AW313A Datasheet

Zhuhai Jieli Technology Co.,LTD

Version 1.0

Date 2024.04.12

Revision History

Date	Revision	Description
2024.04.12	V1.0	Initial Release

Table of Contents

AW313A Features

SYSTEM

- 32bit CPU 160MHz
- Support MATH/AES128
- I-cache
- Support EMU
- On-chip SRAM 32kbyte
- Support MPU
- Support UDMA
- Built-In Flash
- 24MHz crystal oscillator
- Internal low jitter low power RC oscillator
- Internal PLL

Bluetooth

- BLE5.4 +2.4GHz-Proprietary (QDID 223418)
- Support AoA Transmitter
- Support long range BLE
- Maximum transmitting power 9dBm
- Receiver sensitivity
  - -96dBm @BLE-1Mbps
  - -93dBm @BLE-2Mbps
  - -99dBm @BLE-S2
  - -103.5dBm @BLE-S8

Peripherals

- 1 x Full speed USB
- 4 x Multi-function 32bit timer
- 1 x IR RX/TX
- 3 x UART interface
- 1 x I^2C Master/Slave interface
- 2 x SPI Master/Slave interface
- 1 x QDEC
- 4 x MCPWM
- 2 x LEDC
- 1 x 10bit ADC(13 Channel)
- 12 x GPIO Support function remapping

PMU

- Support temperature sensor
- VPWR range 2.7V to 5.5V
- IOVDD range 1.8V to 3.6V
- Deep sleep mode (IOVDD @3.0V)
  - 170nA (External wakeup)
  - 1.37uA (32kHz RC OSC+wakeup)
  - 2.9uA (32kHz RC OSC+wakeup+16k retention SRAM)

Packages

- QFN20(3mm*3mm)

Temperature

- Operating temperature
  TC = -20℃ to +85℃(standard range)
  TC = -40℃ to +105℃(extended range)
- Storage temperature -65℃ to +150℃

Applications

- Mouse devices
- Non-audio remote controller
- Selfie stick
- Page turner
- Adaptive USB
- Bluetooth moudle
- Price tag and other diversified IOT product

