MXCHIP®

Data Sheet

EMC3090 Wi-Fi/BLE Module

Built-in ARM Cortex-M33 MCU
2.4G Hz IEEE 802.11 b/g/n, Bluetooth 4.2
ultra-high integration, rich peripherals

Version: 1.6 Date: 2023-09-22 Number: DS0169EN

Abstract

- **Input Voltage：3.0V~3.6V**
- **Operating Temperature：**-20℃ to +85℃
- **Processor: Cortex-M33 Processor Core MX1300CF**
  - MX1300CF: Main frequency up to 100MHz
  - SWD/JTAG simulation debugger interface

Memory

- 256K bytes SRAM
- 384 bytes OTP memory area
- 2M bytes XIP flash

Wi-Fi

- IEEE 802.11 b/g/n 1T1R 2.4GHz Single Frequency
- Support HT20, up to 65Mbps@MCS7
- 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

Bluetooth

- Bluetooth Low Energy BLE compliant with the 4.2 standard
- Wi-Fi and BLE time division multiplexing, sharing the same PA and antenna
- Support Bluetooth slave mode, can be used for Bluetooth distribution network

Rich Peripherals

- 14 x GPIO
- 1 x SPI，1 x I2C
- 8 x PWM
- 3 x UART，support hardware flow control
- Low-energy RTC

- **Interface and Dimension**
  - Maintain pin compatibility with similar package modules
  - stamp hole
  - PCB antenna: 18mm x 20mm x 3mm
  - IPEX connector antenna: 18mm x 14.3mm x 3mm
  - Provide 5V serial port connector
- **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

Order Code

Order Code	Description
EMC3090-EZI5	IPEX connector antenna, tray package Working Temperature:-20℃-85℃
EMC3090-PZI5	PCB antenna, tray package
EMC3090-EZI7	IPEX connector antenna, tray package Working Temperature:-40℃-105℃
EMC3090-PZI5-TR	PCB antenna, 18mm x 20mm
EMC3090-EZI5-TR	IPEX connector antenna, 18mm x 14.3mm
EMC3090-PZI5-T10	5V serial port, PCB antenna
EMC3090-EZI5-T10	5V serial port, IPEX connector antenna

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Order Code

For example, **EMC 3 09 0 -E Z I 5 -xxx**

Product Series

EMC=IoT Wi-Fi/BLE Module

Product Type

3=Welding type wireless module

Typical target applications and features

09=IOT Application 9 Series

Dimensions, enhancements

0 = 2 x 9pin 2.0 Spacing stamp hole

RF Interface

P = 18mm x 20 mm, 2.4GHz On-Board PCB Antenna

E = 18mm x 14.3mm, 2.4GHz External Antenna IPEX Connector

PSRAM capacity (optional)

Z=No PSRAM

Flash capacity

I = 2M bytes of flash storage

Temperature range

5 = Industrial grade temperature range, -20 ° C ~ 85 ° C

7 = Industrial grade temperature range, -40 ° C ~ 105 ° C

Optional

TR = tape reel package (default package is tray)

T10 = The module is soldered to the T10 switching board (provide 5V UART socket).

T10B0 = The module is soldered to the T10 switching board (provide 5V UART socket), spray glue

T10B1 = The module is soldered to the T10 switching board (5V UART socket provided), mounted in the glue box, and then glued.

T10B2 = The module is soldered to the T10 motherboard (5V UART socket provided), mounted in the pouring glue box, and then pouring glue.

For a list of all relevant features (e.g. packaging, minimum order quantity, etc.) and other information, please contact your nearest MXCHIP point of sale or distributor.

Accessories

Order Code	Description
MXKIT-Base	Development board for all EMC3090 modules
MXKIT-Core-3090	The development board core board for the EMC3090, used with MXKIT-Base
FX-3090	EMC3090 production fixture with accompanying test board： MXKIT-Base, MXKIT-Core-3090

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Release Note

Date	Version	Description
2020-04-20	0.1	Initial version
2020-05-18	1.0	Add a recommendation wrapper diagram
2020-06-05	1.1	Correct some typographical errors, update pin definitions and device package diagrams
2020-07-16	1.3	Add T10 conversion board related data
2020-09-09	1.4	Update order code information
2022-09-28	1.5	Update dimension diagram
2023-09-22	1.6	1. Update Pin definition table and description 2. Add working current parameter 3. Add order code information

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1. Introduction

The EMC3090 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.

EMC3090 module has a built-in ultra-highly integrated Wi-Fi/BLE Combo microcontroller MX1300CF, which provides the necessary computational capability and stable Wi-Fi/BLE connectivity for IOT data terminals. The chip integrates:

- Cortex-M33 core clocked up to 100MHz
- 256K bytes of SRAM
- 2M bytes XIP Flash
- 2.4GHz Wi-Fi controller conforming to IEEE 802.11 b/g/n standard
- Bluetooth Low Energy Controller that complies with BT4.2 BQB specifications

