SKW423B datasheet

USB WIFI 1x1 11a/b/g/n/ac + Bluetooth Module

Document Information		
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Revision history

Revision	Description	Approved	Date
V1.01	Initial Release	George He	20211119

目录

1. Introduction

The module SKW423B is based on Qualcomm Atheros QCA1023-7 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

3. Application Block Diagram

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

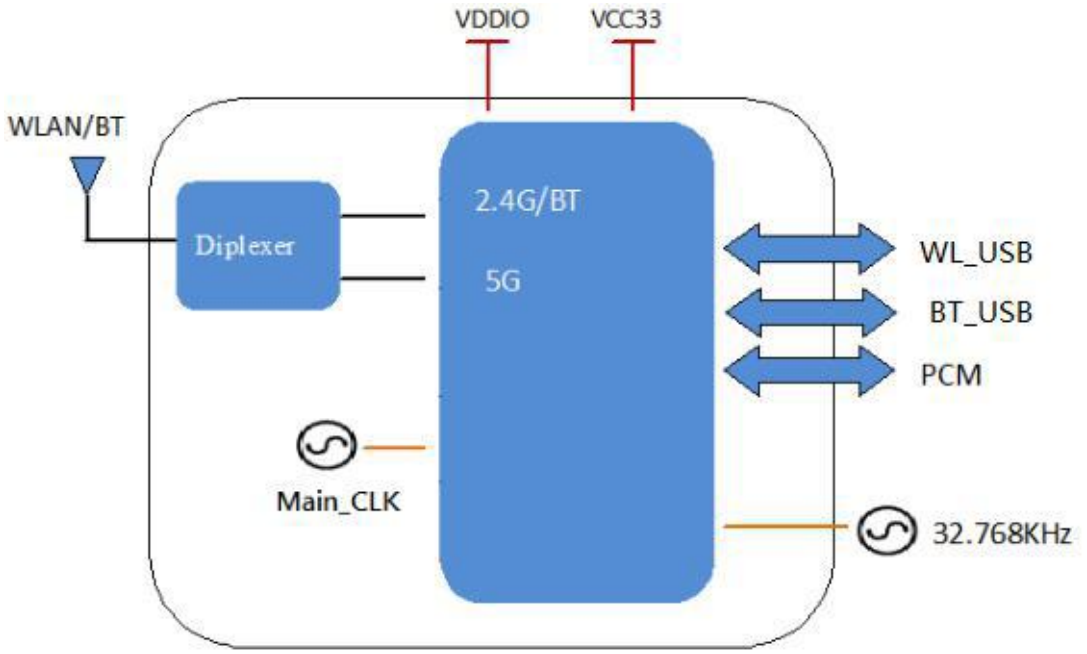


Figure 1: SKW423B Block Diagram

4. Module Pinout Description

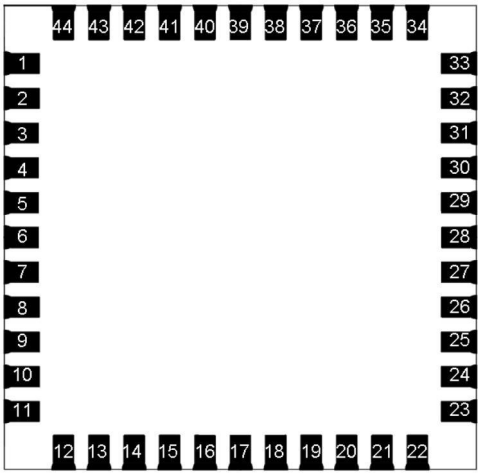


Figure 2: SKW423B Pin packaging

Pin Description

Pin	Symbol Name	Status	Pin 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
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

