

# WT0132C3-S7 Datasheet

V1.0.0

July 5, 2022

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## **About this document**

This document provides users with WT0132C3-S7 specifications.

## **Document version**

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## **Revision history**

Please go to the document revision history page to view the revisions of the document.

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### Revision History

No.	Version	Changes	Change (+/-) Descriptions	Author	Date
1	V1.0.0	C	First release	Guo	July 5, 2022

\*Changes: C—create, A—add, M—modify, D—delete



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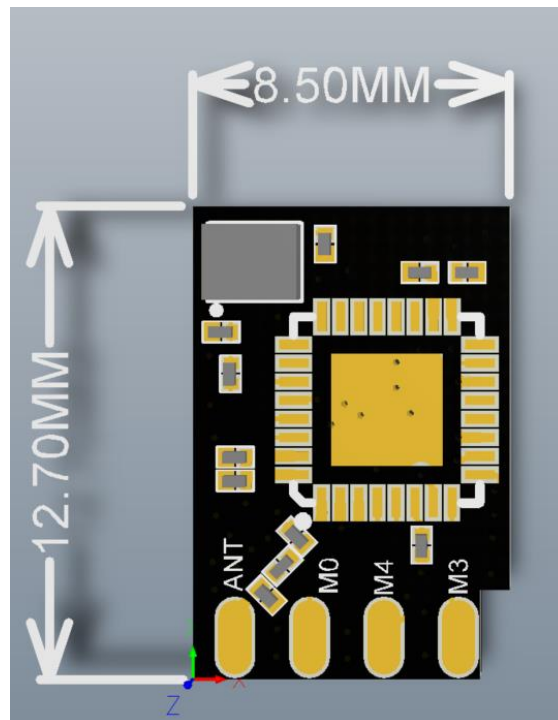
# 1 Product Overview

## 1.1 Product Introduction

WT0132C3-S7 has a built-in ESP32-C3FH4 SoC, which supports WiFi and Bluetooth LE connectivity. It integrates a 32-bit MCU that operates up to 160 MHz, 384KB of ROM and 400KB of RAM, and supports 1T1R mode with data rates up to 150 Mbps. It is a general-purpose Wi-Fi and Bluetooth low energy (Bluetooth LE) module with powerful functions and rich peripheral interfaces, which makes it an ideal choice for smart home, industrial automation, healthcare, consumer electronics, etc.

## 1.2 Module Dimensions

Parameter Type	Parameter Value
Length x Width x Height	12.7±0.35mm (L) ×8.5±0.35mm (W)×2.4±0.15mm (H)





## 2 Product Features

### 2.1 Module Parameters and Chip Features

Technical Parameter	Parameter Value
SoC	ESP32-C3FH4
Wi-Fi standard	802.11 b/g/n
Working voltage	3~3.6V
Peripheral interface	5×PWM
Flash	4M
RAM	400KB
Working frequency	2.412~2.484GHz
Transmit power	17~20.5dBm
Data rate	11b: 1, 2, 5.5 and 11 Mbps 11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 11n: MCS0-7, 72.2 Mbps (Max) 11n: MCS0-7, 150 Mbps (Max)
Receive sensitivity	-88~-93dBm
Working temperature	-40°C ~ +105°C
Technical certification	RF Certification: FCC/CE/SRRC

### 2.2 Power Consumption during Constant Transmit and Receive

Working status	Mode	Rate	Power	Average value	Peak value (typical value)	Unit
TX	11b	11Mbps	+16dBm	273	304	mA
TX	11g	54Mbps	+15dBm	265	280	mA
TX	11n	MCS7	+14dBm	250	273	mA
RX	11b	11Mbps	Constant receiving	73	83	mA



RX	11g	54Mbps	Constant receiving	75	84	mA
RX	11n	MCS7	Constant receiving	75	84	mA

## 2.3 Working Current

Working mode	Working status Ta=25℃	Average value	Maximum value (Typical value)	Unit
Quick network connection state (Bluetooth)	The module is in the fast network connection state and the Wi-Fi indicator flashes fast	70	273	mA
Quick network connection state (AP)	The module is in the hotspot network connection state and the Wi-Fi indicator flashes slowly	80	300	mA
Quick network connection state (EZ)	The module is in the fast network connection state and the Wi-Fi indicator flashes fast	87	380	mA
Network connected state	The module is connected to the network and the Wi-Fi indicator is always on	40	350	mA
Weakly connected	The module and the hotspot are weakly connected and the Wi-Fi indicator light is always on	205	350	mA
Network disconnected state	The module is in disconnected state and the Wi-Fi indicator light is always off	70	267	mA



