

BLE* Module Specification

Model: MS50SFB

Version: V2.0

* Low energy Bluetooth 4.0 and above

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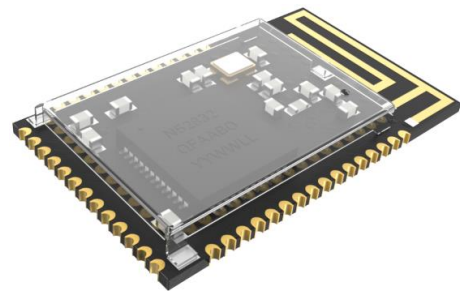
Overview

The MS50SFB is a compact small size Bluetooth 5.0 module with ultra-low power consumption and optional antenna types; it is very suitable for the coin cell battery powered applications.

The module is highly integrated that contains all the necessary components from radio to different antenna and a completely implemented Bluetooth protocol stack and pre-flashed UART communication protocol.

Features

- Frequency: 2402 to 2480 MHz
- Max. Output power: +4dBm
- Single power supply: 1.8 – 3.9V
- Range: 10-60 meters
- Chip: nRF52832 (Nordic)
- GPIO Quantity: 32
- 512kB Flash and 64kB RAM
- Module size: 20.0 x 12.0 x 2.0 mm
- NFC type A interface
- ARM Cortex-M4F processor
- Metal shielding with marking
- UART communication protocol (Slave / Master optional)
- 3 optional antenna types: PCB antenna, chip antenna, IPEX connector
- Operating Temperature range: -25 to 85 degree Celsius



MS50SFB

Certifications

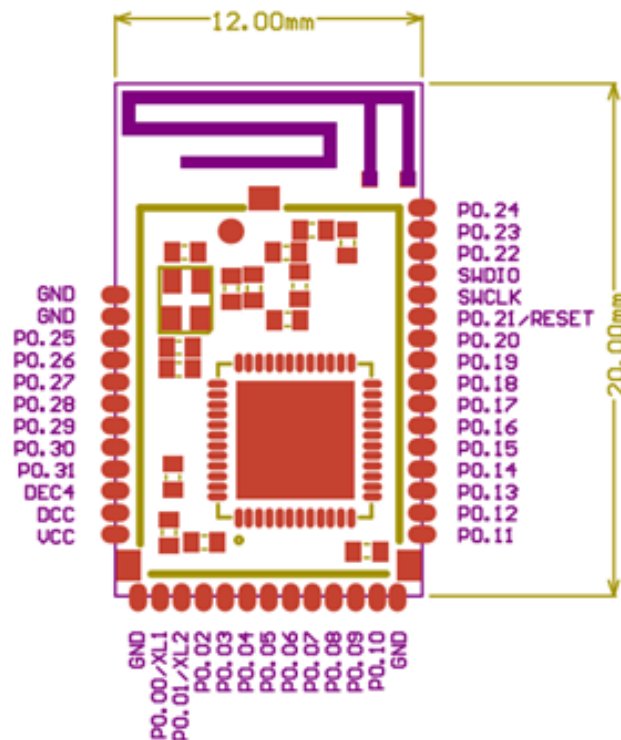
- CE Certification
- FCC Certification (FCCID: 2ABU6-MS50SFB)
- BQB Certification (QDID: 111267)

Applications

- Cycle computer
- Heart rate monitor
- Blood pressure monitor
- Blood glucose meter
- Weighing machine
- Thermometer
- Mobile accessories
- Sports and fitness sensors
- Remote controllers / Toys
- Key fobs and wrist band
- 3D glasses and gaming controller

1. Pin Assignment and Description

1.1 Pin assignment



1.2 Pin description

| Symbol | Type | Description |
|-------------|---------------|--|
| VCC | Power | Power supply |
| DCC | Power | DC/DC converter output pin |
| GND | Power | Ground |
| DEC4 | Power | 1.3V regulator supply decoupling. Input from DC/DC converter. Output from 1.3 V LDO |
| SWDIO | Digital I/O | System reset (active low). Hardware debug and flash programming I/O |
| SWCLK | Digital input | Hardware debug and flash programming I/O |
| P0.00-P0.31 | Digital I/O | General purpose I/O pin |
| XL2 | Analog output | Connection for 32.768 kHz crystal |
| XL1 | Analog input | Connection for 32.768 kHz crystal or external 32.768 kHz |
| RESET | Digital I/O | Configurable as system RESET pin |

2. Electronic Characteristic

2.1 Absolute maximum ratings

| Symbol | Min | Max | Unit | Condition |
|--------|-----|-----|------|---|
| VCC | 1.8 | 3.9 | V | Input DC voltage at VCC pin |
| ANT | | +10 | dBm | Input RF power at antenna pin at receiver |

Note: The module is not protected against overvoltage or reserved voltages. If necessary, voltage spikes exceeding the power supply voltage specification must be limited to values within the specified boundaries by using appropriate protection devices.