5. Dimensions

5.1 Physical Dimensions

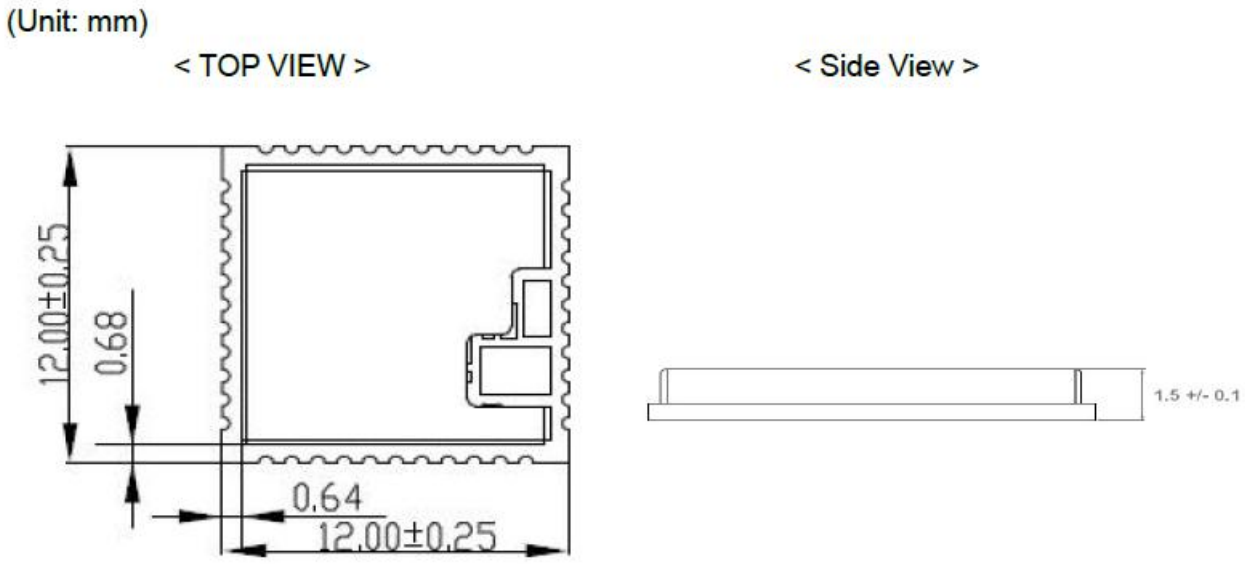
