PRODUCT SPECIFICATION

8291N-PR

Wi-Fi Dual-band 2x2 11ax + Bluetooth 5.1

Combo Module

Version:v7.1

FN-LINK 欧智通

8291N-PR Module Datasheet

Ordering Information	Part NO.	Description
	FG8291NPRX-00	QCA6391, 19.5*21.5mm, 2x2, 802.11a/b/g/n/ac/ax BT5.1 DBS 2G&5G, Dual antenna

Customer: _____

Customer P/N:_____

Signature:_____

Date:_____

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

CONTENTS

Revision History

Version	Date	Contents of Revision Change	Preparde	Checked	Approved
V1.0	2020/04/16	New version	-	Lgp	Szs
V2.0	2020/05/23	1.Add module picture info; 2. Update ordering part number; 3. Add recommended reflow profile; 4. Update package information	-	Lgp	Szs
V3.0	2020/06/08	Update power sequence timing diagram	-	Lgp	Szs
V4.0	2020/07/01	1. Update RF specification; 2. Update temperature range； 3. Update recommended reflow profile	-	Lgp	Szs
V5.0	2020/08/12	1. Update RF specification and temperature range; 2. Update layout recommendation； 3. Update recommended reflow profile; 4. Update module picture	-	Lgp	Szs
V6.0	2020/09/29	1. Update module picture and label marking description; 2. Update key material list	-	Lgp	Szs
V7.0	2020/11/25	1. Update module picture	-	Lgp	Szs
V7.1	2021/12/23	1. Update RF specification; 2. Update the specification format	Fc	LXY	QJP

1. General Description

1.1 Introduction

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

The wireless module complies with IEEE 802.11 a/b/g/n/ac/ax 2x2 MIMO standard and it can achieve up to a speed of 1774.5Mbps (2x2 80MHz 11ax + 2x2 40MHz 11ax DBS). The integrated module provides PCIe interface for Wi-Fi, UART/PCM interface for Bluetooth.

This compact module is a total solution for a combination of Wi-Fi and Bluetooth V5.1 technology. The module is specifically developed for all portable devices.

1.2 Description

Model Name	8291N-PR
Product Description	Support Wi-Fi/Bluetooth functionalities
Dimension	L x W x H: 19.5 x 21.5 x 2.3 (typical) mm
Wi-Fi Interface	Support PCIe
BT Interface	UART / PCM
OS supported	Android /Linux/ Win CE /iOS /XP/WIN7/WIN10
Operating temperature	-30°C to 70°C
Storage temperature	-40°C to 125°C

2. Features

General

- Highly integrated wireless local area network (WLAN) system-on-chip (SOC) for 2.4G/5G 802.11ax WLAN applications.
- Compliant with IEEE 802.11a/b/g/n/ac/ax.
- Supports 2x2 Multi-User Multiple-Input Multiple-Output (MU-MIMO)
- Dual Band Simultaneous (DBS) with dual MAC, up to 1774.5 Mbps data rate (2x2+2x2 11ax DBS) Supports 20/40MHz at 2.4GHz and supports 20/40/80MHz at 5GHz.
- Dynamic Frequency Selection (DFS, radar detection)
- Offloading traffic for minimal host utilization at 11ac/ax speeds
- Supports Bluetooth for class1 and class2 power level transmissions without requiring an external PA
- Small SMT LGA package for placement

Host Interface

- Supports low power PCIe (w/L1 sub-state) interface for WLAN and UART/PCM interface for Bluetooth
- Supports WLAN-Bluetooth coexistence and LTE-5G/ISM coexistence

Bluetooth Features

- Supports Bluetooth V5.1, BLE, ANT+ and be backwards compatible with Bluetooth 1.2, 2.X+ enhance data rate
- BT host digital interface:
    - HCI UART (up to 3.2 Mbps)
    - PCM for audio data

3. Block Diagram

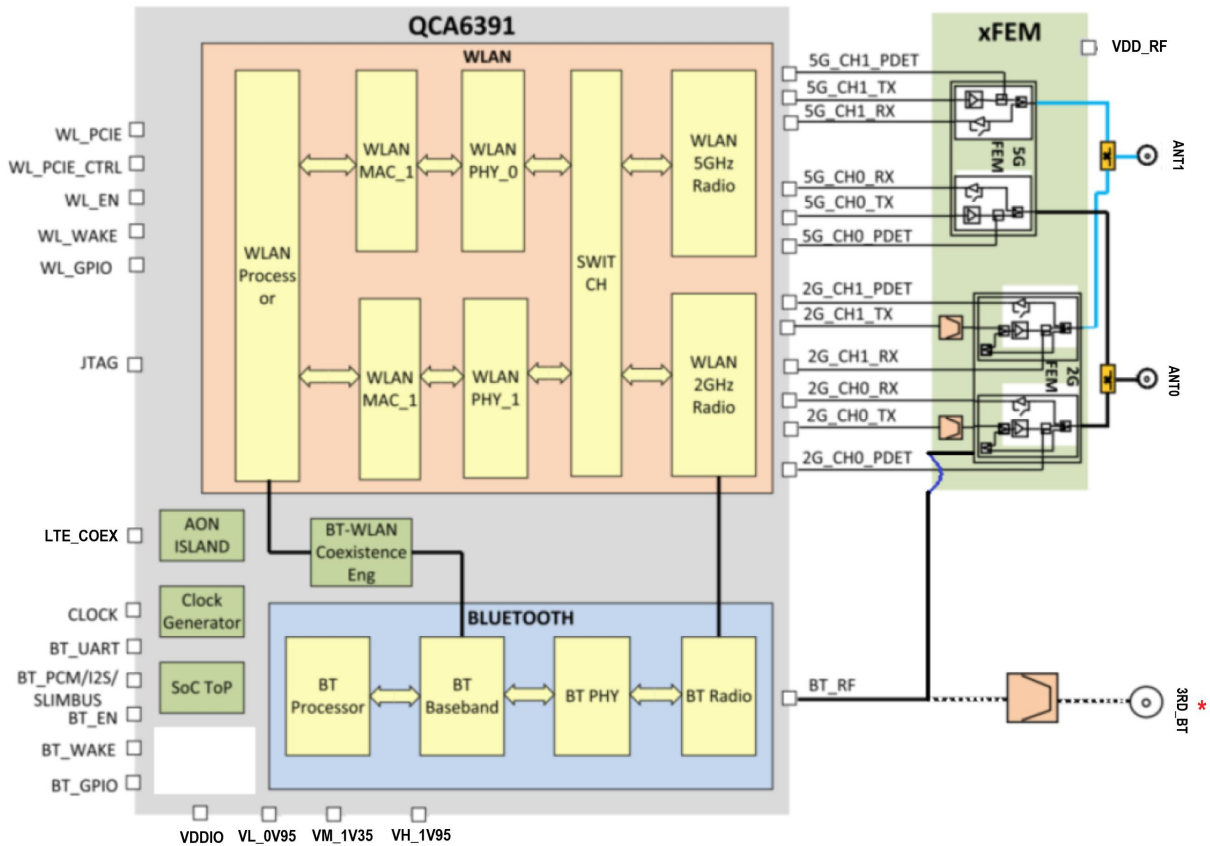
Figure 1-1 Block Diagram

*Note:

The 3RD_BT antenna is an optional BT antenna, based on customization requirement. The BT antenna is route through ANT0 default.

