

AW333A Datasheet

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Version 1.1

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Revision History

Date	Revision	Author	Description
2025.11.27	V1.0	zh-jieli	Initial Release
2026.03.31	V1.1	zh-jieli	Add Table 3-3-3 Power Consumption



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AW333A Features

SYSTEM

- 32bit CPU 160MHz
- Support MATH/AES128
- Support cache
- On-chip SRAM 56kbyte(share Cache 4k)
- Support MPU
- Support UDMA
- Built-In Flash
- 24MHz crystal oscillator
- Dedicated PLL
- Low jitter low power 32kHz RC oscillator

Bluetooth

- BLE6.0(DN 332415)
- Support Channel Sounding PBR/RTT
- Support AoA Transmit
- Support long range BLE
- Support private 2.4G
- Maximum transmitting power 10dBm
- Transmit peak current 10mA @ 0dBm
- Receive peak current 10mA
- BLE ADV average current 14uA @ 2s
- BLE Connection average current 14uA @ 1s
- Receiver sensitivity
 - ❖ -97dBm @1M
 - ❖ -94dBm @2M
 - ❖ -99dBm @500K
 - ❖ -104dBm @125K

Peripherals

- 1 x Full speed USB
- 1 x Lowerpower UART
- 4 x Multi-function 32bit timer
- 1 x Advance Multi-function 16bit timer
- 3 x UART interface
- 1 x IIC Master/Slave interface
- 2 x SPI Master/Slave interface
- 1 x QDEC
- 1 x RAND64
- 1 x 10bit ADC(13 Channels)
- 13 x GPIO Support function remapping
- 2 x Light strip controller

PMU

- Support temperature sensor
- VPWR range 2.7V to 5.5V
- IOVDD range 1.8V to 3.6V
- Deep sleep mode (IOVDD @3.0V)
 - ❖ 200nA (IO wakeup)
 - ❖ 1.80uA (32kHz RTC+IO wakeup)
 - ❖ 5.31uA (32kHz RTC+IO wakeup+ 56kbyte retention SRAM)

Packages

- QFN20(3mm*3mm)

Temperature

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

Applications

- Mouse device
- Non-audio remote control
- Selfie stick
- Page Turner
- Bluetooth module
- Anti-loss device
- Positioner
- Price tags and other diversified Internet of Things products
- Adaptive USB

