TYWE2S UserManual

## 1. Product Overview

TYWE2S is a low power consumptionmodulewithbuilt-in Wi-Fi connectivity solution designed by Hangzhou AiXiangJi Technology Co., Ltd.The Wi-Fi Module consistsof a highly integratedwireless radio chip ESP8285 andsome extra componentthathas been programed with Wi-Fi network protocol and plenty of software examples.TYWE2Sincludea 32-bit CPU, 1M byte flash, 50kB SRAM and various peripheral resources.

TYWE2S is a RTOS platform, embedded with all the Wi-Fi MAC and TCP/IP protocol function examples, users can customize their Wi-Fi product by using these software examples.

Figure 1 shows the block diagramof the TYWE2S.

Figure 1. The block diagram of the TYWE2S
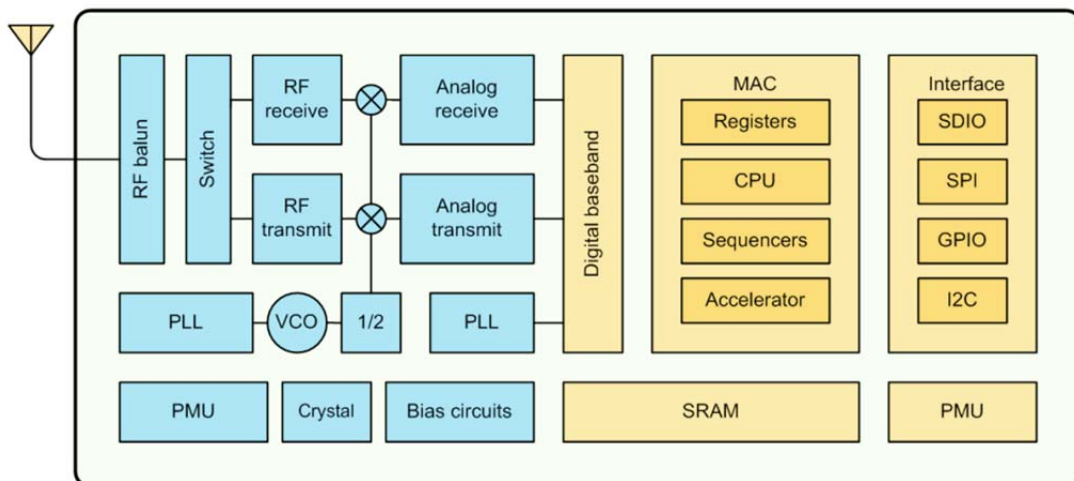
1.1 Features

✧   Integrated low power consumption 32-bit CPU, also known as application processor
✧   Basic frequency of the CPU can support both 80MHz and 160MHz
✧   Supply voltage range: 3V to 3.6V
✧   Peripherals: 5 GPIO channels, 1 UART, 1 ADC
✧   Wi-Fi connectivity:
   ●   802.11 b/g/n20
   ●   Channel 1 to 11 @ 2.4GHz
   ●   Support WPA/WPA2
   ●   +16dBm output power
   ●   Support STA/AP/STA+AP operation mode
   ●   Support SmartConfig function for both Android and IOS devices
   ●   On-board PCB antenna

- Operating temperature range: -20℃ to 85℃

1.2 Main ApplicationFields

✧ Intelligent Building
✧ Intelligent home, Intelligent household applications
✧ Health care
✧ Industrial wireless control
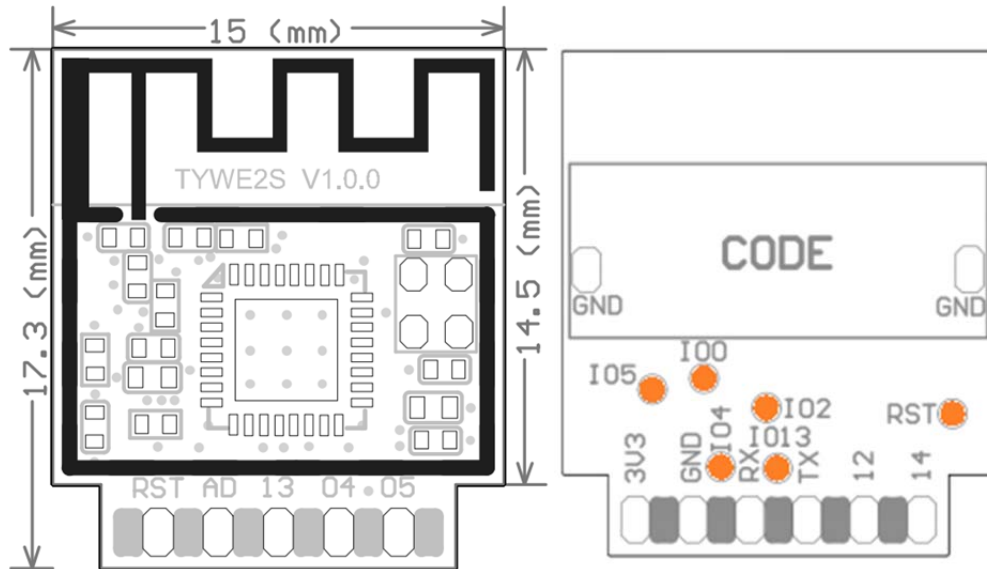✧ Baby monitor
✧ Webcam
✧ Intelligent bus

