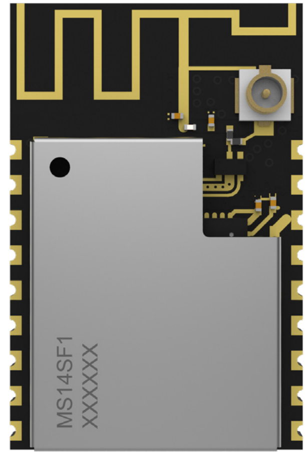
MINEWSEMI

Wi-Fi Module

MS14SF1



Datasheet

V 1.0.0

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Version Note

Version	Details	Contributor(s)	Date	Notes
1.0.0	First edit	Vincle, Leo	2024.07.08	

Part Number

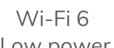
Model	Hardware Code
MS14SF1	-

MS14SF1-nRF7002

Low-power, Dual-band 2.4&5G Wi-Fi 6, Support TWT, Support STA/AP Mode

The MS14SF1 is a low-power, cost-effective wireless WiFi 6 module based on nRF7002. It integrates 2.4G and 5.8G dual-band 1T1R transceiver and LNA, as well as other powerful supporting development resources to provide a perfect solution for WiFi connection. The module has optional onboard antenna and IPEX external antenna, supports WPA/W-PA2/WPA3 encryption, supports STA/AP mode, and has a transmission distance of 80M in office environment, which can meet the needs of various structural scenarios.

FEATURES



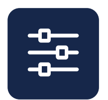
Wi-Fi 6 Low power

High Cost-effective

Dual-band 2.4G + 5G, 1T1R

Support optional external antenna

Support TWT



Support STA/AP Mode

Transmission distance in office environment: 80M

KEY PARAMETER

MS14SF1			
Chip Model	nRF7002	**Antenna**	PCB/IPEX
Module Size	22.9×15×3mm	**Firmware**	None
Receiving Sensitivity	-98.6dBm	**Transmission Power**	Maximum +21dBm
Current(TX)	191mA - 2.4G 260mA - 5G	**Current(RX)**	60mA - 2.4G 56mA - 5G

APPLICATION

Smart Buildings

Consumer Electronics

Smart Healthcare

Security Equipment

Automotive Devices

Smart Agriculture

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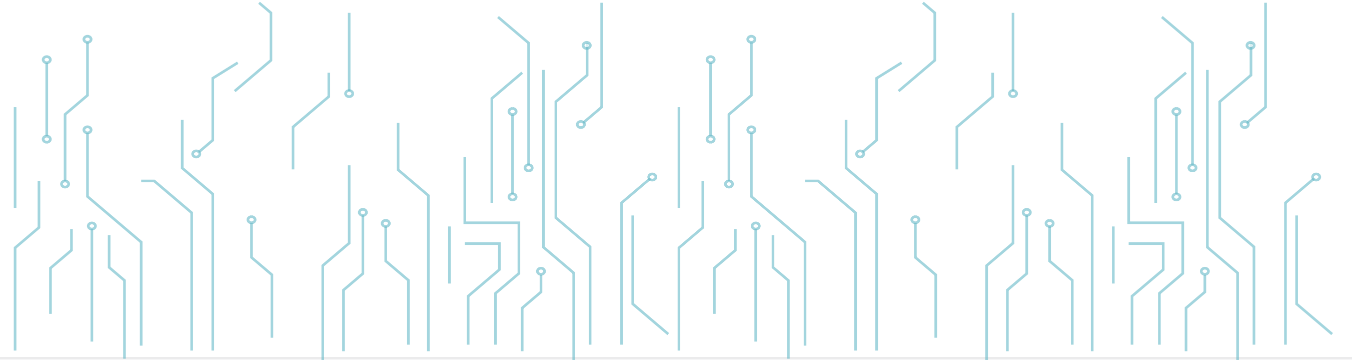
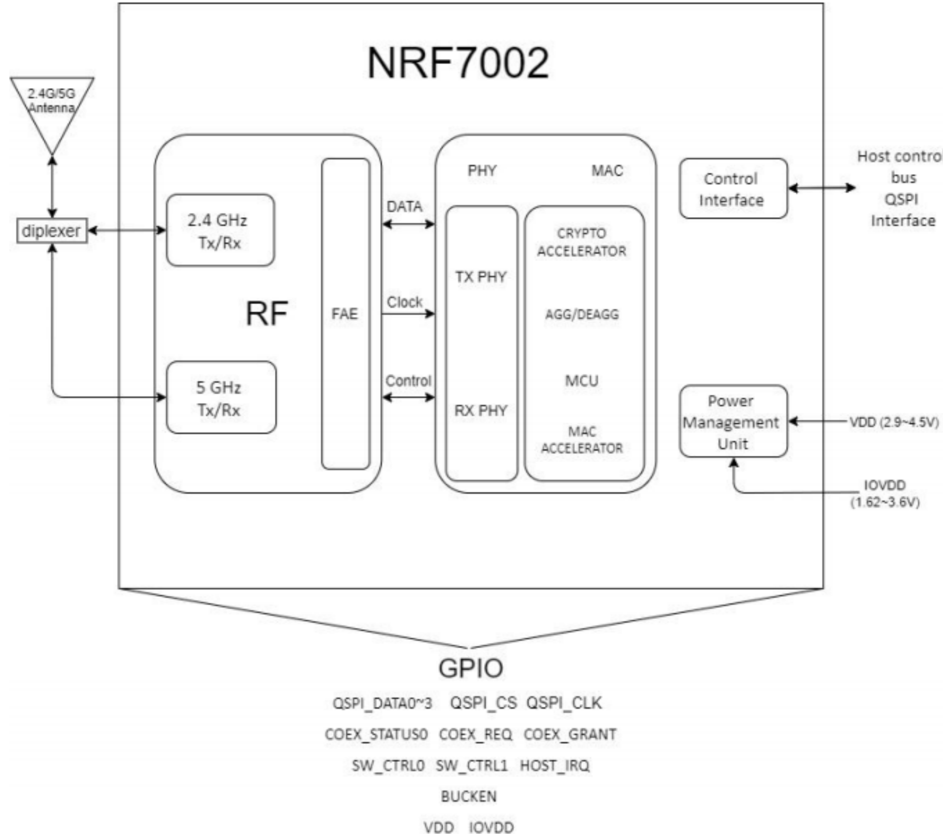


