



# L76 Series GNSS Module Presentation

November, 2015

**Highlights**

**Advanced Features**

**Quectel L76 Vs. Competitor's Product**

**Support Package**



# Highlights

## Support Multi-GNSS Systems

L76: GPS+GLONASS  
L76B: GPS+BeiDou  
L76G: GPS+GLONASS+Galileo (Note1)

## Ultra Low Power Consumption

18mA@Tracking mode (Note2)  
25mA@Acquisition mode (Note2)

## AlwaysLocate™

An intelligent controller of power  
Consumption

## LOCUS

Innate logger solution with no need of host  
and external flash

Note1: L76G is under development.

Note2: Measured in GPS+GLONASS system.

## Extremely Compact Size

10.1 x 9.7 x 2.5 mm

## EASY™

Advanced AGPS technology  
Without external memory

## Anti-Jamming

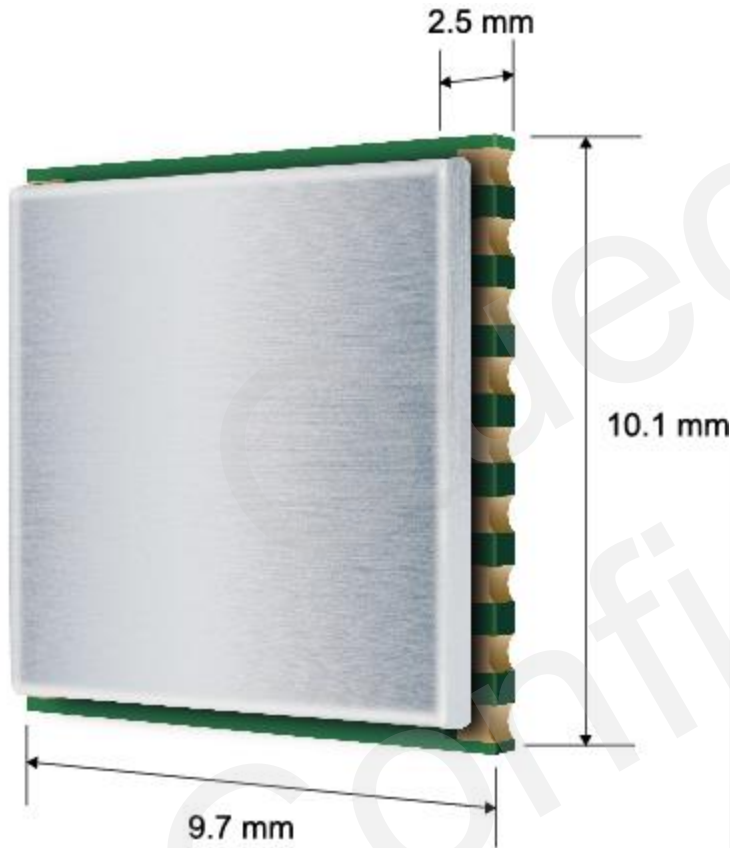
Multi-tone Active Interference  
Canceller

