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# SMART DISPLAY MODULE SPECIFICATION

| 4.3 Inch Smart Display with TOUCH |              |
|-----------------------------------|--------------|
| Model:                            | ET043SM02-VT |
| Version:                          | V3.2         |
| Date:                             | 2024-11-16   |

## Customer Confirmation

| Approved by | Notes |
|-------------|-------|
|             |       |



## REVISION HISTORY

| Revision | Date     | Contents of Revision Change                                                                | Remark |
|----------|----------|--------------------------------------------------------------------------------------------|--------|
| V1.0     | 20240611 | Preliminary release                                                                        |        |
| V2.0     | 20240628 | Change to English version                                                                  |        |
| V2.1     | 20240709 | Change header                                                                              |        |
| V2.2     | 20240713 | Updated mechanical drawing                                                                 |        |
| V3.0     | 20240723 | Add schematic                                                                              |        |
| V3.1     | 20240802 | Add schematic,environment configuration and SDK links,Add a program example link for lvg19 |        |
| V3.2     | 20241116 | Add more hardware details and link to LCD specification                                    |        |
|          |          |                                                                                            |        |
|          |          |                                                                                            |        |
|          |          |                                                                                            |        |
|          |          |                                                                                            |        |
|          |          |                                                                                            |        |



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# 1. Introduction

## 1.1 Features

### Brief Info:

- 1) Two buttons: a reset button and a boot button.
- 2) Backup IO: download ports and multiple IO leads to use on both sides of the periphery.
- 3) Power: DC 5V, 300mA

### System

- 1) OS: RTOS
- 2) CPU: ESP32-S3 240Mhz
- 3) RAM: 8MB
- 4) Flash: 16MB
- 5) Support 2.4GHz Wi-Fi、BLE 5、BLE Mesh
- 6) Support Peripherals:  
GPIO, SPI, LCD interface, Camera interface, UART, I2C, I2S, remote control, pulse counter, LED PWM, full-speed USB 2.0 OTG, USB Serial/JTAG controller, MCPWM, SDIO host, GDMA, TWAI® controller (compatible with ISO 11898-1), ADC, touch sensor, temperature sensor, timers and watchdogs

For more information on ESP32-S3-WROOM-1, please refer to the following link: [datasheet\\_en.pdf](#)

### Display

- 1) Size: 4.3 Inch
- 2) Resolution: 800 \*480
- 3) Pixel Arrangement: RGB Vertical Stripe
- 4) Interface Mode: 40PIN RGB 24bits
- 5) Driver IC: ST7262E43-G4 TP IC: GT911
- 6) Brightness: 400 cd/m<sup>2</sup>
- 7) Touch: CTP

