Device features

- Fully self-contained 12 channel GPS receiver
- Fully EMI shielded
- SiRFstar™ IIe/LP architecture
    - GRF2i/LP RF front-end IC
    - GSP2e/LP GPS Engine with Integrated Processor
- SBAS(Satellite Based Augmentation System) support
- Fast time-to-first-fix
- 8Mbit Flash memory
- Built-in Low-noise amplifier
- Advanced low power modes
- Operating Voltage 3.3V
- Battery supply pin for internal backup memory and real time clock
- Passive and active antenna support
- Active antenna bias supply voltage pin
- Active antenna overcurrent protection
- Industrial operating temperature range -40ºC …85ºC
- Very compact : 25.4 X 25.4 X 3 mm

EZGPM01
GPS RECEIVER
Product Information Data Sheet

MARCH 2004

General Description

The EZGPM01 GPS Receiver is a fully self-contained single-board 12 channel parallel receiver module intended as a component for OEM Global Positioning System(GPS).

Based on the SiRFstar™IIe/LP architecture, the module provides complete GPS signal processing, thus providing accurate satellite position data.

The EZGPM01 is a completely shielded module.

Key Features

Industry Leading GPS Performance

- Builds on the high performance SiRFstar™IIe/LP core
- High-speed signal acquisition using 1920 time/frequency search channels
- SBAS(Satellite Based Augmentation System) support

Applications

- Navigation
- Aviation
- Automotive applications
- Location Based Services
- Timing applications

Low Power GPS Architecture

- Extreme low power in power-down mode, but capable of very fast starts

Maximizes GPS Position Availability

- SingleSat™ updates in reduced visibility
- Superior urban canyon performance
- FoliageLock™ or weak signal tracking

Multiple Operating Modes

- Continuous Mode
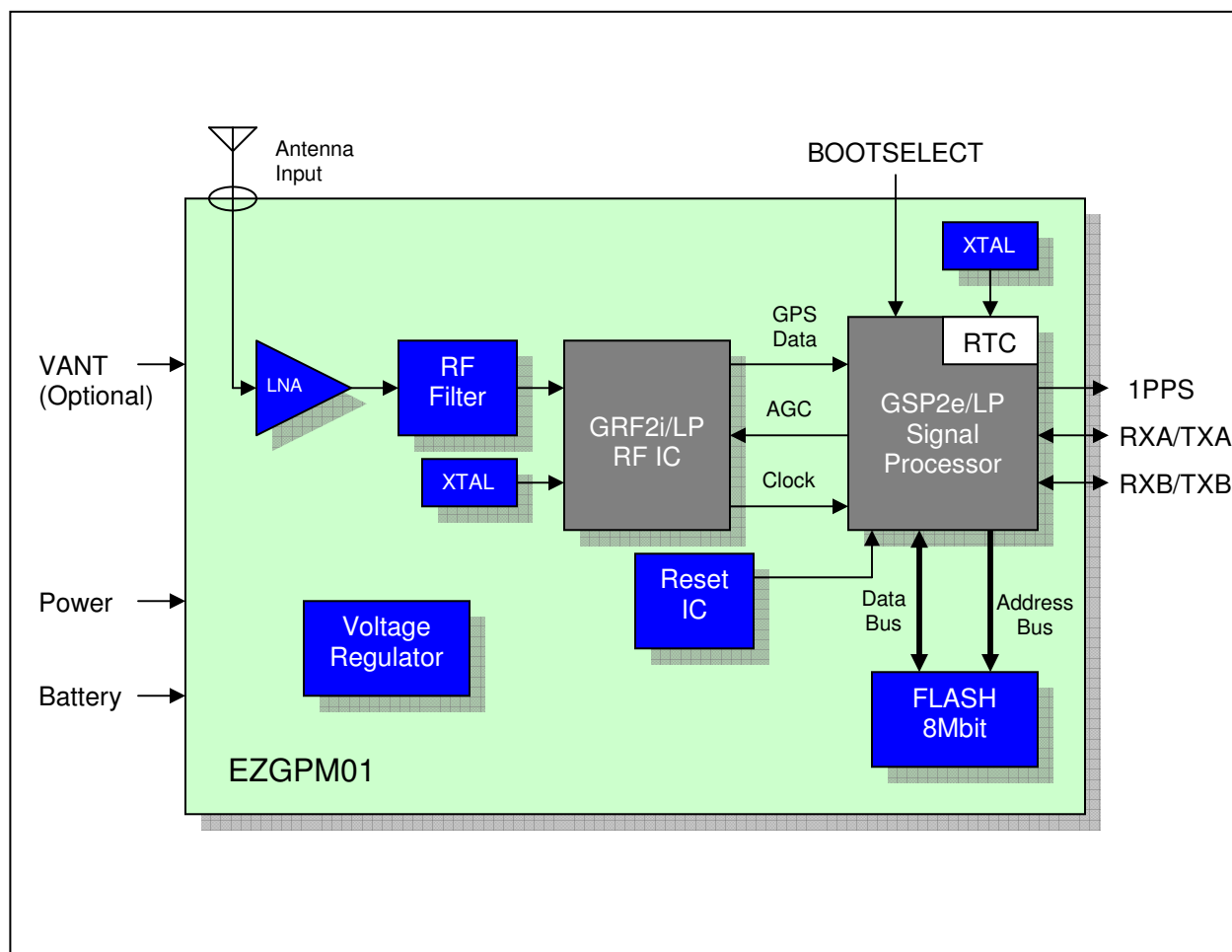- TricklePower™ Mode
- Push-to-Fix™ Mode

