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SiRF star III GPS Module
SJ-301
Specification

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2007.2

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1. Introduction

The SJ-301 GPS Module consists of SiRF Star III technology.(INTERNAL 4Mbit FLASH) with LNA, SAW Filter, Reset IC, RTC X-tal, TCXO and Regulator. Please refer to the section for more information.

2. Product Features

* Fully self-contained GPS receiver.

* Fully shield.

* Full implement of SiRFstarIII™ GPS architecture.

- ▸ GSP3f (GPS Engine with integrated Processor and Flash)
- ▸ GRF3w (A Highly Integrated GPS RF)
- ▸ Low noise amplifier
- ▸ SAW filter
- ▸ TCXO
- ▸ 32.768KHz RTC X-tal
- ▸ Reset & Regulator, etc.

* GPS receiver in a micro-component package
- ▸ Postage stamp type package
- ▸ Fully automatic assembly: Reflow solderable

* Fast TTFF (time-to-first-fix)

* Userable I/O port : Six GPIO port

* Advanced low power mode

3. Product applications

▸   Automotive applications

▸   Personal positioning and navigation

▸   Mobile and PDA applications, etc

4. Block diagram
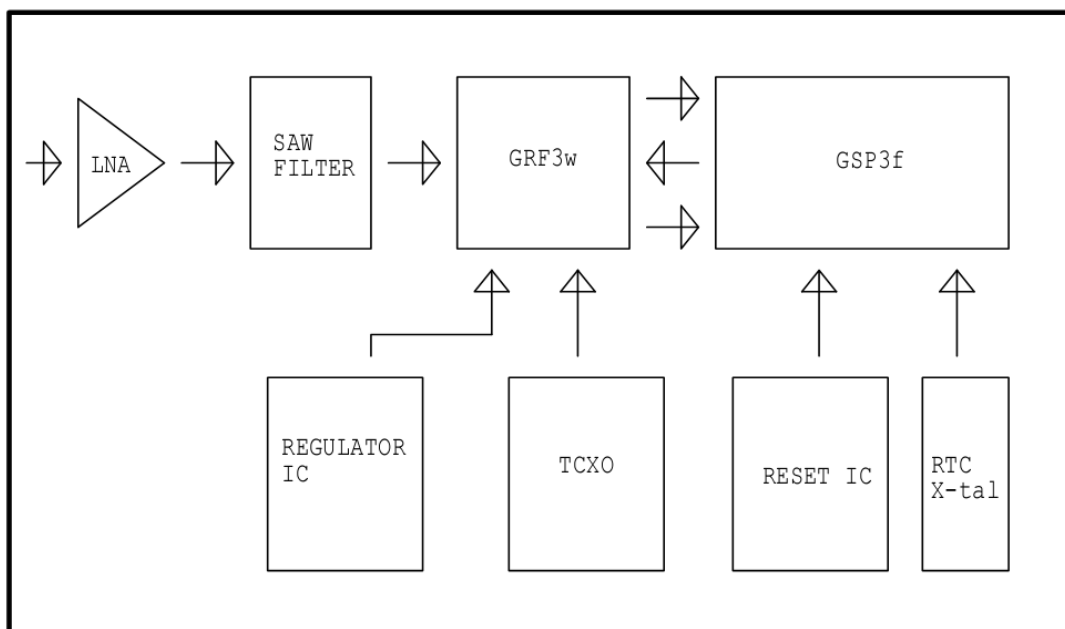
5. Technique specifications

Model: SJ-301

Receiver type: L1 frequency, C/A Code, **20-channel**

Max up-date rate: 1Hz

Accuraccy(SA off): Position < 10M 2DRMS

Tracking Sensitivity: -159dBm (at the receiver input)

Operational Limits:
      Altitude < 18,000m (60,000ft)
      Velocity < 515m/s (1,000knots)

Time To First Fix (TTFF)

      (a) Cold start: 60sec(typical)
      In Cold start scenario, the receiver has no knowledge on last position,
      approximate time or satellite constellation. The receiver starts to search
      for signals blindly. Cold start time is the longest startup time for SJ-S01.

