

# UBX-A9940-KA



## u-blox A9 functional safe GNSS chip

### ISO-26262/ASIL-B measurement engine for GNSS localization

- To support ADAS L2+, L3 (and above) autonomous driving applications
- Dm-level accuracy with guaranteed safety and integrity metrics
- ISO-21434 cyber security compliant
- Multi-band(L1/L2 or L1/L5) support with 3 concurrent constellations
- Safe GNSS raw data availability
- PointSafe native support



5.00 × 5.00 × 0.59 mm



### Product description

The UBX-A9940-KA positioning chip features the u-blox ninth generation GNSS receiver platform and the first generation ASIL-B graded HW, targeting ADAS L2+, L3 and above applications for the Autonomous driving market.

The UBX-A9940-KA receiver can concurrently support three constellations (GPS, GALILEO, and Beidou) in the dual-band configuration (L1/L2 bands or L1/L5 bands).

The A9 platform was designed to meet the stringent functional safety standards and high-integrity requirements typically required by ADAS applications such as lane-accurate positioning and geo-fencing.

u-blox meticulously developed both the A9 hardware and the corresponding firmware according to the ISO26262-2018 functional safety standard, thereby offering peace of mind to the customer in meeting the latest autonomous driving safety regulations and standards.

The A9 Safe Measurement Engine (SME) provides the safe GNSS RAW data (pseudorange and carrier phase information in the Safe UBX format) as an input to the Safe Position Engine (SPE). The SPE then combines other critical components like IMU, WSS (wheel speed sensor), and Safe Correction Services (SCS) to provide dm-level positioning accuracy. The SME plays a critical role in achieving a very high level of integrity for the overall position solution (for example, 10e-6/hour; in other words, 1 failure in 1000000 hours, which is approximately once in 114 years!).

UBX-A9940-KA

|                           |                 |
|---------------------------|-----------------|
| <b>Grade</b>              |                 |
| Automotive                | •               |
| Professional              |                 |
| Standard                  |                 |
| <b>GNSS</b>               |                 |
| GPS                       | •               |
| Galileo                   | •               |
| BeiDou                    | •               |
| Number of concurrent GNSS | 3               |
| Bands                     | L1/L2 and L1/L5 |
| <b>Interfaces</b>         |                 |
| SPI                       | 1               |
| <b>Features</b>           |                 |
| Additional SAW            | S               |
| Oscillator                | T               |
| Measurement pulse         | •               |
| <b>Power supply</b>       |                 |
| 3.0 V – 3.6 V             | •               |

S = Supported, may require ext. components

T = TCXO



## Features

|                    |   |         |
|--------------------|---|---------|
| Receiver type      | 120-channel u-blox A9 engine<br>Option A: GPS L1/L2C, Galileo E1/E5b<br>Option B: GPS L1/L5, Galileo E1/E5a,<br>BeiDou B1/B2a |         |
| Measurement rate   | 10 Hz   |         |
| ASIL-B hardware    | Compliant   |         |
| Acquisition        | Time to acquire first satellite signal  | 6 s     |
| Sensitivity        | Fine acquisition  | 21 dBHz |
|                    | Tracking and nav.   | 22 dBHz |
|                    | Cold starts   | 26 dBHz |
| Supported antennas | Active  |         |

## Software features

|                      |   |  |
|----------------------|---|--|
| Anti-jamming         | Advanced anti-jamming algorithms                    |  |
| Functional safety    | ISO 26262-2018 compliance                           |  |
| Raw data             | Safe GNSS RAW data (pseudoranges and carrier phase) |  |
| Protocols            | Safe UBX (SUBX)                                     |  |
| Safety/Quality flags | Supported   |  |

## Interfaces

|                   |                     |  |
|-------------------|---------------------|--|
| Serial interfaces | 1 SPI<br>Error pins |  |
| Digital I/O       | Measurement pulse   |  |

## Package

|                                   |
|-----------------------------------|
| 40 pin QFN: 5.00 x 5.00 x 0.59 mm |
|-----------------------------------|

## Environmental data, quality & reliability

|                       |  |  |
|-----------------------|--|--|
| Operating temp.       | -40 °C to +105 °C  |  |
| Storage temp.         | -40 °C to +125 °C  |  |
| Environmental grade   | 2015/863/EU RoHS-3, Green,<br>IEC-61249-2-21 halogen-free  |  |
| Environmental testing | AEC-Q100   |  |
| MSL                   | 1  |  |
| Quality management    | Manufactured and fully tested in IATF 16949 certified production sites<br>AEC-Q004 zero ppm strategy |  |

## Electrical data

|                   |                            |  |
|-------------------|----------------------------|--|
| Supply voltage    | 3.0 V to 3.6 V             |  |
| Power consumption | 45 mA @ 3.0 V (continuous) |  |

## Compatible u-blox products and services

|                   |  |  |
|-------------------|--|--|
| Solution          | u-safe advanced driving end-to-end safe positioning solution |  |
| Location services | PointSafe - safe position engine and safe correction service |  |

## Support products

|        |  |  |
|--------|--|--|
| EVK-A9 | Easy to use evaluation board with various communication interfaces |  |
|--------|--|--|

## Product variants

|              |   |  |
|--------------|---|--|
| UBX-A9940-KA | u-blox A9 dual-band ASIL-B graded GNSS measurement engine |  |
|--------------|---|--|

## 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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