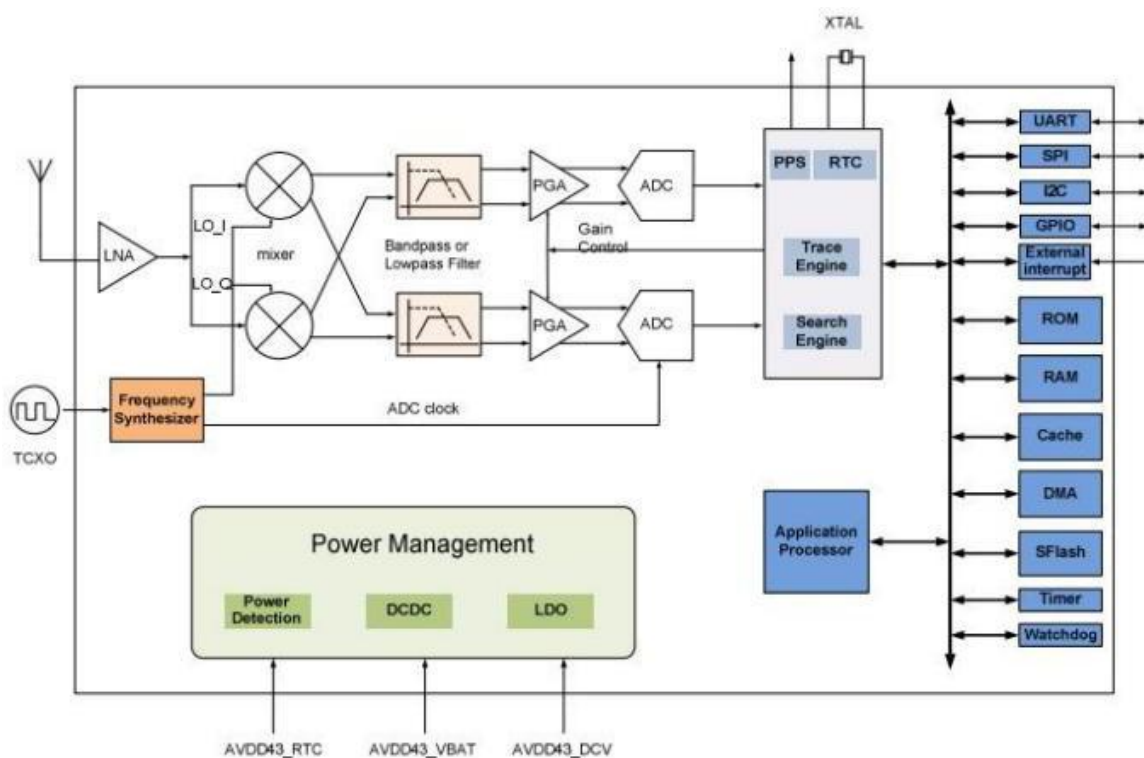


1. Product Description

BG02-T is a highly integrated GNSS SoC module with ceramic antenna, the main chip is GK9501. It is a highly integrated Multi-GNSS SOC that supports low-power BDS / GPS / GLONASS / GALILEO / QZSS / SBAS. It integrates DC / DC, LDO, LNA, RF receiver, baseband, 32-bit RISC CPU, RAM, flash memory, RTC and PMU, and provides various interfaces such as UART, I2C, SPI and GPIO. BG02-T supports crystal And TCXO input. It also provides battery backup memory and a real-time clock to speed up acquisition and reduce TTFB (Time to First Fix).



BG02-T sub-model description:

BG02-T burns different firmware, which can flexibly support GPS / BDS / GLONASS and other positioning systems. Products that support different positioning systems are differentiated according to product submodels. See the table below for details:

Function	BG02-T (G1H10S100)	BG02-T (G2H10S100)	BG02-T (GBH10S100)
GPS	YES	YES	YES
BDS	NO	NO	YES
GLONASS	NO	YES	NO

UART	YES	YES	YES
Antenna	Ceramic	Ceramic	Ceramic
Power Supply	Typ 5.0V	Typ 5.0V	Typ 5.0V
Size	20.3x18.0x5.5mm	20.3x18.0x5.5mm	20.3x18.0x5.5mm

The main parameters:

