MXCHIP®

Datasheet

EMW3080 Wi-Fi Module

Built-in ARM Cortex-M4F Wi-Fi MCU
2.4G Hz IEEE 802.11 b/g/n, ultra-high integration, rich peripherals

version：2.2　　data：2020-04-16　　Number：DS0122CN

Abstract

- **Input Voltage：3.0V~3.6V**
- **Operating Temperature：** -20℃ to +85℃
- **Processor：ARM Cortex-M4 Processor Core MX1290**
  - MX1290，up to 125MHz
  - MX1290V2，up to 62.5MHz
  - 40MHz clock input
  - SWD/JTAG simulation debugger interface
- **Memory**
  - 256K bytes SRAM
  - 512K bytes ROM
  - 512 bytes OTP memory area
  - 2M bytes XIP flash
- **Wi-Fi**
  - IEEE 802.11 b/g/n 1T1R 2.4GHz Single Frequency
  - Built-in power amplifier (PA) with self-calibration
  - Support 802.11e QoS enhancement (WMM)
  - Support WPA/WPA2 PSK，Open/WEP/ TKIP/CCMP
  - Support WPA/WPA2 Enterprise
  - Support WPS，Wi-Fi Direct
  - Support IEEE Power Save mode
- **Rich Peripherals**
  - 13 x GPIO
  - 1 x SPI
  - 2 x I2C，support 400K　high speed mode
  - 6 x PWM，up to 2MHz frequency
  - 2 x UART，support hardware flow control
  - 1 ADC channel
  - Low-energy RTC

- **Interface and Dimension**
  - Maintain pin compatibility with similar package modules
  - RF Interface: PCB antenna, or IPEX connector antenna
  - 18mm x 33mm, stamp hole or pin
- **Application Functions**
  - Support AliOS and MXOS operating system
  - Provide major cloud platforms access SDK
  - Mass production firmware for typical applications
- **Typical applications:**
  - smart home appliances
  - smart electric equipment
  - Industrial automation
- **Ordering Code**

Ordering Code	Notes
EMW3080-P	PCB antenna，MX1290 processor
EMW3080-E	IPEX antenna，　MX1290 processor
EMW3080V2-P	PCB antenna，MX1290V2 processor
EMW3080V2-E	IPEX antenna，　MX1290V2 processor

Order Code

For example, **EMW 3 08 0 V2 -P -xxx**

Product Series

EMW=IoT Wi-Fi Module

Product Type

3=Welding type wireless module

Typical target applications and features

08=IOT Application 8 Series

Dimensions, enhancements

18mm x 33mm, 2 x 6pin 2.0 Spacing double row stamp hole + 9 pin 2.0 Spacing stamp hole or pin 2.0 Spacing stamp hole or pin

Processor version

[omit]= MX1290

V2=MX1290V2

RF Interface

P=2.4GHz On-Board PCB Antenna

E=2.4GHz External Antenna IPEX Connector

Option

TR = tape and reel（default package is tray）

For a list of all relevant features (such as packaging, minimum order quantity, etc.) and other information, please contact the nearest MXCHIP sales point and agent.

Accessories

Order Code	Description
MXKIT-Base	Development board for all EMW3080 modules
MXKIT-Core-3080	The development board core board for the EMW3080, used with MXKIT-Base
FX-3080	EMW3080 production fixture with accompanying test board：MXKIT-Base, MXKIT-Core-3080

Version Update Instructions

Date	Version	Update Contents
2018-05-17	1.0	release
2018-07-10	1.1	Clear the internal hardware pull-up and pull-down resistance values, and correct the storage temperature. Correct production related parameters Update power consumption parameters
2018-08-23	1.2	Added description of IO port level status when the module starts
2018-09-11	1.3	Revise the schematic diagram error, delete the description of VBATMES
2019-01-13	1.4	Add module reference design circuit, increase antenna parameters
2019-04-12	1.5	Update antenna parameters
2020-03-06	2.0	Rewrite according to the new MXCHIP standard
2020-03-24	2.1	Modify the default function and working mode selection of the pin
2020-04-16	2.2	Update packaging information

Copyright Notice

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1. Introduction

The EMW308x/EMW309x series modules are mainly used for IoT data communication. Data collection and control are realized through a rich peripheral interface, and data can be transmitted to the Internet of Things cloud service platform through a Wi-Fi network connection to realize the Internet of Everything. This series of modules is used in a wide range of IoT applications through a variety of different form factors, interface types, antenna interfaces and temperature range.

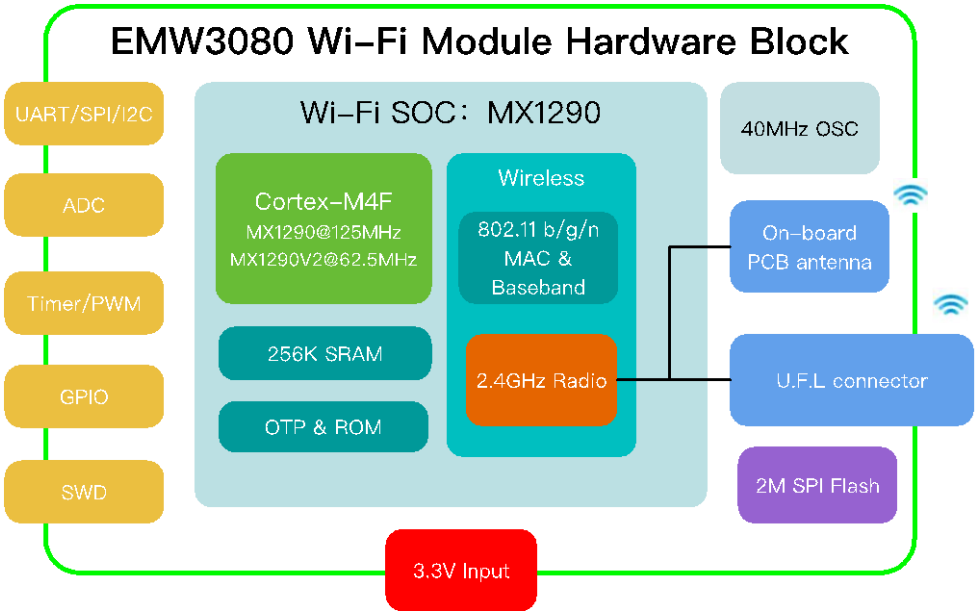
The module includes a super-integrated Wi-Fi microcontroller MX1290 that integrates a Cortex-M4F core up to 125MHz, 256K bytes of SRAM, 2M bytes of Flash memory, and IEEE 802.11 b/g/ n Standard 2.4 GHz RF. Streamlined peripheral circuitry makes the overall module size and interface design more flexible and easier to control costs. The high-performance processing core and security module greatly improve the speed of networking interaction and reduce the overall power consumption while ensuring data security.

