

## 1. Product Overview

HS01 is a Wi-Fi module developed by Hangzhou Tuya Inc ,which take the communication with RS485 differential signal and transmit the data with 2.4G WIFI . It consists of a highly integrated RF chip (RTL8710BN)、RS485 chip and DC-DC components, It embedded with Wi-Fi network protocol stack and robust library functions, Besides it also contains with a low-power ARM-CM4 MCU, 2 MB flash memory, 256KB SRAM, WLAN MAC, 1T1R WLAN and rich peripheral resources.

### 1.1 Features

- ✧ Embedded with 32 bit CPU, which can be used as an application processor
  - Dominant frequency: up to 125 MHz
- ✧ Working voltage: 5 V
- ✧ Wi-Fi connectivity
  - 802.11b/g/n/HT20/HT40
  - Channels 1 to 14 at 2.4 GHz (Ch1-11 for US/CA, Ch1-13 for EU/CN)
  - WPA, WPA2, WEP, and TKIP security modes
  - Up to +17 dBm Avg output power in 802.11b mode
  - STA, AP, and STA+AP working modes
  - Smart and AP network configuration modes (for Android and iOS devices)
  - Onboard PCB antenna
  - Working temperature: -20°C to 85°C

## 1.2 Applications

- ✧ Intelligent building
- ✧ Smart household and home appliances
- ✧ Industrial wireless control
- ✧ Handheld device

## Change History

No.	Date	Change Description	Version After Change
1	2019-12-16	First release.	2.0.0

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## 2 Module Interfaces

### 2.1 Dimensions and Footprint

The electrical interface of the transfer board is ph-4aw connector, pin spacing is 1.25mm.

HS01 dimensions:  $20\text{mm} \pm 0.35\text{mm}(\text{W}) \times 40 \pm 0.35\text{mm}(\text{L}) \times 8.0 \pm 0.15\text{mm}(\text{H})$

Note : (H) is the total height of Bottom surface components and Top surface components of the transfer plate

Figure 1 shows the HS01 dimensions.

