

SSF1513

Ultra High Sensitivity SiRF StarIII 7989
GPS Module with Miniature Dimension

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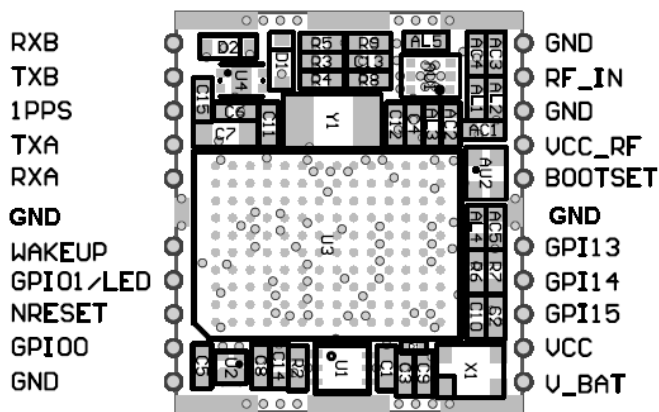
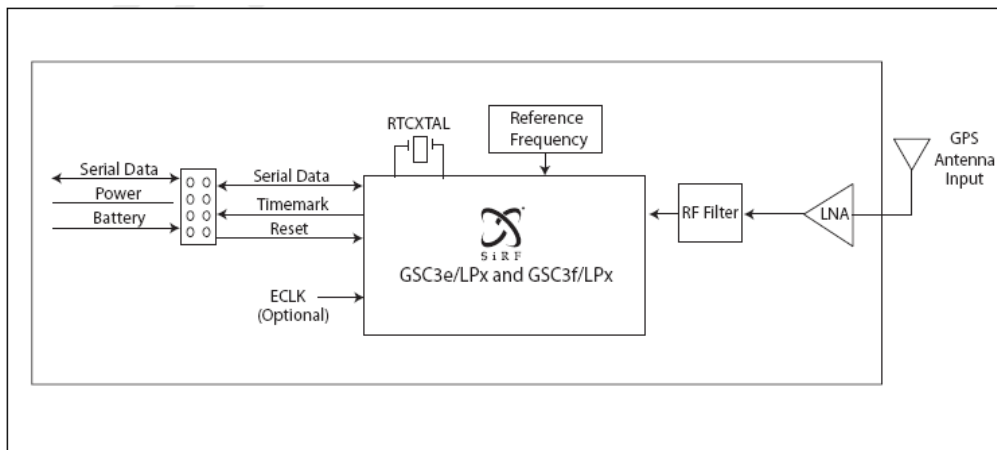
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Features

- ✓ 20 channel SiRF StarIII7989 positioning engine
- ✓ Ultra high sensitivity to -158 dBm
- ✓ SBAS (WAAS, MSAS, and EGNOS) support
- ✓ Supports Power saving modes
- ✓ 15 μ A backup current
- ✓ Support 2 UART ports
- ✓ Ultra low power consumption 60mW
- ✓ Ultra miniature 15 x 13 mm dimension with SMT pad package
- ✓ Operating temperature range: -30 to 85°C
- ✓ RoHS compliant (lead-free)



Block diagram



Technical Specifications

1. Electrical Characteristics

1.1 Chipset	SiRF StarII GSC3eLP	7989
1.2 General	Frequency L1, Channels, C/A code	1575.42MHz 20, 1.023 MHz chip rate, 8192 time/frequency search windows
1.3 Accuracy	Position Time	5 meters CEP 50 nanosecond rms (1 PPS)
1.4 DGPS Accuracy	Position	2.0 meters CEP
1.5 Acquisition Rate	Reacquisition Cold start Warm start Hot start	< 1 sec, typical 35 sec, typical 35 sec, typical 1 sec, typical
1.6 Sensitivity	Tracking	-159dBm
Acqui	sition/Reacquisition	-155dBm
Cold	start	-144dBm
1.7 Dynamic Condition	Altitude Velocity	18,000 meters (60,000 Feet) max. 515 meters /sec (1000 Knots) max.
1.8 Power	Main Power Supply current	3.3 VDC typical 30 mA
	Backup power Backup current	1.4 ~ 5V 15µA typical
1.9 Serial Port Protocols	Electrical interface	2 X UART, NMEA0183 v3.0

