

Datasheet

EMW5080V2

Embedded Wi-Fi module

Version: 1.0

Date: 2018-12-10

Number: DS0127EN

Abstract

Features

- Support 802.11b/g/n, integrate 62.5MHz ARM-CM4F, WLAN MAC/Baseband/RF
- 256KB RAM/ 2MB FLASH
- Working Voltage: DC 5.0V
- Maximum transmission rate up to 72.2 Mbps with 20 MHz bandwidth.
- Wi-Fi Features
 - Support 802.11b/g/n, HT-40
 - Support Station, Soft AP, Station+Soft AP
 - Support EasyLink, Alink, Joinlink
- Peripherals:
 - 1x HS UART
- Operating Temperature:
 - PCBA: -20°C to +85°C
 - Plastic box: depends on detailed box model
- Antenna: PCB or IPX (Optional)

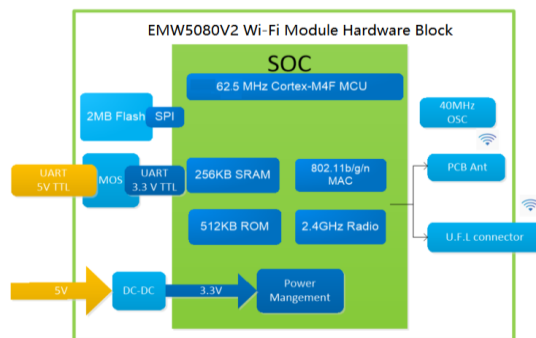
Application

- Intelligent lighting
- Intelligent Transportation
- Smart Home Application
- industrial automation
- Intelligent Security

Module Type

Part number	Antenna type	PCBA size (mm)
EMW5080V2-P	PCB antenna	21.6*35.6
EMW5080V2-E	IPEX connector	

Hardware Block



EMW5080V2

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Version History

Date	Vision	Details
2018-12-10	1.0	First English version

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1. Product Introduction

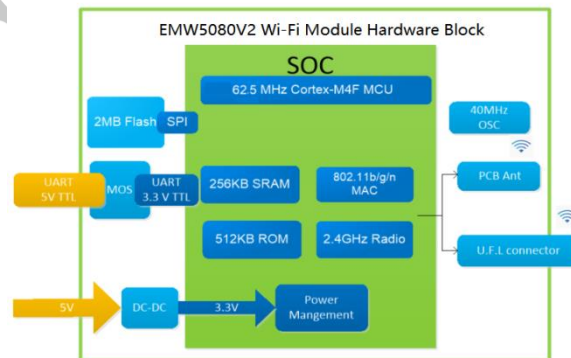
EMW5080V2 is a cost-effective embedded Wi-Fi module released by MXCHIP with high integrating ARM CM4F, WLAN MAC/Baseband/RF. Maximum frequency 62.5MHz with 256KB SRAM and 2MB FLASH. Power supply is DC 5.0V. Peripherals: 1x Uart with connector.

Hardware diagram is shown below with four main parts:

- CM4F main core
- WLAN MAC/BB/RF/ANT
- UART
- Power management

With:

1. ARM CM4F CPU with 62.5MHz maximum frequency and 256KB SRAM and 2M FLASH.
2. 2MB SPI Flash is used for custom firmware development
3. Support PCB antenna and IPEX
4. Input voltage: DC 4.5-5.5V



EMW5080V2 Hardware block

1.1 Label Information



EMW5080V2-P Label

EMW5080V2-E Label

Figure 1 EMW5080V2 Label Information

Label Information:

- CMIIT ID: SRRC approval number
- EMW5080V2: Module part number
- DOBAE420091F: MAC address (Each module has a unique MAC address)
- 0000.0000.0000 : SN series number
- X1716: Date code
- F5080V2P /F5080V2E: PCB antenna / IPEX connector

1.2 Dimension

EMW5080V2 uses a 4-pin connector for power supply and data transfer.

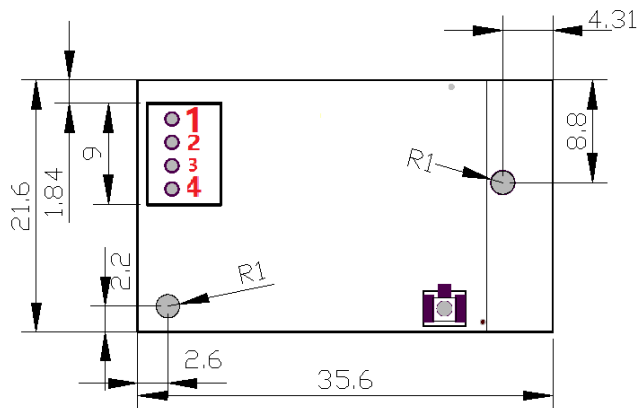


Figure 2 EMW5080V2 pins and size

1.3 Pin Definition

Table 1 EMW5080V2 Pin Definition

Pin NO.	Name	Function
1	VCC	Power supply
2	GND	Ground
3	RXD	UART Data Receive
4	TXD	UART Data Transmit

2. Electrical Parameters

2.1 Operating Conditions

EMW5080V2 would be unstable when input voltage is less than the lowest rated voltage.

