# Wi-Fi Module UserManual

1. Product Overview

TYWE3L is a low power consumption module with built-in Wi-Fi connectivity solution designed by HangZhouTuya Information Technology Corporation. The Wi-Fi Module consists of a highly integrated wireless radio chip ESP8266 and some extra component that has been programed with Wi-Fi network protocol and plenty of software examples.TYWE3L include a 32-bit CPU, 1M byte flash, 50k SRAM and various peripheral resources.

TYWE3L 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 diagram of the TYWE3L.

Figure 1. The block diagram of the TYWE3L
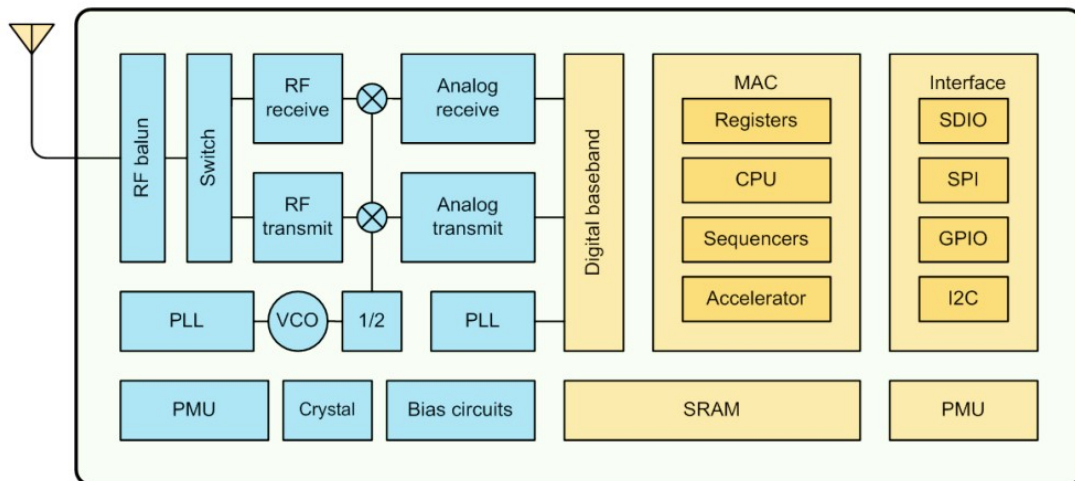
1.1 Features

✧ Integrated low power consumption 32-bit CPU, also known as application processor
✧ Basic frequency of the CPU can support 160MHz
✧ Supply voltage range: 3V to 3.6V
✧ Peripherals: 9 GPIO channels, 1 UART, 1 ADC
✧ Wi-Fi connectivity:
  ● 802.11 b/g/n
  ● channel 1 to 11@2.4G for FCC
  ● Support WPA/WPA2
  ● +20.22dBm output power in 802.11b mode
  ● 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 105℃

