



# NodeMCU-8266 Specification

Version V1.2

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### Document Revision History

| Version | Date       | Description of Changes | Authored by  | Approved by |
|---------|------------|------------------------|--------------|-------------|
| V1.0    | 2016-10-04 | First edition          | Yang Xiaofei |             |
| V1.1    | 2019-03-04 | Update data            | Xie Yiji     |             |
| V1.2    | 2020-04-23 | Update data            | Xie Yiji     |             |

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## 1 Product Overview

NodeMCU-8266 development board is a core development board designed by Ai-Thinker for the ESP8266 module. This board exposes all I/O pins to dual-row pin headers on both sides, allowing developers to connect peripherals according to their requirements. When using a breadboard for development and debugging, the standard pin headers on both sides make operations simpler and more convenient.

It comes with comprehensive resources, including AT commands and SDK secondary development. The UART interface supports firmware flashing, making the process simple and fast! Additionally, the USB interface can also be used with the official programming tools to achieve firmware flashing.

### Features

- Supports 802.11b/g/n
- Wi-Fi frequency range: 2400–2483.5 MHz
- Interface type: Standard micro USB + 2.54 mm pin headers
- Supported interfaces: UART/GPIO/ADC/PWM/I2C/I2S
- Built-in R/G/B tri-color LED
- Integrated Wi-Fi MAC/BB/RF/PA/LNA
- Maximum UART baud rate up to 4 Mbps
- Built-in LwIP protocol stack
- Supports STA/AP/STA+AP operating modes
- Supports one-click network configuration for Android/iOS via Smart Config (APP) / AirKiss (WeChat)
- Supports local upgrade via UART and remote firmware upgrade (FOTA)
- Universal AT commands for quick start
- Supports secondary development; integrated Windows and Linux development environments

## Main Parameters

**Table 1 Main Parameter Specifications**

|                              |                                                                                                                                         |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Model</b>                 | NodeMCU-8266                                                                                                                            |
| <b>Dimensions</b>            | 25.4 mm (W)*48.3 mm (H) ±0.2 mm                                                                                                         |
| <b>Package</b>               | DIP-30 (2.54 mm pitch standard pin header)                                                                                              |
| <b>Frequency Range</b>       | 2400–2483.5 MHz                                                                                                                         |
| <b>Supported Interfaces</b>  | UART/GPIO/ADC/PWM/I2C/I2S/SPI                                                                                                           |
| <b>Operating Temperature</b> | -40–85 °C                                                                                                                               |
| <b>Storage Conditions</b>    | -40–125 °C, < 90% RH                                                                                                                    |
| <b>Power Supply Range</b>    | Micro USB, supply voltage: 4.75–5.25 V (recommended 5.0 V),<br>supply voltage: 3.0–3.6 V (recommended 3.3V), supply current:<br>>500 mA |
| <b>UART Baud Rate</b>        | Supports 110–4608000 bps, default 115200 bps                                                                                            |
| <b>Security</b>              | WEP/WPA-PSK/WPA2-PSK                                                                                                                    |
| <b>SPI Flash</b>             | Default 32 Mbit                                                                                                                         |

