ESP-8285

Product Instructions

Version V1.0

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About this manual

This manual specifically addresses the product characteristics, basic parameters, pin layout and definitions of the ESP-8285 module, RF finger,

Each party such as mark, dimension diagram, peripheral circuit diagram and module placement shall talk about the parameters and use method of the module

Clearly, contain the following sections.

Chapters	Title	Contents
Chapter 1	Product Introduction	The characteristics and applications of ESP-8285 module are summarized
Chapter 2	Product Exhibition	Show actual product pictures and description of features
Chapter 3	Electrical characteristics	List the basic parameters of the product
Chapter 4	Pin Definition	Provides pin layout, definitions, and pin function descriptions
Chapter 5	Function description	Function description, WiFi configuration process and OTA upgrade
Chapter 6	Radio frequency index	Provide module radio frequency characteristic table
Chapter 7	Dimension drawing	The dimension diagram and package dimension diagram of the module are provided
Chapter 8	Schematic diagram of peripheral design	Provide peripheral circuit design reference circuit
Chapter 9	Module placement guide	Provide instructions and diagrams for module placement

Release Notes

Date	Title	Release Notes	Prepared by	Audit
2019.02.14	V1.0	First Release	Wang Pengshuai	

Attention

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1. Product Profile

The ESP-8285 is an ultra-low power Wi-Fi module based on the Lexin ESP8285,

ESP8285 incorporates industry-leading TensilicaL106 ultra-low power 32-bit miniature in smaller packages

MCU. The module has the industry's most competitive package size and ultra-low power consumption technology, designed for mobile devices and the Internet of Things

Application design that gives users' physical devices the ability to access WiFi networks for Internet or LAN connectivity

And realize the networking function. The module can be operated independently for switching control of a single household appliance,

Run on other master MCUs for slave devices. Smart devices developed using this module can be accessed locally by pressing the

Key control, or remote control by connecting the ETOR Mini-Feather Universal APP.

ESP-8285 is encapsulated by ceramic antennas and can be widely used in smart buildings, smart grids, smart transportation, smart homes, handheld devices, industrial control and other fields.

2. Product display

The ESP-8285 single channel switch module uses ceramic antennas.
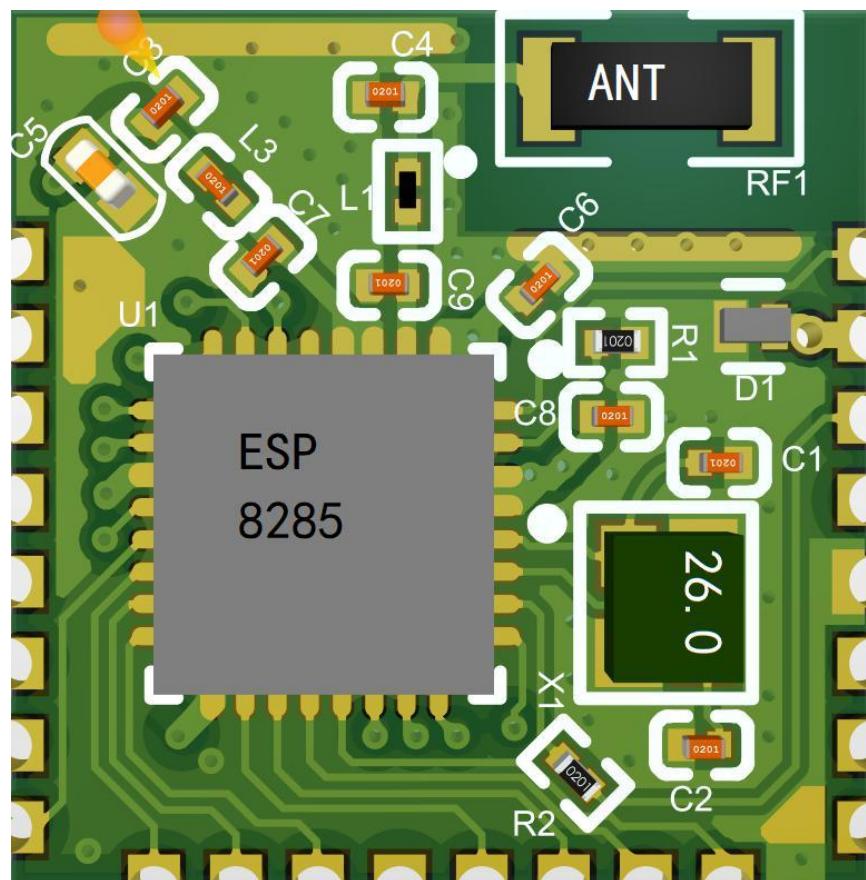
Figure 1. ESP-8285 Front view

