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

目录

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

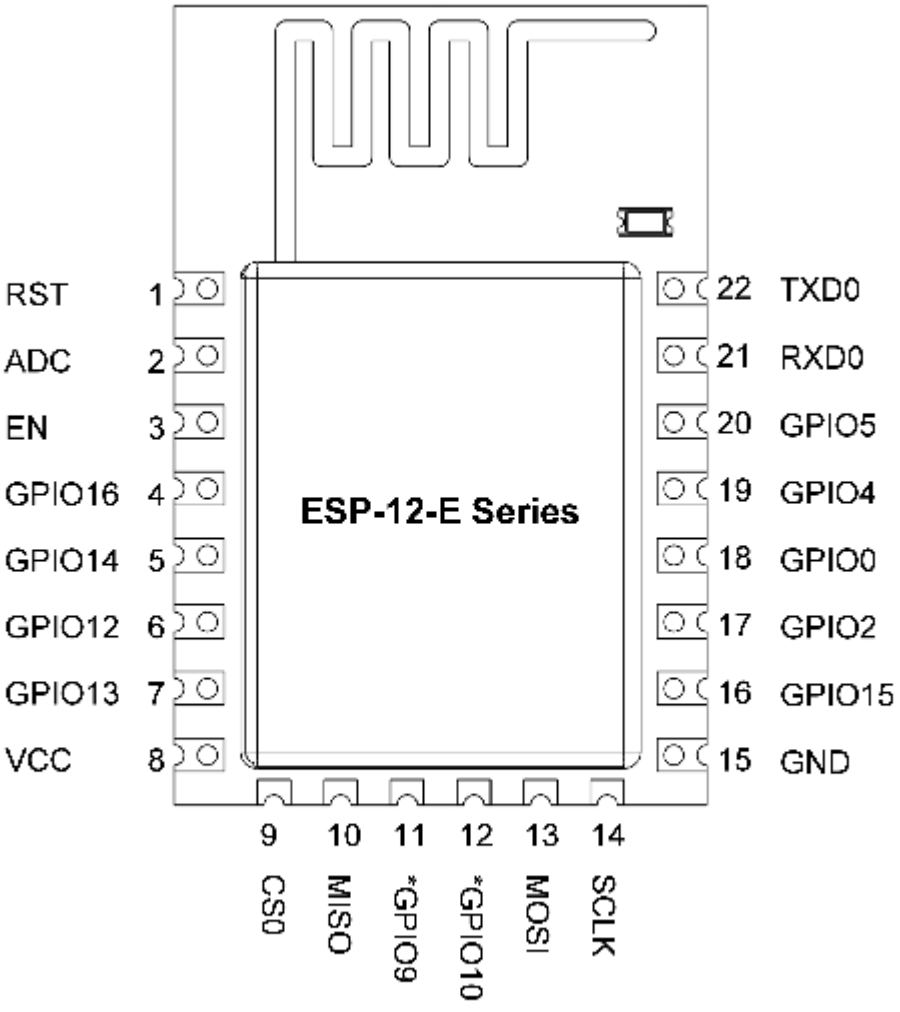
Parameter	Symbol	Min	Max	Unit
InputLow voltage	Vil	-0.3	0.25xViO	V
InputHighVoltage	Vih	0.75xVio	3.3	V
InputLeakageCurrent	Iil		50	nA
OutputLowVoltage	Vol		0.1 xVio	V
OutputHighVoltage	Voh	0.8xVio		V
InputPinCapacitance	Cpad		5	pF
VDDIO	Vio	1.8	3.3	V
MaximumDriveCapability	Imax		12	mA
Temperature	Tamb	-40	125	℃

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



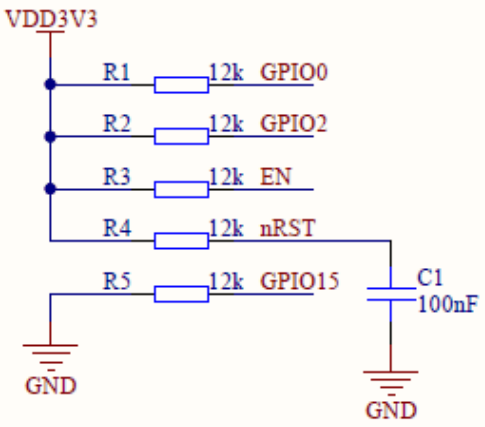
* Can only be used on ESP12-D.

