

8274B-PR

**Wi-Fi Dual-band 2X2 11ac + Bluetooth 5.0
Combo Module Datasheet**



8274B-PR Module Datasheet

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	_____	Title
	_____	Signature
	_____	Date
	_____	Fn-Link

Revision History

Version	Date	Revision Content	Draft	Approved
1.0	2018/12/19	New version	Lzm	Lxy
1.1	2018/12/25	Modify the office and TEL	Lzm	Lxy
1.2	2019/07/08	Update timing information	Lxy	Szs
1.3	2019/08/19	Update 5G tx parameters	Lxy	Szs

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1 Overview

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.

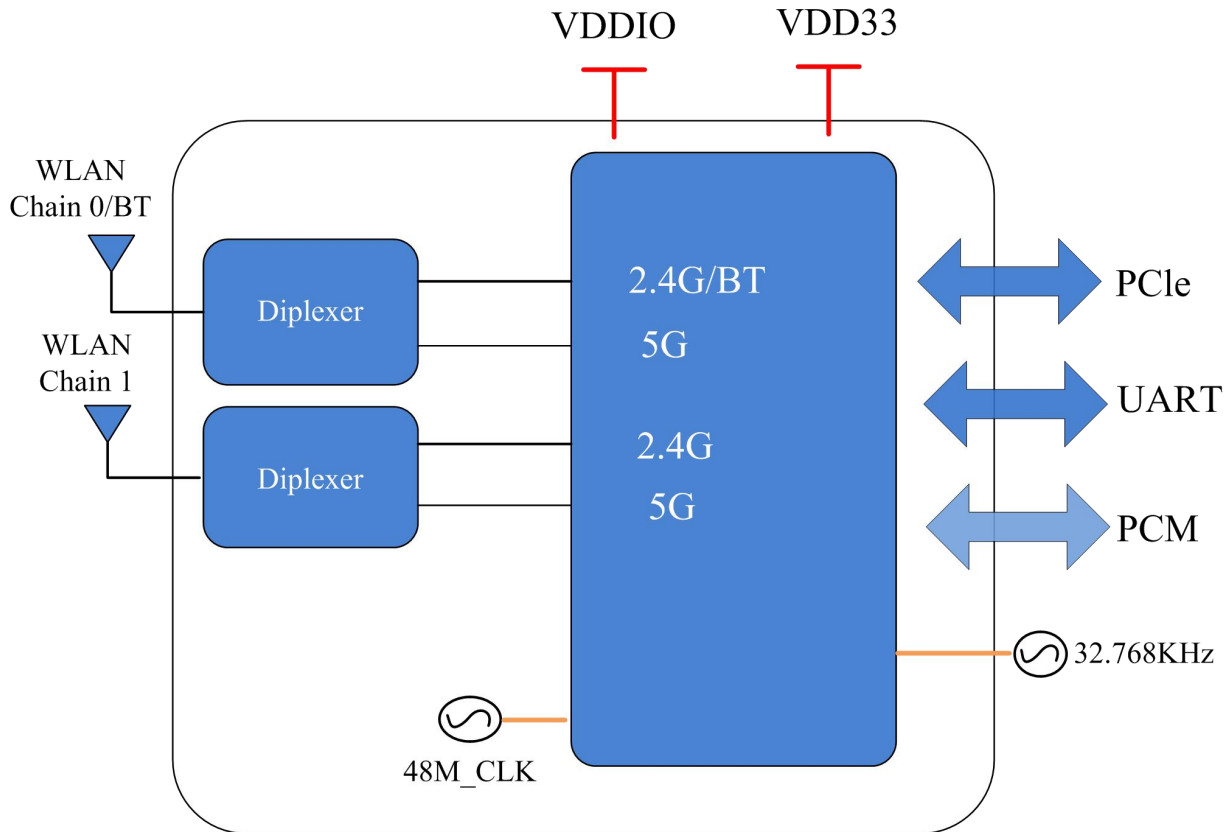
The wireless module complies with IEEE 802.11 a/b/g/n/ac 2x2 MIMO standard and it can achieve up to a speed of 867Mbps with dual stream in 802.11n to connect the wireless LAN. The integrated module provides PCI-e interface for Wi-Fi, UART / PCM interface for Bluetooth.

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 Features

- 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 and ISM-LTE 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

Block Diagram:



1.3 General Specification

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	-30°C to 85°C
Storage temperature	-40°C to 125°C

1.4 Recommended Operating Rating

	Min.	Typ.	Max.	Unit
Operating Temperature	-30	25	85	deg.C
VDD	3.15	3.3	3.45	V
VDDIO	1.7	1.8 or 3.3	3.45	V
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		

※1.5 EEPROM Information

WI-FI

Vendor ID	168C
Device ID	003E

2 Wi-Fi RF Specification

2.1 2.4GHz RF Specification

Conditions : VCC=3.3V ; VDDIO=3.3V ; Temp:25°C

Feature	Description			
WLAN Standard	IEEE 802.11b/g/n Wi-Fi compliant			
Frequency Range	2.400 GHz ~ 2.497 GHz (2.4 GHz ISM Band)			
Number of Channels	2.4GHz : Ch1 ~ Ch14			
Output Power	802.11b /11Mbps : 16 dBm ± 1.5 dB @ EVM ≤ -9dB			
	802.11g /54Mbps : 15 dBm ± 1.5 dB @ EVM ≤ -25dB			
	802.11n /MCS7 : 14 dBm ± 1.5 dB @ EVM ≤ -28dB			
Spectrum Mask	Min. b/g/n	Typ. b/g/n	Max. b/g/n	Unit b/g/n
1st side lobes(to fc ± 11MHZ)	-	-50/-40/-40	-	dBr

