



NXP high-performance, single-chip GPS solution GNS7560

The next level of GPS performance

This high-performance, single-chip GPS solution, designed for cellular handsets and mobile consumer electronics, offers the smallest size and lowest power consumption in the industry, with excellent acquisition and tracking sensitivity, TTFF, and accuracy.

Key features

- ▶ High sensitivity
 - -158 dBm acquisition sensitivity in A-GPS and autonomous hot-start modes
 - -160 dBm tracking sensitivity
- ▶ Excellent TTFF and accuracy
- ▶ Ultra-low power consumption (<15 mW in 1-Hz tracking mode)
- ▶ Extremely low external component count and PCB size
- ▶ Single 1.2-V supply rail (I/O = 1.8 to 3.3 V)
- ▶ Optimized for both cellular handset and portable consumer device integration
- ▶ DynaTrak advanced tracking and multipath algorithms for robust, low-dropout tracking in indoor, very low-signal, and rapid signal-transition environments
- ▶ Hosted architecture optimized for cost and performance, with broad, high-level and real-time kernel OS support
- ▶ Supports GSM, W-CDMA, and CDMA control plane A-GPS assistance data standards
- ▶ Supports SUPL user plane A-GPS assistance data
- ▶ Exceeds 3GPP and 3GPP2 performance requirements
- ▶ Supports all common GPS and cellular handset reference frequencies (10 to 50 MHz)
- ▶ Supports ultra-low-cost PCB dipole antennas
- ▶ UART and SPI host interfaces

- ▶ Operating temperature range -40 to +85 °C
- ▶ Two ultra-small, RoHS-compliant package options:
 - 54-ball WLCSP (3.6 x 2.4 x 0.6 mm, 0.4mm pitch)
 - 54-ball CABGA (6 x 4 x 0.8 mm, 0.65-mm pitch)
- ▶ Available with Nexperia cellular system solutions

Applications

- ▶ Cellular handset integration for navigation and location-based services
- ▶ Personal navigation devices
- ▶ Handheld consumer navigation and multifunction devices
- ▶ Digital cameras
- ▶ Battery-operated GPS devices

The NXP GNS7560 is a complete, ultra low-power GPS subsystem that requires only four passive components plus TCXO for a typical cellular-handset implementation. Manufactured in a 90-nm CMOS process, it integrates the GPS RF and a baseband in a single device. It also includes a high-performance, dual-stage LNA that has a very low noise figure, so there's no need for an external LNA.

In the WLCSP package option, the IC has a footprint of only 9 mm², and the entire GPS design including TCXO occupies less than 25 mm² of PCB area.

Proprietary DynaTrak technology automatically adapts to the user's environments, enabling a seamless experience that continues to work wherever you are. When other solutions dropout – deep indoors, in urban canyons, transitioning from strong to weak signals, or from in-vehicle to pedestrian operation and vice versa – DynaTrak rapidly adjusts to the dynamic signal environment, allowing the receiver to track continuously and accurately.

The solution offers the excellent acquisition and tracking sensitivity, time-to-first-fix (TTFF), and accuracy. It supports fully autonomous operation for use in handheld consumer navigation devices and other standalone navigation systems, as well as Assisted-GPS (A-GPS) operation on GSM, W-CDMA, and CDMA networks.

Equipped with a highly efficient GPS RF and baseband architecture, along with a complete set of power-management modes, the device minimizes system power consumption and offers ultra-low energy-per-fix (EPF).

The hosted architecture shifts the navigation software that isn't real-time-critical to the host system's processor,

thus minimizing system cost and PCB size. Software drivers are available for the most popular high-level operating systems for handsets and other portable devices, including Microsoft Windows CE, Windows Mobile, Linux, and a variety of real-time kernels.

Very high integration reduces external chipcount. The only connections required are for RF and clock inputs, the serial interface to the host, and power. High sensitivity, combined with the DynaTrak technology, allows the use of very low-cost passive antennas, including dipole antennas implemented as PCB traces.

The GNS7560 is built on more than 20 years of investment in ten generations of products (the longest heritable of GPS technology investment in the semiconductor industry), so it assures customers of a reliable technology foundation that has stood the test of time.

NXP supports the GNS7560 with full reference designs, demonstration systems, software development kits, and more than 20 years of experience bringing GPS systems to production.

GNS7560 block diagram