1 Block Diagram

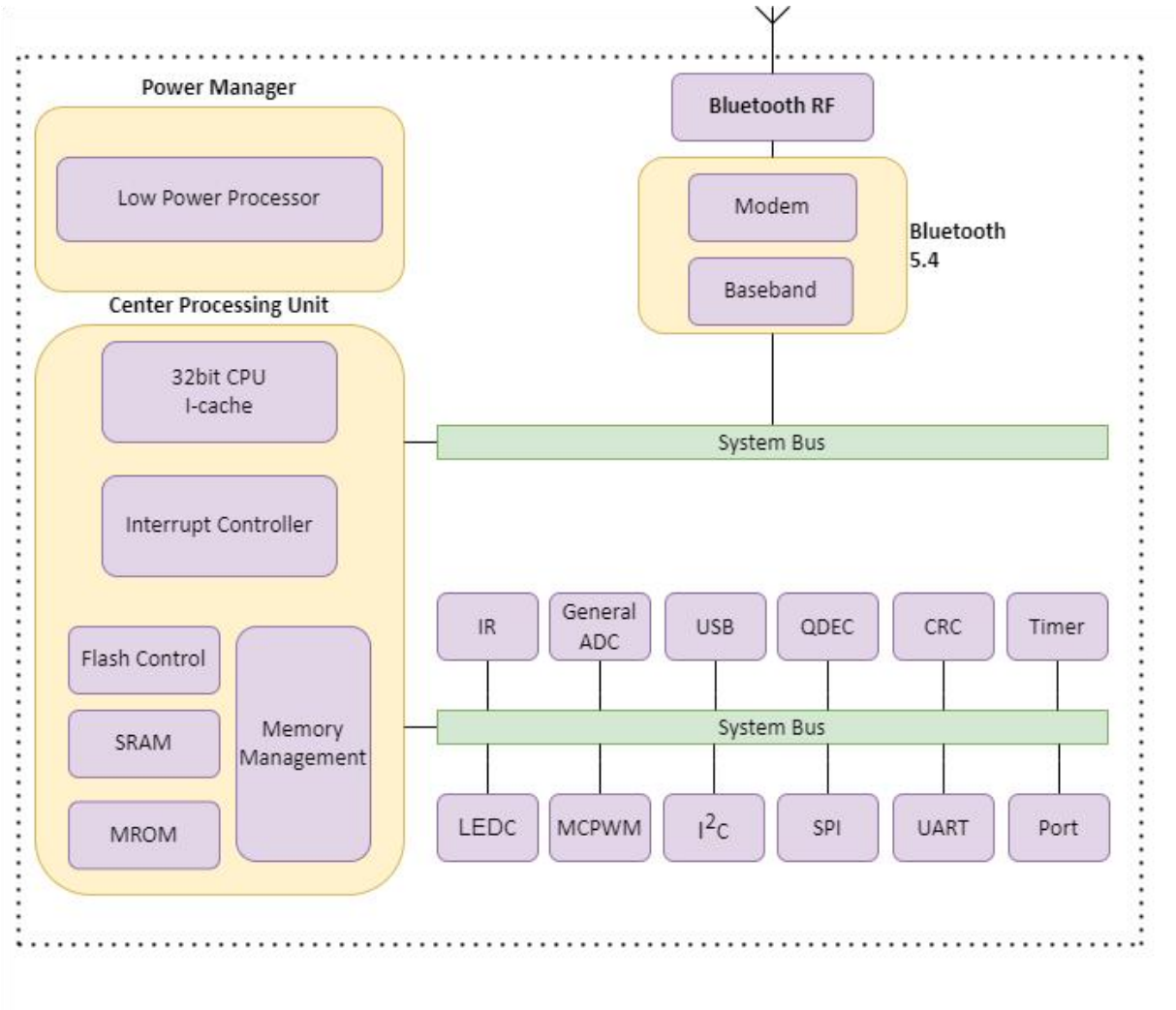


Figure 1-1 AW313A Block Diagram

2 Pin Definition

2.1 Pin Assignment

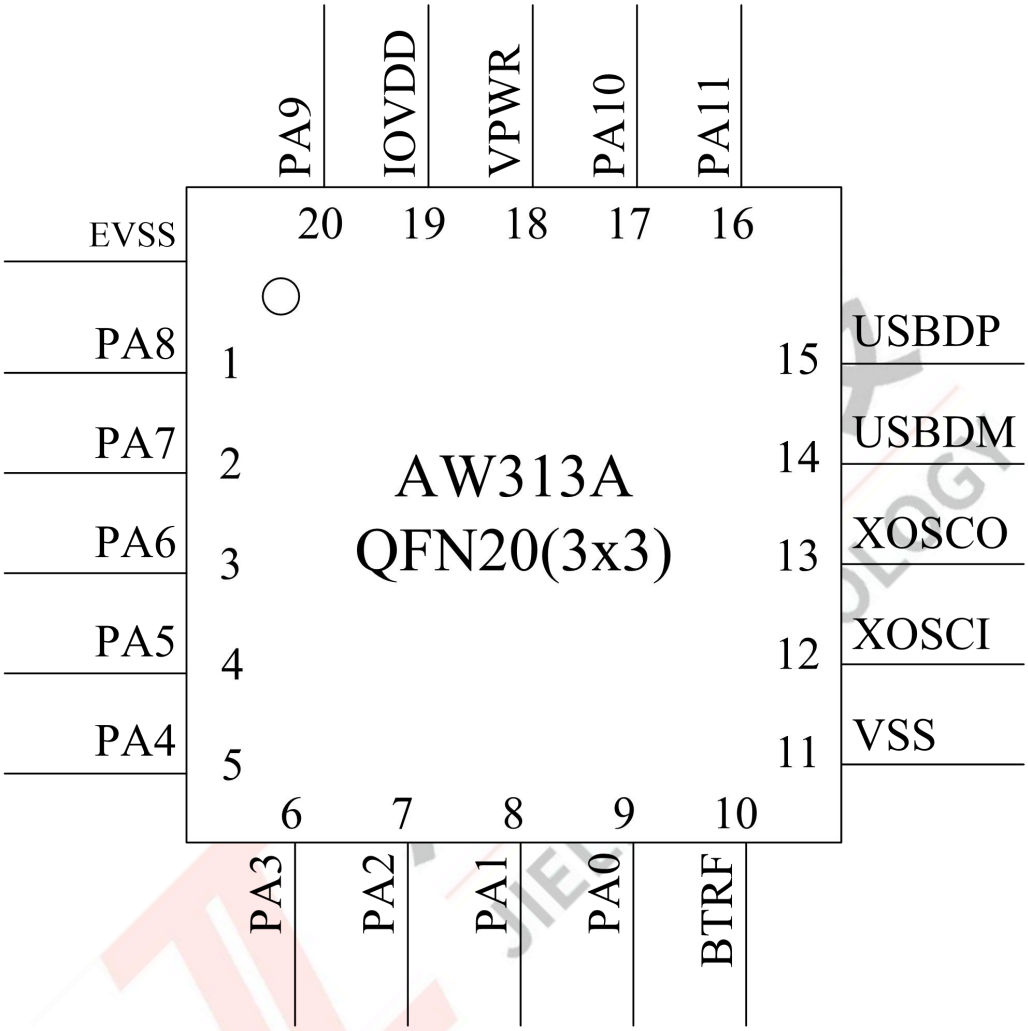


Figure 2-1 AW313A Pin Assignment

2.2 Pin Description

Table 2-2-1 AW313A Pin Description

Pin No.	Name	Type	IO Initial State	Description
1	PA8	I/O	Z	ADC8(ADC Input Channel 8) SPI0_DAT2B
2	PA7	I/O	Z	--
3	PA6	I/O	Z	ADC6(ADC Input Channel 6)
4	PA5	I/O	Z	ADC5(ADC Input Channel 5)
5	PA4	I/O	10kΩ Pull-up	ADC4(ADC Input Channel 4) MCLR(Device Reset)
6	PA3	I/O	Z	ADC3(ADC Input Channel 3) SPI0_DIB(1)
7	PA2	I/O	Z	ADC2(ADC Input Channel 2) SPI0_DOB(0)
8	PA1	I/O	Z	ADC1(ADC Input Channel 1) SPI0_CLKB
9	PA0	I/O	Z	ADC0(ADC Input Channel 0)
10	BTRF	RF	--	Bluetooth RF Antenna
11	VSS	G	--	Ground
12	XOSCI	I	--	Crystal Oscillator Input
13	XOSCO	O	--	Crystal Oscillator Output
14	USBDM	I/O	15kΩ Pull-down	ADC13(ADC Input Channel 13)
15	USBDP	I/O	15kΩ Pull-down	ADC14(ADC Input Channel 14)
16	PA11	I/O	10kΩ Pull-up	ADC11(ADC Input Channel 11) Hold down 0 to reset