1 Block Diagram

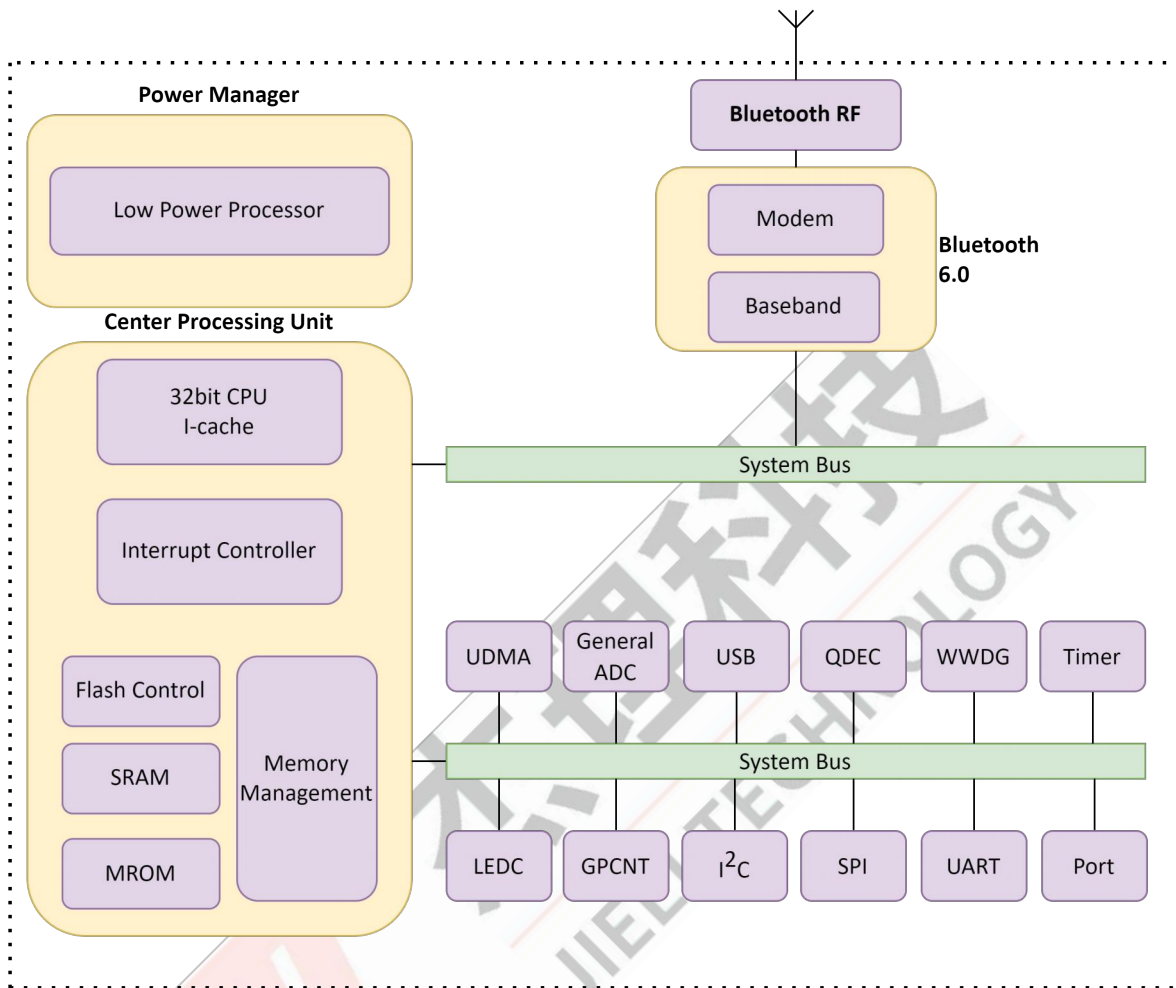


Figure 1-1 AW333A Block Diagram

2 Pin Definition

2.1 Pin Assignment

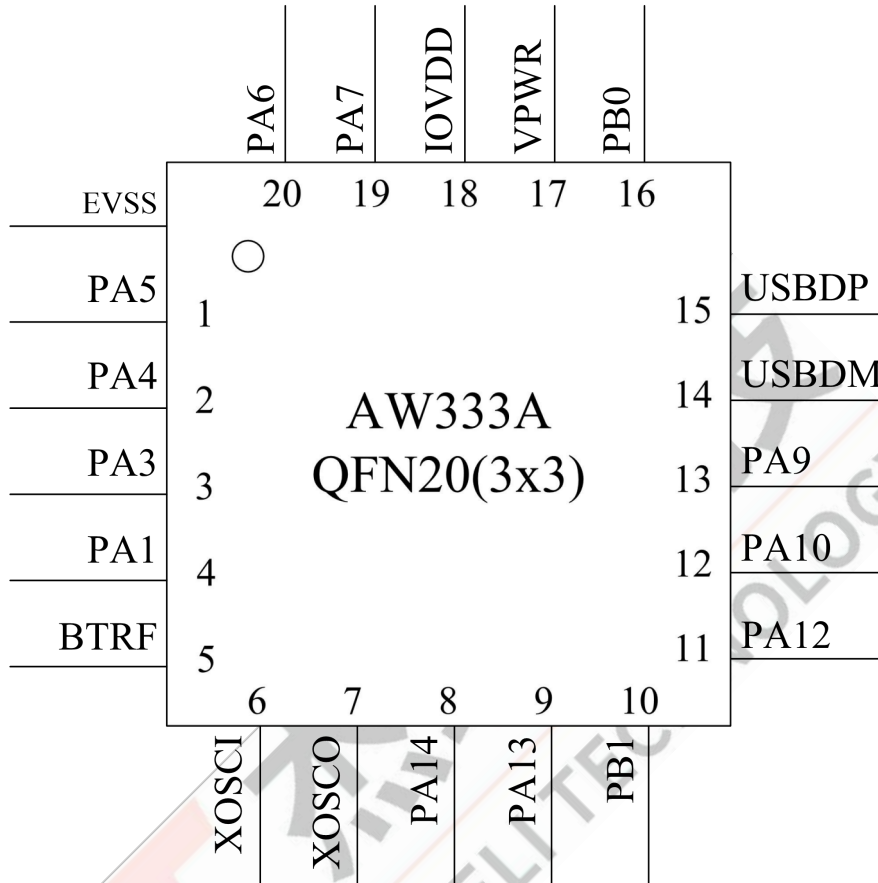


Figure 2-1 AW333A Pin Assignment

2.2 Pin Description

Table 2-2-1 AW333A Pin Description

Pin No.	Name	Type	IO Initial State	Description
1	PA5	I/O	--	ADC5(ADC Input Channel 5) SPI0_CLK(C)
2	PA4	I/O	--	ADC4(ADC Input Channel 4) SPI0_DATA3(C)
3	PA3	I/O	--	ADC3(ADC Input Channel 3) SPI0_DATA2(C)
4	PA1	I/O	10kΩ Pull-up	ADC1(ADC Input Channel 1) Hold down 0 to reset
5	BTRF	RF	--	Bluetooth RF Antenna
6	XOSCI	I	--	Crystal Oscillator Input
7	XOSCO	O	--	Crystal Oscillator Output
8	PA14	I/O	--	ADC12(ADC Input Channel 12)
9	PA13	I/O	--	ADC11(ADC Input Channel 11)
10	PB1	I/O	--	ADC8(ADC Input Channel 8)
11	PA12	I/O	--	--
12	PA10	I/O	--	ADC10(ADC Input Channel 10)
13	PA9	I/O	--	ADC9(ADC Input Channel 9)
14	USBDM	I/O	15kΩ Pull-down	ADC15(ADC Input Channel 15)
15	USBDP	I/O	15kΩ Pull-down	ADC14(ADC Input Channel 14)
16	PB0	I/O	--	--
17	VPWR	P	--	Charge Power Input
18	IOVDD	P	--	IO Power/Power Input/Power Output
19	PA7	I/O	--	ADC7(ADC Input Channel 7) SPI0_DATA1(C)
20	PA6	I/O	--	ADC6(ADC Input Channel 6) LVD(External Low Voltage Detection Input) SPI0_DATA0(C)

Note

- 1.IO initial state abbreviations Z--High resistance, H--High level, L--Low level, X--May be changed during power on.
- 2.Timer, QDEC, UART, LEDC, IIC and SPI 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
RF	RF antenna	O	Output

3 Electrical Characteristics

