

AW366A Datasheet

Version 1.0

Date 2026.06.08

Revision History

Date	Revision	Description
2026.06.08	V1.0	Initial Release



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AW366A Features

SYSTEM

- 32bit Single-core DSP 192MHz
- On-chip SRAM 240kbyte
- With IEEE754 Single precision FPU
- Support FFT/MATRIX/MATH
- I-cache and D-cache
- Support EMU
- Support MMU
- Support MPU
- Built-In Flash
- 24MHz crystal oscillator
- Internal RC oscillator,PLL

DSP Audio Processing

- JLA/JLA_LW/JLA_LL codec
- PLC for voice processing
- EQ,DRC

Audio

- 1 x 24bit DAC
 - ❖ SNR 122dB
 - ❖ Noise 1uVrms
 - ❖ Support differential mode
 - ❖ Support single mode
 - ❖ Sampling rate 8~384kHz
- 2 x 24bit ADC
 - ❖ SNR 100dB
 - ❖ Sampling rate 8~192kHz
 - ❖ Support analog/digital microphone
- 1 x I²S AUDIO Master/Slave interface
 - ❖ Sampling rate 8~384kHz
 - ❖ Support TX and RX
 - ❖ Support multi-slot mode(TDM)

Bluetooth

- BLE6.0 + 2.4GHz-Proprietary (DN Q332415)
- Support LE audio BIS/CIS
- Maximum transmitting power 10dBm
- Receiver sensitivity
 - ❖ -97dBm @BLE1M

❖ -93dBm @BLE2M

Peripherals

- 1 x Full speed USB
- 4 x Multi-function 32bit timer
- 2 x UART interface
- 1 x I²C Master/Slave interface
- 2 x SPI Master/Slave interface
- 1 x 10bit ADC(12 Channels)
- 4 x LP_Touch with low power wake up
- 17 x GPIO Support function remapping

PMU

- Integrated battery charger up to 225mA
- 1 x Buck DC-DC converter
- Support temperature sensor
- Support VBAT input current OCP
- VPWR range 4.5V to 5.5V
- VBAT range 2.7V to 4.5V
- IOVDD range 2.7V to 3.6V

Packages

- QFN32(4mm*4mm)

