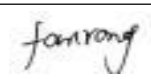



WIFI6 2.4GHz&5GHz Module Specification

IEEE 802.11 a/b/g/n/ac/ax 2T2R WLAN

Bluetooth V5.1-PCIe/UART Interface

CUSTOMER APPROVAL		CHECKED	APPROVED
	SIGNATURE		
	DATE		
ANRAY APPROVAL		CHECKED	APPROVED
	SIGNATURE	Lujianmei	
VERSION		DATE	2020.10.30
		2020.10.30	2020.10.30

Anray Communication Technology CO.LTD

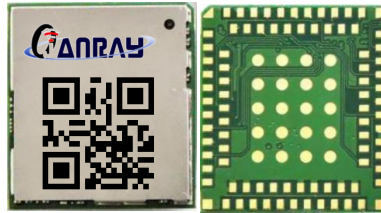
北京偶极通信设备有限责任公司

Contents

1. General description	3
2. Electrical Properties	4~11
2.1 Schematic diagram.....	4
2.2 General Specification.....	4
2.3 Recommended Operating Rating.....	5
2.4 RF Specification.....	6~11
3. Pin Definition	12~18
4. Physical Dimension.....	18
5. Application circuit diagram	19~20
6. Power and Host Interface Timing Diagram	20~21
7. Recommended SMT temperature	22
8. Package	23

1. General description

1.1 Introduction



P/N: Anray210830802GC03
(Size: 19.5*21.5*2.3mm)

Anray 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 Features

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 low power PCIe (w/L1 sub-state) interface for WLAN and UART/PCM interface for Bluetooth.

Supports Bluetooth V5.1, BLE, ANT+ and be backwards compatible with Bluetooth 1.2, 2.X+ enhance data rate.

Supports WLAN-Bluetooth coexistence and LTE-5G/ISM coexistence.

Supports Bluetooth for class1 and class2 power level transmissions without requiring an external PA.

BT host digital interface:

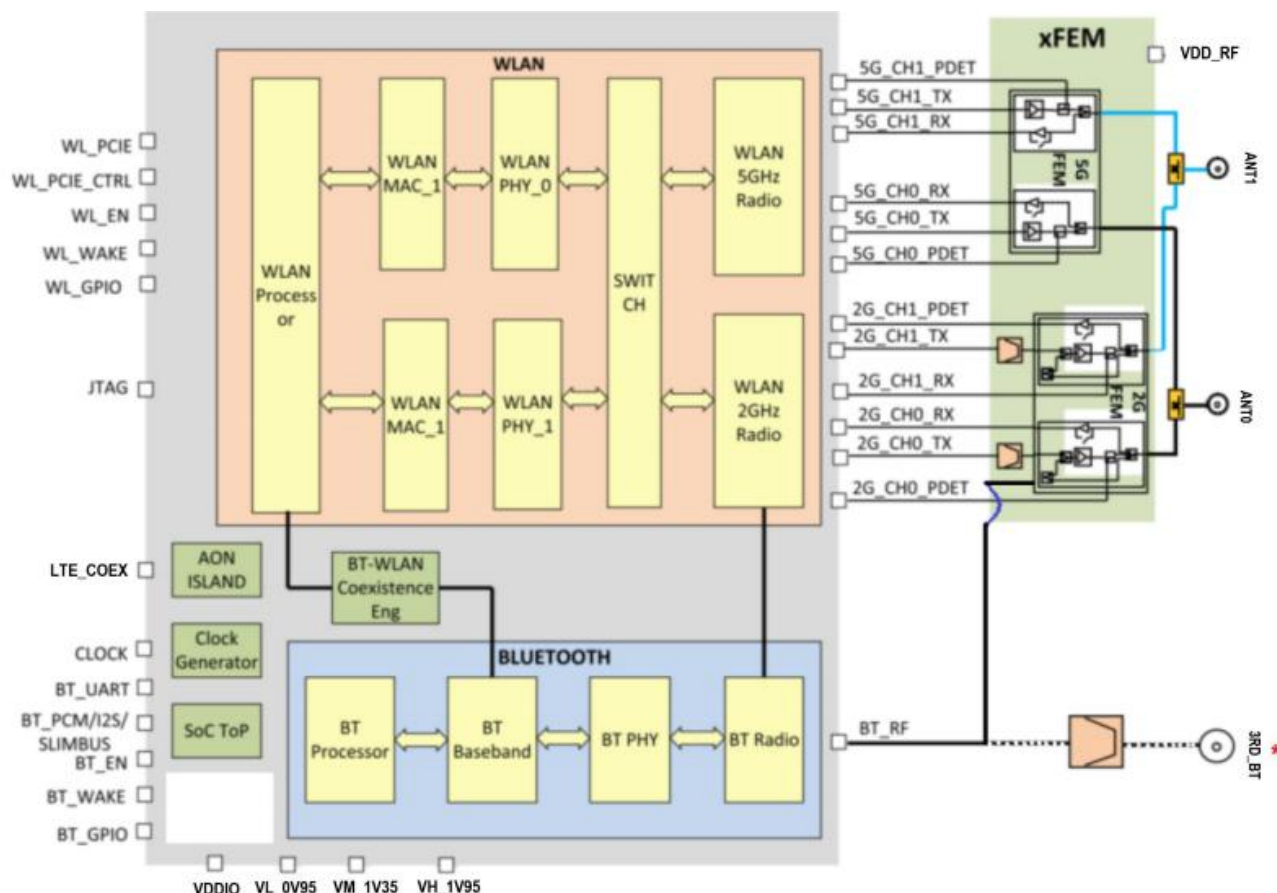
- HCI UART (up to 3.2 Mbps)
- PCM for audio data