2. Dimensions and Footprint

2.1Dimensions

TYWE2S has 2 columns of Pins.The distance between each Pin is 2mm. Size of TYWE2S: 15mm (L) ×17.3mm (W) × 2.8 mm (H) Figure 2 shows the dimensions of TYWE2S.

Figure 2. The dimensions of TYWE2S

2.2 Pin Definition

Table 1 shows the generalpin attributes of TYWE2S

Table 1. The typical pin definitionof TYWE2S

PIN NO.	NAME	TYPE	DISCREPTION
1	RST	I/O	External reset (low level effects, there's already had pull-up resistor)
2	AD	AI	ADC terminal(10-bits SAR ADC)[1]
3	13	I/O	GPIO_13
4	04	I/O	GPIO_04
5	05	I/O	GPIO_05
6	3V3	P	Supply voltage (3.3V)
7	GND	P	Ground
8	RX	I/O	UART0_RXD [2]
9	TX	I/O	UART0_TXD [2]
10	12	I/O	GPIO_12
11	14	I/O	GPIO_14

Note: S: Power supply pins; I/O: Digital input or output pins; AI: Analog input.RST pin is the module hardware reset pin; it cannot eliminate module-pairing information.

(*1) This pin can only be used as ADC input, cannot use it as normal I/O. when not using, just connect nothing. When used as ADC input, the input voltage range is 0~1.0V.

(*2) UART0 is serial port, during power on progress; this serial port will output something, which can be ignored.

2.3Test PinDefinition

Table 2 shows the general test pin definition of TYWE2S

Table 2. The generaltest pin definitionof TYWE2S

PIN NO	Name	IO Type	Function
12	IO4	I/O	GPIO_04
13	IO13	I/O	GPIO_13
14	IO2	I/O	UART1_TXD
15	RST	I/O	Reset Pin
16	IO5	I/O	GPIO_05
17	IO0	I/O	IO0

3. Electrical Characteristics

3.1 Absolute Maximum Ratings

Table 3. Absolute Maximum Ratings

PARAMETERS	DESCRIPTION	MIN	MAX	UNIT
Ts	Storage temperature	-20	85	℃
VCC	Supply voltage	-0.3	3.6	V
Static electricity voltage (human model)	TAMB-25℃	-	2	KV
Static electricity voltage (machine model)	TAMB-25℃	-	0.5	KV

3.2 Electrical Conditions

Table 4. Electrical Conditions

PARAMETERS	DESCRIPTION	MIN	TYPICAL	MAX	UNIT
Ta	Working temperature	-20	-	85	℃
VCC	Working voltage	3	3.3	3.6	V
VIL	IO low level input	-0.3	-	VCC*0.25	V
VIH	IO high level input	VCC*0.75	-	VCC	V
VOL	IO low level output	-	-	VCC*0.1	V
VoH	IO high level output	VCC*0.8	-	VCC	V
Imax	IO drive current	-	-	12	mA

3.3 Wi-Fi Transmitting Current Consumptions

Table 5. Wi-Fi TX current consumption

PARAMETERS	MODE	RATE	transmitting power	TYPICAL	UNIT
IRF	11b	1Mbps	16dBm	220	mA
IRF	11g	6Mbps	21dBm	110	mA
IRF	11n	MCS0	21.5dBm	100	mA

3.4 Wi-Fi Receiving CurrentConsumptions

Table 6. Wi-Fi RX currentconsumption

PARAMETERS	MODE	RATE	TYPICAL	UNIT
IRF	11b	1Mbps	76	mA
IRF	11g	6Mbps	76	mA
IRF	11n	MCS0	76	mA