2st side lobes(to fc ± 22MHZ)	-	-60/-50/-58	-	dBr
Freq. Tolerance	-20/-20/-20	-	20/20/20	ppm
Receive Sensitivity (11b,20MHz) @8% PER	- 1Mbps	PER @ -92 dBm, typical		≤-83
	- 2Mbps	PER @ -90 dBm, typical		≤-80
	- 5.5Mbps	PER @ -87 dBm, typical		≤-79
	- 11Mbps	PER @ -85 dBm, typical		≤-76
Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps	PER @ -89 dBm, typical		≤-85
	- 9Mbps	PER @ -88 dBm, typical		≤-84
	- 12Mbps	PER @ -87 dBm, typical		≤-82
	- 18Mbps	PER @ -84 dBm, typical		≤-80
	- 24Mbps	PER @ -81 dBm, typical		≤-77
	- 36Mbps	PER @ -78 dBm, typical		≤-73
	- 48Mbps	PER @ -73 dBm, typical		≤-69
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0	PER @ -89 dBm, typical		≤-85
	- MCS=1	PER @ -86 dBm, typical		≤-82
	- MCS=2	PER @ -84 dBm, typical		≤-80
	- MCS=3	PER @ -80 dBm, typical		≤-77
	- MCS=4	PER @ -77 dBm, typical		≤-73
	- MCS=5	PER @ -72 dBm, typical		≤-69
	- MCS=6	PER @ -71 dBm, typical		≤-68
	- MCS=7	PER @ -69 dBm, typical		≤-67
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0	PER @ -86 dBm, typical		≤-82
	- MCS=1	PER @ -83 dBm, typical		≤-79
	- MCS=2	PER @ -81 dBm, typical		≤-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			

2.2 5GHz RF Specification

Conditions : VCC=3.3V ; VDDIO=3.3V ; Temp:25°C

Feature	Description		
WLAN Standard	IEEE 802.11a/n/ac 2x2, Wi-Fi compliant		
Frequency Range	4.900 GHz ~ 5.845 GHz (5.0 GHz ISM Band)		
Number of Channels	5.0GHz : Please see the table ¹		
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
	- MCS=8, NSS1 PER @ -67 dBm, typical	≤-60
Receive Sensitivity (11ac,40MHz) @10% PER	- 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)
5180MHz~5240MHz	36	5180
	40	5200
	44	5220
	48	5240
5260MHz~5320MHz	52	5260
	56	5280
	60	5300
	64	5320
5550MHz~5700MHz	100	5500
	104	5520
	108	5540

	112	5560
	116	5580
	120	5600
	124	5620
	128	5640
	132	5660
	136	5680
	140	5700
5745MHz~5825MHz	149	5745
	153	5765
	157	5785
	161	5805
	165	5825

3 Bluetooth Specification

3.1 Bluetooth Specification

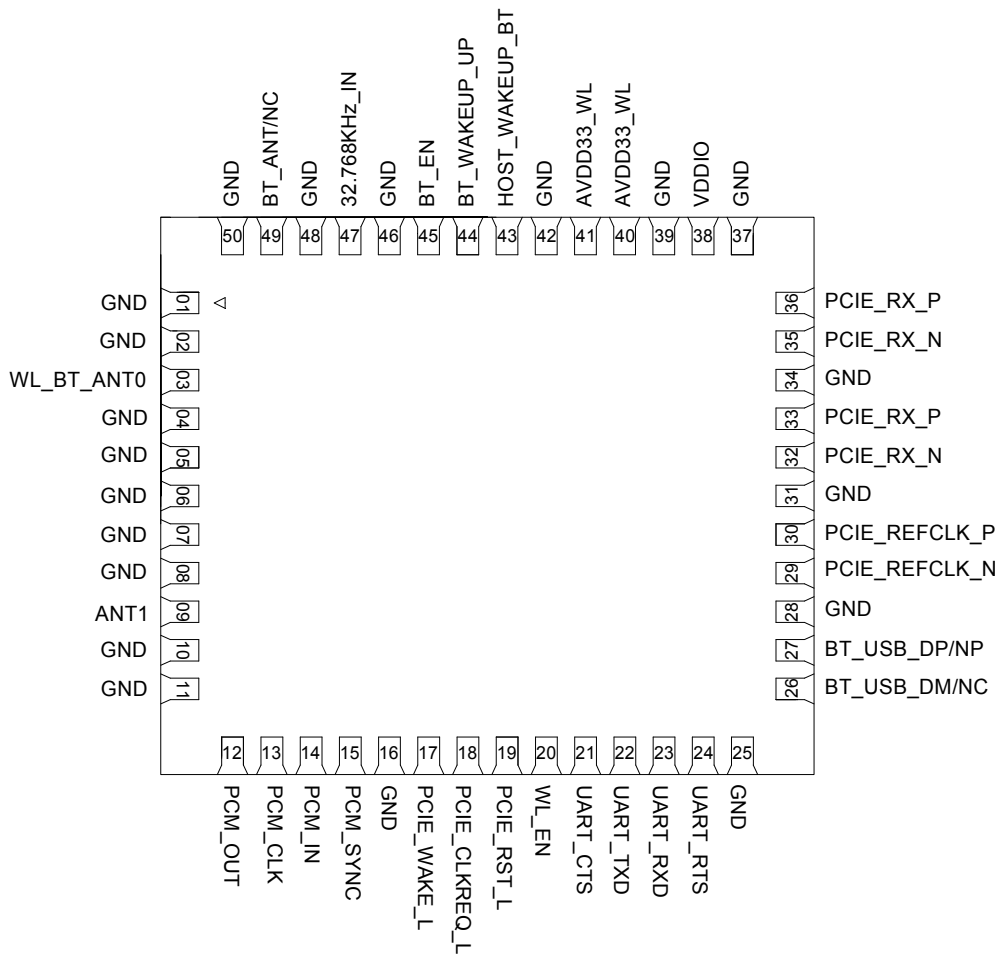
Feature	Description		
General Specification			
Bluetooth Standard	Bluetooth V5.0		
Host Interface	UART		
Antenna Reference	Small antennas with 0~2 dBi peak gain		
Frequency Band	2402 MHz ~ 2480 MHz		
Number of Channels	79 channels		
Modulation	GFSK, $\pi/4$ -DQPSK, 8DPSK		
RF Specification			
	Min.	Typical.	Max.
Output Power (Class 1.5)		10 dBm	
Output Power (Class 2)		2 dBm	
Sensitivity @ BER=0.1% for GFSK (1Mbps)		-92 dBm	
Sensitivity @ BER=0.01% for $\pi/4$ -DQPSK (2Mbps)		-92 dBm	

