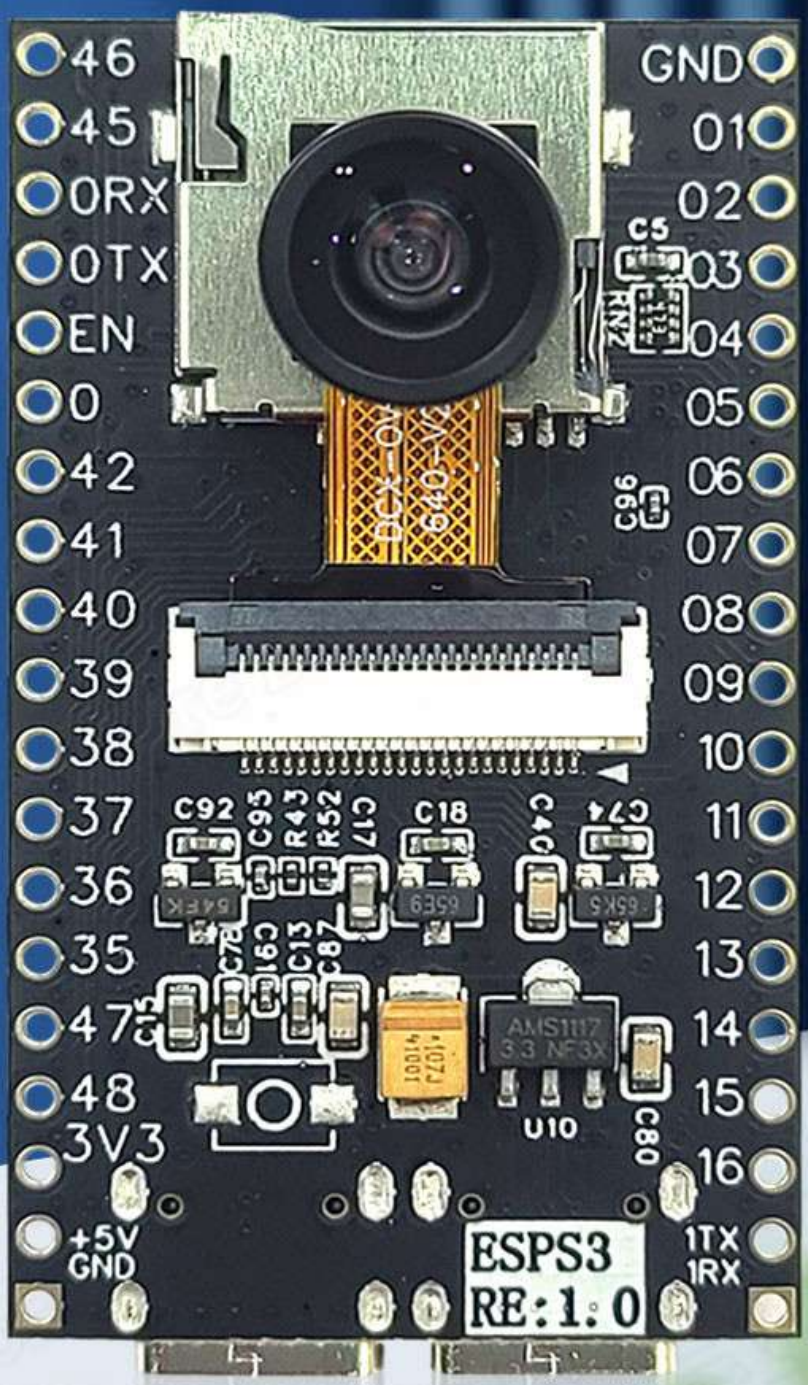
ES32 S3 CAM

8MB PSRAM 16MB Flash

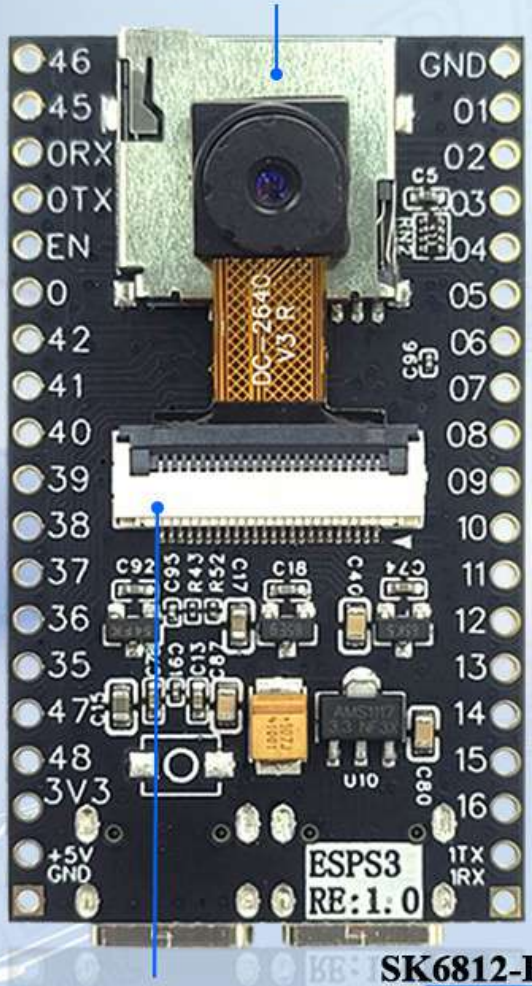
2.4G Wifi BT Module

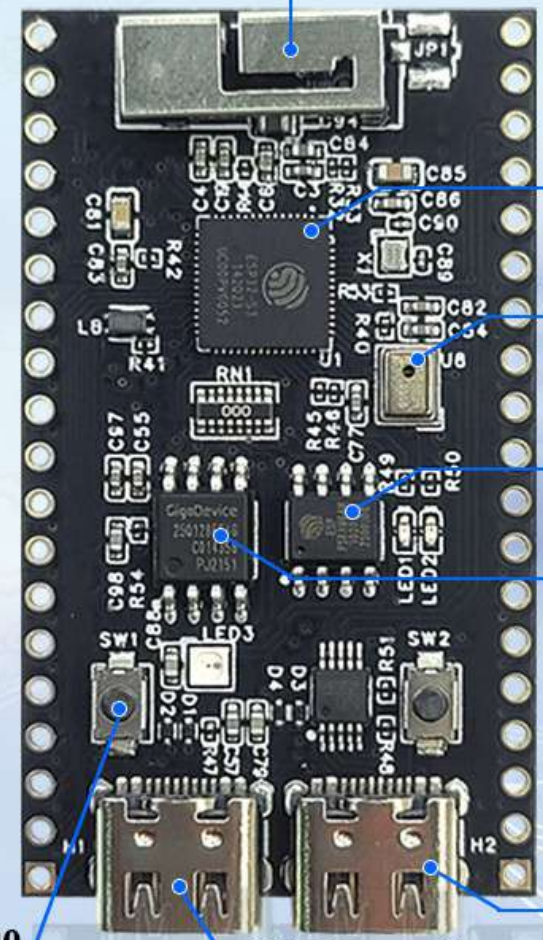
ESP32-S3 Dual-core

Buitl-in MIC I2S



Product Briefing





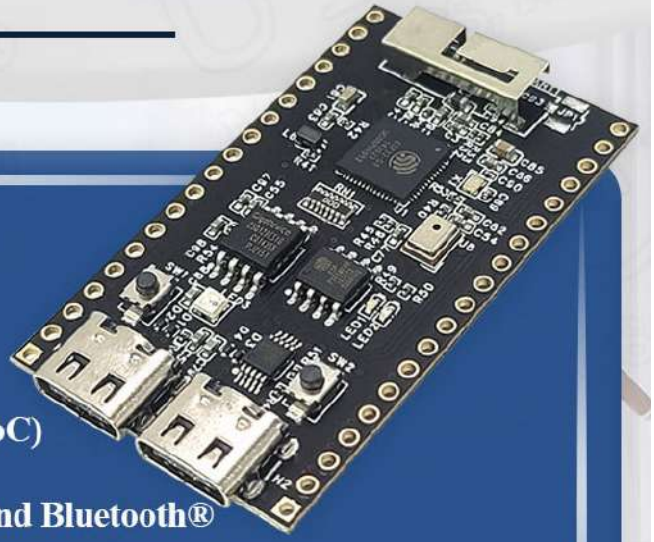
☑OV2640/OV7725/OV3660

☒OV5640

✓ Cameras for Video Streaming

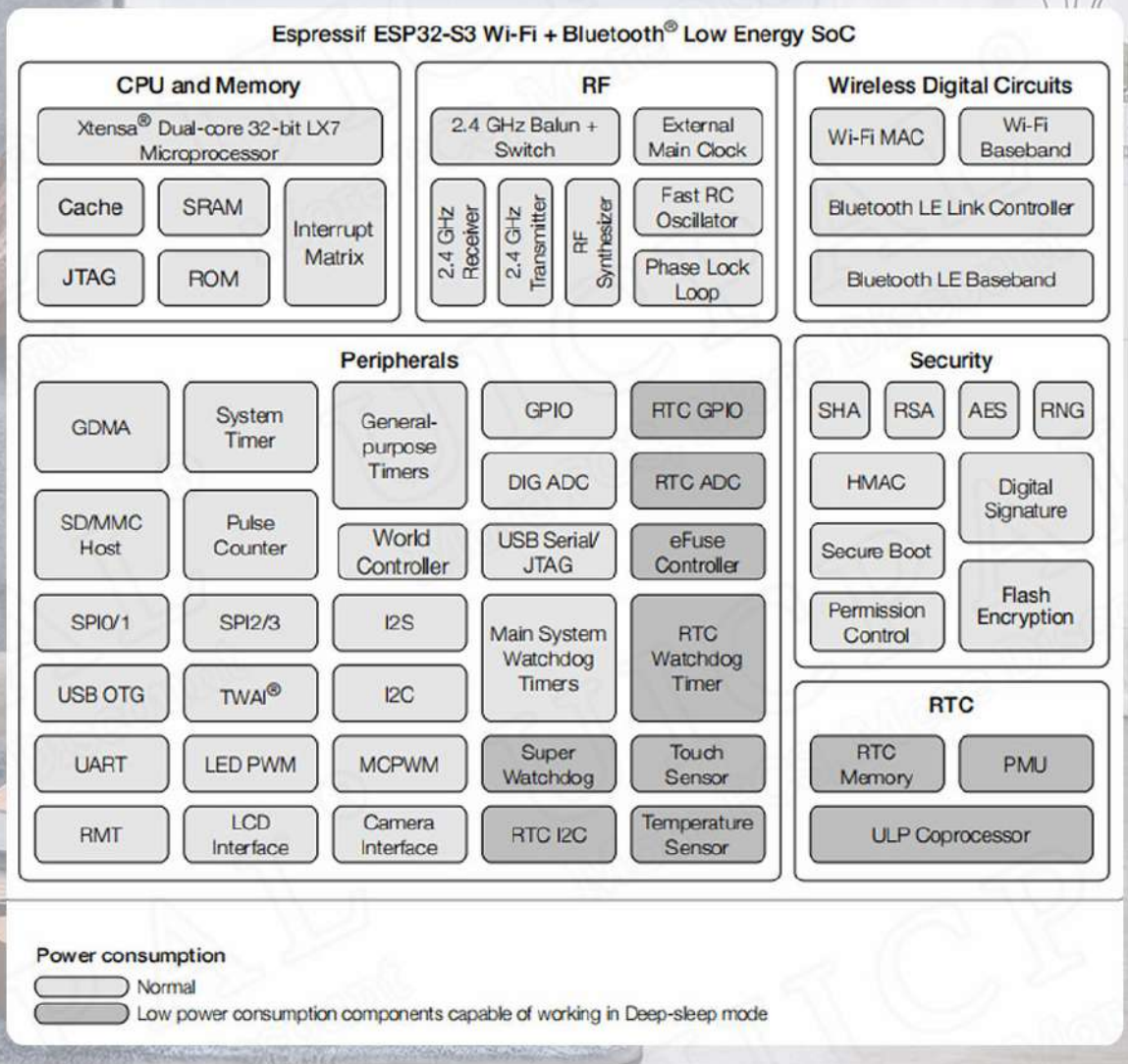
✓ Speech and Image Recognition

