



TYWE3S Datasheet

Device Development > Module > Wi-Fi Module

Version: 20200217

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1 Product Overview

TYWE3S is a low-power embedded Wi-Fi module developed by Hangzhou Tuya technology co., LTD. It consists of a highly integrated radio frequency chip ESP8266 and a handful of peripheral components, with a built-in Wi-Fi network protocol stack and rich library functions. TYWE3S is built in low-power 32-bit CPU, 2Mbyte flash memory, 50KB SRAM and rich peripheral resources.

TYWE3S is a RTOS platform that integrates all Wi-Fi MAC and TCP/IP protocol libraries. Users can develop embedded Wi-Fi products that meet their needs based on these developments.

1.1 Features

- Built-in low-power 32-bit CPU, can be concurrently used as an Application processor (main-frequency support 80MHz & 160MHz)
- Built-in low-power 32-bit CPU can be concurrently used as an Application processor (main-frequency support 80MHz and 160MHz)
- Working voltage: 3V-3.6V
- Peripheral: 9×GPIOs, 1×UART, 1×ADC
- Wi-Fi connectivity
 - 802.11b/g/n
 - Channel 1-14@2.4GHz
 - Support WPA / WPA2 safe mode
 - 802.11b mode + 20dBm output power
 - Support STA/AP/STA+AP work mode
 - Support SmartConfig function (including Android & iOS devices)
 - Onboard PCB antenna
 - Working temperature: -20°C-85°C

1.2 Major Application fields

- Smart building
- Smart home Appliances, smart home
- Smart plug. smart lighting
- Industrial wireless control
- Baby monitor

- Webcam
- Smart bus, etc

2 Dimensions and Footprint

2.1 Dimensions

TYWE3S has 2 rows of pins, lead pitch is 2mm.

TYWE3S size dimension: $16 \pm 0.3\text{mm}$ (W) \times $24 \pm 0.3\text{mm}$ (L) \times $3.4 \pm 0.2\text{mm}$ (H)。