2.2 Maximum ESD ratings

| Parameter | Max | Unit | Remarks |
|-----------------|-------|------|--------------------------------|
| ESD Sensitivity | 4 | KV | Human body model |
| | 750 | V | Charged device model |
| | +/- 8 | KV | ESD indirect contact discharge |

2.3 Operating temperature range

| Parameter | Min | Max | Unit |
|-----------------------|-----|-----|------|
| Storage temperature | -40 | 85 | °C |
| Operating temperature | -40 | 85 | °C |

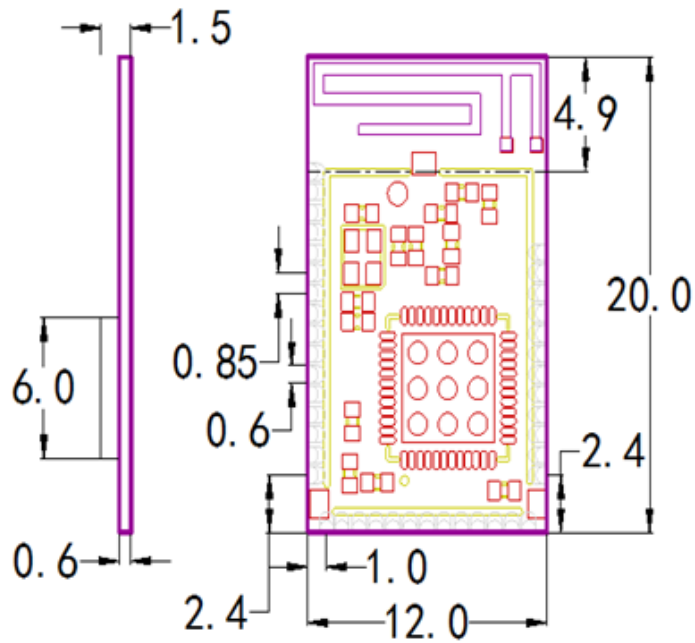
2.4 Current consumption

| Parameter | Min | Max | Unit | Remark |
|--------------------|-----|-----|------|----------------------------|
| Receiving current | | 5.4 | mA | standard mode |
| Transmission power | | 5.3 | mA | transmission power at 0dbm |
| Sleeping current | | 1 | uA | power mode 3 |