Temperature

- Operating temperature
TC = -20℃ to +85℃
- Storage temperature -65℃ to +150℃

Applications

- Wireless microphone

1 Block Diagram

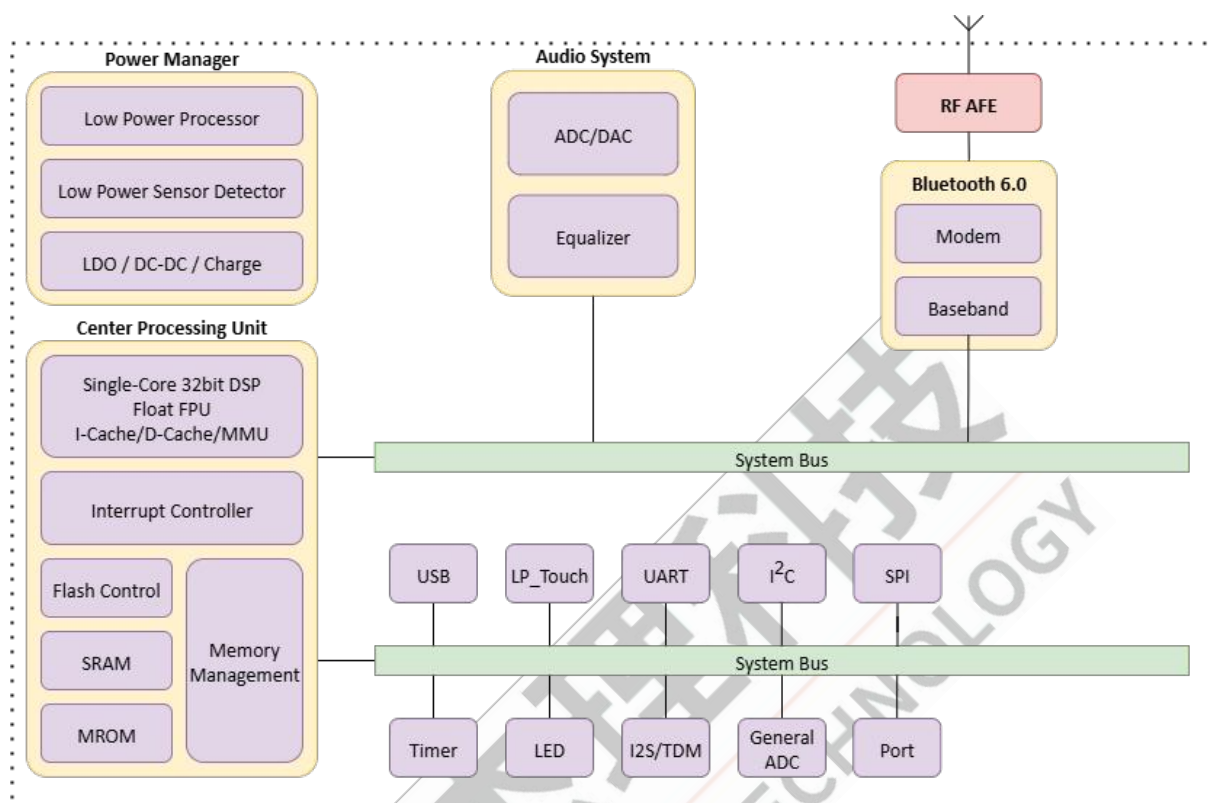


Figure 1-1 AW366A Block Diagram

2 Pin Definition

2.1 Pin Assignment

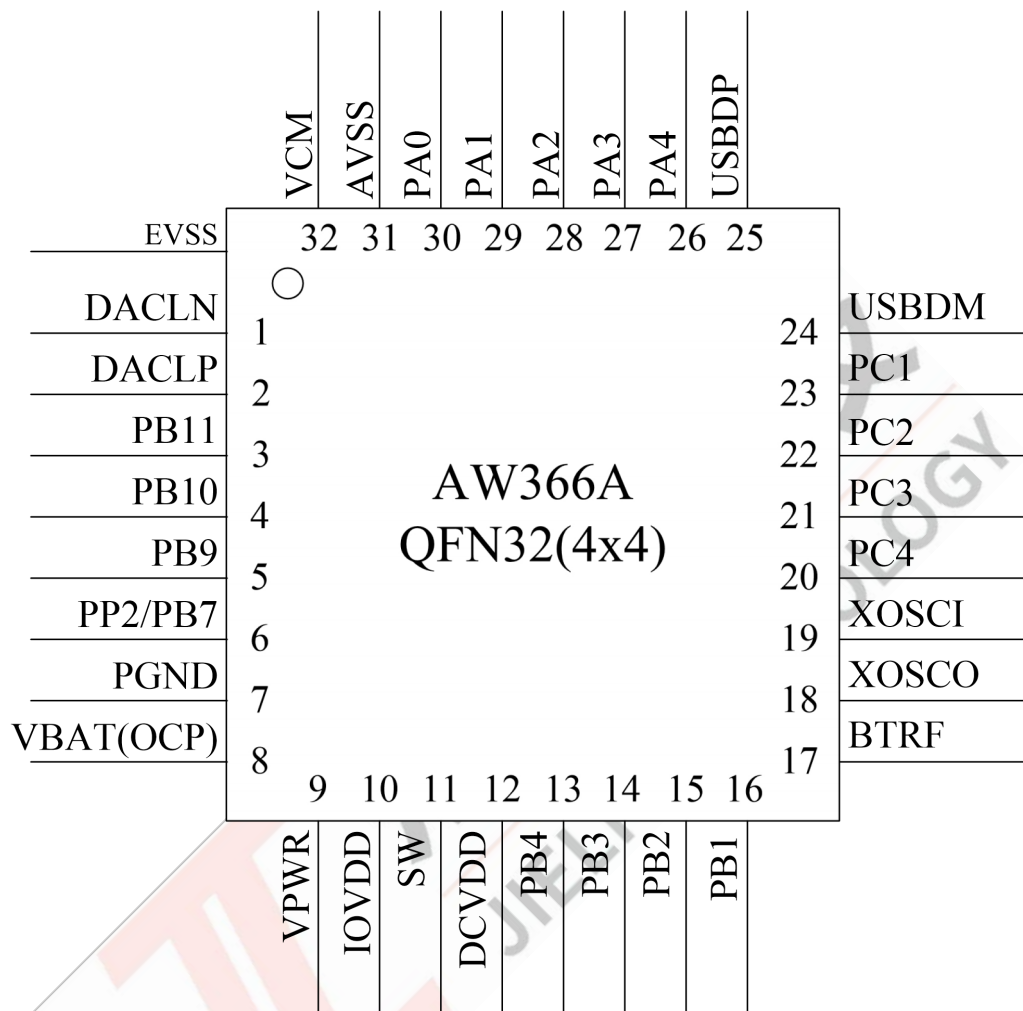


Figure 2-1 AW366A Pin Assignment

2.2 Pin Description

Table 2-2-1 AW366A Pin Description

Pin No.	Name	Type	IO Initial State	Description
1	DACL _N	P	--	Left Channel DAC Negative Output
2	DACL _P	P	--	Left Channel DAC Positive Output
3	PB11	I/O	Z	MICBIAS _B (MIC Bias Output) MIC_B0(MIC Input)
4	PB10	I/O	Z	AIN_B0(Audio ADC Positive Input)
5	PB9	I/O	Z	AIN_BN(Audio ADC Negative Input)
6	PB7	I/O	Z	ADC11(ADC Input Channel 11) LVD(External Low Voltage Detection Input)
	PP2	I/O	Z	SDPG(SD Power) ADC13(ADC Input Channel 13)
7	PGND	G	--	Ground of Buck DC-DC converter