1 BLOCK DIAGRAM



2 ELECTRICAL SPECIFICATION

Parameter	Values	Notes
Operating Voltage	2.9V-4.5V	To ensure RF work, supply voltage suggest not lower than 3.6V
Operating Temperature	-40℃~+85℃	Storage temperature is -40℃~+125℃
Transmission Power	Maximum +21dBm	Configurable
Current(RX)	2.4G - 60mA 5G - 56mA	Maximum output power
Current(TX)	2.4G - 191mA 5G - 260mA	Maximum output power
Module Dimension	22.9*15*3mm	
Quantity of IO Port	13	QSPI, SPI

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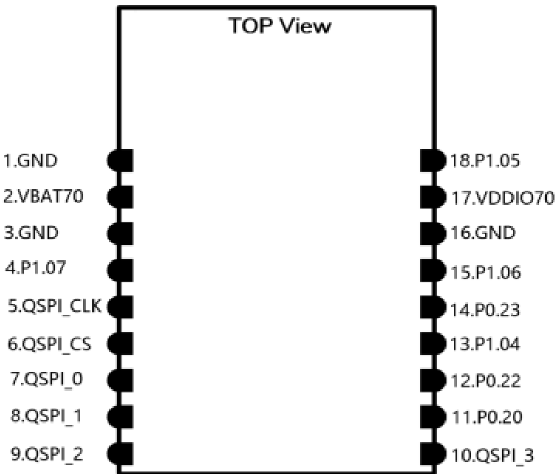
3 PIN DESCRIPTION



4 PIN DEFINITION

Pin Number	Symbol	Definition
VBAT70	Positive power supply	Power supply, 2.5V-5.5V, with this pin, and recommended voltage 3.6V
VDDIO70	Power	VDD IO Power supply 1.8V
GND	Ground	Negative power supply
P0.20	Digital I/O	Coex interface: COEX_STATUS0
P0.22	Digital I/O	Coex interface: COEX_REQ
P0.23	Digital I/O	SW_CTRL0: External switch control
P1.04	Digital I/O	Coex interface: COEX_GRANT
P1.05	Digital I/O	HOST_IRQ: Host processor interrupt request
P1.06	Digital I/O	SW_CTRL1: External switch control
P1.07	Digital I/O	BUCKEN: PWR IP enable pin
QSPI_CLK	Digital I/O	QSPI clock
QSPI_CS	Digital I/O	QSPI Slave select (CS)
QSPI_0	Digital I/O	QSPI data
QSPI_1	Digital I/O	QSPI data
QSPI_2	Digital I/O	QSPI data
QSPI_3	Digital I/O	QSPI data