PRODUCT BRIEFING

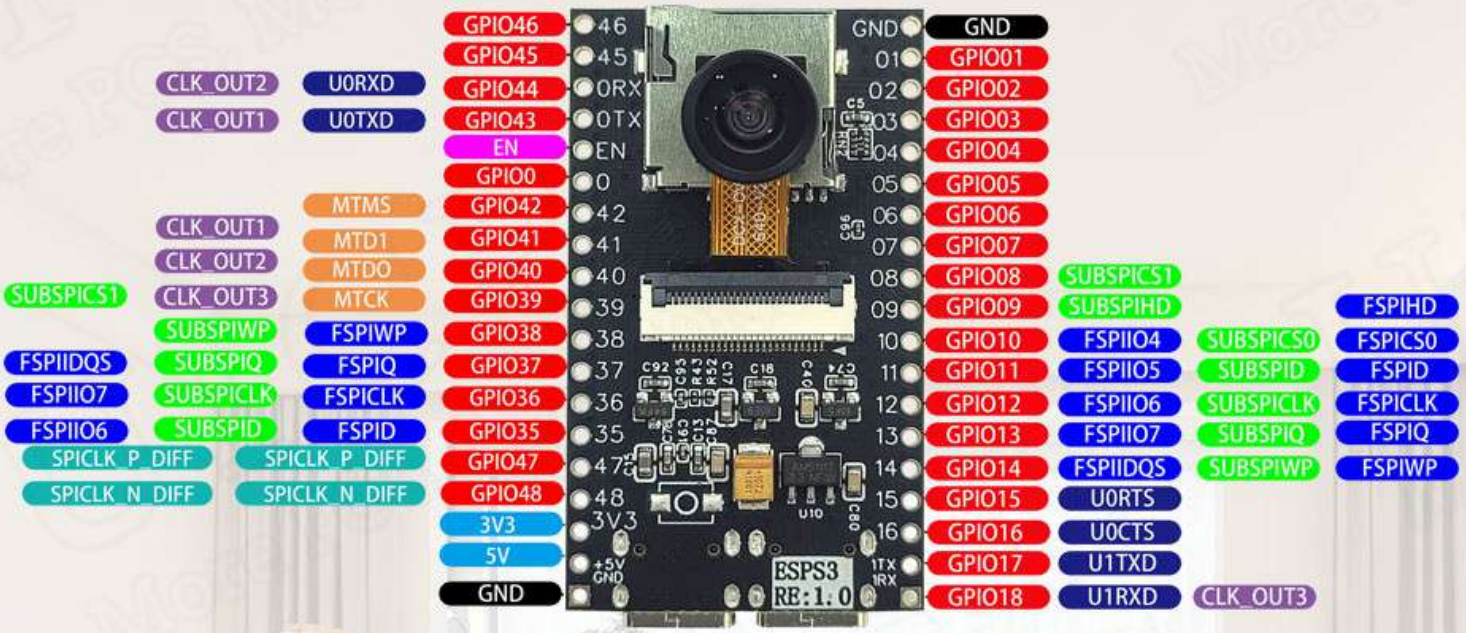


Product Briefing:

ESP32-S3 is a low-power MCU-based system on a chip (SoC) with integrated 2.4 GHz Wi-Fi and Bluetooth® Low Energy (Bluetooth LE). It consists of high-performance dual-core microprocessor (Xtensa® 32-bit LX7), a low power coprocessor, a Wi-Fi baseband, a Bluetooth LE baseband, RF module, and numerous peripherals. The functional block diagram of the SoC is shown below.