8	VBAT(OCP)	P	--	Battery Input OCP(Over current protection)
9	VPWR	P	--	Charge Power Input
10	IOVDD	P	--	IO Power
11	SW	P	--	Buck DCDC Switch Port
12	DCVDD	P	--	1.25V DCDC Power
13	PB4	I/O	10kΩ Pull-up	Hold down 0 to reset LP_TOUCH5(TOUCH_CH5) ADCP0(ADC Input Channel P0)
14	PB3	I/O	Z	LP_TOUCH4(TOUCH_CH4) ADC10(ADC Input Channel 10)
15	PB2	I/O	10kΩ Pull-up	MCLR(Device Reset) LP_TOUCH3(TOUCH_CH3) ADC9(ADC Input Channel 9)
16	PB1	I/O	Z	LP_TOUCH2(TOUCH_CH2) ADC8(ADC Input Channel 8)
17	BTRF	RF	--	Bluetooth RF Antenna
18	XOSCO	O	--	Crystal Oscillator Output
19	XOSCI	I	--	Crystal Oscillator Input
20	PC4	I/O	Z	ADC3(ADC Input Channel 3)
21	PC3	I/O	Z	ADC2(ADC Input Channel 2)
22	PC2	I/O	Z	ADC1(ADC Input Channel 1)
23	PC1	I/O	Z	ADC0(ADC Input Channel 0)
24	USBDM	I/O	15kΩ Pull-down	USB Negative Data ADC15(ADC Input Channel 15)

