WT-01N WiFi Module

Extreme / Open / Small / Easy

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Amendment record

Version	Changed by	Time	Reason	Details
V1.0	Louie	2019.05.03	Original	

Contents

1.Overview

WT-01N Wi-Fi module is a low consumption, high performance Wi-Fi network control module designed by Wireless-Tag. It can meet the IoT application requirements in smart power grids, building automation, security and protection, smart home, remote health care etc.

The module's core processor ESP8285 integrates an enhanced version of Tensilica's L106 Diamond series 32-bit processor with smaller package size and 16 bit compact mode, main frequency support 80 MHz and 160 MHz, support RTOS, integrated Wi-Fi MAC / BB / RF / PA / LNA, on-board IPEX connector antenna or Spring antenna .

The module supports standard IEEE802.11 b / g / n protocol, a complete TCP / IP protocol stack.it can be used to hostthe application or to offload Wi-Fi networking functions from another application processor.

2. Main Features

- DIP-11 package for easy welding
- PCB Antenna
- Operating Voltage: 3.3V
- Operating Temperature：-20-85°C
- CPU Tensilica L106
  - RAM   50KB（Available）
  - The built-in 1 MB flash
- System
  - 802.11 b/g/n
  - Integrated Tensilica L106 ultra-low power 32-bitmicro MCU, with 16-bit RSIC. The CPU clock speed is 80MHz. It can also reach a maximum value of 160MHz.
  - WIFI 2.4 GHz，support WEP/WPA-PSK/WPA2-PSK
  - Ultra-Small 18mm*17mm*2.8mm(±0.2mm)
  - Integrated 10 bit high precision ADC
  - Integrated TCP/IP Stack
  - Integrated TR switch, balun,LNA, Power amplifier and matching network
  - Deep sleep current<20uA, Power down leakage current < 5uA
  - Standby power consumption<1.0mW (DTIM3)
  - UART baud rate up to 4Mbps
  - Support AT remote upgrades and cloud OTA upgrade
  - Support STA/AP/STA+AP operation modes
  - FCC/CE/RoHs