Table 2 Range of input voltage

Symbol	Illustration	Condition	Details			
			Minimum	Typ	Maximum	Unit
VDD	Power Supply		4.5	5	5.5	V

Table 3 Current

Symbol	Note	最大值	单位
Ivcc	Current @VCC 5.0V	230	mA

There would be permanent damage in hardware if the device operates at the voltage over rated value. Meanwhile, reliability could be influenced when the device has a long-term operating at maximum voltage.

Table 3 Absolute maximum voltage rating

Symbol	Description	Minimum	Typ	Unit
VDD	Module input voltage	-0.3	5.5	V
VIN	GPIO input voltage	-0.3	5.5	V

2.2 Power Consumption

Table 4 EMW5080V2 Power Consumption

Mode	Current (5V)	Status
Monitor	96mA	WIFI config mode. Monitor SSID information, and connect to the router.
Idle	82mA	Keep connected to router. No data transfer.
Normal	207mA	Data transfer and receive at certain rate

Actual working current is variable at different operating mode. Maximum operating current 300 mA .

2.3 Working Environment

Table 5 Temperature and humidity condition

Symbol	Name	Maximum	Unit
TSTG	PCBA Storage Temperature	-40 to +125	°C
TA	PCBA Operation Temperature	-20 to +85	°C
Humidity	Non-condensing, Relative humidity	95	%

2.4 Electrostatic Discharge

Table 6 Electrostatic Discharge Parameters

Symbol	Name	Details	Level	Maximum	Unit
V _{ESD} (HBM)	Electrostatic discharge voltage (Human Body Model)	TA= +25 °C , JESD22-A114	2	2000	V
V _{ESD} (CDM)	Electrostatic discharge voltage (Charged Device Model)	TA = +25 °C , JESD22-C101	II	500	

3. RF parameters

3.1 Basic RF parameters

Table 7 Radio-frequency standards

Name		Illustration
Working frequency		2.412~2.484GHz
Wi-Fi wireless standard		IEEE802.11b/g/n
Data transmission rate	20MHz	11b: 1,2,5.5 和 11Mbps 11g : 6,9,12,18,24,36,48,54Mbps 11n : MCS0~7,72.2Mbps
Antenna type		PCB (Default) IPX (Optional)

3.2 TX Performance

3.2.1 Transmit performance of IEEE802.11b mode

Table 8 CCK_11 transmit performance parameters of IEEE802.11b mode

Category	Content				
Mode	IEEE802.11b				
Channel	CH1 to CH13				
Rate	1, 2, 5.5, 11Mbps				
TX	Minimum	Typ.	Maximum	Unit	
1. Output power	14	16.5	18.5	dBm	
2. Spectrum template					
1) fc +/-11MHz to +/-22MHz	-	-	-30	dBr	
2) fc > +/-22MHz	-	-	-50	dBr	
3. Frequency offset	-15	-2	+15	ppm	
4. EVM(Peak EVM)					
1) 1~11Mbps	-	-	35%		

RX Minimum receiving sensitivity	Minimum	Typ	Maximum	Unit	
1Mbps (FER \leq 8%)	-	-98	-83	dBm	
11Mbps (FER \leq 8%)	-	-89	-76	dBm	

3.2.2 Transmit performance of IEEE802.11g mode

Table 9 OFDM_54 transmit performance parameters of IEEE802.11g mode

Category	Content				
Mode	IEEE802.11g				
Channel	CH1 to CH13				
Rate	6, 9, 12, 18, 24, 36, 48, 54Mbps				
TX	Minimum	Typ	Maximum	Unit	
1. Output Power	12.5	14.5	16.5	dBm	
2. Spectrum template					
1) at fc +/- 11MHz	-	-	-20	dBr	
2) at fc +/- 20MHz	-	-	-28	dBr	
3) at fc > +/-30MHz			-40	dBr	
3. Frequency offset	-15	-2	+15	ppm	
4. EVM(Peak EVM)					
6Mbps	-	-30	-5	dBm	
54Mbps	-	-31	-25	dBm	
RX Minimum receiving sensitivity	Minimum	Typ	Maximum	Unit	
6Mbps (FER \leq 10%)	-	-92	-82	dBm	
54Mbps (FER \leq 10%)	-	-76	-65	dBm	

3.2.3 Transmit performance of IEEE802.11n-HT20 mode

Table 10 MCS7 transmit performance parameters of IEEE802.11n-HT20 mode

Category	Content				
Mode	IEEE802.11n HT20				
Channel	CH1 to CH13				
Rate	MCS0/1/2/3/4/5/6/7, Maximum 72.2Mbps				
TX	Minimum	Typ	Maximum	Unit	
1. Output power	11.5	13.5	15.5	dBm	
2. Spectrum template					
1) at $f_c \pm 11\text{MHz}$	-	-	-20	dBr	
2) at $f_c \pm 20\text{MHz}$	-	-	-28	dBr	
3) at $f_c > \pm 30\text{MHz}$			-45	dBr	
3. Frequency offset	-15	-2	+15	ppm	
4. EVM(Peak EVM)					
MCS0	-	-30	-5	dBm	
MCS7	-	-32	-27	dBm	
RX Minimum receiving sensitivity	Minimum	Typ	Maximum	Unit	
MCS0 (FER \leq 10%)	-	-92	-82	dBm	
MCS7 (FER \leq 10%)	-	-73	-64	dBm	

