UBX-M8230-CT

Super low power GNSS chip for portable applications

Highlights

- Super-E mode: ideal balance between low power and good performance
- Optimized for portable & wrist-worn applications
- System power optimization: LNA power saving and data batching
- Concurrent reception of GPS, GLONASS, BeiDou in Super-E mode
- Minimal board space: less than 30 mm²

UBX-M8230-CT
2.99 x 3.21 x 0.36 mm

Product description

The u-blox UBX-M8230-CT is an ultra low power GNSS chip optimized for wearable and portable applications. It features the new Super-E mode (Super-Efficient), providing a unique balance between power and performance. Compared with u-blox traditional 1 Hz full power mode, the Super-E mode provides 3x power savings while maintaining at least 80% of position & speed accuracy in any environment. Average power consumption over a typical 30 min track is lower than 20 mW while instantaneous tracking power is less than 10 mW.

Ultra low tracking power is achieved thanks to the Super-E mode, which can operate up to 90% of the time, combined with internal clocking techniques to allow an absolute minimal current consumption during power optimized periods.

The UBX-M8230-CT optimizes the overall system power consumption by excluding the need for any heavy signal processing on the application processor, and with external components, such as external LNA, that can be automatically duty cycled. Navigation data can be stored internally while the application processor is in deep sleep (data batching).

Used in the combination with multi-GNSS Assistance data, the UBX-M8230-CT not only features faster Time-to-First-Fix,

but also ensures minimal power consumption, since A-GNSS enables the chip to maximize its power optimized period.

The UBX-M8230-CT only needs a few external components (e.g. SAW/LNA) to form a full GNSS solution with a footprint as small as 30 mm². It offers easy access to navigation data via multiple interfaces, such as SPI, I2C and UART.

Optimized for portable and wrist-worn applications, it provides an excellent level of positioning performance for such devices. The UBX-M8230-CT chip is an ideal choice for most wearable applications, such as watches, sport trackers and other applications where low power consumption and small size are key.

The UBX-M8230-CT is built on the u-blox M8 concurrent engine and supports two constellations simultaneously in Super-E mode, thus increasing the number of visible satellites compared to single-GNSS solutions. It 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 UBX-M8230-CT chip is fully tested and qualified according to the JESD47 standard.

Product selector

Model	Package	Category				GNSS					Supply	Interfaces				Features						Grade		
	Package	Standard Precision GNSS	High Precision GNSS	Dead Reckoning	Timing	GPS / QZSS	GLONASS	Galileo	BeiDou	Number of Concurrent GNSS	1.4 V – 3.6 V	UART	USB	SPI	DDC (I²C compliant)	Programmable (Flash)	Data batching	RTC crystal	Oscillator	Antenna supply and supervisor	Timepulse	Standard	Professional	Automotive
UBX-M8230-CT	WL-CSP47	•				•	•	c	•	3	•	•		•	•	S	•	S	T			■		

c = supported in continuous mode, not supported in Super-E mode

T = TCXO supported

S = supported, may require external components

Objective Specification

u-blox

Features

Receiver type	72-channel u-blox M8 engine GPS/QZSS L1 C/A, GLONASS L1OF BeiDou B1I, Galileo E1B/C [1] SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN
Time to first fix [2]	
Cold start:	26 s
Aided start:	2 s
Hot start:	1 s
Sensitivity [2]	
Tracking & Nav.	−167 dBm
Reacquisition	−160 dBm
Cold start	−148 dBm
Hot start	−157 dBm
Max nav. update rate	
Single GNSS	TBD
Concurrent GNSS	TBD
Horizontal Pos. Accuracy [2]	2.0 m CEP
Multi-GNSS Assistance	AssistNow Online AssistNow Offline (up to 35 days) AssistNow Autonomous (up to 6 days) OMA SUPL & 3GPP compliant
Oscillator	Supports TCXO
Real Time Clock (RTC)	Can be derived from external RTC Clock
LNA	Built-in
DC/DC converter	Built-in, external component required
Super-E mode	Super Efficient mode for lowest power
Anti Jamming	Active CW detection and removal
SQI Flash (optional) for	FW update and long term logging
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 batching	For position, velocity, time, and odometer data

1 Galileo supported in continuous mode, not supported in Super-E mode
2 Continuous mode: GPS/SBAS/QZSS+GLONASS

Interfaces

Serial interfaces	1 UART 1 DDC (I²C compliant) 1 SPI
Digital I/O	1 EXTINT interrupt inputs
Memory	SQI interface for optional Flash

Packages

UBX-M8230-CT	47 Pin WL-CSP 2.99 x 3.21 x 0.36 mm

Environmental data, quality & reliability

Operating temp.	−20°C to +70°C
Humidity	JEDEC MSL 1

RoHS compliant (lead-free) and green (no halogens)

Qualification according to JESD47

Electrical data

Supply voltage	1.4 V to 3.6 V
Digital I/O voltage level	1.65 V to 3.6 V
Average Power consumption [3] (Super-E mode, concurrent GNSS)	10 mA @ 1.4 V (open environment) 16 mA @ 1.4 V (mixed environment, e.g. forest) 16 mA @ 1.4 V (obstructed environment, e.g. urban)
Backup Supply	1.4 V to 3.6 V

3 Typical 30 min outdoor (e.g. workout activity) measurement, cold start, use AssistNow Offline data in scenarios, with an industrial antenna design

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-M8230	u-blox M8 Low Power GNSS Evaluation Kit, supports UBX-M8230-CT chip

Product variants

UBX-M8230-CT	u-blox M8 low power concurrent GNSS chip, 47 Pin WL-CSP

Further information

For contact information, see www.u-blox.com/contact-us.

For more product details and ordering information, see the product data sheet.