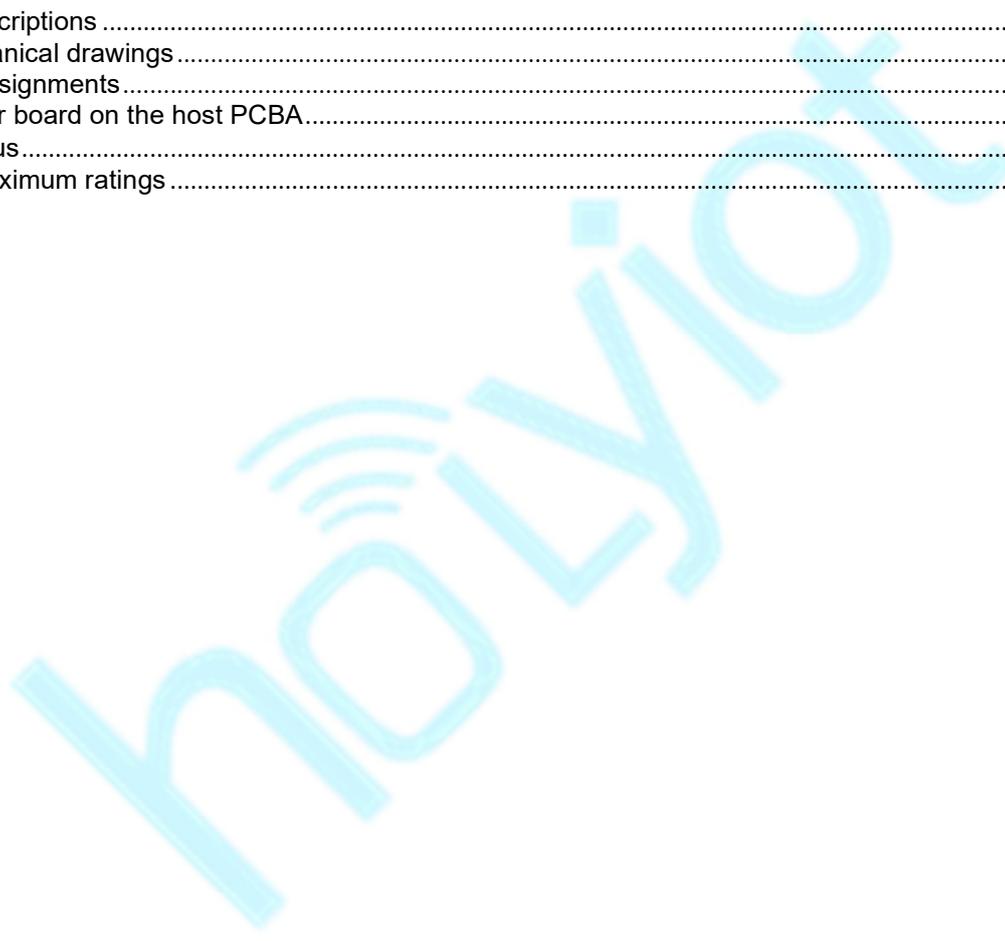


# Datasheet

产品名称 (Product): BT 5.0 module

产品型号 (Model No.): HOLYIOT-21033 -nRF52832

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# 1. Description

HOLYIOT-21033 BLE module is based on Nordic nRF52832 SoC, the nRF52832 SoC is a powerful, highly flexible ultra-low power multi-protocol SoC ideally suited for Bluetooth® low energy (previously called Bluetooth Smart), ANT and 2.4GHz ultra low-power wireless applications. The nRF52832 SoC is built around a 32-bit ARM® Cortex™-M4F CPU with 512kB + 64kB RAM. The embedded 2.4GHz transceiver supports Bluetooth low energy, ANT and proprietary 2.4 GHz protocol stack. It is on air compatible with the nRF51 Series, nRF24L and nRF24AP Series products from Nordic Semiconductor.

