

JS-RK40

High Precision GNSS Helix Antenna Module

Data sheet



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Revision History

[illegible]

1 Product Description

1.1 Overview

The JS-RK40 is a dual-band (L1, L5) GNSS high-precision positioning module. It adopts a high-performance, low-power architecture, enabling optimized multi-band and multi-mode signal tracking. It also features an advanced anti-multipath and anti-jamming RF front-end, including up to 8 single-tone interference rejection filters for the L1 and L5 bands, significantly improving positioning accuracy in complex scenarios and TTFF performance. Based on advanced SoC chip design, it achieves ultra-high sensitivity and fast acquisition. Innovative dynamic power management technology ensures low power consumption during continuous positioning mode. This module is a new product launched for UAV terminal application scenarios to meet their high-precision positioning application requirements. It supports multi-constellation joint calculation, maintaining centimeter-level positioning stability even in extreme environments such as urban canyons and indoor-outdoor transitions.

1.2 Product Features

- Based on high-performance GNSS SOC chip
- Navigation update rate up to 10Hz
- 200 tracking channels and dedicated search engine
- Low power design
- Smart interference detection and suppression
- Supports GPS, BDS, GLONASS, Galileo, QZSS and IRNSS
- Supports SBAS
- Supports A-GNSS
- Indoor and outdoor multipath detection and compensation
- Integrated TCXO, LNA, SAW, RTC
- Compact and lightweight (Bottom: $\Phi 39.80\text{mm}$ Top: $\Phi 35.00\text{mm}$ Height: 32.00mm), ($<10.20\text{g}$)
- ROHS Compliant
- Supports standard NMEA 0183 /RTCM3.X
- Supports two working modes: Rover and Base Station
- Integrated a geomagnetic sensor

1.3 Performance

Parameter	Specifications	
Receiver type	■GPS L1 L5 ■BDS B1I B1C B2I B2B B2A ■Galileo E1 E5 ■GLONASS G1 ■QZSS L1 L5 ■IRNSS L5	
Sensitivity	Tracking	-165dBm
	Reacquisition	-159dBm
	Hot Start	-159dBm
	Cold Start	-148dBm
Time-To-First-Fix ¹	Cold Start	28 s
	AGPS	1.5 s
	Hot Start	1 s
GNSS Positioning Accuracy ²	Single Point	Horizontal: 1.0 m CEP
		Vertical: 2.0 m CEP
	RTK	Horizontal: 1.0 cm+1ppm CEP
		Vertical: 1.5 cm+1ppm CEP
Time Accuracy	PPS	< 20ns RMS
Velocity Accuracy ³		0.1 m/s CEP
Operational limits ⁴	Dynamics	≤ 4 g
	Altitude	20000 m
	Velocity	500 m/s
Baud Rate	115200-921600 bps (default 115200 bps) ⁵	
Max navigation update rate	10Hz (default 1Hz)	

¹ All satellites at ≥-130dBm

- 2 Open sky, 24hours static, -130dBm, >6SVs, CEP 50%
- 3 50%@30m/s dynamic operation
- 4 Assumes airborne platform $\leq 4g$
- 5 Opening debug log requires support for higher baud rates above 230400bps

1.4 Protocols

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

1.5 Antenna

The JS-RK40 module uses an active antenna design.

Parameter	Specification
Helical Antenna	$\Phi 35.00\text{mm}$, Height 25.00mm

1.6 Application Scenarios

- UAV/Drones
- Robotics
- Smart Logistics Dispatching
- Power Grid & Electricity
- Logistics Security
- Smart Transportation
- Wearable Devices
- Car Navigation and Tracking
- Precision Agriculture
- Handheld Terminals

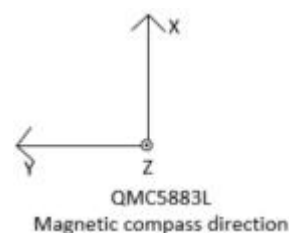
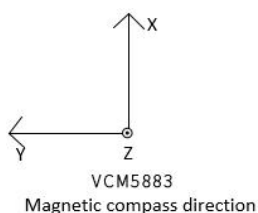
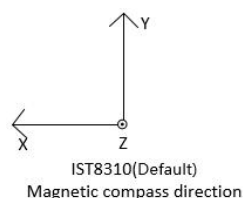
2 Pin Definitions

2.1 Pin Assignment



No.	Name	I/O	Description
1.A	GND	-	Ground
2.B	PPS	O	Pulse Per Second output
3.C	NC	-	NOT USE, KEEP OPEN
4.D	SDA	I/O	I2C Data (keep open if not used)
5.E	SCL	I/O	I2C Clock (keep open when not used)
6.F	TX1	O	UART1 Data output
7.G	RX1	I	UART1 Data input
8.H	VCC	P	Power Supply Voltage

2.2 Description of Geomagnetic Sensors



Note:

Magnetic compass model:

The geomagnetic model is IST8310(Default) , IST8310_MS_ADDRESS 0x0F .

