

Bluetooth LE Module MS50SF7



Datasheet

V 1.0.1



Version Note

Version	Details	Contributor(s)	Date	Notes
1.0.0	First edit	Michelle, Leo	2024.05.10	
1.0.1	Optimize module thickness	Owen	2024.11.22	

Part Number

Model	Hardware Code
MS50SF71	1N32AI

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https://en.minewsemi.com/file/MS50SF7-nRF52832_Datasheet_K_EN.pdf



MS50SF7-nRF52832

Ultra small size, high performance, optional external antenna, Bluetooth 5.4 module with multi-protocol support

The nRF52832 chip used in this module features an ARM Cortex-M4F RF transceiver with faster MCU operating speed, reaching up to 64MHz. It has 512KB of FLASH program space, 64KB of RAM, and other powerful resources. This chip is suitable for low-power systems, offering ultra-low sleep current and low power consumption during operation. The nRF52832 supports protocols such as ANT, Bluetooth Low Energy (BLE), BLE Mesh, Zigbee, and Thread. With its compact size of 9.8*8.4mm and built-in PCB antenna, it can be utilized in applications with strict size requirements. Additionally, it also allows for external antenna designs through the ANT pins.

FEATURES



Bluetooth 5.4



Extremely compact size:
9.8mm*8.4mm*1.6mm



High Performance



Supports protocols such as ANT, Bluetooth Low Energy (BLE), BLE Mesh, Zigbee, and Thread

KEY PARAMETER

MS50SF7-nRF52832			
Chip Model	nRF52832	Antenna	PCB
Module Size	9.8x8.4x1.6mm	GPIO	24
Flash	512KB	RAM	64KB
Receiving Sensitivity	-96dBm	Transmission Power	-40 ~ +4dBm
Current(TX)	0dBm- 5.3mA	Current(RX)	5.4mA