Shanghai MXCHIP provides MXOS and AliOS software platforms to support the development of EMW3080 series modules, providing an efficient development environment, access protocol stacks for various IoT cloud services, rich sample programs and various typical applications.

The following figure shows the hardware block diagram of the EMW3080 module, which mainly includes:

- Wi-Fi processor MX1290/MX1290V2
- Equipped with 2M bytes of SPI interface Flash memory
- On-board or external antenna
- Power and communication interface

Figure 1 EMW3080 Hardware Block Diagram



MX1290 Wi-Fi microcontrollers are provided in two versions, MX1290 and MX1290V2. In MX1290V2, in order to provide a more cost-effective choice for this series of modules, the software restricts hardware

functions and cannot be lifted through software upgrades. The main differences are as follows:

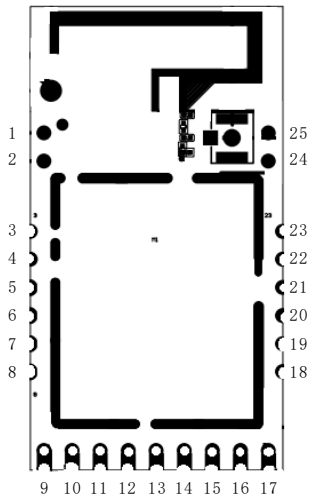
Table 1 MX1290 and MX1290V2 difference Table

Model	Main Frequency	Wi-Fi	Security
MX1290	125MHz	Support HT20 and HT40，transmitting rate up to 150Mbps	Support Flash encryption，Trust Zone Lite
MX1290V2	62.5MHz	Support HT20，transmitting rate up to 72.2Mbps	-

2. Pin Definition

2.1. Pin Arrangement

Figure 2 Pin Arrangement



2.2. Pin Definition

Table 2 Pin definition

Pin Number	Name	Main Function (After Reset)	PWM	UART	I2C	SPI	Others
1, 3	PA_14	SWCLK	PWM_0				
2, 4	PA_15	SWDIO	PWM_1				
5, 6	NC						
7	PA_22	PA_22	PWM_5	UART0_RTS	I2C0_SCL	SPI1_MISO	WAKEUP_2
8	PA_19	PA_19	TIM5_TRIG	UART0_CTS	I2C0_SDA	SPI1_CS	ADC1
9	PA_23	PA_23	PWM_0	UART0_TX	I2C1_SDA	SPI1_MOSI	WAKEUP_3
10	PA_18	PA_18	TIM4_TRIG	UART0_RX	I2C1_SCL	SPI1_CLK	WAKEUP_0
11	CHIP_EN(3) (5)						
12	PA_0(5)	PA_0	PWM_2				
13	PA_12	PA_12	PWM_3				
14	PA_5	PA_5	PWM_4				WAKEUP_1
15	NC						
16	VDD						
17	VSS						
18	NC						
19	PA_11(1)	PA_11					
20	NC						
21, 24	PA_30(1) (2) (5)	UART2_Log_TX	PWM_3	UART2_Log_TX	I2C0_SDA		PA_30
22, 25	PA_29(2) (5)	UART2_Log_RX	PWM_4	UART2_Log_RX	I2C0_SCL		PA_29
23	PA_8(1)	PA_8					

Notes:

1. Module working mode selection signal. During the startup phase, the module detects the level of these pins and enters a specific working state. The correspondence between level and working mode is shown in Table 3:

Table 3 operation mode

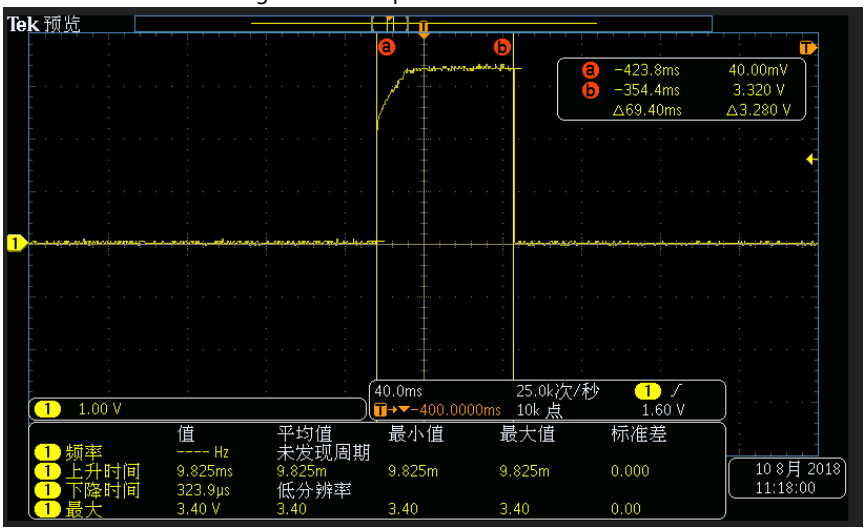
Operation mode	PA_30 (UART2_Log_TX) Default: 1	PA_11 (BOOT) Default: 1	PA_8 (EASYLINK) Default: 1
ISP Program Mode	0	not detect	not detect
Bootloader	1	0	1
ATE	1	0	0
Normal	1	1 (Default)	not detect

(1). During the startup phase, if the processor hardware detects that the PA_30 level is low, it enters the ISP programming mode. In ISP programming mode, you can program the flash of the module through UART2 (PA_29, PA_30). In normal use, the level of the PA_30 pin must be high or floating at the time of power-up, please pay special attention when designing the circuit.