Pin No.	Name	Type	IO Initial State	Description
25	USBDP	I/O	15kΩ Pull-down	USB Positive Data ADC14(ADC Input Channel 14)
26	PA4	I/O	Z	ADC5(ADC Input Channel 5)
27	PA3	I/O	Z	AIN_A1(Audio ADC Positive Input) ADC4(ADC Input Channel 4)
28	PA2	I/O	Z	AIN_AN(Audio ADC Negative Input)
29	PA1	I/O	Z	AIN_A0(Audio ADC Positive Input)
30	PA0	I/O	Z	MICBIASA(MIC Bias Output) MIC_A0(MIC Input)
31	AVSS	G	--	Audio Ground
32	VCM	P	--	Audio reference voltage

Note

- 1.IO initial state abbreviations Z--High resistance, H--High level, L--Low level, X--May be changed during power on.
- 2.Timer, MCPWM, UART, LEDC, I²C, I²S, 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

2.3 Pin Specialist

Table 2-3 Pin keep Description

Pin	Description for IOVDD power off mode
PC1	Support driving and sampling external 100kΩ NTC resistance in single IO
PB4	10kΩ Pull-up and Hold down 0 to reset function can be disable by efuse in IO Initial State

3 Electrical Characteristics

3.1 Absolute Maximum Ratings

Table 3-1 Absolute Maximum Ratings

Symbol	Parameter	Min	Max	Unit
T _{opt}	Operating temperature	-20	+85	°C
T _{stg}	Storage temperature	-65	+150	°C
VBAT	Supply Voltage	-0.3	4.5	V
VPWR		-0.3	6	V
IOVDD		-0.3	3.6	V
DCVDD		-0.3	1.55	V
GPIO	Input voltage of GPIO	-0.3	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	±300V	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 PMU Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
VBAT	Power supply	--	2.7	3.7	4.5	V
VPWR	Power supply	--	4.5	5.0	5.5	V
Operating mode						
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
IOVDD	Voltage output	--	--	3	--	V
	Loading current	IOVDD=3.0V@VBAT = 3.7V or VPWR=5V	--	--	120	mA
DCVDD	Voltage output	--	--	1.25	--	V
	Loading current	DCVDD=1.25V@IOVDD=3.0V in LDO mode	--	--	120	mA
		DCVDD=1.25V@VBAT=3.7V in DCDC mode	--	--	120	mA
Low Power mode						

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
IOVDD	Loading current	IOVDD=3.0V@VBAT = 3.7V or VPWR=5V	--	--	10	mA

3.4 Battery Charge

Table 3-4 Charger Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
VPWR	Charge Input Voltage	4.5	5	5.5	V
CV	CV Mode Voltage Accuracy	4.175	4.2	4.225	V
		4.375	4.4	4.425	V
		4.475	4.5	4.525	V
CC	CC Mode Current	30	--	225	mA
I _{end}	End Of Charge Current	3	--	22.5	mA
V _{Trickl}	Trickle Charge Voltage	--	3	--	V

3.5 IO Characteristics

Table 3-5 IO Characteristics

Input Characteristics						
Symbol	Parameter	Conditions	IO	Min	Max	Unit
V _{IL}	Low-Level Input Voltage	IOVDD = 3.0V	PA0~PA4 PB1~PB4,PB7,PB9~PB11 PC1~PC4 PP2 VPWR USBDP USBDM	-0.3	1.3	V
V _{IH}	High-Level Input Voltage	IOVDD = 3.0V	PA0~PA4 PB1~PB4,PB7,PB9~PB11 PC1~PC4 PP2 USBDP USBDM	1.7	3.3	V
		IOVDD = 3.0V	VPWR	1.7	5.5	V
Output Characteristics						
Symbol	Parameter	Conditions	IO	Typ		Unit
I _{OL}	Output Current	IOVDD = 3.0V Voutput = 0.3V	PA0~PA4 PB1~PB4,PB7,PB9~PB11 PC1~PC4	1(HD=0) 4(HD=1) 8(HD=2) 31(HD=3)		mA
		IOVDD = 3.0V Voutput = 0.3V	USBDP USBDM	8		mA