The geomagnetic model VCM5883 (optional) , VCM5883_MS_ADDRESS 0x0C.

The geomagnetic model QMC5883L (optional) ,QMC5883L_MS_ADDRESS 0x0D

3 Electrical Specifications

Parameter	Symbol	Min	Typical	Max	Units
Power supply voltage	VCC	3.3	5.0	5.5	V
Average current	I	45mA@5.0V	58mA@5.0V	65mA@5.0V	mA
Backup battery voltage	V_BCKP	1.8	3.3	3.6	V
Backup battery current	I_BCKP		14uA@3.3V		uA
Storage temperature	Tstg	-40		70	°C
Operating temperature ¹	Topr	-40		70	°C
Farad capacitor ²	Tstg	-25		60	°C

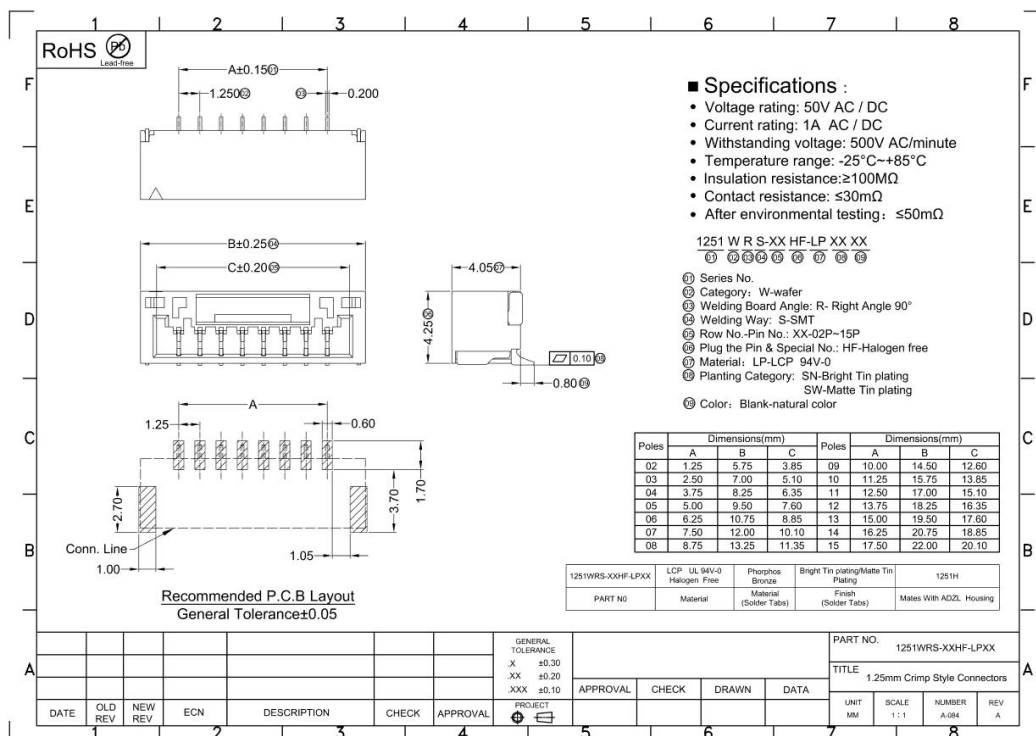
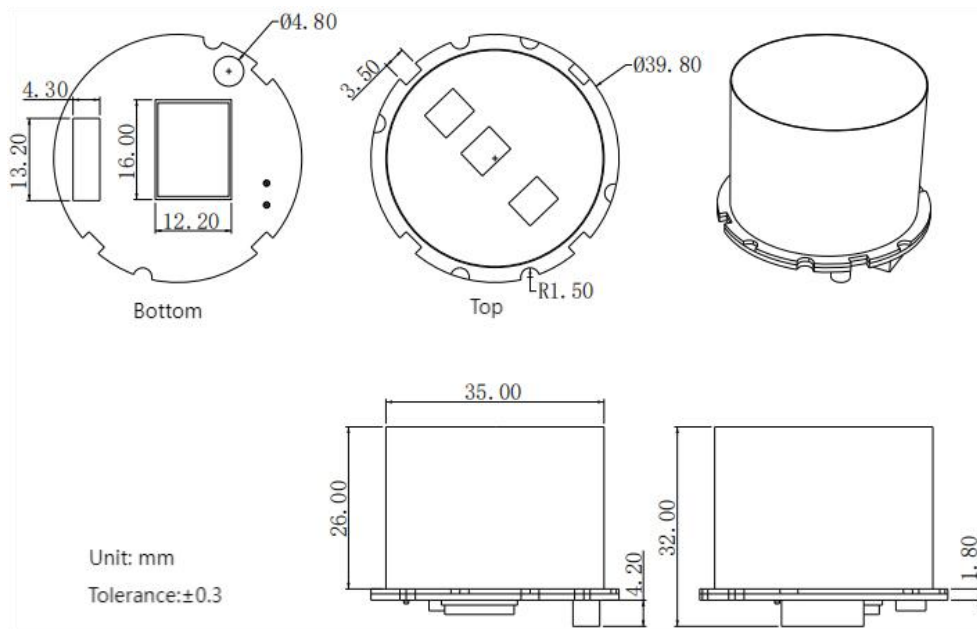
Humidity

