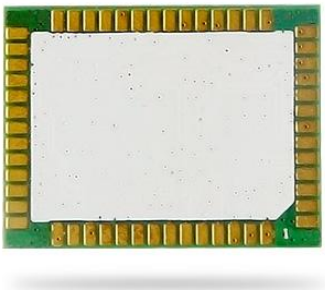
Accurate
positioning
22°39'48.37"N 114°02'10.91"E

JS-M6D

PRODUCT SPECIFICATION

Data Sheet



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Change History of Revision

Revision	Date	Contents of Revision Change	Remark
V1.0	2019-04-27	First release	LPF
V1.1	2019-11-27	Change reflow temperature curve	LPF
V1.2	2021-12-17	Increase AGNSS cold start time	Wang Wei
V1.3	2022-01-08	Software upgrade	Wang Wei
V1.4	2022-02-22	Modify the contents of PIN definitions	Wang Wei

1 Functional description

1.1 Overview

JS-M6D is a multi-frequency multi-mode RTK high-precision positioning module, it can support six frequency points of BDS B1I+B2I, GPS/QZSS L1+L2, GLONASS G1+G2 at the same time. The JS-M6D has a compact appearance and size, using LGA pads, supports standard pick, place and reflow soldering. It has high sensitivity, anti-interference, high performance.

1.2 Product features

- Can receive multiple systems and multiple frequencies simultaneously
- Anti-jamming
- Support DGNSS, RTK centimeter positioning accuracy
- Small package size of（22.0mm×17.0mm x2.4mm±0.2mm）, easy to integrate
- 96 search channels and 60 trace channels
- MSM7 input is supported
- Support the Beidou-3 satellite
- Compatible with Sinan base station

1.3 Product Application

- UAV
- Precision agriculture
- Marine Navigation, Fleet Management
- Intelligent logistics scheduling
- Personnel protective
- Ideal for PDA, Pocket PC
- Geographic Surveying
- Automotive application
- AVL and Location-Based Services
- Handheld GPS receiver application
- Measurement of surveying and mapping
- Driving test
- Car navigation and tracking
- Intelligent robot

1.4 Performance

Parameter	Specification	
Receiver type	■GPS/QZSS L1 L2 ■GLONASS G1 G2 ■BDS B1I B2I (Including the Beidou-3 satellite)	
Sensitivity	Tracking & Navigation	-163dBm
	Reacquisition	-147dBm
Time-To-First-Fix[1]	Cold Start	≤35s
	Cold Start	≤3s（AGNSS）
	Hot Start	≤1 s
	Reacquisition	≤1s
Horizontal Position accuracy[2]	3D	2.0 m CEP
	D-GNSS	0.5m CEP
	RTK	2cm+1ppm (Horizontal)[3]
Accuracy of time pulse signal	1PPS	20ns
Velocity accuracy[4]		0.05m/s
Operational limits[5]	Dynamics	≤ 4 g
	Altitude	18000 m
	Velocity	515 m/s
Baud Rate	9600-230400bps（Default 115200 bps）	
Max navigation update rate	10 Hz (If you need additional navigation update rates, please contact us)	

✌1 All satellites at ≥-130dBm

✌2 CEP 50%, 24 hours static, ≥-130dBm, ≥6SVs

✌3 Based on 30km, the accuracy error increases by 1cm every 10km from the base station