4. Antenna Information

4.1 Antenna Type

EMW5080V2 has two type of antenna: PCB antenna for EMW5080V2-P, and IPEX connector for EMW5080V2-E



EMW5080V2-P



EMW5080V2-E

4.2 PCB Antenna Clearance Zone

Main PCB should have a distance over 16mm with other metal elements when using PCB antenna in Wi-Fi device. Shadow parts in the figure below should keep away from metal elements, sensor, interference source and other material that could cause signal interference.

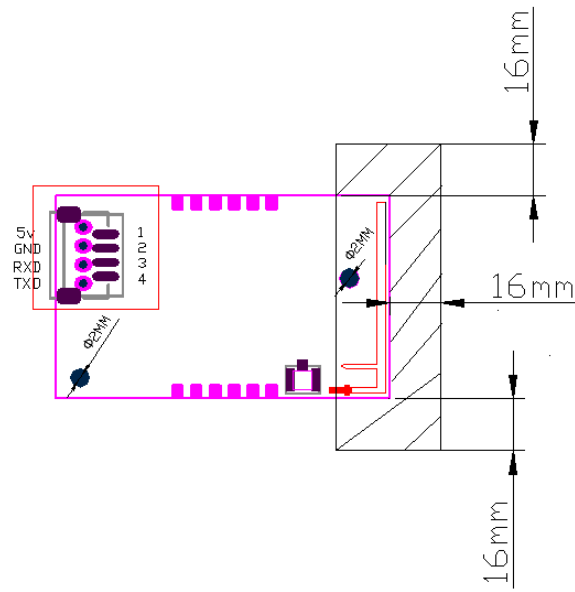


Figure 3 Minimum Clearance Zone of PCB Antenna (Unit: mm)

4.3 External Antenna Connector

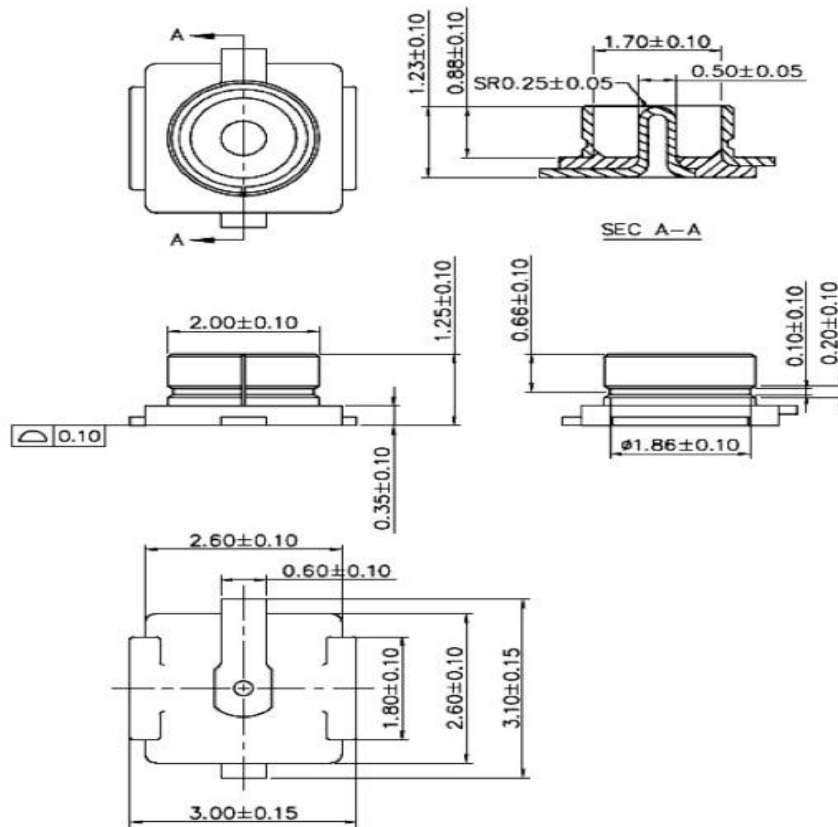
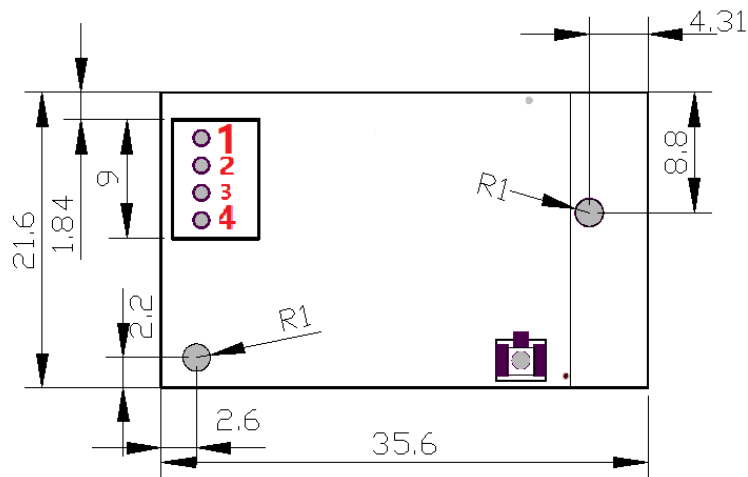


