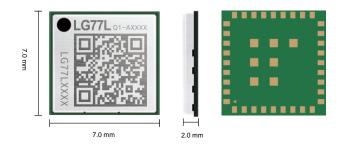


Quectel LG77L

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 lowpower 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











RoHS Compliant

Extremely

Compact Size



Anti-Jamming

Multi-GNSS System

Version: 1.3 | Status: Released

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Quectel LG77L

GNSS ModuleLG77L (A)LG77L (B)LG77L (C)RegionGlobalGlobalGlobalDimensions7.0 mm × 7.0 mm × 2.0 mm7.0 mm × 7.0 mm × 2.0 mmWeightApprox. 0.2 gApprox. 0.2 gApprox. 0.2 gApprox. 0.2 gTemperature Bange-40 °C to +85 °CStorage-40 °C to +90 °C-40 °C to +90 °C-50 °C ELONASS LI SID 2550 MHzGDNASS LI SID 2552 MHzBelDou BIT SID 109 MHz<				
Default SD7.0 mm × 7.0 mm × 2.0 mm7.0 mm × 7.0 mm × 2.0 mm7.0 mm × 7.0 mm × 2.0 mmWeightApprox. 0.2 gApprox. 0.2 gApprox. 0.2 gTemperature Range	GNSS Module	LG77L (A)	LG77L (B)	LG77L (C)
WeightApprox. 0.2 gApprox. 0.2 gApprox. 0.2 gTemperatureAprox. 0.2 g-40 °C to +85 °C-40 °C to +85 °COperating-40 °C to +90 °C-40 °C to +85 °C-40 °C to +85 °CStorage-40 °C to +90 °C-40 °C to +90 °C-40 °C to +90 °CGRSS Features40 °C to +90 °CSupported BandsGPS L1 C/A: 1575.42 MHz BelDou B1: 1561.098 MHz BelDou B1: 1561.098 MHz BelDou B1: 1561.098 MHz Galleo E1: 1575.42 MHz	Region	Global	Global	Global
Temperature Range -40 °C to +85 °C -40 °C to +85 °C -40 °C to +85 °C Gerating 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 GVSS Features GPS L1 C/A: 1575.42 MHz GLONASS L1: 1602.5625 MHz BeiDou B1: 1561.088 MHZ	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
Operating Temperature-40 °C to +85 °C-40 °C to +85 °C-40 °C to +85 °CStorage Temperature-40 °C to +90 °C-40 °C to +90 °C-40 °C to +90 °CGRSS Features-40 °C to +90 °C-40 °C to +90 °C-40 °C to +90 °CSupported BandsGRSL 1 (A: 1575.42 MHz GIONASS LI: 1602.5625 MHz BelDou BI: 1561.098 MHzGPS LI (A: 1575.42 MHz GIONASS LI: 1602.5625 MHz BelDou BI: 1561.098 MHz Galle CEI: 1575.42 MHz Galle CEI: 1574.20 MHz Muthout AId: <0.1 m/s2	Weight	Approx. 0.2 g	Approx. 0.2 g	Approx. 0.2 g
Temperature Suproge Tomperature40° C to +80° C40° C to +80° C40° C to +80° CGNSS Features-40° C to +90° C-40° C to +90° C-40° C to +90° CGNSS FeaturesGPS L1 C/A: 1575 42 MHz GLONASS L1: 1602 5625 MHz BelDou B1: 1561.098 MHz BelDou B1: 1561.098 MHz BelDou B1: 1561.098 MHz GLONASS, or GPS + BelDouGPS L1 C/A: 1575.42 MHz GLONASS, or GPS + BelDouDefault GNSS Constellation 0:GPS + GLONASS, or GPS + BelDouGPS + GLONASS, or GPS + BelDouGPS + GLONASS, or GPS + BelDouDefault GNSS Constellation 0:GPS + GLONASS, or GPS + BelDouGPS + GLONASS, or GPS + BelDouGPS + GLONASS, or GPS + BelDouDefault GNSS Constellation 0:GPS + GLONASS, or GPS + BelDouGPS + GLONASS, or GPS + BelDouGPS + GLONASS, or GPS + BelDouDefault GNSS Constellation 0:GPS + GLONASS, or GPS + BelDouAutonomous: < 2.5 m CEP	Temperature Range			
