Innovation For Surfing

欧智通科技

Fn-Link

8223A-UU

WiFi Dual-band 1X1 11ac + Bluetooth V4.1

Module Datasheet

Revision History

Date	Revision Content	Revised By	Version
2016/08/11	-Preliminary	Ken	1.0

Contents

1. Introduction

Fn-Link Technology would like to announce a low-cost and low-power consumption module which has all of the Wi-Fi, 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 Access Points in the wireless LAN.

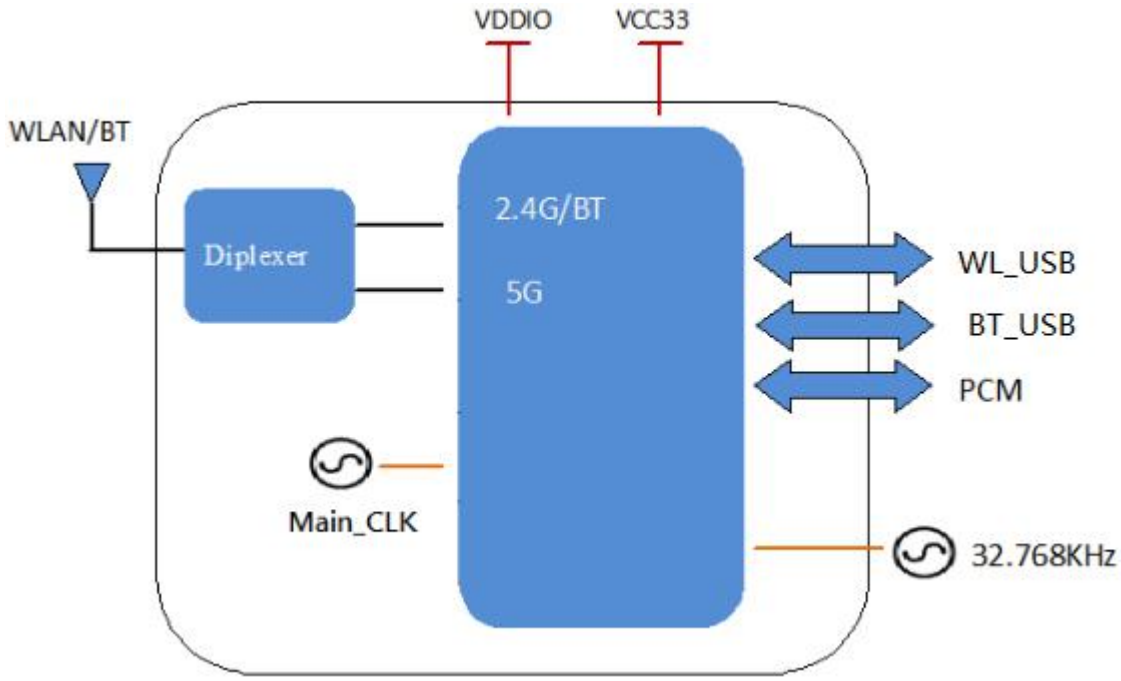
The wireless module complies with IEEE 802.11 a/b/g/n/ac standard and it can achieve up to a speed of 433.3Mbps with single stream in 802.11ac draft to connect to the wireless LAN. The integrated module provides USB interface for Wi-Fi and Bluetooth.

This compact module is a total solution for a combination of Wi-Fi + BT technologies. The module is specifically developed for Smart phones and Portable devices.

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.
- Supports 20/40MHz at 2.4GHz and supports 20/40/80MHz at 5GHz
- Supports USB2.0 interface for WLAN and USB1.1/PCM interface for Bluetooth.
- Supports Bluetooth V4.1+HS, BLE 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:
  - USB1.1
  - PCM for audio data

The block diagram of module is depicted in the figure below.



3. General Specification

3.1 General Specification

Model Name	8223A-UU
Product Description	Support WiFi/Bluetooth functionalities
Dimension	L x W x H: 12 x 12 x 1.5 (typical) mm
WiFi Interface	Support USB 2.0
BT Interface	USB1.1 / PCM
Operating temperature	-30°C to 85°C
Storage temperature	-40°C to 85°C

3.1.2 Recommended Operating Rating

	Min.	Typ.	Max.	Unit
Operating Temperature	-30	25	85	deg.C
VCC33	3.15	3.3	3.45	V
VDDIO	1.7	1.8 or 3.3	3.45	V