## Highest Sensitivity

-165dBm@Tracking mode  
-148dBm@Acquisition mode

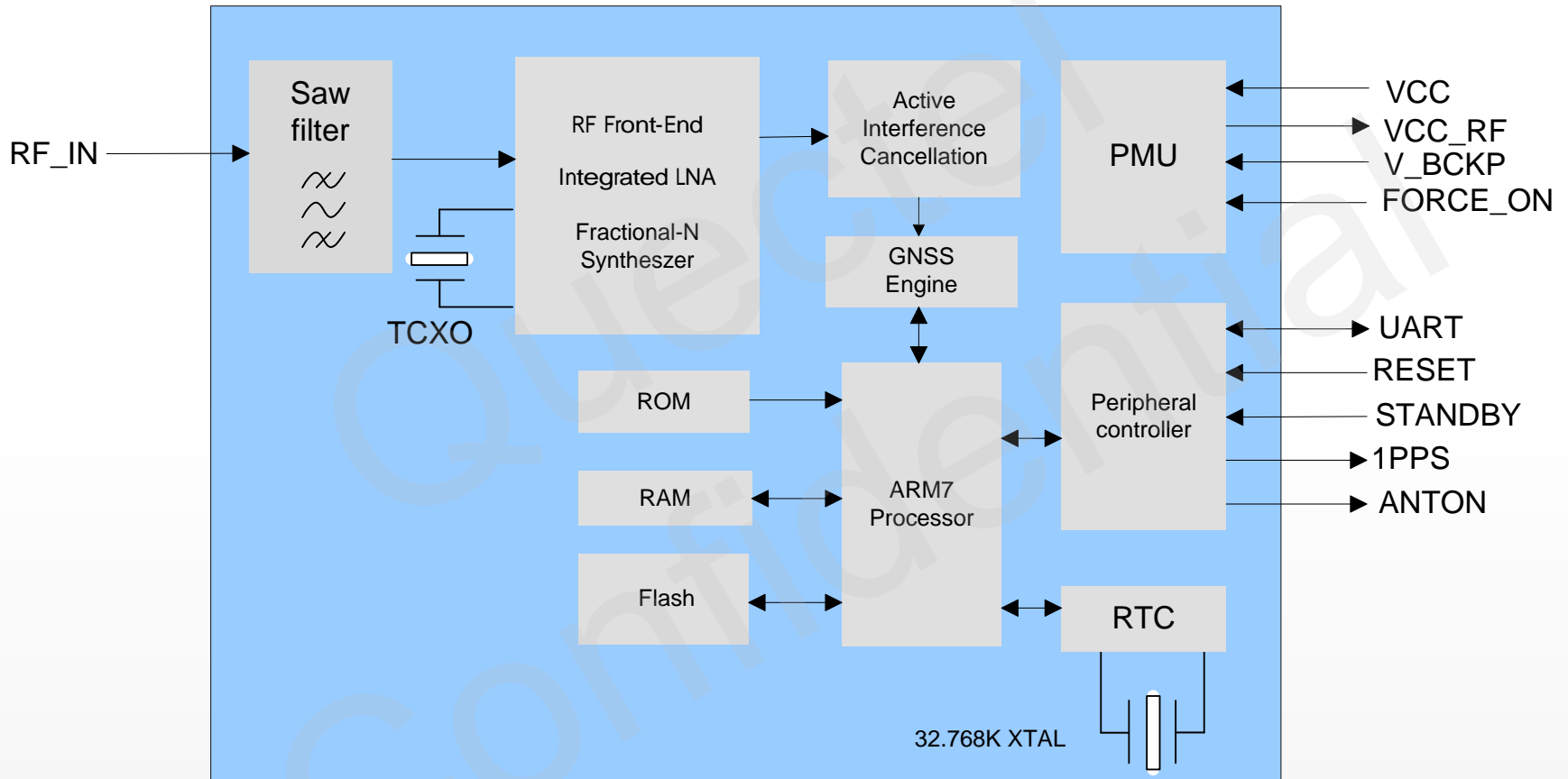


# Mechanical Dimensions



**Length:** 10.1 mm  
**Width:** 9.7 mm  
**Height:** 2.5 mm  
**Weight:** 0.6 g

# Hardware Architecture



- Protocol
  - NMEA 0183 standard V3.01
  - MTK Private Protocol: PMTK
- Configurable Operating Modes
  - UART: Adjustable 4800~115200bps (default: 9600bps)
  - Update rate: 1Hz (default), up to 10Hz
  - Selectable output NMEA messages
  - Configurable Periodic Standby Mode
  - Selectable navigation mode

# Target Applications

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- Portable Devices
- Vehicle Management
- Asset Tracking
- Security System
- Connected PND
- GIS Application
- Industrial PDA





