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Datasheet

产品名称 (Product):   BT 5.0 module

产品型号 (Model No.): HOLYIOT-21031 -nRF52805

1. Description

HOLYIOT-21031 BLE module is based on Nordic nRF52805 SoC, the nRF52805 SoC is an ultra-low power *Bluetooth*® 5.2 System on Chip (SoC) supporting Bluetooth Low Energy and 2.4 GHz proprietary protocols. It supports Bluetooth high-throughput 2 Mbps, transferring data faster and more efficiently, and Bluetooth channel selection algorithm #2 (CSA #2), improving coexistence and reducing interference. The radio has up to 4 dBm TX power and -97 dBm sensitivity (1 Mbps Bluetooth Low Energy).the nRF52805 SoC device compliments the extensive nRF52 Series platform with an SoC in a WLCSP optimized for small two-layer PCB designs, significantly decreasing cost compared to four-layer PCBs. A 9.5 x 8.8 mm reference layout with all ten GPIOs available is provided, requiring only 10 external passive components (including two crystal load capacitors). nRF52805 features a 64 MHz Arm® Cortex®-M4 processor with 192 kB of flash memory and 24 kB of RAM. A wide range of analog and digital interfaces is integrated, including a 2-channel 12-bit ADC, SPI, UART, and TWI. It is the perfect choice for applications such as beacons, disposable medical devices, sensors, styluses, and presenters.

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

Hardware :

SWD programmer (SWDIO,SWCLK,VDD,GND)
nRF52805 -CAAA-WLCSP
Size : 9mm*7mm
BLE stack & RF 2.4Ghz

Features :

- Bluetooth® 5.0, 2.4 GHz transceiver
    - -97 dBm sensitivity in 1 Mbps Bluetooth® Low Energy mode
    - -20 to +4 dBm TX power, configurable in 4 dB steps
    - On-air compatible with nRF52, nRF51, nRF24L, and nRF24AP Series
    - Supported data rates:
        - Bluetooth® 5.0 - 2 Mbps, 1 Mbps
        - Proprietary 2.4 GHz – 2 Mbps, 1 Mbps
    - Single-ended antenna output (on-chip balun)
    - 4.6 mA peak current in TX (0 dBm)
    - 4.6 mA peak current in RX
    - RSSI (1 dB resolution)
- Arm® Cortex®-M4 32-bit processor, 64 MHz
    - 144 EEMBC CoreMark® score running from flash memory
    - 34.4 µA/MHz running CoreMark from flash memory
    - 32.8 µA/MHz running CoreMark from RAM
    - Serial wire debug (SWD)
- Flexible power management
    - 1.7 V to 3.6 V supply voltage range
    - On-chip DC/DC and LDO regulators with automated low current modes
    - Fast wake-up using 64 MHz internal oscillator
    - 0.3 µA at 3 V in System OFF mode, no RAM retention
    - 0.5 µA at 3 V in System OFF mode with full 24 kB RAM retention
    - 1.1 µA at 3 V in System ON mode, with full 24 kB RAM retention, wake on RTC (running from LFXO clock)
    - 1.0 µA at 3 V in System ON mode, no RAM retention, wake on RTC (running from LFXO clock)
- 192 kB flash and 24 kB RAM
- Advanced on-chip interfaces
    - Programmable peripheral interconnect (PPI)
    - 10 general purpose I/O pins
    - EasyDMA automated data transfer between memory and peripherals
- Nordic SoftDevice ready with support for concurrent multiprotocol

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• Temperature sensor

• 12-bit, 200 ksps ADC – 2 configurable channels with programmable gain

• 3x 32-bit timer with Counter mode

• SPI master/slave with EasyDMA

• I2C compatible two-wire master/slave

• UART (CTS/RTS) with EasyDMA

• Quadrature decoder (QDEC)

• AES HW encryption with EasyDMA

• 2x real-time counter (RTC)