1.3 Application

Wireless terminal, industrial remote sensing, security monitoring, medical equipment, electronic station board, intelligent transportation, etc.

2. Electrical Properties

2.1 Schematic diagram



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

2.2 General Specification

Model Name	WIFI6 2.4GHz&5GHz Module(2T2R)
Product Description	Support Wi-Fi/Bluetooth function
Wi-Fi Interface	Support PCIe
BT Interface	UART / PCM
Operating temperature	-10°C to +60°C
Storage temperature	-30°C to +85°C
Size:L* W * T(mm)	19.5*21.5*2.3 (typical)
RoHS	All hardware components are fully compliant with EU RoHS directive

2.3 Recommended Operating Rating

	Min.	Typ.	Max.	Unit	Note
Operating Temperature	-30	25	85	deg.C	If need a wider temperature range, please contact sales for detail
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

2.4 RF Specification

2.4.1 2.4GHz RF Specification

Conditions : VDD_RF=3.85V ; 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	
Item	Value	Standard Value
Output Power	802.11b /11Mbps: 17 dBm \pm 1.5 dB	EVM \leq -9dB
	802.11g /54Mbps: 16 dBm \pm 1.5 dB	EVM \leq -25dB
	802.11n /MCS7: 15 dBm \pm 1.5 dB	EVM \leq -28dB
	802.11ax/MCS9: 13 dBm \pm 1.5 dB	EVM \leq -32dB
	802.11ax/MCS11: 11.5 dBm \pm 1.5 dB	EVM \leq -35dB
SISO Receive Sensitivity (11b,20MHz) @8% PER	- 1Mbps PER @ -92 dBm	\leq -83
	- 2Mbps PER @ -89 dBm	\leq -80
	- 5.5Mbps PER @ -87 dBm	\leq -79
	- 11Mbps PER @ -85 dBm	\leq -76
SISO Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps PER @ -89 dBm	\leq -85
	- 9Mbps PER @ -88 dBm	\leq -84
	- 12Mbps PER @ -87 dBm	\leq -82
	- 18Mbps PER @ -84 dBm	\leq -80
	- 24Mbps PER @ -81 dBm	\leq -77
	- 36Mbps PER @ -78 dBm	\leq -73
	- 48Mbps PER @ -73 dBm	\leq -69
	- 54Mbps PER @ -71 dBm	\leq -68
SISO Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -89 dBm	\leq -85
	- MCS=1 PER @ -86 dBm	\leq -82
	- MCS=2 PER @ -84 dBm	\leq -80
	- MCS=3 PER @ -80 dBm	\leq -77
	- MCS=4 PER @ -77 dBm	\leq -73
	- MCS=5 PER @ -72 dBm	\leq -69
	- MCS=6 PER @ -71 dBm	\leq -68
	- MCS=7 PER @ -69 dBm	\leq -67
SISO Receive	- MCS=0 PER @ -86 dBm	\leq -82

Sensitivity (11n,40MHz) @10% PER	- MCS=1	PER @ -83 dBm	≤-79
	- MCS=2	PER @ -81 dBm	≤-77
	- MCS=3	PER @ -77 dBm	≤-74
	- MCS=4	PER @ -74 dBm	≤-70
	- MCS=5	PER @ -70 dBm	≤-66
	- MCS=6	PER @ -68 dBm	≤-65
	- MCS=7	PER @ -67 dBm	≤-64
SISO Receive Sensitivity (11ax, 20MHz) @10% PER	- MCS=0	PER @ -89 dBm	≤-82
	- MCS=1	PER @ -86 dBm	≤-79
	- MCS=2	PER @ -84 dBm	≤-77
	- MCS=3	PER @ -80 dBm	≤-74
	- MCS=4	PER @ -77 dBm	≤-70
	- MCS=5	PER @ -72 dBm	≤-66
	- MCS=6	PER @ -71 dBm	≤-65
	- MCS=7	PER @ -69 dBm	≤-64
	- MCS=8	PER @ -66 dBm	≤-59
	- MCS=9	PER @ -64 dBm	≤-57
	- MCS=10	PER @ -62 dBm	≤-54
	- MCS=11	PER @ -59 dBm	≤-52
SISO Receive Sensitivity (11ax,40MHz) @10% PER	- MCS=0	PER @ -86 dBm	≤-79
	- MCS=1	PER @ -83 dBm	≤-76
	- MCS=2	PER @ -81 dBm	≤-74
	- MCS=3	PER @ -77 dBm	≤-71
	- MCS=4	PER @ -74 dBm	≤-67
	- MCS=5	PER @ -70 dBm	≤-63
	- MCS=6	PER @ -68 dBm	≤-62
	- MCS=7	PER @ -67 dBm	≤-61
	- MCS=8	PER @ -65 dBm	≤-56
	- MCS=9	PER @ -61 dBm	≤-54
	- MCS=10	PER @ -59 dBm	≤-51
	- MCS=11	PER @ -57 dBm	≤-49
Maximum Input Level	802.11b: -10 dBm		
	802.11g/n/ax: -10 dBm		
Antenna Reference	Small antennas with 0~2 dBi peak gain		