Block Diagram
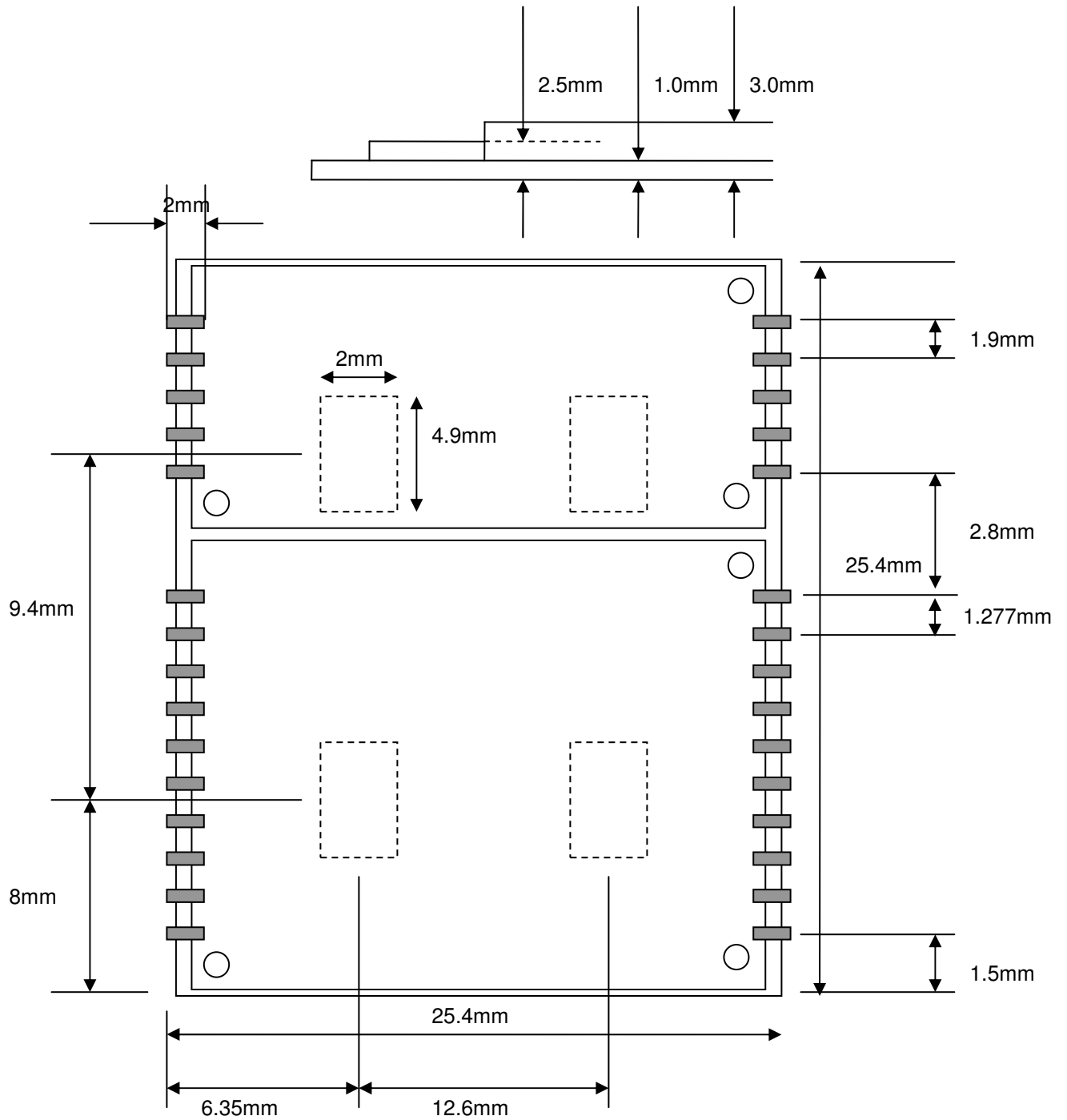

Figure 1: EZGPM01 Block Diagram

Mechanical Drawing

2.5mm   1.0mm   3.0mm

2mm

1.9mm

2mm

4.9mm

2.8mm

25.4mm

1.277mm

9.4mm

