

# **AW-NM512**

**IEEE 802.11 b/g/n Wireless LAN**

**And Bluetooth Module**

## **Datasheet**

**Rev. D**

**DF**

**(For Standard)**

## Features

### Overview

- Integrates Infineon solutions of CYW43439\_A1 WiFi /BT/SoC
- SDIO v2.0 interfaces support for WLAN
- High speed UART and PCM for Bluetooth
- Lead-free Design
- 12.0mm(L) x 12.0mm(W) x 1.5 mm(H) 47 pin LGA package
- **With Crystal(XTAL)**

### WiFi

- Single band 2.4 GHz 802.11 b/g/n
- SDIO v2.0, including DS and HS modes
- Security—WEP, WPA/WPA2/WPA3, AES (HW), TKIP (HW), CKIP (SW), WMM/WMM-PS/WMM-SA
- Data Rate up to 72.2Mbps

### Bluetooth

- Supports extended Synchronous Connections (eSCO), for enhanced voice quality by allowing for retransmission of dropped packets
- Adaptive Frequency Hopping (AFH) for reducing radio frequency interference
- Maximum UART baud rates up to 4 Mbps
- Supports Bluetooth 5.0's LE Secure Connections
- Fully supports Bluetooth Core Specification version 5.0 + (Enhanced Data Rate) EDR features:
  - Adaptive Frequency Hopping (AFH)
  - Quality of Service (QoS)
  - Extended Synchronous Connections (eSCO) — Voice Connections
  - Fast Connect (interlaced page and inquiry scans)
  - Secure Simple Pairing (SSP)
  - Sniff Subrating (SSR)
  - Encryption Pause Resume (EPR)
  - Extended Inquiry Response (EIR)
  - Link Supervision Timeout (LST)
- Interface support – Host Controller Interface (HCI) using a high-speed UART interface and PCM for audio data

## Revision History

Document NO: R2-2512-DST-01

Version	Revision Date	DCN NO.	Description	Initials	Approved
A	2020/09/23	DCN018490	<ul style="list-style-type: none"> <li>● First Initial</li> </ul>	QM.TAN	N.C Chen
B	2021/01/20	DCN020585	<ul style="list-style-type: none"> <li>● Update Specifications Table</li> </ul>	QM.TAN	N.C Chen
C	2021/04/13	DCN021226	<ul style="list-style-type: none"> <li>● Cypress to Infineon</li> <li>● Update BLE Specification</li> </ul>	QM.TAN	N.C Chen
D	2021/08/02	DCN022714	<ul style="list-style-type: none"> <li>● Update Power Consumption</li> <li>● Update ESD Specification</li> </ul>	QM.TAN	N.C Chen

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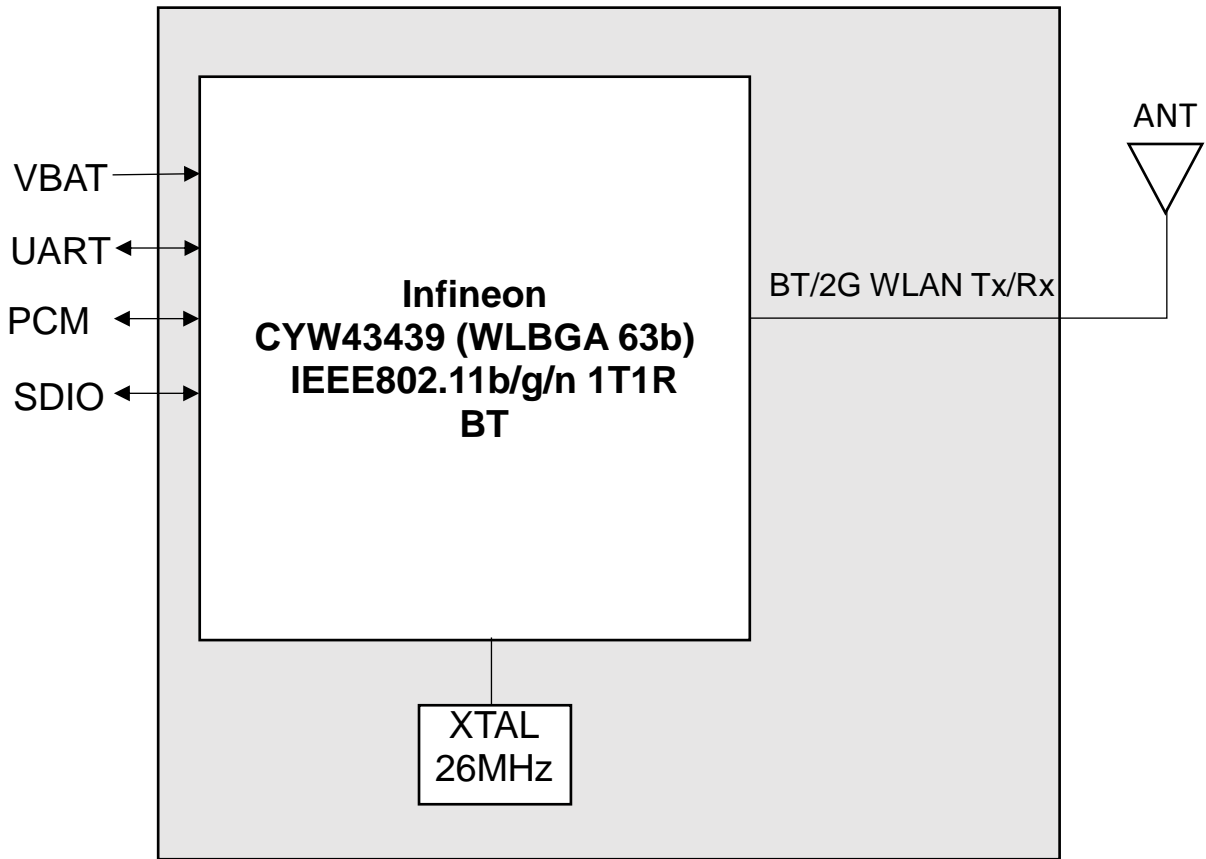
## 1. Introduction

### 1.1 Product Overview

AzureWave Technologies, Inc. introduces the advanced IEEE 802.11 b/g/n WLAN and Bluetooth combo module - AW-NM512. The module is targeted to mobile and embedded devices which need small footprint package, low power consumption, and multiple OS support. The module supports 2.4GHz IEEE 802.11n MAC/baseband/radio, and Bluetooth 5.0 compliance. It also features an integrated Power Management Unit (PMU), Power Amplifiers (PAs), and a Low Noise Amplifier (LNA) to address the needs of mobile devices that require minimal power consumption and compact size. By using AW-NM512, the customers can easily enable the Wi-Fi and BT embedded applications with the benefits of high design flexibility, short development cycle, and quick time-to-market. Specified in the IEEE 802.11 standard minimize the system power requirements by using AW-NM512. In addition to the support of WPA/WPA2/WPA3 and WEP encryption, the AW-NM512 also supports the IEEE 802.11i security standard through AES and TKIP acceleration hardware for faster data encryption. For the video, voice and multimedia applications the AW-NM512 support 802.11e Quality of Service (QoS). The host interface is SDIO v2.0 interface.

For Bluetooth operation, the AW-NM512 is Bluetooth 5.0 compliant. The Bluetooth transmitter also features a Class 1 power amplifier. The AW-NM512 supports extended Synchronous Connections (eSCO), for enhanced voice quality by allowing for retransmission of dropped packets, and Adaptive Frequency Hopping (AFH) for reducing radio frequency interference. It also incorporates all Bluetooth 5.0 features including Secure Simple Pairing, Sniff Subrating, and Encryption Pause and Resume. An independent, high-speed UART is provided for the Bluetooth host interface. The Bluetooth subsystem presents a standard Host Controller Interface (HCI) via a high speed UART and PCM for audio.