APPLICATION



Smart Buildings



Consumer Electronics



Smart Healthcare



Smart Agriculture



Security Equipment

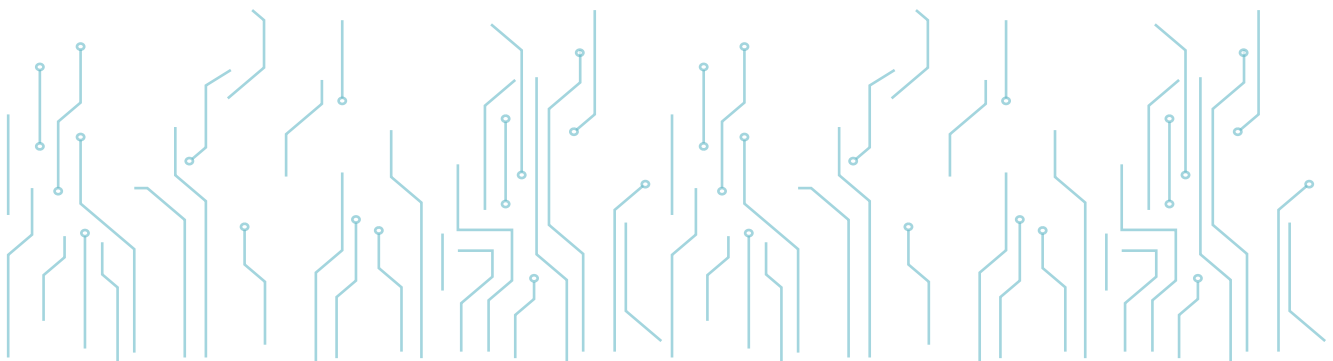


Automotive Equipment

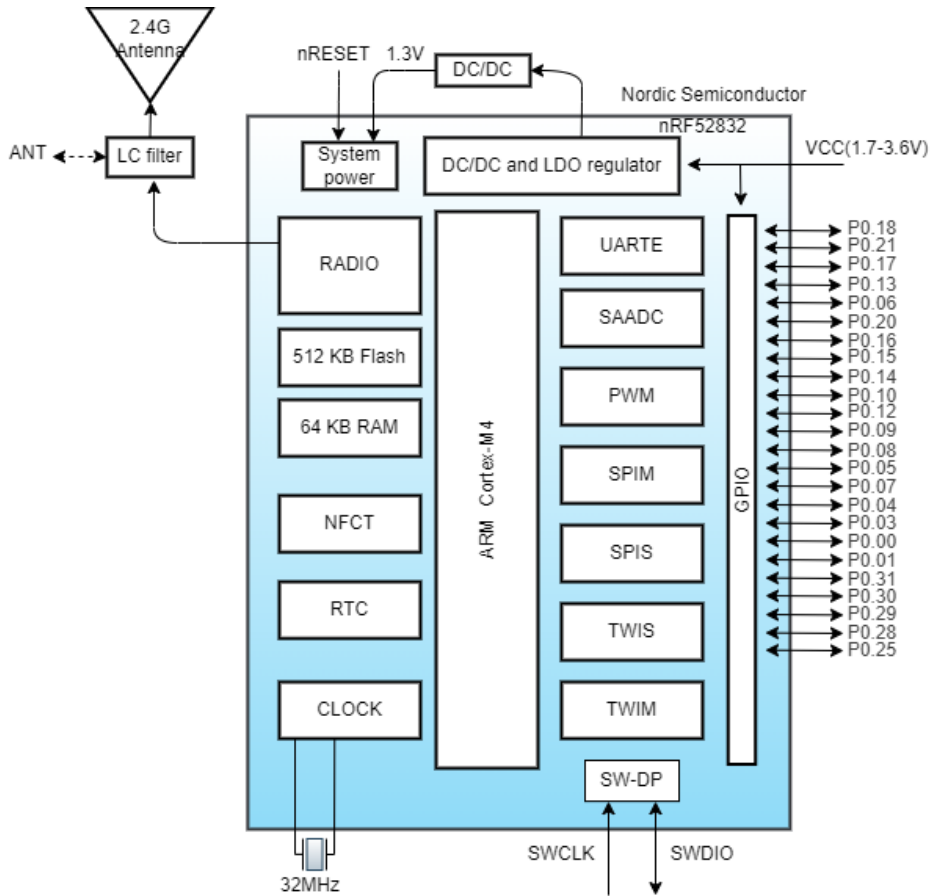


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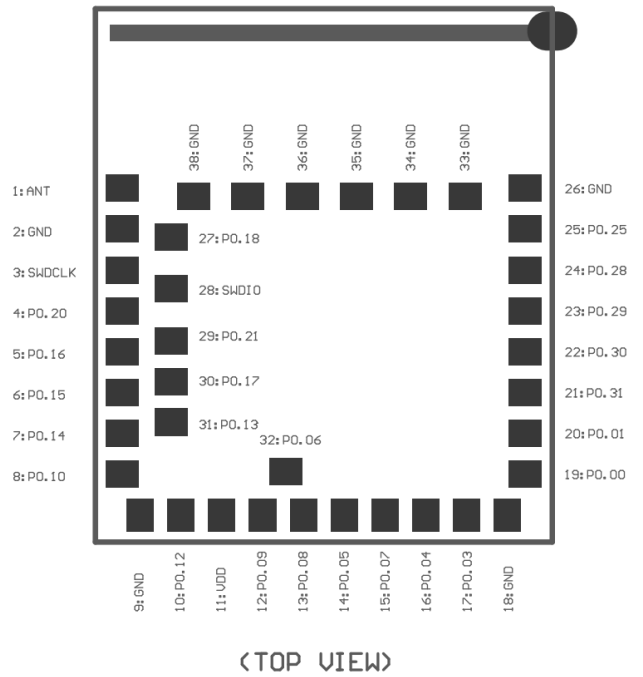
1 BLOCK DIAGRAM



2 ELECTRICAL SPECIFICATION

Parameters	Value	Notes
Working Voltage	1.7V-3.6V	To ensure RF work, supply voltage suggest not lower than 2.3V
Working Temperature	-40 C ~ +85 C	Storage temperature is -40 C ~ +125 C
Transmission Power	-40 ~ +4dBm	Configurable
Current(RX)	5.4mA	RF receiving current under 1Mbps pattern
Current(TX)	5.3mA	RF transmission current under 0dB pattern
Module Dimension	9.8*8.4*1.6mm	
Quantity of IO Port	24	

