1. Product Information

■ Product Name: S3-1315

■ Product Description:

S3-1315 is a compact, high performance, and low power consumption GPS engine board. It uses SiRFStar III chipset which can track up to 20 satellites at a time and perform fast TTFF in weak signalenvironments. S3-1315 is suitable for the following applications:

- Automotive navigation
- Personal positioning
- Fleet management
- Mobile phone navigation
- Marine navigation

■ Product Features:

■ SiRF star III high performance GPS Chipset
■ Very high sensitivity (Tracking Sensitivity: -159 dBm)
■ Extremely fast TTFF (Time To First Fix) at low signal level
■ Two serial ports
■ 4Mb flash
■ Built-in LNA
■ Compact size (15mm * 13mm * 2.2mm) suitable for space-sensitive application
■ One size component, easy to mount on another PCB board
■ Support NMEA 0183 and SiRF binary protocol

■ Product Specifications

GPS Receiver

Chipset SiRF	GSC3e/LP
Frequency	L1, 1575.42 MHz
Code	C/A Code
Protocol	NMEA 0183 v3.0
	Default:GGA,GSA,GSV,RMC
	Support:VTG,GLL,ZDA)
	SiRF binary and NMEA Command
Available Baud Rate	4,800 to 57,600 bps adjustable

Channels	20
Flash	4Mbit
Sensitivity	Tracking:-159dBm
Cold Start	42 seconds, average
Warm Start	38 seconds, average
Hot Start	1 second, average
Reacquisition	0.1 second, average
Accuracy	Position: 10 meters, 2D RMS
	5 meters, 2D RMS, WAAS enabled
	Velocity: 0.1 m/s
	Time: 1us synchronized to GPS time
Maximum Altitude	$<$ 18,000 meter
Maximum Velocity	$<$ 515 meter/second
Maximum Acceleration	$<$ 4G
Update Rate	1 Hz
DGPS	WAAS, EGNOS, MSAS
Datum	WGS-84

Interface

I/O Pins	2 serial ports

Physical Characteristic

Type	22-pin stamp holes
Dimensions	15 mm * 13mm * 2.2 mm ±0.2mm

DC Characteristics

Power Supply	3.3Vdc ± 5%
Backup Voltage	2.0 ~ 3.6Vdc ± 10%
Power Consumption	Acquisition: 42mA

