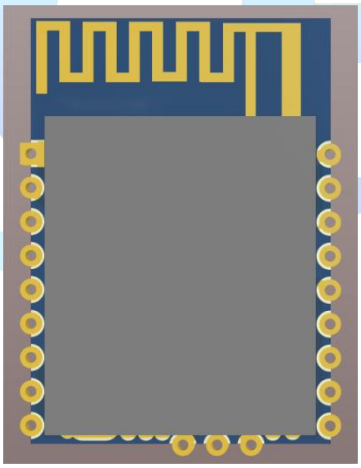
ZX8258



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Version number: V1.0

Hangzhou zhexin communication technology co., ltd

About this manual

The Specification for ZX8258 Series Modules provides an introduction to the basic functions of ZX8258 Series Modules, including the electrical specifications, RF performance, pin size and reference schematic design of the modules. Readers can refer to this document to have a detailed understanding of the overall functional parameters of the module.

Revise history

Version information management

version number	time	update record	bookmaker
V1.0	2019.02.15	Initial version	
V1.1	2020.03.12	Overview, specification, pin description, reference design	
V1.2	2020.02.14	Add power consumption information and change some drawings	
V1.3	2020.07.24	Modify size information and add packaging information.	
V1.4	2020.09.01	Update document format	
V1.5	2021.08.20	Update BUG	
V1.6	2021.11.22	Update parameters	
V1.7	2023.09.19	Add product classification and modify some drawings.	

1.summary

ZX8258 series is a low-power Bluetooth transparent transmission module launched by Hangzhou Zhexin Communication Technology Co., Ltd.. Provide multiple sets of basic firmware, users can realize multiple functions with simple configuration, and support customers' secondary development.

ZX8258 series has built-in 512K Flash, which supports upgrading of BLE (Up to Bluetooth 5.3), BLE MESH, Zigbee3.0, 2.4G Proprietary and OTA, and is flexible to use.

Our company has been deeply involved in the Bluetooth field for many years, and has a strong R&D strength. We can realize various application functions on ZX8258 series modules according to customers' needs, provide software and hardware R&D support, and assist customers in the smooth transition from R&D to mass production. For details, please visit our company in official website.www.zchip.net.cn或联系销售.

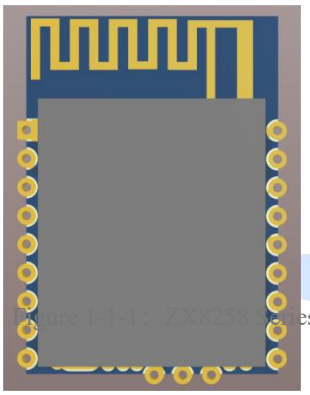


Figure 1-1-1：ZX8258 Series Module

1.1. Functional characteristics

- Built-in high-performance 32-bit MCU, 512KB Flash, 32/48/64KB SRAM.
- It conforms to the Bluetooth 5. 3 standard. It has twice the data transmission rate, four times the transmission distance (LR) and eight times the broadcast packet extension (AE)
- to realize indoor positioning function of Bluetooth 5.1. Up to 8 external antennas can be
- used to improve indoor positioning accuracy, which can reach centimeter-level transmission power: +10dBm at most.
- receiving sensitivity
  - -96dBm@BLE 1Mbps
  - -93dBm@ BLE 2Mbps mode
  - -99dBm@ BLE 500kbps mode
  - -101dBm@ BLE 125kbps mode
- supports UART interface.
- Support AT instruction
- Support APP parameter configuration
- On-board high-performance PCB antenna,
- and support external antenna stamp hole pin, welding is easy and reliable.

Ultra small package: 11x16mm

Working temperature: -40℃~+85℃

Note: ZX8258 series modules only need to connect VCC, GND, TX and RX to complete the data transmission function, and also support the use of AT instructions to modify the default name and other related parameters (see the ZX8258 series module software design technical manual for details).

1.2. application area

Personal equipment:

Wearable, mouse and keyboard, remote control toys; Retail logistics:

Electronic shelf label, cold chain transportation; Smart home:

Lighting, sensors, smart locks, remote controllers, lawn mowers, voice control, smart printers, lifting tables and chairs; Industrial control:

Special printer, medical equipment;

1.3. product classification

order number	material code	main feature
one	WLT8258	Certified by BQB, SRRC, FCC and CE, firmware with AT instruction.
2	WLT8258M	Passed the certification of BQB, SRRC, FCC and CE, and the blank film does not have software.
three	WLT8258-A	It has passed the certification of BQB, SRRC, FCC and CE, and the blank film does not have software, which supports the development of Zigbee protocol gateway.
four	ZX8258	Comply with BQB,SRRC,FCC,CE certification (certification upgrade, certification certificate has not been instructed), firmware with AT instruction.
five	ZX8258M	Conform to BQB, SRRC, FCC and CE certification (certification upgrade, certification certificate has not been instructed),

2. Electrical specification

Table 2-1: Maximum Rated Parameters

Item	Symbol	Min	Max	Unit
supply voltage	VDD	-0.3	3.6	V
Pin input voltage	Vin	-0.3	VDD+0.3	V
Pin output voltage	Vout	0	VDD	V
Storage temperature	Tstr	-65	150	ºC
welding temperature	Tsld	-	260	ºC

note:

1. The listed electrical characteristics are target specifications and are for reference only. Some data may be updated according to the actual test results.
2. The voltage values shown are based on GND in the module. Any voltage exceeding the "maximum rating" may cause permanent damage to the equipment.

