



佳邦科技股份有限公司  
INPAQ TECHNOLOGY CO., LTD.

**MGAFF-U120-00**

## **Specification**

<b>Part Series</b>	<b>GNSS Receiver Module</b>
<b>Part Number</b>	<b>MGAFF-U120-00</b>
<b>Version</b>	<b>V0.2</b>

# Contents

1. Overall .....	3
2. Feature .....	3
3. Application .....	4
4. Pin Configuration and Function .....	5
4.1 Pin Configuration (Top View).....	5
4.2 Pin Function .....	5
5. Performance .....	6
5.1 RF performance .....	6
5.2 Digital performance .....	6
6. Application .....	7
6.1 with passive antenna .....	7
6.2 with active antenna .....	7
7. Electrical Specification .....	8
7.1 Absolution Rating.....	8
7.2 ESD Rating.....	8
7.3 Recommended Operation Conditions .....	8
7.4 Power consumption .....	8
8. Mechanical Specification .....	9
8.1 Outline Dimensions.....	9
8.2 PCB land pattern dimensions .....	10
9. Ordering Information.....	11
10. INPAQ relative and peripheral product .....	11
11. Manufacturing.....	12
11.1 Reflow Soldering Thermal Profile .....	12
11.2 Thermal profile parameter .....	12
12. Version .....	13

# 1. Overall

The MGAFF-U120 series is compact GNSS receiver module. The module support L1 band GNSS signal and multi system, GPS, GLONASS, Galileo, BeiDou and QZSS. The multi-system GNSS receiver will increase the visible satellite and improve navigate performance, fast acquisition time and position accuracy.

The MGAFF-U120 series provide fast TTFF time, acquisition time and up to 47 satellite channel. The module integrates a high rejection filter. That will reduce noise interface and enhance anti-jamming performance.

The MGAFF-U120 series is excellent and easy to use in navigation and position application. The package with stamp hole and compact, that is easy to mount on system board.

# 2. Feature

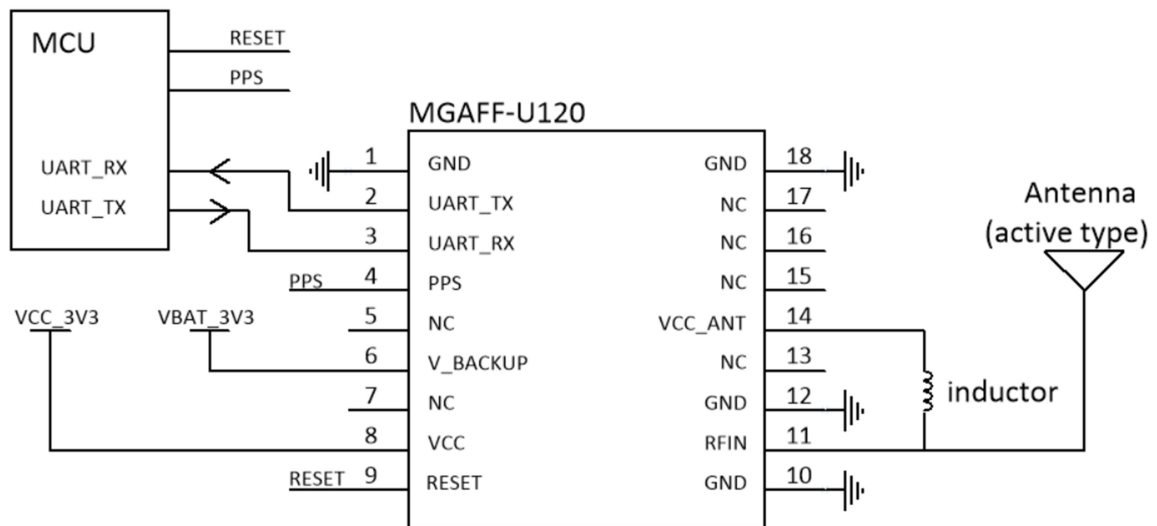
- L1 band GNSS receiver
- Support GPS, GLONASS, Galileo, BeiDou, QZSS
- Support Max. 47 channel
- Time to First Fixed (TTFF)
- Max 10Hz update rate
- Integrate high rejection filter (SAW filter)
- Integrate DC blocking in RFin port
- Signal voltage supply (3.3V)
- UART interface (1.8V level)
- Ultra-low power consumption
- ESD protection
- Ultra-compact module package (1010)
- Support SMD process
- RoSH/REACH Compliance
- CE/RED Certification (ETSI EN 303 413)



