AW313A Datasheet

Zhuhai Jieli Technology Co.,LTD

Version 1.1

Date 2024.07.08

Revision History

Date	Revision	Description
2024.04.12	V1.0	Initial Release
2024.07.08	V1.1	Update Pin Assignment Update Package Information Update IC Marking Information

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

- QFN20L(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

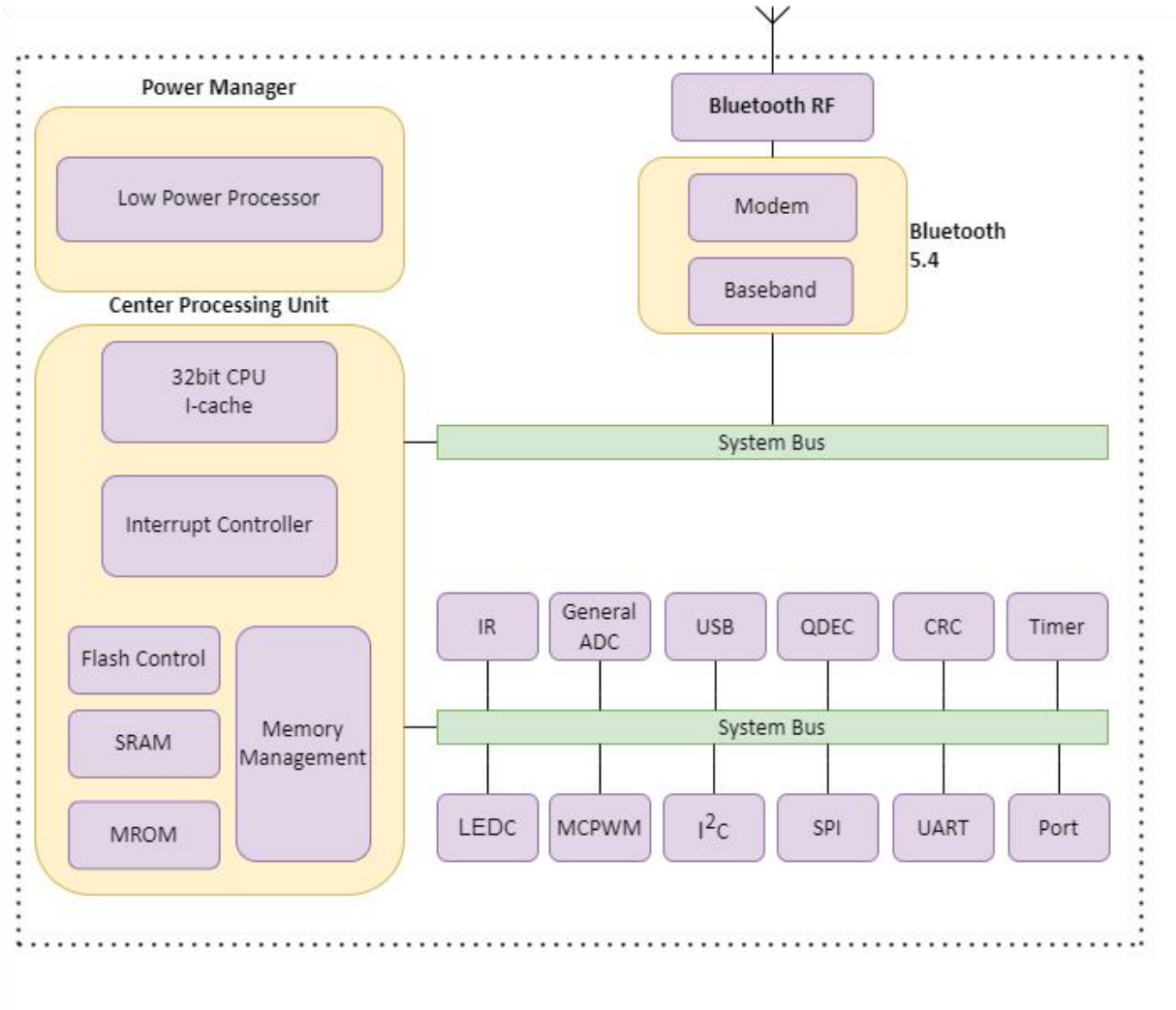


Figure 1-1 AW313A Block Diagram

2 Pin Definition

2.1 Pin Assignment

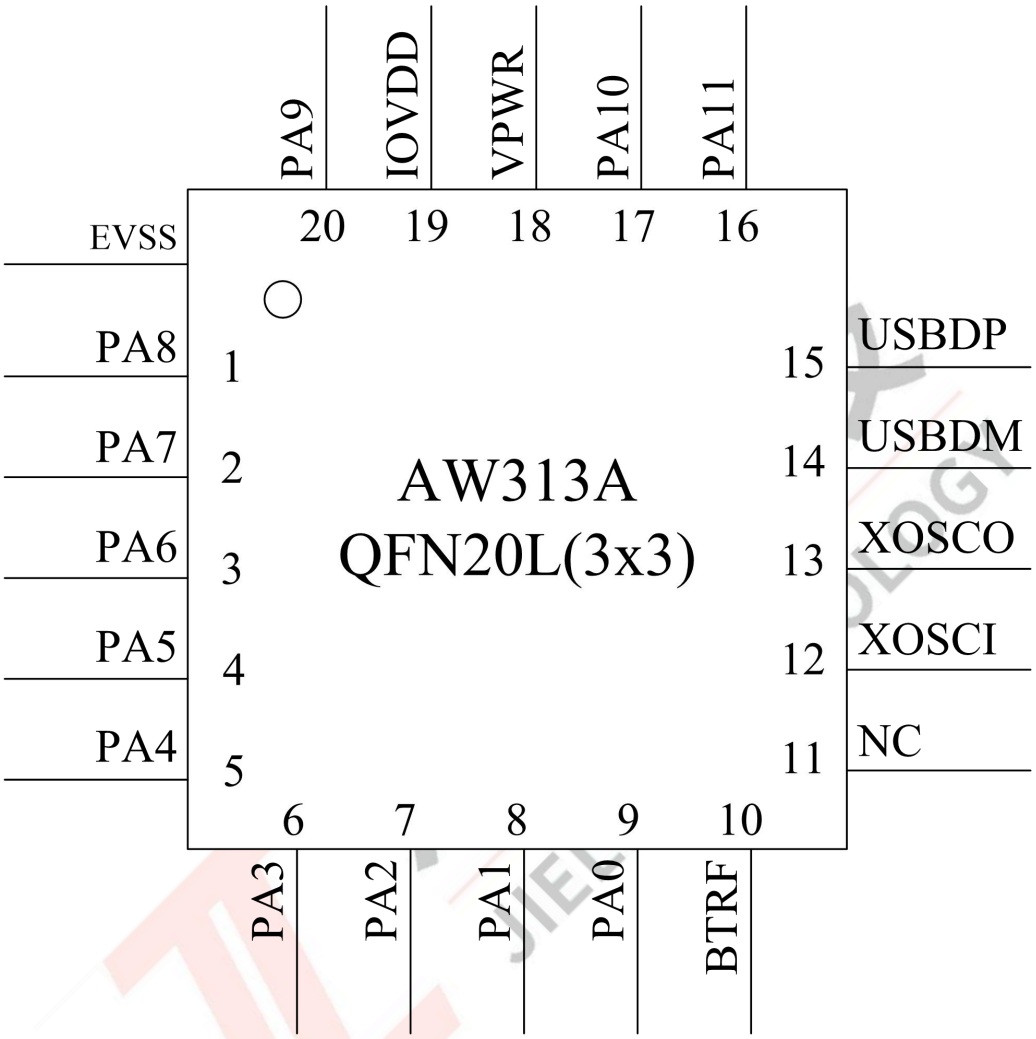


