

JS-RK26-U

Dual-Band GNSS Module

Data sheet



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1. Product Overview

1.1 Overview

The JS-RK26-U is a dual-band (L1, L5) 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

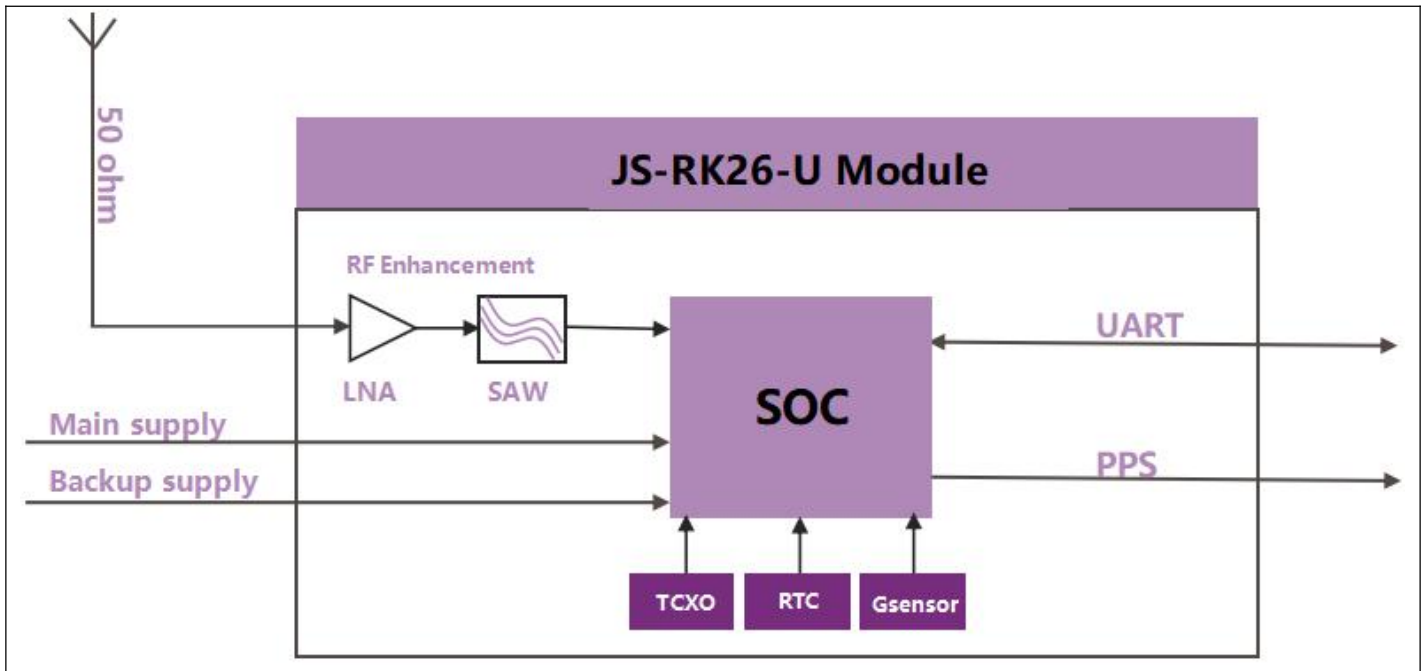
- Based on high-performance SOC series
- Built-in inertial navigation
- Supports IMU integrated navigation function
- Low power consumption , high performance
- Indoor and outdoor multipath detection and compensation
- Features 200 tracking channels and a dedicated search engine
- Update frequency up to 10Hz
- Intelligent interference detection and suppression
- Supports AGPS
- Support 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 L5 ■BDS B1I B1C B2I B2B B2A ■ Galileo E1 E5 ■ GLONASS G 1 ■QZSS L1 L5 ■ IRNSS L5
Sensitivity	Tracking and navigation -165dBm Re-acquisition -159dBm Hot start -159dBm Cold start -148dBm
First positioning time ¹	Cold start 28s AGPS 1.5s warm start 1s
Positioning accuracy ²	Single point positioning Horizontal: 1.0m CEP Vertical: 2.0m CEP RTK Horizontal: 1.0cm + 1ppm CEP Vertical: 1.5cm + 1ppm CEP
Speed accuracy ³	0.1m/s CEP
Tracking Channels	200
INS	GNSS signal loss within 120 seconds: Inertial navigation error 5%
Application Permission ⁴	Dynamic ≤4g 20,000m in height Speed 500m/s
Baud rate	9600 ~ 921600bps (default 115200bps)
Maximum update rate	10Hz (default 1Hz)

1. All satellites ≥ -130dBm
2. Open sky, 24-hour static, ≥-130dBm, >6SVs, CEP 50%
3. 50%@30m/s Dynamic Operation
4. Assuming airborne <4g platform

1.4 Block Diagram



1.5 Protocol

Protocol	Type
NMEA 0183	Input/Output, ASCII
Binary	Private binary protocol
RTCM3.X	Input/output , MSM4 or MSM7 (configurable)

1.6 Antenna

Since the JS-RK26-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 .

