



佳邦科技股份有限公司
INPAQ TECHNOLOGY CO., LTD.

MGAFF-U310-00

Specification

Part Series	GNSS Receiver Module
Part Number	MGAFF-U310-00
Version	V0.2

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1. Overall

The MGAFF-U310 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-U310 series provide fast TTFF time, acquisition time and up to 47 satellite channel. The module integrates low noise amplifier and high rejection filter. These designs will provide high receiver sensitivity and reduce noise interface.

The MGAFF-U310 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

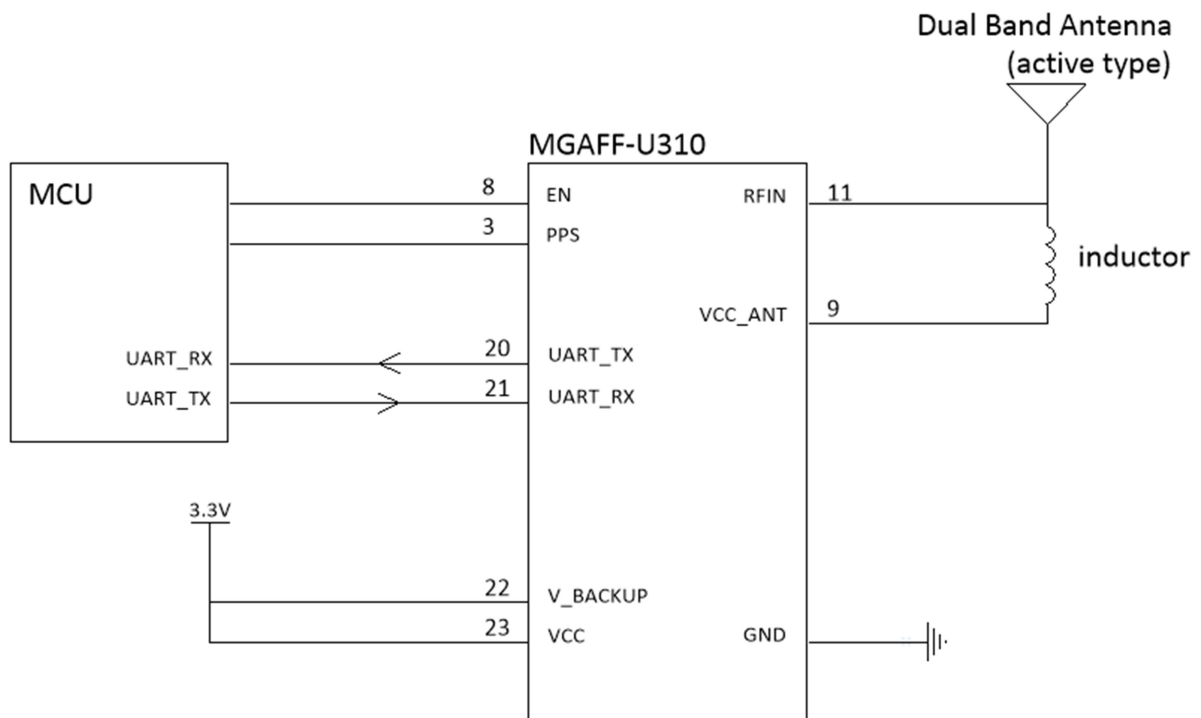
- L1 band GNSS receiver
- Support GPS, GLONASS, Galileo, BeiDou, QZSS
- Support Max. 47 channel
- Time to First Fixed (TTFF)
- Max 10Hz update rate
- Integrate low noise amplifier (LNA)
- Integrate high rejection filter (SAW filter)
- Integrate DC blocking in RFin
- Signal voltage supply (3.3V)
- UART interface (3.3V level)
- low power consumption
- ESD protection
- Small and Standard module package (1612)
- RoSH/REACH Compliance
- CE/RED Certification (ETSI EN 303 413)



3. Application

- Personal position and navigation
- IoT
- Smart city
- Base station location and alignment

Simplified Schematic and application



4. Pin Configuration and Function

4.1 Pin Configuration (Top View)

GND	13	12	GND
NC	14	11	RFIN
NC	15	10	GND
NC	16	9	VCC_ANT
NC	17	8	RESET
NC	18	7	NC
NC	19	6	NC
UART_TX	20	5	NC
UART_RX	21	4	NC
V_BACKUP	22	3	PPS
VCC	23	2	GND
GND	24	1	GND