4. General Specification

4.1 2.4GHz RF Specification

Feature	Description	
WLAN Standard	IEEE 802.11b/g/n/ac/ax Wi-Fi compliant	
Frequency Range	2.400 GHz ~ 2.497 GHz (2.4 GHz ISM Band)	
Number of Channels	2.4GHz：Ch1 ~ Ch14	
Test Items	**Typical Value**	**EVM**

Output Power	802.11b /1Mbps:	17 dBm ± 2 dB	EVM ≤ -9dB
	802.11b /11Mbps:	17 dBm ± 2 dB	EVM ≤ -9dB
	802.11g /6Mbps:	17 dBm ± 2 dB	EVM ≤ -5dB
	802.11g /54Mbps:	17 dBm ± 2 dB	EVM ≤ -25dB
	802.11n HT20 /MCS0:	17 dBm ± 2 dB	EVM ≤ -5dB
	802.11n HT20 /MCS7:	17dBm ± 2 dB	EVM ≤ -28dB
	802.11n HT40 /MCS0:	17 dBm ± 2 dB	EVM ≤ -5dB
	802.11n HT40 /MCS7:	17 dBm ± 2 dB	EVM ≤ -28dB
	802.11ac vHT20/MCS0:	17 dBm ± 2 dB	EVM ≤ -5dB
	802.11ac vHT20/MCS8:	15 dBm ± 2 dB	EVM ≤ -30dB
	802.11ac vHT40/MCS0:	17 dBm ± 2 dB	EVM ≤ -5dB
	802.11ac vHT40/MCS9:	15 dBm ± 2 dB	EVM ≤ -32dB
	802.11ax HE20/MCS0:	17 dBm ± 2 dB	EVM ≤ -5dB
	802.11ax HE20/MCS11:	14 dBm ± 2 dB	EVM ≤ -35dB
	802.11ax HE40/MCS0:	17 dBm ± 2 dB	EVM ≤ -5dB
	802.11ax/MCS11:	14 dBm ± 2 dB	EVM ≤ -35dB
Spectrum Mask	Meet with IEEE standard		
Freq. Tolerance	±20ppm		
SISO Receive Sensitivity (11b,20MHz) @8% PER	- 1Mbps ≤ -92 dBm		≤ -83 dBm
	- 11Mbps ≤ -85 dBm		≤ -76 dBm
SISO Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps ≤ -87 dBm		≤ -85 dBm
	- 54Mbps ≤ -71 dBm		≤ -68 dBm
SISO Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 ≤ -86 dBm		≤ -85 dBm
	- MCS=7 ≤ -68 dBm		≤ -67 dBm
SISO Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0 ≤ -83 dBm		≤ -82 dBm
	- MCS=7 ≤ -65 dBm		≤ -64 dBm
SISO Receive Sensitivity (11ac,20MHz) @10% PER	- MCS=0 ≤ -83 dBm		≤ -82 dBm
	- MCS=8 ≤ -63 dBm		≤ -60 dBm
SISO Receive Sensitivity (11ac,40MHz) @10% PER	- MCS=0 ≤ -82 dBm		≤ -79 dBm
	- MCS=9 ≤ -60 dBm		≤ -55 dBm
SISO Receive Sensitivity (11ax,20MHz) @10% PER	- MCS=0 ≦ -81 dBm		≤-74 dBm
	- MCS=11 ≦ -55 dBm		≤-52 dBm
SISO Receive Sensitivity (11ax,40MHz) @10% PER	- MCS=0 ≦ -74 dBm		≤-71 dBm
	- MCS=11 ≦ -52 dBm		≤-49 dBm
Maximum Input Level	802.11b : -10 dBm		
	802.11g/n/ac/ax: -10 dBm		

4.2 5GHz RF Specification

Conditions : VDD_RF=3.85V ; Temp:25°C

Feature	Description	
WLAN Standard	IEEE 802.11 a/n/ac/ax 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 table1	
Item	**Value**	**Standard Value**
Output Power	802.11a /6Mbps: 17 dBm ± 2 dB	EVM ≤ -5dB
	802.11a /54Mbps: 16 dBm ± 2 dB	EVM ≤ -25dB
	802.11n HT20 /MCS0: 17 dBm ± 2 dB	EVM ≤ -5dB
	802.11n HT20 /MCS7: 16 dBm ± 2 dB	EVM ≤ -28dB
	802.11n HT40 /MCS0: 17 dBm ± 2 dB	EVM ≤ -5dB
	802.11n HT40 /MCS7: 16 dBm ± 2 dB	EVM ≤ -28dB
	802.11ac vHT20/MCS0: 17 dBm ± 2 dB	EVM ≤ -5dB
	802.11ac vHT20/MCS8: 15 dBm ± 2 dB	EVM ≤ -30dB
	802.11ac vHT40/MCS0: 17 dBm ± 2 dB	EVM ≤ -5dB
	802.11ac vHT40/MCS9: 15 dBm ± 2 dB	EVM ≤ -32dB
	802.11ac vHT80/MCS0: 17 dBm ± 2 dB	EVM ≤ -5dB
	802.11ac vHT80/MCS9: 14 dBm ± 2 dB	EVM ≤ -32dB
	802.11ax HE20/MCS0: 17 dBm ± 2 dB	EVM ≤ -5dB
	802.11ax HE20/MCS11: 14 dBm ± 2 dB	EVM ≤ -35dB
	802.11ax HE40/MCS0: 17 dBm ± 2 dB	EVM ≤ -5dB
	802.11ax HE40/MCS11: 14 dBm ± 2 dB	EVM ≤ -35dB
	802.11ax HE80/MCS0: 17 dBm ± 2 dB	EVM ≤ -5dB
	802.11ax HE80/MCS11: 13 dBm ± 2 dB	EVM ≤ -35dB
SISO Receive Sensitivity (11a,20MHz) @10% PER	- 6Mbps PER @ -87 dBm	≤-85
	- 54Mbps PER @ -71 dBm	≤-68
SISO Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -86 dBm	≤-85
	- MCS=7 PER @ -68 dBm	≤-67
SISO Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0 PER @ -83 dBm	≤-82
	- MCS=7 PER @ -65 dBm	≤-64
SISO Receive Sensitivity (11ac,20MHz) @10% PER	- MCS=0, NSS1 PER @ -83 dBm	≤-82
	- MCS=8, NSS1 PER @ -63 dBm	≤-60
SISO Receive Sensitivity (11ac,40MHz) @10% PER	- MCS=0, NSS1 PER @ -82 dBm	≤-79
	- MCS=9, NSS1 PER @ -60 dBm	≤-55
SISO Receive Sensitivity	- MCS=0, NSS1 PER @ -81 dBm	≤-79

(11ac,80MHz) @10% PER	- MCS=9, NSS1 PER @ -57 dBm	≤-54
SISO Receive Sensitivity (11ax, 20MHz) @10% PER	- MCS=0 PER @ -81 dBm	≤-74
	- MCS=11 PER @ -55 dBm	≤-52
SISO Receive Sensitivity (11ax,40MHz) @10% PER	- MCS=0 PER @ -74 dBm	≤-71
	- MCS=11 PER @ -52 dBm	≤-49
SISO Receive Sensitivity (11ax,80MHz) @10% PER	- MCS=0 PER @ -73 dBm	≤-68
	- MCS=11 PER @ -51 dBm	≤-46
Maximum Input Level	802.11a/n/ac/ax : -10 dBm	
Antenna Reference	Small antennas with 0~2 dBi peak gain	