17	PA10	I/O	Z	ADC10(ADC Input Channel 10)
18	VPWR	P	--	Battery Input
19	IOVDD	P	--	IO Power
20	PA9	I/O	Z	LVD(External Low Voltage Detection Input) ADC9(ADC Input Channel 9) SPI0_DAT3B

Note

1.IO initial state abbreviations Z--High resistance, H--High level, L--Low level, X--May be changed during power on.

2.Timer, IR,MCPWM, QDEC, UART, LEDC, I^2C, SPI1 functions can be remapped to any I/O.

Table 2-2-2 Pin Types Description

Pin Type	Description	Pin Type	Description
P	Power	I/O	Input or Output
G	Ground	I	Input

Pin Type	Description	Pin Type	Description
RF	RF antenna	O	Output

3 Electrical Characteristics

3.1 Absolute Maximum Ratings

Table 3-1 Absolute Maximum Ratings

Symbol	Parameter	Min	Max	Unit
Topt	Operating temperature	-20	+85	℃
Tstg	Storage temperature	-65	+150	℃
VPWR	Supply Voltage	-0.3	6.0	V
IOVDD		-0.3	3.6	V
GPIO	Input voltage of GPIO (except PA7)	-0.3	3.6	V
HVTIO	Input voltage of HVT-IO (PA7)	-0.3	6.0	V

Note

1.Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device.

