

AW-CU300

V2

IEEE 802.11 b/g/n WLAN Microcontroller Module

Datasheet

Rev. 0.5

0BH

(Standard)

Revision History

Revision	Date	Description	Initials	Approved
Version 0.1	2018/03/15	Initial Version	Alex Yu	Daniel Lee
Version 0.2	2019/01/15	Update Certification	Apple Chang	Patrick Lin
Version 0.3	2019/02/01	Update Digital IO Pin DC Characteristics Power up Timing Sequence Power Consumption Certifications Specifications Table	Alex Yu	N.C. Chen
Version 0.4	2019/02/19	Revise the typos of 1.4.2	Josh Lin	Patrick Lin
Version 0.5	2019/05/06	Update Specifications Table	Alex Yu	N.C. Chen

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1. Introduction

1.1 Product Overview

AzureWave presents **AW-CU300 V2** Wi-Fi Microcontroller Smart Energy Platform Solution provides a highly cost-effective, flexible and easy to-use hardware/software platform to build a new generation of connected, smart devices. These smart-connected devices enable device to deliver a broad-range of services to consumers including energy-management, demand-response, home automation and remote access. This allows a user to manage comfort and convenience, also run diagnostics and receive alerts and notifications, in addition to managing and controlling the device. Developers can leverage the rich connectivity features of these new smart devices to create a new generation of innovative new applications and services

The platform builds upon the success of Marvell's Wi-Fi microcontroller platform using the Marvell 88MW320 Wi-Fi System-on-Chip (SoC) and Marvell Smart Connect software. Adding new enhancements and capabilities.

The **AW-CU300 V2** is powered by production quality, field-tested Marvell Smart Connect software that includes a rich set of software components that work together to support the development of Smart Energy devices, and enable these devices to connect to mobile clients such as smart-phones, Internet-based Cloud and Smart-Grid services. The feature-rich software stack enables OEMs to focus on application-specific software functionality, thus enabling rapid development and reduced software development costs and risks.