Environmental Range
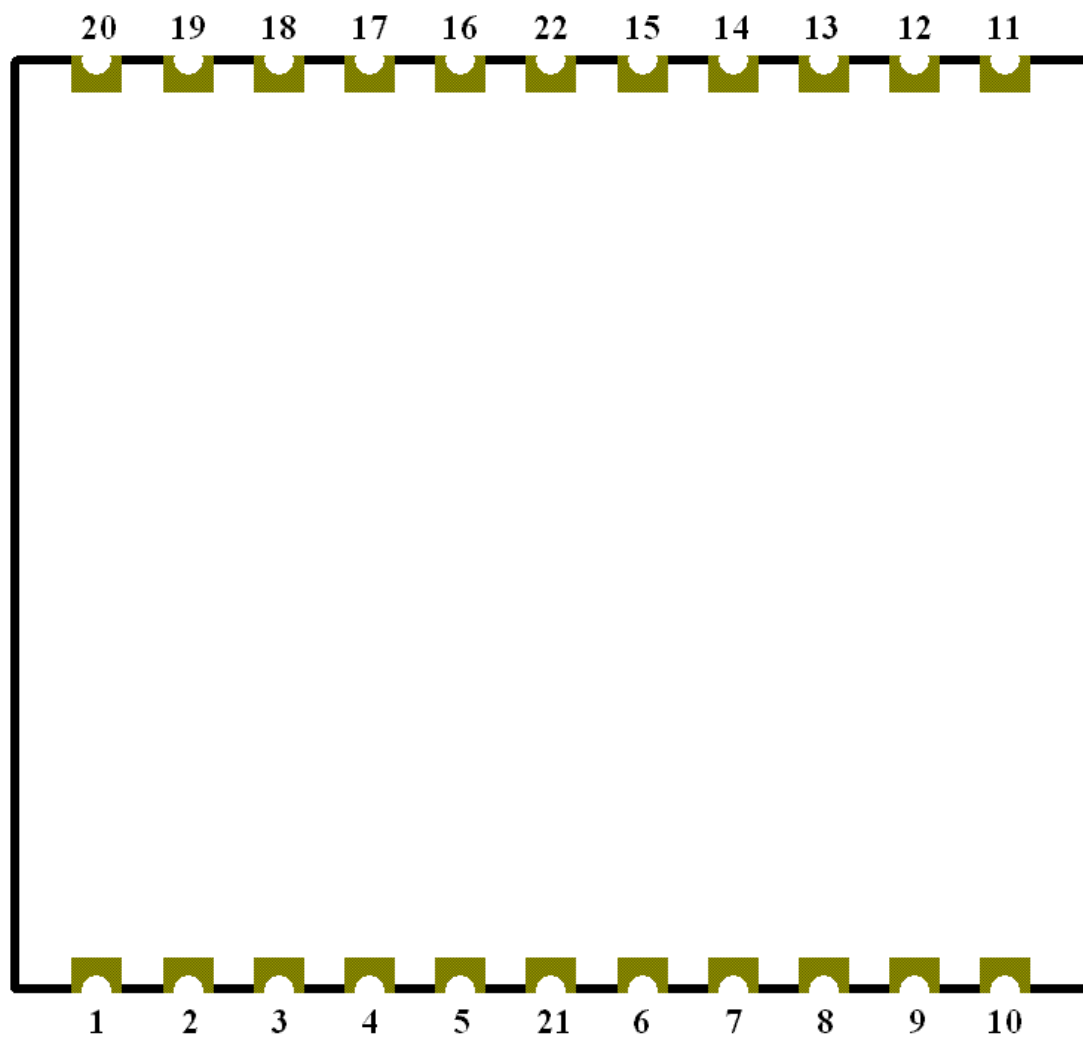
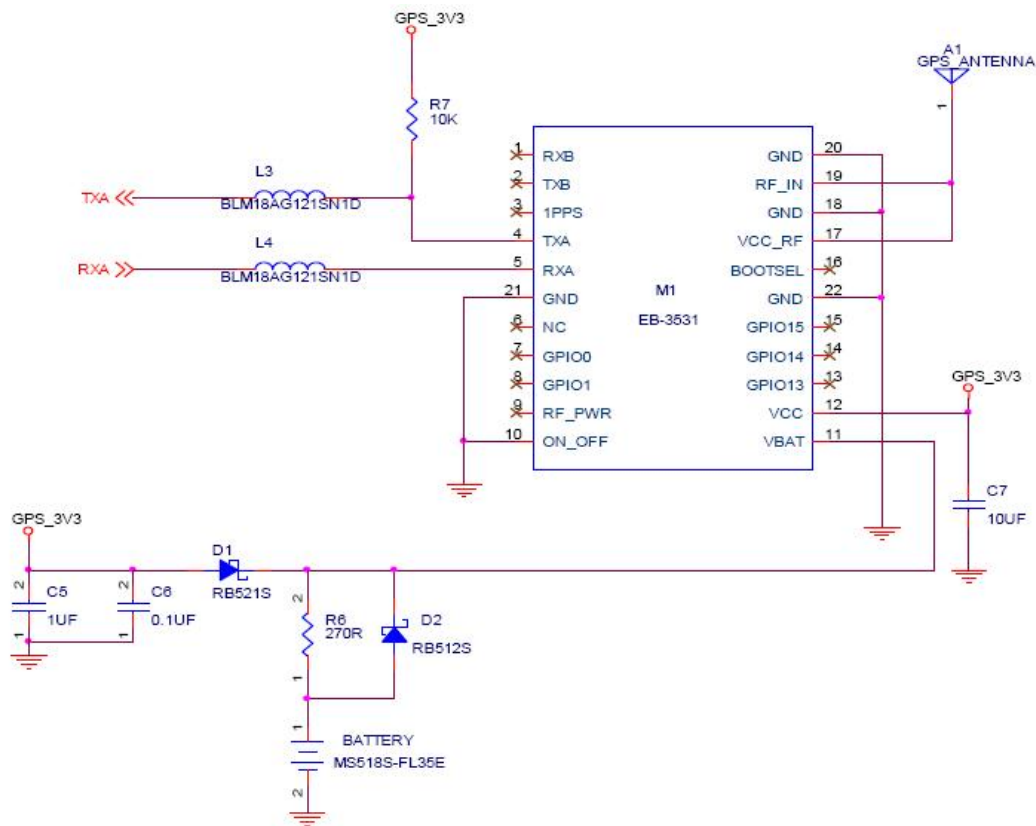|	
Humidity Range	5% to 95% non-condensing
Operation Temperature	-30℃ to 85℃
Storage Temperature	-40℃ to 125℃

