

Date Sheet

EMW3081

Embedded Wi-Fi module

Version : 1.0

Date : 2016-2-23

Number :

Overview

Features

- Support 802.11 b/g/n standard , Consists of a Cortex-M3 microcontroller, WLAN MAC, Base Band and RF.
- 512 KB SRAM ,2 MB SDRAM and 2 MB FLASH configuration
- Operating Voltage : DC 3.3V
- When uses 20MHz bandwidth, the maximum transmission rate reached 72.2Mbps
- When uses 40MHz bandwidth, the maximum transmission rate reached 150Mbps
- Wi-Fi related features
 - Support 802.11 b/g/n and compatible
 - Wi-Fi supports WPS
 - Support Wi-Fi directly connected
 - Support Station, Soft AP
 - Support EasyLink
 - Having designed for IoT applications to optimize the TCP/IP protocol stack
 - PCB Antenna or IPX Antenna is optional
- Peripheral :

- 1x HS UART
- 1x I2C
- 1x SPI
- 1x SWD
- 4x PWM
- Up to 15 GPIOs
- Working environment temperature : -20°C to +85°C

Applications:

- Smart LED
- Smart transportation
- Smart home furnishing and intelligent home appliances
- Instrument
- Medical care
- Industrial automation
- Smart Security
- Smarter Energy

Module model

Product model	Antenna model	Introduction
EMW3081-P	PCB antenna	Default
EMW3081-E	IPX antenna	Optional

 TEL:021-52709556

 Email:sales@mxchip.com

Copyright statement:

Without permission, prohibition of the use or copying any content of this manual in whole or in part, and this applies especially to brand, model name, part number and diagram.

Content

Overview	1
1. Product summary	4
1.1. Pinouts	5
1.2. Pins Definition	6
2. Electrical Parameters	8
2.1 Operating Conditions	8
2.2 Power Parameters	8
2.3 Operating Environment.....	9
2.4 ESD	9
3. RF Parameters.....	11
3.1. General Specification	11
4. Antenna Information.....	12
4.1. Antenna type	12
4.2. PCB antenna design requirements.....	12
4.3. Approved External Antenna Specification.....	13
4.4. U.F.L RF Connector.....	15
5. The assembly information and manufacturing guidance.....	16
5.1. Mechanical dimensions.....	16
5.2. Use guidelines(Please read carefully).....	17
5.3. The matters needing attention.....	19
5.4. MSL/Storage Condition.....	20
5.5. Recommended Reflow Profile	20
6. Label.....	22
7. Firmware encrypt	23
8. FCC Statement.....	24
9. Sales Information and Technical Support.....	27
Diagram Content	
Figure 2.DIP package dimension.....	5
Figure 3. Stamp hole packages dimension.....	5
Table1. EMW3081 Pins definition	6
Table 2. Input voltage range	8

 TEL:021-52709556 Email:sales@mxchip.com

Table 3. Rated voltage parameters	8
Table 4. EMW3081 power parameters.....	8
Table 5. Temperature and humidity conditions	9
Table 6.ESD parameters	9
Table 7.RF Standard.....	11
Figure 4. EWM3081-P.....	12
Figure 5. EMW3081-E.....	12
Figure 6. PCB antenna minimum clearance zone (Unit: mm)	13
Figure 7. External antenna connector size diagram	15
Figure 8. Side View (Unit: mm)	16
Figure 9. Vertical View (Unit: mm)	16
Figure 10. Left View (Unit: mm)	16
Table 11. Temperature and humidity indicator CARDS	18
Figure 12. Storage Condition.....	20
Figure 13. Temperature Curve.....	21

Table Content

Table1. EMW3081 Pins definition	6
Table 2. Input voltage range	8
Table 3. Rated voltage parameters.....	8
Table 4. EMW3081 power parameters.....	8

 TEL:021-52709556

 Email:sales@mxchip.com

Table 5. Temperature and humidity conditions	9
Table 6.ESD parameters	9
Table 7.RF Standard.....	11

1.Product summary

EMW3081 is a low-power and high performance embedded Wi-Fi module, which highly integrates ARM-Cortex M3, WLAN MAC/baseband/RF, and built-in 512KB SRAM and 2MB SDRAM , EMW3162 is 3.3V single-power supply , supports stamp hole SMT or DIP , and supports serial transmission and development two times , peripheral : 1x HS UART / 1x SPI /1x I2C / 4x PWM / Up to 15 GPIOs.