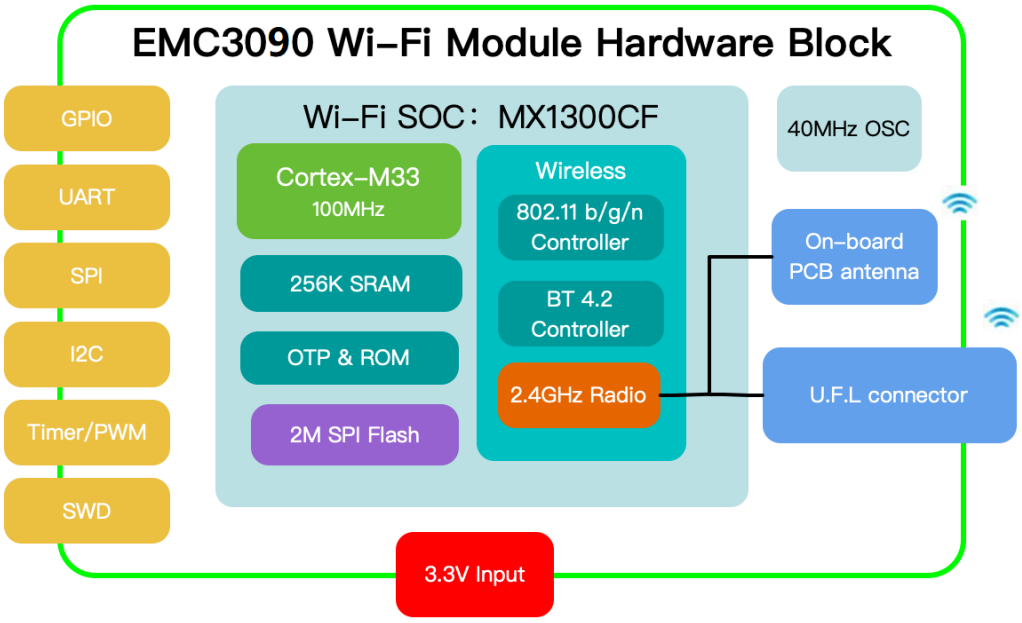
EMC3090 module is powered by a single 3.3V power supply, supports stamp hole installation, and is suitable for various smart home appliances application scenarios.

Shanghai MXCHIP provides MXOS software platforms to support the development of EMC3090 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 EMC3090 module, which mainly includes:

- Wi-Fi microcontroller MX1300CF
- Onboard or external antenna
- Power supply and communication interface

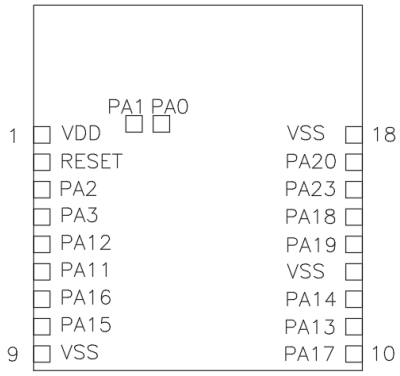
Figure 1 EMC3090 Hardware Block Diagram



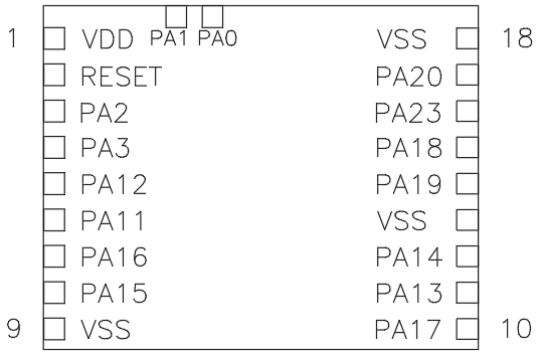
2. Pin Definition

2.1. Pin Arrangement

Figure 2 Pin Arrangement



EMC3090-P



EMC3090-E

2.2. Pin Definition

Table 1 pin definition

Pin No.	Name	I/O	Function Description	Recommended Usage
1	VDD	Power	3.3V power input	3.3V
2	CHIP_EN(3) (5)	I	RESET	RESET
3	PA_2	I/O	PA_2/PMW2/SPI_CS	PMW2
4	PA_3	I/O	PA_2/PWM3/SPI_CLK	PWM3
5	PA_12	I/O	PA_12/UART0_RX/SDA	UART0_RX(1)
6	PA_11	I/O	PA_11/UART0_TX/SCL	UART0_TX(1)
7	PA_16 (2) (5)	I/O	PA_16/UART2_TX/SPI_CLK	DEBUG_TX
8	PA_15(2) (5)	I/O	PA_15/UART2_RX/SPI_CS	DEBUG_RX
9	VSS	GND	GND	GND
10	PA_17	I/O	PA_17/PWM5	PWM5
11	PA_13(1)	I/O	PA_13/UART0_RX	UART0_RX(1)
12	PA_14	I/O	PA_14/UART0_TX	UART0_TX(1)
13	VSS	GND	GND	GND
14	PA_19(1)	I/O	PA_19/ELINK/SPI_MOSI/UART2_CTS	ELINK
15	PA_18	I/O	PA_18/PWM6	PWM6
16	PA_23	I/O	PA_23/PMW7	PMW7
17	PA_20 (1)	I/O	PA_20/BOOT/SPI_MISO/UART2_RTS	BOOT
18	VSS	GND	GND	GND
TP	PA_1	I/O	SWDIO/PWM_1/UART1_TX	
TP	PA_0	I/O	SWDCLK/PWM_0/UART1_RX	

Annotation: (1) User serial port UART0_ RX, UART0_ TX, preferred Pin11, 12.

Special precautions:

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 2:

Table 2 operation mode

Operation Mode	PA_0 Default: 0	PA_13 Default: 0	PA_20 (BOOT) Default: 1	PA_19 (ELINK) Default: 1	Remarks
ISP Program Mode	1	1	Not detected	Not detected	ISP burn mode
Test mode	1	0	Not detected	Not detected	Chip reserving
ATE	0	Not detected	0	1	ATE test mode
QC		Not detected	0	0	QC detect mode
Normal		Not detected	1	Not detected	Normal

(1). ISP Program Mode, Test mode and Normal mode are detected by hardware at startup. PA_0 and PA_13, because it is a function of hardware solidification, it cannot be modified.

(2). QC, ATE and APP modes are judged by the firmware provided by MXCHIP, and the detection conditions and functions can be adjusted by modifying the firmware.

(3). ISP Program Mode function contempt: In the startup phase, if the processor hardware detects that the levels of PA_0 and PA_13 are high, it enters ISP programming mode. In the ISP programming mode, the flash of the module can be programmed through UART2 (PA_16, PA_15).