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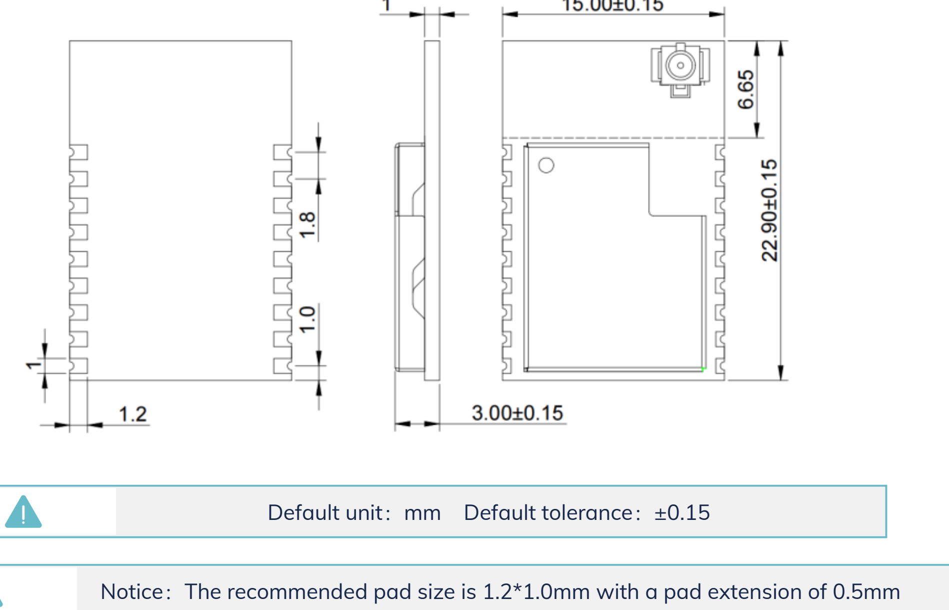
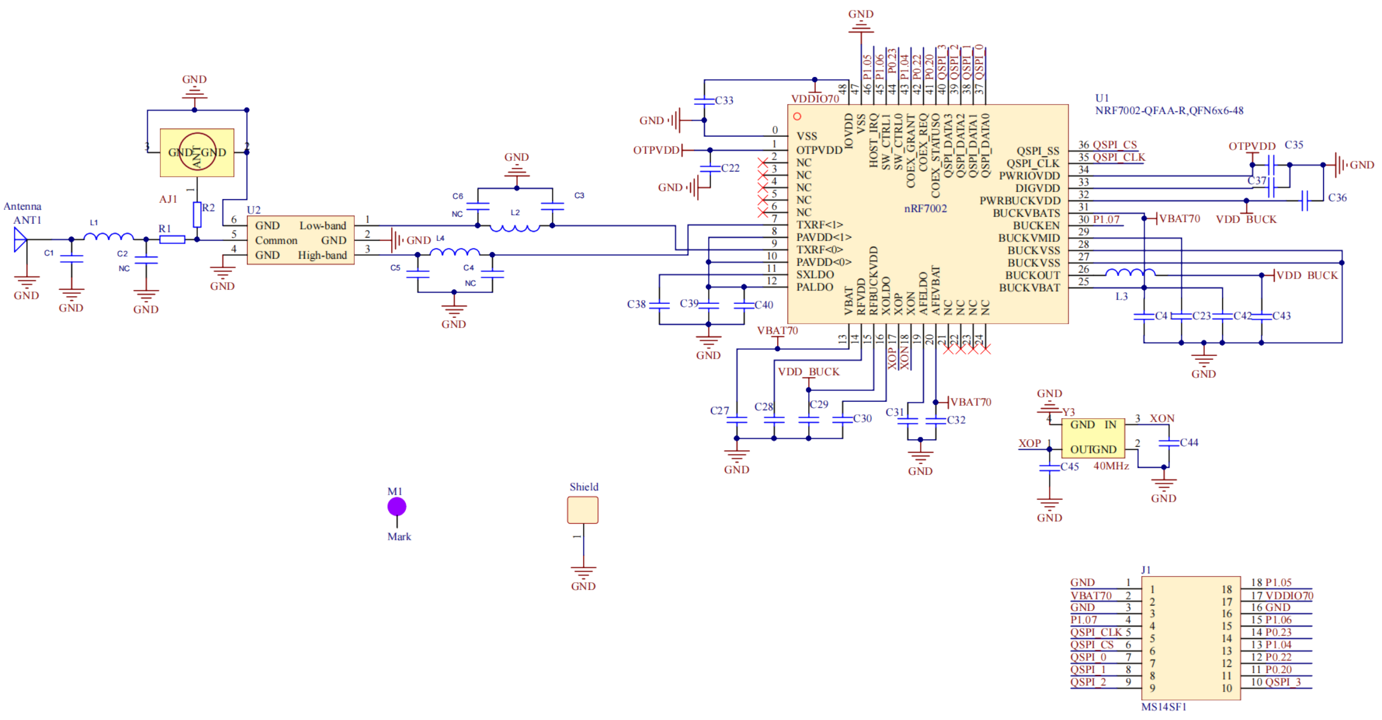
5 MECHANICAL DRAWING



