SE868 V2 Product Description

80424ST10127A Rev.1 Preliminary – 2013-10-24

Making machines talk.

APPLICABILITY TABLE

PRODUCT
SE868 V2

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Contents

1. Introduction

1.1. Scope

Scope of this document is to give an overview of the new standalone GNSS module SE868 V2.

1.2. Audience

This document is intended for customers developing applications using the SE868 V2 module.

1.3. Contact Information, Support

For general contact, technical support, to report documentation errors and to order manuals, contact Telit Technical Support Center (TTSC) at:

TS-EMEA@telit.com
TS-NORTHAMERICA@telit.com
TS-LATINAMERICA@telit.com
TS-APAC@telit.com

Alternatively, use:

http://www.telit.com/en/products/technical-support-center/contact.php

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

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To register for product news and announcements or for product questions contact Telit Technical Support Center (TTSC).

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

Telit appreciates feedback from the users of our information.

1.4. Document Organization

This document contains the following chapters (sample):

"Chapter 1: "Introduction" provides a scope for this document, target audience, contact and support information, and text conventions.

"Chapter 2: "General Description" gives an overview of the product.

"Chapter 3: "Technical Description" describes the characteristics and features of the product.

"Chapter 4: "Software" describes the software characteristics of the product

"Chapter 5: "Performance Data" provides performance data of the product

"Chapter 6: "Electrical Requirements" provides the electrical characteristics of the product

"Chapter 7: "Software Functions and Capabilities" describes the software options and features that are available to the product

"Chapter 8: "Mechanical Drawings" provides information about hardware interfaces

"Chapter 9: "Safety Recommendation" provides some safety recommendations that must be follow by the customer in the design of the application that makes use of the SE868 V2

"Chapter 10: "Document History" provides the history of the present document

1.5. Text Conventions

Danger – This information MUST be followed or catastrophic equipment failure or bodily injury may occur.

Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.

Tip or Information – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

1.6. Related Documents

2. General Description

The SE868 V2 module is a hybrid positioning system that combines GPS, GLONASS, and SBAS to provide a high performance position reporting and navigation solution. The SE868 V2 can navigate to -162dBm and track to -166dBm, providing improved performance in harsher environments. The addition of the GLONASS constellation provides higher coverage, better accuracy, and added availability.
The SE868-V2 is the GNSS equivalent of the JF2.

Note: The SE868-V2 is not an exact drop in replacement for the JF2, some of the signals may have a slightly different function. Refer to the SE868-V2 Hardware User Guide for further information.

2.1. Applications

- Asset Tracking
- Cameras
- Cellular handsets
- Tablet computers
- Other location-aware consumer devices

3. Technical Description

Host Interfaces

- UART:
  - Baud rate accuracy within 2.0 % of absolute
- SPI:
  - Supports SPI mode 1 and SPI mode 3
  - Active high or low chip select support
  - MSB first (big-endian) or LSB first (little-endian) support
  - Slave mode operation only
- I^2C:
  - Bit rate of 100 Kbps to 400 Kbps
  - Master transmit, i.e. multi-master bus
  - Dual-address response (7-bit and 10-bit)
  - Slave receive
  - 1 to 64 B of autonomous data transfer

Flexible Power Management Options

- Continuous Full Power Mode
- Push-To-FixII Mode
- TricklePowerII™

Communications Protocol Support

- OSP (One Socket Protocol Binary)
- NMEA

Configuration Options

- External LNA control through SYSTEM_ON
- 5Hz Navigation Update Rate

Note: The default configuration is NMEA 9600, LNA Gain High, Static Nav Enabled

Active Jammer Removal

- Hardware managed CW / narrowband / wideband interference mitigation
- Cross-correlation mitigation for usable weak signal measurements

- Software jamming detection and mitigation

High Performance GNSS Reception

- All GNSS signals use a single RF input
- GNSS signals processed:
  - GPS: high sensitivity carrier and code track to -165dBm. Enabled by default.
  - GLONASS: high sensitivity carrier and code track to -164dBm. Enabled by default.

3.1. Product Compatibility

The SE868 V2 incorporates a new technology far advanced compared to the previous SiRFstarIV designs. It offers an upgrade path from existing Telit and competitive designs.

The SE868 V2 is pin compatible with the JF2 family but it is not a drop in replacement. Some of the signals have a slightly different function. The designer will have to modify the antenna and possibly other components in the RF path to accommodate both the GPS and GLONASS signals. It may be possible to use the SE868 V2 in place of some JF2 variants (design guidelines specified in the SE868 V2 Hardware User Manual must be followed).