3 PIN DESCRIPTION




4 PIN DEFINITION

Pin Number	Symbol	Type	Definition
1	ANT	External antenna pins	Using the module's built-in antenna, this pin is directly suspended. If not using the built-in antenna of the module, an external antenna can be connected through this pin. When using an external antenna, the resistor that is connected to the antenna needs to be horizontally soldered to this pin.
11	VDD	Power source	Power supply: 1.7V-3.6V, short-circuit VDD and VDDH to use the pin to supply power
2/9/18/26/33-38	GND	Ground	Ground
3/28	SWCLK/SWDIO	Debug	Debug, when debug only need to connect power supply pin, ground and these 2 pins.
4-8	P0.20/P0.16/ P0.15/P0.14/P0.10	I/O	I/O port for general purpose
10	P0.12		
12-17	P0.09/P0.08/P0.05 /P0.07/P0.04/P0.03		
19-25	P0.00/P0.01/P0.31 /P0.30/P0.29/P0.28/P0.25		
27	P0.18		
29-31	P0.21/P0.17/P0.13		
32	P0.06		



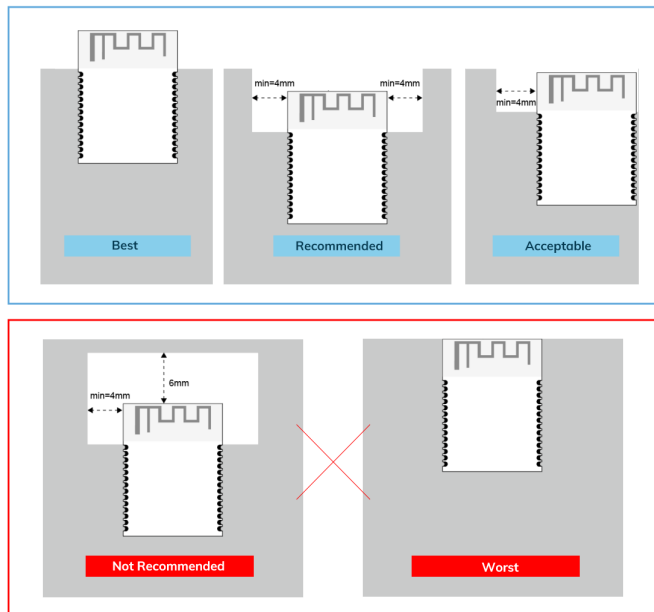
7 PCB LAYOUT

Module antenna area couldn't have GND plane or metal cross line, couldn't place components nearby. It is better to make hollow out or clearance treatment or place it on the edge of PCB board.

 Notice: Refer to examples as below, and highly suggest to use the first design and the adjustment of modules antenna design according to the first wiring.

Layout Notes:

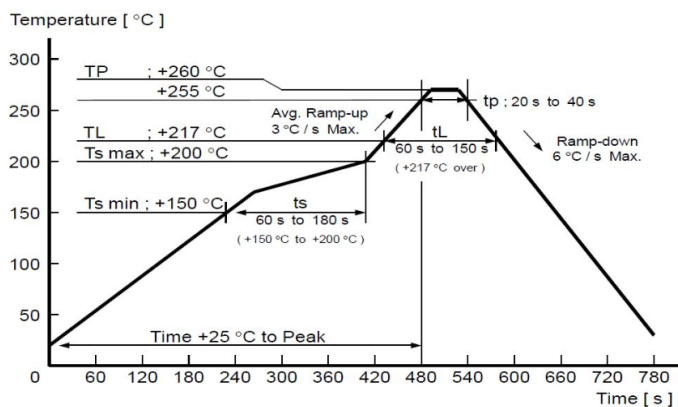
- 1) Preferred Module antenna area completely clearance and not be prevented by metals, otherwise it will influence antenna's effect (as above DWG. indication).
- 2) Cover the external part of module antenna area with copper as far as possible to reduce the main board's signal cable and other disturbing.
- 3) It is preferred to have a clearance area of 4 square meter or more area around the module antenna (including the shell) to reduce the influence to antenna.
- 4) Device should be grounded well to reduce the parasitic inductance.
- 5) Do not cover copper under module's antenna in order to avoid affect signal radiation or lead to transmission distance affected.
- 6) Antenna should keep far from other circuits to prevent radiation efficiency reduction or affects the normal operation of other lines.
- 7) Module should be placed on edge of circuit board and keep a distance away from other circuits.
- 8) Suggesting to use magnetic beads to insulate module's access power supply.