Sensitivity @ BER=0.01% for 8DPSK (3Mbps)		-85 dBm	
Maximum Input Level	GFSK (1Mbps):-20dBm		
	π/4-DQPSK (2Mbps) :-20dBm		
	8DPSK (3Mbps) :-20dBm		

4 Pin Assignments

4.1 Pin Outline

< TOP VIEW >



4.2 Pin Definition

NO	Name	Type	Description	Voltage
1、 2	GND	—	Ground connections	
3	WL_BT_ANT0	—	WL_BT_ANT0 RF output	
4~8	GND	—	Ground connections	

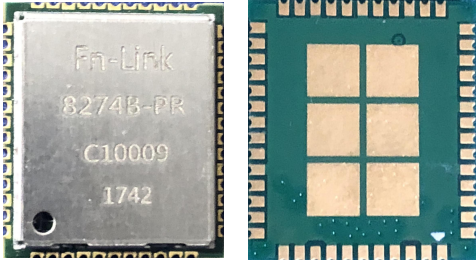
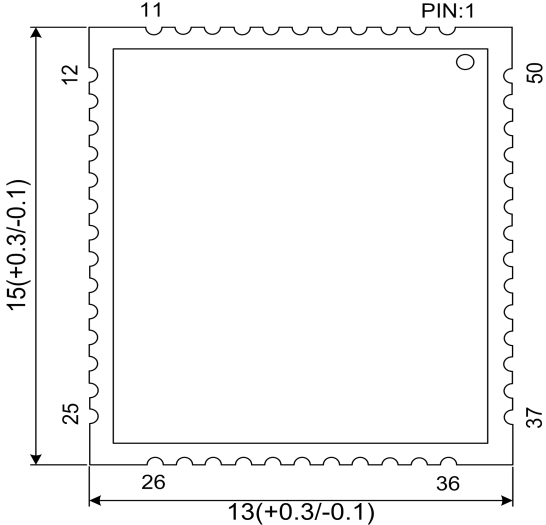
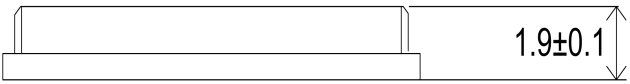
9	ANT1	P	ANT1 RF output	
10、11	GND	—	Ground connections	
12	PCM_OUT	O	PCM Data output	3.3V or 1.8V
13	PCM_CLK	I/O	PCM clock	3.3V or 1.8V
14	PCM_IN	I	PCM data input	3.3V or 1.8V
15	PCM_SYNC	I/O	PCM sync signal	3.3V or 1.8V
16	GND	—	Ground connections	
17	PCIE_WAKE_L	O	PCI-e wake up host, open drain, active 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	GNDP	—	Ground connections	

P:POWER I:INPUT O:OUTPUT PD: PULL-DOWN

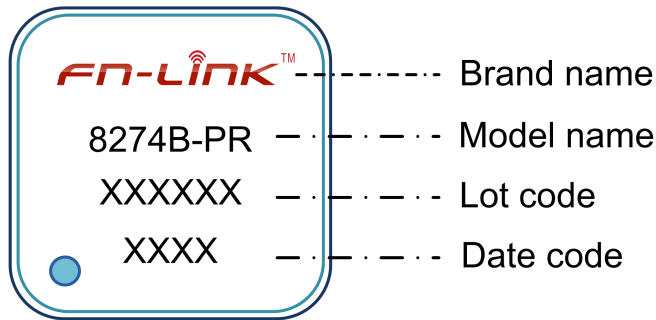
5 Dimensions

5.1 Module Picture

<p>L x W : 15 x 13 (+0.3/-0.1) mm</p> 	
<p>H: 1.9 (±0.1) mm</p>	
<p>Weight</p>	<p>0.71g</p>