(4). Test mode is the reserved mode of the chip and will not be used.

(5). After the startup is completed, when the processor runs the firmware provided by MXCHIP, the firmware detects the status of PA_20 and PA_19 to enter the corresponding working mode. among them:

- ATE mode: a series of serial commands are provided to make the radio frequency in a specific transceiver mode, so that the instrument can be tested and calibrated.
- QC mode: used to self-check the hardware during production and generate QC information for the production device to check the quality of the module.
- Normal working mode: Normal operation mode of the module.

2. The UART2 serial port is used for the input / output of debugging information. Do not use it during design and provide as easy a way as possible 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 the 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.
5. The processing of chip pins inside the module is as follows:
   - PA_0, PA_1, PA_23: 10K pull-down resistor.
   - CHIP_EN: 100K pull-up resistor and 22nF capacitance to ground.

3. Electric 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 3 Absolute Maximum Parameter: Voltage

Symbol	Ratings	Min	Max	Unit
Ts	Storage temperature	-40	105	℃
VDD	Power supply voltage	-0.3	3.6	V
VDD–VSS	Voltage	–0.3	3.6	V
VIN	Input voltage on any other pin	VSS−0.3	VDD+0.3	V

3.2. Working Condition

Table 4 Operating Parameters: Rated Voltage and Current

Symbol	Note	Specification			
		Min.	Typical	Max.	Unit
V_{DD}	Voltage	3.0	3.3	3.6	V
I_{VDD}	3.3V inrush current	-	-	400	mA
I_{VDD}	3.3V，RF Tx CCK 11M 21dBm，peak current	-	-	600	mA

Table 5 Working parameters: Working Current

Symbol	Note		Specification			
	CPU	Wi-Fi	Min.	Typical	Max.	Unit
I_{VDD}	Shut Down	Wi-Fi OFF	-	10	-	μA
I_{VDD}	Deep Sleep	Wi-Fi OFF	-	30	-	μA
I_{VDD}	Standby	Wi-Fi OFF	-	200	-	μA
I_{VDD}	Sleep	Wi-Fi OFF	-	450	-	μA
I_{VDD}	Active	Wi-Fi OFF	-	9	-	mA
I_{VDD}	Active	TX@MCS7/HT20，14dBm	-	198	-	mA
I_{VDD}	Active	TX@MCS7/HT20，16dBm	-	218	-	mA
I_{VDD}	Active	TX@OFDM54M, 15dBm	-	207	-	mA
I_{VDD}	Active	TX@OFDM54M, 17dBm	-	230	-	mA
I_{VDD}	Active	TX@CCK11M, 18dBm	-	249	-	mA
I_{VDD}	Active	TX@CCK11M, 21dBm	-	315	-	mA
I_{VDD}	Active	RX@MCS7, HT20 (Pin= -60dBm)	-	67	-	mA
I_{VDD}	Active	RX@OFDM54M (Pin= -60dBm)	-	TBD	-	mA
I_{VDD}	Active	RX@CCK11M (Pin= -60dBm)	-	61	-	mA
I_{VDD}	Active	RF Standby	-	33	-	mA
I_{VDD}	Active	RF disable	-	24	-	mA

(1) The above parameters were measured in a wireless shielding environment in the laboratory.

(2) The power consumption of Flash is not included in the data in Table 5. When reading code or reading and writing data from Flash, the power consumption of Flash shall not exceed 20mA, and the power consumption of Flash in standby mode (CS signal raised) shall not exceed 50 μ A.

3.3. General I/O Port

Table 6 DC Parameters: 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		1.377	1.683	1.908	V
I_{T-}	Schmitt-trigger Low Level		0.729	0.957	1.116	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 7 operation parameter: Typical RF power consumption

Mode	Average	Max.	Unit	Note
Wi-Fi off	18.2	20	mA	CPU Active
Keep Wi-Fi connected	82.4	97.4	mA	Turn off Wi-Fi and MCU low power consumption
Keep Wi-Fi connected	35.6	97.4	mA	Turn on Wi-Fi low power consumption and MCU low power consumption, DTIM = 1
Keep Wi-Fi connected	TBD	TBD	mA	Turn on Wi-Fi low power consumption and MCU low power consumption, DTIM = 3
SoftAP mode	67.9	244.6	mA	SoftAP networking status
Monitor mode	86.4	101.5	mA	Distribution process, in RX state
Iperf mode	TBD	TBD	mA	Turn off the low power consumption of Wi-Fi and MCU, iperf sends at full speed

3.5. ESD

Table 8 Electrostatic discharge parameters

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

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

3.6. RF parameter

3.6.1. Wi-Fi Parameter

Table 9 Wi-Fi Parameter

Item	Specification
Operating Frequency	2.412~2.484GHz
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 65Mbps
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.

TX Performance

Table 10 Output Power

TX Characteristics	Min.	Typical	Max.	Unit
Power@11Mbps, 802.11b	14	16.5	18	dBm
Power@54Mbps, 802.11g	13	14.5	16	dBm
Power@HT20, MCS7,802.11n	11	12.5	14	dBm

Table 11 Frequency error

TX Characteristics	Min.	Typical	Max.	Unit
Frequency Error	-15	-	+15	ppm

Table 12 EVM

TX Characteristics	Min.	Typical	Max.	Unit
EVM@11Mbps, 802.11b	-	-20	-10	dB
EVM@54Mbps, 802.11g	-	-29	-25	dB
EVM@HT20, MCS7,802.11n	-	-31	-27	dB

RX performance

Table 13 RX sensitivity

RX Characteristics	Min.	Typical	Max.	Unit
Minimum Input Level Sensitivity				
PER≦8%@11Mbps,802.11b	-	-88	-	dBm
PER≦10%@54Mbps,802.11g	-	-75	-	dBm
PER≦10%@HT20, MCS7, 802.11n	-	-72	-	dBm