• Single crystal operation

• Package variants

   • WLCSP package, 2.482 x 2.464 mm

Application:

• Proprietary protocol devices

• Network processor

• Beacons

• Smart Home sensors

• Presenters/Stylus

• Health monitoring

• Drug delivery

• Asset tags

• Toys

• Retail tags and labels

2. Introduction

2.1 Programmer

HOLYIOT-21031 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

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:

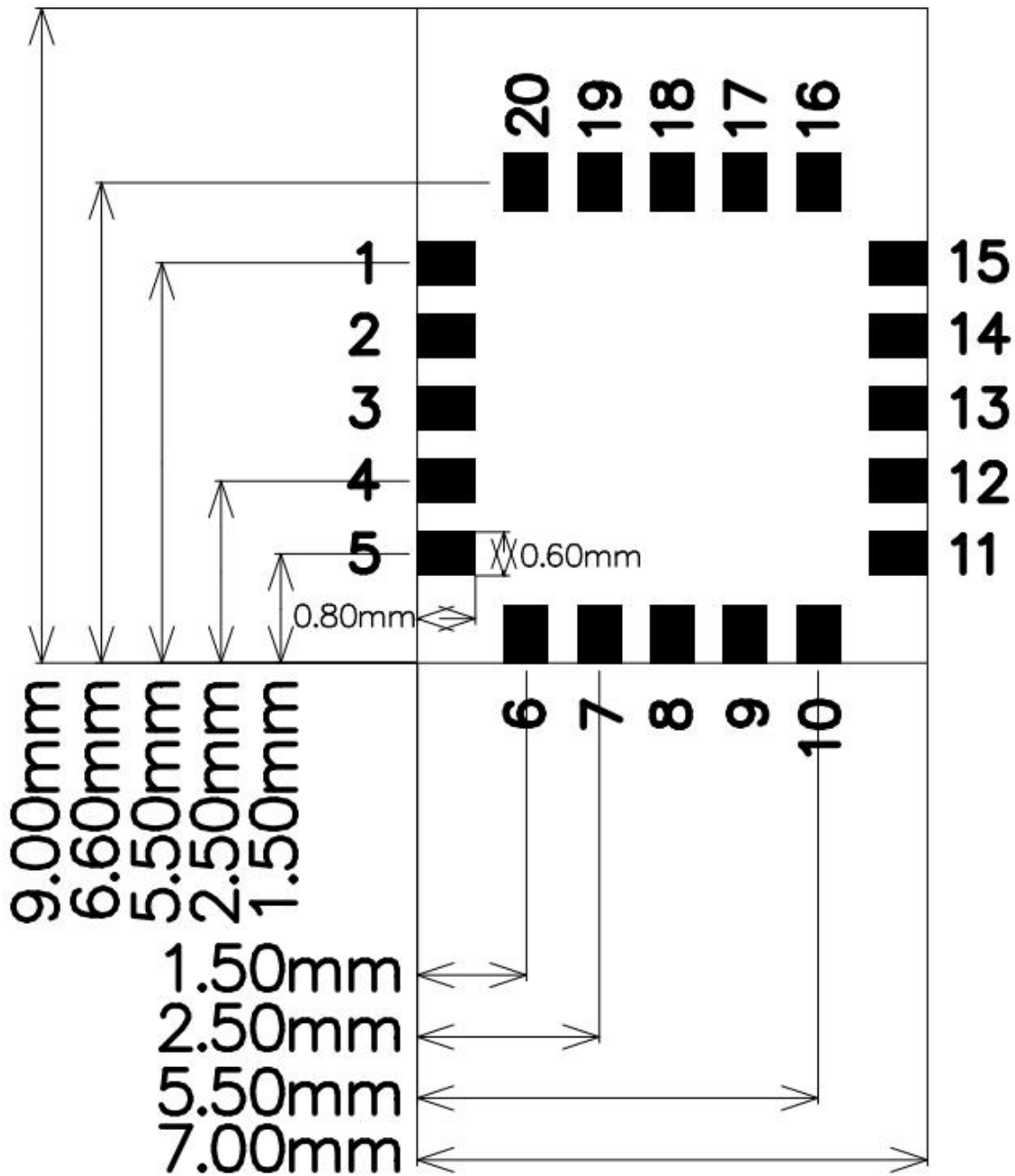https://www.nordicsemi.com/Software-and-Tools/Software/S132