5.3 Marking Description

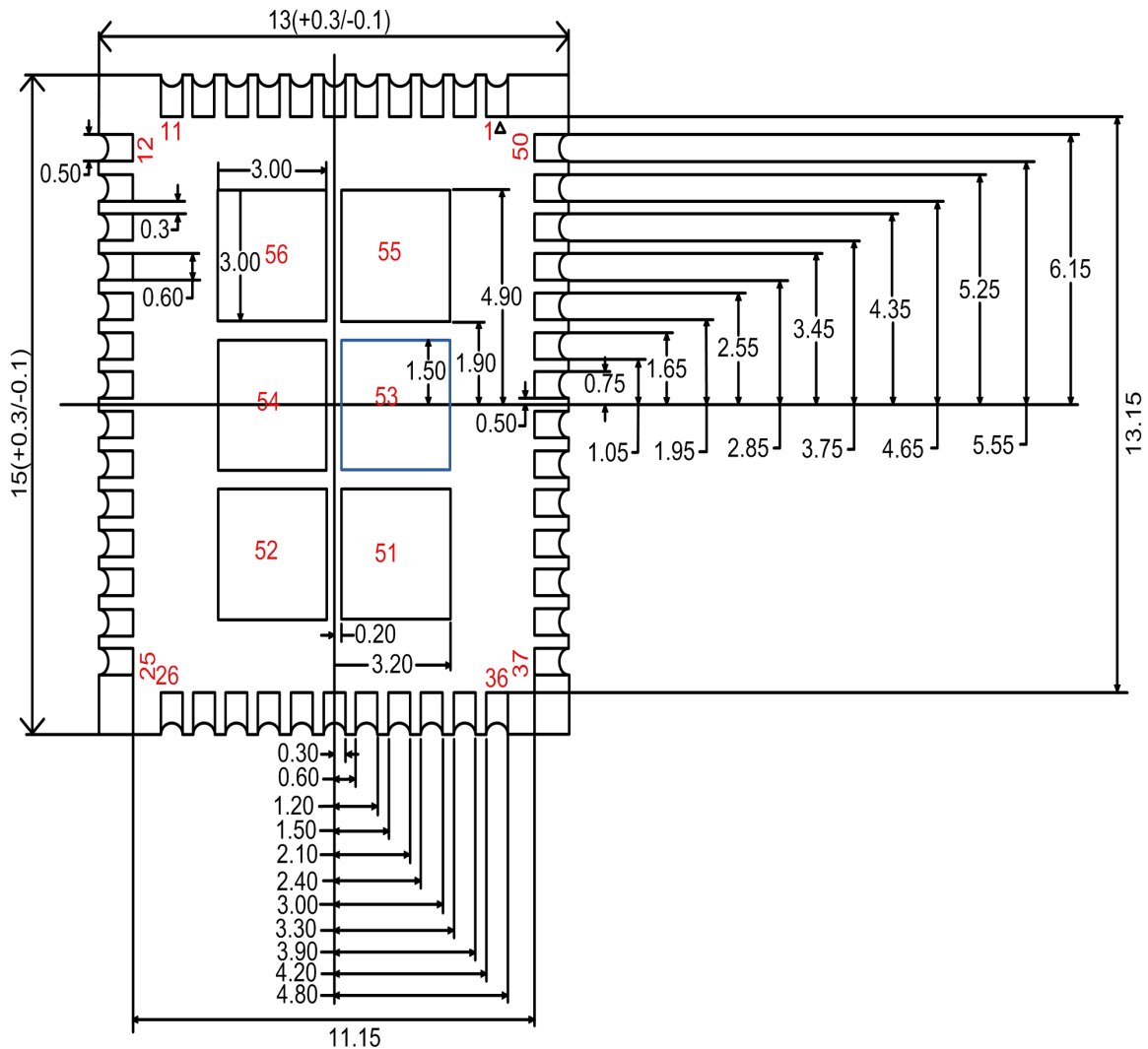
< TOP VIEW >



5.4 Module Physical Dimensions

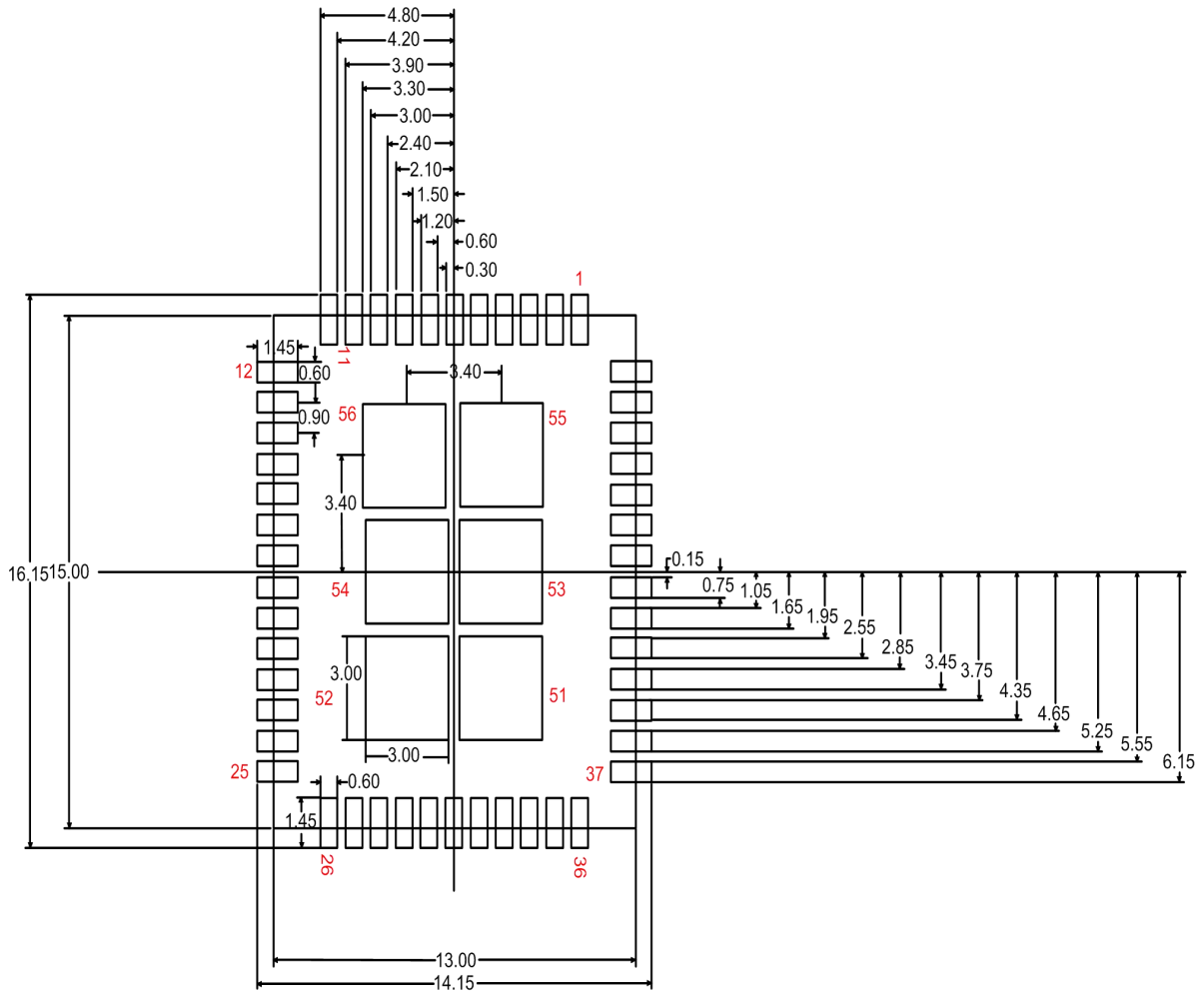
(Unit: mm)