Pin Definitions



GPIO Inout and Output | Serial for Debug | Clock Output | CHIP __PU | MT

Power Rails (3V3 and 5V) | SUBSPI | Ground | SPICLK | FSPI

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

Product Parameters

Wi-Fi

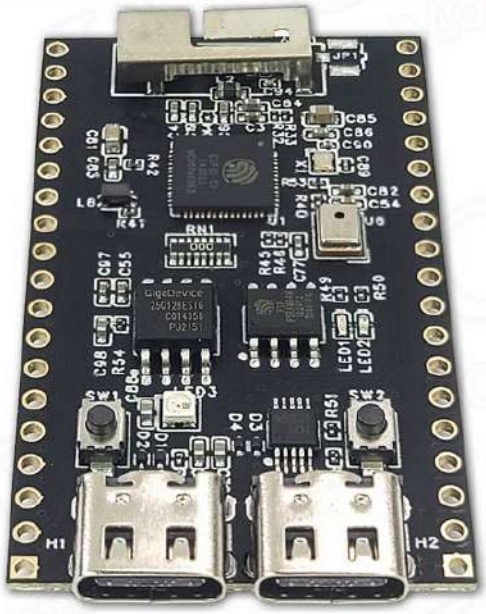
- IEEE 802.11b/g/n-compliant
- Supports 20 MHz, 40 MHz bandwidth in 2.4 GHz band
- 1T1R mode with data rate up to 150 Mbps
- Wi-Fi Multimedia (WMM)
- TX/RX A-MPDU, TX/RX A-MSDU
- Immediate Block ACK
- Fragmentation and defragmentation
- Automatic Beacon monitoring (hardware TSF)
- 4 × virtual Wi-Fi interfaces
- Simultaneous support for Infrastructure BSS in Station, SoftAP, or Station + SoftAP modes
  Note that when ESP32-S3 scans in Station mode, the SoftAP channel will change along with the Station channel
- Antenna diversity
- 802.11mc FTM