Table 2-2: Recommended Operating Conditions

Item	Symbol	Min	Typ.	Max	Unit
supply voltage	VDD	1.8	3.3	3.6	V
Supply voltage rise time (from 1.6V to 2.8V)	TR	-	-	10	ms
operating temperature range	Topr	-40	-	eighty-five	ºC

Table 2-3: Operating Current (VDD=3.3V, T=25°C)

Item	Sym.	Min	Typ.	Max	Unit	Condition
RX current	IRx	-	5.3	-	mA	Whole Module Working
TX current	ITx	-	4.8	-	mA	Whole Module Working @0 dBm With DCDC enable
Sleep mode		-	1.2	-	uA	

Table 2-4: Broadcast Current (VDD= 3.3v, T=25°C,10dBm)

Broadcast interval	100ms	200ms	300ms	1s	2s	Unit
1 channel	147	74	31	16	nine	uA
3 channels	266	98	54	28	18	uA

Table 2-5: Connection Current (VDD= 3.3v, T=25°C,10dBm)

Interval	20ms	50ms	100ms	200ms	500ms	Unit
electric current	643	263	134	sixty-eight	43	uA

Table 2-6: N-pin input/output characteristics (VDD=3.3V, T=25°C)

Item	Sym.	Min	Typ.	Max	Unit	Condition
Input high level	VIH	0.7VDD	-	VDD	V	
Input low level	VIL	VSS	-	0.3VDD	V	
Output high level	VOH	0.9VDD	-	VDD	V	
Output low level	VOL	VSS	-	0.1VDD	V	

Table 2-7: RF Performance Parameters

Item	Sym.	Min	Typ.	Max	Unit	Condition
frequency range	Freq.	2380	-		MHz	1MHz programmable frequency interval
data rate	BLE/2.4G Proprietary 1Mbps, ±250kHz deviation BLE/2.4G Proprietary 2Mbps, ±500kHz deviation BLE 125kbps, ±250kHz deviation BLE 500kbps, ±250kHz deviation					

3.Bluetooth specification

Table 3-1 3-1： BLE 1Mbps RF_Rx performance (±250kHz deviation)

Item	Sym.	Min	Typ.	Max	Unit	Condition
sensitivity	1Mbps	-	-96	-	dBm	
Frequency offset error	-	-250	-	+300	KHz	
Co-frequency suppression	-	-	-11	-	dB	Received signal strength -67dBm
Mirror image suppression	-	-	37	-	dB	Received signal strength -67dBm
In-band blocking suppression (modulation interference)	±1 MHz offset	-	1/3	-	dB	Received signal strength -67dBm
	±2 MHz offset	-	37/39	-	dB	
	>=3 MHz offset	-	forty-two	-	dB	

Table 3-2: BLE 1 Mbps RF _ TX

Item	Sym.	Min.	Typ.	Max.	Unit	Condition
Maximum output power	-	-	10	-	dBm	
Minimum output power	-	-	-45	-	dBm	
Programmable power output range	-	55	55	55	dBm	
20dB modulation bandwidth	-	-	2.5	-	MHz	

Table 3-3: BLE 2 Mbps RF _ Rx performance (±500kHz deviation)

Item	Sym.	Min.	Typ.	Max.	Unit	Condition
sensitivity	2Mbps	-	-93	-	dBm	
Frequency offset error	-	-300	-	+200	KHz	
Co-frequency suppression	-	-	-10	-	dB	Received signal strength -67dBm
Mirror image suppression	-	-	25	-	dB	Received signal strength -67dBm
In-band blocking suppression (modulation interference)	±2 MHz offset	-	6/6	-	dB	Received signal strength -67dBm
	±4 MHz offset	-	39/38	-	dB	
	>=4 MHz offset	-	forty-two	-	dB	

Table 3-4: BLE 2 Mbps RF _ TX Performance

Item	Sym.	Min.	Typ.	Max.	Unit	Condition
Maximum output power	-	-	10	-	dBm	
Minimum output power	-	-	-45	-	dBm	
Programmable power output range	-	55	55	55	dB	
20dB modulation bandwidth	-		1.4	-	MHz	

Table 3-5: BLE 500 kbps RF _ Rx performance (±250kHz deviation)

Item	Sym.	Min.	Typ.	Max.	Unit	Condition
sensitivity	500kbps	-	-99	-	dBm	
Frequency offset error	-	-150	-	+50	KHz	
Co-frequency suppression	-	-	-1	-	dB	Received signal strength -67dBm
Mirror image suppression	-	-	forty-two	-	dB	Received signal strength -67dBm
In-band blocking suppression (modulation interference)	±1 MHz offset	-	34/36	-	dB	Received signal strength -67dBm
	±2 MHz offset	-	42/42	-	dB	
	>=3 MHz offset	-	forty-two	-	dB	

Table 3-6: BLE 500 kbps RF _ TX Performance

Item	Sym.	Min.	Typ.	Max.	Unit	Condition
Maximum output power	-	-	10	-	dBm	
Minimum output power	-	-	-45	-	dBm	
Programmable power output range	-	55	55	55	dB	
20dB modulation bandwidth	-	-	2.5	-	MHz	

Table 3-7: BLE 125 kbps RF _ Rx performance (±250kHz deviation)

Item	Sym.	Min.	Typ.	Max.	Unit	Condition
sensitivity	125kbps	-	-101	-	dBm	
Frequency offset error	-	-150	-	+50	KHz	
Co-frequency suppression	-	-	-3	-	dB	Received signal strength -67dBm
Mirror image suppression	-	-	forty-two	-	dB	Received signal strength -67dBm
In-band blocking suppression (modulation interference)	±1 MHz offset	-	32/34	-	dB	Received signal strength -67dBm
	±2 MHz offset	-	42/42	-	dB	
	>=3 MHz offset	-	forty-two	-	dB	

