

ESP32-WROOM-32D & ESP32-WROOM-32U

Datasheet

NOT RECOMMENDED
FOR NEW DESIGNS
(NRND)



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Espressif Systems
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About This Document

This document provides the specifications for the ESP32-WROOM-32D and ESP32-WROOM-32U modules.

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Revision History

For revision history of this document, please refer to the [last page](#).

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1 Overview

ESP32-WROOM-32D and ESP32-WROOM-32U are powerful, generic Wi-Fi+BT+BLE MCU modules that target a wide variety of applications, ranging from low-power sensor networks to the most demanding tasks, such as voice encoding, music streaming and MP3 decoding.

ESP32-WROOM-32U is different from ESP32-WROOM-32D in that ESP32-WROOM-32U integrates a U.FL connector. For detailed information of the U.FL connector please see Chapter 10. Note that the information in this data sheet is applicable to both modules. Any differences between them will be clearly specified in the course of this document. Table 1 lists the difference between ESP32-WROOM-32D and ESP32-WROOM-32U.

Table 1: ESP32-WROOM-32D vs. ESP32-WROOM-32U

Module	ESP32-WROOM-32D	ESP32-WROOM-32U
Core	ESP32-D0WD	ESP32-D0WD
SPI flash	32 Mbits, 3.3 V	32 Mbits, 3.3 V
Crystal	40 MHz	40 MHz
Antenna	onboard antenna	U.FL connector (which needs to be connected to an external IPEX antenna)
Dimensions (Unit: mm)	(18.00±0.10) × (25.50±0.10) × (3.10±0.10) (See Figure 6 for details)	(18.00±0.10) × (19.20±0.10) × (3.20±0.10) (See Figure 7 for details)
Schematics	See Figure 3 for details.	See Figure 4 for details.

At the core of the two modules is the ESP32-D0WD chip that belongs to the ESP32 series* of chips. The chip embedded is designed to be scalable and adaptive. There are two CPU cores that can be individually controlled, and the CPU clock frequency is adjustable from 80 MHz to 240 MHz. The chip also has a low-power co-processor that can be used instead of the CPU to save power while performing tasks that do not require much computing power, such as monitoring of peripherals. ESP32 integrates a rich set of peripherals, ranging from capacitive touch sensors, Hall sensors, SD card interface, Ethernet, high-speed SPI, UART, I²S and I²C.

Note:

* For details on the part numbers of the ESP32 family of chips, please refer to the document [ESP32 Datasheet](#).

The integration of Bluetooth®, Bluetooth LE and Wi-Fi ensures that a wide range of applications can be targeted, and that the module is all-around: using Wi-Fi allows a large physical range and direct connection to the Internet through a Wi-Fi router, while using Bluetooth allows the user to conveniently connect to the phone or broadcast low energy beacons for its detection. The sleep current of the ESP32 chip is less than 5 μ A, making it suitable for battery powered and wearable electronics applications. The module supports a data rate of up to 150 Mbps, and 20 dBm output power at the antenna to ensure the widest physical range. As such the module does offer industry-leading specifications and the best performance for electronic integration, range, power consumption, and connectivity.

The operating system chosen for ESP32 is freeRTOS with LwIP; TLS 1.2 with hardware acceleration is built in as well. Secure (encrypted) over the air (OTA) upgrade is also supported, so that users can upgrade their products even after their release, at minimum cost and effort.

Table 2 provides the specifications of ESP32-WROOM-32D and ESP32-WROOM-32U.

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Table 2: ESP32-WROOM-32D and ESP32-WROOM-32U Specifications

Categories	Items	Specifications
Certification	RF Certification	FCC/CE-RED/IC/TELEC/KCC/SRRC/NCC
	Wi-Fi Certification	Wi-Fi Alliance
	Bluetooth certification	BQB
	Green Certification	REACH/RoHS
Test	Reliability	HTOL/HTSL/uHAST/TCT/ESD
Wi-Fi	Protocols	802.11 b/g/n (802.11n up to 150 Mbps)
		A-MPDU and A-MSDU aggregation and 0.4 μ s guard interval support
	Frequency range	2.4 GHz ~ 2.5 GHz
Bluetooth	Protocols	Bluetooth v4.2 BR/EDR and BLE specification
	Radio	NZIF receiver with -97 dBm sensitivity
		Class-1, class-2 and class-3 transmitter
		AFH
	Audio	CVSD and SBC
Hardware	Module interfaces	SD card, UART, SPI, SDIO, I ² C, LED PWM, Motor PWM, I ² S, IR, pulse counter, GPIO, capacitive touch sensor, ADC, DAC, Two-Wire Automotive Interface (TWAI [®]), compatible with ISO11898-1 (CAN Specification 2.0)
	On-chip sensor	Hall sensor
	Integrated crystal	40 MHz crystal
	Integrated SPI flash ¹	4 MB
	Operating voltage/Power supply	3.0 V ~ 3.6 V
	Operating current	Average: 80 mA
	Minimum current delivered by power supply	500 mA
	Recommended operating temperature range ²	-40 °C ~ +85 °C
	Moisture sensitivity level (MSL)	Level 3

Notice:

1. ESP32-WROOM-32D and ESP32-WROOM-32U with 8 MB flash or 16 MB flash are available for custom order.
2. ESP32-WROOM-32D and ESP32-WROOM-32U with high temperature range (-40 °C ~ +105 °C) option are available for custom order. 4 MB SPI flash is supported on the high temperature range version.
3. For detailed ordering information, please see [ESP Product Selector](#).

2 Pin Definitions

2.1 Pin Layout

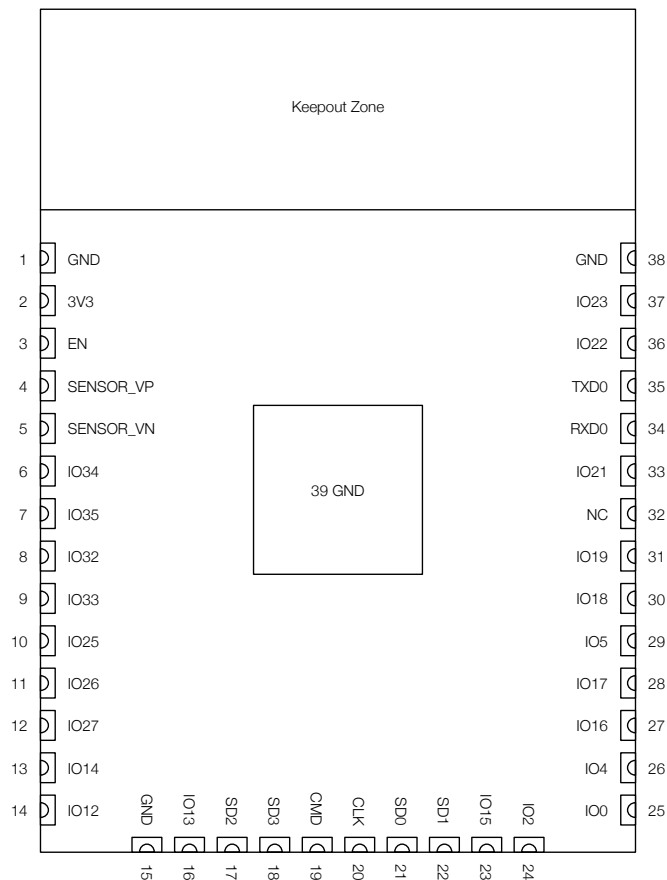


Figure 1: ESP32-WROOM-32D Pin Layout (Top View)

Note:

The pin layout of ESP32-WROOM-32U is the same as that of ESP32-WROOM-32D, except that ESP32-WROOM-32U has no keepout zone.

2.2 Pin Description

The ESP32-WROOM-32D and ESP32-WROOM-32U have 38 pins. See pin definitions in Table 3.

Table 3: Pin Definitions

Name	No.	Type	Function
GND	1	P	Ground
3V3	2	P	Power supply
EN	3	I	Module-enable signal. Active high.
SENSOR_VP	4	I	GPIO36, ADC1_CH0, RTC_GPIO0
SENSOR_VN	5	I	GPIO39, ADC1_CH3, RTC_GPIO3
IO34	6	I	GPIO34, ADC1_CH6, RTC_GPIO4
IO35	7	I	GPIO35, ADC1_CH7, RTC_GPIO5

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Name	No.	Type	Function
IO32	8	I/O	GPIO32, XTAL_32K_P (32.768 kHz crystal oscillator input), ADC1_CH4, TOUCH9, RTC_GPIO9
IO33	9	I/O	GPIO33, XTAL_32K_N (32.768 kHz crystal oscillator output), ADC1_CH5, TOUCH8, RTC_GPIO8
IO25	10	I/O	GPIO25, DAC_1, ADC2_CH8, RTC_GPIO6, EMAC_RXD0
IO26	11	I/O	GPIO26, DAC_2, ADC2_CH9, RTC_GPIO7, EMAC_RXD1
IO27	12	I/O	GPIO27, ADC2_CH7, TOUCH7, RTC_GPIO17, EMAC_RX_DV
IO14	13	I/O	GPIO14, ADC2_CH6, TOUCH6, RTC_GPIO16, MTMS, HSPICLK, HS2_CLK, SD_CLK, EMAC_TXD2
IO12	14	I/O	GPIO12, ADC2_CH5, TOUCH5, RTC_GPIO15, MTDI, HSPIQ, HS2_DATA2, SD_DATA2, EMAC_TXD3
GND	15	P	Ground
IO13	16	I/O	GPIO13, ADC2_CH4, TOUCH4, RTC_GPIO14, MTCK, HSPID, HS2_DATA3, SD_DATA3, EMAC_RX_ER
SHD/SD2*	17	I/O	GPIO9, SD_DATA2, SPIHD, HS1_DATA2, U1RXD
SWP/SD3*	18	I/O	GPIO10, SD_DATA3, SPIWP, HS1_DATA3, U1TXD
SCS/CMD*	19	I/O	GPIO11, SD_CMD, SPICS0, HS1_CMD, U1RTS
SCK/CLK*	20	I/O	GPIO6, SD_CLK, SPICLK, HS1_CLK, U1CTS
SDO/SD0*	21	I/O	GPIO7, SD_DATA0, SPIQ, HS1_DATA0, U2RTS
SDI/SD1*	22	I/O	GPIO8, SD_DATA1, SPID, HS1_DATA1, U2CTS
IO15	23	I/O	GPIO15, ADC2_CH3, TOUCH3, MTDO, HSPICS0, RTC_GPIO13, HS2_CMD, SD_CMD, EMAC_RXD3
IO2	24	I/O	GPIO2, ADC2_CH2, TOUCH2, RTC_GPIO12, HSPIWP, HS2_DATA0, SD_DATA0
IO0	25	I/O	GPIO0, ADC2_CH1, TOUCH1, RTC_GPIO11, CLK_OUT1, EMAC_TX_CLK
IO4	26	I/O	GPIO4, ADC2_CH0, TOUCH0, RTC_GPIO10, HSPICLK, HS2_DATA1, SD_DATA1, EMAC_TX_ER
IO16	27	I/O	GPIO16, HS1_DATA4, U2RXD, EMAC_CLK_OUT
IO17	28	I/O	GPIO17, HS1_DATA5, U2TXD, EMAC_CLK_OUT_180
IO5	29	I/O	GPIO5, VSPICS0, HS1_DATA6, EMAC_RX_CLK
IO18	30	I/O	GPIO18, VSPICLK, HS1_DATA7
IO19	31	I/O	GPIO19, VSPIQ, U0CTS, EMAC_TXD0
NC	32	-	-
IO21	33	I/O	GPIO21, VSPICLK, EMAC_TX_EN
RXD0	34	I/O	GPIO3, U0RXD, CLK_OUT2
TXD0	35	I/O	GPIO1, U0TXD, CLK_OUT3, EMAC_RXD2
IO22	36	I/O	GPIO22, VSPIWP, U0RTS, EMAC_TXD1
IO23	37	I/O	GPIO23, VSPID, HS1_STROBE
GND	38	P	Ground

Notice:

* Pins SCK/CLK, SDO/SD0, SDI/SD1, SHD/SD2, SWP/SD3 and SCS/CMD, namely, GPIO6 to GPIO11 are connected to the integrated SPI flash integrated on the module and are not recommended for other uses.

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2.3 Strapping Pins

ESP32 has five strapping pins, which can be seen in Chapter 6 Schematics:

- MTDI
- GPIO0
- GPIO2
- MTDO
- GPIO5

Software can read the values of these five bits from register "GPIO_STRAPPING".

During the chip's system reset release (power-on-reset, RTC watchdog reset and brownout 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. The strapping bits configure the device's boot mode, the operating voltage of VDD_SDIO and other initial system settings.

Each strapping pin is connected to its internal pull-up/pull-down during the chip reset. Consequently, if a strapping pin is unconnected or the connected external circuit is high-impedance, the internal weak pull-up/pull-down will determine the default input level of the strapping pins.

To change the strapping bit values, users 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.

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

Refer to Table 4 for a detailed boot-mode configuration by strapping pins.

Table 4: Strapping Pins

Voltage of Internal LDO (VDD_SDIO)					
Pin	Default	3.3 V		1.8 V	
MTDI	Pull-down	0		1	
Bootling Mode					
Pin	Default	SPI Boot		Download Boot	
GPIO0	Pull-up	1		0	
GPIO2	Pull-down	Don't-care		0	
Enabling/Disabling Debugging Log Print over U0TXD During Bootling					
Pin	Default	U0TXD Active		U0TXD Silent	
MTDO	Pull-up	1		0	
Timing of SDIO Slave					
Pin	Default	FE Sampling FE Output	FE Sampling RE Output	RE Sampling FE Output	RE Sampling RE Output
MTDO	Pull-up	0	0	1	1
GPIO5	Pull-up	0	1	0	1

Note:

- Firmware can configure register bits to change the settings of "Voltage of Internal LDO (VDD_SDIO)" and "Timing of SDIO Slave" after booting.
- Both ESP32-WROOM-32D and ESP32-WROOM-32U integrate a 3.3 V SPI flash, so the pin MTDI cannot be set to 1 when the modules are powered up.

3 Functional Description

This chapter describes the modules and functions integrated in ESP32-WROOM-32D and ESP32-WROOM-32U.