### 3. Application

- Personal position and navigation
- IoT
- Smart city

Simplified Schematic and application



## 4. Pin Configuration and Function

### 4.1 Pin Configuration (Top View)

GND	10	9	RESET
RFIN	11	8	VCC
GND	12	7	NC
NC	13	6	V_BACKUP
VCC_ANT	14	5	NC
NC	15	4	PPS
NC	16	3	UART_RX
NC	17	2	UART_TX
GND	18	1	GND

### 4.2 Pin Function

PIN		Type	Description
Number	Name		
2	UART_TX	O	UART transmit, 1.8V level
3	UART_RX	I	UART receive, 1.8V level
3	PPS	O	1PPS signal, 1.8V level
6	V_BACKUP	P	Backup Voltage supply
8	VCC	P	Voltage supply
11	RFIN	I	RF input, internal DC block
14	VCC_ANT	P	Voltage Supply for external active antenna
1, 10, 12, 18	GND	GND	Ground pin. Connect to system ground
5, 7, 13, 14, 15, 16, 17	NC	NC	No connect to internal circuit. Can be float.

## 5. Performance

### 5.1 RF performance

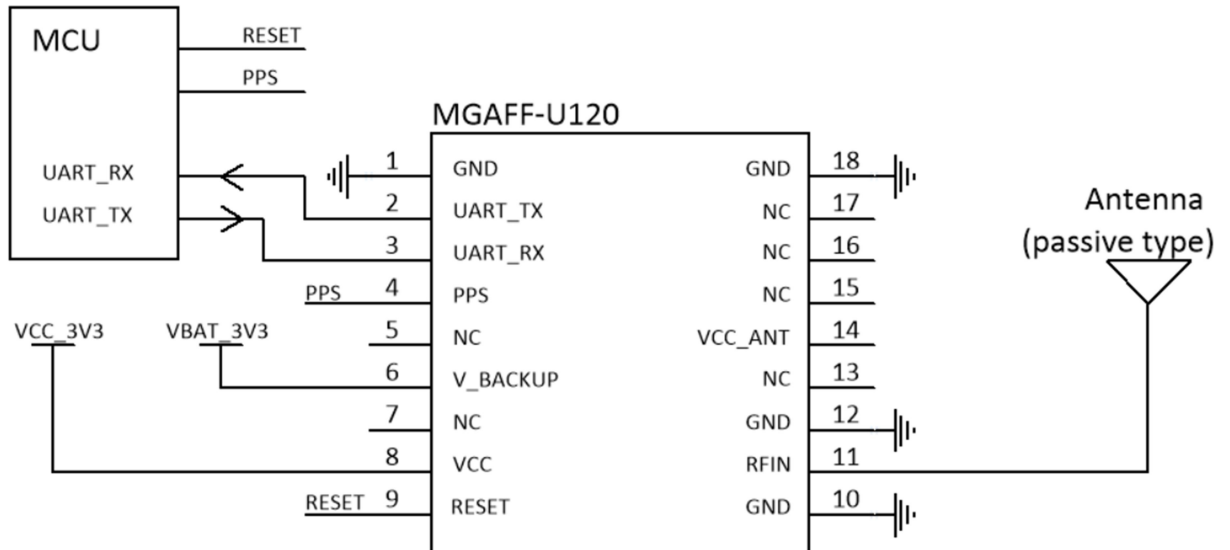
Parameter	Specifications
Frequency (MHz)	GPS: L1 C/A, 1575.42 GLONASS: L1, 1603.68 Galileo: E1,1575.42 BeiDou: B1, 1561.098 QZSS: L1, 1575.42
Channel	47
Timing Accuracy	1pps, +/-10ns
Update rate	1Hz
Sensitivity	Tracking: -163 dBm Acquisition: -146 dBm
TTF	Hot start: 1 sec Cold start: 28 sec
Position Precision (CEP)	2 m
Max input level	-40dBm