Bluetooth

- Bluetooth LE: Bluetooth 5, Bluetooth mesh
- High power mode (20 dBm)
- Speed: 125 Kbps, 500 Kbps, 1 Mbps, 2 Mbps
- Advertising extensions
- Multiple advertisement sets
- Channel selection algorithm #2
- Internal co-existence mechanism between Wi-Fi and Bluetooth to share the same antenna

CPU and Memory

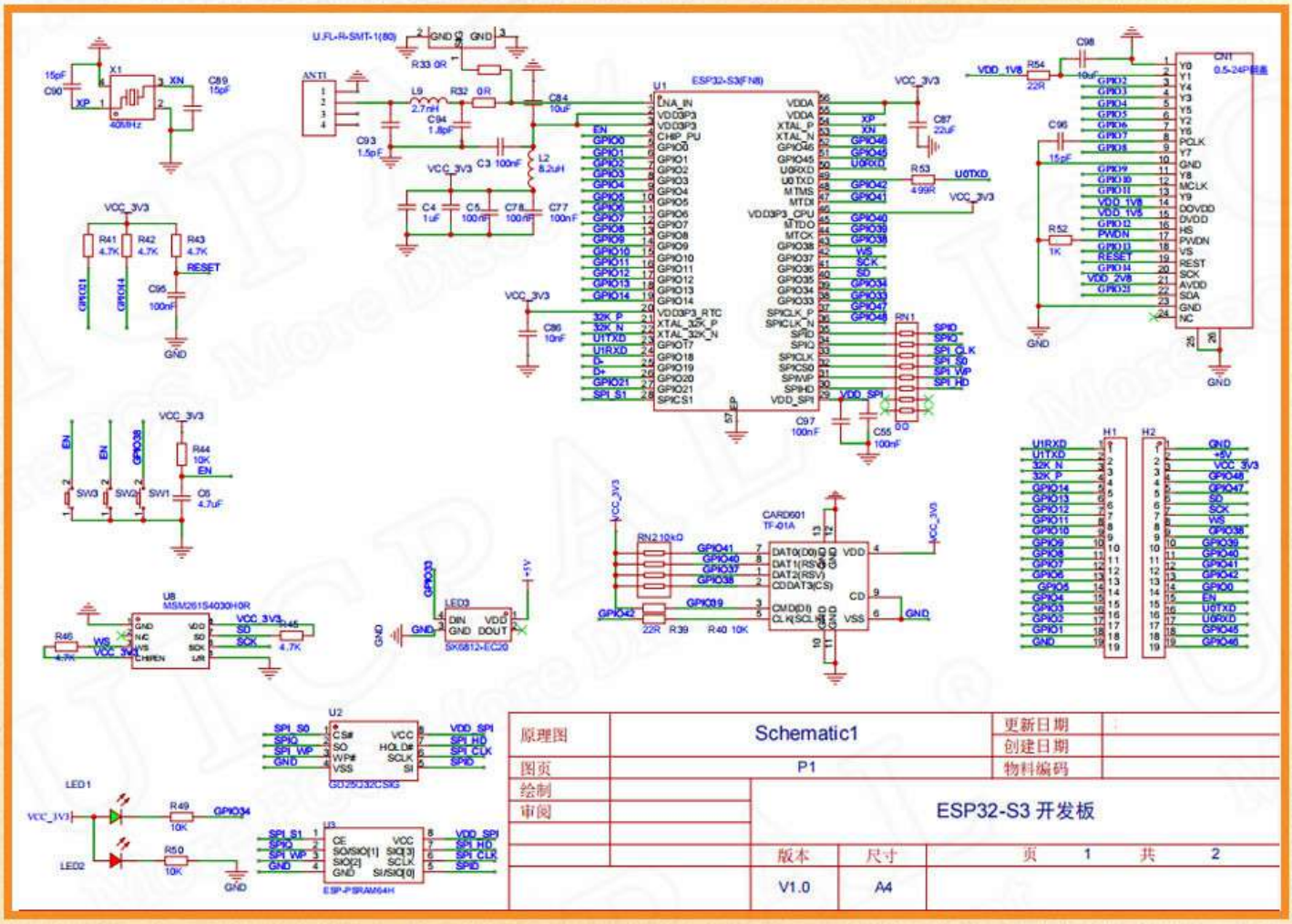
- Xtensa® dual-core 32-bit LX7 microprocessor, up to 240 MHz
- CoreMark® score:
  - 1 core at 240 MHz: 613.86 CoreMark; 2.56 CoreMark/MHz
  - 2 cores at 240 MHz: 1181.60 CoreMark; 4.92 CoreMark/MHz
- 128-bit data bus and SIMD commands
- 384 KB ROM
- 512 KB SRAM
- 16 KB SRAM in RTC
- SPI, Dual SPI, Quad SPI, Octal SPI, QPI and OPI interfaces that allow connection to multiple flash and external RAM
- Flash controller with cache is supported
- Flash in-Circuit Programming (ICP) is supported