EMW3081 runs the MiCO iot operating system , and supports two times development of Configuration , The user can use the MiCO TCP/IP protocol stack, multiple security encryption algorithm to achieve a variety of embedded Wi-Fi application。 We also provide a series of independent firmware to meet different application scenarios , Such as UART-Wi-Fi transparent transmission, EasyLink configuration, access a variety of cloud services.

The figure is a block diagram of the hardware module EMW 3081 , Mainly it includes four parts :

- The main nuclear of Cortex-M3
- WLAN MAC/BB/RF/ANT
- Controllers and peripherals
- Power Management

Description:

- (1) Cortex-M3 CPU ,The max Operating frequency up to 166MHz ,Internal integrates 512KB SRAM , 2MB SDRAM , Supports high-speed UART , I2C , SPI , PWM , and Multiple GPIOs.
- (2) 2MB off-chip SPI Flash for customers to develop custom firmware
- (3) Support PCB antenna and external antenna IPEX
- (4) Input voltage range : DC 3.3V

1.1. Pinouts

EMW3081 uses DIP packages and stamps hole packages interface design , DIP packages (figure 2) can effectively reduce the risk of quality of secondary patch ; Stamp hole packages (figure 3) facilitate customers to debug and easy installation, designed to provide customers diversity selection.

Windows and solder pads have the same size , recommended SMT stencil thickness is 0.12mm-0.14mm.