NMEA version 3.01 protocol is supported as well as the One Socket Binary Protocol (OSP).

3.2. Receiver Architecture

The functional architecture of the SE868 V2 receiver is shown in Figure 1.

Note: The LNA is included in the GNSS chip for passive antenna operation.

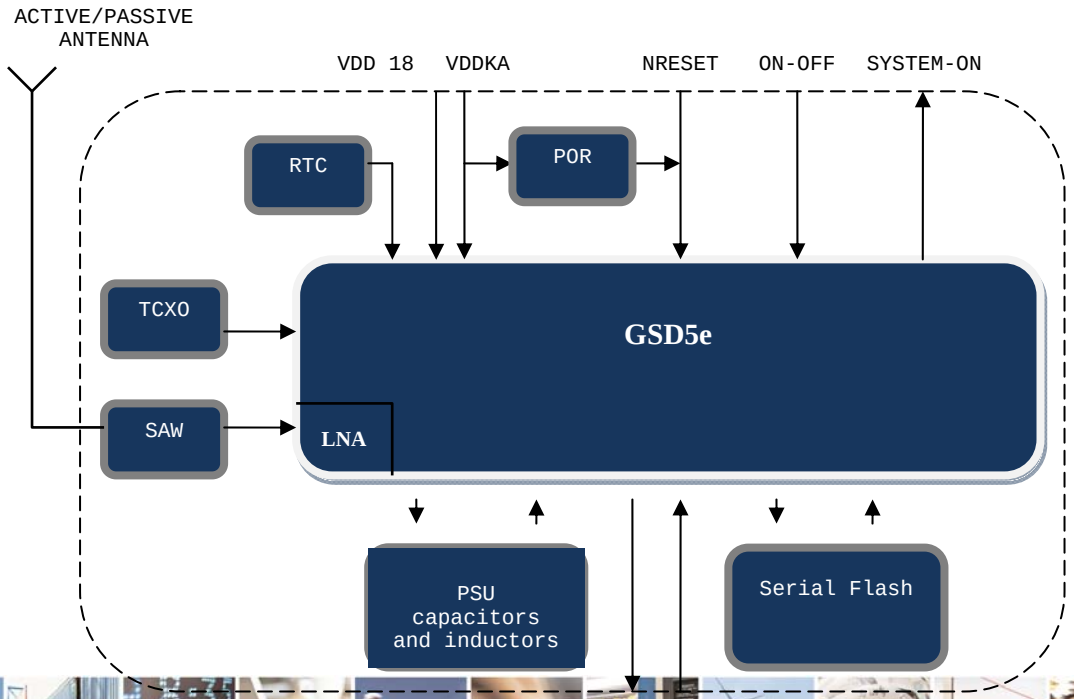

Figure 1 SE868 V2 Architecture

3.3. Major Components

All power supply components are on board including capacitors and additional Power-On-Reset (POR) for the 1.8V supply.

- Single -1.8V mode: one 1.8V supply, an always ON supply.

If the 1.8V supply is inadvertently cut off, the internal 1.8V POR will shut it down with loss of data. It is important that the GNSS has sufficient bulk capacitance to enable the GNSS to shut down gracefully.

3.3.1. ON-OFF

- 1.8V line (tolerant to 3.6V).
- Dedicated input used to command the SE868 V2 to turn ON or OFF
  - Main 1.8V power must already be available and stable
- Turn-ON - Hardware feature based sensing a rising edge on ON-OFF
- Turn-OFF – Software feature based on interrupts related to rising or falling edge on ON-OFF (default is rising edge).

It is suggested to monitor the SYSTEM-ON line which indicates when the receiver can accept an ON pulse after the first 1.8V power application. If a 1.8V battery back-up system is used and the SE868 V2 is already in the Full Power Continuous Running state, another voltage pulse on ON-OFF will Turn-OFF the receiver to the Hibernate state.

Note: A clean application of the 1.8V supply is required

3.3.2. SYSTEM-ON

- 1.8V active HIGH indicator
- A HIGH indicates that the receiver is in Full Power Continuous Running state
- A LOW indicates that the receiver is in Hibernate state
- Outputs a short duration active pulse on first application of the 1.8V supply to indicate it is ready to receive an ON-OFF voltage pulse

3.3.3. Band Pass GNSS SAW Filter (1.588 GHz)

- Filters the GNSS signals and removes unwanted signals caused by external influences that would corrupt the operation of the receiver.