8mm

1.5mm

25.4mm

6.35mm   12.6mm

Figure 2: EZGPM01 recommendations for layout and pads

3

Device Terminal Functions
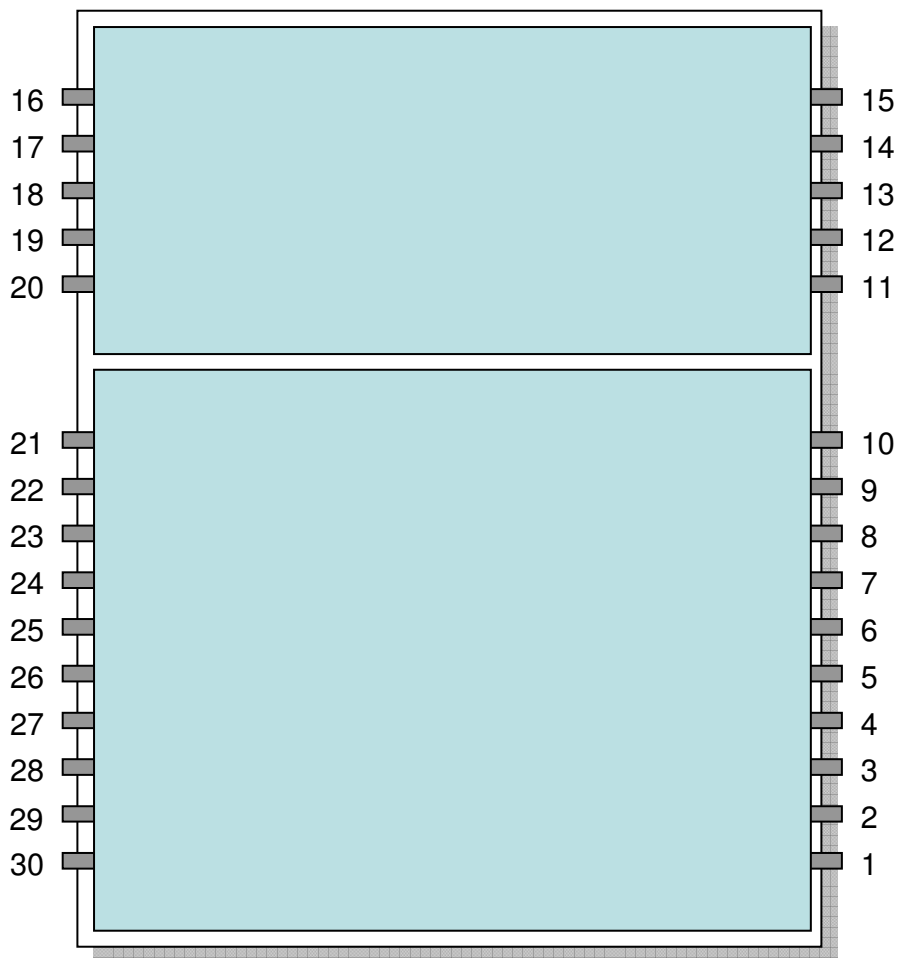
Figure 3: EZGPM01 Terminals