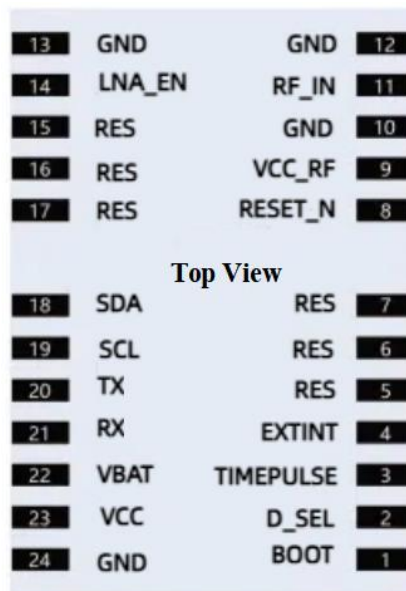
Antenna status	Information output	VCC_RF current
Normal	\$POANT,1,803*4E	3.5mA ≤ VCC_RF < 50mA
Open circuit	\$POANT,0,803*4F	0 < VCC_RF ≤ 3.5mA
Short circuit	\$POANT,2,803*4D	VCC_RF ≥ 55mA

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



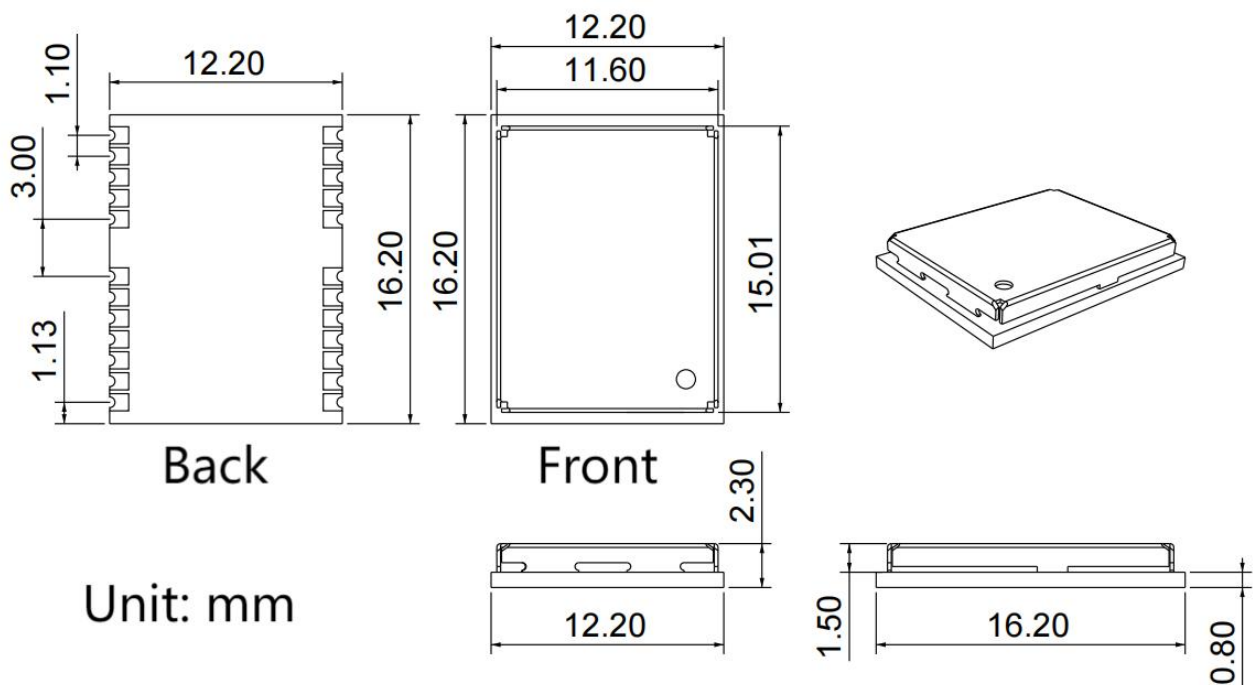
Pin number	Pin Name	I/O	Description
1	BOOT	-	Reserved
2	D_SEL	-	Reserved
3	TIMEPULSE	O	1PPS, pulse per second (keep on if not in use)
4	EXTINT	-	Reserved
5, 6, 7, 15, 16, 17	RES	-	Reserved
8	RESET_N	O	Reset pin (low activation, stays open when not in use)
9	VCC_RF	O	Output voltage RF band (keep it on 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	18mA@3.3V	22mA@3.3V	32mA@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	%