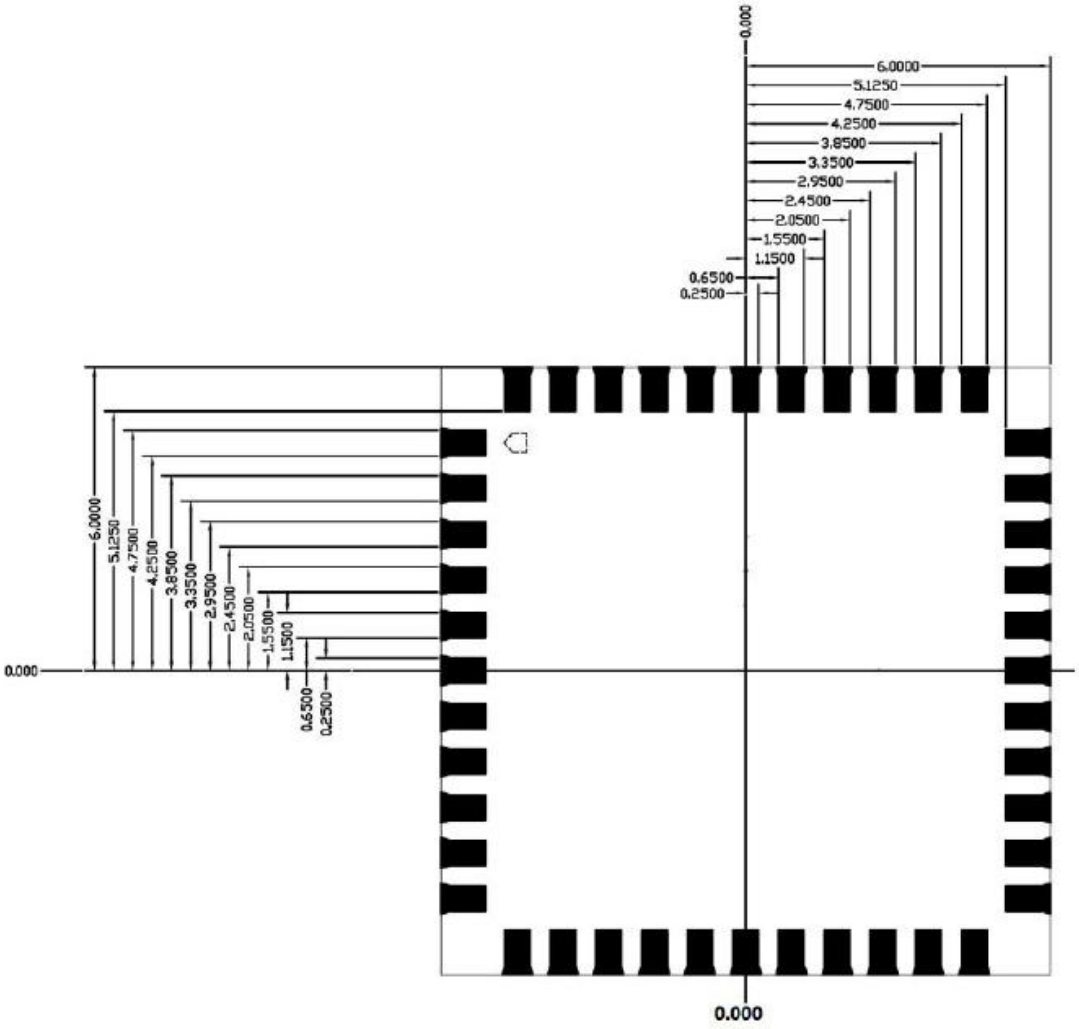