3.1 Absolute Maximum Ratings

Table 3-1 Absolute Maximum Ratings

Symbol	Parameter	Min	Max	Unit
T _{opt}	Operating temperature	-40	+105	°C
T _{stg}	Storage temperature	-65	+150	°C
VPWR	Supply Voltage	-0.3	6	V
IOVDD		-0.3	3.6	V
GPIO	Input voltage of GPIO (except PB0)	-0.3	3.6	V
HVTIO	Input voltage of HVT-IO (PB0)	-0.3	6	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	±4kV	All pins	JEDEC EIA/JESD22-A114
Machine Mode	±200V	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	VPWR-IOVDD≥300mV	2.1	3.0	3.6	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

Table 3-3-3 Power Consumption

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Deep sleep mode	IOVDD @3.0V	32kHz RTC + IO wakeup + 56kbyte retention SRAM	--	5.31	8	uA

Note

1.Current parameters: sampling measured at room temperature.

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	PA1, PA3~PA7 PA9, PA10 PA12~PA14 PB0, PB1 USBDP USBDM	-0.3	1.0	V
V_{IH}	High-Level Input Voltage	IOVDD = 3.0V	PA1, PA3~PA7 PA9, PA10 PA12~PA14 PB1 USBDP USBDM	2.0	3.3	V
		IOVDD = 3.0V	PB0	2.0	5.5	V
Output Characteristics						
Symbol	Parameter	Conditions	IO	Typ	Unit	
$ I_{OL} $	Output Current	IOVDD = 3.0V Voutput = 0.3V	PA1, PA3~PA7 PA9, PA10 PA12~PA14 PB1	1(HD=0) 4(HD=1) 8(HD=2) 32(HD=3)	mA	
	Output Current	IOVDD = 3.0V Voutput = 0.3V	PB0	1(HD=0) 4(HD=1) 8(HD=2) 9(HD=3)	mA	
	Output Current	IOVDD = 3.0V Voutput = 0.3V	USBDP USBDM	10	mA	
$ I_{OH} $	Output Current	IOVDD = 3.0V Voutput = 2.7V	PA1, PA3~PA7 PA9, PA10 PA12~PA14 PB1	1(HD=0) 4(HD=1) 8(HD=2) 32(HD=3)	mA	