4. WiFi RF Specification

4.1 2.4GHz RF Specification

Feature	Description
WLAN Standard	IEEE 802.11b/g/n/ac, WiFi 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 /CCK : 16 dBm ± 1.5 dB @ EVM ≤ -9dB
	802.11g /64-QAM(R=3/4) : 15 dBm ± 1.5 dB @ EVM ≤ -25dB
	802.11n /64-QAM(R=5/6) : 14 dBm ± 1.5 dB @ EVM ≤ -28dB
Receive Sensitivity (11b) @8% PER	- 1Mbps PER @ -96 dBm, typical
	- 2Mbps PER @ -90 dBm, typical
	- 5.5Mbps PER @ -88 dBm, typical
	- 11Mbps PER @ -87 dBm, typical
Receive Sensitivity (11g) @10% PER	- 6Mbps PER @ -90 dBm, typical
	- 9Mbps PER @ -88 dBm, typical
	- 12Mbps PER @ -87 dBm, typical
	- 18Mbps PER @ -85 dBm, typical
	- 24Mbps PER @ -83 dBm, typical
	- 36Mbps PER @ -80 dBm, typical
	- 48Mbps PER @ -76 dBm, typical
	- 54Mbps PER @ -74 dBm, typical
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -89 dBm, typical
	- MCS=1 PER @ -85 dBm, typical
	- MCS=2 PER @ -84 dBm, typical
	- MCS=3 PER @ -80 dBm, typical
	- MCS=4 PER @ -77 dBm, typical
	- MCS=5 PER @ -75 dBm, typical
	- MCS=6 PER @ -72 dBm, typical
	- MCS=7 PER @ -71 dBm, typical
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0 PER @ -89 dBm, typical
	- MCS=1 PER @ -85 dBm, typical
	- MCS=2 PER @ -84 dBm, typical
	- MCS=3 PER @ -80 dBm, typical
	- MCS=4 PER @ -76 dBm, typical
	- MCS=5 PER @ -72 dBm, typical
	- MCS=6 PER @ -70 dBm, typical

	- MCS=7	PER @ -69 dBm, typical
Receive Sensitivity (11ac,20MHz) @10% PER	- MCS=0	PER @ -90 dBm, typical
	- MCS=1	PER @ -87 dBm, typical
	- MCS=2	PER @ -86 dBm, typical
	- MCS=3	PER @ -82 dBm, typical
	- MCS=4	PER @ -79 dBm, typical
	- MCS=5	PER @ -75 dBm, typical
	- MCS=6	PER @ -73 dBm, typical
	- MCS=7	PER @ -72 dBm, typical
	- MCS=8	PER @ -67 dBm, typical
Receive Sensitivity (11ac,40MHz) @10% PER	- MCS=0	PER @ -88 dBm, typical
	- MCS=1	PER @ -85 dBm, typical
	- MCS=2	PER @ -83 dBm, typical
	- MCS=3	PER @ -80 dBm, typical
	- MCS=4	PER @ -77 dBm, typical
	- MCS=5	PER @ -72 dBm, typical
	- MCS=6	PER @ -71 dBm, typical
	- MCS=7	PER @ -69 dBm, typical
	- MCS=8	PER @ -65 dBm, typical
	- MCS=9	PER @ -64 dBm, typical

4 .2 5GHz RF Specification

Feature	**Description**
WLAN Standard	IEEE 802.11a/b/g/n/ac, 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]
Modulation	802.11a/n : 64-QAM,16-QAM, QPSK, BPSK 802.11ac : 256-QAM, 64-QAM,16-QAM, QPSK, BPSK
Output Power	802.11a /64-QAM(R=3/4) : 14 dBm ± 1.5 dB @ EVM ≤ -25dB
	802.11n /64-QAM(R=5/6) : 13 dBm ± 1.5 dB @ EVM ≤ -28dB
	802.11ac/256-QAM(R=3/4) : 12 dBm ± 1.5 dB @ EVM ≤ -30dB
	802.11ac/256-QAM(R=5/6) : 10 dBm ± 1.5 dB @ EVM ≤ -32dB
Receive Sensitivity (11a, 20MHz) @10% PER	- 6Mbps PER @ -91 dBm, typical
	- 9Mbps PER @ -89 dBm, typical
	- 12Mbps PER @ -88 dBm, typical