4.2 Pin Function

PIN		Type	Description
Number	Name		
3	PPS	O	1PPS signal, 3.3V level
8	RESET	O	Reset, internal pull-high. Low active
9	VCC_ANT	P	Voltage Supply for external active antenna
11	RFIN	I	RF input, internal DC block
20	UART_TX	O	UART transmit, 3.3V level
21	UART_RX	I	UART receive, 3.3V level
22	V_BACKUP	P	Backup Voltage supply
23	VCC	P	Voltage supply
1, 2, 10, 12, 13, 24	GND	GND	Ground pin. Connect to system ground
4, 5, 6, 7, 14, 15, 16, 17, 18, 19	NC	NC	No connect to internal circuit. Can be float.

5. Performance

5.1 RF performance

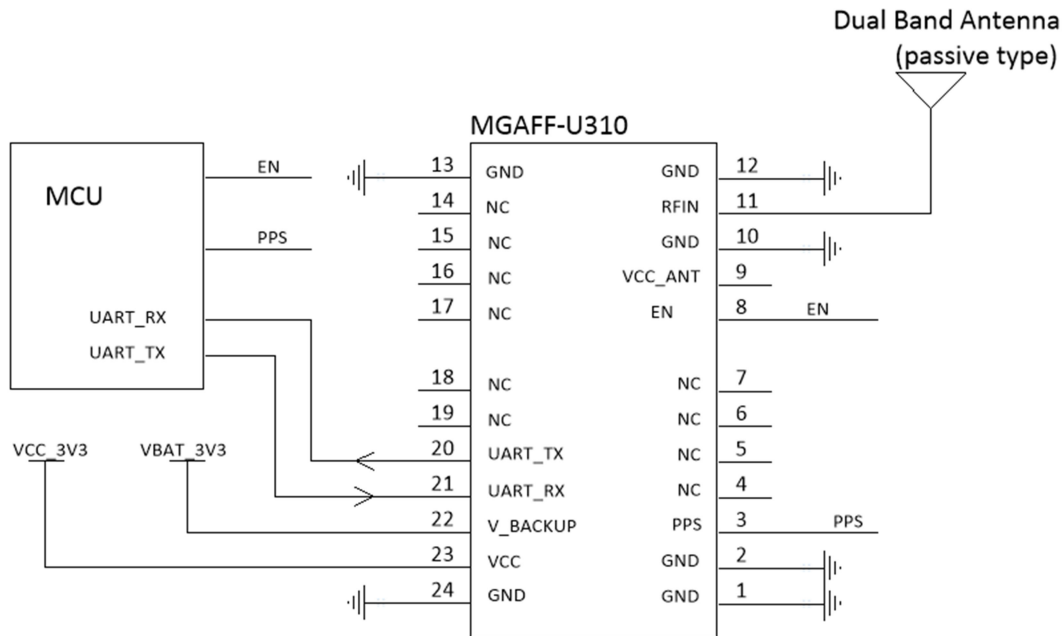
Parameter	Specifications
Frequency (MHz)	GPS: L1 C/A, 1575.42 GLONASS: L1, 1603.68 Galileo: E1,1575.42 BeiDou: B1, 1561.098 QZSS: L1, 1575.42
Channel	47
Timing Accuracy	1pps, +/-10ns
Update rate	1Hz
Sensitivity	Tracking: -163 dBm Acquisition: -146 dBm
TTF	Hot start: 1 sec Cold start: 28 sec
Position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