## 1.2 Block Diagram



**AW-NM512 Block Diagram**

## 1.3 Specifications Table

### 1.3.1 General

Features	Description
<b>Product Description</b>	IEEE 802.11 b/g/n Wireless LAN and Bluetooth Module
<b>Major Chipset</b>	Infineon CYW43439 (WLBGA 63b)
<b>Host Interface</b>	WiFi + BT ● SDIO + UART
<b>Dimension</b>	12.0mm(L) x 12.0mm(W) x 1.5 mm(H)
<b>Form factor</b>	● LGA module, 47 pins
<b>Antenna</b>	For LGA, "1T1R, external" ANT1(Main) : WiFi/Bluetooth → TX/RX
<b>Weight</b>	0.4g

### 1.3.2 WLAN

Features	Description
<b>WLAN Standard</b>	IEEE 802.11 b/g/n, 1T1R
<b>WLAN VID/PID</b>	N/A
<b>WLAN SVID/SPID</b>	N/A
<b>Frequency Range</b>	2.4 GHz ISM Bands 2.412-2.472 GHz
<b>Modulation</b>	DSSS, OFDM, BPSK(9/6Mbps), QPSK(18/12Mbps), DBPSK(1Mbps), DQPSK(2Mbps), CCK(11/5.5Mbps), 16-QAM(36/24Mbps), 64-QAM(72.2/54/48Mbps)
<b>Number of Channels</b>	802.11b: USA, Canada and Taiwan – 1 ~ 11 Most European Countries – 1 ~ 13 802.11g: USA and Canada – 1 ~ 11 Most European Countries – 1 ~ 13 802.11n: USA and Canada – 1 ~ 11 Most European Countries – 1 ~ 13

<b>Output Power (Board Level Limit)*</b>	<b>2.4G</b>				
		Min	Typ	Max	Unit
	11b (11Mbps) @EVM<35%	16	18	20	dBm
	11g (54Mbps) @EVM $\leq$ -25 dB	14	16	18	dBm
	11n (HT20 MCS7) @EVM $\leq$ -27 dB	13	15	17	dBm
<b>Receiver Sensitivity</b>	<b>2.4G</b>				
		Min	Typ	Max	Unit
	11b (11Mbps)		-89	-84	dBm
	11g (54Mbps)		-76	-71	dBm
	11n (HT20 MCS7)		-73	-68	dBm
<b>Data Rate</b>	802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n:MCS 0~7 HT20				
<b>Security</b>	<ul style="list-style-type: none"> <li>◆ WPA™- WPA2™- and WPA3™ support for powerful encryption and authentication</li> <li>◆ AES in WLAN hardware for faster data encryption and IEEE802.11i compatibility</li> <li>◆ Reference WLAN subsystem provides Wi - Fi Protected Setup (WPS).</li> </ul> Wi-Fi Protected Setup (WPS)				

\* If you have any certification questions about output power please contact FAE directly.

### 1.3.3 Bluetooth

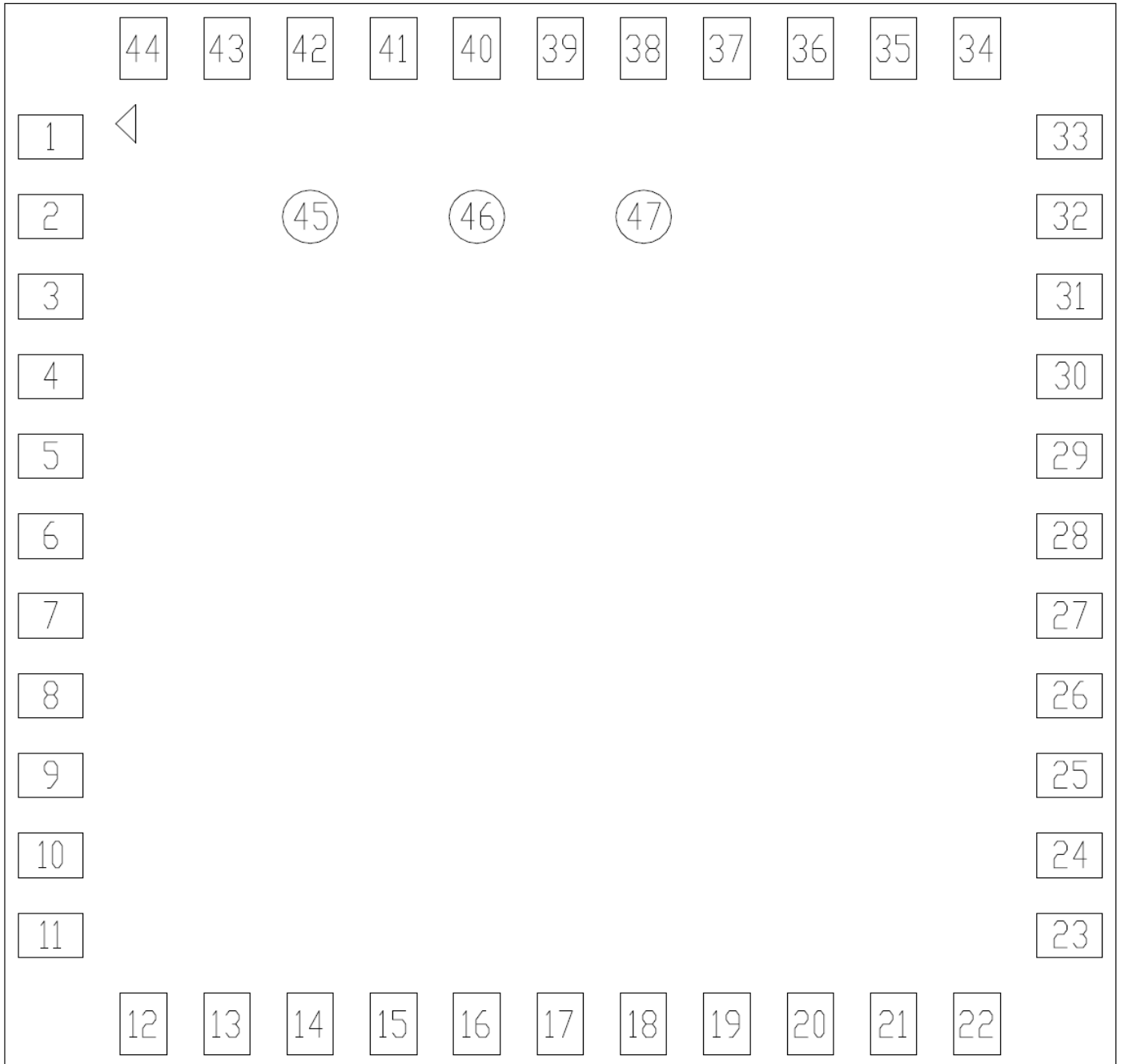
Features	Description				
Bluetooth Standard	Bluetooth 5.0				
Bluetooth VID/PID	N/A				
Frequency Range	2400~2483.5MHz				
Modulation	GFSK (1Mbps), $\pi/4$ DQPSK (2Mbps) and 8DPSK (3Mbps)				
Output Power	6 ≤ Output Power ≤ +10 dBm (Conductive)				
		Min	Typ	Max	Unit
	BDR	6	8	10	dBm
	EDR	6	8	10	dBm
	Low Energy	6	8	10	dBm
Receiver Sensitivity		Min	Typ	Max	Unit
	DH5		-91	-86	dBm
	2DH5		-91	-86	dBm
	3DH5		-83	-79	dBm
	Low Energy		-91	-86	dBm