[1]**5GHz(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

4.3 Bluetooth Specification

Feature	**Description**

General Specification	
Bluetooth Standard	Bluetooth V5.1
Host Interface	UART/PCM
Antenna Reference	Small antennas with 0~2 dBi peak gain
Frequency Band	2402 MHz ~ 2480 MHz
Number of Channels	79 channels
Modulation	GFSK, π/4-DQPSK, 8-DPSK

RF Specification

	Min(dBm)	**Typical**(dBm)	**Max**(dBm)
Output Power (Class 1)		7	
Sensitivity @ BER=0.1% for GFSK (1Mbps)		-92	
Sensitivity @ BER=0.01% for π/4-DQPSK (2Mbps)		-90	
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)		-85	
Maximum Input Level	GFSK (1Mbps):-10dBm		
	π/4-DQPSK (2Mbps) :-10dBm		
	8DPSK (3Mbps) :-10dBm		

5. ID setting information

WI-FI

Vendor ID	TBD
Product ID	TBD

6. Pin Definition

6.1 Pin Outline

<div align="center">< TOP VIEW</div>
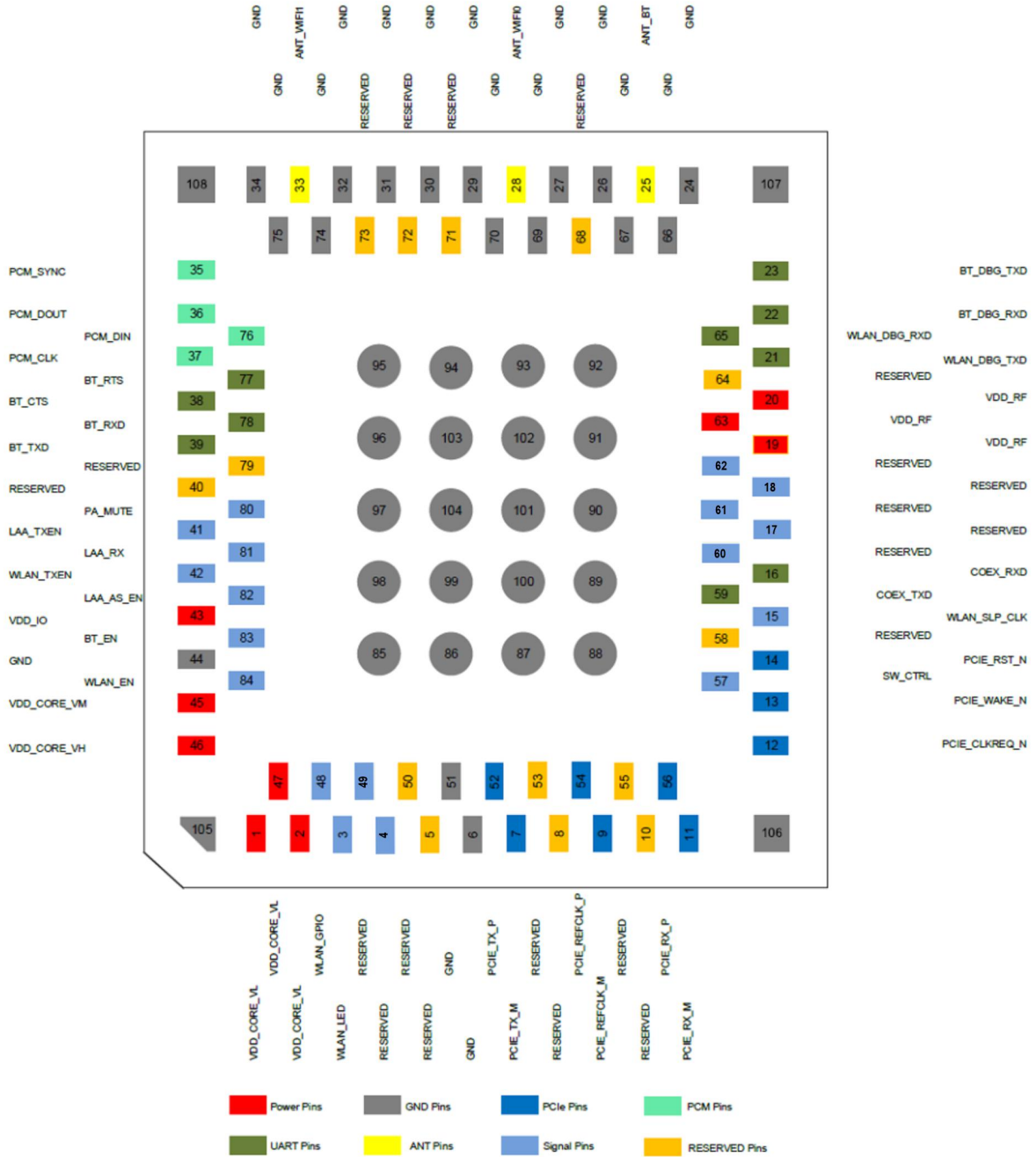
6.2 Pin Definition details

Power input pins

NO	Name	Type	Description	DC Voltage	Comment
1	VDD_CORE_VL1	P	Voltage for core, low voltage	Vmin=0.9V Vnorm=0.95V Vmax=1.0V	It must be provided with sufficient current up to 2.5A
2	VDD_CORE_VL2	P			
47	VDD_CORE_VL3	P			
45	VDD_CORE_VM	P	Voltage for core, mid voltage	Vmin=1.28V Vnorm=1.35V Vmax=1.42V	It must be provided with sufficient current up to 0.4A
46	VDD_CORE_VH	P	Voltage for core, high voltage	Vmin=1.85V Vnorm=1.95V Vmax=2.05V	It must be provided with sufficient current up to 0.4A
43	VDD_IO	P	Power supply for the module's I/O pins	Vmin=1.7V Vnorm=1.8V Vmax=1.9V	It must be provided with sufficient current up to 0.15A
19	VDD_RF1	P	Power supply for the module's RF part	Vmin=3.3V Vnorm=3.85V Vmax=4.25V	It must be provided with sufficient current up to 2.0A
20	VDD_RF2	P			
63	VDD_RF3	P			

Ground pins

NO	Name	Type	Description	DC Voltage	Comment
6	GND		Ground		
24	GND		Ground		
26	GND		Ground		
27	GND		Ground		
29	GND		Ground		
30-32	GND		Ground		
34	GND		Ground		
44	GND		Ground		
51	GND		Ground		
66	GND		Ground		
67	GND		Ground		
69	GND		Ground		
70	GND		Ground		

74	GND		Ground		
75	GND		Ground		
85-108	GND		Ground		

PCIe, PCM, UART

NO	Name	Type	Description	DC Voltage	Comment
7	PCIE_TX_N		PCIe TX differential signals		
52	PCIE_TX_P				
11	PCIE_RX_N		PCIe RX differential signals		
56	PCIE_RX_P				
9	PCIE_REFCLK_N		PCIe clock differential input signal		
54	PCIE_REFCLK_P				
12	PCIE_CLKREQ_N	O	Reference clock request	1.8V	
13	PCIE_WAKE_N	O	Request to service a function-initiated wake event	1.8V	
14	PCIE_RST_N	I	PCI express reset with weak pull-down	1.8V	
37	PCM_CLK		BT PCM clock	1.8V	
76	PCM_DIN	I	BT PCM data in	1.8V	
36	PCM_DOUT	O	BT PCM data out	1.8V	
35	PCM_SYNC		BT PCM sync	1.8V	
39	BT_TXD	O	BT UART interface	1.8V	
78	BT_RXD	I		1.8V	
77	BT_RTS	O	BT UART request to send	1.8V	
38	BT_CTS	I	BT UART clear to send	1.8V	

