

WIRELESS-TAG

# BLE MODULE SPECIFICATIONS

nRF51-04/DK

Bluetooth Low Energy® (BLE) module of nRF51-04 is the next generation BLE module released by SEMITRION electronics. The modules use nRF51822 from NORDIC as the controller chips. With its small form factor, low power, high economic Bluetooth radio, nRF51-04 can easily be added in your system and help to promote the design process.

nRF51822 is an ultra-low power 2.4 GHz wireless System on Chip (SoC) integrating the nRF51 series 2.4 GHz transceiver, a 32 bit ARM® Cortex™-M0 CPU, flash memory, and analog and digital peripherals. nRF51822 can support Bluetooth® low energy and a range of proprietary 2.4 GHz protocols, such as Gazell from Nordic Semiconductor.

Fully qualified Bluetooth low energy stacks for nRF51822 are implemented in the S100 series of SoftDevices. The S100 series of SoftDevices are available for free and can be downloaded and installed on nRF51822 independent of your own application code.

## Key Features

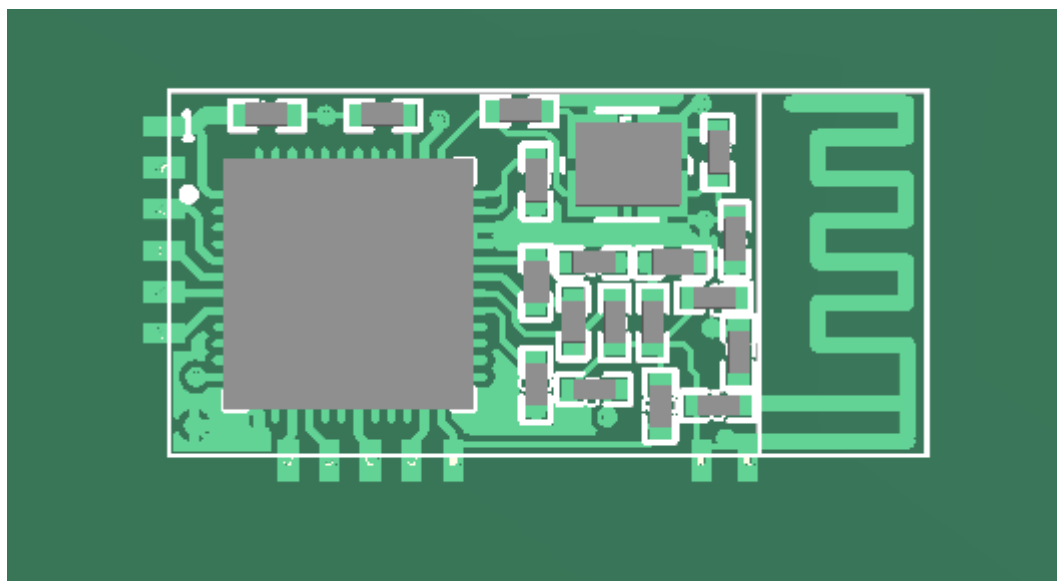
- 2.4 GHz transceiver
  - -93 dBm sensitivity in Bluetooth® low energy mode
  - 250 kbps, 1 Mbps, 2 Mbps supported data rates
  - TX Power -20 to +4 dBm in 4 dB steps
  - TX Power -30 dBm Whisper mode
  - 13 mA peak RX, 10.5 mA peak TX (0 dBm)
  - RSSI (1 dB resolution)
- ARM® Cortex™-M0 32 bit processor
  - 275  $\mu$ A/MHz running from flash memory
  - 150  $\mu$ A/MHz running from RAM
  - Serial Wire Debug (SWD)
- Memory
  - 256 kB or 128 kB embedded flash program memory
  - 16 kB RAM
- Flexible Power Management
  - Supply voltage range 1.8 V to 3.6 V
  - 2.5  $\mu$ s wake-up using 16 MHz RCOSC
  - 0.4  $\mu$ A @3V OFF mode
  - 0.5  $\mu$ A @3V in OFF mode + 1 region RAM retention
  - 2.3  $\mu$ A @3V ON mode, all blocks IDLE
- 8/9/10 bit ADC - 8 configurable channels
- 31 General Purpose I/O Pins
- One 32 bit and two 16 bit timers with counter mode
- SPI Master
- UART (CTS/RTS)
- Two-wire Master (I2C compatible)