3.6.2. Bluetooth RF parameter

Table 14 Bluetooth TX/RX Parameters

Item	Min	Typical	Max	Unit
TX_AVERAGE	4	6	8	dBm
Drift	-	-4	-	KHz
ICFT	-	-15	-	KHz
Modulation characteristics:				
ΔF1avg	-	246	-	KHz
ΔF2avg/ΔF1avg	-	0.92	-	
ΔF2max	-	220	-	KHz
Adjacent channel transmit power				
F = F0 + 1MHz	-	-10	-	dB
F = F0 + 1MHz	-	-10	-	dB
F = F0 + 2MHz	-	-45	-	dB
F = F0 - 2MHz	-	-45	-	dB
F = F0 + 3MHz	-	-50	-	dB
F = F0 - 3MHz	-	-50	-	dB
F = F0 +> 3MHz	-	-50	-	dB
F = F0 -> 3MHz	-	-50	-	dB
RX Characteristics				
Minimum Sensitivity	-	-96	-	dBm

4. Antenna Information

EMC3090 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

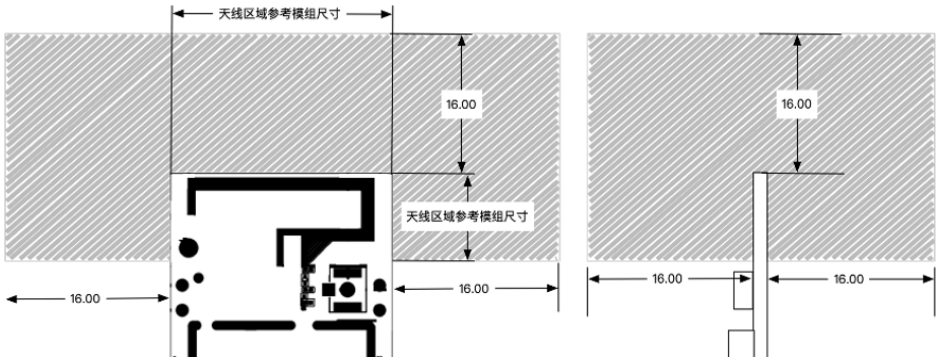
Table 15 On-board PCB parameter

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 3 Antenna minimum clearance area (unit: mm)

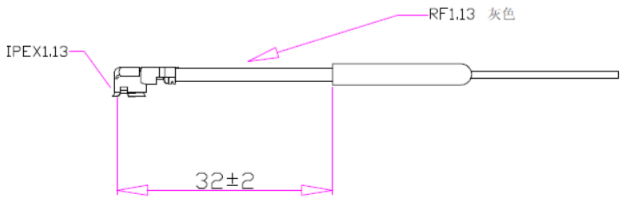


4.3. External antenna parameters and use

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

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

Figure 4 Copper tube antenna size



Frequency range：2400-2500 MHz

Input impedance：50 OHM

VSWR：< 2.0

Gain：2.0DBI

Polarization: vertical

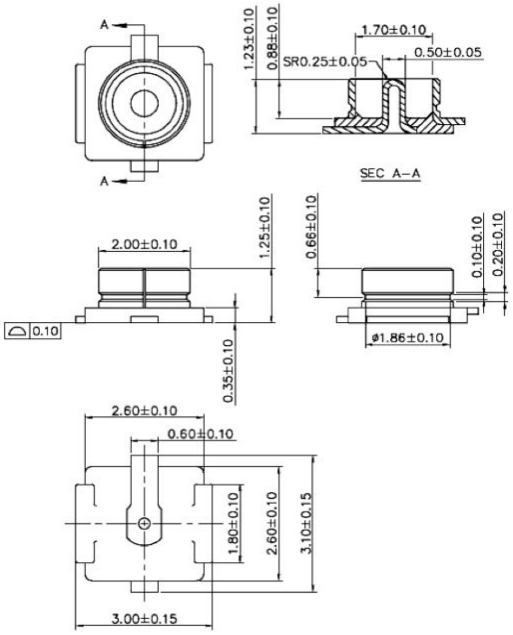
Directivity: Omnidirectional

Copper tube: 4.4 * 23mm

Wire: 1.13 gray wire L-82mm

External antenna IPEX seat size:

Figure 5 Dimension drawing of external antenna connector



4.3.1. SRRC Important statements

The SRRC type approval number obtained for module models using an external antenna base has the (M) suffix and any module with the (M) suffix is specifically declared as follows.

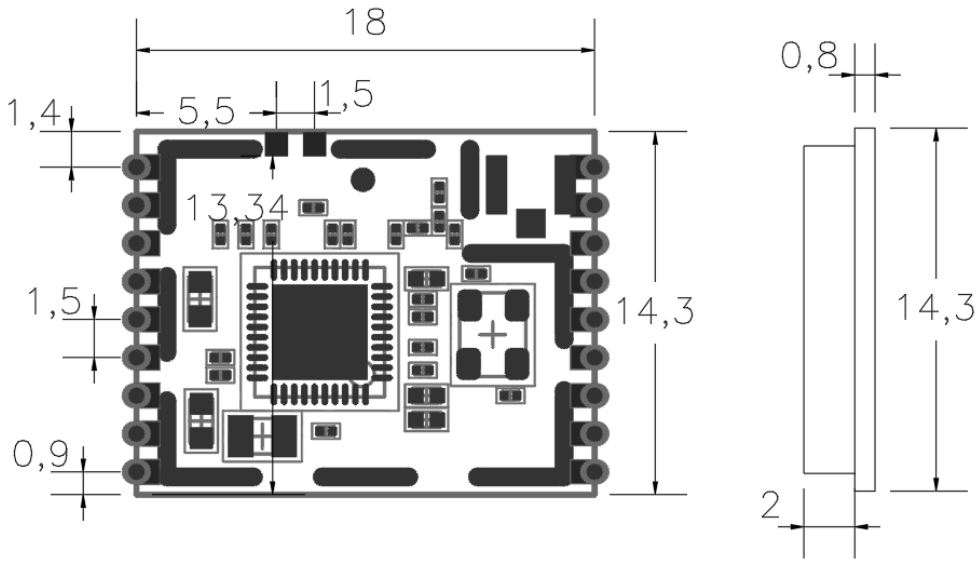
Type approval of a module does not imply that the end equipment in which the module is embedded or in which it is used complies with the relevant radio regulations or standards, and the end equipment manufacturer is responsible for the conformity of the technical characteristics of the product with the radio regulations or standards.