2.4.2 5GHz RF Specification

Conditions : VDD_RF=3.85V ; Temp:25°C

Feature	Description	
WLAN Standard	IEEE 802.11 a/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	
Item	Value	Standard Value
Output Power	802.11a /54Mbps: 15 dBm \pm 1.5 dB	EVM \leq -25dB
	802.11n /MCS7: 14 dBm \pm 1.5 dB	EVM \leq -28dB
	802.11ac /MCS9: 13 dBm \pm 1.5 dB	EVM \leq -32dB
	802.11ax /MCS11: 11.5 dBm \pm 1.5 dB	EVM \leq -35dB
SISO Receive Sensitivity (11a,20MHz) @10% PER	- 6Mbps PER @ -90 dBm	\leq -85
	- 54Mbps PER @ -73 dBm	\leq -68
SISO Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -90 dBm	\leq -85
	- MCS=7 PER @ -70 dBm	\leq -67
SISO Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0 PER @ -88 dBm	\leq -82
	- MCS=7 PER @ -69 dBm	\leq -64
SISO Receive Sensitivity (11ac,20MHz) @10% PER	- MCS=0, NSS1 PER @ -90 dBm	\leq -82
	- MCS=1, NSS1 PER @ -86 dBm	\leq -80
	- MCS=2, NSS1 PER @ -83 dBm	\leq -77
	- MCS=3, NSS1 PER @ -81 dBm	\leq -73
	- MCS=4, NSS1 PER @ -77 dBm	\leq -69
	- MCS=5, NSS1 PER @ -72 dBm	\leq -68
	- MCS=6, NSS1 PER @ -71 dBm	\leq -67
	- MCS=7, NSS1 PER @ -70 dBm	\leq -62
	- MCS=8, NSS1 PER @ -67 dBm	\leq -60
SISO Receive Sensitivity (11ac,40MHz) @10% PER	- MCS=0, NSS1 PER @ -89 dBm	\leq -79
	- MCS=1, NSS1 PER @ -86 dBm	\leq -77
	- MCS=2, NSS1 PER @ -81 dBm	\leq -74
	- MCS=3, NSS1 PER @ -76 dBm	\leq -70
	- MCS=4, NSS1 PER @ -73 dBm	\leq -66
	- MCS=5, NSS1 PER @ -70 dBm	\leq -65
	- MCS=6, NSS1 PER @ -69 dBm	\leq -64
	- MCS=7, NSS1 PER @ -68 dBm	\leq -59
	- MCS=8, NSS1 PER @ -66 dBm	\leq -57

	- MCS=9, NSS1 PER @ -64 dBm	≤-55
SISO Receive Sensitivity (11ac,80MHz) @10% PER	- MCS=0, NSS1 PER @ -86 dBm	≤-79
	- MCS=1, NSS1 PER @ -82 dBm	≤-76
	- MCS=2, NSS1 PER @ -78 dBm	≤-74
	- MCS=3, NSS1 PER @ -75 dBm	≤-71
	- MCS=4, NSS1 PER @ -72 dBm	≤-67
	- MCS=5, NSS1 PER @ -69 dBm	≤-63
	- MCS=6, NSS1 PER @ -67 dBm	≤-62
	- MCS=7, NSS1 PER @ -65 dBm	≤-61
	- MCS=8, NSS1 PER @ -63 dBm	≤-56
	- MCS=9, NSS1 PER @ -61 dBm	≤-54
SISO Receive Sensitivity (11ax, 20MHz) @10% PER	- MCS=0 PER @ -89 dBm	≤-82
	- MCS=1 PER @ -86 dBm	≤-79
	- MCS=2 PER @ -84 dBm	≤-77
	- MCS=3 PER @ -80 dBm	≤-74
	- MCS=4 PER @ -77 dBm	≤-70
	- MCS=5 PER @ -72 dBm	≤-66
	- MCS=6 PER @ -71 dBm	≤-65
	- MCS=7 PER @ -69 dBm	≤-64
	- MCS=8 PER @ -66 dBm	≤-59
	- MCS=9 PER @ -64 dBm	≤-57
	- MCS=10 PER @ -62 dBm	≤-54
	- MCS=11 PER @ -59 dBm	≤-52
SISO Receive Sensitivity (11ax,40MHz) @10% PER	- MCS=0 PER @ -86 dBm	≤-79
	- MCS=1 PER @ -83 dBm	≤-76
	- MCS=2 PER @ -81 dBm	≤-74
	- MCS=3 PER @ -77 dBm	≤-71
	- MCS=4 PER @ -74 dBm	≤-67
	- MCS=5 PER @ -70 dBm	≤-63
	- MCS=6 PER @ -68 dBm	≤-62
	- MCS=7 PER @ -67 dBm	≤-61
	- MCS=8 PER @ -65 dBm	≤-56
	- MCS=9 PER @ -61 dBm	≤-54
	- MCS=10 PER @ -59 dBm	≤-51
	- MCS=11 PER @ -57 dBm	≤-49
SISO Receive Sensitivity	- MCS=0 PER @ -83 dBm	≤-73