	Output Current	IOVDD = 3.0V Voutput = 2.7V	PB0	1(HD=0) 4(HD=1) 8(HD=2) 9(HD=3)	mA
	Output Current	IOVDD = 3.0V Voutput = 2.7V	USBDP USBDM	10	mA
Internal Resistance Characteristics					
Symbol	Parameter	Conditions	IO	Typ	Unit
R _{pu}	Pull-up Resistance	IOVDD = 3.0V	PA1, PA3~PA7 PA9, PA10 PA12~PA14 PB0, PB1 USBDP USBDM	10k(PU=1) 200k(PU=2) 1M(PU=3)	Ω
R _{pd}	Pull-down Resistance	IOVDD = 3.0V	PA1, PA3~PA7 PA9, PA10 PA12~PA14 PB0, PB1 USBDP USBDM	10k(PD=1) 200k(PD=2) 1M(PD=3)	Ω

Note

1. Internal pull-up/pull-down resistance accuracy $\pm 20\%$

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	--	10	--	dBm

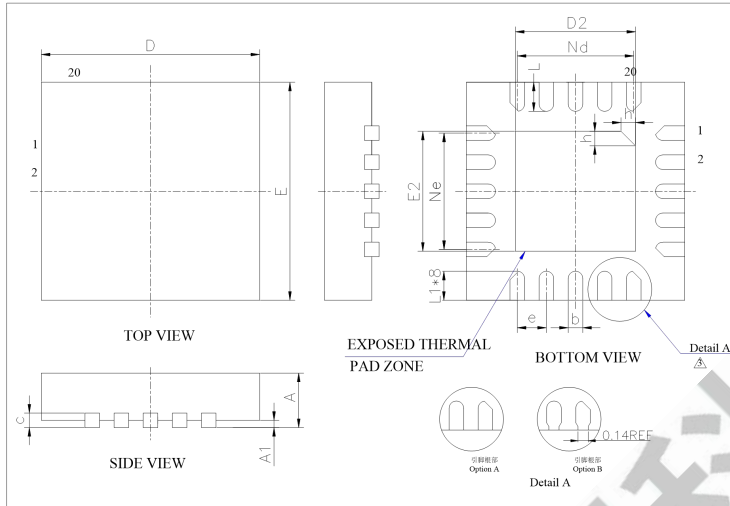
3.5.2 Receiver

Table 3-5-2 Receiver characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Sensitivity	BLE-1Mbps	--	-97	--	dBm
	BLE-2Mbps	--	-94	--	dBm
	BLE-S2	--	-99	--	dBm
	BLE-S8	--	-104	--	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 AW333A Package

5 IC Marking Information

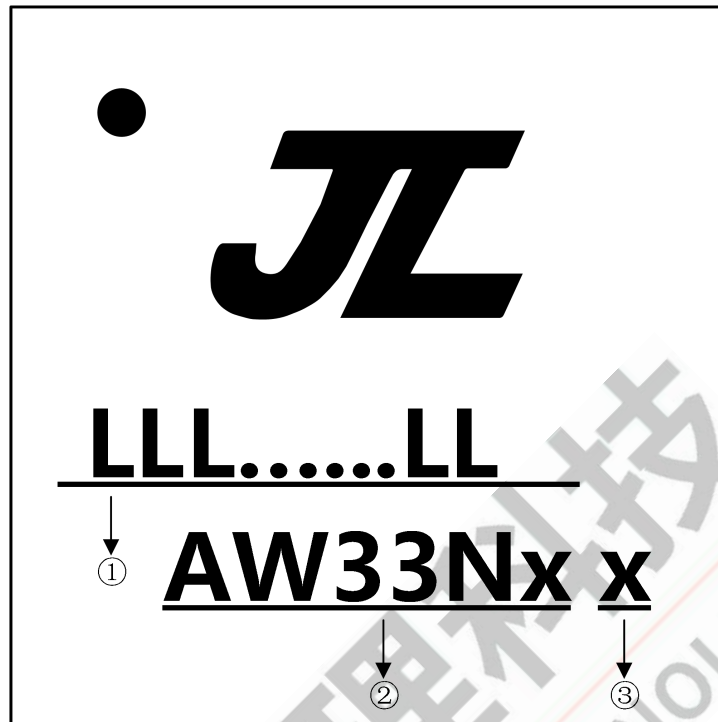


Figure 5-1 AW333A Package Outline

- ① LLL.....LL Production Batch
- ② AW33Nx Chip Model
- ③ x Built-in flash size
2 2Mbit Flash
4 4Mbit Flash