- Quadrature Decoder (QDEC)
- AES HW encryption
- Real Time Counter (RTC)
- 16 MHz crystal
- Balun
- AES HW encryption
- Package variants
  - nRF51-04, 18.5 x 9.1 mm

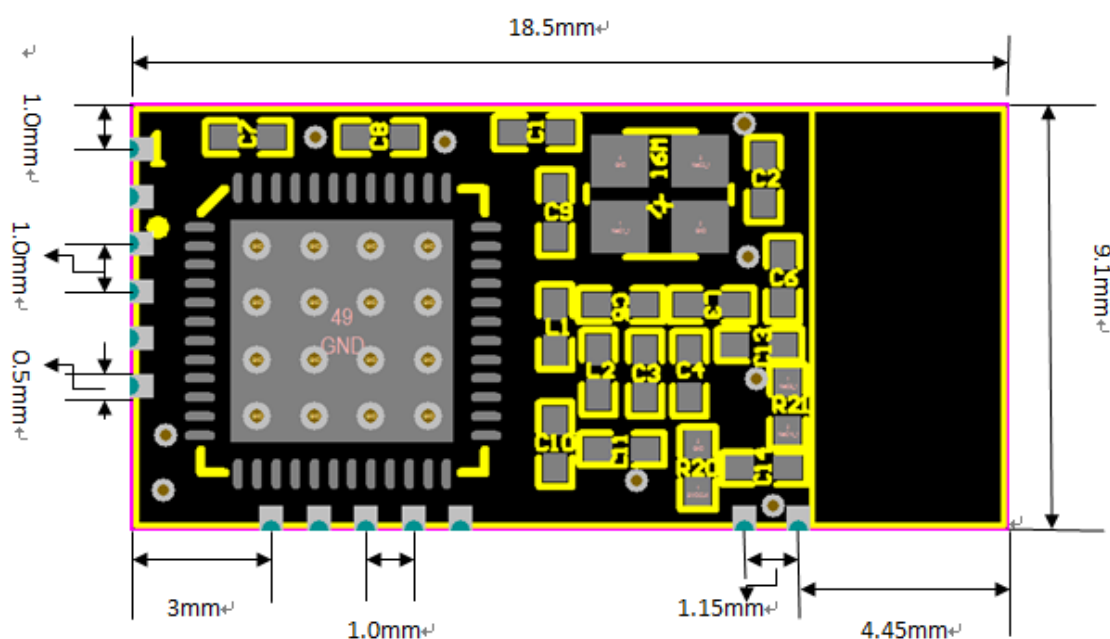
## Applications

- Computer peripherals and I/O devices
  - Mouse
  - Keyboard
  - Multi-touch track pad
- Interactive entertainment devices
  - Remote control
  - 3D Glasses
  - Gaming controller
- Personal Area Networks
  - Health/fitness sensor and monitor devices
  - Medical devices
  - Key-fobs + wrist watch
- Remote control toys