Product characteristics

- 3.3 VDC power supply, power supply current not less than 300mA;
- Built-in TensilicaL106 ultra-low power 32-bit micro MCU, 80MHz and 160MHz main frequency support, support RTOS;
- Supports wireless 802.11 b/g/n standards;
- The contains a 10-bit high accuracy ADC.
- Supports the UART/GPIO/ADC/PWM/IIC interface;
- Wi-Fi @ 2.4 GHz, supports WPA/WPA2 security mode;
- +20.5 dBm output power in 802.11 b mode;
- The maximum serial port speed is 4 Mbps;
- Support local control;
- Supports Wi-Fi remote control;
- AP distribution network mode supporting Android and iOS systems;
- Supports serial port local upgrades and remote firmware upgrades (OTA);
- Applications: Smart Grid, Intelligent Transportation, Smart Home, Handheld Devices and Industrial Control.

3. Electrical characteristics

3.1 Rated parameters

Conditions: VDD=3. 3V ± 10%, GND=0 V; At room temperature.

Table 1. Specification of Rating Parameters

	Type	Parameters
Module	Model	ESP-8285
	Main chip	ESP8285
Hardware parameters	Hardware Interface	UART, GPIO, PWM, ADC, IIC
	Operating voltage	3.0 V-3.6 V; Supply current > 300mA; Typical 3.3 V
	GPIO drive capability	Max: 12mA
	Operating current	± 80 mA average current
		Maximum operating current: 220mA
		Standby: < 200uA
	Operating temperature	-40 ℃ ~ 125 ℃
	Storage Environment	Temperature: < 40 ℃, relative humidity: < 90% RH
	Size Size	13.5 mm × 13.7 mm × 1.9 mm
	Spectral range	2412-2484 MHz
	Antenna type	Ceramic antenna
Software parameters	Wireless network type	STA/AP/TA + AP
	Security mechanism	WEP/WPA-PSK/WPA2-PSK
	Encryption Type	WEP64/WEP128/TKIP/AES
	Network protocol	IPv4, TCP/UDP/FTP/HTTP
	Firmware upgrade	OTA Remote Upgrade

3.2 WI-FI parameters

Conditions: VDD=3. 3V ± 10%, GND=O V; At room temperature.

Table 2. Wi-Fi Parameter Description

	Type	Parameters
Wi-Fi parameters	Wireless Standard	IEEE 802.11 b/g/n
	Frequency Range	2.4 GHz-2.5 GHz (2400M-2483.5 M)
	Transmit power	802.11 b: +20 ± 2 dBm @ 11Mbps
		802.11 g: +17 ± 2 dBm @ 54Mbps
		802.11 n: +14 ± 2 dBm (@ HT20, MCS7)
	Reception sensitivity	802.11 b:-91dBm (@ 11Mbps, CCK)
		802.11 g:-75dBm (@ 54Mbps, OFDM)
		802.11 n:-72dBm (MCS7)