I/O and debug signals

NO	Name	Type	Description	DC Voltage	Comment
3	WLAN_LED	O	WLAN LED signal	1.8V	Default pull high,low active.
4	WAKEUP_BT	I	Host wakeup BT	1.8V	GPIO_8
49	WAKEUP_HOST	O	BT wakeup Host	1.8V	GPIO_9
15	WLAN_SLP_CLK	I	Sleep clock input	1.8V	GPIO_14
16	COEX_RXD	I	LTE coexistence UART RXD	1.8V	GPIO_10
59	COEX_TXD	O	LTE coexistence UART TXD	1.8V	GPIO_11
21	WLAN_DBG_TXD	O	UART TXD for debug	1.8V	GPIO_44

65	WLAN_DBG_RXD	I	UART RXD for debug	1.8V	GPIO_45
22	BT_DBG_RXD	I	BT UART RXD for debug	1.8V	GPIO_12
23	BT_DBG_TXD	O	BT UART TXD for debug	1.8V	GPIO_13
41	LAA_TXEN	I	WLAN XFEM control LAA TX enable	1.8V	GPIO_40
42	WLAN_TXEN	I	WLAN XFEM control for WLAN Tx enable	1.8V	GPIO_41
48	WLAN_GPIO	O	WLAN GPIO	1.8V	GPIO_53, Can be configured as WLAN wakeup host
57	SW_CTRL	O	Switch control	1.8V	GPIO_46
80	PA_MUTE	I	WLAN XFEM control for PA mute	1.8V	GPIO_43
81	LAA_RX	I	WLAN XFEM control for LAA receiver	1.8V	GPIO_42
82	LAA_AS_EN	I	Allow LAA to control WLAN FEM during WLAN sleep mode	1.8V	-
83	BT_EN	I	BT enable signal from Host	1.8V	-
84	WLAN_EN	I	WLAN enable signal from Host	1.8V	-
17	JTAG_TCK		TCK for JTAG. No connect if JTAG is not used		-
18	JTAG_TRST_L		TRST for JTAG. No connect if JTAG is not used		-
60	JTAG_TMS		TMS for JTAG. No connect if JTAG is not used		-
61	JTAG_TDI		TDI for JTAG. No connect if JTAG is not used		-
62	JTAG_TDO		TDO for JTAG. No connect if JTAG is not used		-

RF antenna pins

NO	Name	Type	Description	DC Voltage	Comment
25	ANT_BT		BT antenna or NC		Default NC
28	ANT_WIFI0		Chain0 RF bidirectional antenna port		
33	ANT_WIFI1		Chain1 RF bidirectional antenna port		

Reserved pins

NO	Name	Type	Description	DC Voltage	Comment
5	RESERVED				
8	RESERVED				

10	RESERVED				
40	RESERVED				
50	RESERVED				
53	RESERVED				
55	RESERVED				
58	RESERVED				
64	RESERVED				
68	RESERVED				
71	RESERVED				
72	RESERVED				
73	RESERVED				
79	RESERVED				

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

7. Electrical Specifications

7.1 Power Supply DC Characteristics

	Min.	Typ.	Max.	Unit	Note
Operating Temperature	-30	25	70	deg.C	
VDD_IO	1.7	1.8	1.9	V	It must be provided with sufficient current up to 0.15A
VDD_CORE_VL	0.9	0.95	1.0	V	It must be provided with sufficient current up to 2.5A
VDD_CORE_VM	1.28	1.35	1.42	V	It must be provided with sufficient current up to 0.4A
VDD_CORE_VH	1.85	1.95	2.05	V	It must be provided with sufficient current up to 0.4A
VDD_RF	3.3	3.85	4.25	V	It must be provided with sufficient current up to 2.0A

## 7.2 Interface Circuit time series

7.2.1 Power sequence timing
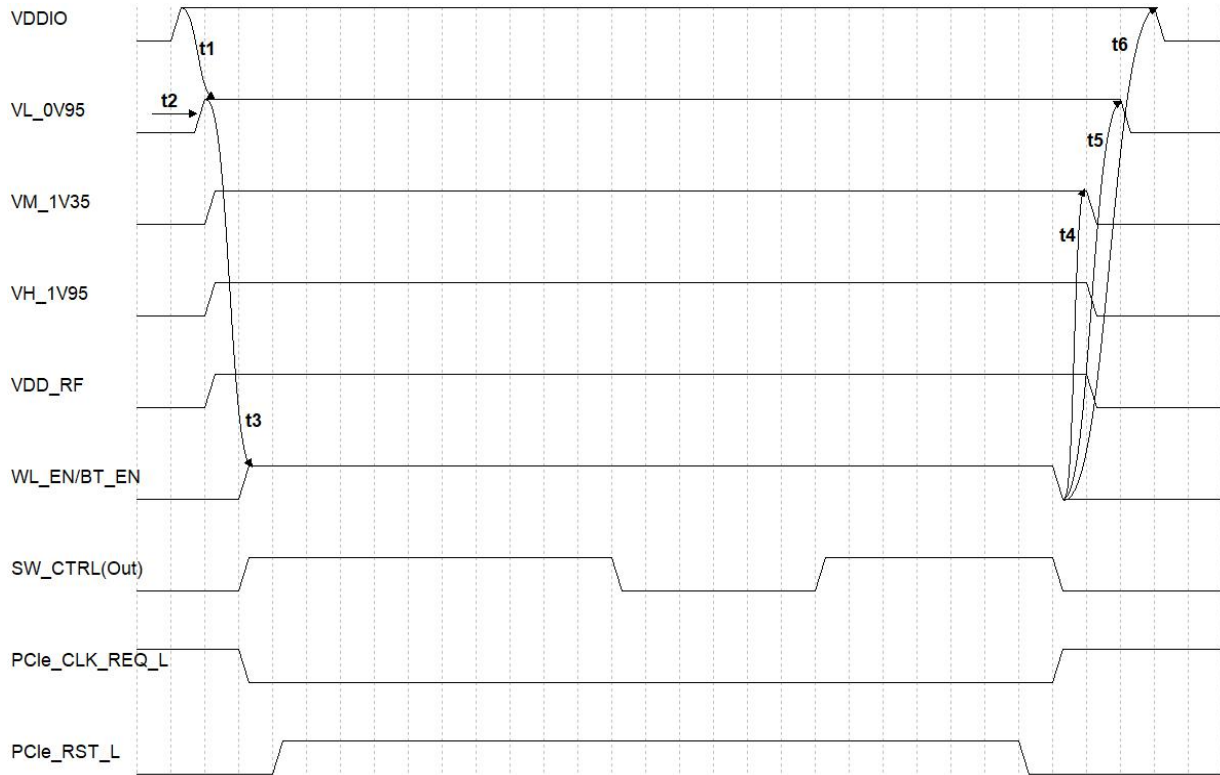
Symbol	Parameter	Min	Max	Unit
t1	VDDIO 1V8 valid to VDD_CORE_VL 0V95 is asserted	10	-	uS
t2	VDD_CORE_VL 0V95 voltage rising time		200	uS
t3	VDD_CORE_VL 0V95 valid to WLAN_EN or BT_EN input active	4		mS
t4	WLAN_EN and BT_EN de-assert to VCORE_VM/VCORE_VH/VDD_RF ramming down	10		uS
t5	WLAN_EN and BT_EN de-assert to VCORE_VL ramming down	12		uS
t6	WLAN_EN and BT_EN de-assert to VDDIO ramming down	12		uS

7.2.2 PCIe powerup sequence timing

Supports PCIe Gen 2 interface for WLAN.