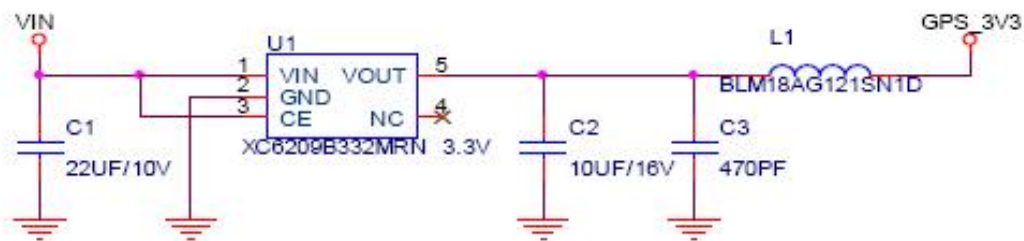# 2. Technical Information

■ Block Diagram
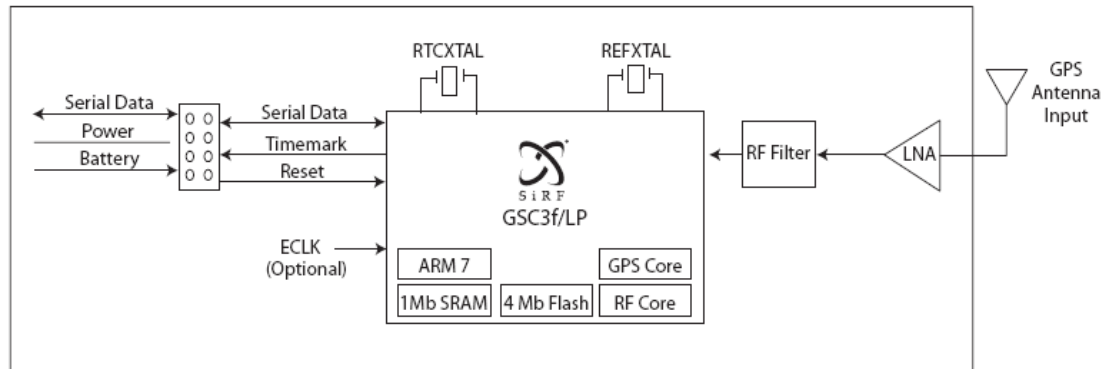
■ Module Pin Assignment:

Pin NO. Pin Name Remark

Pin NO.	Pin Name	Remark
1.	RXB	Unused, not connect.
2.	TXB	Unused, not connect.
3.	TIMEMARK	One pulse per second.
4.	TXA	This is the main transmits channel for outputting navigation andmeasurement data to user's navigation software or user written software. Output TTL level, 0V ~ 2.85V.
5.	RXA	This is the main receive channel for receiving software commands to theengine board from SiRFdemo software or from user written software.
6.	NC	NC
7.	GPIO0	User can use this I/O pin for special function. For example, LED indicator.
8.	GPIO1	User can use this I/O pin for special function. For example, LED indicator.
9.	RF_PWR	RF_PWR ON/OFF
10.	ON_OFF	Edge triggered soft on/off request. Should only be used to wake up chip.(must be Low)
11.	VBAT	This is the battery backup input that powers the SRAM and RTC, The batteryvoltage should be between 2.0v and 5.0v.
12.	VCC	This is the main DC supply for a 3.3V +- 5% DC input power module board.
13.	GPIO13	User can use this I/O pin for special function.For example, on/off LED.
14.	GPIO14	User can use this I/O pin for special function.For example, on/off LED.
15.	GPIO15	LED indicate for GPS status
16.	BOOTSEL	Set this pin to high for programming flash.
17.	VCC_RF	RF POWER 2.85V
18.	GND	Ground.
19.	RF IN	Connect to External Active Antenna. While external antenna is used.
20.	GND	Ground.
21.	GND	Ground.
22.	GND	Ground

■ Application Circuit

GPS Active Antenna Specification (Recommendation)

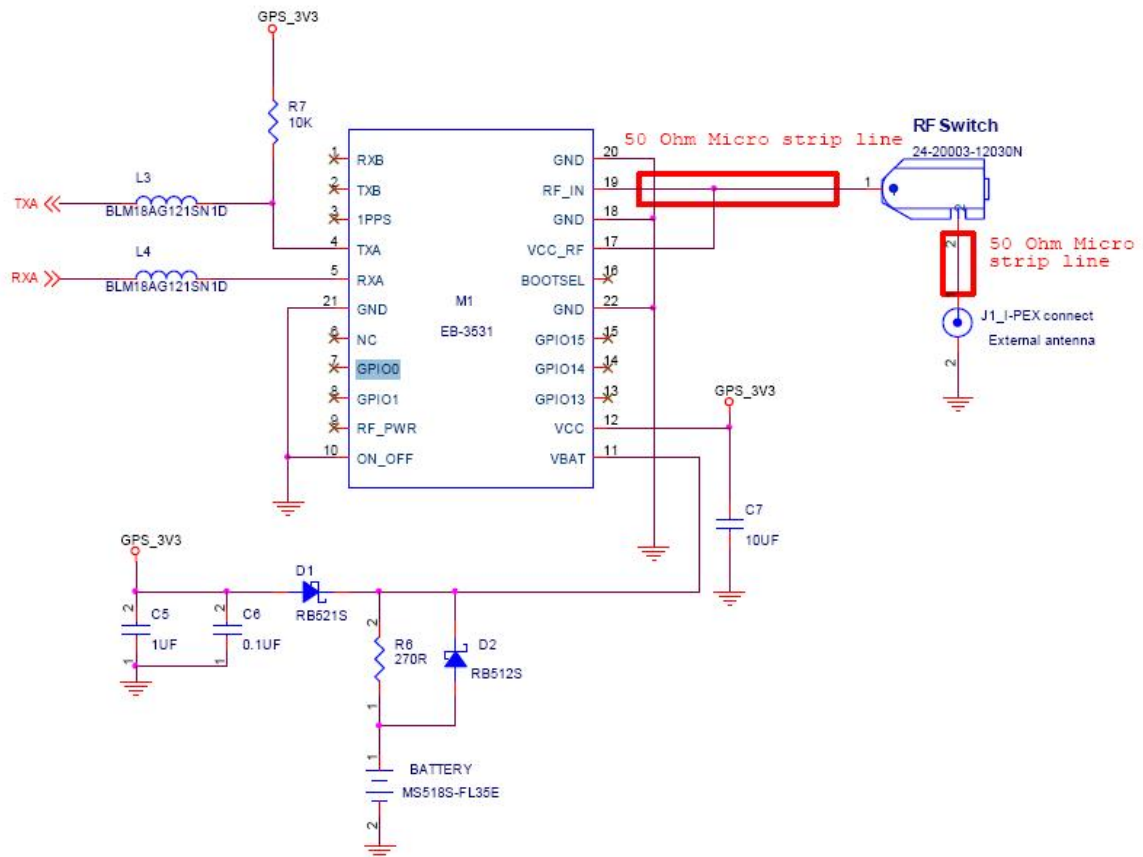|	
Frequency:	1575.42 + 2MHz
Axial Ratio:	3 dB Typical
output Impedance:	50Ω
Polarization:	RHCP
Amplifier Gain:	18~22dB Typical
Output VSWR:	2.0 Max.
Noise Figure:	2.0 dB Max
Antenna Input Voltage:	2.85V (Typ.)