3.5 Working Mode CurrentConsumptions

Table 7. The module working currentconsumption

WORK MODE	AT TA=25℃	TYPICAL	MAX*	UNIT
EZ Mode	TYWE2S is under EZ paring mode, Wi-Fi indicator light flashes quickly	80	151	mA
AP Mode	TYWE2S is under AP paring mode, Wi-Fi indicator light flashes slowly	90	451	mA
Operation Mode	TYWE2S is connected, Wi-Fi indicator light is on	58.5	411	mA
Disconnection Mode	TYWE2S is disconnected, Wi-Fi indicator light is off	80	430	mA

4. WLAN Radio Specification

4.1 Basic Radio Frequency Characteristics

Table 8.Basic Radio frequency characteristics

PARAMETERS	DESCRIPTION
Frequency band	2.4GHz to 2.5GHz
Wi-Fi standard	IEEE 802.11n/g/b
Data transmitting rate	11b:1,2,5.5,11(Mbps)
	11g:6,9,12,18,24,36,48,54(Mbps)
	11n:HT20,MCS0~7
Antenna type	On-board PCB Antenna

4.2Wi-Fi TransmittingPower

Table 9. Wi-Fi transmitting power

PARAMETERS		MIN	TYPICAL	MAX	UNIT
RF average output power, 802.11b CCK Mode	1M	-	16	-	dBm
RF average output power, 802.11g OFDM Mode	6M	-	21	-	dBm
RF average output power, 802.11n OFDM Mode	MCS0	-	21.5	-	dBm
The Frequency error		-10	-	10	ppm

4.3Wi-Fi Receiving Sensitivity

Table 9. Wi-Fi Receiving sensitivity

PARAMETERS	MIN	TYPICAL	MAX	UNI

					T
PER<8%, Receiving sensitivity, 802.11b CCK Mode	1M	-	-91	-	dBm
PER<10%, Receiving sensitivity, 802.11g OFDM Mode	6M	-	-75	-	dBm
PER<10%, Receiving sensitivity, 802.11n OFDM Mode	MCS0	-	-72	-	dBm

5. Antenna Information

5.1 Antenna Type

Antenna can be connected only using On-board PCB antenna.

5.2 Reduce Antenna Interference

While using the On-board PCBantenna, in order to have the best Wi-Fi performance, it's recommended to keep a minimum15mm distance between the antenna part and the other metal pieces.

User's own PCBA design is recommended NOT to pass any wire, NOT do copper pour under the region of the module's antenna, to avoid interferences.

6. Packaging Information And Production Guide

6.1 Mechanical Dimensions

Figure 3. Top view of the module
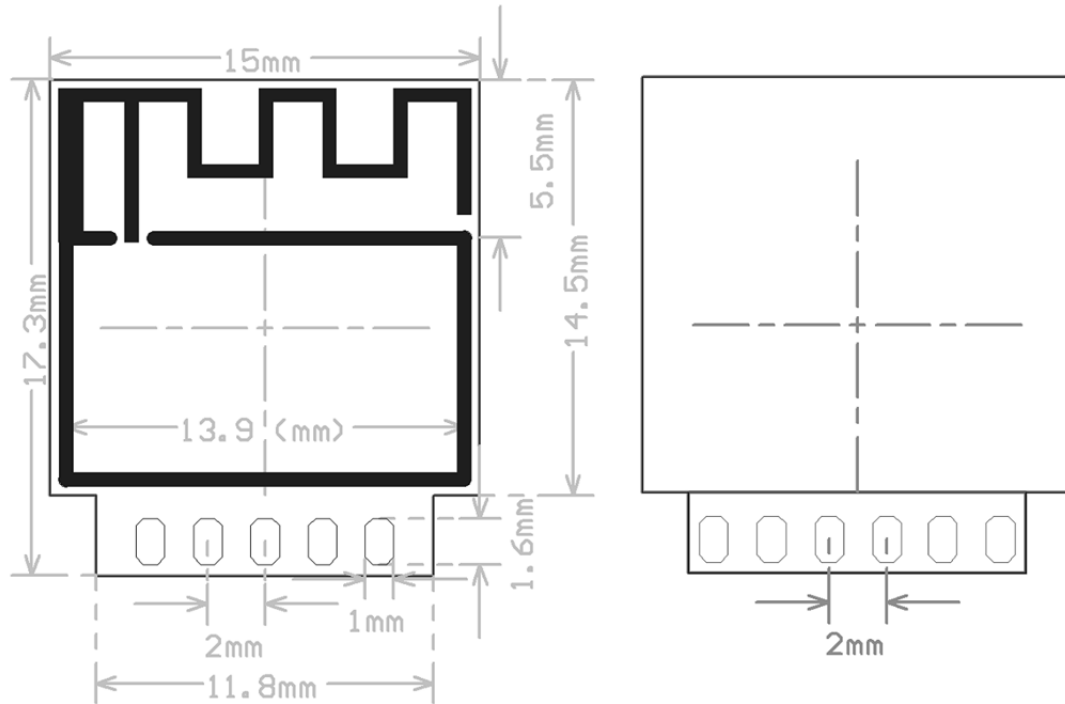
Figure 4. The module's mechanical view