### 1.3.4 Operating Conditions

Features	Description
<b>Operating Conditions</b>	
Voltage	VBAT:3.2V~4.8V (3.6V Typical)
Operating Temperature	-30°C to 70 °C (Optimal RF performance guarantee -20°C~70 °C)
Operating Humidity	less than 85% R.H.
Storage Temperature	-40°C to 85 °C
Storage Humidity	less than 60% R.H.
<b>ESD Protection</b>	
Human Body Model	1000V per MIL-STD-883H Method 3015.8
Changed Device Model	500V per JEDEC EIA/JESD22-C101E

## 2. Pin Definition

### 2.1 Pin Map



**AW-NM512 Pin Map (Top View)**

## 2.2 Pin Table

Pin No	Definition	Basic Description	Voltage	Type
1	GND	Ground.		GND
2	WL_BT_ANT	WLAN/BT RF TX/RX path.		RF
3	GND	Ground.		GND
4	NC	Floating Pin, No connect to anything.		Floating
5	NC	Floating Pin, No connect to anything.		Floating
6	BT_WAKE_DEV	HOST wake-up Bluetooth device	VDDIO	I
7	BT_HOST_WAKE	Bluetooth device to wake-up HOST	VDDIO	O
8	CLK_REQ	The module asserts CLK_REQ when Bluetooth or WLAN directs the host to turn on the reference clock. The CLK_REQ polarity is active-high	VDDIO	O
9	VBAT	3.3V power pin	VBAT	PWR
10	NC	Floating Pin, No connect to anything.		Floating
11	NC	Floating Pin, No connect to anything.		Floating
12	WL_REG_ON	Used by PMU to power up or power down the internal regulators used by the WLAN section. Also, when deasserted, this pin holds the WLAN section in reset. This pin has an internal 200k ohm pull down resistor that is enabled by default. It can be disabled through programming.	VDDIO	I
13	WL_HOST_WAKE	WLAN device to wake-up HOST	VDDIO	O
14	SDIO_DATA_2	SDIO Data Line 2	VDDIO	I/O
15	SDIO_DATA_3	SDIO Data Line 3	VDDIO	I/O
16	SDIO_CMD	SDIO Command Input	VDDIO	I/O
17	SDIO_CLK	SDIO Clock Input	VDDIO	I
18	SDIO_DATA_0	SDIO Data Line 0	VDDIO	I/O
19	SDIO_DATA_1	SDIO Data Line 1	VDDIO	I/O
20	GND	Ground.		GND
21	VIN_LDO_OUT	Internal Buck 1.2V voltage generation pin	1.4V	O
22	VDDIO	1.8V-3.3V VDDIO supply for WLAN and BT	VDDIO	PWR
23	VIN_LDO	Internal Buck 1.2V voltage generation pin	1.4V	I
24	LPO	External 32K or RTC clock	0.2~3.3V	I

25	PCM_OUT	PCM data Out	VDDIO	O
26	PCM_CLK	PCM Clock	VDDIO	I/O
27	PCM_IN	PCM data Input	VDDIO	I
28	PCM_SYNC	PCM Synchronization control	VDDIO	O
29	NC	Floating Pin, No connect to anything.		Floating
30	NC	Floating Pin, No connect to anything.		Floating
31	GND	Ground.		GND
32	NC	Floating Pin, No connect to anything.		Floating
33	GND	Ground.		GND
34	BT_REG_ON	Used by PMU to power up or power down the internal regulators used by the Bluetooth section. Also, when deasserted, this pin holds the Bluetooth section in reset. This pin has an internal 200k ohm pull down resistor that is enabled by default. It can be disabled through programming.	VDDIO	I
35	NC	Floating Pin, No connect to anything.		Floating
36	GND	Ground.		GND
37	NC	Floating Pin, No connect to anything.		Floating
38	NC	Floating Pin, No connect to anything.		Floating
39	GPIO2	Wi-Fi Co-existence pin with LTE(WLAN_SECI_RX)	VDDIO	I
40	GPIO1	Wi-Fi Co-existence pin with LTE(WLAN_SECI_TX)	VDDIO	O
41	UART_RTS_N	High-Speed UART RTS	VDDIO	O
42	UART_OUT	High-Speed UART Data Out	VDDIO	O
43	UART_IN	High-Speed UART Data In	VDDIO	I
44	UART_CTS_N	High-Speed UART CTS	VDDIO	I
45	NC	Floating Pin, No connect to anything.		Floating
46	NC	Floating Pin, No connect to anything.		Floating
47	NC	Floating Pin, No connect to anything.		Floating

### 3. Electrical Characteristics

#### 3.1 Absolute Maximum Ratings

Symbol	Parameter	Minimum	Typical	Maximum	Unit
V <sub>BAT</sub>	Power supply for Internal Regulators	-0.5		6	V
V <sub>DDIO</sub>	DC supply voltage for digital I/O	-0.5		3.9	V

#### 3.2 Recommended Operating Conditions

Symbol	Parameter	Minimum	Typical	Maximum	Unit
V <sub>BAT</sub>	Power supply for Internal Regulators	3*	3.6	4.8*	V

\*Optimal RF performance is guaranteed only for 3.2V<V<sub>BAT</sub><4.8V

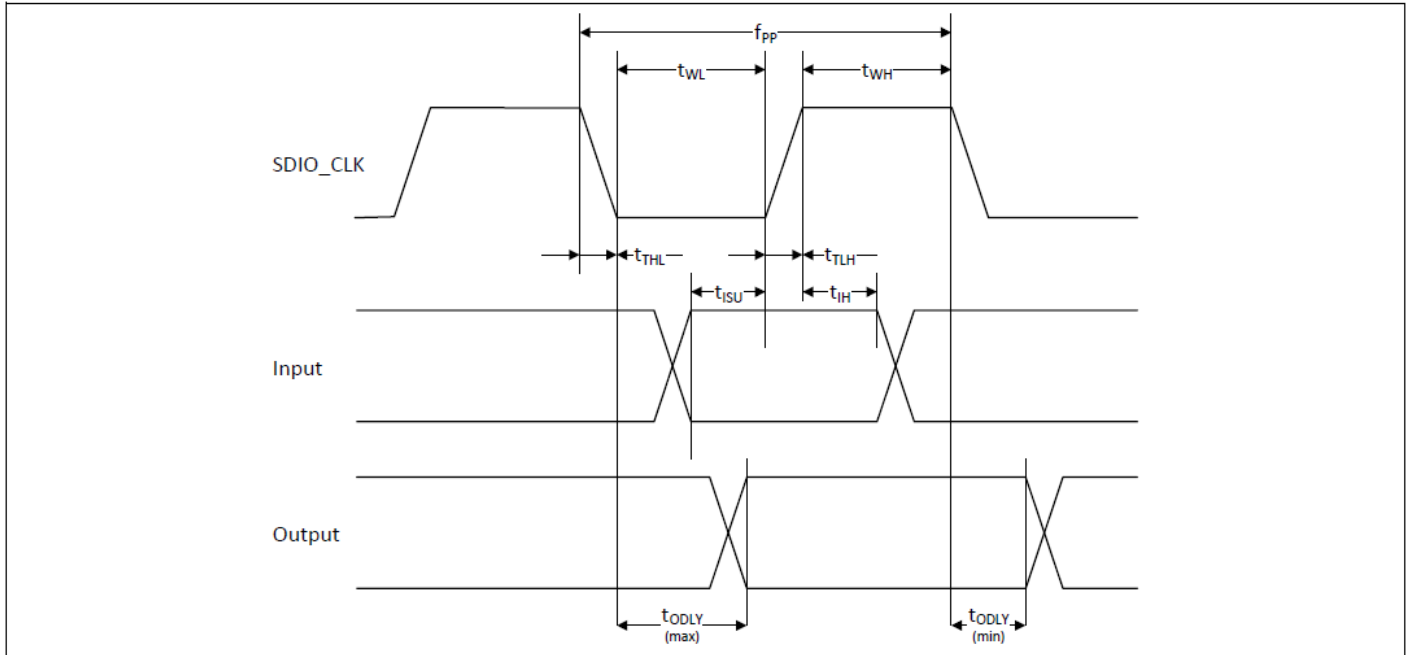
#### 3.3 Digital IO Pin DC Characteristics

