

S4F2217

Ultra High Sensitivity SiRF StarIV GSD4e
GPS Module with Miniature Dimension

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Documentation History

Revision	Description	Date	Remark
V0.1	S4F2217 release	Mar. 2012	
V0.2	Main Feature change	Aug. 2012	

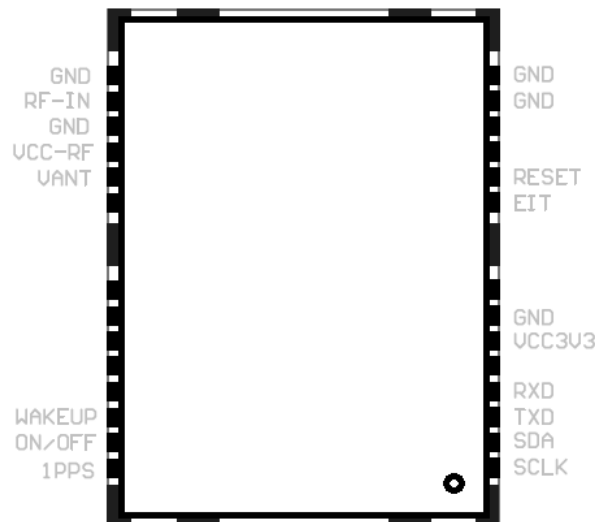
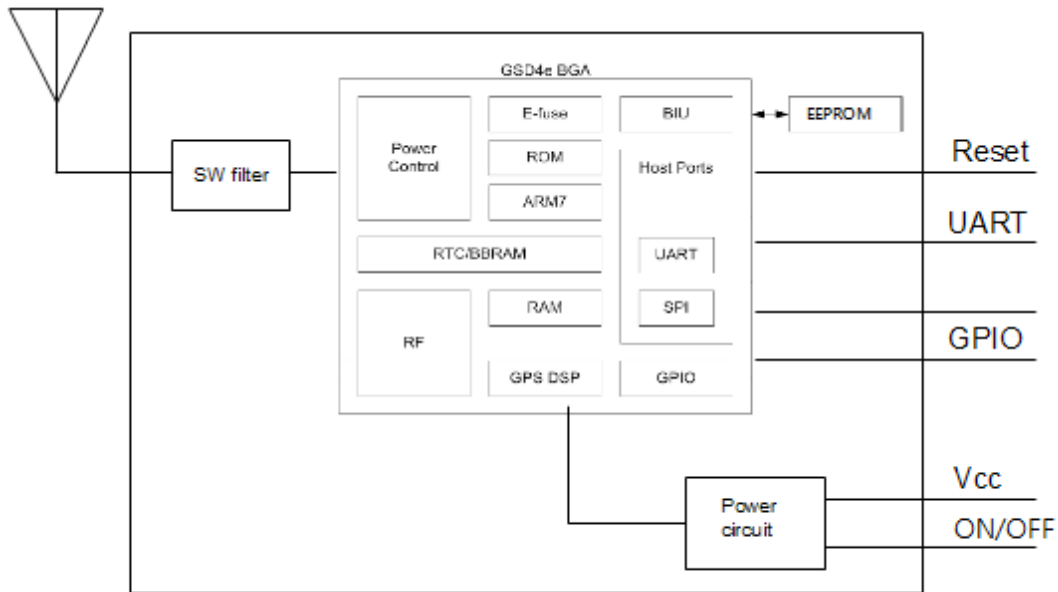
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Features

- ✓ 48 channel SiRF StarIV GSD4e positioning engine.
- ✓ Ultra high sensitivity to -163 dBm.
- ✓ SBAS (WAAS, MSAS, and EGNOS) support.
- ✓ Support 5Hz Update rate
- ✓ Supports UART interface.
- ✓ Ultra low power consumption. <10mW required for TricklePower™ mode
- ✓ Active Jammer Remover: Removes in-band jammers up to 80 dB-Hz; Tracks up to 8 CW jammers
- ✓ Ultra miniature 22 x 17 mm dimension with SMT pad package
- ✓ Operating temperature range: -40 to 85°C
- ✓ RoHS compliant (lead-free)

