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NRF52840-QFAA-R

Nordic Semiconductor

RF System on a Chip - SoC Multiprotocol Bluetooth 5.3 SoC supporting Bluetooth Low Energy, Bluetooth mesh, NFC, Thread and Zigbee

Any questions,please feel free to contact us.
info@kaimte.com

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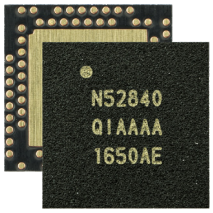

nRF52840

High-end multiprotocol Bluetooth Low Energy (LE) SoC supporting: Bluetooth 5.3/Bluetooth mesh/Thread/ Zigbee/802.15.4/ANT

Ready for Bluetooth 5.3 and high grade IoT security
The nRF52840 is an advanced, highly flexible single chip solution for today's increasingly demanding ULP wireless applications for connected devices on our person, connected living environments and the IoT at large. It is designed ready for the major feature advancements of Bluetooth LE and takes advantage of increased performance capabilities which include long range and high throughput modes. Inherent industry-grade security is essential in today's applications. The nRF52840 adds best-in-class security for Cortex™-M Series with on-chip ARM® CryptoCell cryptographic accelerator.

	nRF52805	nRF52810	nRF52811	nRF52820	nRF52832	nRF52833	nRF52840	nRF5340
Bluetooth 5.3	X	X	X	X	X	X	X	X
Bluetooth 2 Mpbs	X	X	X	X	X	X	X	X
Bluetooth Long Range			X	X		X	X	X
Bluetooth Direction Finding			X	X		X		X
Bluetooth LE Audio								X
Bluetooth mesh				X	X	X	X	X
Thread			X	X		X	X	X
Zigbee				X		X	X	X
Matter							X	X

Advanced performance, lowest power consumption
The nRF52840 employs the same hardware and software architecture as existing nRF52 Series SoCs. At its core is an Arm Cortex-M4 processor allowing quicker and more efficient computation of complex functions for DSP and those requiring floating point math. There is extensive memory availability in both flash and RAM, 1 MB and 256 KB respectively. The combination of Cortex-M4 with floating point and memory availability offers unparalleled capabilities for true single chip applications. A full-speed (12 Mbps) USB 2.0 controller is included on-chip. An extensive range of peripherals are available with a number of high performance digital interfaces such as high speed SPI (32 MHz) and quad SPI (32 MHz) to allow direct interfacing to displays and external memory sources. The nRF52840 can operate from +5.5 V down to 1.7 V supply voltages allowing direct supply from rechargeable batteries and USB supplies.

Key features

- 64 MHz Arm® Cortex-M4 with FPU
- 1 MB Flash + 256 KB RAM
- Bluetooth 5.3 multiprotocol radio
  - 2 Mbps
  - CSA #2
  - Advertising Extensions
  - Long Range
  - +8 dBm TX power
  - -95 dBm sensitivity
  - Integrated balun with 50 Ω single-ended output
- IEEE 802.15.4 radio support
  - Thread
  - Zigbee
- 1.7-5.5 V supply voltage range
- Full-speed 12 Mbps USB
- NFC-A tag
- Arm CryptoCell CC310 security subsystem
- QSPI/SPI/TWI/I²S/PDM/QDEC
- High speed 32 MHz SPI
- Quad SPI interface 32 MHz
- EasyDMA for all digital interfaces
- 12-bit 200 ksps ADC
- 128 bit AES/ECB/CCM/AAR co-processor
- On-chip DC-DC buck converter
- Regulated supply for external components up to 25 mA

Applications

- IoT
  - Smart Home products
  - Matter connected home products
  - Industrial mesh networks
  - Smart city infrastructure
- Advanced wearables
  - Connected watches
  - Advanced personal fitness devices
  - Wearables with wireless payment
  - Connected Health
  - Virtual/Augmented Reality applications
- Interactive entertainment devices
  - Advanced remote controls
  - Gaming controller

nRF 52 SERIES

For more information please visit: **nordicsemi.com/nRF52840**

Thread certified and 802.15.4 support
The nRF52840 is a Thread certified component and as such is ideal for home networking products using the Thread mesh stack. This means it is suitable for developing products for the Matter connected home ecosystem. The radio supports 802.15.4 PHY and MAC layers and makes it suitable for additional stacks using 802.15.4 such as Zigbee.