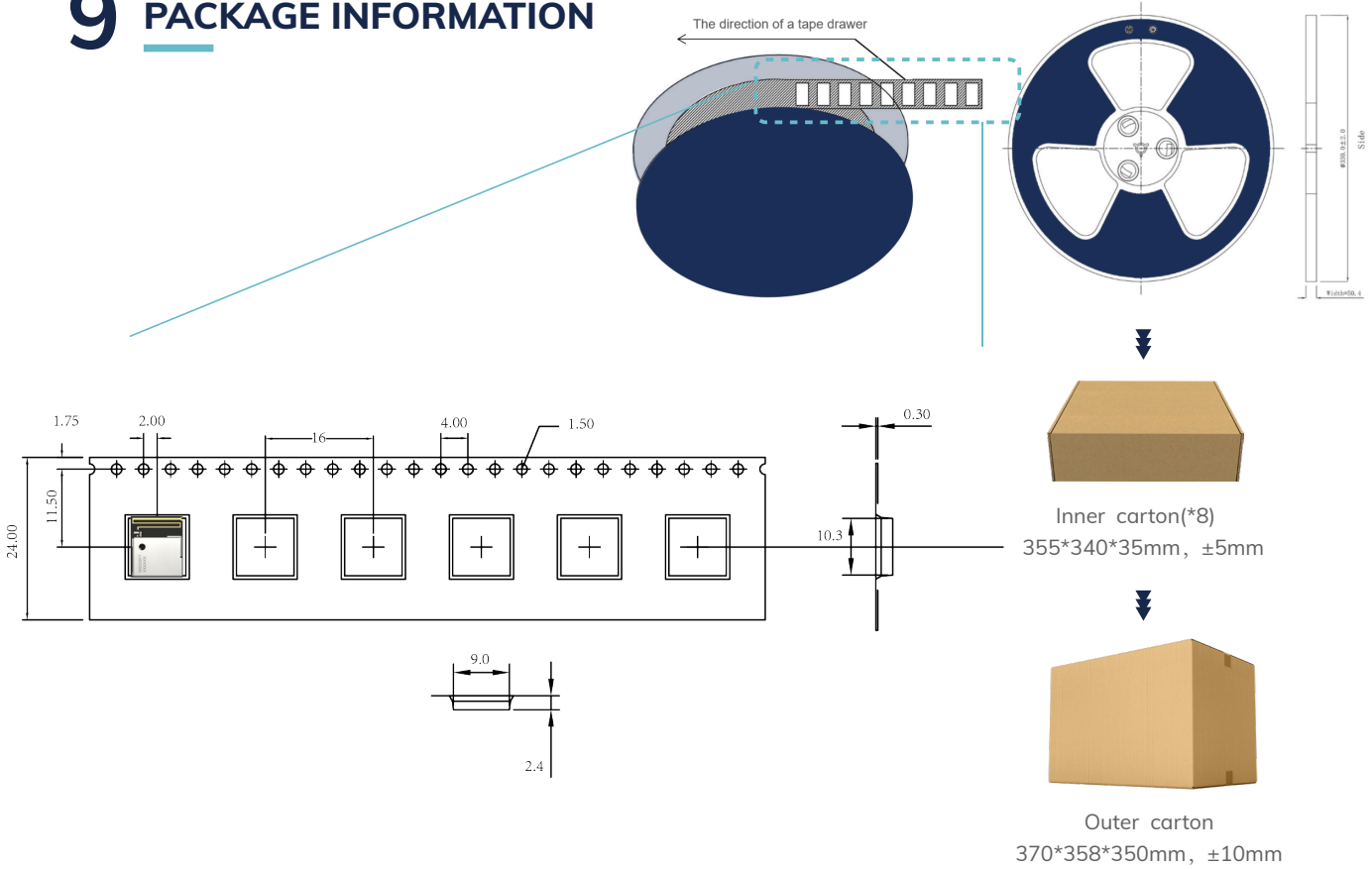
8 REFLOW AND SOLDERING

1) Do SMT according to above reflow oven temperature deal curve. Max. Temperature is 260 °C; Refer to IPC/JEDEC standard; Peak TEMP < 260 °C; Times: ≤ 2 times, suggest only do once reflow soldering on module surface in case of SMT double pad involved. Contact us if special crafts involved.

