# Product summary **NEO-F10N module**

# u-blox F10 standard precision GNSS module

### L1/L5 dual-band GNSS receiver for meter-level accuracy in urban environments

- Effective multipath mitigation to boost urban accuracy
- Exceptional RF interference immunity with co-located cellular modems
- Proven excellent performance, even with small antennas
- Upgradeable firmware for future-proof designs
- Pin-compatible with previous NEO products for easy migration





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Professional



# Product description

The NEO-F10N is built on the u-blox F10 dual-band GNSS technology using L1/L5 GNSS bands, which provides solid meter-level position accuracy in urban areas.

With its proprietary dual-band multipath mitigation technology, u-blox F10 uses the best signals from the L1/L5 bands to achieve a significantly better position accuracy in urban environments than with the L1 band only. Applications like vehicle tracking and micromobility benefit significantly.

NEO-F10N offers a single antenna input. Two SAW filters in series with an LNA between them provide high robustness against RF interference from co-located cellular modems. The firmware is upgradeable and is highly configurable to support many different use cases.

NEO-F10N is pin-to-pin compatible with previous u-blox generations, which saves designers time and cost when upgrading their designs.

u-blox modules are manufactured in IATF 16949 certified sites and are fully tested on a system level.

| GradeAutomotiveProfessionalProfessionalStandardGNSSGPS / QZSSGalileoBeiDouNavICBandsL1/L5/E3a/B2aInterfacesUARTProgrammable (Flash)Additional SAWAdditional LNARTC crystalOscillatorTime pulse output1Pover supply2.7 V - 3.6 VV |                      | NEO-F10       |
|--|----------------------|---------------|
| Professional•StandardGNSSGPS / QZSS·Galileo·BeiDou·NavIC·BandsL1/L5/E5a/B2aInterfacesUART1Features·Programmable (Flash)·Additional LNA·RTC crystal·OscillatorTTime pulse output1Power supply·                                    |                      |               |
| StandardGNSSGPS / QZSSGalileoBeiDouNavICBandsL1/L5/E5a/B2aInterfacesUARTProgrammable (Flash)Additional SAWAdditional LNARTC crystalOscillatorTime pulse outputPower supply   |                      |               |
| GNSSGPS / QZSSGalileoGalileoBeiDouNavICBandsL1/L5/E5a/B2aInterfacesUART1FeaturesProgrammable (Flash)Additional SAWAdditional LNARTC crystalOscillatorTime pulse output1Power supply  |                      | •             |
| GPS / QZSS.Galileo.BeiDou.BeiDou.NavIC.BandsL1/L5/E5a/B2aInterfaces.UART1Features.Programmable (Flash).Additional SAW.Additional LNA.RTC crystal.OscillatorTTime pulse output1Power supply.                                      |                      |               |
| Galileo.BeiDou.NavIC.BandsL1/L5/E5a/B2aInterfaces.UART1Features.Programmable (Flash).Additional SAW.Additional LNA.RTC crystal.OscillatorTTime pulse output1Power supply.  |                      |               |
| BeiDouBeiDouNavICBandsL1/L5/E5a/B2aInterfacesUART1FeaturesProgrammable (Flash)Additional SAWAdditional LNARTC crystalOscillatorTime pulse output1Power supply  |                      | •             |
| NavIC•BandsL1/L5/E5a/B2aInterfaces•UART1Features•Programmable (Flash)•Additional SAW•Additional LNA•RTC crystal•OscillatorTTime pulse output1Power supply•   | Galileo              | •             |
| BandsL1/L5/E5a/B2aInterfacesL1/L5/E5a/B2aUART1Features1Programmable (Flash)·Additional SAW·Additional LNA·RTC crystal·OscillatorTTime pulse output1Power supply·   | BeiDou               | •             |
| InterfacesUART1Features-Programmable (Flash)•Additional SAW•Additional LNA•RTC crystal•OscillatorTTime pulse output1Power supply-  | NavIC                | •             |
| UART1FeaturesProgrammable (Flash)Additional SAWAdditional LNARTC crystalOscillatorTime pulse output1Power supply   | Bands                | L1/L5/E5a/B2a |
| FeaturesProgrammable (Flash)Additional SAWAdditional LNARTC crystalOscillatorTime pulse output1Power supply  | Interfaces           |               |
| Programmable (Flash)•Additional SAW•Additional LNA•RTC crystal•OscillatorTTime pulse output1Power supply•  | UART                 | 1             |
| Additional SAW•Additional LNA•RTC crystal•OscillatorTTime pulse output1Power supply•   | Features             |               |
| Additional LNA     •       RTC crystal     •       Oscillator     T       Time pulse output     1       Power supply     •   | Programmable (Flash) | •             |
| RTC crystal     •       Oscillator     T       Time pulse output     1       Power supply     1  | Additional SAW       | •             |
| Oscillator T<br>Time pulse output 1<br>Power supply  | Additional LNA       | •             |
| Time pulse output 1 Power supply   | RTC crystal          | •             |
| Power supply   | Oscillator           | т             |
|  | Time pulse output    | 1             |
| 2.7 V – 3.6 V ·  | Power supply         |               |
|  | 2.7 V – 3.6 V        | •             |