5. Dimensions and Production Guidance

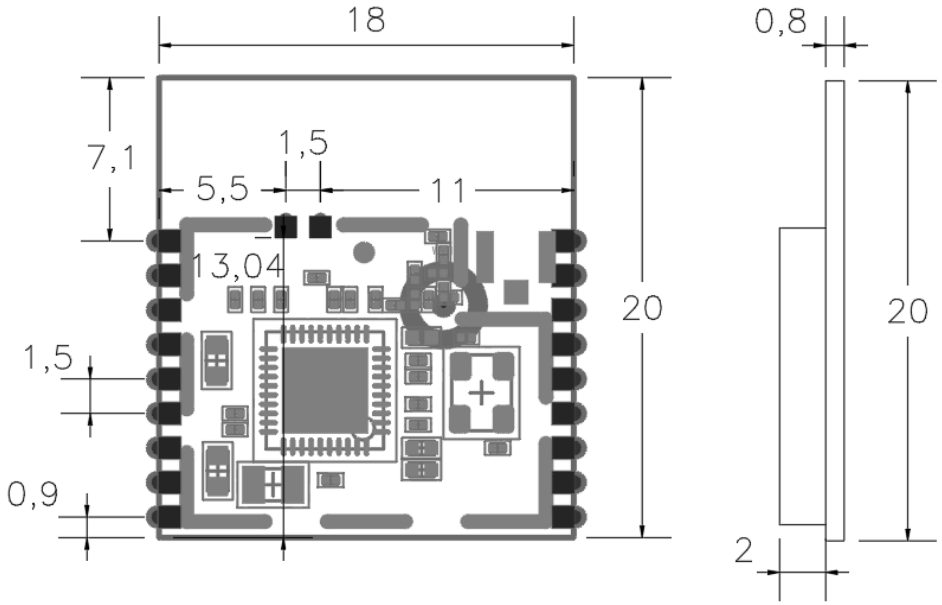
5.1. Assembly Dimension Diagram

Figure 6 Assembly Dimension Diagram（unit: mm, tolerance: ±0.1, outside tolerance±0.2）

EMC3090-E

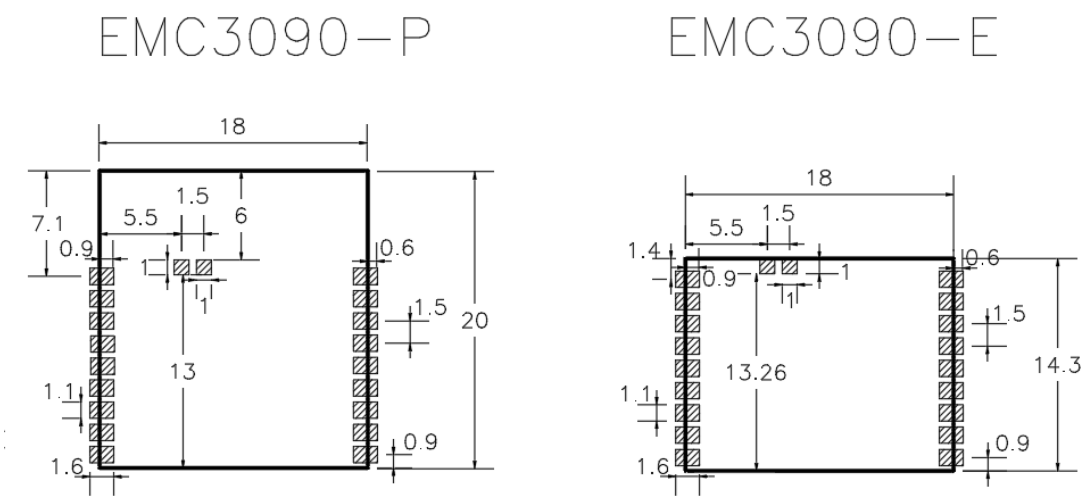


EMC3090-P



5.2. Recommended Package Drawing

Figure 7 Package dimension (unit: mm, tolerance: ±0.1)



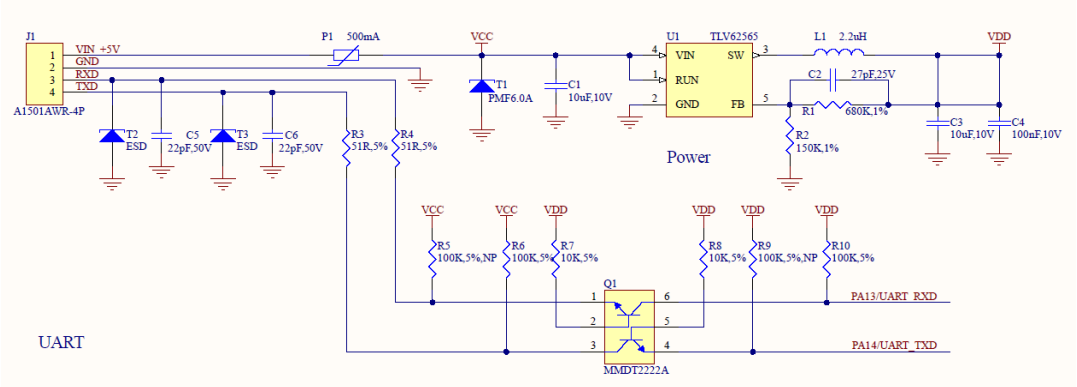
6. Solder-free serial port connectivity solutions: T10

The EMC3090 can be equipped with a dedicated T10 adapter, glue spray box, and glue pouring box to provide a direct cable connection to the serial socket for easy installation.

