

# BLE\* Module Specification

Model: MS88SF2

Version: V1.0

\* Low energy Bluetooth 4.0 and above

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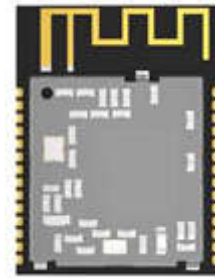
## Overview

The BLE module MS88SF2 is designed based on nRF52840 SoC, it is a compact and very small size Bluetooth 5.0 module with metal cover shield.

The BLE module MS88SF2 is highly integrated that contains all the necessary components from radio to different antenna and a completely implemented Bluetooth protocol stack.

## Features

- Frequency: 2400 to 2483 MHz
- Max. Output power: +8dBm
- Single power supply: 1.8 – 3.9V
- Range: 10-60 meters (BER<0.1%, open space)
- Chip: nRF52840 (Nordic)
- GPIO Quantity: 24
- 1MB Flash and 256kB RAM
- Module size: 23.2 x 17.4 x 2.0 mm
- ARM Cortex-M4F processor
- Metal shielding with marking
- Supports USB data interface
- PCB antenna types
- Operating Temperature range: -25 to 85 degree Celsius



MS88SF2

## Certifications

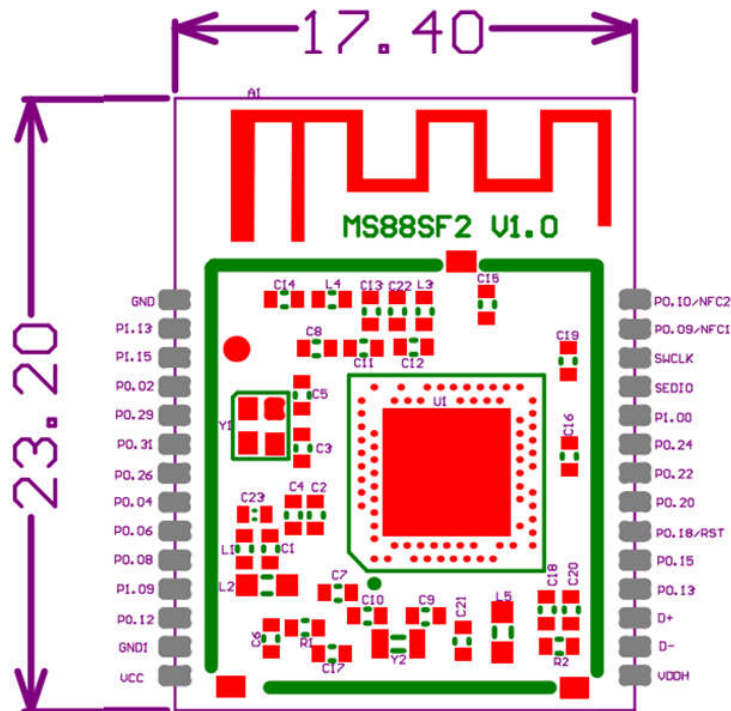
- CE Certification
- FCC Certification (FCCID: 2ABU6-MS88SF2)

## 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/VDDH	Power	Power supply
GND/GND1	Power	Ground
SWDIO	Digital I/O	System reset (active low). Hardware debug and flash programming I/O programming I/O.
SWCLK	Digital input	Hardware debug and flash programming I/O
P0.02 - P0.31 P1.00 - P1.15	Digital I/O	General purpose I/O pin
ANT	Antenna output	External antenna
RST	Digital I/O	Configurable as system RESET pin
D+	Digital I/O	USB D+
D-	Digital I/O	USB D-

## 2. Electronic Characteristic

### 2.1 Absolute maximum ratings

Symbol	Min	Max	Unit	Condition
VCC	1.7	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

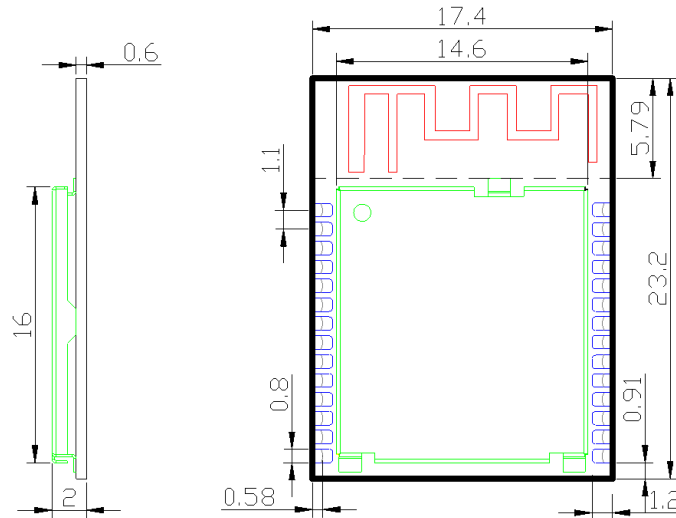
### 2.4 Current consumption

Parameter	Min	Max	Unit	Remark
Receiving current		4.8	mA	standard mode
Transmission power		4.9	mA	transmission power at 0dbm
Sleeping current		1	uA	power mode 3

### 2.5 RF performance

Parameter	Min	Typical	Max	Unit
Receiver input sensitivity		-103		dBm
Output power	-20	0	+8	dBm

### 3. Physical Dimension

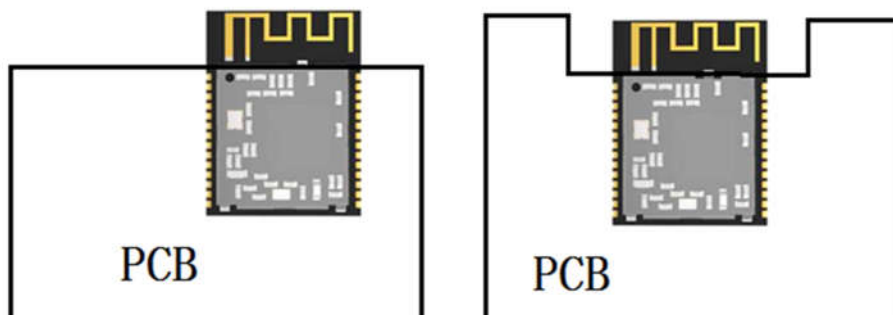


Unit: mm

### 4. 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.

- 4.1 Carrier board under the antenna area of the module like the picture;
- 4.2 Keep out enough area for the antenna area;
- 4.3 Reflow profiles are to be selected according to standard manufacturing process;
- 4.4 The soldering temperature should be less than 206°C;
- 4.5 The module should be placed far away other low frequency and digital circuits;
- 4.6 The MS50 series modules contain highly sensitive electronic circuitry and are Electrostatic Sensitive Devices (ESD). Handling the MS88 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.

## 5. USB Data Interface

Please refer to the specification of nRF52840 to know more.

## 6. 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

## 7. Ordering information

Ordering number	Description
306030063	MS88SF2, nRF52840 BT 5.0 Module, PCB Antenna

<END>

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

15.105 Information to the user.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

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.

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

**Radiation Exposure Statement:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. The module should not be installed and operated simultaneously with other radios except additional RF exposure was evaluated for simultaneously transmission.

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.

The firmware setting is not accessible by the end user.

The final end product must be labelled in a visible area with the following:

“Contains Transmitter Module **2ABU6-MS88SF2**”