      (b) Warm start: 38sec(typical)
      In Warm Start scenario, the receiver knows -due to a backup battery-
      his last position, approximate time and almanac. Thanks to this it can
      quickly acquire satellites and get a position fix faster than in cold start
      mode.

      (c) Hot Start: < 8sec(typical)
      In Hot Start scenario, the receiver was off for less than 2 hours. It
      uses its last Ephemeris data to calculate a position fix.

Re-acquisition Time:
      3sec. typical (within 5sec. Block out)
      5sec typical (within 60sec block out)

Protocol: NMEA 0183 (Default)
      Activated message: GLL, GGA, RMC, VTG, GSV, GSA with checksum
      enabled
      SiRF Binary

Size: 19.0mm x 19.0mm (max.19.7mm) x 2.6mm

Weight: 1g

6. Mechanical Layout

1) DIMENSION / Recommend PCB Layout

7. Hardware interface

Pin No	Signal name	I/O	Description	Note
1	VCC	I	Supply Voltage	
2	GND			
3	TXB	O	Serial outputs for channel B	
4	RXB	I	Serial inputs for channel B	
5	TIMEMARK	I/O	1 pps timemark output	
6	TXA	O	Serial outputs for channel A	
7	RXA	I	Serial inputs for channel A	Pull up if not used
8	GPIO 1	I/O		Leave unconnected if not used
9	Bootsel	I	Module boots into special debug mode if VCC during reset	Leave unconnected if not used
10	GND			
11	GND			
12	GND			
13	GND			
14	GND			
15	GND			
16	GND			
17	GND			
18	RF IN	I	GPS signal from antenna	50Ω (1.57542GHz)
19	GND			
20	V-BAT	I	Backup Voltage supply for RTC and SRAM	Leave unconnected if not used

GND   GND

GND   GND
ANT   GND
GND   GND
                                             GND

EXBAT   GND
                                             BOOTSEL
RESET

VIN   GPIO_1

GND

RXA
TXA
TIME_MARK
RXB
TXB

RESET

An external reset is initiated by pulling RESET low for at least 1 µs. If not used, RESET can be left unconnected since there is an internal 10k pull-up resistor. RESET is also used in Push-to-Fix mode in order to wake up the unit and request a position fix. Minimum pulse width is 1 µs.

BOOTSEL

The boot signal BOOTSEL forces special debug mode when restarted with a reset signal or power-up. If not used, BOOTSEL can be left unconnected since there is an internal 1k pull-down resistor.

RF IN

The line on the PCB from the antenna (or antenna connector) has to be a controlled impedance line (Microstrip at 50Ω).

TIMERSYNC

It is YCLK. Y Clock is an auxiliary clock input that supports dual frequency oscillator calibration systems.

VBAT

This is the battery backup supply that powers the SRAM and RTC when power is removed. Without an external backup battery or on board battery, engine board will execute a cold start after every turn on. To achieve the faster start-up offered by a hot or warm start, either a backup battery must be connected or battery installed on board.

TIMEMARK

This pin provides one pulse per second output from the engine board which is synchronized to within one microsecond of GPS time. The output is TTL negative level signal with negative logic.

8. Serial Interface

The SJ-301 GPS receivers provide two serial ports. All serial interface signals (Port A:TxA RxA Port B:TxB RxB operate on 3.3V CMOS)

Baud Rate	Comments
1200	NMEA,suitable for RMC message only
2400	NMEA,suitable for RMC message only
4800	Must deactivate some messages to avoid communication bottleneck and loss of information; e.g. NMEA:RMC and ZDA only
9600	Minimum recommended baud rate for NMEA output in standard Configuration
19200	Minimum recommended baud rate for SiRF Binary Protocol output
38400	Minimum recommended baud rate for SiRF Binary Protocol output including development data and raw tracking data.
57600	Minimum recommended baud rate for SiRF Binary Protocol output including development data and raw tracking data.

