T102 Wi-Fi module V1.0

1. Product Overview

T102 is a low-power embedded Wi-Fi module developed by Shenzhen Shengchuangwei Technology Co., Ltd. It consists of a highly integrated radio frequency chip RTL8710BN and a small number of peripheral devices, built-in Wi-Fi network protocol stack and a wealth of library functions. The T102 embeds ARM-CM4 MCUs, 1Mbyte of flash memory, 256Kbytes of SRAM and a wealth of peripheral resources.

The T102 runs the RTOS platform and integrates all Wi-Fi MAC and TCP/IP protocol libraries. Based on these, users can develop embedded Wi-Fi products that meet their needs.

The functional schematic of the T102 is shown in Figure 1:

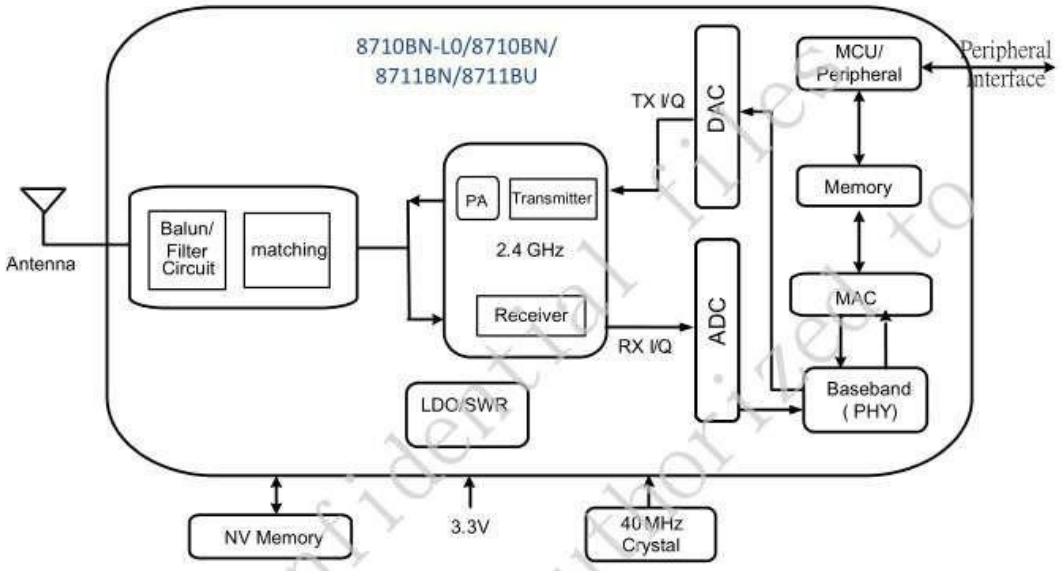


Figure 1 T102 functional schematic

1.1 Features

- Built-in ARM_CM4 MCU, can double as application processor
- Main frequency support 125MHz
- Working voltage: 3.0V-3.6V
- Peripherals: 9×GPIOs, 1×UART, 5×PWM
- Wi-Fi connectivity
- 802.11 b/g/n
- Channel 1-14@2.4GHz
- Support WPA/WPA2 security mode
- Output power of up to +16dBm in 802.11b mode
- STA/AP/STA+AP working mode is supported.
- Support SmartConfig features (including Android and IOS devices)
- Onboard PCB antenna
- Operating temperature: -20 ° C to 85 ° C

1.2 Main application areas

- Intelligent buildings
- Smart home / home appliances
- Smart socket, smart light
- Industrial wireless control
- Baby monitor
- Webcam
- Smart bus

This module will be used for all Main application areas

2.Module interface

Pin definition

The T102 has 2 rows of 11 pins with a pin pitch of 2mm, as shown in Figure 1:

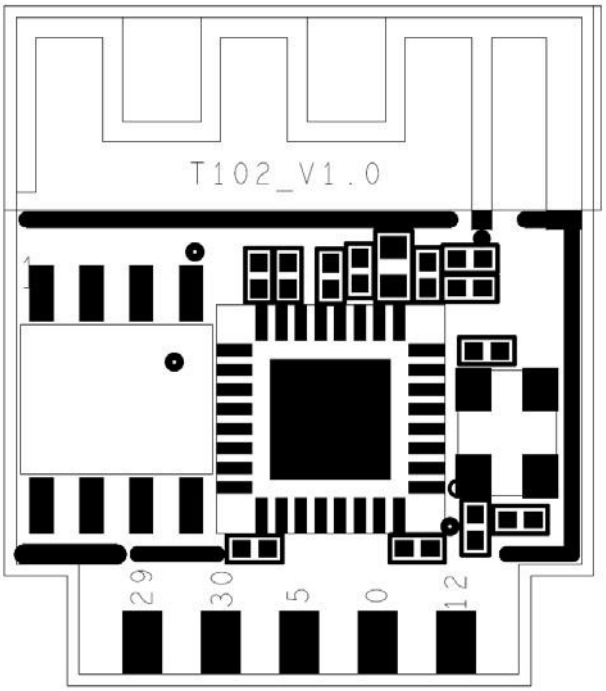
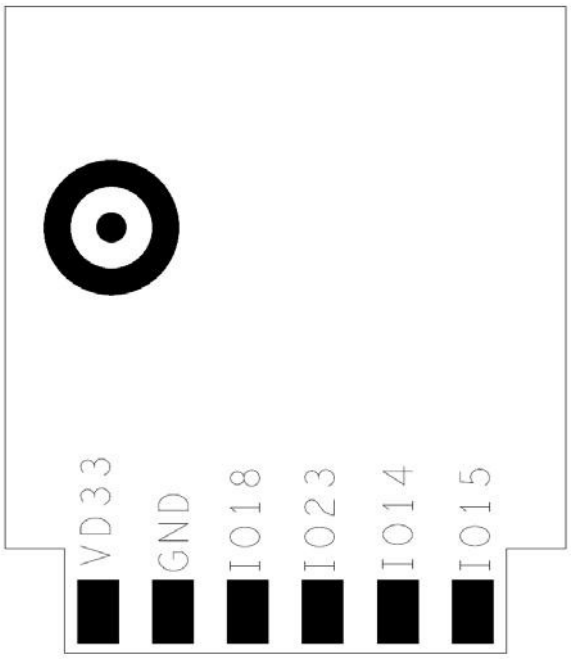


Figure 2 T102 front view



Rear view

The interface pin definitions are shown in Table 1:

Table 1 T102 interface pinout description

Serial number	symbol	IO type	Features
1	VDD	P	Module power supply pin (3.3V)
3	GND	P	Power reference ground
5	A18	I/O	GPIO_A18/UART0_RXD
7	A23	I/O	GPIO_A23/UART0_TXD
9	A14	I/O	GPIO_A14/PWM0
11	A15	I/O	GPIO_A15/PWM1
2	A12	I/O	GPIO_A12/PWM3
4	A0	I/O	GPIO_A0/PWM2
6	A5	I/O	GPIO_A5/PWM4
8	A30	I/O	GPIO_A30/DEBUG_LOG_TX
10	A29	I/O	GPIO_A29/DEBUG_LOG_RX

Description: P identifies the power supply pin, I/O represents the input and output pins, and AI represents the analog input pin.