- 2) For the SMT process, it is recommended to use a stencil thickness of 0.1–0.12 mm. The pad openings should follow a 1:0.9 ratio without outward extension.
- 3) After unsealing, it cannot be used up at one time, should be vacuumed for storage, couldn't be exposed in the air for long time. Please avoid getting damp and soldering-pan oxidizing. If there are 7 to 30 days interval before using online SMT, suggest to bake at 65-70 °C for 24 hours without disassembling the tape.
- 4) Before using SMT, please adopt ESD protection measure.



9 PACKAGE INFORMATION

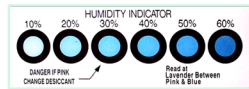


Remarks

General material list for FCL packaging:



Carrier tape packaging tray



Humidity Indicator
(1 pcs/bag)



Desiccant
(placed in a vacuum bag)



Vacuum bag



Inner carton(*8)
355*340*35mm, ±5mm



Outer carton
370*358*350mm, ±10mm

Other:

Moisture-proof label (attached to the vacuum bag)

Certification label (attached to the vacuum bag)

Outer box label

Default unit: mm Default tolerance: ±0.1

Packing detail	Specification	Net weight	Gross weight	Dimension
MS50SF7	1300PCS	338g	1135g	W=24mm, T=0.35mm

Note: Default weight tolerance all are within 10g (except the special notes)



10 STORAGE CONDITIONS

- Please use this product within 6 months after signing the receipt.
 - This product should be stored without opening the package at an ambient temperature of 5~35°C and a humidity of 20~70%RH.
 - This product should be left for more than 6 months after receipt and should be confirmed before use.
 - The product must be stored in a non-corrosive gas (Cl₂, NH₃, SO₂, NO_x, etc.).
 - To avoid damaging the packaging material, do not apply any excessive mechanical shocks, including but not limited to sharp objects adhering to the packaging material and product dropping.
- This product is suitable for MSL2 (based on JEDEC standard J-STD-020).
 - After opening the package, the product must be stored at ≤30°C/<60%RH. It is recommended to use the product within 3-6 months after opening the package.
 - When the color of the indicator in the package changes, the product should be baked before welding.
- Baking is not required for one year if exposure is limited to <30°C and 60%RH. Refer to MSL2 for exposure criteria for moisture sensitivity level. If exposed to (≥168h@85°C/60%RH) conditions or stored for more than one year, recommended baking conditions.
 1. 120 +5/-5°C, 8 hours, 1 timeProducts must be baked individually on heat-resistant trays because the materials (base tape, reel tape, and cover tape) are not heat-resistant, and the packaging material may be deformed at temperatures of 120°C;
 2. 90°C +8/-0°C, 24hours, 1timesThe base tape can be baked together with the product at this temperature. Please pay attention to the uniformity of heat.

11 HANDLING CONDITIONS

- Be careful in handling or transporting products because excessive stress or mechanical shock may break products.
- Handle with care if products may have cracks or damages on their terminals. If there is any such damage, the characteristics of products may change. Do not touch products with bare hands that may result in poor solder ability and destroy by static electrical charge.

12 QUALITY

Cognizant of our commitment to quality, we operate our own factory equipped with state-of-the-art production facilities and a meticulous quality management system. We hold certifications for ISO9001, ISO14001, ISO27001, OHSAS18001, BSCI.

Every product undergoes stringent testing, including transmit power, sensitivity, power consumption, stability, and aging tests. Our fully automated module production line is now in full operation, boasting a production capacity in the millions, capable of meeting high-volume production demands.

13 COPYRIGHT STATEMENT

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14 RELATED DOCUMENTS

- nRF52832_Chip_Datasheet
https://en.minewsemi.com/file/nRF52832_Chip_Datasheet_EN.pdf
- MinewSemi_Product_Naming_Reference_Manual_V1.0
https://en.minewsemi.com/file/MinewSemi_Product_Naming_Reference_Manual_EN.pdf
- MinewSemi_Connectivity_Module_Catalogue_V2.0
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