- The filtered signal is fed to the RF input of the SiRFStarV chipset.

3.3.4. TCXO

- Highly stable 26 MHz oscillator
- Controls the down conversion process for the RF block

3.3.5. RTC

- 32KHz Real Time Clock which allows for Hot/Warm starts.

3.3.6. NRESET

- Active LOW
- User Reset input
- Not recommended to be used. Internal POR is already implemented for the 1.8V supply.

3.3.7. Host Ports

3.3.7.1. UART

At boot up, the software uses different default data rates depending on the protocol selected.

- 4800 baud rate default for NMEA mode
- 115200 baud rate default for OSP mode

3.3.7.2. Slave SPI

The host interface SPI is a slave mode SPI:

- The transmitter and receiver each have independent 1024 B FIFO buffers
- The transmitter and receiver have individual software-defined 2-byte idle patterns of 0xa7 0xb4
- SPI detects synchronization errors and is reset by software.
- Supports a maximum clock of 7.5 MHz

3.3.7.3. I^2C Interface

The I^2C host port interface supports:

- Operation up to 400 kbps
- Individual transmit and receive FIFO lengths of 64 B
- The default I^2C address values are:
  - Rx: 0x60

- Tx: 0x62

- Operating mode is multi-master
- Pins are pseudo open-drain and require pull-up resistors on the external bus

3.4. Physical Characteristics

The SE868 V2 receiver has advanced miniature packaging and is smaller in size than the Jupiter 32 and Jupiter-N3 and is similar in size to the Jupiter-F2.

- LGA footprint
- Surface mount device packaged on a printed circuit board with a metallic RF enclosure on one side
- 32 surface mount connection pads
  - With Base metal of copper
  - Electroless Nickel Immersion Gold (ENIG) finish

3.5. Mechanical Specification

The physical dimension of the SE868 V2 is as follows:

- length: 11.0 mm ± 0.1 mm
- width: 11.0 mm ± 0.1 mm
- thickness: 2.45 mm
- weight: 1 g max

3.6. External Antenna Connection

The RF connection for the external antenna has a characteristic impedance of 50 ohms.

3.7. Input/Output and Power Connections

The I/O (Input / Output) and power connections use surface mount pads.

Note that GPIO and UART/SPI/I^2C are 1.8V signals.

3.8. Environmental

The environmental operating conditions of the SE868 V2 are as follows:

- temperature: –40oC to +85oC (measured on the shield)
- humidity: up to 95% non-condensing or a wet bulb temperature of +35oC
- shock (non-operating): 18 G peak, 5 ms

3.9. Compliances

The SE868 V2 complies with the following:

- Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)
- Manufactured in an ISO 9000: 2008 accredited facility
- Manufactured to TS 16949 requirement (upon request)

3.10. Marking/Serialization

The SE868 V2 supports a 2D barcode indicating the unit serial number below. The Telit 13-character serial number convention is:

- characters 1 and 2: year of manufacture (e.g. 13 = 2013, 14 = 2014)
- characters 3 and 4: week of manufacture (1 to 52, starting first week in January)
- character 5: manufacturer code
- characters 6 and 7: product and type
- character 8: product revision
- characters 9-13: sequential serial number

3.11. Active Antenna Gain Requirements

LNA Gain Setting	LNA Gain (dB)	Noise Figure (dB)	Recommended External Gain Range (dB)
Low	6.0 – 10.0	8.5 – 9.5	16-24
High (default)	16.0 – 20.0	4.0	8-18

Table 1 – Active Antenna Gain Requirements

Notes:

1. Recommended external gain range is total any external gain, such as antenna or external LNA and any passive loss due to cables, connectors, filters, matching network, etc.
2. In the High Gain setting an external LNA is not recommended.
3. In the Low Gain setting, the noise figure of the external LNA or active antenna must be chosen to ensure that the total cascaded noise figure is sufficiently low to meet overall system design requirements.

4. Software

4.1. TTFF (Time to First Fix)

TTFF is the actual time required by a GPS receiver to achieve a valid position solution. This specification will vary with the operating state of the receiver, the length of time since the last position fix, the location of the last fix, and the specific receiver design.

4.1.1. Hot Start

A hot start results from a software reset after a period of continuous navigation, or a return from a short idle period (i.e. a few minutes) that was preceded by a period of continuous navigation. In this state, all of the critical data (position, velocity, time, and satellite ephemeris) is valid to the specified accuracy and available in memory. Requires an always ON 1.8V main supply.