## 2 Electrical Parameters

### Electrical Characteristics

Absolute maximum rating

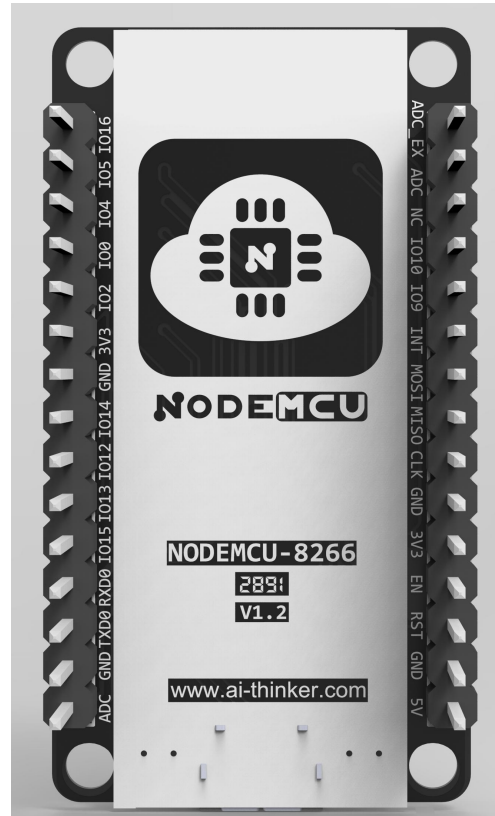
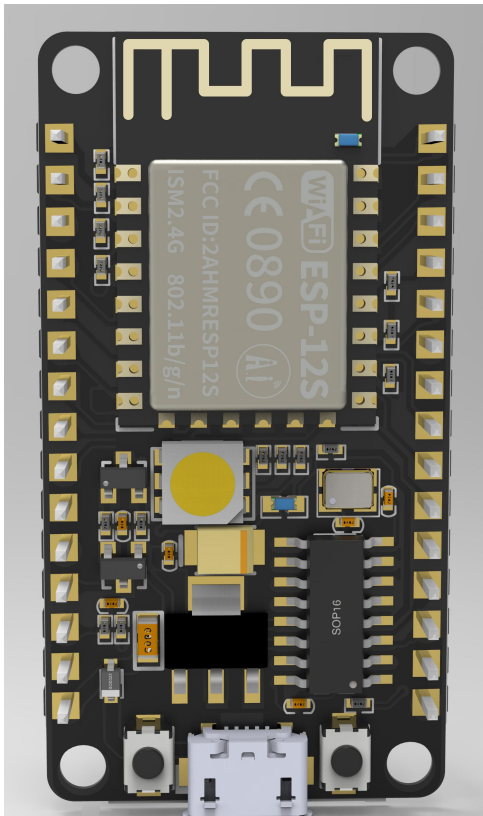
*Any exceeding of the following absolute maximum ratings may result in chip damage.*

| Parameter                | Min  | Typ | Max  | Unit |
|--------------------------|------|-----|------|------|
| Micro USB Supply Voltage | 4.75 | 5.0 | 5.25 | V    |
| Supply Voltage           | 2.6  | 3.3 | 3.6  | V    |
| Operating Temperature    | -40  | -   | +85  | °C   |
| Storage Temperature      | -40  | -   | +125 | °C   |

### RF Performance

| Description                 | Typ         | Unit |
|-----------------------------|-------------|------|
| Frequency Range             | 2400–2483.5 | MHz  |
| <b>Output Power</b>         |             |      |
| 11n mode, PA output power   | 13±2        | dBm  |
| 11g mode, PA output power   | 14±2        | dBm  |
| 11b mode, PA output power   | 16±2        | dBm  |
| <b>Receiver Sensitivity</b> |             |      |
| CCK, 1 Mbps                 | < =-90      | dBm  |
| CCK, 11 Mbps                | < =-85      | dBm  |
| 6 Mbps (1/2 BPSK)           | < =-88      | dBm  |
| 54 Mbps (3/4 64-QAM)        | < =-70      | dBm  |
| HT20 (MCS7)                 | < =-67      | dBm  |

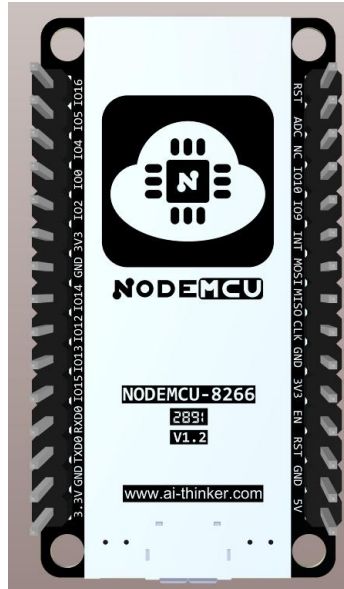
### 3 Appearance





## 4 Pin Definition

The NodeMCU-8266\_V1.2 development board exposes a total of 30 pins, as shown in the pin diagram. The pin function definition table provides the detailed interface specifications.



**NodeMCU-8266 Pin Diagram**

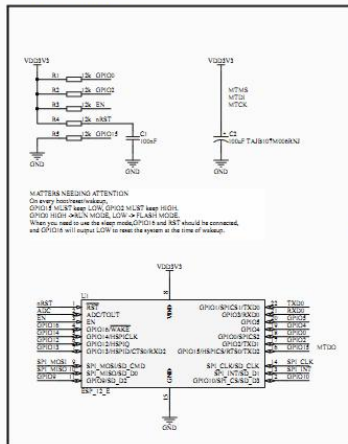
**Pin Function Definition Table**

| Pin No. | Name | Function Description                                                   |
|---------|------|------------------------------------------------------------------------|
| 1       | RST  | Reset pin                                                              |
| 2       | ADC  | A/D conversion result. Input voltage range: 0–1 V, value range: 0–1024 |
| 3       | NC   | Not connected                                                          |
| 4       | IO10 | GPIO10/SDIO DATA3                                                      |
| 5       | IO9  | GPIO9/SDIO DATA2                                                       |
| 6       | INT  | SPI_INT/SDIO DATA1                                                     |
| 7       | MOSI | GPIO13/HSPI_MOSI/SD_CMD                                                |
| 8       | MISO | GPIO12/HSPI_MISO                                                       |
| 9       | CLK  | GPIO14/HSPI_CLK                                                        |
| 10      | GND  | Ground                                                                 |