(2). After the startup is completed, when the processor runs the firmware provided by MXCHIP, the firmware detects the status of PA_11 and PA_8 to enter the corresponding working mode.

2. The UART2_Log serial port is used for the input / output of debugging information. Do not use it during design, and provide it in a convenient way to facilitate software development.
3. The CHIP_EN pin is an enable reset pin, which is active low and can be left floating if not used. Or pull up 3.3V.
4. Please keep unused pins floating. It should be noted that the IO port is in a floating state at startup. If you need to configure the state of the pin through software, you need to wait until the code in the bootloader starts to execute. The time from when the module is powered on to when the code in the bootloader is executed will be affected by the flash startup time. Therefore, if you need IO to be in a certain level state at startup, you need to use a 100k resistor on the pin to pull up and down. Figure 3 shows the level change of the IO port whose software is configured as a low level after being pulled up by an external 100K resistor in the floating state. It can be seen that the time from powering on the module to the IO port software controllable time is 69.4ms, during which the time for IO to be pulled to high level is about 20ms.

Figure 3 IO The power-on state interface



5. The module has 100K hardware pull-up resistors in PA_30 (UART2_Log_TX) and PA_29 (UART2_Log_RX). The PA_0 pin has a 100K hardware pull-down resistor, and CHIP_EN has an internal 100K pull-up resistor and 0.01μF capacitance to ground.

3. Electrical Parameter

3.1. Absolute Maximum Parameters

Operation of the module outside of its absolute maximum ratings may result in permanent damage. At the same time, long-term exposure to the maximum rated conditions will affect the reliability of the module.

Table 4 Absolute Maximum Parameter: Voltage

Symbol	Ratings	Min	Max	Unit
V_{DD}–V_{SS}	Voltage	–0.3	3.6	V
V_{IN}	Input voltage on any other pin	V_{SS}–0.3	V_{DD}+0.3	V

3.2. Operating Voltage and Current

Table 5 Operating parameters: rated voltage and current

Symbol	Note	Specification			
		Min.	Typical	Max.	Unit
V_{DD}	Voltage	3.0	3.3	3.6	V
V_{DD_IO}	Digital IO Supply Voltage	1.62	1.8 ~ 3.3	3.6	V
I_{VDD}	3.3V Rating Current (with 450 mA internal regulator and integrated CMOS PA)			450	mA
I_{DD_IO}	IO Rating Current (including V_{DD_IO})			50	mA
I_{VDD}	Deep Sleep Mode		7	7	uA
I_{VDD}	Deep Standby Mode		70	70	uA
I_{VDD}	Sleep Power Gate		120	120	uA
I_{VDD}	Sleep Clock Gate		350	350	uA

Table 6 Operation parameter: Typical RF power consumption

Symbol	Note		Specification			
	CPU	Wi-Fi	Min.	Typical	Max.	Unit
I_{VDD}	Deep Sleep Mode	Wi-Fi OFF		7	10	μA
I_{VDD}	Deep Standby Mode Pull up Flash CS pin	Wi-Fi OFF			150	μA
I_{VDD}	Sleep	Wi-Fi OFF		500	600	μA
I_{VDD}	Active	Wi-Fi OFF	14	14	26	mA
I_{VDD}	Sleep	Wi-Fi Associate, DTIM = 1		2.78		mA
I_{VDD}	Sleep	Wi-Fi Associate, DTIM = 3		1.49		mA
I_{VDD}	Active	Wi-Fi Associate, DTIM = 1		47		mA
I_{VDD}	Active	Wi-Fi Associate, DTIM = 3		46		mA
I_{VDD}	Sleep	Wi-Fi RX		90		mA
I_{VDD}	Active	Wi-Fi RX		120		mA
I_{VDD}	Active	TX@MCS7/HT40，13dBm		220		mA
I_{VDD}	Active	TX@MCS7/HT40，16.5dBm		230		mA

Symbol	Note		Specification			
	CPU	Wi-Fi	Min.	Typical	Max.	Unit
I_{VDD}	Active	TX@MCS7/HT20，13dBm		244		mA
I_{VDD}	Active	TX@MCS7/HT20，16.5dBm		257		mA
I_{VDD}	Active	TX@OFDM54M, 15dBm		255		mA
I_{VDD}	Active	TX@OFDM54M, 17.5dBm		267		mA
I_{VDD}	Active	TX@CCK11M, 17dBm		287		mA
I_{VDD}	Active	TX@CCK11M, 18dBm		295		mA
I_{VDD}	Active	RX@Idle, HT40		120		mA
I_{VDD}	Active	RX@MCS7, HT40 (Pin= -60dBm)		130		mA
I_{VDD}	Active	RX@MCS7, HT20 (Pin= -60dBm)		127		mA
I_{VDD}	Active	RX@OFDM54M (Pin= -60dBm)		127		mA
I_{VDD}	Active	RX@CCK11M (Pin= -60dBm)		115		mA
I_{VDD}	Active	RF Standby		84		mA
I_{VDD}	Active	RF disable		62		mA

(1). The above parameters are measured in the laboratory wireless shielding environment. Refer to Table 8 for actual application power consumption.

(2). In Deep Standby Mode, the CS signal of Flash should be pulled high, otherwise the MX1290 will generate leakage current on the Flash interface.

(3). Flash power consumption is not included in the data in Table 6. When reading code or reading and writing data from the Flash, the power consumption of the Flash is not higher than 20mA, and the power consumption of the Flash in standby mode (CS signal pulled high) is not higher than 50μA.

3.3. General I/O interface

Table 7 DC current: digital I/O

Symbol	Note	Conditions	Specification			
			Min.	Typical	Max.	Unit
V_{IH}	Input-High Voltage	LVTTL	2.0	-	-	V
V_{IL}	Input-Low Voltage	LVTTL	-	-	0.8	V
V_{OH}	Output-High Voltage	LVTTL	2.4	-	-	V
V_{OL}	Output-Low Voltage	LVTTL	-	-	0.4	V
I_{T+}	Schmitt-trigger High Level		1.78	1.87	1.97	V
I_{T-}	Schmitt-trigger Low Level		1.36	1.45	1.56	V
I_{IL}	Input-Leakage Current	V_{IN}=3.3V or 0	-10	±1	10	μA

3.4. Typical Application Power Consumption

The module current test environment is based on VDD=3.3V. Test under common office application environment (values measured under different test environments will be different).