■ Dimensions

15.00

14.75

1.15

13.00

1.27

1.60

0.60

■ Recommend Layout PAD

13.9mm
13.0mm
12.1mm

1.27mm

0.6mm

0.7mm

0.92mm

12.7mm
13.4mm
15.0mm
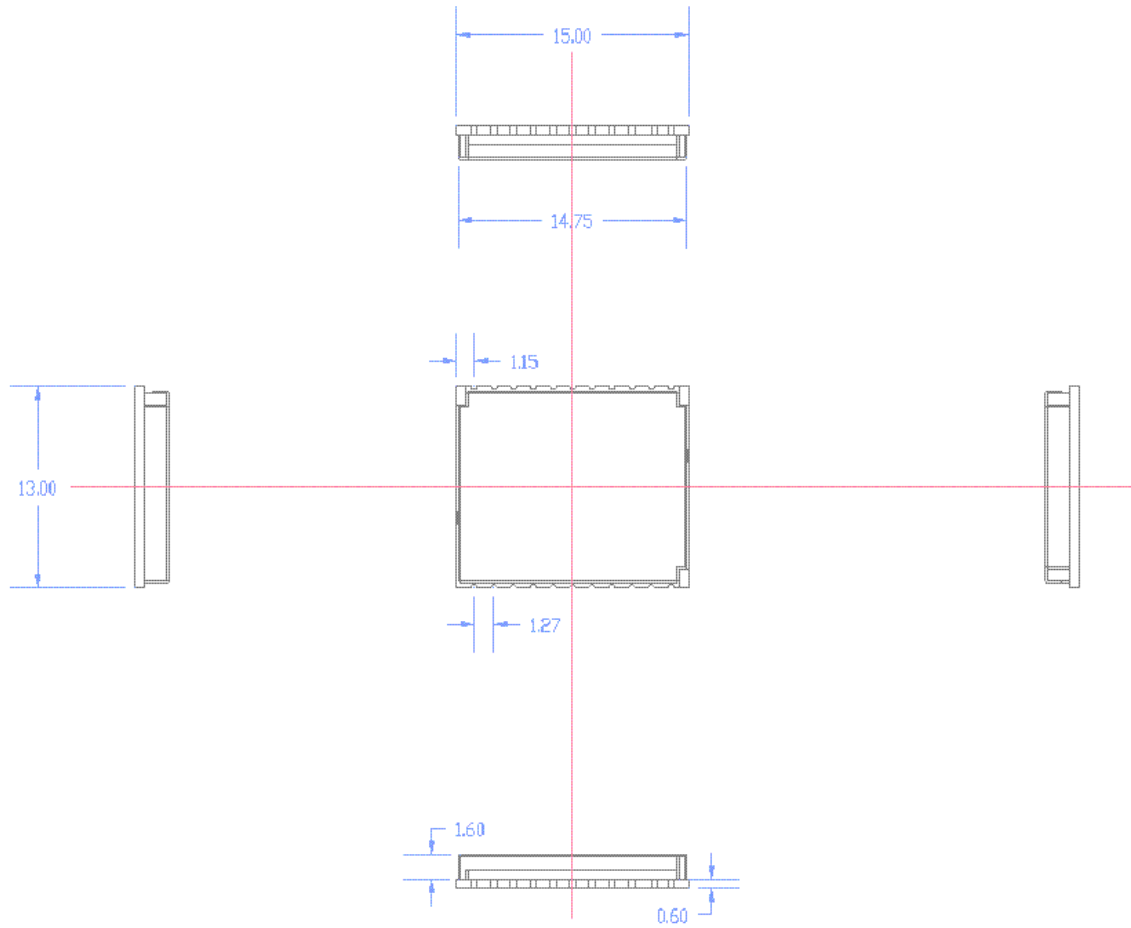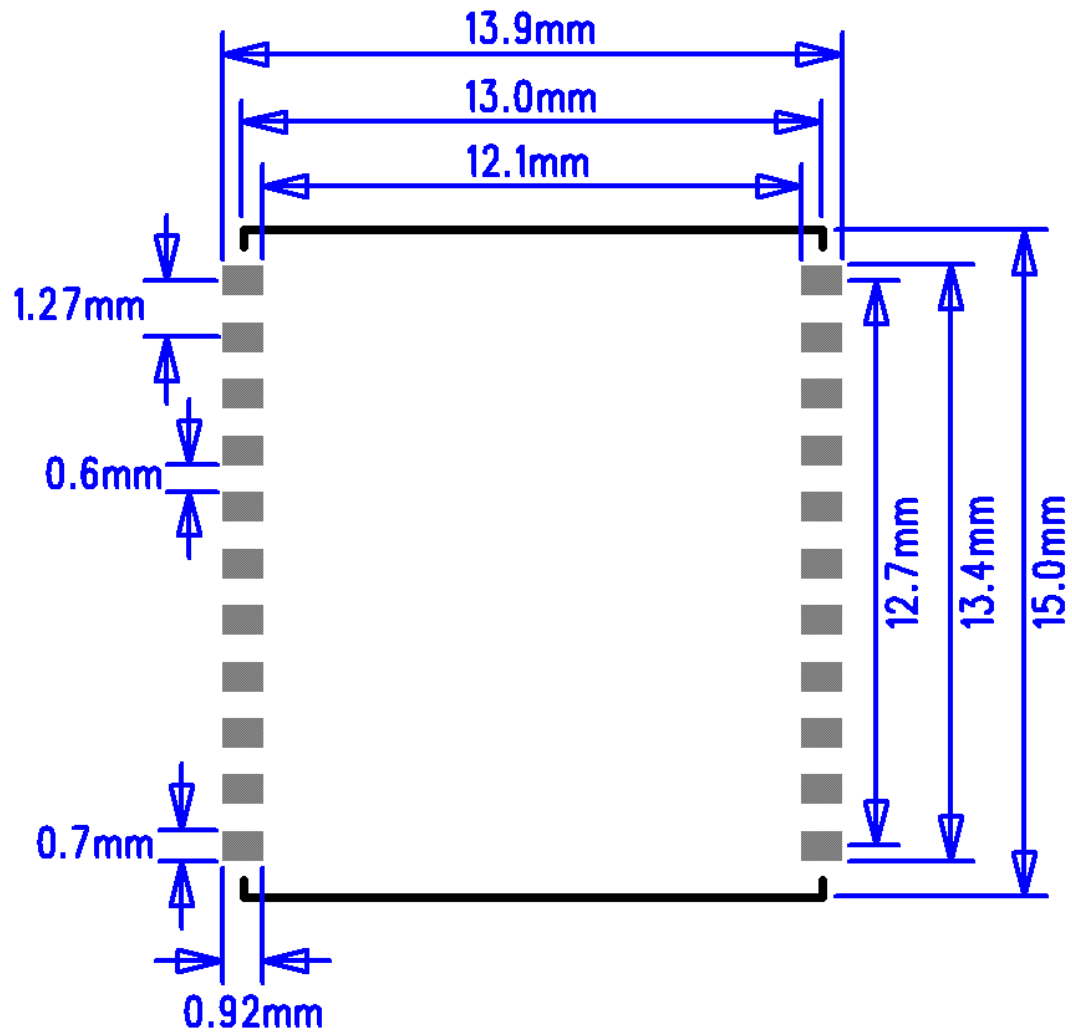
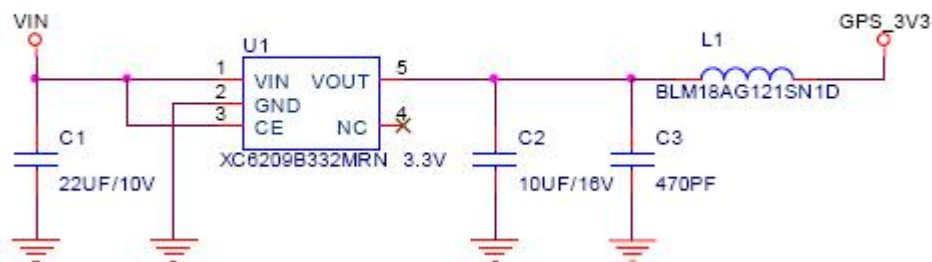**Tolerances : ±0.1mm**

