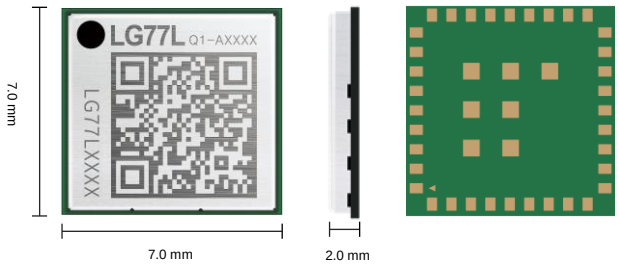
Quectel LG77L

Extremely Compact Multi-Constellation GNSS Module with Ultra-Low Power Consumption



Quectel LG77L GNSS module supports concurrent reception of GPS, GLONASS (or BeiDou), Galileo, and QZSS. It can acquire and track any mix of GPS, GLONASS (or BeiDou), Galileo and SBAS signals.

Compared with single GPS systems, enabling multiple GNSS systems increases the number of visible satellites, reduces the time to a first fix and improves the positioning accuracy, especially when driving through dense urban canyons.

By combining EASY™ (Embedded Assist System), an advanced AGNSS feature, with GLP (GNSS Low Power), a low-power mode, the LG77L module achieves high performance, low power consumption and fully meets the industrial standards. The EASY™ technology allows the module to calculate and predict orbits automatically by using the ephemeris data (of up to 3 days duration) which are stored in the internal RAM. As a result, the LG77L can acquire a fix position quickly, even at lower signal levels with low power consumption. With the GLP technology, on the other hand, the LG77L can adaptively adjust the on/off time based on the environmental and motion conditions to achieve a balance between the positioning accuracy and power consumption.

Its enhanced performance makes the LG77L ideal for the industrial PDA, consumer and industry applications. Extremely low-power consumption makes it a great solution for power-sensitive applications, such as portables.

Key Features

- Extremely compact size: 7.0 mm × 7.0 mm × 2.0 mm
- Multi-GNSS engine for GPS, GLONASS (or BeiDou), Galileo (in the LG77L (C) version) and QZSS
- Supports anti-jamming technology and a multi-tone active interference canceller
- Multiple low-power modes ensure ultra-low power consumption
- Supports UART and I2C Interfaces
- Maximum update rate: up to 10 Hz
- Supports SDK commands developed by Quectel
- Supports AGNSS