## nRF51-04 module



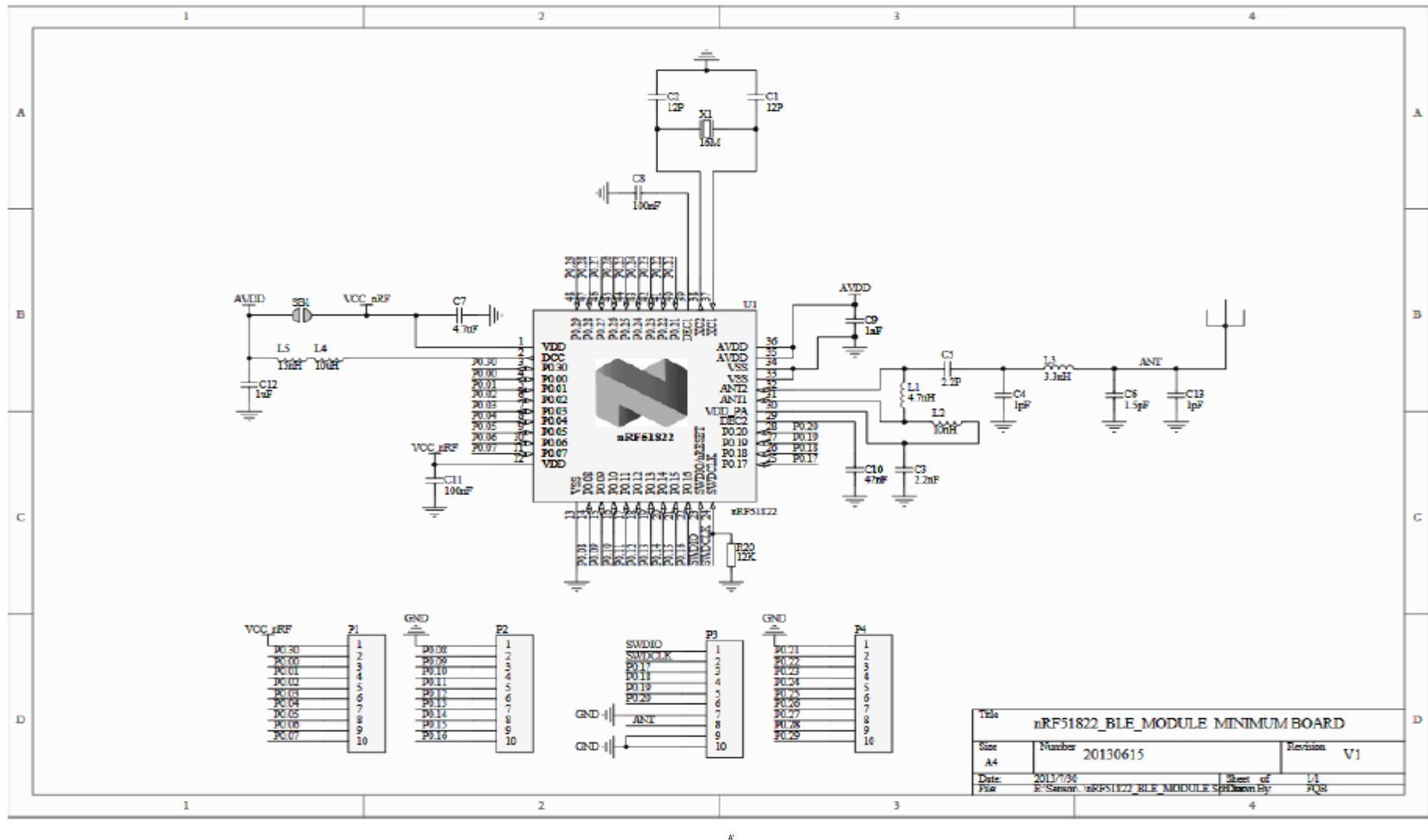
## Mechanical drawings



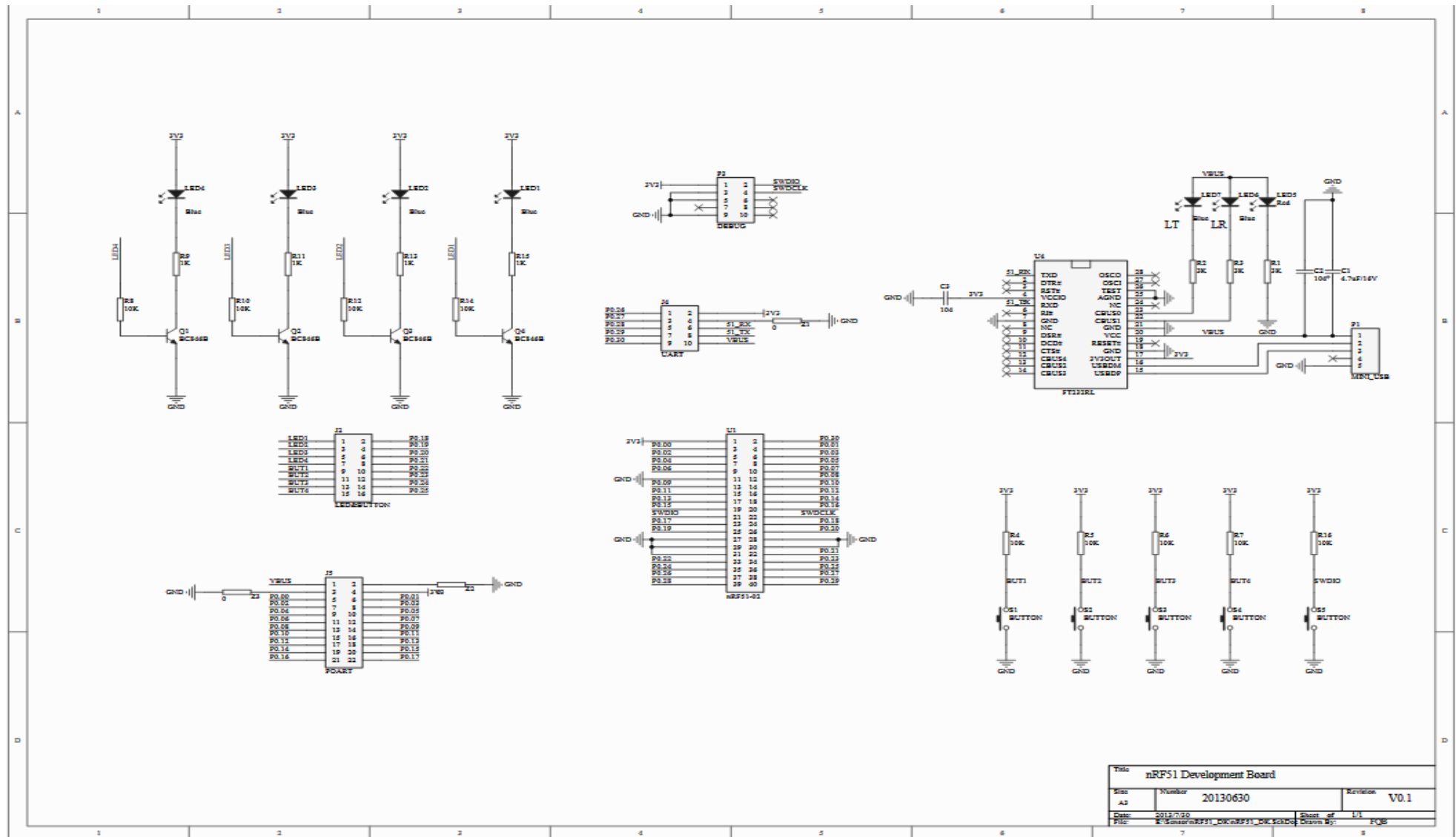
## Pin assignment

| No. | Name  | Function description    | No. | Name   | Function description   |
|-----|-------|-------------------------|-----|--------|--|
| 1   | VCC   | DC2.5V~3.6V             | 21  | SWDIO  | System reset (active low). Also HW debug and flash programming I/O       |
| 2   | P0.30 | General purpose I/O pin |     | RST    |  |
| 3   | P0.00 | General purpose I/O pin | 22  | SWDCLK | HW debug and flash programming I/O                                       |
|     | AREF0 | ADC Reference voltage   | 23  | P0.17  | General purpose I/O pin  |
| 4   | P0.01 | General purpose I/O pin | 24  | P0.18  | General purpose I/O pin  |
|     | AIN2  | ADC input 2             |     |        |  |
| 5   | P0.02 | General purpose I/O pin | 25  | P0.19  | General purpose I/O pin  |