Table 1: The main parameters description

Module model	BG02-T
size	20.3*18.0*5.5(±0.2)MM
Operating temperature	-20 °C ~ 85 °C
Storage environment	-40 °C ~ 125 °C , < 90%RH
Power supply range	Supply voltage 4.75V ~ 5.25V, typical value 5V
Certification	RoHS

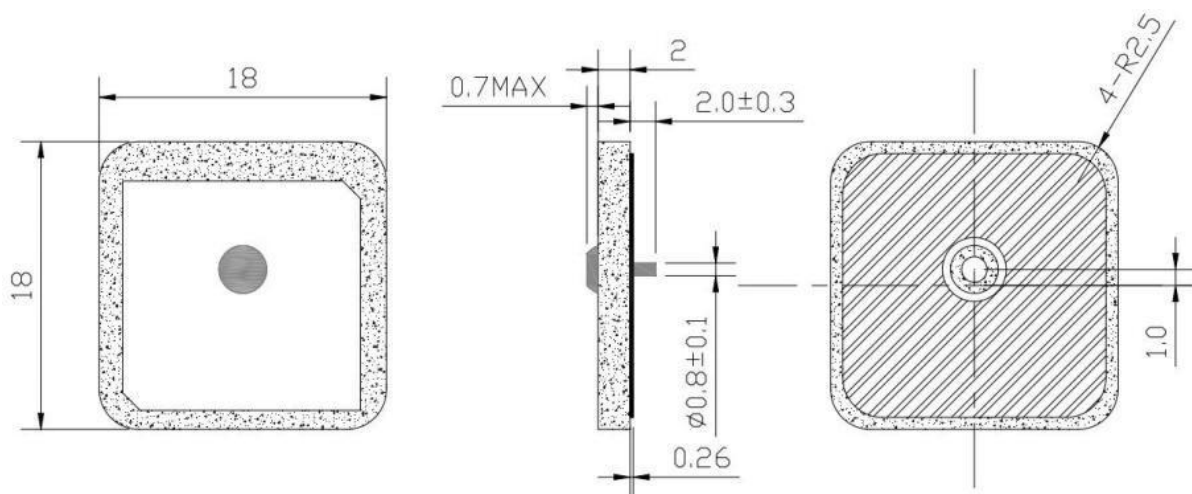
2. Electrical parameters Electrical characteristics

Condition	Test items	Value	Unit
TTF (condition 1)	Cold start	27.5	s
	Hot Start	<1	s
	Restart	<1	s
	A-GNSS	<10	s
Sensitivity (condition 2)	Cold start	-148	dBm
	Hot Start	-162	dBm
	Restart	-164	dBm
	Tracking mode	-166	dBm

Accuracy (condition 3)	Horizontal position accuracy	2.5	m
	Altitude position accuracy	3.5	m
	Speed accuracy	0.1	m/s
	Time pulse signal accuracy	30	ns
Power (condition 4)	Receive current 3.3V	30	mA
	Tracking current 3.3V	20	mA
Operating temperature		-20 ~ 85	°C
Storage temperature		-40 ~ 125	°C
Humidity		< 90%	

- The above is based on GPS / BDS mode
- Test result of [Condition 1]: The number of satellites received exceeds six, and the signals of all these satellites are -130dBm. Test 10 times to get the average value, and the positioning accuracy is less than 10 meters
- [Condition 2]: The external LNA noise figure is 0.8, and the number of satellites received is greater than 6. If the signal strength received during the five-minute continuous lock is the test value
- [Condition 3]: Broad and non-blocking environment, continuous 24 hours test, CEP is 50%
- [Condition 4]: The number of satellites received is greater than six and the signal is -130dBm for all these satellites.

