



佳邦科技股份有限公司
INPAQ TECHNOLOGY CO., LTD.

MGAFF-U320-00

Specification

| | |
|-------------|----------------------|
| Part Series | GNSS Receiver Module |
| Part Number | MGAFF-U320-00 |
| Version | V0.2 |

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-U320 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-U320 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-U320 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

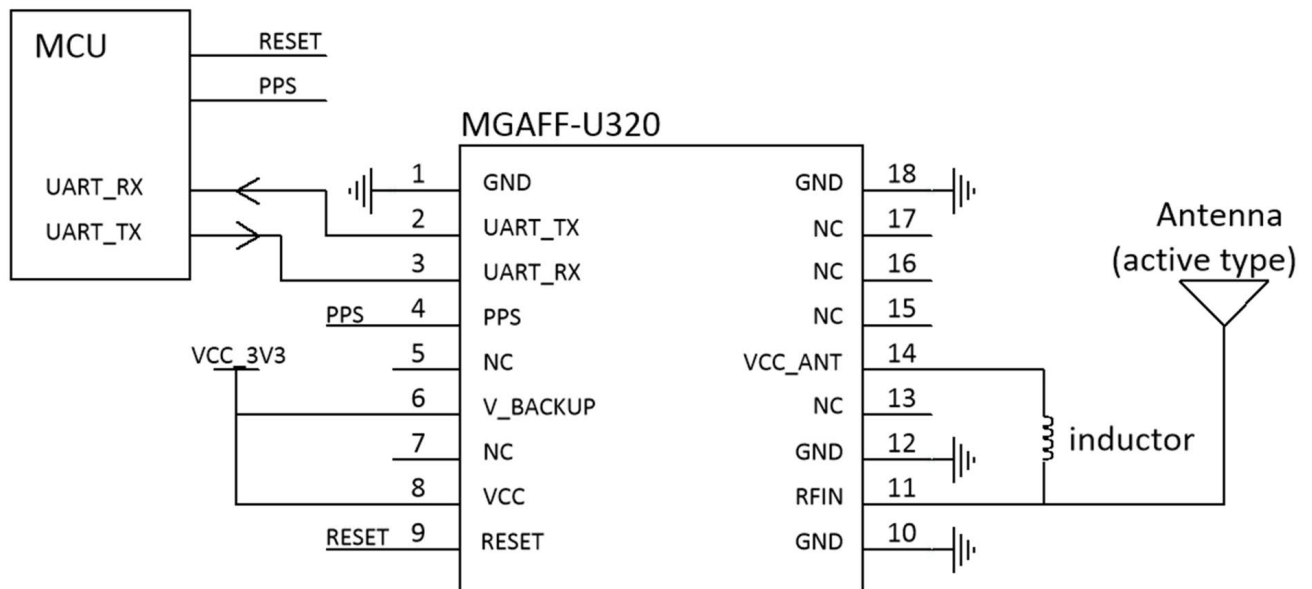
- L1 band GNSS receiver
- Support GPS, GLONASS, Galileo, BeiDou, QZSS
- Support Max. 47 channel
- Time to First Fixed (TTFF)
- Max 10Hz update rate
- Integrate high rejection filter (SAW filter)
- Integrate DC blocking in RFin port
- Signal voltage supply (3.3V)
- UART interface (3.3V level)
- Ultra-low 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, 3.3V level |
| 3 | UART_RX | I | UART receive, 3.3V level |
| 3 | PPS | O | 1PPS signal, 3.3V 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