3. Hardware Specifications

3.1 System Diagram
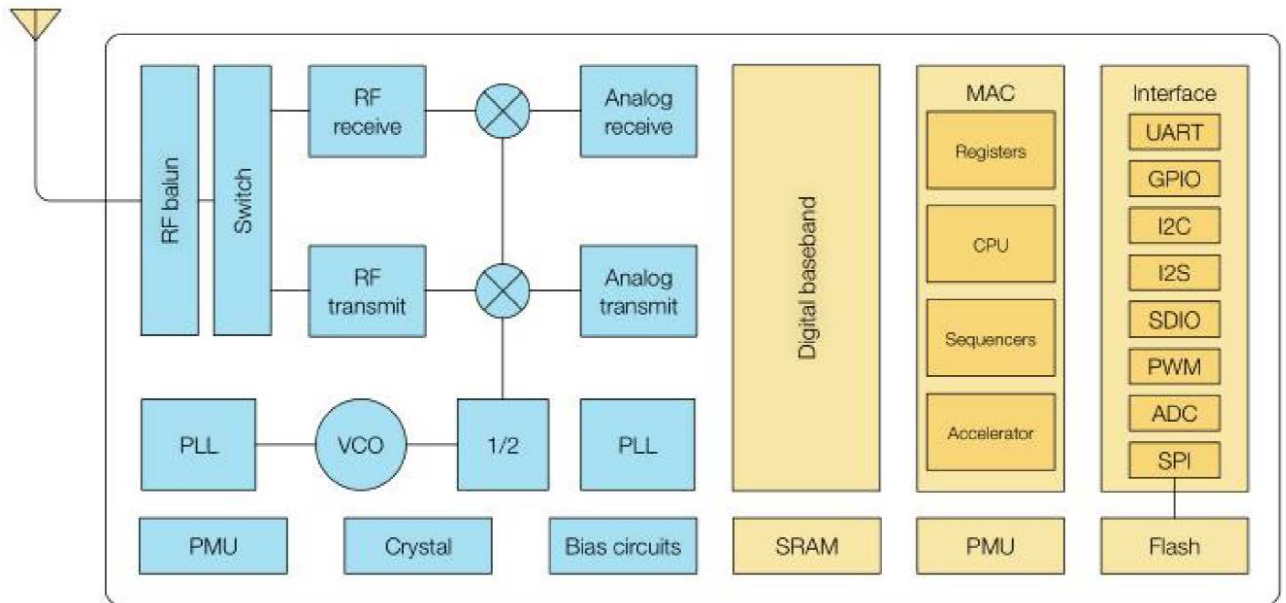

Figure-1System Diagram

3.2Pin Description
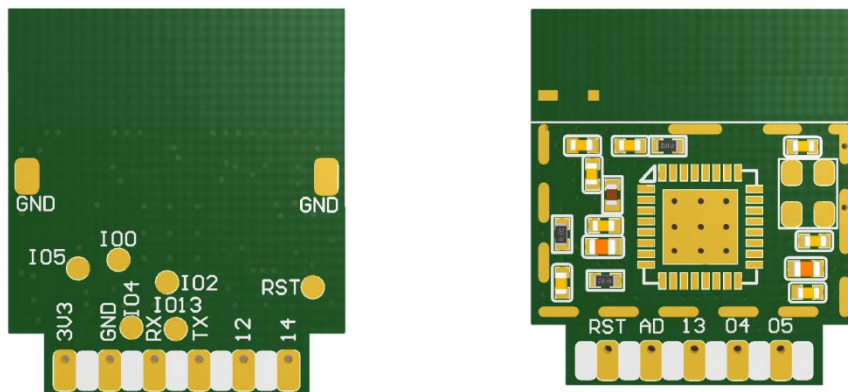
Figure-2 Physical Map

Table 1 Pin Definition and Description

Pin	Name	Description
1	RST	Reset Pin, Active Low
2	AD	Detecting chip VDD3P3 supply voltage or ADC pin input voltage (not available at the same time). Input voltage range 0~1V, the value range is 0~1024.
3	13	GPIO13
4	04	GPIO4

5	05	GPIO5
6	3V3	Module power supply pin, Voltage 3.0V ~ 3.6V
7	GND	GND
8	RX	UART0_RXD; GPIO3
9	TX	UART0_TXD; GPIO1
10	12	GPIO12
11	14	GPIO14

Note：

Table-2 Pin Mode

Mode	RST	TXD0	IO15	IO0	IO2
UARTDownload Mode	High	High	Low	Low	High
Flash Boot Mode	High	High	Low	High	High

Table-3 Interface Description

Name	Pin	Function Description
HSPI Interface	IO12(MISO),IO13(MOSI),IO14(CLK),IO15(CS)	Can connect external SPI Flash, display and MCU etc.
PWM Interface	IO12(R),IO15(G),IO13(B)	The official demo provides4-channel PWM (user can expand to 8-channel), can be used to control lights, buzzers, relays and motors, etc.
IR Interface	IO14(IR_T), IO5(IR_R)	The functionality of Infrared remote control interface can be implemented via software programming. NEC coding, modulation, and demodulation are used by this interface. The frequency of modulated carrier signal is 38KHz.
ADC Interface	ADC	ESP8285EX Integrated 10-bit precision SARADC. ADC_IN interface is used to test the power supply voltage of VDD3P3(Pin 3 and Pin 4), as well as the input voltage of TOUT (Pin 6). It can be used in sensors application.
I2C Interface	IO14(SCL), IO2(SDA)	Can connect to external sensor and display, etc.
UART Interface	**UART0:** TX0(U0TXD),RX0(U0RXD), IO15(RTS),IO13(CTS) **UART1:** IO2(TX0)	Devices with UART interfaces can be connected **Download：** U0TXD+U0RXD or GPIO2+U0RXD **Communication：** (UART0):U0TXD,U0RXD,MTDO(U0RTS),MTCK(U0CTS) **Debug：** UART1_TXD(GPIO2)Can be used to print debugging information
		By default, UART0 will output some printed information when the device is powered on and is booting up. If this issue exerts influence on some specific applications, users can exchange the inner pins of UART when initializing, that is to say, exchange U0TXD, U0RXD with U0RTS, U0CTS.

3.3 Electrical Characteristic

3.3.1 Maximum Ratings

Table- 4. Maximum Ratings

Ratings	Condition	Value	Unit
Storage Temperature	/	-20 to 85	°C
Maximum Soldering Temperature	/	260	°C
Supply Voltage	IPC/JEDEC J-STD-020	+3.0 to +3.6	V

3.3.2 Recommended Operating Environment

Table -5 Recommended Operating Environment

Working Environment	Name	Min Value	Typical Values	Max Value	Unit
Operating Temperature	/	-20	20	85	°C
Supply Voltage	VDD	3.0	3.3	3.6	V

3.3.3 Digital Port Characteristics

Table -6 Digital Port Characteristics

Port	Typical Values	Min Value	Max Value	Unit
Input low logic level	VIL	-0.3	0.25VDD	V
Input high logic level	VIH	0.75vdd	VDD+0.3	V
Output low logic level	VOL	N	0.1VDD	V
Output high logic level	VOL	0.8VDD	N	V

3.4 Power Consumption

3.4.1 Operating Power Consumption

Table -7 Operating Power Consumption

Mode	Standard	Speed Rate	Typical Value	Unit
Tx	11b	11	220	mA
	11g	54	110	
	11n	MCS7	100	
Rx	All rates		76	mA

Note: RX mode data packet length is 1024 bytes;

3.4.2Standby Power Consumption

The following current consumption is based on 3.3V supply and a voltage stabilizer, in 25°C ambient temperature. Values are measured at antenna port without SAW filter. All the transmission measurements values are based on 90% duty cycle, continuous transmission mode.

