



nRF5340

Dual processor SoC supporting Bluetooth 5.1, Bluetooth mesh, NFC, Thread & Zigbee

Overview

The nRF5340 is the world's first wireless SoC with two Arm® Cortex®-M33 processors. It is truly secure, and the combination of two flexible processors, the advanced feature set, and an operating temperature up to 105 °C, make it the ideal choice for professional lighting, advanced wearables, and other complex IoT applications.

All-in-one

The nRF5340 is an all-in-one SoC, including a superset of the most prominent nRF52® Series features. Features like USB, Bluetooth 5.1, up to 105 °C operating temperature, and more, are combined with more performance, memory, integration, for significantly less current consumption.

High-performance application processor

The application processor is optimized for performance and can be clocked at either 128 or 64 MHz, using voltage-frequency scaling. The highest performance (510 CoreMark) is achieved with 128 MHz, while running at 64 MHz offers a more efficient option (76 CoreMark/mA). The application processor has 1 MB Flash, 512 KB RAM, a floating-point unit (FPU), an 8 KB 2-way associative cache and DSP instruction capabilities.

Fully-programmable network processor

The network processor is clocked at 64 MHz and is optimized for low power and efficiency (101 CoreMark/mA). It has 256 KB Flash and 64 KB RAM. It is fully programmable, enabling the developer to select which parts to have the highest efficiency, in addition to the wireless protocol stack.

A truly secure SoC

The nRF5340 is a truly secure SoC, offering trusted execution, root-of-trust and secure key storage security features. Arm TrustZone® provides trusted execution by implementing a division between secure and non-secure Flash, RAM, peripherals and GPIOs. The state-of-the-art Arm CryptoCell-312 provides hardware-accelerated cryptography, and together with the key management unit (KMU) peripheral, root-of-trust and secure key storage are implemented.

KEY FEATURES

- High-performance application processor
 - 128/64 MHz Arm Cortex-M33 with FPU & DSP instructions
 - 1 MB Flash + 512 KB RAM
 - 8 KB 2-way set associative cache
- Fully-programmable network processor
 - 64 MHz Arm Cortex-M33 with 2 KB instruction cache
 - 256 KB Flash + 64 KB RAM
 - Ultra low power
- A truly secure SoC
 - Trusted execution with Arm TrustZone
 - Root-of-trust with Arm CryptoCell-312
- Ultra-low-power 2.4 GHz multiprotocol radio
 - Bluetooth 5.1 Direction Finding capable
 - Bluetooth 5 Long Range
 - Bluetooth mesh, Thread and Zigbee
 - 3.2 mA in TX (0 dBm) and 2.6 mA in RX
 - -97.5 dBm RX sensitivity
- NFC
- Full range of digital interfaces with EasyDMA
 - Full-speed USB
 - 96 MHz encrypted QSPI for external memory
 - 32 MHz high-speed SPI for displays and fast sensors
- 105 °C extended operating temperature
- 1.7-5.5 V supply voltage range

APPLICATIONS

- Professional lighting
- Industrial
- Advanced wearables
- Medical
- Smart home
- Asset tracking and RTLS

Extensive wireless protocol support

The nRF5340 SoC supports an extensive range of wireless protocols. It supports Bluetooth Low Energy, and is capable of all AoA and AoD roles in Bluetooth 5.1 Direction Finding, in addition to all Bluetooth 5 features, including Long Range. Mesh protocols like Bluetooth mesh, Thread and Zigbee can be run concurrently with Bluetooth LE, enabling smartphones to provision, commission, configure and control mesh nodes. NFC, ANT, 802.15.4 and 2.4 GHz proprietary protocols are also supported.