Table 3-8: BLE 125 kbps RF _ TX

Item	Sym.	Min.	Typ.	Max.	Unit	Condition
Maximum output power	-	-	10	-	dBm	
Minimum output power	-	-	-45	-	dBm	
Programmable power output range	-	55	55	55	dB	
20dB modulation bandwidth	-	-	2.5	-	MHz	

4.Pin description

4.1. Pin distribution

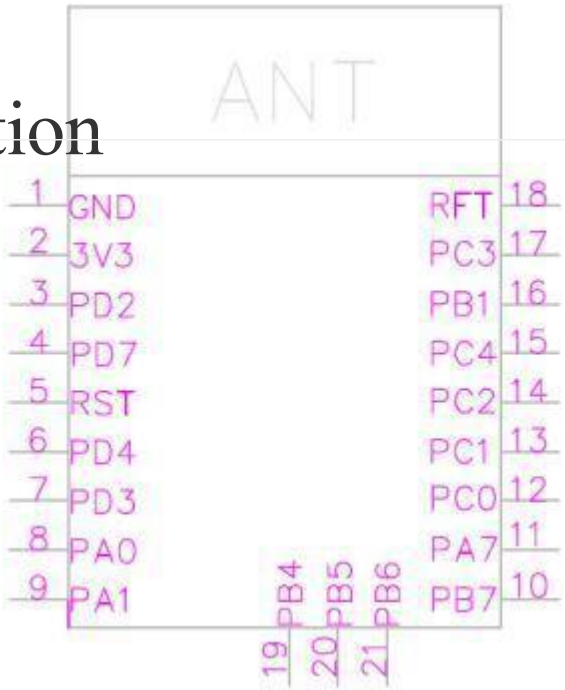


Figure 4-1: Module Pin Diagram

Note: Figure 4-1 Pin function can be redefined through pin reuse.

4.2. Schematic diagram of connection

The module supports UART port for communication, and transmits and receives data through TX and RX. And support hardware RTS and CTS flow control functions.

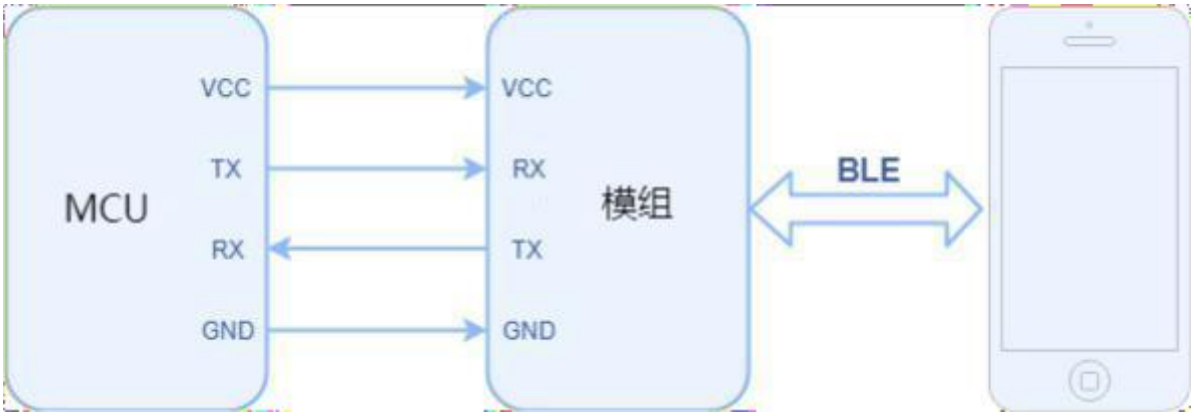


Figure 4-2: UART communication

4.3. Pin definition

PIN #	Pin name	type	describe
one	GND	POWER	Modularly
2	3V3	POWER	3.3V power supply
three	PD<2>	Digital I/O	SPI_CN/I2S_LR/PWM3/PD<2>
four	PD<7>	Digital I/O	SPI_CK/I2S_BCK/7816_TRX/PD<7>
five	RST	RESET	Power on reset, active low
six	PD<4>	Digital I/O	SWM/I2S_SDO/PWM2_N/PD<4>
seven	PD<3>	Digital I/O	PWM1_N/I2S_SDI/7816_TRX/PD<3>
eight	PA<0>	Digital I/O	DMIC_DI/PWM0_N/UART_RX/PA<0>
nine	PA<1>	Digital I/O	DMIC_CLK/7816_CLK/I2S_CLK/PA<1>
10	PB<7>	Digital I/O	SDM_N1/SPI_DO/UART_RX/lc_comp_ain<7>/sar_aio<7>/PB<7>
11	PA<7>	Digital I/O	SWS/UART_RTS/PA<7>
twelve	PC<0>	Digital I/O	I2C_SDA/PWM4_N/UART_RTS/PGA_P0/PC<0>
13	PC<1>	Digital I/O	I2C_SCK/PWM1_N/PWM0/PGA_N0/PC<1>
14	PC<2>	Digital I/O	PWM0/7816_TRX/I2C_SDA/XC32K_O/PGA_P1/PC<2>
15	PC<4>	Digital I/O	PWM2/UART_CTS/PWM0_N/sar_aio<8>/BIAS/PC<4>
16	PB<1>	Digital I/O	PWM4/UART_TX/ATSEL2/lc_comp_ain<1>/sar_aio<1>/PB<1>
17	PC<3>	Digital I/O	PWM1/UART_RX/I2C_SCK/XC32K_I/PGA_N1/PC<3>
18	RFT	ANALOG	External RF antenna terminal
19	PB<4>	Digital I/O	SDM_P0/PWM4/lc_comp_ain<4>/sar_aio<4>/PB<4>
twenty	PB<5>	Digital I/O	SDM_N0/PWM5/lc_comp_ain<5>/sar_aio<5>/PB<5>
21	PB<6>	Digital I/O	SDM_P1/SPI_DI/UART_RTS/lc_comp_ain<6>/sar_aio<6>/PB<6>

Note: All digital IO can be used as GPIO with configurable pull-up/pull-down resistors.

