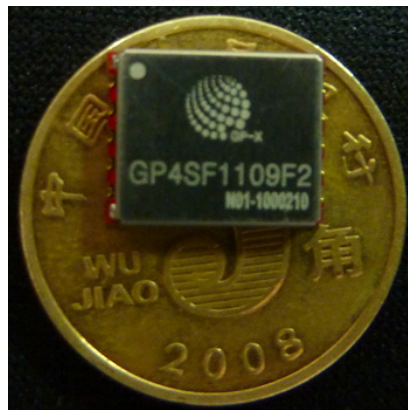


THE PRODUCT SPECIFICATION

GP4SF1109F2 GPS MODULE

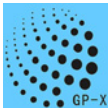


The version is subject to update without notice

Version 2.2

2011-01-15

Global Position eXpert Co.,LTD



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1 Introduction

GP4SF1109F2 module is now mini size in the GPS industry, it's a unique package of GP-X Co.,LTD. It features high sensitivity, low power, fast capturing satellite. The GPS module is powered, it consists of GSD4e WLCSP chipset, it can provide you with superior sensitivity and performance. Especially, the module will show the outstanding advantages in receiving GPS signals in atrocious environment such as urban canyon, dense forest. The excellent performance makes that the module is the best choice to integrate into portable device like mobile phone, PDAs, camera and vehicle locators.

2 Product Features

- Module size: 11.4 X 8.8 X 1.8 (mm)
- 48 track verification channels
- SiRF StarIV low power solution
- Extreme fast TTFF at low signal level
- NMEA-0183 compliant protocol
- SBAS (WAAS, EGNOS and MSAS) support
- High sensitivity(open sky): -163 dBm
- Built-in LNA and SAW
- One Uart port
- Smart sensor I²C interface
- SMD type with stamp holes

3 Product Applications

- Handset
- Automotive navigation
- Track
- logistics management



- Location-aware consumer device
- Personal positioning and navigation
- Marine navigation
- Timing application

4 GPS Receiver Key Parameters

GP4SF1109F2 Key Parameters	
Chip Module	GSD4e™ WLCSP (the new SiRFstar IV™ architecture)
Frequency	L1 1575.42MHz, C/A code
Channels	48
Update rate	1Hz
Baud rate	4800bps
Sensitivity	Tracking -163dBm
	Capture -148dBm
Acquisition Time	Hot start (Open Sky) < 2s
	Hot start (Indoor) < 15s
	Cold Start (Open Sky) 37s (typical)
Position Accuracy	Autonomous < 5m (2D RMS)
	SBAS < 2.5m (2D RMS)
Max. Altitude	< 18,000 m
Max. Velocity	< 1,000 km/h
Power	Continuous tracking : 58 mW
	Hibernate current : 20 uA
	TricklePower(1Hz) : 8 mW
Protocol Support:NMEA 0183	NMEA 0183 8 data bits, no parity, 1 stop bits (default),1Hz: GGA, GSA, RMC; 5Hz: GSV(after fixing)

Table 4-1

5 Software Interface

GP4SF1109F2 supports NMEA data output format. For further information about the NMEA Standard please refer to “NMEA0183 Standard For Interfacing Marine Electronic Devices” on <http://www.nmea.org> for ordering instructions



NMEA Protocol Frame:

\$	<Address>	{,<value>}	*<checksum>	<CR><LF>
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Table 5-1-1

NMEA Protocol Record:

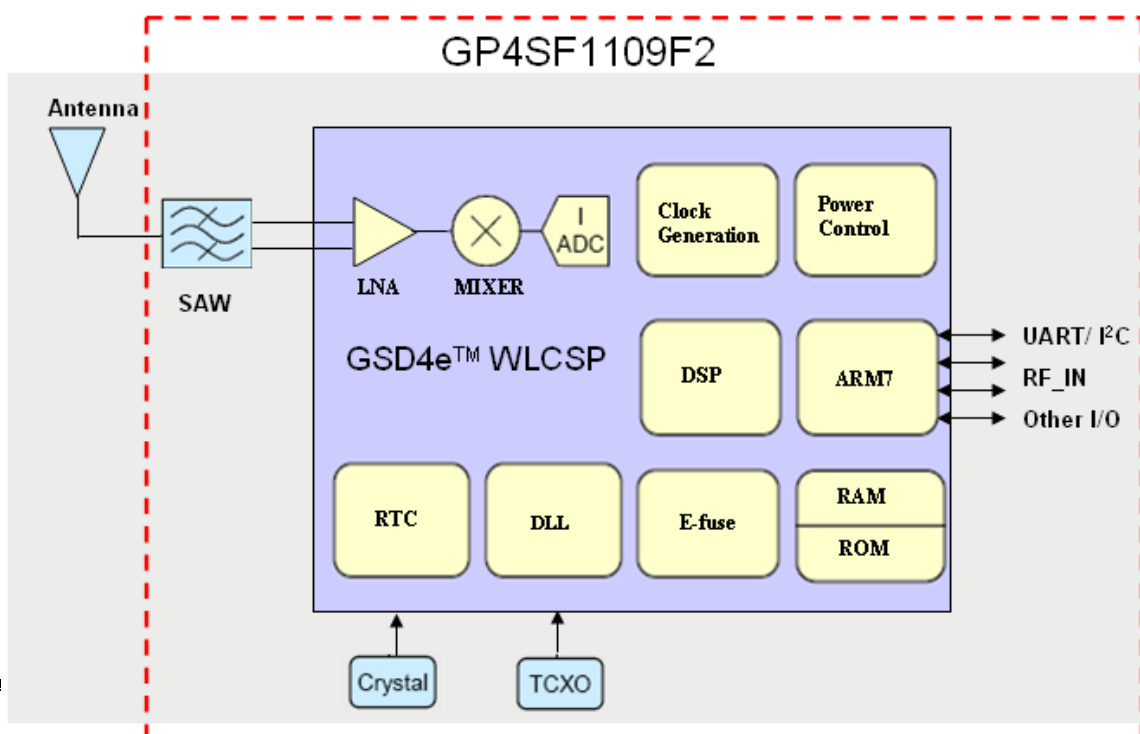
NMEA RECORD	Description
GGA	GPS fix data
GSA	GNSS DOP and active satellite
GSV	GNSS satellites in view
RMC	Recommended minimum specific GNSS data