3. Electrical parameters

3.1 Absolute electrical parameters

Table 2 Absolute parameters

parameter	description	Minimum value	Maximum	unit
Ts	storage temperature	-20	85	℃
VCC	Supply voltage	-0.3	3.6	V

3.2 Working conditions

3 Normal working conditions

parameter	description	Minimum value	Typical value	Maximum	unit
Ta	Operating temperature	-20	-	85	℃
VCC	Operating Voltage	3.0	3.3	3.6	V
VOL	IO low output	-	-	VCC*0.1	V
VOH	IO high output	VCC*0.8	-	VCC	V
Imax	IO drive current	-	-	16	mA

3.3 Wi-Fi transmission power consumption

Table 4 Power consumption during TX continuous transmission

symbol	parameter			Typical value	unit
	mode	rate	Transmit power		
I_{RF}	11b	11Mbps	+16dBm	288	mA
I_{RF}	11g	54Mbps	+14dBm	258	mA
I_{RF}	11n	MCS7	+13dBm	251	mA

3.4 Wi-Fi receiving power consumption

Table 5 Power consumption of RX continuous reception

symbol	parameter		Typical value	unit
	mode	rate		
I_{RF}	11b	11Mbps	119	mA
I_{RF}	11g	54Mbps	122	mA
I_{RF}	11n	MCS7	122	mA

3.4 Power consumption in working mode

Table 6 T102 operating current

Operating mode	Working condition, Ta=25°C	average value	unit
Fast connection network status	The module is in the state of fast connection network, and the WI-FI indicator flashes quickly.	120	mA
Hot spot distribution status	The module is in the hotspot distribution network, and the WI-FI indicator flashes slowly.	122	mA
Network connection status	The module is in a networked state and the Wi-Fi indicator is always on.	51	mA
Network disconnection status (try networking)	The module is in the working state of disconnected network (trying to connect to the network), and the Wi-Fi indicator is always off.	116	mA

4 RF characteristics

4.1 Basic RF characteristics

Table 7 Basic RF characteristics

Parameter item	Detailed description
working frequency	2.412~2.484GHz
Wi-Fi standard	IEEE 802.11b/g/n (channels 1-14)
Data transfer rate	11b:1,2,5.5, 11 (Mbps) 11g:6,9,12,18,24,36,48,54(Mbps) 11n:BW20_MCS7 65Mbps 11n:BW40_MCS7 135Mbps
Antenna type	PCB antenna (default)

4.2 Wi-Fi output power

Table 8 TX continuous transmission power

parameter		Minimum value	Typical value	Maximum	unit
mode	rate				dBm
RF average output power, 802.11b CCK Mode	11M	14	16	18	dBm
RF average output power, 802.11g OFDM Mode	54M	12	14	16	dBm
RF average output power, 802.11n OFDM Mode	BW20_MCS7	11	13	15	dBm
RF average output power, 802.11n OFDM Mode	BW40_MCS7	11	13	15	dBm
Frequency error		-10	-	10	ppm

4.3 Wi-Fi receiving sensitivity

Table 9 RX sensitivity

parameter		Minimum value	Typical value	Maximum	unit
mode	rate				dBm
PER<8%, RX sensitivity, 802.11b CCK Mode	11M	-	-86	-80	dBm
PER<10%RX sensitivity, 802.11g OFDM Mode	54M	-	-89	-83	dBm
PER<10%RX sensitivity, 802.11nOFDM Mode	BW20_MCS0	-	-89	-83	dBm
PER<10%RX sensitivity, 802.11nOFDM Mode	BW20_MCS7	-	-71	-65	dBm

5 antenna information

5.1 Antenna type

Only the PCB onboard antenna is connected.

5.2 Reducing antenna interference

When using a PCB on-board antenna on a Wi-Fi module, 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.