Symbol	Parameter	Minimum	Typical	Maximum	Unit
For SDIO Interface V <sub>DDIO</sub> =1.8V					
V <sub>IH</sub>	Input high voltage	1.27	-	-	V
V <sub>IL</sub>	Input low voltage	-	-	0.58	V
V <sub>OH</sub>	Output High Voltage @ 2mA	1.4	-	-	V
V <sub>OL</sub>	Output Low Voltage @ 2mA	-	-	0.45	V
For SDIO Interface V <sub>DDIO</sub> =3.3V					
V <sub>IH</sub>	Input high voltage	0.625 x V <sub>DDIO</sub>	-	-	V
V <sub>IL</sub>	Input low voltage	-	-	0.25 x V <sub>DDIO</sub>	V
V <sub>OH</sub>	Output High Voltage @ 2mA	0.75 x V <sub>DDIO</sub>	-	-	V
V <sub>OL</sub>	Output Low Voltage @ 2mA	-	-	0.125 x V <sub>DDIO</sub>	V
Other Digital Interface V <sub>DDIO</sub> =1.8V					
V <sub>IH</sub>	Input high voltage	0.65 x V <sub>DDIO</sub>	-	-	V
V <sub>IL</sub>	Input low voltage	-	-	0.35 x V <sub>DDIO</sub>	V
V <sub>OH</sub>	Output High Voltage @ 2mA	V <sub>DDIO</sub> – 0.45	-	-	V

VOL	Output Low Voltage @ 2mA	-	-	0.45	V
Other Digital Interface VDDIO=3.3V					
VIH	Input high voltage	2.00	-	-	V
VIL	Input low voltage	-	-	0.80	V
VOH	Output High Voltage @ 2mA	VDDIO – 0.4	-	-	V
VOL	Output Low Voltage @ 2mA	-	-	0.40	V

### 3.4 Host Interface

#### 3.4.1 SDIO



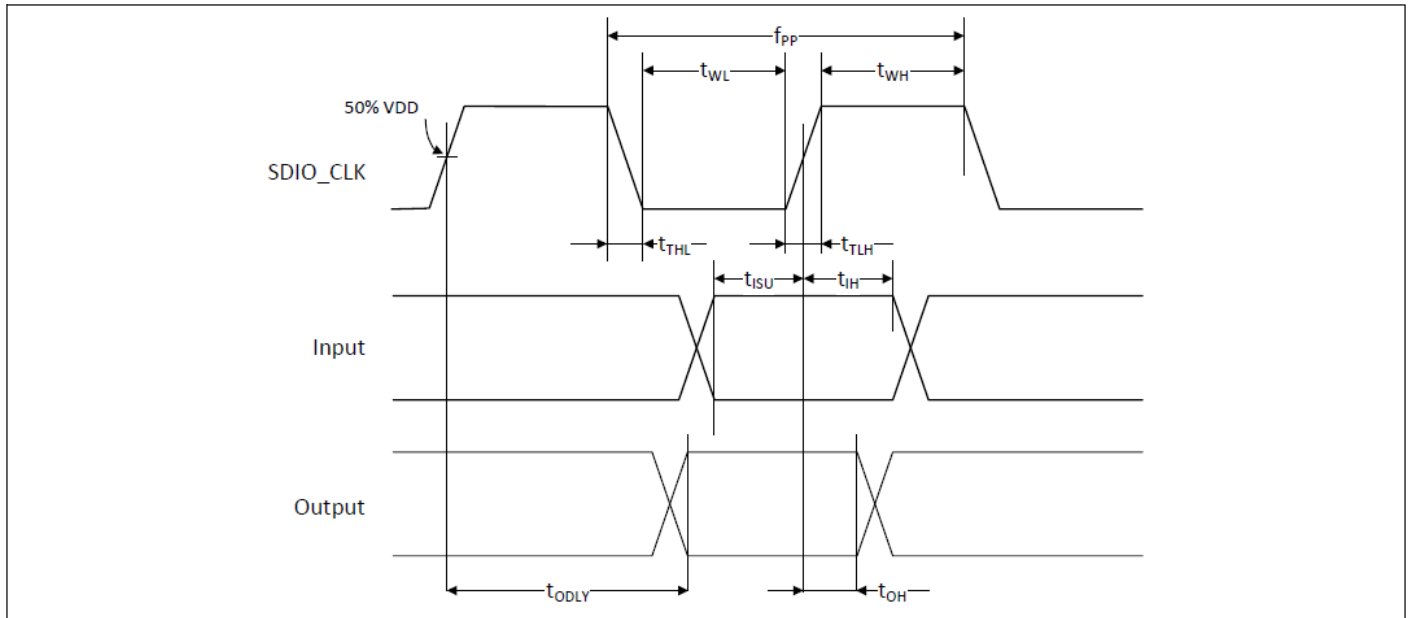
#### SDIO Bus Timing (Default Mode)

Parameter	Symbol	Minimum	Typical	Maximum	Unit
SDIO CLK (All values are referred to minimum VIH and maximum VIL*)					
Frequency – Data Transfer mode	$f_{PP}$	0	–	25	MHz
Frequency – Identification mode	$f_{OD}$	0	–	400	kHz
Clock low time	$t_{WL}$	10	–	–	ns
Clock high time	$t_{WH}$	10	–	–	ns
Clock rise time	$t_{TLH}$	–	–	10	ns
Clock low time	$t_{THL}$	–	–	10	ns
Inputs: CMD, DAT (referenced to CLK)					
Input setup time	$t_{ISU}$	5	–	–	ns
Input hold time	$t_{IH}$	5	–	–	ns
Outputs: CMD, DAT (referenced to CLK)					

Output delay time – Data Transfer mode	tODLY	0	–	14	ns
Output delay time – Identification mode	tODLY	0	–	50	ns

### SDIO Bus Timing Parameters (Default Mode)

\*  $\min(V_{IH}) = 0.7 \times V_{DDIO}$  and  $\max(V_{IL}) = 0.2 \times V_{DDIO}$



### SDIO Bus Timing (High-Speed Mode)

Parameter	Symbol	Minimum	Typical	Maximum	Unit
SDIO CLK (all values are referred to minimum VIH and maximum VIL)					
Frequency – Data Transfer Mode	fPP	0	–	50	MHz
Frequency – Identification Mode	fOD	0	–	400	kHz
Clock low time	tWL	7	–	–	ns
Clock high time	tWH	7	–	–	ns
Clock rise time	tTLH	–	–	3	ns
Clock low time	tTHL	–	–	3	ns
Inputs: CMD, DAT (referenced to CLK)					
Input setup Time	tISU	6	–	–	ns
Input hold Time	tIH	2	–	–	ns

Outputs: CMD, DAT (referenced to CLK)					
Output delay time – Data Transfer Mode	tODLY	–	–	14	ns
Output hold time	tOH	2.5	–	–	ns
Total system capacitance (each line)	CL	–	–	40	pF

### SDIO Bus Timing a Parameters (High-Speed Mode)

\*  $\min(V_{ih}) = 0.7 \times V_{DDIO}$  and  $\max(V_{il}) = 0.2 \times V_{DDIO}$

### 3.4.2 UART Interface

The AW-NM512 includes a single UART for Bluetooth. The UART is a standard 4-wire interface (RX, TX, RTS, and CTS) with adjustable baud rates from 9600 bps to 4.0 Mbps. The interface features an automatic baud rate detection capability that returns a baud rate selection. Alternatively, the baud rate may be selected through a vendor-specific UART HCI command.

