

SoCs

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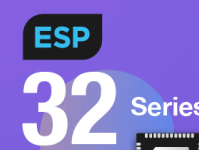
32-bit MCU | Wi-Fi | Bluetooth/Bluetooth LE | AI Functions

ESP32-S Series SoCs

ESP32-C3 Series SoCs

ESP32 Series SoCs

ESP8266 Series SoCs

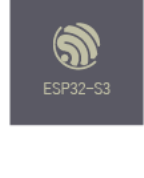


ESP32-S Series

ESP32-S3 Series

32-bit MCU & 2.4 GHz Wi-Fi & Bluetooth LE 5.0

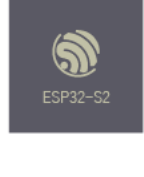
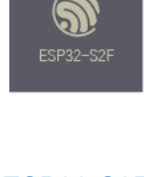
- Xtensa® 32-bit LX7 dual-core processor that operates at up to 240 MHz
- 512 KB of SRAM and 384 KB of ROM on the chip, and SPI, Dual SPI, Quad SPI, Octal SPI, QPI, and OPI interfaces that allow connection to flash and external RAM
- Additional support for vector instructions in the MCU, which provides acceleration for neural network computing and signal processing workloads
- Peripherals include 44 programmable GPIOs, SPI, I2S, I2C, PWM, RMT, ADC, DAC and UART, SD/MMC host and TWAI™
- Reliable security features ensured by RSA-based secure boot, AES-XTS-based flash encryption, the innovative digital signature and the HMAC peripheral, "World Controller"

SoC	Variants	Core	Dimensions (mm)	Pins	RAM (KB)	Flash (MB)	PSRAM (MB)	Module	Development Board	Footprint
	ESP32-S3 ESP32-S3FN8 ESP32-S3R2 ESP32-S3R8 ESP32-S3R8V	Dual Core	QFN 7x7	56	384 KB ROM, 512 KB SRAM, 16 KB RTC SRAM	N/A 8 N/A 2 N/A	N/A N/A 2 8	ESP32-S3-WROOM-1	ESP32-S3-DevKitC-1	2D Footprint

ESP32-S2 SoC

32-bit MCU & 2.4 GHz Wi-Fi

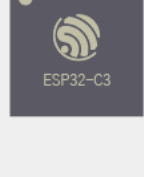
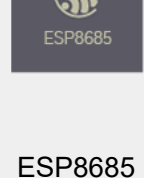
- High-performance 240 MHz single-core CPU
- Ultra-low-power performance: fine-grained clock gating, dynamic voltage and frequency scaling
- Security features: eFuse, flash encryption, secure boot, signature verification, integrated AES, SHA and RSA algorithms
- Peripherals include 43 GPIOs, 1 full-speed USB OTG interface, SPI, I2S, UART, I2C, LED PWM, LCD interface, camera interface, ADC, DAC, touch sensor, temperature sensor
- Availability of sensor cloud connectivity agents and common product features shortens the time to market

SoC	Variants	Core	Dimensions (mm)	Pins	RAM (KB)	Flash (MB)	PSRAM (MB)	Module	Development Board	Footprint
	ESP32-S2 ESP32-S2R2	Single Core	QFN 7x7	56	128 KB ROM, 320 KB SRAM, 16 KB RTC SRAM	N/A	N/A 2	ESP32-S2-WROOM ESP32-S2-WROOM-I ESP32-S2-WROVER ESP32-S2-WROVER-I	ESP32-S2-Saola-1 ESP32-S2-Kaluga-1	2D Footprint
	N/A	Single Core	QFN 7x7	56	128 KB ROM, 320 KB SRAM, 16 KB RTC SRAM	2.4	N/A or 2	ESP32-S2-MINI-1 ESP32-S2-MINI-1U	ESP32-S2-DevKitM-1 ESP32-S2-DevKitM-1U	2D Footprint

ESP32-C3 Series SoCs

32-bit RISC-V MCU & 2.4 GHz Wi-Fi & Bluetooth LE 5.0

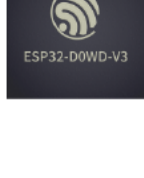



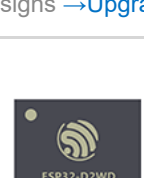
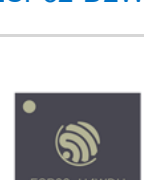
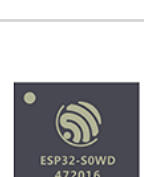
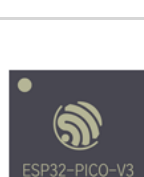


- 32-bit RISC-V single-core processor with a four-stage pipeline that operates at up to 160 MHz
- State-of-the-art power and RF performance
- 400 KB of SRAM and 384 KB of ROM on the chip, and SPI, Dual SPI, Quad SPI, and QPI interfaces that allow connection to flash
- Reliable security features ensured by RSA-3072-based secure boot, AES-128-XTS-based flash encryption, the innovative digital signature and the HMAC peripheral, hardware acceleration support for cryptographic algorithms
- Rich set of peripheral interfaces and GPIOs, ideal for various scenarios and complex applications