	- 18Mbps	PER @ -86 dBm, typical
	- 24Mbps	PER @ -82 dBm, typical
	- 36Mbps	PER @ -79 dBm, typical
	- 48Mbps	PER @ -74 dBm, typical
	- 54Mbps	PER @ -73 dBm, typical
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0	PER @ -90 dBm, typical
	- MCS=1	PER @ -88 dBm, typical
	- MCS=2	PER @ -85 dBm, typical
	- MCS=3	PER @ -82 dBm, typical
	- MCS=4	PER @ -78 dBm, typical
	- MCS=5	PER @ -74 dBm, typical
	- MCS=6	PER @ -72 dBm, typical
	- MCS=7	PER @ -71 dBm, typical
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0	PER @ -88 dBm, typical
	- MCS=1	PER @ -85 dBm, typical
	- MCS=2	PER @ -83 dBm, typical
	- MCS=3	PER @ -79 dBm, typical
	- MCS=4	PER @ -76 dBm, typical
	- MCS=5	PER @ -71 dBm, typical
	- MCS=6	PER @ -70 dBm, typical
	- MCS=7	PER @ -68 dBm, typical
Receive Sensitivity (11ac,20MHz) @10% PER	- MCS=0	PER @ -89 dBm, typical
	- MCS=1	PER @ -87 dBm, typical
	- MCS=2	PER @ -84 dBm, typical
	- MCS=3	PER @ -81 dBm, typical
	- MCS=4	PER @ -77 dBm, typical
	- MCS=5	PER @ -73 dBm, typical
	- MCS=6	PER @ -71 dBm, typical
	- MCS=7	PER @ -70 dBm, typical
	- MCS=8	PER @ -66 dBm, typical
Receive Sensitivity (11ac,40MHz) @10% PER	- MCS=0	PER @ -87 dBm, typical
	- MCS=1	PER @ -83 dBm, typical
	- MCS=2	PER @ -81 dBm, typical
	- MCS=3	PER @ -78 dBm, typical
	- MCS=4	PER @ -75 dBm, typical
	- MCS=5	PER @ -70 dBm, typical
	- MCS=6	PER @ -68 dBm, typical

	- MCS=7	PER @ -66 dBm, typical
	- MCS=8	PER @ -64 dBm, typical
	- MCS=9	PER @ -63 dBm, typical
Receive Sensitivity (11ac,80MHz) @10% PER	- MCS=0	PER @ -83 dBm, typical
	- MCS=1	PER @ -80 dBm, typical
	- MCS=2	PER @ -78 dBm, typical
	- MCS=3	PER @ -74 dBm, typical
	- MCS=4	PER @ -71 dBm, typical
	- MCS=5	PER @ -69 dBm, typical
	- MCS=6	PER @ -65 dBm, typical
	- MCS=7	PER @ -63 dBm, typical
	- MCS=8	PER @ -60 dBm, typical
	- MCS=9	PER @ -59 dBm, typical

[1]5GHz Channel table

Band (GHz)	Operating Channel Numbers	Channel center frequencies(MHz)
5.15GHz~5.25GHz	36	5180
	40	5200
	44	5220
	48	5240
5.25GHz~5.35GHz	52	5260
	56	5280
	60	5300
	64	5320
5.5GHz~5.7GHz	100	5500
	104	5520
	108	5540
	112	5560
	116	5580
	120	5600
	124	5620
	128	5640
	132	5660
	136	5680
	140	5700
5.725GHz~5.825GHz	149	5745
	153	5765
	157	5785
	161	5805
	165	5825

5. Bluetooth Specification

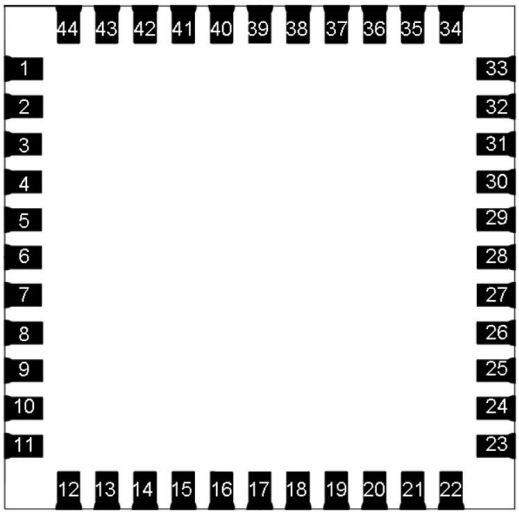
5.1 Bluetooth Specification

Feature	Description		
General Specification			
Bluetooth Standard	Bluetooth V4.1 of 1, 2 and 3 Mbps.		
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	FHSS, GFSK, DPSK, DQPSK		
RF Specification			
	Min.	**Typical.**	**Max.**
Output Power (Class 1.5)		8 dBm	
Sensitivity @ BER=0.1% for GFSK (1Mbps)		-92 dBm	
Sensitivity @ BER=0.01% for π/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		