1.2 Main ApplicationFields

✧ Intelligent Building
✧ Intelligent home, Intelligent household applications
✧ Health care
✧ Industrial wireless control
✧ Baby monitor
✧ Webcam
✧ Intelligent bus
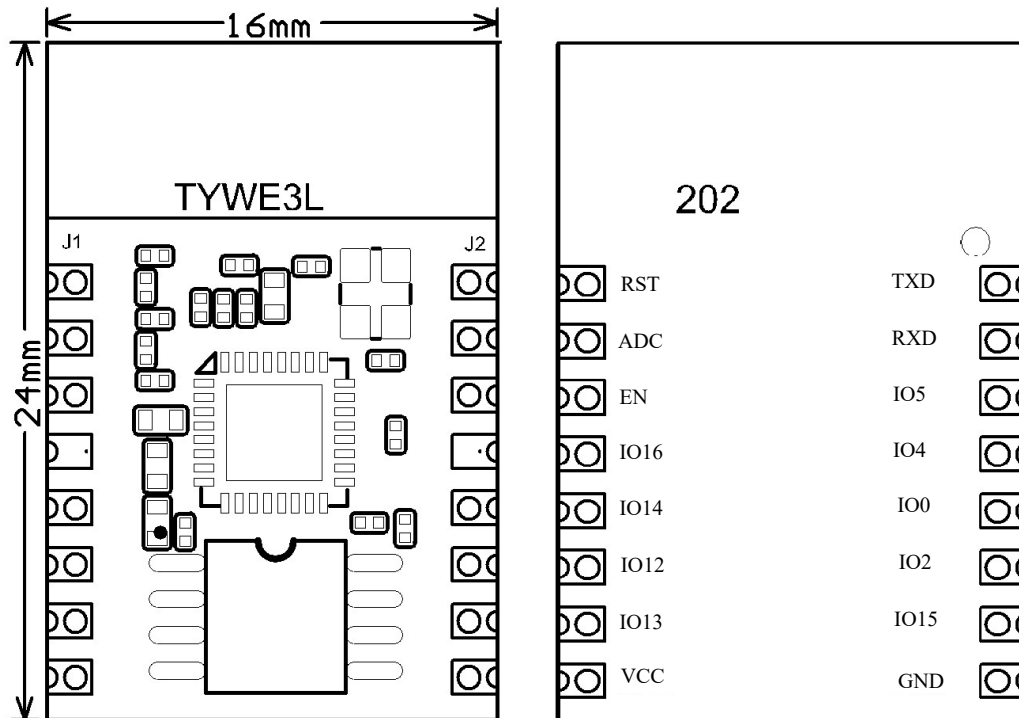
2. Dimensions and Footprint

2.1Dimensions

TYWE3L has 2 columns of Pins.The distance between each Pin is 2mm.

Size of TYWE3L: 16mm(W)*24mm(L)*3.5mm(H)

Figure 2 shows the dimensions of TYWE3L.

Figure 2. The dimensions of TYWE3L

2.2 Pin Definition

Table 1 shows the generalpin attributes of TYWE3L

Table 1. The typical pin definitionof TYWE3L

PIN NO.	NAME	TYPE	DISCREPTION
1	RST	I/O	External reset (low level effects, there's already had pull-up resistor)
2	ADC	AI	ADC terminal(10-bits SAR ADC)[1]
3	EN	I	Enable pin for module, high level effects
4	GPIO16	I/O	GPIO_16（10k pull-up resistor needed)
5	GPIO14	I/O	GPIO_14
6	GPIO12	I/O	GPIO_12
7	GPIO13	I/O	GPIO_13
8	VCC	P	Supply voltage (3.3V)
9	GND	P	Ground
10	GPIO15	I/O	GPIO_15(processing during initials, caution when used)
11	GPIO2	I/O	UART0_TXD(used to print module's internal information)
12	GPIO0	I/O	GPIO_0(processing during initials, caution when used)
13	GPIO4	I/O	GPIO_04
14	GPIO5	I	GPIO_05
15	RXD0	AI	UART0_RXD [2]
16	TXD0	I/O	UART0_TXD [2]

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.

2.3 Test PinDefinition

Table 2 shows the generaltest pindefinition of TYWE3L

Table 2. The generaltest pindefinitionof TYWE3L

PIN NO.	NAME	TYPE	DESCRIPTION
-	TEST	I	Used for module's production test

Note: This test pin is not recommended to use.