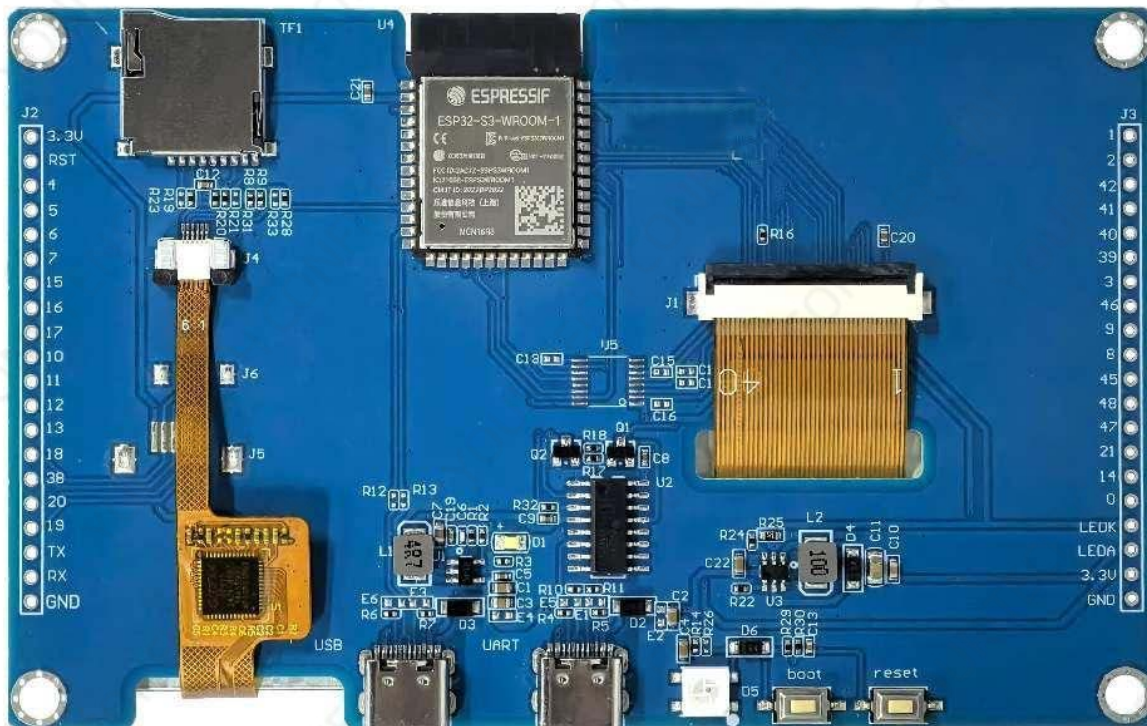
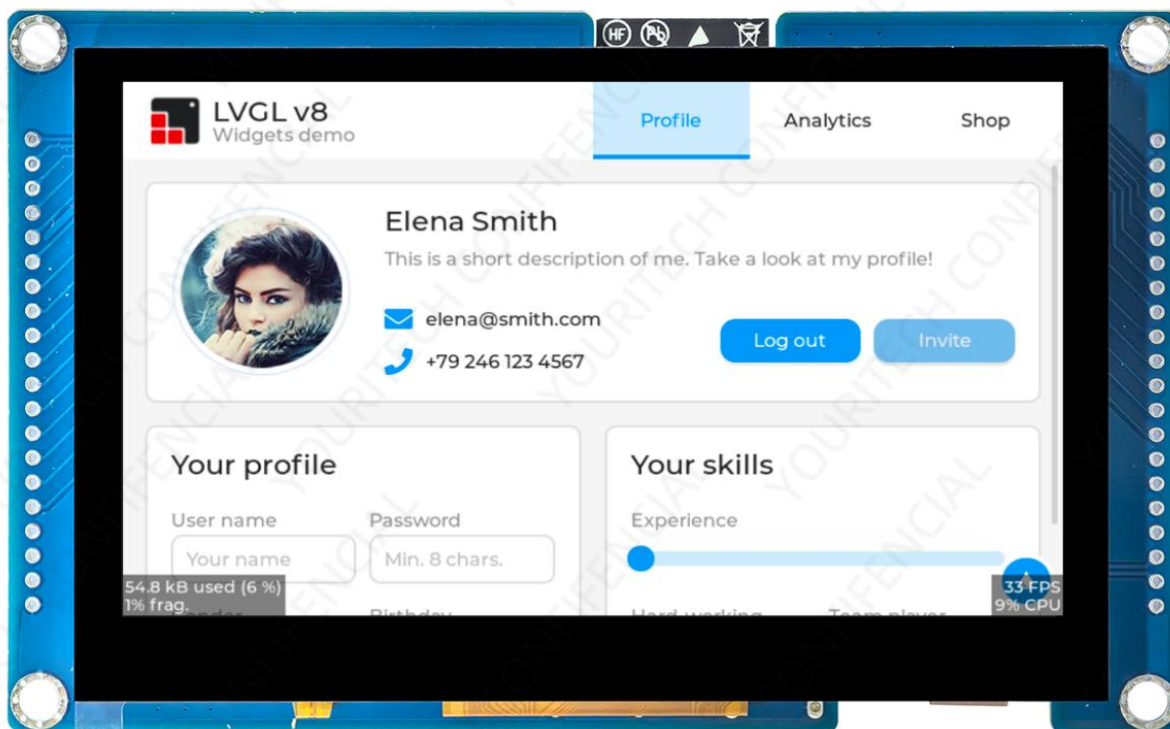
More information about Display can be found here: [Display Specification.pdf](#)

