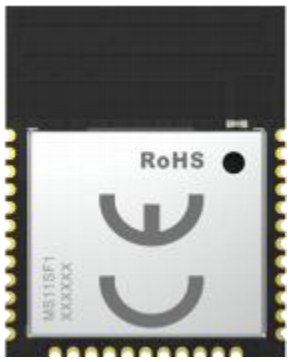
WiFi BLE Transparent Transmission Module

MS11SF1



MS11SF1-ESP32C3

Support 2.4G Wi-Fi4（IEEE802.11 b/g/n），support AP/STA/AP +STA Mode, Tiny size

MS11SF1 is a WIFI + BLE Soc combo module that supports WIFI 4 as well as BLE 5.0. This module supports Wi-Fi4 + BLE 5.0, equipped with RISC-V 32-bit single-core processor, the operating frequency up to 160MHz. MS11SF1 supports the use of AT commands to development, through the serial port to send AT commands to configure the Wi-Fi, BLE, to achieve the function of pass-through. BLE single packet can support up to 514 bytes to be sent, the chip wakes up BLE and BLE and WIFI start at the same time when the chip wakes up, WIFI is STA mode by default and BLE is broadcast mode.

FEATURES

- Bluetooth 5.0
- Dual-core high performance
- IEEE802.11 a/b/g/n, 2.4GHz & 5GHz
- Support HT20/HT40 mode
- Support optional PCB/IPEX antenna
- Support WiFi AP/STA/AP+STA mode
- Supports built-in AES/DES/SHA hardware engine

KEY PARAMETER

MS11SF1			
Chip Model	ESP32C3	**Antenna**	PCB/ ANT Pin
Module size	16.6×13.2×2.2mm	**GPIO**	22
Flash	4MB	**RAM**	400KB
Receiving Sensitivity	-97dBm	**Transmission Power**	BLE: -27 ~ +18dBm Wi-Fi: +10 ~ +20dBm
Current(TX)	278mA	**Current(RX)**	87mA
Firmware	AT Firmware		

APPLICATION

Smart Home

Consumer Electronics

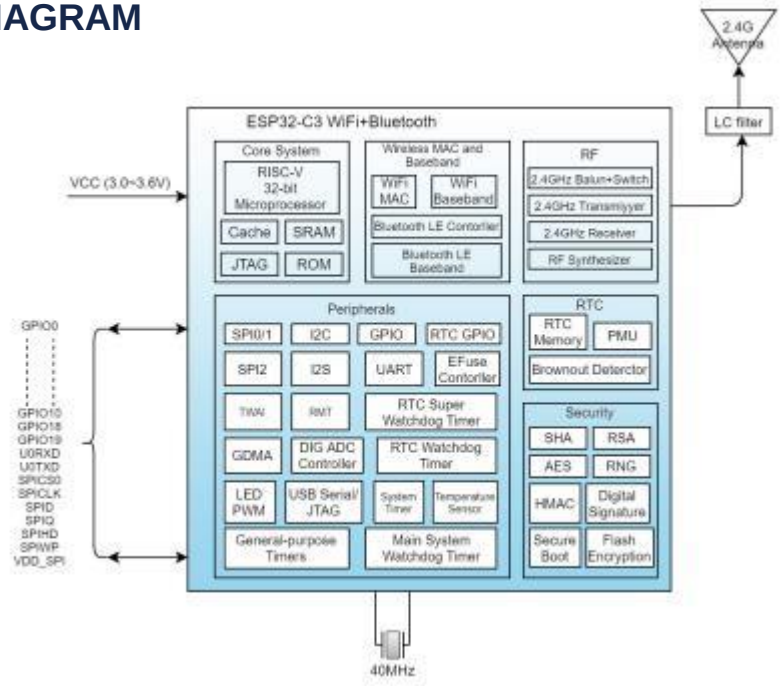
Smart Agriculture

Security Equipment

Intelligent wearable device

Automotive Devices

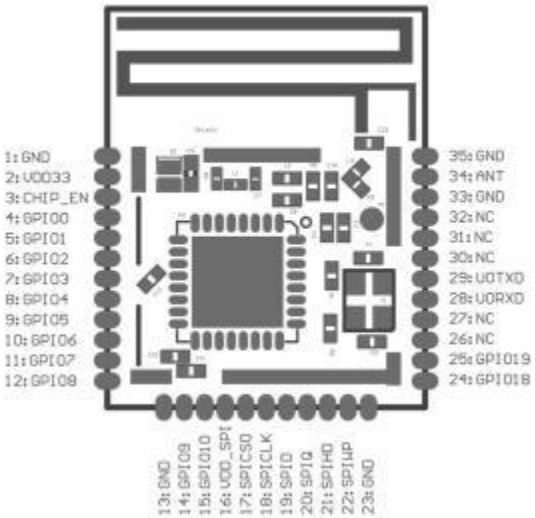
1 BLOCK DIAGRAM



2 ELECTRICAL SPECIFICATION

Parameter	Values	Notes
Working Voltage	3.3V-3.6V	To ensure RF work, supply voltage suggest not lower than 3.3V
Power supply current	≥500mA	
Working Temperature	-40℃~+85℃	
BLE Broadcast Transmission Power	-27 ~ +18dBm	Configurable
WiFi RF Transmission Power	+10 ~ +20dBm	Configurable
Receiving Sensitivityurrent	-97dBm	