Temps ratureAU * LO + BU * LAU * LO + BU * LAU * LO + BU * LGNSS FeaturesGPS L1 C/A: 1575 A2 MH2 GLONASS L1: 1602.5625 MH2 BelDou B1: 1561.098 MH2GPS L1 C/A: 1575 A2 MH2 GLONASS L1: 1602.5625 MH2 BelDou B1: 1561.098 MH2GPS L1 C/A: 1575 A2 MH2 GLONASS L1: 1602.5625 MH2 BelDou B1: 1561.098 MH2GPS + GLONASS, or GPS + BelDou B1: 1561.098 MH2 BelDou B1: 1561.098 MH2GPS + GLONASS, or GPS + BelDou GPS + GLONASS, or GPS + BelDouGPS + GLONASS, or GPS + BelDou B1: 1561.098 MH2 BelDou B1: 1561.098 MH2GPS + GLONASS, or GPS + BelDou GPS + GLONASS, or GPS + BelDouGPS + GLONASS, or GPS + BelDou Concurrent GNSNumber of Concurrent GNSS223SBASWAAS, EGNOS, MSAS, and GAGANWAAS, EGNOS, MSAS, and GAGANWAAS, EGNOS, MSAS, and GAGANAccuracy 0Autonomous: < 2.5 m CEP		-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +85 °C
Supported BandsGPS L1 C/A: 1575.42 MHz GLONASS L1: 1602.5625 MHz BeiDou B1: 1561.098 MHzGPS L1 C/A: 1575.42 MHz GLONASS L1: 1602.5625 MHz BeiDou B1: 1561.098 MHzGPS L1 C/A: 1575.42 MHz GLONASS L1: 1602.5625 MHz BeiDou B1: 1561.098 MHzGPS L1 C/A: 1575.42 MHz GLONASS L1: 1602.5625 MHz BeiDou B1: 1561.098 MHzGPS L1 C/A: 1575.42 MHz GLONASS L1: 1602.5625 MHz BeiDou B1: 1561.098 MHzGPS L1 C/A: 1575.42 MHz GLONASS, or GPS + BeiDouDefault GNSS Constellation ©GPS + GLONASS, or GPS + BeiDouGPS + GLONASS, or GPS + BeiDouGPS + GLONASS, or GPS + BeiDouNumber of Concurrent GNSSGPS + GLONASS, and GAGANWAAS, EGNOS, MSAS, and GAGANWAAS, EGNOS, MSAS, and GAGANMatcomous: < 2.5 m CEP		-40 °C to +90 °C	-40 °C to +90 °C	-40 °C to +90 °C
Supported BanksGPS LT QA: 15/3.42 MH2 GLONASS L1: 1602.5625 MH2 BelDou B1: 1561.098 MH2GPS LT QA: 15/3.42 MH2 Galloo S1: 1602.5625 MH2 BelDou B1: 1561.098 MH2GDONASS L1: 1602.5625 MH2 Galloo S1: 1551.098 MH2Default GNSS constellation ©GPS + GLONASS, or GPS + BelDouGPS + GLONASS, or GPS + BelDouGPS + GLONASS, or GPS + BelDouNumber of concurrent GNSS223SBASWAAS, EGNOS, MSAS, and GAGANWAAS, EGNOS, MSAS, and GAGANWAAS, EGNOS, MSAS, and GAGANHorizontal Position Accoracy ©Autonomous: < 2.5 m CEP	GNSS Features			
Constellation ①CPS + GLONASS, or GPS + BeildouCPS + GLONASS, or GPS + BeildouCPS + GLONASS, or GPS + BeildouNumber of Concurrent KMSS223SBASWAAS, EGNOS, MSAS, and GAGANWAAS, EGNOS, MSAS, and GAGANWAAS, EGNOS, MSAS, and GAGANHorizontal Position Accuracy ②Autonomous: < 2.5 m CEP	Supported Bands	GLONASS L1: 1602.5625 MHz	GLONASS L1: 1602.5625 MHz	GLONASS L1: 1602.5625 MHz BeiDou B1I: 1561.098 MHz
Concurrent GNSS223SBASWAAS, EGNOS, MSAS, and GAGANWAAS, EGNOS, MSAS, and GAGANWAAS, EGNOS, MSAS, and GAGANMorizontal PositionAutonomous: < 2.5 m CEP	_	GPS + GLONASS, or GPS + BeiDou	GPS + GLONASS, or GPS + BeiDou	GPS + GLONASS, or GPS + BeiDou