Block diagram



Technical Specifications

1. Electrical

Characteristics

1.1 Chip set	SiRF StarIV GSD4e9316	
1.2 General	Frequency	L1, 1575.42MHz
	Channels, C/A code	48, 1.023 MHz chip rate, 8192 time/frequency search windows
1.3 Accuracy	Position	3 meters CEP
	Time	200 msec (1 PPS)
1.4 DGPS Accuracy	Position	2.5 meters CEP
1.5 Acquisition Rate	Reacquisition	< 1 sec, typical
	Cold start	32 sec, typical
	Cold start (CGEE*)	Under 15 sec
	Hot start	1 sec, typical
1.6 Sensitivity	Tracking	-163dBm (with external LNA)
	Navigation	-160dBm (With external LNA)
	Autonomous Acquisition	-148dBm (With external LNA)
1.7 Dynamic Condition	Altitude	18,288 meters (60,000 Feet) max.
	Velocity	515 meters /sec (1000 Knots) max.
1.8 Power	Main Power	3.3 VDC typical
	Supply current (Tracking)	45 mA (AVG)
	Supply current (Navigation)	42 mA (AVG)
	OFF mode	40 uA
1.9 Serial Port	Electrical interface	UART(defalut), I2C,
	Protocols	NMEA0183 v3.0
	Baud Rate	9600

2. Environmental Characteristics

2.1 Temperature	Operating range	- 40 °C to + 85 °C
2.2 Mechanical dimensions	L x W x H	22.4 x 17.0 x 3.0 mm
2.3 Interface	I/O connector	28 pin SMD micro package

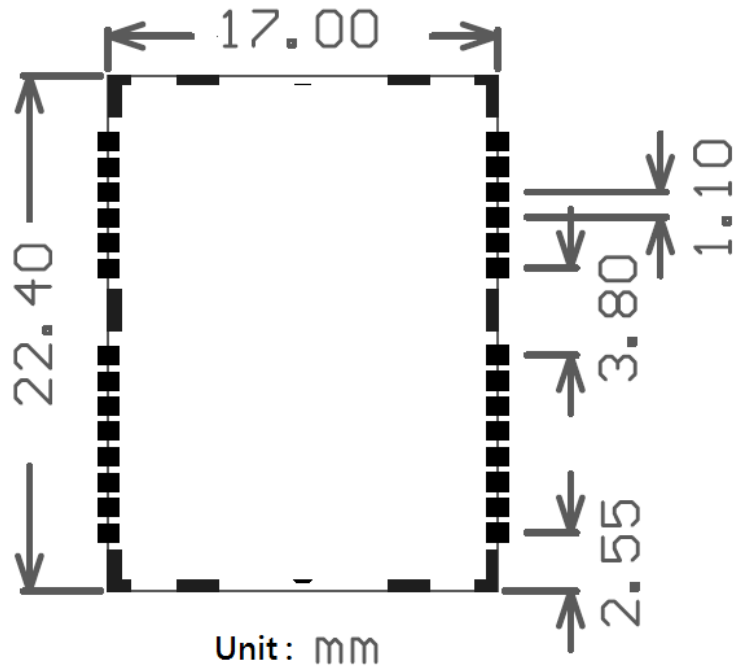
*CGEE: Client Generated Extended Ephemeris

3 Antenna

Parameter	Specification
3.1 Antenna type	Passive or active antenna
3.2 Active Antenna	15 ~ 27 dB Gain recommended, 1.5 dB noise figure max.
3.3 Antenna Supply	Using VCC_RF (pin #18) input pin to provide antenna bias voltage to RF_IN (pin #16)

Dimension

Recommended Solder Pad Layout



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

Pin Definition

Pin#	Name	Type	Description
1	SCLK	O	I2C clock
2	SDA	O	I2C Data
3	TXD	O	UART0 TXD output. The major GPS UART port for application.
4	RXD	I	UART0 RXD input. The major GPS UART port for application. If no used, please use pull-up resistor to avoid incorrect output by Tx
5	NC		Keep floating
6	VCC3V3	PWR	Digital Power Input. Typical 3.3V.
7	GND	GND	Digital GND
8	NC		Keep floating
9	EIT	I	External interupt
10	Reset		Baseband RESET input. '0' = reset and '1' = normal operation(1.8V)
11	NC		Keep floating
12	NC		Keep floating
13	GND	GND	Digital GND
14	GND	GND	Digital GND
15	GND_RF	GND	RF-GND
16	RF_IN	I	GPS single input
17	GND_RF	GND	RF-GND
18	VCC_RF	PWR	Output Voltage RF section. V_RF=VCC-0.3V
19	VANT	PWR	Input Antenna Bias voltage
20	NC		Keep floating
21	NC		Keep floating
22	NC		Keep floating
23	NC		Keep floating
24	NC		Keep floating
25	NC		Keep floating
26	WAKEUP	O	"H" GPS in operational model, "L" GPS in low power model. GPS Wake up output for control of external LNA or active antenna, or can also enable an external regulator, e.g. battery to 1.8V for the main input to the switch-mode regulator when full current mode is entered.(1.8V)
27	NC		Keep floating
28	1PPS	O	The 1PPS unit is used for generating a timing pulse, typically once per second,