Figure 4 Size of External Antenna Connector

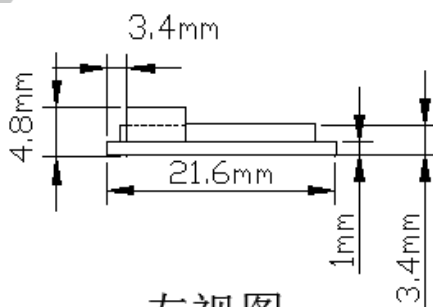
5. Assembly Information and Production Guidance

5.1 Assembly Size



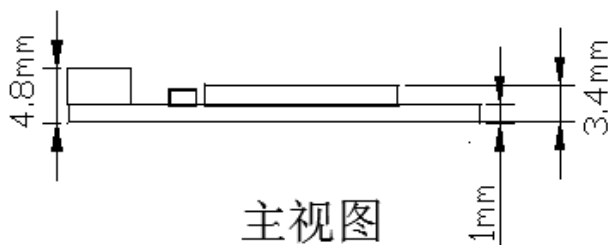
Top View

Note: EMW5080V2 has two locating holes. The hole in the lower left corner can use M2*3 size metal screw. The hole near PCB antenna is suggested to use plastic screw to avoid affecting antenna performance.



左视图

Left Side View

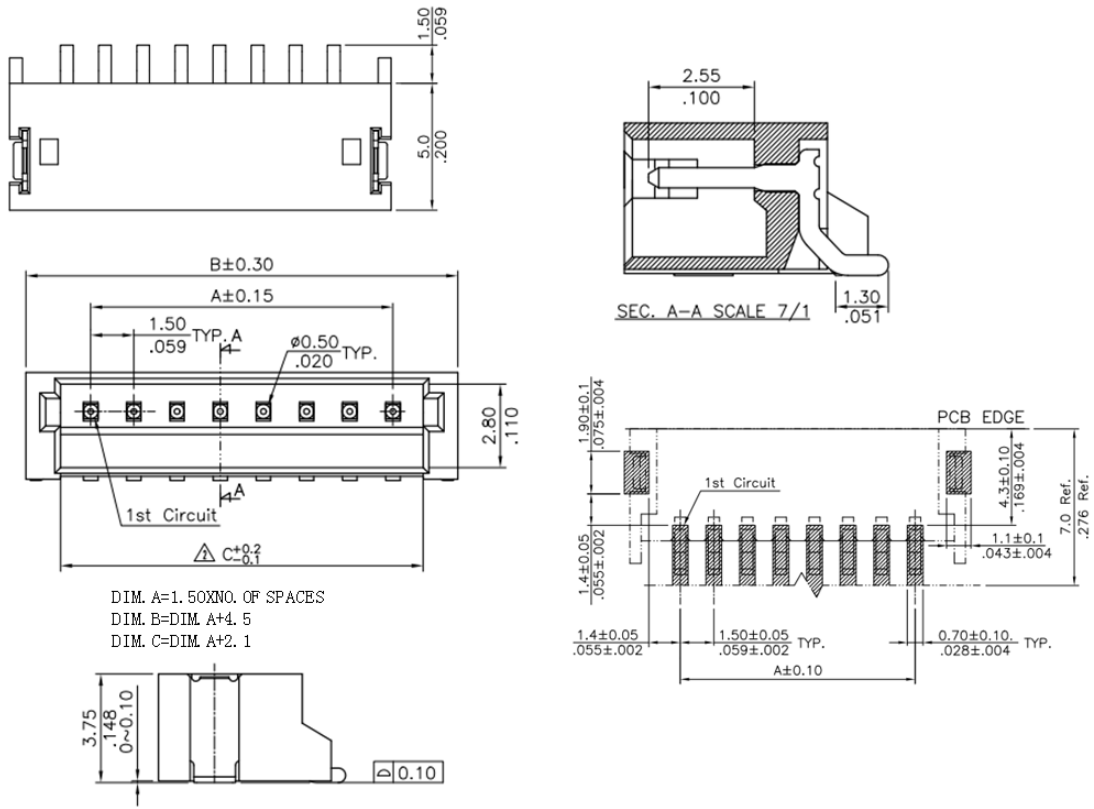


主视图

Side View

Figure 5 EMW5080V2 Side View (Unit: mm)