UART has a 1040-byte receive FIFO and a 1040-byte transmit FIFO to support EDR. Access to the FIFOs is conducted through the AHB interface through either DMA or the CPU. The UART supports the Bluetooth 5.0 UART HCI specification: H4, a custom Extended H4, and H5. The default baud rate is 115.2 Kbaud.

The UART supports the 3-wire H5 UART transport, as described in the Bluetooth specification (“Three-wire UART Transport Layer”). Compared to H4, the H5 UART transport reduces the number of signal lines required by eliminating the CTS and RTS signals.

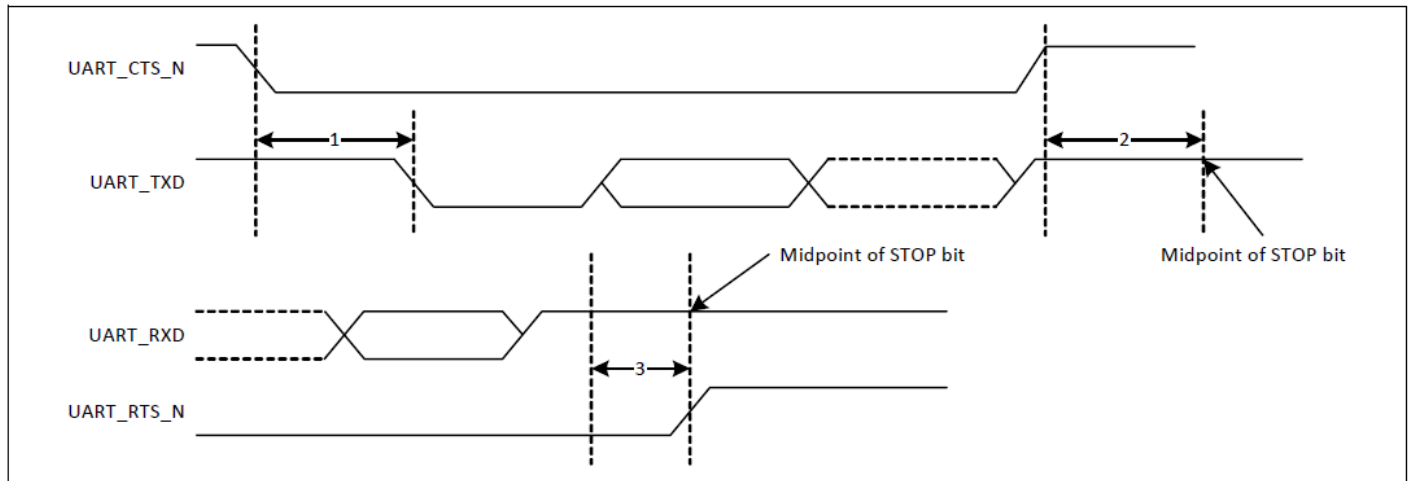
The AW-NM512 UART can perform XON/XOFF flow control and includes hardware support for the Serial Line Input Protocol (SLIP). It can also perform wake-on activity. For example, activity on the RX or CTS inputs can wake the chip from a sleep state.

Normally, the UART baud rate is set by a configuration record downloaded after device reset, or by automatic baud rate detection, and the host does not need to adjust the baud rate. Support for changing the baud rate during normal HCI UART operation is included through a vendor-specific command that allows the host to adjust the contents of the baud rate registers. The AW-NM512 UARTs operate correctly with the host UART as long as the combined baud rate error of the two

devices is within  $\pm 2\%$ .

### UART Interface Signals

PIN No.	Name	Description	Type
40	UART_TXD	Bluetooth UART Serial Output. Serial data output for the HCI UART Interface	O
41	UART_RXD	Bluetooth UART Series Input. Serial data input for the HCI UART Interface	I
43	UART_RTS_N	Bluetooth UART Request-to-Send. Active-low request-to-send signal for the HCI UART interface	O
42	UART_CTS_N	Bluetooth UART Clear-to-Send. Active-low clear-to-send signal for the HCI UART interface.	I

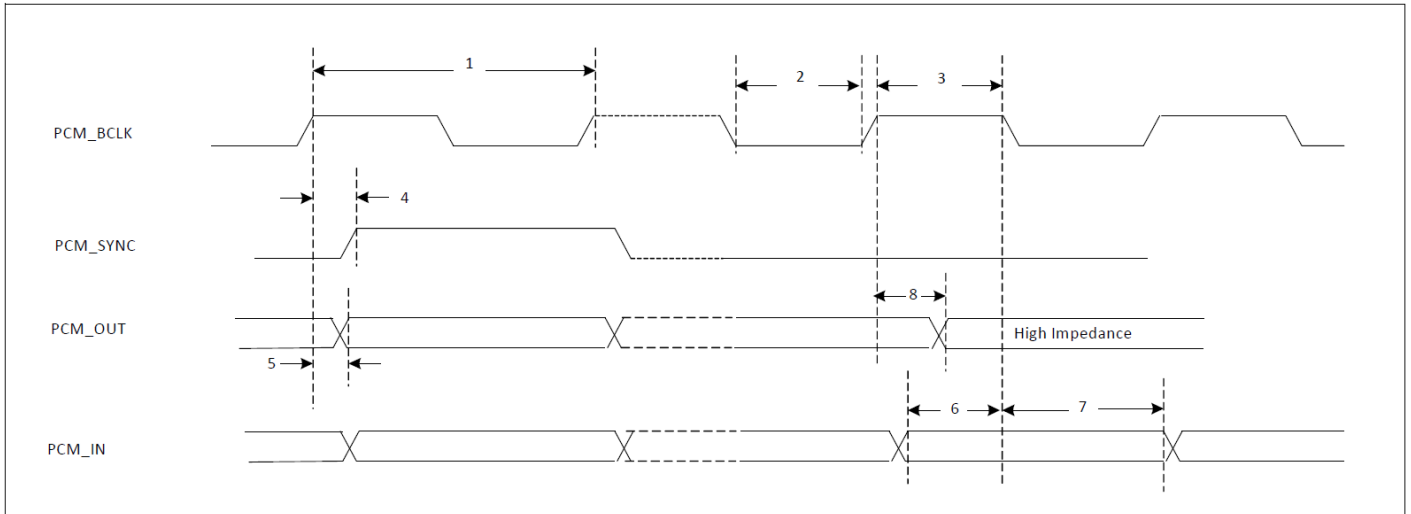


### UART Timing

	Reference Characteristics	Minimum	Typical	Maximum	Unit
1	Delay time, UART_CTS_N low to UART_TXD valid	–	–	1.5	Bit periods
2	Setup time, UART_CTS_N high before midpoint of stop bit	–	–	0.5	Bit periods
3	Delay time, midpoint of stop bit to UART_RTS_N high	–	–	0.5	Bit periods