6.1. DCDC convert circuit

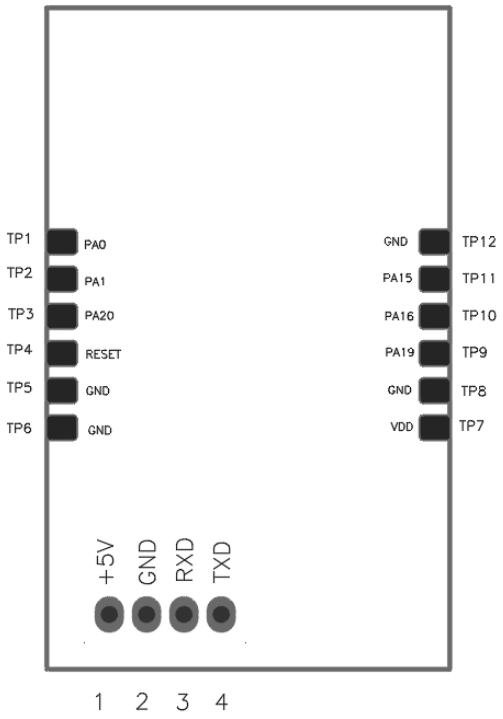
The EMC3090 provides a T10 adapter board with high-efficiency 5V/3.3V DC-DC power conversion and UART level conversion circuitry to accommodate external 5V level signals. The inlet side of the power supply is protected by PTC and TVS, and some devices are subject to actual use. The reference schematic diagram is shown below.

Figure 11 DCDC circuit schematic



6.2. Pin Arrangement of the Switching Board

Figure 8 T10 pin arrangement



6.3. T10 Pin Definition Table

Table 16 T10 pin arrangement

Pin No.	Name	I/O type	Function
1	VDD	Power	5V power supply
2	VSS	GND	GND
3	RXD	I/O	RXD
4	TXD	I/O	TXD

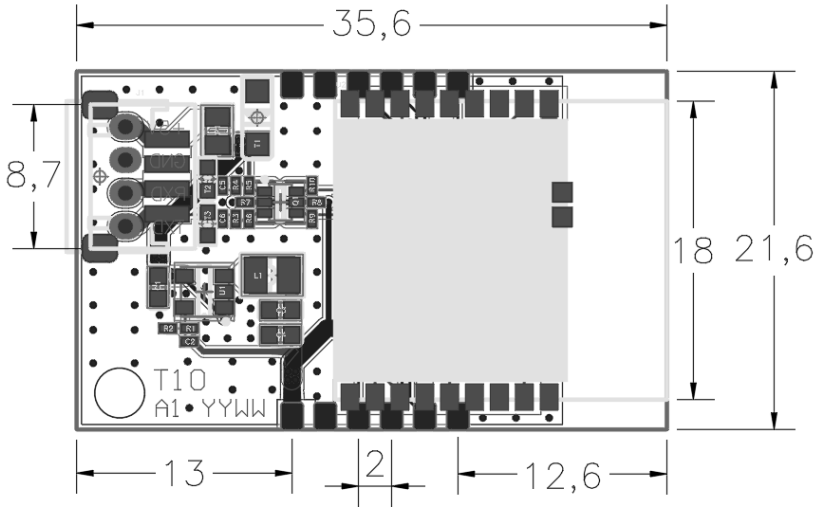
Table 17 T10 test point definition

Pin No.	Name	I/O type	Function
TP1	PA_0	I/O	PA_0/SWD_CLK
TP2	PA_1	I/O	PA_1/SWD_DIO
TP3	PA_20	I/O	PA_20/BOOT
TP4	RESET	I	RESET
TP5	VSS	GND	GND
TP6	VSS	GND	GND
TP7	VDD	Power	3.3V INPUT
TP8	VSS	GND	GND
TP9	PA_19	I/O	PA_19/EINK
TP10	PA16	I/O	PA_16/DEBUG_TXD
TP11	PA_15	I/O	PA_15/DEBUG_RXD
TP12	VSS	GND	GND

6.4. Switching board Dimension

Figure 9 T10 Assembly dimension drawing

(unit: mm, tolerance: ±0.1，outside size tolerance: ±0.1)



6.5. Glue spray box dimension

Figure 10 Shell size of glue spray box (unit: mm)