Table -8 Standby Power Consumption

Mode	Status	Typical Value
Standby	Modem Sleep	~20mA
	Light Sleep	~2mA
	Deep Sleep	~20uA
	Off	~0.5uA

3.5RF Characteristics

3.5.1RF Configuration and General Specifications of Wireless LAN

Table-9 RF Configuration and General Specifications of Wireless LAN

Items	Specifications		Unit
Country/Domain Code	Reserved		—
Center Frequency	11b	2.412-2.472	GHz
	11g	2.412-2.472	GHz
	11n HT20	2.412-2.472	GHz
Rate	11b	1, 2, 5.5, 11	Mbps
	11g	6, 9, 12, 18, 24, 36, 48, 54	Mbps
	11n 1stream	MCS0, 1, 2, 3, 4, 5, 6, 7	Mbps
Modulation type	11b	DSSS	—
	11g/n	OFDM	—

3.5.2 RF Tx Characteristics

Table-10 Emission Characteristics

Mark	Parameters	Condition	Min Value	Typical Value	Max Value	Unit
Ftx	Input Frequency	—	2.412	—	2.484	GHz
Pout		Output Power				
		802.11b, 11Mbps	14	16	18	dBm
		802.11g, 54Mbps,	12	14	16	dBm
		802.11n, Ht20,MCS7	11	13	15	dBm

3.5.3RF Rx Characteristics

Table-11RF Receiving Characteristics

Mark	Parameters	Condition	Min Value	Typical Value	Max Value	Unit
Frx	Input Frequency	—	2.412	—	2.484	GHz
Srf	Sensitivity					
	DSSS	1 Mbps	—	-90	—	dBm
		11 Mbps	—	-85	—	dBm
	OFDM	6 Mbps	—	-88	—	dBm
		54 Mbps	—	-70	—	dBm
	HT20	MCS7	—	-67	—	dBm

