

MIA-F10Q module



u-blox F10 standard precision GNSS SiP module

L1/L5 dual-band GNSS receiver module for miniature devices

- 4.5 x 4.5 mm chip-sized module requiring no external components
- Effective multipath mitigation to boost urban accuracy
- Exceptional RF interference immunity with co-located cellular modems
- Proven excellent performance, even with small antennas
- Pin-compatible with previous MIA products for easy migration



4.5 × 4.5 × 1.0 mm



Product description

The MIA-F10Q 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.

MIA-F10Q offers a single antenna input. Two SAW filters in series with a LNA in between provide high robustness against RF interference from co-located cellular modems.

The small, highly integrated system-in-package requires only 20 mm² board space with no need for any external components.

MIA-F10Q 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.

MIA-F10Q

	MIA-F10Q
Grade	
Automotive	
Professional	•
Standard	
GNSS	
GPS + QZSS/SBAS	•
Galileo	•
BeiDou	•
NaVIC	•
Multi-band	L1/L5/E5a/B2a
Interfaces	
UART	1
DDC (I2C compliant)	1
Features	
Additional SAW	•
Additional LNA	•
Oscillator	TCXO
Timepulse	1
Power supply	
1.76 V – 3.6 V	•



Product performance

Receiver type	u-blox F10 engine GPS L1C/A, L5 Galileo E1B/C, E5a BeiDou B1C, B2a NavIC L5 QZSS L1C/A, L1S, L1Sb, L5 SBAS L1C/A: EGNOS, GAGAN, MSAS, WAAS	
Nav. update rate ¹	Up to 10 Hz	
Horizontal position accuracy ²	1.0 m CEP (with SBAS) 1.5 m CEP (without SBAS)	
Acquisition	Cold start	28 s
	Aided start	2 s
	Hot start	1 s
Sensitivity	Tracking & Nav.	-167 dBm
	Reacquisition	-160 dBm
	Cold start	-148 dBm
	Hot start	-159 dBm

Tracking features

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

Security features

Signal integrity	RF interference and jamming detection and reporting Spoofing detection and reporting
Device integrity	Receiver configuration lock by command
Secure interface	Signed UBX messages (SHA-256) JTAG debug interface disabled by default

Electrical data

Power consumption at 3 V	3 GNSS: 57 mW
Power consumption at 1.8 V	3 GNSS: 52 mW
Power supply	1.76 V to 3.6 V
Backup supply	1.65 V to 3.6 V

1 = The highest navigation rate can limit the number of supported constellations
2 = Depends on atmospheric conditions, GNSS antenna, multipath conditions, satellite visibility, and geometry

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.

Package

53 pin S-LGA (soldered land grid array): 4.5 × 4.5 × 1.0 mm, 0.055 g

Environmental data, quality & reliability

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

Interfaces

Serial interfaces	1 UART 1 DDC (I2C compliant)
Digital I/O	Configurable timepulse 1 EXTINT input for Wakeup
Raw Data output	Code phase data
Timepulse	Configurable: 0.25 Hz to 10 MHz
RTC crystal	For optional connection to external RTC clock
Supported antennas	Active and passive
Protocols	NMEA 4.11, UBX binary

Compatible u-blox location services

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

ANN-MB5	L1/L5 multi-band active GNSS antenna
u-center 2	Highly intuitive software for GNSS performance evaluation

Product variants

MIA-F10Q	u-blox F10 GNSS SiP module, firmware in ROM, 2 SAW filters, LNA, TCXO
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