Horizontal Position Accuracy @Autonomous: < 2.5 m CEPAutonomous: < 2.5 m CEPAutonomous: < 2.5 m CEPVelocity Accuracy @Without Aid: < 0.1 m/s		2	2	3
Accuracy (*)Autonomous: 2.5 m CEPAutonomous: 2.5 m CEPAutonomous: 2.5 m CEPVelocity Accuracy (*)Without Aid: < 0.1 m/s	SBAS	WAAS, EGNOS, MSAS, and GAGAN	WAAS, EGNOS, MSAS, and GAGAN	WAAS, EGNOS, MSAS, and GAGAN
Acceleration AccuracyWithout Aid: < 0.1 m/s²Without Aid: < 0.1 m/s²Without Aid: < 0.1 m/s²Timing Accuracy1PPS < 50 ns		Autonomous: < 2.5 m CEP	Autonomous: < 2.5 m CEP	Autonomous: < 2.5 m CEP
AccuracyWithout Aid: < 0.1 m/s4Without Aid: < 0.1 m/s4Without Aid: < 0.1 m/s4Timing Accuracy1PPS < 50 ns	Velocity Accuracy $^{(2)}$	Without Aid: < 0.1 m/s	Without Aid: < 0.1 m/s	Without Aid: < 0.1 m/s
TTF @ -130 dBm with EASY ^M Cold Start: < 14 s Warm Start: < 4 s Warm Start: < 5 s Hot Start: < 2 s Hot Start Mainum Altitude: Max. 1000 m Maximum Alt		Without Aid: < 0.1 m/s ²	Without Aid: < 0.1 m/s ²	Without Aid: < 0.1 m/s ²
TTFF @ -130 dBm with EASY™Warm Start: < 4 s Hot Start: < 2 sWarm Start: < 4 s Hot Start: < 2 sWarm Start: < 4 s Hot Start: < 2 sTTFF @ -130 dBm without EASY™Cold Start: < 2 s Marm Start: < 2 4 s Warm Start: < 2 4 s Hot Start: < 2 s	Timing Accuracy $^{(2)}$	1PPS < 50 ns	1PPS < 50 ns	1PPS < 50 ns
TTFF @ -130 dBm without EASY M @Warm Start: < 24 s Hot Start: < 2 sWarm Start: < 23 s Hot Start: < 2 sWarm Start: < 23 s Hot Start: < 2 sSensitivityAcquisition: -147 dBm Tracking: -158 dBm Reacquisition: -156 dBm <td>-</td> <td>Warm Start: < 4 s</td> <td>Warm Start: < 4 s</td> <td>Warm Start: < 5 s</td>	-	Warm Start: < 4 s	Warm Start: < 4 s	Warm Start: < 5 s
SensitivityTracking: -158 dBm Reacquisition: -156 dBmTracking: -158 dBm Reacquisition: -156 dBmTracking: -163 dBm Reacquisition: -156 dBmDynamic 	-	Warm Start: < 24 s	Warm Start: < 24 s	Warm Start: < 23 s
Dynamic PerformanceMaximum Velocity: Max. 515 m/s Maximum Acceleration: 4gMaximum Velocity: Max. 515 m/s Maximum Acceleration: 4gCertificationsEndEndMaximum Acceleration: 4gMaximum Acceleration: 4gRegulatoryCECECECEOthersRoHSRoHSRoHSRoHSRoHSInterfacesUp to 400 kbpsUp to 400 kbpsUp to 400 kbpsDefault: 9600 bps to 921600 bps Update Rate: 1 Hz (Default), up to 10 HzAdjustable: 9600 bps to 921600 bps Update Rate: 1 Hz (Default), up to 10 HzAdjustable: 9600 bps to 921600 bps Update Rate: 1 Hz (Default), up to 10 HzProtocolsNMEA 0183, PMTK, PQNMEA 0183, PMTK, PQNMEA 0183, PMTK, PQNMEA 0183, PMTK, PQAntenna TypeActive or PassiveActive or PassiveActive or PassiveActive or PassiveAntennaShort-Circuit Protection and Open-Short-Circuit Protection and Open-Short-Circuit Protection and Open-	Sensitivity	Tracking: -158 dBm	Tracking: -158 dBm	Tracking: -163 dBm