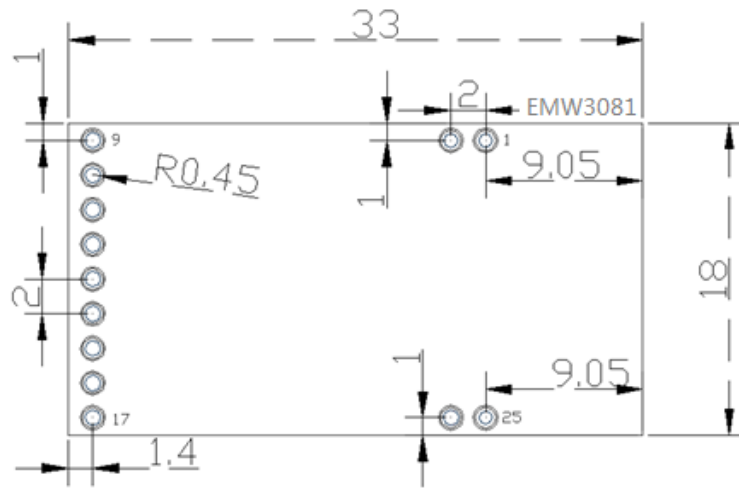


Figure 2.DIP package dimension

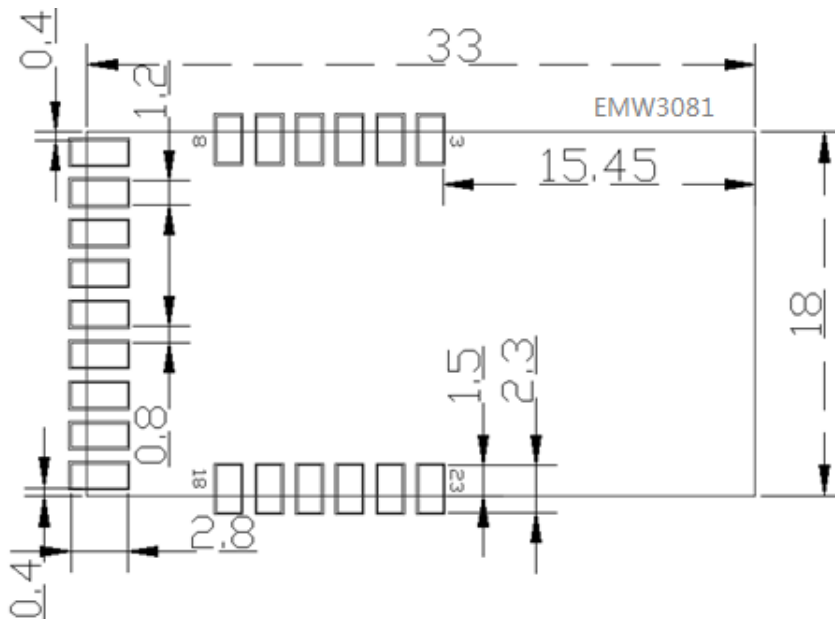


Figure 3. Stamp hole packages dimension

1.2. Pins Definition

Table1. EMW3081 Pins definition

Pin Number	Name	Type	Function
1 , 3	PE4/SWCLK	I/O	SWCLK
2 , 4	PE3/SWDIO	I/O	SWDIO
5 , 6	NC		NC
7	PA3/UART0_RTS	I/O	USER_UART_RTS (<i>either UART or IO</i>)
8	PA5/UART0_CTS	I/O	USER_UART_CTS (<i>either UART or IO</i>)
9	PA7/UART0_TXD	I/O	USER_UART_TX (<i>either UART or IO</i>)
10	PA6/UART0_RXD	I/O	USER_UART_RX (<i>either UART or IO</i>)
11	CHIP_EN	I	CHIP_EN(<i>Module enabled, active high</i>)
12	PC0/SPI0_CS/PWM	I/O	SPI0_CS (<i>IO not available when used as SPI or PWM</i>)
13	PC3/SPI0_MISO/PWM	I/O	SPI0_MISO (<i>O not available when used as SPI or PWM</i>)
14	PC2/SPI0_MOSI/PWM	I/O	SPI0_MOSI (<i>O not available when used as SPI or PWM</i>)
15	PC1/SPI0_CLK/PWM	I/O	SPI0_CLK (<i>O not available when used as SPI or PWM</i>)
16	VDD	S	<i>VDD</i>
17	GND	S	<i>GND</i>
18	NC		<i>NC</i>
19	PC4/I2C1_SDA/BOOT	I/O	<i>BOOT</i>
20	PC5/I2C1_SCL/STATUS	I/O	<i>STATUS</i>
21,24	PB0/DEBUG_TXD	I/O	DEBUG_OUT (<i>either DEBUG or IO</i>)
22,25	PB1/DEBUG_RXD	I/O	DEBUG_IN (<i>either DEBUG or IO</i>)
23	PB_3/ELINK	I/O	ELINK

- S indicates power pin , I/O indicates GPIO ;
- NC indicates not connect , Customers do not use this pin ;
- I indicates Input ;
- The bold italic indicates standard functions definition for this pin



Global leading IOT operating system-MiCO



TEL:021-52709556



Email:sales@mxchip.com

2.Electrical Parameters

2.1 Operating Conditions

EMW3081 input voltage falls below the minimum rated voltage will cause instability. Must note this point when designed power supply.

Table 2. Input voltage range

Symbol	Description	Condition	Detail			
			Min	Typ	Max	Unit
VDD	Power supply		3.0	3.3	3.6	V

Stresses above the absolute maximum ratings may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these conditions is not implied. Exposure to maximum rating conditions for extended periods may affect device reliability.

Table 3. Rated voltage parameters

Symbol	Description	Min	Typ	Unit
VDD	The input voltage of Module power supply	-0.3	3.6	V
VIN	The pin' s input voltage of GPIO	-0.3	3.6	V

2.2 Power Parameters

Table 4. EMW3081 power parameters

Condition	Current (3V3)	Description
Deep sleep	16 uA	Waked up by low power timer and GPIO triggering
Sleep	19 mA	Stay connected but no data transfer
Only CPU operation mode	33 mA	CPU clock at 166MHZ, UART/SPI/I2C is available, Wi-Fi is unavailable
11n RX mode	61 mA	CPU clock at 166MHZ, UART/SPI/I2C is available, Wi-Fi operates in 11n RX data reception mode

11n TX(when power transmission is 13 dBm)	260mA	CPU clock at 166MHZ, UART/SPI/I2C is available, Wi-Fi operates in 11n TX data transmission mode
---	-------	---

Note: The test data at different firmware versions may be different.