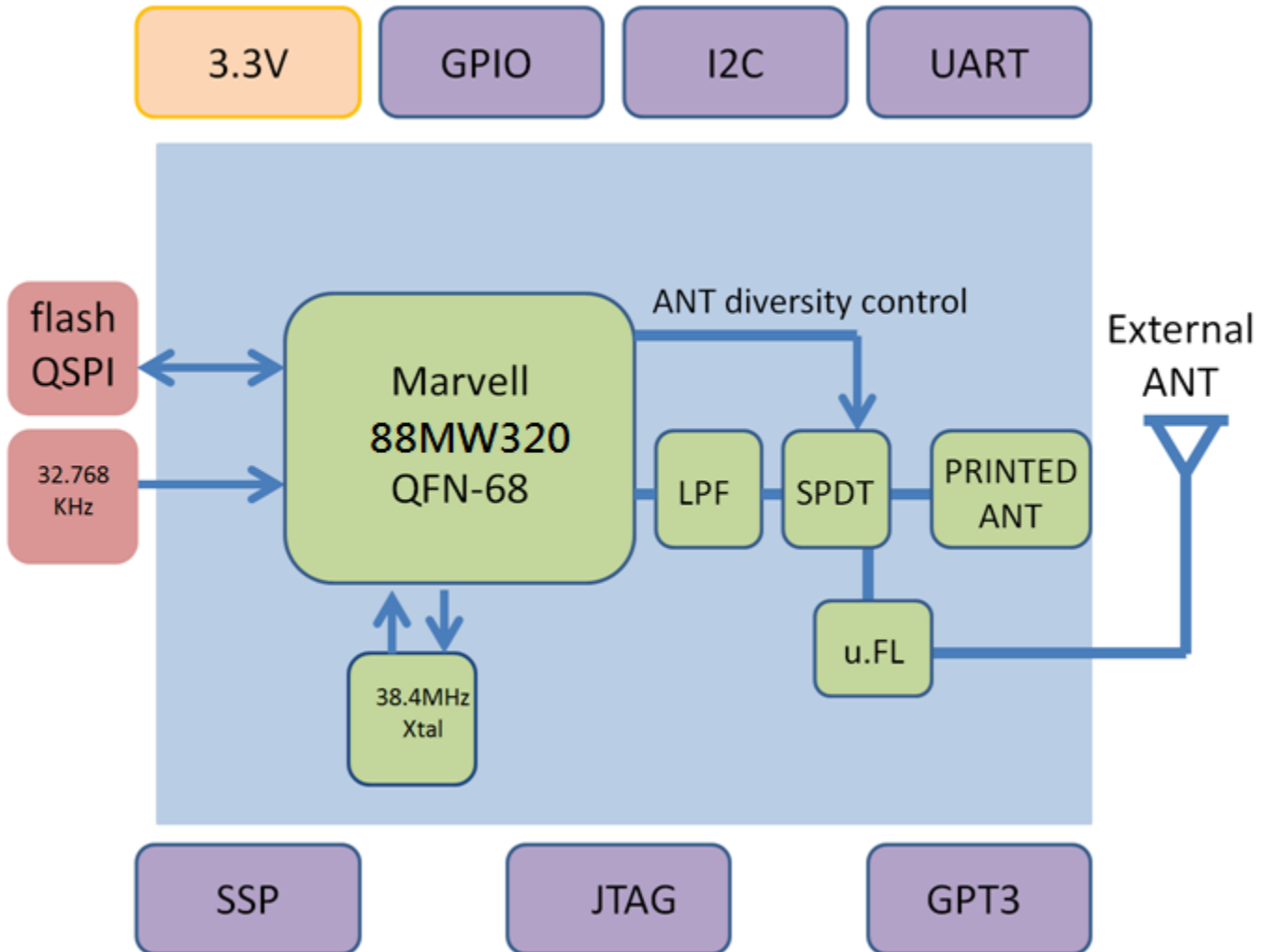
1.2 Features

1.2.1 WLAN

88MW320 (Marvell 88MW320 is a WLAN IEEE 802.11 b/g/n standalone SoC)

- **Processor**
 - ✓ ARM Cortex-M4F, 32bit
 - ✓ 200MHz main bus clock
- **Memory**
 - ✓ 128KB ROM
 - ✓ 512KB RAM
- **Flash Controller**
 - ✓ 32KB SRAM cache to support XIP
 - ✓ Memory-mapped access to QSPI Flash devices
- **Wireless**
 - ✓ IEEE 802.11 b/g/n HT20
 - ✓ Low-power with deep sleep and standby modes
 - ✓ Fully supports clients (stations) implementing IEEE Power Save mode
 - ✓ Wi-Fi direct connectivity
- **Antenna**
 - ✓ Support printed Antenna for Internal Antenna
 - ✓ Support U.FL Connector for External Antenna
 - ✓ Antenna Diversity
- **IO Interfaces**
 - ✓ UART
 - ✓ JTAG
 - ✓ GPIO
 - ✓ SSP
 - ✓ I2C
 - ✓ GPT
- **High Integration and Low-RBOM**
 - ✓ Single 3.3V Power Input
- **Package**
 - ✓ LGA Module – 23 mm x 15 mm x 2.35 mm, 64 pin
- **Certifications**
 - ✓ FCC/ CE/ IC/ NCC/ Brazil/ Mexico/ Argentina/ China/ Japan (TELEC)
 - ✓ FCC ID: TLZ-CU300
 - ✓ IC ID: 6100A-CU300
 - ✓ NCC ID: CCAI18LP2100T8
 - ✓ Brazil ID: 01874-16-03657
 - ✓ Mexico ID: RCPAZAW17-0602
 - ✓ Argentina: C-16113
 - ✓ China: 2016DJ1791 (M)
 - ✓ Japan TELEC: 201-152863

1.3 Block Diagram



Block Diagram of AW-CU300 V2

1.4 Specifications Table

1.4.1 General

Features	Description
Product Description	AW-CU300 V2 Wireless Smart Connect module
Major Chipset	Marvell 88MW320
Host Interface	UART/JTAG
Dimension	23 mm x 15 mm x 2.35 mm
Package	64-pin LGA
Antenna	Printed Antenna and U.FL Connector for WLAN
Weight	1.3g