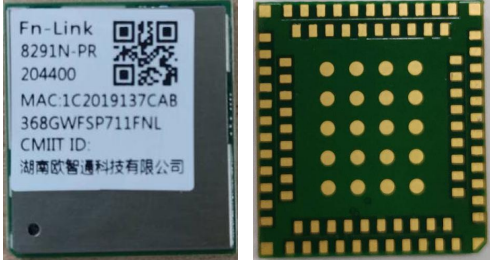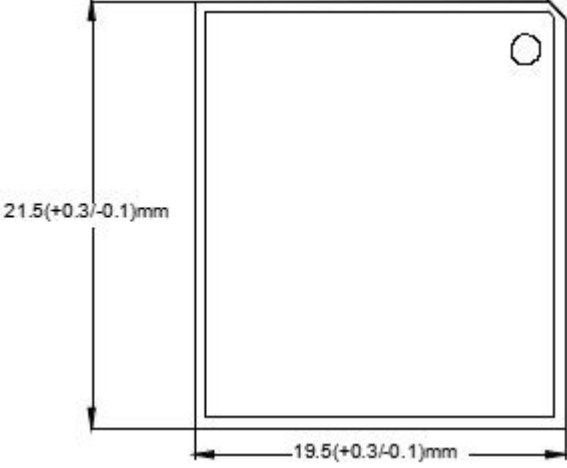Compliant to PCIe Gen 2 powerup sequence timing.
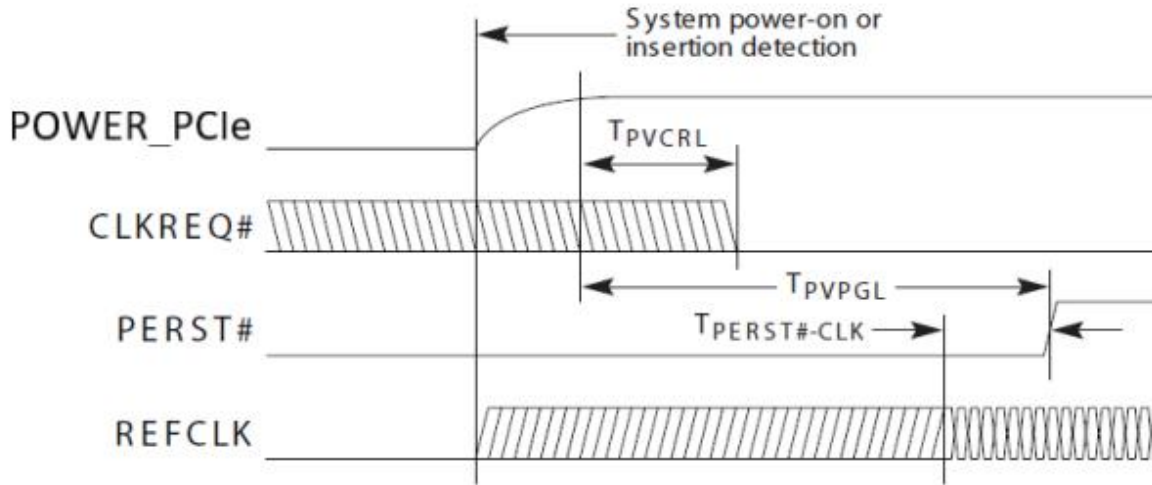
Note: T_{PVCRL} is measured from the later rising edge of +3.3V.

Symbol	Parameter	Min	Max	Units
T_{PVCRL}	Power Valid to CLKREQ# Output active		100	µS
T_{PVPGL}	Power Valid to PERST# Input inactive	1		mS
$T_{PERST\#-CLK}$	REFCLK stable before PERST# inactive	100		µS

8. Size reference

8.1 Module Picture

L x W : 19.5 x 21.5 (+0.3/-0.1) mm	21.5(+0.3/-0.1)mm 19.5(+0.3/-0.1)mm
H: 2.3 (±0.2) mm	2.3±0.1mm 0.8±0.1mm
Weight	1.9±0.1g

8.2 Marking Description

< TOP VIEW >

Company Logo → Fn-Link
Module Name → 8291N-PR
Date Code → 202500
Wi-Fi MAC ID → MAC:ABABABABABAB
TPV PN → 368GWFSP711FNL
CMIIT ID → CMIIT ID:XXXXXXXXXX
Company Name → 湖南欧智通科技有限公司

