
WT9932C61 TINY User Guide

WT9932C61 Development Board User Manual

,

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Revision History

Version	Date	Changed By	Change Item
V1.0	2025/11/21	Kirto	Initial Document Creation



1. Board Overview

1.1 Product Category

1.2 Board Introduction

WT9932C61-TINY is a mini development board designed for lightweight IoT applications. It is powered by the ESP32-C61 chip from Espressif and features the WT0132C61-S5 module from Qiming Cloud. Measuring only 23×38mm, it balances high performance with rich functionality in a compact form factor.

The board runs at 160MHz and leverages the upgraded wireless capabilities of the ESP32-C61, supporting Wi-Fi 6 (802.11ax), OFDMA, MU-MIMO, TWT, and Bluetooth 5.3 dual-mode communication. It offers enhanced security features (e.g., TEE, PSRAM encryption) and rich peripherals (e.g., Event Task Matrix ETM, analog comparators), making it suitable for high-performance, low-power IoT scenarios.

The hardware design exposes all pins for breadboard prototyping, integrates a USB-to-serial chip for easy debugging, and includes onboard RGB LEDs, EN & BOOT buttons, and a power indicator. The LDO power supply can deliver up to 1A for stable peripheral operation. By shorting the EN pin to GND, the board can also function as a USB-to-serial debugger.

1.3 Key Features

1. Ultra-compact and highly integrated

23×38mm size fits space-constrained scenarios (e.g., small smart devices, embedded modules). Integrated module, USB-to-serial, LEDs/buttons allow immediate development without extra core components.

2. High performance, dual-mode wireless

Powered by ESP32-C61 at 160MHz. Supports Wi-Fi and Bluetooth dual-mode communication, suitable for smart home, remote control, and data transmission scenarios.

3. Flexible and compatible development

All pins exposed for breadboard prototyping; compatible with various sensors and actuators. Onboard USB-to-serial reduces the need for external modules.

4. Multi-functional debugging, dual-purpose

EN (enable) and BOOT (boot) buttons allow easy entry to download mode. EN shorted to GND switches the board to a USB-to-serial debugger for other devices.

5. Stable power, visible status

LDO design supports up to 1A output. Power indicator and RGB LED provide real-time status and functional indication (e.g., network or data transmission).

1.4 Board Images

Front view:

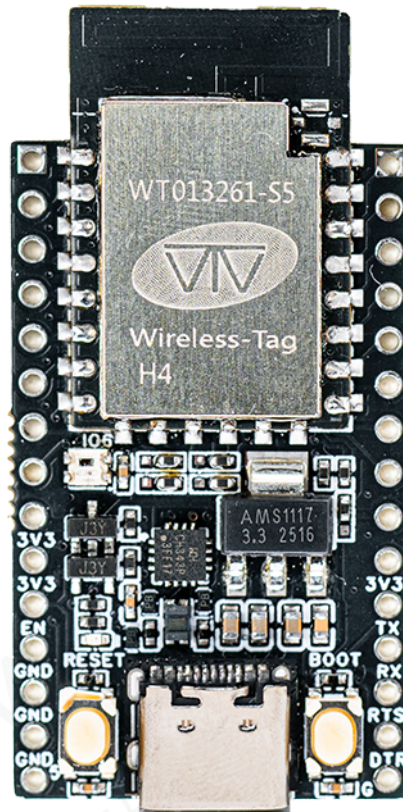


Figure 1 – Board Image

Back view:

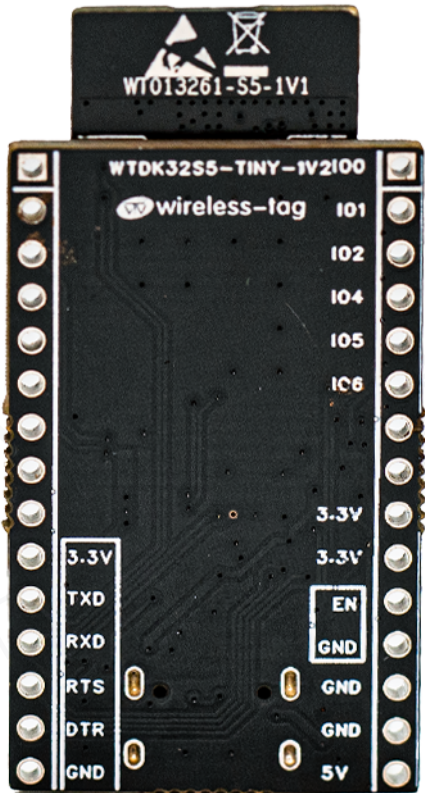


Figure 2 – Board Image

2. Hardware Reference

2.1 Functional Block Diagram

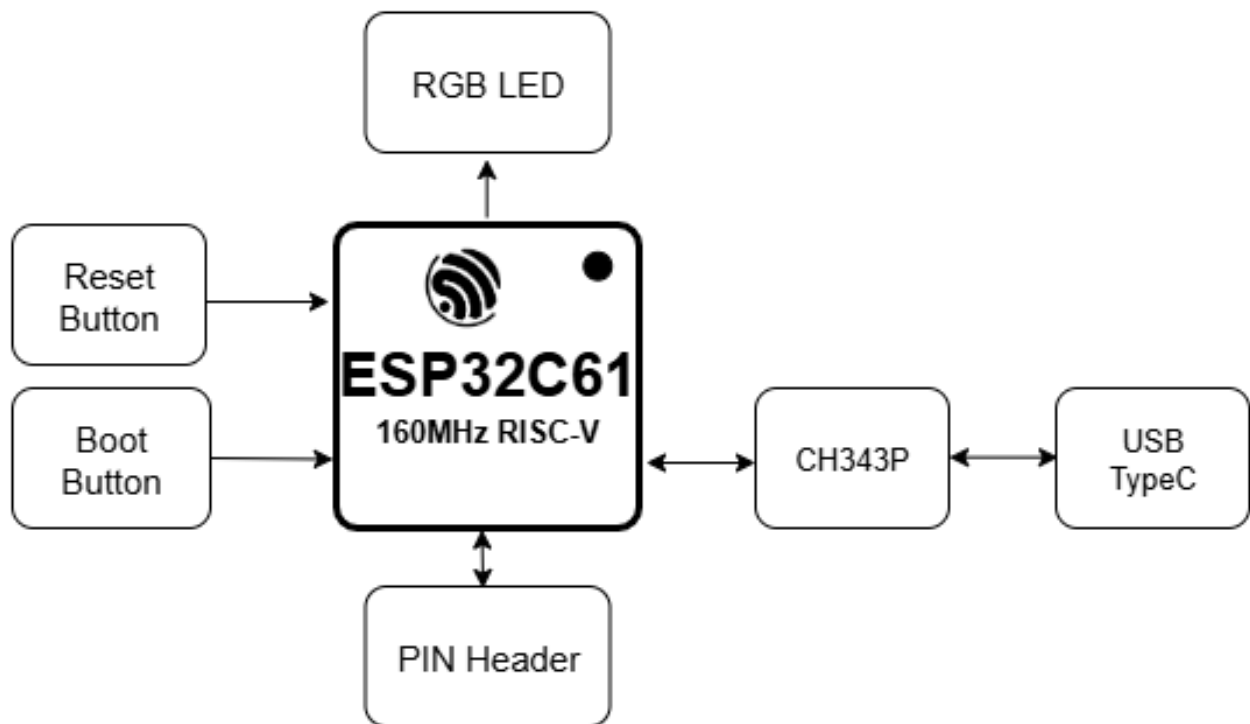


Figure 3 – Block Diagram

2.2 Hardware Peripherals

Peripheral	Description
WS2812	Single-wire RGB LED connected to IO6
RESET Button	Reset the board
BOOT Button	Enter flash mode manually (IO9)
USB	USB-to-serial for power and flashing
CH343P	Serial-to-USB chip

2.3 Component Overview

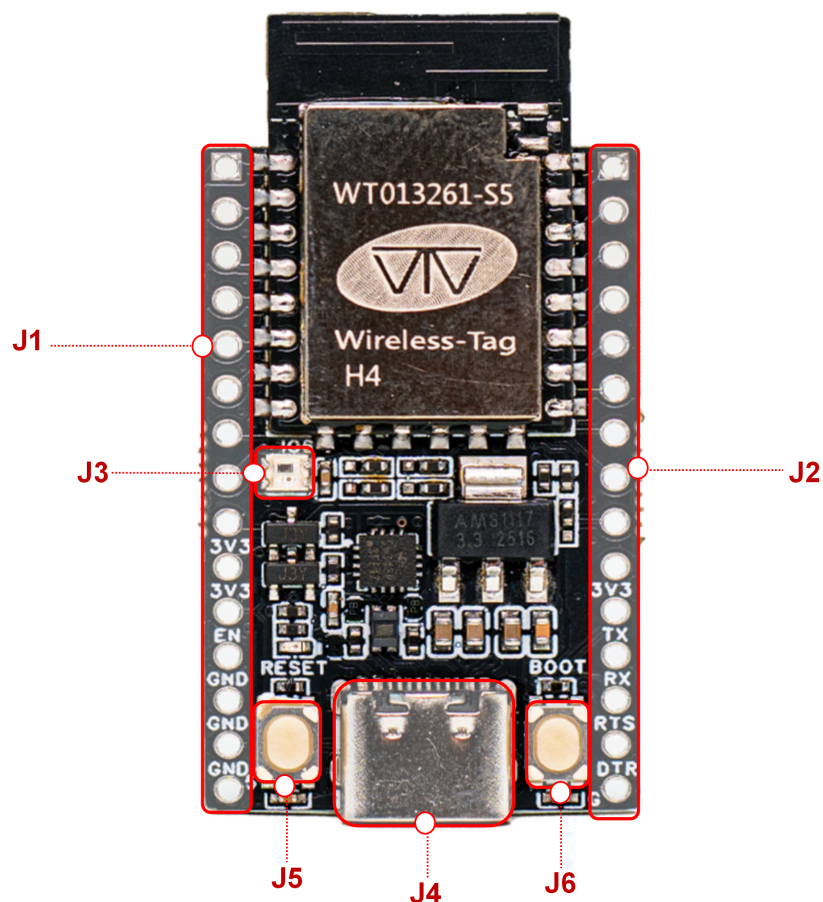


Figure 4 – Component Layout

No.	Component	Description
J1,J2	Header Pins	2.54mm pitch, can act as USB-to-serial when EN connected to GND
J3	RGB LED	SMD 2020 single-wire RGB LED connected to IO6
J4	USB 2.0 Type-C Port	USB-to-serial debug interface
J5,J6	Tactile Buttons	Reset and manual flash entry

2.4 Connector Package

Interface	Package	Notes
Header x2	HDR-TH_15P-P2.54-V-M	Compatible with breadboards
Type-C USB	USB-C-SMD_TYPE-C	USB-to-serial debugging

2.5 Pinout Description

[J1] Header Pin

No.	Pin	Description	Voltage	Notes
1	IO0	GPIO0	0V/3.3V	
2	IO1	GPIO1	0V/3.3V	
3	IO2	GPIO2	0V/3.3V	
4	IO4	GPIO4	0V/3.3V	
5	IO5	GPIO5	0V/3.3V	
6	IO6	GPIO6	0V/3.3V	
7	IO18	GPIO18	0V/3.3V	
8	IO19	GPIO19	0V/3.3V	
9	3.3V	Power output	3.3V	
10	3.3V	Power output	3.3V	
11	EN	Reset	0V	
12	GND	Ground	0V	

No.	Pin	Description	Voltage	Notes
13	GND	Ground	0V	
14	GND	Ground	0V	
15	5V	Power output	5V	

[J2] Header Pin

No.	Pin	Description	Voltage	Notes
1	IO3	GPIO3	0V/3.3V	
2	IO10	GPIO10	0V/3.3V	
3	IO9	GPIO9	0V/3.3V	
4	IO8	GPIO8	0V/3.3V	
5	IO7	GPIO7	0V/3.3V	
6	IO20	GPIO20	0V/3.3V	
7	IO21	GPIO21	0V/3.3V	
8	IO22	GPIO22	0V/3.3V	
9	IO23	GPIO23	0V/3.3V	
10	3.3V	Power output	3.3V	
11	RXD	CH343P RX	0V/3.3V	
12	TXD	CH343P TX	0V/3.3V	
13	RTS	CH343P flow control	0V/3.3V	
14	DTR	CH343P flow control	0V/3.3V	
15	GND	Ground	0V	

[J3] RGB LED

Uses single-wire [WS2812](#), connected to IO6.

[J4] Type-C USB

Uses [CH343P](#). EN connected to GND allows the board to act as a USB-to-serial module.

3. Schematic

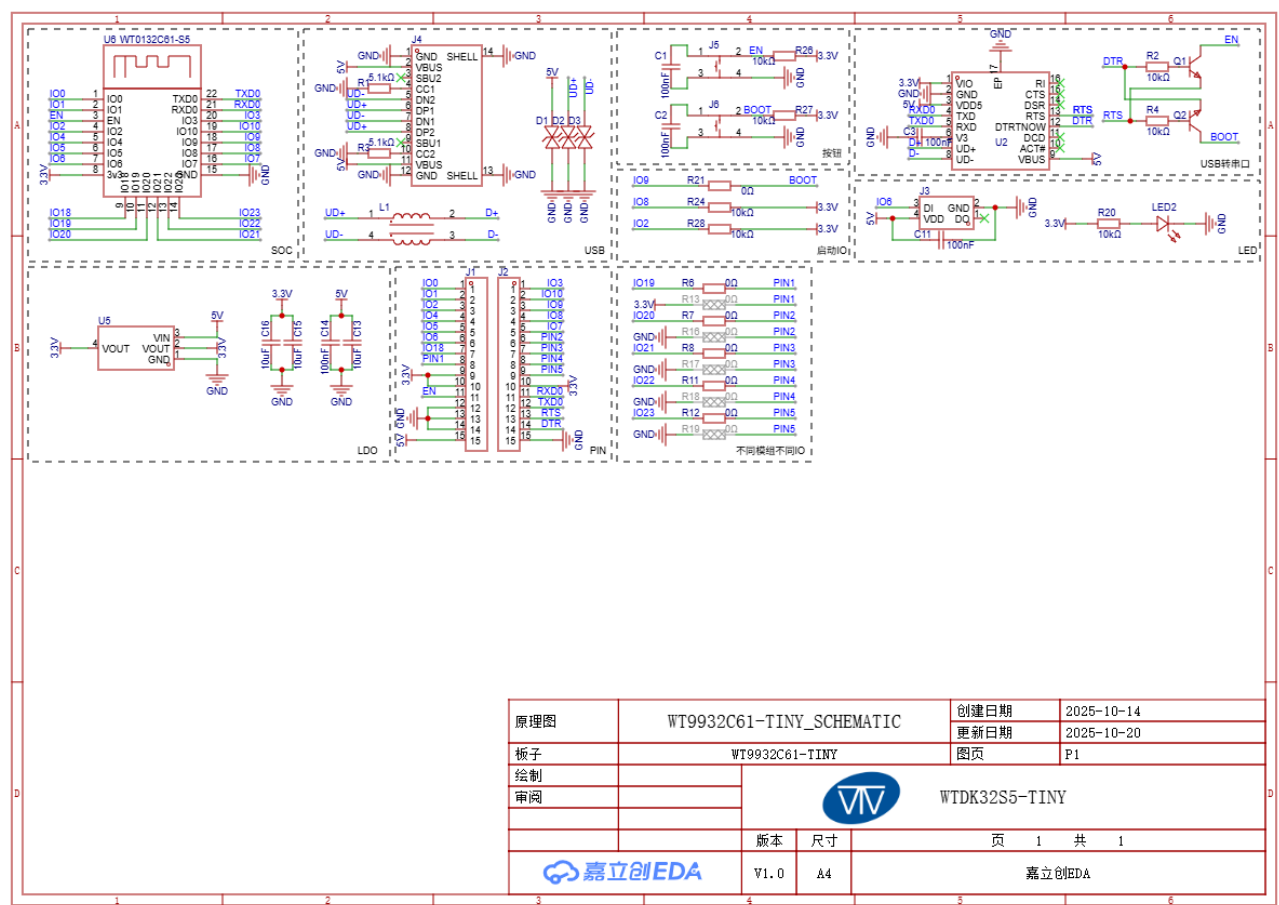


Figure 5 – Schematic

4. Mechanical Support

4.1 PCBA Dimensions

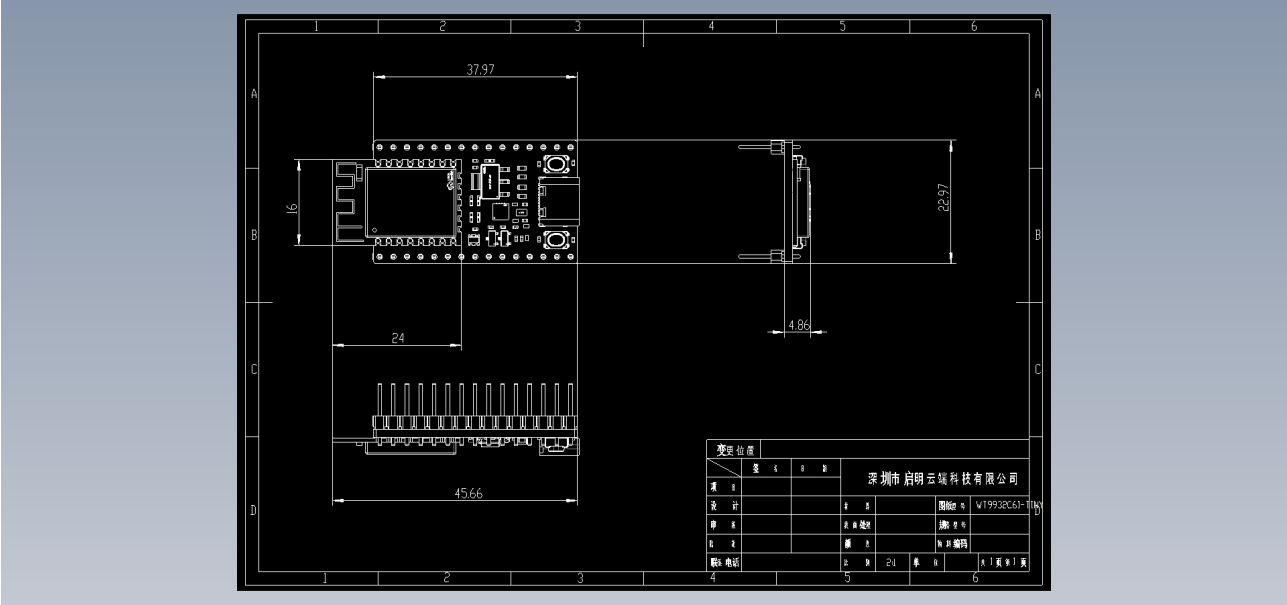


Figure 6 – Board Size

5. Usage Guide

5.1 Preparation

Before use, prepare the following:

1. **USB-C Cable** × 1

For power and connection to PC. Use high-quality or original cable for stable power.

2. **WT9932P4-TINY Board** × 1

Core hardware of this product.

5.2 Hardware Setup

1. **Connect Power**

- Connect the board to PC or USB adapter using USB-C cable.
- Recommended adapter: **5V/1A or above.**
- Power on the board; indicator LED shows the board is powered.

5.3 Usage Instructions

1. **Set up ESP-IDF environment**

[Official Quick Start](#)

2. **Clone Example**

Clone the official blink example and export ESP-IDF.

3. **Build & Flash**

Connect board via USB-C:

```
1 idf.py set-target esp32c61
2 idf.py build
```

Modify IO pin in menuconfig:

```
1 ``shell
```

idf.py menuconfig““

Flash example:

```
1  ``shell
```

idf.py flash ““

The RGB LED will blink on the board.

wireless-tag
深圳市启明云端科技有限公司

6. Related Documents

Document Name	Link	Description
WT9932C61-TINY User Guide	WT9932C61-TINY User Guide	
ESP32-C61 IDF Online Documentation	https://docs.espressif.com/projects/esp-idf/zh_CN/v5.5.1/esp32c61/get-started/index.html	ESP-IDF programming guide & API reference
ESP32-C61 Datasheet	https://www.espressif.com.cn/sites/default/files/documentation/esp32-c61_datasheet_cn.pdf	ESP32-C61 chip reference
MicroPython Documentation	https://docs.micropython.org/en/latest/	MicroPython online reference

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Figure 7 – Wireless-Tag QR Code