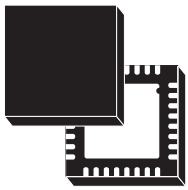
STA5630

Low power GPS RF front-end

Data brief

Features

- Integrated LNA
- Low power consumption (< 25 mW)
- 1.8 V supply voltage
- GPS and Galileo compliant
- Minimum external components
- Serial interface
- 3 bits A/D converter
- CMOS 65 nm technology
- 2 kV HBM ESD protected
- Standard QFN-32 package



VFQFPN32

Description

The chip is a fully integrated RF front-end able to down-convert either the GPS L1 signal from 1575.42 MHz to 4.092 MHz.

The STA5630 embeds high performance LNA minimizing external component count. The chip uses state of the art CMOS 65 nm technology.

A 3-bit ADC converts the IF signal to Sign (SIGN) and Magnitude (MAG0 and MAG1). The magnitude bits are internally integrated in order to control the variable gain amplifiers. The VGA gain can be also set by the SPI interface.

The STA5630 accepts a range of reference clocks (10 to 52 MHz) and generates a 16.368 MHz sampling clock (GPS_CLK) for the baseband. The STA5630 embeds LDO to supply the internal core of the device facilitating requirements to external power supply.

High performance low power and cost effective device, the STA5630 is the ideal solution for automotive, cellular and consumer battery powered applications.

Table 1. Device summary

Order code	Marking	Package	Packing
STA5630	STA5630	VFQFPN32	Tray
STA5630TR	STA5630	VFQFPN32	Tape and reel

Contents

1 Applications

Three main applications cases are considered and described hereafter.

The first uses a passive antenna and only a single RF SAW in front of the internal LNA. It targets low cost and medium performance applications. In this case LNA is ON and RFA is set at minimum gain.

The second uses a passive antenna and two RF SAWs. It maximizes the performances in presence of severe blockers. In this case LNA is ON and RFA is set at maximum gain.

The third case uses an active antenna. This solution targets applications where the GPS antenna is far from the RF front-end. In this case the signal can be fed into either LNA or RFA input depending on the application conditions.

STA5630 is suitable for baseband requiring 16.368/4.092 clock/RF interface and one, two or three bits samples. It accepts reference clocks (TCXO) in the range of 10-52 MHz and delivers a TCXO buffered copy to the baseband.

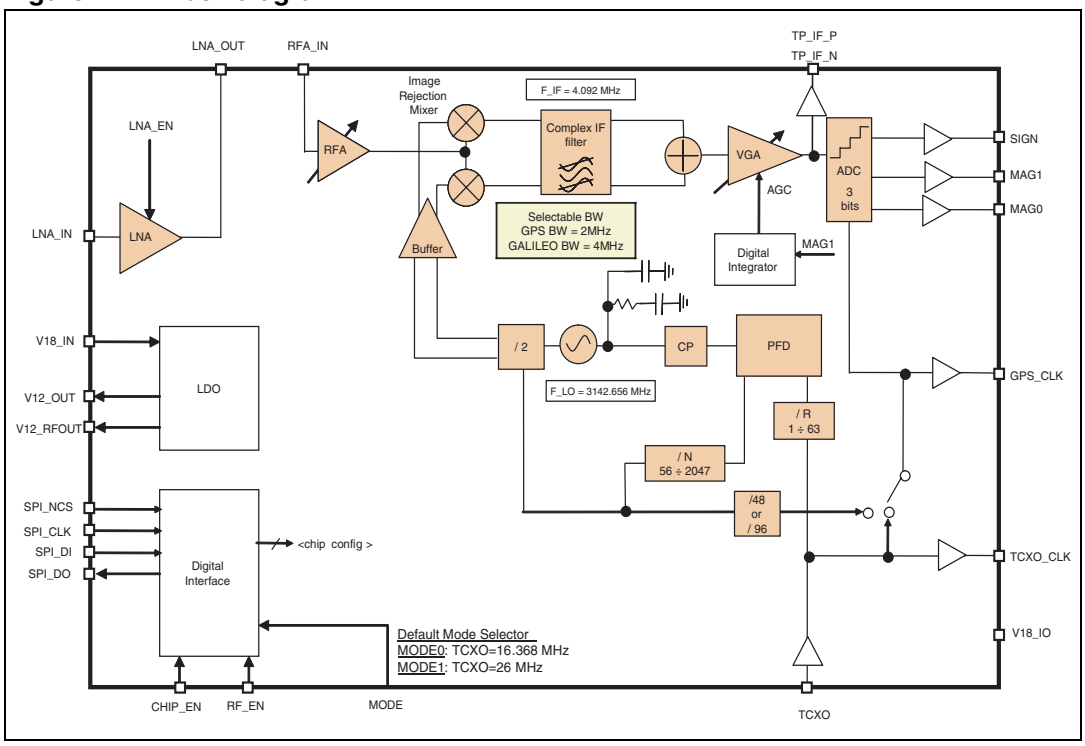
The STA5630 has two default modes selectable by an external pin (MODE):

- MODE 0: the chip is configured to use 16.368 MHz as reference frequency,
- MODE 1: the chip is configured to use 26 MHz as reference frequency.

