

ESP32-S3 Development Board 2.4G Wifi Module for Arduino **ESP IDF ESP32-S3-WROOM-1 N8R2 N16R8 44Pin Type-C 8M PSRAM ESP32 S3**

\$4.82 ~~\$14.20~~

- Package: DIP
- is_customized: Yes
- Model Number: **ESP32 S3**
- Operating Temperature: -20 to 70
- Dissipation Power: Standard
- Supply Voltage: 5V
- Application: MOBILE PHONE
- Condition: New
- Type: Module
- Brand Name: UICPAL
- Origin: Mainland China

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Wishlist

SKU: 3256806080061048

CATEGORY: [ESP32](#)

[DESCRIPTION](#) [REVIEWS \(0\)](#)

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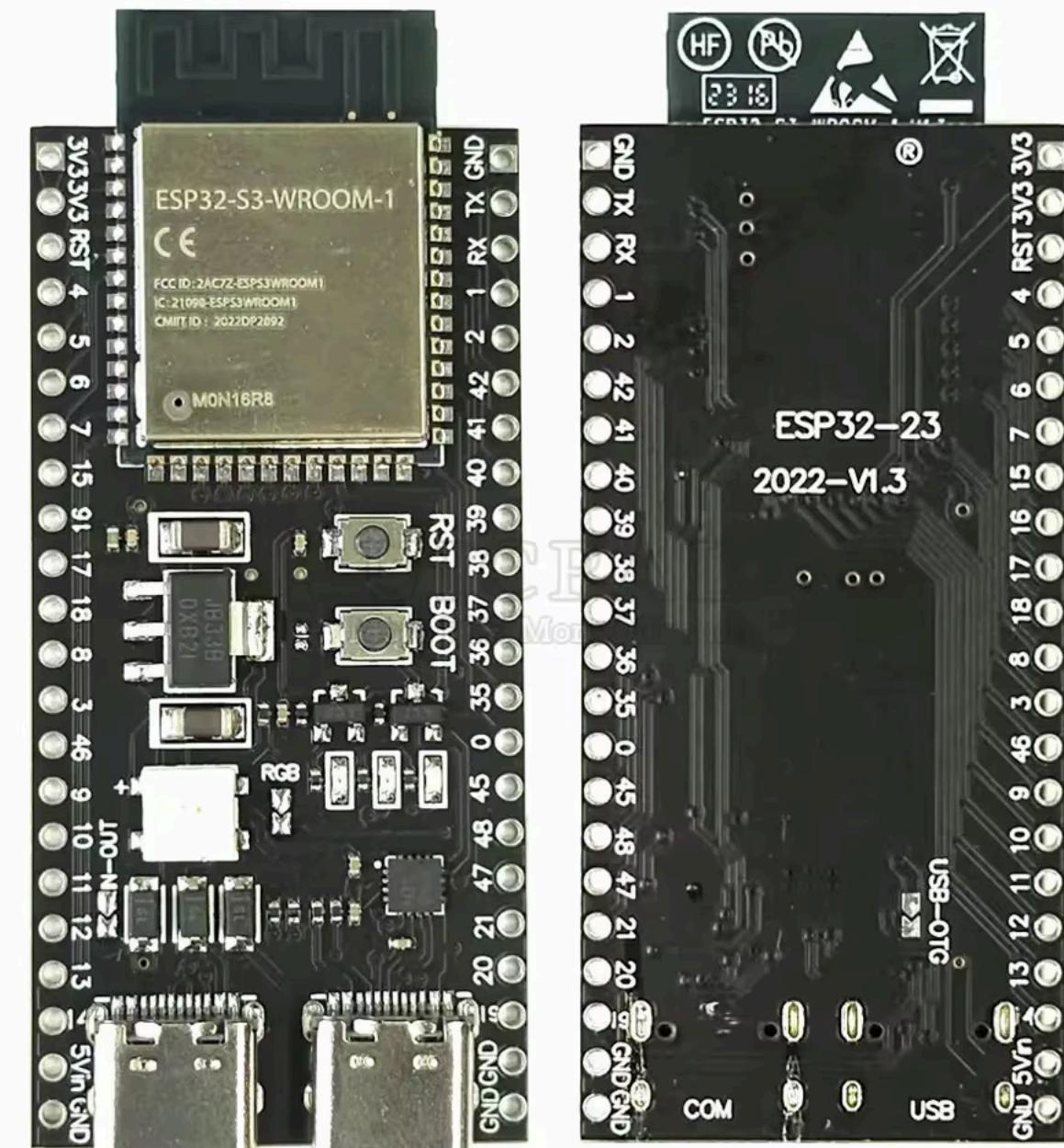
ESP32-S3 DEV MODULE