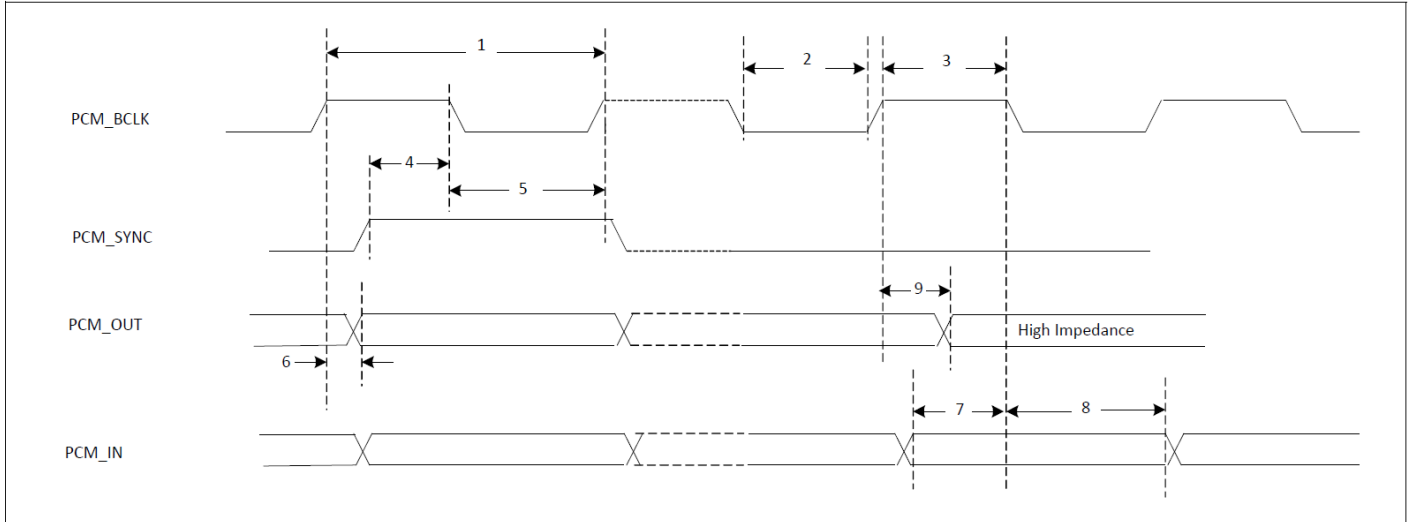
### UART Timing Specifications

### 3.4.3 PCM Interface Timing



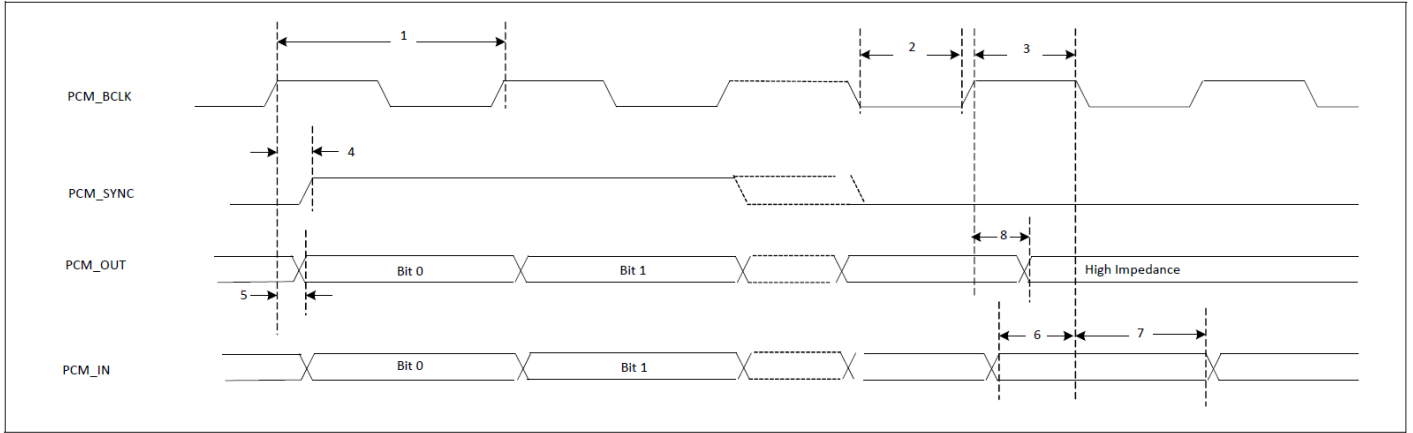
**PCM Timing Diagram(Short Frame Sync, Master Mode)**

	Reference Characteristics	Minimum	Typical	Maximum	Unit
1	PCM bit clock frequency			12	MHz
2	PCM bit clock low	41			ns
3	PCM bit clock high	41			ns
4	PCM_SYNC delay	0		25	ns
5	PCM_OUT delay	0		25	ns
6	PCM_IN setup	8			ns
7	PCM_IN hold	8			ns
8	Delay from rising edge of PCM_BCLK during last bit period to PCM_OUT becoming high impedance	0		25	ns



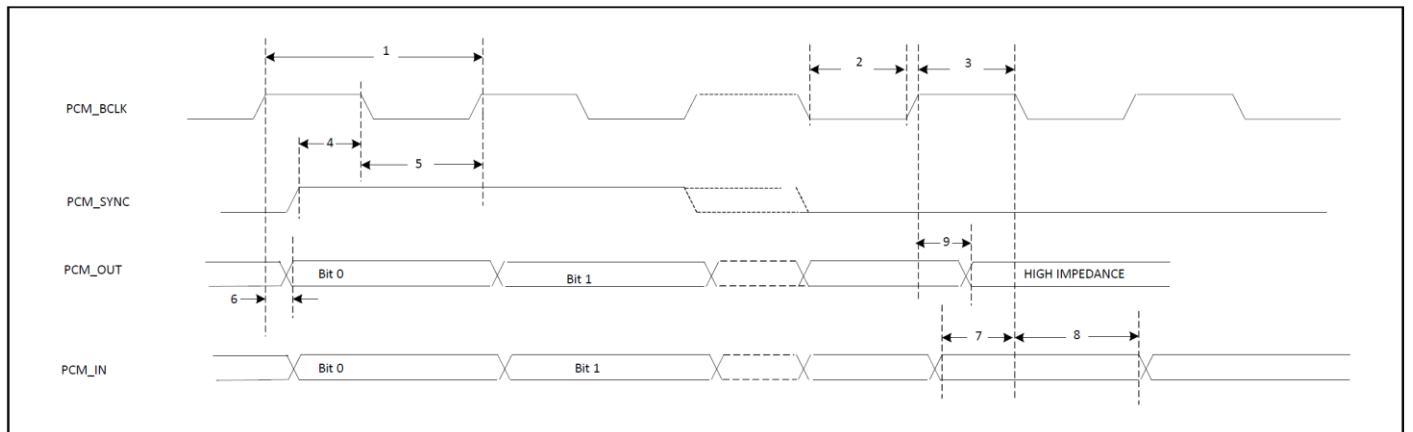
**PCM Timing Diagram(Short Frame Sync, Slave Mode)**

	Reference Characteristics	Minimum	Typical	Maximum	Unit
1	PCM bit clock frequency			12	MHz
2	PCM bit clock low	41			ns
3	PCM bit clock high	41			ns
4	PCM_SYNC setup	8			ns
5	PCM_SYNC hold	8			ns
6	PCM_OUT delay	0		25	ns
7	PCM_IN setup	8			ns
8	PCM_IN hold	8			ns
9	Delay from rising edge of PCM_BCLK during last bit period to PCM_OUT becoming high impedance	0		25	ns



**PCM Timing Diagram(Long Frame Sync, Master Mode)**

	Reference Characteristics	Minimum	Typical	Maximum	Unit
1	PCM bit clock frequency			12	MHz
2	PCM bit clock low	41			ns
3	PCM bit clock high	41			ns
4	PCM_SYNC delay	0		25	ns
5	PCM_OUT delay	0		25	ns
6	PCM_IN setup	8			ns
7	PCM_IN hold	8			ns
8	Delay from rising edge of PCM_BCLK during last bit period to PCM_OUT becoming high impedance	0		25	ns