3.1 CPU and Internal Memory

ESP32-D0WD contains a dual-core Xtensa® 32-bit LX6 MCU. The internal memory includes:

- 448 KB of ROM for booting and core functions.
- 520 KB of on-chip SRAM for data and instructions.
- 8 KB of SRAM in RTC, which is called RTC FAST Memory and can be used for data storage; it is accessed by the main CPU during RTC Boot from the Deep-sleep mode.
- 8 KB of SRAM in RTC, which is called RTC SLOW Memory and can be accessed by the co-processor during the Deep-sleep mode.
- 1 Kbit of eFuse: 256 bits are used for the system (MAC address and chip configuration) and the remaining 768 bits are reserved for customer applications, including flash-encryption and chip-ID.

3.2 External Flash and SRAM

ESP32 supports multiple external QSPI flash and SRAM chips. More details can be found in Chapter SPI in the [ESP32 Technical Reference Manual](#). ESP32 also supports hardware encryption/decryption based on AES to protect developers' programs and data in flash.

ESP32 can access the external QSPI flash and SRAM through high-speed caches.

- The external flash can be mapped into CPU instruction memory space and read-only memory space simultaneously.
 - When external flash is mapped into CPU instruction memory space, up to 11 MB + 248 KB can be mapped at a time. Note that if more than 3 MB + 248 KB are mapped, cache performance will be reduced due to speculative reads by the CPU.
 - When external flash is mapped into read-only data memory space, up to 4 MB can be mapped at a time. 8-bit, 16-bit and 32-bit reads are supported.
- External SRAM can be mapped into CPU data memory space. Up to 4 MB can be mapped at a time. 8-bit, 16-bit and 32-bit reads and writes are supported.

Both ESP32-WROOM-32D and ESP32-WROOM-32U integrate a 4 MB of external SPI flash. The integrated SPI flash is connected to GPIO6, GPIO7, GPIO8, GPIO9, GPIO10 and GPIO11. These six pins cannot be used as regular GPIOs.

3.3 Crystal Oscillators

The module uses a 40-MHz crystal oscillator.

3.4 RTC and Low-Power Management

With the use of advanced power-management technologies, ESP32 can switch between different power modes.

For details on ESP32's power consumption in different power modes, please refer to section "RTC and Low-Power Management" in [ESP32 Datasheet](#).

4 Peripherals and Sensors

Please refer to Section Peripherals and Sensors in [ESP32 Datasheet](#).

Note:

External connections can be made to any GPIO except for GPIOs in the range 6-11. These six GPIOs are connected to the module's integrated SPI flash. For details, please see Section [6 Schematics](#).

5 Electrical Characteristics

5.1 Absolute Maximum Ratings

Stresses beyond the absolute maximum ratings listed in Table 5 below may cause permanent damage to the device. These are stress ratings only, and do not refer to the functional operation of the device that should follow the [recommended operating conditions](#).

Table 5: Absolute Maximum Ratings

Symbol	Parameter	Min	Max	Unit
VDD33	Power supply voltage	-0.3	3.6	V
I_{output}^1	Cumulative IO output current	-	1,100	mA
T_{store}	Storage temperature	-40	150	°C

1. The module worked properly after a 24-hour test in ambient temperature at 25 °C, and the IOs in three domains (VDD3P3_RTC, VDD3P3_CPU, VDD_SDIO) output high logic level to ground. Please note that pins occupied by flash and/or PSRAM in the VDD_SDIO power domain were excluded from the test.
2. Please see Appendix IO_MUX of [ESP32 Datasheet](#) for IO's power domain.

5.2 Recommended Operating Conditions

Table 6: Recommended Operating Conditions

Symbol	Parameter	Min	Typical	Max	Unit
VDD33	Power supply voltage	3.0	3.3	3.6	V
I_{VDD}	Current delivered by external power supply	0.5	-	-	A
T	Operating temperature	-40	-	85	°C

5.3 DC Characteristics (3.3 V, 25 °C)

Table 7: DC Characteristics (3.3 V, 25 °C)

Symbol	Parameter		Min	Typ	Max	Unit
C_{IN}	Pin capacitance		-	2	-	pF
V_{IH}	High-level input voltage		$0.75 \times VDD^1$	-	$VDD^1 + 0.3$	V
V_{IL}	Low-level input voltage		-0.3	-	$0.25 \times VDD^1$	V
I_{IH}	High-level input current		-	-	50	nA
I_{IL}	Low-level input current		-	-	50	nA
V_{OH}	High-level output voltage		$0.8 \times VDD^1$	-	-	V
V_{OL}	Low-level output voltage		-	-	$0.1 \times VDD^1$	V
I_{OH}	High-level source current ($VDD^1 = 3.3\text{ V}$, $V_{OH} \geq 2.64\text{ V}$, output drive strength set to the maximum)	VDD3P3_CPU power domain ^{1, 2}	-	40	-	mA
		VDD3P3_RTC power domain ^{1, 2}	-	40	-	mA
		VDD_SDIO power domain ^{1, 3}	-	20	-	mA

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Symbol	Parameter	Min	Typ	Max	Unit
I_{OL}	Low-level sink current ($V_{DD}^1 = 3.3\text{ V}$, $V_{OL} = 0.495\text{ V}$, output drive strength set to the maximum)	-	28	-	mA
R_{PU}	Resistance of internal pull-up resistor	-	45	-	k Ω
R_{PD}	Resistance of internal pull-down resistor	-	45	-	k Ω
V_{IL_nRST}	Low-level input voltage of CHIP_PU to power off the chip	-	-	0.6	V

Notes:

1. Please see Appendix IO_MUX of [ESP32 Datasheet](#) for IO's power domain. VDD is the I/O voltage for a particular power domain of pins.
2. For VDD3P3_CPU and VDD3P3_RTC power domain, per-pin current sourced in the same domain is gradually reduced from around 40 mA to around 29 mA, $V_{OH} \geq 2.64\text{ V}$, as the number of current-source pins increases.
3. Pins occupied by flash and/or PSRAM in the VDD_SDIO power domain were excluded from the test.

5.4 Wi-Fi Radio

Table 8: Wi-Fi Radio Characteristics

Parameter	Condition	Min	Typical	Max	Unit
Operating frequency range ^{note1}	-	2412	-	2484	MHz
Output impedance ^{note2}	-	-	note 2	-	Ω
TX power ^{note3}	11n, MCS7	12	13	14	dBm
	11b mode	17.5	18.5	20	dBm
Sensitivity	11b, 1 Mbps	-	-98	-	dBm
	11b, 11 Mbps	-	-89	-	dBm
	11g, 6 Mbps	-	-92	-	dBm
	11g, 54 Mbps	-	-74	-	dBm
	11n, HT20, MCS0	-	-91	-	dBm
	11n, HT20, MCS7	-	-71	-	dBm
	11n, HT40, MCS0	-	-89	-	dBm
	11n, HT40, MCS7	-	-69	-	dBm
Adjacent channel rejection	11g, 6 Mbps	-	31	-	dB
	11g, 54 Mbps	-	14	-	dB
	11n, HT20, MCS0	-	31	-	dB
	11n, HT20, MCS7	-	13	-	dB

1. Device should operate in the frequency range allocated by regional regulatory authorities. Target operating frequency range is configurable by software.
2. For the modules that use IPEX antennas, the output impedance is 50 Ω . For other modules without IPEX antennas, users do not need to concern about the output impedance.
3. Target TX power is configurable based on device or certification requirements.

5.5 BLE Radio

5.5.1 Receiver

Table 9: Receiver Characteristics – BLE

Parameter	Conditions	Min	Typ	Max	Unit
Sensitivity @30.8% PER	-	-	-97	-	dBm
Maximum received signal @30.8% PER	-	0	-	-	dBm
Co-channel C/I	-	-	+10	-	dB
Adjacent channel selectivity C/I	$F = F_0 + 1 \text{ MHz}$	-	-5	-	dB
	$F = F_0 - 1 \text{ MHz}$	-	-5	-	dB
	$F = F_0 + 2 \text{ MHz}$	-	-25	-	dB
	$F = F_0 - 2 \text{ MHz}$	-	-35	-	dB
	$F = F_0 + 3 \text{ MHz}$	-	-25	-	dB
	$F = F_0 - 3 \text{ MHz}$	-	-45	-	dB
Out-of-band blocking performance	30 MHz ~ 2000 MHz	-10	-	-	dBm
	2000 MHz ~ 2400 MHz	-27	-	-	dBm
	2500 MHz ~ 3000 MHz	-27	-	-	dBm
	3000 MHz ~ 12.5 GHz	-10	-	-	dBm
Intermodulation	-	-36	-	-	dBm

5.5.2 Transmitter

Table 10: Transmitter Characteristics – BLE

Parameter	Conditions	Min	Typ	Max	Unit
RF transmit power	-	-	0	-	dBm
Gain control step	-	-	3	-	dBm
RF power control range	-	-12	-	+9	dBm
Adjacent channel transmit power	$F = F_0 \pm 2 \text{ MHz}$	-	-52	-	dBm
	$F = F_0 \pm 3 \text{ MHz}$	-	-58	-	dBm
	$F = F_0 \pm > 3 \text{ MHz}$	-	-60	-	dBm
$\Delta f_{1\text{avg}}$	-	-	-	265	kHz
$\Delta f_{2\text{max}}$	-	247	-	-	kHz
$\Delta f_{2\text{avg}}/\Delta f_{1\text{avg}}$	-	-	-0.92	-	-
ICFT	-	-	-10	-	kHz
Drift rate	-	-	0.7	-	kHz/50 μs
Drift	-	-	2	-	kHz

5.6 Reflow Profile

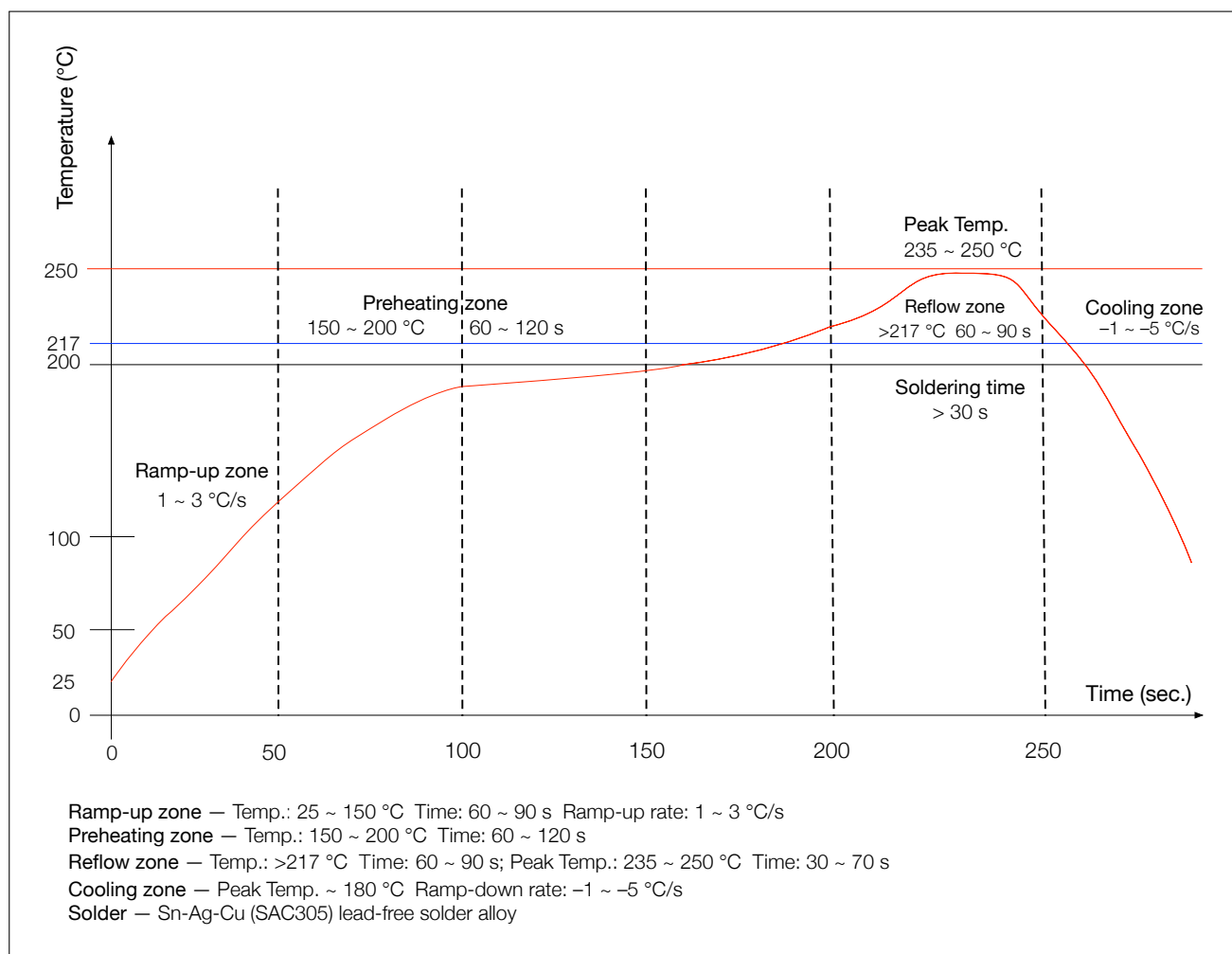


Figure 2: Reflow Profile

Note:

Solder the module in a single reflow.