4.1.2. Warm Start

A warm start typically results from user-supplied position and time initialization data or continuous RTC operation with an accurate last known position available in memory. In this state, position and time data are present and valid but ephemeris data validity has expired. Requires always ON 1.8V main supply.

4.1.3. Cold Start

A cold start acquisition results when either position or time data is unknown. Almanac information is used to identify previously healthy satellites.

Please refer to section 5 for performance data.

4.2. AGPS

GPS aiding comes in several forms, for the purposes of this document we will focus on extended ephemeris data as a form of assisted GPS data.

InstantFix (SGEE and CGEE) is a method of GPS aiding that effectively reduces the TTFF by making every start a Hot or Warm start, through the use of ephemeris predictions.

Client Generated Extended Ephemeris (CGEE) captures ephemeris data from satellites locally and predicts ephemeris for those visible satellites for up to 3 days.

Server Generated Extended Ephemeris (SGEE) does not require local ephemeris collection from satellites; it receives the extended ephemeris data from a server and has ephemeris predictions for all available satellites in the sky.

The module supports AGPS as standard. TELIT provides a server for customers to mirror with their own servers for download of the SGEE file. Contact TELIT for support regarding this service.

4.3. Time Mark Pulse (1PPS)

A 1PPS time mark pulse is provided as an output with a width of 200ms. This signal has not been verified or characterized for all operational conditions.

Note: The GPS will only provide 1PPS when a 3D fix has been obtained using 5 SVs. When the fix degrades below a 3D solution, the 1PPS will be blanked. Once the fix quality improves back to a 3D FIX the 1PPS will again be output.

4.4. Power Management Modes

The following paragraphs describe the power management modes and power states supported by the SE868 V2.

Note that power consumption will be lower if AGPS is used.

4.4.1. Full Power Continuous Running State

The receiver functions in full power and continuously measures positioning information and outputs PVT at a nominal 1 Hz rate.

4.4.2. Hibernate State

This is the lowest power consumption state and allows a Hot Start within 2-4 hours of last shut down. The GPS receiver must have had a valid fix with sufficient visible satellites before having been shut down via the ON-OFF line or serial command.

Note: If AGPS is used there will be no time limit as long as the AGPS data is still valid.

4.4.3. TricklePower Mode

The receiver transitions to TricklePower mode after receiving a host command and completing a first fix. In this mode, the receiver power manager commands enable positioning measurements at a periodic rate, dependent upon the request from the host, to generate and output a PVT estimate. Following each fix, the receiver power manager commands the positioning system into hibernation, without awareness, until a subsequent fix is requested.

4.4.4. TricklePowerII Mode

Enable TricklePowerII mode at any time during full power operation. In TricklePowerII mode, software monitors the signal strength and other parameters of tracked satellites. When excess signal strength is detected in sufficient satellites, the RF circuitry duty cycle is adaptively reduced, to lower system current consumption while maintaining signal strength sufficient to obtain 1 Hz navigation updates. Disabling TricklePowerII mode at any time, returns the system to full power operation

4.4.5. Push to FixII Mode (PTF)

The receiver transitions to PTF mode after receiving a host command and completing a first fix. If the unit is unable to complete a fix immediately, it schedules a periodic wakeup and hibernation cycle until it obtains a successful first fix. The hybrid manager then commands the unit to hibernation for the period specified in the host command. This ranges from 30 to 7200 seconds. On wakeup, the unit generates and outputs a PVT estimate, performs required GNSS maintenance and returns the unit to hibernation. At any time, the user can request an immediate PTF fix by entering a push button On request in which the unit wakes up, generates and outputs a PVT fix and then returns to hibernation in the PTF state. A user can optionally enable the Data Logger to store the fix for each PTF wakeup interval. This creates a breadcrumb log of time and positions that can be requested later.

4.5. Differential Aiding (DGPS)

4.5.1. Satellite Based Augmentation Systems (SBAS)

The SE868 V2 is capable of receiving WAAS and EGNOS, MSAS, GAGAN differential corrections which are regional implementations of SBAS. SBAS improves horizontal position accuracy by correcting GPS signal errors caused by ionospheric disturbances, timing and satellite orbit errors.

4.6. 5Hz Update Rate

The SE868 V2 defaults to an update rate of 1Hz. The SE868 V2 can be configured to operate in 5Hz through NMEA or SiRF Binary OSP command. In UART mode, it is necessary to increase the baud rate to meet the higher rate of message output from the receiver.

