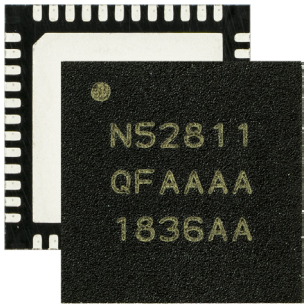
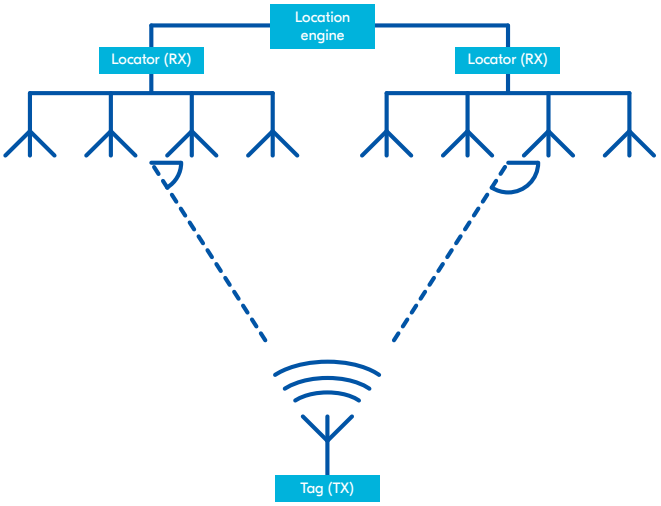
NORDIC SEMICONDUCTOR



nRF52811

Comprehensive Bluetooth 5.1 Direction Finding SoC with Thread and Zigbee support

Pinpoint anything with the nRF52811 SoC
The nRF52811 SoC is the 4th addition to the nRF52 Series, and adds capabilities for *Bluetooth*® 5.1 Direction Finding. Direction Finding enables positioning solutions to not only rely on received signal strength indicator (RSSI), but also the actual direction of a signal. This improves accuracy significantly and opens new possibilities for applications in this segment. There are two types of methods for determining direction, angle of arrival (AoA), where the direction of the received signal is calculated, and angle of departure (AoD), where the direction of the transmitted signal is calculated. The nRF52811 SoC is the perfect choice as a transmitter in both the AoA or AoD scenarios, with its low power character and connectivity features.



Real time locating system
Above you see an example of a real time location system (RTLS) where the principle of AoA is used to determine the location of an tag. The tag is just a simple beacon, broadcasting. Each locator determines which direction the signal is coming from and together with the location engine they are able to calculate the location of the tag.

KEY FEATURES

- 64 MHz Arm® Cortex-M4
- 192 KB Flash + 24 KB RAM
- Bluetooth 5.1 radio
  - Direction Finding
  - Long Range
  - +4 dBm TX power
  - -96 dBm sensitivity
  - 4.6 mA in TX (0 dBm)
  - 4.6 mA in RX
  - Integrated balun with 50 Ω single-ended output
- IEEE 802.15.4 radio support
  - Thread
  - Zigbee
- 1.7-3.6 V supply voltage range
- Integrated DC-DC regulator
- 0.3 µA in System OFF
- 1.1 uA in System ON with RTC and full RAM retention
- Full range of digital interfaces with EasyDMA
- 12-bit 200 ksps ADC
- Small size

APPLICATIONS

- Beacons
- Network processor
- Proximity solutions
- Real time locating systems
- Asset tracking
- Smart home

nRF 52 SERIES

Enhancing beacon applications
The nRF52811 SoC gives the opportunity to enhance beacon applications to leverage the Long Range feature introduced in Bluetooth 5, in addition to Direction Finding introduced in Bluetooth 5.1. It achieves longer range without adding more costly components, providing an ideal option for cost-sensitive beacon applications.

The ultimate network processor
The nRF52811 offers comprehensive connectivity with a long list of capabilities and features. It is capable of all the latest features of Bluetooth, including Long Range and Direction Finding, but also 802.15.4, Thread and Zigbee. This comprehensive connectivity offer makes it the ultimate network processor, and paired with a companion MCU, it offers great value in for example gateway and router applications for smart home.

Get started today
The nRF52811 is supported by the nRF5 SDK, providing all the necessary examples, libraries and drivers to get started with development. SoftDevice S112, a Bluetooth 5 protocol stack, is already qualified for it, providing high throughput with 2 Mbps and improved coexistence with channel selection algorithm #2. In addition, a Thread connectivity solution is available in the nRF5 SDK for Thread and Zigbee.

Development kit for the nRF52811
The nRF52840 DK is the recommend development kit, it emulates the nRF52811, and can be used as a starting point for development before moving over to a custom board. Please note that this development kit does not support Bluetooth Direction Finding.

RELATED PRODUCTS

nRF52840	SoC for Bluetooth 5/Bluetooth mesh/ 802.15.4/Thread/Zigbee/ANT/2.4 GHz
nRF52832	SoC for Bluetooth 5/Bluetooth mesh/ ANT/2.4 GHz
nRF52810	SoC for Bluetooth 5/ANT/2.4 GHz
nRF52840 DK	Development kit for nRF52811 and nRF52840 SoCs
nRF5 SDK	Main software development kit for Bluetooth 5, ANT and 802.15.4
nRF5 SDK for Thread and Zigbee	Software development kit for Thread and Zigbee
Power Profiler Kit	Current measurement tool for embedded development

SPECIFICATIONS

Protocol support	Bluetooth 5.1/802.15.4/ANT/2.4 GHz proprietary
Microprocessor	64 MHz 32-bit Arm Cortex-M4
Memory	192 KB Flash + 24 KB RAM
On-air data rate	Bluetooth 5.1: 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 +4 to -20 dBm in 4 dB steps
Sensitivity	Bluetooth 5.1: -104 dBm at 125 kbps -100 dBM at 500 kbps -96 dBm at 1 Mbps -94 dBm at 2 Mbps 802.15.4: -101 dBm at 250 kbps ANT: -94 dBm at 1 Mbps 2.4 GHz: -94 dBm at 1 Mbps -91 dBm at 2 Mbps
Radio current consumption DC/DC at 3 V	7.0 mA at +4 dBm TX power, 4.6 mA at 0 dBm TX power, 4.6 mA in RX at 1 Mbps 5.2 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	0.3 µA in System OFF, no RAM retention 0.5 µA in System OFF, full RAM retention 0.6 µA in System ON, no RAM retention 0.8 µA in System ON, full RAM retention 1.1 µA in System ON, full RAM retention and RTC
Hardware security	128-bit AES CCM, ECB, AAR
Digital interfaces	SPI master/slave TWI master/slave UART PWM QDEC PDM
Analog interfaces	12-bit, 200 ksps ADC, comparator
Peripherals	3 × 32 bit timer/counter 2 × 24 real-time counter 20 × PPI channels 4 × GPIOTE Temperature sensor Watchdog timer RNG BPROT - flash protection
Voltage supply	1.7 to 3.6 V LDO or DC/DC
Package options	6 × 6 QFN48 with 32 GPIO 5 × 5 QFN32 with 17 GPIO 2.48 × 2.46 WLCSP33 with 15 GPIO

6×6 mm

5×5 mm

2.48×2.46 mm

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.