Teseo-VIC6A

Data brief

Automotive quad-bands GNSS module with 6-axis IMU

Product status link
Teseo-VIC6A

Product summary	
Order code	Teseo-VIC6A

Features

- Qualified AEC-Q104
- GNSS features:
  - Simultaneous quad-bands multiconstellation GNSS
  - -163 dBm sensitivity tracking
  - Sub-meter CEP accuracy positioning
  - 192 (96 data and 96 pilot) signal tracking channels
- Hardware feature:
  - Automotive Teseo VI GNSS IC
  - Automotive 6-axis inertial sensor
  - 3.3 V supply voltage range
  - LCC 24 pins package (16.0 mm x 12.2 mm x 2.42 mm)
  - Operating temperature: (from -40° to +105°C)
- Firmware features:
  - Autonomous PVT
  - Measurement engine (raw measurements GNSS data)
  - Teseo dead reckoning automotive way firmware
  - Free firmware configuration

Description

The Teseo-VIC6A module brings the proven accuracy and robustness of the Teseo VI chip to the reach of everyone: the embedded firmware and the complete evaluation environment save development time.

Within its 16.0 mm x 12.2 mm size, Teseo-VIC6A offers superior accuracy thanks to the on-board temperature compensated crystal oscillator (TCXO) and a reduced time to first fix (TTFF) relying on its dedicated real-time clock (RTC) oscillator.

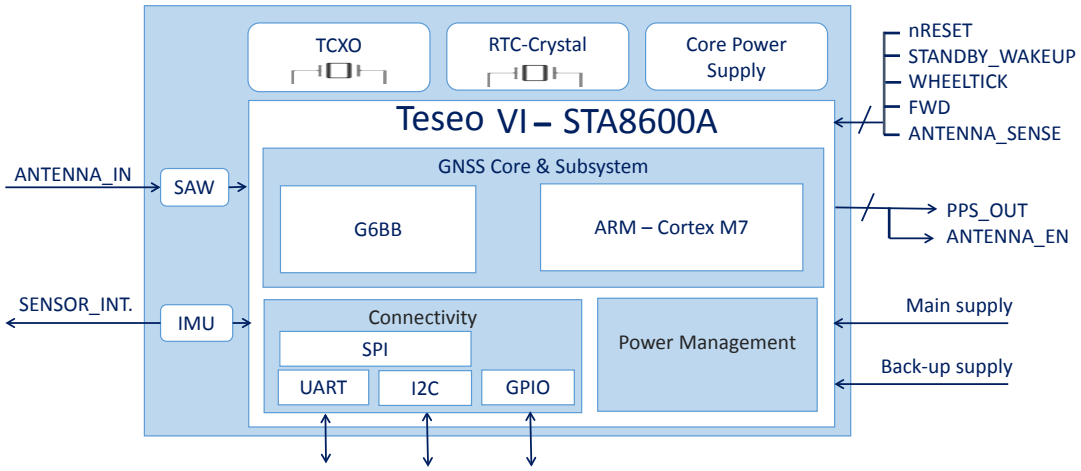
Thanks to the embedded flash Teseo-VIC6A offers many extra features such as 7 days autonomous assisted GNSS and real-time assisted GNSS. Teseo-VIC6A supports firewall configurability as well as firewall upgrades.

Teseo-VIC6A module, being a certified solution, optimizes the time to market of the final applications with a temperature operating range from -40°C to +105°C.