✌4 50% @ 30m/s dynamic operation

✌5 Assuming Airborne < 4 g platform

1.5 Supported GNSS constellations

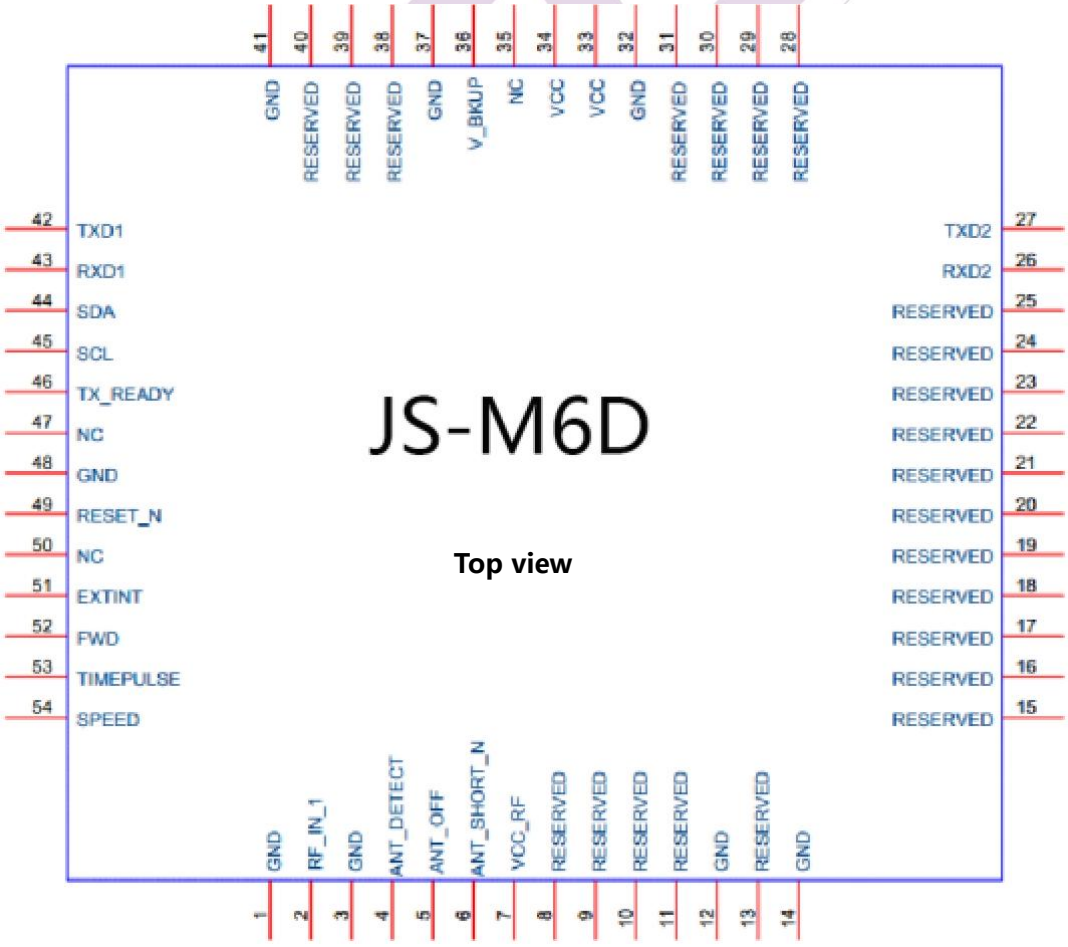
The M6D GNSS modules are concurrent GNSS receivers that can receive and track multiple GNSS systems. Owing to the multi-band RF front-end architecture, all four major GNSS constellations (GPS L1 L2, GLONASS G1 G2，Galileo E1 E5b and BDS B1I B2I) can be received concurrently. All satellites in view can be processed to provide an RTK navigation solution when used with correction data. The M6D receiver can be configured for concurrent GPS, GLONASS, Galileo and BDS plus QZSS reception.

The M6D supports the GNSS and their signals as shown in table

GPS	GLONASS	BDS	Galileo
L1(1575.42 MHz)	G1 (1602 MHz + k*562.5 kHz, k = –7,..., 5, 6)	B1I (1561.098 MHz)	E1-B/C (1575.42 MHz)
L2 (1227.60 MHz)	G2 (1246 MHz + k*437.5 kHz, k = –7,..., 5, 6)	B2I (1207.140 MHz)	E5b (1207.140 MHz)

2 Pin definitions

2.1 Pin assignment



2.2 Pin assignment

Table 2.1 module PIN definition

Pin	Name	I/O	Electical level	Description
1	GND	-	--	Ground
2	RF_IN_1	I	--	RF input
3	GND	-	--	Ground
4	ANT_DETECT	O	3.3V±10%	Antenna open circuit detection output (high open circuit, low normal)
5	ANT_OFF	O	3.3V±10%	Built-in antenna feed switch control (high off, low enable)
6	ANT_SHORT_N	O	3.3V±10%	Antenna short circuit detection output (high normal, low short circuit)
7	VCC_RF	O	3.3V±10%	Voltage for external Antenna
8	RESERVED	-	- -	Reserved
9	RESERVED	-	- -	Reserved
10	RESERVED	-	- -	Reserved
11	RESERVED	-	- -	Reserved
12	GND	-	--	Ground
13	RESERVED	-	- -	Reserved
14	GND	-	--	Ground
15	RESERVED	-	- -	Reserved
16	RESERVED	-	- -	Reserved
17	RESERVED	-	- -	Reserved
18	RESERVED	-	- -	Reserved
19	RESERVED	-	- -	Reserved
20	RESERVED	-	- -	Reserved
21	RESERVED	-	- -	Reserved
22	RESERVED	-	- -	Reserved
23	RESERVED	-	- -	Reserved
24	RESERVED	-	- -	Reserved
25	RESERVED	-	- -	Reserved
26	RXD2	I	- -	Correction UART input