6 Solder-Reflow Condition

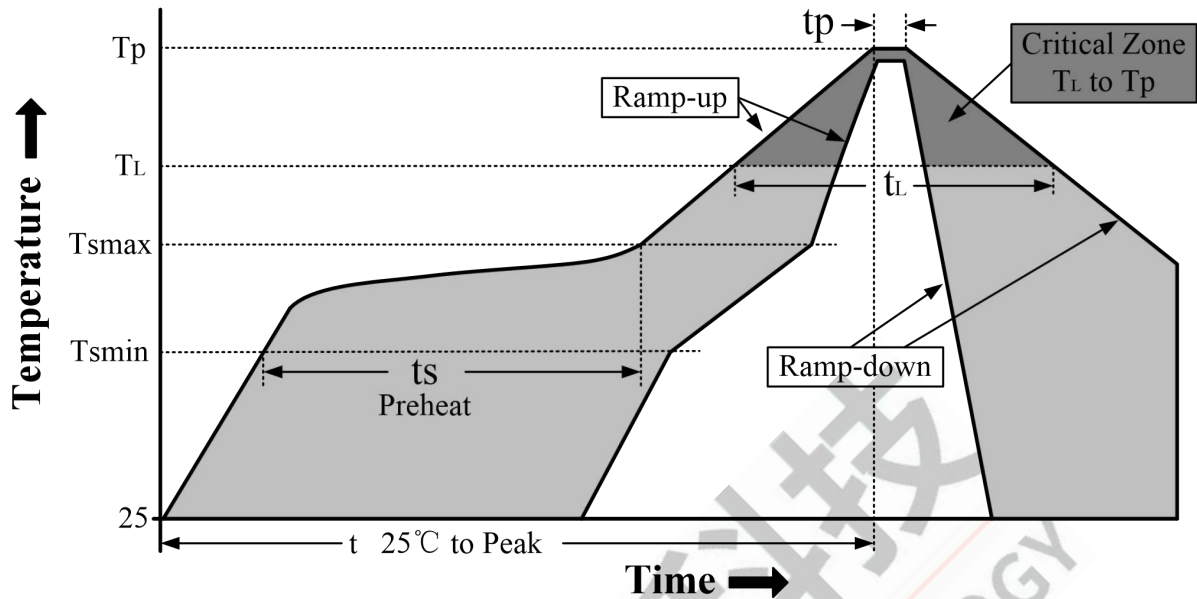


Figure 6-1 Classification Reflow Profile

Table 6-1 Classification Profiles

Profile Feature		Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat/Soak	Temperature Min (T_{smin})	100°C	150°C
	Temperature Max (T_{smax})	150°C	200°C
	Time (t_s) from (T_{smin} to T_{smax})	60-120 seconds	60-180 seconds
Average ramp-up rate (T_{smax} to T_p)		3°C/second max	3°C/second max
Liquidous temperature (T_L)		183°C	217°C
Time (t_L) maintained above T_L		60-150 seconds	60-150 seconds
Peak package body temperature (T_p)		See Table 6-2	See Table 6-3
Time within 5°C of actual Peak Temperature (t_p) ²		10-30 seconds	20-40 seconds
Ramp-down rate (T_p to T_L)		6°C/second max	6°C/second max
Time 25°C 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°C of actual peak temperature (t_p) specified for the reflow profiles is a “supplier” and “user” maximum.

Table 6-2 SnPb Classification Temperature

Package Thickness	Volume mm ³	Volume mm ³
	< 350	≥ 350
<2.5 mm	240 +0/-5°C	225 +0/-5°C
≥2.5 mm	225 +0/-5°C	225 +0/-5°C

Table 6-3 Pb-free - Classification Temperature

Package Thickness	Volume mm ³ < 350	Volume mm ³ 350 - 2000	Volume mm ³ > 2000
< 1.6mm	260°C	260°C	260°C
1.6 mm - 2.5mm	260°C	250°C	245°C
> 2.5mm	250°C	245°C	245°C

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°C.For example 260°C+0°C)at the rated MSL level.