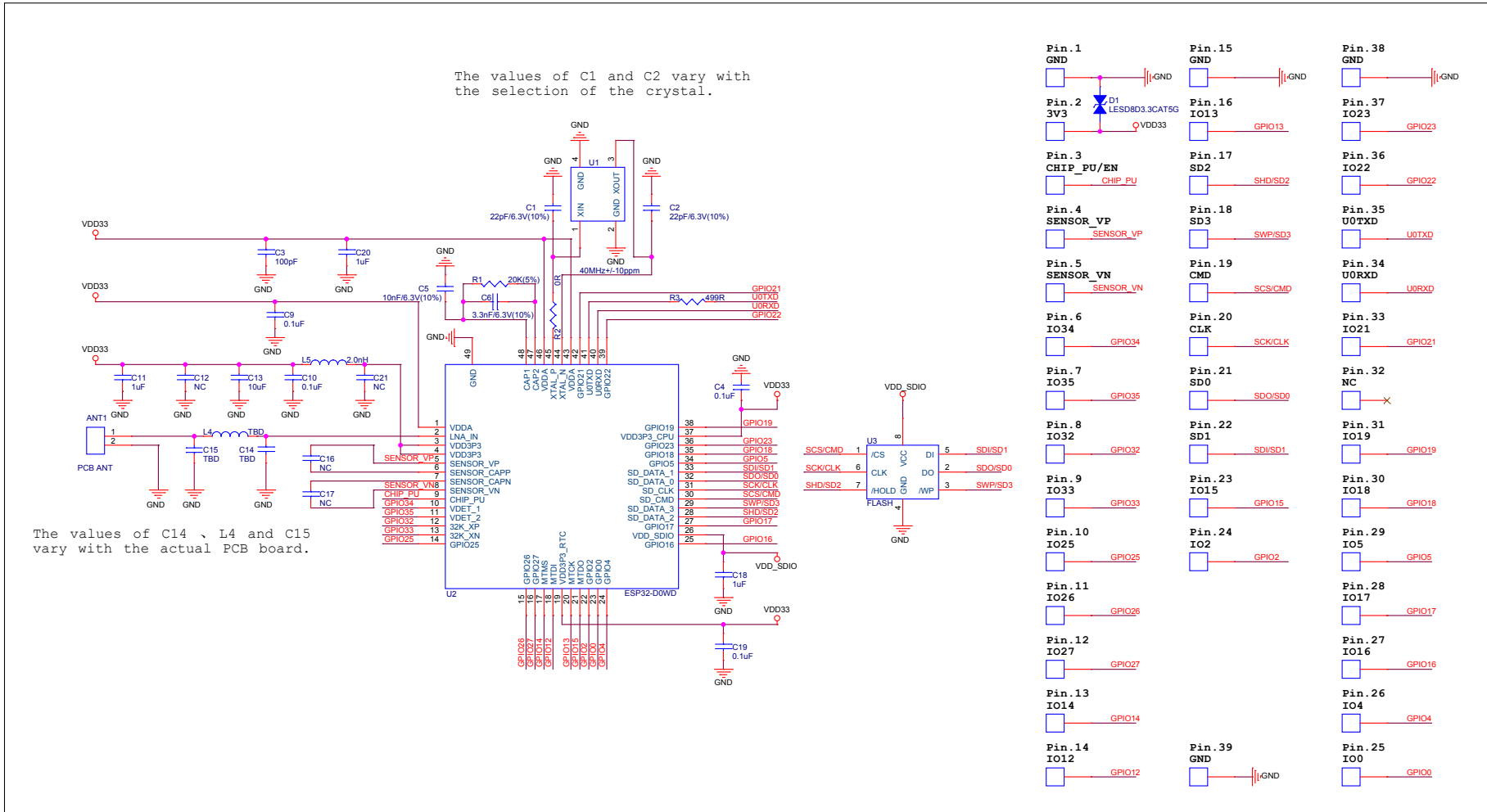


Figure 3: ESP32-WROOM-32D Schematics

6 Schematics

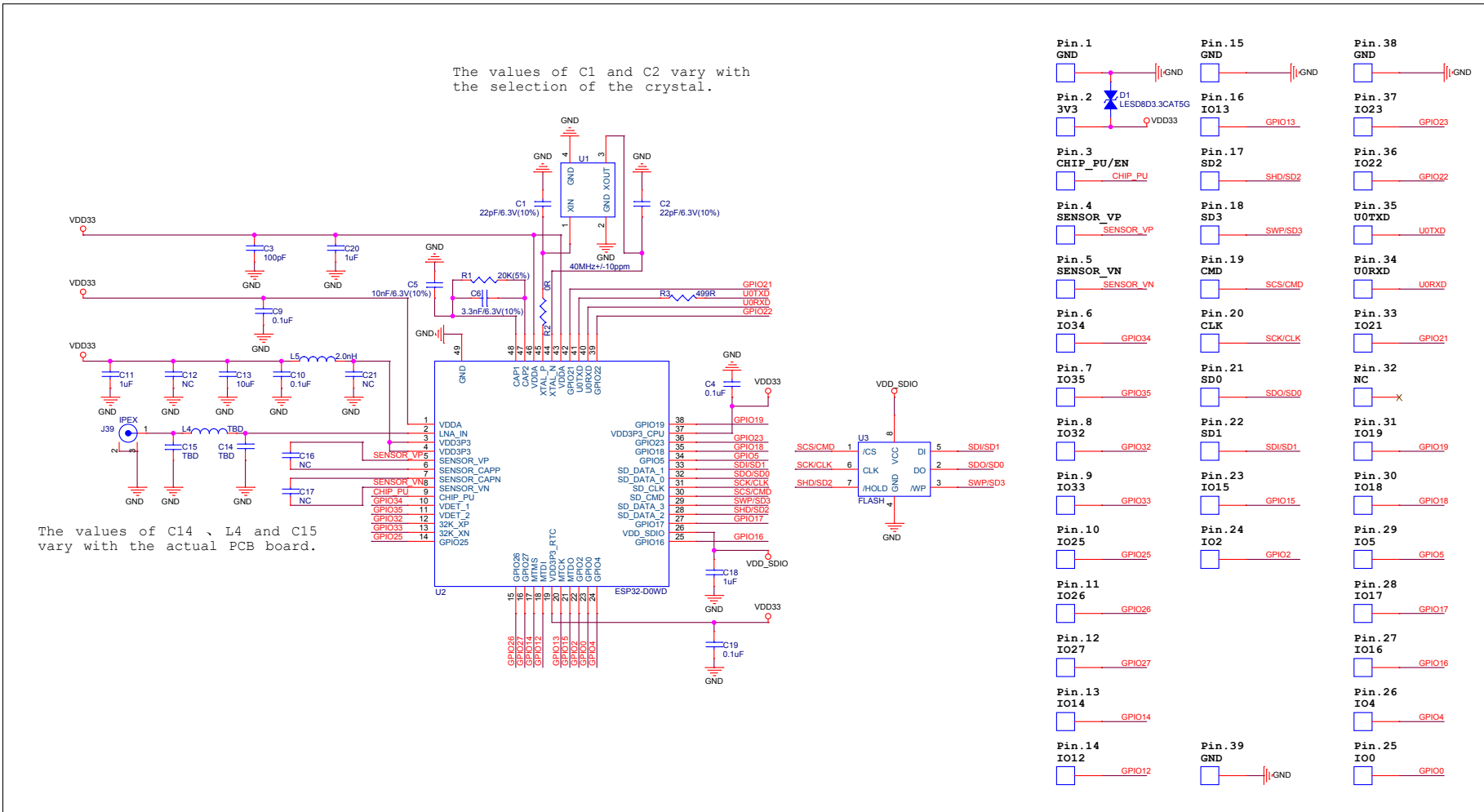


Figure 4: ESP32-WROOM-32U Schematics

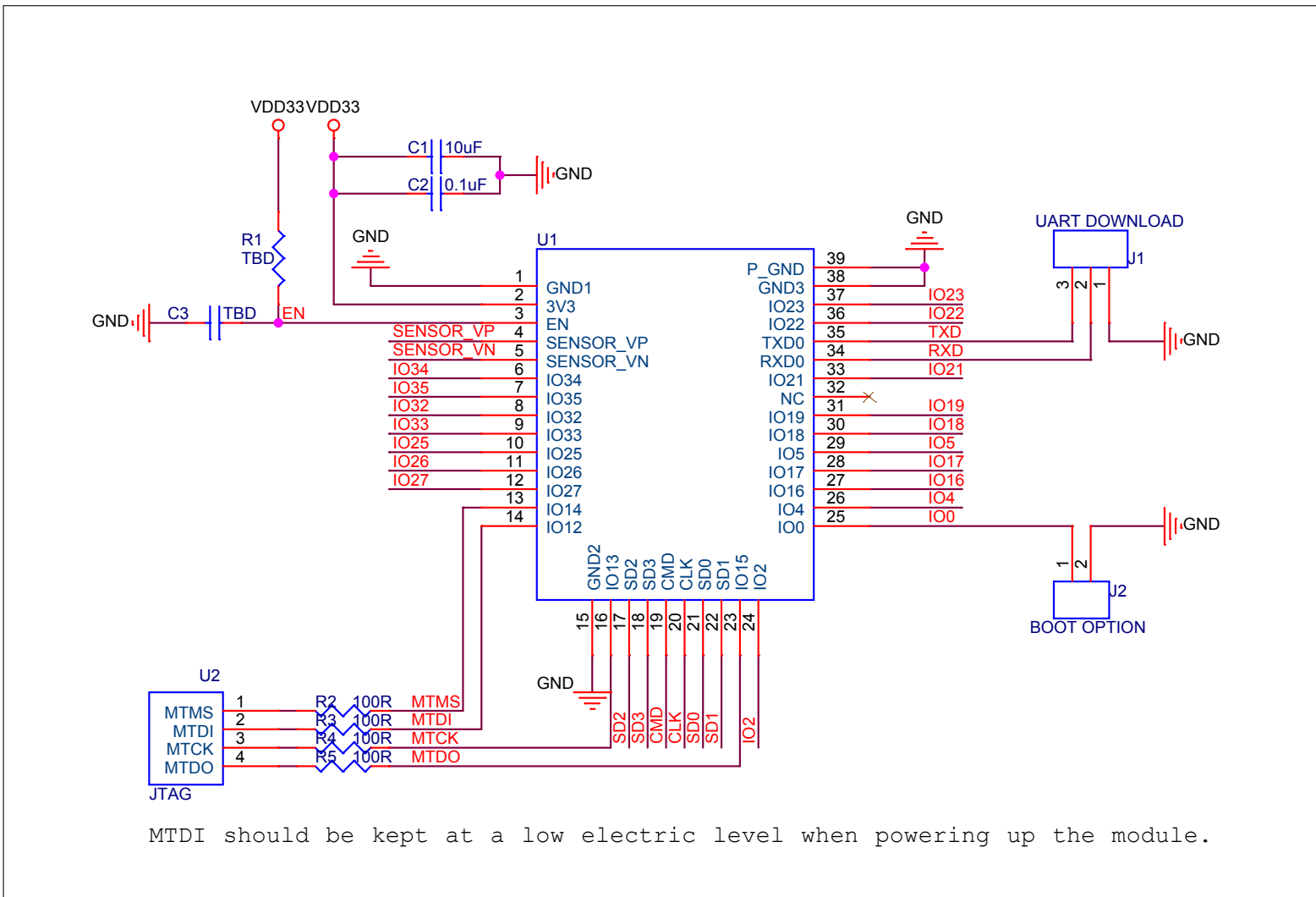


Figure 5: ESP32-WROOM-32D & ESP32-WROOM-32U Peripheral Schematics

Note:

- Soldering Pad 39 to the Ground is not necessary for a satisfactory thermal performance. If users do want to solder it, they need to ensure that the correct quantity of soldering paste is applied.
- To ensure the power supply to the ESP32 chip during power-up, it is advised to add an RC delay circuit at the EN pin. The recommended setting for the RC delay circuit is usually $R = 10\text{ k}\Omega$ and $C = 1\text{ }\mu\text{F}$. However, specific parameters should be adjusted based on the power-up timing of the module and the power-up and reset sequence timing of the chip. For ESP32's power-up and reset sequence timing diagram, please refer to Section *Power Scheme* in [ESP32 Datasheet](#).