3.2 ESD Ratings

Table 3-2 ESD Ratings

Parameter	Typ	Test pin	Reference standard
Human Body Mode	±8kV	All pins	JEDEC EIA/JESD22-A114
Machine Mode	±400V	All pins	JEDEC EIA/JESD22-A115
Charge Device Model	±2kV	All pins	ANSI/ESDA/JEDEC JS-002-2022

3.3 PMU Characteristics

Table 3-3-1 PMU Characteristics under VPWR supply

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
VPWR	Power supply	--	2.7	--	5.5	V
Operating mode						
Symbol	**Parameter**	**Conditions**	**Min**	**Typ**	**Max**	**Unit**
IOVDD	Voltage output	--	--	3.0	--	V
	Loading current	IOVDD=3.0V@VPWR = 3.7V	--	--	60	mA
Low Power mode						
Symbol	**Parameter**	**Conditions**	**Min**	**Typ**	**Max**	**Unit**
IOVDD	Loading current	IOVDD=3.0V@VPWR = 3.7V	--	--	8	mA

Table 3-3-2 PMU Characteristics under IOVDD supply

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
IOVDD	Power supply	--	1.8	--	3.6	V

3.4 IO Characteristics

Table 3-4 IO Characteristics

Input Characteristics						
Symbol	**Parameter**	**Conditions**	**IO**	**Min**	**Max**	**Unit**
V_{IL}	Low-Level Input Voltage	IOVDD = 3.0V	PA0~PA11	-0.3	1.4	V
V_{IH}	High-Level Input Voltage	IOVDD = 3.0V	PA0~PA6 PA8~PA11 USBDP USBDM	1.7	3.3	V
		IOVDD = 3.0V	PA7	1.7	5.5	V
Output Characteristics						
Symbol	**Parameter**	**Conditions**	**IO**	**Typ**		**Unit**
$\lvert I_{OL} \rvert$	Output Current	IOVDD = 3.0V Voutput = 0.3V	PA0~PA6 PA8~PA11	3(HD=0) 9(HD=1) 21(HD=2) 54(HD=3)		mA
		IOVDD = 3.0V Voutput = 0.3V	PA7 USBDP USBDM	8		mA
$\lvert I_{OH} \rvert$	Output Current	IOVDD = 3.0V Voutput = 2.7V	PA0~PA6 PA8~PA11	3(HD=0) 9(HD=1) 21(HD=2) 54(HD=3)		mA
		IOVDD = 3.0V Voutput = 2.7V	PA7 USBDP USBDM	8		mA
Internal Resistance Characteristics						
Symbol	**Parameter**	**Conditions**	**IO**	**Typ**		**Unit**
R_{pu}	Pull-up Resistance	IOVDD = 3.0V	PA0~PA11	10k(PU=1) 100k(PU=2) 1M(PU=3)		Ω
		IOVDD = 3.0V	USBDP	1.5k		Ω
		IOVDD = 3.0V	USBDM	180k		Ω
R_{pd}	Pull-down Resistance	IOVDD = 3.0V	PA0~PA11	10k(PD=1) 100k(PD=2) 1M(PD=3)		Ω
		IOVDD = 3.0V	USBDP USBDM	15k		Ω

Note

1.Internal pull-up/pull-down resistance accuracy ±20%.

3.5 BT Characteristics

3.5.1 Transmitter

Table 3-5-1 Transmitter characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Maximum RF Transmit Power	BLE-1Mbps	--	8	9	dBm