### Other

- 1) Operation Temperature: -20~70°C
- 2) Storage Temperature: -30~80°C

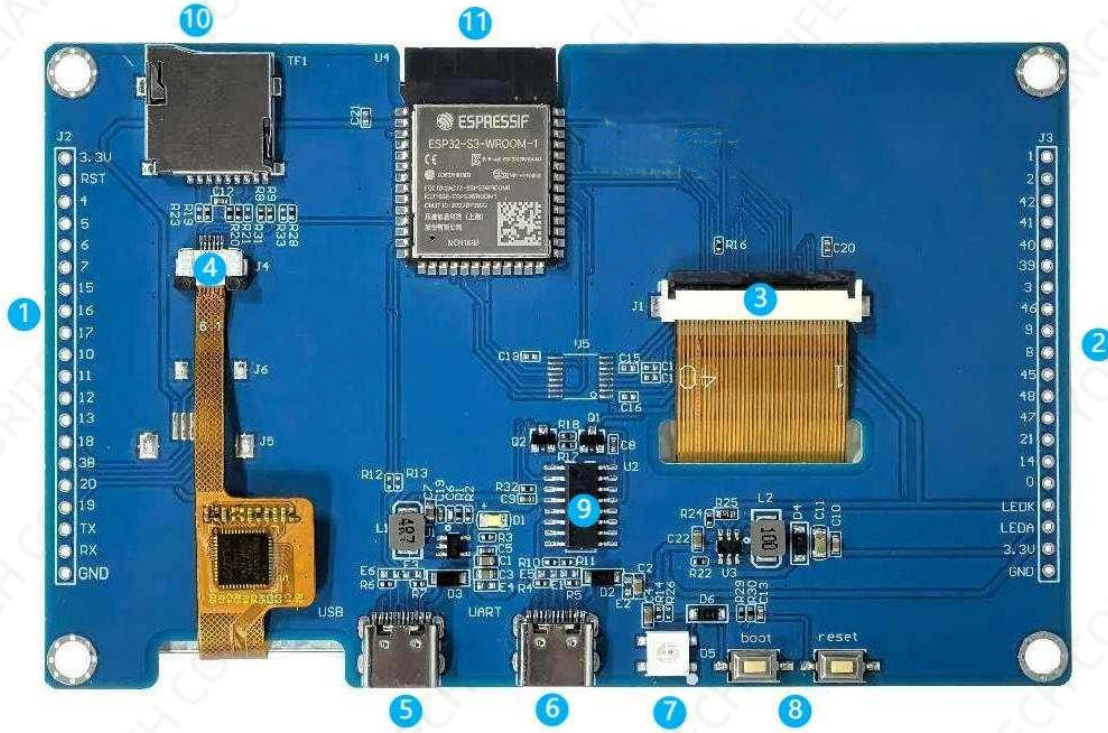


## 1.2 Appearance picture



## 2. Product information

### 2.1 Interface Description



#### ① External GPIO: J2

| Pin NO. | Symbol  | Description                                                                                            | Current Usage                          |
|---------|---------|--------------------------------------------------------------------------------------------------------|----------------------------------------|
| 3.3V    | 3.3V    | Power 3.3V                                                                                             | Power 3.3V                             |
| RST     | CHIP-EN | High: on, enables the chip<br>Low: off, the chip powers off.<br>Note: Do not leave the EN pin floating | Note: Do not leave the EN pin floating |
| 4       | GPIO4   | RTC_GPIO4, GPIO4, TOUCH4, ADC1_CH3                                                                     | LCD G5                                 |
| 5       | GPIO5   | RTC_GPIO5, GPIO5, TOUCH5, ADC1_CH4                                                                     | LCD G0                                 |
| 6       | GPIO6   | RTC_GPIO6, GPIO6, TOUCH6, ADC1_CH5                                                                     | LCD G1                                 |
| 7       | GPIO7   | RTC_GPIO7, GPIO7, TOUCH7, ADC1_CH6                                                                     | LCD G2                                 |
| 15      | GPIO15  | RTC_GPIO15, GPIO15, U0RTS, ADC2_CH4, XTAL_32K_P                                                        | LCD G3                                 |
| 16      | GPIO16  | RTC_GPIO16, GPIO16, U0CTS, ADC2_CH5, XTAL_32K_N                                                        | LCD G4                                 |
| 17      | GPIO17  | RTC_GPIO17, GPIO17, U1TXD, ADC2_CH6                                                                    | Not used                               |
| 10      | GPIO10  | RTC_GPIO10, GPIO10, TOUCH10, ADC1_CH9, FSPICS0, FSPIIO4, SUBSPICS0                                     | SD-CS                                  |



|     |        |                                                                    |                 |
|-----|--------|--------------------------------------------------------------------|-----------------|
