

BLE Module

MS53SF2

DateSheet

V 1.0.0

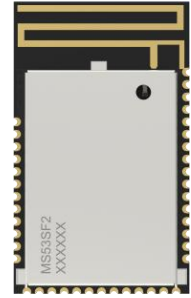
Applicable Product Model
MS53SF2-BlueNRG-332AC

Version Note

Version	Details	Contributor(s)	Date	Notes
1.0.0	First edit	Michelle	2023.09.14	

MS53SF2-BlueNRG-332AC

High data rate, long-range, cost-effective, ultra-low-power Bluetooth 5.3 modules



The MS53SF2 is a highly flexible, ultra-low power, cost-effective wireless BLE 5.3 module based on BlueNRG-332AC. It also comes with 192kB FLASH program space, 24 KB RAM + 4 KB PKA RAM to provide a perfect solution for Bluetooth connectivity. The hardware supports high speed, long range, broadcast extension, channel selection algorithms, direction finding (AoA/AoD) and more. At 125kbps data rate, it can transmit up to 500 meters in open space.

■ Features

- Bluetooth 5.3
- Cost-effective
- Ultra-low power consumption
- Option to add external PA and LNA
- Support for optional external antenna
- Extremely long transmission distance, with a transparent transmission range of up to 500 meters

■ Application

- Smart Buildings
- Consumer Electronics
- Smart Healthcare
- Security Equipment
- Automotive Devices
- Smart Agriculture

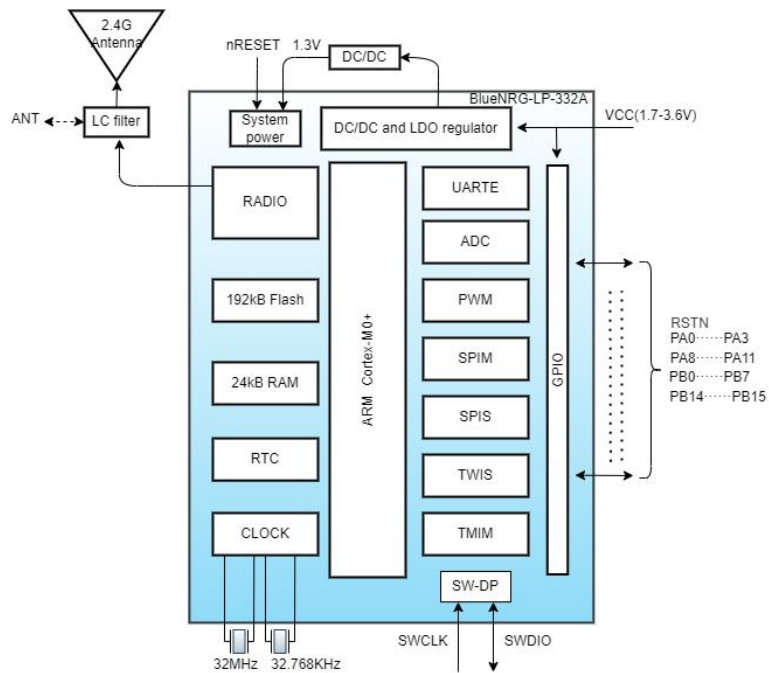
■ Key parameter

Chip Model	BlueNRG-332AC	Antenna	PCB
Module Size	20×12×2mm	GPIO	19
Flash	192KB	RAM	24KB
Receiving Sensitivity	-97dBm	Transmission Power	-20 ~ +8dBm
Current(TX)	0dBm- 4.3mA	Current(RX)	3.4mA