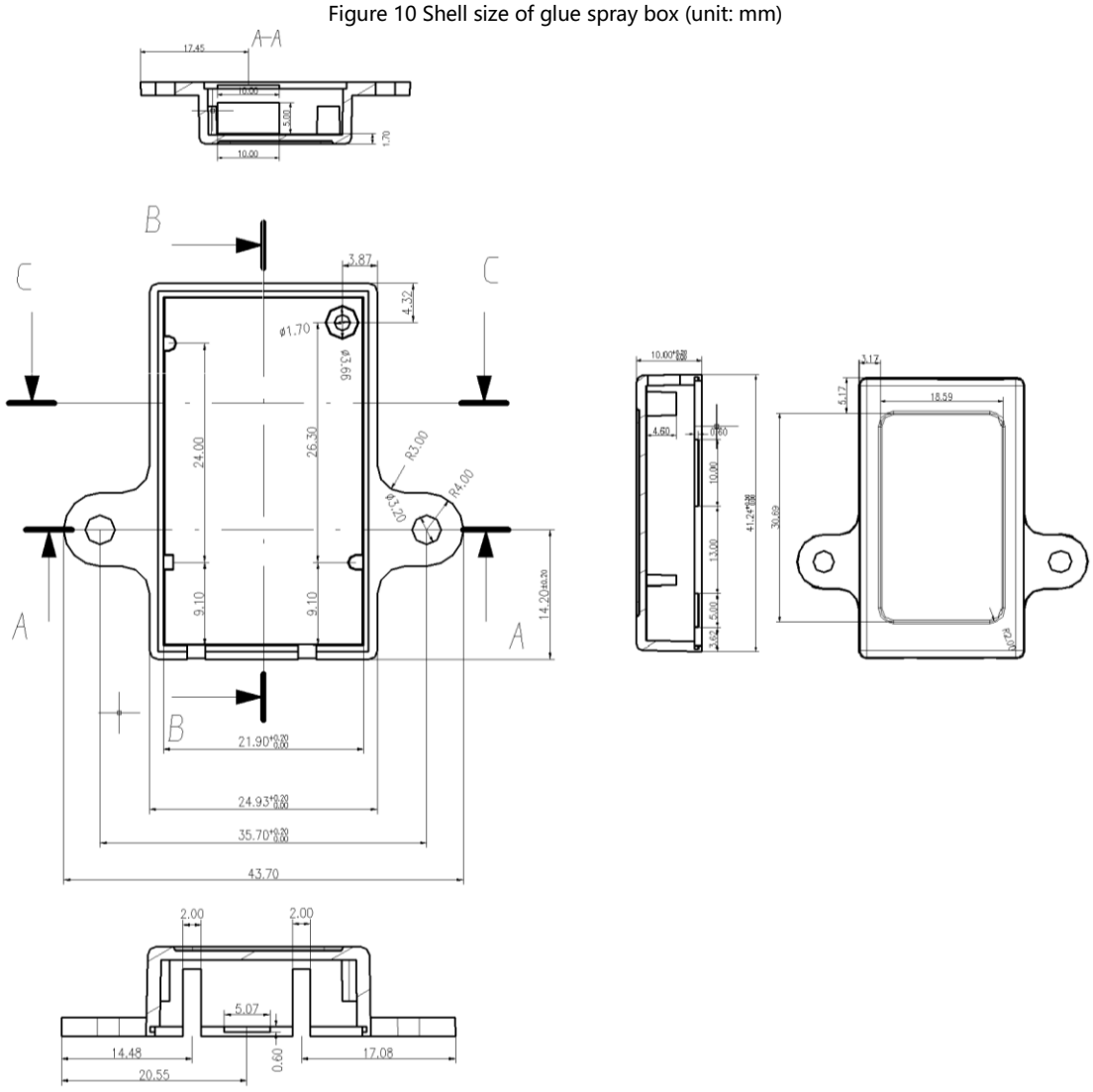
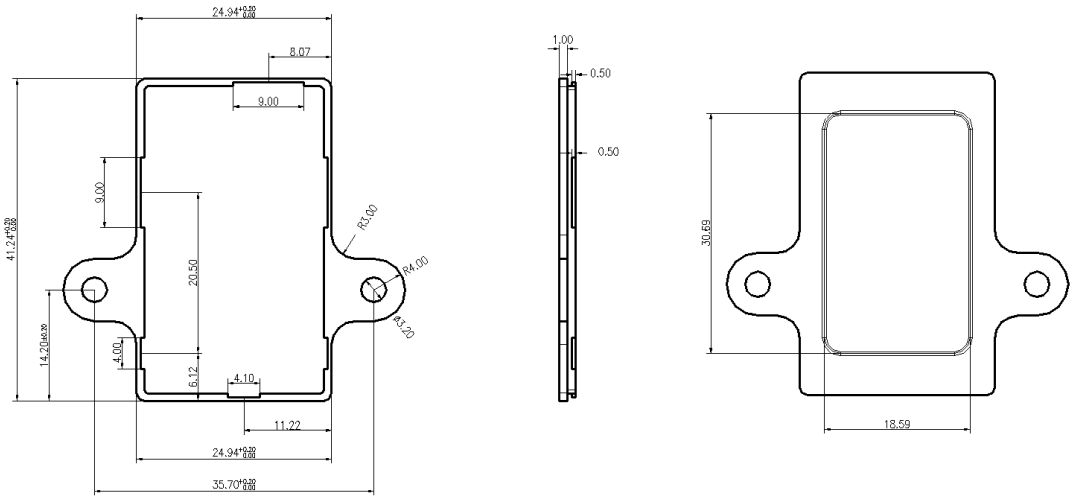
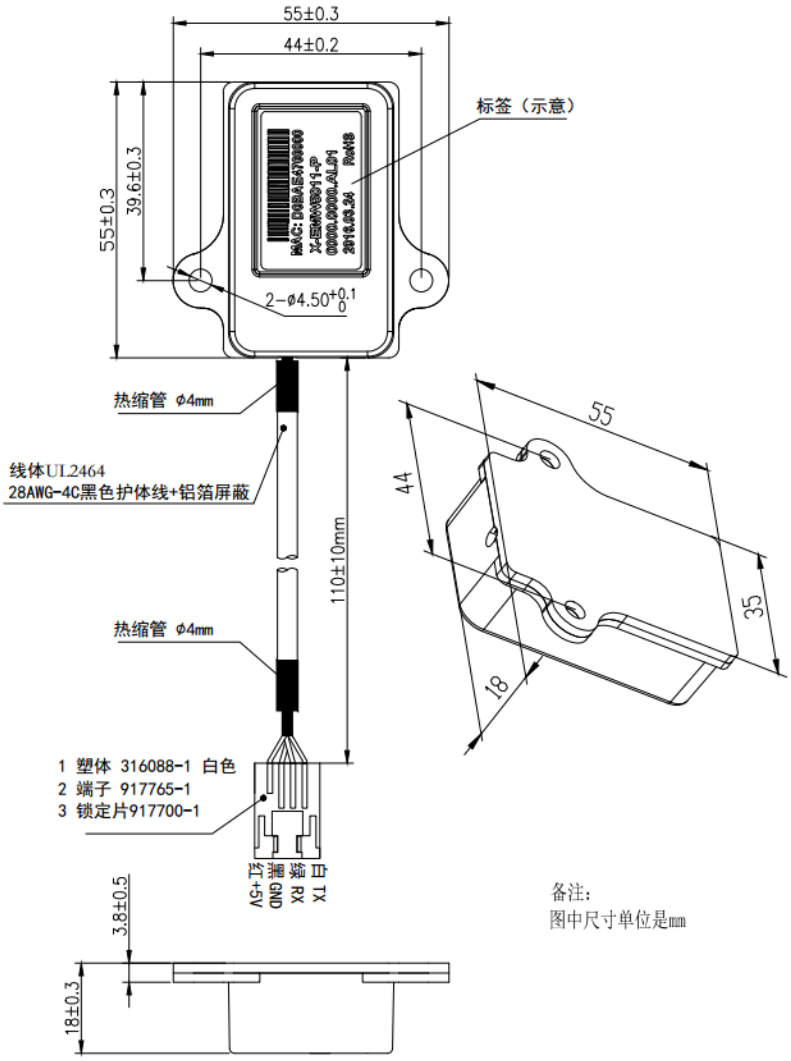