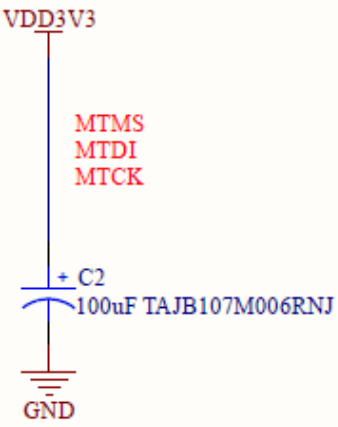
PIN	Function	Description
1	RST	1) Reset Pin. Active low ; 2) NC Or External MCU control ;
2	ADC/TOUT	1) 10-bit ADC Analog Input 0-1V ;
3	EN	1) Module Enable. Active HIGH
4	GPIO16	1) GPIO (WEAK UP)
5	GPIO14	1) GPIO
6	GPIO12	1) GPIO
7	GPIO13	1) GPIO 2) UART2 RXD
8	VDD	1) Power supply . 3.3V IN ;
9	CS0	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

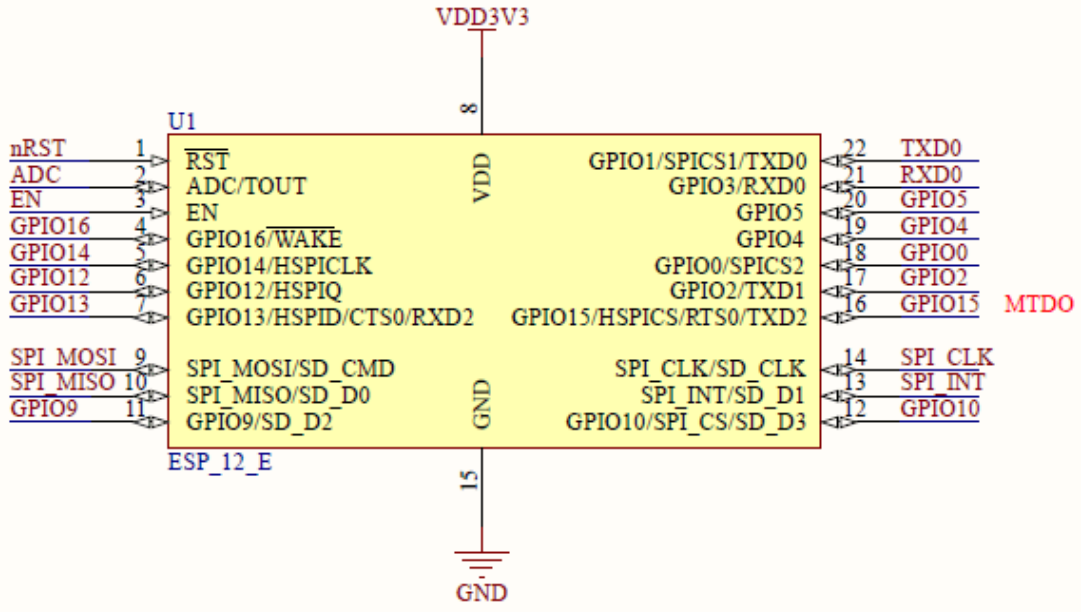
GPIO15	GPIO0	GPIO2	
1	X	X	SDIO/SPI WIFI
0	0	1	UART Download
0	1	1	Flash BOOT