Table 8 Typical application power consumption

Mode	EMW3080		EMW3080V2		Unit	Note
	Average	Max.	Average	Max.		
Wi-Fi off	28.3	28.3	21	21	mA	CPU idle
Wi-Fi off	3.5	3.5	3.5	3.5	mA	CPU idle, turn on low power consumption
Wi-Fi off	24.6	24.7	19	20	mA	CPU running at full load
Wi-Fi initial	114.	121	110	126	mA	Power on state, turn off low power consumption
Keep Wi-Fi connected	114	147	109	124	mA	Turn off Wi-Fi and MCU low power consumption
Keep Wi-Fi connected	14	290	9.06	282	mA	Turn on Wi-Fi and MCU low power consumption
SoftAP mode	118	306	116	306	mA	SoftAP networking status
Monitor mode	114	122	114	126	mA	Distribution process, in RX state
Deepsleep mode	10	12	10	12	μA	MCU / RAM / peripheral / RTC is off, can be woken up by wake-up pin or internal Timer
Iperf performance mode	160	336	115	345	mA	Turn off Wi-Fi and MCU low power consumption
Iperf performance mode	164	332	115	353	mA	Turn on Wi-Fi and MCU low power consumption

3.5. Temperature

Table 9 Temperature and humidity parameters

Symbol	Ratings	Max	Unit
T_{STG}	Storage temperature	–55 to +125	℃
T_{work}	Ambient Operating Temperature	-20 to +85	℃
T_{Jun}	Junction Temperature	0 to +125	℃

3.6. ESD

Table 10 Electrostatic discharge parameters

Symbol	Name	Name	Level	Max.	Unit
V_{ESD}(HBM)	Electrostatic discharge voltage (Human body model)	TA= +25 °C comply with JESD22-A114	2	2000	V

V_{ESD}(CDM)	Electrostatic discharge voltage (Discharge equipment model)	TA = +25 °C comply with JESD22-C101	II	500	

3.7. RF Parameter

Table 11 RF Parameter

Item	Specification
Operating Frequency	2.412~2.484GHz
Channel BW	20MHz，40MHz(MX1290 only)
Antenna Interface	1T1R, Single stream
Wi-Fi Standard	IEEE 802.11b/g/n
Modulation Type	11b: DBPSK, DQPSK, CCK for DSSS 11g: BPSK, QPSK, 16QAM, 64QAM for OFDM 11n: MCS0~7, OFDM
Data Rates	802.11b: 1, 2, 5.5 and 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48 and 54 Mbps 802.11n: MCS0~7, up to 72.2Mbps 802.11n: MCS0~7, up to 150Mbps (MX1290 only)
Antenna type	One U.F.L connector for external antenna PCB printed ANT (Reserve)

Note: The typical values of the following Tx test data are recorded under normal temperature environment and Tx lasts about 20s.

IEEE 802.11b mode

Table 12 RF TX Parameters in IEEE802.11b mode

TX Characteristics	Min.	Typical	Max.	Unit
Transmitter Output Power				
11b Target Power	14	16	18	dBm
Spectrum Mask				
fc +/-11MHz to +/-22MHz			-30	dBr
fc > +/-22MHz			-50	dBr
Frequency Error	-10	-2	+10	ppm
Constellation Error (peak EVM)				
1~11Mbps		-15.5	35% (or -11dB)	

Table 13 RF RX parameters in IEEE802.11b mode

RX Characteristics	Min.	Typical	Max.	Unit

Minimum Input Level Sensitivity				
1Mbps (FER≦8%)		-98	-83	dBm
11Mbps (FER≦8%)		-89	-76	dBm

IEEE802.11g

Table 14 RF TX Parameters in IEEE802.11g mode

TX Characteristics	Min.	Typical	Max.	Unit
Transmitter Output Power				
11gTarget Power	12.5	14.5	16.5	dBm
Spectrum Mask				
fc +/- 11MHz			-20	dBr
fc +/- 20MHz			-28	dBr
fc > +/-30MHz			-40	dBr
Frequency Error	-10	-2	+10	ppm
Constellation Error (peak EVM)				
6Mbps	-	-30	-5	dBm
54Mbps	-	-31	-25	dBm

Table 15 RF RX Parameters in IEEE802.11g mode

RX Characteristics	Min.	Typical	Max.	Unit
Minimum Input Level Sensitivity				
6Mbps (FER≦10%)		-92	-82	dBm
54Mbps (FER≦10%)		-75.5	-65	dBm

IEEE802.11n HT20

Table 16 RF TX Parameters in IEEE802.11n HT20 mode

TX Characteristics	Min.	Typical	Max.	Unit
Transmitter Output Power				
11n Target Power	11.5	13.5	15.5	dBm
Spectrum Mask				
fc +/- 11MHz			-20	dBr
fc +/- 20MHz			-28	dBr
fc > +/-30MHz			-45	dBr
Frequency Error	-10	-2	+10	ppm
Constellation Error (peak EVM)				
MCS0	-	-30	-5	dBm
MCS7	-	-32	-27	dBm

Table 17 RF RX Parameters in IEEE802.11n HT20 mode

RX Characteristics	Min.	Typical	Max.	Unit

Minimum Input Level Sensitivity				
MCS0 (FER≦10%)		-92	-82	dBm
MCS7 (FER≦10%)		-73	-64	dBm

IEEE802.11n HT40 mode (MX1290V2 not support)

Table 18 RF TX Parameters in IEEE802.11n HT40 mode

TX Characteristics	Min.	Typical	Max.	Unit
Transmitter Output Power				
11n Target Power	11.5	13.5	15.5	dBm
Spectrum Mask				
fc +/- 11MHz			-20	dBr
fc +/- 20MHz			-28	dBr
fc > +/-30MHz			-45	dBr
Frequency Error	-15	-2	+15	ppm
Constellation Error (peak EVM)				
MCS0	-	-30	-5	dBm
MCS7	-37	-32	-27	dBm

Table 19 RF RX Parameters in IEEE802.11n HT40 mode

RX Characteristics	Min.	Typical	Max.	Unit
Minimum Input Level Sensitivity				
MCS0 (FER≦10%)		-89	-79	dBm
MCS7 (FER≦10%)		-69	-61	dBm

4. Antenna Information

EMW3080 has two specifications: PCB antenna and external antenna, please refer to the order code for order. IPX antenna connectors are not soldered on the modules using PCB antennas. By connecting an external antenna through an IPX connector, you can get better RF performance.

