

# ZOE-M8 series



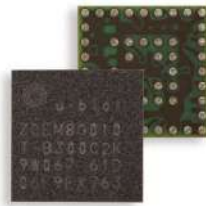
## Ultra small u-blox M8 GNSS SiPs

### Ultra small GNSS SiPs with superior performance

- Ultra small size SiP (System-in-Package) 4.5 x 4.5 x 1.0 mm
- Fully integrated and complete solution, reducing total design efforts
- Ideal for passive antennas, due to built-in SAW and LNA
- High accuracy thanks to concurrent reception of up to 3 GNSS
- -167 dBm sensitivity for reliable positioning in challenging conditions



4.5 x 4.5 x 1.0 mm



### Product description

ZOE-M8G and ZOE-M8Q are u-blox's latest, highly integrated System in Package (SiP) GNSS solutions based on the high performing u-blox M8 concurrent positioning engine. The new, record breaking ultra miniature form factor integrates a complete GNSS SiP, including SAW filter, LNA and TCXO.

ZOE-M8 SiPs are targeted for applications that require a small size without compromising performance. For RF optimization, the ZOE-M8 SiPs integrate a front-end SAW filter and an additional front-end LNA for increased jamming immunity and easier antenna integration. A passive antenna can be used to provide a highly integrated system solution with minimal eBOM. Incorporating ZOE-M8 into customer designs is simple and straightforward thanks to the fully integrated design, single voltage supply (ZOE-M8G 1.8 V, ZOE-M8Q 3 V), low power consumption, simple interface, and sophisticated interference suppression that ensure maximum performance even in GNSS-hostile environments.

With its dual-frequency RF front-end, the ZOE-M8 SiPs are able to utilize concurrent reception of up to 3 GNSS systems (GPS/Galileo together with either BeiDou or GLONASS). In addition, the ZOE-M8 SiPs provide an SPI interface for optional external flash, allowing future firmware upgrades and improved A-GNSS performance.

Thanks to u-blox advanced algorithms and a complete GNSS solution, ZOE-M8 SiPs meet even the most stringent requirements in versatile industrial and consumer applications, such as UAVs, vehicles and assets tracking. The ZOE-M8 series also supports message integrity protection, anti-jamming, and anti-spoofing, providing reliable positioning in difficult environmental conditions as well as in security attack scenarios.

The ZOE-M8 S-LGA (Soldered Land Grid Array) packaging technology is easily integrated in manufacturing, which enables easier and more reliable soldering processes compared to a standard LGA package.

The ZOE-M8 SiPs are fully tested and qualified according to the JESD47 / ISO 16750 standard.

	ZOE-M8G	ZOE-M8Q
<b>Grade</b>		
Automotive		
Professional	•	•
Standard		
<b>GNSS</b>		
GPS / QZSS	•	•
GLONASS	•	•
Galileo	•	•
BeiDou	•	•
Number of concurrent GNSS	3	3
<b>Interfaces</b>		
UART	1	1
USB		
SPI	1	1
DDC (I <sup>2</sup> C compliant)	1	1
<b>Features</b>		
Programmable (Flash)	E	E
Data logging	E	E
Additional SAW	•	•
Additional LNA	•	•
RTC crystal	o	o
Oscillator	T	T
Timepulse	1	1
<b>Power supply</b>		
1.71 V – 1.89 V	•	
2.7 V – 3.6 V		•

E = External Flash Required  
C = Crystal / T = TCXO

o = Optional, or requires external components



## Features

Receiver type	72-channel u-blox M8 engine GPS/QZSS L1 C/A, GLONASS L10F BeiDou B1I, Galileo E1B/C SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN
Max navigation update rate <sup>1</sup>	Single GNSS: up to 18 Hz 2 Concurrent GNSS: up to 10 Hz
Accuracy <sup>2</sup>	2.0 m CEP
Acquisition <sup>2</sup>	Cold starts: 26 s Aided starts: 2 s Reacquisition: 1 s
Sensitivity <sup>2</sup>	Tracking & Nav: -167 dBm Cold starts: -148 dBm Hot starts: -157 dBm
Assistance GNSS	AssistNow Online AssistNow Offline (up to 35 days) AssistNow Autonomous (up to 6 days) OMA SUPL & 3GPP compliant
Oscillator	TCXO
RTC crystal	Optional, can be connected to external RTC Clock
DC/DC converter	Optional only in ZOE-M8Q for low power, requires external components
Anti jamming	Active CW detection and removal. Extra onboard SAW band pass filter
Memory	ROM
SQL flash (optional) for	FW update AssistNow Offline, AssistNow Autonomous Data logging
Supported antennas	Active and passive
Raw Data	Code phase output
Odometer	Integrated in navigation filter
Geofencing	Up to 4 circular areas GPIO for waking up external CPU
Spoofing detection	Built-in
Signal integrity	Signature feature with SHA 256
Data-logger <sup>3</sup>	For position, velocity, time, and odometer data

## Electrical data

Supply voltage	1.71 V to 1.89 V (ZOE-M8G) 2.7 V to 3.6 V (ZOE-M8Q)
Power consumption <sup>2</sup>	ZOE-M8G: 40 mA @ 1.8 V (Continuous) ZOE-M8Q: 25 mA @ 3.0 V (Continuous)
Backup Supply	1.4 V to 3.6 V

- <sup>1</sup> ROM  
<sup>1</sup> Default mode: GPS/SBAS/QZSS+GLONASS  
<sup>1</sup> External flash required  
<sup>1</sup> with DC/DC

## Package

51 pin S-LGA (Soldered Land Grid Array): 4.5 x 4.5 x 1.0 mm, 0.04 g

## Environmental data, quality & reliability

Operating temp.	-40 °C to +85 °C
RoHS compliant (lead-free)	
Qualification according to standard	JESD47 / ISO 16750
Uses u-blox M8 chips qualified according to	AEC-Q100
Moisture sensitivity level	3

## Interfaces

Serial interfaces	1 UART 1 SPI (optional) 1 DDC (I <sup>2</sup> C compliant) 1 SQL interface (for optional flash)
Digital I/O	Configurable timepulse 1 EXTINT input
Timepulse	Configurable 0.25 Hz to 10 MHz
Protocols	NMEA, UBX binary, RTCM

## Support products

u-blox M8 Evaluation Kits:

Easy-to-use kits to get familiar with u-blox M8 positioning technology, evaluate functionality, and visualize GNSS performance.

EVK-M8GZOE	u-blox M8 Concurrent GNSS Evaluation Kit, supports ZOE-M8G and ZOE-M8Q
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## Product variants

ZOE-M8G	u-blox M8 concurrent GNSS SiP, 1.8 V, S-LGA, TCXO, ROM, SAW, LNA
ZOE-M8Q	u-blox M8 concurrent GNSS SiP, 3.0 V, S-LGA, TCXO, ROM, SAW, LNA

## Further information

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

For more product details and ordering information, see the [product data sheet](#).

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