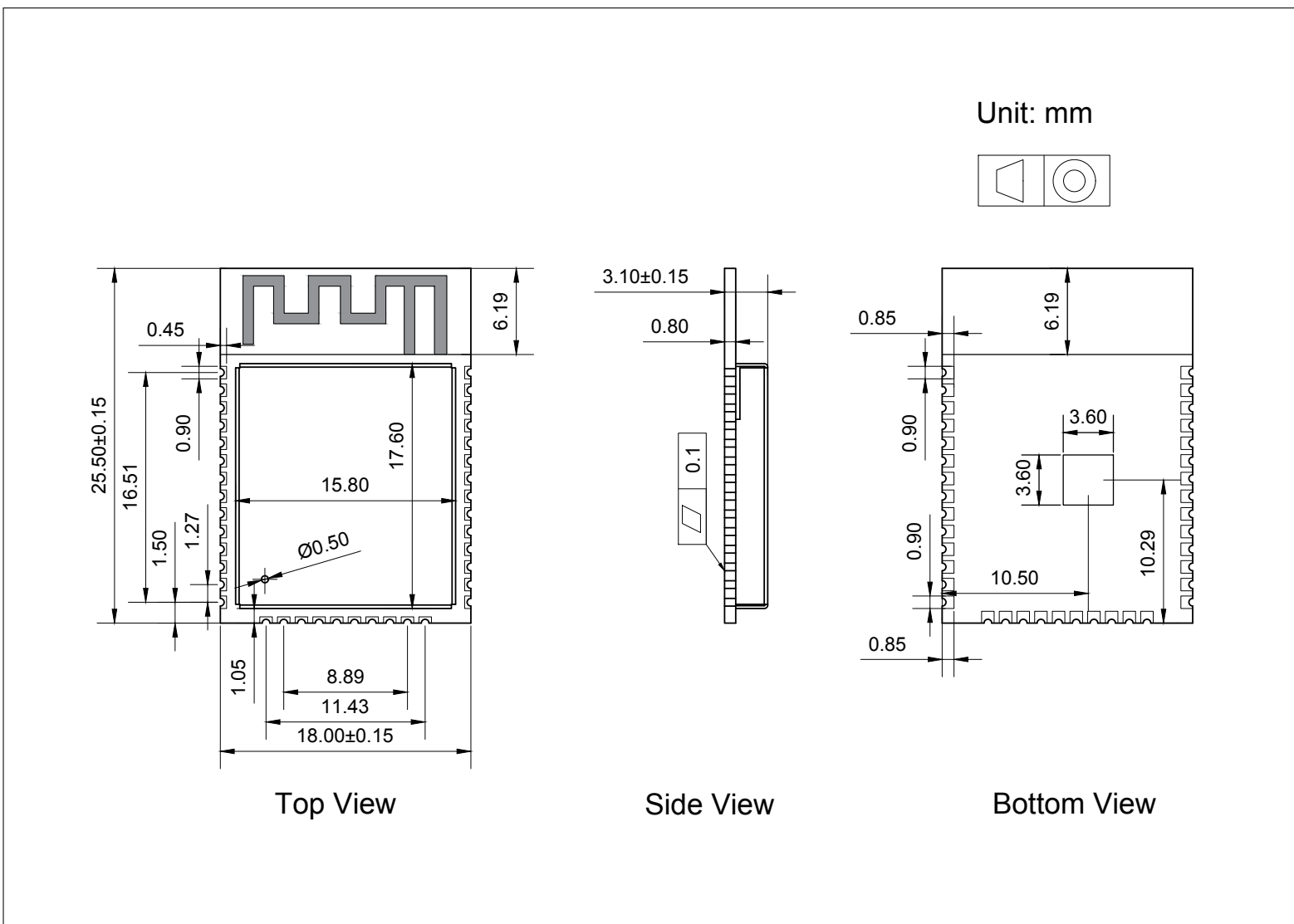


Figure 6: Physical Dimensions of ESP32-WROOM-32D

8 Physical Dimensions

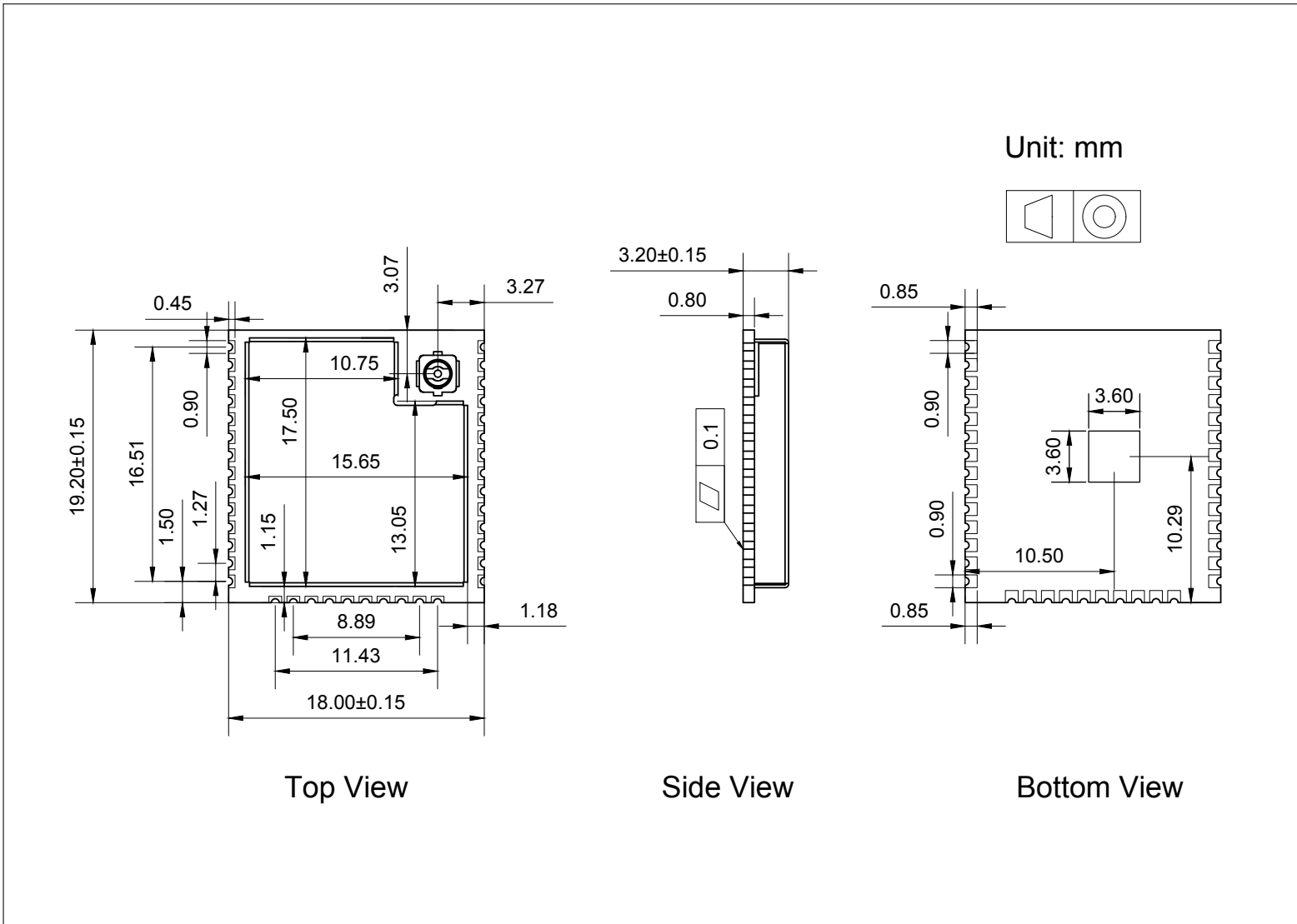


Figure 7: Physical Dimensions of ESP32-WROOM-32U

9 Recommended PCB Land Pattern

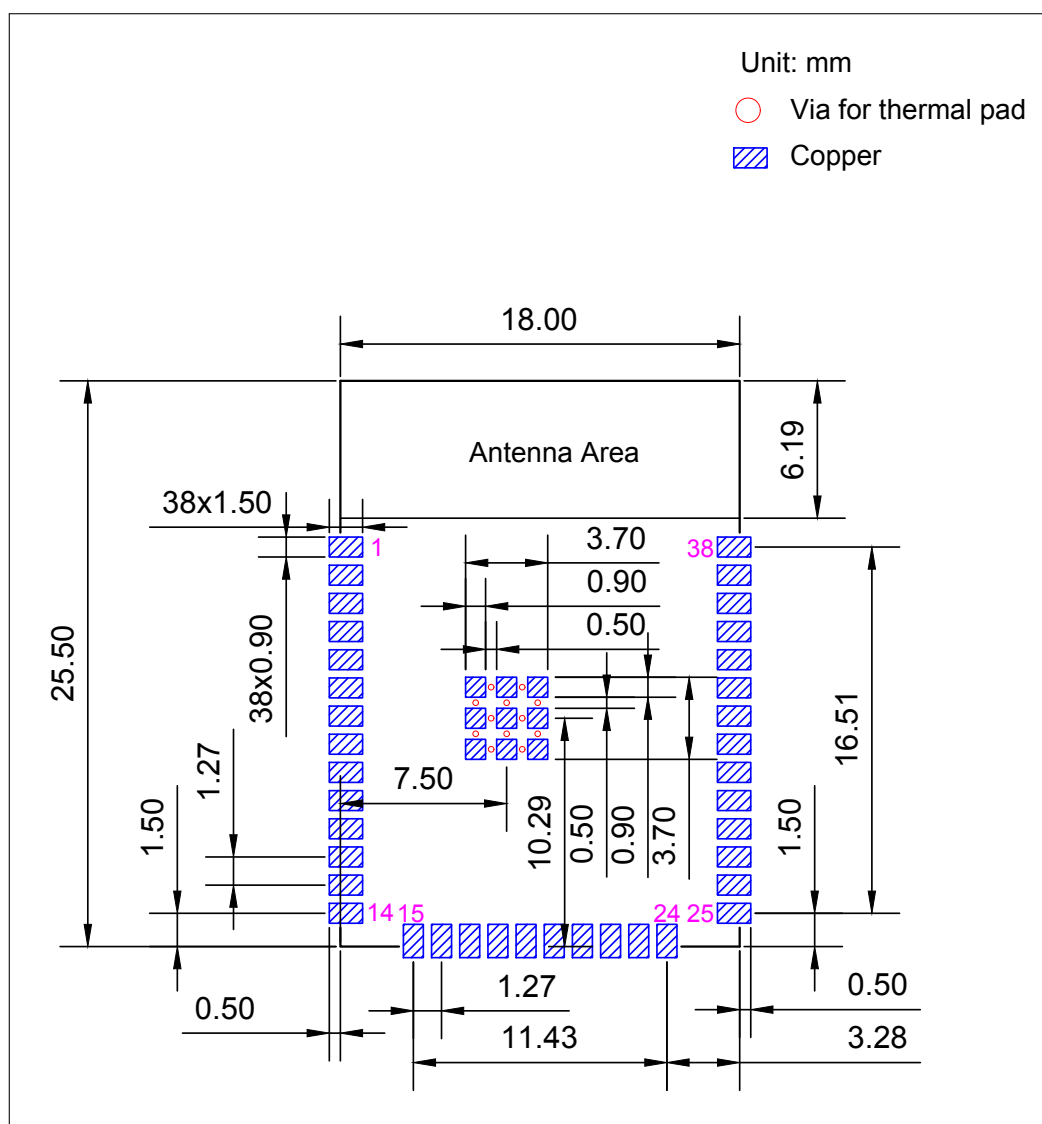


Figure 8: Recommended PCB Land Pattern of ESP32-WROOM-32D





11 Learning Resources

11.1 Must-Read Documents

The following link provides documents related to ESP32.

- [ESP32 Datasheet](#)
This document provides an introduction to the specifications of the ESP32 hardware, including overview, pin definitions, functional description, peripheral interface, electrical characteristics, etc.
- [ESP32 ECO V3 User Guide](#)
This document describes differences between V3 and previous ESP32 silicon wafer revisions.
- [ECO and Workarounds for Bugs in ESP32](#)
This document details hardware errata and workarounds in the ESP32.
- [ESP-IDF Programming Guide](#)
It hosts extensive documentation for ESP-IDF ranging from hardware guides to API reference.
- [ESP32 Technical Reference Manual](#)
The manual provides detailed information on how to use the ESP32 memory and peripherals.
- [ESP32 Hardware Resources](#)
The zip files include the schematics, PCB layout, Gerber and BOM list of ESP32 modules and development boards.
- [ESP32 Hardware Design Guidelines](#)
The guidelines outline recommended design practices when developing standalone or add-on systems based on the ESP32 series of products, including the ESP32 chip, the ESP32 modules and development boards.
- [ESP32 AT Instruction Set and Examples](#)
This document introduces the ESP32 AT commands, explains how to use them, and provides examples of several common AT commands.
- [ESP Product Selector](#)

11.2 Must-Have Resources

Here are the ESP32-related must-have resources.

- [ESP32 BBS](#)
This is an Engineer-to-Engineer (E2E) Community for ESP32 where you can post questions, share knowledge, explore ideas, and help solve problems with fellow engineers.
- [ESP32 GitHub](#)
ESP32 development projects are freely distributed under Espressif's MIT license on GitHub. It is established to help developers get started with ESP32 and foster innovation and the growth of general knowledge about the hardware and software surrounding ESP32 devices.
- [ESP32 Tools](#)
This is a webpage where users can download ESP32 Flash Download Tools and the zip file "ESP32 Certification and Test".

[Not Recommended For New Designs \(NRND\)](#)

- [ESP-IDF](#)

This webpage links users to the official IoT development framework for ESP32.

- [ESP32 Resources](#)

This webpage provides the links to all available ESP32 documents, SDK and tools.

Revision History

Date	Version	Release notes
2021.08	v2.2	Replaced Espressif Product Ordering Information with ESP Product Selector Updated the description of TWAI in Table 1 Labeled this document as (Not Recommended For New Designs)
2021.02	V2.1	Updated Figure 6: <i>Physical Dimensions of ESP32-WROOM-32D</i> , Figure 7: <i>Physical Dimensions of ESP32-WROOM-32U</i> , Figure 8: <i>Recommended PCB Land Pattern of ESP32-WROOM-32D</i> , and Figure 9: <i>Recommended PCB Land Pattern of ESP32-WROOM-32U</i> . Modified the note below Figure 2: <i>Reflow Profile</i> . Modified the note below Figure 5: <i>ESP32-WROOM-32D & ESP32-WROOM-32U Peripheral Schematics</i> . Updated the trade mark from TWAI™ to TWAI®.
2020.11	V2.0	Added TWAI™ in Table 1; Added a note under Figure 2: Reflow Profile; Updated the C value in RC delay circuit from 0.1 μ F to 1 μ F; Provided feedback link.
2019.09	V1.9	- Changed the supply voltage range from 2.7 V ~ 3.6 V to 3.0 V ~ 3.6 V; - Added Moisture sensitivity level (MSL) 3 in Table 2 <i>ESP32-WROOM-32D and ESP32-WROOM-32U Specifications</i>; - Added notes about "Operating frequency range" and "TX power" under Table 8 <i>Wi-Fi Radio Characteristics</i>; - Updated Section 7 <i>Peripheral Schematics</i> and added a note about RC delay circuit under it; - Updated Figure 8 and Figure 9 <i>Recommended PCB Land Pattern</i>.
2019.01	V1.8	Changed the RF power control range in Table 10 from -12 ~ +12 to -12 ~ +9 dBm.
2018.10	V1.7	Added notice on module custom options under Table 2; Added "Cumulative IO output current" entry to Table 5: Absolute Maximum Ratings; Added more parameters to Table 7: DC Characteristics.
2018.09	V1.6	Updated the hole diameter in the shield from 1.00 mm to 0.50 mm, in Figure 6.
2018.08	V1.5	- Added certifications and reliability test items the module has passed in Table 2: ESP32-WROOM-32D and ESP32-WROOM-32U Specifications, and removed software-specific information; - Updated section 3.4: RTC and Low-Power Management; - Changed the modules' dimensions; - Updated Figure 8 and 7: Physical Dimensions; - Updated Table 8: Wi-Fi Radio.

Date	Version	Release notes
2018.06	V1.4	- Deleted Temperature Sensor in Table 2: ESP32-WROOM-32D & ESP32-WROOM-32U Specifications; - Updated Chapter 3: Functional Description; - Added notes to Chapter 7: Peripheral Schematics; - Added Chapter 8: Recommended PCB Land Pattern; Changes to electrical characteristics: - Updated Table 5: Absolute Maximum Ratings; - Added Table 6: Recommended Operating Conditions; - Added Table 7: DC Characteristics; - Updated the values of "Gain control step", "Adjacent channel transmit power" in Table 10: Transmitter Characteristics - BLE.
2018.04	V1.3	Updated Figure 4 ESP32-WROOM-32U Schematics and Figure 3 ESP32-WROOM-32D Schematics.
2018.02	V1.2	Update Figure 4 ESP32-WROOM-32U Schematics.
2018.02	V1.1	Updated Chapter 6 Schematics. Deleted description of low-noise amplifier. Replaced the module name ESP-WROOM-32D with ESP32-WROOM-32D. Added information about module certification in Table 2. Updated the description of eFuse bits in Section 3.1.
2017.11	V1.0	First release.