1.4.2 WLAN

Features	Description																				
WLAN Standard	IEEE 802.11b/g/n, Wi-Fi compliant																				
Frequency Range	2.4 GHz ISM radio band																				
Modulation	DSSS and OFDM for WLAN																				
Number of Channels	802.11b: USA, Canada and Taiwan – 11 Most European Countries – 13 France – 4, Japan – 14 802.11g: USA, Canada and Taiwan – 11 Most European Countries – 13 Japan – 13 802.11n(HT20): Channel 1~13(2412~2472)																				
Output Power (Board Level Limit)*	Module for IEEE 802.11b/g/n spec: WLAN:2.4GHz <table border="1"> <thead> <tr> <th></th> <th>Min</th> <th>Typ</th> <th>Max</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>11b (11Mbps)</td> <td>15</td> <td>17</td> <td>19</td> <td>dBm</td> </tr> <tr> <td>11g (54Mbps)</td> <td>12</td> <td>14</td> <td>16</td> <td>dBm</td> </tr> <tr> <td>11n (HT20 MCS7)</td> <td>11</td> <td>13</td> <td>15</td> <td>dBm</td> </tr> </tbody> </table>		Min	Typ	Max	Unit	11b (11Mbps)	15	17	19	dBm	11g (54Mbps)	12	14	16	dBm	11n (HT20 MCS7)	11	13	15	dBm
	Min	Typ	Max	Unit																	
11b (11Mbps)	15	17	19	dBm																	
11g (54Mbps)	12	14	16	dBm																	
11n (HT20 MCS7)	11	13	15	dBm																	
Receiver Sensitivity	Module for IEEE 802.11b/g/n spec: WLAN: 2.4GHz <table border="1"> <thead> <tr> <th></th> <th>Min</th> <th>Typ</th> <th>Max</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>11b (11Mbps)</td> <td></td> <td>-84</td> <td></td> <td>dBm</td> </tr> <tr> <td>11g (54Mbps)</td> <td></td> <td>-69</td> <td></td> <td>dBm</td> </tr> <tr> <td>11n (HT20 MCS7)</td> <td></td> <td>-66</td> <td></td> <td>dBm</td> </tr> </tbody> </table>		Min	Typ	Max	Unit	11b (11Mbps)		-84		dBm	11g (54Mbps)		-69		dBm	11n (HT20 MCS7)		-66		dBm
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11n (HT20 MCS7)		-66		dBm																	

* FCC/CE output power limit spec: Please refer to the 3.6 Certifications.

Data Rate	WLAN <ul style="list-style-type: none"> ● 802.11b: 1, 2, 5.5, 11Mbps ● 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps ● 802.11n: MCS0-7, up to 72.2Mbps(20MHz channel)
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1.4.3 Operating Conditions

Features	Description
Operating Conditions	
Voltage	3.3V +/- 10%
Operating Temperature	-30 ~ 85°C
Operating Humidity	<85%
Storage Temperature	-40 ~ 85°C
Storage Humidity	< 60 %
ESD Protection	
Human Body Model	2KV per JEDEC EID/JESD22-A114
Changed Device Model	500V per JEDEC EIA/JESD22-C101

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2. Pin Definition

2.1 Pin Map (Bottom View)

	GND	GPIO_6	GPIO_9	GPIO_7	GPIO_26	GPIO_22	GPIO_43	GND	8
		RESET	GPIO_10	GPIO_8	GPIO_25	GPIO_23	B_3.3V	M_3.3V	7
	GND	GND	GND	GND	GND	GPIO_27	GPIO_16	GPIO_30	6
	GND	GND	GND	GND	GND	GND	GPIO_29	GPIO_33	5
	GND	GND	GND	GND	GND	GND	GPIO_28	GPIO_31	4
	GND	GND	GND	GND	GND	GPIO_24	GPIO_32	GPIO_41	3
	GND	GPIO_5	GPIO_3	GPIO_1	GPIO_49	GPIO_47	GPIO_39	GPIO_40	2
	GND	GPIO_4	GPIO_2	GPIO_0	GPIO_48	GPIO_46	GPIO_42	GND	1
	H	G	F	E	D	C	B	A	