5.2 Digital performance

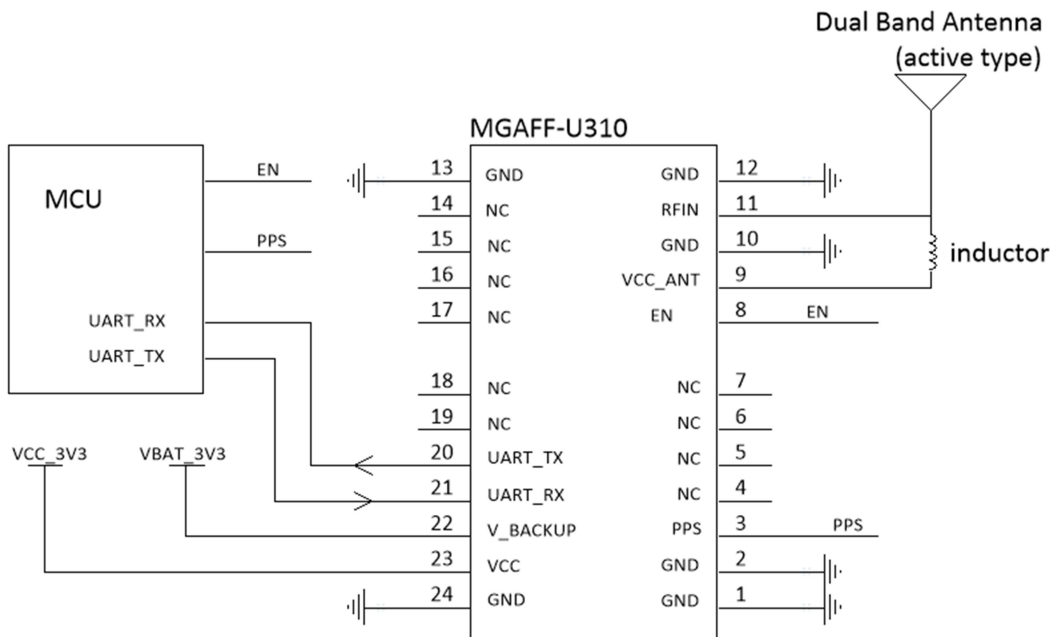
Parameter	Specifications
Update rate	1Hz
UART	9600 bps
Protocols	NMEA 0183

6. Application

6.1 with passive antenna



6.2 with active antenna



Choose Inductor, 18nH~33mH, and consider the current of 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

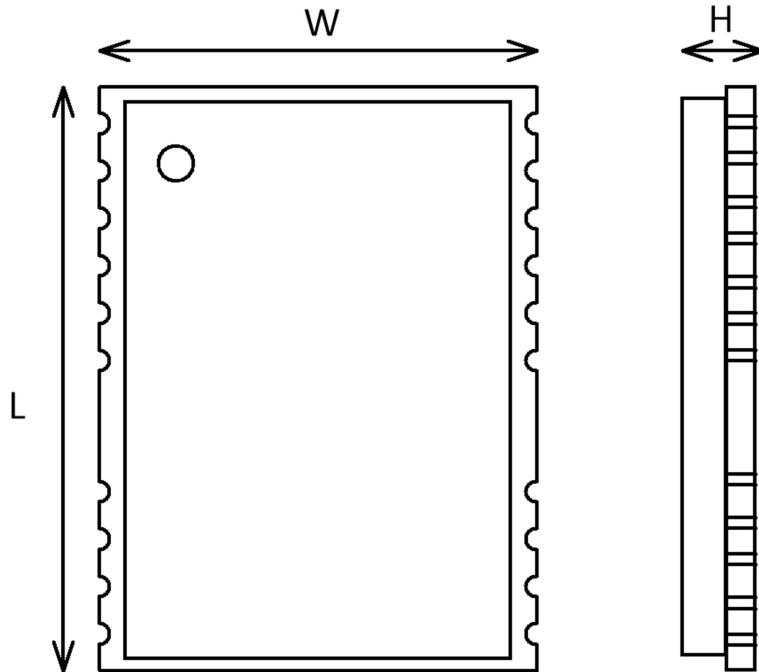
Parameter	Description	Min	Max	Unit
VCC	Voltage input	3	5	V
V_BACKUP	Backup voltage input	3	5	V
V-IH	IO, UART	2	3.6	V
V-IL	IO, UART	-0.3	0.8	V
V-OH	IO, UART	2.4		V
V-OL	IO, UART		0.4	V
Temp-op	Operation temperature	-40	+85	°C
Temp-st	Storage temperature	-40	+105	°C