8MB PSRAM 16MB Flash

2.4G Wifi BT Module

ESP32-S3 Dual-core

USB Tep-c



Note on the storage situation of the ESP32-S3-WROOM-1 module

mpn	内置sram	内置rom	外扩psram	外扩flash
ESP32-S3-WROOM-1-N4	512K	384K	0M	4M
ESP32-S3-WROOM-1-N8	512K	384K	0M	8M
ESP32-S3-WROOM-1-N16	512K	384K	0M	16M
ESP32-S3-WROOM-1-N4R8	512K	384K	8M	4M
ESP32-S3-WROOM-1-N4R2	512K	384K	2M	4M
ESP32-S3-WROOM-1-N8R2	512K	384K	2M	8M
ESP32-S3-WROOM-1-N16R2	512K	384K	2M	16M
ESP32-S3-WROOM-1-N8R8	512K	384K	8M	8M
ESP32-S3-WROOM-1-N16R8	512K	384K	8M	16M

The link can choose N8R2/N8R8/R16R8 specifications of goods, the series in turn downward compatible, storage specifications of the module program can be stored without modification, directly run on the higher specifications of the storage module, for example, the N4 program can be run on top of the N8, N16, the specifications of the module program can be run on top of the expansion of the prom 0 expansion of the psram module of 2M, 8M.

About ESP32-S3 hardware resources

ESP32-S3 is a low-power MCU SoC that integrates 24ghz Wi-Fi and Bluetooth low energy dual-mode wireless communications.

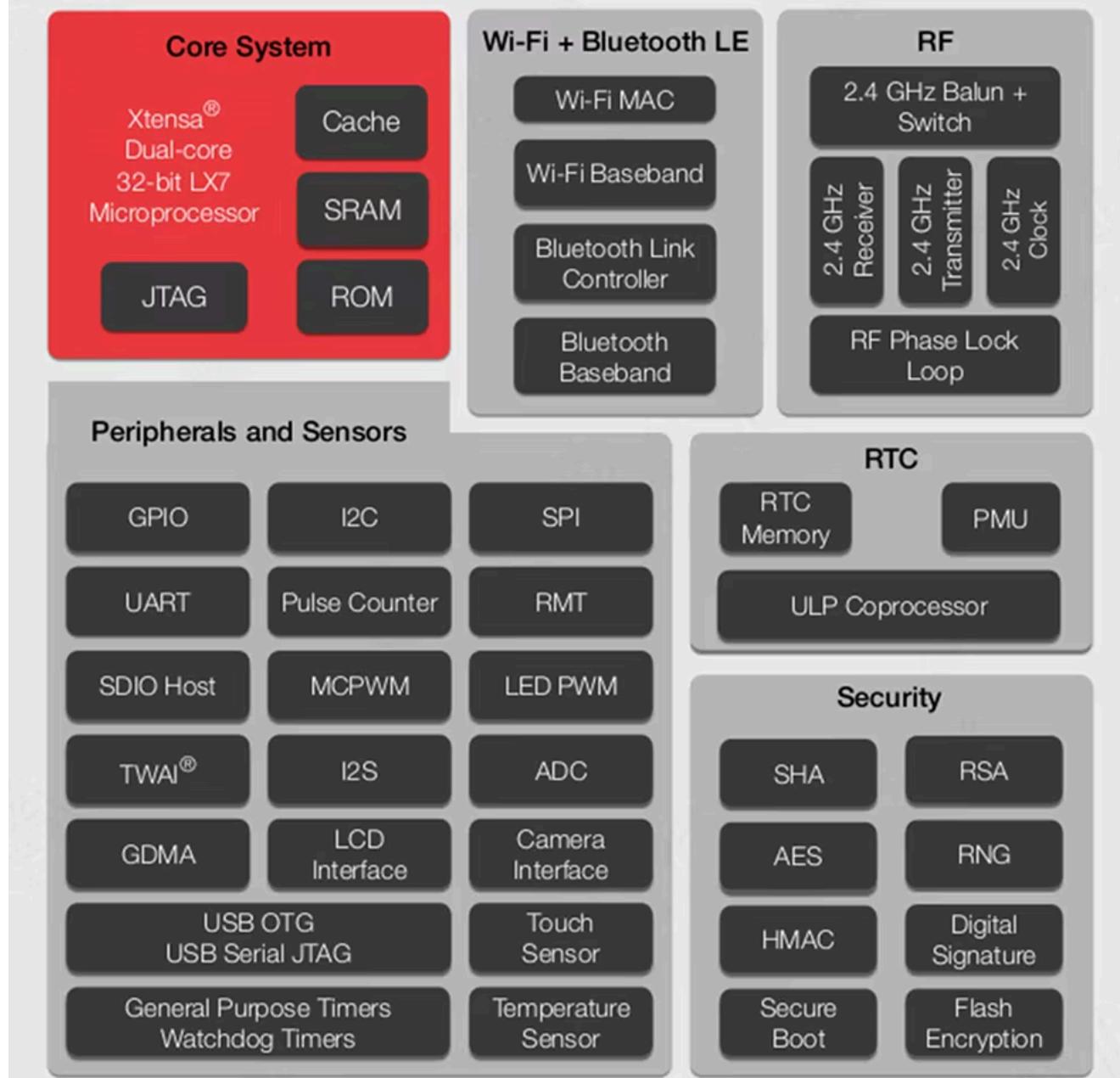
ESP32-S3 has a full Wi-Fi and Bluetooth low energy subsystem, providing industry-leading low power and RF performance.