6.2PCBRecommended Package
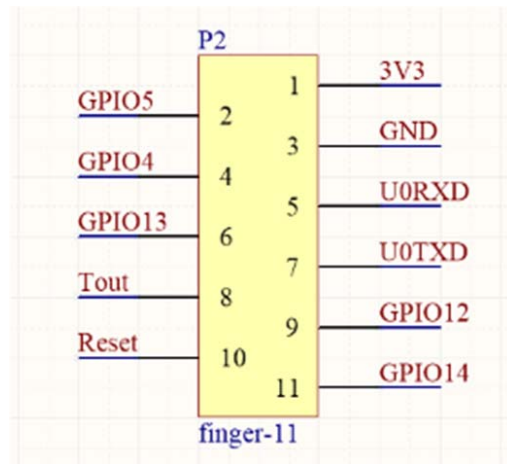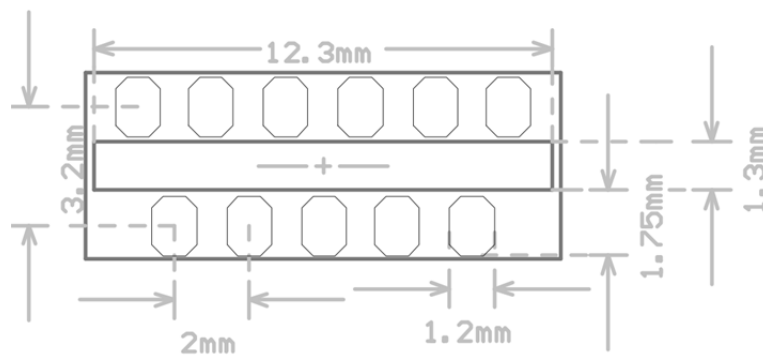
Figure 5. PCB schematic Drawing

Figure 6. PCB Package Drawing

6.3 Production Guide

✧ The storage for the delivered module should meet the following condition:

1. The anti-moisture bag should be kept in the environment withtemperature< 30℃ and humidity< 85% RH.

2. The expiration date is 6 months since the dry packaging products was sealed.

✧ Cautions:

1. All the operators should wear electrostatic ringin the whole process of production.

2. While operating, water and dirt should not have any contact with the modules.

6.4 Recommended furnace temperature curve

Figure 7. PCB Package DrawingRecommended furnace temperature curve
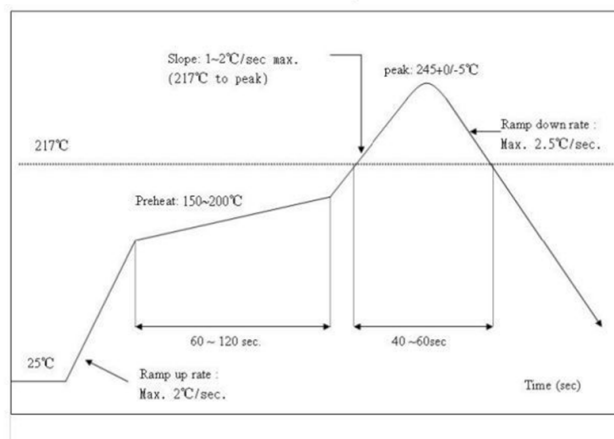
FCC Waring

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

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.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.

FCC/ISED Label Instructions

The outside of final products that contains this module device must display a label referring to the enclosed module. This exterior label can use wording such as: "Contains Transmitter Module FCC ID:2ANDL-TYWE2S or IC:23243-TYWE2S"or "Contains FCC ID:2ANDL-TYWE2S or IC:23243-TYWE2S", Any similar wording that expresses the same meaning may be used.

ISED RSS Warning:

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

ISED Radiation Exposure Statement:

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 20cm between the radiator& your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Le rayonnement de la classe b repecte ISED fixaient un environnement non contrôlés.Installation et mise en œuvre de ce matériel devrait avec échangeur distance minimale entre 20 cm ton corps.Lanceurs ou ne peuvent pas coexister cette antenne ou capteurs avec d'autres.