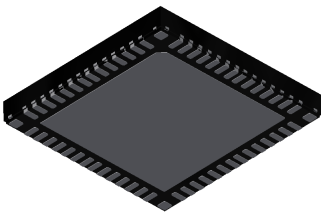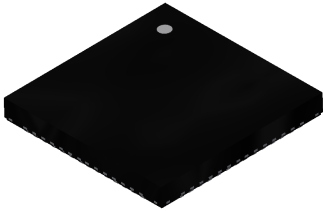# Teseo APP2 automotive ASIL quad-band GNSS precise measurement

VFQFPN56 (7 × 7 × 0.9 mm)
with wettable flanks

Features

Highlights

- *AEC*-Q100 automotive qualified
- Arm® Cortex®-M7 (lockstep support)
- Embedded RAM/NVM/cache
- Dedicated ADC for antenna sensing
- *ESD*: 2 kV (*HBM*) and 500 V (*CDM*)
- Automotive grade 105°C

GNSS features

- STMicroelectronics' sixth generation positioning receiver with six constellations: *GPS*, *Galileo*, *GLONASS*, *BeiDou*, *QZSS*, *NAVIC* (former *IRNSS*)
- Standard *PVT* positioning supporting up to quad-band for submeter accuracy applications
- Measurement engine to support precise positioning algorithms
- Code phase, carrier phase, doppler frequency measurement and related quality metrics
- Support any *SBAS* systems
- 192 (96 data & 96 pilot) signal tracking channels

Safety

- Comprehensive ISO26262 safety concept
- Fault collection and control unit (FCCU) with up to two error outputs
- ECC/CRC
- Safe communication protocol with host
- RF and core hardware monitors

Security

- Cybersecurity (ISO21434) support
- Chip integrity (secure boot, secure firmware update, secure link) thanks to an embedded hardware security module (*HSM*)
- Signal integrity (antijamming/antispoofing)
- Interface integrity (on-the-fly decryptor engine)

Communication interfaces

- Two *UART* ports for host communication supporting hardware flow control
- One synchronous serial port (*SSP*) for host communication
- One I²C port for sensor interfacing
- One *SPIQ* port for sensor interfacing
- *PPS* configurable output

Core peripherals

- Embedded *DMA*
- 32 kHz oscillator real-time clock
- Watchdog timer
- 1× extended function timer

Product status link
STA9200MA

Product summary	
Order code	Packing
STA9200MA	Tape and reel
STA9200MATR	Tray

DB5486 - Rev 1 - February 2025
For further information, contact your local STMicroelectronics sales office.

www.st.com

Power management unit

- Separate power supply domains:
    - Backup domain: 1.71 V to 3.63 V
    - Switchable domain: 1.71 V to 3.63 V
    - Optional external core supply voltage: 0.9 V to 1.0 V
- On-chip *LDO*s with high-voltage/low-voltage monitors

1 Introduction

1.1 Description

The STA9200MA measurement engine is a multiband multiconstellation receiver IC. It supports multiconstellations up to quad-band with a single die approach.

The STA9200MA requires very few external components since it embeds enough *MIPS*/memory resources for supporting multiband measurement up to quad-band. Combined with the *PPP/RTK* algorithm running in the main host, the device provides *ASIL* precise positioning accuracy. It shows great flexibility thanks to the capability to handle all the software configurations with a unique binary firmware component. It supports a unique *PCB* design for safety and non-safety applications thanks to the *P2P* compatibility with the STA8600A (automotive chip).

The STA9200MA also includes a hardware security module (*HSM*) for supporting secure boot. This module, with the signal and interface integrity mechanism, makes the STA9200MA the ideal solution for applications where integrity is a key factor. It is compliant with the ST automotive-grade qualification, which is included in addition to the AEC-Q100 requirements.

The usage of in-house manufacturing fabrication plants combined with a set of production flow methodologies targeting zero defect per million, makes the STA9200MA the ideal solution for stringent automotive quality and supply chain requirements.