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.
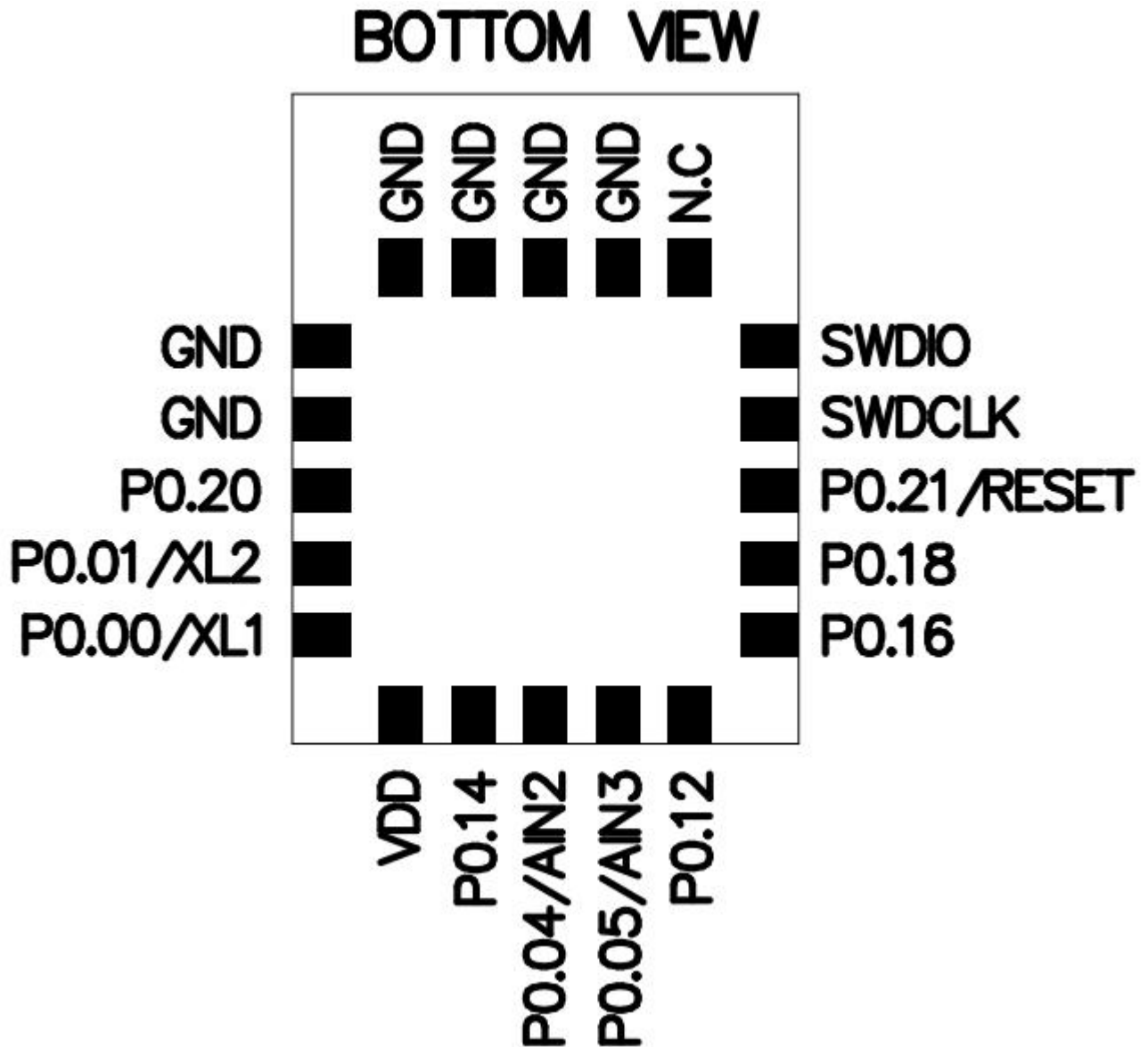
3. Product Descriptions