Support a variety of low-power working state, can meet the power requirements of various application scenarios. ESP32-S3 chip provides rich peripheral interfaces, and has a variety of unique hardware security mechanisms. The Perfect Security Mechanism enables the chip to meet the strict security requirements.

Performance:

- **Core:**
 - Xtensa® dual-core 32-bit LX7 CPU, frequency up to 240MHz
- **Memories:**
 - 384 KB of ROM
 - 512 KB of SRAM
 - 16 KB of RTCSRAM
 - 8 MB of PSRAM
- **Working Voltage:** 3 V to 3.6 V
- **Up to 45 GPIOs**
- **2*12-bit ADC (up to 20 channels)**
- **Communication interfaces**
 - 2 I2C interfaces
 - 2 I2S interface
 - 4 SPI interfaces
 - 3 UART interfaces
 - 1 USB OTG interface
- **Security:**
 - 4096 bit OTP
 - AES, SHA, RSA, ECC, RNG
 - Secure Boot, Flash Encryption, Digital signature, HMAC module
- **Extended temperature range:** -40 to 65 °C

Espressif's ESP32-S3 Wi-Fi + Bluetooth® Low Energy SoC



WiFi

- Support IEEE802.11b/g/n protocols (hardware TSF)
- Supports 20 MHZ and 40MHz bandwidth in 24GHz band.
- Supports 1T1R mode with data rate up to 150Mbps.
- Wireless Multimedia (WMM)
- Frame Aggregation (TX/RXA-MPDUTX/RXA-MSDU)
- Immediate Block ACK (IBAC)
- Fragmentation and reorganization (Fragmentation/defragmentation)
- Beacon automatic monitoring
- 4x Virtual Wi-Fi Interface
- Also supports Infrastructure BSS (Infrastructure BSS) Station Mode, SoftAP Mode and Station+SoftAP Mixed Mode, please note that when ESP32-S3 is scanning in Station Mode, the SoftAP channel will be changed at the same time.
- Antenna Diversity
- 802.11mcFTM
- Support external power amplifier

Bluetooth

- Low Power Bluetooth (Bluetooth LE): 2Mbps Advertising Extensions
- Bluetooth 5, Bluetooth mesh
- Multiple Advertisement Sets
- Channel Selection (Channel Selection Algorithm #2)
- High power mode (20 dBm, shared PA with Wi-Fi)
- Wi-Fi and Bluetooth coexist and share the same antenna.
- Rate support 125 Kbps, 500Kbps, 1Mbps,