4.1. PCB antenna parameters and use

4.1.1. On-board PCB parameter

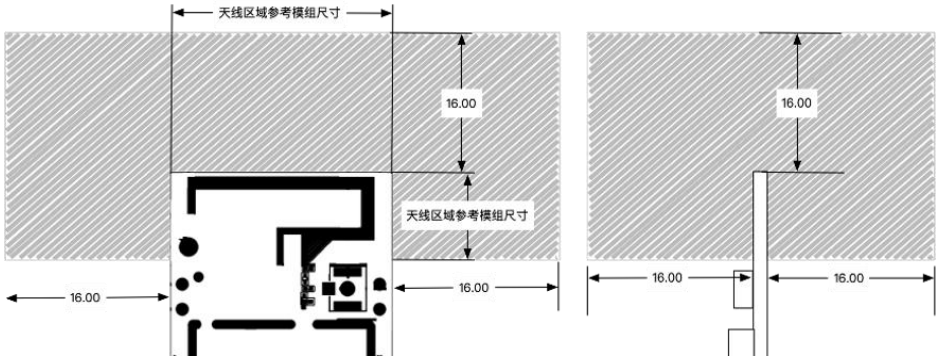
Table 20 On-board PCB parameter

Item	Min.	Typical	Max.	Unit
Frequency	2400		2500	MHz
Impedance		50		Ω
VSWR			2	
Gain	≤2dBi			
Efficiency	>70% or >-1.54dB			

4.2. PCB Antenna Clearance

When using PCB antenna in WIFI module, it is necessary to ensure that PCB and other metal devices are at least 16 mm away from the motherboard. The shaded areas in the figure below need to be far away from metal devices, sensors, interference sources and other materials that may cause signal interference.

Figure 4 Antenna minimum clearance area (unit: mm)



4.3. External antenna parameters and use

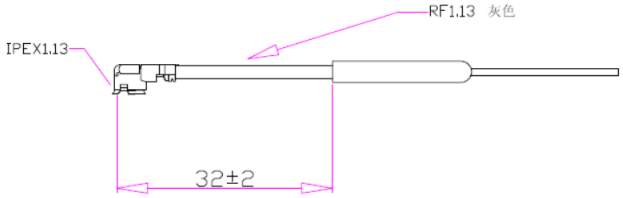
Users can choose different 2.4G antennas with different external dimensions and gains not greater than 2dBi according to the application environment.

When using an external antenna, it should be noted that the module must be powered on after the antenna is connected, because the module will perform IQ calibration after power on, and send a single carrier through the PA to pass the RX loop detection signal. If the load is not loaded (the antenna is not connected), it will cause calibration errors, which will make the PA output power

abnormal, and a large standing wave will be formed at the PA output, which may damage the internal devices.

The following is a copper tube antenna with an IPEX connector commonly used by MXCHIP:

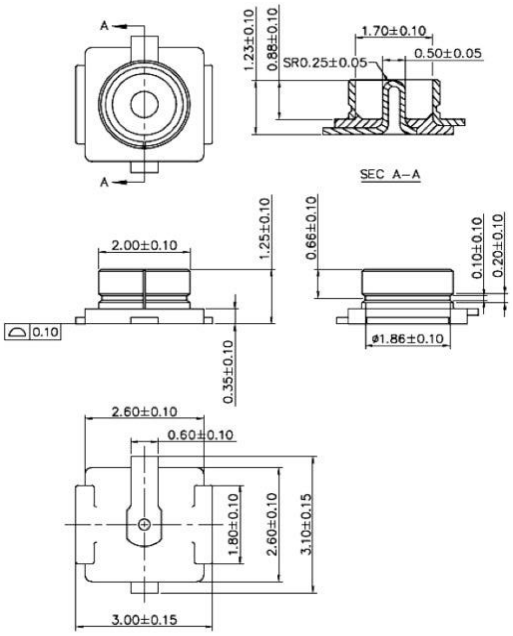
Figure 5 Copper tube antenna size



- Frequency range: 2400-2500 Hz
- Input impedance: 50 OHM
- VSWR: < 2.0
- Gain：2.0DBI
- Polarization: vertical
- Directivity: Omnidirectional
- Copper tube: 4.4 * 23mm
- Wire: 1.13 gray wire L-82mm

External antenna IPEX seat size:

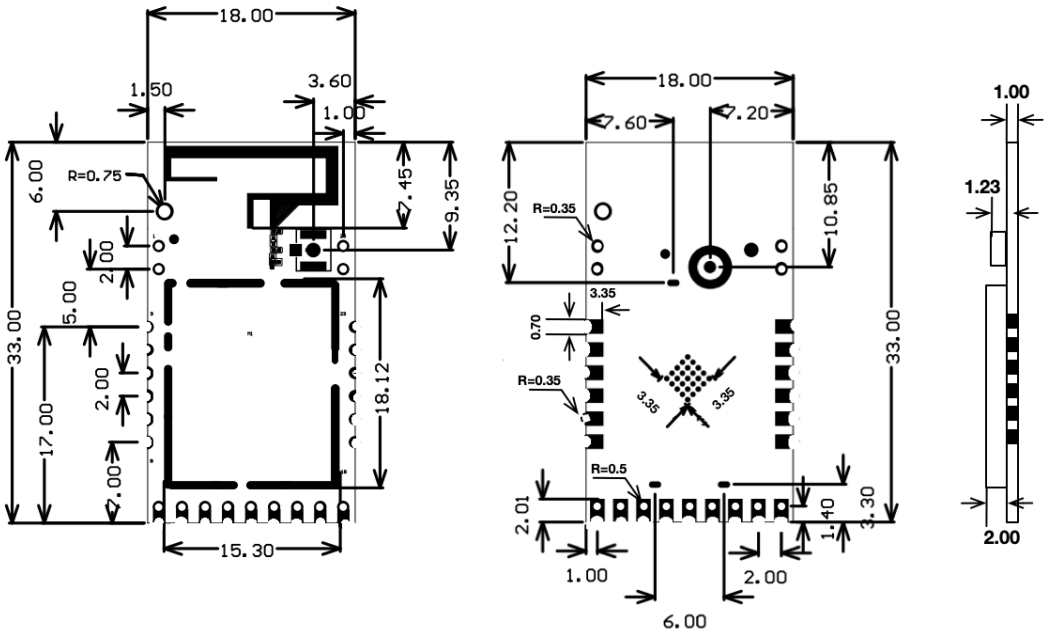
Figure 6 Dimension drawing of external antenna connector