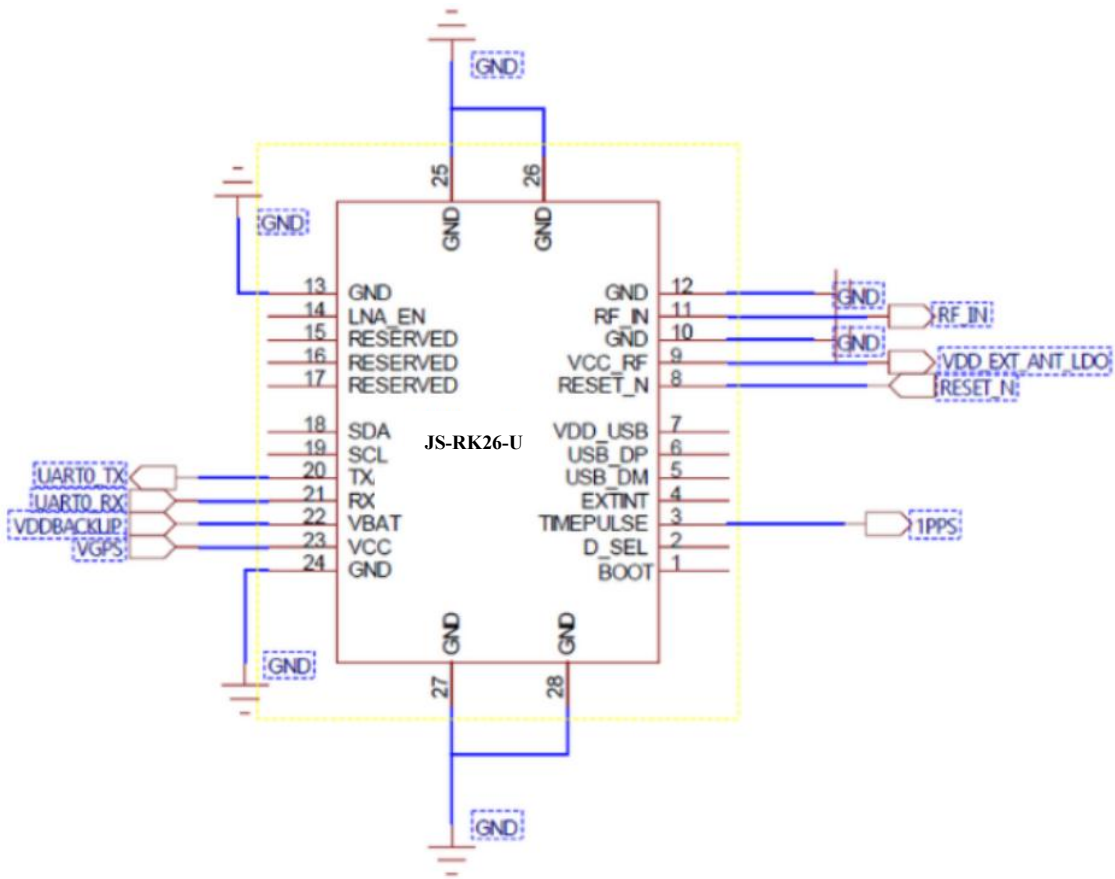
4. Mechanical Specifications



Dimensional tolerance: ±0.3mm

5. Antenna design

JS-RK26-U module circuit design reference diagram:



6. Installation Instructions

6.1 Inertial Navigation Direction of Module

The X-axis points due east; the Y-axis points due 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 on 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

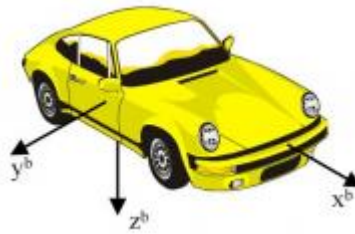
steering wheel. At the same time,

relationship between the module

and configure the mounting axis

the actual installation matching

refer to the inertial navigation setting instructions document .



users need to refer to the XYZ axis

and the carrier in the figure below,

and mounting angle according to

relationship. For specific commands,

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 $250\pm 5^{\circ}\text{C}$, but it can also be $260\pm 5^{\circ}\text{C}$.

