

ESP-12E

Brief Spec

规格修改记录 (SPECIFICATION CHANGE HISTORY)

| 编号 | 修订日期 | 修订内容 | 修订者 |
|----|----------|------|-------|
| 1 | 2012-5-5 | 最初版本 | Harri |

| Approve 批准 | Check 审核 | Preparation 拟制 | Date 日期 |
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Product Description

Description

ESP-12E is a low power consumption of the UART-WiFi module, with very competitive prices in the industry and ultra low power consumption technology, designed specifically for mobile devices and IOT applications, user's physical device can be connected to a Wi-Fi wireless network, Internet or intranet communication and networking capabilities. ESP-07 the use of small ceramic antenna package can support IPEX interface. users have a variety of installation options.

Features

- ▪ 802.11 b/g/n protocol
- ▪ Wi-Fi Direct (P2P), soft-AP
- ▪ Integrated TCP/IP protocol stack
- ▪ +19.5dBm output power in 802.11b mode
- ▪ Power down leakage current of < 10uA
- ▪ Integrated low power 32-bit MCU
- ▪ SDIO 2.0, SPI, UART
- ▪ STBC, 1x1 MIMO, 2x1 MIMO
- ▪ A-MPDU & A-MSDU aggregation & 0.4μs guard interval
- ▪ Wake up and transmit packets in < 2ms
- ▪ Standby power consumption of < 1.0mW (DTIM3)

Applications

- Smart power plugs
- Home automation
- Mesh network
- Industrial wireless control
- Baby monitors
- IP Cameras
- Sensor networks
- Wi-Fi location-aware devices
- Security ID tags
- Wi-Fi position system beacons

Electrical performance

Digital IO Pads

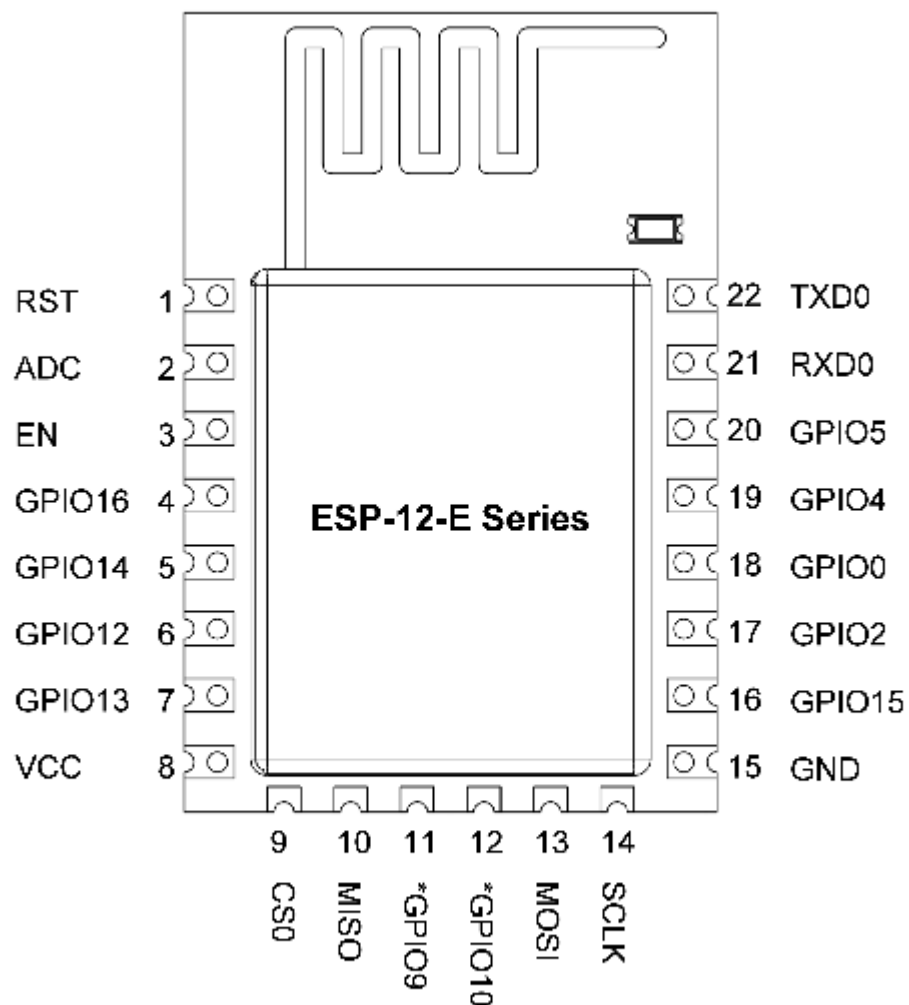
| Parameter | Symbol | Min | Max | Unit |
|------------------------|------------------|----------|----------|------|
| InputLow voltage | Vil | -0.3 | 0.25xVio | V |
| InputHighVoltage | Vih | 0.75xVio | 3.3 | V |
| InputLeakageCurrent | Iil | | 50 | nA |
| OutputLowVoltage | Vol | | 0.1 xVio | V |
| OutputHighVoltage | Voh | 0.8xVio | | V |
| InputPinCapacitance | Cpad | | 5 | pF |
| VDDIO | Vio | 1.8 | 3.3 | V |
| MaximumDriveCapability | I _{max} | | 12 | mA |
| Temperature | Tamb | -40 | 125 | °C |