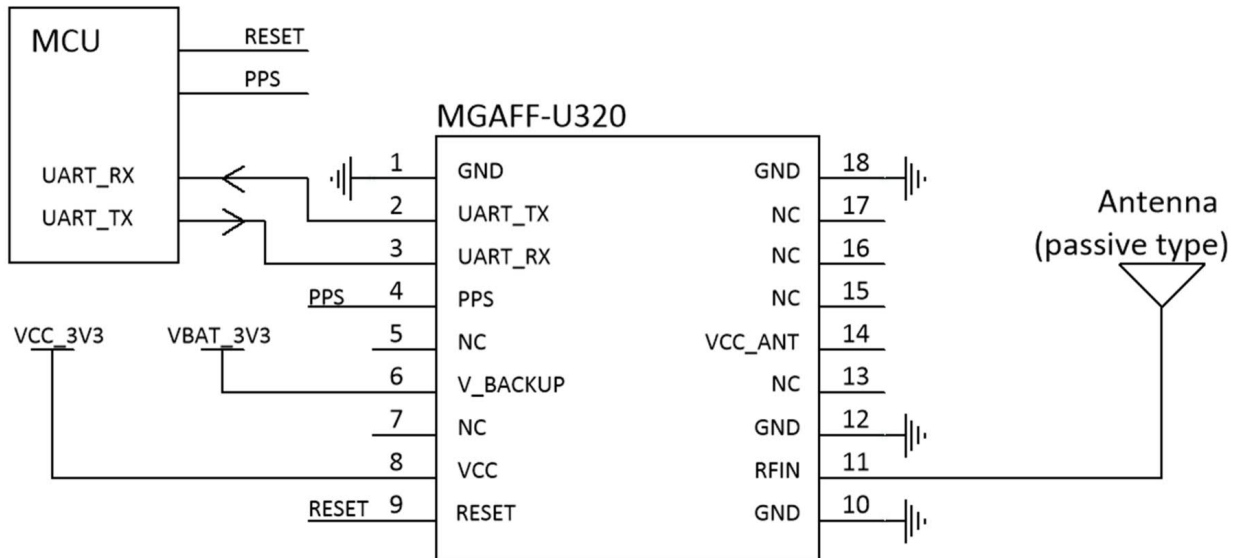
| Parameter | Specifications |
|--------------------------|--|
| Frequency (MHz) | GPS: L1 C/A, 1575.42 GLONASS: L1, 1603.68 Galileo: E1,1575.42 BeiDou: B1, 1561.098 QZSS: L1, 1575.42 |
| Channel | 47 |
| Timing Accuracy | 1pps, +/-10ns |
| Update rate | 1Hz |
| Sensitivity | Tracking: -163 dBm Acquisition: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

5.2 Digital performance

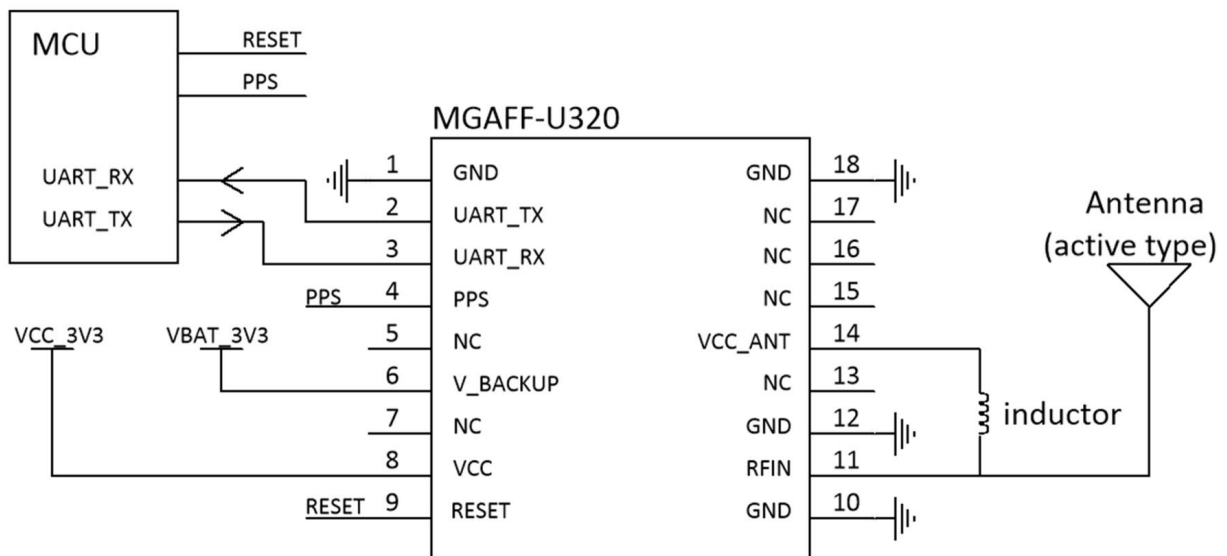
| Parameter | Specifications |
|-------------|----------------|
| Update rate | 1Hz |
| UART | 9600 bps |
| Protocols | NMEA 0183 |