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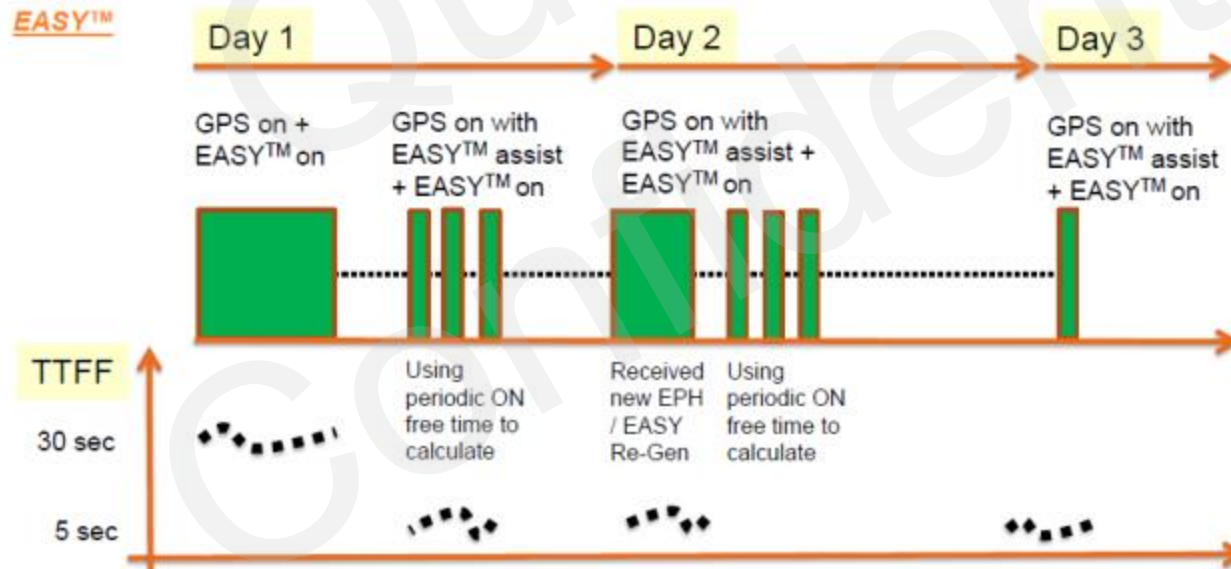
- EASY™, advanced AGPS technology without the need of external memory
- Extremely low power consumption, 18mA@Tracking
- AlwaysLocate™, an intelligent algorithm for power saving
- LOCUS, innate logger solution with no need of host and external flash
- High sensitivity, -165dBm@Tracking, -148dBm@Acquisition
- Support DGPS, QZSS, SBAS(WASS/EGNOS/MSAS/GAGAN)
- Anti-Jamming, Multi-tone Active Interference Canceller
- Balloon mode, for high altitude up to 80km
- PPS VS. NMEA can be used in time service

# Specifications

L1 Band Receiver (1575.42MHz)	Channel	33 (tracking) / 99 (acquisition)	Environmental	Operating Temperature	-40°C to 85°C
	C/A code			Storage Temperature	-45°C to 125°C
	SBA	WAAS, EGNOS MSAS,GAGAN	Dynamic Performance	Maximum Altitude	Max.18000m
		Maximum Velocity		Max.515m/s	
Horizontal Position Accuracy	Autonomous	<2.5m CEP		Maximum Acceleration	4G
Velocity Accuracy	Without aid	<0.1m/s	Dimensions	10.1 x 9.7 x 2.5mm	
Acceleration Accuracy	Without aid	0.1m/s <sup>2</sup>	Weight	Approx. 0.6g	
Timing Accuracy	1PPS	10ns	Serial Interface	UART: Adjustable 4800~115200 bps Default: 9600bps	
Reacquisition Time		<1s	Update Rate	1Hz by default, up to 10Hz	
TTFF@-130dBm with EASY™	Cold Start	<15s	I/O Voltage	2.7V ~ 2.9V	
	Warm Start	<5s	Protocols	NMEA 0183 PMTK	
	Hot Start	<1s	Power Supply	2.8V ~ 4.3V	
TTFF@-130dBm without EASY™	Cold Start	<35s	Power Acquisition	25mA (GPS+GLONASS)	
	Warm Start	<30s	Power Tracking	18mA (GPS+GLONASS)	
	Hot Start	<1s	Power Saving	2.6mA@AlwaysLocate™	
		7uA@Backup Mode			
		500uA@Standby Mode			
Sensitivity	Acquisition	-148dBm		Periodic Mode	
	Tracking	-165dBm	Antenna Type	Active or Passive	
	Re-acquisition	-160dBm	Antenna Power	External or Internal VCC_RF	

# Self-AGPS EASY Technology(1)

- EASY™ is the abbreviation for Embedded Assist System for quick positioning. With EASY™ technology, the GNSS engine can calculate and predict automatically single ephemeris ( up to 3 days) when the power is on, and then save the predict information into the memory. So the GNSS engine can use the information for positioning later if there are not enough information received from the satellites.
- This function will be helpful for positioning and TTFF improvement under indoor or urban conditions.