Ultra-low-power radio with great sensitivity

The nRF5340 SoC radio sets a new standard when it comes to combining advanced features and minimizing current. The 0 dBm TX current is 3.2 mA, while the RX current is only 2.6 mA, resulting in a reduction of 30% and 40% when comparing to the nRF52840 SoC. The RX sensitivity is -97.5 dBm, 2.5 dB better than nRF52840, meaning that the nRF5340 provides 2.5 dB better sensitivity, while using 40% less current.

nRF Connect SDK

The nRF Connect SDK is the software development kit for the nRF5340 SoC. It also supports the nRF9160, our LTE-M/NB-IoT/GPS SiP, offering a common platform for cellular IoT and short-range development. It offers a complete solution integrating the Zephyr RTOS, protocol stacks, application samples and hardware drivers. The nRF Connect SDK is publicly hosted on GitHub, offers source code management with Git and has free SEGGER Embedded Studio IDE support.

nRF5340 PDK

The nRF5340 PDK is the preview development kit for the nRF5340 SoC. It is affordable, and has everything needed for development on a single board. All features and GPIOs of the nRF5340 SoC are made available to the developer, and it comes with an on-board SEGGER J-Link debugger enabling both programming and debugging of the nRF5340 SoC. The nRF5340 PDK is for evaluation purposes only, it is a preview development kit, and will be replaced by the nRF5340 DK when the nRF5340 SoC is closer to being production ready.

The nRF5340 PDK is available through our distribution network.

For more information please visit:

nRF5340 SoC: www.nordicsemi.com/nRF5340
nRF5340 PDK: www.nordicsemi.com/nRF5340PDK

RELATED PRODUCTS

nRF5340 PDK	Preview development kit for the nRF5340 SoC
nRF Connect SDK	Software development kit for the nRF5340

SPECIFICATIONS

Application core	
CPU	128/64 MHz Arm Cortex-M33
Memory	1 MB Flash + 512 KB RAM
Cache	8 KB 2-way set associative cache
Performance	510/255 CoreMark
Efficiency	65/76 CoreMark/mA
Network core	
CPU	64 MHz Arm Cortex-M33
Memory	256 KB Flash + 64 KB RAM
Cache	2 KB instruction cache
Performance	238 CoreMark
Efficiency	101 CoreMark/mA
Security features	Trusted execution, root-of-trust, secure key storage, 128-bit AES
Security hardware	Arm TrustZone, Arm CryptoCell-312, SPU, KMU, ACL
Wireless protocol support	Bluetooth LE/Bluetooth mesh/NFC/Thread/Zigbee/802.15.4/ANT/2.4 GHz proprietary
On-air data rate	Bluetooth LE: 2 Mbps/1 Mbps/125 kbps 802.15.4: 250 kbps 2.4 GHz proprietary: 2 Mbps/1 Mbps
TX power	Programmable from +3 to -20 dBm in 1 dB steps
RX sensitivity	Bluetooth LE: -97.5 dBm at 1 Mbps -94.3 dBm at 2 Mbps
Radio current consumption DC/DC at 3 V	4.7 mA at +3 dBm TX power, 3.2 mA at 0 dBm TX power, 2.6 mA in RX at 1 Mbps 3.0 mA in RX at 2 Mbps
Oscillators	64 MHz from 32 MHz external crystal or internal 32 kHz from crystal, RC or synthesized
System current consumption DC/DC at 3 V	1.1 µA in System OFF 1.5 µA in System ON 1.6 µA in System ON with network core RTC running 1.8 µA in System ON with 64 KB network core RAM retained and network core RTC running
Digital interfaces	12 Mbps full-speed USB 96 MHz encrypted QSPI 32 MHz high-speed SPI, 4×UART/SPI/TWI, UART/SPI/TWI, I2S, PDM, 4×PWM, 2×QDEC
Analog interfaces	12-bit, 200 ksps ADC, low-power comparator, general-purpose comparator
Other peripherals	6 × 32 bit timer/counter, 4 × 24 bit real-time counter, DPPI, GPIOTE, Temp sensor, WDT, RNG
Temperature range	-40°C to 105°C
Supply voltage	1.7 to 5.5 V
Package options	7×7 mm aQFN™94 with 48 GPIOs

WORLD WIDE OFFICE LOCATIONS

Headquarters:
Trondheim, Norway
Tel: +47 72 89 89 00

For more information

Visit nordicsemi.com for the complete product specification about this and any other wireless ULP products.

About Nordic Semiconductor

Nordic Semiconductor is a fabless semiconductor company specializing in ULP short-range wireless communication. Nordic is a public company listed on the Norwegian stock exchange.

