ZED-F9K-01A module

High precision dead reckoning with integrated IMU sensors

Reliable lane identification for ADAS applications up to 105 °C
- Fully integrated dead reckoning RTK solution up to 50 Hz with very low latency
- Multi-band operation for flexibility and security
- Multiple outputs to serve all possible architecture
- Dependable protection level output
- Advanced security by top-notch spoofing & jamming algorithms
- Native support of global PointPerfect augmentation

Product description
The ZED-F9K-01A module features the u-blox F9 GNSS platform, which provides continuous decimeter-level positioning accuracy for the most challenging automotive use cases. It supports both L1/L2/E5B and L1/L5 bands for maximum flexibility, satellite availability, and security. The sophisticated built-in algorithms cleverly fuse the IMU data, GNSS measurements, wheel ticks, and vehicle dynamics model to identify driving lanes where GNSS alone would fail. The module natively supports the u-box PointPerfect GNSS augmentation service. It delivers multiple GNSS and IMU outputs in parallel to support all possible architectures, including a 50 Hz sensor-fused solution with very low latency. It also enables advanced real-time applications like augmented reality, while the optimized multi-band and multi-constellation capability maximizes the number of visible satellites even in urban conditions.

The device is a self-contained solution, which provides the best possible system performance to address issues such as latency constraints, RF front-end design issues, or RTK algorithm integration. This eliminates the technical risk and effort of selecting and integrating RF components and third-party libraries, like positioning engines, which helps customers optimize time to market. The u-blox approach also dramatically reduces supply chain complexity during production.

The u-blox position engine incorporates a dependable protection level output and advanced security features including anti-spoofing and anti-jamming. Operation up to 105 °C makes it possible to integrate the product anywhere in the car without design constraints.

u-blox manufacturing partners use ISO/TS 16949 certified sites and adhere to the latest standards in the automotive industry. Qualification tests are performed as stipulated in the AEC-Q104 standard: “Failure mechanism based stress test qualification for multichip modules (MCM) in automotive applications”.

Product summary

UBX-19047326 - R03
Objective Specification
ZED-F9K-01A module

Features

**Receiver type**
- 184-channel u-blox F9 engine
  - Option A: GPS L1/L2/C, Galileo E1/E5b, GLONASS L1/L2, BeiDou B1/B2i, QZSS L1/L2C, SBAS L1
  - Option B: GPS L1/L5, Galileo E1/E5a, GLONASS L1, BeiDou B1/B2a, QZSS L1/L5, SBAS L1

**Nav. update rate**
- up to 50 Hz

**Position accuracy**
- RTK < 0.2 m + 1 ppm CEP

**ADR position error**
- < 1% of distance travelled without GNSS

**Convergence time**
- RTK < 10 s

**Acquisition**
- Cold starts: 24 s
- Aided starts: 4 s
- Reacquisition: 2 s

**Sensitivity**
- Tracking & nav.: -160 dBm
- Cold starts: -147 dBm
- Hot starts: -158 dBm

**Built-in**
- TCXO, RTC, flash memory, 3D accelerometer, 3D gyroscope, diplexer, SAW filters

**Supported antennas**
- Active

1 Limited by firmware for best DR performance

Software features

**Anti-jamming**
- Advanced anti-jamming algorithms

**Anti-spoofing**
- Advanced anti-spoofing algorithms
  - Sensor based spoofing detection

**Raw data**
- Code and Doppler measurements and IMU data

**Protocols**
- NMEA, UBX binary, RTCM version 3.3

Interfaces

**Serial interfaces**
- 2 UART
- 1 USB
- 1 SPI (optional)
- 1 DDC (I2C compliant)

**Digital I/O**
- Configurable timepulse

**Timepulse**
- Configurable: 0.25 Hz to 10 MHz

Package

- 54-pin LGA (Land Grid Array)
- 17 x 22 x 2.4 mm

Environmental data, quality & reliability

**Operating temp.**
- −40 °C to +105 °C

**Storage temp.**
- −40 °C to +105 °C

**RoHS compliant**
- lead-free, 2015/863/EU

**Green (halogen-free)**

**Module qualification according to AEC-Q104**
- Manufactured and fully tested in ISO/TS 16949 certified production sites

**Uses u-blox F9 chips qualified according to AEC-Q100**

Electrical data

**Supply voltage**
- 2.7 V to 3.6 V

**Power consumption**
- 85 mA @ 3.0 V (continuous)

**Backup supply**
- 1.65 V to 3.6 V

Related u-blox products and services

**Products**
- NEO-D9S correction receiver

**Location services**
- AssistNow A-GNSS service
- PointPerfect GNSS augmentation service

**Support products**
- EVK-F9DR Easy to use evaluation board with various communication interfaces for correction services

Product variants

**ZED-F9K-01A**
- u-blox F9 multi-band high precision dead reckoning, automotive grade, L1/L2/E5b or L1/L5 bands, up to 105° C

Further information

For contact information, see [www.u-blox.com/contact-u-blox](http://www.u-blox.com/contact-u-blox).

For more product details and ordering information, see the product data sheet.

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