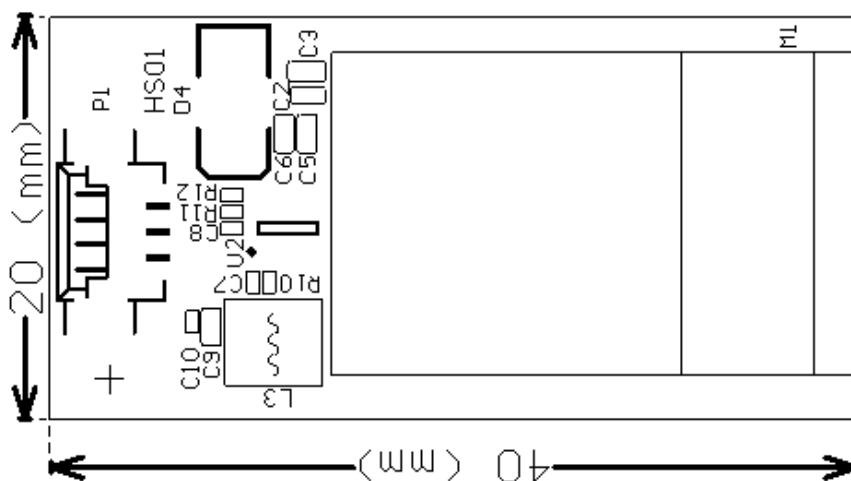


Figure 1 HS01 front views

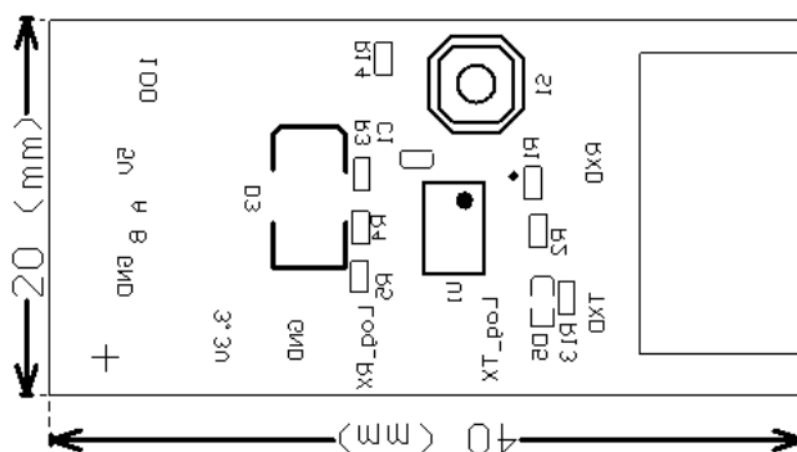


Figure 2 HS01 back views

## 2.2 Pin Definition

Table 1 describes the interface pins.

**Table 1 HS01 interface pins**

No.	Symbol	I/O Type	Function
1	A	I/O	RS485-A Interface
2	B	I/O	RS485-B Interface
3	GND	P	Power supply reference ground pin
4	5V	P	Power supply pin

Note: P indicates power-supply pins, I/O indicates input and output pins.

## 2.3 Test Pin Definition

Table 2 describes the test pins.

**Table 2 HS01 test pins**

No.	Symbol	I/O Type	Function
1	3.3V	P	Internal 3.3V Power pin for downloading and authorizing
2	GND	P	Internal GND pin
3	Rx	I/O	UART0_Rx, Used for authorization
4	Tx	I/O	UART0_Tx, Used for authorization
5	Log_Tx	I/O	Log Tx, Used for debugging to print the log information
6	Log_Rx	I/O	Log Rx, Used for debugging to print the log information

Note: Test pins cannot be used.

## 3 Electrical Parameters

### 3.1 Absolute Electrical Parameters

Table 3 Absolute electrical parameters

Parameter	Description	Minimum Value	Maximum Value	Unit
Ts	Storage temperature	−20	85	°C
VBAT	Power supply voltage	2.5	5.5	V
Static electricity voltage (human body model)	Tamb = 25°C	N/A	2	kV
Static electricity voltage (machine model)	Tamb = 25°C	N/A	0.5	kV

### 3.2 Electrical Conditions

Table 4 Normal electrical conditions

Parameter	Description	Minimum Value	Typical Value	Maximum Value	Unit
Ta	Working temperature	−20	N/A	85	°C
VBAT	Power supply voltage	4.5	5	5.5	V
V <sub>I</sub>	Input voltage at any bus terminal(separately or common mode)	-7	N/A	12	V
V <sub>IL</sub>	Low-level input voltage (driver, driver enable, and receiver enable inputs)	0	N/A	0.8	V
V <sub>IH</sub>	High-level input voltage (driver, driver enable, and receiver enable inputs)	2	N/A	VCC	V

$V_{ID}$	Differential input Voltage	-12	N/A	12	V
$I_o$	Output current, driver	-60	N/A	60	mA
$I_o$	Output current, receiver	-8	N/A	8	mA

### 3.3 RF Current

**Table 5 Current during constant transmission and transmitting**

Working Status	Parameter			Typical Value	Unit
	Mode	Rate	TX Power (EIRP)		
TX	802.11b	11 Mbit/s	+19 dBm	340	mA
	802.11g	6 Mbit/s	+16 dBm	330	mA
	11n BW20	Mcs0	15dBm	330	mA
	11n BW40	Mcs0	15dBm	330	mA

### 3.4 Wi-Fi RX Power Consumption

**Table 6 RX power consumption during constant receiving**

Symbol	Mode	Rate	Typical Value	Unit
$I_{RF}$	CPU Sleep	11 Mbit/s	90	mA
$I_{RF}$	CPU Active	54 Mbit/s	120	mA