		IOPP2VDD = 3.0V Voutput = 0.3V	PP2	30(HD=0) 120(HD=1)	mA
		IOVDD = 3.0V Voutput = 0.3V	VPWR	2	mA
I _{OH}	Output Current	IOVDD = 3.0V Voutput = 2.7V	PA0~PA4 PB1~PB4,PB7,PB9~PB11 PC1~PC4	1(HD=0) 4(HD=1) 8(HD=2) 31(HD=3)	mA
		IOVDD = 3.0V Voutput = 2.7V	USBDP USBDM	8	mA
		IOVDD = 3.0V Voutput = 2.7V	PP2	30(HD=0) 120(HD=1)	mA
		IOVDD = 3.0V Voutput = 2.7V	VPWR	2	mA
Internal Resistance Characteristics					
Symbol	Parameter	Conditions	IO	Typ	Unit
R _{pu}	Pull-up Resistance	IOVDD = 3.0V	PA0~PA4 PB1~PB4,PB7,PB9~PB11 PC1~PC4 PP2 VPWR	10k(PU=1) 200k(PU=2) 1M(PU=3)	Ω
		IOVDD = 3.0V	USBDP	1.5k 10k(PU=1) 200k(PU=2) 1M(PU=3)	Ω
		IOVDD = 3.0V	USBDM	180k 10k(PU=1) 200k(PU=2) 1M(PU=3)	Ω
R _{pd}	Pull-down Resistance	IOVDD = 3.0V	PA0~PA4 PB1~PB4,PB7,PB9~PB11 PC1~PC4 PP2 VPWR	10k(PD=1) 200k(PD=2) 1M(PD=3)	Ω
		IOVDD = 3.0V	USBDP USBDM	15k 10k(PU=1) 200k(PU=2) 1M(PU=3)	Ω

Note

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

3.6 Audio DAC Characteristics

Table 3-6 DAC Characteristics

Parameter	Conditions		Min	Typ	Max	Unit
Resolution	--		--	24	--	bits
Input Sample Rate	--		8	--	384	kHz
SNR ^①	Differential Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted	Load=16Ω	--	122	--	dB
	Single-ended Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted	Load=16Ω	--	114	--	dB
Dynamic Range	Differential Mode Fin=1kHz@-60dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted	Load=16Ω	--	109	--	dB
	Single-ended Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted	Load=16Ω	--	96	--	dB
THD+N	Differential Mode Fin=1kHz@-0.5dBFS* Fs=44.1kHz B/W=20Hz~20kHz A-Weighted	Load=32Ω	--	-80	--	dB
	Single-ended Mode Fin=1kHz@-0.5dBFS* Fs=44.1kHz B/W=20Hz~20kHz A-Weighted	Load=32Ω	--	-56	--	dB
Noise Floor	Differential Mode Fs=44.1kHz B/W=20Hz~20kHz A-Weighted	Load=16Ω	--	4.5	--	uVrms
	Single-ended Mode Fs=44.1kHz B/W=20Hz~20kHz A-Weighted	Load=16Ω	--	9	--	uVrms
Noise Floor with MUTE	Differential Mode Fs=44.1kHz B/W=20Hz~20kHz A-Weighted	Load=16Ω	--	1	--	uVrms
	Single-ended Mode Fs=44.1kHz B/W=20Hz~20kHz A-Weighted	Load=16Ω	--	1	--	uVrms

Max Output Power	Differential Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted THD+N<1%	Load=16Ω	--	100	--	mW
	Single-ended Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted THD+N<1%	Load=16Ω	--	20	--	mW

Note

- ① SNR is the ratio of output level with a 1kHz full-scale input to output level with MUTE on.