5.2 4-Pin connector size



5.3 Storage Condition


	CAUTION This bag contains MOISTURE-SENSITIVE DEVICES	LEVEL <div style="border: 1px solid black; padding: 5px; display: inline-block;"> 3 </div>
	If Blank, see adjacent bar code label	
<p>1. Calculated shelf life in sealed bag: 12 months at < 40°C and < 90% relative humidity (RH)</p>		
<p>2. Peak package body temperature: <u>260</u> °C <small>If Blank, see adjacent bar code label</small></p>		
<p>3. After bag is opened, devices that will be subjected to reflow solder or other high temperature process must</p>		
<p>a) Mounted within: <u>168</u> hrs. of factory conditions <small>If Blank, see adjacent bar code label</small></p>		
<p>≤ 30°C/60%RH, OR</p>		
<p>b) Stored at <10% RH</p>		
<p>4. Devices require bake, before mounting, if:</p>		
<p>a) Humidity Indicator Card is > 10% when read at 23 ± 5°C</p>		
<p>b) 3a or 3b not met.</p>		
<p>5. If baking is required, devices may be baked for 48 hrs. at 125 ± 5°C</p>		
<p>Note: If device containers cannot be subjected to high temperature or shorter bake times are desired, reference IPC/JEDEC J-STD-033 for bake procedure</p>		
<p>Bag Seal Date: _____ <small>If Blank, see adjacent bar code label</small></p>		
<p>Note: Level and body temperature defined by IPC/JEDEC J-STD-020</p>		

Figure 6 Storage Condition

6. Part numbers

For PCBA, the part numbers are as below:

Part number	Antenna Type
EMW5080V2-P	PCB 天线
EMW5080V2-E	IPX 天线

For PCBA+BOX mode, the part numbers are as below:

Table 17. Recommended part numbers

Part number	Mode	Description
EMW5080V2-P	PCBA mode	Only PCBA
EMW5080V2-P-BOX1	Box and glue spray	PCBA+glue spray+box+assembly
EMW5080V2-P-BOX2	Box and glue pouring	PCBA+glue pouring+box+cable+assembly
EMW5080V2-E	PCBA	Only PCBA
EMW5080V2-E-BOX1	Box and glue spray	PCBA+glue spray+box+screws+ without assembly

Table 18. Other option part numbers

Options			
	Glue spray	Box (including screws)	Assembly
EMW5080V2-P	0/1	0/1	0/1
EMW5080V2-E	0/1	0/1	0/1
Note: 1 for choose, 0 for not choose. For example, EMW5080V2-P-110: PCBA+Glue spray+box+without assembly; EMW5080V2-P-010: PCBA+box+ without assembly			

