Quectel LC86G Series

Compact Integrated Antenna GNSS Module

Based on the latest enhanced chipset, the new Quectel LC86G series GNSS module supports concurrent reception of GPS, GLONASS, BDS, Galileo and QZSS. The LC86G series is designed to be compatible with Quectel L80 and L86 modules, allowing for smooth migration between them.

Compared with single constellation receivers, by enabling multiple GNSS constellations, the LC86G series increases the number of visible satellites, reduces the time to first fix and improves positioning accuracy, especially when driving through dense urban canyons. The integrated antenna on top of the module simplifies the design process and reduces RF complexities allowing for fast time to market.

The integrated LNA improves sensitivity, effectuating high accuracy positioning, clear signal tracking and fast acquisition and allows for direct connection to passive antennas.

Based on its enhanced performance, LC86G series is perfectly suited for applications such as real-time tracking systems and sharing economy devices, and due to its extremely low power consumption, it is ideal for wearable battery operated products, toll tags, emergency beacons and livestock or pallet trackers.

Key Features

- Multi-GNSS engine for GPS, GLONASS , BDS , Galileo and QZSS, ensuring fast and accurate fix in any environment
- Footprint compatible with L80 and L86 modules
- Industry-leading sensitivity: -166 dBm during tracking and -148 dBm during acquisition
- Integrated LNA improves sensitivity
- Embedded multi-tone active interference canceller for anti-jamming
- UART interface
- Integrated patch antenna or external antenna


AGNSS Technology


Ultra Low Power Consumption


Ultracompact Size


Tracking Sensitivity: -166 dBm


Operating Temperature Range: -40 °C to +85 °C

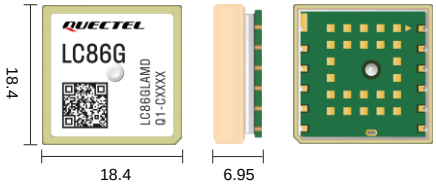
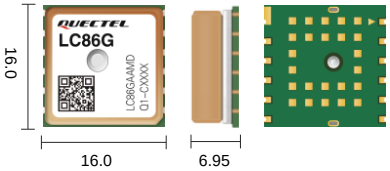

Anti-jamming


RoHS Compliant


Multi-constellation System

Version: 1.5 | Status: Released

Quectel LC86G Series

GNSS Module	LC86G (LA)①	LC86G (AA)
Dimensions (mm)		
Weight (g)	Approx. 8.0	Approx. 5.9
Temperature Range		
Operating Temperature	-40 °C to +85 °C	-40 °C to +85 °C
Storage Temperature	-40 °C to +90 °C	-40 °C to +90 °C
GNSS Features		
Supported Bands	GPS L1 C/A GLONASS L1 Galileo E1 BDS B1I & B1C QZSS L1 C/A	GPS L1 C/A Galileo E1 BDS B1I & B1C QZSS L1 C/A
Default Constellations	GPS + GLONASS + Galileo + BDS + QZSS	GPS + Galileo + BDS
Number of Tracking Channels	47	47
Number of Concurrent GNSS	4 + QZSS	3 + QZSS
SBAS	WAAS, EGNOS, MSAS and GAGAN	WAAS, EGNOS, MSAS and GAGAN
Horizontal Position Accuracy②	Autonomous: 1.5 m	Autonomous: 1.5 m
Velocity Accuracy③	Without Aid: 0.1 m/s	Without Aid: 0.1 m/s
Acceleration Accuracy③	Without Aid: 0.1 m/s²	Without Aid: 0.1 m/s²
Accuracy of 1PPS Signal (RMS)③	30 ns	30 ns
TTFF (with EASY)④	Cold Start: 12 s Warm Start: 2 s Hot Start: 1 s	Cold Start: 12 s Warm Start: 2 s Hot Start: 1 s
TTFF (with Flash EPO)④	Cold Start: 5 s	Cold Start: 5 s
TTFF (Without AGNSS)③	Cold Start: 30 s Warm Start: 25 s Hot Start: 1s	Cold Start: 30 s Warm Start: 28 s Hot Start: 1s
Sensitivity (@ Default Constellations)⑤	Acquisition: -148 dBm Tracking: -166 dBm Reacquisition: -160 dBm	Acquisition: -148 dBm Tracking: -166 dBm Reacquisition: -160 dBm
Dynamic Performance③	Maximum Altitude: 10000 m Maximum Velocity: 490 m/s Maximum Acceleration: 4g	Maximum Altitude: 10000 m Maximum Velocity: 490 m/s Maximum Acceleration: 4g
Certifications		
Regulatory	**Europe**: CE	**Europe**: CE
Others	RoHS	RoHS
Interfaces		
UART	Adjustable: 9600–921600 bps Default: 115200 bps Update Rate: 1 Hz (default), max. 10 Hz	Adjustable: 9600–921600 bps Default: 115200 bps Update Rate: 1 Hz (default), max. 10 Hz
Protocol	NMEA 0183 V4.10	NMEA 0183 V4.10
Antenna Interface		
Antenna Type	Integrated patch antenna or external antenna	Integrated patch antenna or external antenna
Electrical Characteristics		
Supply Voltage Range (VCC)	2.55–3.6 V, typ. 3.3 V	2.55–3.6 V, typ. 3.3 V
I/O Voltage	Following VCC	Following VCC
Power Consumption (@ 3.3 V, Default Constellations)③	**Normal Operation:** 35 mA (115.5 mW) @ Acquisition 35 mA (115.5 mW) @ Tracking **Power Saving Modes:** 12.2 mA (40.3 mW) @ ALP Mode 1 25.7 mA (84.8 mW) @ ALP Mode 2 13 µA (42.9 µW) @ Backup Mode	**Normal Operation:** 32 mA (105.6 mW) @ Acquisition 33 mA (108.9 mW) @ Tracking **Power Saving Modes:** 12 mA (39.6 mW) @ ALP Mode 1 24.9 mA (82.2 mW) @ ALP Mode 2 13 µA (42.9 µW) @ Backup Mode