6. Pin Assignments

6.1 Pin Outline

< TOP VIEW >



6.2 Pin Definition

NO	Name	Type	Description
1	GND	—	Ground connections
2	WL_BT_ANT	I/O	RF I/O port
3	GND	—	Ground connections
4	NC	—	Floating (Don't connected to ground)
5	NC	—	Floating (Don't connected to ground)
6	HOST_WAKE_BT	I	HOST to wake-up Bluetooth device
7	BT_WAKE_HOST	O	Bluetooth device to wake-up HOST
8	NC	—	Floating (Don't connected to ground)
9	VCC33	P	Main power voltage source input 3.3V
10	NC	—	Floating (Don't connected to ground)
11	NC	—	Floating (Don't connected to ground)
12	WL_EN	I	Enable pin for WLAN device ON: pull high ; OFF: pull low
13	WL_HOST_WAKE	O	WLAN to wake-up HOST

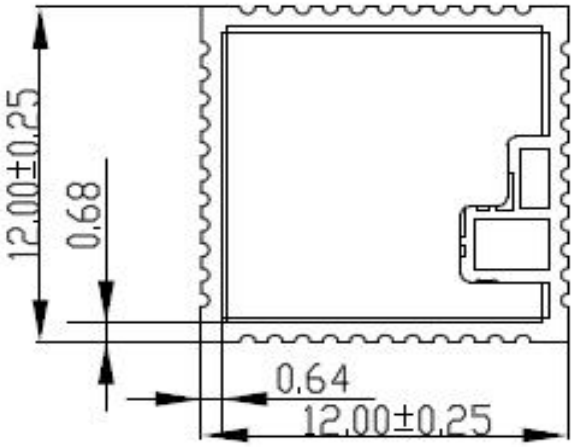
14	NC	—	Floating (Don't connected to ground)
15	BT_USB_DP	AI/AO	USB1.1 differential pair for Bluetooth
16	BT_USB_DM	AI/AO	USB1.1 differential pair for Bluetooth
17	NC	—	Floating (Don't connected to ground)
18	WL_USB_DM	AI/AO	USB2.0 differential pair for WLAN
19	WL_USB_DP	AI/AO	USB2.0 differential pair for WLAN
20	GND	—	Ground connections
21	NC	—	Floating (Don't connected to ground)
22	VDDIO	P	I/O Voltage supply input 1.8V or 3.3V
23	NC	—	Floating (Don't connected to ground)
24	LPO	I	External Low Power Clock input (32.768KHz)
25	PCM_OUT	O	PCM Data output
26	PCM_CLK	I/O	PCM clock
27	PCM_IN	I	PCM data input
28	PCM_SYNC	I/O	PCM sync signal
29	NC	—	Floating (Don't connected to ground)
30	NC	—	Floating (Don't connected to ground)
31	GND	—	Ground connections
32	NC	—	Floating (Don't connected to ground)
33	GND	—	Ground connections
34	BT_EN	I	Enable pin for Bluetooth device ON: pull high ; OFF: pull low
35	NC	—	Floating (Don't connected to ground)
36	GND	—	Ground connections
37	NC	—	Floating (Don't connected to ground)
38	NC	—	Floating (Don't connected to ground)
39	Debug_UART_TXD	O	Floating (Don't connected to ground)
40	Debug_UART_RXD	I	Floating (Don't connected to ground)
41	UART_RTS_N	O	Bluetooth UART interface
42	UART_TXD	O	Bluetooth UART interface
43	UART_RXD	I	Bluetooth UART interface
44	UART_CTS_N	I	Bluetooth UART interface
45	TP1(NC)	—	Floating (Don't connected to ground)
46	TP2(NC)	—	Floating (Don't connected to ground)
47	TP3(NC)	—	Floating (Don't connected to ground)

7. Dimensions

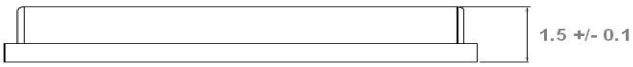
7.1 Physical Dimensions

(Unit: mm)