3.7 Audio ADC Characteristics

Table 3-7 Audio ADC Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Resolution	--	--	24	--	bits
Output Sample Rate	--	8	--	192	kHz
SNR	Differential input Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted ADC gain=0dB	--	100	--	dB
	Single-ended input Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted ADC gain=0dB	--	99	--	dB
Dynamic Range	Differential input Mode Fin=1kHz@-60dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted ADC gain=0dB	--	100	--	dB
	Single-ended input Mode Fin=1kHz@-60dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted ADC gain=0dB	--	99	--	dB
THD+N	Differential input Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted ADC gain=0dB	--	-90	--	dB
	Single-ended input Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted ADC gain=0dB	--	-88	--	dB
Analogue Gain	--	-6	--	27	dB
Max Input Level	Differential input Mode ADC gain=0dB	--	0.56	--	Vrms
	Single-ended input Mode ADC gain=0dB	--	0.28	--	Vrms

3.8 BT Characteristics

3.8.1 Transmitter

Table 3-8-1 Transmitter characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Maximum RF Transmit Power	BLE-1Mbps/2Mbps	--	10	--	dBm
1 σ of Maximum RF Transmit Power distribution	BLE	--	2	--	dB

3.8.2 Receiver

Table 3-8-2 Receiver characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Sensitivity	BLE-1Mbps	--	-97	--	dBm
	BLE-2Mbps	--	-93	--	dBm
1 σ of sensitivity distribution	BLE	--	2	--	dB

