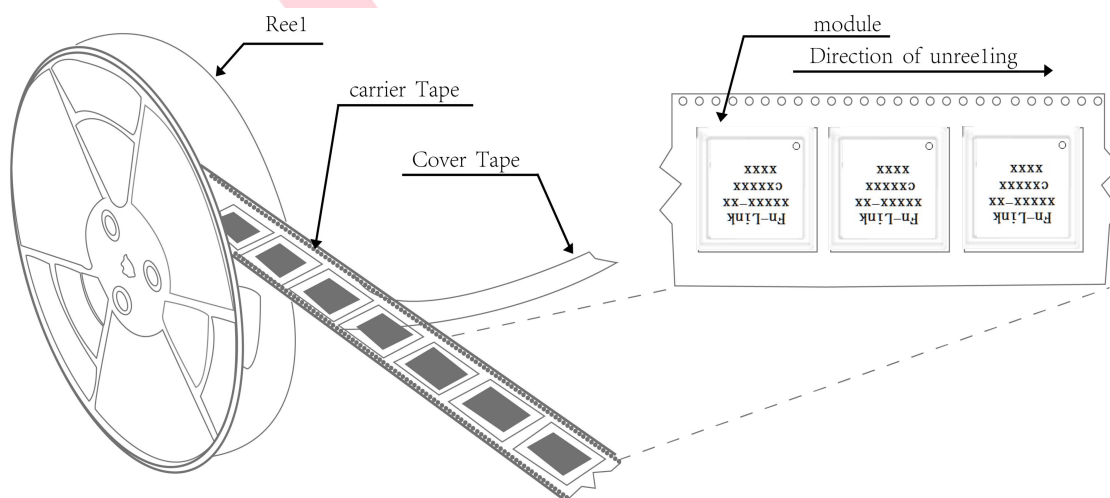


12. Package

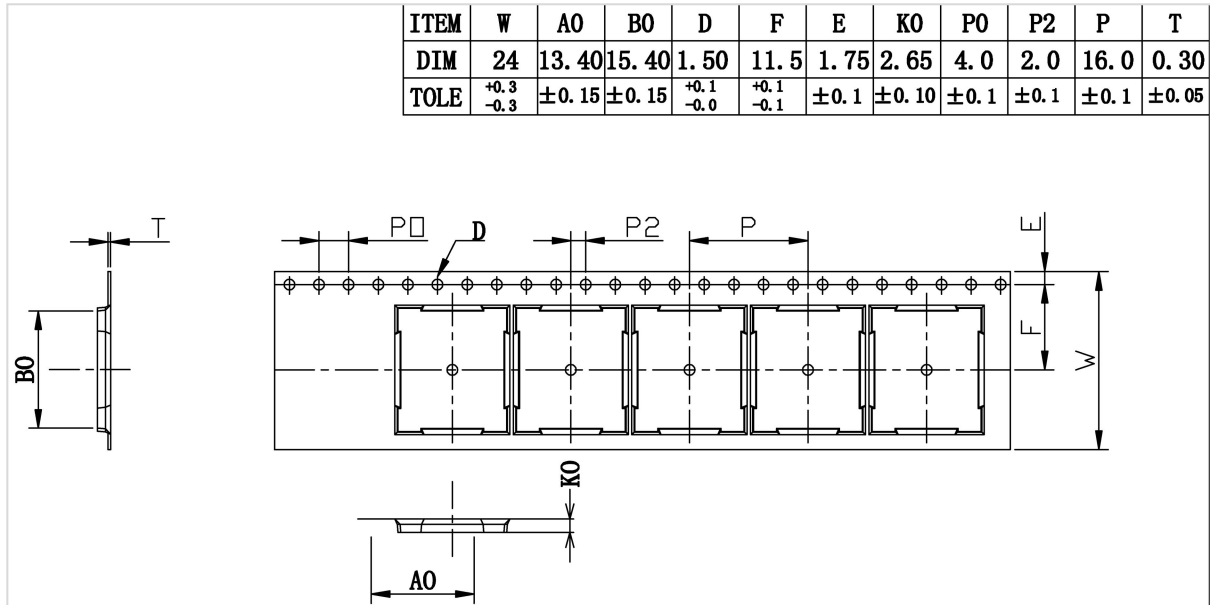
12.1 Reel

A roll of 1500pcs

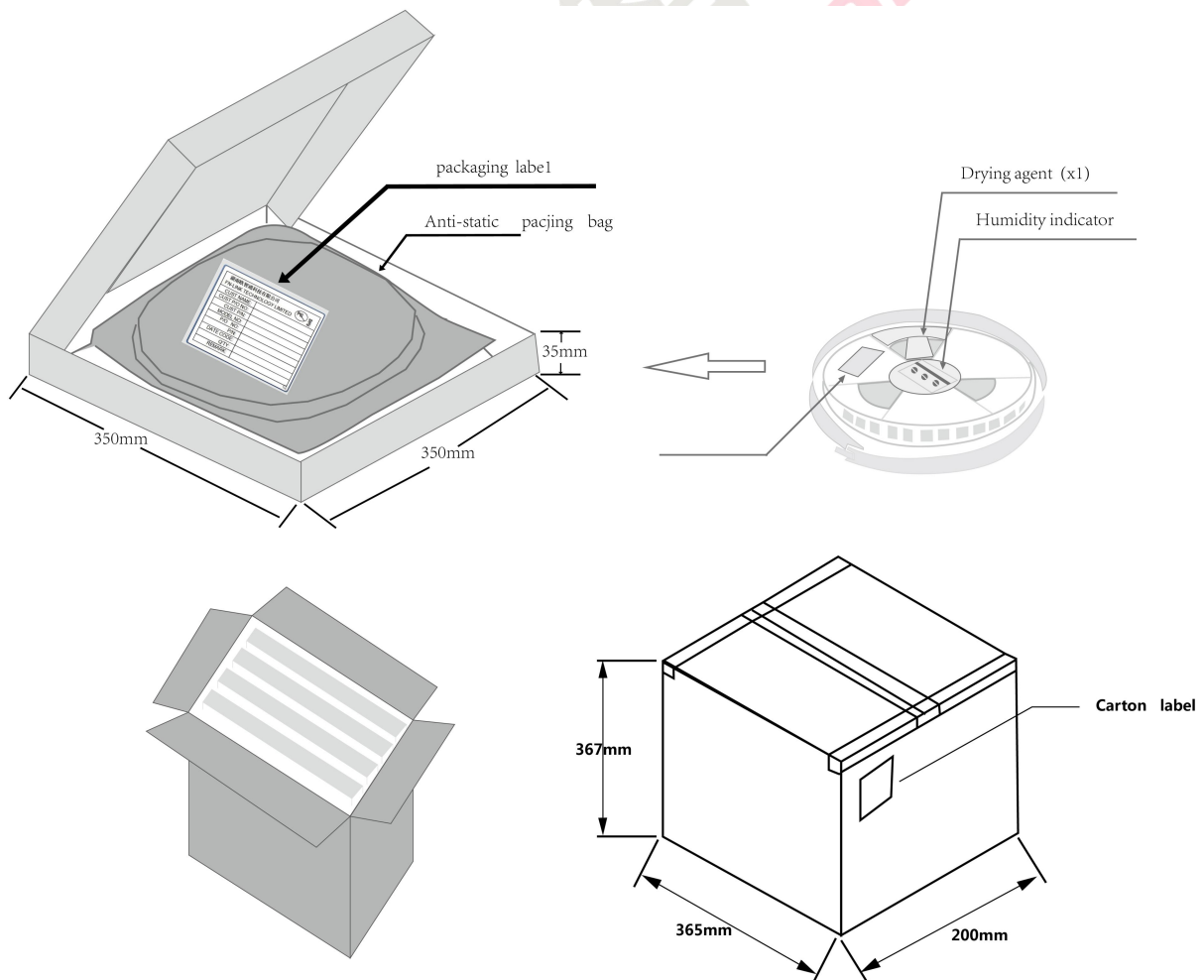
Use pallet packaging for less than 300 pieces



12.2 Carrier Tape Detail



12.3 Packaging Detail



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