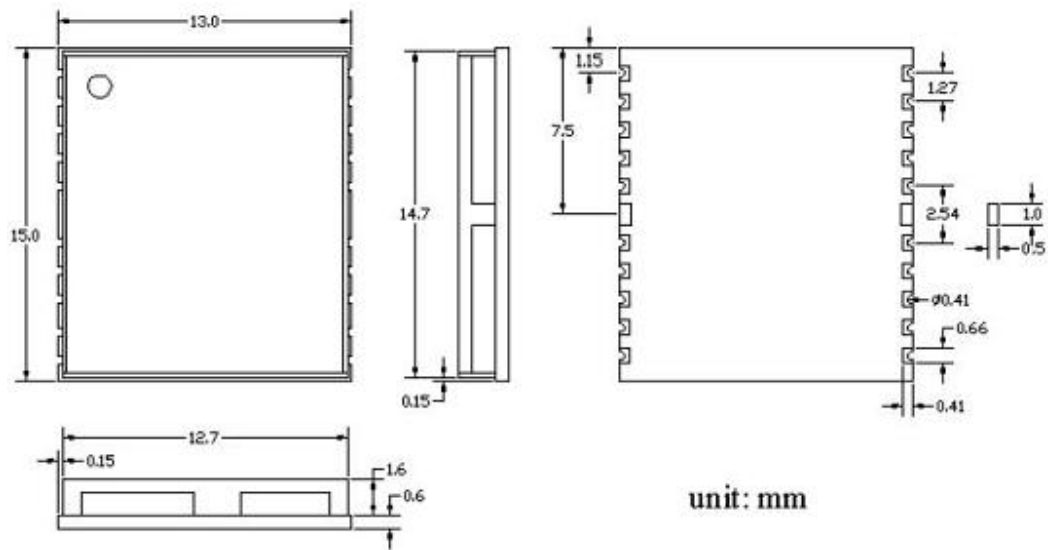
2. Environmental Characteristics

2.1 Temperature	Operating range	- 30 to + 85
2.2 Mechanical dimensions	L x W x H	15.0 x 13.0 x 2.2 mm
2.3 Interface	I/O connector	22 pin SMD micro package

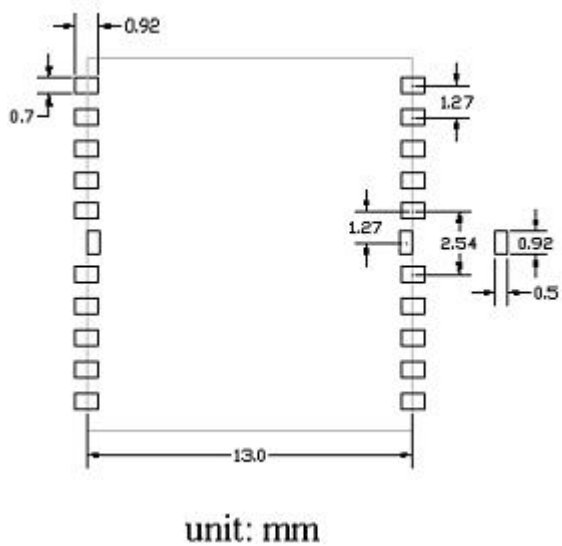
3 Antenna

Parameter	Specification
3.1 Antenna type	Passive and/or active antenna
3.2 Active Antenna	15 ~ 25 dB Gain recommended 1.5 dB noise figure max.
3.3 Antenna Supply	Using VCC_RF (pin #17) output pin to provide antenna bias voltage to RF_IN (pin #19)

Dimension



Recommended Solder Pad Layout



Note: The tolerance of foot pad is +/-10%.

Pin Definition

Pin#	Name	Type	Description
1	RXB Input		UART RXB input
2	TXB Output		UART TXB output
3	1PPS Output		Time plus
4	TXA Output		UART TXA output
5	RXA Input		UART RXA output
6	GND PWR		Ground
7	WAKEUP Input		Wakeup
8	GPIO1/LED Output		General purpose I/O
9	NRESET Input		Baseband RESET input. '0' = reset and '1' = normal operation
10	GPIO0 I/O		General purpose I/O
11	GND PWR		Ground
12	V_BAT	PWR	Linear regulator battery input voltage: 1.4 - 5V.
13	VCC PWR		DC power input 3.3 – 5V
14	GPIO15 I/O		General purpose I/O
15	GPIO14 I/O		General purpose I/O
16	GPIO13 I/O		General purpose I/O
17	GND PW	R	Ground
18	BOOTSET	Input	High Boot from Flash, Low Boot from serial port
19	VCC_RF PWR		Output power. Range 3 – 5 V
20	GND PWR		Ground
21	RF_IN Input		GPS RF signal input
22	GND PWR		Ground