Default unit：mm   Default tolerance：±0.15

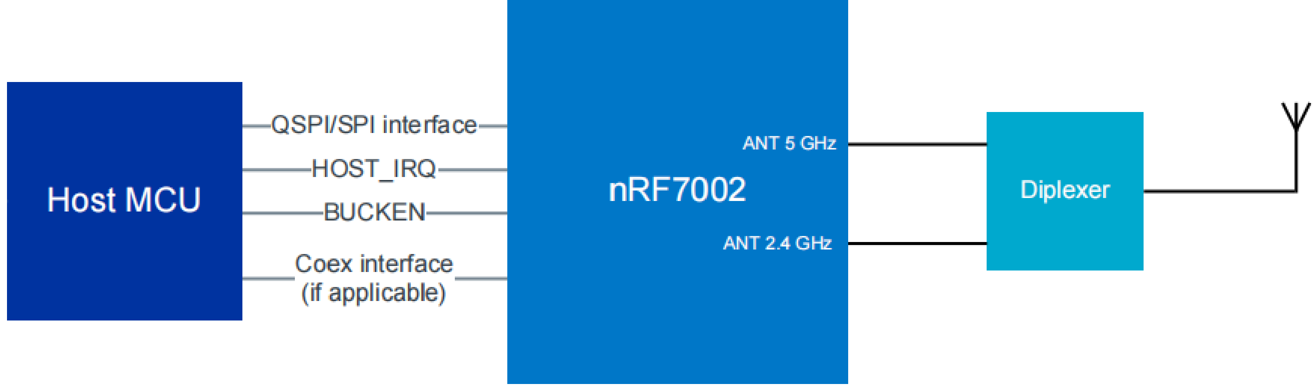
Notice：The recommended pad size is 1.2*1.0mm with a pad extension of 0.5mm

6 ELECTRICAL SCHEMATIC



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

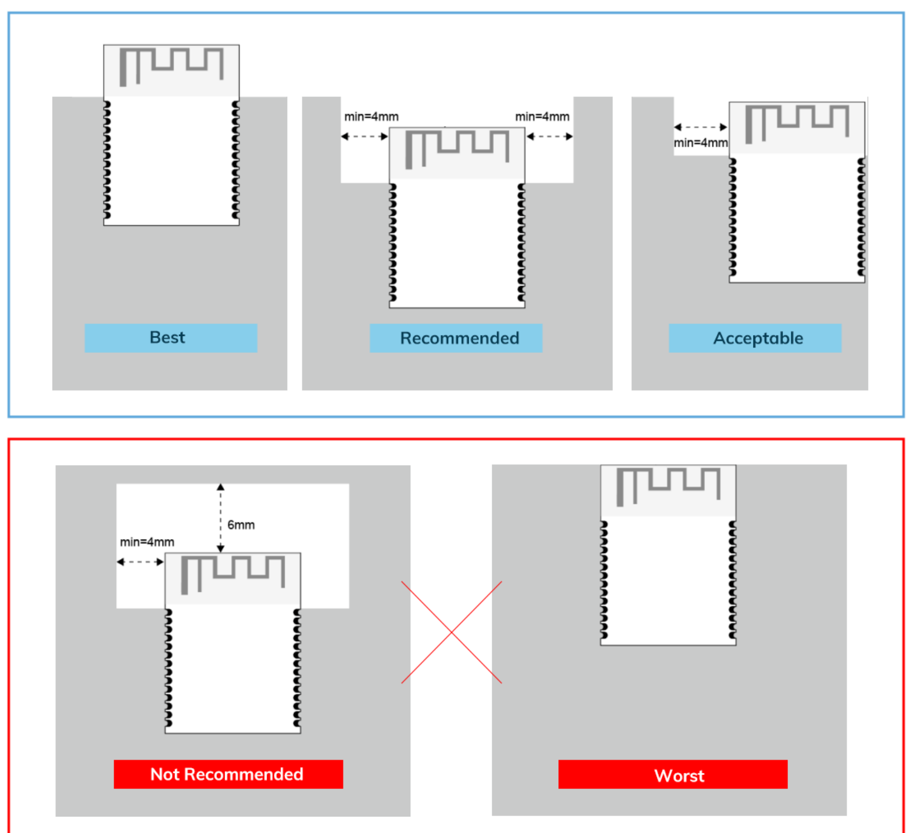
7 CONNECTION DIAGRAM



8 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.