27	TXD2	-	- -	Reserved
28	RESERVED	-	- -	Reserved
29	RESERVED	-	- -	Reserved
30	RESERVED	-	- -	Reserved
31	RESERVED	-	- -	Reserved
32	GND	-	--	Ground
33	VCC	I	3.3V±10%	Voltage supply
34	VCC	I	3.3V±10%	Voltage supply
35	NC	-	--	Do not connect to any network
36	V_BKUP	I	1.8V-3.6V	Backup supply voltage
37	GND	-	--	Ground
38	RESERVED	-	- -	Reserved
39	RESERVED	-	- -	Reserved
40	RESERVED	-	- -	Reserved
41	GND	-	--	Ground
42	TXD1	O	3.3V±10%	UART1 data transmition
43	RXD1	I	3.3V±10%	UART1 data acceptance
44	SDA	I/O	3.3V±10%	I2C Data
45	SCL	I/O	3.3V±10%	I2C Clock
46	TX_READY	O	3.3V±10%	TX Data ready to complete output indication (high efficiency)
47	NC	-	--	Do not connect to any network
48	GND	-	--	Ground
49	RESET_N	I	3.3V±10%	Module reset signal input (low effective)
50	NC	-	--	Do not connect to any network
51	EXTINT	I	3.3V±10%	External interrupt input pin (low valid)
52	FWD	-	- -	Reserved
53	TIMEPULSE	O	3.3V±10%	PPS output
54	SPEED	-	- -	Reserved

3 Electrical specifications

3.1 Absolute maximum

Parameter	Symbol	Min	Max	Unit	Condition
Power supply voltage	Vcc	3.0	3.6	V	--
VCC maximum ripple	Vrpp	0	50	mV	--
Input pin voltage	Vin	-0.5	Vcc +0.2	V	--
ESD	VESD(HBM)	--	2000	V	All pins
MSD(MSL) Level	Level 3				

3.2 Operation condition

Parameter	Symbol	Min	Typical value	Max	Unit	Condition
RTC Power Supply (V_BCKP)	Vrtc	2.0	3.0	3.6	V	--
RTC supply current	Irtc	10	12	13	uA	--
Power Supply (VCC)	Vcc	3.0	3.3	3.6	V	--
supply current	Icc	94	105	--	mA	--
peak current	Iccp	--	--	130	mA	Vcc = 3.3 V
Input pin low level	Vin_low	--	--	0.2*Vcc	V	--
Input pin high level	Vin_high	0.7*Vcc	--	--	V	--
Output pin low	Vout_low	--	--	0.4	V	Iout= -8 mA
Output pin high level	Vout_high	Vcc–0.4	--	--	V	Iout = 8 mA
antenna gain	Gant	15	--	40	dB	--
Receiver link noise factor	NFtot	--	3	--	dB	--