Arm CryptoCell 310
The nRF52840 features an on-chip Arm CryptoCell 310 cryptographic hardware accelerator. CryptoCell offers a wide range of ciphers and security features for building solid security into applications from the ground up. Use of CryptoCell also makes associated security operations run faster and uses less processing time and power than equivalent operation carried out in software by the CPU.

nRF Connect SDK
The nRF Connect SDK is the software development kit for the nRF52 Series SoCs. It supports development of Bluetooth Low Energy, Thread and Zigbee applications. It integrates the Zephyr RTOS, protocol stacks, samples, hardware drivers and much more.

nRF Connect SDK also offers integration of HomeKit Accessory Development Kit for developing products using HomeKit.

nRF52840 Development Kit (DK)
The nRF52840 DK is the development kit for the nRF52840 SoC. It is affordable, and has everything needed for development on a single board. All features and GPIOs of the nRF52840 SoC are made available to the developer, and it comes with an onboard SEGGER J-Link debugger enabling both programming and debugging of the nRF52840 SoC, without additional hardware investments.

The nRF52840 SoC and the nRF52840 DK is available through Nordic Semiconductors distribution network.

Related Products

nRF52840 DK	Development kit for nRF52811 and nRF52840 SoCs
nRF Connect SDK	Main software development kit for the nRF 52840 SoC and other nRF52 Series SoCs
Power Profiler Kit II	Hardware tool for current measurement and power profiling your applications
nRF21540 RF FEM	Range extender front end for Bluetooth LE, Thread and Zigbee applications
nPM1100 PMIC	Higly efficient power management IC for low power small form factor devices

Specifications

Protocol support	Bluetooth 5.3/802.15.4/ANT/2.4 GHz proprietary	
Microprocessor	64 MHz 32-bit Arm Cortex-M4 with FPU	
Memory	1 MB Flash + 256 KB RAM	
On-air data rate	Bluetooth LE: 2 Mbps/1 Mbps/500 kbps/125 kbps 802.15.4: 250 kbps 2.4 GHz proprietary: 2 Mbps/ 1 Mbps	
TX power	Programmable from +8 dBm to -20 dBm in 4 dB steps	
Sensitivity	Bluetooth LE: 802.15.4: 2.4 GHz:	-103 dBm at 125 kbps -95 dBm at 1 Mbps -100 dBm at 250 kbps -93 dBm at 1 Mbps -89 dBm at 2 Mbps
Radio current consumption DC/DC at 3 V	16.40 mA at +8 dBm TX power, 6.40 mA at 0 dBm TX power, 6.26 mA in RX at 1 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	0.4 µA in System OFF, no RAM retention 1.86 µA in System OFF, full RAM retention 0.97 µA in System ON, no RAM retention 2.35 µA in System ON, full RAM retention 3.16 µA in System ON, full RAM retention and RTC	
Hardware security	128-bit AES CCM, ECB, AAR	
Security subsystem	Arm TrustZone CryptoCell 310	
Digital interfaces	USB 2.0, 4 × SPI master/slave, 2 × TWI master/slave, 2 × UART, 4 × PWM, QPSI, I²S, PDM, QDEC	
Analog interfaces	12-bit 200 ksps ADC, GP comparator, LP comparator	
Peripherals	5 × 32 bit timer/counter, 3 × 24 real-time counter, 20 × PPI channels, 4 × GPIOTE, temperature sensor, watchdog timer, RNG	
NFC	NFC-A tag	
Voltage supply	1.7 to 5.5 V LDO or DC/DC	
Package options	7 × 7 aQFN73 with 48 GPIOs 6 × 6 QFN48 with 30 GPIOs 3.5 × 3.6 WLCSP94 with 48 GPIOs	


7×7 mm


6×6 mm


3.5×3.6 mm

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