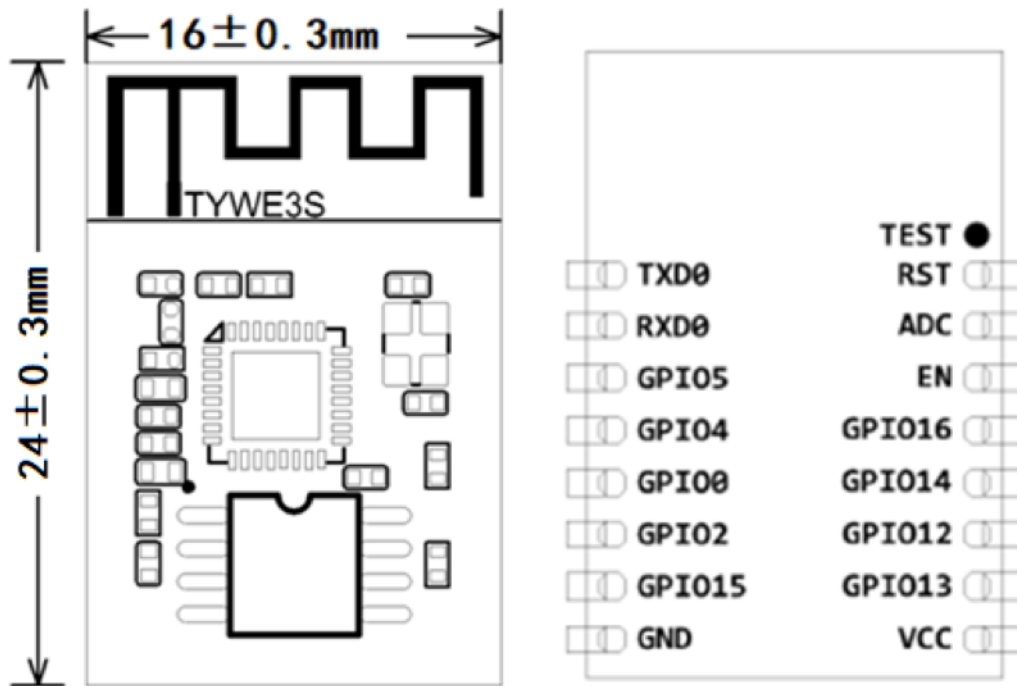


Figure 1: 尺寸封装

Figure 2. TYWE3S front and back view

2.2 Definition of pin

引脚

序号	符号	IO 类型	功能
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1	RST	I/O	Hardware reset pin (low level effective, internal pull-up resistance)
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引脚 序号	符号	IO 类型	功能
2	ADC	AI	ADC port, 10-bit precision SAR ADC
3	EN	I	Module enable pin,normal use needs to receive 3.3V
4	GPIO16	I/O	GPIO_16(Use 10K pull-up resistor for use)
5	GPIO1	I/O	GPIO_14
6	GPIO12	I/O	GPIO_12
7	GPIO1	I/O	GPIO_13
8	VCC	P	Module Power Pin(3.3V)
9	GND	P	Power Reference Ground
10	GPIO15	O	GPIO_15(Participate in the module power-on initialization process,use with caution)
11	GPIO1	O	UART0_TXD(Used to print module internal information)
12	GPIO0	I/O	GPIO5_0(Participate in the module power-on initialization process,use with caution)
13	GPIO4	I/O	GPIO_04
14	GPIO5	I/O	GPIO_05
15	RXD0	I/O	UART0_RXD (2)
16	TXD0	O	UART0_TXD (2) effective, internal pull-up resistance)

Instructions:

P indicates the power pin,I/O means input and output pins, AI represents the analog input pin.

RST is just a module hardware reset pin, can't clear Wi-Fi distribution network.

(1):This pin can only be used as an ADC port, can not be used as a normal IO port,need to be suspended when not in use。 When used ad an ADC input,input voltage range is limited to 0~1.0V

(2):UART0 is the user serial port, when the module is powered om, serial port has

information output, user can ignore.

2.3 Definition of test point

Definition of test point pin is shown in the diagram as below.

Pin Number	Symbol	IO type	Function
-	TEST	I	For module production testing

Note: Test pins are not recommended.

3 Electrical Characteristics

3.1 Absolute Electrical Characteristics

Table 3, Absolute electrical characteristics

Parameters	Description	Minimum value	Maximum value	Unit
Ts	Storage temperature	-20	85	°C
VCC	Power supply voltage	-0.3	3.6	V
Static electricity voltage (human model)	TAMB-25°C	-	2	KV
Static electricity voltage (machine model)	TAMB-25°C	-	0.5	KV

3.2 Electrical conditions

Table 4, Normal electrical conditions

Parameters	Description	Min	Typ	Max	Unit
Ta	Working temperature	-20	-	85	°C
VCC	Working voltage	3.0	3.3	3.6	V
VIL	I/O low-level input	-0.3	-	VCC*0.25	V
VIH	I/O high-level input	VCC*0.75	-	VCC	V
VOL	I/O low-level output	-	-	VCC*0.1	V
VOH	I/O high-level output	VCC*0.8	-	VCC	V
I _{max}	I/O drive current	-	-	12	mA

Table 4, Normal electrical conditions

3.3 WI-Fi TX Power Consumption

Table 5 TX power consumption during constant emission

Parameter	Mode	Rate	Tx power	Typ	Unit
IRF	11b	11 Mbit/s	+17 dBm	220	mA
IRF	11g	54 Mbit/s	+15 dBm	110	mA
IRF	11n	MCS7	+13 dBm	100	mA

3.4 WI-Fi RX Power Consumption

Table 6 RX power consumption during constant emission

Parameter	Mode	Rate	Typ	Unit
IRF	11b	11 Mbit/s	76	mA
IRF	11g	54 Mbit/s	76	mA
IRF	11n	MCS7	76	mA

3.5 Power Consumption in Operating Mode

Table 7 TYWE2L working current

Working Mode	Working Status(Ta=25°C)	Value	Max	Unit
EZ mode	The module is in EZ status and the Wi-Fi indicator quickly flashes.	80	151	mA
AP mode	The module is in AP status and the Wi-Fi indicator slowly flashes.	90	451	mA

Working Mode	Working Status(Ta=25°C)	Value	Max	Unit
Operation mode	The module is in connected status and the Wi-Fi indicator is steady on.	58.5	411	mA
Disconnection mode	The module is in disconnected status and the Wi-Fi indicator is steady off.	80	430	mA

4 RF Features

4.1 Basic RF Features

Table 8, Basic RF features

Parameter	Description
Frequency band	2.412-2.484 GHz
Wi-Fi standard	IEEE 802.11b/g/n (channel 1-14)
Data transmitting rate	11b: 1, 2, 5.5, 11 (Mbit/s)11g: 6, 9, 12, 18, 24, 36, 48, 54 (Mbit/s)11n: HT20 MCS0-MCS7
Antenna type	PCB antenna