Receiver Sensitivity

| Description | MIN | Typical | MAX | Unit |
|-----------------------------------|------|---------|------|------|
| Input frequency | 2412 | | 2484 | MHz |
| Input impedance | | 50 | | Ω |
| Input reflection | | | -10 | dB |
| Output power of PA for 72.2Mbps | 14 | 15 | 16 | dBm |
| Output power of PA for 11b mode | 17.5 | 18.5 | 19.5 | dBm |
| Sensitivity | | | | |
| CCK 1Mbps | | -98 | | dBm |
| CCK 11Mbps | | -91 | | dBm |
| 6Mbps(1/2BPSK) | | -93 | | dBm |
| 54Mbps(3/4 64-QAM) | | -75 | | dBm |
| HT20 · MCS7 (65Mbps · 72.2Mbps) | | -71 | | dBm |
| Adjacent Channel Rejection | | | | |
| OFDM · 6Mbps | | 37 | | dB |
| OFDM · 54Mbps | | 21 | | dB |
| HT20 · MCS0 | | 37 | | dB |
| HT20 · MCS7 | | 20 | | dB |

Current Consumption

| Mode | MIN | Typical | MAX | Unit |
|---|-----|---------|-----|------|
| Send 802.11b · CCK 1Mbps · Pout=+19.5dBm | | 215 | | mA |
| Send 802.11b · CCK 11Mbps · Pout=+18.5dBm | | 197 | | mA |
| Send 802.11g · OFDM54 Mbps · Pout=+16dBm | | 145 | | mA |
| Send 802.11n · MCS7 · Pout=+14dBm | | 135 | | mA |
| Receive 802.11b · Length 1024 Byte · -80dBm | | 100 | | mA |
| Receive 802.11g · Length 1024 Byte · -70dBm | | 100 | | mA |
| Receive 802.11n · Length 1024 Byte · -65dBm | | 102 | | mA |
| Standby | | 70 | | mA |
| Power Down | | 0.5 | | μA |



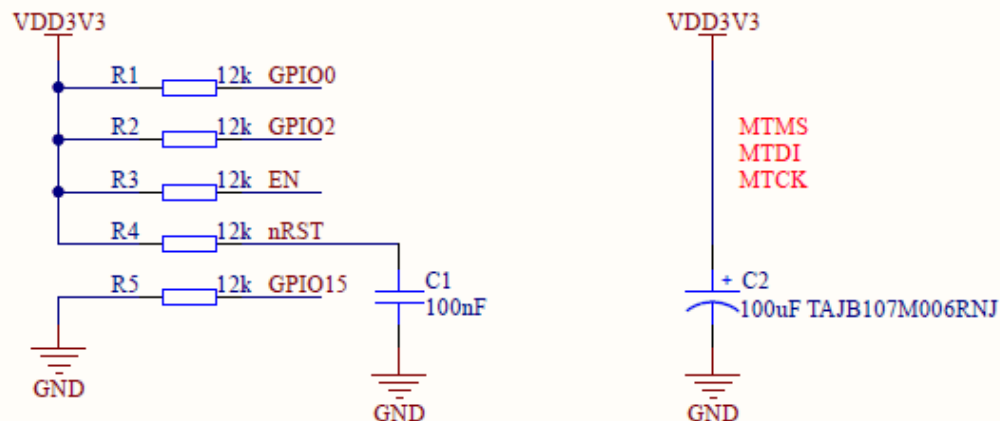
* Can only be used on ESP12-D.