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5.5 Layout Recommendation

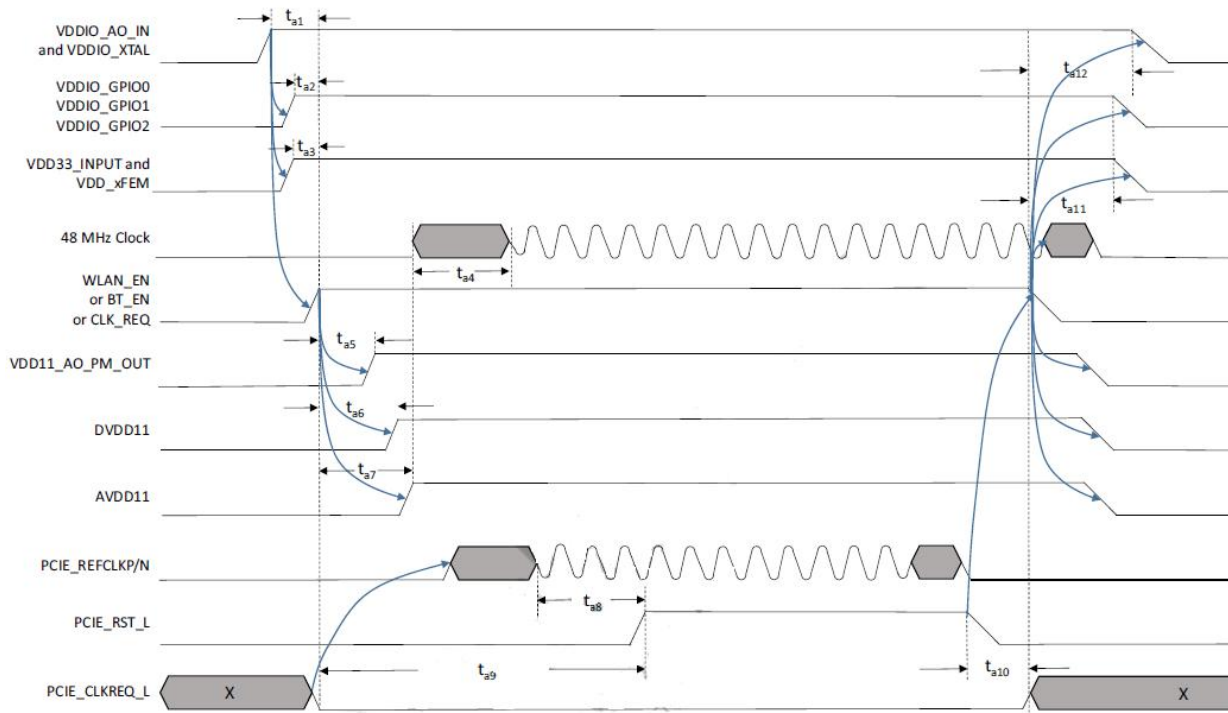
(Unit: mm)