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

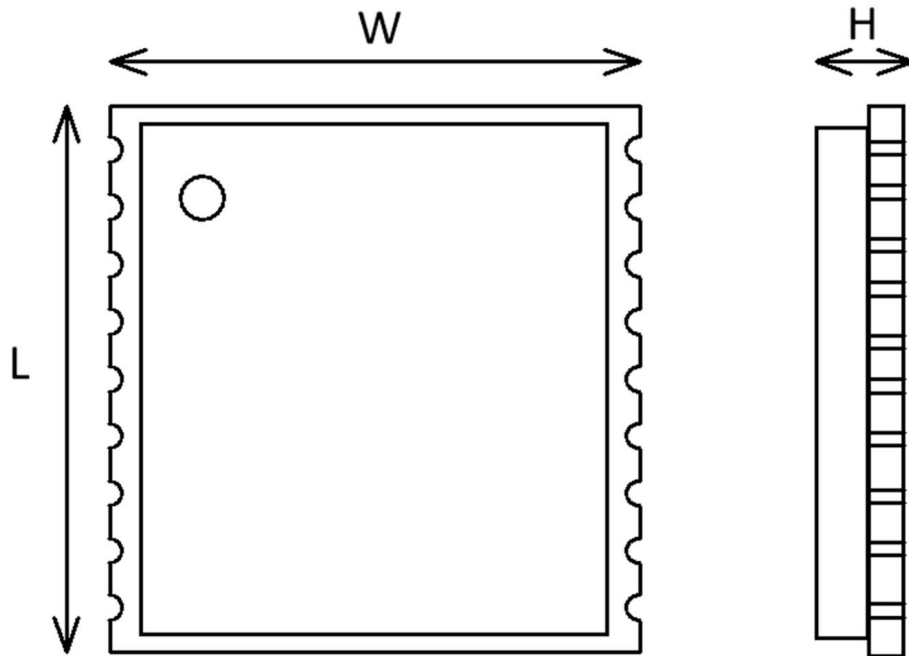
| Parameter | Description | Min | Max | Unit |
|-----------|-----------------------|------|------|------|
| VCC | Voltage input | 3 | 5 | V |
| V_BACKUP | Backup voltage input | 3 | 5 | V |
| V-IH | IO, UART | 2 | 3.6 | V |
| V-IL | IO, UART | -0.3 | 0.8 | V |
| V-OH | IO, UART | 2.4 | | V |
| V-OL | 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 | 85 | mW |