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2.2 Pin Table

2.2.1 Power

Pin No	Definition	Basic Description	Type	Level
B7	B_3V3	3.3V Power input	PWR	3.3V
A7	M_3V3	3.3V Power input	PWR	3.3V

2.2.2 GPIO

Pin No	Definition	Function 0	Function 1	Function 2	Function 3	Function 4	Function 5	Type	Level
E1	GPIO_0	GPIO_0	GPT0_CH0	UART0_CTS	SSP0_CLK			I/O	3.3V
E2	GPIO_1	GPIO_1	GPT0_CH1	UART0_RTS	SSP0_FRM			I/O	3.3V
F1	GPIO_2	GPIO_2	GPT0_CH2	UART0_TXD	SSP0_TXD			I/O	3.3V
F2	GPIO_3	GPIO_3	GPT0_CH3	UART0_RXD	SSP0_RXD			I/O	3.3V
G1	GPIO_4	GPIO_4	GPT0_CH4	I2C0_SDA	AUDIO_CLK			I/O	3.3V
G2	GPIO_5	GPIO_5	GPT0_CH5	I2C0_SCL				I/O	3.3V
B2	GPIO_39	GPIO_39	GPT3_CLKIN	UART1_RXD	SSP1_RXD			I/O	3.3V
G8	GPIO_6	JTAG TDO	GPIO_6	I2C1_SDA				I/O	3.3V
E8	GPIO_7	JTAG TCK	GPIO_7	UART2_CTS	SSP2_CLK	I2C0_SDA		I/O	3.3V
E7	GPIO_8	JTAG TMS	GPIO_8	UART2_RTS	SSP2_FRM	I2C0_SDL		I/O	3.3V
F8	GPIO_9	JTAG TDI	GPIO_9	UART2_TXD	SSP2_TXD	I2C1_SDA		I/O	3.3V
F7	GPIO_10	JTAG TRST	GPIO_10	UART2_RXD	SSP2_RXD	I2C1_SDL		I/O	3.3V
B6	GPIO_16	GPIO_16	CON[5]		AUDIO_CLK			I/O	3.3V
C6	GPIO_27	GPIO_27	CON[4]	UART0_TXD				I/O	3.3V
C8	GPIO_22	WAKE_UP_0	GPIO_22					I/O	3.3V
C7	GPIO_23	WAKE_UP_1	GPIO_23	UART0_CTS			COMP_IN_P	I/O	3.3V
C3	GPIO_24		GPIO_24	UART0_RXD	GPT1_CH5		COMP_IN_N	I/O	3.3V
D8	GPIO_26	32KHzCLK_OUT	GPIO_26	I2C1_SCL				I/O	3.3V
A2	GPIO_40	GPIO_40	ADC_DAC_T RIGGER0	ACOMP0_GP IO_OUT	ACOMP1_GP IO_OUT			I/O	3.3V
A3	GPIO_41	GPIO_41	ADC_DAC_T RIGGER1	ACOMP0_ED GE_PULSE	ACOMP1_ED GE_PULSE			I/O	3.3V
B1	GPIO_42	GPIO_42	ADC_0/ ACOMP0	UART1_CTS	SSP_CLK			I/O	3.3V
B8	GPIO_43	GPIO_43	ADC_1/ ACOMP1	UART1_RTS	SSP1_FRM			I/O	3.3V
C1	GPIO_46	GPIO_46	ADC_4/ ACOMP4	UART2_CTS	SSP2_CLK			I/O	3.3V