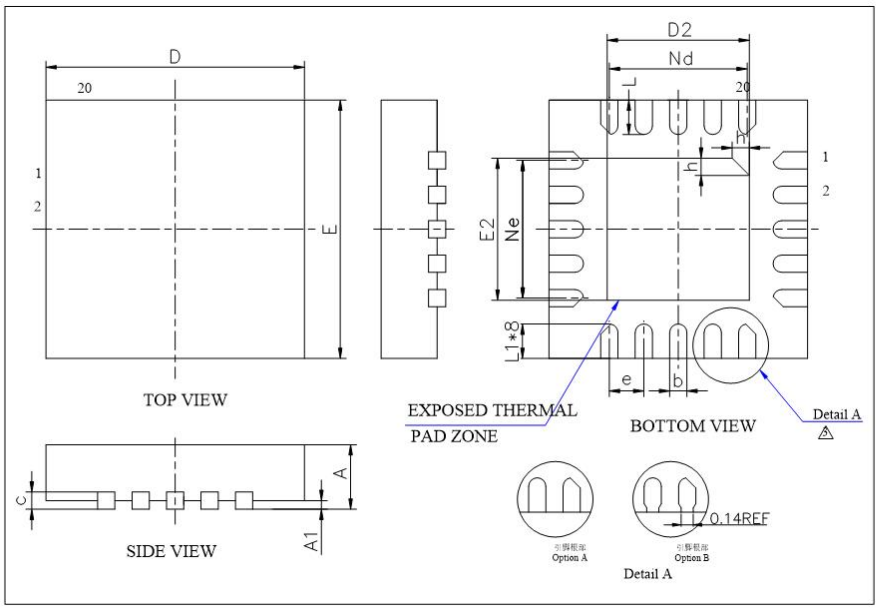
3.5.2 Receiver

Table 3-5-2 Receiver characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Sensitivity	BLE-1Mbps	--	-96	--	dBm
	BLE-2Mbps	--	-93	--	dBm
	BLE-S2	--	-99	--	dBm
	BLE-S8	--	-103.5	--	dBm

4 Package Information

4.1 QFN20_3×3mm



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	--	0.02	0.05
b	0.15	0.20	0.25
c	0.18	0.20	0.25
D	2.90	3.00	3.10
D2	1.40	1.60	1.80
e	0.40BSC		
Ne	1.60BSC		
Nd	1.60BSC		
E	2.90	3.00	3.10
E2	1.40	1.60	1.80
L	0.35	0.40	0.45
L1	0.30	0.40	0.50
h	0.20	0.25	0.30

Figure 4-1 AW313A Package

5 IC Marking Information

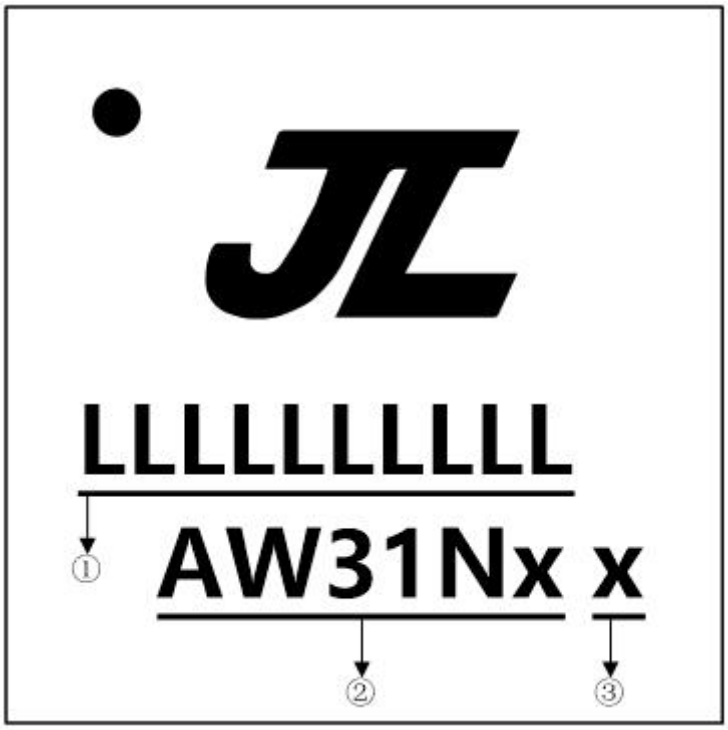


Figure 5-1 AW313A Package Outline

① LLLLLLLLL Production Batch
② AW31Nx Chip Model
③ x Built-in flash size
0 No Flash Memory
2 2Mbit Flash
4 4Mbit Flash