6. Packaging information and production guidance

6.1Mechanical dimensions

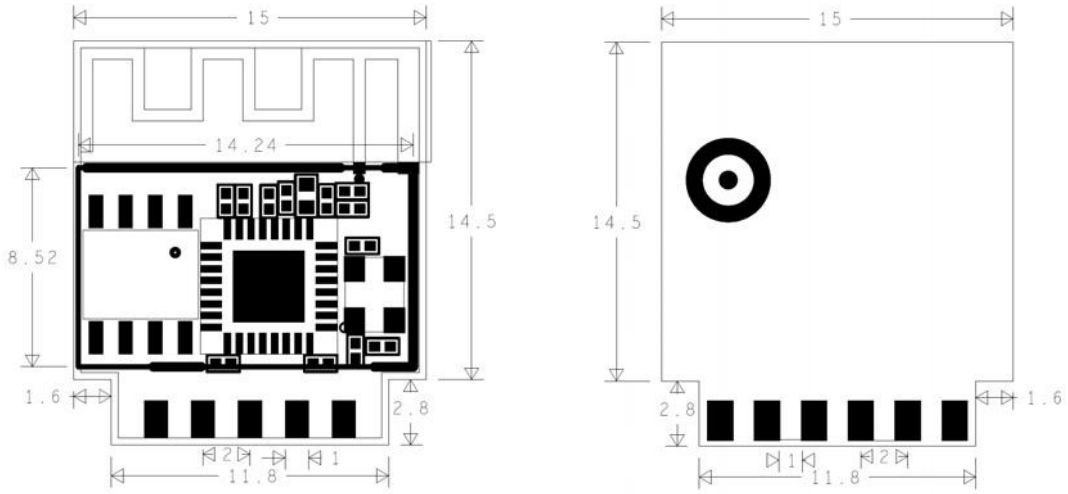


图 3 T102 Size

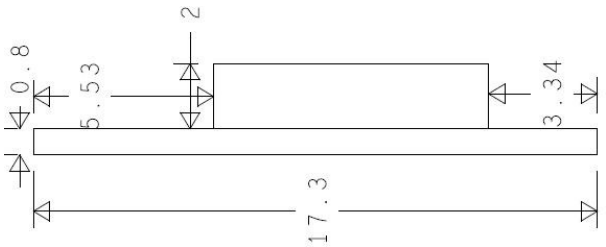


图 4 T102 Side view

6.2 PCB Recommended Package

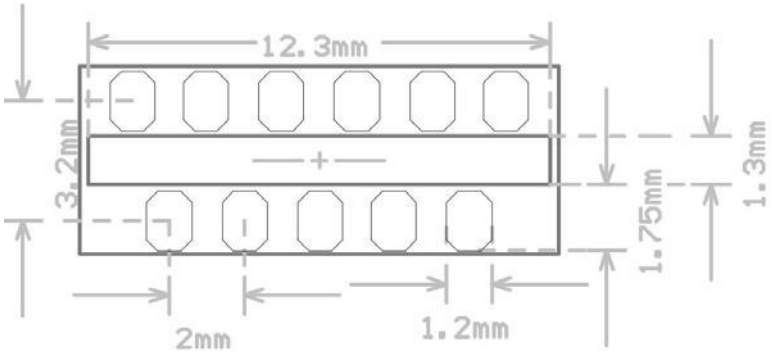


Figure 5 T102 PCB package drawing

5.3 Production Guide

The factory module storage conditions are as follows:

1. The moisture-proof bag must be stored in an environment with a temperature <30 ° C and a humidity <85% RH.

2. For dry-packed products, the shelf life should be 6 months from the date of sealing of the package.

Precautions

1. In the whole process of production, the operator of each station must wear an electrostatic ring.

2. When operating, prevent the module from getting wet or dirty.

The host will Satisfy Class I or Class Ⅱ permissive change based this module FCC ID.

If the FCC identification number is not visible when the module is installed inside the host, 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 Contains FCC ID:2ASKS-T102 or “Contains FCC ID:2ASKS-T102 .Any similar wording that expresses the same meaning may be used.

Warning：

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.

changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.
If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-- Reorient or relocate the receiving antenna.
-- Increase the separation between the equipment and receiver.
-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-- Consult the dealer or an experienced radio/TV technician for help.
NOTE: This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter

RF Exposure Statement

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance of 20Cm the radiator your body. This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter