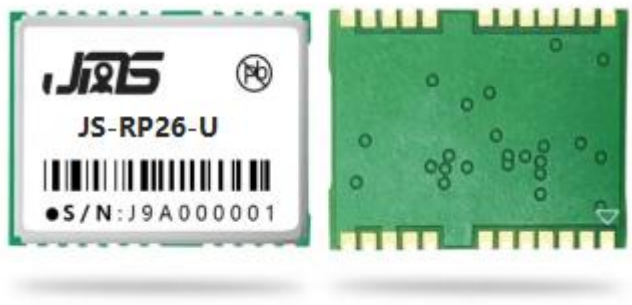
# JS-RP26-U Single-frequency (L1) GNSS Module (Built-in INS)

## Data Sheet



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# Change revision history

| Revised Edition | Date | Modifications and changes | Remark |
|---|---|---|---|
| V1.0 | 2026-1-12 | First release | HJX |
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# 1. Product Overview

## 1.1 Overview

The JS-RP26-U is a single-frequency (L1) GNSS module with a built-in inertial navigation device, featuring high performance and low power consumption. It employs an advanced hardware and software-integrated low-power design to achieve low power consumption without compromising performance. It enables optimized multi-band and multi-mode signal tracking, while also featuring an advanced anti-multipath and anti-interference RF front-end and up to eight anti-single-tone interference filters for the L1 band, significantly improving actual positioning and TTFF performance. It is suitable for applications such as rail transportation, marine navigation, drones, and automotive navigation.

## 1.2 Product Characteristics

- Based on high-performance SOC series
- Built-in inertial navigation
- Low power consumption , high performance
- Features 200 tracking channels and a dedicated search engine
- Update frequency up to 20Hz
- Supports single- frequency ( L1 ) across all constellations
- Supports AGPS and SBAS
- Small size ( 16.2mm*12.2mm*2.3mm±0.3mm ), lightweight (<1.1g)
- Supports standard NMEA 0183 protocol and RTCM 3.X
- Supports adaptive installation

## 1.3 Performance Indicators

| Category | Specification |
|---|---|
| Constellation Frequency | ■ GPS: L1 ■ BDS: B1I B1C ■ QZSS: L1<br>■ GALILEO: E1 ■ GLONASS: G1 |
| Sensitivity | Tracking and navigation - 165dBm<br>Reacquisition -159dBm<br>Hot start -159dBm<br>Cold start -148dBm |
| First positioning time[1] | Cold start 28s<br>AGPS 1.5s<br>Warm start 1s |
| Positioning accuracy[2] | Single point positioning Horizontal: 1.0 m CEP<br>Vertical: 2.0 m CEP |
| Velocity accuracy[3] | 0.1m/s CEP |
| Tracking Channels | 200 |
| INS | GNSS signal loss within 120 seconds: Inertial navigation error 5% |
| Application Permission [4] | Dynamic ≤ 4 g<br>20,000 m in height<br>Velocity 500m/s |
| Baud rate | 115200 ~ 9216 00 bps, (default 115200 bps) |
| Maximum update rate | 20Hz (default 1 Hz) |

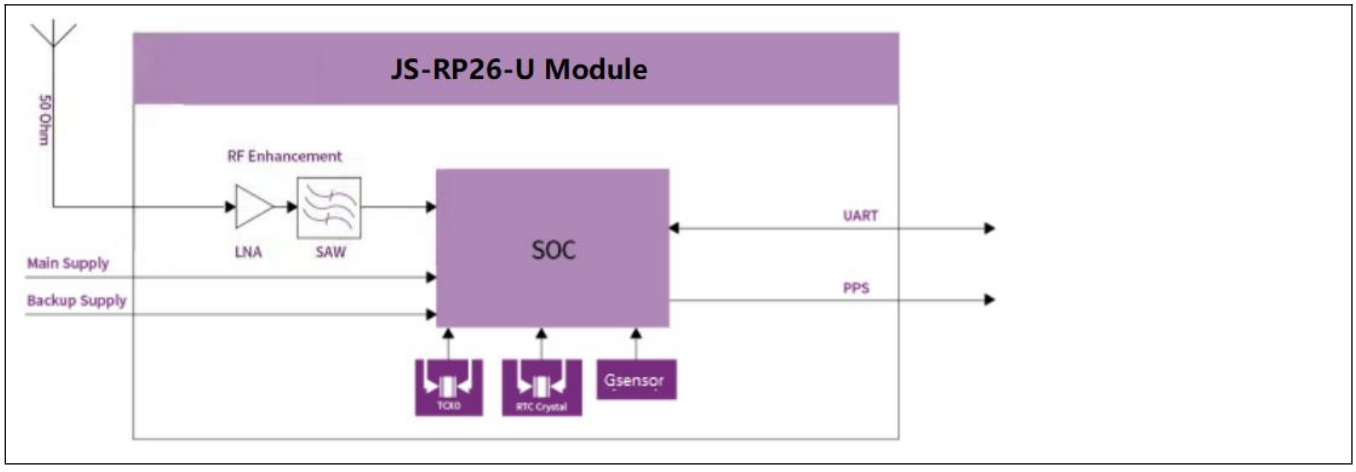
1. All satellites ≥ -130dBm

2. Open sky, 24-hour static, ≥-130dBm, >6SVs, CEP 50%

3 50%@30m/s Dynamic Operation

4. Assuming airborne <4 g platform

## 1.4 Block Diagram



### 1.5 Agreement

| Protocol | Type |
|---|---|
| NMEA 0183 | Input/Output, ASCII |
| RTCM3.X | Input/Output |

### 1.6 Antenna

Since the JS-RP26-U positioning module has a built-in LNA and SAW, it is recommended that the antenna gain not exceed 30dB when using an active antenna. The module has built-in active antenna detection and antenna overcurrent protection functions, which can detect the status of the active antenna in normal connection, open circuit and short circuit, and issue prompt information in the form of NMEA data.

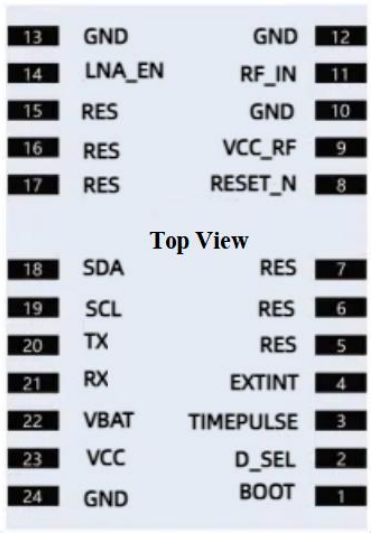
| Antenna status | Information output | VCC_RF current |
|---|---|---|
| normal | $POANT,1,803*4E | 3.5mA≤VCC_RF<50mA |
| Open circuit | $POANT,0,803*4F | 0 < VCC_RF ≤ 3.5mA |
| Short circuit | $POANT,2,803*4D | VCC_RF≥55mA |

### 1.7 Product Application

- Emergency Rescue
- Automotive Applications
- AVL and location-based services
- Maritime navigation and fleet management
- Intelligent logistics scheduling
- Drone applications
- Rail transit applications
- UAV