| 11  | GPIO11 | RTC_GPIO11, GPIO11, TOUCH11, ADC2_CH0, FSPID, FSPIIO5, SUBSPID     | RTP-DIN         |
| 12  | GPIO12 | RTC_GPIO12, GPIO12, TOUCH12, ADC2_CH1, FSPICLK, FSPIIO6, SUBSPICLK | RTP-CLK         |
| 13  | GPIO13 | RTC_GPIO13, GPIO13, TOUCH13, ADC2_CH2, FSPIQ, FSPIIO7, SUBSPIQ     | RTP-DOUT        |
| 18  | GPIO18 | RTC_GPIO18, GPIO18, U1RXD, ADC2_CH7, CLK_OUT3                      | INT(Not used)   |
| 38  | GPIO38 | GPIO38, FSPIWP, SUBSPIWP                                           | RTP-csb-CTP-rst |
| 20  | GPIO20 | RTC_GPIO20, GPIO20, U1CTS, ADC2_CH9, CLK_OUT1, USB_D+              | TP SCL          |
| 19  | GPIO19 | RTC_GPIO19, GPIO19, U1RTS, ADC2_CH8, CLK_OUT2, USB_D-              | TP SDA          |
| TX  | GPIO43 | U0TXD, GPIO43, CLK_OUT1                                            | UARTTX          |
| RX  | GPIO44 | U0RXD, GPIO44, CLK_OUT2                                            | UARTRX          |
| GND | GND    | Grounds                                                            | GND             |

②

## External GPIO: J2

| Pin NO. | Symbol | Description                                          | Current Occupancy |
|---------|--------|------------------------------------------------------|-------------------|
| 1       | GPIO1  | RTC_GPIO1, GPIO1, TOUCH1, ADC1_CH0                   | LCD B4            |
| 2       | GPIO2  | RTC_GPIO2, GPIO2, TOUCH2, ADC1_CH1                   | LCD-BL-EN         |
| 42      | GPIO42 | MTMS, GPIO42                                         | LCD PCLK          |
| 41      | GPIO41 | MTDI, GPIO41, CLK_OUT1                               | LCD VS            |
| 40      | GPIO40 | MTDO, GPIO40, CLK_OUT2                               | LCD DE            |
| 39      | GPIO39 | MTCK, GPIO39, CLK_OUT3, SUBSPICS1                    | LCD HS            |
| 3       | GPIO3  | RTC_GPIO3, GPIO3, TOUCH3, ADC1_CH2                   | LCD B1            |
| 46      | GPIO46 | GPIO46                                               | LCD B2            |
| 9       | GPIO9  | RTC_GPIO9, GPIO9, TOUCH9, ADC1_CH8, FSPIHD, SUBSPIHD | LCD B3            |
| 8       | GPIO8  | RTC_GPIO8, GPIO8, TOUCH8, ADC1_CH7, SUBSPICS1        | LCD B0            |
| 45      | GPIO45 | GPIO45                                               | LCD R0            |
| 48      | GPIO48 | SPICLK_N_DIFF, GPIO48, SUBSPICLK_N_DIFF              | LCD R1            |