## 4 RF Features

### 4.1 Basic RF Features

**Table 7 Basic RF features**

Parameter	Description
Frequency band	2.412 GHz to 2.484 GHz ( channels1-11 for FCC、 1-13 for CE )
Wi-Fi standard	IEEE 802.11b/g/n20/n40 (channels 1 to 14)
Data transmission rate	802.11b: 1, 2, 5.5, or 11 (Mbit/s) 802.11g: 6, 9, 12, 18, 24, 36, 48, or 54 (Mbit/s) 802.11n: HT20 MCS0 to MCS7 802.11n: HT40 MCS0 to MCS7
Antenna type	PCB antenna

### 4.2 Wi-Fi Output Power

**Table 8 TX power during constant emission**

Parameter		Minimum Value	Typical Value	Maximum Value	Unit
Average RF output power, 802.11b CCK mode	1 Mbit/s	N/A	19	N/A	dBm
Average RF output power, 802.11g OFDM mode	54 Mbit/s	N/A	16	N/A	dBm
Average RF output power, 802.11n OFDM mode	MCS7	N/A	15	N/A	dBm
Frequency error		-20	N/A	20	ppm

## 4.3 Wi-Fi RX Sensitivity

Table 9 RX sensitivity

Parameter		Minimum Value	Typical Value	Maximum Value	Unit
PER < 8%, 802.11b CCK mode	1 Mbit/s	N/A	-91	N/A	dBm
PER < 10%, 802.11g OFDM mode	54 Mbit/s	N/A	-75	N/A	dBm
PER < 10%, 802.11n OFDM mode	MCS7	N/A	-72	N/A	dBm

## 5 Antenna Information

### 5.1 Antenna Type

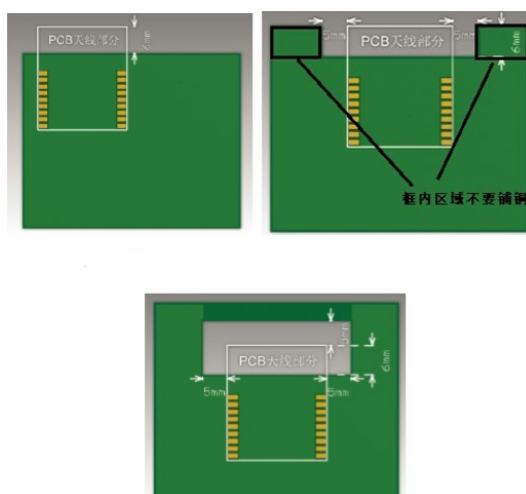
HS01 uses the onboard PCB antenna.

### 5.2 Antenna Interference Reduction

To ensure optimal Wi-Fi performance when the Wi-Fi module uses an onboard PCB antenna, it is recommended that the antenna be at least 15 mm away from other metal parts.

To prevent adverse impact on the antenna performance, do not use copper or route cables along the antenna area on the PCB.

For details about the onboard PCB antenna area on a module, see Figure 3.





## 7 MDQ and Packing Information

MOQ and packing information				
Product Model	MOQ	Packing Method	Number of Modules in Each Reel Pack	Number of Reel Packs in Each Box
HS01				

## 8 Appendix: Statement

Federal Communications Commission (FCC) Declaration of Conformity

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this 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.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

15.105 Information to the user.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

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.

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 and your body.

#### Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.

The firmware setting is not accessible by the end user.

The final end product must be label led in a visible area with the following:

“Contains Transmitter Module 2ANDL-HS01-485”

This radio module must not installed to co-locate and operating simultaneously with other radios in host system, additional testing and equipment authorization may be required to operating simultaneously with other radio.

## Declaration of Conformity European notice



Hereby, Hangzhou Tuya Information Technology Co., Ltd declares that this WIFI module product is in compliance with essential requirements and other relevant provisions of Directive 2014/53/EC. A copy of the Declaration of conformity can be found at <http://www.tuya.com>.

EN 300 328 V2.2.2

EN 301 489-1 V2.2.3; Draft ETSI EN 301 489-17 V3.2.2

EN 62311:2008; EN 50665:2017

EN 62368-1:2014+A11:2017