Advanced Peripheral Interfaces and Sensors

- 45 x GPIO port
- Digital interfaces.
 - ◆-4xSPI
 - ◆-1xLCD interface (8-bit~16-bit parallel RGB, I8080, MOTO6800), YUV422, YUV420, YUV411 conversion between each other.
 - ◆-1xDVP 8-bit~16-bit camera interface
 - ◆- 3xUART
 - ◆- 2xI2C
 - ◆- 2xI2S
 - ◆- 1x RMT(TX/RX)
 - ◆- 1xPulse Counter
 - ◆- LED PWM Controller, up to 8 channels
 - ◆-1xFull Speed USB OTG
 - ◆-1xUSB Serial/JTAG Controller
 - ◆-2xMCPWM
- ◆-1x SDIO host interface with 2 card slots
- ◆- General Purpose DMA controller (GDMA for short), 5 receive channels and 5 transmit channels
- ◆-1xTWA controller with ISO11898-1 (CAN specification 2.0)
 - Analog Interface.
 - ◆-2 x 12-bit SAR ADC, up to 20 channels
 - ◆-1 x temperature sensor
 - ◆-14 x capacitive sensing GPIOs
- Timer: - 1X RMT(TX/RX)
 - ◆- 4×54-bit general-purpose timer
 - ◆-1x 52-bit System Timer
 - ◆-3×Watchdog Timer



The ESP32-S3 is an integrated 2.4 GHz Wi-Fi and Bluetooth 5 (LE) MCU with Long Range support, powered by the Xtensa (R) 32-bit LX7 dual-core processor with 240 MHz, 512 KB of internal SRAM (TCM), 45 programmable GPIO pins and a rich set of API flash and off-chip RAM, user configurable data cache and instruction cache.



AI Acceleration

The ESP32-S3 MCU adds vector instructions to accelerate neural network computation and signal processing. AI developers can use these vector instructions through the ESP-DSP and ESP-NN libraries to realize high-performance applications such as image recognition, speech wake-up and recognition. ESP-WHO and ESP-Skainet will also support this feature. Skainet will also support this feature.



Wi-Fi + Bluetooth 5 (LE)

The ESP32-S3 integrates 2.4GHz Wi-Fi (802.11 b/g/n) supporting 40 MHz bandwidth; its low-power Bluetooth subsystem supports Bluetooth 5 (LE) and Bluetooth Mesh for long-distance communication with broadcast extensions via Coded PHY. It also supports 2Mbps PHY for higher transmission speed and data throughput. The ESP32-S3 has excellent Wi-Fi and Bluetooth LE RF performance, and can work stably at high temperatures.



Sophisticated security mechanisms

The ESP32-S3 provides a complete security mechanism and protection for IoT devices against all kinds of malicious attacks and threats. It supports flash alarm based on AES-XTS algorithm, secure boot based on RSA algorithm, digital signature and HMAC. ESP32-S3 also adds a new "world controller" module, which provides two non-interfering execution environments and realizes the trusted execution environment or privilege separation mechanism. ESP32-S3 also adds a new "world controller" module, which provides two execution environments that do not interfere with each other, realizing a trusted execution environment or privilege separation mechanism.



Mature software support

ESP32-S3 is based on Loxin's mature IoT development framework, ESP-IDF, which has successfully empowered hundreds of millions of IoT devices, undergone rigorous testing and release cycles, and has a clear and effective support strategy. Based on its mature software architecture, developers will find it easier to build applications or migrate legacy programs to the ESP32-S3 platform, thanks to its familiarity with the tools and APIs.



Rich IO interfaces

The ESP32-S3 features 45 programmable GPIOs as well as popular peripheral interfaces such as SPI, I2S, I2C, PWM, RMT, ADC, UART, SD/MMC host controller and TWAITM controller. Fourteen of the GPIOs can be configured as capacitive touch inputs for HMI interaction. In addition, the ESP32-S3 is equipped with an ultra-low-power co-processor (ULP), which supports a variety of low-power modes and is widely used in various low-power application scenarios.

ESP32-S3 IDE software using python

ESP32-S3 can be programmed and controlled using Micropython for the Python language IDE is recommended to use the MIT-licensed Thonny software developed at the University of Estonia.