|      |        |                                                                  |            |
|------|--------|------------------------------------------------------------------|------------|
| 47   | GPIO47 | SPICLK_P_DIFF,GPIO47, SUBSPICLK_P_DIFF                           | LCD R2     |
| 21   | GPIO21 | RTC_GPIO21, GPIO21                                               | LCD R3     |
| 14   | GPIO14 | RTC_GPIO14, GPIO14, TOUCH14, ADC2_CH3, FSPiWP, FSPIDQS, SUBSPiWP | LCD R4     |
| 0    | GPIO0  | RTC_GPIO0, GPIO0                                                 | Boot       |
| LEDK | LEDK   | BL-                                                              | BL-        |
| LEDA | LEDA   | BL+                                                              | BL+        |
| 3.3V | 3.3V   | Power 3.3V                                                       | Power 3.3V |
| GND  | GND    | Grounds                                                          | Grounds    |

Note: ① ②

- A pin can be used for other purposes when it is not used at the same time, When using Display interface, most of the pins are occupied because the RGB interface is used.
- You can also use an external gpio to drive other interface types, such as SPI interface, MCU interface, MIPI interface, etc., without using the Display interface provided by us
- Where GPIO0 is the link to the boot button, but you can use it for other purposes; GPIO17 and GPIO18 are not used, you are free to use them
- If the Display interface is used but the SD is not used, then the SD pins are freely usable.

### ③ Display Interface:

| Pin No. | Symbol | I/O | Description                                                 |
|---------|--------|-----|-------------------------------------------------------------|
| 1       | LEDK   | P   | Power supply for backlight cathode                          |
| 2       | LEDA   | P   | Power supply for backlight anode                            |
| 3       | GND    | P   | Power Ground                                                |
| 4       | VDD    | P   | Power supply to the internal logic power regulator( 3.3V)   |
| 5-12    | R0-R7  | I   | Red data input.                                             |
| 13-20   | G0-G7  | I   | Green data input.                                           |
| 21-28   | B0-B7  | I   | Blue data input.                                            |
| 29      | GND    | P   | Power Ground                                                |
| 30      | CLK    | I   | Pixel clock input pin, Negative polarity                    |
| 31      | DISP   | I   | Standby mode. Normally pulled high.                         |
| 32      | HSYNC  | I   | Horizontal sync signal, Negative polarity                   |
| 33      | VSNC   | I   | Vertical sync signal, Negative polarity                     |
| 34      | DEN    | I   | Data input enable. Display access is enabled when DE is "H" |



|    |     |   |              |
|----|-----|---|--------------|
| 35 | NC  | I | Dummy        |
| 36 | GND | P | Power Ground |
| 37 | XR  | - | Dummy        |
| 38 | YD  | - | Dummy        |
| 39 | XL  | - | Dummy        |
| 40 | YU  | - | Dummy        |

I: Input; O: Output; P: Power

#### ④ TP Interface:

| Pin No. | Symbol | I/O | Description                                               |
|---------|--------|-----|-----------------------------------------------------------|
| 1       | GPIO20 | P   | TP SCL                                                    |
| 2       | GPIO19 | P   | TP SDA                                                    |
| 3       | GPIO18 | P   | INT(It's not actually used)                               |
| 4       | GND    | P   | Power Ground                                              |
| 5       | VDD    | I   | Power supply to the internal logic power regulator( 3.3V) |
| 6       | GPIO38 | I   | RTP-csb-CTP-rst                                           |
| 7       | GND    | P   | Power Ground                                              |
| 8       | GND    | P   | Power Ground                                              |

#### ⑤ USB:

The USB interface belongs to Type-C and is mainly used to power the board. The picture on the left shows serial communication and the picture on the right shows the download port.

#### ⑥ UART:

Used for serial communication, such as burning, serial debugging, etc

#### ⑦ RGB LCD:

Can emit red, green, blue three colors of light, and through different combinations to produce a variety of colors

#### ⑧ button:

Boot button and the reset button.