For example, in NMEA, an output of RMC, GGA, and GSA at five times per second, and GSV at once per second will require at least a baud rate of 19200. This will ensure that the messages are outputted within about 0.75 seconds.

Note that the SE868 V2 will continue to run in 1Hz navigation until it gets a navigation fix. Once a navigation fix is attained, it will transition into 5Hz navigation.

Utilize $PSRF103 for control in NMEA and MID136 in SiRF Binary OSP.

4.7. Dynamic Constraints

The SE868 V2 receiver will lose track if any of the following limits are exceeded:

- ITAR limits: velocity greater than 514 m/s AND altitude above 18,288 m
- altitude: 24,000 m (max) or -500 m (min)
- velocity: 600 m/s (max)
- acceleration: 4 G (max)
- vehicle jerk: 5 m/s3 (max)

5. Performance Data

Parameter	Description	Performance			
		Min	Typical	Max	Units
Horizontal Position Accuracy[1]	Autonomous	-	< 2.5	-	m
Velocity Accuracy[2]	Speed	-	-	<0.01	m/s
	Heading	-	-	<0.01	0
Time to First Fix[3]	Hot Start: Autonomous	-	<1	-	s
	Warm Start: Autonomous	-	<35	-	s
	Cold Start: Autonomous	-	<35	-	s
Sensitivity	Autonomous acquisition	GPS: -147 GLONASS: -145	-	-	dBm
	Tracking	GPS: -166 GLONASS: -164	-	-	dBm
	Navigation	GPS: -162 GLONASS: -159	-	-	dBm

1. 50%, 24 hr static, -130 dBm
2. 50% @ 30 m/s
3. 50% , -130 dBm (Fu 0.5 ppm, Tu ±2 s, Pu 30 Km)
4. Supported on SE868 V2 Flash designs only. Not available in standard code release.

Table 2 – SE868 V2 Performance Data

6. Pinout Description

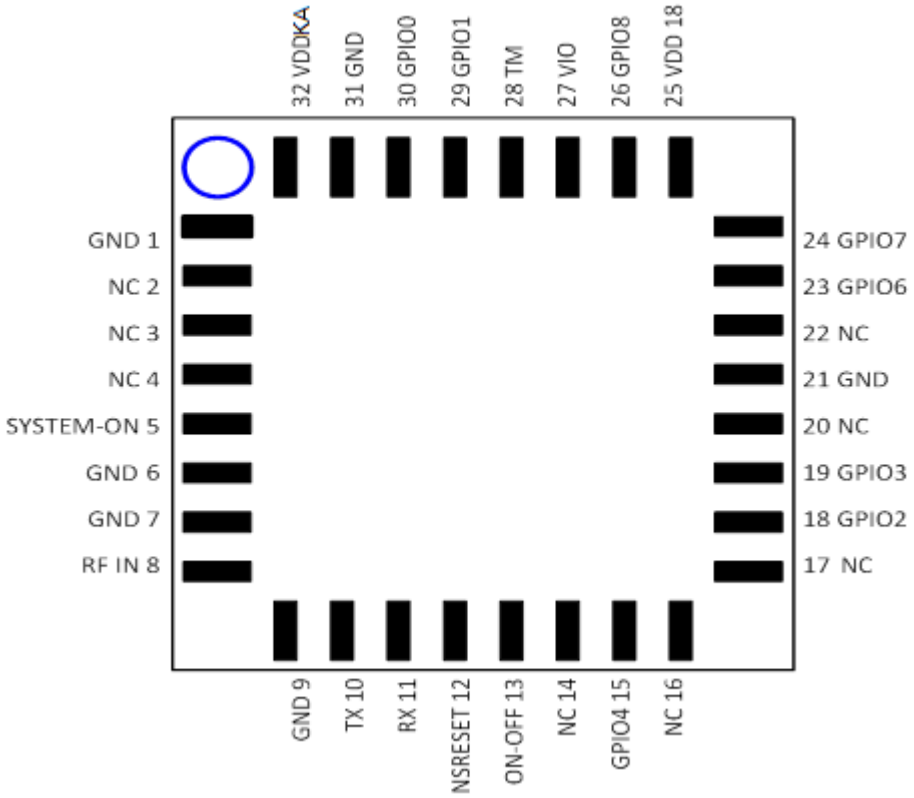

Figure 2 Pinout (Top View)