(11ax,80MHz) @10% PER	- MCS=1	PER @ -80 dBm	≤-70
	- MCS=2	PER @ -78 dBm	≤-68
	- MCS=3	PER @ -74 dBm	≤-65
	- MCS=4	PER @ -71 dBm	≤-61
	- MCS=5	PER @ -68 dBm	≤-57
	- MCS=6	PER @ -65 dBm	≤-56
	- MCS=7	PER @ -64 dBm	≤-55
	- MCS=8	PER @ -62 dBm	≤-50
	- MCS=9	PER @ -58 dBm	≤-48
	- MCS=10	PER @ -56 dBm	≤-45
	- MCS=11	PER @ -54 dBm	≤-43
Maximum Input Level	802.11a/n/ac/ax : -10 dBm		
Antenna Reference	Small antennas with 0~2 dBi peak gain		

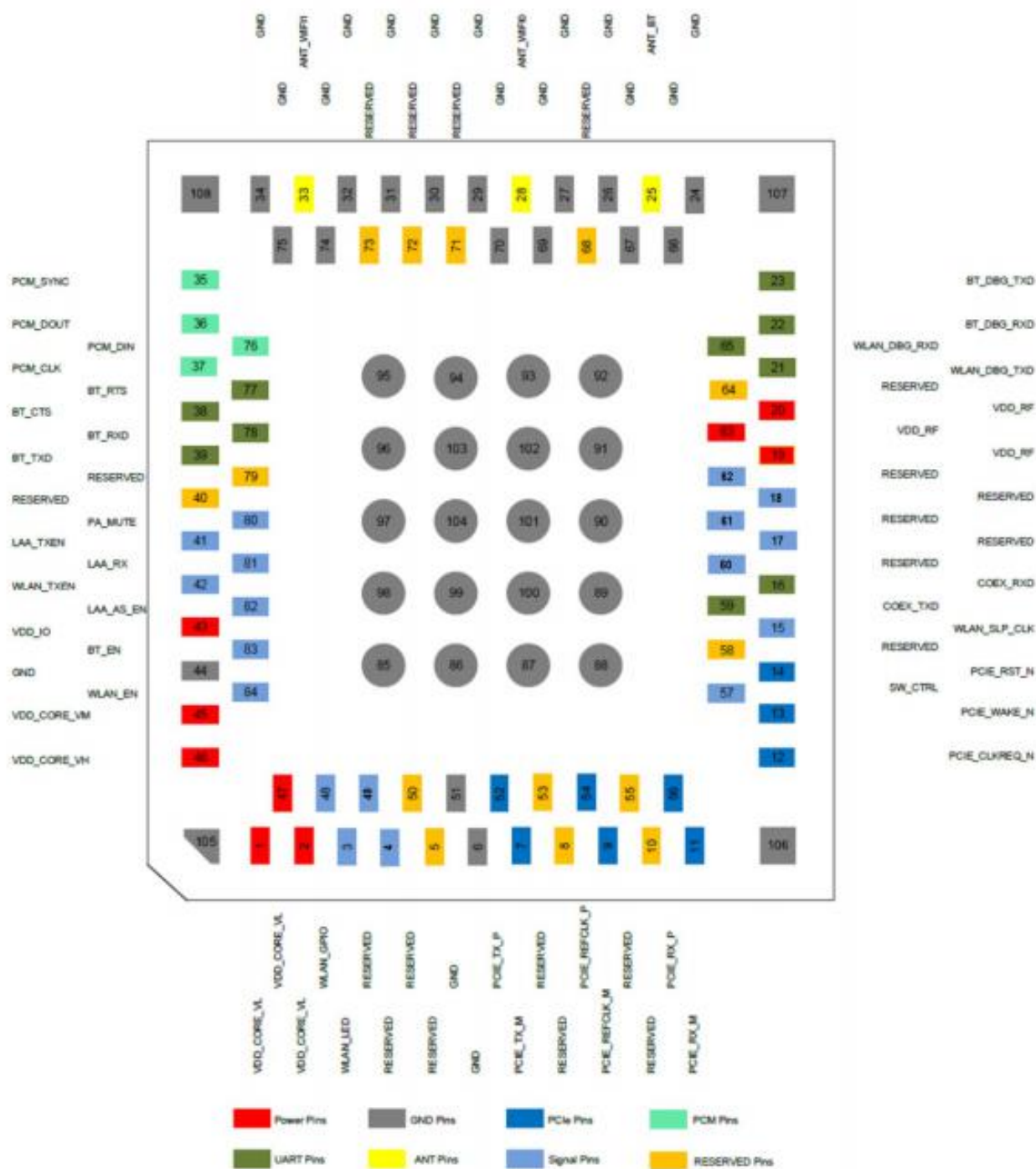
15GHz(20MHz) Channel table

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
5745MHz~5825MHz	140	5700
	149	5745
	153	5765
	157	5785
	161	5805
	165	5825

2.4.3 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, $\pi/4$ -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):-10dBm		
	$\pi/4$ -DQPSK (2Mbps) :-10dBm		
	8DPSK (3Mbps) :-10dBm		

3. Pin Definition



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	GND		Ground		
31	GND		Ground		
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	GND		Ground		
86	GND		Ground		
87	GND		Ground		
88	GND		Ground		
89	GND		Ground		
90	GND		Ground		
91	GND		Ground		
92	GND		Ground		
93	GND		Ground		
94	GND		Ground		