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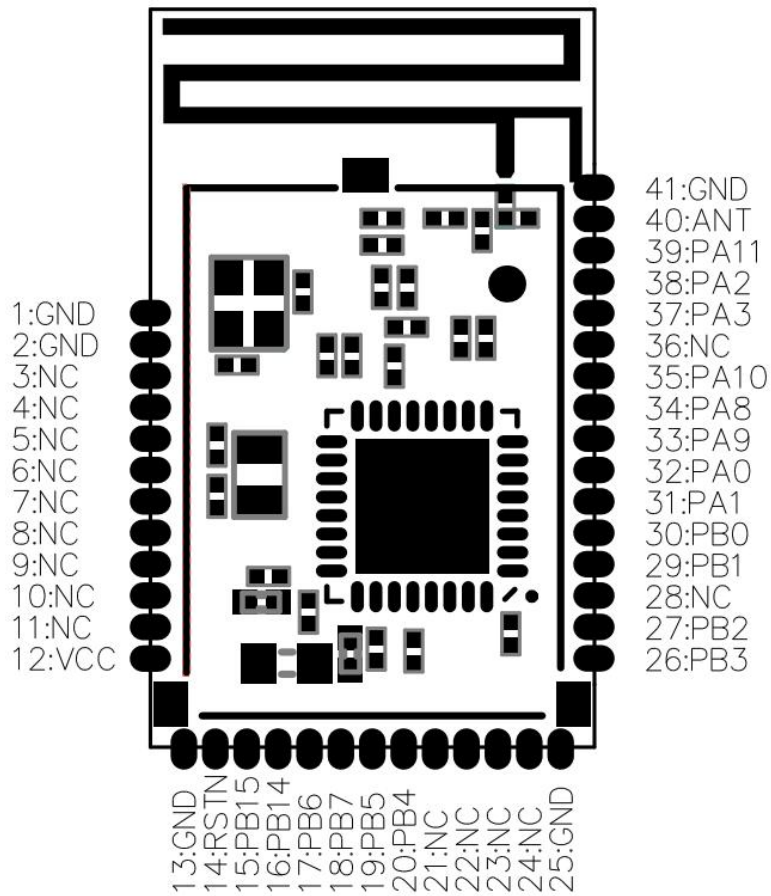
1 Block Diagram



2 Electrical Specification

Parameter	Values	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~+105°C
Transmission Power	-20 ~ +8dBm	Configurable
Current(RX)	3.4mA	RF receiving current under 1Mbps pattern
Current(TX)	4.3mA	RF transmission current under 0dB pattern
Module Dimension	20*12*2mm	
Quantity of IO Port	19	