Figure 3: SKW423B Recommend Dimensions

5.2 Layout Recommendation

(Unit: mm)

< TOP VIEW >



(Unit: mm)

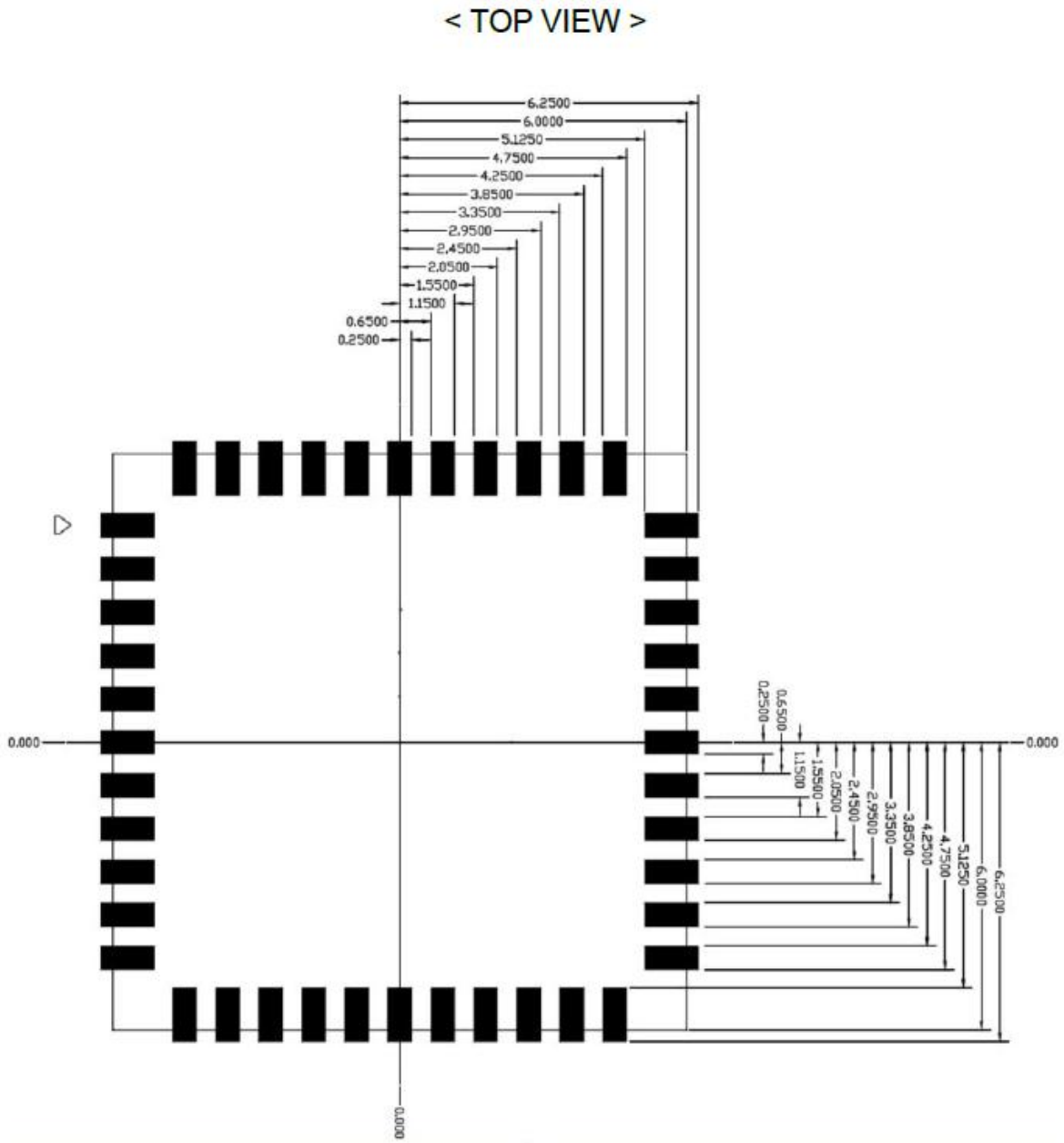


Figure 4: SKW423B Recommend PCB Footprint

6. General Specification

6.1 Recommended Operating Rating

Element	Min.	Type	Max.	Unit
Operating Temperature	-10	25	70	Deg.c
VCC 3.3V	3.15	3.3	3.45	V
VDDIO	1.7	1.8 or 3.3	3.45	V

6.2 DC Characteristics

Element	Power	Min.	Type	Max.	Unit
Standby	3.3V	-	115	-	mA
Tx Current	3.3V	-	-	450	mA
Rx Current	3.3V	-	55	-	mA

6.3 Environment Condition

Temperature	Operating Temperature: -10 deg.C ~ 70 deg.C
	Storage Temperature: -30 deg.C ~ 85 deg.C
Humidity	Operating Humidity: 5% ~ 95%
	Storage Humidity: 5% ~ 95%

7. WiFi RF Specification

7.1 2.4GHz RF Specification

Feature	Description
WLAN Standard	IEEE 802.11b/g/n/ac, 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 /CCK : 16±1.5dBm @ EVM ≤ -9dB
	802.11g /64-QAM(R=3/4) : 15±1.5dBm @ EVM ≤ -25dB
	802.11n /64-QAM(R=5/6) : 14±1.5dBm @ EVM ≤ -28dB
Receive Sensitivity (11b PER ≤ 8%)	- 1Mbps PER @ -96dBm, typical
	- 2Mbps PER @ -90dBm, typical
	- 5.5Mbps PER @ -88dBm, typical
	- 11Mbps PER @ -87dBm, typical
Receive Sensitivity (11g PER ≤ 10%)	- 6Mbps PER @ -90dBm, typical
	- 9Mbps PER @ -88dBm, typical
	- 12Mbps PER @ -87dBm, typical
	- 18Mbps PER @ -85dBm, typical
	- 24Mbps PER @ -83dBm, typical
	- 36Mbps PER @ -80dBm, typical
	- 48Mbps PER @ -76dBm, typical