# Self-AGPS EASY Technology(2)

## ➤ TTFB Comparison

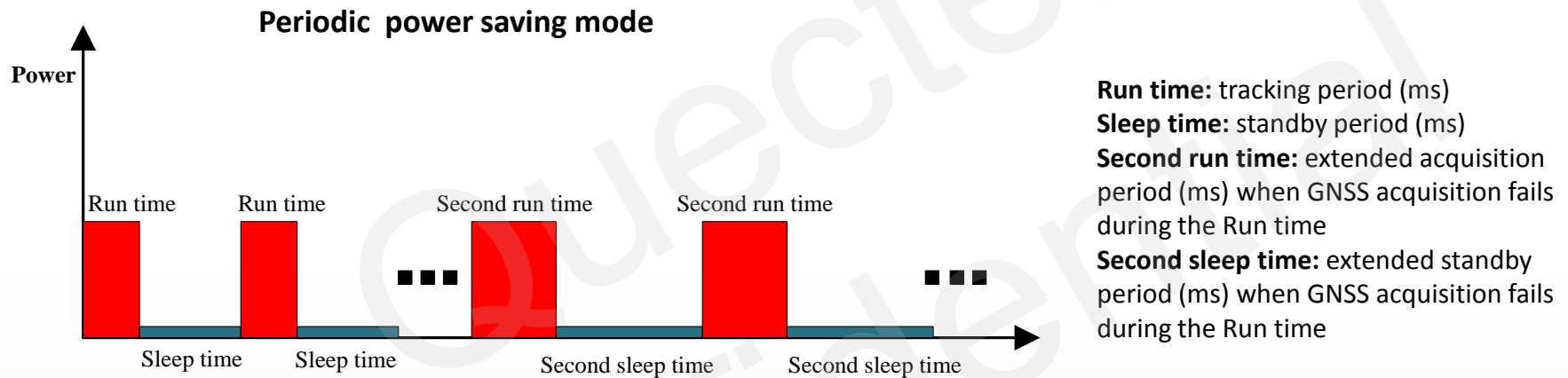
Test Condition		TTFB without EASY™	TTFB with EASY™
Under GNSS signal Generator, conductive power level -130dBm	Cold Start	<35s	<15s
	Warm Start	<30s	<5 s

With EASY™ technology, L76 series accelerates TTFB obviously.

# Periodic Standby Mode

Periodic standby mode can control power on/off time of GNSS periodically to reduce average power consumption, and on/off time can be configured by using PMTK command. For details, see the figure below. Periodic standby mode can be entered by sending the following PMTK command.

**\$PMTK255, Type, Run time, Sleep time, Second run time, Second sleep time**

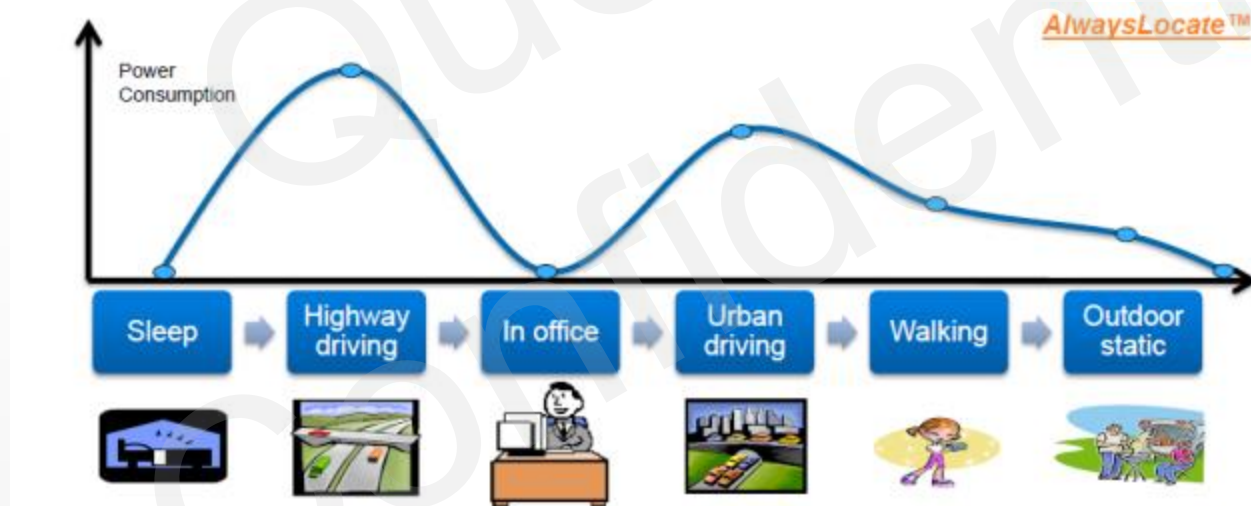


## Notes:

1. Normally, the GNSS module will enter the periodic mode after successfully fixing position. But if acquisition fails, the GNSS module still can enter this mode.
2. If GNSS acquisition fails during the Run time, in order to ensure the success of reacquisition, it is better to set the longer Second run time.