Reference Schematic



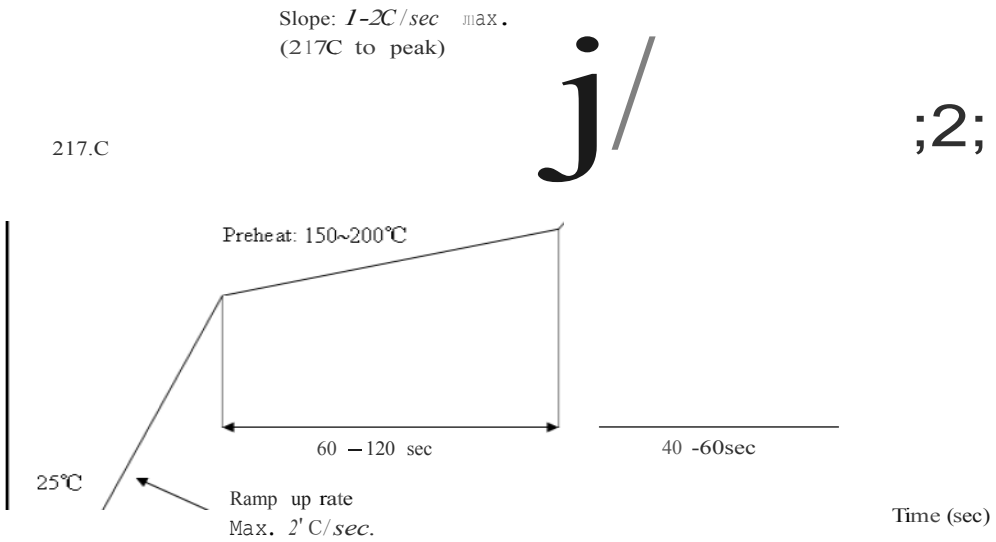


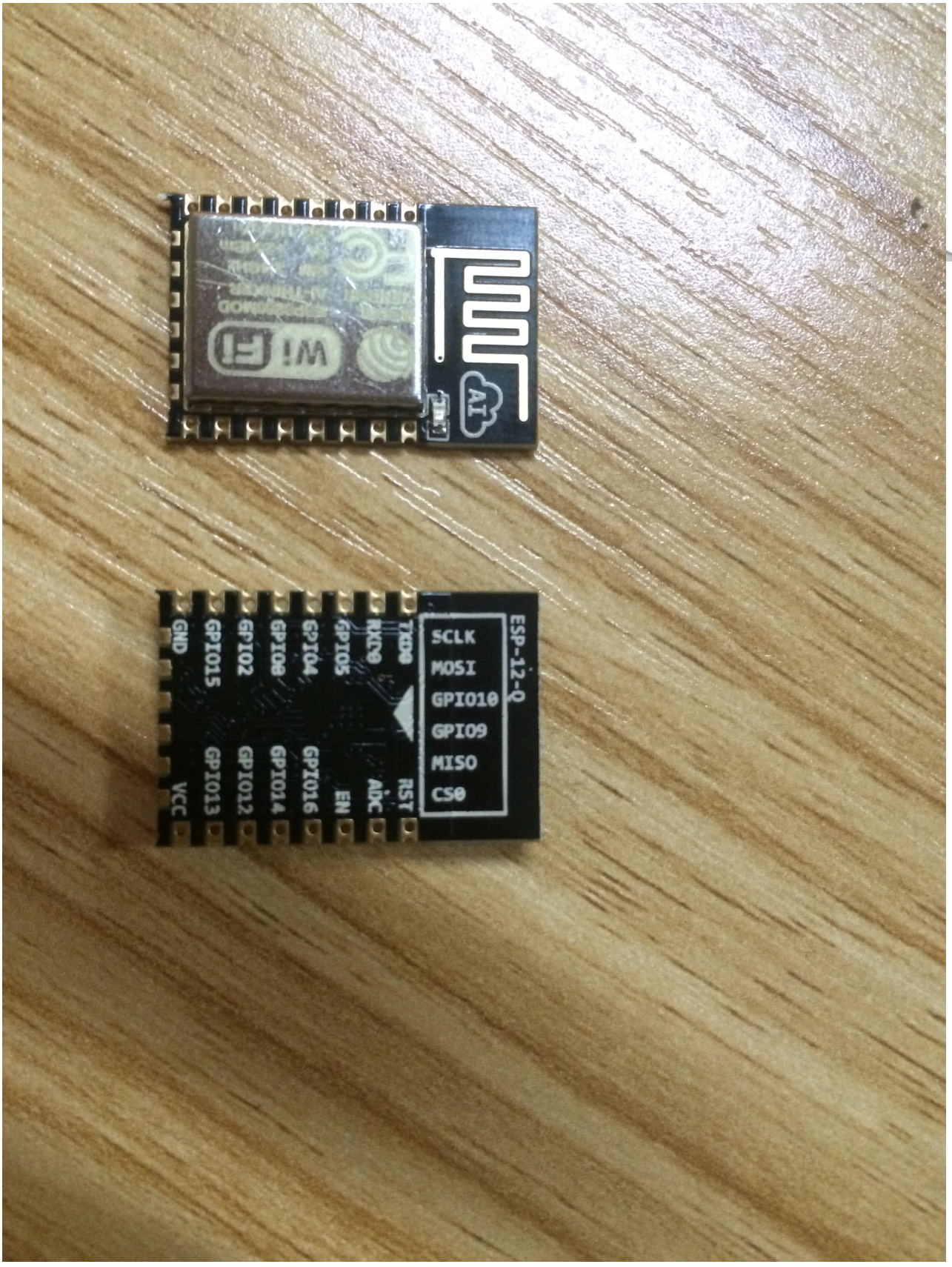
MATTERS NEEDING ATTENTION
On every boot/reset/wakeup,
GPIO15 MUST keep LOW, GPIO2 MUST keep HIGH.
GPIO0 HIGH ->RUN MODE, LOW -> FLASH MODE.
When you need to use the sleep mode,GPIO16 and RST should be connected,
and GPIO16 will output LOW to reset the system at the time of wakeup.