6 Solder-Reflow Condition

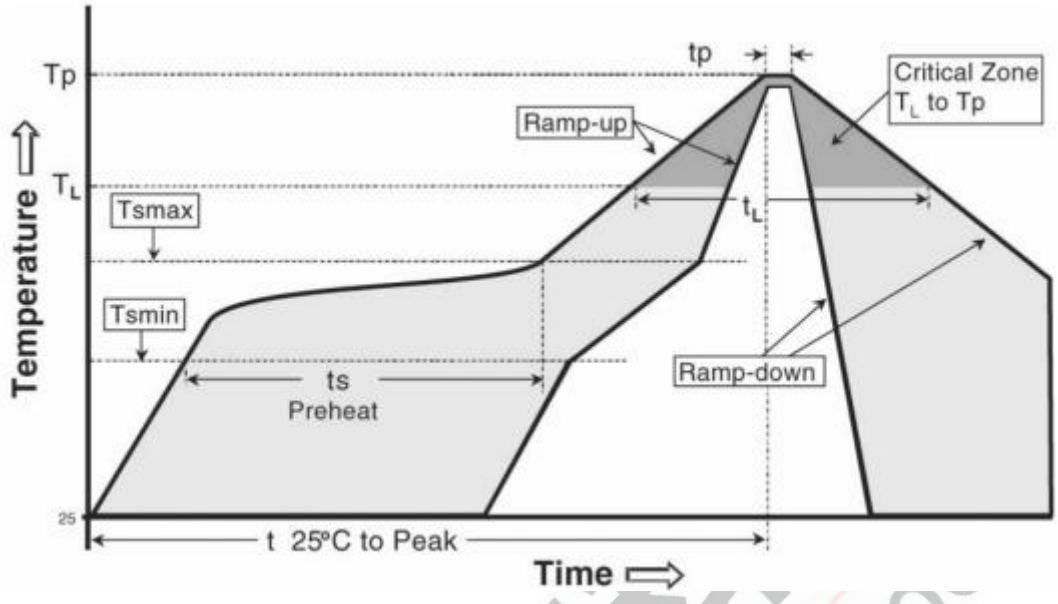


Figure 6-1 Classification Reflow Profile

Table 6-1 Classification Profiles

Profile Feature		Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat/Soak	Temperature Min (T_{smin})	100℃	150℃
	Temperature Max (T_{smax})	150℃	200℃
	Time (ts) from (T_{smin} to T_{smax})	60-120 seconds	60-180 seconds
Average ramp-up rate (T_{smax} to T_p)		3℃/second max	3℃/second max
Liquidus temperature (T_L) Time (t_L) maintained above T_L		183℃ 60-150 seconds	217℃ 60-150 seconds
Peak package body temperature (T_p)		See Table 6-2	See Table 6-3
Time within 5℃ of actual Peak Temperature (tp)[2]		10-30 seconds	20-40 seconds
Ramp-down rate (T_p to T_L)		6℃/second max	6℃/second max
Time 25℃ to peak temperature		6 minutes max	8 minutes max

Note

1.All temperatures refer to topside of the package, measured on the package body surface

2.Time within 5℃ of actual peak temperature (tp) specified for the reflow profiles is a "supplier" and "user" maximum.

Table 6-2 SnPb Classification Temperature

Package Thickness	Volume mm³ < 350	Volume mm³ ≥ 350
<2.5 mm	240 +0/-5℃	225 +0/-5℃
≥2.5 mm	225 +0/-5℃	225 +0/-5℃

Table 6-3 Pb-free - Classification Temperature

Package Thickness	Volume mm³ < 350	Volume mm³ 350 - 2000	Volume mm³ > 2000
< 1.6mm	260℃	260℃	260℃
1.6 mm - 2.5mm	260℃	250℃	245℃
> 2.5mm	250℃	245℃	245℃

Note

1.*Tolerance The device manufacturer/supplier shall assure process compatibility up to and including the stated classification temperature (this means Peak reflow temperature +0℃.For example 260℃+0℃)at the rated MSL level.