# 2. Pin definition

### 2.1 Pin Assignment



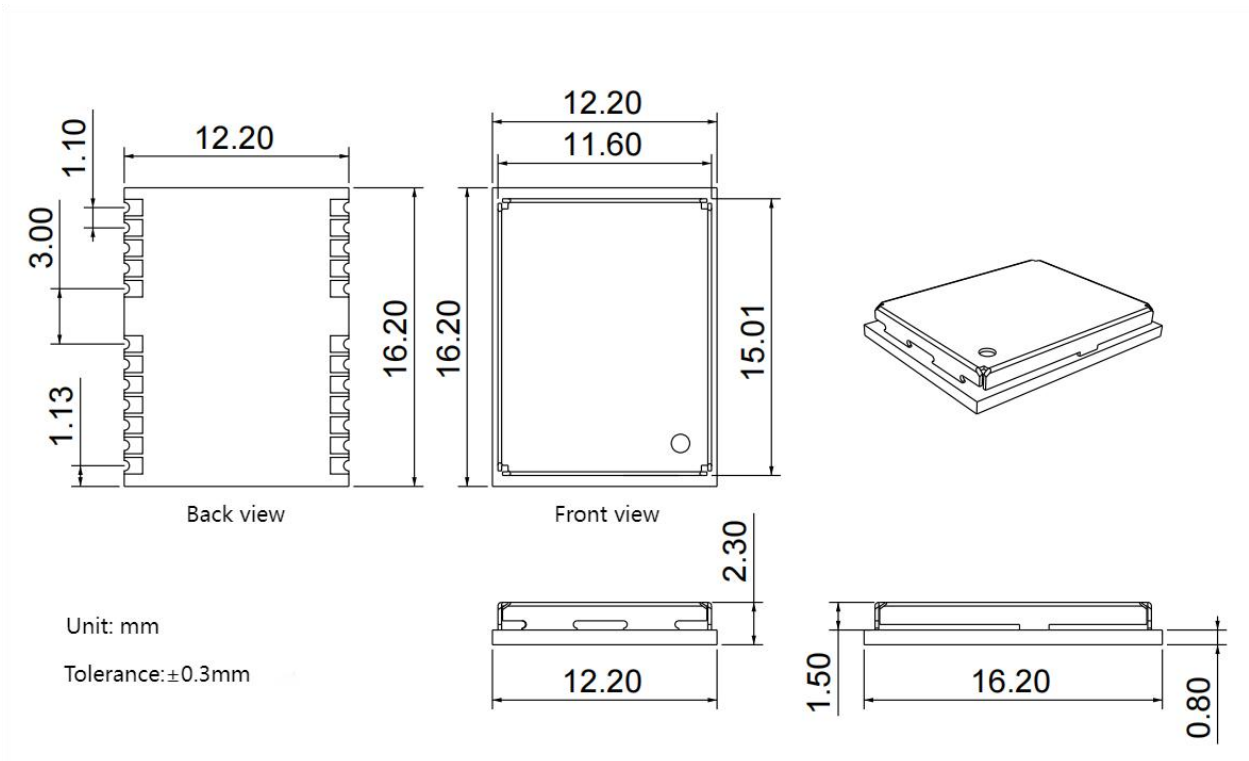
| Pin number | Pin Name | I/O | Description |
|---|---|---|---|
| 1 | BOOT | - | Reserved |
| 2 | D_SEL | - | Reserved |
| 3 | TIMEPULSE | O | 1PPS, pulse per second (keep on if not in use) |
| 4 | EXTINT | - | Reserved |
| 5, 6, 7, 15, 16, 17 | RES | - | Reserved |
| 8 | RESET _N | O | Reset pin (low activation, stays open when not in use) |
| 9 | VCC_RF | O | Output voltage RF band (keep it on if not in use) |
| 10, 12, 13, 24 | GND | - | Ground |
| 11 | RF_IN | I | GNSS signal input |
| 14 | LNA_EN | - | Reserved |
| 18 | SDA | I/O | IIC is for internal inertial navigation use only. |
| 19 | SCL | I/O | IIC is for internal inertial navigation use only. |
| 20 | TX | O | TTL output (keep on when not in use) |
| 21 | RX | I | TTL input (keep on when not in use) |
| 22 | V BAT | I | Backup voltage power supply |
| 23 | VCC | P | Main power supply |

# 3. Electrical Specifications

| Parameter | Symbol | Minimum | Typical | Maximum | Unit |
|---|---|---|---|---|---|
| Power supply voltage | VCC | 2.0 | 3.3 | 3.6 | V |
| Average current | I | 16mA @3.3V | 20mA @3.3V | 30mA@3.3V | mA |
| Backup battery voltage | V_BACK | 1.8 | 3.3 | 3.6 | V |
| Standby mode | | | 14uA@3.3V | | uA |
| Digital I/O voltage | Div | 1.8 | | 3.6 | V |
| Storage temperature | Tstg | -40 | | 85 | °C |
| Operating temperature | Topr | -40 | | 85 | °C |
| Humidity | | | | 95 | % |