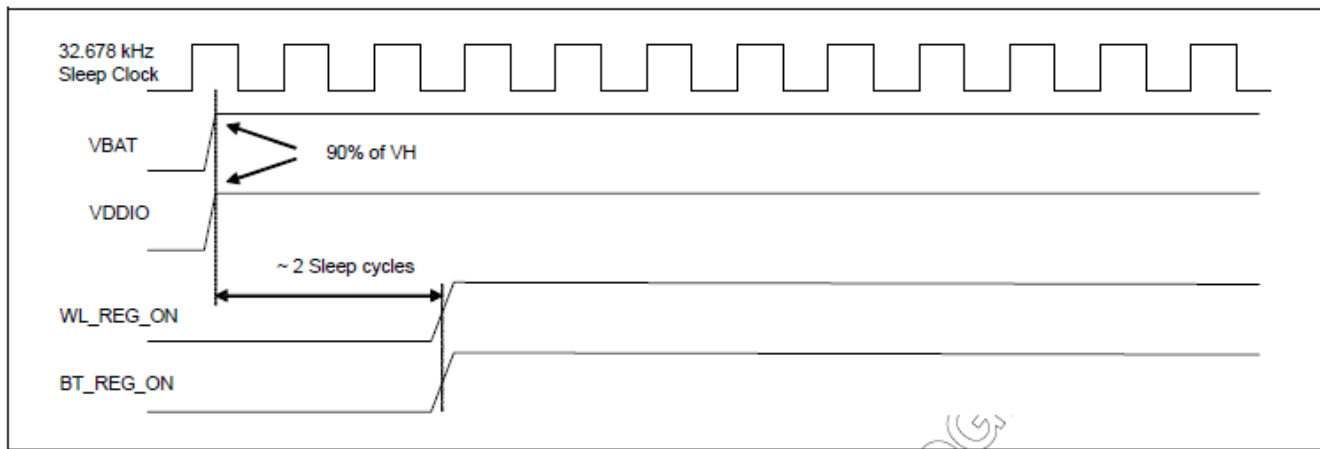


### PCM Timing Diagram(Long Frame Sync, Slave Mode)

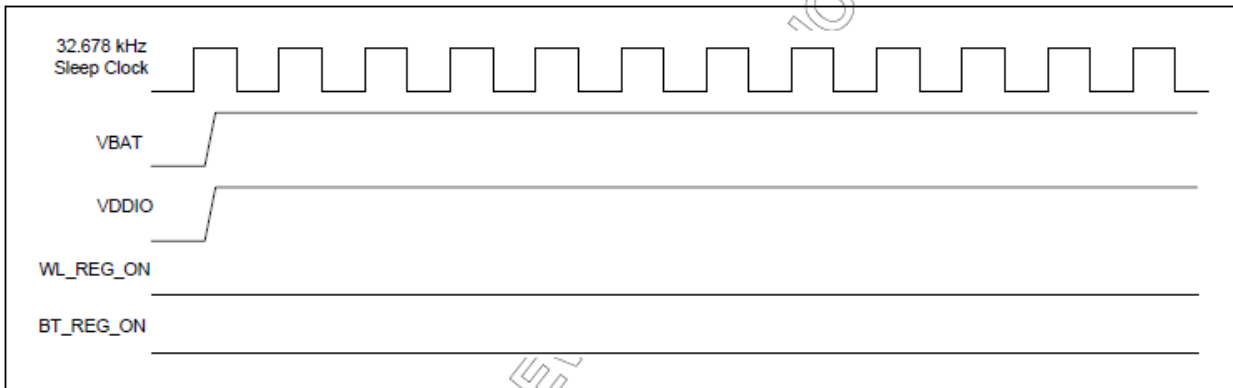
	Reference Characteristics	Minimum	Typical	Maximum	Unit
1	PCM bit clock frequency			12	MHz
2	PCM bit clock low	41			ns
3	PCM bit clock high	41			ns
4	PCM_SYNC setup	8			ns
5	PCM_SYNC hold	8			ns
6	PCM_OUT delay	0		25	ns
7	PCM_IN setup	8			ns
8	PCM_IN hold	8			ns
9	Delay from rising edge of PCM_BCLK during last bit period to PCM_OUT becoming high impedance	0		25	ns

### 3.5 Power up Timing Sequence

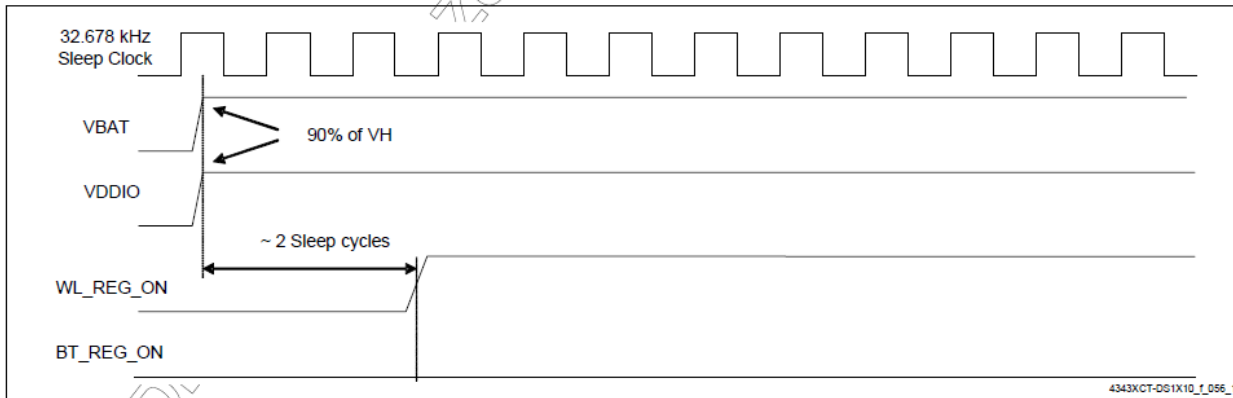
WLAN = ON, Bluetooth = ON



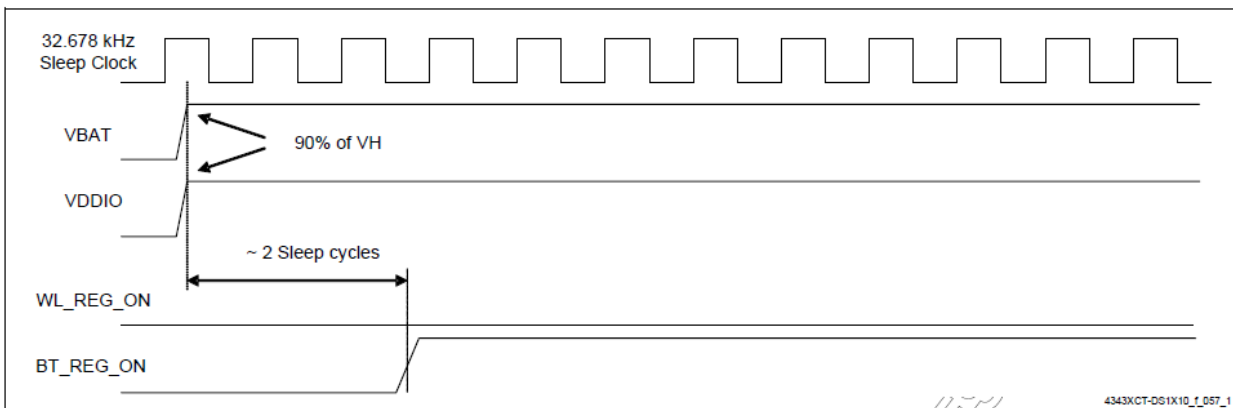
**WLAN = OFF, Bluetooth = OFF**



**WLAN = ON, Bluetooth = OFF**



**WLAN = OFF, Bluetooth = ON**



### 3.6 Frequency References

The AW-NM512 uses an external 26MHz xtal for normal operation and an external secondary low frequency clock for low-power-mode timing. Either the internal low-precision LPO or an external 32.768 kHz precision oscillator is required. The internal LPO frequency range is approximately 33 kHz  $\pm$  30% over process, voltage, and temperature, which is adequate for some applications. However, a trade-off caused by this wide LPO tolerance is a small current consumption increase during WLAN power save mode that is incurred by the need to wake up earlier to avoid missing beacons.