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[Not Recommended For New Designs \(NRND\)](#)



Espressif

Product Ordering Information



Version 4.4
Espressif Systems
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About This Guide

This guide provides the ordering information of Espressif products.

Release Notes

For any changes to this document over time, please refer to the last page.

Documentation Change Notification

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Certification

Download certificates for Espressif products from <https://www.espressif.com/en/certificates>.

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Buy Espressif products from <https://www.espressif.com/en/company/contact/pre-sale-questions-crm>.

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Notes to This Guide

- MP denotes mass production.
- SPQ: Standard Pack Quantity; MOQ: Minimum Order Quantity.
- For high temperature range option, please contact our [salesperson](#).
- Unless otherwise specified, all the modules have the same dimensional tolerance: ± 0.10 mm for length, width and thickness.
- Release notes for this document are listed on the last page.
- Label ***New** indicates that this is an new product, label ***Recommend** indicates that this product is recommended by Espressif, label ***Default** indicates the default specification of a product, and label ***NRND** indicates that this product is not recommended for new designs.



1. ESP32-S2 Series

1.1. ESP32-S2 Series of SoCs

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-S2 Datasheet (*New)	ESP32-S2	-	SMD Wi-Fi IC, ESP32-S2, single-core MCU, QFN 56-pin, 7*7 mm	-	-	-	-40 °C ~ +125 °C	7×7	2,000 & 1,000	1,000	MP	-
ESP32-S2F (*New)	ESP32-S2FH2	-	SMD Wi-Fi IC, ESP32-S2F, single-core MCU, QFN 56-pin, 7*7 mm, 2 MB flash inside, -40°C ~ +105°C	2 MB	-	-	-40 °C ~ +105 °C	7×7	2,000 & 1,000	1,000	Sample	-
	ESP32-S2FH4	-	SMD Wi-Fi IC, ESP32-S2F, single-core MCU, QFN 56-pin, 7*7 mm, 4 MB flash inside, -40°C ~ +105°C	4 MB	-	-	-40 °C ~ +105 °C	7×7	2,000 & 1,000	1,000	Sample	-



1.2. ESP32-S2 Series of Modules

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-S2-MINI-1 (*New) (*Recommend)	-	ESP32-S2-MINI-1(M50F2H000PH3Q0)	SMD module, ESP32-S2FH4, PCB antenna	4 MB embedded in chip	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	15.40×20.00×2.40(±0.15)	TBD	TBD	Sample	ESP32-S2FH4
ESP32-S2-MINI-1U (*New) (*Recommend)	-	ESP32-S2-MINI-1U(M50F2H000UH3Q0)	SMD module, ESP32-S2FH4, IPEX antenna connector	4 MB embedded in chip	-	External IPEX antenna	-40 °C ~ +85 °C	15.40×15.40×2.40(±0.15)	TBD	TBD	Sample	ESP32-S2FH4
ESP32-S2-WROOM Datasheet (*New)	ESP32-S2-WROOM (*Default)	ESP32-S2-WROOM(M22S2H3200PH3Q0)	SMD module, ESP32-S2, 4MB SPI flash, PCB antenna	4 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×31.00×3.30 (±0.15)	650	650	MP	ESP32-S2 Datasheet ESP32-S2-Saola-1 User Guide
	ESP32-S2-WROOM (High Temp. 105°C)	ESP32-S2-WROOM(M22S2H3200PS3Q0)	SMD module, ESP32-S2, 4MB SPI flash, PCB antenna, -40 °C ~ +105 °C	4 MB	-	Internal PCB on-board antenna	-40 °C ~ +105 °C	18.00×31.00×3.30 (±0.15)	650	650	MP	ESP32-S2 Datasheet
ESP32-S2-WROOM-I Datasheet (*New)	ESP32-S2-WROOM-I	ESP32-S2-WROOM-I(M22S2H3200UH3Q0)	SMD module , ESP32-S2, 4MB SPI flash, IPEX antenna connector	4 MB	-	External IPEX antenna	-40 °C ~ +85 °C	18.00×31.00×3.30 (±0.15)	650	650	MP	ESP32-S2 Datasheet ESP32-S2-Saola-1 User Guide
	ESP32-S2-WROOM-I (High Temp. 105°C)	ESP32-S2-WROOM-I(M22S2H3200US3Q0)	SMD module , ESP32-S2, 4MB SPI flash, IPEX antenna connector, -40 °C ~ +105 °C	4 MB	-	External IPEX antenna	-40 °C ~ +105 °C	18.00×31.00×3.30 (±0.15)	650	650	MP	ESP32-S2 Datasheet



1.2 ESP32-S2 Series of Modules

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-S2-WROVER Datasheet (*New)	ESP32-S2-WROVER (*Default)	ESP32-S2-WROVER(M22S2H3216PH3Q0)	SMD module, ESP32-S2, 3.3V, 2MB PSRAM, 4MB SPI flash, PCB Antenna	4 MB	2 MB	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×31.00×3.30 (±0.15)	650	650	MP	ESP32-S2 Datasheet ESP32-S2-Saola-1 User Guide
ESP32-S2-WROVER-I Datasheet (*New)	ESP32-S2-WROVER-I	ESP32-S2-WROVER-I(M22S2H3216UH3Q0)	SMD module, ESP32-S2, 3.3V, 2MB PSRAM, 4MB SPI flash, IPEX antenna connector	4 MB	2 MB	External IPEX antenna	-40 °C ~ +85 °C	18.00×31.00×3.30 (±0.15)	650	650	MP	ESP32-S2 Datasheet ESP32-S2-Saola-1 User Guide



1.3. ESP32-S2 Series of Development Boards

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-S2-Saola-1 User Guide (*New)	ESP32-S2-Saola-1R	ESP32-S2-Saola-1R	ESP32-S2 general-purpose development board, embeds ESP32-S2-WROVER, 4 MB flash, with pin header	4 MB	2 MB	Internal PCB on-board antenna	-40 °C ~ +85 °C	53.9x27.9	1	-	MP	ESP32-S2-WROVER Datasheet
	ESP32-S2-Saola-1RI	ESP32-S2-Saola-1RI	ESP32-S2 general-purpose development board, embeds ESP32-S2-WROVER-I, 4 MB flash, with pin header	4 MB	2 MB	External IPEX antenna	-40 °C ~ +85 °C	53.9x27.9	1	-	MP	ESP32-S2-WROVER-I Datasheet
	ESP32-S2-Saola-1M	ESP32-S2-Saola-1M	ESP32-S2 general-purpose development board, embeds ESP32-S2-WROOM, 4 MB flash, with pin header	4 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	53.9x27.9	1	-	MP	ESP32-S2-WROOM Datasheet
	ESP32-S2-Saola-1MI	ESP32-S2-Saola-1MI	ESP32-S2 general-purpose development board, embeds ESP32-S2-WROOM-I, 4 MB flash, with pin header	4 MB	-	External IPEX antenna	-40 °C ~ +85 °C	53.9x27.9	1	-	MP	ESP32-S2-WROOM-I Datasheet
ESP32-S2-Kaluga-1 User Guide (*New)	-	ESP32-S2-Kaluga-1	The new multimedia development board ESP32-S2-Kaluga-1 based on ESP32-S2 has various functions, such as an LCD screen display, touch panel control, camera image acquisition, audio playback, etc. It can be flexibly assembled and disassembled, thus fulfilling a variety of customized requirements.	4 MB	2 MB	Internal PCB on-board antenna	-40 °C ~ +65 °C	128x166x60 (kit size)	1	-	Sample	ESP32-S2-WROVER Datasheet



2. ESP32 Series

2.1. ESP32 Series of SoCs

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32 Datasheet	ESP32-D0WD-V3 (*New) (*Recommend)	-	SMD IC ESP32- D0WD-V3, ESP32 ECO V3, dual-core MCU, Wi-Fi & Bluetooth combo, QFN 48-pin, 5*5 mm.	-	-	-	-40 °C ~ +125 °C	5×5	5,000 & 1,000	1,000	MP	-
	ESP32-D0WDQ6-V3 (*New) (*Recommend)	-	SMD IC ESP32- D0WDQ6-V3, ESP32 ECO V3, dual-core MCU, Wi-Fi & Bluetooth combo, QFN 48-pin, 6*6 mm	-	-	-	-40 °C ~ +125 °C	6×6	3,000 & 1,000	1,000	MP	-
	ESP32-D0WD	-	SMD IC ESP32-D0WD, dual-core MCU, Wi-Fi & Bluetooth combo, QFN 48-pin, 5*5 mm	-	-	-	-40 °C ~ +125 °C	5×5	5,000 & 1,000	1,000	MP	-
	ESP32-D0WDQ6	-	SMD IC ESP32-D0WDQ6, dual-core MCU, Wi-Fi & Bluetooth combo, QFN 48-pin, 6*6 mm	-	-	-	-40 °C ~ +125 °C	6×6	3,000 & 1,000	1,000	MP	-
	ESP32-D2WD	-	SMD IC ESP32-D2WD, dual-core MCU, Wi-Fi & Bluetooth combo, 2 MB flash inside, QFN 48-pin, 5*5 mm	2 MB	-	-	-40 °C ~ +105 °C	5×5	5,000 & 1,000	1,000	MP	-
	ESP32-S0WD	-	SMD IC ESP32-S0WD, single-core MCU, Wi-Fi & Bluetooth combo, QFN 48-pin, 5*5 mm	-	-	-	-40 °C ~ +125 °C	5×5	5,000 & 1,000	1,000	MP	-
	ESP32-U4WDH (*New)	-	SMD IC ESP32-U4WDH, ESP32 ECO V3, single-core MCU, Wi-Fi & Bluetooth combo, 4 MB flash inside, QFN 48-pin, 5*5 mm	4 MB	-	-	-40 °C ~ +105 °C	5×5	5,000 & 1,000	1,000	MP	-



2.2. ESP32 Series of Modules

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-WROOM-32E Datasheet (*New) (*Recommend)	ESP32-WROOM-32E (*Default)	ESP32-WROOM-32E(M113EH3200PH3Q0)	SMD module, ESP32-D0WD-V3, ESP32 ECO V3, 4 MB SPI flash, PCB antenna	4 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×25.50×3.10	650	650	MP	ESP32-D0WD-V3 Datasheet
	ESP32-WROOM-32E (8 MB) (*New)	ESP32-WROOM-32E(M113EH6400PH3Q0)	SMD module, ESP32-D0WD-V3, ESP32 ECO V3, 8 MB SPI flash, PCB antenna	8 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×25.50×3.10	650	650	MP	
	ESP32-WROOM-32E (16 MB) (*New)	ESP32-WROOM-32E(M113EH2800PH3Q0)	SMD module, ESP32-D0WD-V3, ESP32 ECO V3, 16 MB SPI flash, PCB antenna	16 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×25.50×3.10	650	650	MP	
	ESP32-WROOM-32E (High Temp. 105°C) (*New)	ESP32-WROOM-32E(M113EH3200PS3Q0)	SMD module, ESP32-D0WD-V3, ESP32 ECO V3, 4 MB SPI flash, PCB antenna, -40 °C ~ +105°C	4 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×31.00×3.30 (±0.15)	650	650	MP	



2.2 ESP32 Series of Modules

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-WROOM-32D Datasheet	ESP32-WROOM-32D (*Default)	ESP32-WROOM-32D(M11 3DH3200PH3Q0)	SMD module, ESP32-D0WD, 4 MB SPI flash, PCB antenna	4 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×25.50×3.10	650	650	MP	ESP32-D0WD Datasheet ESP32-DevKitC-32D Getting Started Guide
	ESP32-WROOM-32D (8 MB)	ESP32-WROOM-32D(M11 3DH6400PH3Q0)	SMD module, ESP32-D0WD, 8 MB SPI flash, PCB antenna	8 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×25.50×3.10	650	650	MP	
	ESP32-WROOM-32D (16 MB)	ESP32-WROOM-32D(M11 3DH2800PH3Q0)	SMD module, ESP32-D0WD, 16 MB SPI flash, PCB antenna	16 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×25.50×3.10	650	650	MP	
	ESP32-WROOM-32D (High Temp. 105°C)	ESP32-WROOM-32D(M11 3DH3200PS3Q0)	SMD module, ESP32-D0WD, 4 MB SPI flash, PCB antenna, -40 °C ~ +105 °C	4 MB	-	Internal PCB on-board antenna	-40 °C ~ +105 °C	18.00×25.50×3.10	650	650	MP	ESP32-D0WD Datasheet



2.2 ESP32 Series of Modules

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-WROOM-32UE Datasheet	ESP32-WROOM-32UE (*Default)	ESP32-WROOM-32UE(M1 13EH3200UH3Q0)	SMD module, ESP32-D0WD-V3, ESP32 ECO V3, 4 MB SPI flash, IPEX antenna connector	4 MB	-	External IPEX antenna	-40 °C ~ +85 °C	18.00×19.20×3.20	650	650	MP	ESP32-D0WD-V3 Datasheet
	ESP32-WROOM-32UE (8 MB)	ESP32-WROOM-32UE(M1 13EH6400UH3Q0)	SMD module, ESP32-D0WD-V3, ESP32 ECO V3, 8 MB SPI flash, IPEX antenna connector	8 MB	-	External IPEX antenna	-40 °C ~ +85 °C	18.00×19.20×3.20	650	650	MP	
	ESP32-WROOM-32UE (16 MB)	ESP32-WROOM-32UE(M1 13EH2800UH3Q0)	SMD module, ESP32-D0WD-V3, ESP32 ECO V3, 16 MB SPI flash, IPEX antenna connector	16 MB	-	External IPEX antenna	-40 °C ~ +85 °C	18.00×19.20×3.20	650	650	MP	
	ESP32-WROOM-32UE (High Temp. 105°C) (*New)	ESP32-WROOM-32UE(M1 13EH3200US3Q0)	SMD module, ESP32-D0WD-V3, ESP32 ECO V3, 4 MB SPI flash, IPEX antenna connector, -40 °C ~ +105 °C	4 MB	-	External IPEX antenna	-40 °C ~ +105 °C	18.00×19.20 ×3.20	650	650	MP	