2.3 Operating Environment

Table 5. Temperature and humidity conditions

Symbol	Name	Range	Unit
TSTG	Storage temperature	-40 to +85	°C
TA	Operate temperature	-20 to +85	°C
Humidity	Noncondensing , relative humidity	95	%

2.4 ESD

Table 6.ESD parameters

Symbol	Ratings	Conditions	Class	Max	Unit
V _{ESD} (HBM)	Electrostatic discharge voltage (human body model)	TA= +25 °C conforming to JESD22-A114	2	2000	V
V _{ESD} (CDM)	Electrostatic discharge voltage (charge device model)	TA = +25 °C conforming to JESD22-C101	II	500	

MXCHIP[®] | Global leading IOT operating system-MiCO

 TEL:021-52709556

 Email:sales@mxchip.com

3.RF Parameters

3.1. General Specification

Table 7.RF Standard

project		Instructions
Operating Frequency		2.412~2.462GHz
Wi-Fi Standard		IEEE802.11b/g/n
Data Transmission Rate	20MHz	11b : 1,2,5.5,11Mbps 11g : 6,9,12,18,24,36,48,54Mbps 11n : MCS0~7, 72.2Mbps (Channel 1~11)
	40MHz	11n : MCS0~7, 150Mbps (Channel 3~9)
Antenna type		PCB antenna(default) IPX external antenna (optional)

4. Antenna Information

4.1. Antenna type

EMW3081 have two antenna types: PCB built-in antenna and external antenna, the models are EMW3081-P and EMW3081-E.



Figure 4. EWM3081-P



Figure 5. EMW3081-E

4.2. PCB antenna design requirements

Components are strictly forbidden to place in the surrounding 15mm of PCB antenna area in module. Such the shaded area need away from metal devices, sensors, interference sources and other materials may cause signal interference.

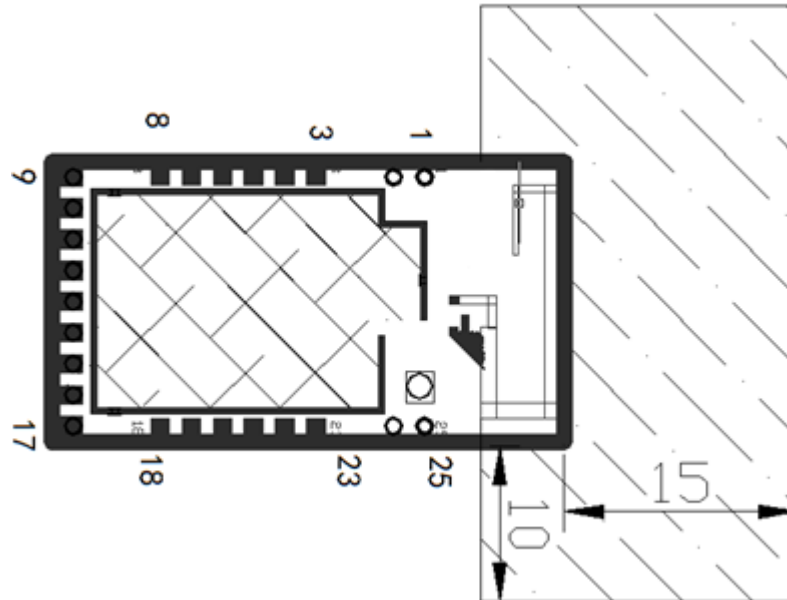
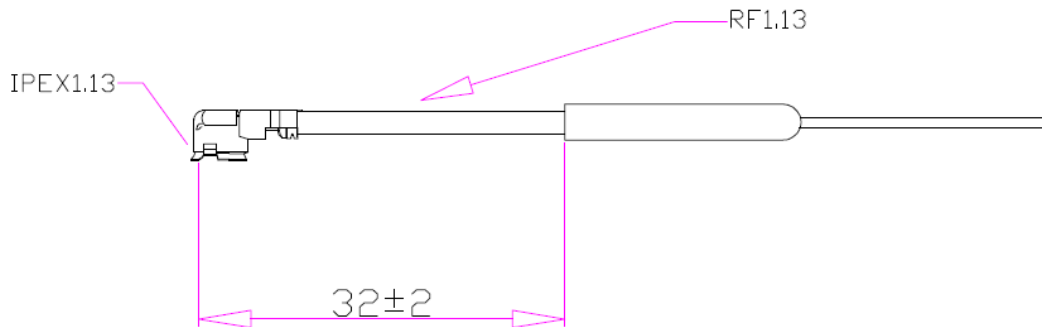