## 2.4 RF Parameters

### 2.4.1 Basic RF Features

Parameter	Description
Working frequency	2.412~2.484GHz
Wi-Fi standard	IEEE 802.11b/g/n(channels 1 to 14)
Data transmission rate	11b: 1,2,.5,11 (Mbps)
	11g: 6,9,12,18,24,36,48,54 (Mbps)
	11n: HT20 MSCO~7
	11n: HT40 MSCO~7
Antenna type	External monopole antenna

### 2.4.2 WiFi Transmit Performance

Parameter	Minimum value	Typical value	Maximum value	Unit
Average RF output power,802.11b CCK Mode 11M	-	16	-	dBm
Average RF output power,802.11g OFDM Mode 54M	-	15	-	dBm
Average RF output power,802.11n HT20 OFDM Mode MSC7	-	14	-	dBm
Frequency error	-20	-	20	Ppm





### 2.4.3 WiFi Receiving Performance

Parameter	Minimum value	Typical value	Maximum value	Unit
PER<8%, RX sensitivity, 802.11b DSSS Mode 11M	-	-88	-	dBm
PER<10%, RX sensitivity, 802.11g OFDM Mode 54M	-	-75	-	dBm
PER<10%, RX sensitivity, 802.11n HT20 OFDM Mode MCS7	-	-72	-	dBm
PER<10%, RX sensitivity, Bluetooth 1M	-	-93	-	dBm

### 2.4.4 Bluetooth Transmit Performance

Parameter	Minimum value	Typical value	Maximum value	Unit
Working frequency	2402	-	2480	MHz
Air rate	-	1	-	Mbps
Transmit power	-20	6	20	dBm
Frequency error	-150	-	150	KHz



## 2.4.5 Bluetooth Receiving Performance

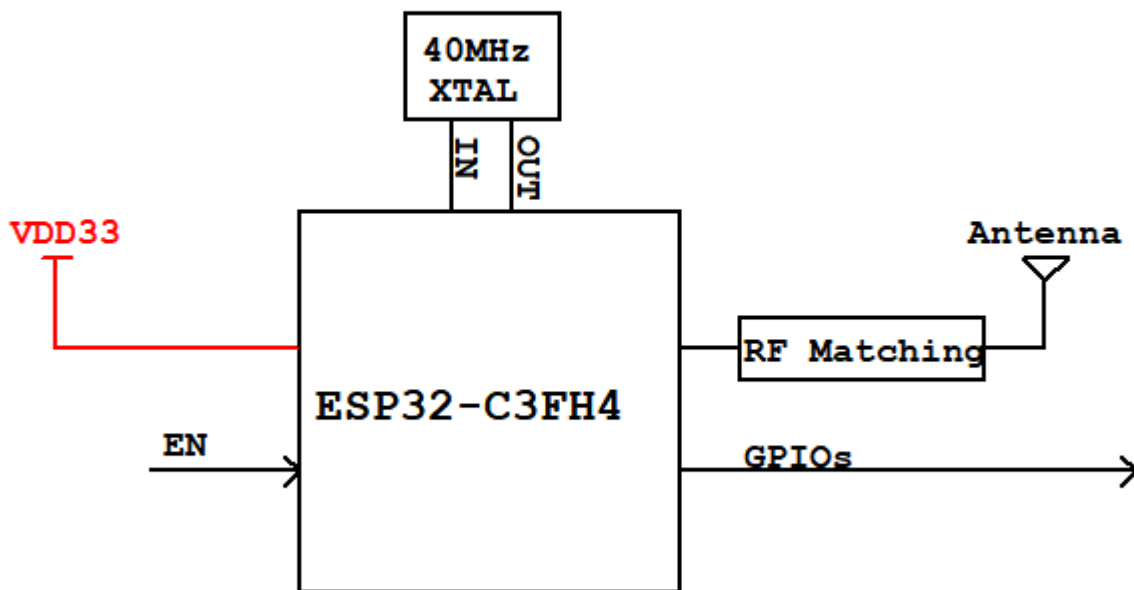
Parameter	Minimum value	Typical value	Maximum value	Unit
RX sensitivity	-	-93	-	dBm
Maximum RF signal input	-10	-	-	dBm
Inter-modulation	-	-	-23	dBm
Co-channel suppression ratio	-	10	-	dB