5. Dimensions and Production Guidance

5.1. Assembly Dimension Diagram

Figure 7 Assembly Dimension Diagram（unit: mm, tolerance: ±0.1, outside tolerance±0.2）



5.2. Recommended Package Drawing

The solder resist window and the pad size are the same. SMT recommends a steel mesh thickness of 0.12mm-0.14mm.

Figure 8 DIP package dimension (unit: mm)

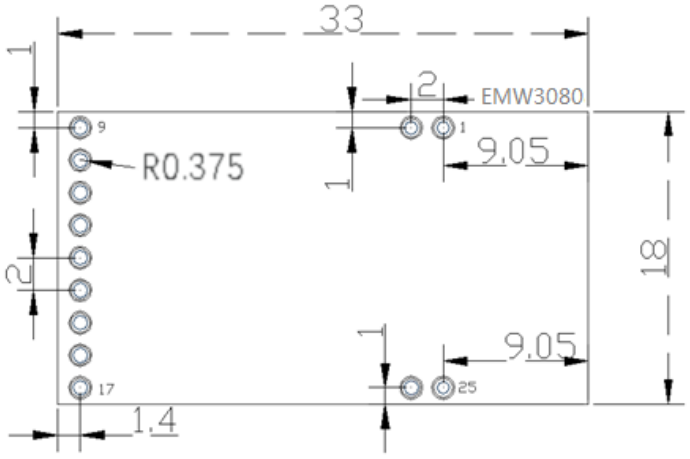


Figure 9 Stamp hole package size (mounting pad, unit: mm)

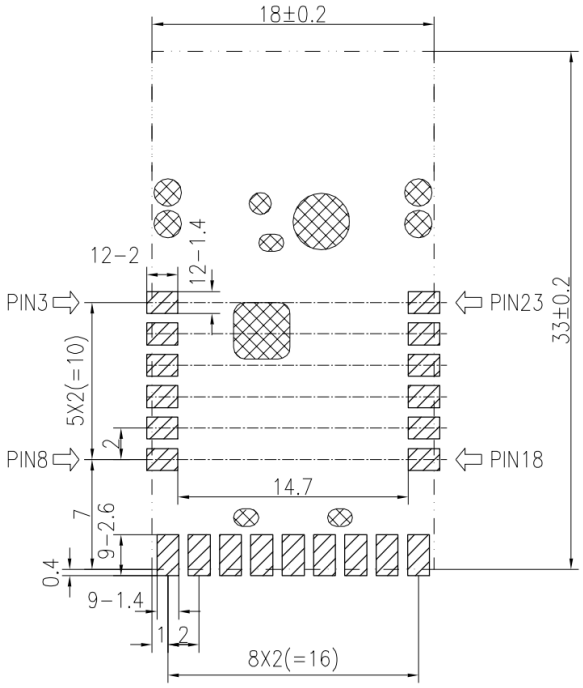
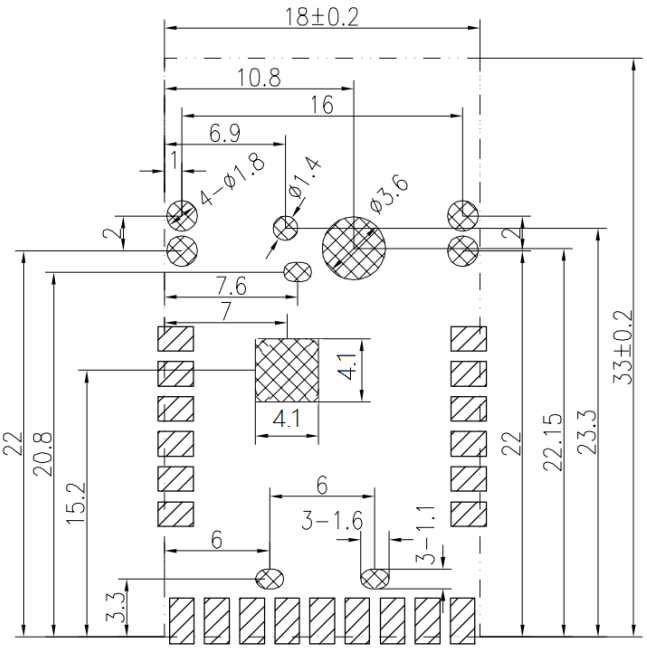


Figure 10 Stamp hole package size (no mounting pad, unit: mm)



Notes:

As shown in Figure 9 and Figure 10 the two-dot chain line indicates the outline of the module, and components cannot be arranged on the main board in the outline.

As shown in Figure 9 the hatching in the middle oblique line indicates the mounting pad of the module on the main board and expresses the size of the mounting position of the module on the main board.