Advanced Peripheral Interfaces

- 45 × programmable GPIOs
- Digital interfaces:
  - 4 × SPI
  - 1 × LCD interface (8-bit ~16-bit parallel RGB, I8080 and MOTO6800), supporting conversion between RGB565, YUV422, YUV420 and YUV411
  - 1 × DVP 8-bit ~16-bit camera interface
  - 3 × UART
  - 2 × I2C
  - 2 × I2S
  - 1 × RMT (TX/RX)
  - 1 × pulse counter
  - LED PWM controller, up to 8 channels
  - 1 × full-speed USB OTG
  - 1 × USB Serial/JTAG controller
  - 2 × MCPWM
  - 1 × SD/MMC host controller with 2 slots
  - General DMA controller (GDMA), with 5 transmit channels and 5 receive channels
  - 1 × TWAI® controller, compatible with ISO 11898-1 (CAN Specification 2.0)
- Analog interfaces:
  - 2 × 12-bit SAR ADCs, up to 20 channels
  - 1 × temperature sensor
  - 14 × touch sensing IOs
- Timers:
  - 4 × 54-bit general-purpose timers
  - 1 × 52-bit system timer
  - 3 × watchdog timers

Feature overview	
MCU:ESP32-S3	Xtensa®32LX7 dual-core processor, frequency adjustable between 2040MHz, integrated 2.4GHz Wi-Fi and Bluetooth dual-mode, 40nm process, integrated 512KB RAM and 384KB ROM memory (for program startup and core function call) FLASH support SPI, DualSPIQuadSPI, OctalSPI and RAM peripherals.
USB : CH340X	Automatic download circuit, with E8051 core compatible with MCS51 instruction set, the average instruction speed is 8~15 times faster than the standard MCS51, ESP32-CAM module uses CH340X to realize automatic download circuit, with USB can be easily written and debugged ESP32.
MSM261S4030H0R	Built-in complete 24bit I2S audio interface, no additional addition of codec, can be directly connected with DSP or MCU full digital signal, microphone collects audio signal and converts into analog voltage signal
	output, through the codec ADC into digital signal and encoding by the main control chip for audio processing.
TF card slot	The module has a TF card slot on board, which is compatible with most standard TF cards on the market, supports up to 16GB, and can realize functions such as photo storage, and playback with the camera.
SK6812-EC20	The SK6812-EC20 is a digitally programmable color LED with integrated LED and control circuitry. It is available in a surface mount technology (SMD) package for compact size and reliable performance. The SK6812-EC20 LED is a digitally programmable RGB LED.
OV2640 Camera	Provides a complete power over the serial camera control bus (SCCB) interface for single-chip JXGA (1632x1232) cameras and image processors, providing YUV(422/420)/YCbCr422 full-frame sampling, scaling, or windowing of 8-bit/10-bit images. THE BEST IMAGE DISTANCE IS 20-250CM.
TYPE-C 16PIN 2MD	Two electrical connectors for Type-C interface devices are available, with high-speed transmission, reversible pluggability, and multifunctional expansion. Among them, USB2 is automatically downloaded with CH340 connection. USB1 is connected to the ESP32-S3 chip.
Module application scenarios	
DIY secondary development	
Low-cost camera solutions	
IoT node devices	
Size information	
28.00X48.514X10mm	
Support software development	
C++ / Esp-IDF / Ardiuno-IDE / Vscode / Microphython	