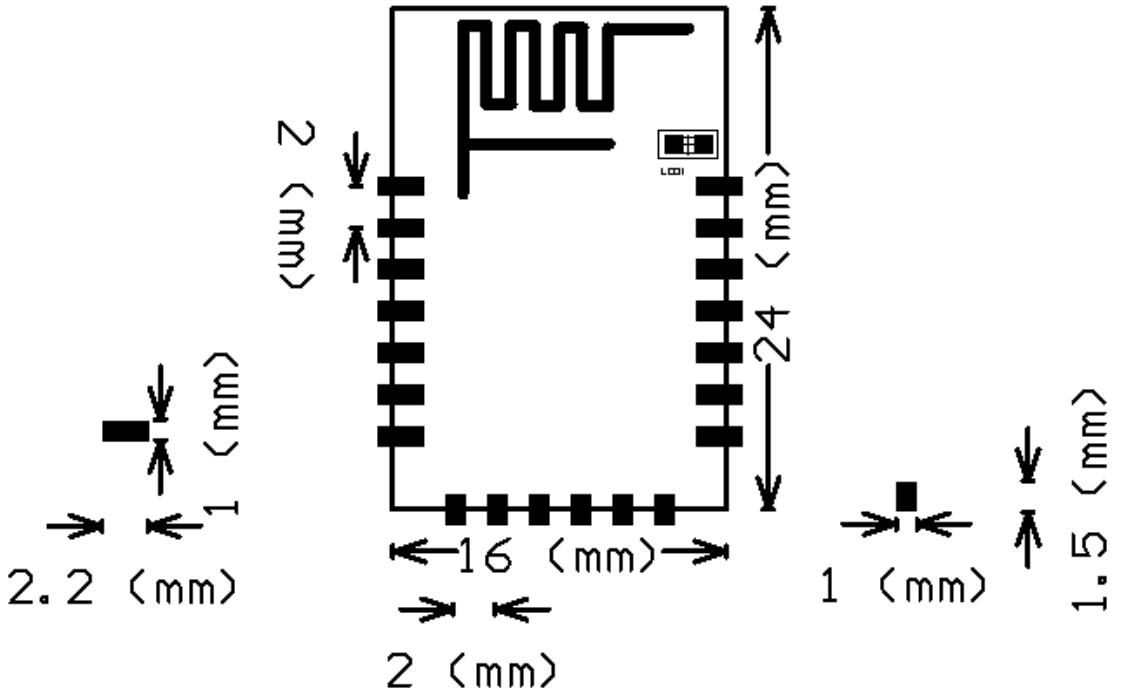


Reßow Profile

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




Wi Fi
AI
ESP-12-Q
SCLK
MOSI
GPIO10
GPIO9
MISO
CS0
RST
ADC
EN
GPIO16
GPIO14
GPIO12
GPIO13
VCC
GPIO15
GPIO2
GPIO0
GPIO4
GPIO5
RXD0
TXD0
GND


2 (mm)
24 (mm)
1 (mm)
2.2 (mm)
16 (mm)
2 (mm)
1 (mm)
1.5 (mm)