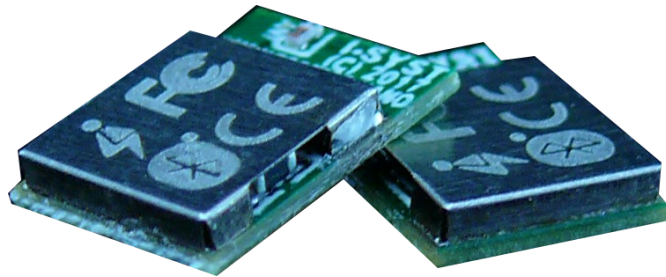


HARDWARE REFERENCE

IMM-NRF52832-NANO

Module



Part No : IBLE832N

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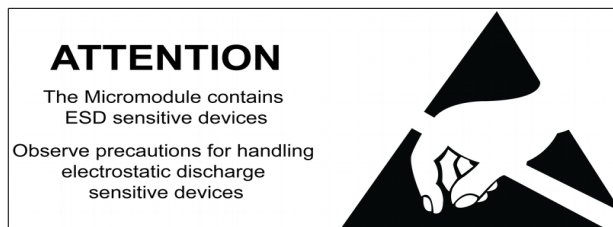


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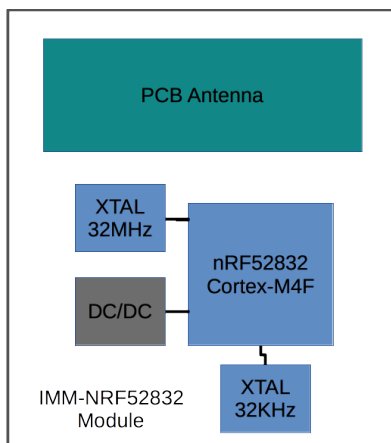
Introduction

The nRF52832 is an ultra low power System on Chip (SoC) from Nordic Semiconductor. It integrates the nRF52 series 2.4GHz transceiver, a 32 bits ARM® Cortex™-M4F MCU, Flash memory, analog and digital I/O. The nRF52832 supports ANT+, Bluetooth 5 Low Energy and proprietary protocols.

The IMM-NRF52832-NANO is a 10 x 7 x 1.6 mm module with embedded PCB antenna. It allows developers to take full advantage of the nRF52832 by making all its I/O available via 34 SMD 0.5mm pitch pads.

Features:

- 32 bits ARM® Cortex™-M4F @ 64MHz.
- 2.4GHz transceiver, Bluetooth 5 LE, ANT+
- 64KB SRAM.
- 512KB Flash
- 32 MHz & 32.768 KHz Crystals
- DC/DC power mode configuration
- 30 configurable I/O pins
- Type 2 NFC-A Tag with wakeup on field
- 8 configurable 12 bits, 200 ksps ADC
- Digital microphone interface
- 3 x 4 channels PWM
- AES hardware encryption
- RNG, RTC
- Temperature sensor
- Up to 4 PWM
- Digital interfaces SPI Master/Slave, 2-wire Master (I2C compatible), UART (CTS/RTS)
- Quadrature decoder
- Low power comparator
- Operating voltage : 1.8V to 3.6V
- Dimension : 10 x 7 x 1.6 mm



Module Layout

Dimensions and I/O pins layout

Bellow is the direct relationship of the module pads and the nRF52832 I/O pins.