	- 54Mbps PER @ -74dBm, typical
Receive Sensitivity (11n, 20MHz PER ≤ 10%)	- MCS=0 PER @ -89dBm, typical
	- MCS=1 PER @ -85dBm, typical
	- MCS=2 PER @ -84dBm, typical
	- MCS=3 PER @ -80dBm, typical
	- MCS=4 PER @ -77dBm, typical
	- MCS=5 PER @ -75dBm, typical
	- MCS=6 PER @ -72dBm, typical
	- MCS=7 PER @ -71dBm, typical
Receive Sensitivity (11n, 20MHz PER ≤ 10%)	- MCS=0 PER @ -89dBm, typical
	- MCS=1 PER @ -85dBm, typical
	- MCS=2 PER @ -84dBm, typical
	- MCS=3 PER @ -80dBm, typical
	- MCS=4 PER @ -76dBm, typical
	- MCS=5 PER @ -72dBm, typical
	- MCS=6 PER @ -70dBm, typical
	- MCS=7 PER @ -69dBm, typical
Receive Sensitivity (11ac, 20MHz PER ≤ 10%)	- MCS=0 PER @ -90dBm, typical
	- MCS=1 PER @ -87dBm, typical
	- MCS=2 PER @ -86dBm, typical
	- MCS=3 PER @ -82dBm, typical
	- MCS=4 PER @ -79dBm, typical
	- MCS=5 PER @ -75dBm, typical
	- MCS=6 PER @ -73dBm, typical
	- MCS=7 PER @ -72dBm, typical
	- MCS=8 PER @ -67dBm, typical
Receive Sensitivity (11ac, 40MHz PER ≤ 10%)	- MCS=0 PER @ -88dBm, typical
	- MCS=1 PER @ -85dBm, typical
	- MCS=2 PER @ -83dBm, typical
	- MCS=3 PER @ -80dBm, typical
	- MCS=4 PER @ -77dBm, typical
	- MCS=5 PER @ -72dBm, typical
	- MCS=6 PER @ -71dBm, typical
	- MCS=7 PER @ -69dBm, typical
	- MCS=8 PER @ -65dBm, typical
	- MCS=9 PER @ -64dBm, typical

7.2 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:
Modulation	802.11a/n : 64-QAM,16-QAM, QPSK, BPSK
Output Power	802.11a /64-QAM(R=3/4) : 12±2dBm @ EVM≤-25dB
	802.11n /64-QAM(R=5/6) : 11±2dBm @ EVM≤-28dB
	802.11ac/256-QAM(R=3/4) : 10±2dBm @ EVM≤-30dB
	802.11ac/256-QAM(R=5/6) : 10±2dBm @ EVM≤-32dB
Receive Sensitivity (11a, 20MHz PER ≤ 10%)	- 6Mbps PER @ -91dBm, typical
	- 9Mbps PER @ -89dBm, typical
	- 12Mbps PER @ -88dBm, typical
	- 18Mbps PER @ -86dBm, typical
	- 24Mbps PER @ -82dBm, typical
	- 36Mbps PER @ -79dBm, typical
	- 48Mbps PER @ -74dBm, typical
	- 54Mbps PER @ -73dBm, typical
Receive Sensitivity (11n, 20MHz PER ≤ 10%)	- MCS=0 PER @ -90dBm, typical
	- MCS=1 PER @ -88dBm, typical
	- MCS=2 PER @ -85dBm, typical
	- MCS=3 PER @ -82dBm, typical
	- MCS=4 PER @ -78dBm, typical
	- MCS=5 PER @ -74dBm, typical
	- MCS=6 PER @ -72dBm, typical
	- MCS=7 PER @ -71dBm, typical
Receive Sensitivity (11n, 40MHz PER ≤ 10%)	- MCS=0 PER @ -88dBm, typical
	- MCS=1 PER @ -85dBm, typical
	- MCS=2 PER @ -83dBm, typical
	- MCS=3 PER @ -79dBm, typical
	- MCS=4 PER @ -76dBm, typical
	- MCS=5 PER @ -71dBm, typical
	- MCS=6 PER @ -70dBm, typical
	- MCS=7 PER @ -68dBm, typical
Receive Sensitivity (11ac, 20MHz PER ≤ 10%)	- MCS=0 PER @ -89dBm, typical
	- MCS=1 PER @ -87dBm, typical
	- MCS=2 PER @ -84dBm, typical
	- MCS=3 PER @ -81dBm, typical
	- MCS=4 PER @ -77dBm, typical