|     | AIN3  | ADC input 3             |     |        |  |
| 6   | P0.03 | General purpose I/O pin | 26  | P0.20  | General purpose I/O pin  |
|     | AIN4  | ADC input 4             |     |        |  |
| 7   | P0.04 | General purpose I/O pin | 27  | GND    | Ground (0 V)   |
|     | AIN5  | ADC input 5             |     |        |  |
| 8   | P0.05 | General purpose I/O pin | 28  | ANTEN  | 2.4G antenna   |
|     | AIN6  | ADC input 6             |     |        |  |
| 9   | P0.06 | General purpose I/O pin | 29  | GND    | Ground (0 V)   |
|     | AIN7  | ADC input 7             |     |        |  |
|     | AREF1 | ADC Reference voltage   |     |        |  |
| 10  | P0.07 | General purpose I/O pin | 30  | GND    | Ground (0 V)   |
| 11  | GND   | Ground (0 V)            | 31  | GND    | Ground (0 V)   |
| 12  | P0.08 | General purpose I/O pin | 32  | P0.21  | General purpose I/O pin  |
| 13  | P0.09 | General purpose I/O pin | 33  | P0.22  | General purpose I/O pin  |
| 14  | P0.10 | General purpose I/O pin | 34  | P0.23  | General purpose I/O pin  |
| 15  | P0.11 | General purpose I/O pin | 35  | P0.24  | General purpose I/O pin  |
| 16  | P0.12 | General purpose I/O pin | 36  | P0.25  | General purpose I/O pin  |
| 17  | P0.13 | General purpose I/O pin | 37  | P0.26  | General purpose I/O pin  |
|     |       |                         |     | AIN0   | ADC input 0  |
|     |       |                         |     | XL2    | Connection for 32.768 kHz crystal  |
| 18  | P0.14 | General purpose I/O pin | 38  | P0.27  | General purpose I/O pin  |
|     |       |                         |     | AIN1   | ADC input 1  |
|     |       |                         |     | XL1    | Connection for 32.768 kHz crystal or external 32.768 kHz clock reference |
| 19  | P0.15 | General purpose I/O pin | 39  | P0.28  | General purpose I/O pin  |
| 20  | P0.16 | General purpose I/O pin | 40  | P0.29  | General purpose I/O pin  |