Figure 6. PCB antenna minimum clearance zone (Unit: mm)

4.3. Approved External Antenna Specification



Model Name:IPEX1.13-2.4G Brass Pipe Antenna-L32

Manufacture Name: Shenzhen Zhengda Letter Communications Equipment Co.,Ltd

NO.	NAME	DESCRIPTION	QUANTITY	PART NUMBER
1	Cable	L = 32±2mm	1	1301-0010
2	Brass Pipe	4.4*23mm	1	1113-0004

 TEL:021-52709556 Email:sales@mxchip.com

3	IPEX	20278-113R	1	1101-0001
---	------	------------	---	-----------

Gain:	<2.0dBi
Impedance:	50OHM
Frequency Range:	2400-2500MHz
VSWR	<2.0

To meet requirements of design, External Antenna must satisfy parameters above.

4.4. U.F.L RF Connector

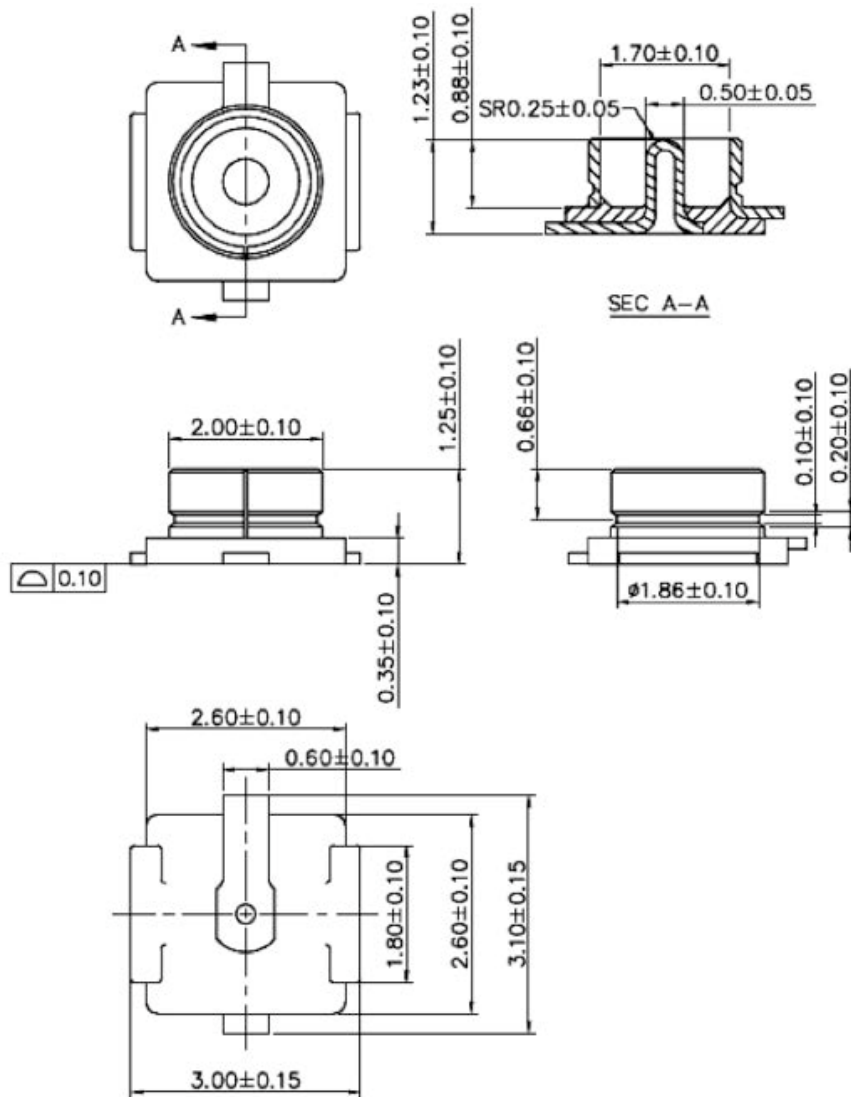


Figure 7. External antenna connector size diagram

5.The assembly information and manufacturing guidance

5.1. Mechanical dimensions

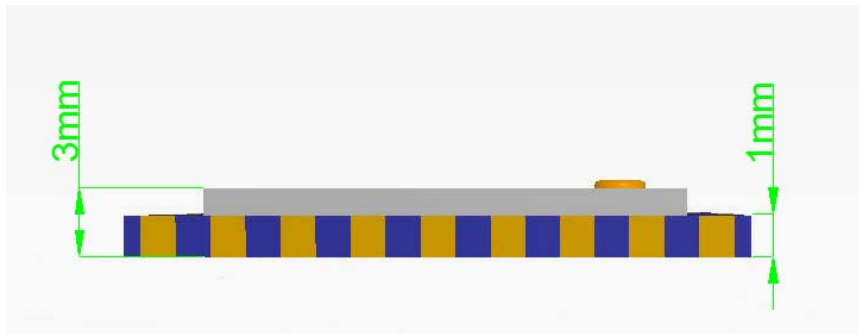


Figure 8. Side View (Unit: mm)

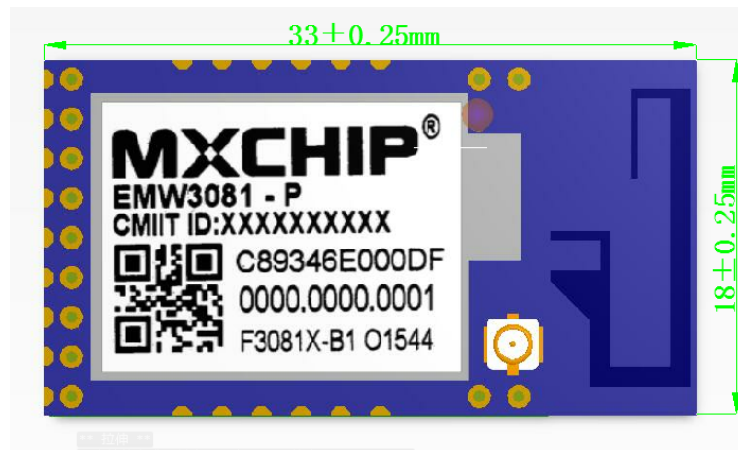


Figure 9. Vertical View (Unit: mm)