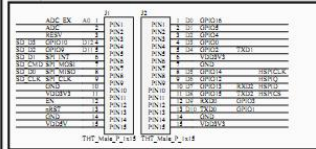
|    |      |                                                                                           |
|----|------|-------------------------------------------------------------------------------------------|
| 11 | 3V3  | Power supply                                                                              |
| 12 | EN   | Enable pin                                                                                |
| 13 | RST  | Reset pin                                                                                 |
| 14 | GND  | Ground                                                                                    |
| 15 | 5V   | Power supply                                                                              |
| 16 | 3.3V | Power supply                                                                              |
| 17 | GND  | Ground                                                                                    |
| 18 | TXD0 | UART0_TXD/GPIO1                                                                           |
| 19 | RXD0 | UART0_RXD/GPIO3                                                                           |
| 20 | IO15 | GPIO15/MTDO/HSPICS/UART0_RTS                                                              |
| 21 | IO13 | GPIO13/HSPI_MOSI/UART0_CTS                                                                |
| 22 | IO12 | GPIO12/HSPI_MISO                                                                          |
| 23 | IO14 | GPIO14/HSPI_CLK                                                                           |
| 24 | GND  | Ground                                                                                    |
| 25 | 3V3  | Power supply                                                                              |
| 26 | IO2  | GPIO2/UART1_TXD                                                                           |
| 27 | IO0  | GPIO0; download mode: externally pulled low, run mode: floating or externally pulled high |
| 28 | IO4  | GPIO4                                                                                     |
| 29 | IO5  | GPIO5/IR_R                                                                                |
| 30 | IO16 | GPIO16; can be used to wake up from deep sleep when connected to the RST pin              |

## 5 Schematic Diagram

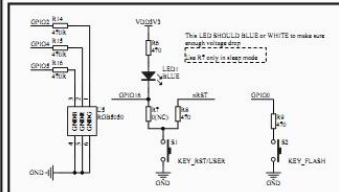
### ESP12 Package



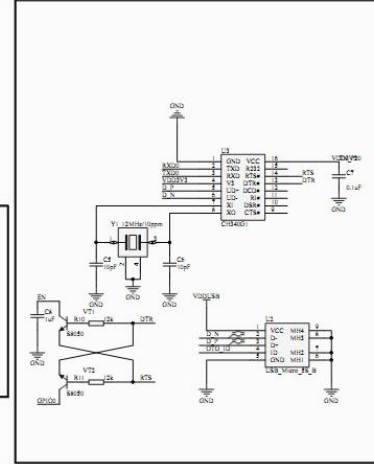
### Frame Package



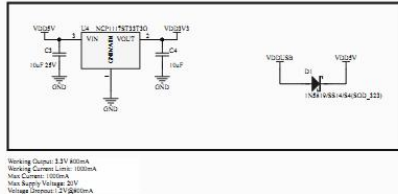
### KEY/LED



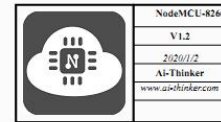
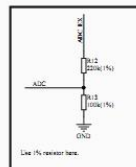
### USB TO UART