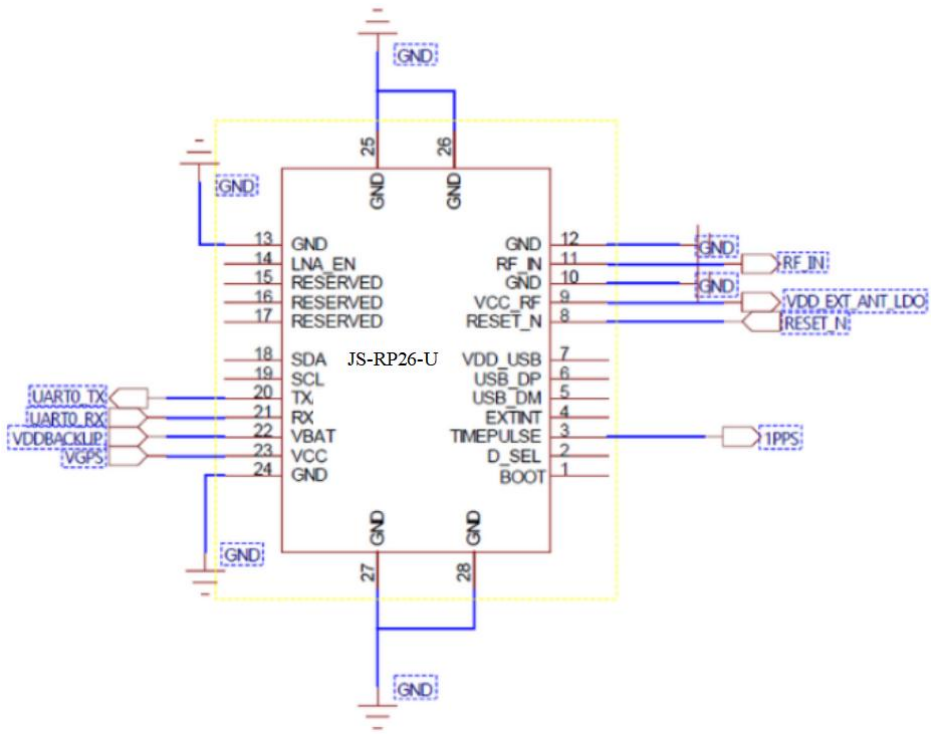
# 4. Mechanical Specifications

Module dimension diagram:




# 5. Antenna design

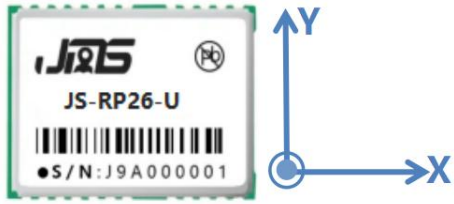
JS-RP26-U module circuit design reference diagram:



# 6. Installation Instructions

## 6.1 Inertial Navigation Direction of Module

The X-axis is east; the Y-axis is north; the Z-axis is perpendicular to the X and Y axes and points upwards. See the diagram below.




## 6.2 Module Installation Method

1. Before the initial power-on test, ensure the equipment is securely mounted on a carrier, away from heat sources and air vents with large temperature fluctuations, and away from areas with strong vibrations. If the installation location or orientation of the equipment is changed, power must be turned off and then start again.

2. For four-wheeled vehicles, the algorithm supports adaptive detection of the mounting axis and mounting angle; for two-wheeled vehicles, it is recommended to install the vehicle frame rather than the steering wheel. At the same time, users need to refer to the XYZ axis relationship between the module and the carrier in the figure below, and configure the mounting axis and mounting angle according to the actual installation matching relationship. For specific commands, refer to the inertial navigation setting instructions document .


3. Operation: It is recommended to power on the device in a relatively open environment. An open environment means that there are no buildings or trees obstructing the view of the antenna from above, and that there are at least 4 satellites in sight.