RegulatoryCECECEOthersRoHSRoHSRoHSInterfacesInterface ③Up to 400 kbpsUp to 400 kbpsUp to 400 kbpsI2C Interface ③Up to 400 kbpsUp to 400 kbpsUp to 400 kbpsUp to 400 kbpsUART InterfaceAdjustable: 9600 bps to 921600 bps Update Rate: 1 Hz (Default), up to 10 HzAdjustable: 9600 bps to 921600 bps Update Rate: 1 Hz (Default), up to 10 HzAdjustable: 9600 bps Update Rate: 1 Hz (Default), up to 10 HzProtocolsNMEA 0183, PMTK, PQNMEA 0183, PMTK, PQNMEA 0183, PMTK, PQAntenna TypeActive or PassiveActive or PassiveActive or PassiveAntenna Power SupplyExternalExternalExternalActive AntennaShort-Circuit Protection and Open-Short-Circuit Protection and Open-		Maximum Velocity: Max. 515 m/s	Maximum Velocity: Max. 515 m/s	Maximum Velocity: Max. 515 m/s
OthersRoHSRoHSRoHSInterfacesI2C Interface ③Up to 400 kbpsUp to 400 kbpsUp to 400 kbpsUART Interface ④Adjustable: 9600 bps to 921600 bps Default: 9600 bps Update Rate: 1 Hz (Default), up to 10 HzAdjustable: 9600 bps to 921600 bps Default: 9600 bps Update Rate: 1 Hz (Default), up to 10 HzAdjustable: 9600 bps Default: 9600 bps Update Rate: 1 Hz (Default), up to 10 HzProtocolsNMEA 0183, PMTK, PQNMEA 0183, PMTK, PQNMEA 0183, PMTK, PQExternal Antenna InterfaceActive or PassiveActive or PassiveAntenna TypeActive or PassiveActive or PassiveExternalAntenna Power SupplyExternalShort-Circuit Protection and Open-Short-Circuit Protection and Open-	Certifications			
InterfacesI2C Interface ③Up to 400 kbpsUp to 400 kbpsUp to 400 kbpsUART Interface ③Adjustable: 9600 bps to 921600 bps Default: 9600 bps Update Rate: 1 Hz (Default), up to 10 HzAdjustable: 9600 bps to 921600 bps Default: 9600 bps Update Rate: 1 Hz (Default), up to 10 HzAdjustable: 9600 bps to 921600 bps Default: 9600 bps Update Rate: 1 Hz (Default), up to 10 HzProtocolsNMEA 0183, PMTK, PQNMEA 0183, PMTK, PQNMEA 0183, PMTK, PQExternal Antenna InterfaceActive or PassiveActive or PassiveActive or PassiveAntenna TypeActive or PassiveActive or PassiveExternalAntenna Power SupplyExternalShort-Circuit Protection and Open-Short-Circuit Protection and Open-	Regulatory	CE	CE	CE
I2C Interface ③Up to 400 kbpsUp to 400 kbpsUp to 400 kbpsUART InterfaceAdjustable: 9600 bps to 921600 bps Default: 9600 bps Update Rate: 1 Hz (Default), up to 10 HzAdjustable: 9600 bps to 921600 bps Default: 9600 bps Update Rate: 1 Hz (Default), up to 10 HzAdjustable: 9600 bps to 921600 bps Default: 9600 bps Update Rate: 1 Hz (Default), up to 10 HzProtocolsNMEA 0183, PMTK, PQNMEA 0183, PMTK, PQNMEA 0183, PMTK, PQExternal Antenna InterfaceActive or PassiveActive or PassiveActive or PassiveAntenna TypeActive or PassiveActive or PassiveExternalAntenna Power SupplyExternalShort-Circuit Protection and Open-Short-Circuit Protection and Open-	Others	RoHS	RoHS	RoHS