Terminal	Terminal Name	I/O	Description
1	VCC	I	3.3V DC supply voltage
2	DGND		Digital ground
3	BOOTSELECT	I	Boots in update mode when high
4	RXA	I	Serial Data Input A
5	TXA	O	Serial Data Output A
6	TXB	O	Serial Data Output B
7	RXB	I	Serial Data Input B
8	GPIO3	I/O	
9	RF_ON	O	Indicates RF part is ON
10	DGND		Digital ground
11	AGND		Analog ground
12	AGND		Analog ground
13	AGND		Analog ground
14	AGND		Analog ground
15	AGND		Analog ground
16	AGND		Analog ground
17	RF_IN	I	Antenna input
18	AGND		Analog ground
19	V_ANT	I	Supply for active antenna
20	VCC_RF	O	2.85V output of RF section
21	V_BAT	I	External backup battery
22	RESET_N	I	Resets the module when low
23	GPIO10	I/O	
24	GPIO6	I/O	
25	GPIO5	I/O	
26	GPIO7	I/O	
27	GPIO0	I/O	
28	GPIO1	I/O	
29	T-MARK(1PPS)	O	One-pulse-per-second
30	DGND		Digital ground

Table 1: Device Terminal Functions

Electrical Characteristics

Absolute Maximum Ratings				
Parameter	**Symbol**	**Min**	**Max**	**Units**
Power Supply Voltage	Vcc		6	V
Input Pin Voltage	Vin		5	V
Antenna Bias Current	Iant		100	mA
Storage Temperature	Tstg	-55	+125	℃

Table 2: Absolute Maximum Ratings

Operating Conditions T_A = 25℃; 3V active antenna						
Parameter	Symbol	Condition	Min	Typ	Max	Units
Power Supply Voltage	Vcc		3.0	3.3	6	V
Backup Battery Voltage	Vbat		2.5	3.0	3.6	V
Antenna Bias Voltage	Vant		2.0	3.0	12	V
Supply Current	Icc	Vcc = 3.3V		67		mA
TricklePower Supply Current	Itps	Vcc = 3.3V; 20% duty cycle; 1 sec update period		16.5		mA
Standby Battery Current	Ibat	Vbat = 3.0V		3.8		μA
Antenna Bias Current	Iant	Vant = 3.0V		18		mA
Operating Temperature	Topr		-40		85	℃

Table 3: Operating Conditions

Electrical Specifications	
General	
Frequency	L1, CA code, 1575.42 MHz
CA Code	1.023 MHz chip rate
Channels	12
Sensitivity	
Holding Sensitivity(C/N ave. 26dB-Hz)	-144dBm
Accuracy	
Position	10 meters CEP (SA off)

Velocity	0.1 meters/second (SA off)
Time	1 μsec synchronized to GPS time
DGPS Accuracy	
Position	< 5 meters (SA off)
Velocity	0.05 meters/second, typical
Datum	WGS-84
Time-To-First-Fix	
Reacquisition	100ms
SnapStart™	< 3 seconds
Hot Start	< 8 seconds
Warm Start	< 38 seconds
Cold Start	< 45 seconds
Serial Port	
Electrical Interface	2 full duplex serial communication
Protocol support	NMEA, SiRF binary, RTCM SC-104
Time – 1PPS	
Level	CMOS
Pulse Duration	100 ms
Time Reference	At the pulse positive edge
Measurement	Aligned to GPS second

Table 4: Electrical Specifications

Operating Modes

TricklePower™ Description

The TricklePower™ mode provides the lowest average power dissipation by powering down the module after a position fix. It cycles through three states: tracking state(or full power), cpu state, and trickle state.

The receiver is in the full power tracking state when it is first turned on, after a system reset, and when the internal RTC wakeup interrupt is generated. Satellite search, initial acquisition, initial position calculation, and tracking measurements are always taken in full power.

In the CPU state, the RF antenna section and GPS clock has been turned off, although the RTC keeps running. The CPU would keep running to process the GPS data until a position fix is determined and the result has been transmitted by the serial communication interface.

The trickle state is a low power standby state in which the CPU clock and RF circuits are turned off but power is still applied to the baseband. After a set amount of time, the receiver wakes up, makes a reset and tries to acquire satellites.

Push-to-Fix™ Description

The push-to-fix™ mode puts the receiver into a background duty cycle mode that provides a periodic refresh of position, GPS time, ephemeris data, and RTC calibration every 30 minutes. The push-to-fix mode sets the receiver in a background duty cycle consisting of 30 seconds of On time in the tracking state at full power, followed by a position computation in the CPU state, followed by approximately 29.5 minutes in the trickle state.