## Schematics



nRF51-04

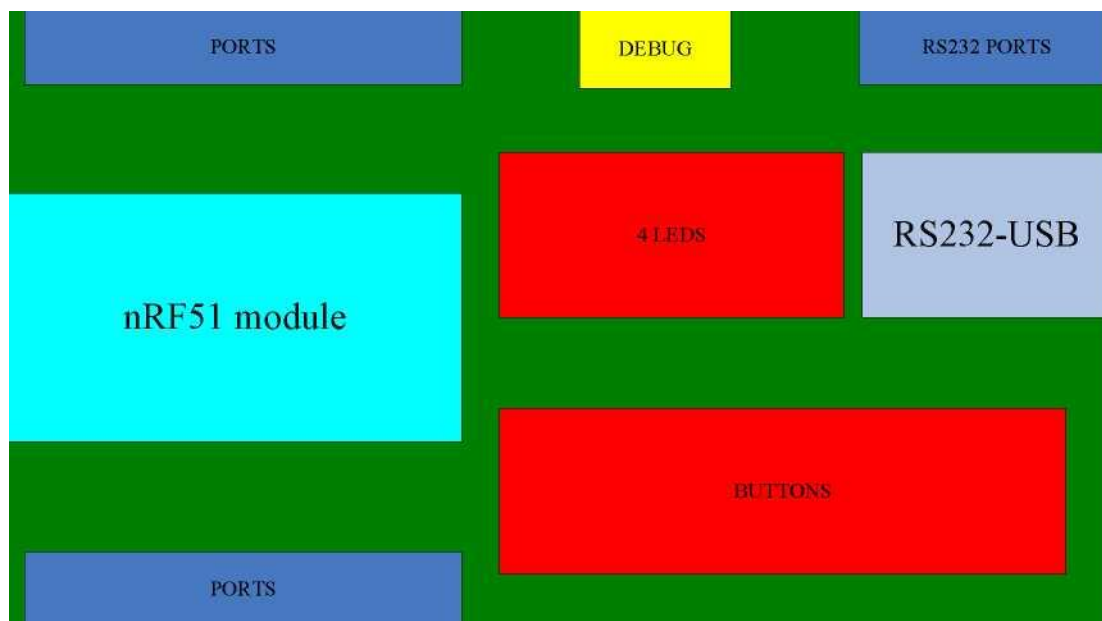


nRF51-DK

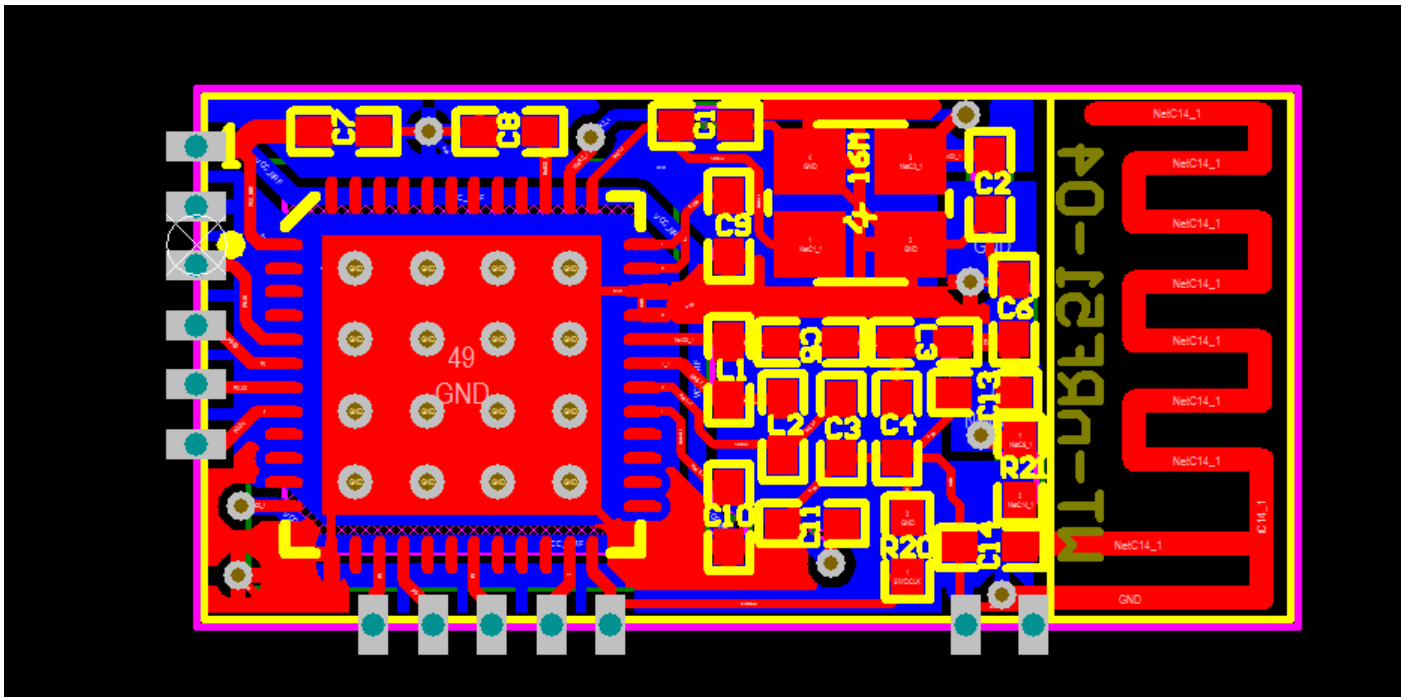
## Development Board Introduction (nRF51-DK)