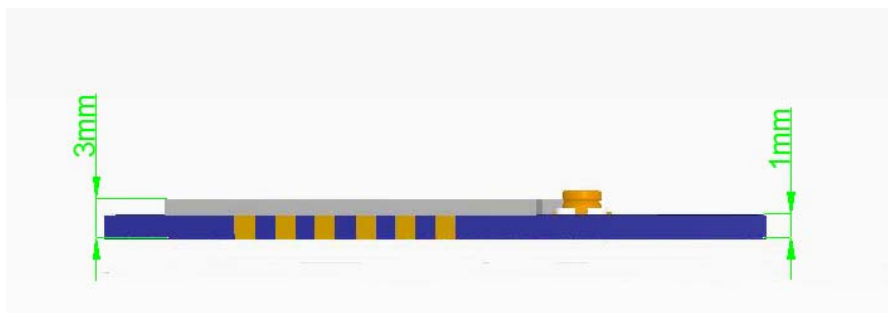


Figure 10. Left View (Unit: mm)

5.2. Use guidelines(Please read carefully)

●Stamps Wi-Fi modules from MXCHIP must be soldered with SMT machine. After unpacking and burn the firmware patch must be completed within 24, or to re-vacuum packaging, Must be baking before patching the modules

▪SMT need machine:

- (1) Reflow soldering SMT machine
- (2) The AOI detector
- (3) 6-8 mm diameter suction nozzle

▪baking need equipment:

- (1) Cabinet baking box
- (2) The antistatic, high temperature resistant tray
- (3) The antistatic high temperature resistant gloves

●Storage conditions as follows :

- (1) Moisture bag must be stored in a temperature < 30 ° C, humidity 85% RH of the environment.
- (2) Dry packing products, the guarantee period should be from 6 months from the date of Packing seal.
- (3) Sealed packaging is equipped with humidity indicator card, as shown in Figure 11.