### 5.2 Digital performance

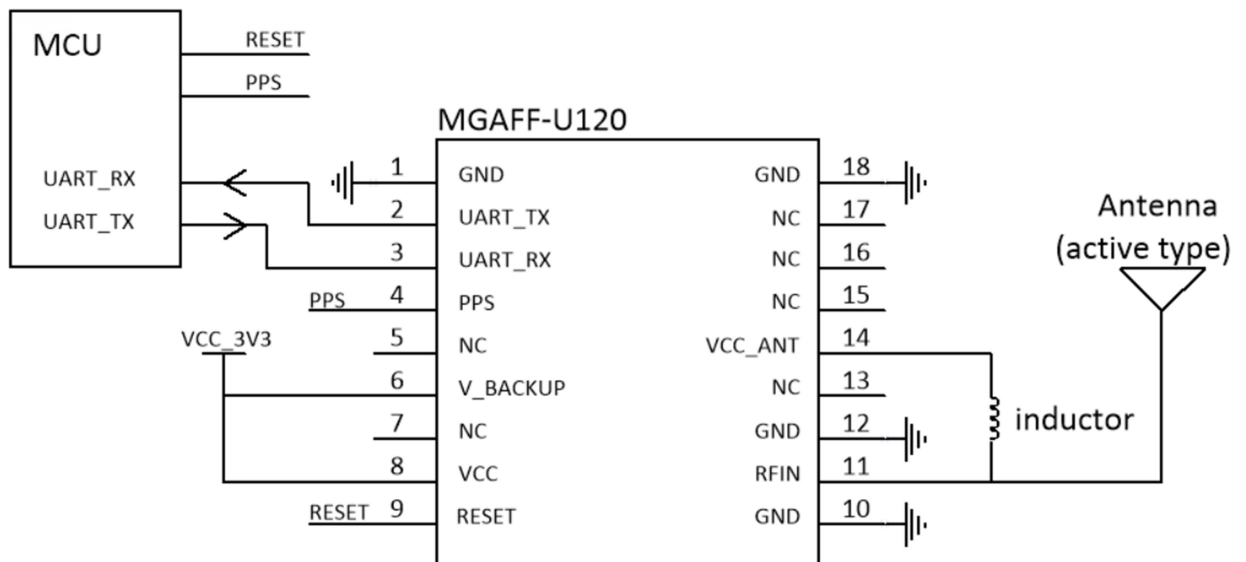
Parameter	Specifications
Update rate	1Hz
UART	9600 bps
Protocols	NMEA 0183

## 6. Application

## 6.1 with passive antenna



## 6.2 with active antenna



## 7. Electrical Specification

### 7.1 Absolution Rating

Parameter	Description	Min	Max	Unit
VCC	Voltage input		5.5	V
V_BACKUP	Backup voltage input		5.5	V
RF_IN	Max RF input level		-40	dBm

### 7.2 ESD Rating

Mode	JEDEC Specification	Min	Max	Unit
Human body model	JESD22-A114-F	-2000	2000	V
Charge device model	JESD22-C101-D	-500	500	V

### 7.3 Recommended Operation Conditions

Parameter	Description	Min	Max	Unit
VCC	Voltage input	3	5	V
V_BACKUP	Backup voltage input	3	5	V
V-IH	IO, UART	1.2	2.1	V
V-IL	IO, UART	-0.3	0.6	V
V-OH	IO, UART	1.4		V
V-OL	IO, UART		0.4	V
Temp-op	Operation temperature	-40	+85	°C
Temp-st	Storage temperature	-40	+105	°C