#### ⑨ USB to serial chip: CH340C

The CH340 is a USB bus conversion chip that implements USB-to-serial port or USB-to-print port. In serial port mode, the CH340 provides common MODEM communication signals, which can be used to extend the asynchronous serial port for a computer or upgrade a common serial device to the USB bus.

#### ⑩ SD:

A port or slot for inserting an SD card, usually for storing data

#### ⑪ Main Control Chip: ESP32S3-MCN16R8

Dual-core processor, up to 240MHz operating frequency



## 2.2 Display Information

| Item                     | Specification             | Unit              | Remark               |
|--------------------------|---------------------------|-------------------|----------------------|
| Pixel Driving element    | IPS TFT                   | -                 | -                    |
| Screen Size              | 4.3                       | Inch              | Diagonal             |
| Resolution               | 800(W)*3(RGB)*480(H)      | Dots              | -                    |
| Interface                | RGB 24bits                | -                 | 40PIN                |
| Module Power Consumption | 1.04                      | Watt              | Typ.                 |
| Active Area              | 95.04(W)*53.86(H)         | mm                | -                    |
| Pixel pitch (W*H)        | 0.1188(W)*0.1122(H)       | mm                | -                    |
| Module Size (W*H*D)      | 105.52(W)*67.17(H)*2.8(D) | mm                | Tolerance: $\pm 0.2$ |
| Luminance                | 400                       | cd/m <sup>2</sup> | Typ.                 |
| Viewing Direction        | All                       | O'clock           | -                    |
| Display Color            | 16.2M                     | Colors            | 24bits               |

## 2.3 Voltage & Current

| Item                               | Conditions                          | Min | Typ | Max | Unit |
|------------------------------------|-------------------------------------|-----|-----|-----|------|
| Power Voltage                      | DC                                  | 4.0 | 5.0 | 5.5 | V    |
| Operation Current                  | VCC= +5V, Maximum backlight current | 50  | 280 | 150 | mA   |
|                                    | VCC= +5V, backlight off             | -   | 150 | -   | mA   |
| Recommended power supply: 5V 1A DC |                                     |     |     |     |      |

## 2.4 Reliability Test

| Item                | Conditions          | Min                                  | Typ | Max | Unit |
|---------------------|---------------------|--------------------------------------|-----|-----|------|
| Working Temperature | 60%RH at 5V voltage | -20                                  | 25  | 70  | C    |
| Storage Temperature | ---                 | -30                                  | 25  | 85  | C    |
| Working Humidity    | 25°C                | 10%                                  | 60% | 90% | RH   |
| ESD                 | ---                 | Contact: $\pm 4KV$<br>Air: $\pm 8KV$ |     |     | KV   |



## 2.5 Related software

| Software name | Version               | Software associated configuration                                                                                                                                                                                                                                                                                                                                          | Development environment configuration link        |
|---------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Arduino IDE   | 3.0.X (esp32)         | <ol style="list-style-type: none"> <li>1. Board: ESP32S3 Dev Module</li> <li>2. CPU Frequency: 240MHz (WiFi)</li> <li>3. Flash Frequency: NO</li> <li>4. Flash Mode: QIO 80MHz</li> <li>5. Flash Size: 16MB (128Mb)</li> <li>6. Partition Scheme: Default 4MB with spiffs (1.2MB APP/1.5MB SPIFFS)</li> <li>7. PSRAM: OPI PSRAM</li> <li>8. Programmer: Esptool</li> </ol> | <a href="#">ESP32-Arduino config (github.com)</a> |
| ESP-IDF       | 5.1.1<br>5.2.2<br>5.3 | Once configured, no configuration is required<br>(If you have any problem with the configuration, please contact us, we will help you)                                                                                                                                                                                                                                     | <a href="#">ESP-IDF_config (github.com)</a>       |

**Note: If you are compiling in Arduino architecture and using WIFI or have other questions, please refer to:**[FAQ](#)



## 4. Schematic