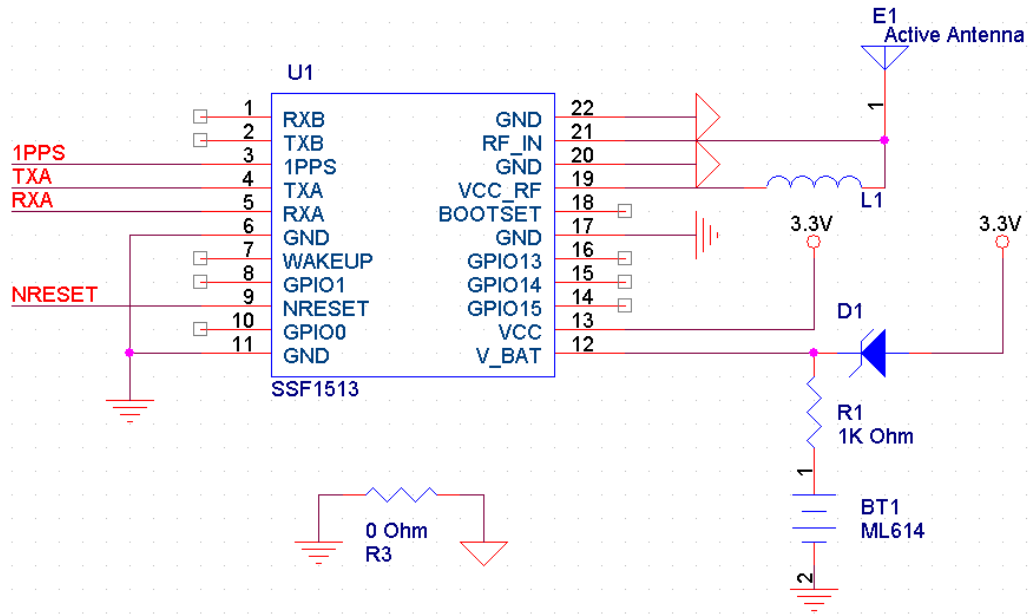
Output NMEA Messages

NMEA-0183 V3.0 Output Messages

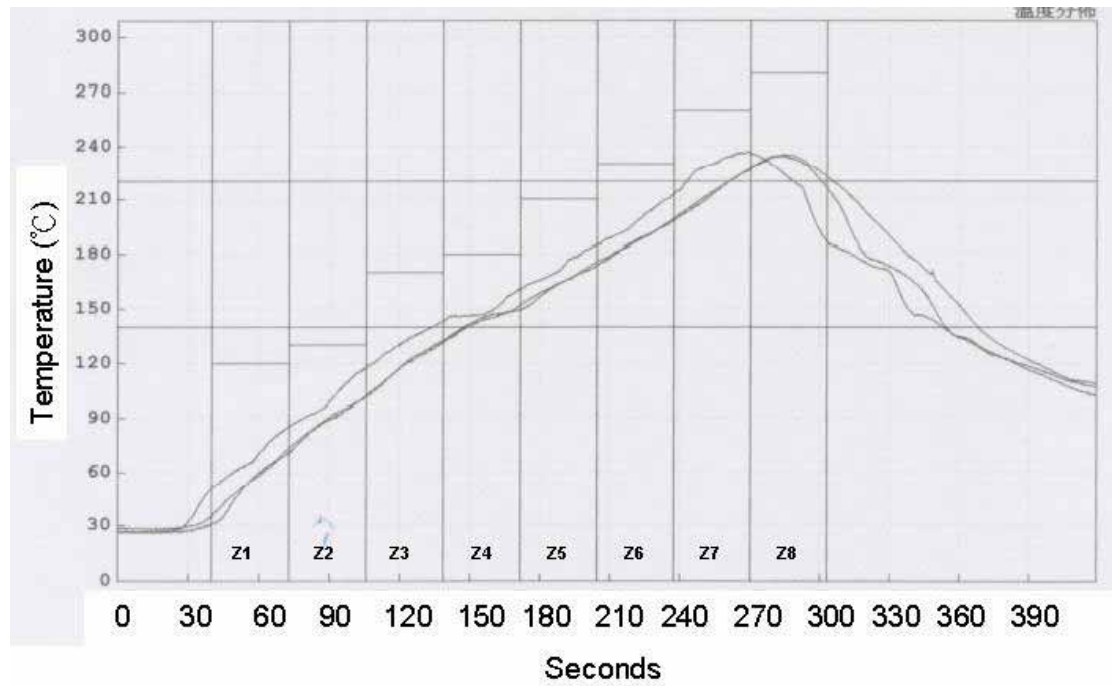
NMEA Sentence	Description
GGA (default)	Global Positioning System Fixed Data
GLL	Geographic Position - Latitude/Longitude
GSA (default)	GNSS DOP and Active Satellites
GSV (default)	GNSS Satellites in View
RMC (default)	Recommended Minimum Specific GNSS data
VTG	Course Over Ground and Ground Speed
ZDA	Time and Date

The detail information please refers to SSFXXXX series GPS module NMEA protocol reference manual.

Application Circuit



Reflow Profile



Setpoints (°C)

Zone	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8
Top	120	130	170	180	210	230	260	280
Bottom	120	130	170	180	210	230	260	280

Conveyer Speed (cm/min): 73