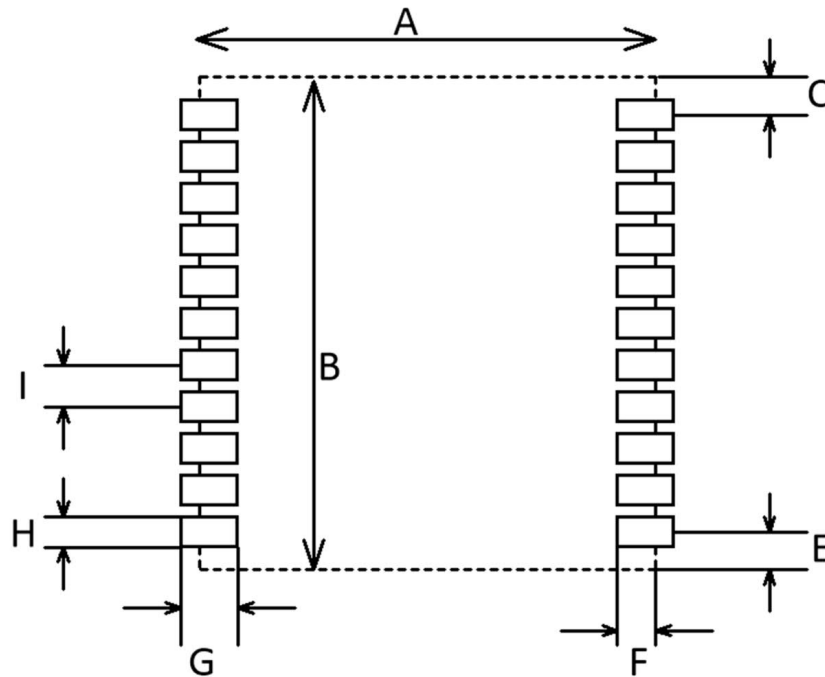
8. Mechanical Specification

8.1 Outline Dimensions



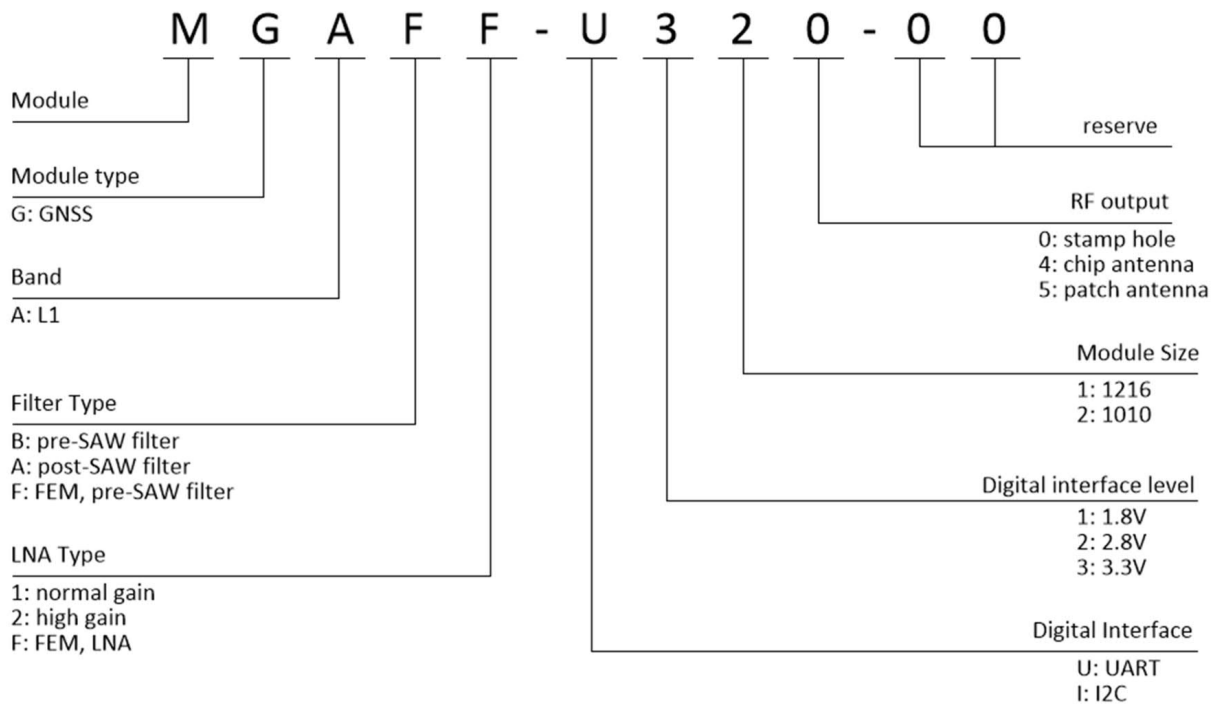
| Symbol | Min (mm) | Normal (mm) | Max (mm) |
|--------|----------|-------------|----------|
| W | 9.5 | 9.7 | 9.9 |
| L | 9.9 | 10.1 | 10.3 |
| H | 2.4 | 2.5 | 2.7 |