6.1 Glue spray box size (box + cover)

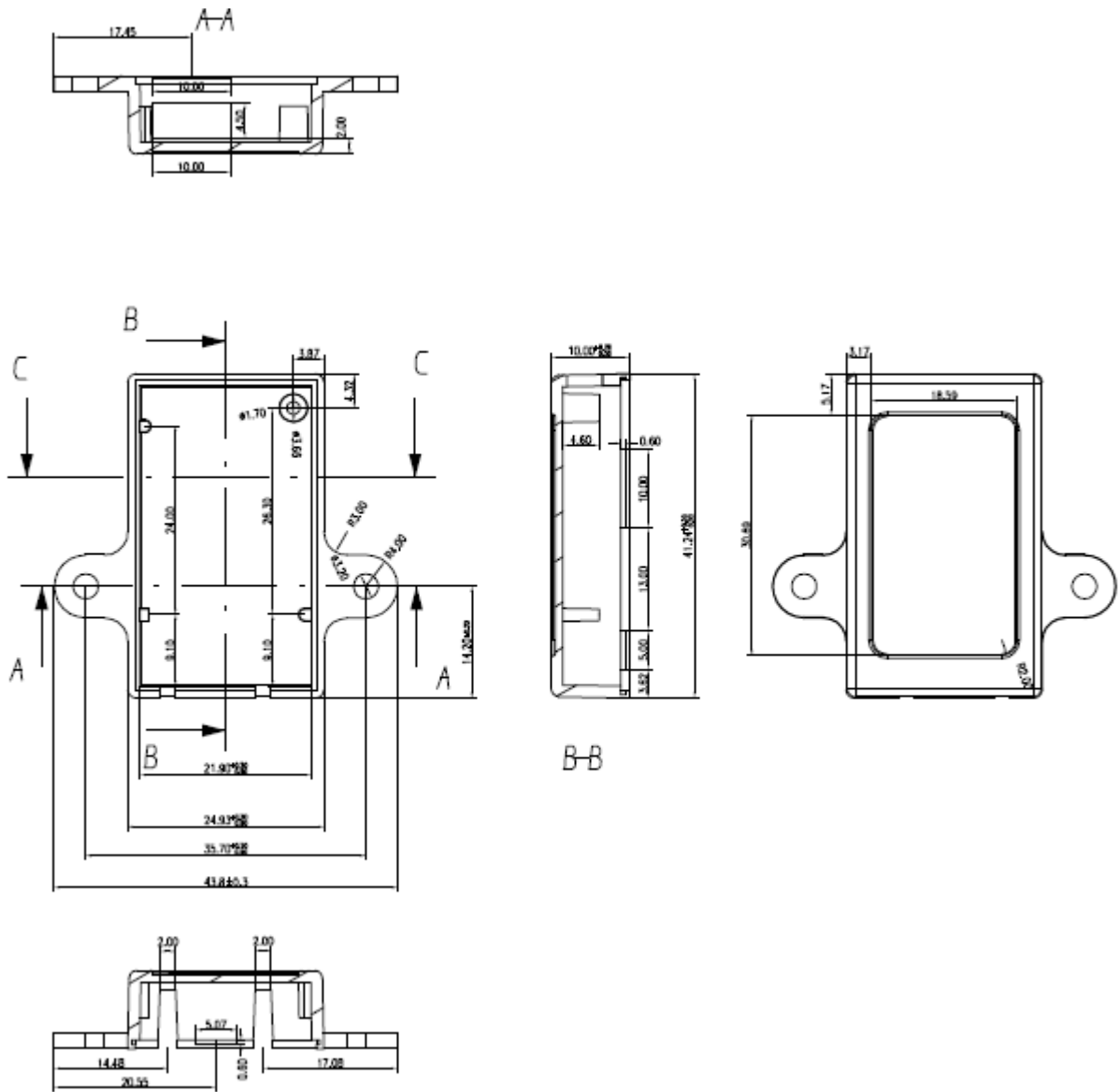


Figure 10. Glue spray box size

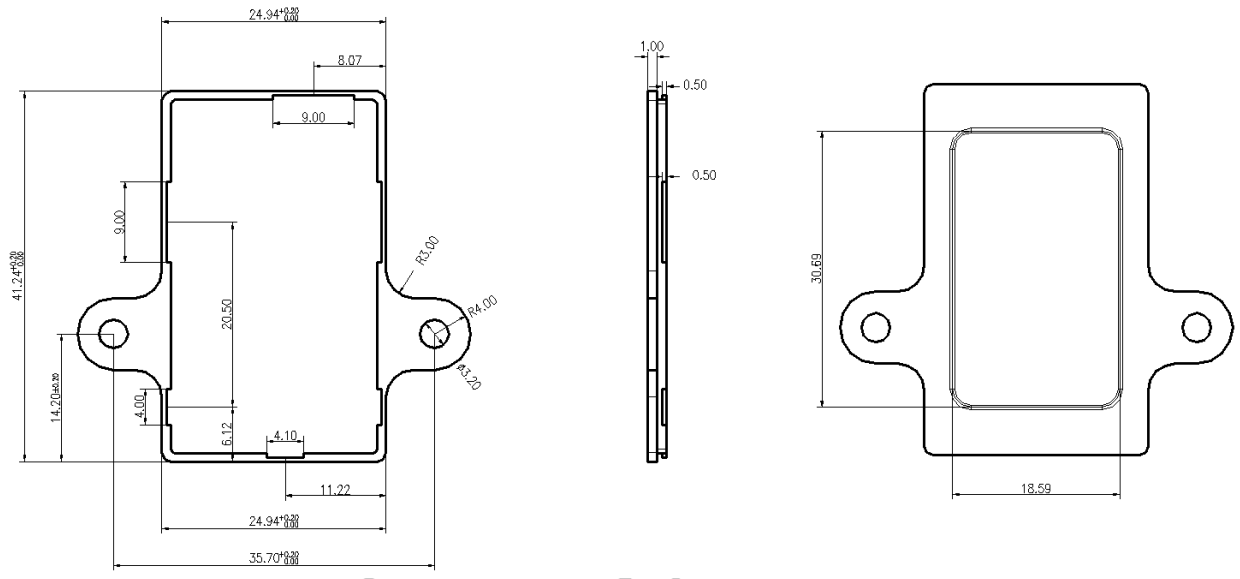
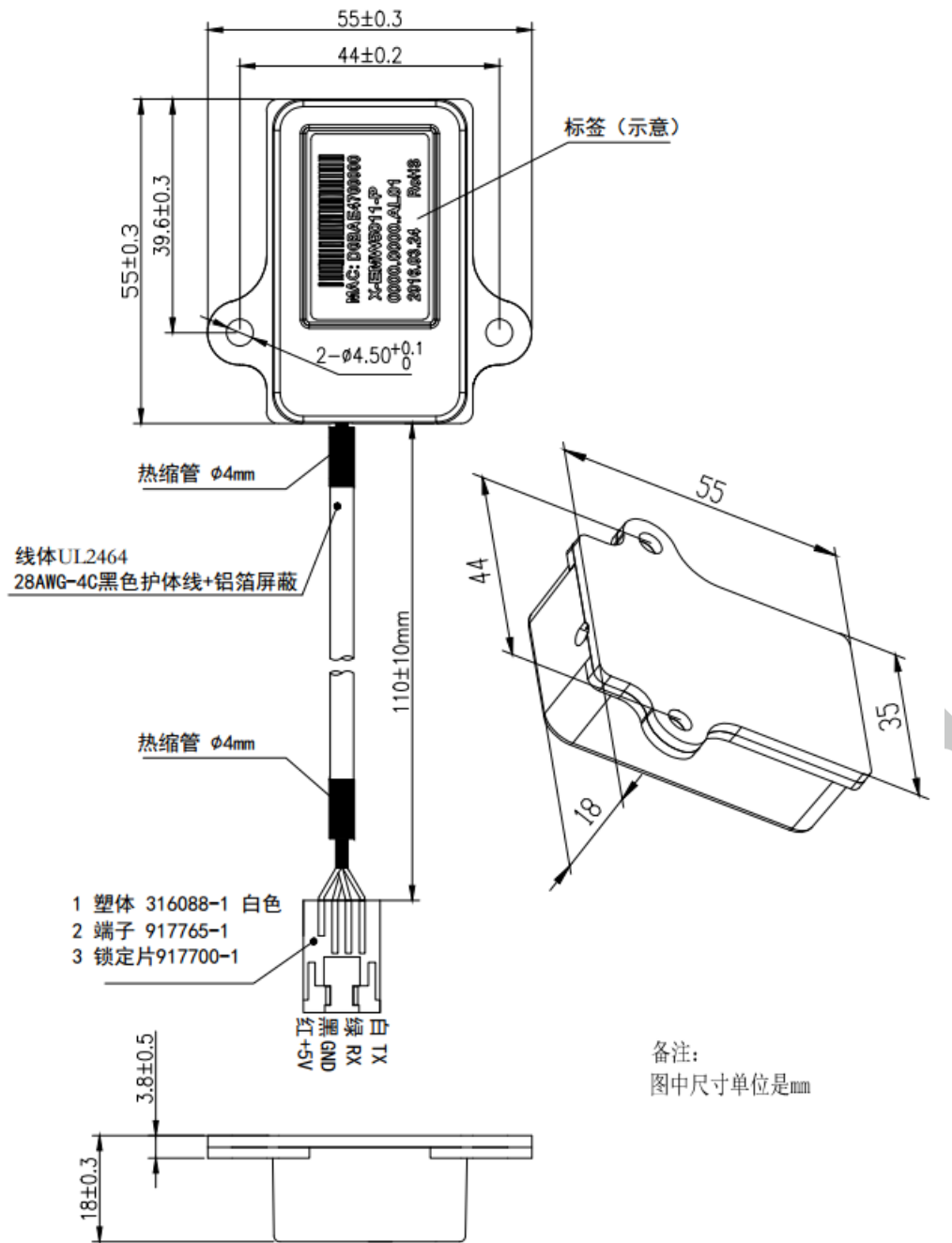
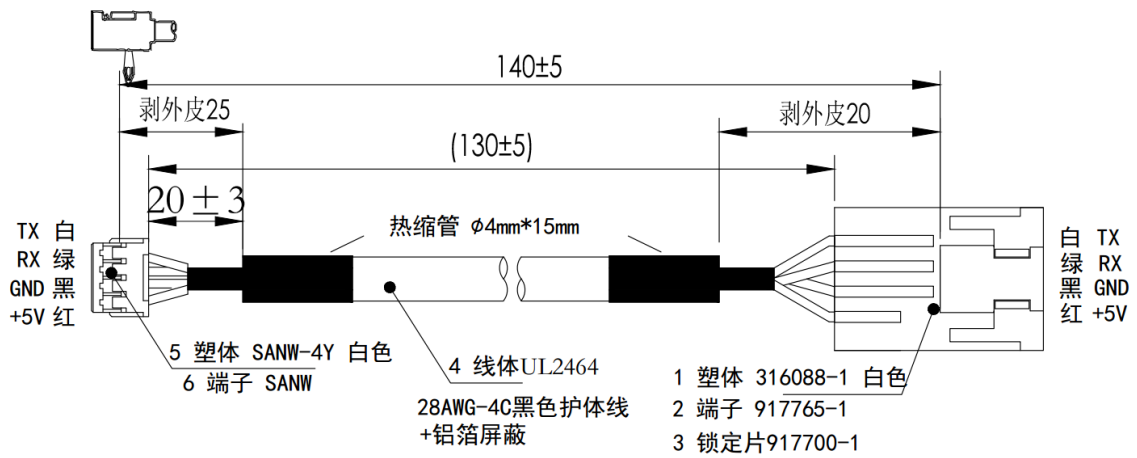


Figure 11. Glue spray box cover size

6.2 Glue pouring box size



6.3 Glue pouring cable



上海夏雷电子

7. Reference Circuit

Inside 4-PIN connector, there are a high efficient 3.3V DC-DC, and a UART voltage converter circuit, so that the input of 4-PIN connector can be 5V voltage and UART.