Pad Number	Pad Function	Type	Description
1	GND	PWR	GROUND
2	NC	-	No connection
3	NC	-	No connection
4	NC	-	No connection
5	SYSTEM-ON	O	Indication that GPS is running (Active high)
6	GND	-	GROUND
7	GND	PWR	GROUND
8	RF IN	I	GPS RF Input
9	GND	PWR	GROUND
10	TX	O	UART TX/SPI MISO/I2C CLOCK (1.8V)
11	RX	I	UART RX/SPI MOSI/I2C DATA (3.6V tolerant)
12	NRESET	I	GPS Reset (Active low)
13	ON-OFF	I	Input signal turns GPS ON or OFF (Active high pulse)
14	NC	-	No connection
15	GPIO4	I/O	General Purpose Input Output/EIT
16	NC	-	No connection
17	NC	-	No connection
18	GPIO2	I/O	General Purpose Input/Output
19	GPIO3	I/O	General Purpose Input/Output
20	NC	-	No connection
21	GND	PWR	GROUND
22	NC	-	No connection
23	GPIO6	I/O	General Purpose Input Output/SPI Clock
24	GPIO7	I/O	General Purpose Input Output/SPI CHIP Select
25	VDD 18	PWR	Supply (1.8V).
26	GPIO8	I/O	General Purpose Input/Output
27	VIO	PWR	1.2V to 3.6V supply for digital I/O
28	TM	O	1PPS time mark pulse
29	GPIO1	I/O	General Purpose Input/Output (DR I2C CLK)
30	GPIO0	I/O	General Purpose Input/Output (DR I2C IO)
31	GND	PWR	GROUND

32	VDDKA	PWR	1.8V supply for Keep Alive domain

Table 3 LGA Pad Functions

7. Electrical Requirements

7.1. Absolute Maximum Ratings

Parameter	Symbol	Rating	Units
Power Supply Voltage	VDD	1.9	V
Input Pin Voltage	VIO_IN	3.6	V
Output Pin Voltage	VIO_OUT	3.6	V
Storage Temperature	T_{stg}	-50 to 150	^{0}C
Warning – Stressing the device beyond the "Absolute Maximum Ratings" may cause permanent damage. These are stress ratings only. Operation beyond the "Operating Conditions" is not recommended and extended exposure beyond the "Operating Conditions" may affect device reliability.			

Table 4 Absolute Maximum Ratings

7.2. Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Power Supply Voltage [1,3]	VDD	1.75	1.8	1.90	V
Operating Temperature [2]	T_{OPR}	-40		+85	^{0}C
Current Consumption[4]					
Acquisition					
GPS + Glonass			54.7		mA
GPS Only			43.2		mA
Tracking					
GPS + Glonass			46.3		mA
GPS Only			38.4		mA
Trickle Power[5]			9.5		mA
Push to Fix					
CGEE			0.57		mA
SGEE			0.50		mA
Hibernate Current:			53.1		uA

1. Power must be always applied. The receiver will control its own power consumption depending on the required power configuration. The ON-OFF pin must be used to power the GNSS OFF and ON.
2. Operating temperature is ambient.
3. Ripple characteristics must be ensured for best GNSS performance and reliable operation. The 1.8V POR has strict requirements and will shut the receiver down if these minimum specifications are not maintained.
4. LNA set to High Gain Mode.
5. 1Hz, 100ms On time.

Table 5 Operating Conditions

Note: Allowable ripple on 1.8V supply: <50mV (0-3MHz) and <15mV above 3MHz.

7.3. Standard I/O

Note:

VDD = 1.8V

Parameter	Symbol	Min	Typ	Max	Units
Low level output voltage Test conditions l_{ol}=2mA and 4.0mA	V_{ol}	-	-	0.40	V
High level output voltage Test conditions l_{ol}=2mA and 4.0mA	V_{oh}	0.75xVDD	-	-	V
Low level input voltage	V_{il}	-0.4	-	0.45	V
High level input voltage	V_{ih}	0.7xVDD	-	3.6	V
Internal pull-up resistor equivalent	R_{pu}	50	86	157	kΩ
Internal pull-down resistor equivalent	R_{pd}	51	91	180	kΩ
Input leakage at V_I=1.8V or 0V	L_i	-10	-	10	uA
Tristate output leakage at V_0=1.8V or 0V	L_{oz}	-10	-	10	uA
Input capacitance	C_{in}	-	5	-	pF
Output capacitance	C_{load}	-	-	8	pF

Table 6 Standard I/O

8. Software Functions and Capabilities

Table 7 shows the software features available to the SE868 V2.