NOTE:

1. ①: The LC86G (LA) antenna dimensions are larger, whereas the PCB footprint size is identical for the whole LC86G series.
2. ②: CEP, 50 %, 24 hours static, -130 dBm, more than 6 SVs.
3. ③: Tested at room temperature, with typical operating voltage, and satellite signal of -130 dBm configured by the instrument. In this case, the power consumption refers exclusively to that of the module, excluding the external antenna.
4. ④: Open-sky, active high-precision GNSS antenna.
5. ⑤: Conducted sensitivity without patch antenna.

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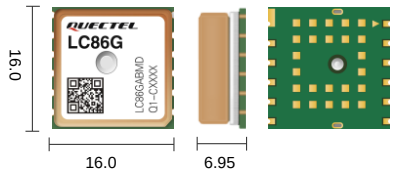
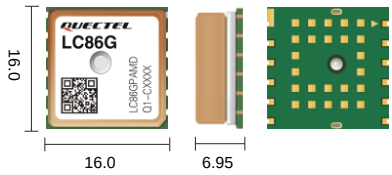
Quectel LC86G Series

GNSS Module	LC86G (AB)	LC86G (PA)
Dimensions (mm)		
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Default Constellations	GPS + GLONASS + Galileo	GPS + GLONASS + Galileo + BDS + QZSS
Number of Tracking Channels	47	47
Number of Concurrent GNSS	3 + QZSS	4 + QZSS
SBAS	WAAS, EGNOS, MSAS and GAGAN	WAAS, EGNOS, MSAS and GAGAN
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I/O Voltage	Following VCC	Following VCC
Power Consumption (@ 3.3 V, Default Constellations)②	**Normal Operation:** 33 mA (108.9 mW) @ Acquisition 34 mA (112.2 mW) @ Tracking **Power Saving Modes:** 12.8 mA (42.2 mW) @ ALP Mode 1 25.8 mA (85.1 mW) @ ALP Mode 2 13 µA (42.9 µW) @ Backup Mode	**Normal Operation:** 12 mA (39.6 mW) @ Acquisition 12 mA (39.6 mW) @ Tracking **Power Saving Modes:** 5.5 mA (18.2 mW) @ ALP Mode 1 8.9 mA (29.4 mW) @ ALP Mode 2 13 µA (42.9 µW) @ Backup Mode

NOTE:
1. ①: CEP, 50 %, 24 hours static, -130 dBm, more than 6 SVs.
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