### 3 Hardware Specifications

#### 3.1 Block Diagram

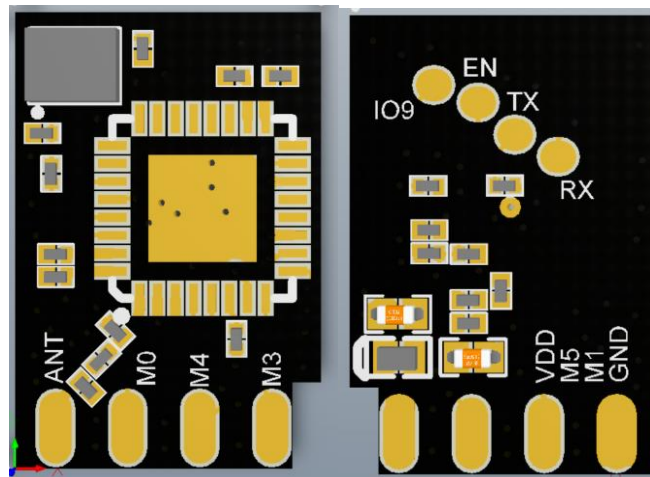
Figure 1 Hardware Block Diagram

Hardware Block:



#### 3.2 Pin Description

Figure 2 Pin Diagram



**Table 1 Pin Definition and Description**

Pin No.	Symbol	IO Type	Function
1	ANT	O	External antenna pad pin
2	G	P	Ground pin
3	M4	I/O	Support hardware PWM
4	M5	I/O	Support hardware PWM
5	M0	I/O	Support hardware PWM
6	3V3	P	Power supply pin
7	M1	I/O	Support hardware PWM
8	M2	I/O	Support hardware PWM

**Table 2 Test Pin Definition**

Pin No.	Symbol	IO Type	Function
	RX	I/O	UART0_RX
	TX	I/O	UART0_TX
	IO9	I	If pulled down before powered on, enter RF test mode, if left floating or pulled up, enter application firmware
	EN	I	Chip enable pin



### 3.3 Strapping Pins

ESP32-C3FH4 has three strapping pins:

- GPIO2
- GPIO8
- GPIO9

Software can read the values of corresponding bits from register GPIO\_STRAPPING.

During the chip's system reset (power-on-reset, RTC watchdog reset, brownout reset, analog super watchdog reset, and crystal clock glitch detection reset), the latches of the strapping pins sample the voltage level as strapping bits of "0" or "1", and hold these bits until the chip is powered down or shut down.

By default, GPIO9 is connected to the internal pull-up resistor. If GPIO9 is not connected or connected to an external high-impedance circuit, the latched bit value will be "1"

To change the strapping bit values, you can apply the external pull-down/pull-up resistances, or use the host MCU's GPIOs to control the voltage level of these pins when powering on ESP32-C3FH4 family.

After reset, the strapping pins work as normal-function pins.

Refer to Table 3 for a detailed boot-mode configuration of the strapping pins.

Note:

Some pins have been pulled up internally, please refer to the schematic diagram.

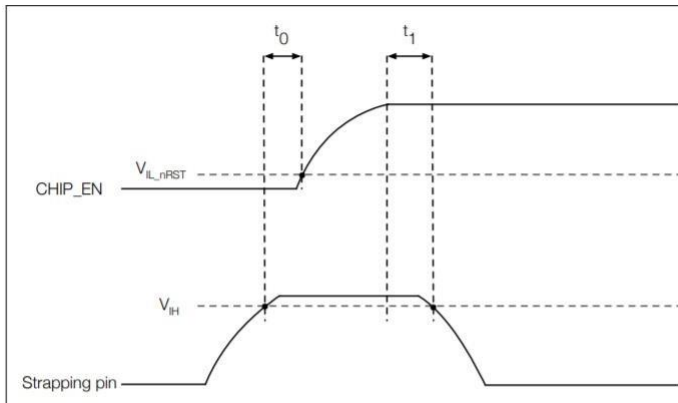
**Table 3 Strapping Pins**

Booting Mode <sup>1</sup>			
Pin	Default	SPI Boot	Download Boot
GPIO2	N/A	1	1
GPIO8	N/A	Don't care	1
GPIO9	Internal pull-up	1	0
Enabling/Disabling ROM Code Print During Booting			
Pin	Default	Functionality	

GPIO8	N/A	<p>When the value of eFuse field EFUSE_UART_PRINT_CONTROL is 0 (default), print is enabled and not controlled by GPIO8.</p> <p>1, if GPIO8 is 0, print is enabled; if GPIO8 is 1, it is disabled.</p> <p>2, if GPIO8 is 0, print is disabled; if GPIO8 is 1, it is enabled.</p> <p>3, print is disabled and not controlled by GPIO8</p>
<b>Parameter Descriptions of Setup and Hold Times for the Strapping Pins(refer to the figure below)</b>		
Parameter	Description	Min
t0	Setup time before CHIP_EN goes from low to high	0ms
t1	Hold time after CHIP_EN goes high	3ms

Figure 3 shows the setup and hold times for the strapping pins before and after the CHIP\_EN signal goes high

**Figure 3 Setup and Hold Times**



Note:

The strapping combination of GPIO8 = 0 and GPIO9 = 0 is invalid



## 4 Electrical Characteristics

### 4.1 Absolute Maximum Ratings

Stresses beyond the absolute maximum ratings may cause permanent damage to the device. These are stress ratings only, and do not refer to the functional operation of the device. Exposure to the Absolute Maximum Rating condition for extended periods may affect device reliability.

### 4.2 Recommended Operating Conditions

Table 4 Working Conditions

Symbol	Parameter	Min	Typ	Max	Unit
VDD	Voltage applied to power supply pins	3.0	3.3	3.6	V
IVDD	Current delivered by external power supply	0.5	-	-	A
T <sub>A</sub>	Ambient temperature	-40	-	85	°C
				105	
Humidity	Humidity	-	-	85	%RH

Table 5 Current Consumption Depending on RF modes

Current Consumption Depending on RF modes			
Work mode	Description		Peak (mA)
Active (RF working)	TX	802.11b, 1 Mbps, @19.5dBm	384
		802.11g, 54 Mbps, @16.4dBm	287
		802.11n, HT20, MCS 7, @16 dBm	275
		802.11n, HT40, MCS 7, @16 dBm	260
	RX	802.11b/g/n, HT20	83
		802.11n, HT40	86

Note:

Room temperature, 3.3V power supply, TX continues mode, DC power supply accuracy is 100 microamps.

**Table 6 Power consumption Depending on Work Modes**

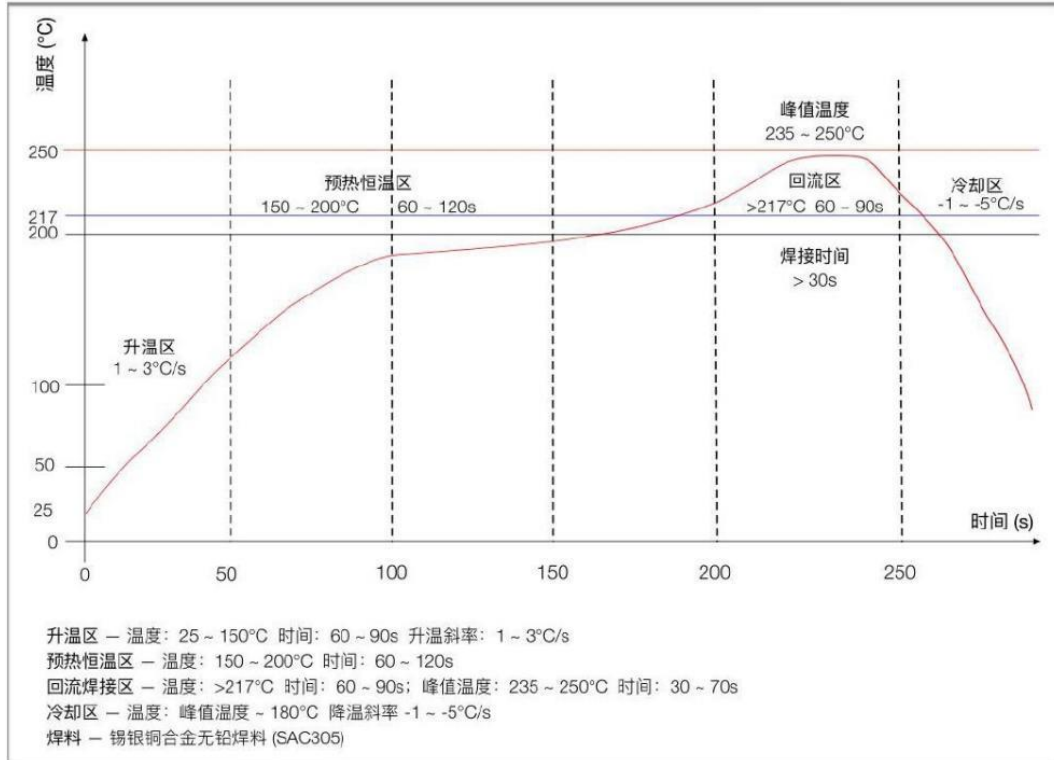
<b>Work Mode</b>	<b>Description</b>		<b>Typical value</b>
Modem-sleep	The CPU is powered on	160M Hz	25.8mA
		80MHz	22.7mA
Light-sleep			0.3mA
Deep-sleep			14uA
Power off	EN set to low level		0



## 5 Application Notes

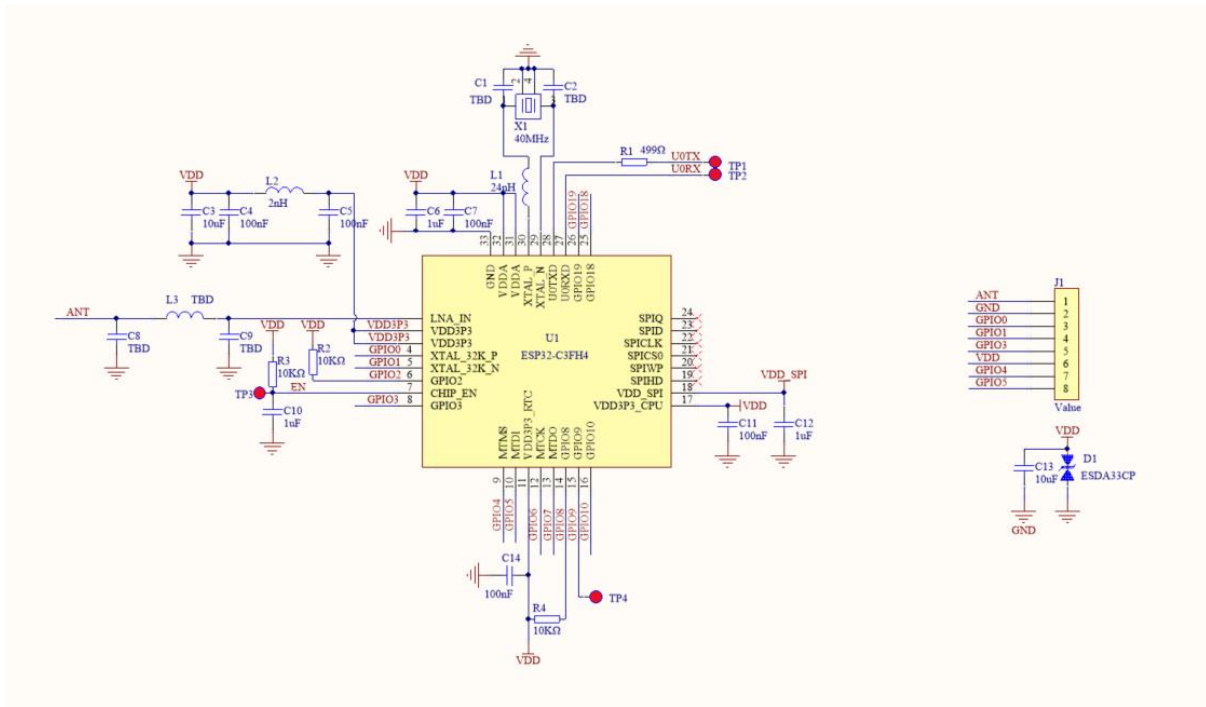
### 5.1 Reflow Profile

Figure 4 Reflow Profile



## 5.2 Module Schematic

Figure 5 Module Schematic





## 6 Product Trial

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