5.reference design

5.1.Reference schematic diagram

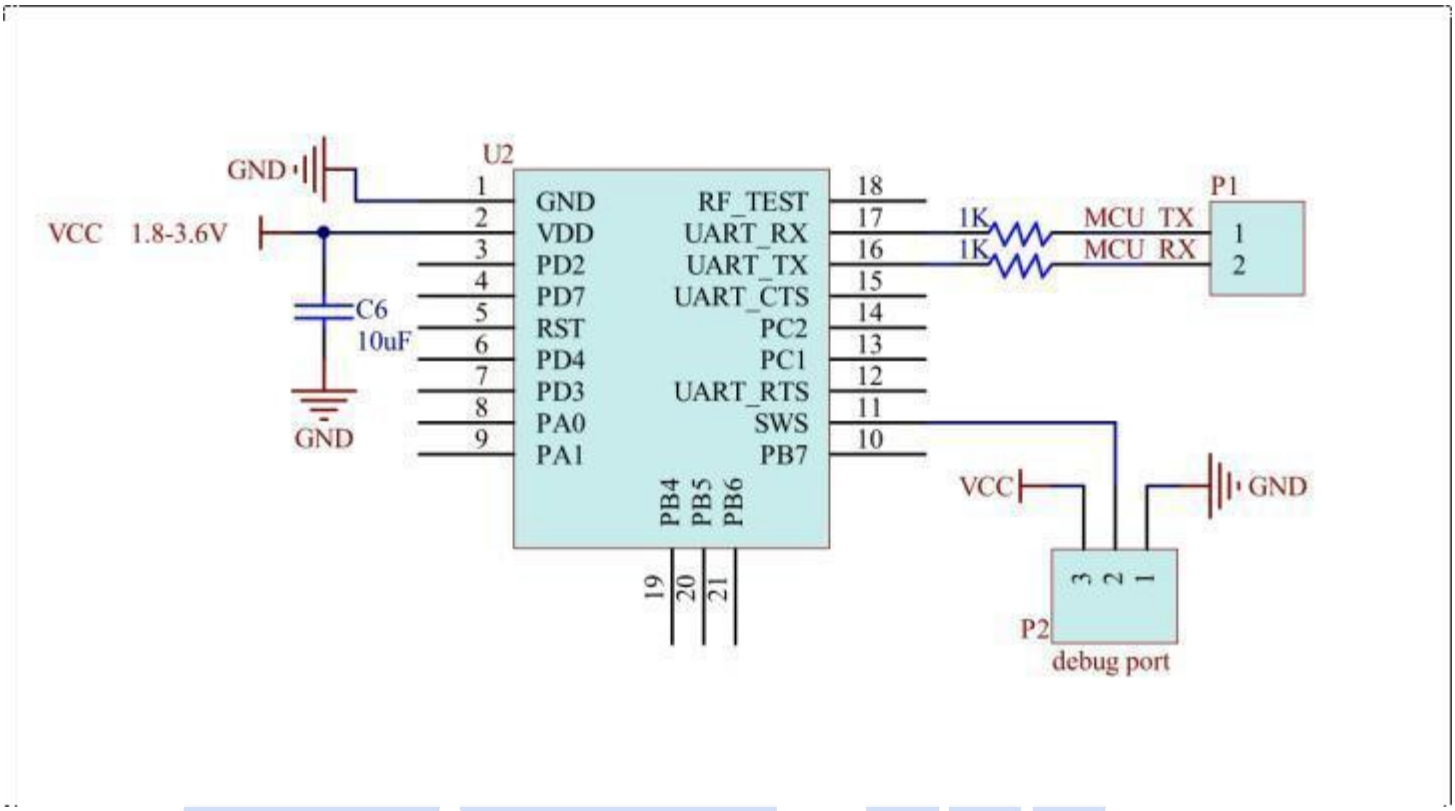


Figure 5- 1: Reference

5.2. Module outline size

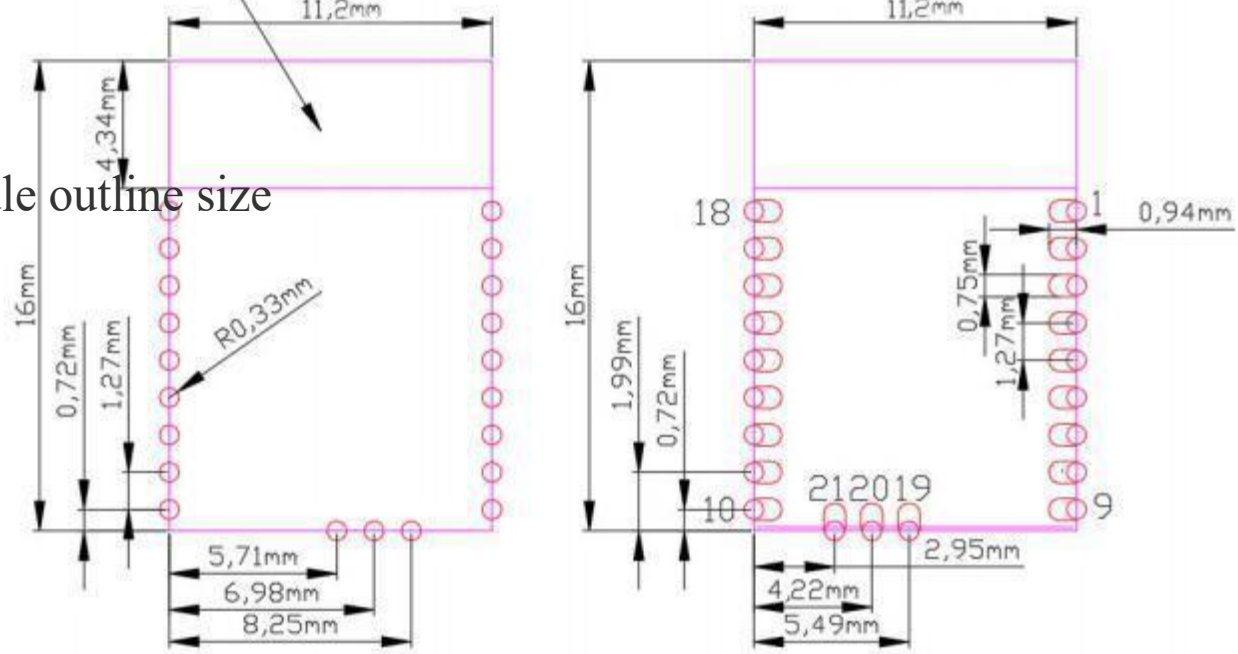


Figure 5-2: top view (seen from top) bottom view (seen from bottom)

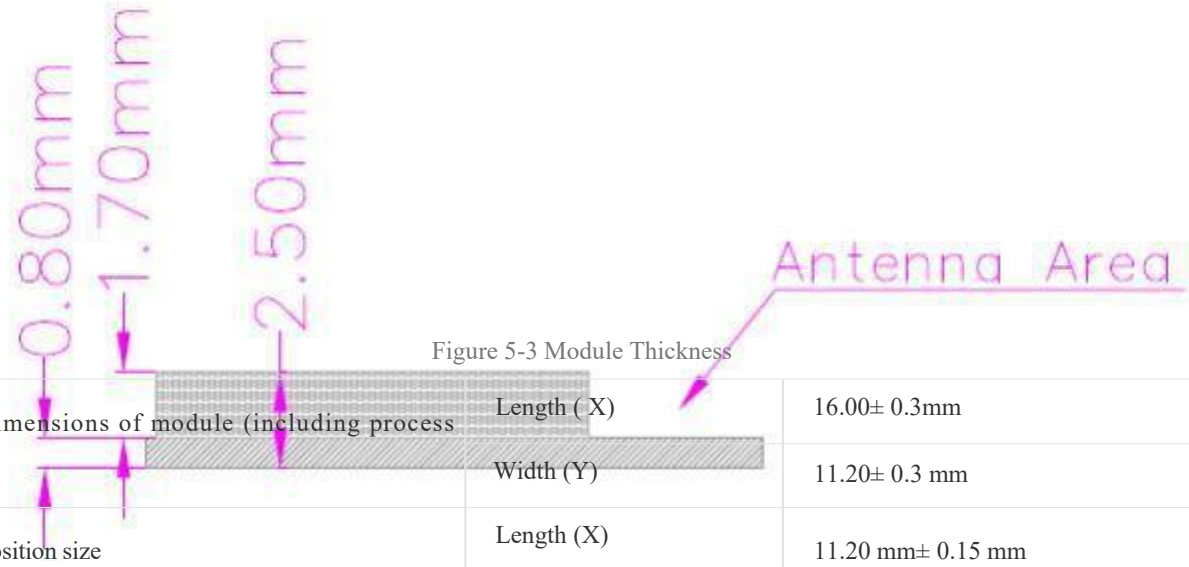


Figure 5-3 Module Thickness

Overall dimensions of module (including process edge)	Length (X)	16.00± 0.3mm
	Width (Y)	11.20± 0.3 mm
Antenna position size	Length (X)	11.20 mm± 0.15 mm
	Width (Y)	4.34 mm± 0.15 mm
PCB thickness	Height (H)	0.80 ± 0.05 mm
Total thickness of module (including shield)	Height (H)	2.50 ± 0.1 mm

Table 5-1: Module Design Dimensions

Note: Hangzhou Zhexin Communication Technology Co., Ltd. reserves the right to select components from different suppliers to realize the function of the module. At the same time, ensure that all mechanical and electrical certificates can be maintained. The design shall be carried out within the range of mechanical and physical dimensions shown in Figure 5-2. All dimensions are in millimeters (mm).

Gas specification and module identification

5.3. matters need attention

Bluetooth works at the frequency of 2.4GHz, so we should try to avoid the influence of various factors on wireless transceiver. Pay attention to the following points: avoid using

- metal in the product shell surrounding the module, and consider using an external antenna
- if the shell is metal. Metal screws inside the product should be far away from the RF part
- of the module.
- In order to maximize RF performance, the user motherboard layout should follow the following recommendations:

Antenna clearance area: The user motherboard located directly below the module antenna area cannot have any copper foil traces (including power, ground and signal layers).

Module location: Ideally, the module should be arranged in a corner of the user's motherboard, and the PCB antenna is located at the far end of the motherboard. This position can minimize the clearance area of the antenna.