Feature	Description	Availability
SBAS	Improve position accuracy by using freely available satellite based correction services called SBAS (Satellite Based Augmentation System)	A
Trickle Power	Improves battery life by using enhanced power management and intelligently switching between low and full power depending on the current GNSS signal level. Refer to the Low Power Operating Modes application note.	A
Push to FixII Mode	Provides an on-demand position fix mode designed to further improves battery life compared to Tricklepower.	A
Almanac to Flash	Improves cold start times by storing the most recent almanac to flash memory.	Yes
Low Signal Acquisition	Acquires satellites and continues tracking in extremely low signal environments.	Yes
Low Signal Navigation	Continues navigating in extremely low signal environments.	Yes
Time Mark Pulse (1PPS)	A timing pulse generated every second the receiver is in a valid navigation state (5 SVs required for initial pulse start-up).	Yes
SGEE	AGPS using predicted ephemeris data from a server. Supporting Host required.	Yes
CGEE	AGPS using prediction of ephemeris from live (downloaded from satellites), ephemeris stored in memory.	Yes
Adaptive Jammer Detection	System scan for up to 8 CW jammers for removal by the receiver	Yes
5Hz Update Rate	SE868 V2 update rate is configurable by software command to 5Hz.	A
Yes = always enabled A = available, but not enabled by default		