6 Host Interface Timing Diagram

6.1 PCIe powerup sequence timing

PCIe powerup sequence timing

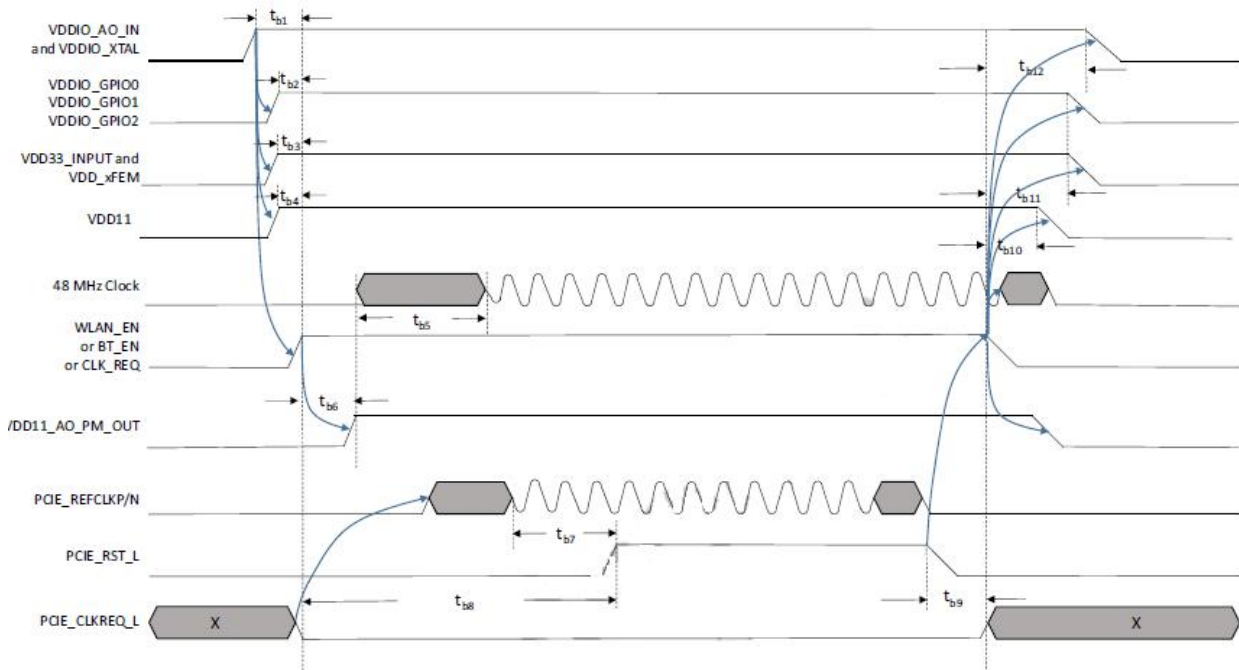


PCIe power sequence timing diagram (internal 1.1 V)

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

1. VDDIO_AO must be on first and off last. VDDIO_AO must also be >1.62 V at all times when VDD33 > 1 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.



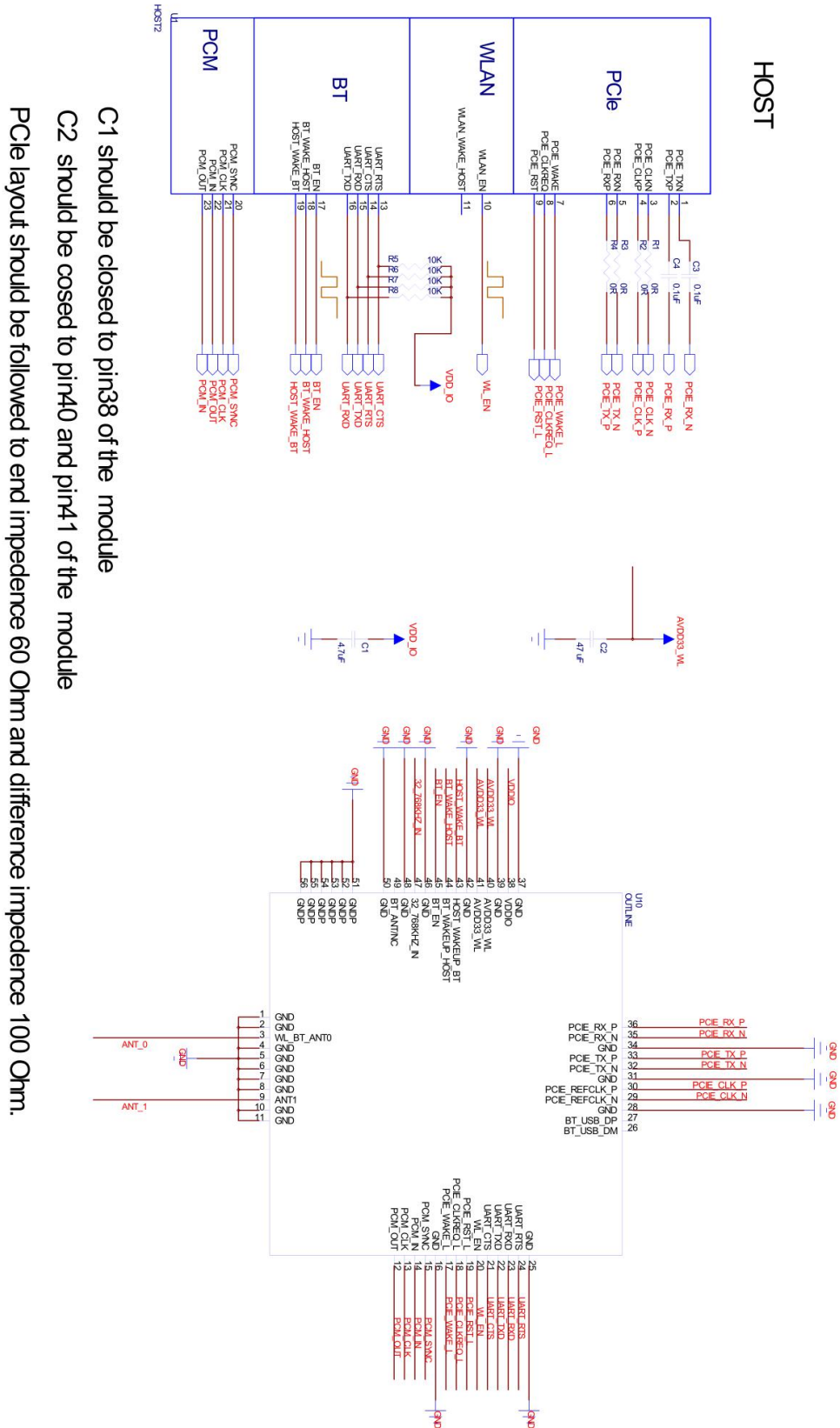
PCIe power sequence timing diagram (external 1.1 V)

PCIe 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 V at all times when VDD33 > 1V.
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.

