



NK6010P1 Datasheet

A Highly Integrated NB+GNSS SoC

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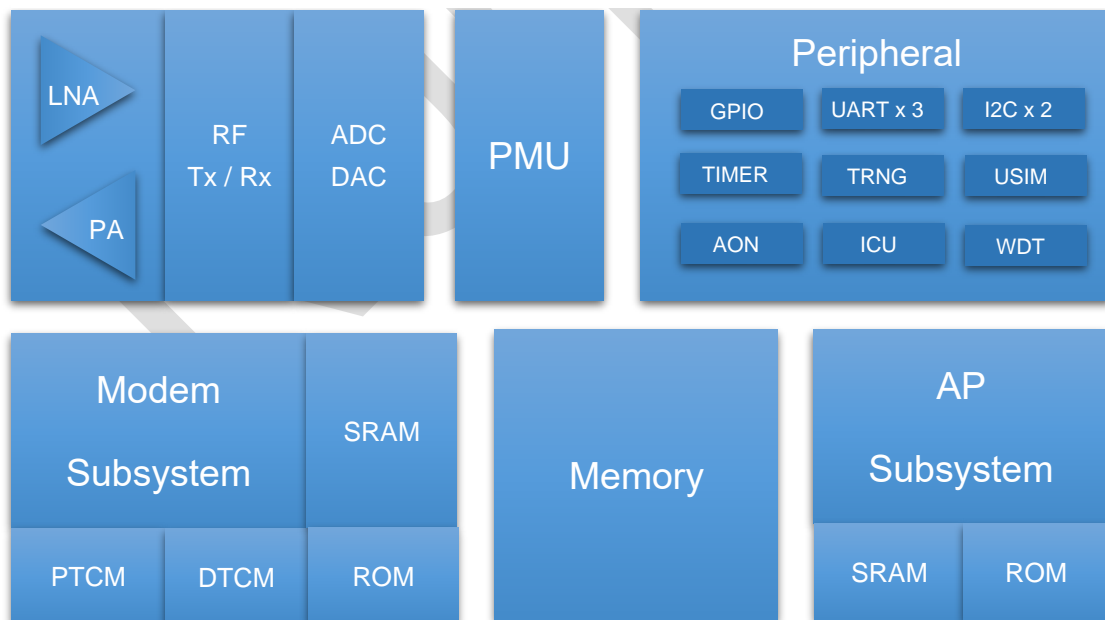
1 System Overview

NK6010P1 is a highly integrated NB-IoT chip featuring a light-weight ARM Cortex-M0 application processor, a NB-IoT and GNSS modem DSP subsystem, a low-power RF transceiver, a multi-band RF front end, and a power management unit (PMU).

The NB-IoT modem incorporates both 3GPP R13 and R14, providing up-to 160 kbps uplink and 120 kbps downlink rates. The integrated RF transceiver and RF front-end support most NB-IoT bands ranging from 450 MHz to 2.2 GHz and 23 dBm Tx power (Power Class 3). The extremely low-power GNSS subsystem features assisted GNSS over NB-IoT and supports GPS/Beidou/Galileo/GLONASS global navigation systems.

NK6010P1 is designed for low data rate, ultra-low power, long distance, and massive connections of IoT applications. With its versatile network protocols and various low power modes, NK6010P1 enables IoT devices for a wide range of applications from smart metering, intelligent agriculture, asset tracking, smart wearable devices, to Machine-to-Machine connections.

Figure 1 NK6010P1 CHIP-LEVEL FUNCTIONAL BLOCK DIAGRAM



2 Feature List

NB-IoT System

- Compliant with 3GPP R13 & R14
- Deployment modes:
 - Stand-alone
 - Guard-band
 - In-band
- Support wide range bands from 450MHz to 2.2GHz
- Uplink: 160 kbps (NB2), 60 kbps (NB1)
- Downlink: 120 kbps (NB2), 20 kbps (NB1)
- Uplink multi-tone transmission
- Multi-carrier operation
- Control plane EPS ClOT optimization
- User plane EPS ClOT optimization

RF Output Power and Sensitivity

- NB Transmission: 23±2dBm, 20±2dBm (Configurable to save power)
- Sensitivity: up to -118dBm

GNSS System

- Fast GNSS with super low power consumption
- Assisted and Standalone GNSS
- GNSS signal support:
 - GPS (L1)
 - Beidou (B1)
 - QZSS

Power Consumption

- eDRX: < 1 mA @ battery
- PSM: < 1 uA @ battery

Application Memory

- 256KB NOR Flash

- 128KB SRAM

Peripherals

- 24 x GPIOs
- 2 x I2C with 7- or 10-bit addressing
 - Standard mode (100 Kb/s)
 - Fast mode (400 Kb/s)
- 3 x UARTs
 - AT command
 - Diag & firmware update
 - BLE & AP extension
- JTAG
- USIM
- 4-channel auxiliary ADC

Power Management

- Two high-efficiency Buck converters supporting 2.5~4.2V input
- Gated 1.8V output for USIM

Timing Reference

- Internal 32kHz crystal oscillator for RTC
- Internal 19.2MHz DCXO or external TCXO
- 19.2MHz reference clock output for peripherals

Security Features

- ECC256
- AES 128
- Built-in TRNG

Firmware Updates

- UART
- FOTA