< TOP VIEW >

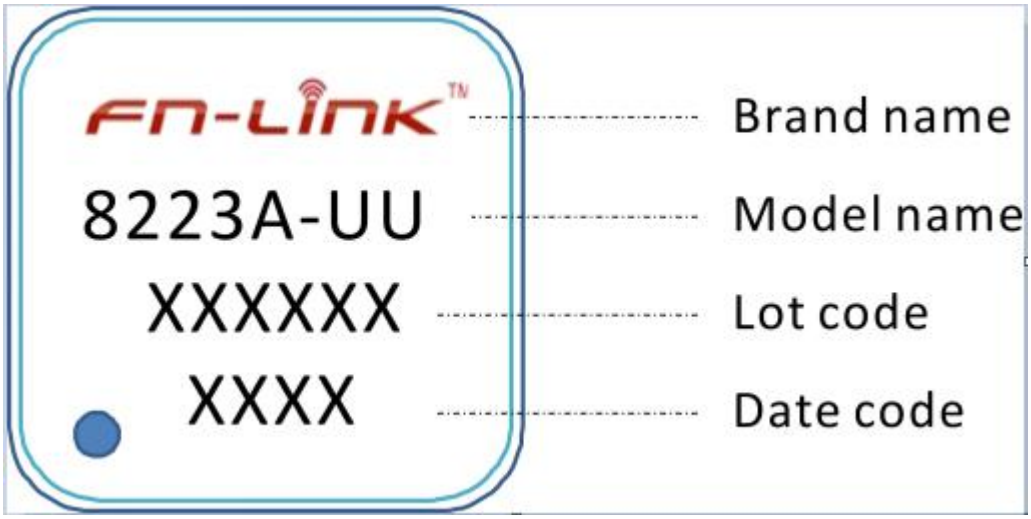


< Side View >



Marking Description

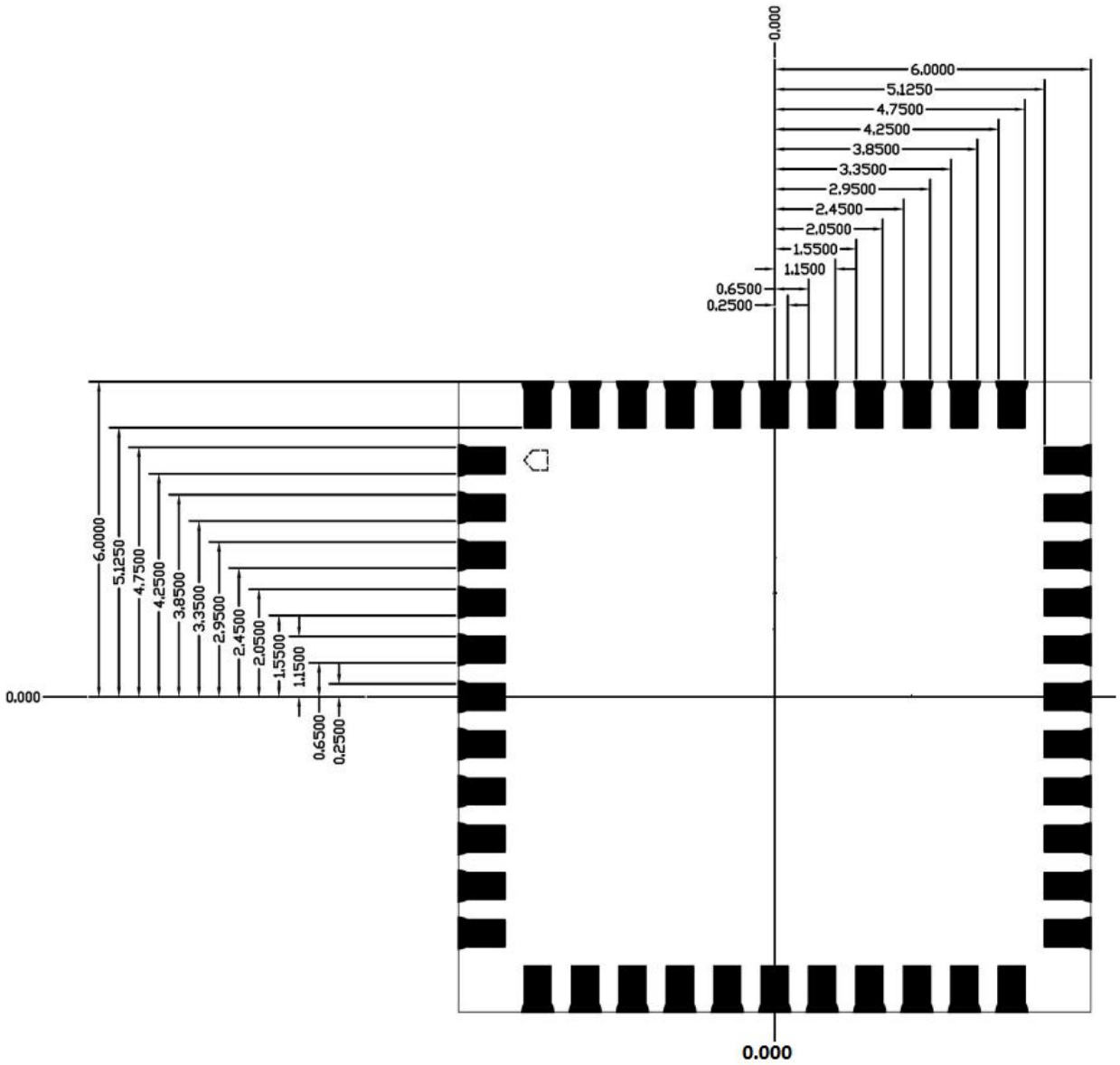
< TOP VIEW >



Module Physical Dimensions

(Unit: mm)

< TOP VIEW >



7.2 Layout Recommendation

(Unit: mm)