The STA9200MA is also designed according to the most stringent automotive safety standards (ISO 26262) to support applications, which require automotive safety integrity levels up to ASIL B.
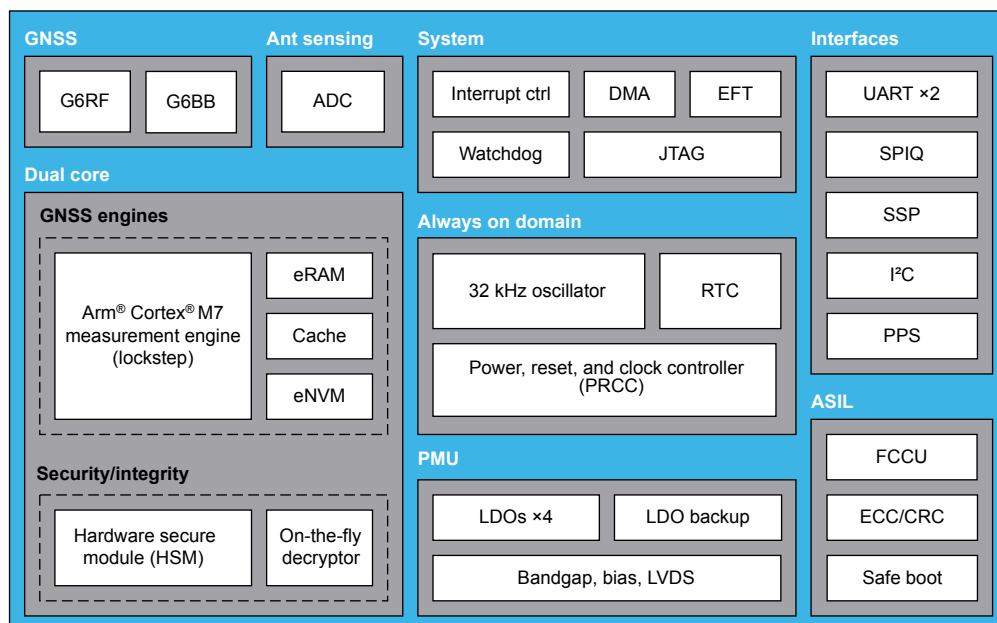
The device is delivered in a QFN package.

Note: *For information on the Arm® core, refer to the Arm® Cortex®-M7 technical reference manual, available from the www.arm.com website.*

Note: *Arm, Cortex, and the Arm logo are registered trademarks of Arm Limited (or its subsidiaries) in the US and/or elsewhere.*

1.2 Block diagram

Figure 1. Block diagram

Revision history

Table 1. Document revision history

Date	Version	Changes
10-Feb-2025	1	Initial release.

Glossary

ADC Analog-to-digital converter

AEC Automotive Electronics Council. Also known as CDF-AEC for Chrysler-Delco-Ford Automotive Electronics Council. Shortened to AEC.

ASIL Automotive safety integrity level

It is a risk classification system defined by the ISO 26262 standard for the functional safety of road vehicles. There are four ASILs identified by ISO 26262—A, B, C, and D. ASIL A represents the lowest degree and ASIL D represents the highest degree of automotive hazard.

BeiDou Chinese navigation satellite-based radio navigation system

CBC Cipher block chaining

CDM Charged device model

DMA Direct memory access

DRAW Dead reckoning automotive way

DRUM Dead reckoning unplugged mode

ESD Electrostatic discharge

Galileo EU´s global navigation satellite system

GLONASS Russian satellite navigation system. Acronym for GLObalnaya NAvigatsionnaya Sputnikovaya Sistema (Russian). The role of the GLONASS satellite navigation system is similar to the GPS of the United States, the Galileo satellite positioning system of Europe, and the BeiDou satellite navigation system of China.

GNSS Global navigation satellite system

GPIO General-purpose input/output

GPS Global positioning system

HBM Human body model

HSM Hardware security module

HSSTP High-speed serial trace probe

IRNSS Indian regional navigation satellite system, with the operational name of Navigation with Indian constellation (NAVIC).

ISO International Organization for Standardization

I²C Inter-integrated circuit

JTAG Joint Test Action Group

LDO Low-dropout regulator

LEO Low Earth orbit

LVDS Low-voltage differential signaling

MIPS Microprocessor without interlocked pipeline stages

NAVIC Navigation with Indian constellation. The Indian regional navigation satellite system (IRNSS) is an autonomous regional satellite navigation system that provides accurate real-time positioning and timing services.

NVM Nonvolatile memory

OSNMA Open service navigation message authentication

P2P Peer-to-peer

PCB Printed-circuit board

PPP Precise point positioning

PPS Pulse per second

PVT Position-velocity-time

QFN Quad-flat no-leads

QZSS Quasi-zenith satellite system.

A Japanese satellite positioning system composed mainly of satellites in quasi-zenith orbits (QZO), but also of satellites in geostationary orbits (GEO).

RAM Random access memory

RTK Real-time kinematic

SBAS Satellite-based augmentation system. It provides services for improving the accuracy, integrity, and availability of basic GNSS signals.

SPI Serial peripheral interface

SPIQ Queued serial peripheral interface

SSP Synchronous serial port

ST STMicroelectronics

UART Universal asynchronous receiver/transmitter

IMPORTANT NOTICE – READ CAREFULLY