The CN0 value must be greater than 40dB-Hz for the number of satellites. After startup, drive at a speed of at least 5m/s (3m/s for two-wheeled vehicles) on open roads, including two turns or U-turns of at least 90 degrees, interspersed with acceleration, deceleration, and lane changes. This process should last 6-8 minutes to complete the integrated navigation calibration. Users can check the integrated navigation status via the INS Status on the POINS; 4 indicates the system is usable, and 5 indicates that the integrated navigation error has converged, with better positioning performance in tunnels and underground parking garages. For two-wheeled vehicles, due to their smaller dynamic range, the convergence time may take up to 10 minutes. If the device remains fixed on the carrier and its position and angle do not change, the saved installation information will remain valid, and subsequent use can directly begin the initial setup.

Once aligned, the integrated navigation calibration can be completed in as little as 5 minutes.

# 7. Recommended reflux profile

**7.1 GNSS module notes prior to SMT**

7.1.1 When the customer opens the stencil, they must ensure that the holes are larger than the GNSS module board. Please widen the opening by 0.7 mm at a 1:1 ratio, with a thickness of 0.12 mm.

7.1.2 When necessary, GNSS modules must not be handled with bare hands; gloves and a static ring must be worn.

7.1.3 The furnace temperature depends on the size of the customer's motherboard. The standard temperature for motherboards that are usually mounted on flat panels is 250±5°C, but it can also be 260±5°C.

**7.2 The following points should be noted when storing and using GNSS module control:**

7.2.1 Shelf life: 12 months. Storage conditions: < 40℃. Relative humidity: < 90%

7.2.2 After opening the bag, the apparatus to be subjected to infrared reflux, gas phase reflux or equivalent treatment must be inspected.

7.2.3 Check the humidity card: Store in an environment with a relative humidity ≤20%. If: 30%~40% (pink) or greater than 40% (red), the label module is hygroscopic.

7.2.4 Installation within 168 hours under factory conditions: t ≤ 30% ℃, relative humidity ≤ 60%

7.2.5 Once opened, the shelf life in the workshop is 168 hours.

**7.3 If baking is required, the apparatus may be baked:**

7.3.1 The module must be free of moisture.

7.3.2 Baking temperature: 125 ℃, 8 hours.

7.3.3 After baking, place an appropriate amount of desiccant into the sealed packaging.

**7.4 The actual quantity of vacuum-packed modules, which is based on the actual packaging quantity required by the customer.**

**The 7.5 module roll packaging project is as follows.**

7.5.1 Shelf life: 12 months. Storage conditions: < 40℃. Relative humidity: < 90%

7.5.2 After the module is unpacked for 168 hours, it needs to be baked before it can be pushed out of the surface mount to remove the moisture absorption of the module. Baking temperature conditions: 125℃, 8 hours.