### Resources:

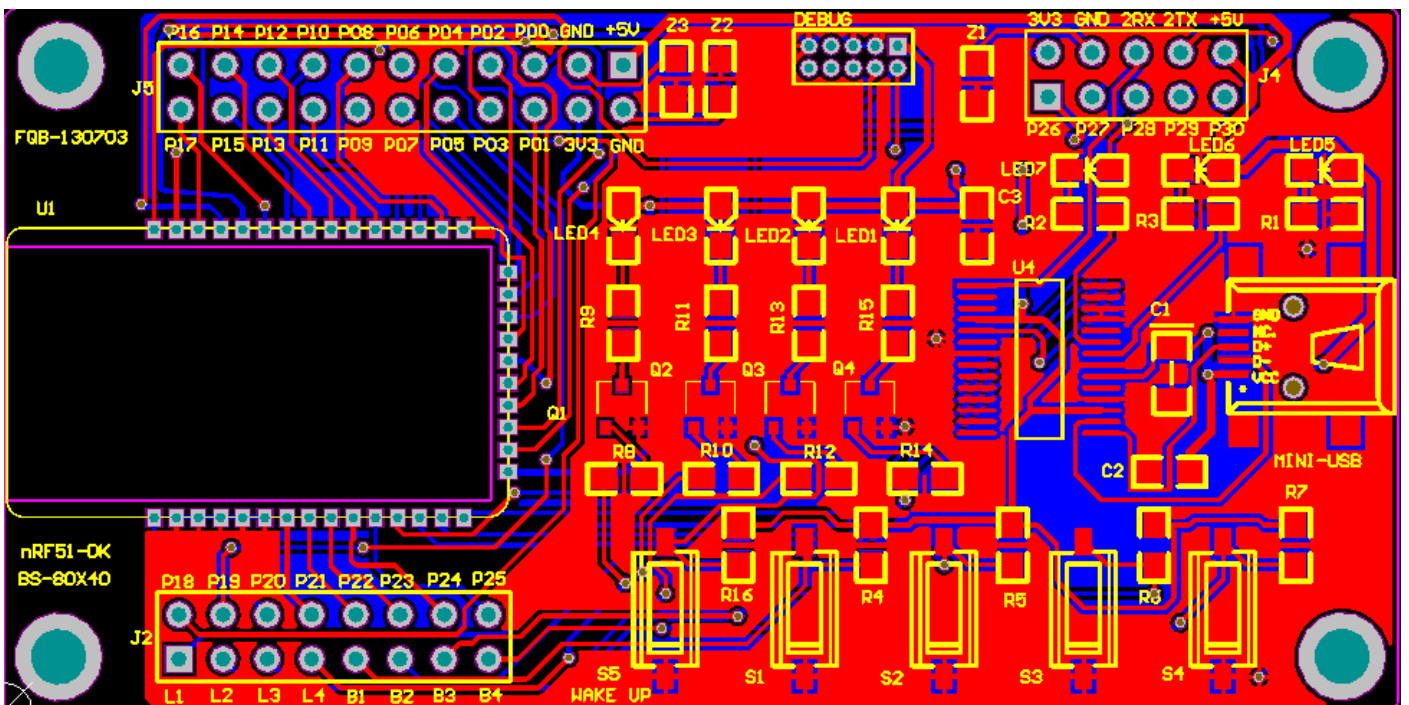
- 4 LEDs
- 4 Buttons
- Wakeup buttons
- Debug interface
- RS232-USB interface (FT232)
- All leading feet in 2.54mm
- USB powered