3.3 Work environment

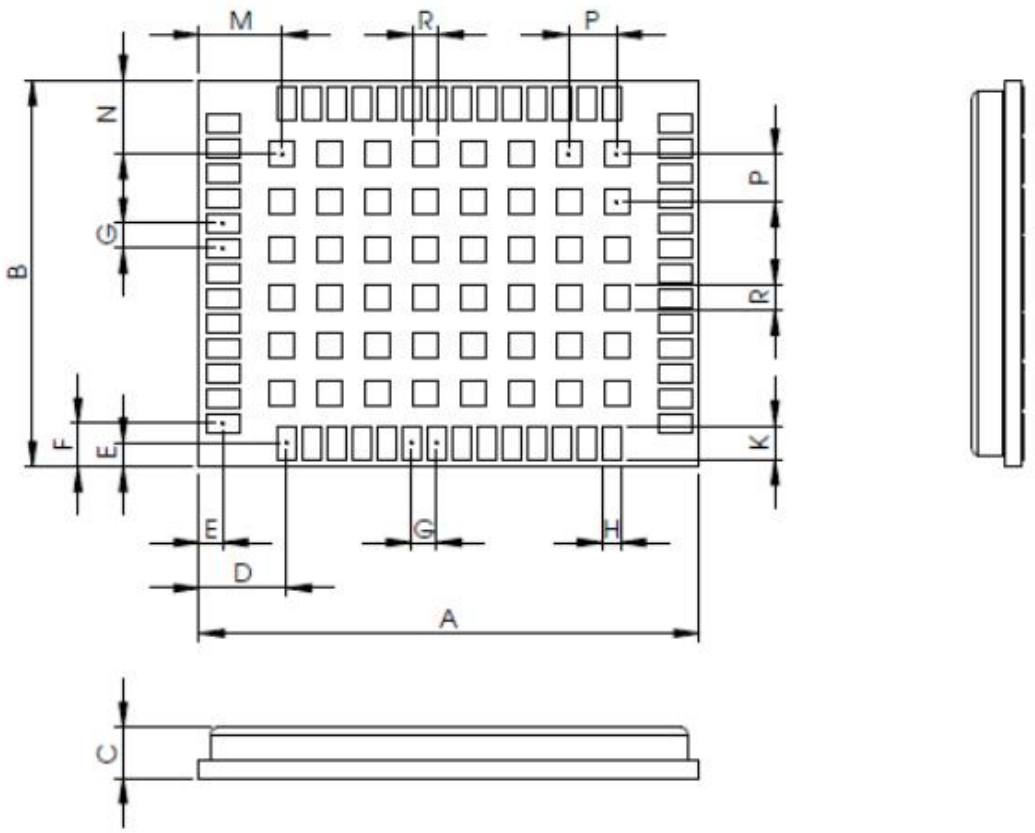
Operating Temperature: -40°C ~+85°C

Storage Temperature: -45℃ ~ +85℃

3.4 Protocol

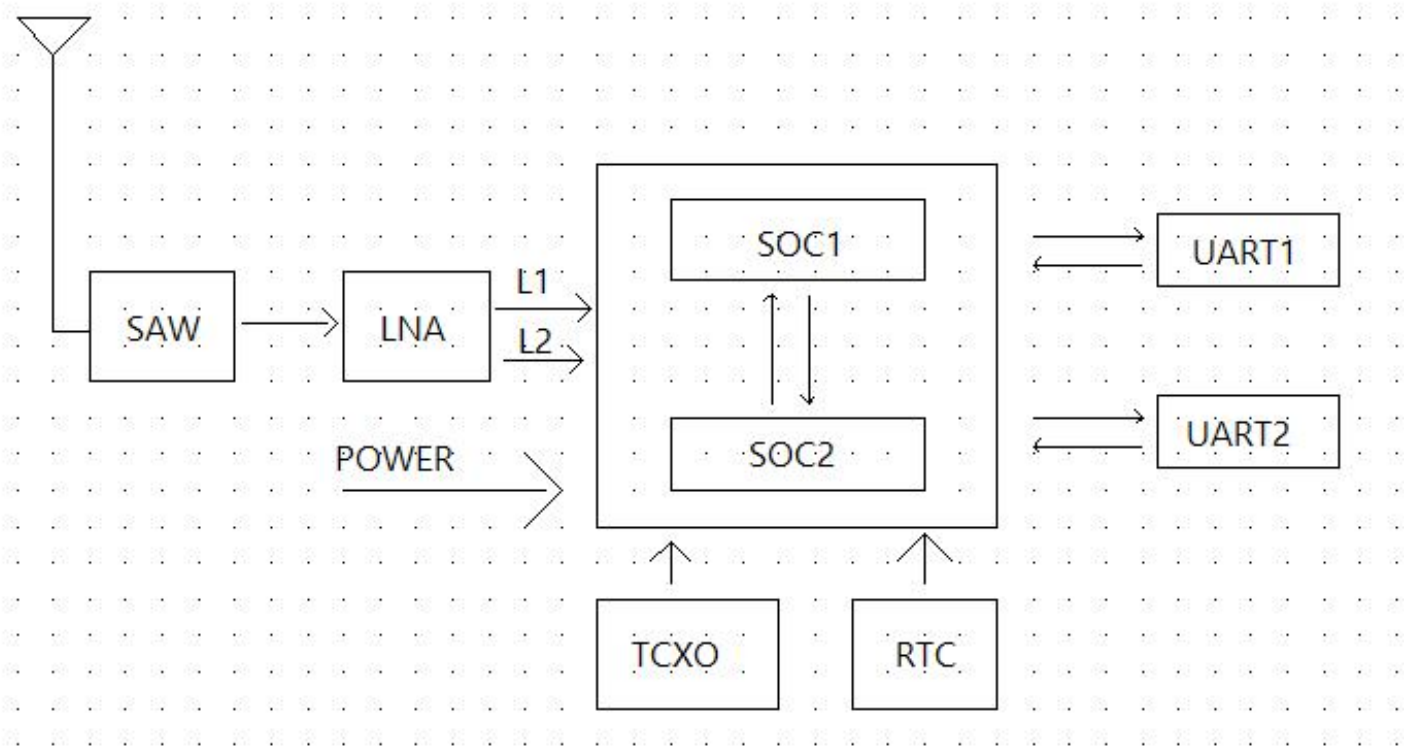
Protocol	Type
NMEA 0183	Out put/In put
RTCM3.x	Out put/In put
JMS	Custom