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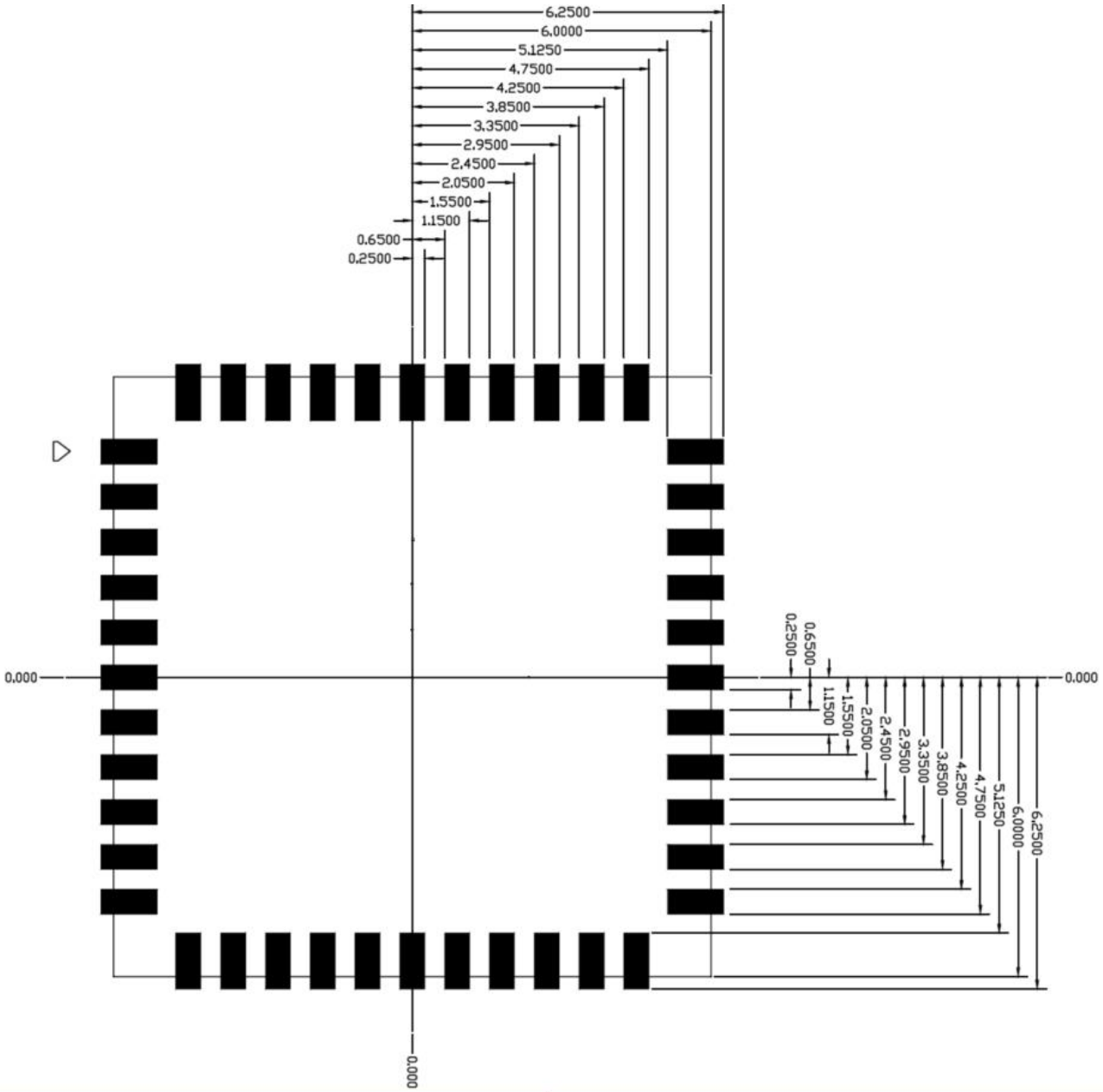
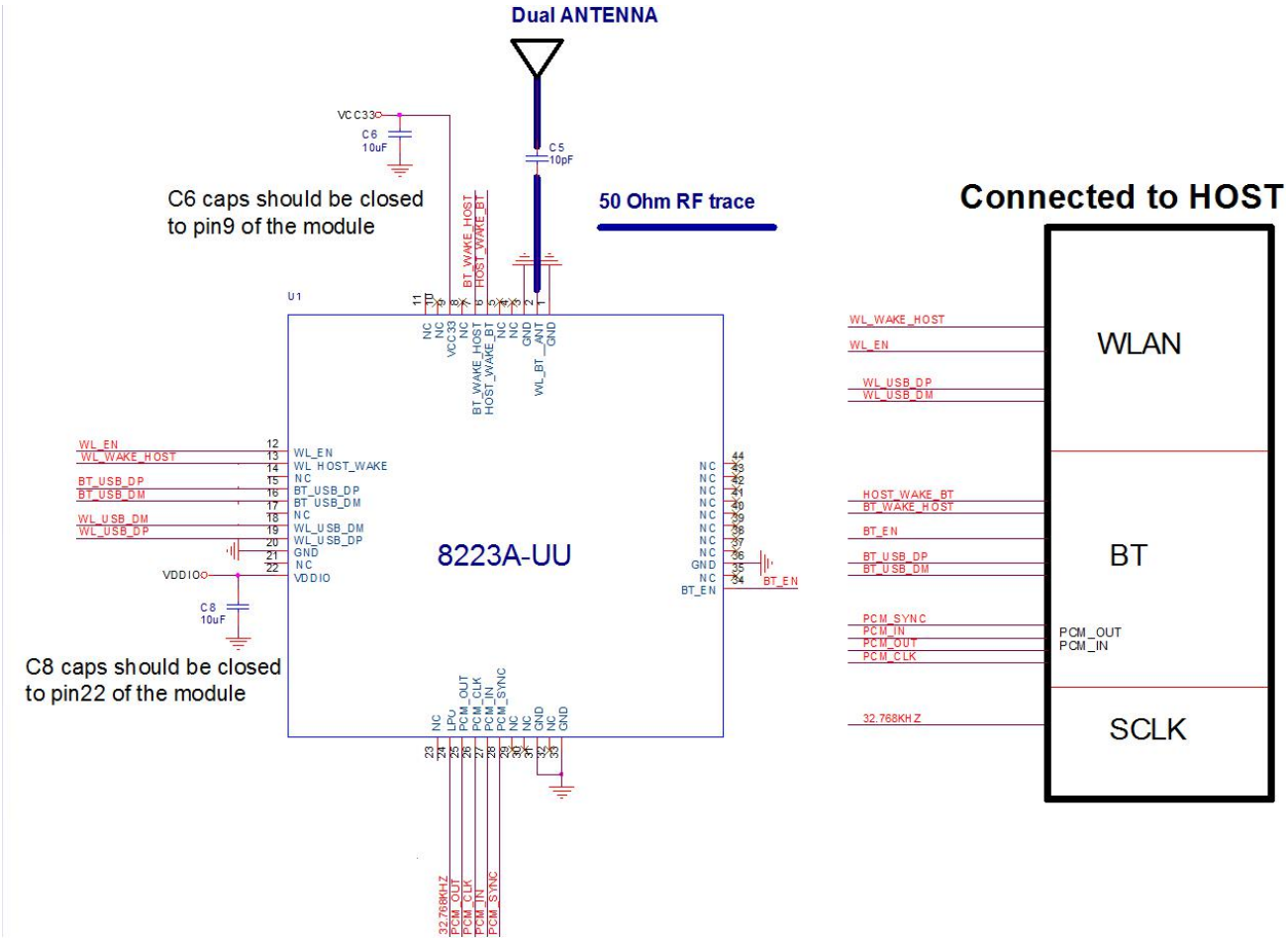


8. Reference Design



Note1: USB_DP, USB_DM layout trace should be 90 ohm of PCB impedance.