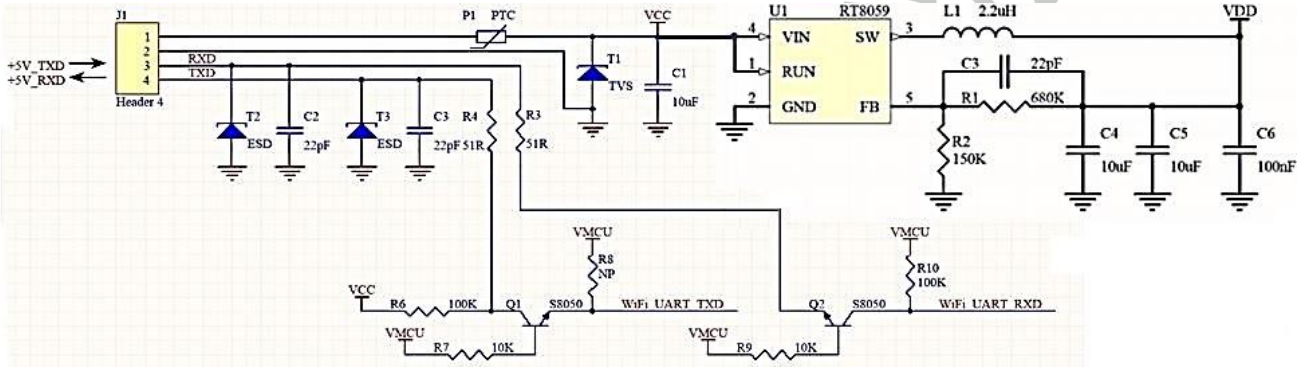
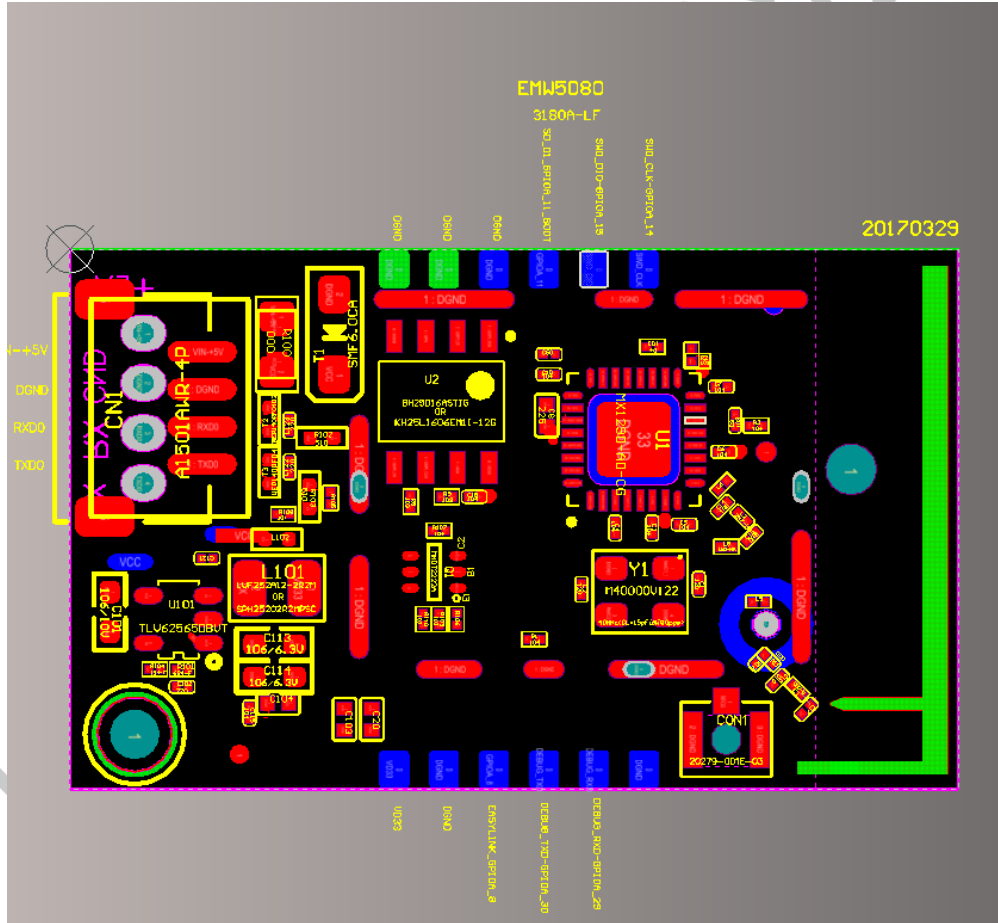


Figure 7 4-Pin connector internal circuit

8. Other pins

There are two lines of other pints for EMW5080V2. These pins are only used for development and debugging, not for product usage.



9. Module MOQ and Package Information

Table 16 Module MOQ and Package Information

	MOQ(pcs)	Packaging
EMW5080V2 (PCBA)	1200	Tray
EMW5080V2 (Glue spray box)	1080	Plastic bag
EMW5080V2 (Glue pouring box)	1080	Plastic bag

10. Sales Information and Technical Support

For consultation or purchase the product, please contact Mxchip during working hours:

From Monday to Friday, morning 9:00~12:00, afternoon 13:00~18:00

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