The screenshot shows the Thonny IDE interface. In the top editor window, there is a single file named '2812.py' containing the following code:

```
1 import machine, neopixel
2
3 n = 1
4 p = 8
5
6 np = neopixel.NeoPixel(machine.Pin(p), n)
7
8 np[0] = (255, 0, 0)
9
10 np.write()
```

Below the editor is a 'Shell' window showing a MicroPython session:

```
>>> %Run -c $EDITOR_CONTENT
>>>
```

The shell then displays the MicroPython prompt and version information:

```
MicroPython v1.17 on 2021-09-03; ESP32C3 module with ESP32C3
Type "help()" for more information.
>>> %Run -c $EDITOR_CONTENT
>>> |
```

At the bottom right of the shell window, it says 'MicroPython (ESP32)'.

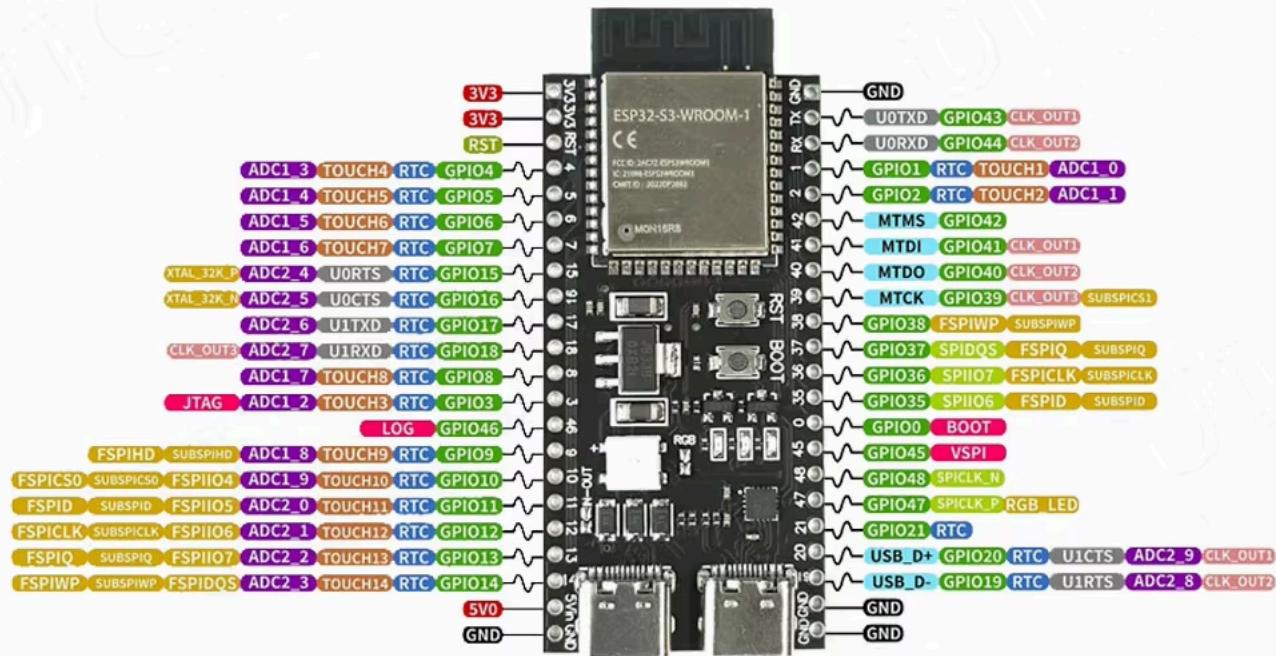
Low Power Management

- Power management unit with five power consumption modes
 - Ultra-low power co-processor (ULP):
 - ULP-RISC-V coprocessor.
 - ULP-FSM coprocessor
- 4096-bit OTP, user-available up to 1652 bits
 - Encryption hardware gas pedal
 - AES-128/256(FIPS PUB197)
 - Hash (FIPS PUB 180-4)
 - RSA
 - Random Number Generator (RNG)
 - HMAC
 - Digital Signature

Secure Mechanism

- Secure Boot
- Flash Encryption

— Pin Definitions —



ESP32-S3 Specs

32-bit Xtensa® dual-core @240MHz
Wi-Fi IEEE 802.11 b/g/n 2.4GHz + BLE 5 Mesh
512 KB SRAM (16 KB SRAM in RTC)
384 KB ROM
45 GPIOs, 4x SPI, 3x UART, 2x I2C,
14x Touch, 2x I2S, RMT, LED PWM, USB-OTG,
TWAI®, 2x 12-bit ADC, 1x LCD interface, DVP