95	GND		Ground		
96	GND		Ground		
97	GND		Ground		
98	GND		Ground		
99	GND		Ground		
100	GND		Ground		
101	GND		Ground		
102	GND		Ground		
103	GND		Ground		
104	GND		Ground		
105	GND		Ground		
106	GND		Ground		
107	GND		Ground		
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	
4	WAKEUP_BT	I	Host wakeup BT	1.8V	
49	WAKEUP_HOST	O	BT wakeup Host	1.8V	
15	WLAN_SLP_CLK	I	Sleep clock input	1.8V	
16	COEX_RXD	I	LTE coexistence UART RXD	1.8V	
59	COEX_TXD	O	LTE coexistence UART TXD	1.8V	
21	WLAN_DBG_TXD	O	UART TXD for debug	1.8V	
65	WLAN_DBG_RXD	I	UART RXD for debug	1.8V	
22	BT_DBG_RXD	I	BT UART RXD for debug	1.8V	
23	BT_DBG_TXD	O	BT UART TXD for debug	1.8V	
41	LAA_TXEN	I	WLAN XFEM control LAA TX enable	1.8V	
42	WLAN_TXEN	I	WLAN XFEM control for WLAN Tx enable	1.8V	
48	WLAN_GPIO	O	WLAN GPIO	1.8V	
57	SW_CTRL	O	Switch control	1.8V	
80	PA_MUTE	I	WLAN XFEM control for PA mute	1.8V	
81	LAA_RX	I	WLAN XFEM control for LAA receiver	1.8V	
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, can be configured as BT RF out for customize requirements
28	ANT_WIFI0		Chain0 RF bidirectional antenna port		
33	ANT_WIFI1		Chain1 RF bidirectional antenna port		