7.5.3 The actual quantity of module reel packaging is based on the actual packaging quantity required by the customer.

**7.6 The modular pallet packaging project is as follows:**

7.6.1 Shelf life: 3 months. Storage conditions: < 40℃. Relative humidity: < 90%

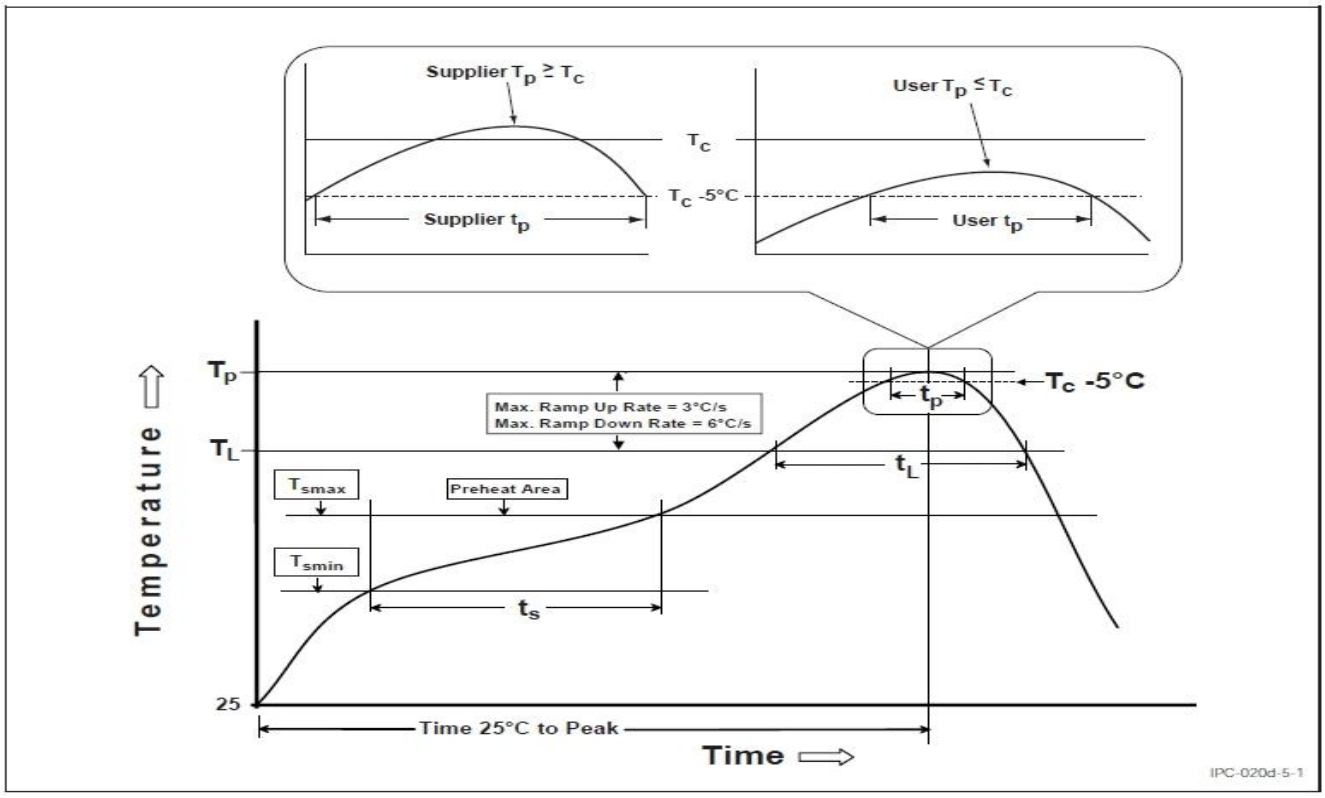
7.6.2 If the module is not used within 48 hours, it needs to be baked before starting. Baking temperature: 125 ℃, 8 hours.

7.6.3 Pallet packaging: 100 pieces per pallet. The actual quantity of modular pallet packaging is based on the actual packaging quantity required by the customer.

7.6.4 Lead-free process - Classification temperature (Ta)

| Pack thickness | Volume (mm3)<br><350 | Volume (mm3)<br>350 - 2000 | Volume (mm3)<br>>2000 |
|---|---|---|---|
| < 1.6mm | 260 ℃ | 260℃ | 260℃ |
| 1.6mm-25mm | 260℃ | 250℃ | 245℃ |
| > 2.5mm | 250℃ | 245℃ | 245℃ |

7.6.5 Temperature curve



| Contour features | Lead-free assembly |
|---|---|
| Preheating/Soaking<br><br>Minimum temperature (Tsmin)<br><br>Maximum temperature (Tamax) | 150 ℃<br><br>200 ℃<br><br>60-120 seconds |
| Rate of ascent ( $_{TL}$ to $_{Tp}$ ) | Maximum 3°C/second |
| Liquid phase temperature ( $_{TL}$ ) | 217 ℃ |
| Peak package temperature ( $_{Tp}$ ) | It must not exceed Tc (Tc=260℃) |
| Duration (tp) within the specified temperature (Tc) | 30* seconds |
| Rate of descent ( $_{Tp}$ to $_{TL}$ ) | Maximum 6℃/second |
| Time from 25°C to peak temperature | Maximum 8 minutes |
| ✦The tolerance for peak temperature (Tp ) is defined as the minimum value from the supplier and the | |

*The time spent above 255℃ should not exceed 30 seconds.

# 8. RoHS

This product is complies with RoHS standards.