| PIN | Function | Description |
|-----|----------|---|
| 1 | RST | 1) Reset Pin. Active low ; 2) NC Or External MCU control ; |
| 2 | ADC/TOUT | 1) 10-bit ADC Analog Input 0-1V ; |
| 3 | EN | 1) Module Enable. Active HIGH |
| 4 | GPIO16 | 1) GPIO (WEAK UP) |
| 5 | GPIO14 | 1) GPIO |
| 6 | GPIO12 | 1) GPIO |
| 7 | GPIO13 | 1) GPIO 2) UART2 RXD |
| 8 | VDD | 1) Power supply . 3.3V IN ; |
| 9 | CS0 | 1) Chip selection of SPI interface. |
| 10 | MISO | 1) MISO of SPI interface. |
| 11 | GPIO9 | 1) GPIO (Only available on ESP-12-D) |
| 12 | GPIO10- | 1) GPIO (Only available on ESP-12-D) |
| 13 | MOSI | 1) MOSI of SPI interface. |
| 14 | SCLK | 1) Clock of SPI interface. |
| 15 | CND | 1) Power Ground |
| 16 | GPIO15 | 1) GPIO 2) UART2 TXD |
| 17 | GPIO2 | 1) GPIO 2) WIFI status. Connection inside the module LED |
| 18 | GPIO0 | 1) GPIO |
| 19 | GPIO4 | 1) GPIO |
| 20 | GPIO5 | 1) GPIO |
| 21 | RXD0 | 1) UART0 RXD |
| 22 | TXD0 | 1) UART0 TXD |

BOOT Mode

| GPIO15 | GPIO0 | GPIO2 | |
|--------|-------|-------|---------------|
| 1 | X | X | SDIO/SPI WIFI |
| 0 | 0 | 1 | UART Download |
| 0 | 1 | 1 | Flash BOOT |

Reference Schematic



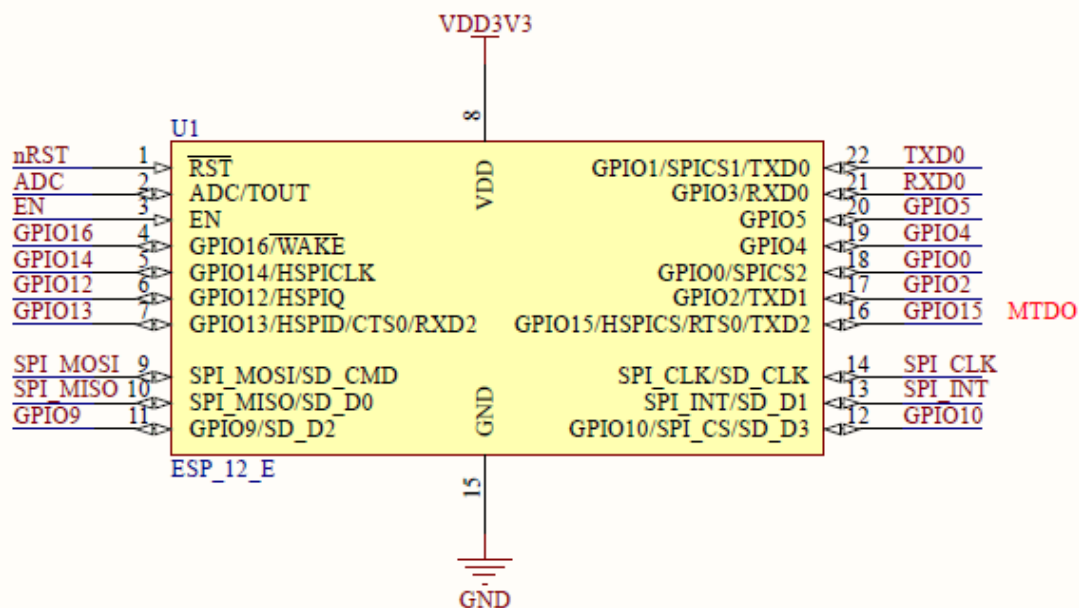
MATTERS NEEDING ATTENTION

On every boot/reset/wakeup,

GPIO15 MUST keep LOW, GPIO2 MUST keep HIGH.

GPIO0 HIGH → RUN MODE, LOW → FLASH MODE.

When you need to use the sleep mode, GPIO16 and RST should be connected, and GPIO16 will output LOW to reset the system at the time of wakeup.



Reflow Profile

Refer to IPC/JEDEC standard; Peak Temperature : <250°C; Number of Times: 2 times;