Figure 2-1 AW313A Pin Assignment

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	NC	--	--	No Connection
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

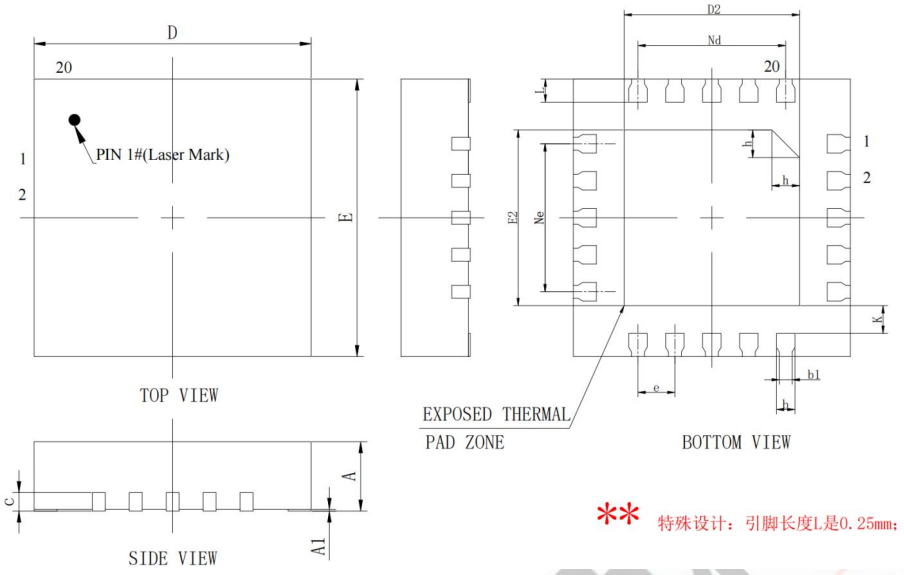
3.5.2 Receiver

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 QFN20L_3×3mm



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0	0.02	0.05
b	0.15	0.20	0.25
b1		0.14REF	
c		0.203REF	
D	2.90	3.00	3.10
D2	1.80	1.90	2.00
e		0.40BSC	
Ne		1.60BSC	
Nd		1.60BSC	
E	2.90	3.00	3.10
E2	1.80	1.90	2.00
L	0.20	0.25	0.30
h	0.25	0.30	0.35
K		0.30REF	