Figure 11 Cover plate size of glue spray box (unit: mm)



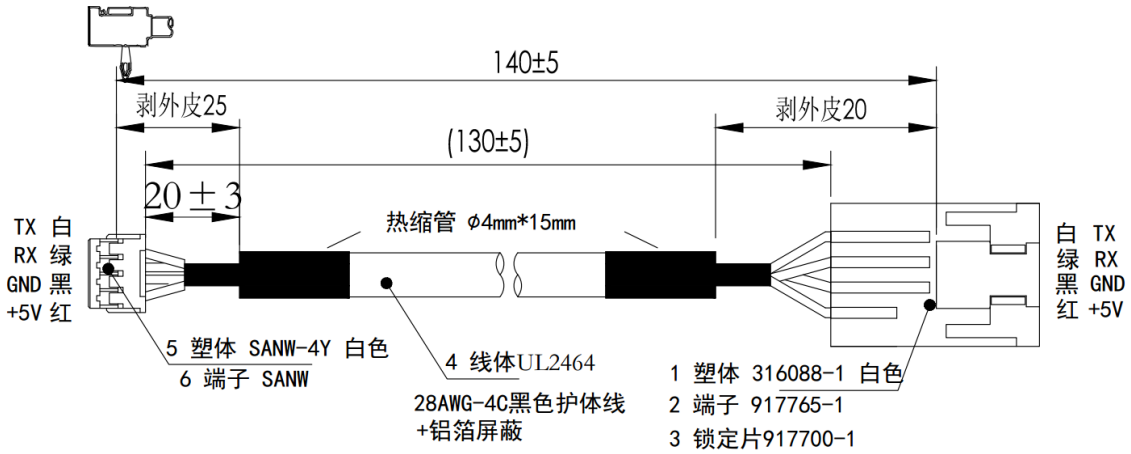
6.6. Glue pouring box dimension

Figure 12 Glue pouring box dimension (unit: mm)



6.7. Wiring harness dimension of Glue spray box

Figure 13 Wiring harness dimension（unit: mm）



7. Label Information

Figure 14 Label diagram

1. MXCHIP: Company Logo
2. EMC3090-E: Product Main Type
3. CMIIT ID: SRRC Model Authorization ID
4. FCC ID：FCC Authorization
5. ZI5: Product Auxiliary Model
6. X2023: Production serial number
7. B0F89379A30C: MAC Address

8. 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. The reflow temperature curve is shown in Chapter 9.

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.

8.1. 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.

8.2. Secondary reflow temperature curve

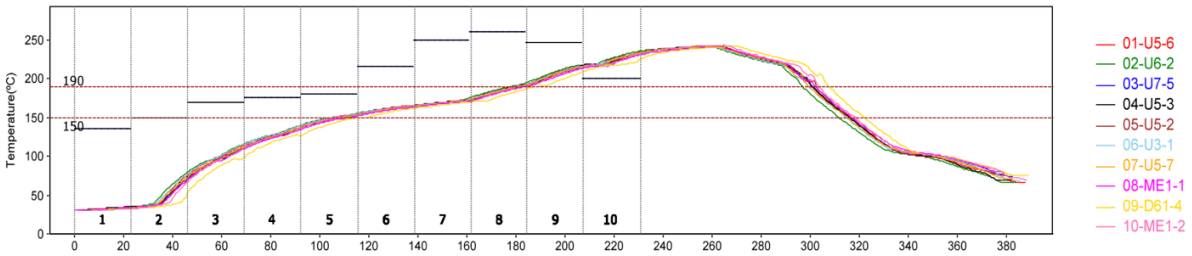
Recommended solder paste type: SAC305, lead free. No more than 2 reflow cycles. Peak temperature not to exceed 245°C. The following is a typical furnace temperature profile setting.

Table 18 Typical furnace temperature settings

Furnace settings	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	Z9	Z10

Upper temperature zone setting	135	150	170	175	180	215	250	260	247	200
Lower temperature zone setting	135	150	170	175	180	215	250	260	247	200

Figure 16 Typical secondary reflux temperature profile



- 30℃～150℃ preheating temperature rise: 0-3℃/s, typical value: 1.2℃/s
- 150℃～190℃ immersion time: 60-100second, typical value：72second
- Peak temperature: 245°C, typical value: 242°C
- Time above 220°C: 50 sec. to 90 sec. Typical value: 70 sec
- 217℃cooling speed: -3～0℃/s, typical value：-2.0℃/s

8.3. Storage Condition

Figure 17 Label diagram

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

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