Processing power

Multiprotocol radio (bluetooth low energy, ANT, 2.4G proprietary)

Power efficiency

## Hardware :

SWD programmer (SWDIO,SWCLK,VDD,GND)

nRF52832 -QFAA-QFN48

Size : 24.8mm\*15mm

BLE stack & RF 2.4Ghz

## Features :

Single chip, highly flexible, 2.4 GHz multi-protocol SoC

32-bit ARM Cortex-M4F Processor

1.7v to 3.6v operation

512kB flash + 64kB RAM

Supports concurrent Bluetooth low energy/ANT protocol operation

Up to +4dBm output power

-96dBm sensitivity, Bluetooth low energy

Thread safe and run-time protected

Event driven API

On air compatible with nRF24L and nRF24AP series

2 data rates (2Mbps/1Mbps)

PPI - maximum flexibility for power-efficient applications and code simplification

Automated power management system with automatic power management of each peripheral

Configurable I/O mapping for analog and digital I/O

3 x Master/Slave SPI

2 x Two-wire interface (I<sup>2</sup>C)

UART (RTS/CTS)

3 x PWM

AES HW encryption

Real Time Counter (RTC)

Digital microphone interface (PDM)

On-chip balun

### **Application:**

- Internet of Things (IoT)
- SmartHome sensors
- Computer peripherals
- A4WP 'Rezence' wireless charging
- Sports and fitness sensors and hubs
- Smart watches
- Interactive games
- Wearables
- Connected white goods
- Voice-command smart remotes
- Beacons
- Connected health products
- RC Toys
- Building automation and sensor networks

## 2. Introduction

### 2.1 Programmer

HOLYIOT-21033 module use the Serial Wire Debug(SWD port ), the module which layout the SWDIO, SWCLK, VDD, GND for debug and flash your own firmware, more info about the SWD, please visit [https://www.silabs.com/community/mcu/32-bit/knowledge-base.entry.html/2014/10/21/serial\\_wire\\_debugs-qKCT](https://www.silabs.com/community/mcu/32-bit/knowledge-base.entry.html/2014/10/21/serial_wire_debugs-qKCT)

You can using the Jlink or Jtag for programmer.

### 2.2 Software development Tool

It supports the standard Nordic Software Development Tool-chain using Segger Embedded Studio, Keil, IAR and GCC. More info please visit <https://www.nordicsemi.com/Software-and-Tools/Development-Tools>

### 2.3 Protocols

This module support Bluetooth 5, Bluetooth Low Energy,Bluetooth mesh,Thread,802.15.4,ANT, 2.4GHz proprietary. So we can use different protocols for different situations.

#### **Software Development Kit**

Nordic Semiconductor's Software Development Kits (SDK) are your starting point for software development on the nRF51 and nRF52 Series. It contains source code libraries and example applications covering wireless functions, libraries for all peripherals, bootloaders, wired and OTA FW upgrades, RTOS examples, serialization libraries.

More info please visit <https://www.nordicsemi.com/Software-and-Tools/Software/nRF5-SDK>

You can also download the SDK for coding development .

### 2.4 SoftDevices

Nordic Semiconductor protocol stacks are known as SoftDevices. SoftDevices are pre-compiled, pre-linked binary files. SoftDevices can be programmed in nRF5 series devices, and are freely downloadable from the Nordic website. Please download that here:

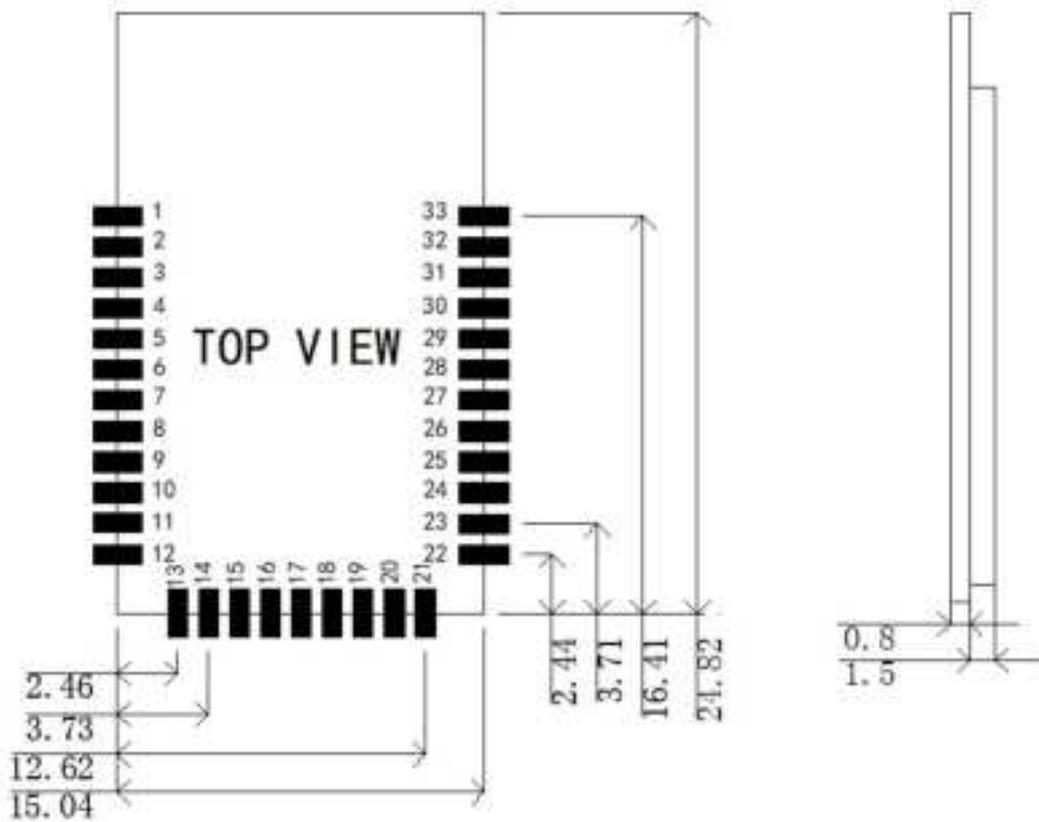
<https://www.nordicsemi.com/Software-and-Tools/Software/S132>