Figure 4-1 AW313A Package

5 IC Marking Information

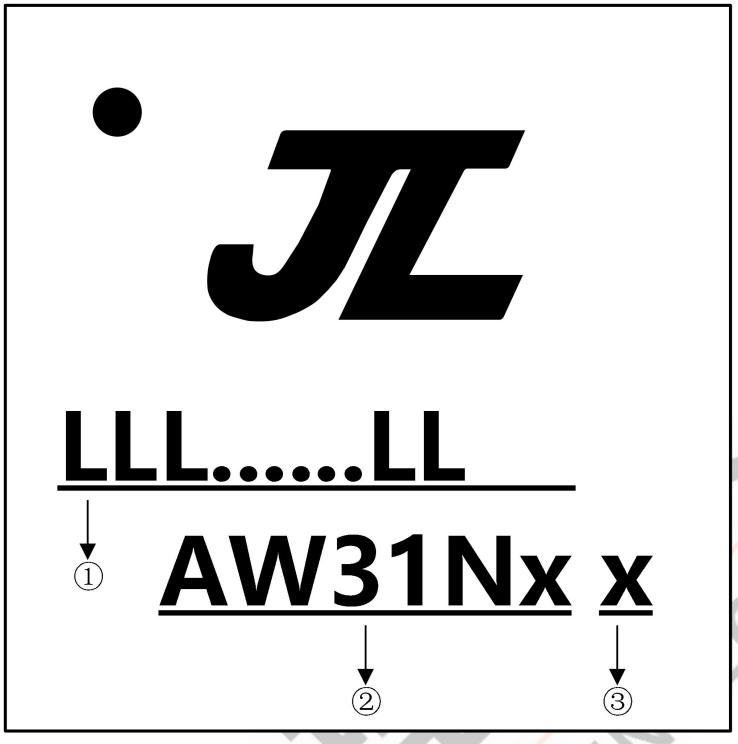


Figure 5-1 AW313A Package Outline

① LLL.....LL LOT No. , It contains 7 to 18 alphanumerics
② AW31Nx Chip Model
③ x Built-in flash size
0 No Flash Memory
2 2Mbit Flash
4 4Mbit Flash

6 Solder-Reflow Condition

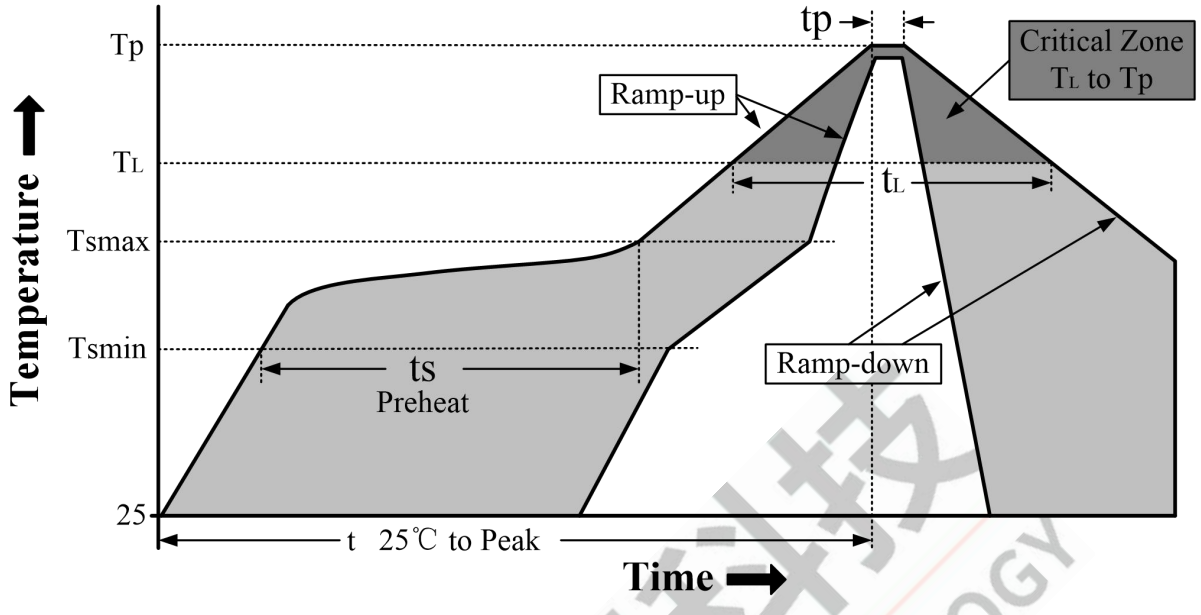


Figure 6-1 Classification Reflow Profile

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 mm^3 < 350	Volume mm^3 ≥ 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.