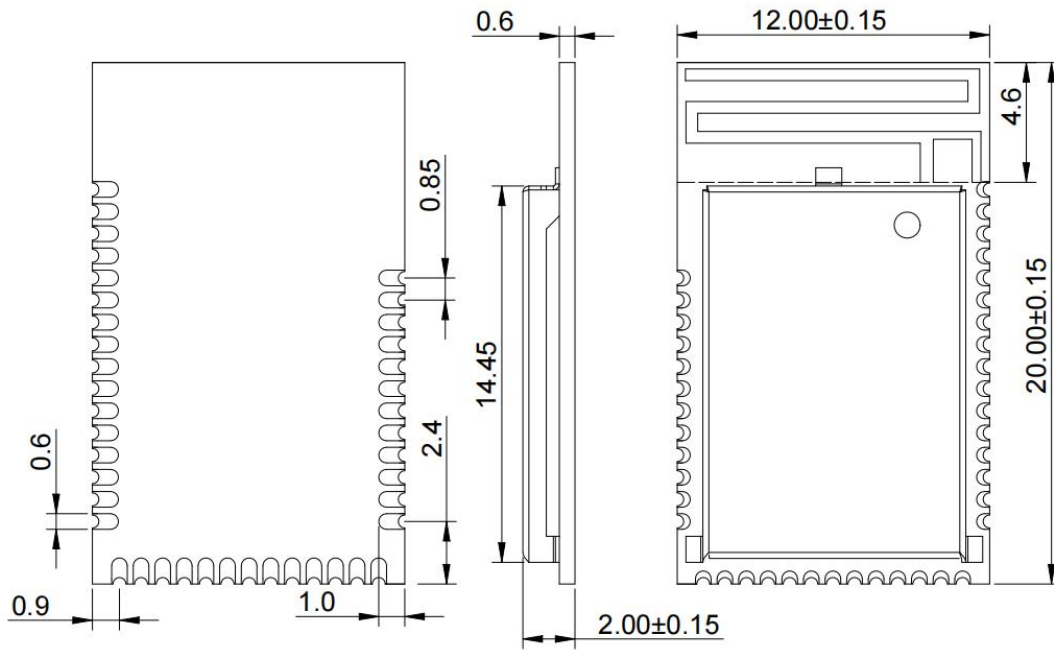
3 Pin Description



4 Pin Definition

Pin Number	Symbol	Type	Definition
1-2/13/25/41	GND	Negative power supply	Grounded
3-11/21-24/28/36	NC	NC	NC
12	VCC	Negative power supply	Power supply, 1.7V-3.6V, powered by this pin
14	RSTN	I/O, Asynchronous reset pins	I/O Pin Multiplexing, Reset
14-20/26-27/29-35/37-39	RSTN/ PB0-PB7/ PB14-PB15/ PA0-PA3/ PA8-PA11	GPIO	General IO port
33	PA9	I/O, TX	I/O pin multiplexing, UART TX
34	PA8	I/O, RX	I/O pin multiplexing, UART receive pin (RX):
37	PA3	I/O, SWCLK	I/O pin multiplexing, debug pin. During debugging, only connect this pin with the power and ground pins:
38	PA2	I/O, SWDIO	I/O pin multiplexing, debug pin. During debugging, only connect this pin with the power and ground pins:
40	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.