### POWER



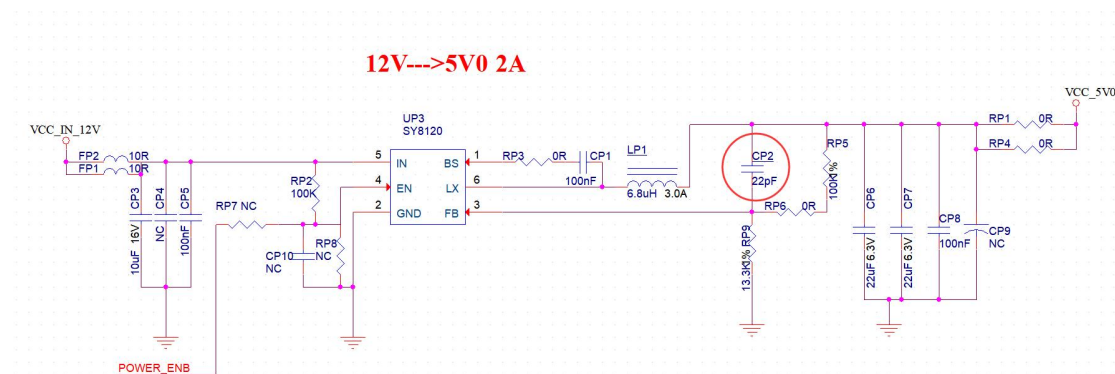
### ADC



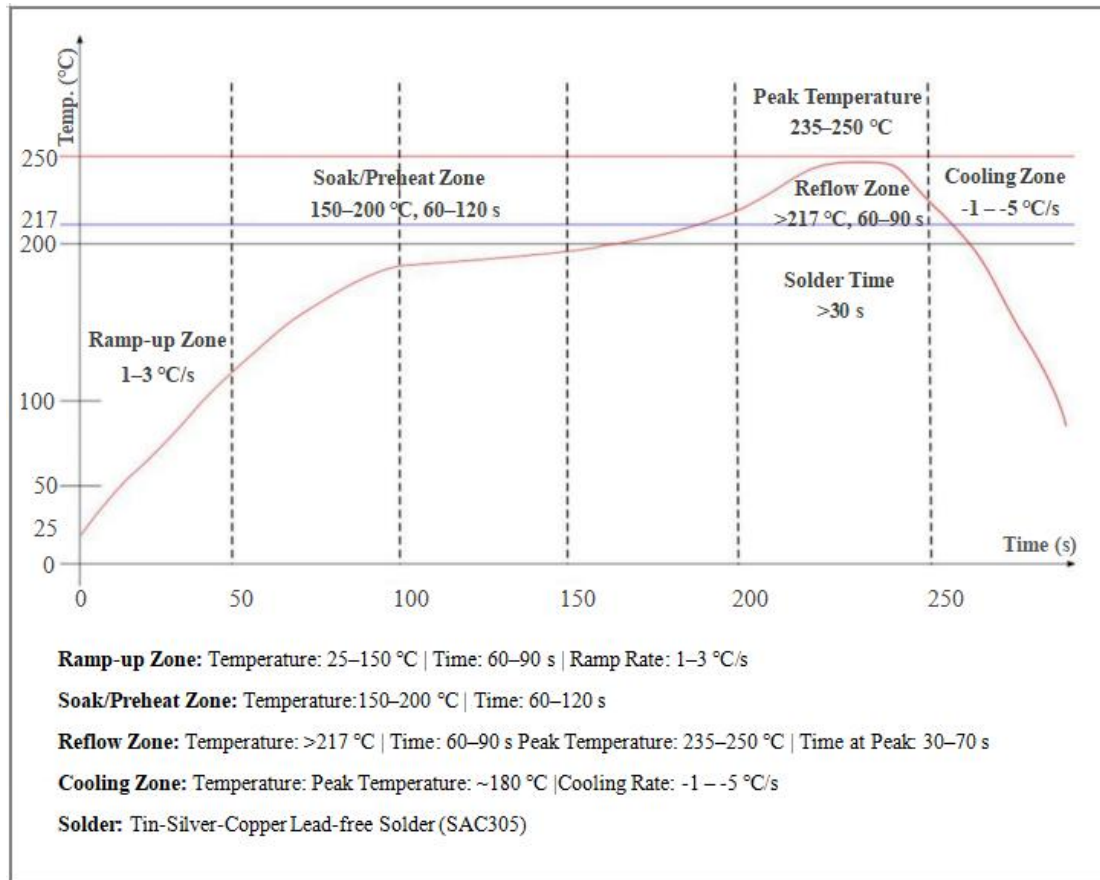
## 6 Design Guide

### 1. Power Supply

- (1) Recommended 3.3 V voltage, with peak current above 500 mA.
- (2) LDO power supply is recommended; if using DC-DC, it is advised to control ripple within 30 mV.
- (3) For the DC-DC power supply circuit, it is recommended to reserve space for a dynamic response capacitor, which can optimize output ripple under significant load variations.
- (4) It is recommended to add ESD protection devices to the 5V power interface.



## 7 Reflow Soldering Profile



## 8 Packaging Information

The NodeMCU-8266\_V1.2 development board is packaged in an anti-static bag with inserted EPE.

## 9 Contact Information

**Official Website:** <https://www.ai-thinker.com>

**Develop DOCS:** <https://docs.ai-thinker.com>

**Official Forum:** <http://bbs.ai-thinker.com>

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