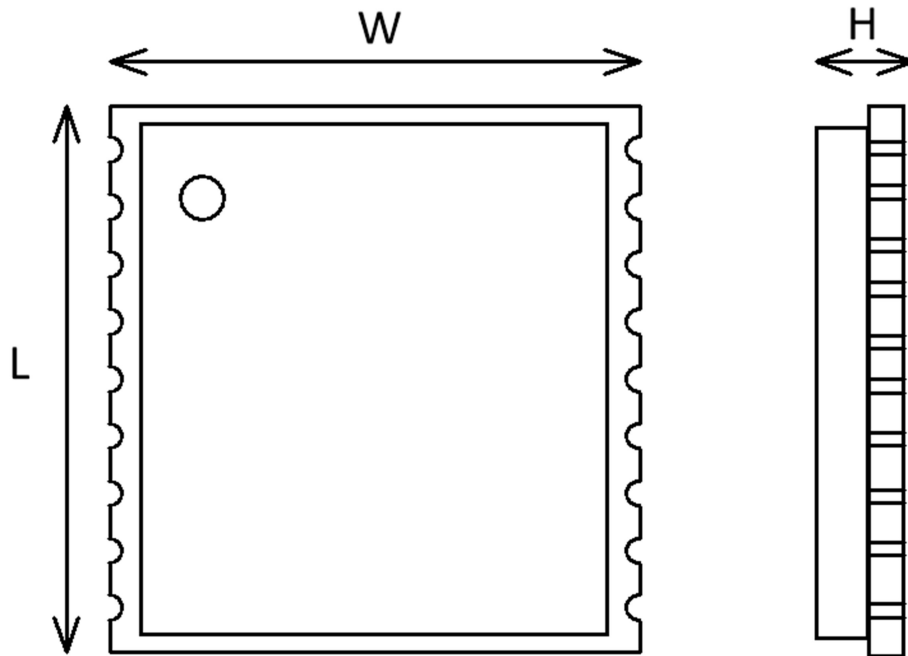
### 7.4 Power consumption

Parameter	Description	typical	Unit
Pcon	Power consumption	85	mW



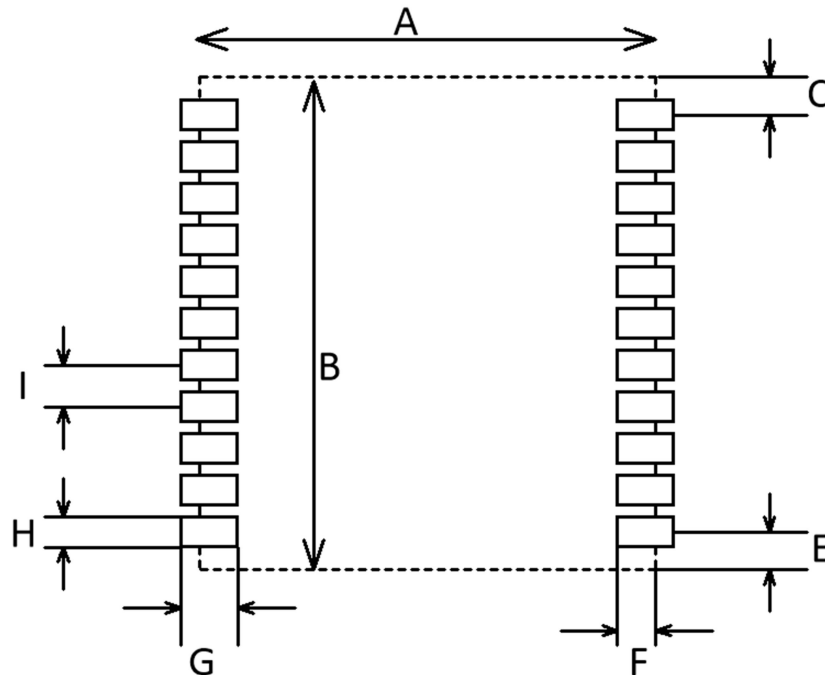
## 8. Mechanical Specification

### 8.1 Outline Dimensions



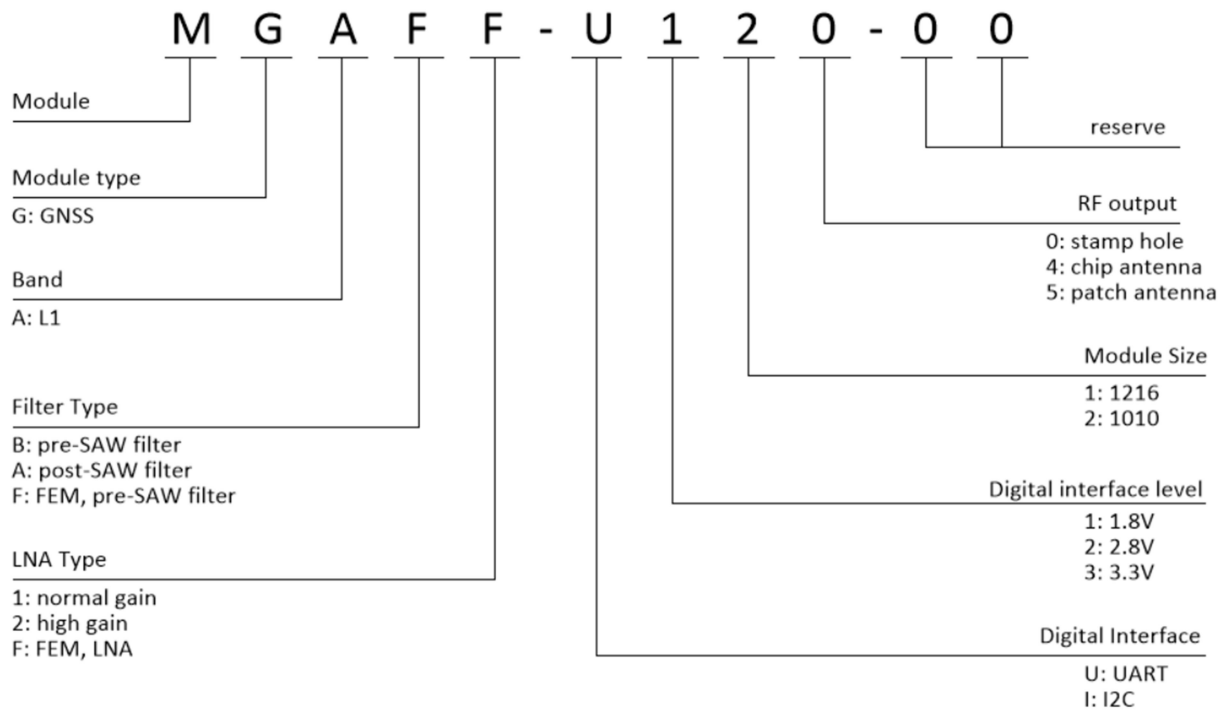
Symbol	Min (mm)	Normal (mm)	Max (mm)
W	9.5	9.7	9.9
L	9.9	10.1	10.3
H	2.4	2.5	2.7

## 8.2 PCB land pattern dimensions



Symbol	Min (mm)	Normal (mm)	Max (mm)
A	9.5	9.7	9.9
B	9.9	10.1	10.3
C	0.6	0.65	0.7
E	0.6	0.65	0.7
F	0.5	0.6	0.7
G	0.7	0.8	0.9
H	0.7	0.8	0.9
I	1.0	1.1	1.2

## 9. Ordering Information



Part Number	Description
MGAFF-U120-00	1612 SMD type module
MGAFF-U120-EV	Evaluation Board

