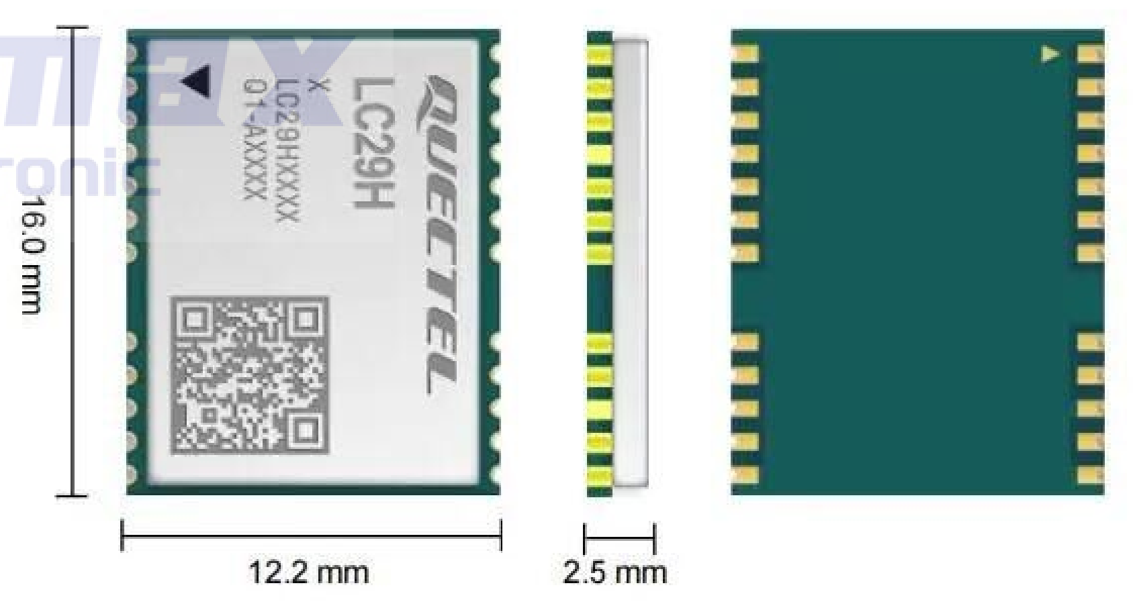
Quectel LC29H Series

Dual-Band Multi-Constellation GNSS Module with RTK and DR Functions



LC29H is a series of dual-band, multi-constellation GNSS modules that support the concurrent reception of global GNSS constellations such as GPS, BDS, Galileo and GLONASS.

Compared to GNSS modules that track only L1 signals, the LC29H series can receive and track a higher number of visible satellites in multi bands, thereby significantly mitigating the multipath effect in deep urban canyons and improving positioning accuracy. By having an internal LNA and SAW filter, the module achieves better sensitivity and anti-interference capability. Featuring dual frequency support, the module delivers CEP accuracy values of 1 m in autonomous mode and centimeter levels in the RTK capable variants. The optional DR function ensures the module's superior positioning performance even in weak signal areas or when GNSS signals are not available.

Based on the receiver chip using 12 nm technology, the LC29H series provides advanced power management enabling low-power GNSS sensing and position fix, which makes the module an ideal solution for power-sensitive and battery-powered systems.

Featuring high-precision positioning and low power consumption makes the LC29H series perfectly suited for applications such as real time tracking and sharing economy related services.

Key Features

- ✓ Multi-GNSS engine for GPS, GLONASS, BDS, Galileo and QZSS
- ✓ Reception of L1 and L5 GNSS bands signals concurrently
- ✓ Integrated DR function (optional)
- ✓ RTK (optional) providing sub-meter accuracy with fast convergence time and outstanding performance
- ✓ Output GNSS and IMU raw data messages (optional)
- ✓ Integrated LNA for high sensitivity
- ✓ Integrated SAW filter for noise cancellation
- ✓ UART, I2C and SPI* interfaces
- ✓ Integrated AGNSS function
- ✓ Integrated AIC and jamming function