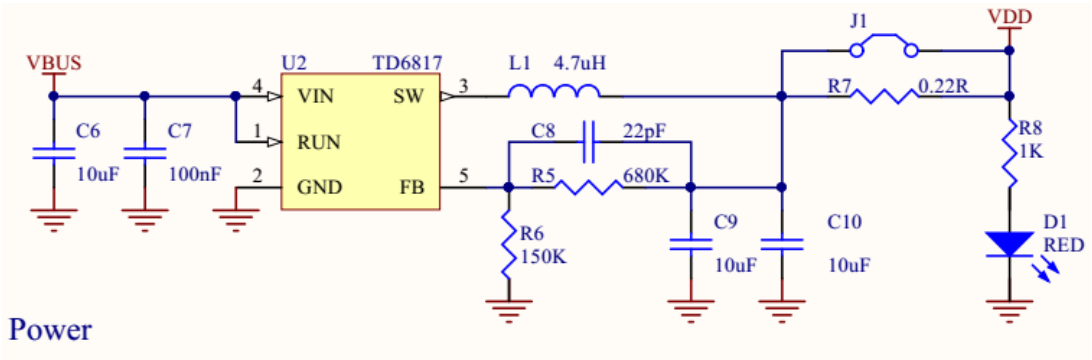
As shown in Figure 10 the medium meshed wire frame indicates the place where the pad cannot be placed on the motherboard and expresses the position size of the prohibited pad on the main board.

6. Reference Circuits

6.1. Power

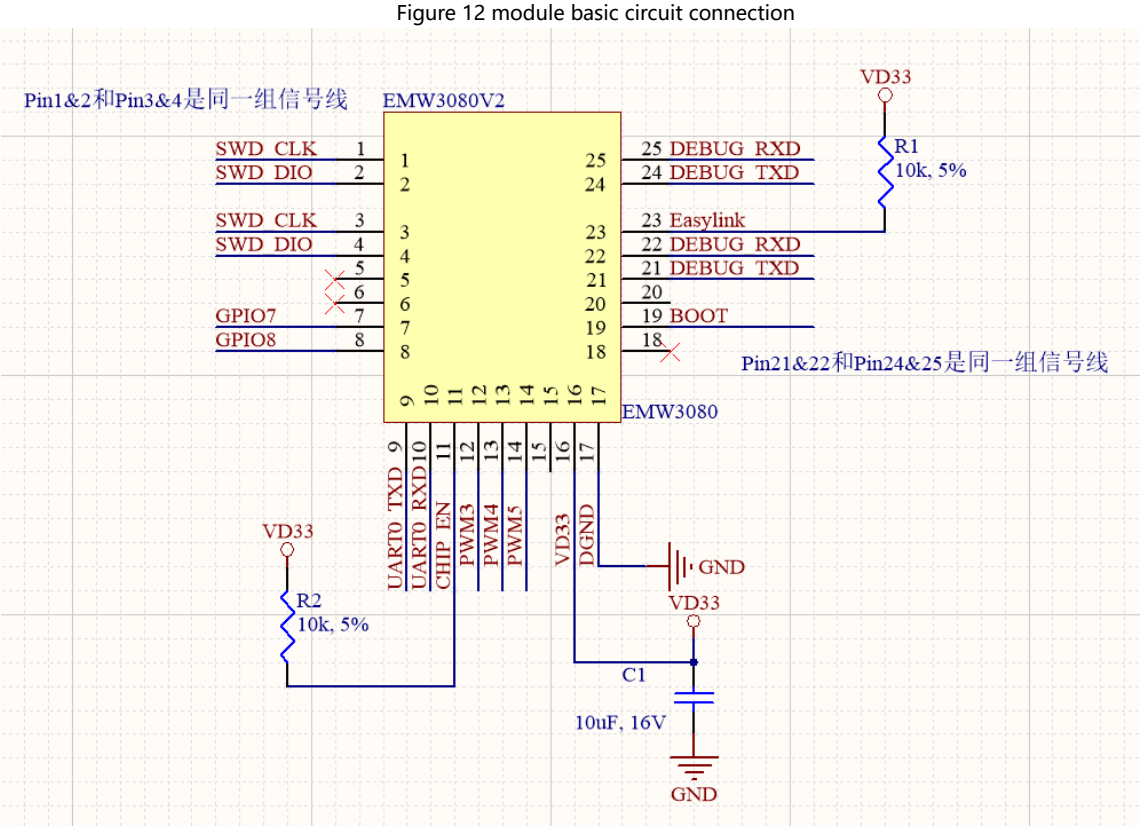
The module uses 3.3V DC single voltage power supply. The following is an example of power supply after conversion with 5V power supply of USB interface.

Figure 11 Power reference circuit



6.2. Module basic circuit

Figure 12 module basic circuit connection



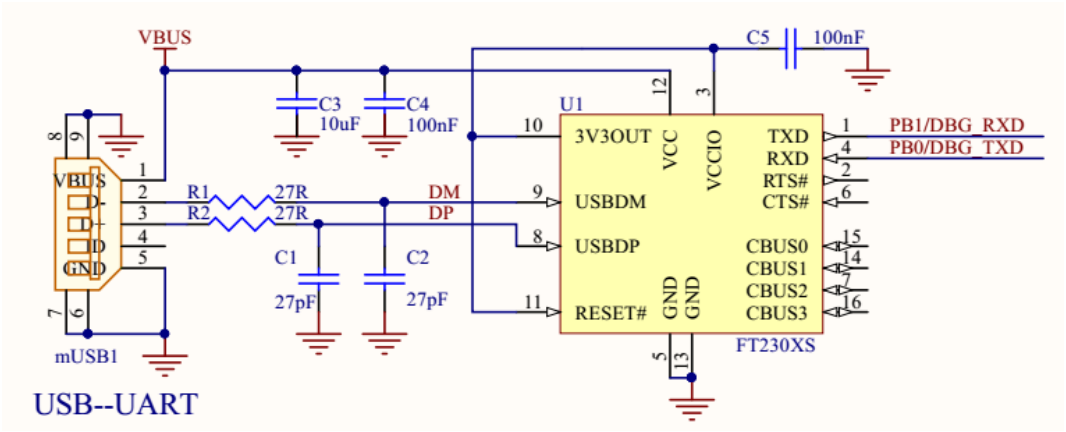
Note: The module has 100K hardware pull-up resistors in PA_30 (UART2_Log_TX) and PA_29 (UART2_Log_RX). The PA_0 pin has a 100K hardware pull-down resistor. CHIP_EN has an internal 100K pull-up resistor and 0.01μF capacitance to ground. Please pay special attention to the design schematic and

PCB and allocate the pull-up and pull-down according to the internal hardware.