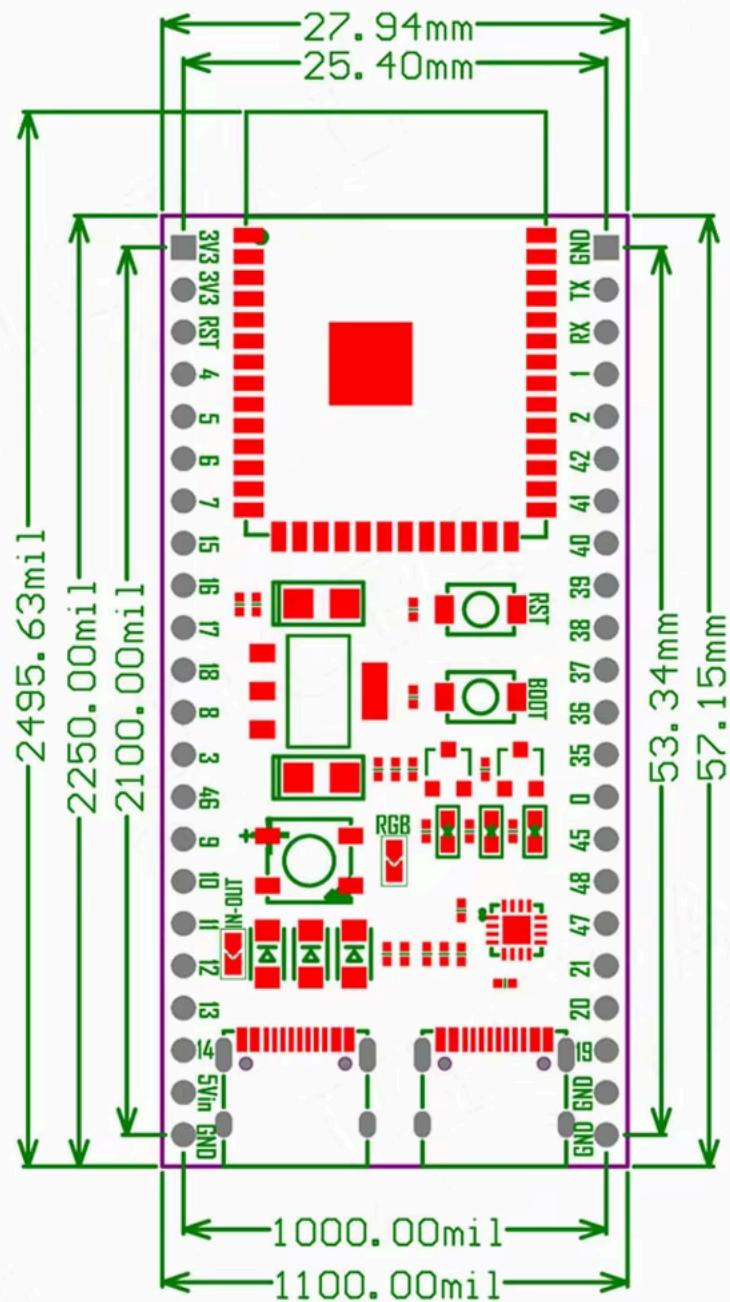
	PWM Capable Pin
	GPIOX GPIO Input and Output
	JTAG/USB JTAG for Debugging and USB
	ADCX_CH Analog-to-Digital Converter
	TOUCHX Touch Sensor Input Channel
	OTHER Other Related Functions
	SERIAL Serial for Debug/Programming
	STRAP Strapping Pin Functions
	RTC RTC Power Domain (VDD3P3_RTC)
	GND Ground
	PWD Power Rails (3V3 and 5V)
	MISC Miscellaneous/SPI functions
	CLK_OUTx Clock Output