7.4 Power consumption

Parameter	Description	typical	Unit
Pcon	Power consumption	95	mW

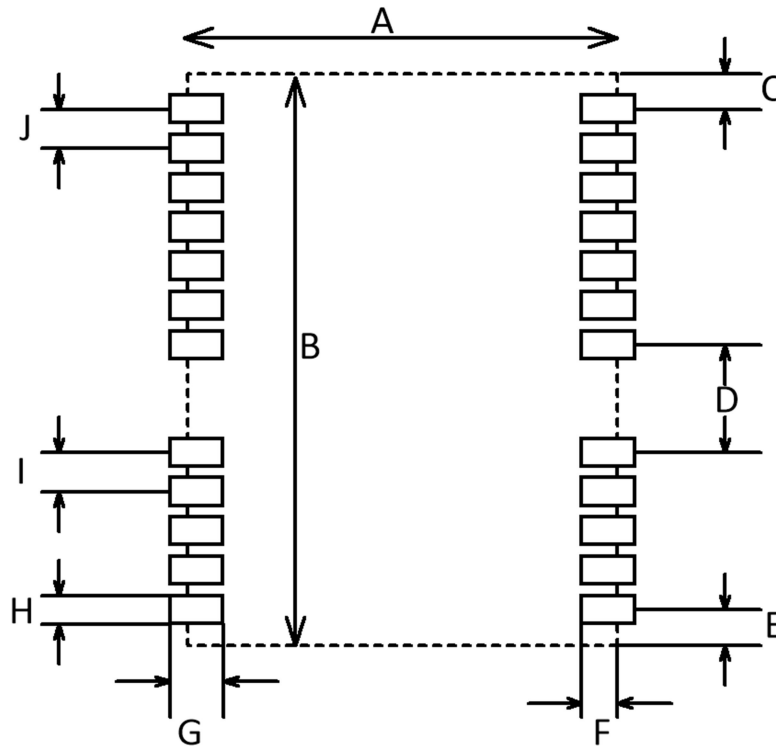
8. Mechanical Specification

8.1 Outline Dimensions



Symbol	Min (mm)	Normal (mm)	Max (mm)
W	12.0	12.2	12.4
L	15.8	16.0	16.2
H	2.3	2.5	2.7