1 Module description

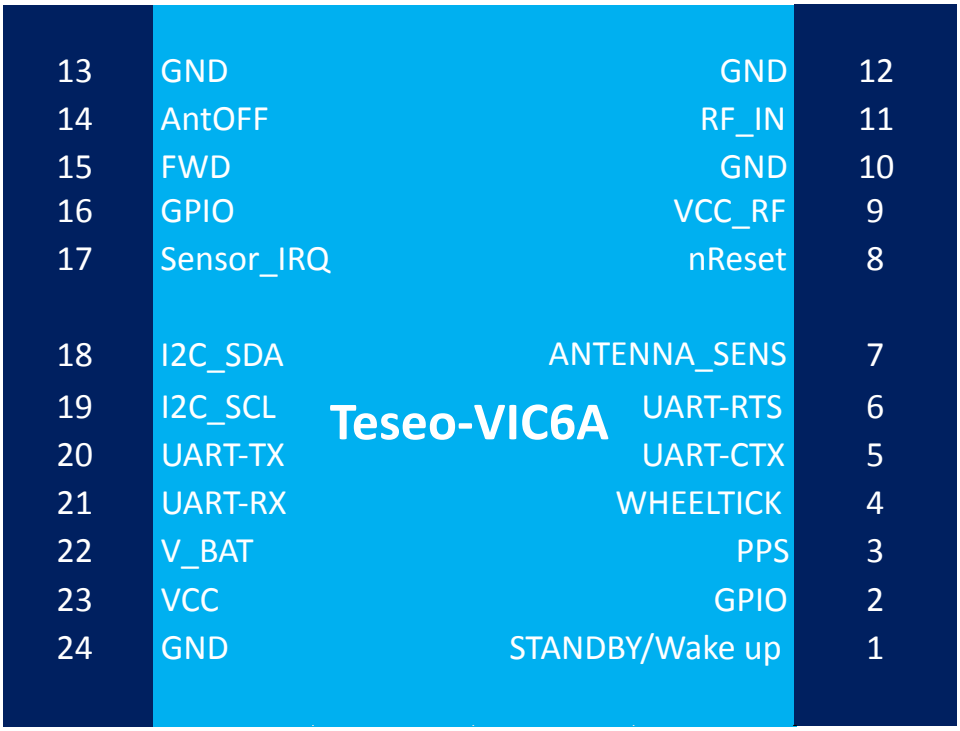
1.1 Block diagram

Figure 1. Block schematic



1.2 Pin configuration

Figure 2. Module pins layout



1.3 Pin out description

Table 1. Module pin out description

Number	Name	I/O	Description
1	Wake-up	I	External interrupt pin (if not used, must be left floating)
2	Reserved		Reserved
3	PPS	O	Time pulse (PPS)
4	WHEELTICK	I	DRAW wheel tick signal
5	Reserved	I	Reserved
6	IRQ	O	IRQ
7	Reserved		NC
8	nReset	I	Input signal to force the module to reset
9	VCC_RF	O	Output voltage RF section. It can be used to supply an external active antenna
10	GND	Ground	Ground
11	RF_IN	I	GNSS signal input
12	GND	Ground	Ground
13	GND	Ground	Ground
14	Ant_OFF	O	External antenna control
15	FWD	I	DRAW Forward signal
16	Reserved		Reserved
17	Reserved		Reserved
18	I2C_SDA	I/O	I2C-Data
19	I2C_SCL	I/O	I2C-Clock
20	UART-TX	O	UART-TX
21	UART-RX	I	UART-RX
22	V_BAT	I	Backup voltage supply
23	VCC	I	Supply voltage
24	GND	Ground	Ground

2 Supported GNSS constellations

The module firmware supports all the GNSS constellations (GPS, GLONASS, GALIELO, BEIDOU, QZSS, and IRNSS). The user can select what the application needs by the firmware configuration.

Table 2. GNSS constellations and bands supported

Constellation	Bands acquired
GPS	L1C/A, L1C, L2C, L5
SBAS	EGNOS, WASS, MSAS, SDCM, GAGAN, KAZZ
GLONASS	L1OF, L2OF, L1OC, L3OC
BeiDou	B1I, B1C, B2I, B2B, B3I
Galileo	E1B/C, E5b, E5a, E6
QZSS	L1C/A, LIC/V, L1C. L1S. L2C, L5
IRNSS (Navic)	L5

2.1 GPS

The module is designed to receive and track the L1C/A (1575.42 MHz), L1C (1575.42 MHz), L2C (1227.6 MHz), L5 (1176.45 MHz) signals provided by the global positioning system (GPS).

The module can receive and process GPS concurrently with Galileo, GLONASS, and BeiDou.

2.2 GLONASS

The module is designed to receive and track the L1OF (1598.0625 MHz-1605.375 MHz), L2OF (1242.9375 MHz - 1248.625 MHz), L1OC, L3OC (1207.14 MHz) signals provided by the Russian GLONASS satellite system.

The module can receive and process GLONASS concurrently with GPS, Galileo, and BeiDou.

2.3 BeiDou

The module is designed to receive and track the B1I (1561.98 MHz), B1C, B2I (1207.14 MHz), B2B, B3I (1268.52 MHz) signals provided by the Chinese BeiDou satellites system.

The module can receive and process BeiDou concurrently with GPS, GLONASS, and Galileo.

2.4 Galileo

The module is designed to receive and track the E1B/C (1575.42 MHz), E5b (1207.14 MHz), E5a (1176.45 MHz), E6 (1278.75 MHz) signals provided by the European Galileo satellites system.

The module can receive and process Galileo concurrently with GPS, GLONASS, and BeiDou.

2.5 IRNSS

The module is designed to receive and track the L5 (1575.42 MHz) signal provided by the Indian IRNSS (Navic) satellites system.

The module can receive and process IRNSS concurrently with GPS, GLONASS, Galileo, and BeiDou.

2.6 QZSS

The module is designed to receive and track the L1C/A (1575.42 MHz) signal provided by the Japanese QZSS satellites system.

QZSS with GPS signals provide GNSS augmentation service for the Pacific region covering Japan and Australia. QZSS satellites are placed in a periodic highly elliptical orbit (HEO): these orbits allow the satellites to “dwell” for more than 12 hours a day at an elevation above 70° (it means that they appear almost overhead most of the time).

3 Augmentation systems

3.1 Satellite-based augmentation system

The module supports SBAS. SBAS is a wide area differential GPS (WADGPS), it is a system which provides differential GPS corrections data; SBAS includes the WAAS within the United States, the EGNOS within Europe, the multifunctional transport satellite (MTSAT) – based MSAS within Japan and southeast Asia, and the GPS and GEO augmented navigation (GAGAN) system in India.

SBAS data correction is used in the GNSS algorithm to provide a better position estimation. The overall SBAS differential correction mechanism can be conceived as built in 2 phases:

- The “acquire and tracking” phase
- The “decoding” phase

The “acquire and track” phase relates to the capacity of the acquisition engine to reliably track the configured SBAS satellite; during the decoding phase the SBAS message can be decoded to fetch the differential corrections.

The current longitude limits for each service are:

- WAAS -180°C to -25°C
- EGNOS -25°C to +50°C
- GAGAN +50°C to +100°C
- MSAS +100°C to +180°C

The module software with SBAS capability implements a command interface at the NMEA level to allow interaction with the SBAS library. It supports commands to enable/disable the SBAS functionality.

3.2 Differential GPS

The module supports differential-GPS data according to RTCM 2.3 (radio technical commission for maritime services).

Differential-GPS data improves position accuracy.

Revision history

Table 3. **Document revision history**

Date	Revision	Changes
24-Jan-2025	1	Initial release.
20-Feb-2025	2	Updated Features on cover page.

Contents