Table 5-1-2

Note: The GP4SF1109F2 receiving module supports 4 kinds of NMEA data formats: GGA, GSA, RMC, GSV, and the module just output GSV after fixing, the details about these data formats please refer to the **Appendix I** on the text end.

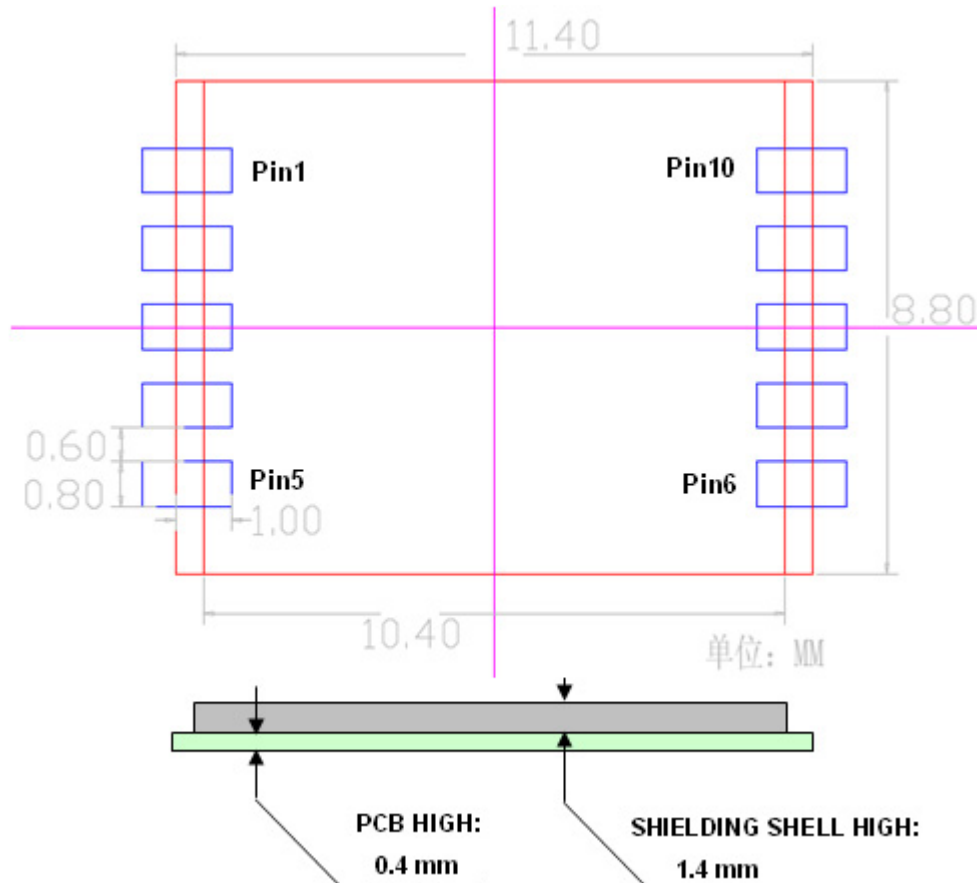
6 Hardware Description

6.1 Diagram





6.2 Hardware Interface



6.3 Definition of Pin

PIN	Definition	I/O	Description
1	VIN	I	DC Supply Voltage $V_{IO}=1.8V$
2	GND	G	Ground
3	RXD	I	Serial port $V_{IO}=1.8V$
4	TXD	O	Serial port $V_{IO}=1.8V$
5	GND	G	Ground
6	GND	G	Ground
7	RF_IN	I	GPS Signal input
8	GND	G	Ground
9	N/S	I	Referring to "Application circuit"
10	ON/OFF	I	Referring to "Application circuit"



6.4 Antenna

Antenna description:

GP4SF1109F2 GPS module can use both active and passive antenna.