3.1 Mechanical drawings

3.2 Pin assignments

PIN No.	PIN define	Functions
1	GND	Ground
2	GND	Ground
3	P0.20	General purpose I/O
4	P0.01 XL2	Digital I/O Connection for 32.768 kHz crystal (LFXO
5	P0.00 XL1	Digital I/O Connection for 32.768 kHz crystal (LFXO)

| 6	VDD	Power (battery) supply
7	P0.14	General purpose I/O
8	P0.04 AIN2	General purpose I/O SAADC input
9	P0.05 AIN3	Digital I/O(general purpose I/O^2 SAADC input
10	P0.12	General purpose I/O
11	P0.16	General purpose I/O
12	P0.18	General purpose I/O
13	P0.21 nRESET	General purpose I/O Configurable as pin reset
14	SWDCLK	Serial wire debug clock input for debug and programming
15	SWDIO	Serial wire debug I/O for debug and programming
16	N.C	Not Connect
17	GND	Ground
18	GND	Ground
19	GND	Ground
20	GND	Ground

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.
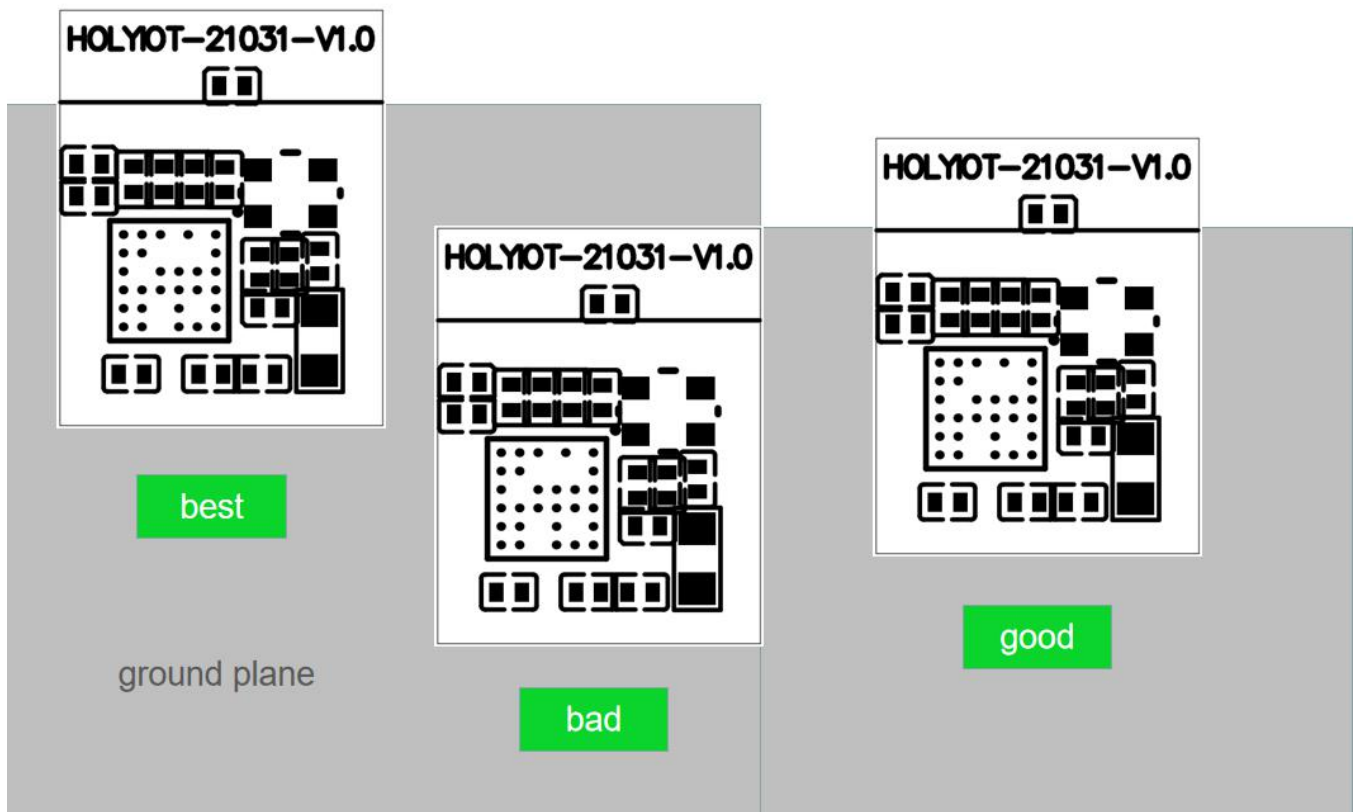
5. Miscellaneous