TEL:021-52709556

Email:sales@mxchip.com



Table 11. Temperature and humidity indicator CARDS

- Humidity indicator CARDS and baking several ways as follow:
 - When opened, if the temperature and humidity indicator CARDS read 30%, 40%, 50%, three colors are blue, to continue to bake for 2 hours for module;
 - When opened, if the humidity indicator CARDS read 30% color ring into pink, need to continue to bake module 4 hours;
 - When opened, if the humidity indicator CARDS read into 30%, 40%, color ring into pink, need to continue to bake for 6 hours module;
 - When opened, if the humidity indicator CARDS read into 30%, 40%, 50% are pink color ring, need to continue to bake for 12 hours module;
 - When opened, if the humidity indicator CARDS read into 10%, 20%, 30% ,40%are pink

color ring, need to continue to bake for 14 hours module;

- Baking parameters are as follows:
 - Baking temperature: 125 °C + / - 5 °C;
 - Set the alarm temperature as 130 °C;
 - Under the condition of natural cooling < 36 °C, SMT placement can be made;
 - Dry times: 1 times;
- If opened the time more than 3 months, please ban the use of SMT process welding this batch module, zedoary because PCB process, more than 3 months bonding pad oxidation, SMT is likely to cause virtual welding, welding, the resulting problems we do not assume corresponding responsibility.
- Please to ESD (static discharge , static electricity discharge) protection module before SMT;
- Please according to the SMT reflow soldering curve, peak temperature 245 °C, reflow soldering temperature curve as shown in figure 11 , section 5.5.
- For the first time in order to ensure the qualified rate of reflow soldering, first SMT please extraction 10% product to visual analysis, AOI inspection, to ensure that the furnace temperature control, device adsorption method, the rationality of the put way; Suggestions : when batch production per hour 5-10 pieces of visual analysis, AOI test.

5.3. The matters needing attention

- In the entire production, Each station of the operator must wear anti-static gloves;
- When baking, no more than baking time;
- When roasting, it is forbidden to join explosive, flammable, corrosive substances;
- When baking, high temperature module application tray in the oven, keep the air circulation between each module, at the same time avoid direct contact with the oven wall module;
- Baking, please will bake the door is closed, the guarantee baking box sealing, prevent leakage, temperature influence the baking effect;

TEL:021-52709556

Email:sales@mxchip.com

- Don't open the door, as far as possible when baking box running if must open, shortening the time of can open the door as far as possible;
- After baking, must be natural cooling modules to $< 36^{\circ}\text{C}$ before wear anti-static gloves out, so as not to burn.
- Operation, forbidden module bottom touch water or dirt;
- Temperature and humidity control level for Level3, storage and baking conditions based on IPC/JEDEC J - STD - 020.

5.4. MSL/Storage Condition


	CAUTION This bag contains MOISTURE-SENSITIVE DEVICES	LEVEL 3 <small>If Blank, see adjacent bar code label</small>
<p>1. Calculated shelf life in sealed bag: 12 months at $< 40^{\circ}\text{C}$ and $< 90\%$ relative humidity (RH)</p> <p>2. Peak package body temperature: <u>260</u> $^{\circ}\text{C}$ <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 a) Mounted within: <u>168</u> hrs. of factory conditions <small>If Blank, see adjacent bar code label</small> $\leq 30^{\circ}\text{C}/60\%\text{RH}$, OR b) Stored at $<10\%$ RH</p> <p>4. Devices require bake, before mounting, if: a) Humidity Indicator Card is $> 10\%$ when read at $23 \pm 5^{\circ}\text{C}$ b) 3a or 3b not met.</p> <p>5. If baking is required, devices may be baked for 48 hrs. at $125 \pm 5^{\circ}\text{C}$</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 12. Storage Condition

5.5. Recommended Reflow Profile

Reflow times ≤ 2 times (Max.)