2.5 RF performance

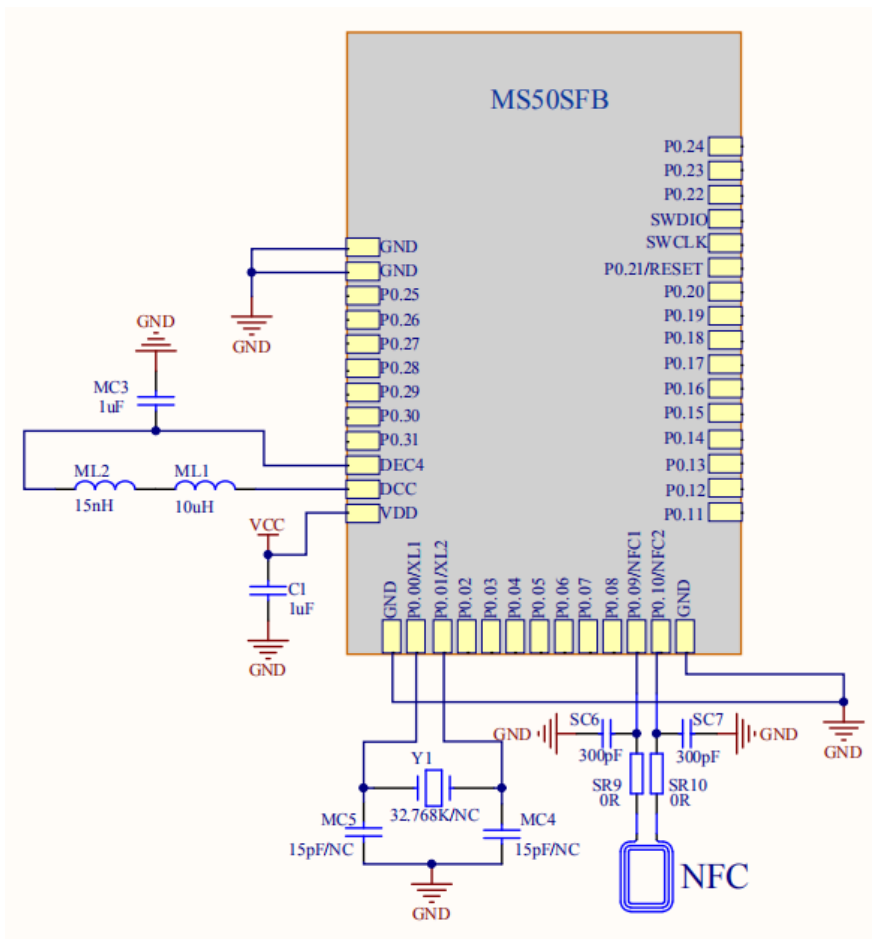
| Parameter | Min | Typical | Max | Unit |
|----------------------------|-----|---------|-----|------|
| Receiver input sensitivity | | -93 | | dBm |
| Output power | -30 | 0 | +4 | dBm |

3. Physical Dimension



Unit: mm

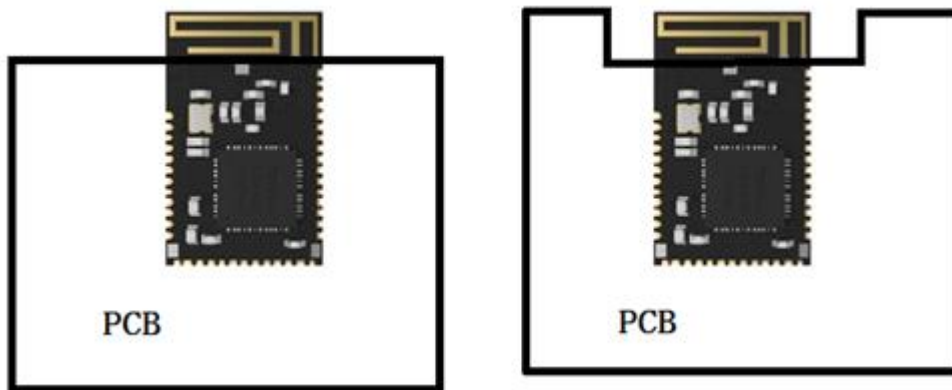
4. Reference Schematic Design



5. Layout and Soldering Considerations

To make sure wireless performance is at its best condition, please layout the module on the carrier board as below instructions.

- 5.1 Carrier board under the antenna area of the module like the picture;
- 5.2 Keep out enough area for the antenna area;
- 5.3 Reflow profiles are to be selected according to standard manufacturing process;
- 5.4 The soldering temperature should be less than 206°C;
- 5.5 The module should be placed far away other low frequency and digital circuits;
- 5.6 The MS50 series modules contain highly sensitive electronic circuitry and are Electrostatic Sensitive Devices (ESD). Handling the MS50 series modules without proper ESD protection may destroy or damage them permanently.



Recommended Layout for the Carrier Board

*PCB: It's the mother board / carrier board.

6. UART Commands

Please refer to the UART commands document to know more.

7. Package

| Details | Tray | Carton |
|-------------------|----------------|---------------------|
| Quantity (module) | 80 pcs | 4000 pcs / 50 trays |
| Net Weight | 40.0g | 4.5Kg |
| Gross Weight | 75.0g | 9.5Kg |
| Size | 20 x 18 x 5 cm | 32 x 23 x 40 cm |

8. Ordering information

| Ordering number | Description |
|-----------------|---|
| 306030058 | MS50SFB-001, nRF52832 BT 5.0 Module, PCB Antenna, UART function |
| 306030059 | MS50SFB-002, nRF52832 BT 5.0 Module, Chip Antenna, UART function |
| 306030060 | MS50SFB-003, nRF52832 BT 5.0 Module, IPEX connector for external antenna, UART function |

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