Soldering Temperature-Time Profile for Re-Flow Soldering. Maximum number of cycles for re-flow is 2. No opposite side re-flow is allowed due to module weight.
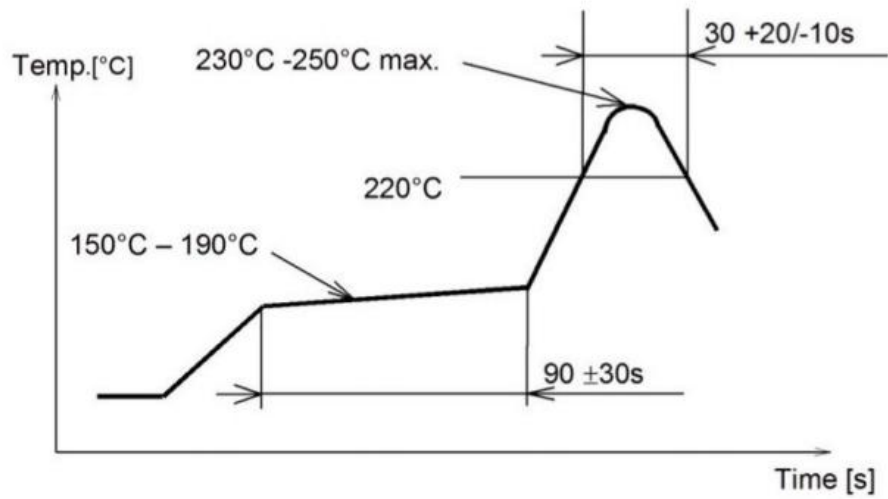
6. Absolute maximum ratings

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.

Absolute maximum ratings:

	Note	Min.	Max.	Unit
Supply voltages				
VDD		-0.3	+3.9	V
VSS			0	V
I/O pin voltage				
$V_{I/O}$, VDD ≤3.6 V		-0.3	VDD + 0.3	V
$V_{I/O}$, VDD >3.6 V		-0.3	3.9	V
Environmental WLCSP package				
Storage temperature		-40	+125	°C
MSL	Moisture Sensitivity Level		1	
ESD HBM	Human Body Model		3	kV
ESD HBM Class	Human Body Model Class		2	
ESD CDM	Charged Device Model		1	kV
Flash memory				
Endurance		10 000		write/erase cycles
Retention at 85 °C		10		years

ATTENTION
OBSERVE PRECAUTION FOR HANDLING
ELECTROSTATIC SENSITIVE DEVICE
HBM (Human Body Model): Class 3A