(Refer to the following figure for the definition of antenna clearance area)

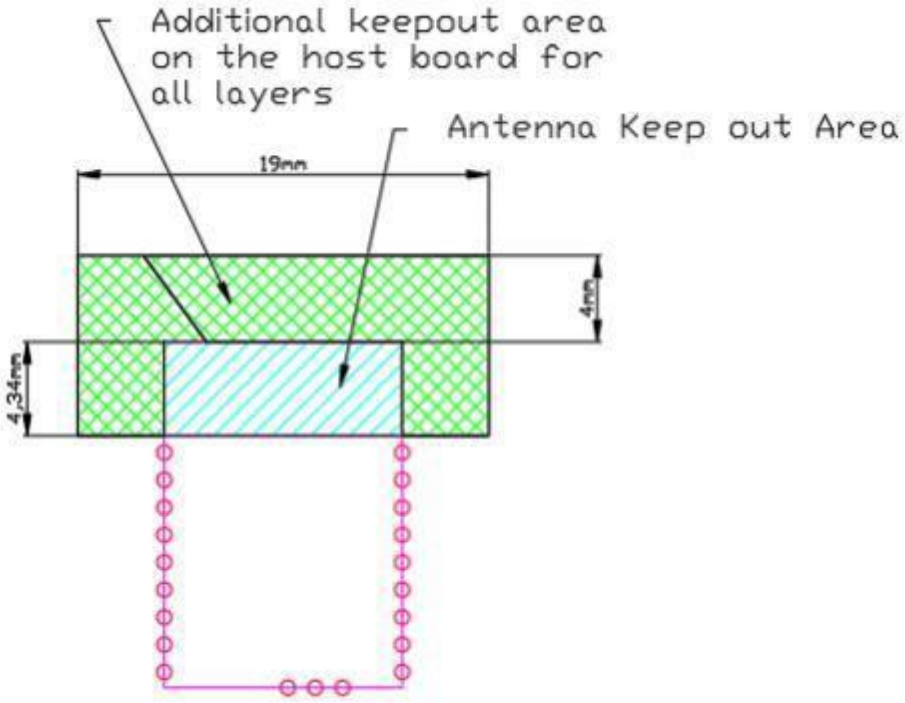


Figure 5-4: antenna keep out

5.4. Reference PCB package

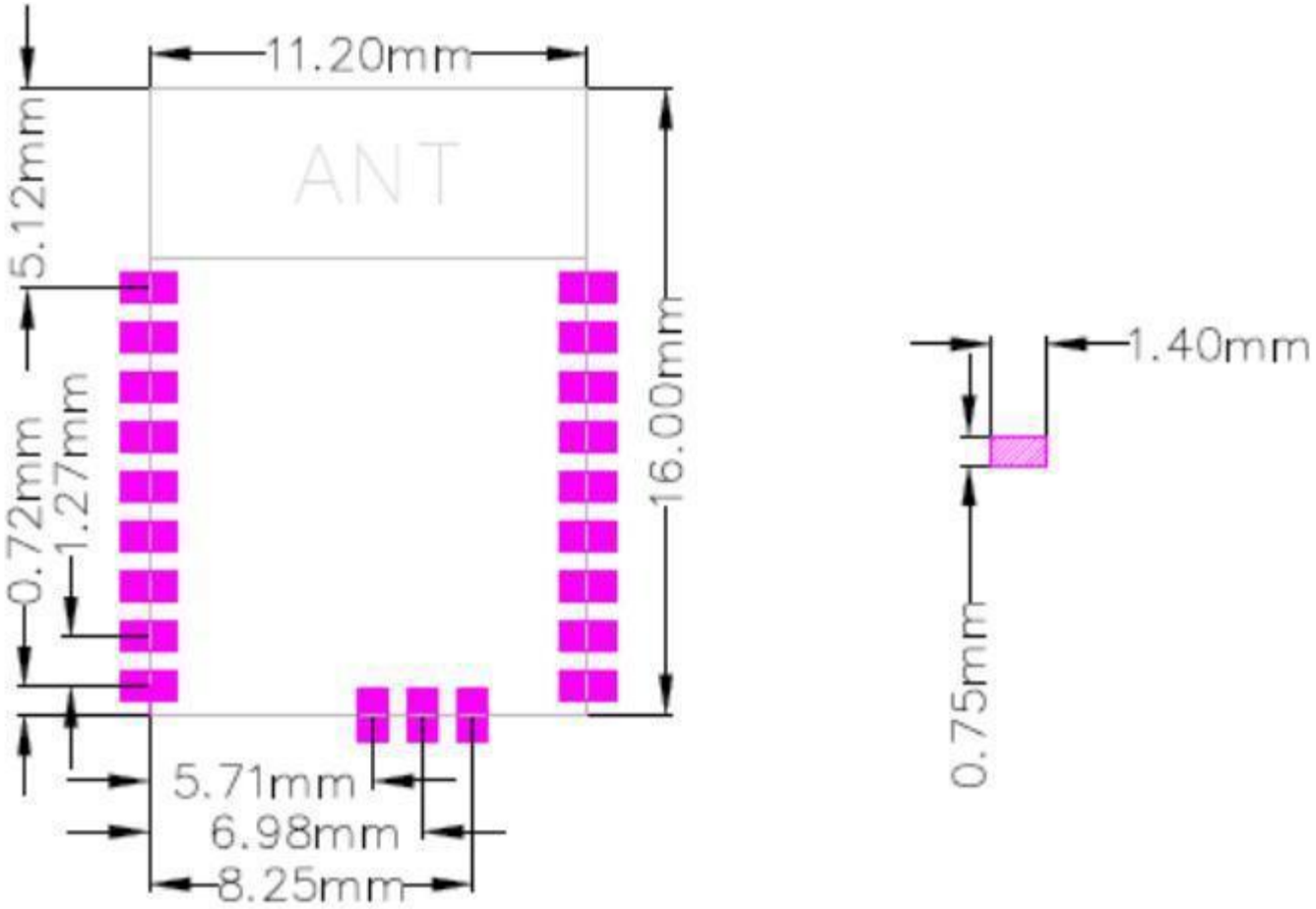


Figure 5- 5: Reference

6. Reflux parameter recommendation

Reflux parameters can refer to the following settings:

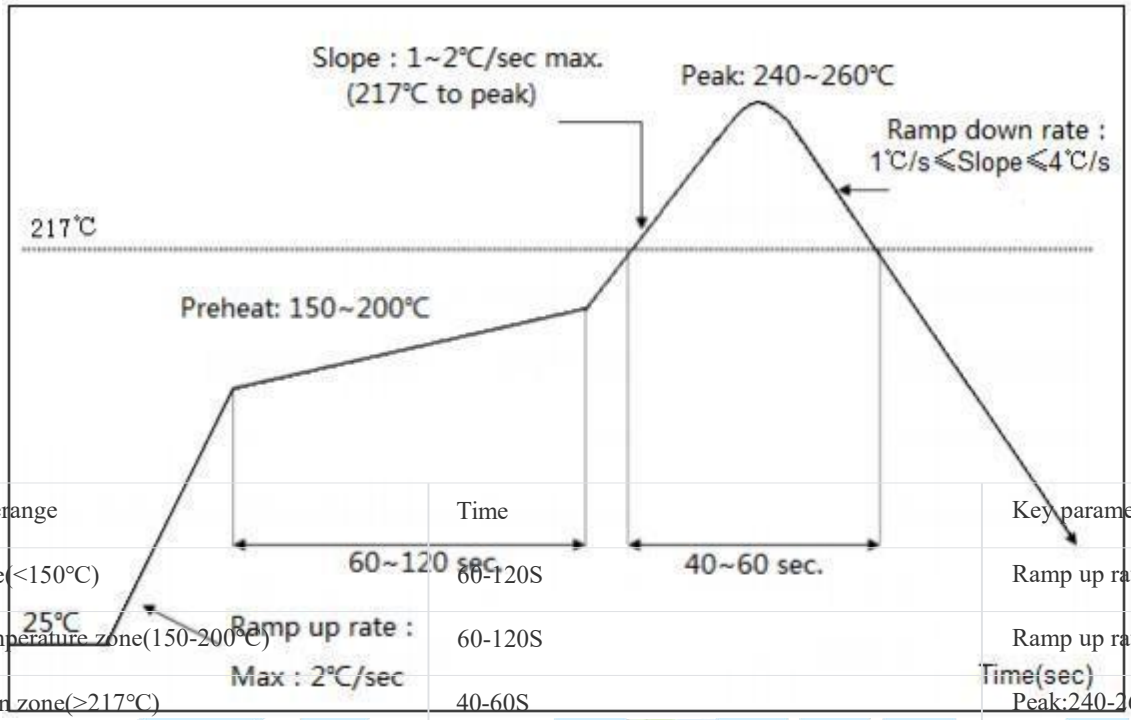


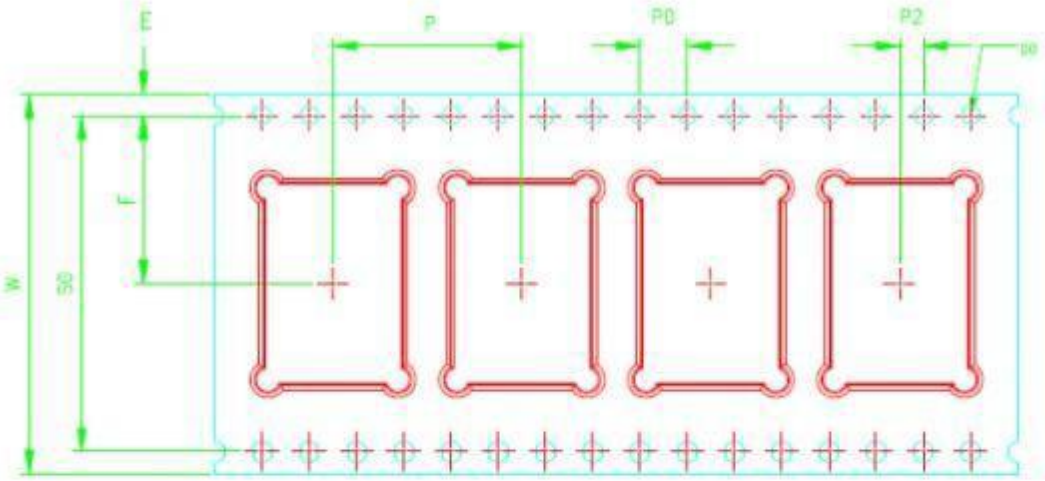
Figure 6- 1: Reflux Recommended Parameters

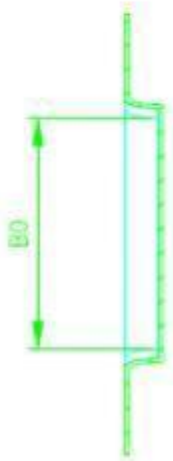
Temperaturerange	Time	Key parameters
Preheat zone(<150°C)	60-120S	Ramp up rate:≤2S
Uniform temperature zone(150-200°C)	60-120S	Ramp up rate:<1S
Recirculation zone(>217°C)	40-60S	Peak:240-260°C
Cooling zone	Ramp down rate:1°C/s≤Slope≤4°C/s	

