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NORDIC SEMICONDUCTOR



nRF52820

Bluetooth 5.2 SoC with built-in USB supporting
Bluetooth Low Energy, Bluetooth mesh, Thread and Zigbee

Overview

The nRF52820 System-on-Chip (SoC) is the 6th addition to the industry-leading nRF52® Series. It augments the already extensive collection of wireless SoCs with a lower-end option with built-in USB and a fully-featured multiprotocol radio. The nRF52 Series is truly the ideal platform for basing a product portfolio upon. The common hardware and software architecture results in excellent software portability, increasing software reusability and lowering time-to-market and development cost.

The nRF52820 features an Arm® Cortex®-M4 processor, clocked at 64 MHz. It has 256 KB Flash and 32 KB RAM, and a range of analog and digital interfaces such as an analog comparator, SPI, UART, TWI, QDEC, and last but not least, USB. It can be supplied with a voltage from 1.7 to 5.5 V which enables powering the device from sources such as rechargeable batteries or via USB.

The nRF52820 supports Bluetooth® Low Energy, and is capable of all Bluetooth 5.2 features, in addition to the Direction Finding, high-throughput 2 Mbps and Long Range features. It also capable of Bluetooth mesh, Thread and Zigbee mesh protocols.

For HID applications the built-in USB and +8 dBm TX power make the nRF52820 a great single-chip option, while asset tracking applications can leverage its Bluetooth Direction Finding capabilities. The extended temperature range of -40 to +105 °C makes it suitable for professional lighting applications.

The built-in USB, fully-featured multiprotocol radio and +8 dBm output power makes it the perfect network processor to be paired with an application MCU in gateways and other smart home, commercial and industrial applications requiring advanced wireless connectivity.

Hardware feature comparison	nRF52810	nRF52811	nRF52820	nRF52832	nRF52833	nRF52840	nRF5340
Bluetooth 5.2	X	X	X	X	X	X	X
Bluetooth Direction Finding		X	X		X		X
Bluetooth 2 Mbps	X	X	X	X	X	X	X
Bluetooth Long Range		X	X		X	X	X
802.15.4		X	X		X	X	X
USB			X		X	X	X
Max supply voltage (V)	3.6	3.6	5.5	3.6	5.5	5.5	5.5
Max temperature (°C)	+85	+85	+105	+85	+105	+85	+105

KEY FEATURES

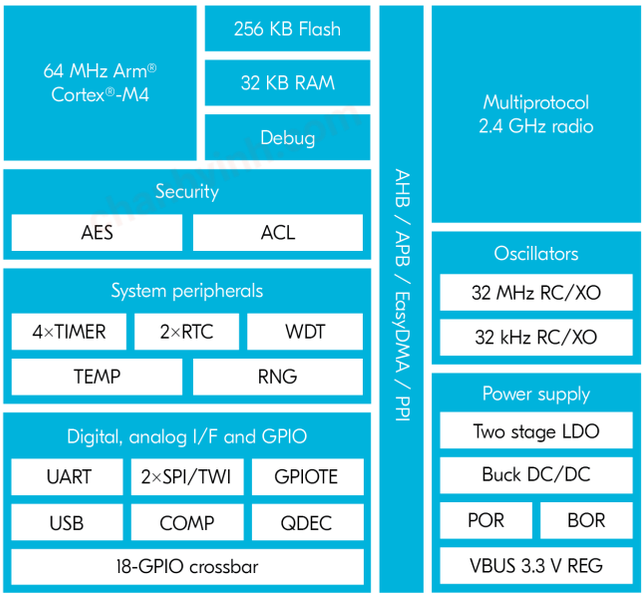
- 64 MHz Arm Cortex-M4
- 256 KB Flash + 32 KB RAM
- Bluetooth Low Energy
  - Bluetooth 5.2
  - Direction Finding
  - High-throughput 2 Mbps
  - Long Range
- Bluetooth mesh
- Thread and Zigbee (802.15.4)
- Ultra-low-power 2.4 GHz multiprotocol radio
  - +8 dBm TX power
  - -95 dBm RX sensitivity
  - 4.9 mA in TX (0 dBm)
  - 4.7 mA in RX (1 Mbps)
  - Integrated balun with single-ended output
- 12 Mbps Full Speed USB 2.0
- Integrated DC/DC regulator
- Extended temperature range: -40°C to +105°C
- 1.7-5.5 V supply voltage range

APPLICATIONS

- Advanced beacons
- HID
- Bluetooth LE USB dongle
- Bluetooth LE mouse
- Bluetooth LE keyboard
- Smart home
- Mesh networks
- Professional lighting
- Asset tracking
- Real-time location systems
- Network processor
- Gateways

nRF 52 SERIES

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Built-in USB for communication, DFU and power supply
The nRF52820's USB peripheral implements a Full Speed USB 2.0 device that offers a widely-used interface that enables low-latency and high-bandwidth communication with a range of hosts, such as PCs, tablets, smartphones, and gateways. It also adds the option of performing device firmware updates (DFU) over USB.

