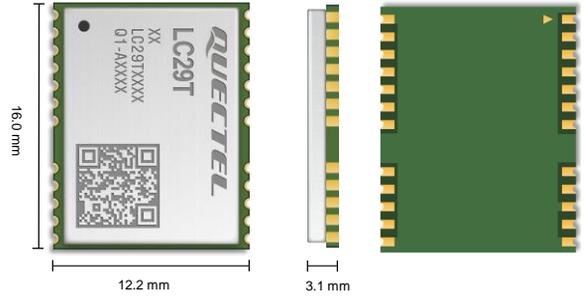


Quectel LC29T (AA)

High-Precision Timing GNSS Module



LC29T (AA) is a multi-constellation GNSS module that delivers high integrity precision timing in demanding applications worldwide. It simultaneously receives and tracks L1 signals from multiple (GPS, GLONASS, Galileo, BDS and QZSS) constellations. Its timing capabilities remain operational even if only one satellite is tracked.

LC29T (AA) is designed to meet the most stringent timing synchronization requirements within global 4G/5G mobile networks. In addition, the module can generate a 10 MHz square wave for various applications. By effectively minimizing timing errors of the primary source of cellular network synchronization, it empowers operators to maximize their network performance. Simultaneously the LC29T (AA) meets the strict synchronization and timing demands of the next-generation networks across various industry verticals such as 5G O-RAN, smart power grid, data centers, satellite communication system, LoRa base stations, calibration services and industrial automation applications.

The module's multi-constellation capability reduces timing errors to less than 13.6 ns under open-sky conditions. Additionally, it is designed and manufactured in accordance with the stringent Quality Management System, aligning with the IATF 16949:2016 Standard.



Key Features

- ✓ Ultra compact size: 12.2 mm × 16.0 mm × 3.1 mm
- ✓ Multi-Constellation GNSS engine for GPS, GLONASS, Galileo, BDS and QZSS
- ✓ Integrated AGNSS function
- ✓ Single-satellite timing
- ✓ 10 MHz frequency output
- ✓ Auto position hold



AGNSS
Technology



Multi-constellation
System



Ultra Compact Size



Tracking Sensitivity:
-161 dBm



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



Anti-jamming



RoHS Compliant

Quectel LC29T (AA)

GNSS Module	LC29T (AA)
Dimensions	12.2 mm × 16.0 mm × 3.1 mm
Weight	Approx. 1.1 g
Temperature Range	
Operating Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +90 °C
GNSS Features	
Supported Bands	GPS: L1 C/A GLONASS: L1 Galileo: E1 BDS: B1I QZSS: L1 C/A
Default Constellations	GPS + GLONASS + Galileo + BDS + QZSS
Number of Channels	80 Tracking Channels 4 Fast Acquisition Channels
Number of Concurrent GNSS	4 + QZSS
SBAS	WAAS, EGNOS, MSAS, and GAGAN
Horizontal Position Accuracy ^①	Autonomous: 1.1 m
Velocity Accuracy ^②	Without Aid: 0.1 m/s
Acceleration Accuracy ^②	Without Aid: 0.1 m/s ²
1PPS Timing Accuracy ^②	< 13.6 (±6.8) ns @ 1σ
1PPS Jitter ^②	±6.5 ns
Frequency Reference ^③	10 MHz ±0.05 ppm
TTFF (with AGNSS) ^③	Warm Start: 5 s
TTFF (without AGNSS) ^②	Cold Start: 35 s Warm Start: 24 s Hot Start: 2 s
Sensitivity (@ Default Constellations) ^④	Acquisition: -145 dBm Tracking: -161 dBm Reacquisition: -153 dBm
Dynamic Performance ^②	Maximum Altitude: 18000 m Maximum Velocity: 515 m/s Maximum Acceleration: 4g
Certifications	
Regulatory	Europe: CE*
Others	RoHS
Interface	
UART	Adjustable: 115200–921600 bps Default: 115200 bps Update Rate: 1 Hz (default), up to 10 Hz
Protocol	
Protocol	NMEA 0183
External Antenna Interface	
Antenna Type	Active ^⑤
Antenna Power Supply	External or Internal (through VDD_RF)
Electrical Characteristics	
Supply Voltage Range	3.0–3.6 V, Typ. 3.3 V
I/O Voltage	Following VCC
Power Consumption (@ Default Constellations, 3.3 V) ^②	Normal Operation: 222 mA (732.6 mW) @ Acquisition 232 mA (765.6 mW) @ Tracking Power Saving Mode: 55 μA (181.5 μW) @ Backup mode

NOTE:

- ①: CEP, 50%, 24 hours static, -130 dBm, more than 6 SVs.
- ②: Default constellations, room temperature, all satellites at -130 dBm.
- ③: Open-sky, active high-precision GNSS antenna.
- ④: Test with two external LNAs with 16.5 dB gain and 0.85 dB noise figure.
- ⑤: To further mitigate the impact of out-of-band signals on GNSS module performance, you must choose the active antenna whose SAW filter is placed in front of the LNA in the internal framework. DO NOT place the LNA in the front.
- *: In progress.