## Over-The-Air DFU

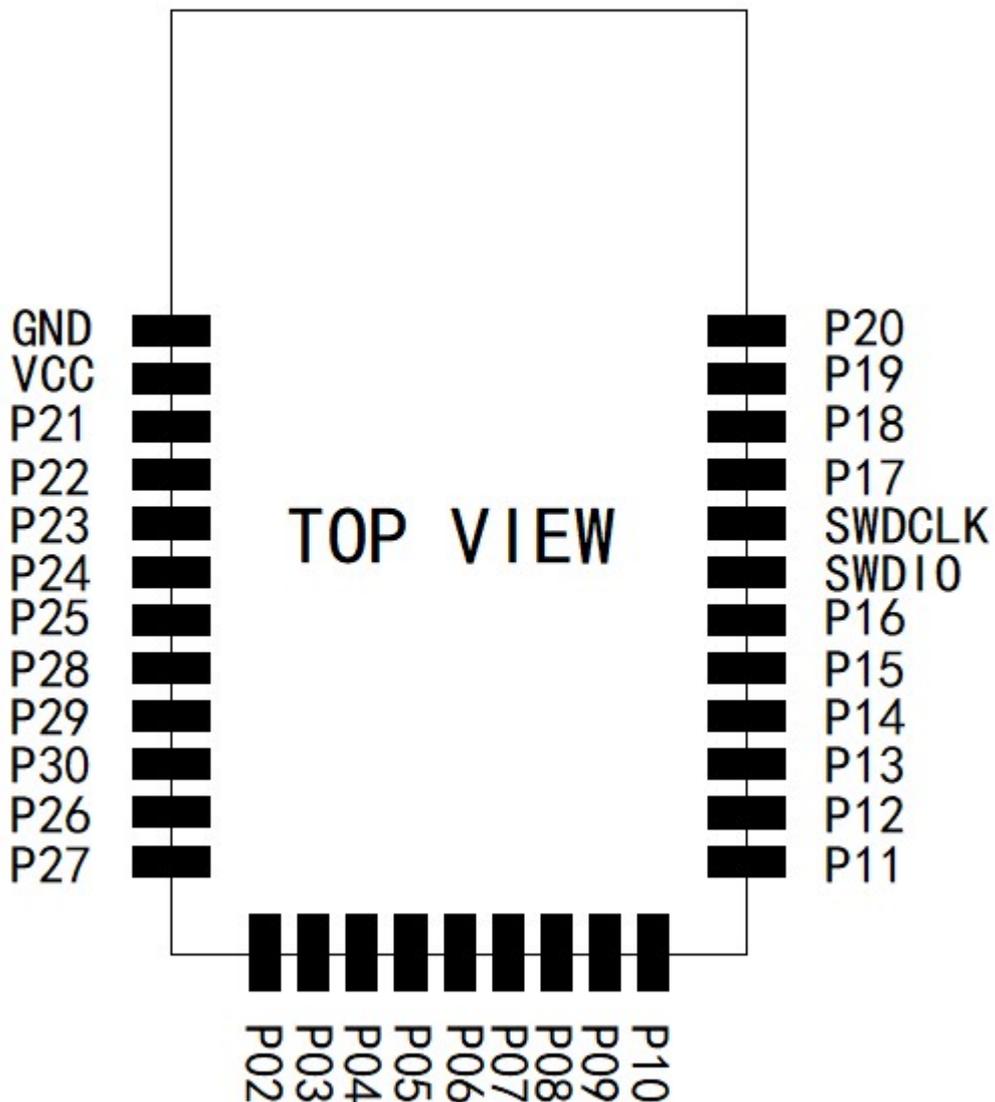
The SoC is supported by an Over-The-Air Device Firmware Upgrade (OTA DFU) feature. This allows for in the field updates of application software and SoftDevice.