U1
ESP32-S3(FN8)
U2
U3
U8
LED1
LED2
LED3
CARD601
TF-01A
H1
H2
CNT
原理图
Schematic1
更新日期
创建日期
图页
P1
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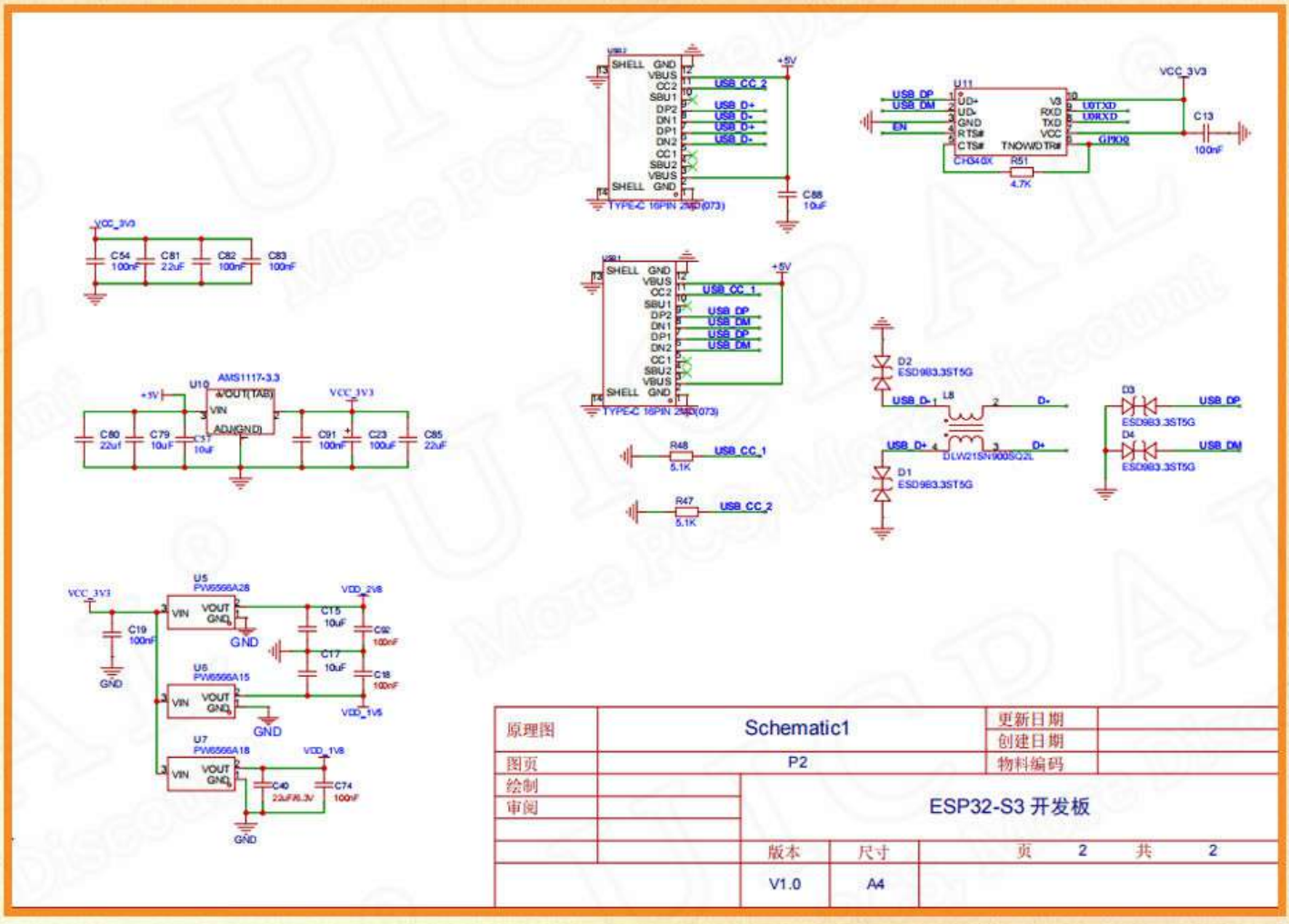
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U11
D1
D2
D3
D4
U5
U6
U7
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创建日期
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V1.0
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A4
页 2 共 2