4. Pin Definitions

The ESP-8285 module provides a single-channel switch control interface, a Wi-Fi LED interface, and a UART serial port.
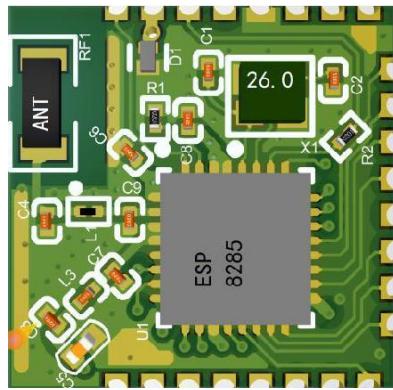
Figure 2. Module Pin Front Arrangement Figure 3. Module Pin Back Arrangement Figure
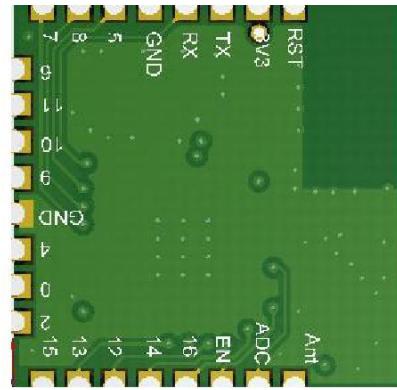

Figure 4. Block Pinout Diagram

Table 3. Pin Definitions and Function Descriptions

Pin	Name	Function
1	ANT	Wi-Fi Antenna
2	ADC	ADC interface, 0-1V input range
3	EN	Chip enable
4	GPIO16	GPIO16
5	GPIO14	GPIO14
6	GPIO12	GPIO12: Relay switch, active high
7.	GPIO13	GPIO13: Wi-Fi status indicator lamp, connected to LED lamp series current limiting
8	GPIO15	GPIO15
9	GPIO2	GPIO2: UART1_TX available for burn-write flash memory
10.	GPIO0	GPIO0
11	GPIO4	GPIO4
12	GND	GND
13	GPIO9	GPIO9
14	GPIO10	GPIO10
15	GPIO11	GPIO11
16	GPIO6	GPIO6
17	GPIO7	GPIO7
18	GPIO8	GPIO8
19	GPIO5	GPIO5
20	GND	GND
21	RX	UART_RX for writing Flash
22	TX	UART_TX for writing Flash
23	3V3	Power Supply
24	RST	External reset signal: active low

5. Function description

5.1 Module Function Description

The ESP-8285 module can be used as a single-channel switching device, either locally or remotely via APP. The following is a functional description:

1. Distribution network mode: AP configuration mode. Press the key (IOO pull-down, default high) for more than 5s to enter AP distribution network mode.

2. Switch: Under normal condition, click the key (IOO pull-down more than 100ms) to turn on and off the control relay (IO12 output high/low level);

3. Power-Up Status: Relay power-up is off by default.

5.2 Basic workflow for Wi-Fi modules

The device module is a "isolated island of information" when it is not connected to the LAN. The device-side operation, together with the APP setting of Weiyu Wanlian, enables the device to obtain the necessary information for joining the service network, including router SSID, Password, server IP, port number, and so on. Module built-in configuration: the module is in AP mode, the mobile terminal as a station to join the AP to form a local area network to achieve data interaction. Press the configuration key 5S for a long time to enter the distribution network mode. Click Weiyu Wanlian APP Add Device (iOS mobile terminal needs to manually connect the SSID to which it needs to connect in the Settings menu, such as the hotspot of ETOR-GWM, Password: 11111111, which is not required for Android terminal), enter the SSID and Password of the home router, and complete the online preparation of the device.

The device module goes through the following process from power-up to the connection server:

1. Join that configure router to connect to the Internet;

2, connecte that scheduling serv to obtain the information of the long-connected cloud server;

3. Connecte to a long-connected cloud server;

4. Registration of equipment, bound to the Weiyu Wanlian account;

5. Obtain equipment application parameters and keep them online.

Each of the above steps has a backoff policy and a reconnection mechanism when the connection/acquisition fails. Make sure the equipment is stable and real-time online.

5.3 OTA Upgrade

The device connects to the upgrade server, remotely updates to the latest version of firmware, and realizes the online upgrade of the device.