# 3. Product Descriptions

## 3.1 Mechanical drawings



## 3.2 Pin assignments



PIN No.	PIN define	Functions
1	GND	Ground
2	VCC	power
3	P0.21 (Reset)	Digital I/O(general purpose I/O <sup>2</sup> Configure as the Pins reset )
4	P0.22	Digital I/O
5	P0.23	Digital I/O
6	P0.24	Digital I/O
7	P0.25	Digital I/O
8	P0.28 (ANI4)	Digital I/O(general purpose I/O <sup>2</sup> Analog input (SAADC,COMP,LPCOMP)
9	P0.29	Digital I/O(general purpose I/O <sup>2</sup> )

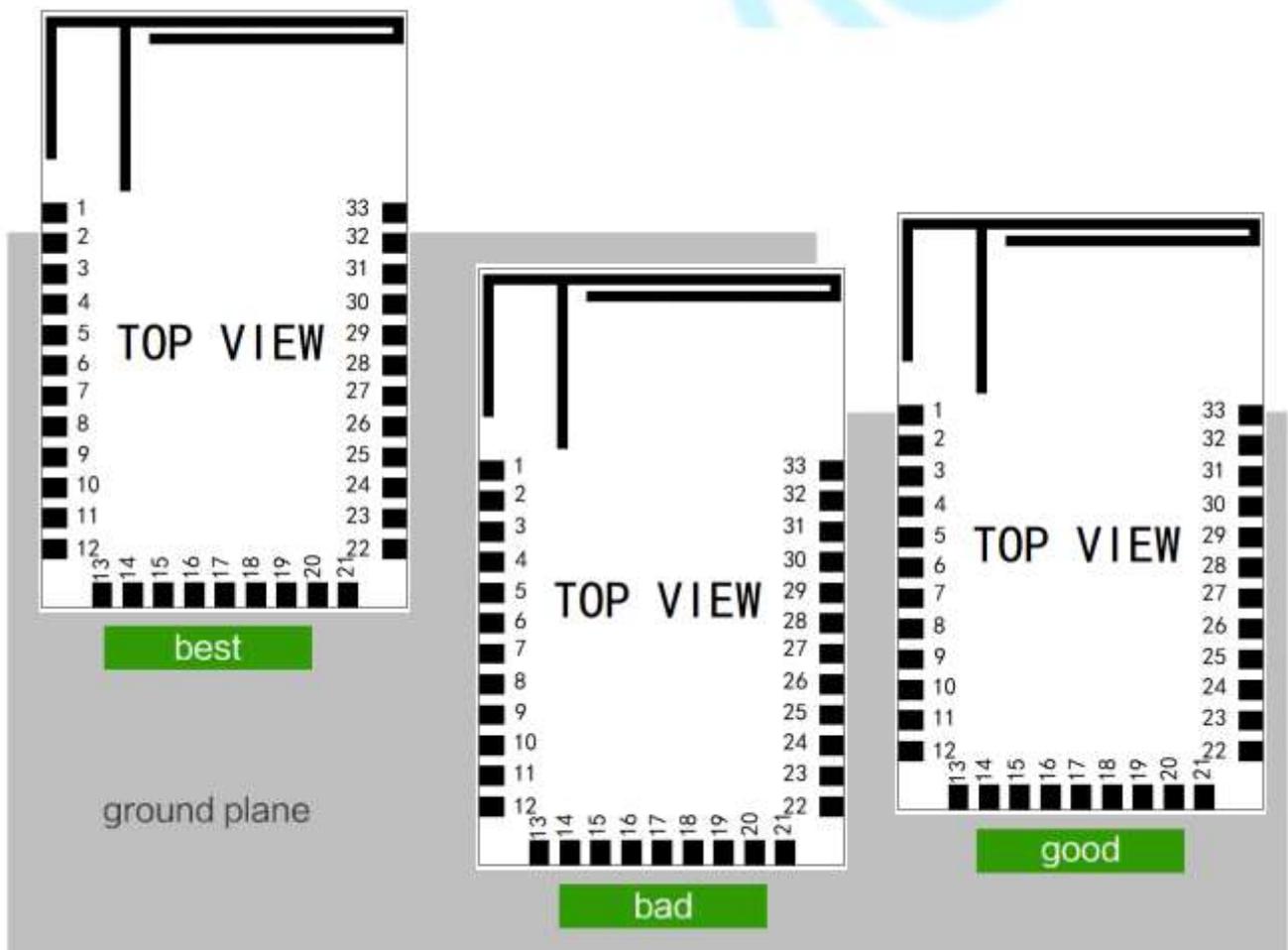
	(ANI5)	Analog input (SAADC,COMP,LPCOMP)
10	P0.30 (ANI6)	Digital I/O(general purpose I/O <sup>2</sup> ) Analog input (SAADC,COMP,LPCOMP)
11	P0.26	Digital I/O
12	P0.27	Digital I/O
13	P0.02 (ANI0)	Digital I/O(general purpose I/O <sup>2</sup> ) Analog input (SAADC,COMP,LPCOMP)
14	P0.03 (ANI1)	Digital I/O(general purpose I/O <sup>2</sup> ) Analog input (SAADC,COMP,LPCOMP)
15	P0.04 (ANI2)	Digital I/O(general purpose I/O <sup>2</sup> ) Analog input (SAADC,COMP,LPCOMP)
16	P0.05 (ANI3)	Digital I/O(general purpose I/O <sup>2</sup> ) Analog input (SAADC,COMP,LPCOMP)
17	P0.06	Digital I/O(general purpose I/O)
18	P0.07	Digital I/O(general purpose I/O)
19	P0.08	Digital I/O(general purpose I/O)
20	P0.09 NFC1	Digital I/O(general purpose I/O <sup>1</sup> ) NFC1 input(antenna connection)
21	P0.10 NFC2	Digital I/O(general purpose I/O <sup>1</sup> ) NFC2 input(antenna connection)
22	P0.11	Digital I/O(general purpose I/O )
23	P0.12	Digital I/O(general purpose I/O )
24	P0.13	Digital I/O(general purpose I/O )
25	P0.14 TRACEDATA[3]	Digital I/O(general purpose I/O Trace port output)
26	P0.15 TRACEDATA[2]	Digital I/O(general purpose I/O Trace port output )
27	P0.16 TRACEDATA[1]	Digital I/O(general purpose I/O Trace port output )
28	SWDIO	Digital input(serial wire debug)
29	SWCLK	Digital I/O <sup>2</sup> (serial wire debug)