AGNSS Technology

Ultra Low Power Consumption

Ultra Compact Size

Tracking Sensitivity: -165 dBm

Operating Temperature Range: -40 to +85 °C

Anti-jamming

RoHS Compliant

Multi-constellation System

Version: 1.4 | Status: Released

Quectel LC29H Series

GNSS Module	LC29H (AA)	LC29H (BA)	LC29H (CA)
Dimensions	12.2 mm × 16.0 mm × 2.5 mm	12.2 mm × 16.0 mm × 2.5 mm	12.2 mm × 16.0 mm × 2.5 mm
Weight	Approx. 0.9 g	Approx. 0.9 g	Approx. 0.9 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/ QZSS: L1 C/A, L5 GLONASS: L1 Galileo: E1, E5a BDS: B1I, B2a	GPS/ QZSS: L1 C/A, L5 GLONASS: L1 Galileo: E1, E5a BDS: B1I, B2a	GPS/ QZSS: L1 C/A, L5 GLONASS: L1 Galileo: E1, E5a BDS: B1I, B2a
Default GNSS Constellation	GPS + GLONASS + Galileo + BDS + QZSS	GPS + GLONASS + Galileo + BDS + QZSS	GPS + GLONASS + Galileo + BDS + QZSS
Number of Concurrent GNSS	4 + QZSS	4 + QZSS	4 + QZSS
SBAS	WAAS, EGNOS, MSAS and GAGAN	WAAS*, EGNOS*, MSAS* and GAGAN*	WAAS*, EGNOS*, MSAS* and GAGAN*
Function(s)	Standard	RTK + DR (integrated IMU)	DR (integrated IMU)
Horizontal Position Accuracy	Autonomous①: 1 m	Autonomous①: 1 m RTK②: < 0.1 m + 1 ppm	Autonomous①: 1 m
DR Position Error (with Speed)	-	< 2 % of distance traveled without GNSS	< 2 % of distance traveled without GNSS
DR Position Error (without Speed)	-	< 4 % of distance traveled without GNSS	< 4 % of distance traveled without GNSS
Velocity Accuracy③	0.03 m/s	0.03 m/s	0.03 m/s
Accuracy of 1PPS Signal③	20 ns	20 ns	20 ns
Convergence Time	-	RTK②: < 10 s	-
TTFF (with AGNSS)④	Full Cold Start: 5 s	Full Cold Start: 5 s	Full Cold Start: 5 s
TTFF (without AGNSS)③	Full Cold Start: 26 s Warm Start: 16 s Hot Start: 1 s	Full Cold Start: 26 s Warm Start: 16 s Hot Start: 1 s	Full Cold Start: 26 s Warm Start: 16 s Hot Start: 1 s
Sensitivity	Acquisition: -147 dBm Tracking: -165 dBm Reacquisition: -159 dBm	Acquisition: -145 dBm Tracking: -165 dBm Reacquisition: -157 dBm	Acquisition: -145 dBm Tracking: -165 dBm Reacquisition: -157 dBm
Dynamic Performance③	Maximum Altitude: 10000 m Maximum Velocity⑤: 500 m/s Maximum Acceleration⑤: 4g	Maximum Altitude: 10000 m Maximum Velocity⑤: 500 m/s Maximum Acceleration⑤: 4g	Maximum Altitude: 10000 m Maximum Velocity⑤: 500 m/s Maximum Acceleration⑤: 4g
Nav. Update Rate	1–10 Hz	1 Hz/ 10 Hz	1 Hz/ 10 Hz
Raw Data Update Rate	GNSS: 1 Hz	GNSS: 1 Hz IMU: 100 Hz (Max.)*	GNSS: 1 Hz IMU: 100 Hz (Max.)*
Certifications			
Regulatory	**Europe:** CE	**Europe:** CE	**Europe:** CE
Others	RoHS*	RoHS*	RoHS*
Interfaces			
I2C	Up to 400 kbps	Up to 400 kbps	Up to 400 kbps
UART	Adjustable: 9600–3000000 bps Default: 115200 bps	Adjustable: 9600–3000000 bps Default: 115200 bps	Adjustable: 9600–3000000 bps Default: 115200 bps
Protocol			
Protocol	NMEA 0183/ RTCM 3.x	NMEA 0183/ RTCM 3.x	NMEA 0183/ RTCM 3.x
External Antenna Interface			
Antenna Type	Active or Passive	Active or Passive	Active or Passive
Antenna Power Supply	External or VDD_RF pin of module	External or VDD_RF pin of module	External or VDD_RF pin of module
Electrical Characteristics			
Supply Voltage Range	3.1–3.6 V, Typ. 3.3 V	3.1–3.6 V, Typ. 3.3 V	3.1–3.6 V, Typ. 3.3 V
I/O Voltage	Typ. 2.8 V	Typ. 2.8 V	Typ. 2.8 V
Current Consumption (@ Default GNSS Constellations, 3.3 V)③	**Normal Operation:** 24 mA @ Acquisition 24 mA @ Tracking **Power Saving Mode:** 25 µA @ Backup Mode	**Normal Operation:** 30 mA @ Acquisition 30 mA @ Tracking **Power Saving Mode:** 25 µA @ Backup Mode	**Normal Operation:** 28 mA @ Acquisition 28 mA @ Tracking **Power Saving Mode:** 25 µA @ Backup Mode