Example: PMTK225, 1, 3000, 12000, 18000, 72000\*16 for periodic mode with 3s in tracking mode and 12s sleep in standby mode. The average current is about 3.7mA.

- AlwaysLocate™ is an intelligent controller of periodic mode.
- L76 series can adaptively adjust the on/off time to achieve balance between positioning accuracy and power consumption according to the environmental and motion conditions. So the average power consumption is lower in AlwaysLocate™ power saving mode than that in periodic power saving mode. Typical average power is 2.6mA.



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# L76 vs. Ucompany LEX-6N(1)

## ➤ Specification Comparison

Product Features		L76	Ucompany LEX-6N
Power supply		2.8V~4.3V	2.7V~3.6V
Power Consumption	Acquisition mode	25mA@3.3V	40mA@3.0V typical
	Tracking mode	18mA@3.3V	
Sensitivity	Acquisition	-148dBm	-148dBm
	Tracking	-165dBm	-162dBm
	Re-acquisition	-160dBm	-157dBm
TTFF @ -130dBm	Hot start	<1s	1s
	Warm start	<5s (EASY™)	26s
	Cold start	<15s (EASY™)	26s
Position Accuracy		2.5m CEP	4m CEP
Timing Accuracy	1PPS	10ns	10ns
Data Update Rate		Up to 10Hz	Up to 5Hz

# L76 vs. Ucompany LEX-6N(2)

## ➤ Tracking Comparison



When driving across overpass and making a turn, L76 module can still capture the accurate tracking data. But Ucompany module has a small drift.

# L76 vs. Ucompany LEX-6N(3)

## ➤ Tracking Comparison



When driving under the overpass, L76 module shows its excellent performance. But Ucompany's module has a bigger drift.



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# Support Package(1)

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## Evaluation Board

### ➤ Interfaces

- Serial port
- Antenna interface
- Micro-USB interface

### ➤ Accessories

- Micro-USB cable
- Antenna



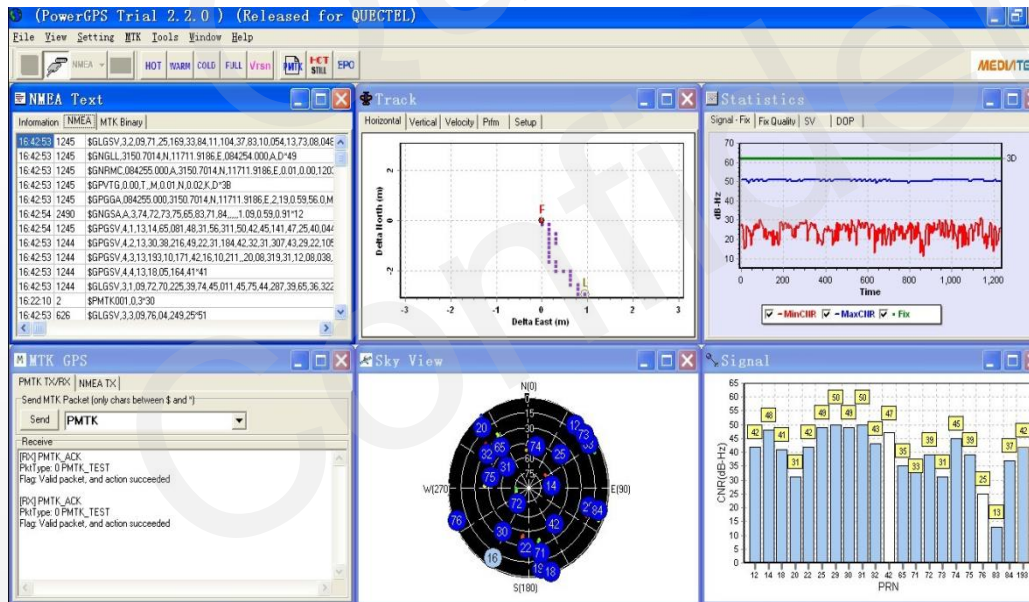
# Support Package(2)

## ➤ Documents

- Hardware Design
- Protocol Specification
- Part&Decal in PADS and Protel Format
- Evaluation Board User Guide
- Circuit Reference Design

## ➤ PC tool

- PowerGPS - GPS/GLONASS testing tool



Q&A...

*Thank you*