4 Package Information

4.1 QFN32_4×4mm

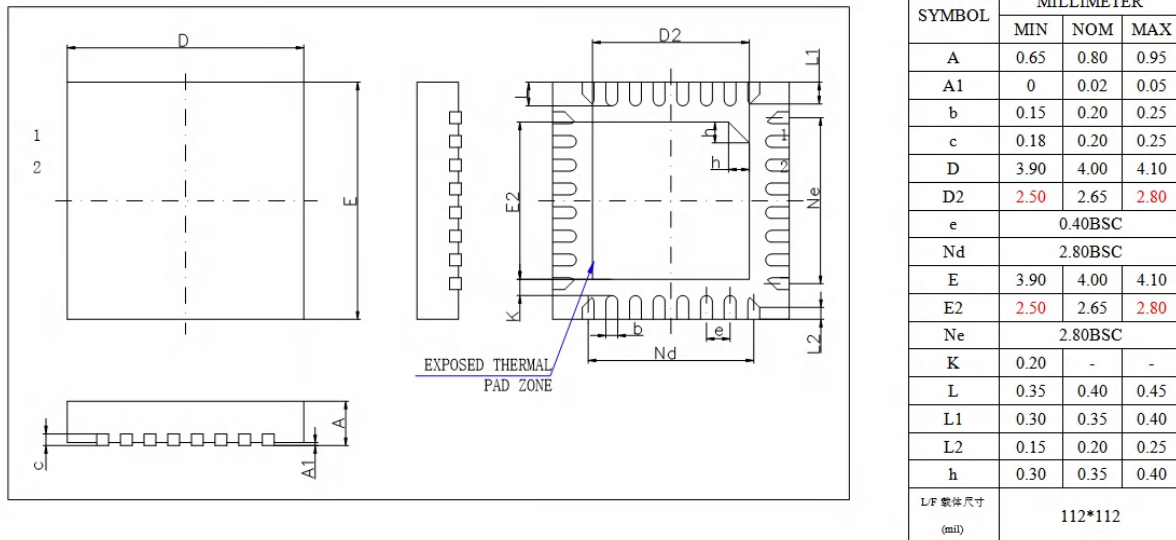


Figure 4-1 AW366A Package

5 IC Marking Information

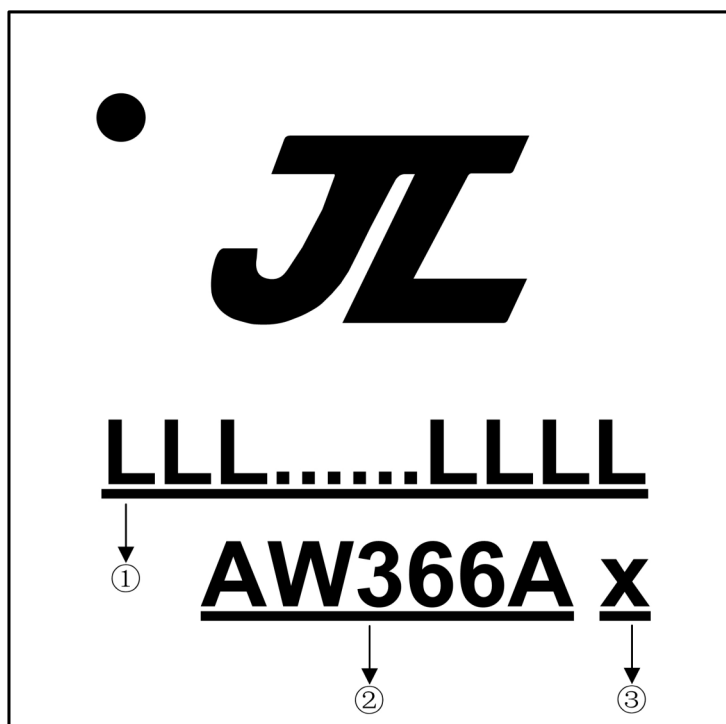


Figure 5-1 AW366A Package Outline

- ① LLL.....LLLL Production Batch
- ② AW366A Chip Model
- ③ x Built-in flash size
 - 4 4Mbit Flash
 - 8 8Mbit Flash
 - 6 16Mbit Flash

6 Solder-Reflow Condition

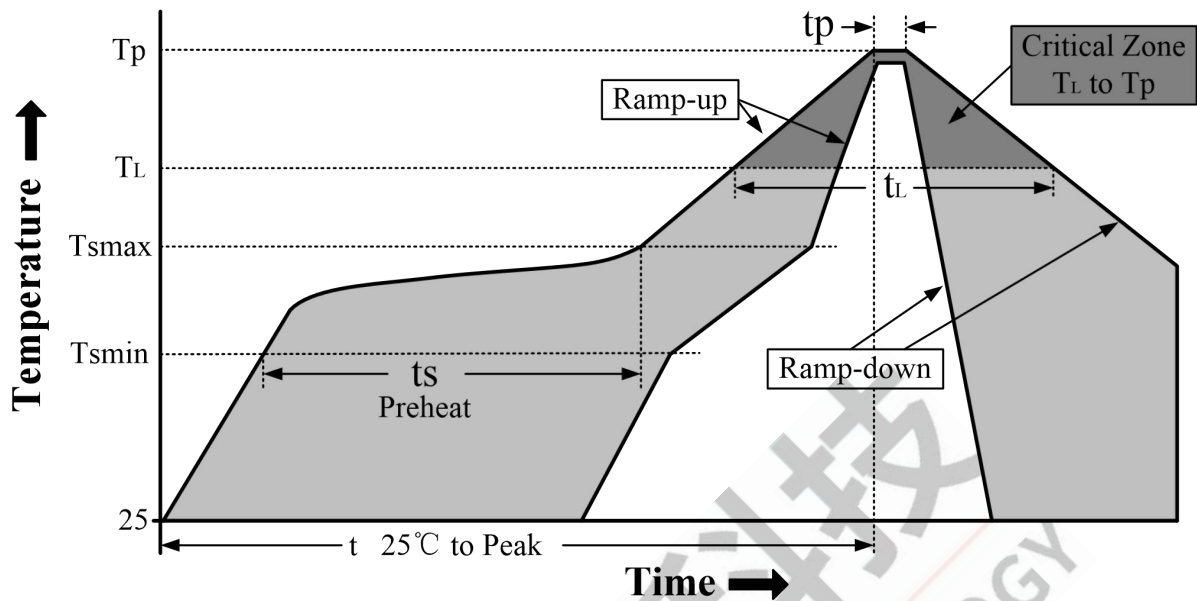


Figure 6-1 Classification Reflow Profile

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 < 350	Volume mm ³ ≥ 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.