3. Electrical Characteristics

3.1 Absolute Maximum Ratings

Table 3. Absolute Maximum Ratings

PARAMETERS	DESCRIPTION	MIN	MAX	UNIT
Ts	Storage temperature	-20	105	℃
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	-	105	℃
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	+ 20.22dBm	220	mA
IRF	11g	6Mbps	+23.00dBm	110	mA
IRF	11n	MCS0	+22.74dBm	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	TYWE3L is under EZ paring mode, Wi-Fi indicator light flashes quickly	80	151	mA
AP Mode	TYWE3L is under AP paring mode, Wi-Fi indicator light flashes slowly	90	451	mA
Operation Mode	TYWE3L is connected, Wi-Fi indicator light is on	58.5	411	mA
Disconnection Mode	TYWE3L 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	2.412GHz to 2.462GHz
Wi-Fi standard	IEEE 802.11n/g/b (Terminal 1-11)
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	-	20.22	-	dBm
RF average output power, 802.11g OFDM Mode	6M	-	23.00	-	dBm
RF average output power, 802.11n OFDM Mode	MCS0	-	22.74	-	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
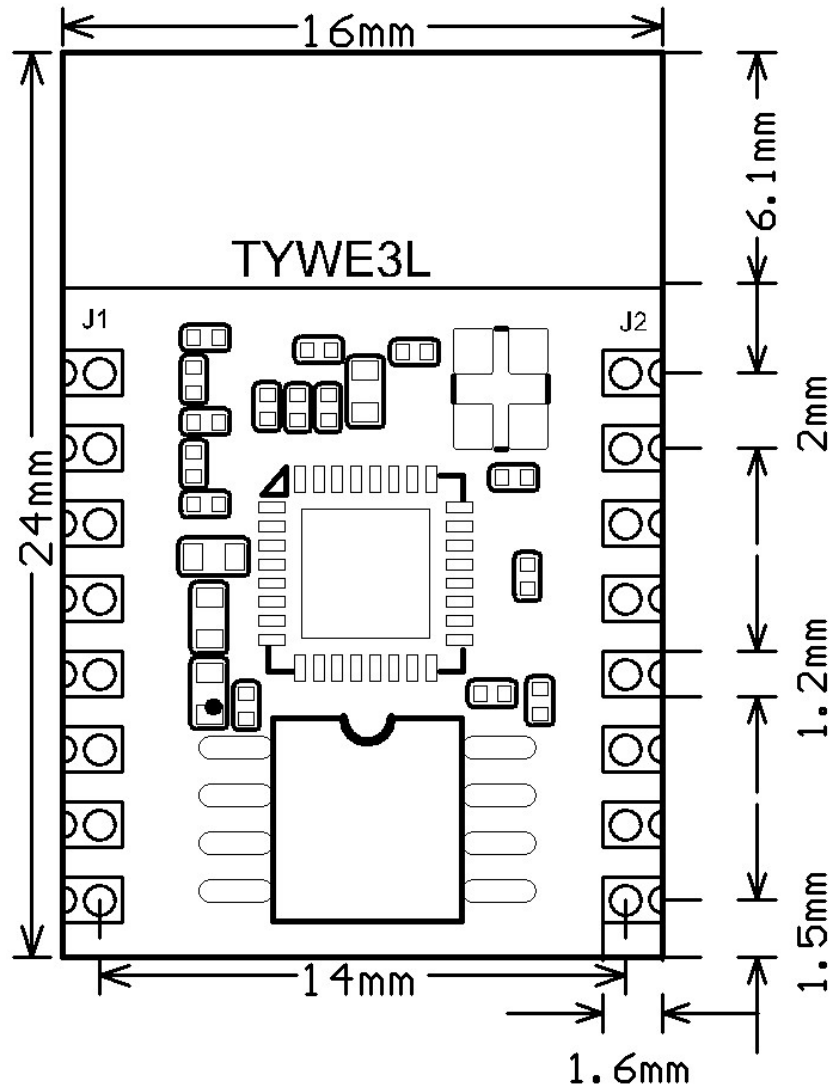
Figure 4. The module's mechanical view
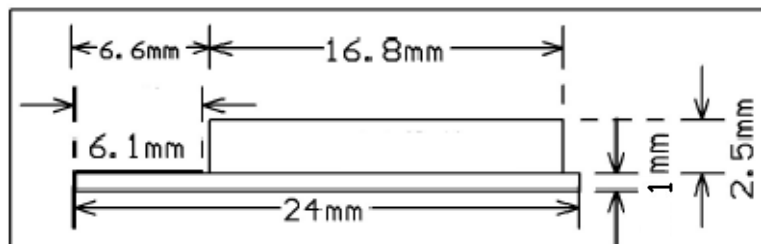
6.2PCBRecommended Package
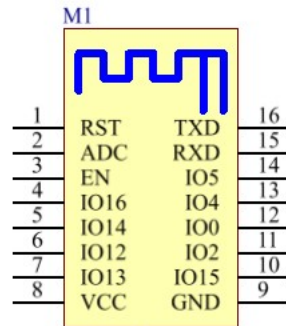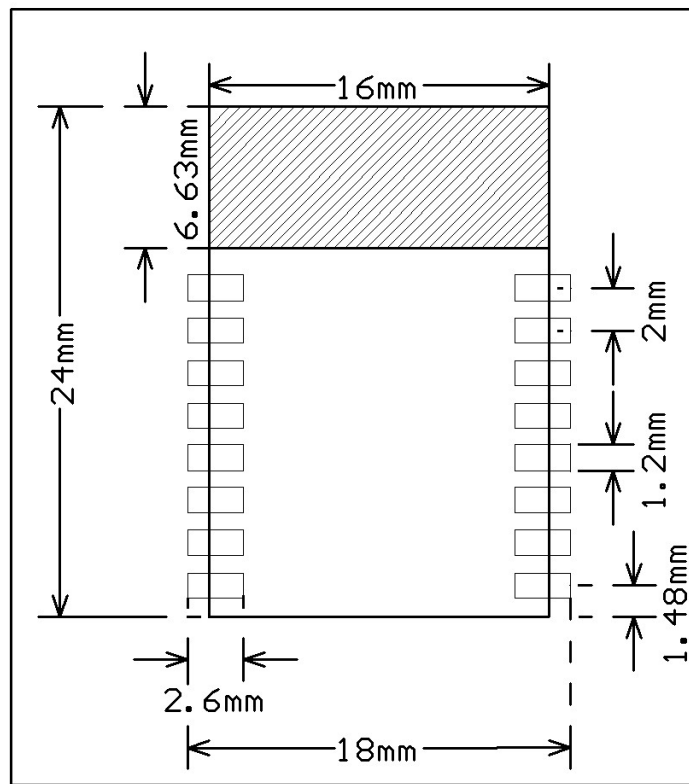
Figure 5. PCB schematic Drawing