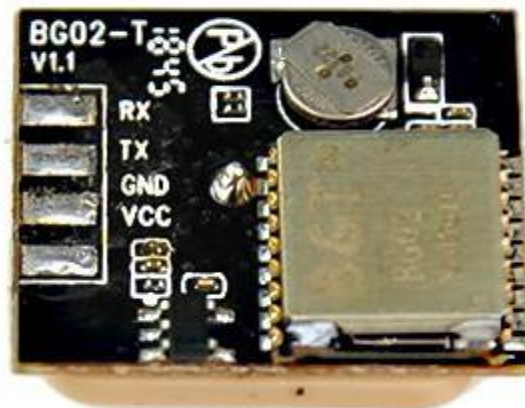
Antenna size:

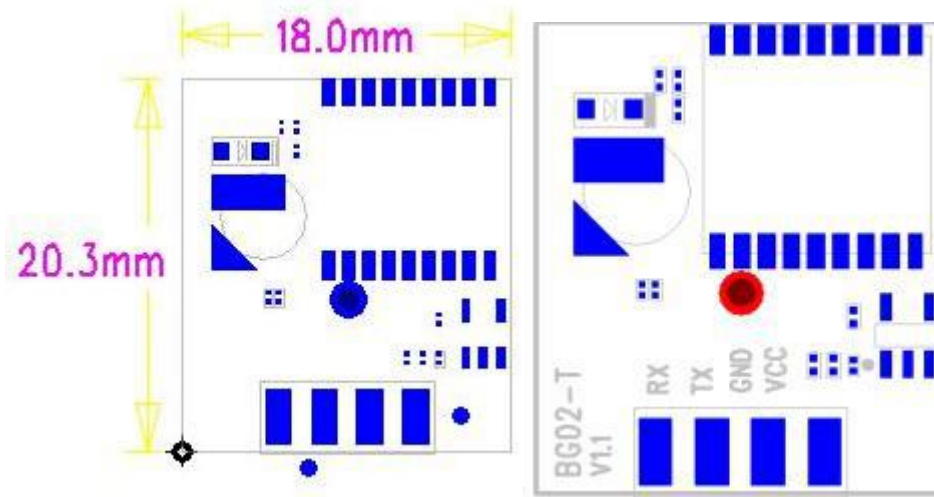


Antenna electrical specifications:

Name	Specification	Value
Receiving frequency range / MHz	GPS: 1575.42 BDS: 1561.098 GLONASS: 1602	±2.5
Center frequency (MHz) (using YBAT02GND plane)	1579	±2.0
Frequency band (MHz) (return loss ≤ -10dB)	≥5	
V. S. W. R (center frequency)	≤1.5	
Gain (Zenith) (dBi typ)	1 dB typical	
Axle ratio	5 dB max	
Polarization	Right-Handed Circular	
Impedance (Ω)	50	
Frequency temperature coefficient (ppm / °C)	0 ± 10	