30	P0.17	Digital I/O(general purpose I/O )
31	P0.18 TRACEDATA[0] / SWO	Digital I/O(general purpose I/O Single wire output, Trace port output)
32	P0.19	Digital I/O(general purpose I/O)
33	P0.20 Traceclk	Digital I/O(general purpose I/O Trace port clock output )

## 4. Mounting our board on the host PCBA

We suggest that you mount our RF board(HOLYIOT-21033 -nRF52832) on the board like that:

1. For the best Bluetooth performance, the antenna of the area need to extend about several mm without ground under the antenna of the edge of the host PCB.
2. The second choice is that place our board at the corner of host PCB, the antenna of board need to extend several mm outside of the Ground plane of the host PCB.



## **FCC Statement**

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help important announcement

## **Radiation Exposure Statement**

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

## **Important Note:**

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

## **End Product Labeling**

The final end product must be labeled in a visible area with the following "Contains FCC ID: 2ALGY-21032".

## **Manual Information to the End User**

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

## Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01

### 2.2 List of applicable FCC rules

CFR 47 FCC PART 15 SUBPART C has been investigated. It is applicable to the modular transmitter.

### 2.3 Specific operational use conditions

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

### 2.4 Limited module procedures

Not applicable

### 2.5 Trace antenna designs

Not applicable

### 2.6 RF exposure considerations

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

### 2.7 Antennas

This radio transmitter **2ALGY-21032** has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Model	Type	Peak Gain(dBi)
2400-2500MHz	PCB antenna	0 dBi

### 2.8 Label and compliance information

The final end product must be labeled in a visible area with the following "Contains FCC ID: 2ALGY-21032".

### 2.9 Information on test modes and additional testing requirements

Host manufacturer which install this modular with limit modular approval should perform the test of radiated emission and spurious emission according to FCC part 15C:15.247 and 15.209 requirement, only if the test result comply with FCC part 15.247 and 15.209 requirement, then the host can be sold legally.

### 2.10 Additional testing, Part 15 Subpart B disclaimer

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B.