4 Pin assigments

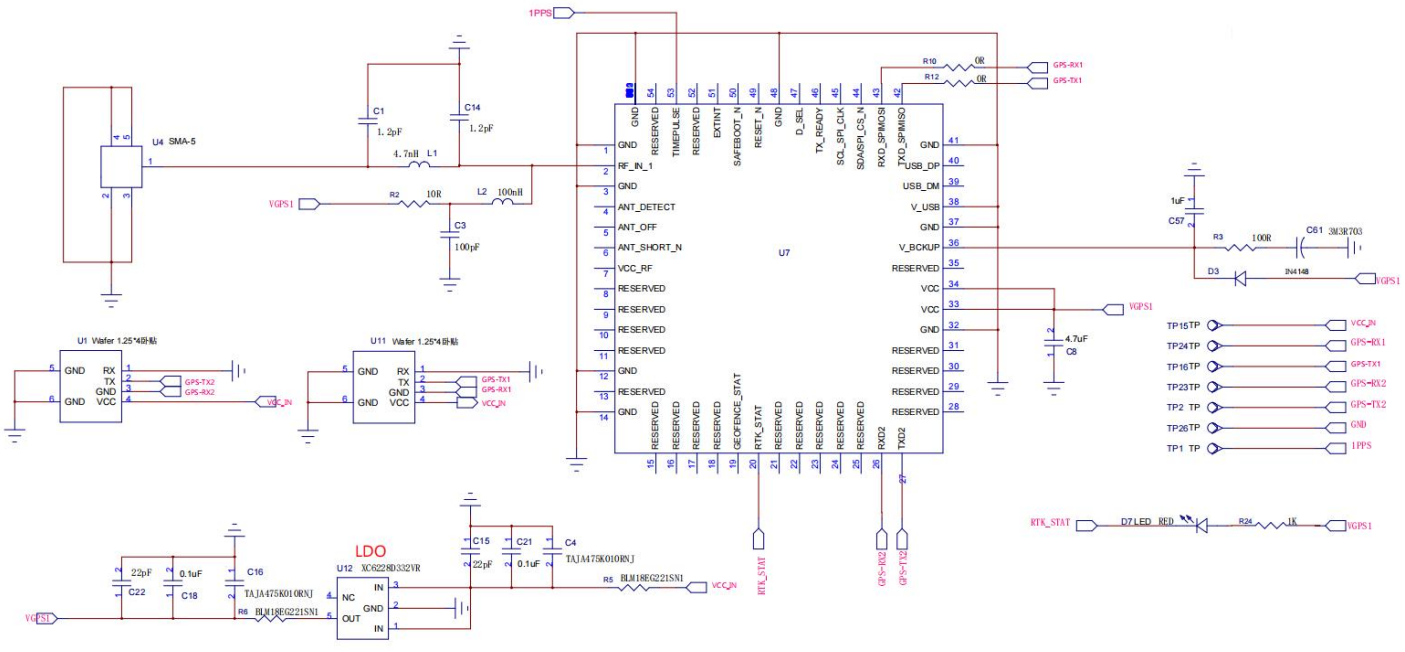


Parameter	Value（mm）	Parameter	Value（mm）
A	22±0.2	H	0.8±0.1
B	17±0.2	K	1.5±0.1
C	2.4±0.2	M	3.65±0.1
D	3.85±0.1	N	3.25±0.1
E	1.05±0.1	P	2.1±0.1
F	1.9±0.1	R	1.1±0.1
G	1.1±0.1		

5 Block diagram



6 Application Circuit



7 ESD Protection

The module is an electrostatic sensitive device. Please pay attention to the anti-static treatment during transportation and production. Do not touch the module with your hands or solder it with non-anti-static soldering iron to avoid damage to the module.

8 ROHS

This product is ROHS compliance