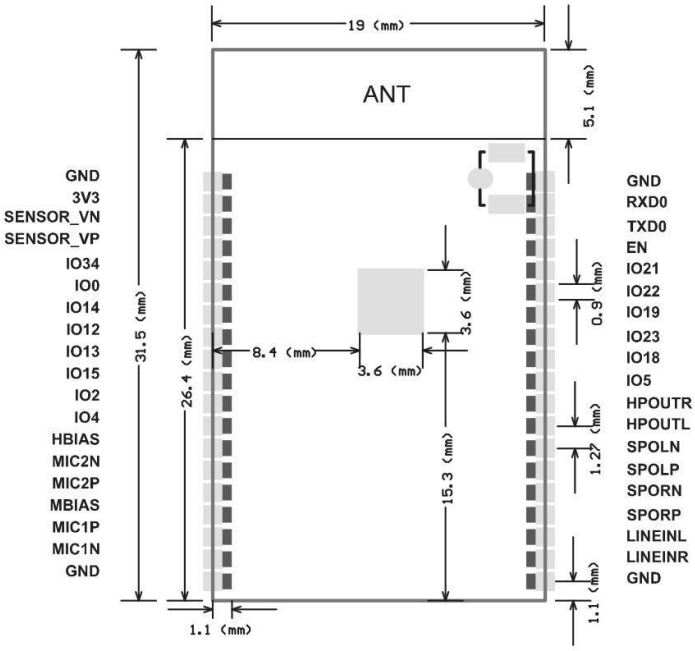
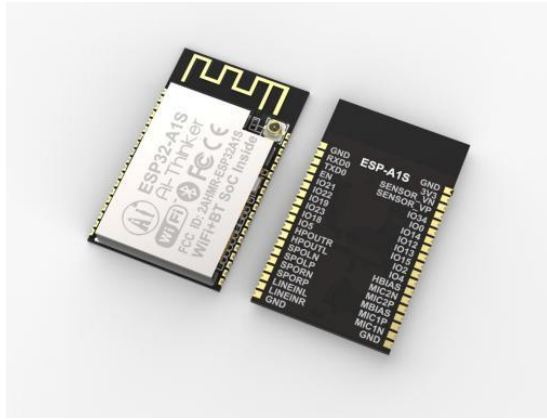
ESP32-A1S





Overview:

ESP32-A1S is an ultra-small, powerful module. Built-in advanced low-power dual-core 32-bit CPU and Codec AC101 audio decoder chip, can be widely used in various IoT applications, suitable for home smart devices, smart Audio, story machine solutions, etc., are the ideal solution for IoT applications.

The ESP32-A1S internal circuit is highly integrated, supports a variety of peripherals, supports secondary development, and quickly realizes product differentiation.

ESP32-A1S adopts SMD package to realize rapid production of products and provide customers with high-reliability connection mode. It is especially suitable for modern, large-scale, low-cost production methods, and is convenient for various IoT hardware terminal applications.

Characteristic:

- Ultra-small 802.11b/g/n Wi-Fi + BT/BLE SoC Module
-The main chip uses a low-power dual-core 32-bit CPU with a frequency of up to 240MHz and a computing power of up to 600 DMIPS
- Built-in AC101 Codec audio decoding chip that supports playback of music and recording
- Built-in 520 KB SRAM, external 4MPSRAM
- Support UART/SPI/I2C/I2S/PWM/ADC/DAC, etc.
- Support firmware upgrade (FOTA)
- Antenna supports onboard antenna or IPEX mount output
- Supports a variety of mainstream compression and lossless audio formats, including

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M4A, AAC, FLAC, OGG, OPUS, MP3, WAV, etc.

- Supports audio input methods such as MIC and Line-in.

Product specifications

Module model	ESP32-A1S
Package	SMD-38
Size	32mm*19mm*3mm
SPI Flash	Default 32Mbit
RAM	520KB SRAM +4M PSRAM
Bluetooth	Bluetooth 4.2 BR/EDR and BLE standards, support A2DP, AVRC protocol, etc.
Wi-Fi	802.11 b/g/n/e/i, supporting DLNA protocol
Audio output	Support 1 headphone output and 1 channel left and right speaker output
Audio input	Support LINEIN and 2-way MIC input
Custom IO port	14
Serial port rate	Default 115200 bps
Audio format	MP3, WAV, M4A, AAC, FLAC, OGG, OPUS, etc.
Antenna form	Onboard PCB antenna and antenna socket
Transmit power	802.11b: 17±2 dBm (@11Mbps) 802.11g: 14±2 dBm (@54Mbps) 802.11n: 13±2 dBm (@MCS7)
Receiving sensitivity	CCK, 1 Mbps : -90dBm CCK, 11 Mbps: -85dBm 6 Mbps (1/2 BPSK): -88dBm 54 Mbps (3/4 64-QAM): -70dBm MCS7 (65 Mbps, 72.2 Mbps): -67dBm
Power consumption	350mA
safety	WPA/WPA2/WPA2-Enterprise/WPS
Power supply range	3.3V±0.3V
Operating temperature	-20 ℃ ~ 85 ℃

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Storage environment	-40 ℃ ~ 90 ℃ , < 90%RH
Weight	2.5±0.05g