QT Code Contet: Wi-Fi MAC ID

15.0mm

15.0mm
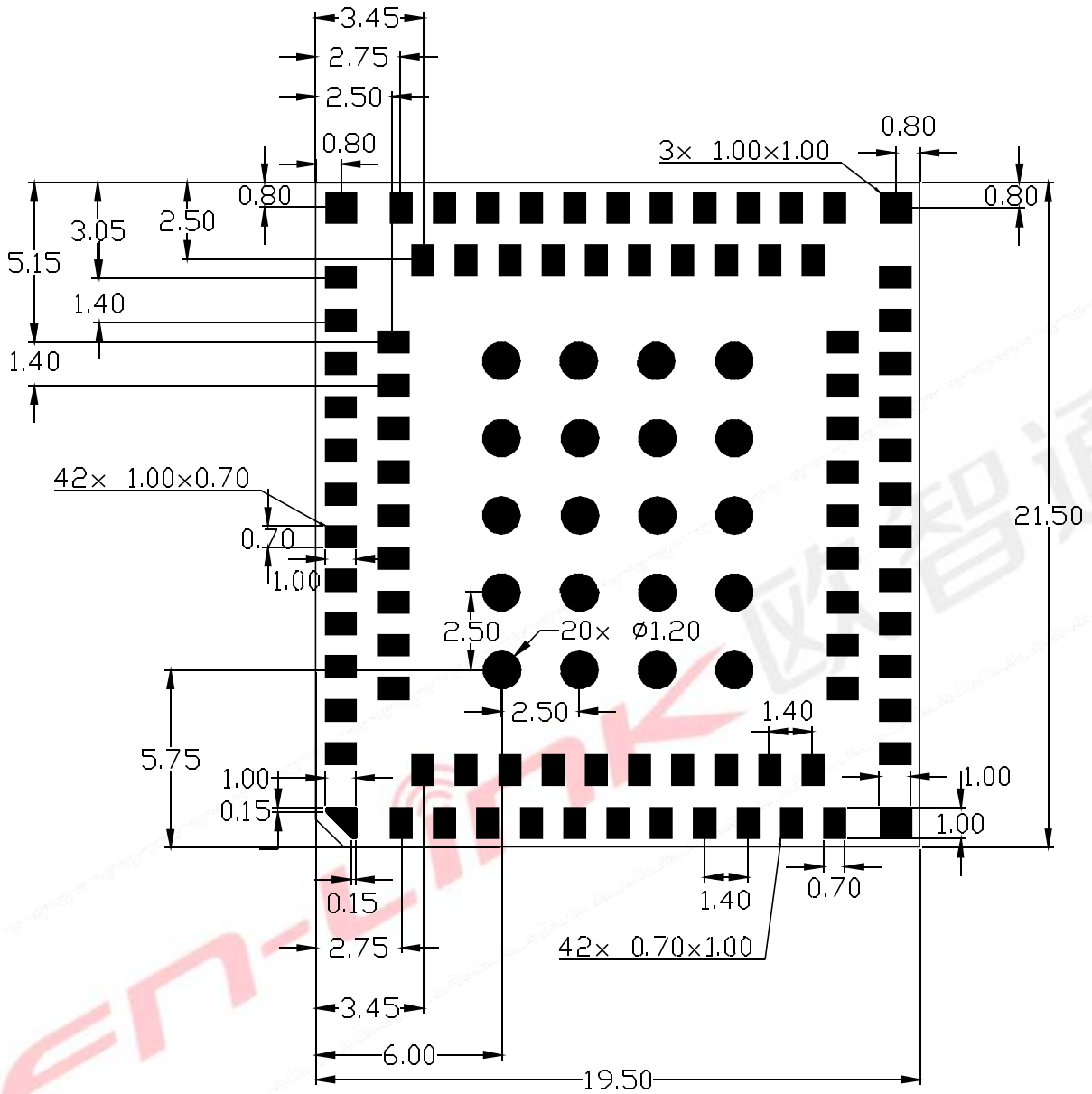
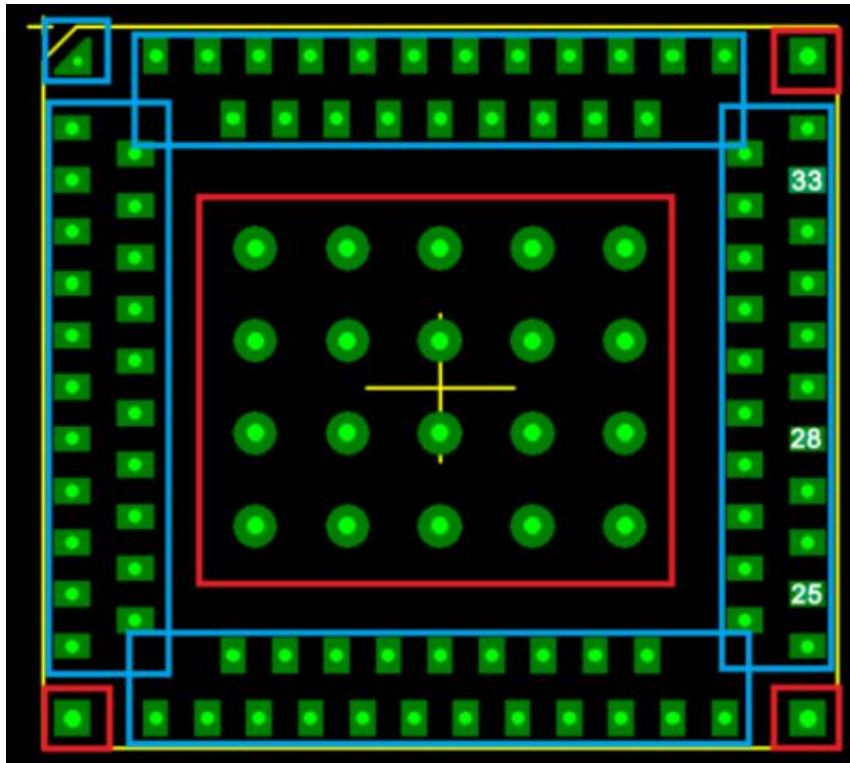## 8.3 Physical Dimensions

<TOP View>
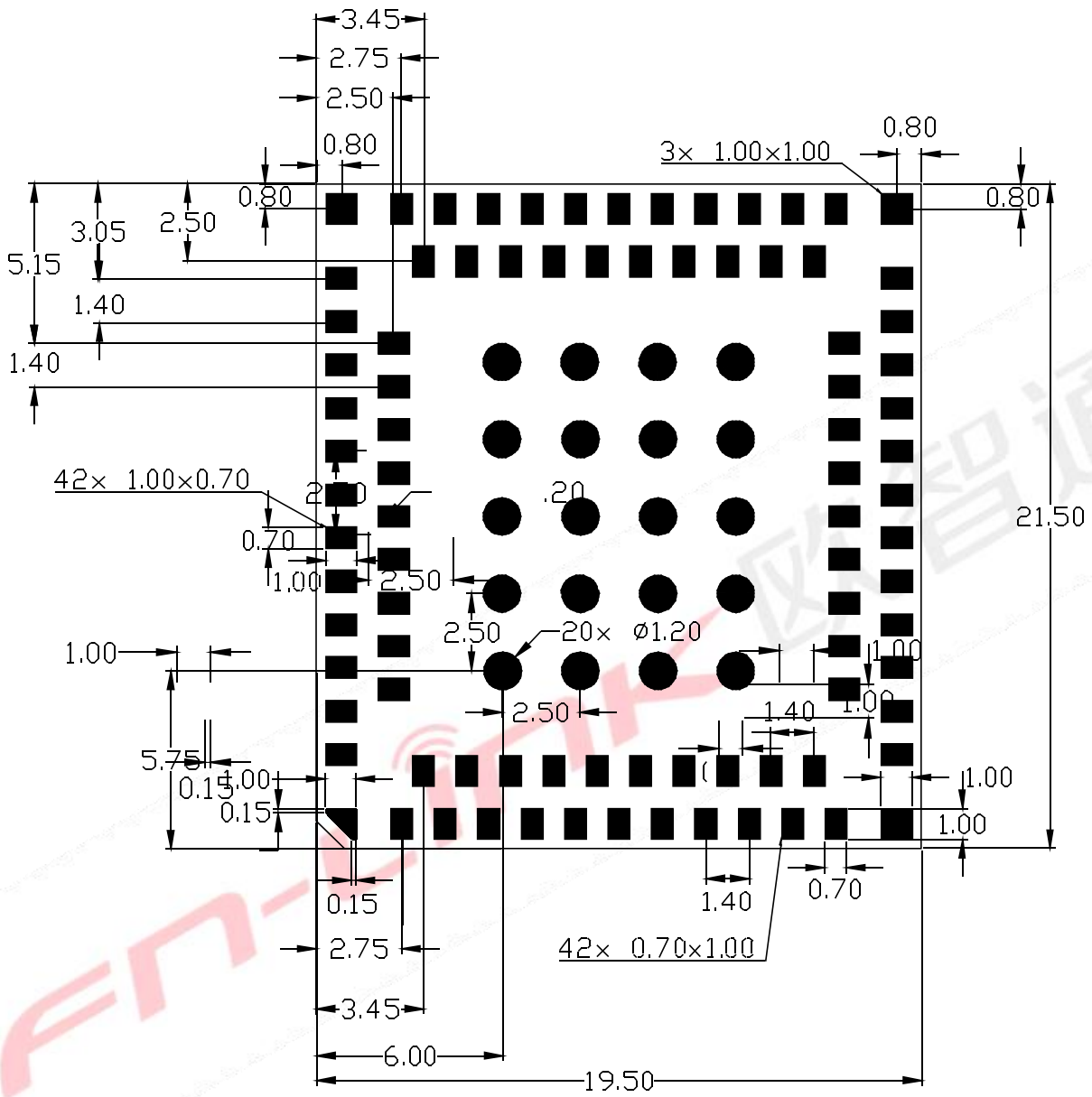
8.4 Layout Recommendation

a, The circular pads and square pads in red zone, add diameter of 0.4mm via in pad center;