TEL:021-52709556

Email:sales@mxchip.com

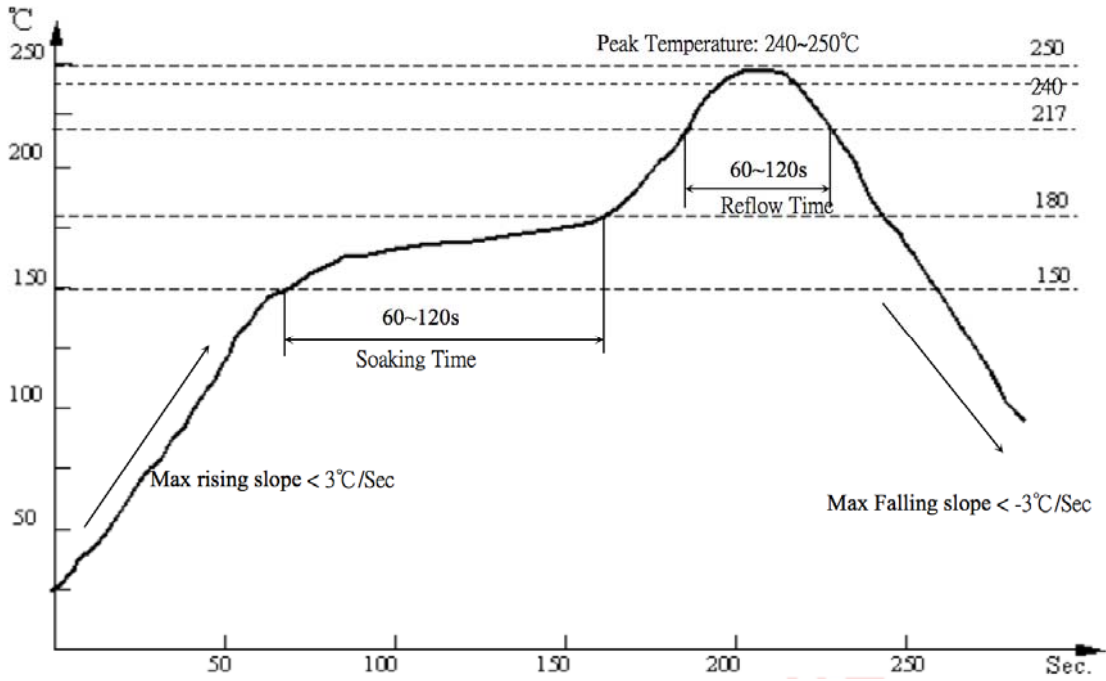


Figure 13. Temperature Curve

TEL:021-52709556

Email:sales@mxchip.com

6.Label



Label of EMW3081-E



Label of EMW3081-P



Label of Location

7.Firmware encrypt

Firmware version : 0000.0000.AL10

In order to make sure the firmware could not be modified after programming in the module by unauthorized party, firmware must be encrypted with the bootloader drivers and the chip ID MXCHIP offered.

Bootloaderdriver is used to drive the device in the module and integrated with one AES encryption way. The application part of the firmware must be combined with the bootloader driver to generate one MVA/bin file after adding the chip ID details which can be used to identify MXCHIP module. Check the official website for more information.

Note:

Unauthorized party is forbidden from modification.

Everyone cannot change new firmware by anyway , otherwise it will cause bad work.

8.FCC Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

RF Exposure Information

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm

TEL:021-52709556

Email:sales@mxchip.com

between the radiator & your body.

This module is only used into fixed host applications.

The module is only for integration in fixed applications.

Label Information to the End User by the OEM or Integrators

This Module used affixed label with FCC ID: P53-EMW3081. If the FCC ID of this module is not visible when it is installed inside another device, then the outside of the device into which the module is installed must be label with "Contains FCC ID: P53-EMW3081".



Label of EMW3081-E

Label of EMW3081-P

The labels above must be included in the application for equipment Authorization;

This module complies with Part 15 of the FCC rules, but the usage of module by integrator (OEM) is subject to and fully informed of the following conditions:

Integrator (OEM) is Responsible for ensuring host complying with the according FCC rules, when module collocates with other radiators operating individually or simultaneously. This includes compliance for the summation of all emissions from all output occupying the same or overlapping frequency ranges, as defined by the applicable FCC rules.

Necessary actions by integrator (OEM) on final host devices with compliance and authorization:

The integrator shall not use any other antennas except the approved one or same type with same in and out of band characteristics, otherwise additional approvals are necessary.

 TEL:021-52709556

 Email:sales@mxchip.com

Changes or modification unapproved on module may break compliance, otherwise additional approvals are performed.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

 TEL:021-52709556

 Email:sales@mxchip.com

9.Sales Information and Technical Support

If you need to get the latest information on this product or our buy this product , please call us during the working hours.

Office hours :

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

Telephone: +86-21-52655026

Contact address: 9F, 5 Building, No.2145 Jinshajiang Road, Shanghai, China

Postcode : 200333

Email: sales@mxchip.com