When connected to a USB host, the nRF52820 can be directly powered by the always-present 5 V VBUS signal, and Nordic provides a reference layout for this configuration. In addition to the main supply regulators, the USB peripheral in the nRF52820 integrates a dedicated regulator for converting the 5 V VBUS signal to the 3.3 V needed for supplying the USB signaling interface, removing the cost and space for an external regulator.

Get started today
The nRF52820 is supported by three Bluetooth LE protocol stacks, SoftDevice S112, S122 and S140. The S112 is a memory-optimized peripheral stack, the S122 is a memory-optimized central stack, while the S140 is a feature-rich Bluetooth 5 protocol stack supporting both central and peripheral.

A guide on how to use nRF52820 with nRF5 SDK v16.0.0 is available, while full nRF5 SDK support is coming in Q2 2020.

The nRF52833 DK is the recommended development kit, it emulates the nRF52820, and can be used as a starting point for development before moving over to a custom board.

For more information please visit:
www.nordicsemi.com/nRF52820

SPECIFICATIONS

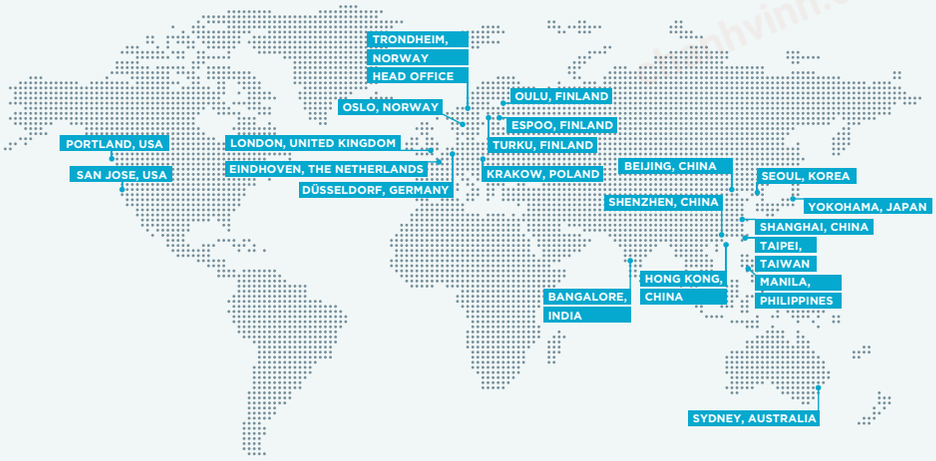
Core CPU Memory Performance Efficiency	64 MHz Arm Cortex-M4 256 KB Flash + 32 KB RAM 144 CoreMark 39 CoreMark/mA	
Wireless protocol support	Bluetooth LE/Bluetooth mesh/Thread/ Zigbee/802.15.4/ANT/2.4 GHz proprietary	
On-air data rate	Bluetooth LE: 802.15.4: 2.4 GHz proprietary:	2 Mbps/1 Mbps/125 kbps 250 kbps 2 Mbps/1 Mbps
TX power	Programmable from +8 dBm to -20 dBm in 4 dB steps	
RX sensitivity	Bluetooth LE: 802.15.4:	-103 dBm at 125 kbps -95 dBm at 1 Mbps -99 dBm at 250 kbps
Radio current consumption DC/DC at 3 V	+8 dBm TX power +4 dBm TX power 0 dBm TX power RX at 1 Mbps	14.0 mA 9.4 mA 4.9 mA 4.7 mA
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	0.6 µA in System OFF 1.1 µA in System ON 2.6 µA in System ON with 32 KB RAM retained and RTC running	
Security features	128-bit AES	
Digital interfaces	12 Mbps Full Speed USB device UART, 2×SPI/TWI, QDEC	
Analog interfaces	Comparator	
Other peripherals	4 × 32 bit timer/counter, 2 × 24 real-time counter, PPI, GPIOTE, temp sensor, WDT, RNG	
Temperature range	-40°C to +105°C	
Voltage supply	1.7 to 5.5 V LDO and DC/DC	
Package options	5×5 mm QFN40 with 18 GPIOs (drop-in compatible with nRF52833 SoC)	

RELATED PRODUCTS

nRF52833 DK	Development kit for nRF52820 and nRF52833 SoCs
nRF5 SDK	Software development kit for Bluetooth Low Energy, ANT and 802.15.4

WORLD WIDE OFFICE LOCATIONS

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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.