nRF51-DK functional blocks



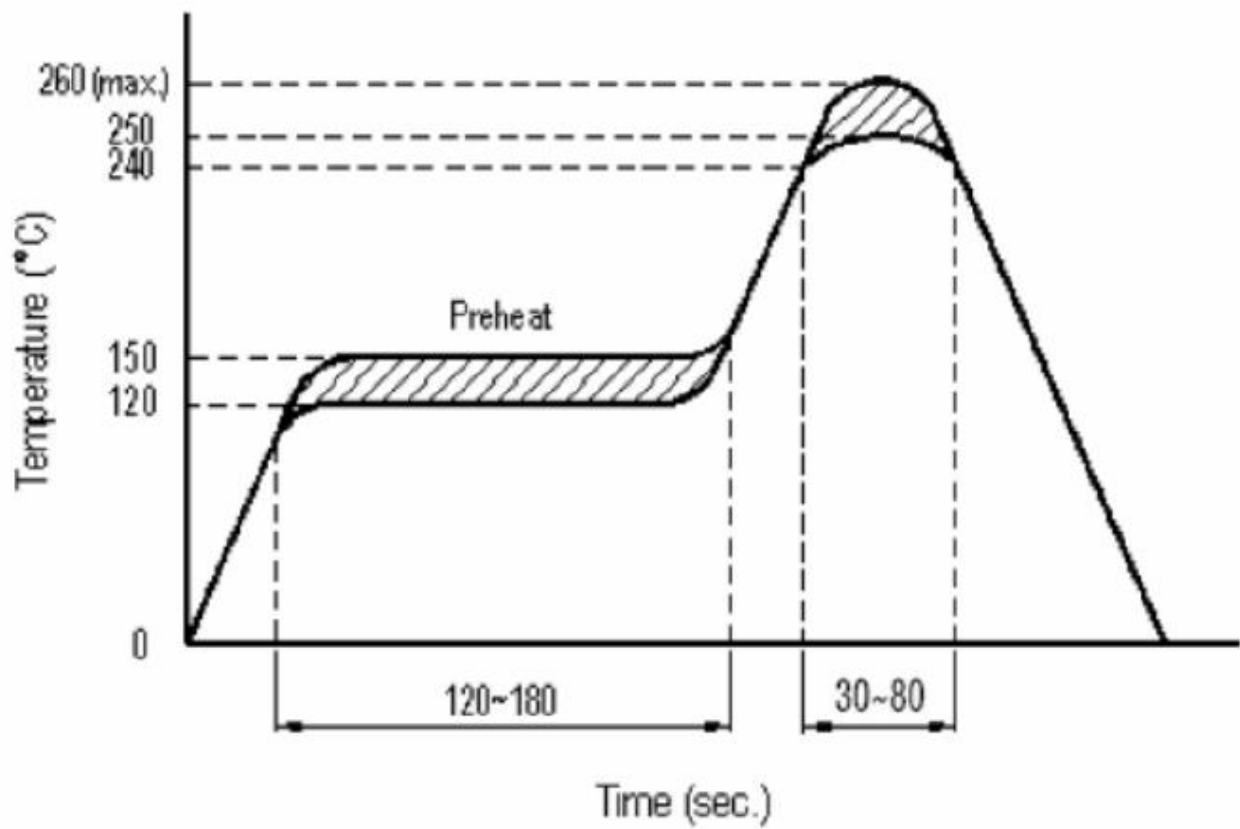
nRF51-04



nRF51-DK



## Reflow soldering reference



# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Seeed Studio:](#)

[317030015](#)