b, The rectangle pads and located pad in blue zone, add diameter of 0.3mm via in pad center;

c, The RF pins, pin 25, pin 28, pin 33, no need to add vias

9. The Key Material List

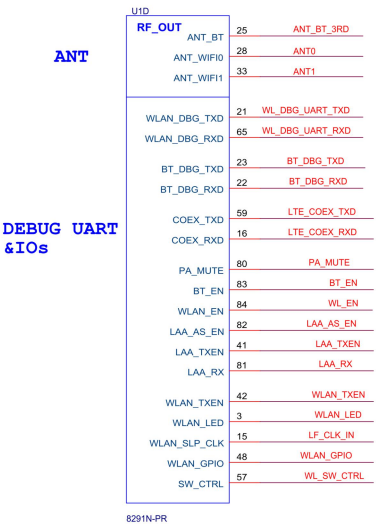| Item	Part Name	Description	Manufacturer
1	Crystal	2016 48MHz 9.9pF ±20ppm	ECEC,TKD,HOSONIC,JWT
2	PCB	8291N-PRH-V1.0 8L,19.5X21.5X0.8mm	Sunlord, XY-PCB, SL-PCB, KX-PCB
3	Chipset	QCA-6391-0-NSP265-TR-02-0	Qualcomm
4	Inductor	0201 1nH±0.1nH	Murata, Chilisin, sunlord, cenke，ceaiya
5	Shielding	8291N-PR-V1.0, 20.4X18.4X1.50MM	信太，精力通
6	Diplexer	DP1608-R2455NNQ2T/LF	ACX, Glead, Walsin, Murata

10. Reference Design

U1A   POWER

VDD_CORE_VL1 1
VDD_CORE_VL2 2
VDD_CORE_VL3 47
VDD_IO 43
VDD_CORE_VM 45
VDD_CORE_VH 46
VDD_RF1 19
VDD_RF2 20
VDD_RF3 63
8291N-PR

VDD_CORE_VL
C3 C4 C1 22uF 22uF 22uF
VDD_IO
VDD_CORE_VM
VDD_CORE_VH
VDD_IO VDD_CORE_VM VDD_CORE_VH
C6 C7 C8 22uF 22uF 22uF
VDD_RF
C9 C10 C11 22uF 22uF 22uF

U1B

GND 6, 24, 26, 27, 29, 30, 31, 32, 34, 44, 51, 66, 67, 69, 70, 74, 75, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108

GROUND PINS
8291N-PR

U1D

RF_OUT

ANT
ANT_BT 25 ANT_BT_3RD
ANT_WIFI0 28 ANT0
ANT_WIFI1 33 ANT1

DEBUG UART &IOs
WLAN_DBG_TXD 21 WL_DBG_UART_TXD
WLAN_DBG_RXD 65 WL_DBG_UART_RXD
BT_DBG_TXD 23 BT_DBG_TXD
BT_DBG_RXD 22 BT_DBG_RXD
COEX_TXD 59 LTE_COEX_TXD
COEX_RXD 16 LTE_COEX_RXD
PA_MUTE 80 PA_MUTE
BT_EN 83 BT_EN
WLAN_EN 84 WL_EN
LAA_AS_EN 82 LAA_AS_EN
LAA_TXEN 41 LAA_TXEN
LAA_RX 81 LAA_RX
WLAN_TXEN 42 WLAN_TXEN
WLAN_LED 3 WLAN_LED
WLAN_SLP_CLK 15 LF_CLK_IN
WLAN_GPIO 48 WLAN_GPIO
SW_CTRL 57 WL_SW_CTRL
8291N-PR

U1C

PCIe
PCIE_TX_N 7 R1 0R PCIE_TXN
PCIE_TX_P 52 R2 0R PCIE_TXP
PCIE_RX_N 11 C2 0.1uF PCIE_RXN
PCIE_RX_P 56 C5 0.1uF PCIE_RXP
PCIE_REFCLK_N 9 R3 0R PCIE_REFCLKN
PCIE_REFCLK_P 54 R4 0R PCIE_REFCLKP
PCIE_CLKREQ_N 12 PCIE_CLKREQ
PCIE_WAKE_N 13 PCIE_WAKE
PCIE_RST_N 14 PCIE_RST

PCM
PCM_CLK 37 PCM_CLK
PCM_DIN 76 PCM_DIN
PCM_DOUT 36 PCM_DOUT
PCM_SYNC 35 PCM_SYNC

UART
BT_TXD 39 BT_UART_TXD
BT_RXD 78 BT_UART_RXD
BT_RTS 77 BT_UART_RTS
BT_CTS 38 BT_UART_CTS
8291N-PR

U1E

RESERVED BT WAKEUP
WAKEUP_BT 4 HOST_WAKEUP_BT
BT_WAKEUP_HOST 49 BT_WAKEUP_HOST

RESERVED JTAG
JTAG_TCK 17 JTAG_TCK
JTAG_TRST_L 18 JTAG_TRST_L
JTAG_TMS 60 JTAG_TMS
JTAG_TDI 61 JTAG_TDI
JTAG_TDO 62 JTAG_TDO

RESERVED_2 5
RESERVED_3 8
RESERVED_4 10
RESERVED_7 40
NC PINS
RESERVED_9 50
RESERVED_10 53
RESERVED_11 55
RESERVED_12 58
RESERVED_16 64
RESERVED_17 68
RESERVED_18 71
RESERVED_19 72
RESERVED_20 73
RESERVED_21 79
8291N-PR