Table 7 – Software Features

9. Mechanical Drawing

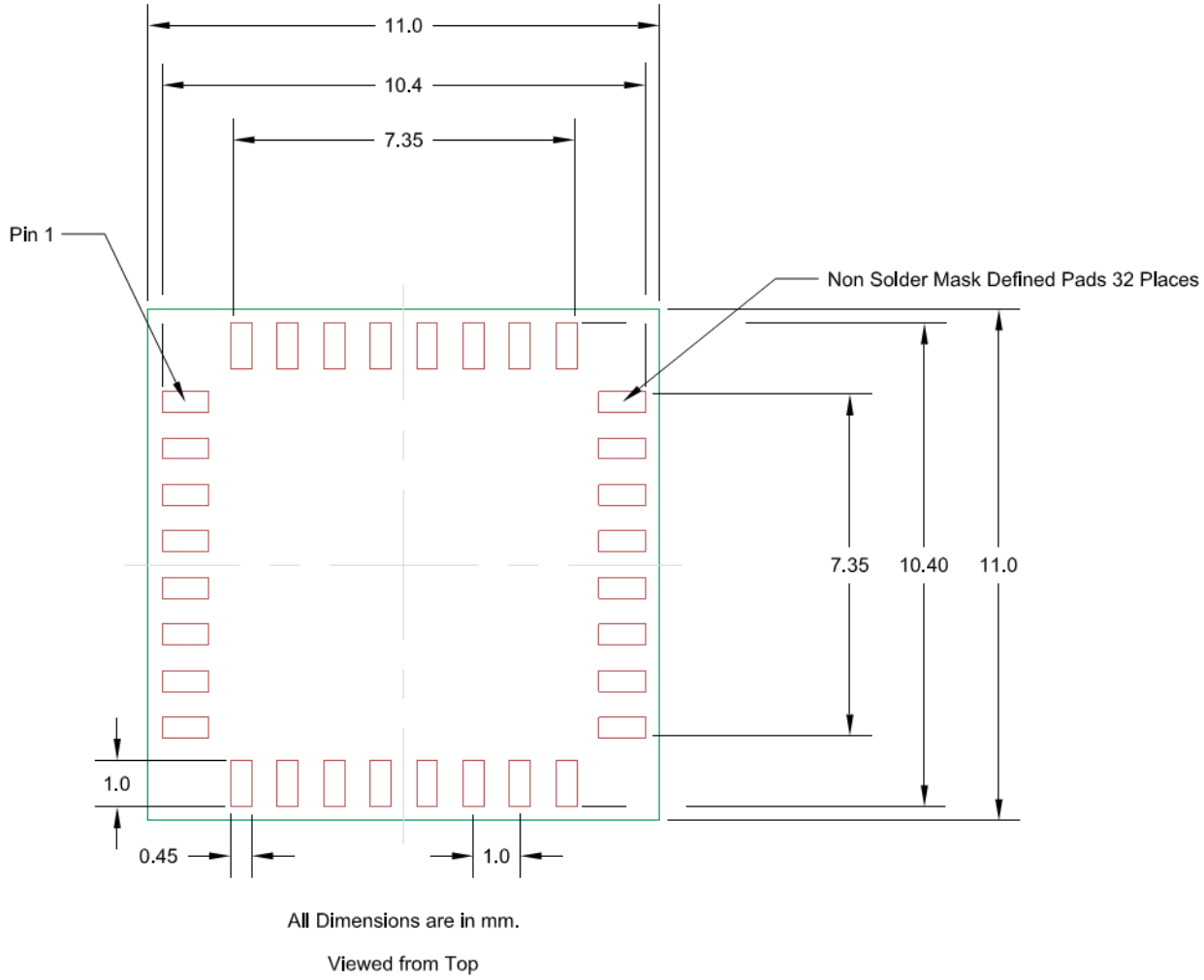

Figure 3 Mechanical Drawing

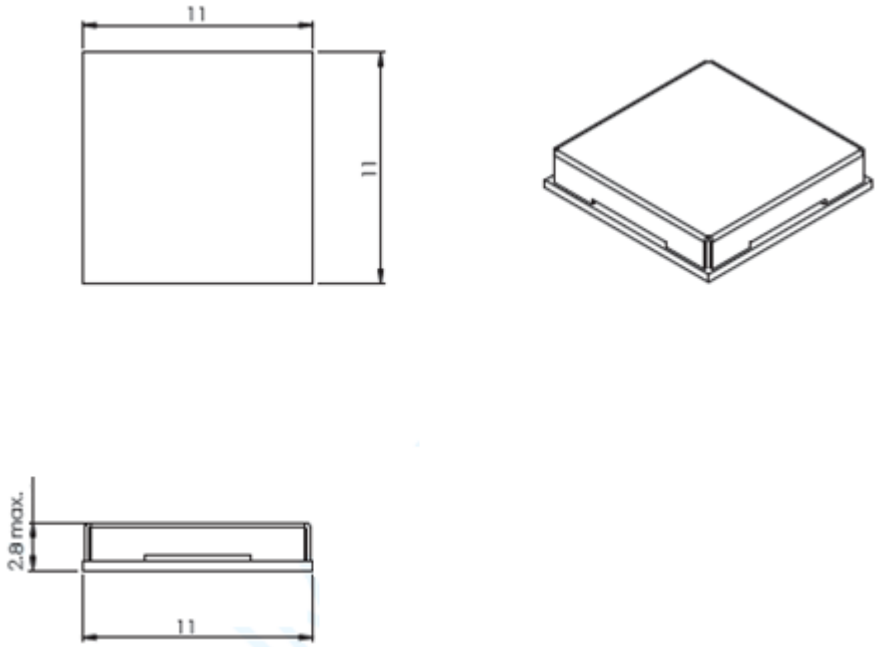

Figure 4 3D Model

10. Safety Recommendations

READ CAREFULLY

Be sure the use of this product is allowed in the country and in the environment required. The use of this product may be dangerous and has to be avoided in the following areas:

- Where it can interfere with other electronic devices in environments such as hospitals, airports, aircrafts, etc.
- Where there is risk of explosion such as gasoline stations, oil refineries, etc. It is responsibility of the user to enforce the country regulation and the specific environment regulation.

Do not disassemble the product; any mark of tampering will compromise the warranty validity. We recommend following the instructions of the hardware user guides for a correct wiring of the product. The product has to be supplied with a stabilized voltage source and the wiring has to be conforming to the security and fire prevention regulations. The product has to be handled with care, avoiding any contact with the pins because electrostatic discharges may damage the product itself. Same cautions have to be taken for the SIM, checking carefully the instruction for its use. Do not insert or remove the SIM when the product is in power saving mode.
The system integrator is responsible of the functioning of the final product; therefore, care has to be taken to the external components of the module, as well as of any project or installation issue, because the risk of disturbing the GSM network or external devices or having impact on the security. Should there be any doubt, please refer to the technical documentation and the regulations in force. Every module has to be equipped with a proper antenna with specific characteristics. The antenna has
to be installed with care in order to avoid any interference with other electronic devices and has to guarantee a minimum distance from the body (20 cm). In case of this requirement cannot be satisfied, the system integrator has to assess the final product against the SAR regulation.

The European Community provides some Directives for the electronic equipments introduced on the market. All the relevant information’s are available on the European Community website:

http://ec.europa.eu/enterprise/sectors/rtte/documents/

The text of the Directive 99/05 regarding telecommunication equipments is available, while the applicable Directives (Low Voltage and EMC) are available at:

http://ec.europa.eu/enterprise/sectors/electrical/

11. Document History

Revision	Date	Changes
0	2013-05-14	First issue
1	2013-10-24	Added information Note on pages 9 and 10 Updated Sensitivity measurements Added corrections in table 2 and table 7.1