6. Radio frequency indicators

Conditions: VDD=3. 3V ± 10%, GND=0 V; At room temperature.

Table 4. Description of RF metrics

Description	Minimum	Usually	Maximum	Unit
Input Frequency	2412	–	2484	MHz
Output Resistance	–	39 +j6	–	A) The fact that
Input reflection	–	–	−10	DB
Output Power of PA at 72.2 Mbps	15.5	16.5	17.5	DBm
Output Power for PA in 802.11 b Mode	19.5	20.5	21.5	DBm
Sensitivity				
CCK1Mbps		−98		DBm
CCK11Mbps		−91		DBm
6Mbps (1/2 BPSK)		−93		DBm
54Mbps (3/464-QAM)		−75		DBm
HT20, MCS7 (65 Mbps, 72.2 Mbps)		−72		DBm
Adjacent frequency suppression				
OFDM, 6Mbps		37		DB
OFDM, 54Mbps		21		DB
HT20, MCS0		37		DB
HT20, MCS7		20		DB

Note:

1) 72.2 Mbps was measure in 802.11 n mode with MCS=7 and GI=200uS;

2) Output power up to +21.5 dBm in 802.11 b mode;

7. Dimension drawing

封装尺寸图
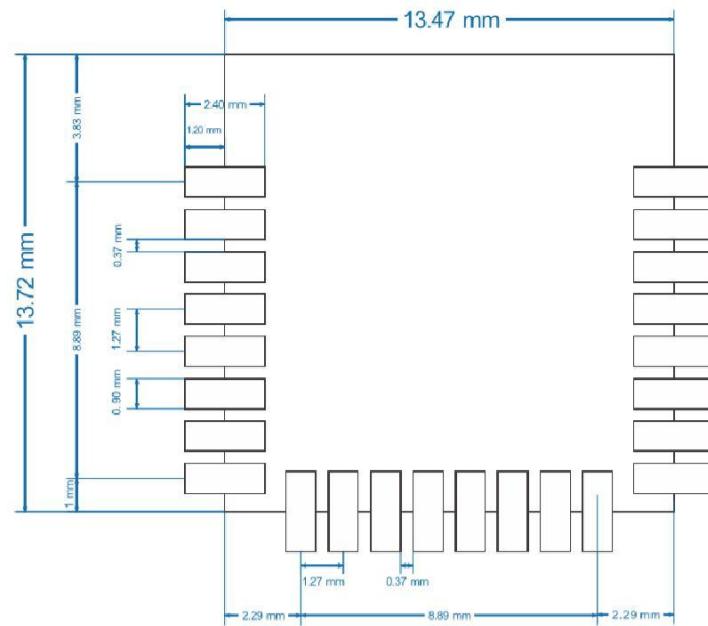
实物尺寸图
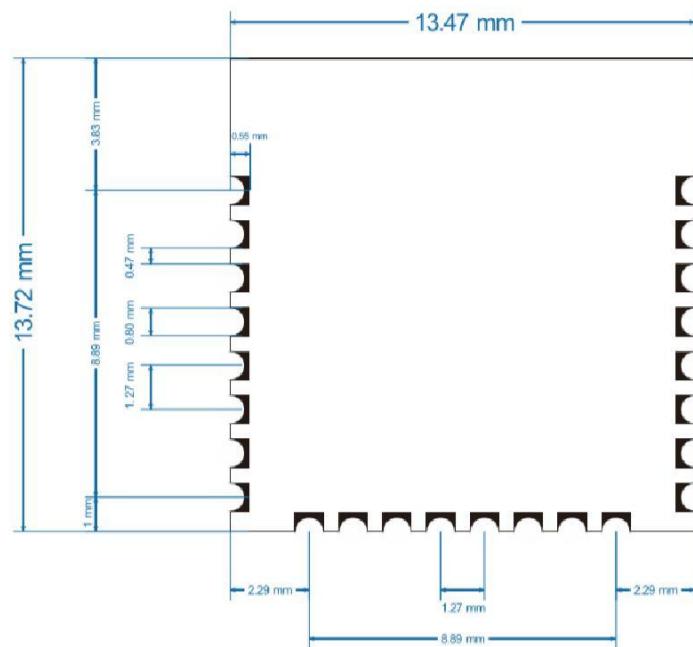
Figure 4. Dimension Diagram