Antenna Type: active or passive

Recommend the use of Minimum Gain:10-15 dB

Active Antenna	The biggest noise factor:	1.5 dB
	Maximum Gain:	50 dB



Appendix I: Details of NMEA output message

1. GGA—Global Positioning System Fixed Data

Table I-1-1 contains the values for the following example:

\$GPGGA,053740.000,2503.6319,N,12136.0099,E,1,08,1.1,63.8,M,15.2,M,,0000*64

Table I-1-1 GGA Data Format:

Name	Example	Units	Description
Message ID	\$GPGGA		GGA protocol header
UTC Time	53740		hhmmss.sss
Latitude	2503.6319		Ddmm.mmmm
N/S indicator	N		N=north or S=south
Longitude	12136.01		dddmm.mmmm
E/W Indicator	E		E=east or W=west
Position Fix Indicator	1		See Table I-1-2
Satellites Used	08		Range 0 to 12
HDOP	1.1		Horizontal Dilution of Precision
MSL Altitude	63.8	mters	
Units	M	mters	
Geoid Separation	15.2	mters	
Units	M	mters	
Age of Diff. Corr.		second	Null fields when DGPS is not used
Diff. Ref. Station ID	0		
Checksum	*64		
<CR> <LF>			End of message termination



Table I-1-2 Position Fix Indicators:

Value	Description
0	Fix not available or invalid
1	GPS SPS Mode, fix valid
2	Differential GPS, SPS Mode, fix valid
3	Not supported
6	Dead Reckoning Mode, fix valid

2. GSA—GNSS DOP and Active Satellites

Table I-3-1 contains the values for the following example:

\$GPGSA,A,3,24,07,17,11,28,08,20,04,,,,,2.0,1.1,1.7*35

Table I-3-1 GSA Data Format:

Name	Example	Description
Message ID	\$GPGSA	GSA protocol header
Mode 1	A	See Table I-3-2
Mode 2	3	See Table I-3-3
ID of satellite used	24	Sv on Channel 1
ID of satellite used	07	Sv on Channel 2
.....	
ID of satellite used		Sv on Channel 12
PDOP	2	Position Dilution of Precision
HDOP	1.1	Horizontal Dilution of Precision
VDOP	1.7	Vertical Dilution of Precision
Checksum	*35	



<CR> <LF>		End of message termination
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Table I-3-2 Mode 1:

Value	Description
M	Manual- forced to operate in 2D or 3D mode
A	Automatic-allowed to automatically switch 2D/3D

Table I-3-3 Mode 2:

Value	Description
1	Fix not available
2	2D
3	3D

3. GSV—GNSS Satellites in View

Table I-4-1 contains the values for the following example:

\$GPGSV,3,1,12,28,81,285,42,24,67,302,46,31,54,354,,20,51,077,46*73

\$GPGSV,3,2,12,17,41,328,45,07,32,315,45,04,31,250,40,11,25,046,41*75

\$GPGSV,3,3,12,08,22,214,38,27,08,190,16,19,05,092,33,23,04,127,*7B

Table I-4-1 GSV Data Format:

Name	Example	Units	Description
Message ID	\$GPGSV		GSV protocol header
Total number of messages ¹	3		Range 1 to 3
Message number ¹	1		Range 1 to 3
Satellites in view	12		
Satellite ID	28		Channel 1 (Range 01 to 32)
Elevation	81	degrees	Channel 1 (Range 00 to 90)
Azimuth	285	degrees	Channel 1 (Range 000 to 359)
SNR (C/No)	42	dB-Hz	Channel 1 (Range 00 to 99, null when not tracking)
Satellite ID	20		Channel 4 (Range 01 to 32)
Elevation	51	degrees	Channel 4 (Range 00 to 90)



Azimuth	77	degrees	Channel 4 (Range 000 to 359)
SNR (C/No)	46	dB-Hz	Channel 4 (Range 00 to 99, null when not tracking)
Checksum	*73		
<CR> <LF>			End of message termination

1. Depending on the number of satellites tracked multiple messages of GSV data may be required.

4. RMC—Recommended Minimum Specific GNSS Data

Table I-5-1 contains the values for the following example:

\$GPRMC,053740.000,A,2503.6319,N,12136.0099,E,2.69,79.65,100106,,,A*53

Table I-5-1 RMC Data Format:

Name	Example	Units	Description
Message ID	\$GPRMC		RMC protocol header
UTC Time	53740		hhmmss.sss
Status	A		A=data valid or V=data not valid
Latitude	2503.6319		ddmm.mmmm
N/S Indicator	N		N=north or S=south
Longitude	12136.01		dddmm.mmmm
E/W Indicator	E		E=east or W=west
Speed over ground	2.69	knots	True
Course over ground	79.65	degrees	
Date	100106		Ddmmyy
Magnetic variation		degrees	
Variation sense			E=east or W=west (Not shown)
Mode	A		A=autonomous, D=DGPS, E=DR



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Checksum	*53		
<CR> <LF>			End of message termination