7 Reference Design



C1 should be closed to pin38 of the module

C2 should be closed to pin40 and pin41 of the module

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

8 Ordering Information

Part No.	Description
FG8274BPRX-00	QCA6174A-1, a/b/g/n/ac Wi-Fi+BLE5.0, 2T2R, 13X15mm, PCIE+Uart, PCB Version V4.0

9 The Key Material List

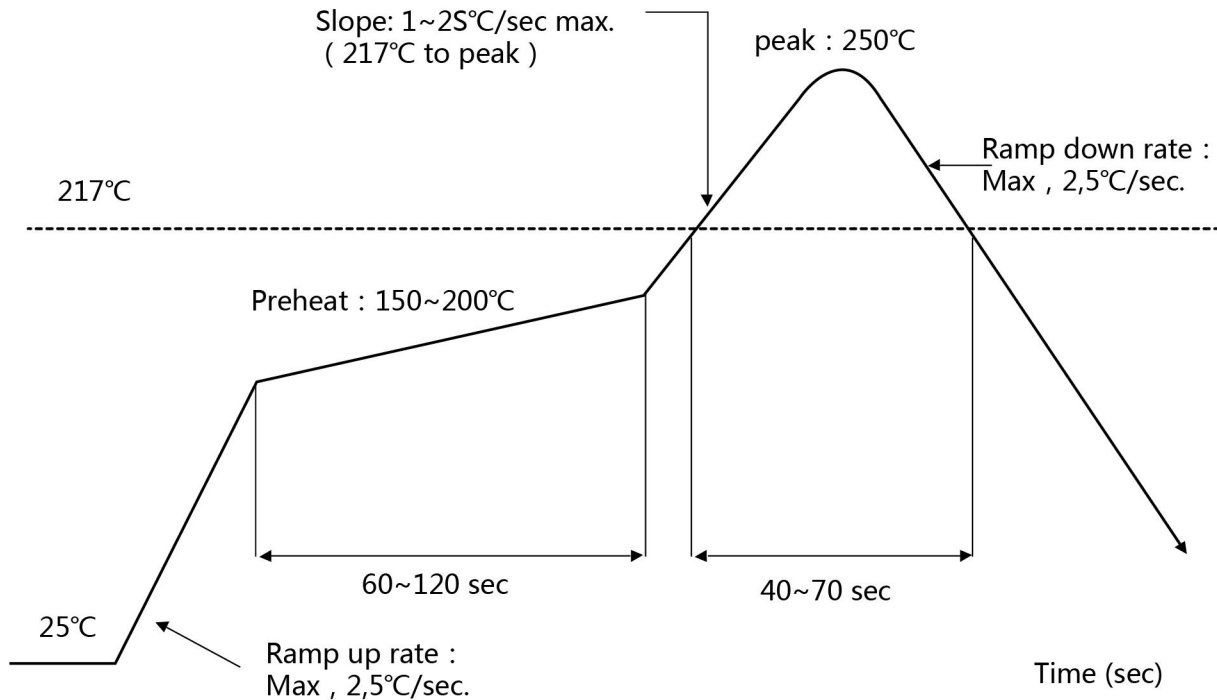
Main	Diplexer	LTD-1608-2G4S5-C9-KH(MAG)
Alternative	Diplexer	MDPX18M2455P69-D06(Maijie)
Main	Shielding cover	8274B-PR shield cover copper, no positioning foot 11.5x13.5x1.2mm
Main	Crystal	2016 48MHZ 10ppm , 8.8pF(Hosonic)
Alternative	Crystal	2016 48MHZ 10ppm , 8.8pF XTL501100-Q23-022(Xihua)
Alternative	Crystal	2016 48MHZ 10ppm , 8.8pF(Yingdali)
Alternative	Crystal	2016 48MHZ 10ppm , 8.8pF(TXC)
Alternative	Crystal	2016 48MHZ 10ppm , 9pF(TST)
Main	Chipset	QCA6174A-1 172BWLN