2.2 ESP32 Series of Modules

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-WROOM-32U Datasheet	ESP32-WROOM-32U (*Default)	ESP32-WROOM-32U(M11 3DH3200UH3Q0)	SMD module, ESP32-D0WD, 4 MB SPI flash, IPEX antenna connector	4 MB	-	External IPEX antenna	-40 °C ~ +85 °C	18.00×19.20×3.20	650	650	MP	ESP32-D0WD Datasheet ESP32-DevKitC-32U Getting Started Guide
	ESP32-WROOM-32U (8 MB)	ESP32-WROOM-32U(M11 3DH6400UH3Q0)	SMD module, ESP32-D0WD, 8 MB SPI flash, IPEX antenna connector	8 MB	-	External IPEX antenna	-40 °C ~ +85 °C	18.00×19.20×3.20	650	650	MP	
	ESP32-WROOM-32U (16 MB)	ESP32-WROOM-32U(M11 3DH2800UH3Q0)	SMD module, ESP32-D0WD, 16 MB SPI flash, IPEX antenna connector	16 MB	-	External IPEX antenna	-40 °C ~ +85 °C	18.00×19.20×3.20	650	650	MP	
	ESP32-WROOM-32U (High Temp. 105°C)	ESP32-WROOM-32U(M11 3DH3200US3Q0)	SMD module, ESP32-D0WD, 4 MB SPI flash, IPEX antenna connector, -40 °C ~ +105 °C	4 MB	-	External IPEX antenna	-40 °C ~ +105 °C	18.00×19.20×3.20	650	650	MP	ESP32-D0WD Datasheet



2.2 ESP32 Series of Modules

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-WROOM-32 Datasheet (*NRND)	-	ESP32-WROOM-32(M103 QH3200PH3Q0)	SMD module, ESP32-D0WDQ6, 4 MB SPI flash, PCB antenna. Note, this module is not recommended for new designs. The recommended replacement for it is ESP32-WROOM-32E .	4 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×25.50×3.10	550	550	MP	ESP32-D0WDQ6 Datasheet
ESP32-WROOM-32SE Datasheet	ESP32-WROOM-32SE	ESP32-WROOM-32SE(M123DH3200PH3Q0)	SMD module , ESP32-D0WD, 4 MB SPI Flash, ATECC608A chip, PCB antenna	4 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×25.50×3.10	650	650	MP	ESP32-D0WD Datasheet
ESP32-SOLO-1 Datasheet	ESP32-SOLO-1 (*Default)	ESP32-SOLO-1(M113SH3200PH3Q0)	SMD module, ESP32-S0WD, single core, 4 MB SPI flash, PCB antenna	4 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×25.50×3.10	650	650	MP	ESP32-S0WD Datasheet ESP32-DevKitC-S1 Getting Started Guide
	ESP32-SOLO-1 (High Temp. 105°C) (*New)	ESP32-SOLO-1(M113SH3200PS3Q0)	SMD module, ESP32-S0WD, single core, 4 MB SPI flash, PCB antenna , -40 °C ~ +105 °C	4 MB	-	Internal PCB on-board antenna	-40 °C ~ +105 °C	18.00×25.50×3.10	650	650	MP	



Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-WROVER-E Datasheet (*New) (*Recommend)	ESP32-WROVER-E (*Default)	ESP32-WROVER-E(M213EH3264PH3Q0)	SMD module, ESP32-D0WD-V3, ESP32 ECO V3, 3.3 V, 8 MB PSRAM, 4 MB SPI flash, PCB antenna	4 MB	8 MB	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×31.40×3.30	650	650	MP	ESP32-D0WD-V3 Datasheet
	ESP32-WROVER-E (8 MB flash)	ESP32-WROVER-E(M213EH6464PH3Q0)	SMD module, ESP32-D0WD-V3, ESP32 ECO V3, 3.3 V, 8 MB PSRAM, 8 MB SPI flash, PCB antenna	8 MB	8 MB	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×31.40×3.30	650	650	MP	
	ESP32-WROVER-E (16 MB flash)	ESP32-WROVER-E(M213EH2864PH3Q0)	SMD module, ESP32-D0WD-V3, ESP32 ECO V3, 3.3 V, 8 MB PSRAM, 16 MB SPI flash, PCB antenna	16 MB	8 MB	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×31.40×3.30	650	650	MP	



Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-WROVER-IE Datasheet (*New) (*Recommend)	ESP32-WROVER-IE (*Default)	ESP32-WROVER-IE(M213EH3264UH3Q0)	SMD module, ESP32-D0WD-V3, ESP32 ECO V3, 3.3 V, 8 MB PSRAM, 4 MB SPI flash, IPEX antenna connector	4 MB	8 MB	External IPEX antenna	-40 °C ~ +85 °C	18.00×31.40×3.30	650	650	MP	ESP32-D0WD-V3 Datasheet
	ESP32-WROVER-IE (8 MB flash)	ESP32-WROVER-IE(M213EH6464UH3Q0)	SMD module, ESP32-D0WD-V3, ESP32 ECO V3, 3.3 V, 8 MB PSRAM, 8 MB SPI flash, IPEX antenna connector	8 MB	8 MB	External IPEX antenna	-40 °C ~ +85 °C	18.00×31.40×3.30	650	650	MP	
	ESP32-WROVER-IE (16 MB flash)	ESP32-WROVER-IE(M213EH2864UH3Q0)	SMD module, ESP32-D0WD-V3, ESP32 ECO V3, 3.3 V, 8 MB PSRAM, 16 MB SPI flash, IPEX antenna connector	16 MB	8 MB	External IPEX antenna	-40 °C ~ +85 °C	18.00×31.40×3.30	650	650	MP	



Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-WROVER-B Datasheet (*NRND)	ESP32-WROVER-B (*Default)	ESP32-WROVER-B(M213DH3264PH3Q0)	SMD module, ESP32-D0WD, 3.3 V, 8 MB PSRAM, 4 MB SPI flash, PCB antenna. Note, this module is not recommended for new designs. The recommended replacement for it is ESP32-WROVER-E / ESP32-WROVER-IE .	4 MB	8 MB	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×31.40×3.30	650	650	MP	ESP32-D0WD Datasheet ESP32-DevKitC-VB Getting Started Guide ESP-WROVER-KIT-VB Getting Started Guide
	ESP32-WROVER-B (8 MB flash)	ESP32-WROVER-B(M213DH6464PH3Q0)	SMD module, ESP32-D0WD, 3.3 V, 8 MB PSRAM, 8 MB SPI flash, PCB antenna. Note, this module is not recommended for new designs. The recommended replacement for it is ESP32-WROVER-E / ESP32-WROVER-IE .	8 MB	8 MB	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×31.40×3.30	650	650	MP	
	ESP32-WROVER-B (16 MB flash)	ESP32-WROVER-B(M213DH2864PH3Q0)	SMD module, ESP32-D0WD, 3.3 V, 8 MB PSRAM, 16 MB SPI flash, PCB antenna. Note, this module is not recommended for new designs. The recommended replacement for it is ESP32-WROVER-E / ESP32-WROVER-IE .	16 MB	8 MB	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×31.40×3.30	650	650	MP	



2.2 ESP32 Series of Modules

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-WROVER-B Datasheet (*NRND)	ESP32-WROVER-IB (4 MB flash)	ESP32-WROVER-IB(M213DH3264U H3Q0)	SMD module, ESP32-D0WD, 3.3 V, 8 MB PSRAM, 4 MB SPI flash, IPEX antenna connector. Note, this module is not recommended for new designs. The recommended replacement for it is ESP32-WROVER-E / ESP32-WROVER-IE .	4 MB	8 MB	External IPEX antenna	-40 °C ~ +85 °C	18.00×31.40×3.30	650	650	MP	ESP32-D0WD Datasheet ESP32-DevKitC-VIB Getting Started Guide
	ESP32-WROVER-IB (8 MB flash)	ESP32-WROVER-IB(M213DH6464U H3Q0)	SMD module, ESP32-D0WD, 3.3 V, 8 MB PSRAM, 8 MB SPI flash, IPEX antenna connector. Note, this module is not recommended for new designs. The recommended replacement for it is ESP32-WROVER-E / ESP32-WROVER-IE .	8 MB	8 MB	External IPEX antenna	-40 °C ~ +85 °C	18.00×31.40×3.30	650	650	MP	



Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
	ESP32-WROVER-IB (16 MB flash)	ESP32-WROVER-IB(M213DH2864U H3Q0)	SMD module, ESP32-D0WD, 3.3 V, 8 MB PSRAM, 16 MB SPI flash, IPEX antenna connector. Note, this module is not recommended for new designs. The recommended replacement for it is ESP32-WROVER-E / ESP32-WROVER-IE .	16 MB	8 MB	External IPEX antenna	-40 °C ~ +85 °C	18.00×31.40×3.30	650	650	MP	
ESP32-WROVER Datasheet (*NRND)	ESP32-WROVER (PCB)	-	SMD module, ESP32-D0WDQ6, 1.8 V, 8 MB PSRAM, 4 MB SPI flash, PCB antenna. Note, this module is not recommended for new designs. The recommended replacement for it is ESP32-WROVER-E .	4 MB	8 MB	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×31.40×3.30	650	650	MP	ESP32-D0WDQ6 Datasheet
	ESP32-WROVER (IPEX)	-	SMD module, ESP32-D0WDQ6, 1.8 V, 8 MB PSRAM, 4 MB SPI flash, IPEX antenna connector. Note, this module is not recommended for new designs. The recommended replacement for it is ESP32-WROVER-E .	4 MB	8 MB	External IPEX antenna	-40 °C ~ +85 °C	18.00×31.40×3.30	650	650	MP	



2.2 ESP32 Series of Modules

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-PICO-V3 Datasheet (*New) (*Recommend)	ESP32-PICO-V3	-	Module in SiP form, ESP32 ECO V3 with 4 MB flash, dual-core MCU, Wi-Fi & Bluetooth combo, LGA 48-pin, 7*7 mm	4 MB	-	-	-40 °C ~ +85 °C	7×7	2,000 & 1,000	1,000	MP	-
ESP32-PICO-V3-02 (*New)	-	-	Module in SiP form, ESP32 ECO V3 with 8 MB flash and 2 MB PSRAM inside, dual-core MCU, Wi-Fi & Bluetooth combo, LGA 48-pin, 7*7 mm	8 MB	2 MB	-	-40 °C ~ +85 °C	7×7	2,000 & 1,000	1,000	Sample	-
ESP32-PICO-D4 Datasheet	-	-	Module in SiP form, ESP32 with 4 MB flash, dual-core MCU, Wi-Fi & Bluetooth combo, LGA 48-pin, 7*7 mm	4 MB	-	-	-40 °C ~ +85 °C	7×7	2,000 & 1,000	1,000	MP	ESP32-PICO-KIT Getting Started Guide



2.3. ESP32 Series of Development Boards

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-DevKitC Getting Started Guide	ESP32-DevKitC-32D	ESP32-DevKitC-32D	ESP32 general-purpose development board, embeds ESP32-WROOM-32D, 4 MB flash, with pin header	4 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	54.4×27.9	1	-	MP	ESP32-WROOM-32D Datasheet
	ESP32-DevKitC-32U	ESP32-DevKitC-32U	ESP32 general-purpose development board, embeds ESP32-WROOM-32U, 4 MB flash, with pin header	4 MB	-	External IPEX antenna	-40 °C ~ +85 °C	54.4×27.9	1	-	MP	ESP32-WROOM-32U Datasheet
	ESP32-DevKitC-S1	ESP32-DevKitC-S1	ESP32 general-purpose development board, embeds ESP32-SOLO-1, 4 MB flash, with pin header	4 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	54.4×27.9	1	-	MP	ESP32-SOLO-1 Datasheet
	ESP32-DevKitC-VB	ESP32-DevKitC-VB	ESP32 general-purpose development board, embeds ESP32-WROVER-B, 4 MB flash, 8 MB PSRAM, with pin header	4 MB	8 MB	Internal PCB on-board antenna	-40 °C ~ +65 °C	54.4×27.9	1	-	MP	ESP32-WROVER-B Datasheet
	ESP32-DevKitC-VIB	ESP32-DevKitC-VIB	ESP32 general-purpose development board, embeds ESP32-WROVER-B (IPEX), 4 MB flash, 8 MB PSRAM, with pin header	4 MB	8 MB	External IPEX antenna	-40 °C ~ +65 °C	54.4×27.9	1	-	MP	ESP32-WROVER-B (IPEX) Datasheet



2.3 ESP32 Series of Development Boards

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-DevKitC Getting Started Guide	ESP32-DevKitC-32E (*New)	ESP32-DevKitC-32E	ESP32 general-purpose development board, embeds ESP32-WROOM-32E, 4 MB flash, with pin header	4 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	54.4×27.9	1	-	MP	ESP32-WROOM-32E Datasheet
	ESP32-DevKitC-32UE (*New)	ESP32-DevKitC-32UE	ESP32 general-purpose development board, embeds ESP32-WROOM-32UE, 4 MB flash, with pin header	4 MB	-	External IPEX antenna	-40 °C ~ +85 °C	54.4×27.9	1	-	MP	ESP32-WROOM-32UE Datasheet
	ESP32-DevKitC-VE (*New)	ESP32-DevKitC-VE	ESP32 general-purpose development board, embeds ESP32-WROVER-E, 8 MB flash, with pin header	8 MB	8 MB	Internal PCB on-board antenna	-40 °C ~ +85 °C	54.4×27.9	1	-	MP	ESP32-WROVER-E Datasheet
	ESP32-DevKitC-VIE (*New)	ESP32-DevKitC-VIE	ESP32 general-purpose development board, embeds ESP32-WROVER-IE, 8 MB flash, with pin header	8 MB	8 MB	External IPEX antenna	-40 °C ~ +85 °C	54.4×27.9	1	-	MP	ESP32-WROVER-IE Datasheet