9. Electrical Specification

Absolute Maximum Ratings

| Parameter	Min	Max	Unit
Power supply voltage(VDD,V_BAT)	-0.3	4.8	V
Serial port Input pin voltage	-0.3	5.0	V
I/O port voltage	-0.3	VCC+0.3	V
I/O port current		±25	mA
Storage temperature	-65	150	℃

Warning – Stressing the device beyond the "Absolute Maximum Ratings" may cause permanent damage. These are stress ratings only. Operation beyond "Operating conditions" is not recommended and extended exposure beyond the "Operating condition" may affect device reliability. This module is not protected against over voltage, reversed voltage or short current of RF_IN port.

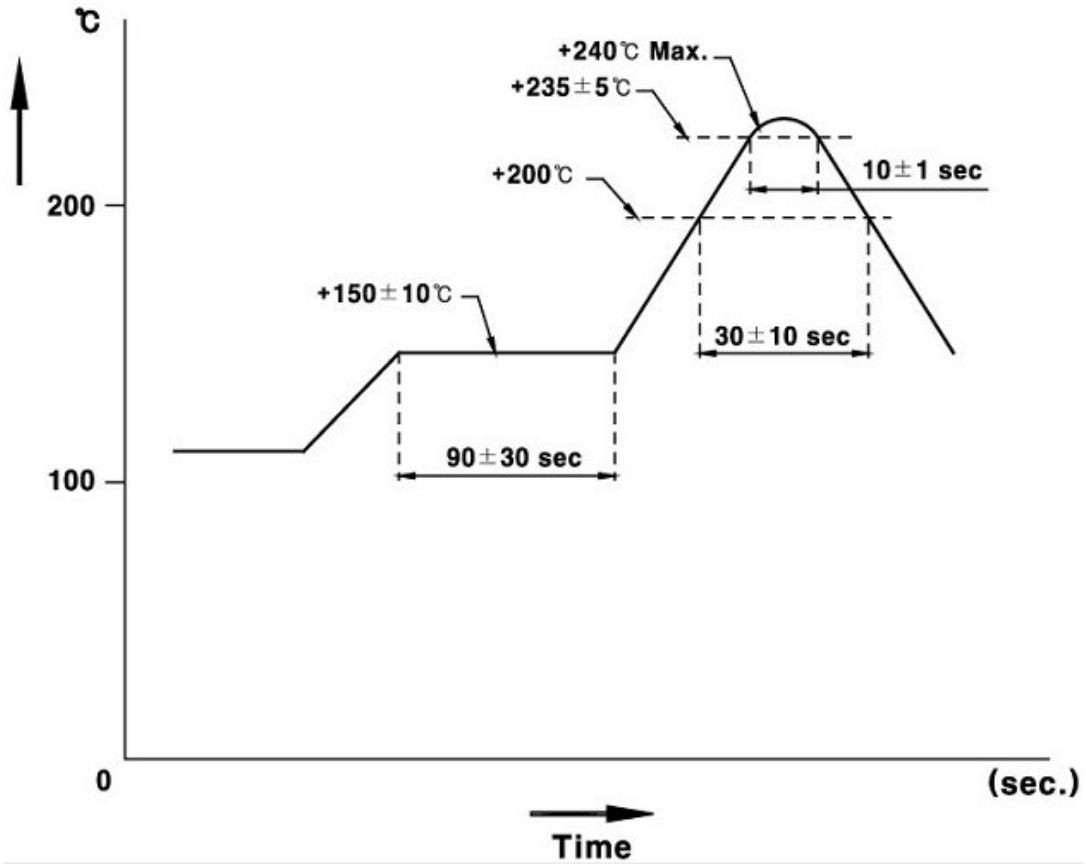## 10. Operating Conditions

(Test Temperature : 25℃)