8. Schematic diagram of peripheral design
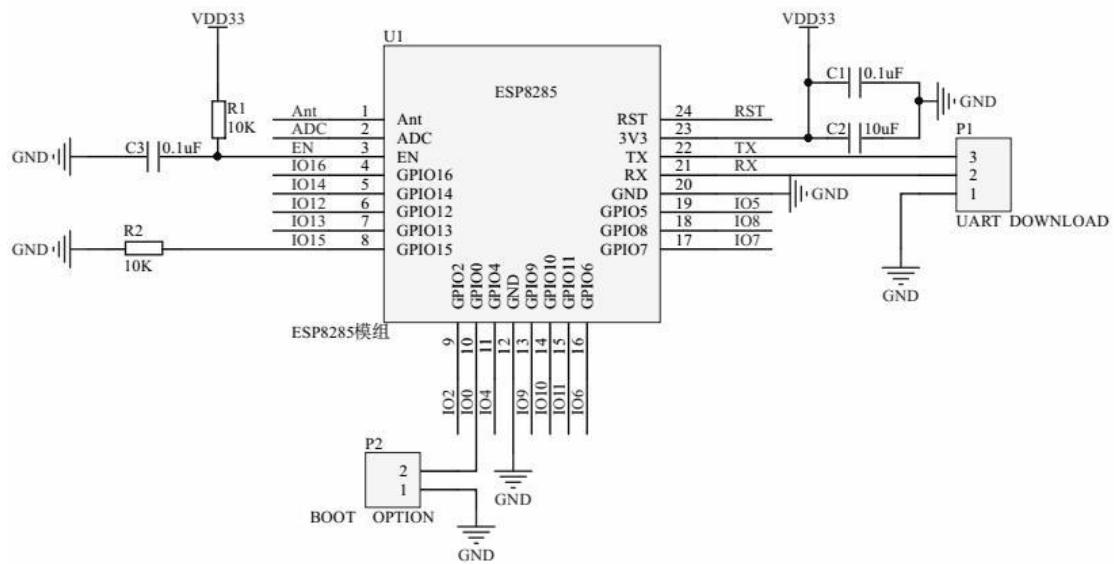
Figure 5. Peripheral Circuit Schematic

The IO0/IO2/IO15/EN and RST pins of the module are internally pulled up and can be powered directly for operation.				
The mode of the module can be controlled by controlling the level of IO0/IO2/IO15, as shown in the following table:				
GPIO15	GPIO0	GPIO2	Mode
1	X	X	
0	0	1	Uart Download
0	1	1	Flash Boot

9. Module placement guide

The ESP-8285 module can be soldered to the PCB backplane. For optimum RF performance of the end product, please note that the placement of the module on the backplane is designed in a reasonable manner in accordance with this guide. The module uses 2.4 GWi-F

The arrangement of the antenna outside the board frame or along the board edge and hollowed out below (at least 5.0 mm from both sides of the PCB antenna to both sides of the base plate) has little effect on the RF performance, which is comparable to the RF performance of the module tested separately.

If the design is limited, the PCB antenna must be placed on the backplane. Place the antenna along the edge of the board and hollowed out or uncopper it. This way the RF performance will be somewhat impaired.

If the antenna is placed in the backplane, the radio frequency signal can not be well radiated and received.

For details of several common placement schemes of the module, please refer to the scheme diagram below. After rigorous RF analysis, the RF performance of various placement schemes in the scheme diagram is analyzed as follows:

1. The RF performance of scenarios 1, 2, and 3 is close. That is, the arrangement of the antenna outside the board frame, or the antenna along the board edge and hollowed out below (at least 5.0 mm from both sides of the PCB antenna to both sides of the base plate) has no significant impact on the RF performance, which is equivalent to the RF performance of the module tested separately.