2.3 ESP32 Series of Development Boards

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP-WROVER-KIT Getting Started Guide	ESP-WROVER-KIT-VB	ESP-WROVER-KIT-VB	ESP32 development board, JTAG function, TFT display and camera supported, ESP32-WROVER-B on the board	4 MB	8 MB	Internal PCB on-board antenna	-40 °C ~ +65 °C	85.1×84.3	1	-	MP	ESP32-WROVER-B Datasheet
ESP32-PICO-KIT Getting Started Guide	-	ESP32-PICO-KIT	ESP32-PICO-D4 development board	4 MB	-	Internal 3D antenna	-40 °C ~ +85 °C	52.0×20.3	1	-	MP	ESP32-PICO-D4 Datasheet
ESP32-LyraT User Guide	-	ESP32-LyraT	ESP32 audio development board, integrates ESP32-WROVER/ESP32-WROVER-B, peripherals like touch buttons, mic, speaker supported	4 MB	8 MB	Internal PCB on-board antenna	-40 °C ~ +65 °C	95.5×80.6	1	-	MP	ESP32-WROVER Datasheet ESP32-WROVER-B Datasheet
ESP32-Vaquita-DSPG User Guide (*New)	-	ESP32-Vaquita-DSPG	Alexa built-in solution powered by ESP32 and DSP Group's DBMD5P audio SoC, 2-Mic array, voice enablement, AWS-IoT cloud connectivity.	16 MB	8 MB	Internal PCB on-board antenna	-40 °C ~ +65 °C	Main board: 85 mm X 65 mm Sun board: 65 mm X 24 mm	1	-	MP	ESP32-WROVER-E Datasheet



Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-LyraTD-DSPG User Guide (*New) (*Recommend)	-	ESP32-LyraTD-DSPG	An Espressif Audio Development Board, based on ESP32-WROVER-B, a BT/WIFI combo module, and DBMP5P DSP that features a three-microphone array for noise reduction, echo cancellation, beamforming and wake-word detection.	16 MB	8 MB	Internal PCB on-board antenna	-20 °C ~ +65 °C	Main board: 85 mm X 65 mm Sun board: diameter 90 mm	1	-	MP	ESP32-WROVER-B Datasheet
ESP32-LyraTD-SYNA User Guide (*New) (*Recommend)	-	ESP32-LyraTD-SYNA	ESP32-LyraTD-SYNA is one of Espressif's Audio Development Board based on ESP32 MCU and Synaptics DSP. It is an Acoustic Echo Cancelation (AEC) solution, supporting voice recognition and voice wake-up. It also supports connection to Amazon's AVS (Alexa Voice Service), Google's Dialogflow and Google's GVA (Google Voice Assistant).	16 MB	8 MB	Internal PCB on-board antenna	-20 °C ~ +65 °C	91×69	1	-	MP	ESP32-WROVER-E Datasheet



2.3 ESP32 Series of Development Boards

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-LyraTD- MSC User Guide	-	ESP32- LyraTD-MSC	ESP32 audio development board, integrates ESP32-WROVER-B and DSP, noise reduction, echo cancellation, voice recognition, near-field and far-field voice wake-up supported	4 MB	8 MB	Internal PCB on-board antenna	-40 °C ~ +65 °C	90×90	1	-	MP	ESP32-WROVER-B Datasheet
ESP32-LyraT-Mini Getting Started	-	ESP32-LyraT-Mini	ESP32-LyraT-Mini is a lightweight audio development board based on ESP32-WROVER-B, which implements AEC, AGC, NS WWE (wake word engine) and other audio signal processing technologies.	8 MB	8 MB	Internal PCB on-board antenna	-20 °C ~ +65 °C	77×72	1	-	MP	ESP32-WROVER-B Datasheet
ESP32-Korvo Datasheet (*New) (*Recommend)	-	ESP32-Korvo	ESP32-based audio development board with microphone arrays, together with Espressif's speech recognition SDK ESP-Skainet, ESP32-Korvo is suitable for far-field speech recognition applications with low power consumption, such as smart displays, smart plugs, smart switches, etc.	16 MB	8 MB	Internal PCB on-board antenna	-20 °C ~ +70 °C	Main board: diameter 88.00 mm Sub board: diameter 88.00 mm	1	-	MP	ESP32-WROVER-E Datasheet



2.3 ESP32 Series of Development Boards

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP-Prog Getting Started	-	ESP-Prog	Development and debugging tool with functions including automatic firmware downloading, serial communication, and JTAG online debugging	-	-	-	-20 °C ~ +65 °C	73.4×25.1	1	-	MP	ESP32-Sense Kit User Guide ESP32-MeshKit-Sense Hardware Design Guidelines
ESP32-MeshKit-Sense Hardware Design Guidelines	-	ESP32-MeshKit-Sense	A development board that embeds ESP32-WROOM-32D, peripherals such as temperature and humidity sensor, ambient light sensor, LCD screen connector, Micro USB port and ESP-Prog connector	4 MB	-	Internal PCB on-board antenna	-40 °C ~ +65 °C	75.0×41.0	1	-	MP	ESP32-WROOM-32D Datasheet ESP-Prog Getting Started ESP32-MeshKit-Light User Guide
ESP32-MeshKit-Light User Guide	-	ESP32-MeshKit-Light	Smart lights based on ESP-Mesh networking technology	4 MB	-	-	-20 °C ~ +40 °C	60×60×118	1	-	MP	ESP32-MeshKit-Sense Hardware Design Guidelines
ESP-EYE Getting Started (*Recommend)	-	ESP-EYE	A development board for image recognition and audio processing in AIoT applications	4 MB	8 MB	3D Antenna	0°C - 50°C	41.00 x 21.00 x 6.50	1	10	MP	ESP32-D0WD Datasheet



2.3 ESP32 Series of Development Boards

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-LCDKit Hardware Design Guidelines (*New)	-	ESP32-LCDKit	An HMI development board based on ESP32-DevKitC (need to purchase if you didn't have one), integrated with such peripherals as SD-Card, DAC-Audio, can be connected to an external display.	-	-	-	-40 °C ~ +85 °C	73.4x25.1	1	-	MP	ESP32-DevKitC Getting Started Guide
ESP32-Korvo-DU1906 (*New)	-	ESP32-Korvo-DU1906	ESP32-Korvo-DU1906 is an Espressif audio development board with an ESP32-DU1906 module as its core. This board is designed not only to provide advanced end-to-end audio solutions with highly efficient integrated AI capabilities as well as a Cloud + End integrated device-level AIoT platform, significantly lowering the barrier to entry for IoT devices to AI capability.	8 MB	8 MB	Internal PCB on-board antenna	-40 °C ~ +85 °C	110 x 120	1	-	MP	ESP32-DU1906



2.3 ESP32 Series of Development Boards

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-Ethernet-Kit User Guide	ESP32-Ethernet-Kit-VE	ESP32-Ethernet-Kit-VE	ESP32-Ethernet-Kit, ESP32-based development board produced by Espressif, consists of two development boards, the Ethernet board A and the PoE board B. The Ethernet board contains Bluetooth / Wi-Fi dual-mode ESP32-WROVER-E module and IP101GRI, a Single Port 10/100 Fast Ethernet Transceiver (PHY). The PoE board (B) provides power over Ethernet functionality. The A board can work independently, without the board B installed.	4 MB	8 MB	Internal PCB on-board antenna	0 °C ~ +70 °C	Board A: 72 × 98 Board B: 25 × 69	1	-	MP	ESP32-WROVER-E Datasheet



2.4. ESP32 Series of Development Kits

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-Sense Kit User Guide (*New)	-	ESP32-Sense Kit	Touch sensor development kit, with ESP-Prog by default	4 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	-	1	-	MP	ESP32-WROOM-32 Datasheet ESP32-WROOM-32D Datasheet ESP-Prog Getting Started
ESP32-MeshKit	-	-	Smart-light development kit, containing 1×ESP32-MeshKit-Sense, 5×ESP32-MeshKit-Light, 1×ESP-Prog	-	-	-	-	-	1	-	MP	ESP32-MeshKit-Sense Hardware Design Guidelines ESP32-MeshKit-Light User Guide ESP-Prog Getting Started



3. ESP8266 Series

3.1. ESP8266 Series of SoCs

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP8266EX Datasheet	-	-	SMD IC ESP8266EX, QFN32-pin, 5*5 mm	NA	-	NA	-40 °C ~ +125 °C	5×5	5,000 & 1,000	1,000	MP	-
ESP8285 Datasheet	ESP8285N08	ESP8285N08	SMD IC ESP8285N08, QFN32-pin, 5*5 mm, 1 MB flash inside, -40 °C ~ +85 °C	1 MB	-	NA	-40 °C ~ +85 °C	5×5	5,000 & 1,000	1,000	MP	-
	ESP8285H08	ESP8285H08	SMD IC ESP8285H08, QFN32-pin, 5*5 mm, 1 MB flash inside, -40 °C ~ +105 °C	1 MB	-	NA	-40 °C ~ +105 °C	5×5	5,000 & 1,000	5,000	MP	-
	ESP8285H16	ESP8285H16	SMD IC ESP8285H16, QFN32-pin, 5*5 mm, 2 MB flash inside, -40 °C ~ +105 °C	2 MB	-	NA	-40 °C ~ +105 °C	5×5	5,000 & 1,000	5,000	Sample	-



3.2. ESP8266 Series of Modules

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP-WROOM-02D Datasheet (*Recommend)	ESP-WROOM-02D (*Default)	ESP-WROOM-02D(M1102H1600PH3Q0)	SMD Module ESP-WROOM-02D, ESP8266EX, 2 MB SPI flash, UART Mode	2 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×20.00×3.20	650	650	MP	ESP8266EX Datasheet
	ESP-WROOM-02D (4 MB)	ESP-WROOM-02D(M1102H3200PH3Q0)	SMD Module ESP-WROOM-02D, ESP8266EX, 4 MB SPI flash, UART Mode	4 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	18.00×20.00×3.20	650	650	MP	ESP8266-DevKitC Getting Started
	ESP-WROOM-02D (High Temperature) (*New)	ESP-WROOM-02D(M1102H1600PS3Q0)	SMD Module ESP-WROOM-02D, ESP8266EX, 2 MB SPI flash, UART Mode, -40 °C ~ +105 °C	2 MB	-	Internal PCB on-board antenna	-40 °C ~ +105 °C	18.00×20.00×3.20	650	650	MP	ESP8266EX Datasheet
ESP-WROOM-02U Datasheet (*Recommend)	ESP-WROOM-02U (*Default)	ESP-WROOM-02U(M1102H1600UH3Q0)	SMD Module ESP-WROOM-02U, ESP8266EX, 2 MB SPI flash, UART Mode, external IPEX antenna connector	2 MB	-	External IPEX antenna	-40 °C ~ +85 °C	18.00×14.30×3.20	650	650	MP	ESP8266EX Datasheet
	ESP-WROOM-02U (4 MB)	ESP-WROOM-02U(M1102H3200UH3Q0)	SMD Module ESP-WROOM-02U, ESP8266EX, 4 MB SPI flash, UART Mode, external IPEX antenna connector	4 MB	-	External IPEX antenna	-40 °C ~ +85 °C	18.00×14.30×3.20	650	650	MP	ESP8266-DevKitC Getting Started
	ESP-WROOM-02U (High Temperature) (*New)	ESP-WROOM-02U(M1102H1600US3Q0)	SMD Module ESP-WROOM-02U, ESP8266EX, 2 MB SPI flash, UART Mode, external IPEX antenna connector, -40 °C ~ +105 °C	2 MB	-	External IPEX antenna	-40 °C ~ +105 °C	18.00×14.30×3.20	650	650	MP	ESP8266EX Datasheet



3.2 ESP8266 Series of Modules

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP-WROOM-02 Datasheet (*NRND)	-	-	SMD Module, ESP8266EX, 2 MB SPI flash, UART Mode. Note, this module is not recommended for new designs. The recommended replacement for it is ESP-WROOM-02D .	2 MB	-	Internal PCB on-board antenna	- 40 °C ~ +85 °C	18.00×20.00 ×2.80	650	650	MP	ESP8266EX Datasheet
ESP-WROOM-S2 Datasheet (*NRND)	-	-	SMD Module, ESP8266EX, 2 MB SPI flash, SPI Mode. Note, this module is not recommended for new designs. For recommended replacement, please contact our sales person directly.	2 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	16.00×23.00 ×2.80	650	650	MP	ESP8266EX Datasheet



3.3. ESP8266 Series of Development Boards

Product Name	Variants	MPN	Product Description	Flash Size	PSRAM Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP8266-DevKitC Getting Started (*Recommend)	ESP8266-DevKitC-02D-F	ESP8266-DevKitC-02D-F	ESP8266 General Development Kit with ESP-WROOM-02D embedded and female header connector on board	2 MB	-	Internal PCB on-board antenna	-40 °C ~ +85 °C	44.9×25.4	1	-	MP	ESP-WROOM-02D Datasheet
	ESP8266-DevKitC-02U-F	ESP8266-DevKitC-02U-F	ESP8266 General Development Kit, embeds ESP-WROOM-02U and female header connector on the board	2 MB	-	External IPEX antenna	-40 °C ~ +85 °C	44.9×25.4	1	-	MP	ESP-WROOM-02U Datasheet
ESP-Launcher Hardware Design Guidelines	-	ESP-LAUNCHER	Development board for ESP8266EX, with external SMA antenna	4 MB	-	External SMA antenna	-25 °C ~ +85 °C	46×78.5	1	-	MP	ESP8266EX Datasheet



4. Production Testing Equipment

4.1. Production Testing Boards

Product Name	Variants	MPN	Product Description	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP-FactoryTB1	-	ESP-FactoryTB1	Production testing board with two high-speed serial ports	-40 °C ~ +65 °C	66.5×46.0	1	-	MP	All Espressif products



4.2. Signal Boards

Product Name	Variants	MPN	Product Description	Flash Size	Antenna Type	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP-BAT32	-	ESP-BAT32	RF testing board for ESP32 products	4 MB	External SMA antenna	-25 °C ~ +75 °C	100×60×25	1	-	MP	ESP32 products
ESP-BAT8	-	ESP-BAT8	RF testing board for ESP8266 products	4 MB	External SMA antenna	-25 °C ~ +75 °C	100×60×25	1	-	MP	ESP8266 products



4.3. Flashing Boards

Product Name	Variants	MPN	Product Description	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-DevKitS (*New)	ESP32-DevKitS	ESP32-DevKitS	ESP32-DevKitS is a flashing board used to flash official ESP32 WROOM and SOLO modules.	-20 °C ~ +65 °C	48.3x28.9	1	-	MP	ESP32 WROOM and SOLO modules
	ESP32-DevKitS-R	ESP32-DevKitS-R	ESP32-DevKitS-R is a flashing board used to flash official ESP32 WROVER modules.	-20 °C ~ +65 °C	48.3x28.9	1	-	MP	ESP32 WROVER modules
ESP8266-DevKitS (*New)	ESP8266-DevKitS	ESP8266-DevKitS	ESP8266-DevKitS is a flashing board used to flash official ESP8266 WROOM modules.	-20 °C ~ +65 °C	38.9x28.9	1	-	MP	ESP8266 WROOM modules