95

%

- 1 The temperature range is the operating temperature range without the Farad capacitor
- 2 Hot start cannot be carried out when the temperature is below -25°C or above 60°C

4 Mechanical Specifications

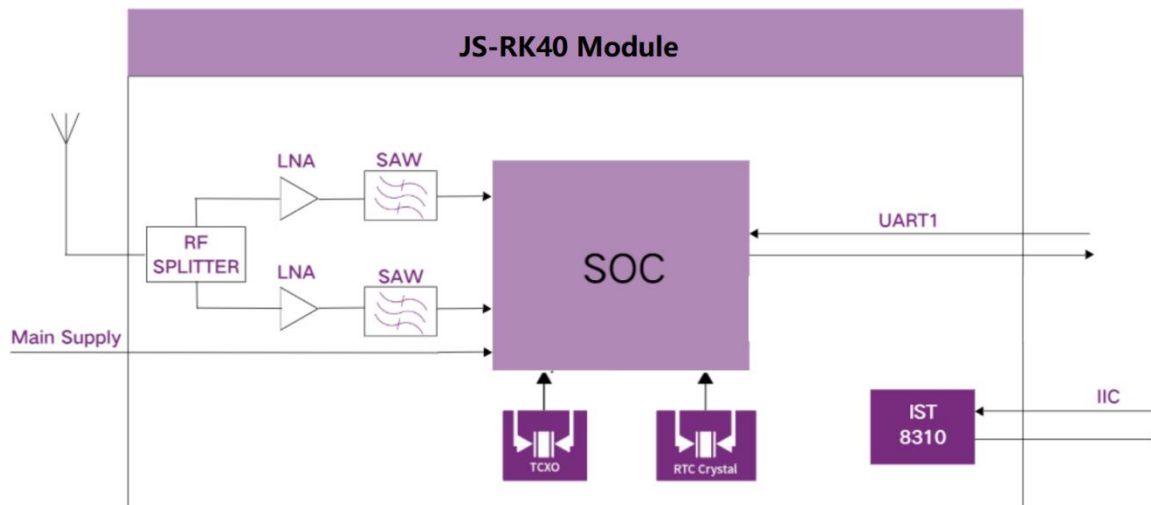


5 Interface Configuration Selections

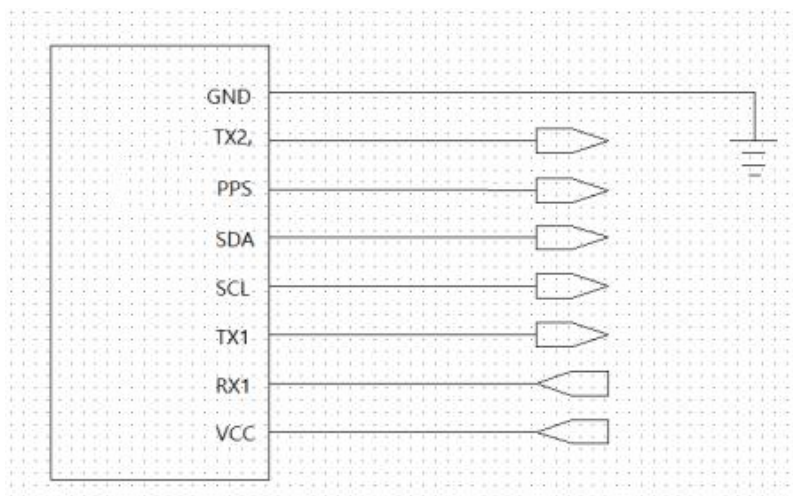
5.1 Interfaces Description

The JS-RK40 module is equipped with one UART for host communication and one IIC interface for data transmission with the internal magnetometer. It supports flexible configuration of the baud rate.

5.2 Block Diagram



5.3 Application Circuit



6 ROHS

This product is RoHS compliant.