2. If the design is limited and the PCB antenna must be placed on the backplane, refer to the arrangement in Scheme 4, where the antenna is placed along the edge of the board without copper underneath, which results in some loss of RF performance. Alternatively, the arrangement of scheme 5 may be adopted, and the antenna portion may be separated by an opening in the middle of the plate, but scheme 5 is not recommended if scheme 1-4 may be adopted.

3. Option 6 has the worst RF performance. Because the antenna is placed in the backplane, the radio frequency signal can not be radiated and received well.

Guide diagram for placement of modules:
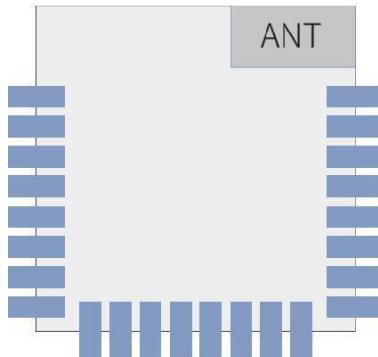
Scenario 1: Single module, no backplanScenario 2: Antenna outside the frame
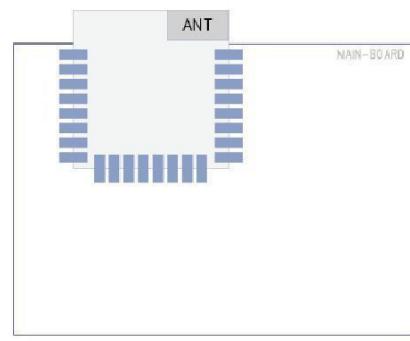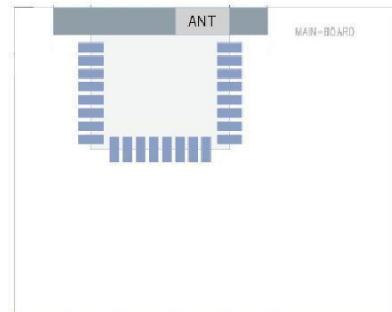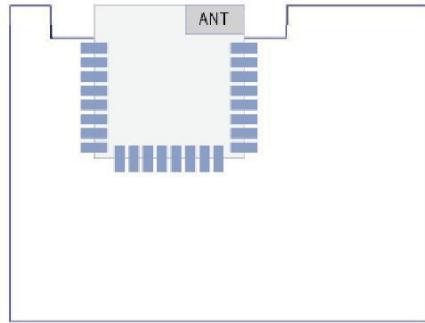
Scenario 3: The antenna is placed along the edge of the plate and hollowed out below the plate.
Scenario 4: The antenna is placed along the edge of the plate and there is no copper under it
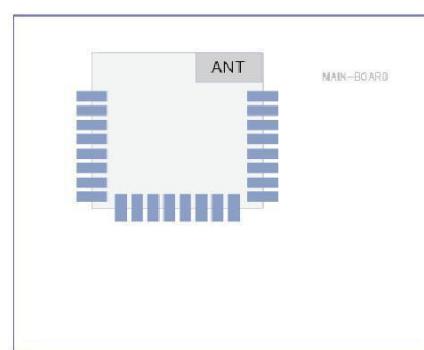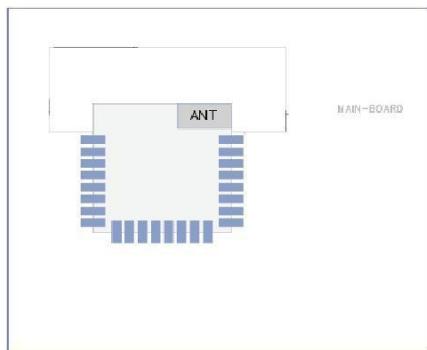
Scheme 5: The antenna board frame is placed and hollowed out below
Scheme 6: The antenna is in the board frame (there is no clearance below)

FCC Statement

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.

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 and your body.