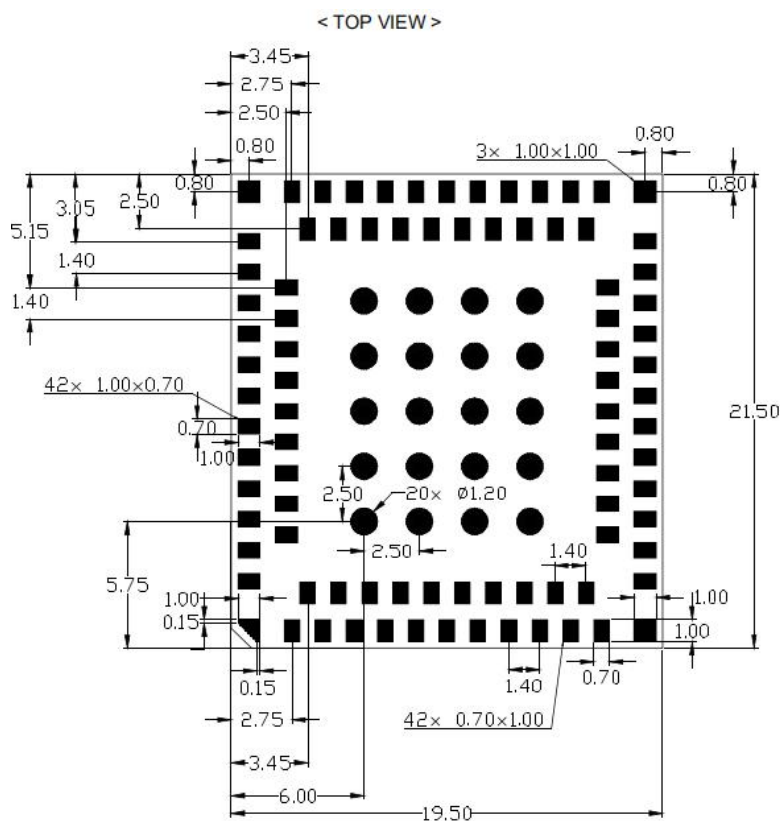
Reserved pins

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

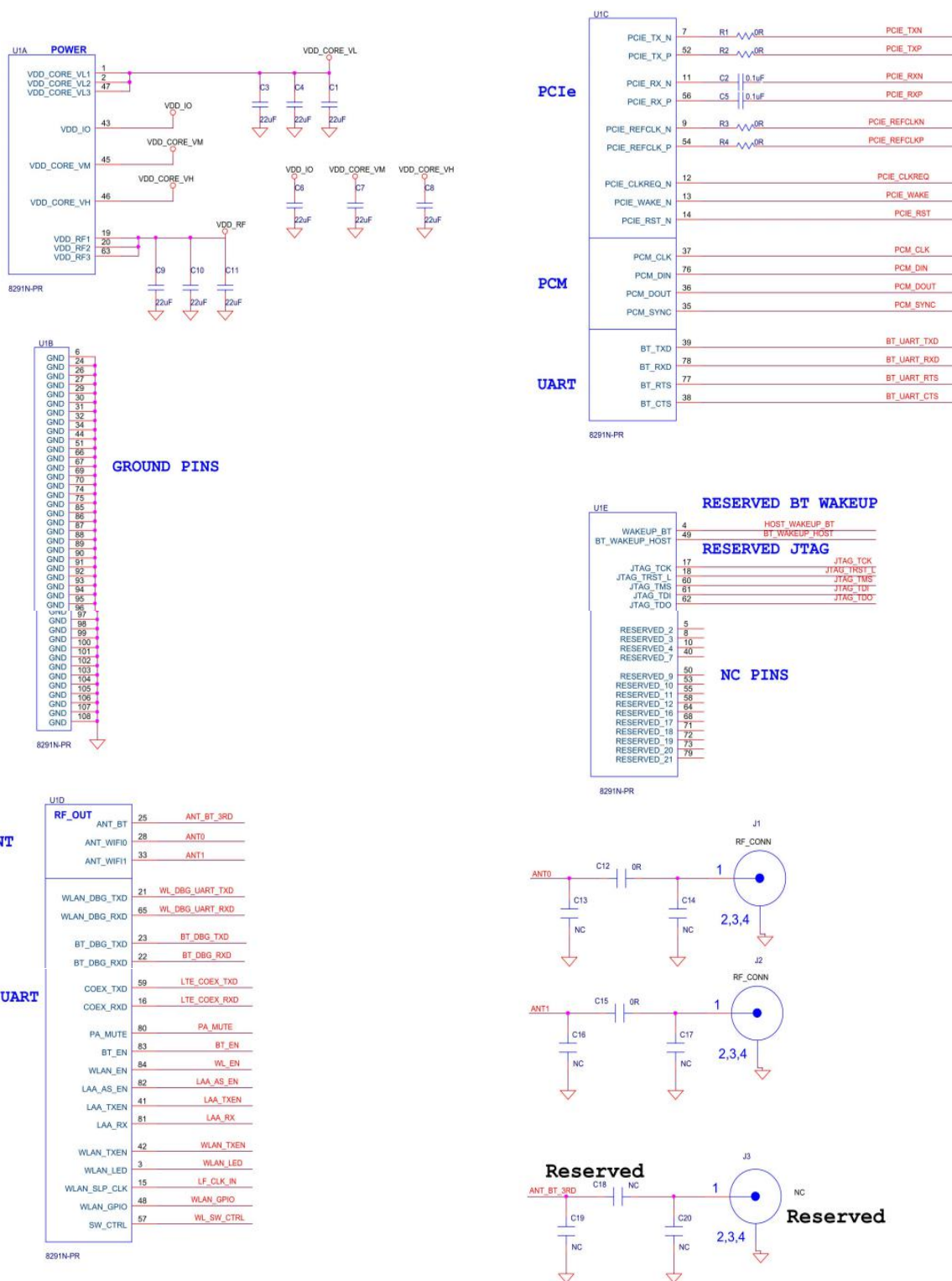
4. Physical Dimension

(Unit: mm)