4.2 WI-FI Output Power

Table 9 TX power during constant emission

Parameter	Min	Typ	Max	Unit
RF average output power, 802.11b CCK mode	1 M	20	-	dBm
RF average output power, 802.11g OFDM mode	54 M	17	-	dBm
RF average output power, 802.11n OFDM mode	MCS -	14	-	dBm
Frequency error	-10	-	10	ppm

4.3 RF RX sensitivity

Table 10 RX Sensitivity

Parameter		Min	Typ	Max	Unit
PER < 8%, RX sensitivity, 802.11b CCK mode	1 M	-	-91	-	dBm
PER < 10%, RX sensitivity, 802.11g OFDM mode	54 M	-	-75	-	dBm
PER < 10%, RX sensitivity, 802.11n OFDM mode	MCS -	-	-72	-	dBm

5 Antenna Information

5.1 Antenna type

TYWE3S uses a MIFA onboard antenna with a PCB antenna of 2.4G Wi-Fi band.

5.2 Antenna Interference Reduction

To ensure optimal Wi-Fi performance, it is recommended that the antenna portion of the module be at least 15 mm away from other metal parts.

Since the use of TYWE3S is Applied to the main control board and other components through the SMT process, the placement and placement of the PCB antenna directly affects the RF performance. Below are our recommended placements and suggested placements.

It is recommended to use the placement of scheme 1 and scheme 2, the antenna is hollowed out outside the frame or near the antenna, and the performance is basically consistent with the performance of the individual module RF test.

If the design must be limited, the PCB antenna must be placed on the backplane. Refer to the layout of the scheme 3. The antenna is in the frame, but there is no copper or trace near the antenna, but the RF performance will be somewhat lost. 2dBm.

It is not recommended to use the placement position of scheme 4. The antenna is in the frame and the copper or trace is placed under the antenna. The RF signal will be significantly attenuated.

6 Packaging Information and Production Instructions

6.1 Mechanical Dimensions

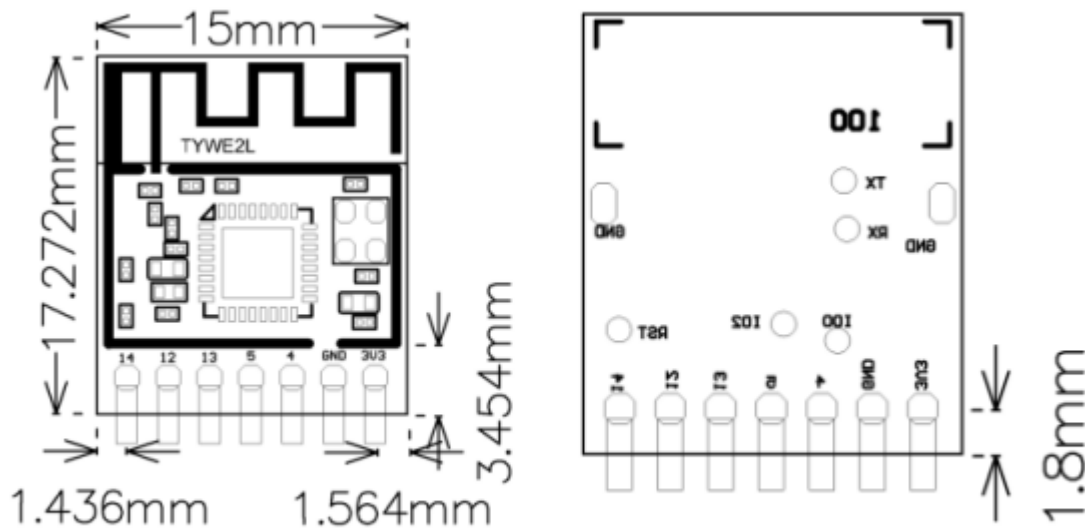


Figure 3 TYWE2L front view and rear view



Figure 4 TYWE2L side view

Note: PCB frame tolerance ± 0.15 mm, PCB depth tolerance ± 0.1 mm

6.2 Production Instructions

Storage conditions of a delivered module are as follows:

1. The anti-moisture bag is placed in an environment where the temperature is under 30°C and the relative humidity is under 85%.

- The shelf life of a dry-packaged product is six months from the date when the product is packaged and sealed.

Precautions:

- Throughout the production process, each involved operator must wear an electrostatic ring.
- During the operation, strictly protect the module from water and strains.

6.3 Recommended Oven Temperature Profile

Refer to IPC/JEDEC standard ; Peak Temperature : $<250^{\circ}\text{C}$; Number of Times: ≤ 2 times ;