EASY™ Technology

Ultra Low Power Consumption

Extremely Compact Size

Super Tracking Sensitivity: -158 dBm

Extended Temperature Range: -40 to +85 °C

Anti-Jamming

RoHS Compliant

Multi-GNSS System

Version: 1.3 | Status: Released

Quectel LG77L

GNSS Module	LG77L (A)	LG77L (B)	LG77L (C)
Region	Global	Global	Global
Dimensions	7.0 mm × 7.0 mm × 2.0 mm	7.0 mm × 7.0 mm × 2.0 mm	7.0 mm × 7.0 mm × 2.0 mm
Weight	Approx. 0.2 g	Approx. 0.2 g	Approx. 0.2 g
Temperature Range			
Operating Temperature	-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +85 °C
Storage Temperature	-40 °C to +90 °C	-40 °C to +90 °C	-40 °C to +90 °C
GNSS Features			
Supported Bands	GPS L1 C/A: 1575.42 MHz GLONASS L1: 1602.5625 MHz BeiDou B1I: 1561.098 MHz	GPS L1 C/A: 1575.42 MHz GLONASS L1: 1602.5625 MHz BeiDou B1I: 1561.098 MHz	GPS L1 C/A: 1575.42 MHz GLONASS L1: 1602.5625 MHz BeiDou B1I: 1561.098 MHz Galileo E1: 1575.42MHz
Default GNSS Constellation ①	GPS + GLONASS, or GPS + BeiDou	GPS + GLONASS, or GPS + BeiDou	GPS + GLONASS, or GPS + BeiDou
Number of Concurrent GNSS	2	2	3
SBAS	WAAS, EGNOS, MSAS, and GAGAN	WAAS, EGNOS, MSAS, and GAGAN	WAAS, EGNOS, MSAS, and GAGAN
Horizontal Position Accuracy ②	Autonomous: < 2.5 m CEP	Autonomous: < 2.5 m CEP	Autonomous: < 2.5 m CEP
Velocity Accuracy ②	Without Aid: < 0.1 m/s	Without Aid: < 0.1 m/s	Without Aid: < 0.1 m/s
Acceleration Accuracy ②	Without Aid: < 0.1 m/s^2	Without Aid: < 0.1 m/s^2	Without Aid: < 0.1 m/s^2
Timing Accuracy ②	1PPS < 50 ns	1PPS < 50 ns	1PPS < 50 ns
TTFF @ -130 dBm with EASY™	Cold Start: < 14 s Warm Start: < 4 s Hot Start: < 2 s	Cold Start: < 14 s Warm Start: < 4 s Hot Start: < 2 s	Cold Start: < 17 s Warm Start: < 5 s Hot Start: < 2 s
TTFF @ -130 dBm without EASY™ ②	Cold Start: < 26 s Warm Start: < 24 s Hot Start: < 2 s	Cold Start: < 26 s Warm Start: < 24 s Hot Start: < 2 s	Cold Start: < 25 s Warm Start: < 23 s Hot Start: < 2 s
Sensitivity	Acquisition: -147 dBm Tracking: -158 dBm Reacquisition: -156 dBm	Acquisition: -147 dBm Tracking: -158 dBm Reacquisition: -156 dBm	Acquisition: -146 dBm Tracking: -163 dBm Reacquisition: -156 dBm
Dynamic Performance ②	Maximum Altitude: Max. 10000 m Maximum Velocity: Max. 515 m/s Maximum Acceleration: 4g	Maximum Altitude: Max. 10000 m Maximum Velocity: Max. 515 m/s Maximum Acceleration: 4g	Maximum Altitude: Max. 10000 m Maximum Velocity: Max. 515 m/s Maximum Acceleration: 4g
Certifications			
Regulatory	CE	CE	CE
Others	RoHS	RoHS	RoHS
Interfaces			
I2C Interface ③	Up to 400 kbps	Up to 400 kbps	Up to 400 kbps
UART Interface	Adjustable: 9600 bps to 921600 bps Default: 9600 bps Update Rate: 1 Hz (Default), up to 10 Hz	Adjustable: 9600 bps to 921600 bps Default: 9600 bps Update Rate: 1 Hz (Default), up to 10 Hz	Adjustable: 9600 bps to 921600 bps Default: 9600 bps Update Rate: 1 Hz (Default), up to 10 Hz
Protocols	NMEA 0183, PMTK, PQ	NMEA 0183, PMTK, PQ	NMEA 0183, PMTK, PQ
External Antenna Interface			
Antenna Type	Active or Passive	Active or Passive	Active or Passive
Antenna Power Supply	External	External	External
Active Antenna Protection	Short-Circuit Protection and Open-Circuit Detection	Short-Circuit Protection and Open-Circuit Detection	Short-Circuit Protection and Open-Circuit Detection

Notes:
1. ①: Depending on the firmware version.
2. ②: Room temperature, all satellites at -130 dBm.
3. ③: Only certain firmware versions support the I2C interface.

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GNSS Module	LG77L (A)	LG77L (B)	LG77L (C)
Electrical Characteristics			
Supply Voltage Range	2.8–4.3 V, Typ. 3.3 V	2.8–4.3 V, Typ. 3.3 V	2.8–4.3 V, Typ. 3.3 V
I/O Voltage ①	1.8 V or 2.8 V	1.8 V or 2.8 V	1.8 V or 2.8 V
Integrated RTC	-	Included	Included
Current Consumption (GPS + GLONASS @ 3.3 V) ②	**Normal Operation:** 25 mA @ Acquisition) 24 mA @ Tracking **Power Saving Modes:** 6 μA @ Backup Mode 1 mA @ Standby Mode	**Normal Operation:** 26 mA @ Acquisition 25 mA @ Tracking **Power Saving Modes:** 6 μA @ Backup Mode 1 mA @ Standby Mode	**Normal Operation:** 24 mA @ Acquisition 23 mA @ Tracking **Power Saving Modes:** 6 μA @ Backup Mode 0.9 mA @ Standby Mode

Notes:
1. ①: I/O Voltage = VCC_IO. The VCC_IO pin requires an external power supply.
2. ②: Room temperature, all satellites at -130 dBm.

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