J1 RF_CONN
ANT0 C12 0R 1
C13 NC C14 NC 2,3,4

J2 RF_CONN
ANT1 C15 0R 1
C16 NC C17 NC 2,3,4

J3
Reserved
ANT_BT_3RD C18 NC 1 NC
C19 NC C20 NC **Reserved** 2,3,4

Note: For the 1.8V interface, such as PCM, UART and some I/O, if the host voltage level is 3.3V or 5V, need to add level shift circuit.
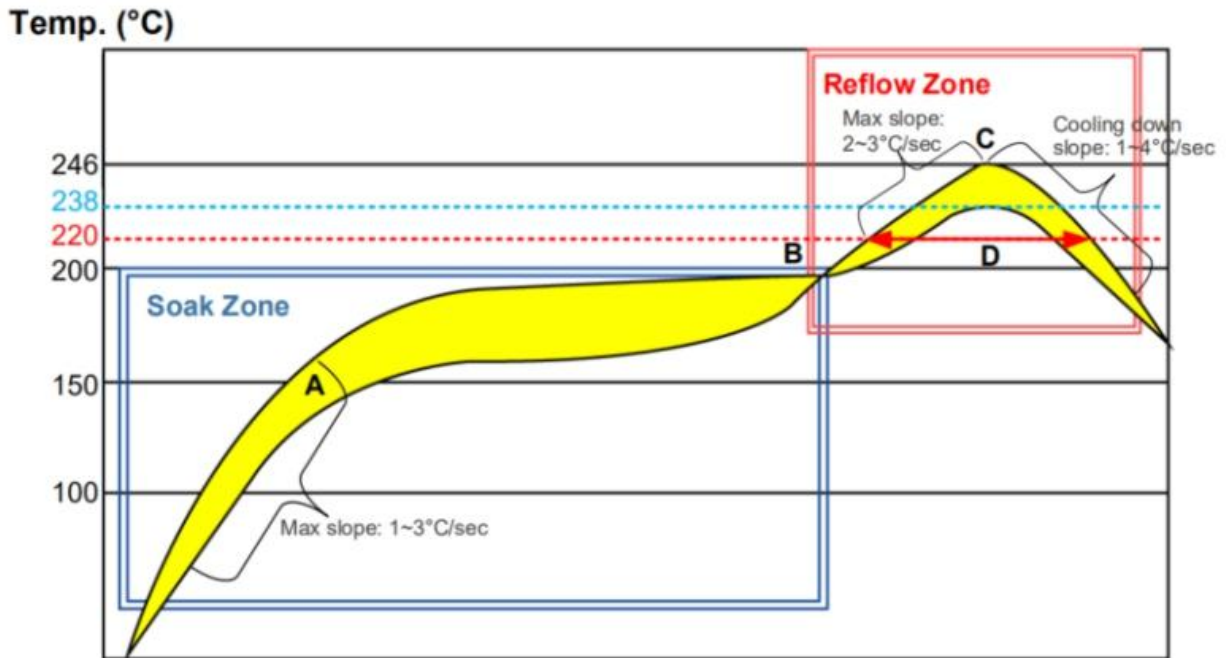
11. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

Number of Times : ≤2 times

Reference reflow value

Item	Recommended Value
Ramp rate（50～150℃）	1～3℃/sec
Soak Zone（Time zone between A and B：150～180℃）	70～110sec
Tmax	238～246℃
Reflow Zone（Zone D）	50～70sec
Cooling down slope	-1℃/sec～-4℃/sec

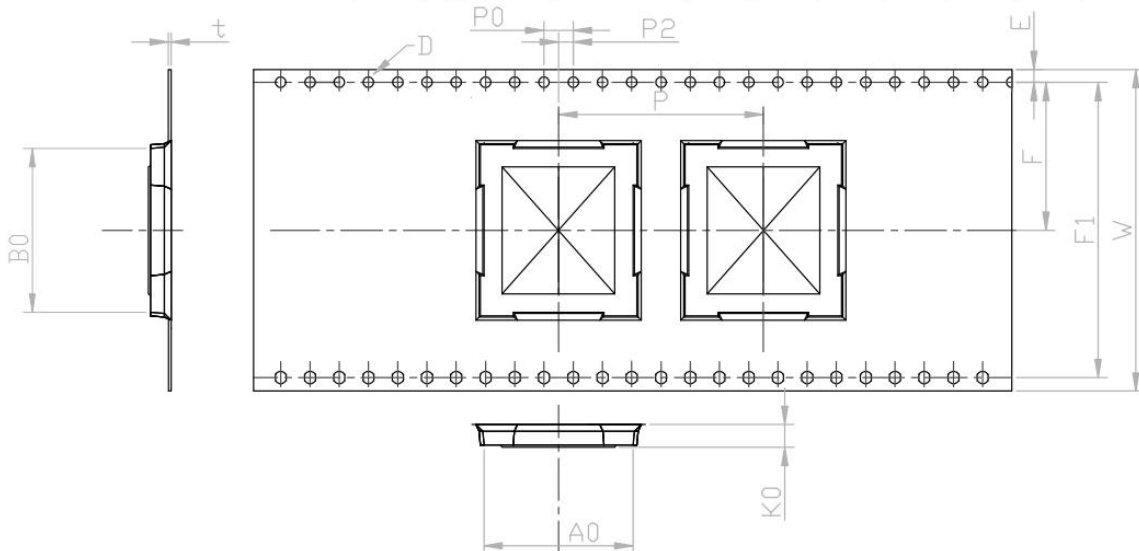Note: For more information of SMT and reflow, please contact Fn-Link for detail.

12. Package

12.1 Reel

A roll of 500pcs
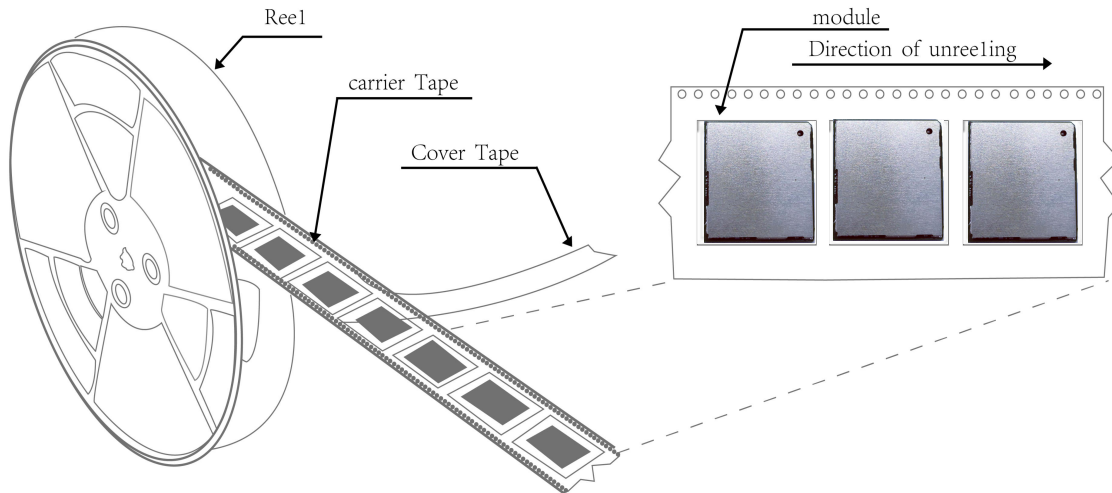
12.2 Carrier Tape Detail

ITEM	W	AO	BO	D	E	F	F1	KO	PO	P2	P	T
DIM	44	20.00	22.00	1.5	1.75	20.2	40.4	2.90	4.0	2.0	28.0	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

12.3 Packaging Detail

the take-up package

Using self-adhesive tape
Size of black tape:44mm*17.3m   the cover tape :37.5mm*17.3m
Color of plastic disc: blue

NY bag size:420mm*450mm   size ： 335*335*55mm
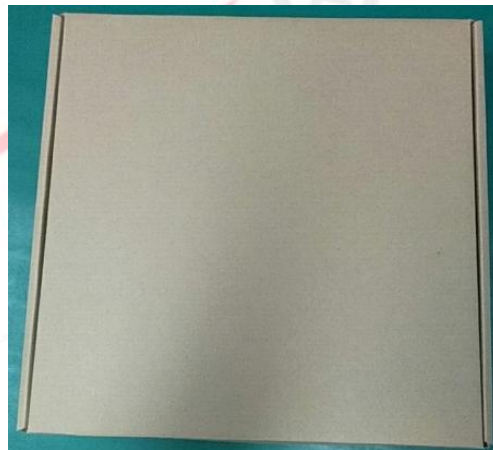
The packing case size:335*255*360mm

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