C2	GPIO_47	GPIO_47	ADC_5/ ACOMP5	UART2_RTS	SSP2_FRM			I/O	3.3V
D1	GPIO_48	GPIO_48	ADC_6/ ACOMP6	UART2_TXD	SSP2_TXD			I/O	3.3V
D2	GPIO_49	GPIO_49	ADC_7/ ACOMP7	UART2_RXD	SSP2_RXD			I/O	3.3V
D7	GPIO_25	32KHz_CLK_IN	GPIO_25	I2C1_SDA				I/O	3.3V
G7	RESETN	RESETN	Host reset					I/O	3.3V (internal pull high 51k ohm)
B4	GPIO_28	QSPI_SS _n	GPIO_28	I2C0_SDA			GPT1_CH0	I/O	3.3V
B5	GPIO_29	QSPI_Clk	GPIO_29	I2C0_SCL			GPT1_CH1	I/O	3.3V
A6	GPIO_30	QSPI_D0	GPIO_30	UART0_CTS	SSP0_CLK		GPT1_CH2	I/O	3.3V
A4	GPIO_31	QSPI_D1	GPIO_31	UART0_RTS	SSP0_FRM		GPT1_CH3	I/O	3.3V
B3	GPIO_32	QSPI_D2	GPIO_32	UART0_TXD	SSP0_TXD		GPT1_CH4	I/O	3.3V
A5	GPIO_33	QSPI_D3	GPIO_33	UART0_RXD	SSP0_RXD		GPT1_CH5	I/O	3.3V

2.2.3 GND

Pin No Definition		Basic Description	Remark
C4	G3	GND	
C5	G4		
D3	G5		
D4	G6		
D5	H1		
D6	H2		
E3	H3		
E4	H4		
E5	H5		
E6	H6		
F3	H8		
F4	A1		
F5	A8		
F6			

2.2.4 NC(Floating)

Pin No Definition	Basic Description	Remark
H7	DNS(Don't connect)	

2.2.5 CONFIGURATION PINS

Pin No	Definition	Basic Description	Remark
C4	G3	GND	
C5	G4		
D3	G5		
D4	G6		
D5	H1		
D6	H2		
E3	H3		
E4	H4		
E5	H5		
E6	H6		
F3	H8		
F4	A1		
F5	A8		
F6			

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3. Electrical Characteristics

3.1 Absolute Maximum Ratings

Symbol	Parameter	Minimum	Typical	Maximum	Unit
B_3V3	3.3V power supply		3.3	3.6	V
M_3V3	3.3V power supply		3.3	3.6	V

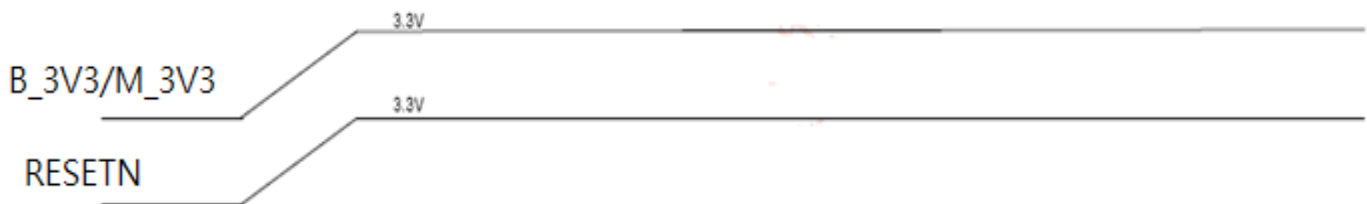
3.2 Recommended Operating Conditions

Symbol	Parameter	Minimum	Typical	Maximum	Unit
B_3V3	3.3V power supply		3.3	3.6	V
M_3V3	3.3V power supply		3.3	3.6	V

3.3 Digital IO Pin DC Characteristics

Symbol	Parameter	Minimum	Typical	Maximum	Unit
V _{IH}	Input High Voltage	3.3 *70%		3.3 +0.4	V
V _{IL}	Input Low Voltage	-0.4		3.3 *30%	V

3.4 Power up Timing Sequence



3.5 Power Consumption*

3.5.1 MFG Continuous Tx Mode

No.	Item			Voltage=3.3V					
	Band (GHz)	Mode	BW (MHz)	RF Power (dBm)	Transmit			Receive	
					Max.	Avg.	Duty. (%)	Max.	Avg.
2.4	11b@1Mbps	20	17	306mA	302mA	99%	77.5mA	77.4mA	
	11b@11Mbps	20	17	288mA	287mA	93%	78.1mA	78.0mA	
	11g@54Mbps	20	14	230mA	229mA	77%	79.6mA	79.2mA	
	11n@MCS7	20	13	224mA	223mA	79%	79.6mA	79.4mA	

