



Product Summary

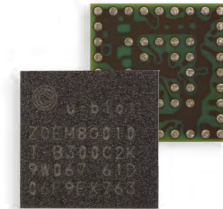
ZOE-M8 series

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.

The ZOE-M8 SiPs are targeted for applications that require a small size without compromising the 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 SiPs can be easily integrated in manufacturing thanks to the advanced S-LGA (Soldered Land Grid Array) packaging technology, which enables easier and more reliable soldering processes compared to a normal LGA (Land Grid Array) package.

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

Product selector

Model	Category	GNSS				Supply	Interfaces				Features				Grade									
	Standard Precision GNSS High Precision GNSS Dead Reckoning Timing	GPS/QZSS	GLONASS	Galileo	BeiDou	Number of concurrent GNSS	1.71 V - 1.89 V	2.7 V - 3.6 V	UART	USB	SPI	DDC (iFC compliant)	Programmable (flash)	Data logging	Additional SAW	Additional LNA	RTC crystal	Oscillator	Built-in antenna	Built-in antenna supply and supervisor	Timepulse	Standard	Professional	Automotive
ZOE-M8G	•	•	•	•	•	3	•		•		•	•	E	E	•	•	o	T			1	•		
ZOE-M8Q	•	•	•	•	•	3	•		•		•	•	E	E	•	•	o	T			1	•		

E = External flash required / o = Optional, or requires external components / C = Crystal / T = TCXO



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 ¹	Single GNSS: up to 18 Hz 2 Concurrent GNSS: up to 10 Hz
Accuracy ²	2.0 m CEP
Acquisition ²	Cold starts: 26 s Aided starts: 2 s Reacquisition: 1 s
Sensitivity ²	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
SQI 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 ³	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 ²	ZOE-M8G: 40 mA @ 1.8 V (Continuous) ZOE-M8Q ⁴ : 25 mA @ 3.0 V (Continuous)
Backup Supply	1.4 V to 3.6 V

1 ROM

2 Default mode: GPS/SBAS/QZSS+GLONASS

3 External flash required

4 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 ² C compliant) 1 SQI 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
------------	--

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.

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

Legal Notice:

u-blox reserves all rights to this document and the information contained herein. Products, names, logos and designs described herein may in whole or in part be subject to intellectual property rights. Reproduction, use, modification or disclosure to third parties of this document or any part thereof without the express permission of u-blox is strictly prohibited.

The information contained herein is provided "as is". No warranty of any kind, either express or implied, is made in relation to the accuracy, reliability, fitness for a particular purpose or content of this document. This document may be revised by u-blox at any time. For most recent documents, please visit www.u-blox.com.
Copyright © 2018, u-blox AG