SoC	Variants	Core	Dimensions (mm)	Pins	RAM (KB)	Flash (MB)	PSRAM (MB)	Module	Development Board	Footprint
	ESP32-C3 ESP32-C3FN4 ESP32-C3FH4	Single Core	QFN 5x5	32	400 KB RAM, 384 KB ROM, 8 KB RTC SRAM	N/A 4 4	N/A	ESP32-C3-WROOM-02 ESP32-C3-MINI-1	ESP32-C3-DevKitC-02 ESP32-C3-DevKitM-1	2D Footprint
	N/A	Single Core	QFN 4x4	28	400 KB RAM	2	N/A	N/A	N/A	N/A

ESP32 Series SoCs

32-bit MCU & 2.4 GHz Wi-Fi & Bluetooth/Bluetooth LE


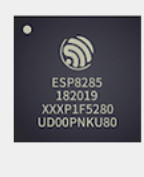
- Two or one CPU core(s) with adjustable clock frequency, ranging from 80 MHz to 240 MHz
- +19.5 dBm output power ensures a good physical range
- Classic Bluetooth for legacy connections, also supporting L2CAP, SDP, GAP, SMP, AVDTP, AVCTP, A2DP (SNK) and AVRCP (CT)
- Support for Bluetooth Low Energy (Bluetooth LE) profiles including L2CAP, GAP, GATT, SMP, and GATT-based profiles like BLUFI, SPP-like, etc
- Bluetooth Low Energy (Bluetooth LE) connects to smart phones, broadcasting low-energy beacons for easy detection
- Sleep current is less than 5 µA, making it suitable for battery-powered and wearable-electronics applications
- Peripherals include capacitive touch sensors, Hall sensor, SD card interface, Ethernet, high-speed SPI, UART, I2S and I2C


SoC	Core	Dimensions (mm)	Pins	RAM (KB)	Flash (MB)	PSRAM (MB)	Module	Development Board	Footprint
	Dual Core	QFN 5x5	48	520 KB SRAM, 448 KB ROM, 16 KB RTC SRAM	N/A	N/A	ESP32-WROOM-32E ESP32-WROOM-32UE ESP32-WROVER-E ESP32-WROVER-IE	ESP32-DevKitC ESP32-LyraT ESP32-LyraT-Mini ESP32-LyraT-MSC ESP32-LyraT-D-SYNA ESP32-Vaquita-DSPG ESP32-Kervo ESP32-Ethernet-Kit	N/A
	Dual core	QFN 5x5	48	520 KB SRAM, 448 KB ROM, 16 KB RTC SRAM	N/A	N/A	ESP32-WROOM-32D ESP32-WROOM-32U ESP32-WROOM-32SE ESP32-WROVER-B ESP32-WROVER-IB	ESP32-DevKitC ESP32-LyraT ESP32-LyraT-Mini ESP32-LyraT-MSC ESP32-LyraT-D-DSPG ESP32-LyraT-D-SYNA ESP32-Kervo ESP-WROVER-KIT	N/A
	Dual Core	QFN 6x6	48	520 KB SRAM, 448 KB ROM, 16 KB RTC SRAM	N/A	N/A	N/A	N/A	N/A
	Dual core	QFN 6x6	48	520 KB SRAM, 448 KB ROM, 16 KB RTC SRAM	N/A	N/A	ESP32-WROOM-32 ESP32-WROVER ESP32-WROVER-I	ESP32-DevKitC	N/A
	Dual core	QFN 5x5	48	520 KB SRAM, 448 KB ROM, 16 KB RTC SRAM	2	N/A	N/A	N/A	N/A
	Single Core	QFN 5x5	48	520 KB SRAM, 448 KB ROM, 16 KB RTC SRAM	4	N/A	ESP32-MINI-1	ESP32-DevKitM-1	N/A
	Single core	QFN 5x5	48	520 KB SRAM, 448 KB ROM, 16 KB RTC SRAM	N/A	N/A	ESP32-SOLO-1	ESP32-DevKitC	N/A
	Dual core	LGA 7x7	48	448 KB ROM, 520 KB SRAM, 16 KB RTC SRAM	4	N/A	ESP32-PICO-V3-ZERO	ESP32-PICO-V3-ZERO-DevKit	N/A
	Dual Core	LGA 7x7	48	448 KB ROM, 520 KB SRAM, 16 KB RTC SRAM	8	2	ESP32-PICO-MINI-02	ESP32-PICO-DevKitM-2	N/A
	Dual Core	LGA 7x7	48	448 KB ROM, 520 KB SRAM, 16 KB RTC SRAM	4	N/A	N/A	ESP32-PICO-KIT	N/A

ESP8266 Series SoCs

32-bit MCU & 2.4 GHz Wi-Fi

- High-performance 160 MHz single-core CPU
- +19.5 dBm output power ensures a good physical range
- Sleep current is less than 20 µA, making it suitable for battery-powered and wearable-electronics applications
- Peripherals include UART, GPIO, I2C, I2S, SDIO, PWM, ADC and SPI


SoC	Core	Dimensions (mm)	Pins	RAM (KB)	Flash (MB)	PSRAM (MB)	Module	Development Board	Footprint
	Single core	QFN 5x5	32	160 KB RAM	N/A	N/A	ESP-WROOM-02D ESP-WROOM-02U ESP-WROOM-02 ESP-WROOM-S2	ESP8266-DevKitC ESP-Launcher	N/A
	Single core	QFN 5x5	32	160 KB RAM	1.2	N/A	N/A	N/A	N/A



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