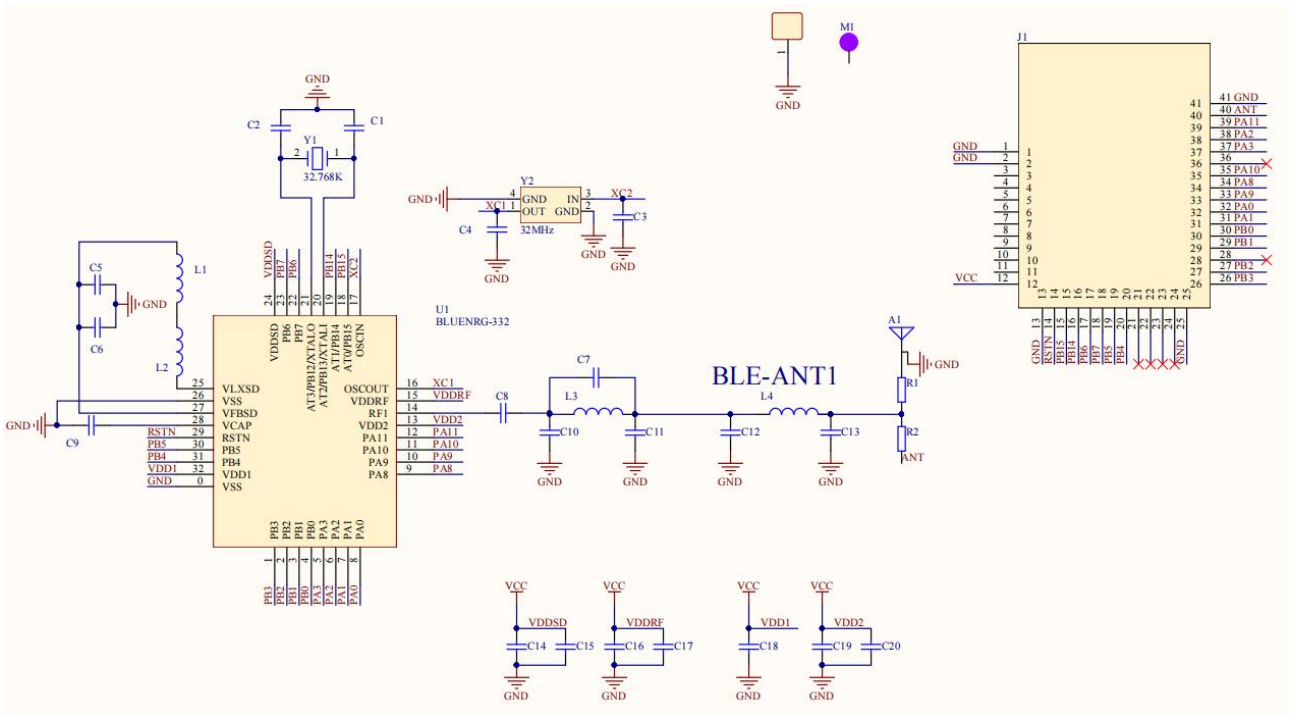
5 Mechanical Drawing



* (Default unit: mm Default tolerance: ±0.1)

Notice: The recommended pad size is 1.8*0.8mm with a pad extension of 0.5mm

6 Electrical Schematic



Notice: Before placing an order, please confirm the specific configuration required with the salesperson.

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.



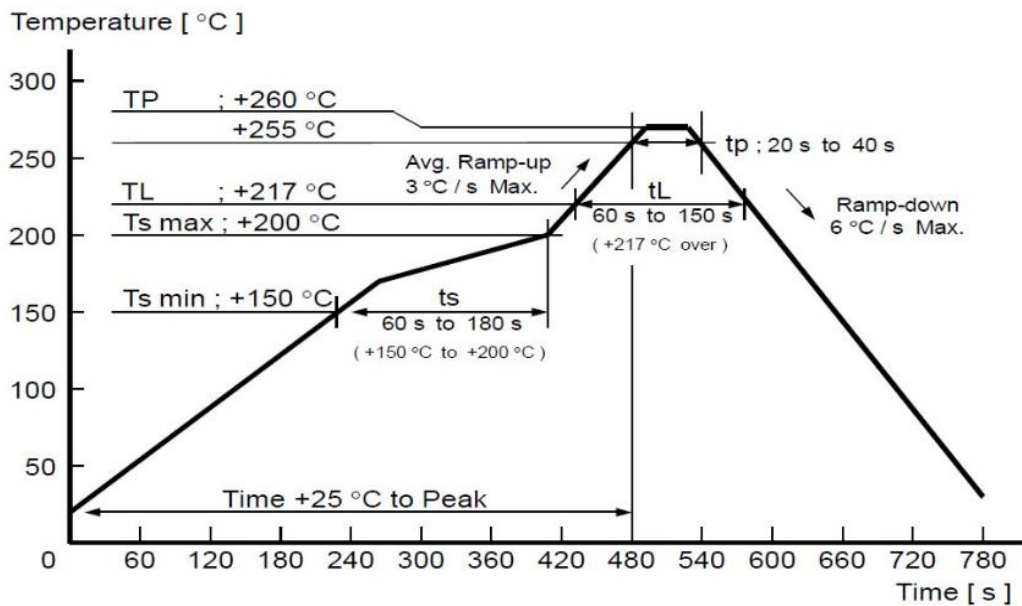
Layout notes:

- 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

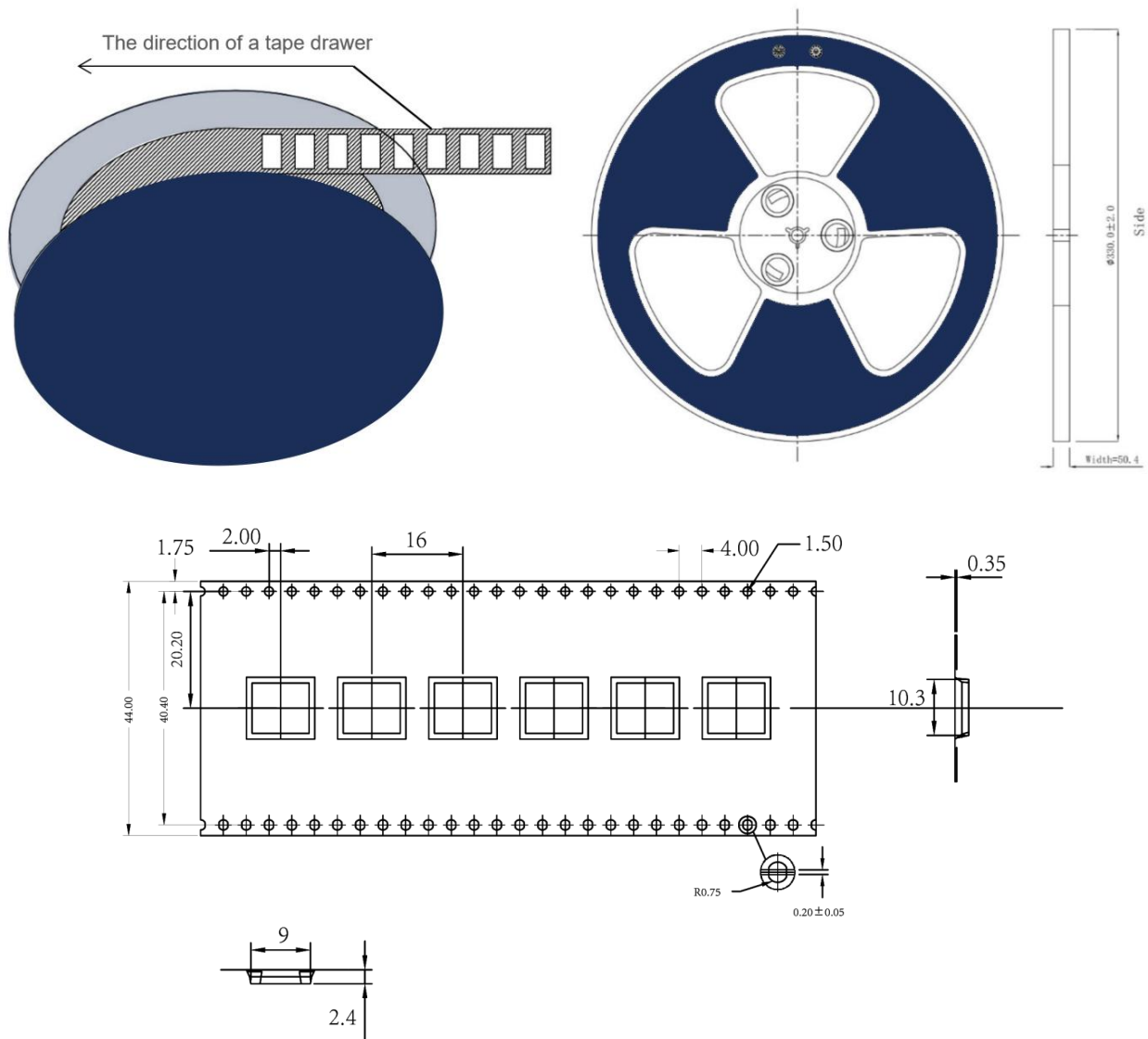
1) Do SMT according to above reflow oven temperature deal curve. Max. Temperature is 260°C;

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) Suggesting to make 0.2mm thickness of module SMT for partial ladder steel mesh, then make the opening extend 0.8mm
- 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



* (Default unit: mm Default tolerance: ± 0.1)

Packing detail	Specification	Net weight	Gross weight	Dimension
Quantity	850PCS	680g	1150g	W=44mm, T=0.35mm

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

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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.

● Contact Us

Shenzhen Minewsemi Co., Ltd. is committed to swiftly delivering top-quality connectivity modules to our customers. For assistance and support, please feel free to contact our relevant personnel, or contact us as follows:

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Related documents: Chip specification

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