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-U320-00 | 1612 SMD type module |
| MGAFF-U320-00-EV | Evaluation Board |

10. INPAQ relative and peripheral product

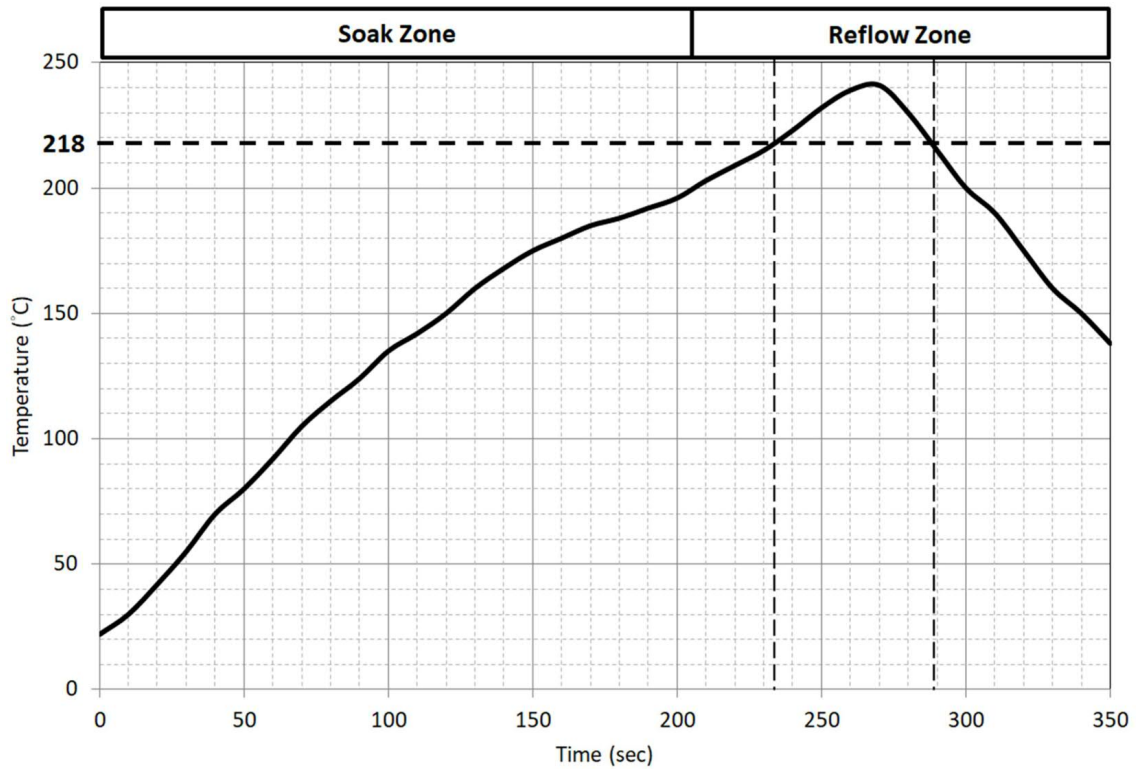
| Series | Part Number | Description |
|----------------------|---------------|----------------------------|
| GNSS receiver module | MGAFF-U320-00 | Basic GNSS receiver module |
| GNSS patch antenna | * | Active patch antenna |
| GNSS patch antenna | * | Passive patch antenna |

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) Add manufacturing and soldering information |
| | | |