UART InterfaceAdjustable: 9600 bps to 921600 bps Default: 9600 bps Update Rate: 1 Hz (Default), up to 10 HzAdjustable: 9600 bps Default: 9600 bps Update Rate: 1 Hz (Default), up to 10 HzAdjustable: 9600 bps Default: 9600 bps Update Rate: 1 Hz (Default), up to 10 HzProtocolsNMEA 0183, PMTK, PQNMEA 0183, PMTK, PQNMEA 0183, PMTK, PQExternal Antenna InterfaceActive or PassiveActive or PassiveActive or PassiveAntenna Power supplyExternalExternalExternalExternalActive AntennaShort-Circuit Protection and Open-Short-Circuit Protection and Open-Short-Circuit Protection and Open-	Interfaces			
UART InterfaceDefault: 9600 bpsDefault: 9600 bpsDefault: 9600 bpsUpdate Rate: 1 Hz (Default), up to 10 HzUpdate Rate: 1 Hz (Default), up to 10 HzUpdate Rate: 1 Hz (Default), up to 10 HzProtocolsNMEA 0183, PMTK, PQNMEA 0183, PMTK, PQNMEA 0183, PMTK, PQExternal Antenna InterfaceActive or PassiveActive or PassiveActive or PassiveAntenna Power supplyExternalExternalExternalExternalActive AntennaShort-Circuit Protection and Open-Short-Circuit Protection and Open-Short-Circuit Protection and Open-	I2C Interface ³	Up to 400 kbps	Up to 400 kbps	Up to 400 kbps
External Antenna Interface External Antenna Antenna Type Active or Passive Active or Passive Antenna Power Supply External External External Active Antenna Short-Circuit Protection and Open- Short-Circuit Protection and Open- Short-Circuit Protection and Open-	UART Interface	Default: 9600 bps	Default: 9600 bps	Default: 9600 bps
Interface Antenna Type Active or Passive Active or Passive Active or Passive Antenna Power Supply External External External External Active Antenna Short-Circuit Protection and Open- Short-Circuit Protection and Open- Short-Circuit Protection and Open-	Protocols	NMEA 0183, PMTK, PQ	NMEA 0183, PMTK, PQ	NMEA 0183, PMTK, PQ
Antenna Power Supply External External External Active Antenna Short-Circuit Protection and Open- Short-Circuit Protection and Open- Short-Circuit Protection and Open-				
Supply External External External Active Antenna Short-Circuit Protection and Open- Short-Circuit Protection and Open- Short-Circuit Protection and Open-	Antenna Type	Active or Passive	Active or Passive	Active or Passive
		External	External	External
				-

Notes:

1.^①: Depending on the firmware version.

2.⁽²⁾: Room temperature, all satellites at -130 dBm.

3. $^{\textcircled{3}}$: Only certain firmware versions support the I2C interface.



Quectel LG77L

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
	Normal Operation:	Normal Operation:	Normal Operation:
Current	25 mA @ Acquisition)	26 mA @ Acquisition	24 mA @ Acquisition
Consumption	24 mA @ Tracking	25 mA @ Tracking	23 mA @ Tracking
(GPS + GLONASS @	Power Saving Modes:	Power Saving Modes:	Power Saving Modes:
3.3 V) ^②	6 μA @ Backup Mode	6 μA @ Backup Mode	6 μA @ Backup Mode
	1 mA @ Standby Mode	1 mA @ Standby Mode	0.9 mA @ Standby Mode

Notes:

1. $^{(l)}:$ 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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