nRF7002 Product Specification

NORDIC SEMICONDUCTOR

Contents

1. nRF7002 Product Specification

This Product Specification contains functional descriptions, register tables, and electrical specifications, and is organized into chapters based on the modules and peripherals that are available in this IC.

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- nRF7002 Product Specification v1.1
- nRF7002 Product Specification v1.0

Note: The HTML rendition of the Product Specification corresponds to the latest version only. All versions are available as PDF files.

Key features	Applications

• Wi-Fi® 6 companion IC with integrated RF
• Supports IEEE 802.11 ax and earlier standards (IEEE 802.11 a/b/g/n/ac)
• Supports *Target Wake Time (TWT)*, *Orthogonal Frequency Division Multiple Access (OFDMA)*, *Basic Service Set (BSS)* Coloring
• Supports Wi-Fi CERTIFIED 6™, Wi-Fi CERTIFIED™, Wi-Fi Enhanced Open™
• Supports WPA3™, WPA2™, WPA™ - Personal and Enterprise, Protected Management Frames
• Supports WMM®, WMM - Power Save, Wi-Fi Agile Multiband™, Wi-Fi Direct®
• Maximum output power 20 dBm
• Dual-band 2.4 GHz and 5 GHz operation
• Single-ended 50 Ω antenna port
• 191 mA @ max output power, 2.4 GHz, MCS7
• 260 mA @ max output power, 5 GHz, MCS7
• 60 mA RX 2.4 GHz, 56 mA RX 5 GHz
• SPI or QSPI host interface, 3-wire or 4-wire coexistence interface
• Supply voltage range 2.9 – 4.5 V
• Operating temperature range -40° C to 85° C
• Package variants
  • QFN48 package, 6 x 6 mm
  • WLCSP81 package, 3.8 x 3.4 mm
	• *Internet of Things (IoT)*
	  • Smart Home applications, including Gateways and Border Routers
	  • Industrial IoT sensors and controllers
	• Sports and Fitness
	• Health monitor devices
	• Wireless Payment Terminals
	• Wi-Fi locationing based on SSID scanning

Revision history

About this document This document is organized into chapters that are based on the modules and peripherals available in the IC.

Product overviewnRF7002 is a wireless companion IC that adds low-power Wi-Fi 6 capabilities to another *System on Chip (SoC)*, *Microprocessor Unit (MPU)*, or *Microcontroller Unit (MCU)* host. It implements the *Physical (PHY)* and *Medium Access Control (MAC)* layers of the 802.11 protocol stack, while the higher layers of the networking stack run on the host.

Host connectionnRF7002 is a wireless companion device that is connected to a host *MCU* or application processor. It is

connected to the host through a *Quad Serial Peripheral Interface (QSPI)* (6-wire) or *Serial Peripheral Interface (SPI)* (4-wire) for data and a 3-wire or 4-wire coexistence control interface for hosts that include a Bluetooth® LE/IEEE 802.15.4 radio. In addition, two lines (HOST_IRQ and BUCKEN) are required. The user application executes on the host MCU.

Power and clock management The power and clock management system in nRF7002 is optimized for ultra-low power applications to ensure maximum power efficiency.

Software stack This section details the partitioning of the TCP/IP networking stack and the IEEE 802.11 Wi-Fi stack across the host *MCU* and nRF7002.

Quad Serial Peripheral Interface The *SPI*/*QSPI* slave interface is compatible with the nRF52 and nRF53 Series SPI/QSPI master interface.

CoexistencenRF70 Series devices have a highly configurable coexistence hardware to help mitigate interference between WLAN and Bluetooth® LE/IEEE 802.15.4 devices (Thread®, Zigbee®).

OTP memory programmingnRF7002 includes a 128 x 32-bit *One Time Programmable (OTP) memory*. This memory is partitioned into two regions, a factory programmed region and a customer programmed region, each containing 64 x 32-bit locations.

FICR - Factory Information Configuration Registers The Factory Information Configuration Registers (FICR) are stored in the *OTP memory*.

Recommended operating conditions The operating conditions are the physical parameters that the chip can operate within.

Absolute maximum ratings Maximum ratings are the extreme limits to which the chip can be exposed for a limited amount of time without permanently damaging it. Exposure to absolute maximum ratings for prolonged periods of time may affect the reliability of the device.

Electrical specification This section provides a summary of nRF7002 electrical specifications.

Hardware and layout This section describes nRF7002 hardware and layout specifications.

Ordering information This chapter contains information on IC marking, ordering codes, and container sizes.

GlossaryThe glossary contains terms and acronyms that are used in this document.

Notifications related to GNU GPL SoftwareA core within the nRF7002 device uses copyrighted software that is licensed under the GPL.

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