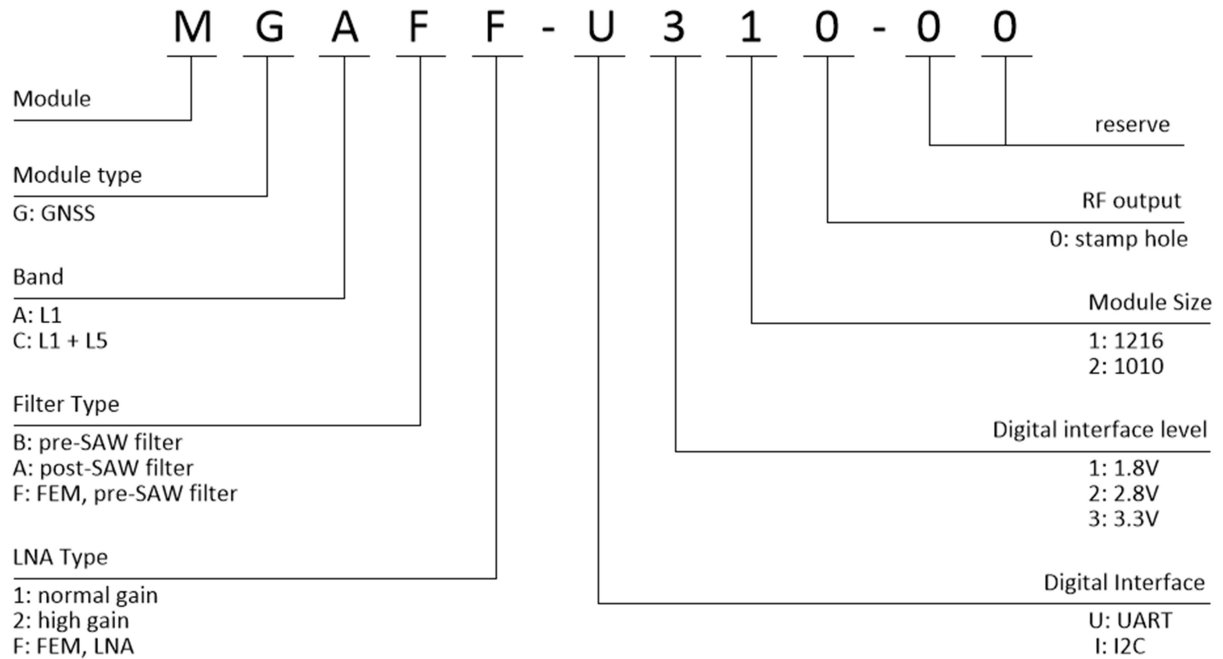
8.2 PCB land pattern dimensions



Symbol	Min (mm)	Normal (mm)	Max (mm)
A	12.0	12.2	12.4
B	15.8	16.0	16.2
C	0.9	1.0	1.1
D	2.9	3.0	3.1
E	0.9	1.0	1.1
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
J	1.0	1.1	1.2

9. Ordering Information

9.1 Ordering Information



Part Number	Description
MGAFF-U310-00	1612 SMD type module
MGAFF-U310-00-EV	Evaluation Board

10. INPAQ relative and peripheral product

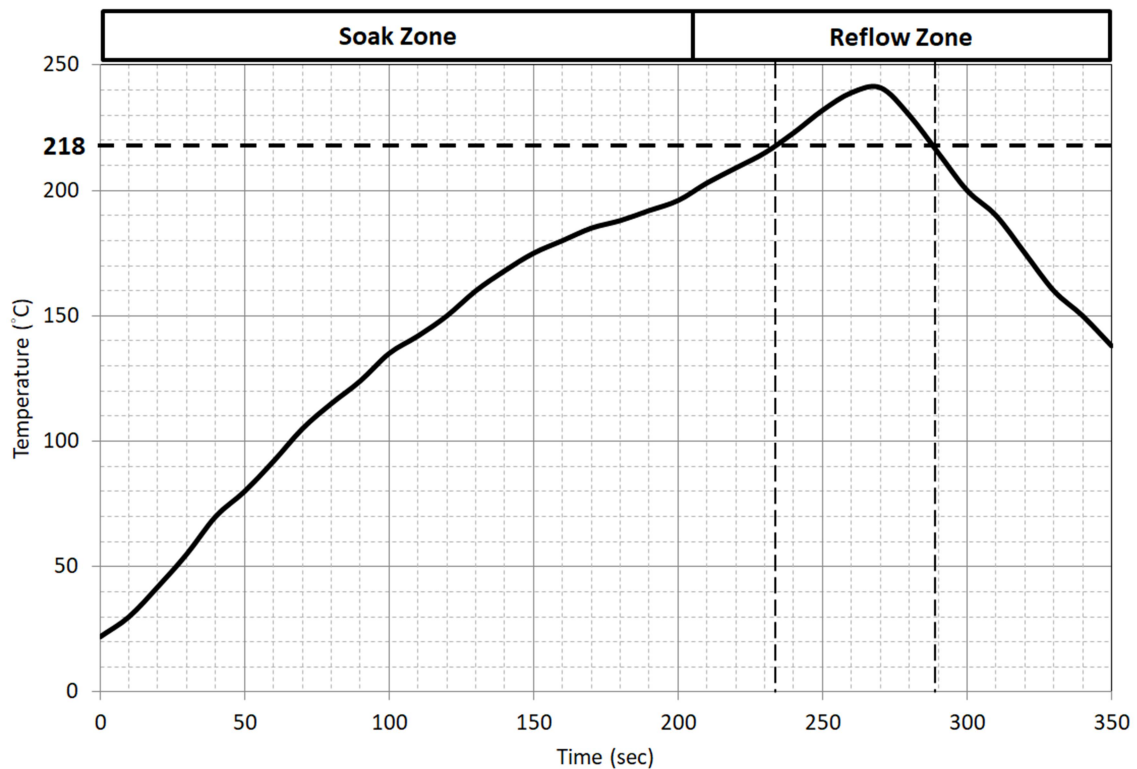
Series	Part Number	Description
GNSS receiver module	MGAFF-U310-00	Basic GNSS receiver module
GNSS patch antenna	*	Active patch antenna
GNSS patch antenna	*	Passive patch antenna

Note:

* connect with INPAQ sales for more detail product information

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	2024.02.26	Initial Release
V0.2	2024.12.19	Add CE/RED certification (ETSI EN 303 413) Add manufacturing and soldering information