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

Refer to IPC/JEDEC standard ; Peak Temperature : <250°C ; Number of Times: ≤2 times ;
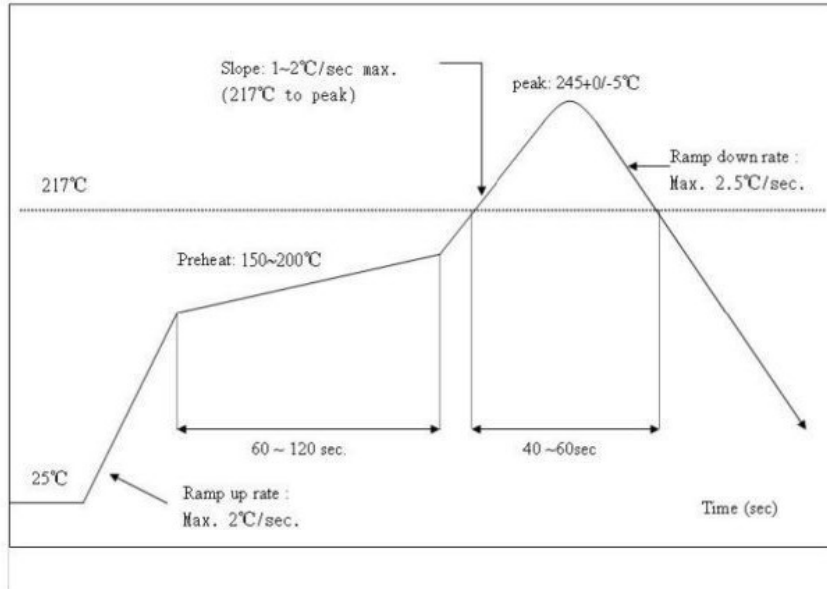
FCC Statement

 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, and
(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 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-TYWE3L",or "Contains FCC ID:2ANDL-TYWE3L", Any similar wording that expresses the same meaning may be used.