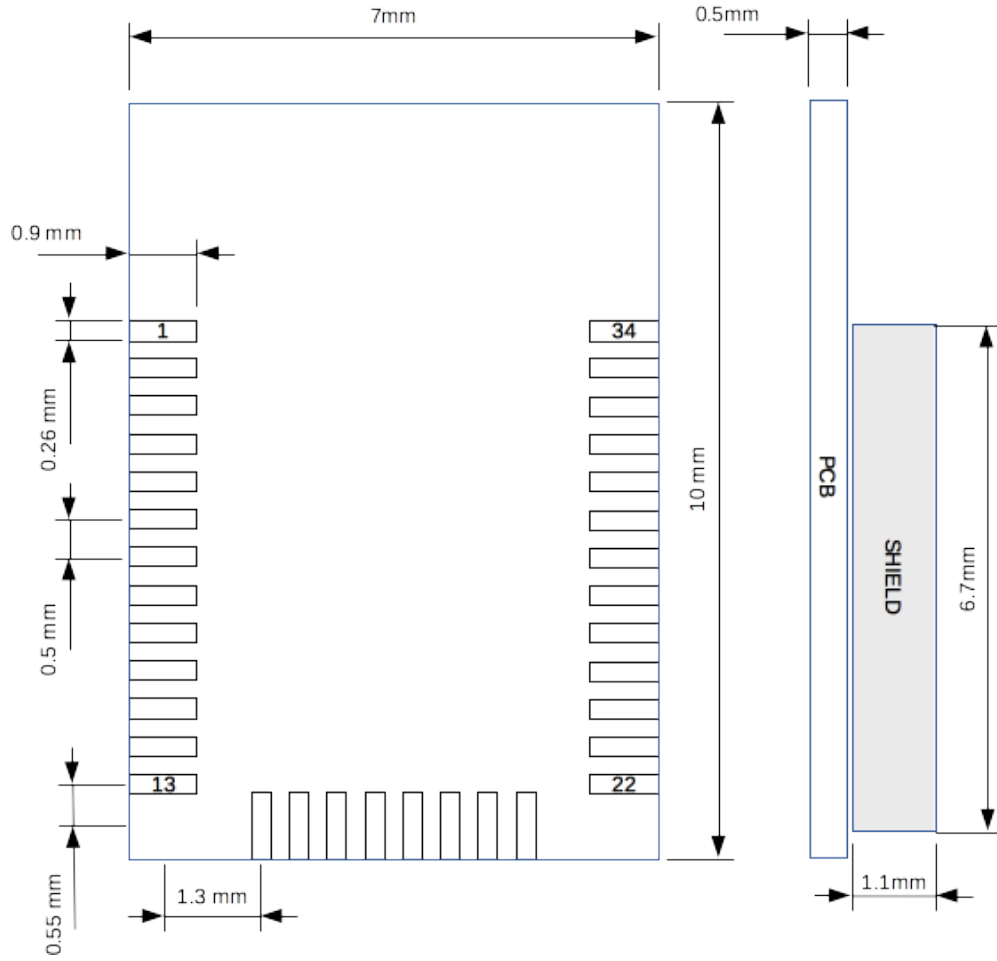


Fig. 1: Dimensions top view

Pin Number	Pin Name	Description
1	P0.22	GPIO 22
2	P0.21/nRESET	GPIO 21 or RESET active low
3	P0.20	GPIO 20
4	P0.19	GPIO 19
5	P0.18	GPIO 18
6	P0.17	GPIO 17
7	P0.16	GPIO 16
8	P0.15	GPIO 15
9	P0.14	GPIO 14
10	P0.13	GPIO 13
11	P0.12	GPIO 12
12	P0.11	GPIO 11
13	P0.10/NFC2	GPIO 10 or NFC2 tag
14	P0.09/NFC1	GPIO 9 or NFC1 tag
15	P0.08	GPIO 8
16	P0.07	GPIO 7
17	P0.06	GPIO 6
18	SWDIO	JTAG Data
19	SWDCLK	JTAG Clock
20	VDD	Power 1.8V-3.6V
21	GND	Ground
22	P0.05/AIN3	GPIO 5 or Analog Input 3
23	P0.04/AIN2	GPIO 4 or Analog Input 2
24	P0.03/AIN1	GPIO 3 or Analog Input 1
25	P0.02/AIN0	GPIO 2 or Analog Input 0
26	P0.31/AIN7	GPIO 31 or Analog Input 7
27	P0.30/AIN6	GPIO 30 or Analog Input 6
28	P0.29/AIN5	GPIO 29 or Analog Input 5
29	P0.28/AIN4	GPIO 28 or Analog Input 4
30	P0.27	GPIO 27
31	P0.26	GPIO 26
32	P0.25	GPIO 25
33	P0.24	GPIO 24
34	P0.23	GPIO 23

SMD Footprint

Note : Do not route any traces or planes under the indicated antenna area.