*Current Unit: mA

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

3.6 Certifications FCC/ETSI WIFI 2.4GHz Power Table

FCC WIFI 2.4GHz Power Table:

- Internal ANT(5.12dBi)/PIFA ANT(4dBi)/Dipole ANT(3dBi)/Monopole ANT(3dBi)
- Peak: Peak power is for certification, which follow FCC KDB 558074 D01 DTS Meas Guidance v03r01
- AVG: Average power measured by the power meter
- Test condition: Under limit 2.5dB

Mode:		11b		Data Rate:		1Mbps		Directional Gain (dBi):	
Channel	Frequency (MHz)	Power Setting	Chain0						
			Gain:	0.00					
			Avg (dBm)	Peak (dBm)					
1	2412	15	16.01	18.37					
6	2437	17	17.64	20.01					
11	2462	16	16.56	19.10					

Mode:		11g		Data Rate:		6Mbps			
1	2412	11	12.24	21.89					
6	2437	14	14.94	23.11					
11	2462	12	12.86	22.37					

Mode:		11n20 2.4G		Data Rate:		MCS0 6.5Mbps			
1	2412	9	10.31	19.01					
6	2437	13	13.58	22.11					
11	2462	11	11.68	20.67					

ETSI WIFI 2.4GHz Power Table:

- Conducted measurement: Tnormal(25°C)/ Tmin(-20°C)/ Tmax(85°C)

Mode:		Tx 11b					Data Rate:	1Mbps		Gain(dBi) :		5.12
Channel	Freq. (MHz)	Power Setting	Conducted AVG Power (dBm)					EIRP				
			Chain0				Total	Tnorm	Tmin		Tmax	
							Vnorm	Vnorm		Vnorm		
1	2412	12	13.40				13.40	18.52	18.99		18.02	20.00
7	2442	12	13.35				13.35	18.47	18.88		17.96	20.00
13	2472	13	13.68				13.68	18.80	19.14		18.26	20.00

Mode:		Tx 11g					Data Rate:	6Mbps		Gain(dBi) :		5.12
Channel	Freq. (MHz)	Power Setting	Conducted AVG Power (dBm)					EIRP				
			Chain0				Total	Tnorm	Tmin		Tmax	
							Vnorm	Vnorm		Vnorm		
1	2412	13	14.19				14.19	19.31	19.78		18.81	20.00
7	2442	13	14.16				14.16	19.28	19.69		18.77	20.00
13	2472	13	13.97				13.97	19.09	19.43		18.55	20.00

Mode:		Tx 11n20 2.4G					Data Rate:	MCS0 6.5Mbps		Gain(dBi) :		5.12
Channel	Freq. (MHz)	Power Setting	Conducted AVG Power (dBm)					EIRP				
			Chain0				Total	Tnorm	Tmin		Tmax	
							Vnorm	Vnorm		Vnorm		
1	2412	13	14.21				14.21	19.33	19.80		18.83	20.00
7	2442	13	14.19				14.19	19.31	19.72		18.80	20.00
13	2472	13	13.95				13.95	19.07	19.41		18.53	20.00

Antenna Information

Internal Antenna with Certifications FCC/CE:

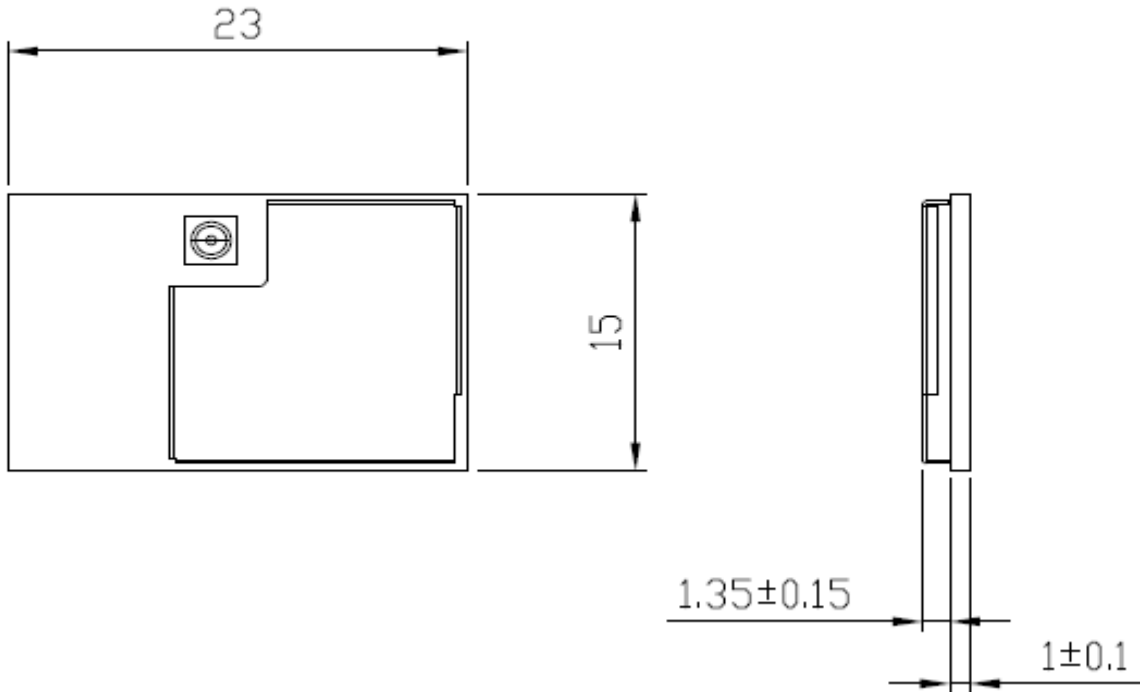
- PCB antenna
 - Peak Gain 5.12dBi (2.4GHz~2.5GHz)

External Antennas with Certifications FCC/CE:

- Monopole antenna[FXP73.07.0100A, TAOGLAS]
 - Peak Gain 3dBi (2.4GHz~2.5GHz)
- Dipole antenna[PC11.07.0100A, TAOGLAS]
 - Peak Gain 3dBi (2.4GHz~2.5GHz)
- PIFA antenna[FXP74.07.0100A, TAOGLAS]
 - Peak Gain 4dBi (2.4GHz~2.5GHz)