5. Application circuit diagram

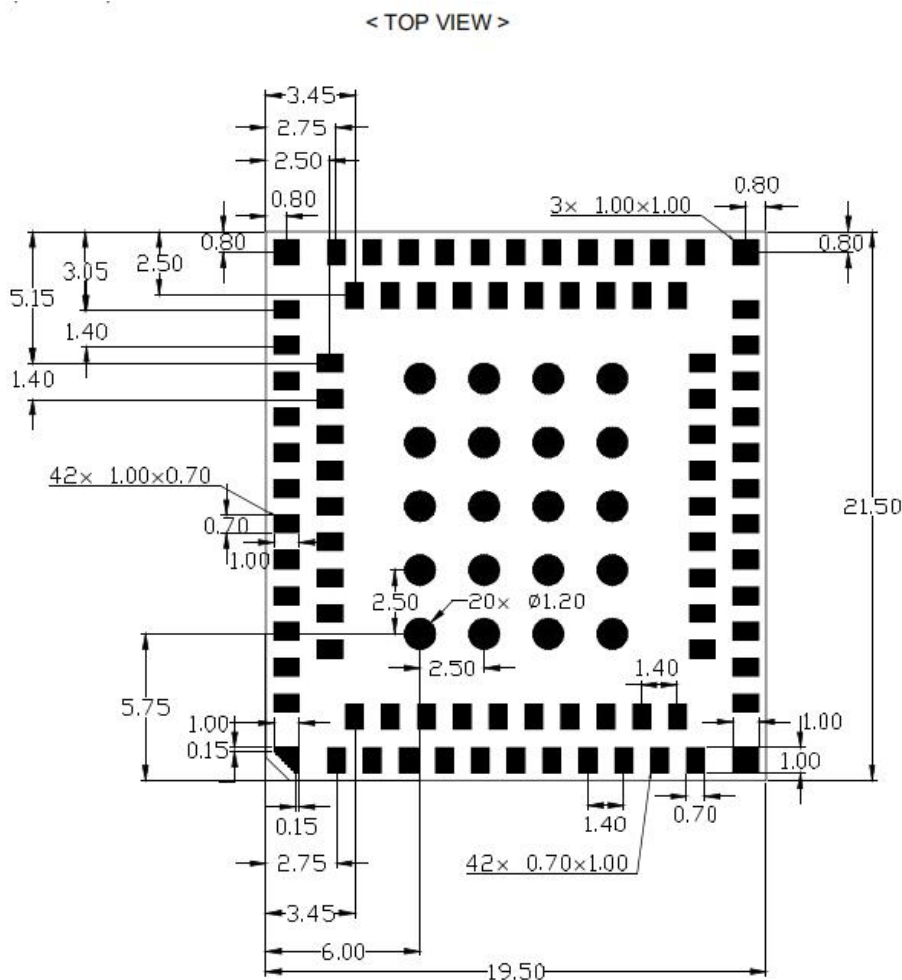
5.1 Reference Design



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.

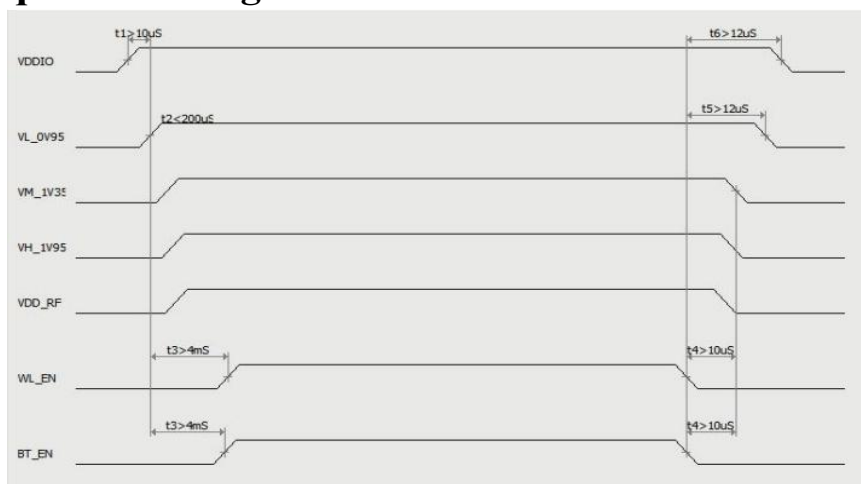
5.2 Reference Dimension

(Unit: mm)