6.3. UART

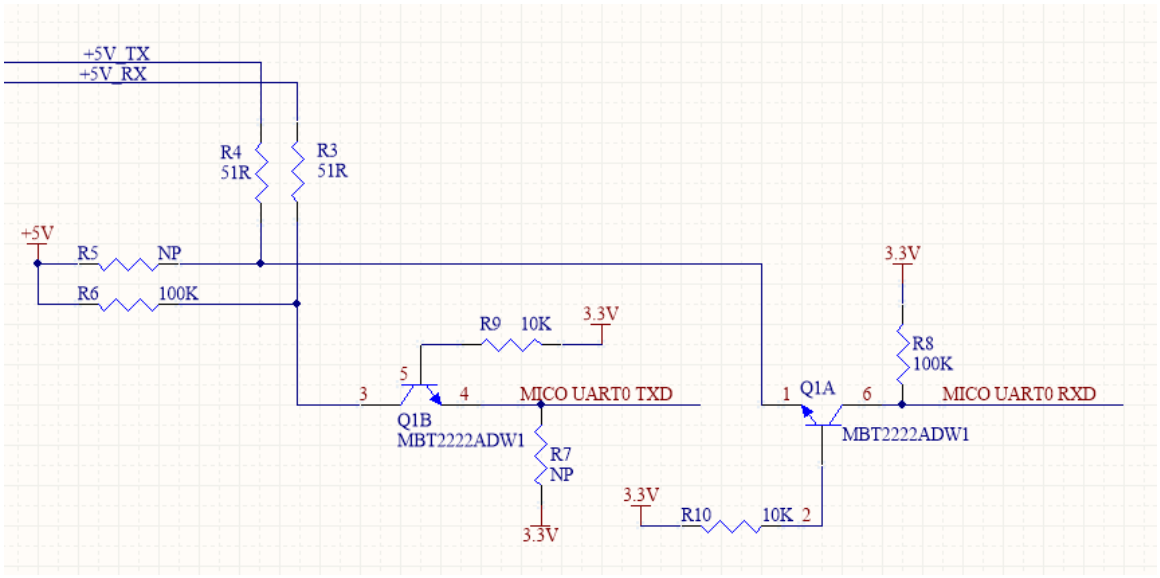
During the debugging process, the UART signal is usually converted to USB and then connected to the PC. The conversion reference circuit is shown in Figure 13:

Figure 13 USB to serial port reference circuit



If the UART of the chip used by the user is 5V, you need to convert the 5V UART to 3.3V to communicate with the module. For the 5V-3.3V UART conversion circuit, please refer to the circuit shown in Figure 14.

Figure 14 UART 3.3V/5V conversion circuit



7. Production Guidelines

MXCHIP stamp port packaging module must be SMT machine patches, module humidity sensitivity grade MSL3, after unpacking more than a fixed time patches to bake module.

- SMT patches require instruments
  - Reflow bonding machine
  - AOI detector
  - 6-8mm suction nozzle
- Baking requires equipment:
  - Cabinet oven
  - Anti-static, high temperature tray
  - Antistatic and heat resistant gloves

The storage conditions of MXCHIP module are as follows:

- Moisture-proof bags must be stored in an environment with temperature < 30 degree C and humidity < 85% RH.
- A humidity indicator card is installed in the sealed package.

Figure 15 Humidity Card

After the module is split, if the humidity card shows pink, it needs to be baked.

The baking parameters are as follows:

- The baking temperature is 120℃±5℃ and the baking time is 4 hours.
- The alarm temperature is set to 130℃.
- SMT patches can be made after cooling < 36℃ under natural conditions.
- Drying times: 1 time.
- If there is no welding after baking for more than 12 hours, please bake again.

If the disassembly time exceeds 3 months, SMT process is forbidden to weld this batch of modules, because PCB gold deposition process, over 3 months, pad oxidation is serious, SMT patch is likely to lead to virtual welding, leak welding, resulting in various problems, our company does not assume the corresponding responsibility;

Before SMT patch, ESD (Electrostatic Discharge, Electrostatic Release) protection should be applied to the module.

SMT patches should be made according to the reflow curve. The peak temperature is 250 C.

In order to ensure the qualified rate of reflow soldering, 10% of the first patches should be taken for visual inspection and AOI testing to ensure the rationality of furnace temperature control, device adsorption mode and placement mode, and 5-10 patches per hour are recommended for visual inspection and AOI testing in subsequent batch production.

7.1. Precautions

- Operators of each station must wear static gloves during the entire production process.
- Do not exceed the baking time when baking.
- It is strictly forbidden to add explosive, flammable, or corrosive substances during baking.
- When baking, the module uses a high temperature tray to be placed in the oven to keep the air circulation between each module while avoiding direct contact between the module and the inner wall of the oven.
- When baking, please close the oven door to ensure that the oven is closed to prevent temperature leakage and affect the baking effect.
- Try not to open the door when the oven is running. If it must be opened, try to shorten the time for opening the door.
- After baking, the module should be naturally cooled to <36°C before wearing the static gloves to avoid burns.
- When operating, strictly guard against water or dirt on the bottom of the module.

The temperature and humidity control level of MXCHIP factory module is Level3, and the storage and baking conditions are based on IPC/JEDEC J-STD-020.

7.2. Storage Condition

Figure 16 Storage Conditions Diagram

8. Label Information

Figure 17 Module Label Schematic Diagram

1. MXCHIP: Company Logo.
2. CMIIT ID: SRRC Model Authorization ID, 10 bits, not yet available, replaced by X.
3. EMC3380-S: Product Main Type.
4. JL5: Product Auxiliary Model.
5. X1916: Production serial number, where: X-factory code, 19-year of production, 16-week.
6. B0F893100008: MAC Address.
7. 0000.0000.A213: Firmware Number.

9. Sales and Technical Support Information

If you need to consult or purchase this product, please call Shanghai MXCHIP Information Technology Co., Ltd. during office hours.

Office hours: Monday to Friday morning: 9:00-12:00, afternoon: 13:00-18:00

Contact Tel: +86-21-52655026

Address: 9th Floor, Lane 5, 2145 Jinshajiang Road, Putuo District, Shanghai

Zip code: 200333

Email: sales@mxchip.com