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

7.2.1 Shelf life: 12 months. Storage conditions: $< 40^{\circ}\text{C}$. 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 $\leq 20\%$. If: 30%~40% (pink) or greater than 40% (red), the label module is hygroscopic.

7.2.4 Installation within 168 hours under factory conditions: $t \leq 30^{\circ}\text{C}$, relative humidity $\leq 60\%$

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°C , 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: $< 40^{\circ}\text{C}$. 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°C , 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: 3months. Storage conditions: <40°C. Relative humidity: <90%

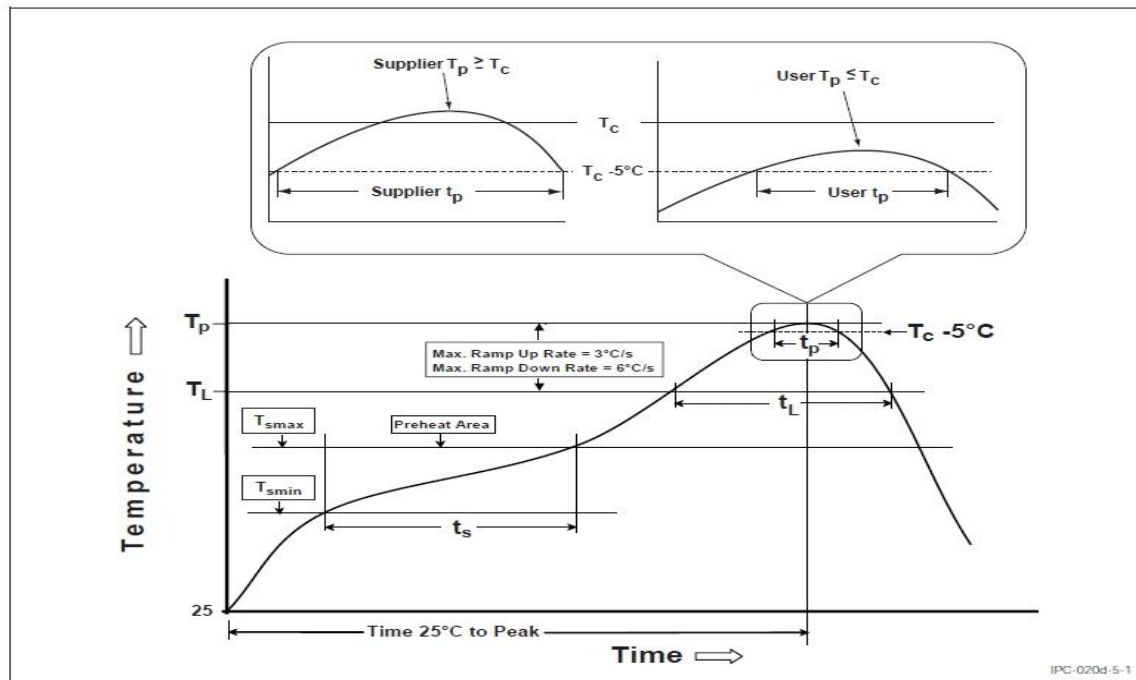
7.6.2 If the module is not used within 48 hours, it needs to be baked before starting. Baking temperature: 125°C, 8hours.

7.6.3 Pallet packaging: 100pieces 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 (mm ³)	Volume (mm ³)	Volume (mm ³)
< 1.6mm	<350	350 - 2000	>2000
< 1.6mm	260°C	260°C	260°C
1.6mm-25mm	260°C	250°C	245°C
> 2.5mm	250°C	245°C	245°C

7.6.5 Temperature curve



Contour features	Lead-free assembly
Preheating/Soaking	150°C
Minimum temperature (T _{min})	200°C
Maximum temperature (T _{max})	60-120seconds
Rate of ascent (T _L to T _p)	Maximum 3°C/second
Liquid phase temperature (T _L)	217°C
Peak package temperature (T _p)	It must not exceed T _c (T _c =260°C)
Duration (t _p) within the specified temperature (T _c)	30* seconds
Rate of descent (T _p to T _L)	Maximum 6°C/second
Time from 25°C to peak temperature	Maximum 8minutes
♦The tolerance for peak temperature (T _p) is defined as the minimum value from the supplier and the	

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

8. RoHS

This product complies with RoHS standards.