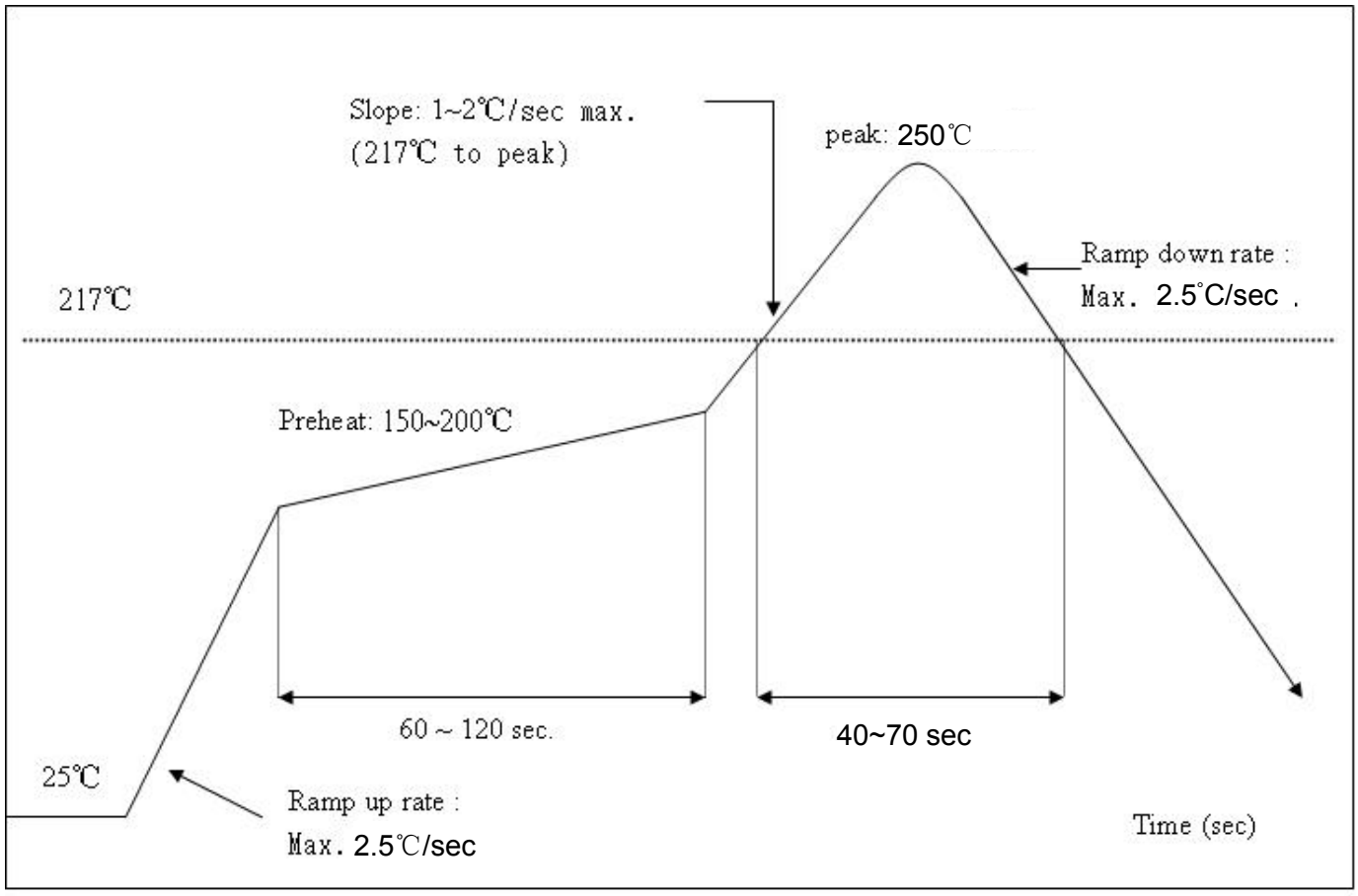
Note2: VCC5V and VCC3V3 that driving current should be 700mA or above from HOST PMU.

9. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

Number of Times : ≤2 times



10. Package Information

TBD