3 PIN DESCRIPTION

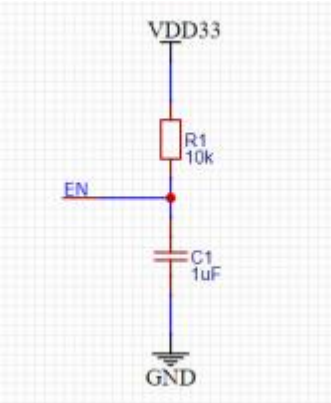


4 PIN DEFINITION

Pin Number	Symbol	Type	Definition
1	GND	Grounded	
2	VDD33	Supply Power	
3	CHIP_EN	Sleep/Wake-up pin	High level: Chip operational Low level: Chip in sleep mode
4-8	GPIO0-GPIO4	IO	General-purpose IO (GPIO), firmware not utilized.
9	GPIO5	BLE CONN-IND	High level: Connected Low level: Not connected
10	GPIO6	Serial port RX	UART1
11	GPIO7	Serial port TX	UART1
12	GPIO8	IO	General-purpose IO (GPIO), firmware not utilized.
13	GND	Grounded	
14	GPIO9	IO	General-purpose IO (GPIO), firmware not utilized.
15	GPIO10	IO	General-purpose IO (GPIO), firmware not utilized.
16	VDD_SPI	Supply Power	VDD_SPI is typically used to provide power to the chip's built-in flash or external flash. It can only be used as GPIO11 when an external flash is connected and powered separately.
17-22	SPICS0-SPIWP	IO	General-purpose IO (GPIO) or SPI interface, firmware not utilized.
23	GND	Grounded	
24-25	GPIO18-GPIO19		General-purpose IO (GPIO) or built-in USB-to-JTAG interface.
26-27 30-32	NC	-	Not connected
28	U0RXD	RXD	Used for firmware debugging
29	U0TXD	TXD	Used for firmware debugging
34	ANT	RF	Antenna pin
35	GND	Grounded	

Notice:

1. The MS11SF1 has a total of 3 SPIs (SPI0, SPI1 and SPI2). SPI0 and SPI1 can be configured in SPI memory mode, and SPI2 can be configured in general SPI mode.
2. GPIO11-GPIO17 have been connected to the SPI Flash pins inside the module and are not recommended for other functions.
3. In order to ensure the regular power supply when the MS11SF1 module is used, an RC delay circuit needs to be added to the EN pin. The RC is usually recommended to be R = 10 kΩ, C = 1 μF.