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.



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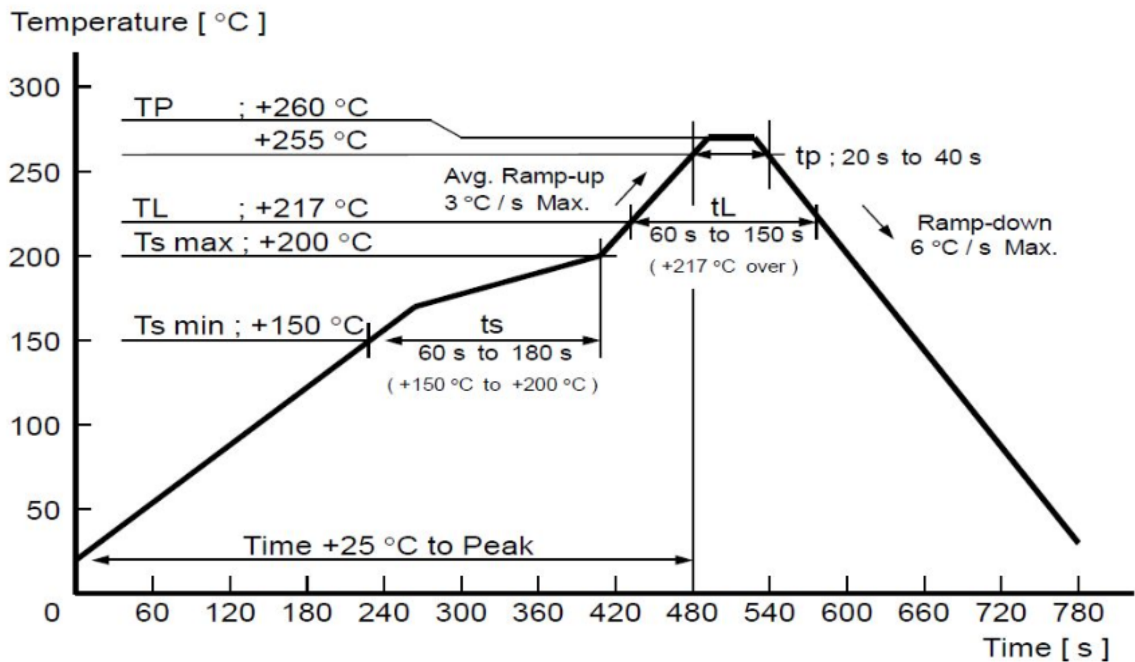
Layout Notes:

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.

9 REFLOW AND SOLDERING

1) Do SMT according to above reflow oven temperature deal curve. Max. Temperature is 260℃;
Refer to IPC/JEDEC standard; Peak TEMP<260℃; 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 ℃ for 24 hours without disassembling the tape.
4) Before using SMT, please adopt ESD protection measure.

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10 PACKAGE INFORMATION

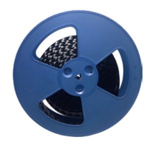
The direction of a tape drawer

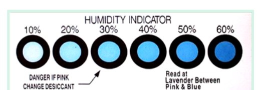
Inner carton(*5)
355*345*65mm，±5mm

Outer carton
370*358*350mm，±10mm

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(*5)
355*345*65mm，±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
MS14SF1	900PCS	-	-	W=44mm，T=0.35mm

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

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11 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 (CI2, NH3, SO2, NOx, 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 time
  Products 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℃;
  2、90℃ +8/-0℃， 24hours， 1times
  The base tape can be baked together with the product at this temperature. Please pay attention to the uniformity of heat.

12 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.

13 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, OHSA18001, 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.

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14 COPYRIGHT STATEMENT

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15 RELATED DOCUMENTS

- nRF7002_Chip_Datasheet
  https://en.minewsemi.com/file/nRF7002_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
  https://en.minewsemi.com/file/MinewSemi_Connectivity_Module_Catalogue_EN.pdf

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