4. Mechanical Information

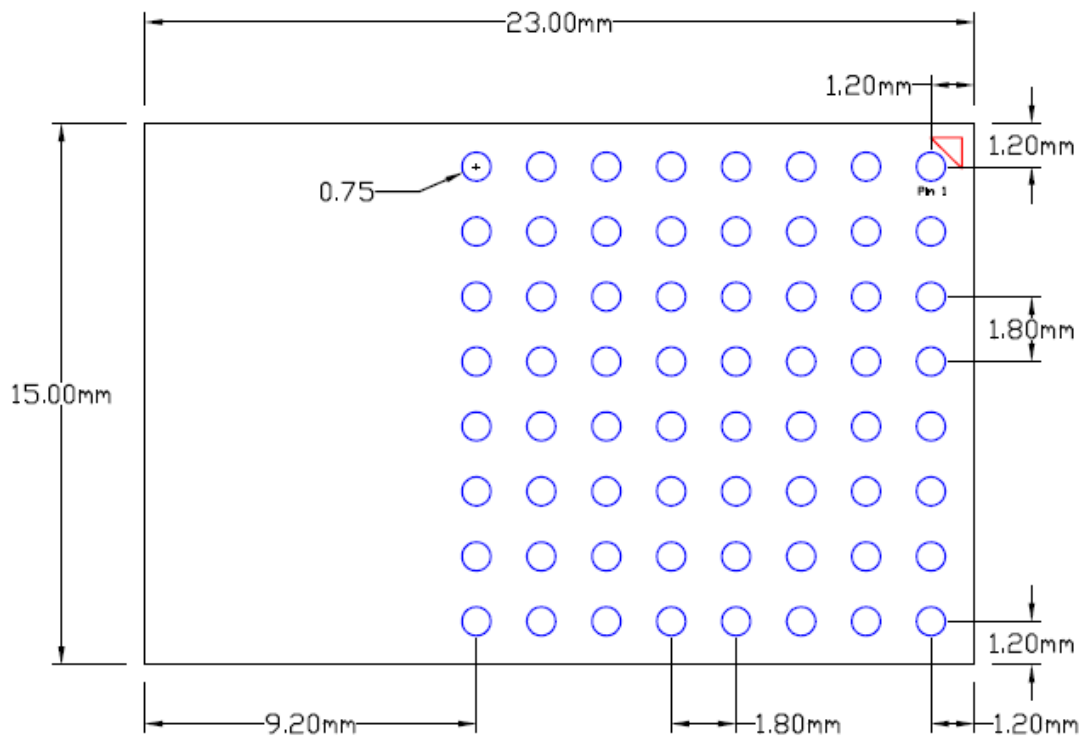
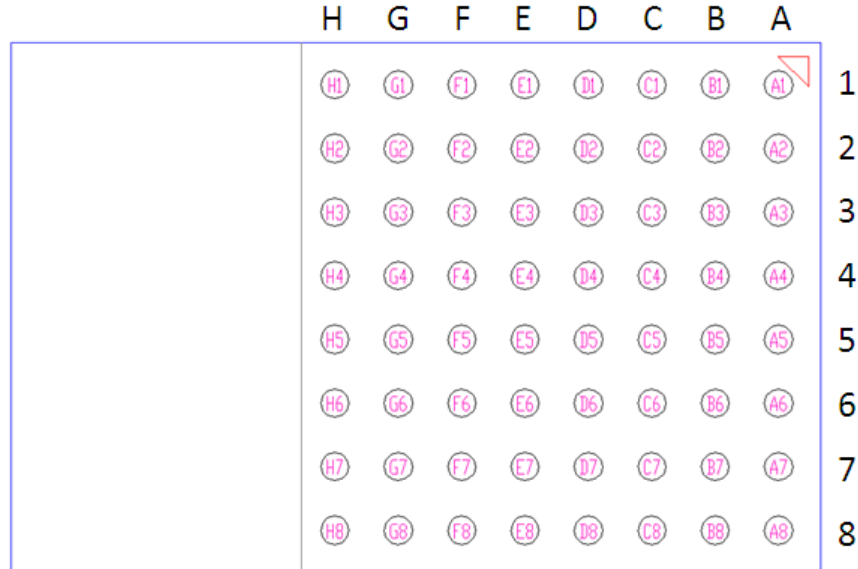
4.1 Mechanical Drawing



4.2 PCB Footprint

The size and thickness of the AW-CU300 V2 LGA package module is listed below:

AW-CU300 V2 TOP View PCB Layout Footprint



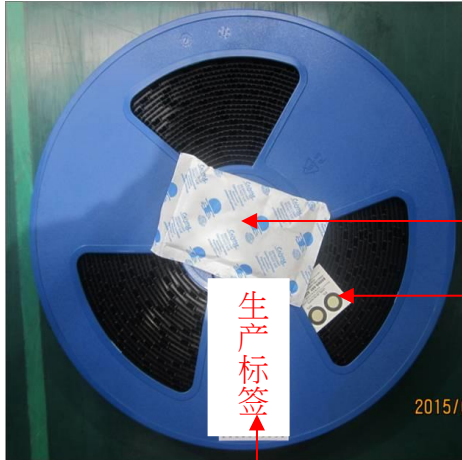
TOP VIEW

5. Packaging Information

1 Tape reel = 1 Box = 1,000 pcs

1 Carton = 3 Boxes = 3,000 pcs

5.1 Tape & Reel Picture



DESICCANT

HUMIDITY INDICATOR CARD

AFFIX PACKING LABEL

5.2 Packing Picture



AFFIX PACKING LABEL

5.3 Inside of Inner Box Picture



PINK BUBBLE WRAP

5.4 Inner Box Picture



AFFIX PACKING LABEL

5.5 Inside of Carton Picture

1 Carton = 3 Boxes



5.6 Carton and Label Picture



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AFFIX SHIPPING LABEL

AFFIX PACKING LABEL

AFFIX BOX LABEL