NOTE:
1. ①: CEP, 50 %, 24 hours static, -130 dBm, more than 6 SVs.
2. ②: CEP, 50 %, with active high-precision antennas in an open-sky environment and within 1 km from the base station.
3. ③: Room temperature, all satellites at -130 dBm.
4. ④: Open-sky, active high-precision antennas; less than 1 km baseline length is also required for LC29H (BA, DA, EA*).
5. ⑤: ITAR limits.
6. * : Under development/ ongoing.

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Quectel LC29H Series

GNSS Module	LC29H (DA)	LC29H (EA)*	LC29H (BS)
Dimensions	12.2 mm × 16.0 mm × 2.5 mm	12.2 mm × 16.0 mm × 2.5 mm	12.2 mm × 16.0 mm × 2.5 mm
Weight	Approx. 0.9 g	Approx. 0.9 g	Approx. 0.9 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/ QZSS: L1 C/A, L5 GLONASS: L1 Galileo: E1, E5a BDS: B1I, B2a	GPS/ QZSS: L1 C/A, L5 GLONASS: L1 Galileo: E1, E5a BDS: B1I, B2a	GPS/ QZSS: L1 C/A, L5 GLONASS: L1 Galileo: E1, E5a BDS: B1I, B2a
Default GNSS Constellations	GPS + GLONASS + Galileo + BDS + QZSS	GPS + GLONASS + Galileo + BDS + QZSS	GPS + GLONASS + Galileo + BDS + QZSS
Number of Concurrent GNSS	4 + QZSS	4 + QZSS	4 + QZSS
SBAS	WAAS*, EGNOS*, MSAS* and GAGAN*	WAAS*, EGNOS*, MSAS* and GAGAN*	-
Function(s)	RTK	RTK	Base station
Horizontal Position Accuracy	Autonomous①: 1 m RTK②: 1 cm + 1 ppm	Autonomous①: 1 m RTK②: 1 cm + 1 ppm	-
DR Position Error (with Speed)	-	-	-
DR Position Error (without Speed)	-	-	-
Velocity Accuracy③	0.03 m/s	0.03 m/s	-
Accuracy of 1PPS Signal③	20 ns	20 ns	-
Convergence Time	RTK②: < 10 s	RTK②: < 10 s	-
TTFF (with AGNSS)④	Full Cold Start: 5 s	Full Cold Start: 5 s	-
TTFF (without AGNSS)③	Full Cold Start: 26 s Warm Start: 16 s Hot Start: 1 s	Full Cold Start: 26 s Warm Start: 16 s Hot Start: 1 s	-
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Raw Data Update Rate	GNSS: 1 Hz	GNSS: 10 Hz	GNSS: 1 Hz
Certifications			
Regulatory	**Europe:** CE	**Europe:** CE	**Europe:** CE
Others	RoHS*	RoHS*	RoHS*
Interfaces			
I2C	Up to 400 kbps	Up to 400 kbps	Up to 400 kbps
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Protocol			
Protocol	NMEA 0183/ RTCM 3.x	NMEA 0183/ RTCM 3.x	RTCM 3.x
External Antenna Interface			
Antenna Type	Active or Passive	Active or Passive	Active
Antenna Power Supply	External or VDD_RF pin of module	External or VDD_RF pin of module	External or VDD_RF pin of module
Electrical Characteristics			
Supply Voltage Range	3.1–3.6 V, Typ. 3.3 V	3.1–3.6 V, Typ. 3.3 V	3.1–3.6 V, Typ. 3.3 V
I/O Voltage	Typ. 2.8 V	Typ. 2.8 V	Typ. 2.8 V
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