Parameter	Condition	Min	Typ	Max	Unit
Operating supply voltage	VCC	2.7	3.3	3.6	V
Operating supply ripple				50	mV
Backup battery input voltage	V_BAT	1.9		3.6	V
I/O input low level				0.3xVCC	V
I/O input high level		0.7xVCC			V
I/O output high level	Ioh=2mA	2.4	2.8		V
I/O output low level	Iol=2mA		0.2	0.4	V
Antenna input voltage	V_ANT	2.7	3.3	5.0	V
Sustained supply current	VCC=3.3V		80		mA
Peak supply current	VCC=3.3V		100		mA
Operating temperature	VCC=3.3V	-40	25	+85	℃

11. Application Schemetic (for Active Ant.)

※ Active Ant. ————————————————————→ RF-IN

INDUCTOR(33nH) ← FERRITE BEAD(ECFB1005800) ← VANT0
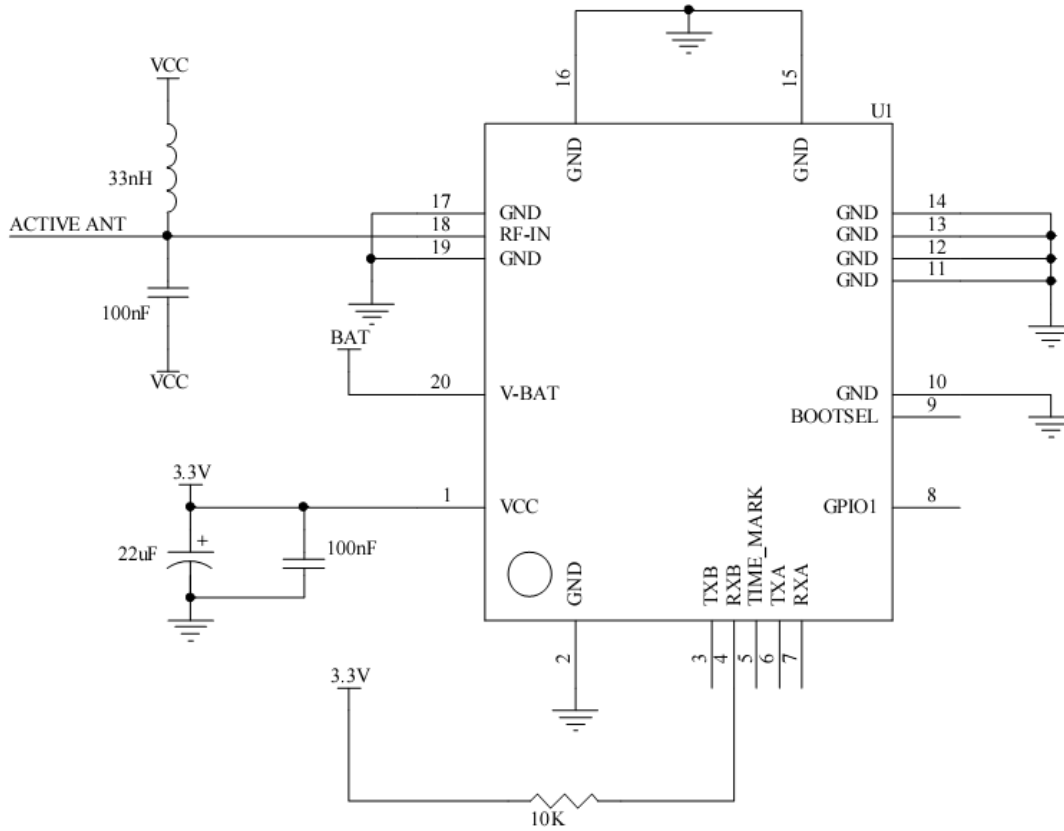
12. Reflow Profile

Reflow Profile

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For further info, please contact us.

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