	- MCS=5 PER @ -73dBm, typical
	- MCS=6 PER @ -71dBm, typical
	- MCS=7 PER @ -70dBm, typical
	- MCS=8 PER @ -66dBm, typical
Receive Sensitivity (11ac, 40MHz PER ≤ 10%)	- MCS=0 PER @ -87dBm, typical
	- MCS=1 PER @ -83dBm, typical
	- MCS=2 PER @ -81dBm, typical
	- MCS=3 PER @ -78dBm, typical
	- MCS=4 PER @ -75dBm, typical
	- MCS=5 PER @ -70dBm, typical
	- MCS=6 PER @ -68dBm, typical
	- MCS=7 PER @ -66dBm, typical
	- MCS=8 PER @ -64dBm, typical
	- MCS=9 PER @ -63dBm, typical
Receive Sensitivity (11ac, 80MHz PER ≤ 10%)	- MCS=0 PER @ -83dBm, typical
	- MCS=1 PER @ -80dBm, typical
	- MCS=2 PER @ -78dBm, typical
	- MCS=3 PER @ -74dBm, typical
	- MCS=4 PER @ -71dBm, typical
	- MCS=5 PER @ -69dBm, typical
	- MCS=6 PER @ -65dBm, typical
	- MCS=7 PER @ -63dBm, typical
	- MCS=8 PER @ -60dBm, typical
	- MCS=9 PER @ -59dBm, typical

7.3 5GHz Channel Table

Band (GHz)	Operating Channel	Channel Center
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

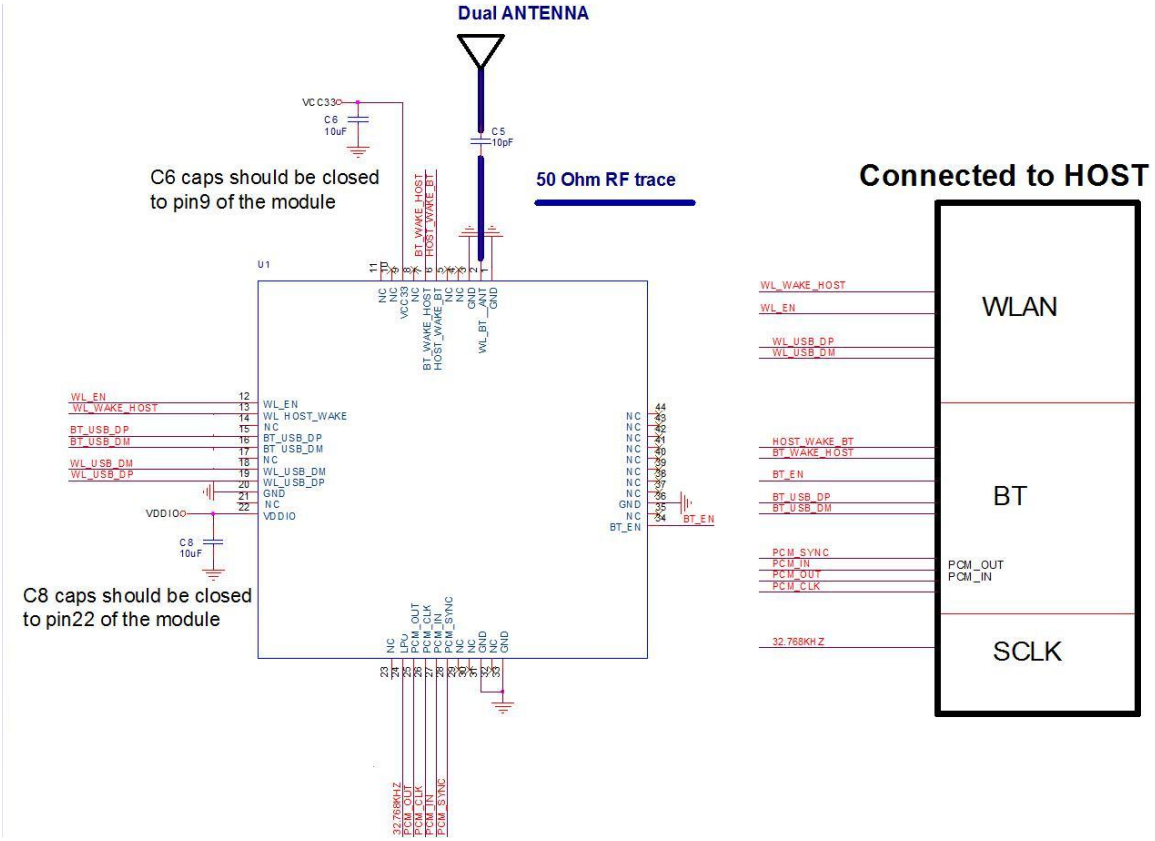
	112	5560
	116	5580
	120	5600
	124	5620
	128	5640
	132	5660
	136	5680
	140	5700
5.725GHz~5.825GHz	149	5745
	153	5765
	157	5785
	161	5805
	165	5825