S3-1315 Application guideline

Application Circuit

2.GPS Power

■Layout Rule

Do not routing the other signal or power trace under the engine board .

■RF:

This pin receives signal of GPS analog via external active antenna .It has to be a has to be acontrolled impedance at 50 ohm .

Do not have RF traces closed the other signal path and routing it on the top layer.

Keep the RF traces as short as possible

■ Antenna:

Keep the active antenna on the top of your system and confirm the antenna radiation pattern、axial、ratio、power gain、noise figure、VSWR are correct when you Setup the antenna in you case.

GPS Passive (or Active)Antenna Specification(Recommendation)

Frequency:	1575.42±2 MHz
Axial Ratio:	3 dB Typical
output Impedance:	50Ω
Polarization:	RHCP
Output VSWR:	1.5 Max.

Active option

Low Noise Amplifter:

Amplifier Gain :	18~22dB Typical
Output VSWR:	2.0 Max.
Noise Figure:	2.0 dB Max.
Antenna Input Voltage :	2.85V(Typ.)

Definition of Pin assignment

VCC

This is the main DC supply for a 3.3V ± 5% DC input power module board.

GND

GND provides the ground for digital part.

RXA

This is the main receive channel for receiving software commands to the engine

board from SiRFdemo software or from user written software.

RXB

For user's application (not currently used).

TXA

This is the main transmits channel for outputting navigation and measurement data to user's navigation software or user written software.Output TTL level, 0V ~ 2.85V

TXB

For user's application (not currently used).

RF_IN

This pin receives signal of GPS analog via external active antenna .It has to be a has to be acontrolled impedance at 50 ohm .Do not have RF traces closed the other signal path and routing iton the top layer.

Keep the RF traces as short as possible.

VBAT

This is the battery backup input that powers the SRAM and RTC when main power is removed.

Typical current draw is 15uA. Without an external backup battery, the module/engine board willexecute a cold star after every turn on.

To achieve the faster start-up offered by a hot or warm start, a battery backup must be connected.The battery voltage should be between 2.0v and 5.0v.

GPIO

User can use this I/O pin for special function.

(For example, on/off LED)

BOOTSEL

Set this pin to high for programming flash.

VCC_RF

Provide Active Antenna Power 2.85V

ON_OFF

Edge triggered soft on/off request. Should only be used to wake up chip.(must be Low)