Module pin definition

GPIO	Function	Type	Remarks
TXD0	GPIO1/CLKOUT2	I/O	Download serial port
RXD0	GPIO3/CLKOUT3	I/O	
EN		I	Reset function
IO21	U0CTS/VSPIQ	I/O	
IO22	U0RTS/VSPIWP	I/O	
IO23	VSPIIDHS1STROBE	I/O	
IO18	VSPICLK/HS1DATA7	I/O	
IO5	VSPICS0	I/O	
HPOUTR		O	Headphone output
HPOUTL		O	
SPOLN		O	Speaker left channel output
SPOLP		O	
SPORN		O	Speaker right channel output
SPORP		O	
LINEINL		I	Headphone input
LINEINR		I	
SENSOR_VN	GPIO34/ADC1_3RTCIO3	I	
SENSOR_VP	GPIO36/ADC1_0/RTCIO0	I	
IO34	ADC1_6/RTCIO4	I	
IO0		I/O	Must be left floating when using internal code
IO14	ADC2_6/RTCIO16/SDCLK/HSPICKJ/HS2CLK	I/O	
IO12	ADC2_5/RTCIO15/HSPIQ/SDDATA2/HS2DATA2	I/O	
IO13	ADC2_4/RTCIO14/HSPIID/SDDATA3/H2DATA3	I/O	

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IO15	ADC2_3/RTCIO15/HSPICS0/SDCMD/HS2CMD	I/O	
IO2	ADC2_2/RTCIO12/SDDATA0/HS2DATA0	I/O	
IO4	ADC2_3/RTCIO10/HSPIHD/SDDATA1/HS2DATA1	I/O	
HBIAS		O	MIC2 control pin
MIC2N		I	MIC2 input
MIC2P		I	
MBIAS		O	MIC1 control pin
MIC1P		I	MIC1 input
MIC1N		I	

Strapping PIN

System startup mode			
PIN	Default	Normal operation	Download
GPIO0	Pull up	Empty	0
GPIO2	Drop down	Irrelevant item	0
Built-in LDO (VDD_SDIO) voltage			
PIN	Default	3.3V	1.8V
MTDI/GPIO12	Drop down	0	1

Note: The built-in flash operating voltage is 3.3V. Model chips with built-in flash need to pull down or float MTDI when powering up.

Module schematic

ESP32 AC101 I2S pin connection	
AC101	ESP32
I2S_SDOUT	IO35
I2S_SDIN	IO25

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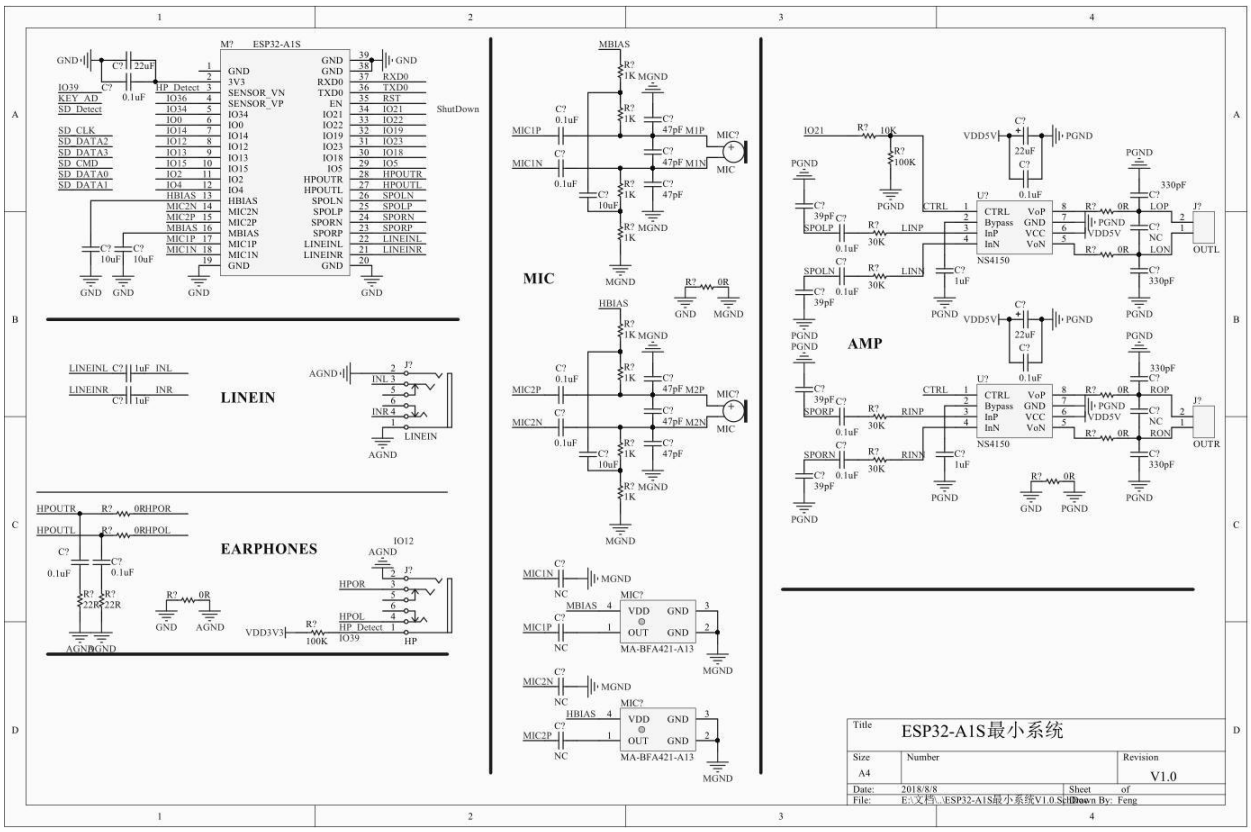
I2S_LRCK	IO26
I2S_BCLK	IO27
I2S_MCLK	IO0
ESP32 AC101 I2C pin connection	
AC101	ESP32
SCL	IO32
SDA	IO33

Minimum system diagram



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