Application Circuit
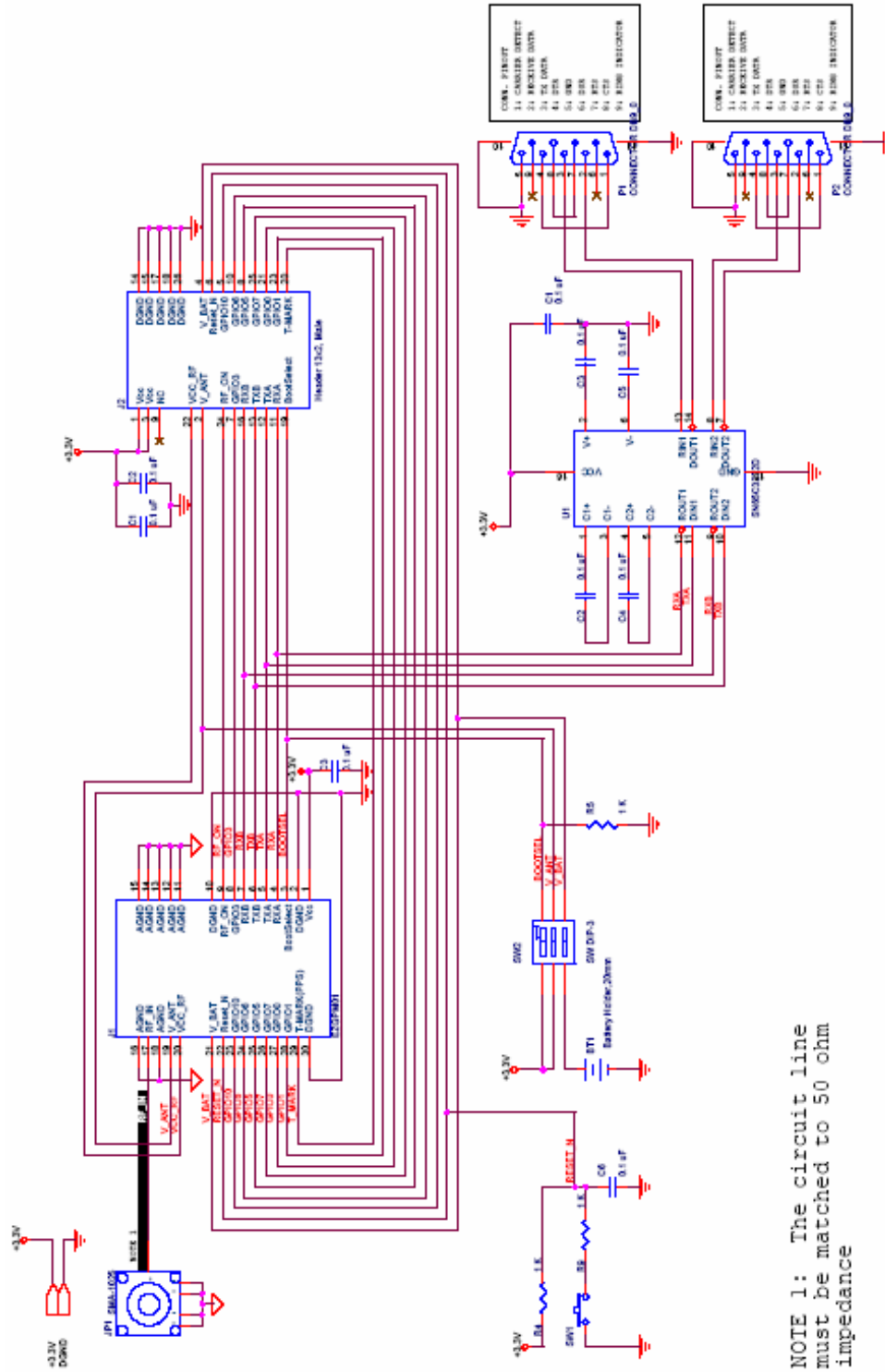
Figure 4: EZGPM01 Reference Design

Ordering and Contact Information

Order Number	Description
EZGPM01	MOQ is 1k. Leadtime: 12-16 weeks

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