8. Bluetooth Specification

8.1 Bluetooth Specification

Feature	**Description**		
General Specification			
Bluetooth Standard	Bluetooth V4.1 of 1, 2 and 3Mbps.		
Host Interface	USB 1.1		
Antenna Reference	Small antennas with 0~2dBi 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)		8dBm	
Sensitivity @ BER=0.1%		-92dBm	
Sensitivity @ BER=0.01%		-92dBm	
Sensitivity @ BER=0.01%		-85 dBm	
Maximum Input Level	GFSK (1Mbps):-20dBm		
	π/4-DQPSK (2Mbps) :-20dBm		
	8DPSK (3Mbps) :-20dBm		

9. 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.

10. Recommended Re-flow Profile

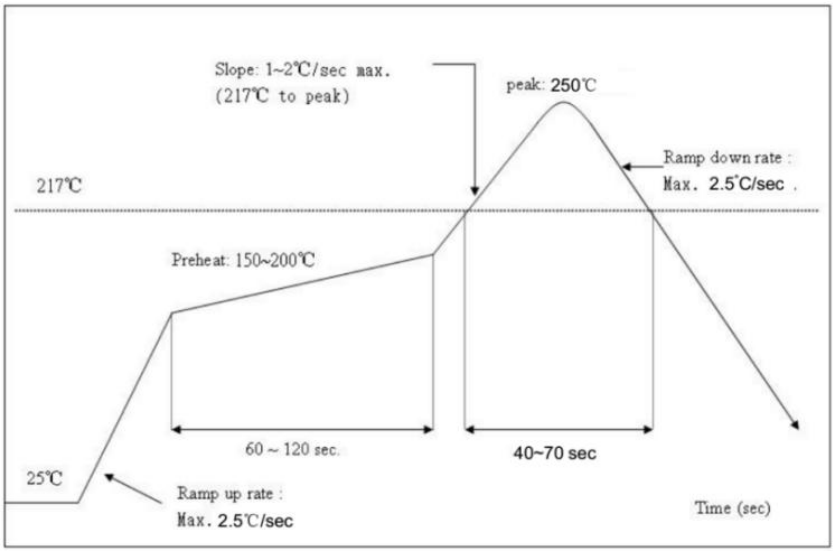


Figure 5: WG423B Typical Lead-free Soldering Profile

11. Contact Information

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