Other modes are programmed through the serial interface

1.1 Block diagram

Figure 1. Block diagram



2 Pin description

Table 2. Pin list description

Pin #	Pin name	Description	Type
1	TP_IF_P	RF/IF receiver chain test positive output	Analog output
2	V12_RFA	RF amplifier (RFA) power supply (1.2V)	Supply pin
3	RFA_IN	RFA input, DC coupled	Analog input
4	V12_IF	IF section power supply (1.2V)	Supply pin
5	V12_OUT	LDO IF/DIG output. Power supply (1.2V) delivered for IF/ADC/DIG_TCXO/VCO/VDD_IO VCC	Output
6	V12_RF_OUT	LDO RF output: Power supply (1.2V) delivered for LNA/RFA/MIXER VCC	Output
7	V18_IN	LDOs power supply (1.8V)	Supply pin
8	V12_LNA	Low noise amplifier (LNA) power supply (1.2V)	Supply pin
9	LNA_OUT	LNA output	Analog output
10	GND	Ground	Ground
11	LNA_IN	LNA input, DC coupled	Analog input
12	GND	Ground	Ground
13	CHIP_EN	Chip Enable	Digital input
14	MODE	Power-On Default Configuration Selector	Digital input
15	V18_IO	I/Os power supply (1.8V)	Supply pin
16	GPS_CLK	GPS clock (16.368MHz)	Digital output
17	MAG0	Mag0 data (Last significant bit)	Digital output
18	MAG1	Mag1 data	Digital output
19	SIGN	Sign data (most significant bit)	Digital output
20	SPI_CLK	Serial Parallel Interface Clock	Digital input
21	SPI_NCS	Serial Parallel Interface Chip Select (Active Low - 1.8V domain)	Digital input
22	SPI_DI	Serial Parallel Interface Data Input	Digital input
23	SPI_DO	Serial Parallel Interface Data Output	Digital output
24	TCXO_CLK	TCXO Buffered Output	Digital output
25	V12_IO	Power supply for I/Os digital section (1.2V)	Supply pin
26	GND_IO	I/Os Ground	Ground
27	TCXO_IN	TCXO Input, DC coupled	Analog input
28	V12_DIG	Digital section and TCXO buffer input power supply (1.2V)	Supply pin
29	V12_VCO	VCO power supply (1.2V)	Supply pin
30	V12_ADC	ADC section power supply (1.2V)	Supply pin
31	V12_MIX	Mixer power supply (1.2V)	Supply pin
32	TP_IF_N	RF/IF receiver chain test negative output	Analog output
EP	GND	Ground	Ground

3 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*.

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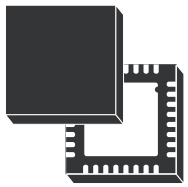
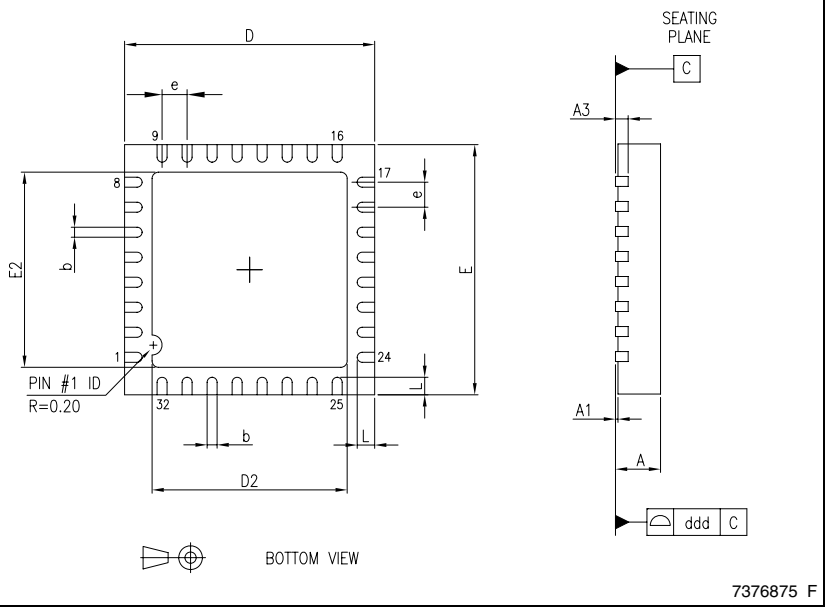
Figure 2. VFQFPN32 (5x5x1.0 mm) mechanical data and package dimensions

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	0.800	0.900	1.000	0.031	0.035	0.039
A	0.800	0.900	1.000	0.0315	0.0354	0.0394
A1		0.020	0.050		0.0008	0.0020
A3		0.200			0.0079	
b	0.180	0.250	0.300	0.0071	0.0098	0.0118
D	4.850	5.000	5.150	0.1909	0.1969	0.2028
D2	3.500	3.600	3.700	0.1378	0.1417	0.1457
E	4.850	5.000	5.150	0.1909	0.1969	0.2028
E2	3.500	3.600	3.700	0.1378	0.1417	0.1457
e		0.500			0.0197	
L	0.300	0.400	0.500	0.0118	0.0157	0.0197
ddd			0.050			0.0020

OUTLINE AND MECHANICAL DATA



VFQFPN32 (5x5x1.0mm)
Very **F**ine **Q**uad **F**lat **P**ackage **N**o lead



4 Revision history

Table 3. Document revision history

Date	Revision	Changes
22-Jul-2009	1	Initial release.

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