S

T = TCXO



# **NEO-F10N** module



#### Features

| Receiver type                             | u-blox F10 engine<br>GPS L1C/A, L5<br>GAL E1B/C, E5a<br>BDS B1C, B2a<br>QZSS L1C/A, L1S,<br>NavIC L5<br>SBAS L1C/A: EGNC | L1Sb, L5<br>)S, GAGAN, MSAS, and WAAS        |
|---|--|--|
| Nav. update rate <sup>1</sup>             | up to 10 Hz  |  |
| Horizontal position accuracy <sup>2</sup> | 1.0 m CEP (with SBAS)<br>1.5 m CEP (without SBAS)  |  |
| Acquisition                               | Cold start<br>Aided start<br>Hot start   | 28 s<br>2 s<br>2 s                           |
| Sensitivity                               | Tracking and nav.<br>Reacquisition<br>Cold start<br>Hot start  | -167 dBm<br>-159 dBm<br>-148 dBm<br>-159 dBm |
| Oscillator                                | тсхо   |  |
| RTC crystal                               | Built-in   |  |
|   |  |  |

#### **Tracking features**

| Odometer         | Measure traveled distance with support for<br>different user profiles |
|------------------|---|
| Protection level | Real-time position accuracy estimate with 95% confidence              |

### Security features

| Signal integrity | RF interference & jamming detection and<br>reporting<br>Spoofing detection and reporting           |
|------------------|--|
| Device integrity | Secure boot of firmware downloaded from host<br>or flash<br>Receiver configuration lock by command |
| Secure interface | Signed UBX messages (HMAC-SHA256)<br>JTAG debug interface disabled by default                      |

#### Compatible u-blox location services

| AssistNow | Real-time online A-GNSS service with assured |
|-----------|--|
|           | global availability                          |

1 = The highest navigation rate can limit the number of supported constellations

 $\ensuremath{\mathsf{2}}$  = Depends on atmospheric conditions, GNSS antenna, multipath conditions, satellite visibility, and geometry

#### Package

| 24-pin LCC (Leadless Chip Carrier) |  |
|------------------------------------|--|
| 12.2 x 16.0 x 2.4 mm, 1.0 g        |  |

# Environmental data, quality, and reliability

| Operating temp.                          | -40 °C to +85 °C   |
|--|--|
| Storage temp.                            | -40 °C to +85 °C   |
| Environmental<br>grade                   | 2015/863/EU RoHS-3   |
| EMC (electromag-<br>netic compatibility) | 2014/53/EU RED   |
| Quality<br>management                    | Manufactured and fully tested in IATF 16949 certified production sites |

## Electrical data

| Supply voltage    | 2.7 V to 3.6 V  |
|-------------------|-----------------|
| Power consumption | 63 mW (3 GNSS)  |
| Backup supply     | 1.65 V to 3.6 V |

#### Interfaces

| Serial interfaces     | 1 UART  |
|-----------------------|---|
| Digital I/O           | Configurable timepulse<br>1 EXTINT input for Wakeup |
| Time pulse output     | Configurable: 0.25 Hz to 10 MHz                     |
| Raw data output       | Code phase data                                     |
| Supported<br>antennas | Active and passive                                  |
| Protocols             | NMEA, UBX binary                                    |

#### Support products

| u-blox support products provide reference design, and allow efficient integration and evaluation of u-blox positioning technology. |   |
|--|---|
| ANN-MB5  | L1/L5 multi-band active GNSS antenna                      |
| EVK-F10N   | u-blox F10 GNSS evaluation kit for NEO-F10N               |
| u-center 2   | Highly intuitive software for GNSS performance evaluation |

#### **Product variants**

| NEO-F10N-00B | u-blox F10 GNSS LCC module, upgradeable   |
|--------------|---|
|              | firmware in flash memory, SAW filter, LNA |

## **Further information**

For contact information, see **www.u-blox.com/contact-u-blox**. For more product details and ordering information, see the product data sheet.

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