Applications

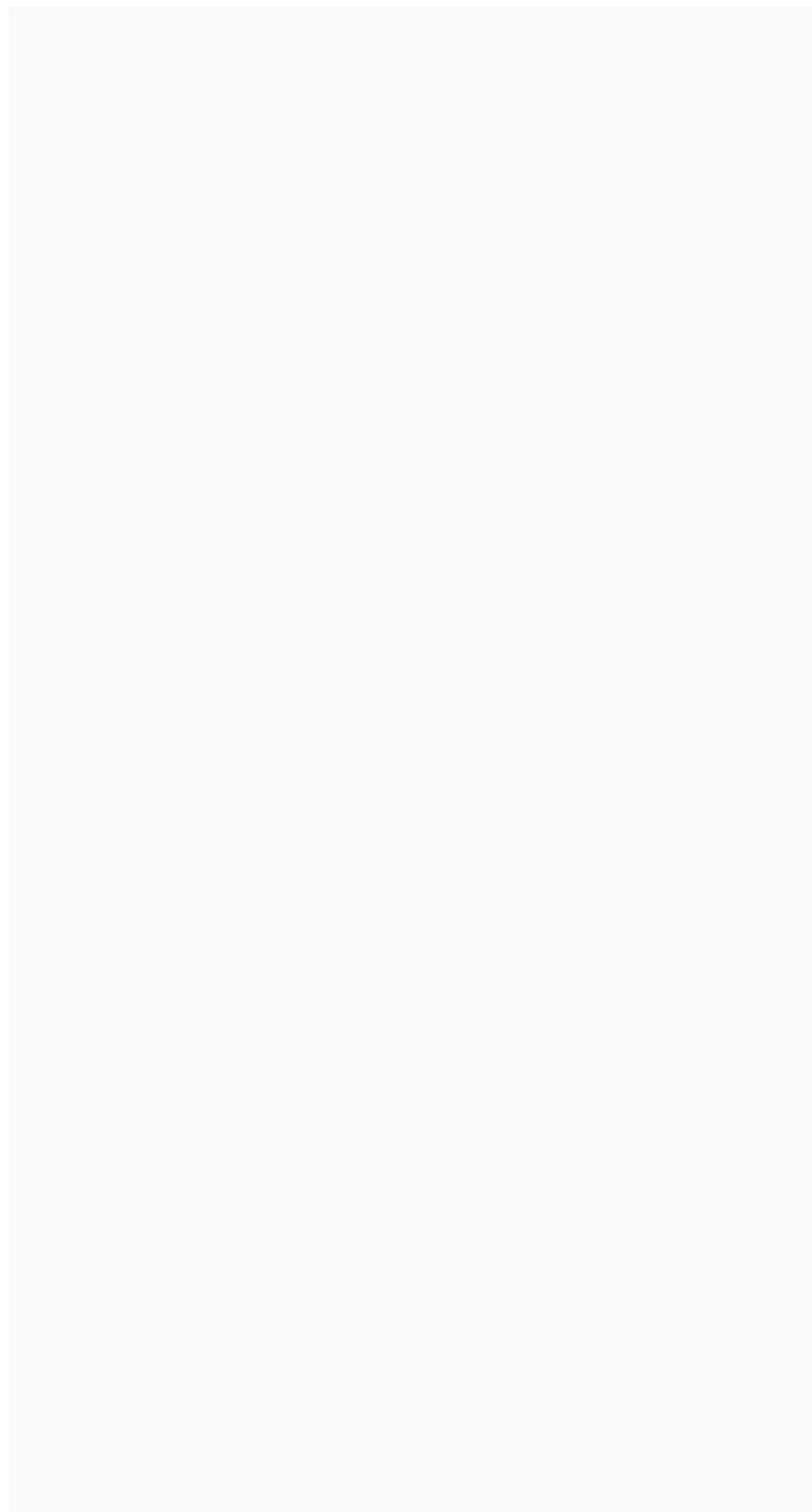
With low power consumption, ESP32-S3 is an ideal choice for IoT devices in the following areas:

- Smart Home
- Industrial Automation
- Health Care
- Consumer Electronics
- Smart Agriculture
- POS machines
- Service robot
- Audio Devices
- Generic Low-power IoT Sensor Hubs
- Generic Low-power IoT Data Loggers
- Cameras for Video Streaming
- USB Devices
- Speech Recognition
- Image Recognition
- Wi-Fi + Bluetooth Networking Card
- Touch and Proximity Sensing

Dimension Drawing



100mil = 2.54mm



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