## 10. INPAQ relative and peripheral product

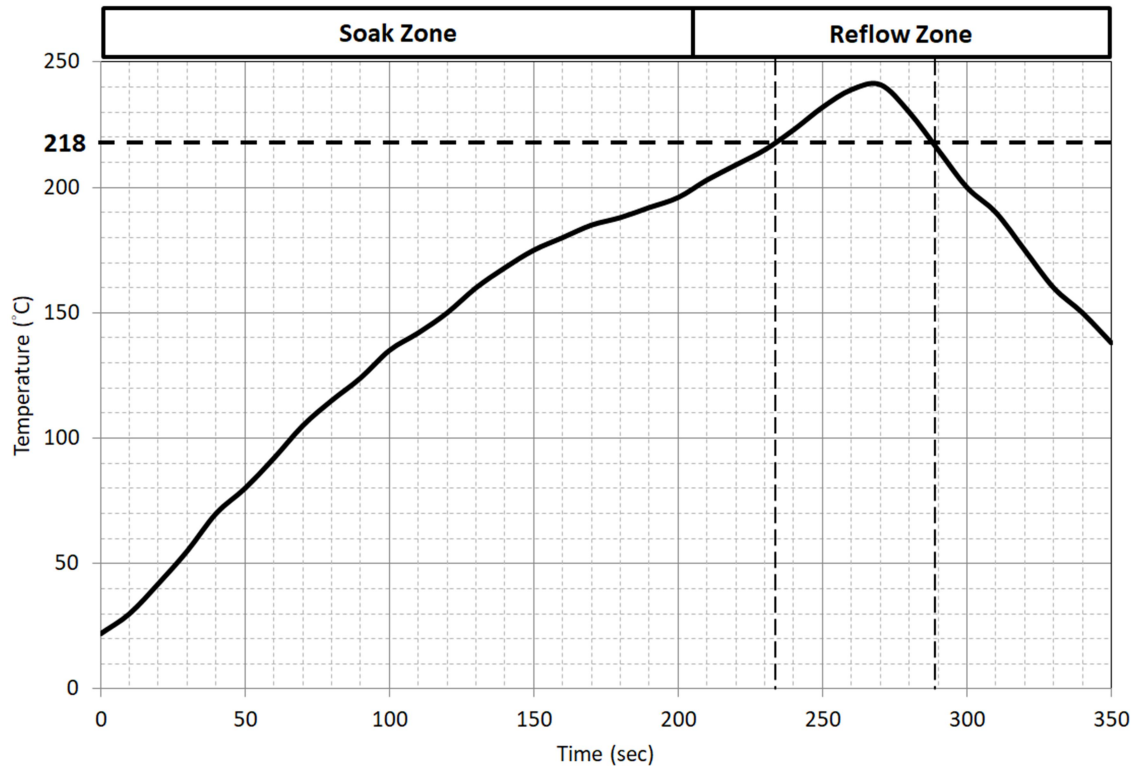
Series	Part Number	Description
GNSS receiver module	MGAFF-U120-00	Basic GNSS receiver module
GNSS patch antenna	*	Active patch antenna
GNSS patch antenna	*	Passive patch antenna

### NOTE

\* contact with INPAQ sales for detail antenna specification.

# 11. Manufacturing

## 11.1 Reflow Soldering Thermal Profile



## 11.2 Thermal profile parameter

Zone	Factor	Description
Soak Zone	Max slope	3°C/sec
	Soak time (150°C ~ 200°C)	60 sec ~120 sec
Reflow Zone	Max slope	2°C/sec
	Soak time (over 220°C)	40 sec ~60 sec
	Max temperature	245°C
	Cooling down slope	-1°C/sec to -3°C/sec
Reflow cycle	Max reflow cycle	1

## 12. Version

Version	Date	Description
V0.1	2024.01.08	Initial Release
V0.2	2024.12.19	Add CE/RED certification (ETSI EN 303 413)