4.4. Test Fixtures

Product Name	Variants	MPN	Product Description	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-WROOM-V1	ESP32-WROOM-V1T1 (1 v 1)	ESP32-WROOM-V1T1	This test fixture is a set of production equipment used during the production stage. ESP32-WROOM-V1 can be used to download firmware to modules including ESP32-WROOM-32E / ESP32-WROOM-32D / ESP32-WROOM-32/ ESP32-SOLO-1 / ESP32-WROOM-32DC / ESP32-SOLO-1C and can be used with the ESP-BAT32 signal board for production testing. One piece of a module can be tested with this fixture at a time.	-20 °C ~ +65 °C	150×150×295	1	1	MP	-
	ESP32-WROOM-V1T4 (1 v 4)	ESP32-WROOM-V1T4	This test fixture is a set of production equipment used during the production stage. ESP32-WROOM-V1 can be used to download firmware to modules including ESP32-WROOM-32E/ESP32-WROOM-32D/ESP32-WROOM-32/ ESP32-SOLO-1/ESP32-WROOM-32DC/ ESP32-SOLO-1C and can be used with the ESP-BAT32 signal board for production testing. Four pieces of modules can be tested with this fixture at a time.	-20 °C ~ +65 °C	150×150×295	1	1	MP	-



Product Name	Variants	MPN	Product Description	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-WROOM-V3	ESP32-WROOM-V3T4 (1 v 4)	ESP32-WROOM-V3T4	This test fixture is a set of production equipment used during the production stage. ESP32-WROOM-V3 can be used to download firmware to modules including ESP32-WROOM-32UE/ESP32-WROOM-32U and can be used with the ESP-BAT32 signal board for production testing. Four pieces of modules can be tested with this fixture at a time.	-20 °C ~ +65 °C	150×150×295	1	1	MP	-
ESP32-WROVER-V1	ESP32-WROVER-V1T1 (1 v 1)	ESP32-WROVER-V1T1	This test fixture is a set of production equipment used during the production stage. ESP32-WROVER-V1 can be used to download firmware to modules including ESP32-WROVER-E (PCB) / ESP32-WROVER-B (PCB)/ ESP32-WROVER (PCB), and can be used with the ESP-BAT32 signal board for production testing. Four pieces of modules can be tested with this fixture at a time.	-20 °C ~ +65 °C	150×150×295	1	1	MP	-
	ESP32-WROVER-V1T4 (1 v 4)	ESP32-WROVER-V1T4	This test fixture is a set of production equipment used during the production stage. ESP32-WROVER-V2 can be used to download firmware to modules including ESP32-WROVER-IE / ESP32-WROVER-B (IPEX) , and can be used with the ESP-BAT32 signal board for production testing. Four pieces of modules can be tested with this fixture at a time.	-20 °C ~ +65 °C	150×150×295	1	1	MP	-



Product Name	Variants	MPN	Product Description	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP32-WROVER-V2	ESP32-WROVER-V2T4 (1 v 4)	ESP32-WROVER-V2T4	This test fixture is a set of production equipment used during the production stage. ESP32-WROVER-V2 can be used to download firmware to modules including ESP32-WROVER-IE / ESP32-WROVER-B (IPEX) , and can be used with the ESP-BAT32 signal board for production testing. Four pieces of modules can be tested with this fixture at a time.	-20 °C ~ +65 °C	150×150×295	1	1	MP	-
ESP-WROOM-V1	ESP-WROOM-V1T1 (1 v 1)	ESP-WROOM-V1T1	This test fixture is a set of production equipment used during the production stage. ESP-WROOM-V1 can be used to download firmware to modules including ESP-WROOM-02 / ESP-WROOM-02D / ESP-WROOM-02DC, and can be used with the ESP-BAT8 signal board for production testing. One piece of a module can be tested with this fixture at a time.	-20 °C ~ +65 °C	150×150×295	1	1	MP	-
	ESP-WROOM-V1T4 (1 v 4)	ESP-WROOM-V1T4	This test fixture is a set of production equipment used during the production stage. ESP-WROOM-V1 can be used to download firmware to modules including ESP-WROOM-02 / ESP-WROOM-02D / ESP-WROOM-02DC, and can be used with the ESP-BAT8 signal board for production testing. Four pieces of modules can be tested with this fixture at a time.	-20 °C ~ +65 °C	150×150×295	1	1	MP	-



Product Name	Variants	MPN	Product Description	Operating Temperature	Dimensions (mm)	SPQ	MOQ	Production Status	Related Product
ESP-WROOM-V3	ESP-WROOM-V3T4 (1 v 4)	ESP-WROOM-V3T4	This test fixture is a set of production equipment used during the production stage. ESP-WROOM-V3 can be used to download firmware to ESP-WROOM-02U module, and can be used with the ESP-BAT8 signal board for production testing. Four pieces of modules can be tested with this fixture at a time.	-20 °C ~ +65 °C	150×150×295	1	1	MP	-



Release Notes

Date	Version	Release notes
2017.06	V1.0	First release.
2017.08	V1.1	Updated version.
2017.08	V1.2	• Added ESP32-PICO-D4; • Deleted ESP8689; • Corrected typos.
2017.09	V1.3	• Updated SPQ and MOQ for ESP32-PICO-D4; • Updated the marketing status of ESP32-D0WD and ESP32-D2WD to MP; • Added ESP-WROOM-02D module.
2017.11	V1.4	• Added ESP-WROOM-32D and ESP32-WROOM-32U modules; • Added ESP32-PICO-KIT; • Added ESP-WROOM-02D and ESP-WROOM-02U modules; • Updated SPQ and MOQ for several modules.
2017.12	V1.5	Corrected some typos.
2018.03	V1.6	Updated the product names of ESP-WROOM-32 and ESP-WROOM-32D.
2018.06	V1.7	• Updated the marketing status of ESP32-S0WD, ESP32-WROOM-32D, ESP32-WROOM-32U, ESP-WROOM-02D, and ESP-WROOM-02U to MP; • Updated the module information of ESP32-DevKitC; • Updated the information of PSRAM integrated on ESP32-WROVER and ESP32-WROVER-I; • Added ESP32-SOLO-1, ESP32-LyraT, ESP32-LyraTD-MSC, ESP32-Sense Kit, and ESP-Prog.
2018.06	V1.8	• Added the link to ESP32-SOLO-1 Datasheet; • Added ESP32-WROVER-B and ESP32-WROVER-IB.



Date	Version	Release notes
2018.07	V1.9	- Updated the marketing status of ESP32-PICO-D4, ESP32-LyraT, ESP32-LyraTD-MSK, ESP32-Sense Kit, ESP-Prog, ESP32-WROVER-B, and ESP32-WROVER-IB to MP; - Added ESP32-MeshKit-Sense and ESP32-MeshKit-Light. - Added the column “Custom flash size” for modules available for customized order.
2018.09	V2.0	- Added labels *New, *Recommend and *Default; - Updated document cover; - Updated information of modules' dimensions; - Updated the description of a number of products.
2018.11	V2.1	- Added variants of ESP32-WROOM-32D and ESP32-WROOM-32U with high temperature range (–40 °C ~ +105 °C); - Updated the operating temperature range of ESP32-WROVER from –40 °C ~ 65 °C to –40 °C ~ 85 °C; - Removed all ESP32-DevKitC variants with female headers; - Updated the description of ESP32-MeshKit.
2018.12	V2.2	- Removed information about ESP8089; - Added new products and variants: - ESP-WROOM-02DC - ESP-WROOM-02UC - ESP-WROOM-02D (High Temperature) - ESP-WROOM-02U (High Temperature)
2019.01	V2.3	Added the development board for image recognition and audio processing ESP-EYE.
2019.02	V2.4	Removed information about ESP-WROOM-02DC and ESP-WROOM-02UC.
2019.05	V2.5	Added a new product ESP32-LCDKit
2019.07	V2.6	- Corrected a typo in the product description of ESP32-WROOM-32; - Added a new variant for ESP32-SOLO-1; - Updated the description of ESP32-SOLO-1.



Date	Version	Release notes
2019.08	V2.7	• Added a new product ESP32-LyraTD-DSPG; • Updated SPQ and MOQ information of the following products: - ESP32-D0WD - ESP32-D0WDQ6 - ESP32-D2WD - ESP32-S0WD - ESP32-PICO-D4 - ESP8266EX • Updated information of ESP8285.
2019.08	V2.8	• Updated information of ESP32 series of chips; • Added MPNs for ESP32-WROOM-32D and ESP32-WROOM-32U; • Move the location of ESP32-LyraTD-DSPG in the table, so it is closer to other ESP32-LyraT boards.
2019.09	V2.9	Added a new product ESP32-LyraT-Mini.
2019.11	V3.0	Added a new product ESP32-LyraTD-SYNA.
2020.01	V3.1	• Added new product variants ESP32-D0WD-V3 and ESP32-D0WDQ6-V3. • Added Submit Documentation Feedback link in the footer.



Date	Version	Release notes
2020.01	V3.2	- Added the following products: - ESP32-U4WDH - ESP32-WROOM-32E (*Default) - ESP32-WROVER-E series - ESP32-WROVER-IE series - ESP32-PICO-V3 - ESP32-S2 - ESP32-S2-WROOM - ESP32-S2-WROOM-I - ESP32-S2-WROVER - ESP32-S2-WROVER-I - ESP32-S2-Saola series - ESP32-DevKitS series - ESP8266-DevKitS - ESP32-WROOM-32SE - Modified the information for the following products: “Related Product” and tags for ESP32-LyraTD-SYNA - Tags for ESP32-WROOM-32D, ESP32-WROOM-32U and ESP32-WROVER-B



Date	Version	Release notes
2020.03	V3.3	• Added the following products: - ESP32-WROOM-32E (8 MB) - ESP32-WROOM-32E (16 MB) - ESP32-WROOM-32UE • Modified the information for the following products: - Added MPN information for ESP32-WROOM-32, ESP-WROOM-02D (*Default), ESP-WROOM-02D (4 MB), ESP-WROOM-02U (*Default) and ESP-WROOM-02U (4 MB); - ESP32-S2-Saola renamed to ESP32-S2-Saola-1.
2020.03	V3.4	• Modified the MPN and operating temperatures for the following products: - ESP32-WROVER-E - ESP32-WROVER-IE - ESP32-WROVER-B • Added a Table of Contents • Updated “Submit Documentation Feedback” link
2020.03	V3.5	• Added the following product: - ESP32-Vaquita-DSPG • Modified the information for the following products: - The production status of ESP32-U4WDH; - The dimensional tolerance of ESP32-S2-WROOM, ESP32-S2-WROOM-I, ESP32-S2-WROVER and ESP32-S2-WROVER-I.



Date	Version	Release notes
2020.04	V3.6	• Added the following product: - ESP32-Korvo - ESP32-PICO-V3-ZERO • Added the following variants in ESP32-DevKitC: - ESP32-DevKitC-32E - ESP32-DevKitC-32UE - ESP32-DevKitC-VE - ESP32-DevKitC-VIE • Modified the information for the following products: - Provided more detailed information in the product description of ESP32-PICO-V3 and ESP32-PICO-D4.



Date	Version	Release notes
2020.05	V3.7	• Moved ESP32-S2 Series to the beginning of the document; • Added a new label NRND; • Added the following products or variants: - ESP32-Korvo-DU1906 - ESP32-WROOM-V1 and its variants - ESP32-WROOM-V3 and its variants - ESP32-WROVER-V1 and its variants - ESP32-WROVER-V2 - ESP-WROOM-V1 and its variants - ESP-WROOM-V3 • Modified the product information of the following products: - Modified the production status ▸ ESP32-PICO-V3-ZERO ▸ ESP32-WROVER-E ▸ ESP32-WROVER-IE ▸ ESP32-WROOM-32E ▸ ESP32-WROOM-32UE - Added a NRND label ▸ ESP32-WROOM-32 ▸ ESP-WROOM-S2 ▸ ESP-WROOM-02 ▸ ESP32-WROVER - Modified the Related Product information ▸ ESP32-Korvo



Date	Version	Release notes
2020.05	V3.8	• Added the following products: - ESP32-S2-Kaluga-1 - ESP32-S2F • Removed the following products: - ESP32-PICO-V3-ZERO • Modified the production status of the following products: - ESP32-DevKitC • Added reference documents for the following products: - ESP32-LyraTD-SYNA - ESP32-S2-WROOM - ESP32-S2-WROOM-I - ESP32-S2-WROVER - ESP32-S2-WROVER-I - ESP32-S2-Saola-1 - ESP32-WROOM-32E - ESP32-WROOM-32UE - ESP32-WROVER-E - ESP32-WROVER-IE - ESP32-Vaquita-DSPG - ESP32-Korvo
2020.06	V3.9	• Added the following product: - ESP32-Ethernet-Kit • Modified the production status of the following products: - ESP32-S2-WROOM - ESP32-S2-WROOM-I



Date	Version	Release notes
2020.07	V4.0	- Added the following variant: - ESP32-S2FH32 - Modified the production status of the following products or variants: - ESP32-S2-WROVER - ESP32-S2-WROVER-I - ESP32-S2-Saola-1R - ESP32-S2-Saola-1RI - ESP32-S2-Saola-1M - ESP32-S2-Saola-1MI - Modified the product description of the following products or variants: - ESP32-WROVER - ESP32-WROOM-32 - ESP-WROOM-02 - ESP-WROOM-S2
2020.08	V4.1	- Modified the production status of the following product - ESP32-Korvo-DU1906 - Modified the product description of the following products or variants: - ESP32-WROVER-B
2020.08	V4.2	- Added the following products or variants: - ESP32-PICO-V3-02 - ESP32-S2-WROOM (High Temp) - ESP32-S2-WROOM-I (High Temp)
2020.08	V4.3	Updated the variant names of the following product: ESP32-S2F



Date	Version	Release notes
2020.09	V4.4	• Updated the variant names of the following product: - ESP32-S2F • Added the following products or variants: - ESP32- WROOM-32E - ESP32- WROOM-32UE - ESP32-S2-MINI-1 - ESP32-S2-MINI-1U



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