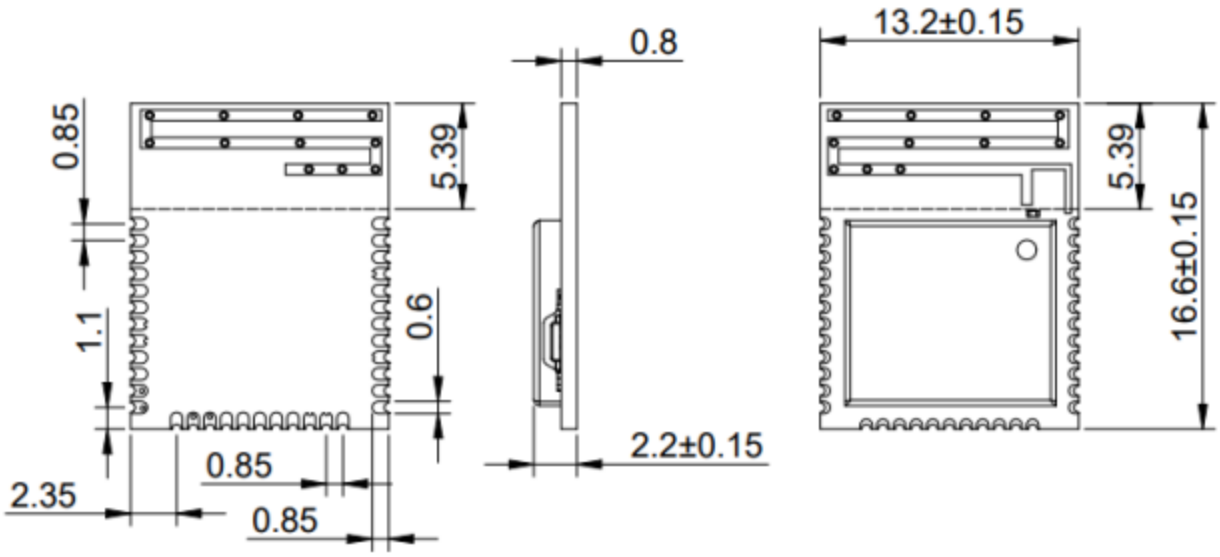


4.1 SPI data communication ports， as follows

MS11SF11	SPI	MCU-SPI
GPIO2	SPIQ/DO	MISO
GPIO6	SPICLK	SCLK
GPIO7	SPID/DI	MOSI
GPIO10	SPICS0	CS
GPIO3	HANDSHARE	HANDSHARE_EN

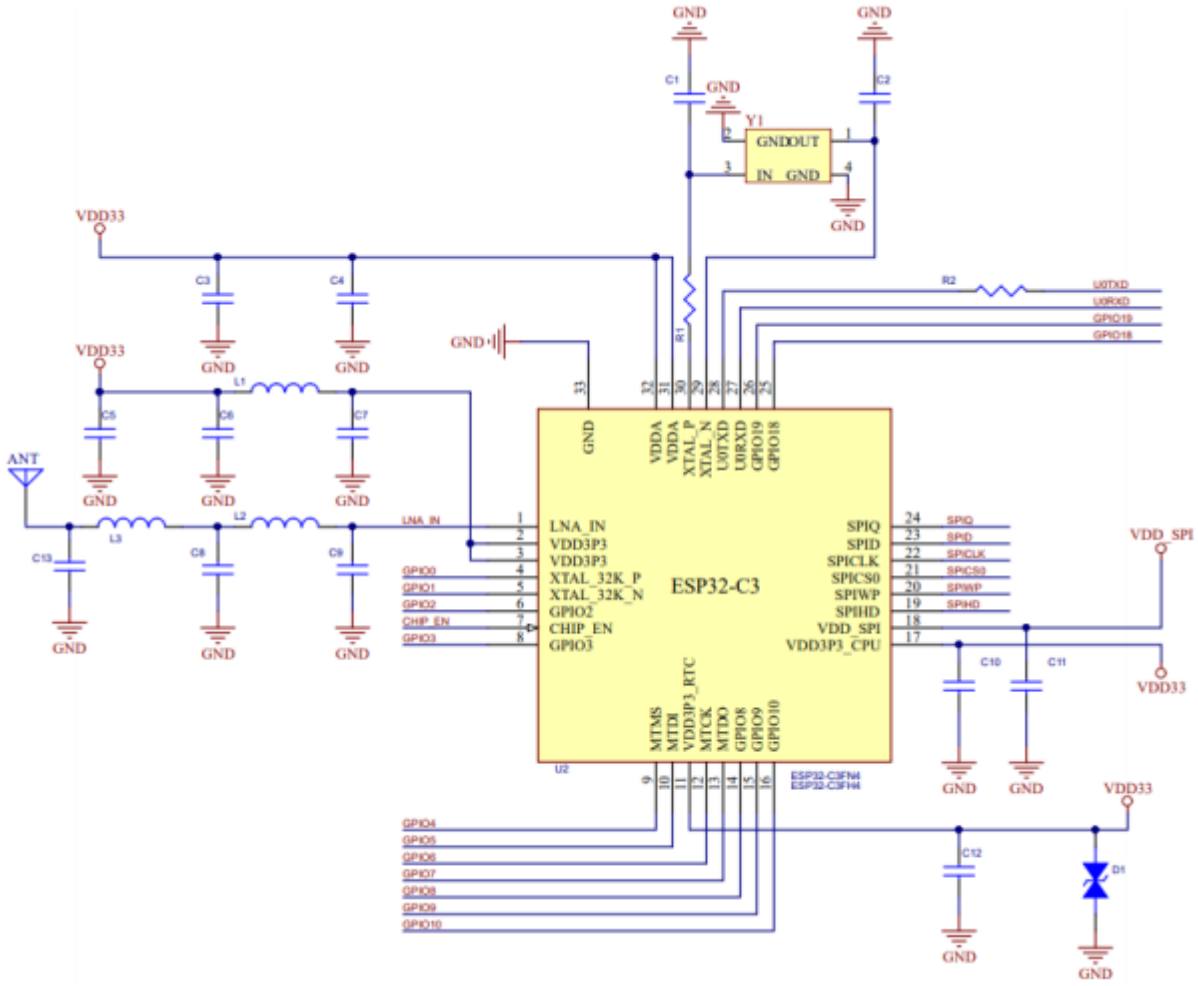
Where as the module pin-out diagram, SPI pins in the red box line, the above pins are not recommended for other functions. It is the data port connection between ESP32-C3 series chips and external flash chips.