The preferred approach for WLAN is to connect a precision external 26MHz & 32.768 kHz clock that meets the requirements listed in Table below.

Parameter	Conditions/Notes	Crystal			External Frequency Reference			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	
Frequency			26			26		MHz
Crystal load capacitance			12					pF
ESR				60				Ohms
Drive level	External crystal must be able to tolerate this drive level	200						uW
Input Impedance (XTAL_IN)	Resistive				10k	100k		Ohms
	Capacitive						7	pF
Input Voltage(XTAL_IN)	AC-coupled analog signal				400		1260	mV(p-p)
Input Low Level(XTAL_IN)	DC-coupled digital signal				0		0.2	V
Input High Level(XTAL_IN)	DC-coupled digital signal				1		1.26	V
Frequency tolerance Initial + over temperature		-20	0	20	-20	0	20	ppm

Parameter	LPO	Units
Nominal input frequency	32.768	kHz
Frequency accuracy	+200	ppm
Duty cycle	30 - 70	%
Input signal amplitude	200 - 3300	mV , p-p
Input impedance	>100	k $\Omega$
	<5	pF
Signal type	Square-wave or sine-wave	-
Clock jitter (during initial start-up)	<10000	ppm

### 3.7 Power Consumption\*

#### 3.7.1 WLAN

No.	Item			V <sub>BAT</sub> =3.6V(mA)		
				Max.	Avg.	
1	WLAN OFF			3.9uA		
2	Sleep			8.1uA	5.5uA	
3	Power Save DTIM1 (2.4GHz)			27mA	1.2mA	
4	Power Save DTIM3 (2.4GHz)			31mA	773uA	
Band (GHz)	Mode	BW (MHz)	RF Power (dBm)	Transmit		
				Max.	Avg.	Duty (%)
2.4	11b@1Mbps	20	18	303	301	96
	11g@54Mbps	20	16	194	192	49
	11n@MCS7	20	15	182	181	54
Band (GHz)	Mode	BW(MHz)	Receive			
			Max.	Avg.		
2.4	11b@1Mbps	20	37	35		
	11n@MCS7	20	37	34		

\* The power consumption is based on Azurewave test environment, these data for reference only.

No.	Item			V <sub>DIO</sub> =1.8 V	
				Max.	Avg.
1	WLAN OFF			6.4uA	
2	Sleep			94uA	86uA
3	Power Save DTIM1 (2.4GHz)			158uA	79uA
Band (GHz)	Mode	BW (MHz)	RF Power (dBm)	Transmit	
				Max.	Avg.
2.4	11b@1Mbps	20	18	52uA	48uA
Band (GHz)	Mode	BW(MHz)	Receive		
			Max.	Avg.	
2.4	11b@1Mbps	20	62uA	48uA	

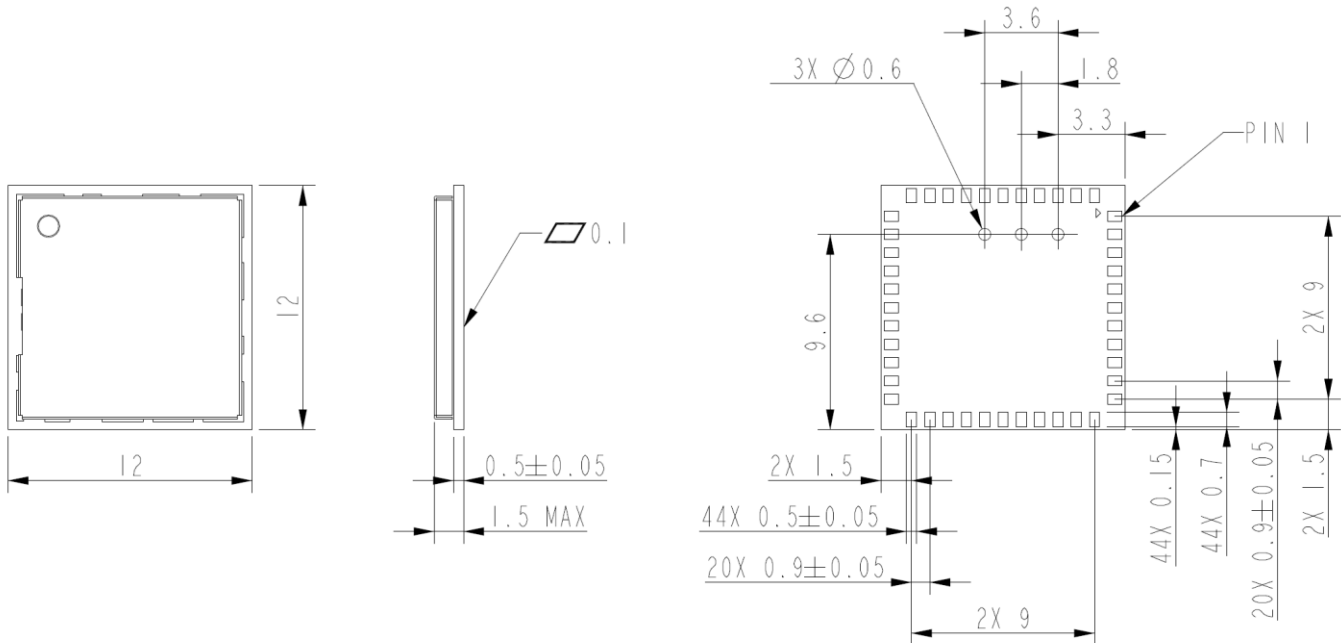
### 3.7.2 Bluetooth

No.	Mode	Packet Type	RF Power (dBm)	VBAT=3.6 V	
				Max.	Avg.
1	Sleep	n/a	n/a	39.8uA	18uA
2	Transmit	DH5	9.3	25.3mA	25.1mA
3	Receive	3DH5	n/a	11.2mA	11.1mA
4	Transmit	LE	8.9	28.1mA	28.0mA
5	Receive	LE	n/a	12.1mA	12.1mA

\* The power consumption is based on Azurewave test environment, these data for reference only.

## 4. Mechanical Information

### 4.1 Mechanical Drawing



TOLERANCE UNLESS OTHERWISE SPECIFIED:  $\pm 0.1$ mm

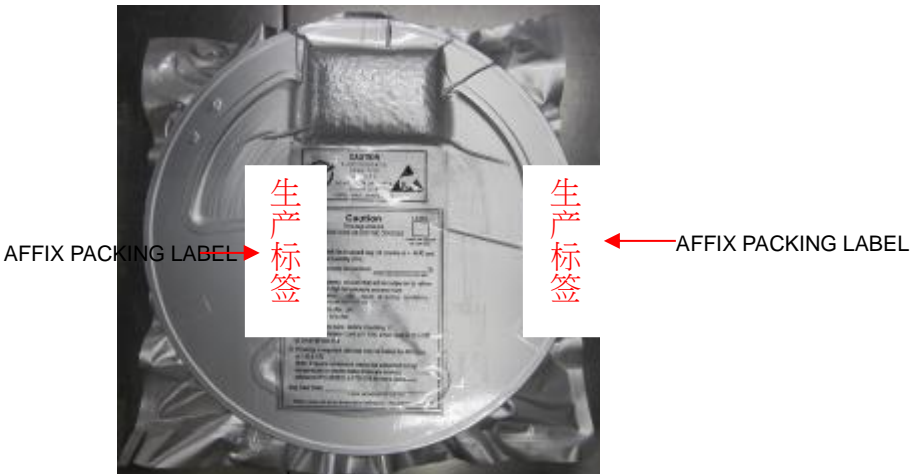
Unit:mm

## 5. Packaging Information

### 5.1



### 5.2



**5.3**



PINK BUBBLE WRAP

**5.4**



AFFIX PACKING LABEL

### 5.5

1.5K/reel, 7.5K / carton



### 5.6