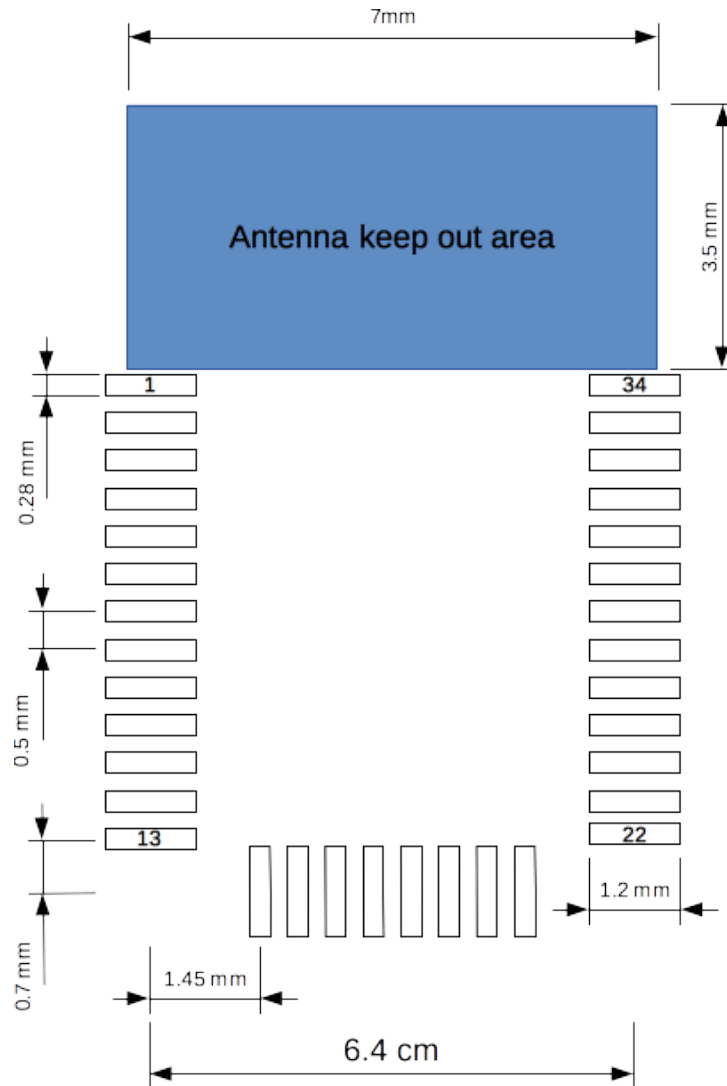


Fig. 2: SMD footprint

Quick Start

Requirements

The follows are required for software development

- Debug J-Tag : IDAP-Link, Segger J-Link, or any ARM compatible J-Tag.
- Nordic SDK & Softdevice ANT & BLE stack (<https://developer.nordicsemi.com/>)
- C/C++ embedded software development environment : Eclipse, Keil, CrossWorks, ...

Flashing firmware

The Nordic Softdevice is required to use ANT & BLE application. There are many methods to flash it in the module. The official method from Nordic is to use nRFGo with J-Link. This program is available only on Windows operating system. The other method is to use IDAP-Link with IDAPnRFProg for OSX & Windows. More details available on blog page <http://embeddedsoftdev.blogspot.ca/p/ehal-nrf51.html>. The IDAPnRFProg can program Softdevice, DFU and Firmware app without requiring mergehex. It can parallel program multiple nRF51 boards at once when multiple IDAP-Link are connected to PC..

Breakout board

The module can also be mounted on the optional breakout board, the IBK-BLUEIO-NANO. This breakout board has all I/O pins routed out to standard DIP32, 2.54mm pitch header pin, with onboard LED indicator and coin battery holder. Ready to be mounted on a breadboard. The SWD pins are also routed out for debug probe. Connect it to the IDAP-Link for OpenOCD debugging or turn the IMM-NRF52832-NANO into mBed compatible.

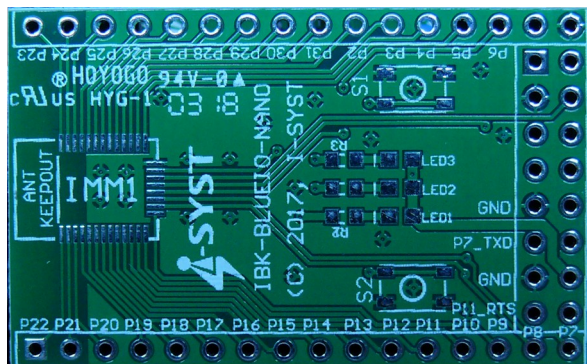


Fig. 3: IBK-BLUEIO-NANO.

Breakout PCB for the IMM-NRF52832-NANO module

J-Tag wiring

The IMM-NRF52832-NANO module has exposed the SWD (Serial Wire Debug) pins SWDIO & SWCLK, see I/O layout section. The module can be directly connected to a J-Tag tool for development by wiring the 2 SWD and the optional Reset pins to the appropriate pins on the J-Tag connector. The VIN must be wire to the VCC pin on the J-Tag. GND pad is also require to be connected to GND on J-Tag.

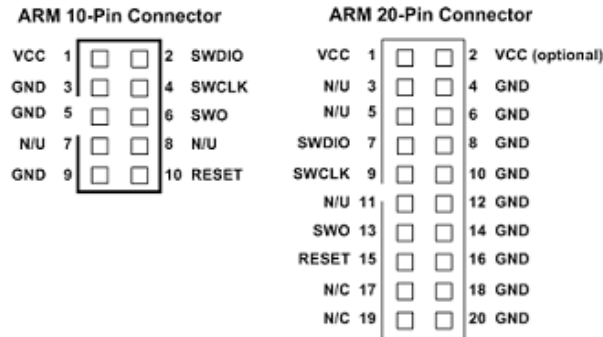


Fig. 4: ARM JTAG Connector

The module can be powered from 1.8V to 3.6V on VIN. It could be coin battery or DC supply source.



Fig. 5: IDAP-Link JTag with IBK-BLUEIO-NANO for development with the IMM-NRF52832-NANO module

Nordic Software

The Nordic SDK and software tools can be download from <http://developer.nordicsemi.com> and <http://www.nordicsemi.com>. Community support forum at <https://devzone.nordicsemi.com>.

Eclipse IDE

Eclipse with GCC is the most cost effective software development environment. It is 100% free. The drawback is that it requires a bit of gymnastics to setup. Fortunately many Blog posts are available on the Internet showing step by step. Follow this blog to setup the Eclipse IDE & GCC compiler: <http://embeddedsoftdev.blogspot.ca/p/eclipse.html>.

There are samples code in the Nordic SDK itself. Other Eclipse based example code are available from this Blog page <http://embeddedsoftdev.blogspot.ca/p/ehal-nrf51.html>