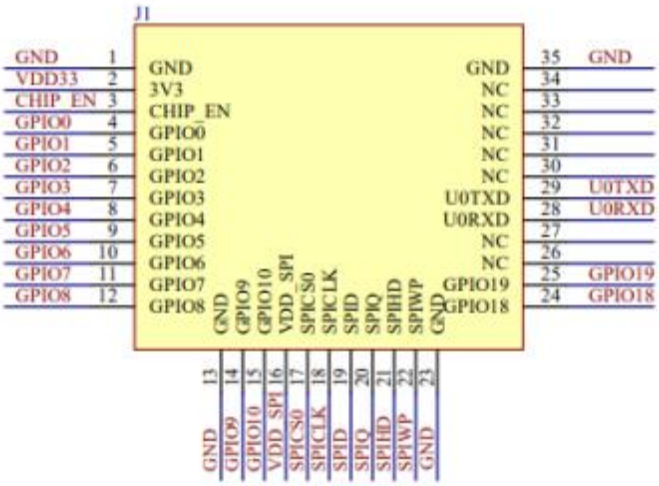
5 MECHANICAL DRAWING

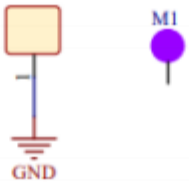


Default unit： mm Default tolerance： ±0.15

6 ELECTRICAL SCHEMATIC

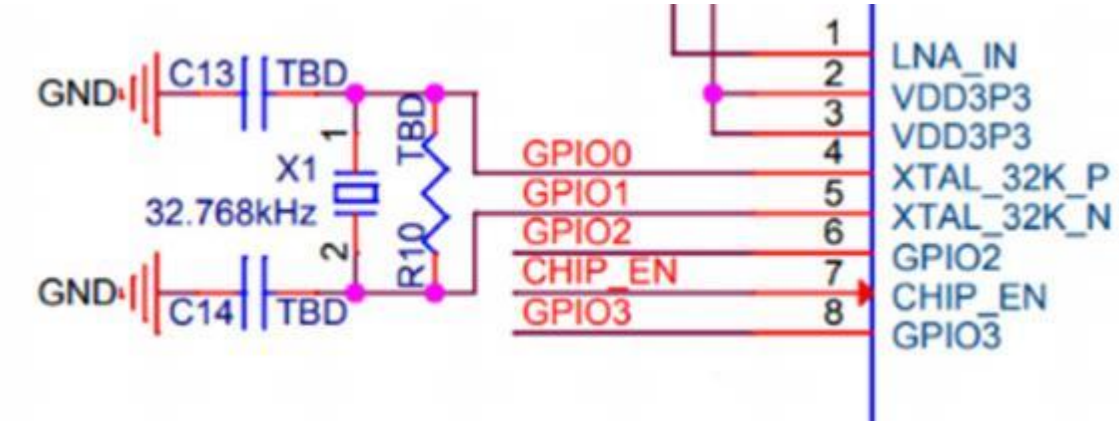






Notice: If you need to use an external antenna annoying please contact the salesman, need to internally modify the 0Ω resistor connection direction.

External RTC crystal oscillator circuit：



Notice:

The 32.768kHz crystal oscillator selected requirements:
Equivalent Series Resistance(ESR)≤70kΩ

The load capacitance values at both ends are configured according to the specifications of the crystal oscillator
Parallel resistor R10 is used for paranoid crystal oscillator,this resistor is usually NC.

If can't the RTC CLK source, else Pin 4(XTAL_3K_P) and Pin5(XTAL_32K_N) can also be configured for GPIO port.

7 TRANSPARENT TRANSMISSION FUNCTION DESCRIPTION

This firmware includes BLE slave transponder, WIFI can be setted as AP or STA mode for data transfer. WIFI can be connect- ed to a variety of cloud servers, such as Ali Cloud, Baidu Cloud, Amazon cloud, etc.. BLE and WiFi can be started at the same time, but when transmitting data, BLE has to exit instruction mode because of transmission through, and WIFI data transmis- sion is through instruction control, so BLE and WiFi can not be carried out at the same time, data transmission.

In order to ensure the normal operation of the module, the module needs to provide a stable 3.3 V voltage, CHIP-EN pin pull up, the module will be awakened, into the BLE broadcast state and serial port will be opened. WIFI is not started, needs to be configured with instructions to start.

In the instruction mode, the basic parameters of the module, BLE parameter and WIFI parameter can be configured by AT instruction. See the MS11SF1-AT command set file for details.