10 Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

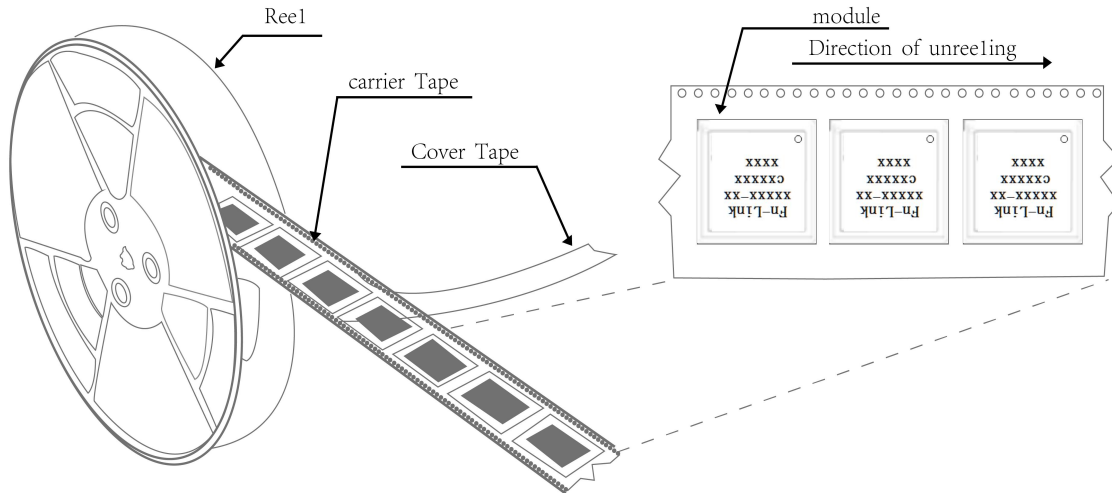
Number of Times : ≤2 times



11 Package Information

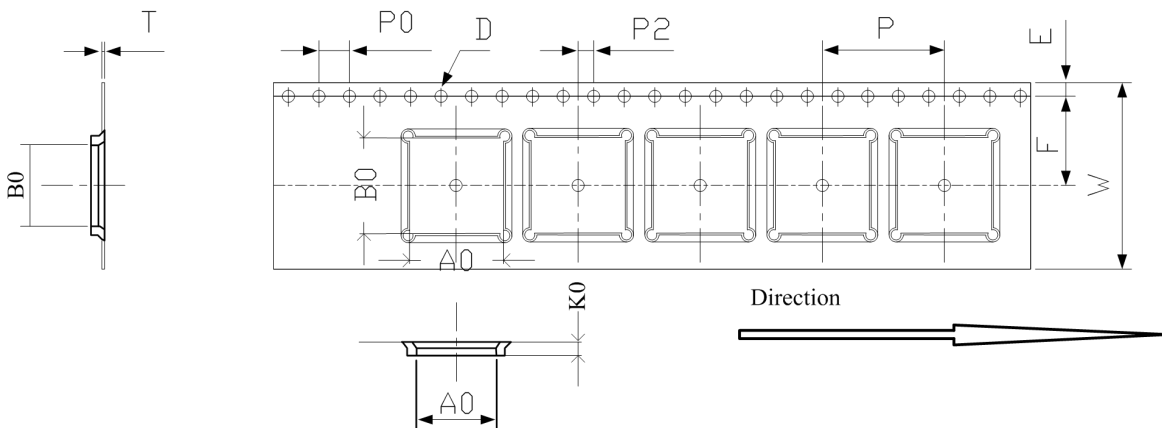
11.1 Reel

A roll of 1500pcs

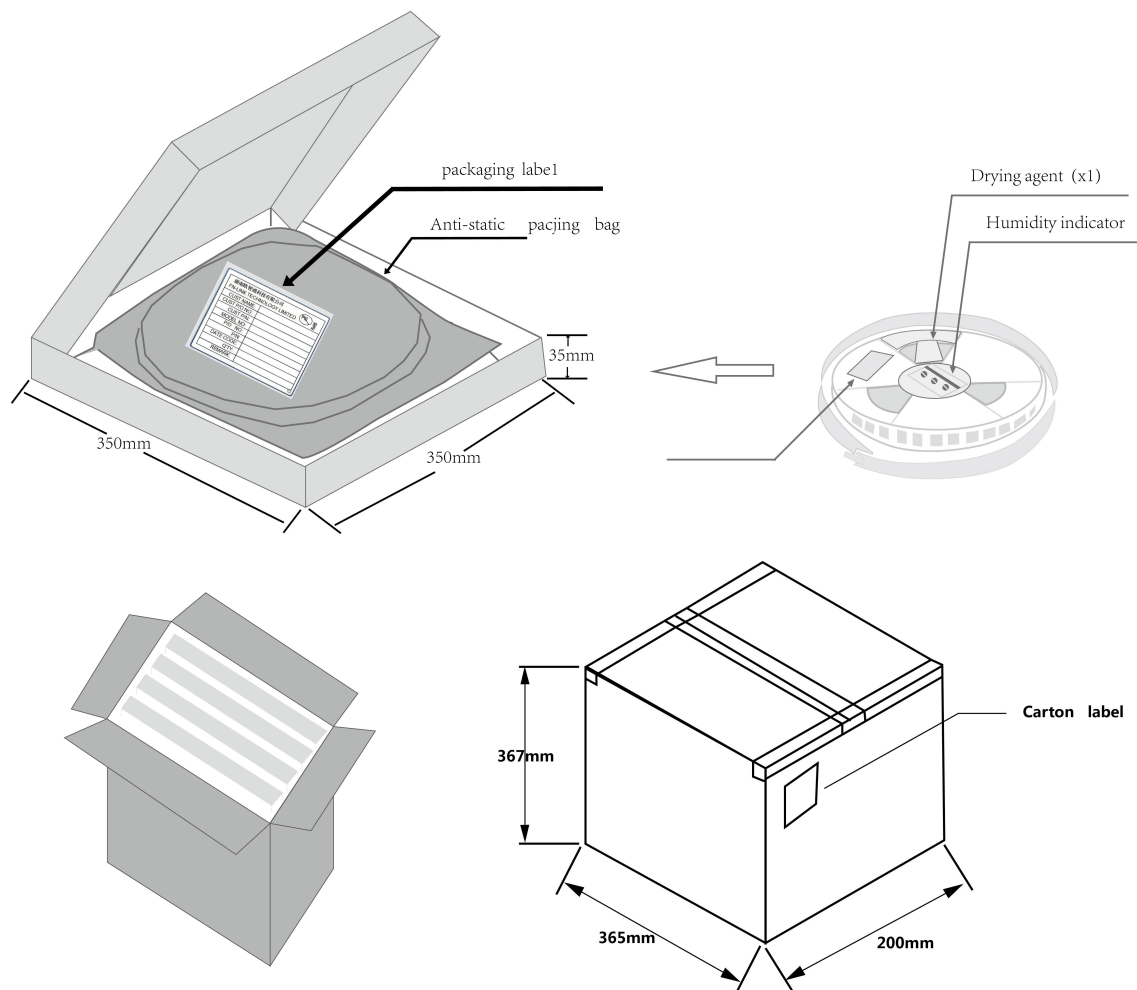


11.2 Carrier Tape Detail

ITEM	W	A0	B0	D	F	E	K0	P0	P2	P	T
DIM	24	13.50	15.40	1.50	11.5	1.75	1.80	4.0	2.0	20.0	0.30
TOLE	+0.3 -0.3	±0.15	±0.15	+0.1 -0.0	+0.1 -0.1	±0.1	±0.10	±0.1	±0.1	±0.1	±0.05



11.3 Packaging Detail



11.4 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, the customer has to take care of the following conditions:

- Calculated shelf life in sealed bag: 12 months at $<40^{\circ}$ C and $<90\%$ relative humidity (RH).
- Environmental condition during the production: 30° C / 60% RH according to IPC/JEDEC J-STD-033A paragraph 5.
- The maximum time between the opening of the sealed bag and the reflow process must be 168 hours if condition
- “IPC/JEDEC J-STD-033A paragraph 5.2” is respected
- Baking is required if conditions b) or c) are not respected
- Baking is required if the humidity indicator inside the bag indicates 10% RH or more