3. Appearance

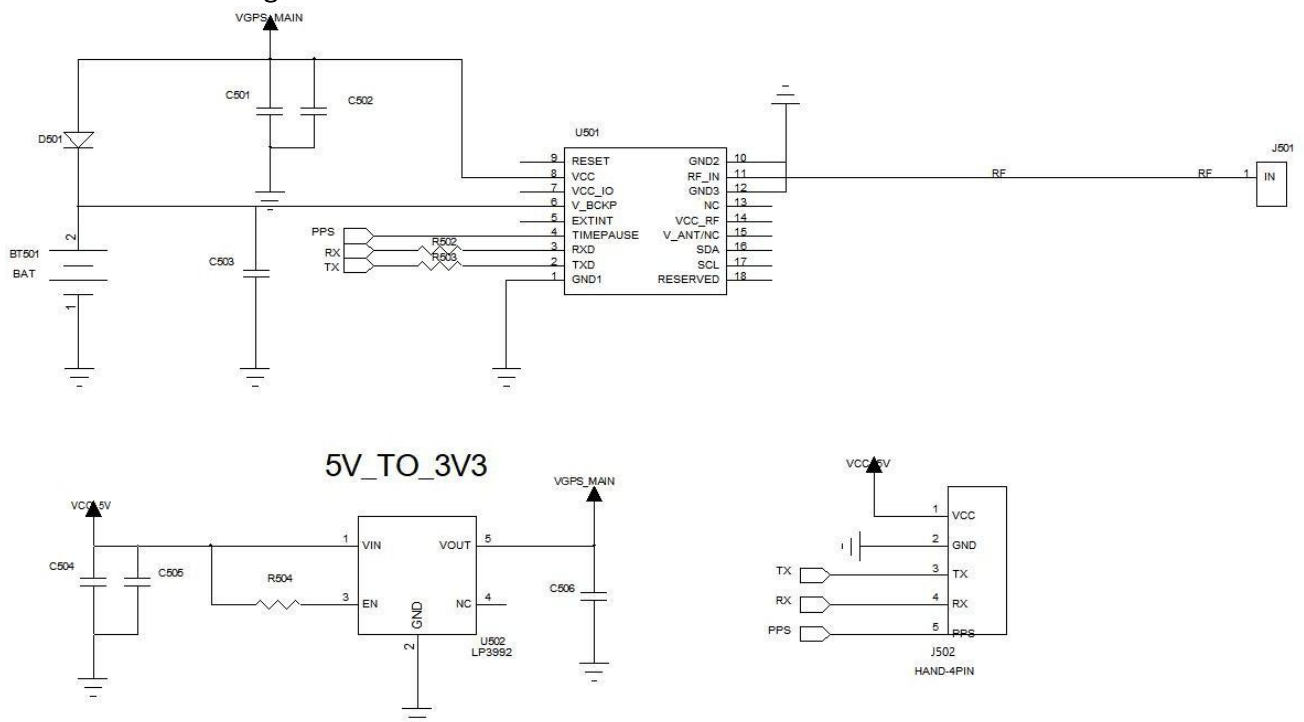




4. Pin definition

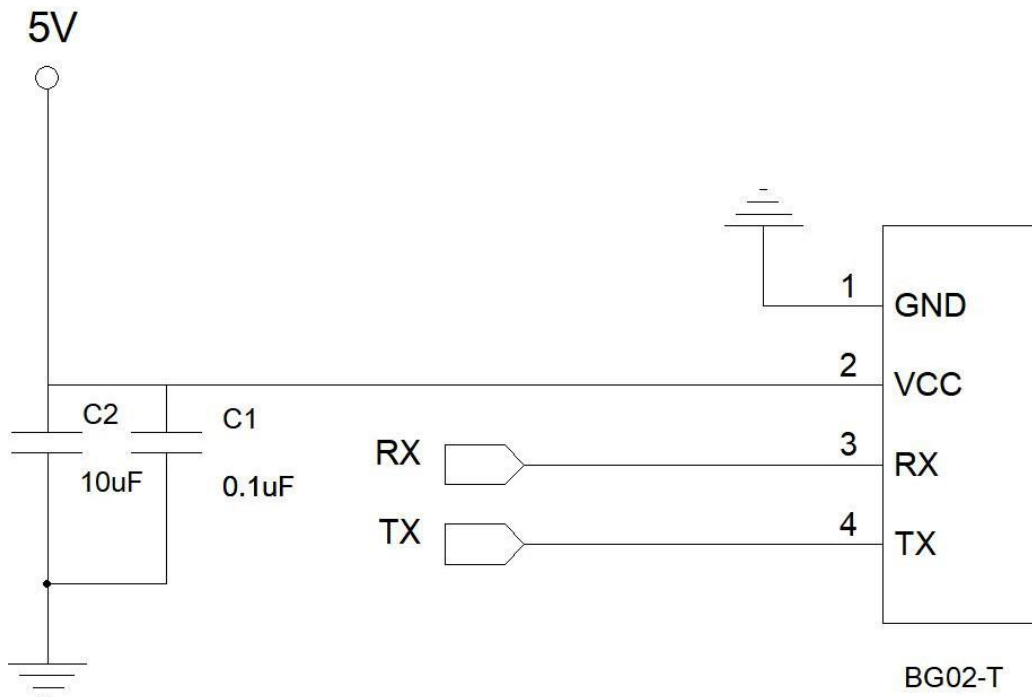
Number	Name	Function Description
1	VCC	4.75-5.25V
2	GND	Ground
3	TXD	Serial output
4	RXD	Serial input

5. Schematic diagram



6. Design guidance

6.1 Application circuit



6.2, antenna layout requirements

- (1) The module comes with a ceramic antenna.
- (2) In order to meet the performance of the on-board antenna, it is forbidden to place metal parts around the antenna, away from high-frequency devices.

6.3 Power supply

- (1) Recommended 5V voltage, peak current above 100mA
- (2) It is recommended to use LDO for power supply; if using DC-DC, it is recommended to control the ripple within 30mV.
- (3) It is recommended to reserve the position of the dynamic response capacitor in the DC-DC power supply circuit, which can optimize the output ripple when the load changes greatly.
- (4) It is recommended to add ESD device for 5V power interface.