6. Power and Host Interface Timing Diagram

6.1 Power sequence timing

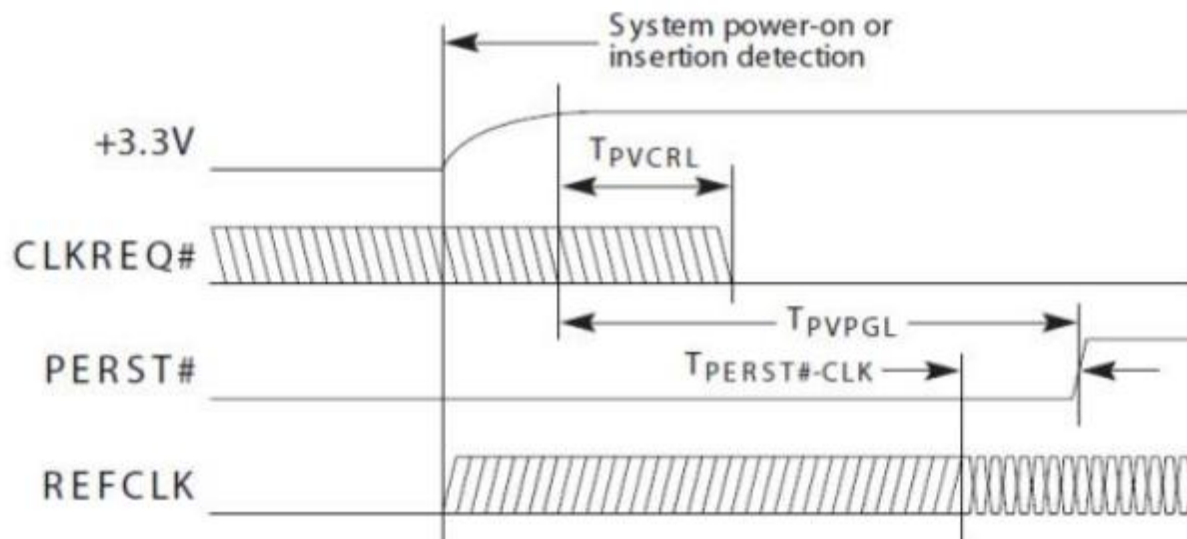


Symbol	Parameter	Min	Max	Unit
t1	VDDIO 1V8 valid to VDD_CORE_VL 0V95 is asserted	10	-	uS
t2	VDD_CORE_VL 0V95 voltage rising time		200	uS
t3	VDD_CORE_VL 0V95 valid to WLAN_EN or BT_EN input active	4		mS
t4	WLAN_EN and BT_EN de-assert to VCORE_VM/VCORE_VH/VDD_RF ramming down	10		uS
t5	WLAN_EN and BT_EN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

6.2 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.

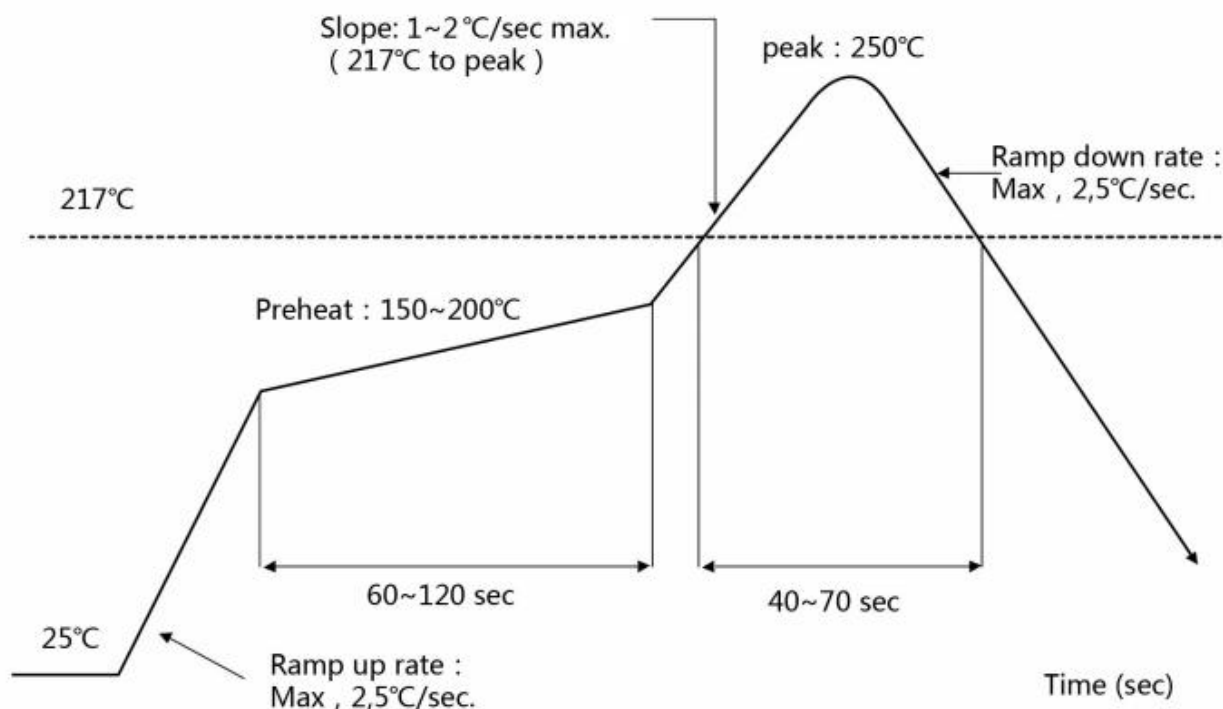
Symbol	Parameter	Min	Max	Units
T_{PVCRL}	Power Valid to CLKREQ# Output active		100	μ S
T_{PVPGI}	Power Valid to PERST# Input inactive	1		mS
$T_{PERST\#-CLK}$	REFCLK stable before PERST# inactive	100		μ S

7. Recommended SMT temperature

Referred to IPC/JEDEC standard.

Peak Temperature : $<250^{\circ}\text{C}$

Number of Times : ≤ 2 times



8. Package

Layer size: L-300.0*W-240.0 mm

Layer material: PVC

Carton size: L310.0*W260.0*H220.0 mm

Carton material: A=A