4. Application Specification

4.1 Module Size
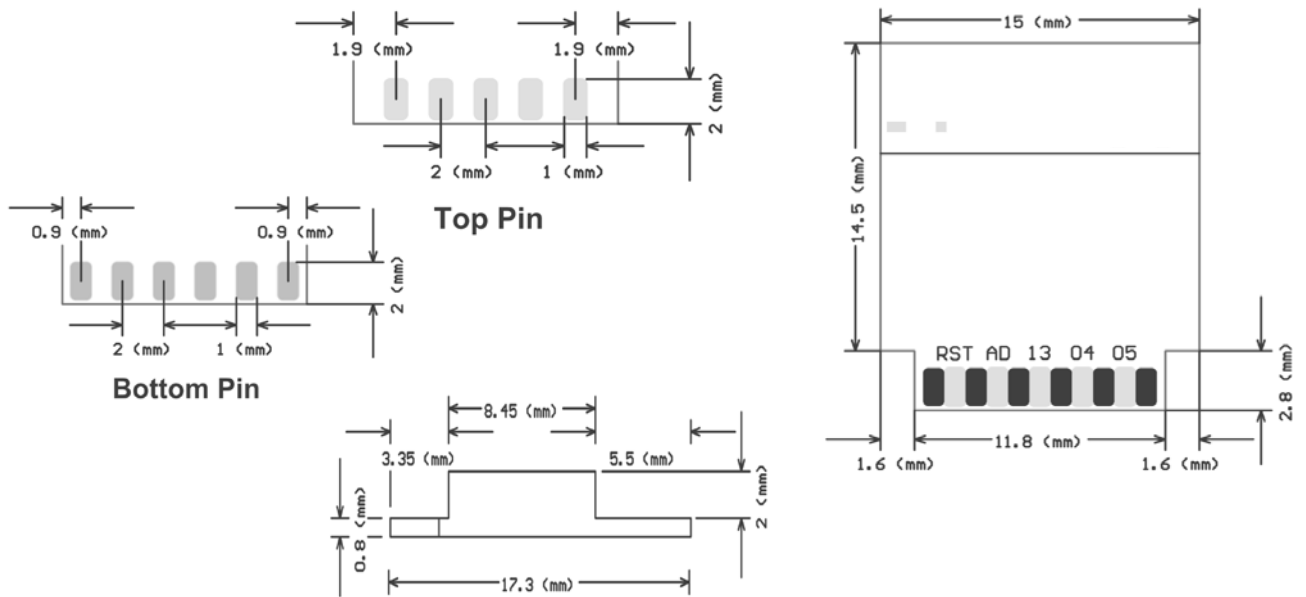
Figure -4 Module Size

4.2 Reflow Profile

升温区 — 温度：25～150°C 时间：60～90s 升温斜率：1～3°C/s
预热恒温区 — 温度：150～200°C 时间：60～120s
回流焊接区 — 温度：>217°C 时间：60～90s；峰值温度：235～250°C 时间：30～70s
冷却区 — 温度：峰值温度～180°C 降温斜率 -1～-5°C/s
焊料 — 锡银铜合金无铅焊料 (SAC305)
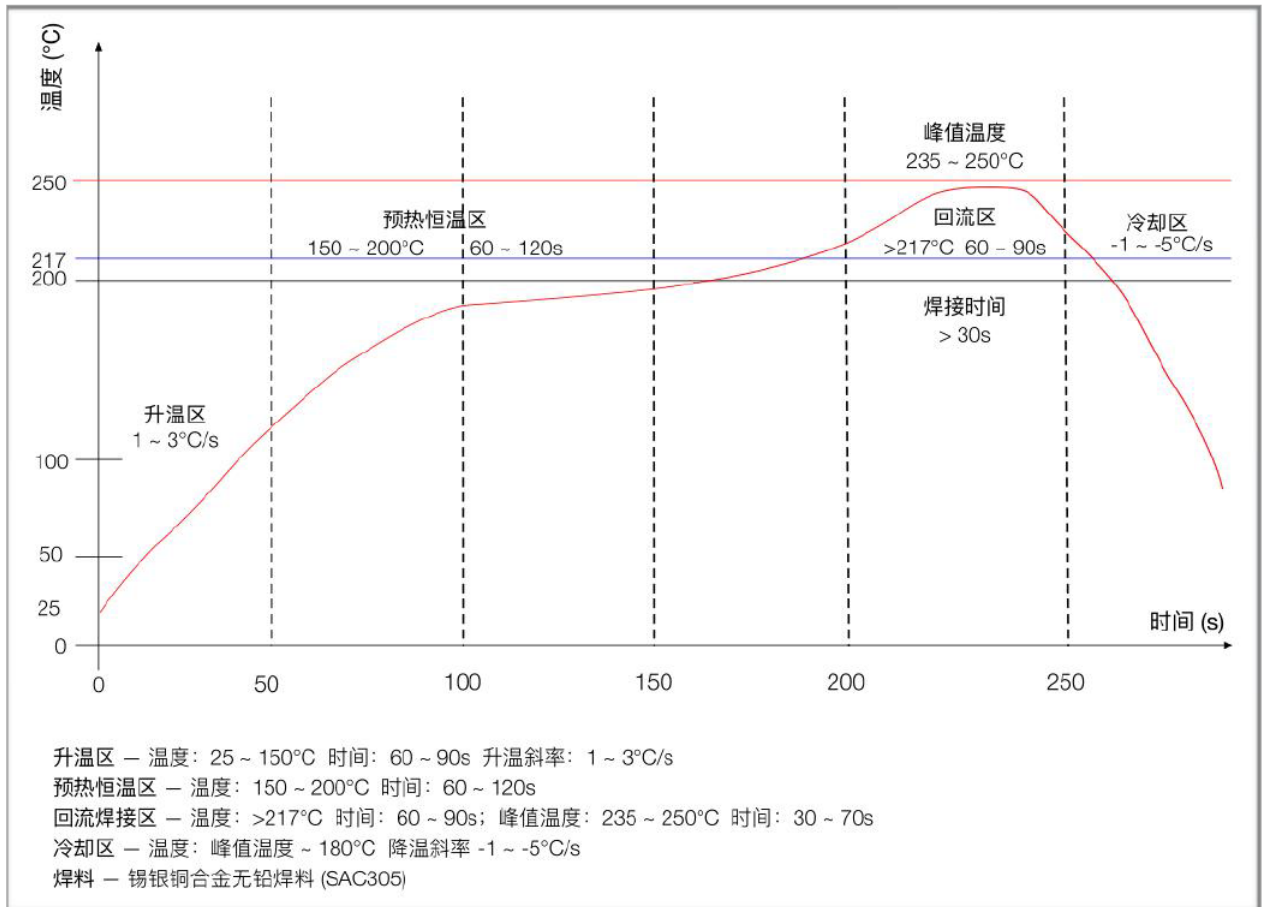
5. Product Trial

- Sales：sales@wirless-tag.com

- Technical Support ：technical@wireless-tag.com