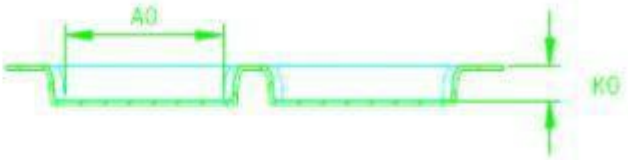
Table 6- 1: Reflux Recommended Parameters

7.Packing size

By default, the module adopts braided tape packaging, and the braided tape dimensions are as follows:

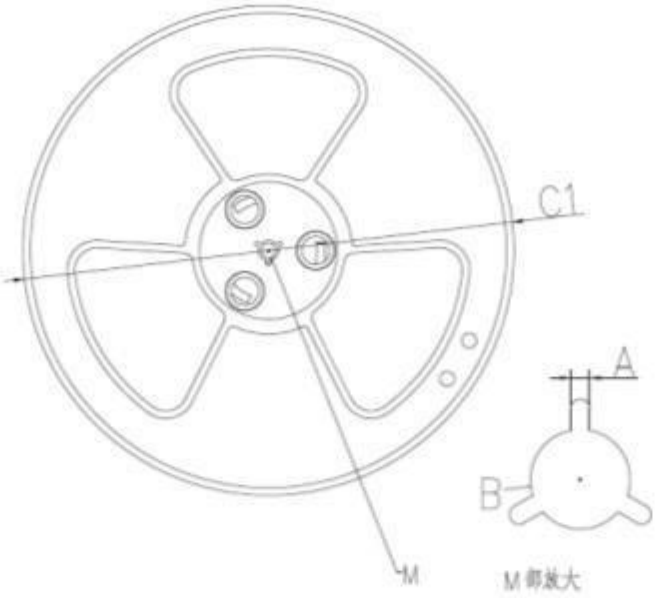


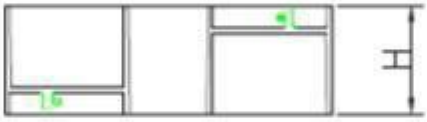


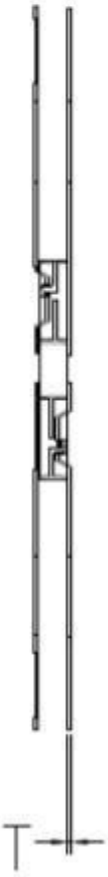


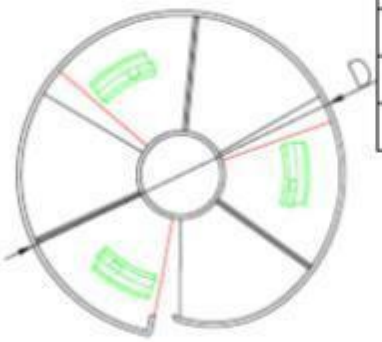
W	32.00 ±0.30	P	16.00 ±0.10	A0	11.60 ±0.10		B0	16.80 ±0.10	
S0	28.40 ±0.10	P0	4.00 ±0.10	A1			B1		
E	1.75 ±0.10	P2	2.00 ±0.10	A2			B2		
F	14.20 ±0.10	D0	1.50 $^{+0.10}_{-0.00}$	K0	2.50 ±0.10		K1		
T	0.30 ±0.05	D1		SCALE:	1:1	UNIT:	mm	REV.	R1

The reel size is as follows:









Available Reel Sizes(mm)		
Tape Width	D ±0.5mm	H +1mm
12mm	ø100mm	12.6mm
16mm		16.6mm
24mm		24.6mm
32mm		32.6mm

SPEC	13"
C1±1	φ330
A±0.2	2.6
B±0.2	φ13.5
T±0.2	1.4

8.software application

ZX8258 series module is a data transmission module, which supports transparent transmission mode and command transmission mode. AT+ instruction set means that the user inputs commands through the serial port to configure parameters. Please refer to the Technical Manual for Software Design of ZX8258 Series Modules for detailed instructions. ZX8258 supports customer customization, please contact our company for details.

About us

Hangzhou Zhexin Communication Technology Co., Ltd. is a fast-growing Internet of Things wireless communication technology company, located in Yuhang District, Hangzhou. The company focuses on providing the world's leading wireless connection scheme for the Internet of Things (WiFi/ Bluetooth /BLE, etc.), including self-developed communication modules, communication protocol software, mobile phone APP, and in-depth solution customization for customers.
. It mainly serves customers in industries such as industrial Internet of Things, automobiles, medical care and beauty, high-end consumer electronics, office equipment, etc. At present, the products have been stably supplied to domestic, American, European and other markets.

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Add: Room 317, Building 1, No.2616 Yuhangtang Road, Cangqian Street, Yuhang District, Hangzhou

FCC Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept

any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “Contains Transmitter Module FCC ID: 2ABMOC-ZX8258 Or Contains FCC ID: 2ABMOC-ZX8258”

When the module is installed inside another device, the user manual of the host must contain below warning statements;

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference.

(2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

Any company of the host device which install this modular with Single modular approval should perform the test of radiated emissionand spurious emission according to FCC part 15C : 15.247 and 15.209 requirement,Only if the test result comply with FCC part 15C : 15.247 and 15.209 requirement， then the host can be sold legally.