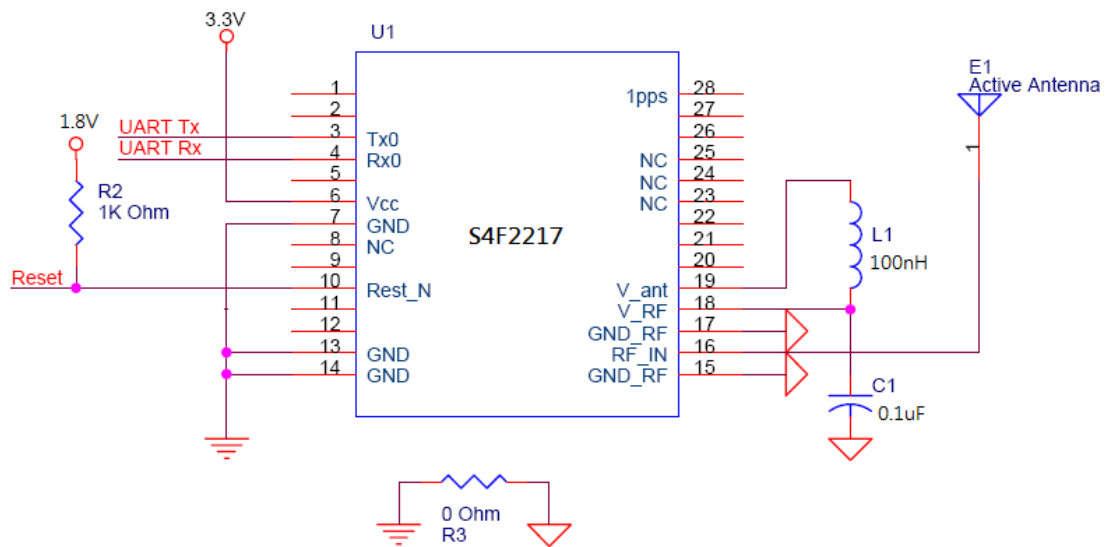
Output NMEA Messages

NMEA-0183 V3.0 Output Messages

NMEA Sentence	Description
GGA (default)	Global Positioning System Fixed Data
GSA (default)	GNSS DOP and Active Satellites
GSV (default)	GNSS Satellites in View
RMC (default)	Recommended Minimum Specific GNSS data

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

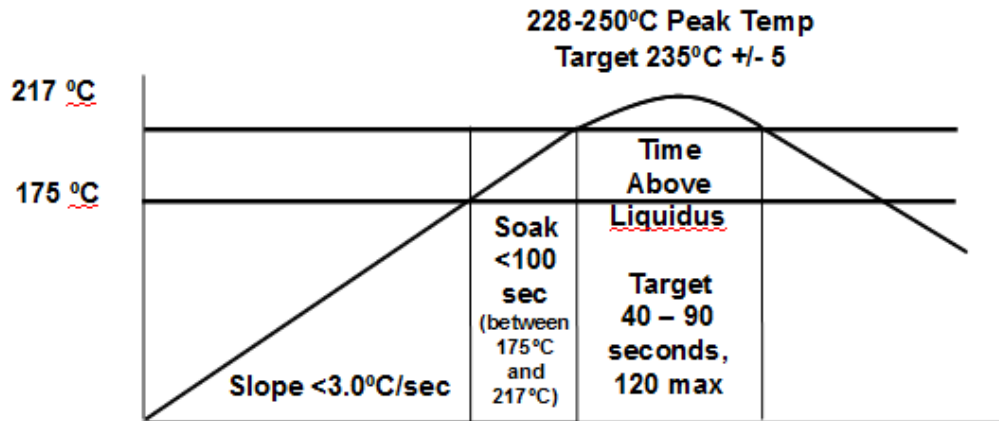
Application Circuit



Reflow information

Reflow Profile Graphic, assuming:

1. Kester R905 Sn/4Ag/0.5Cu solder paste.
2. All solder ball alloys melt at 217°C.
3. Component joints do not exceed temperatures as per J-STD-02



Packing handling

500pcs per reel

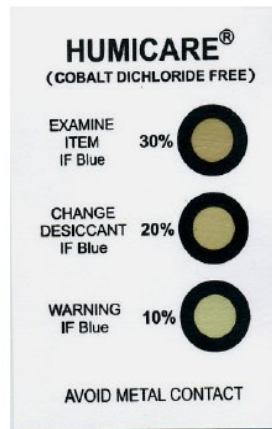
Labeling information

The Labeling of GPS modules includes product information. The location of the product type number and serial number are show in the figure.



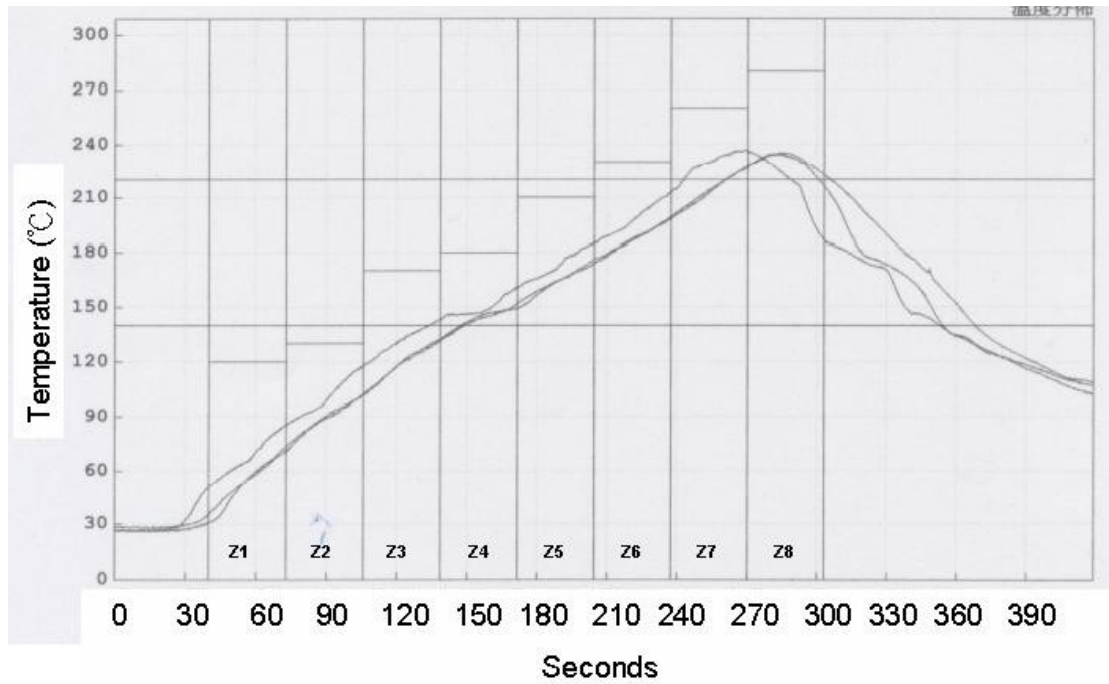
Humidity Card

The dry bag provide an MSD label describing the handling requirement to prevent humidity intake. JEDEC J-STD-033B specifications require that MSD sensitive device be packaged together with a Humidity indicator Card and desiccant to absorb humidity. If no moisture has been absorbed, the three field in the HIC indicate blue color.



The calculated shelf life for dry packed SMD packages is a minimum of 12 months from the bag seal date, when stored in a non-condensing atmospheric environment of <math><40^{\circ}\text{C}/90\% \text{RH}</math>. The parts must be processed and soldered within the time specified for the MSL level 3 168 hours. If this time is exceeded, or the humidity indicator card in the sealed package indicates that they have been exposed to moisture, the devices need to be pre-baked before the reflow solder process.

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

Ordering code

S4F2217-a

S4F2217-b

a. On/off function enabled.

Need trigger the on/off pin to start the gps function after supplying power to VCC

b. On/off function disabled.

Automatical enable the gps function when supplying power to VCC.