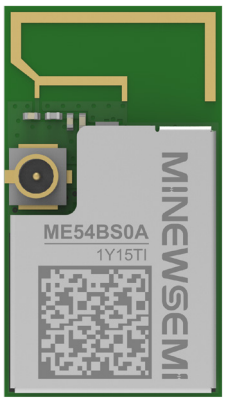
MINEWSEMI

Bluetooth LE Module
ME54BS0A



Datasheet

V 1.0.0

Version Note

Version	Details	Contributor(s)	Date	Notes
1.0.0	First edit	Michelle	2025.11.25	

Part Number

Model	Hardware Code
ME54BS0A	1Y15TI

Click the icon to view and download the latest product documents electronically.
https://en.minewsemi.com/file/ME54BS0A-nRF54L15_Datasheet_K_EN.pdf

ME54BS0A

High-Sensitivity, Multi-Protocol Bluetooth 6.0 PA Module (PCB / U.FL Antenna Options)

The ME54BS0A is an ultra-low-power and high-performance Bluetooth module built on the Nordic nRF54L15 SoC and nRF21540 RF FEM. It integrates an Arm® Cortex-M33 processor running at 128 MHz, along with 1.5 MB NVM and 256 KB RAM, providing strong computing and storage capability for advanced wireless applications.

With the nRF21540 RF FEM, the module supports up to +20 dBm transmit power, delivering extended wireless range with excellent RF performance. It offers selectable PCB or U.FL antenna options, abundant GPIO resources, and a compact integrated hardware design optimized for multi-protocol operation.

Featuring ultra-low power consumption and support for Bluetooth 6.0, Bluetooth Mesh, Matter, Thread, and other protocols, the ME54BS0A is a reliable and versatile solution for next-generation, long-range Bluetooth connectivity.

FEATURES

- Built-in PA/LNA
- The communication distance can reach up to 800 meters
- Power output up to +20 dBm
- Optional PCB antenna or U.FL connector
- Multi-Protocol supports: Bluetooth LE 6.0 Channel Sounding, Bluetooth Mesh, Thread, Matter, and proprietary 2.4 GHz protocols

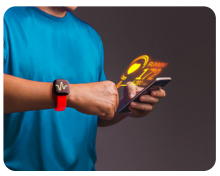
KEY PARAMETERS

ME54BS0A			
Chip Model	nRF54L15	**Antenna**	PCB/U.FL (MHF 1)
Module Size	18×10×1.7mm	**GPIO**	30
Flash	1.5MB	**RAM**	256 KB
Receiving Sensitivity	-96dBm	**Transmission Power**	~ +20dBm
Current(TX)	20dBm-150mA	**Current(RX)**	7mA

APPLICATIONS

Smart Home

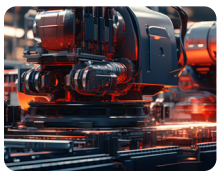
Computer Accessories



Virtual reality and Augmented reality

Game controllers and Remotes

Medical Devices



Industrial IoT

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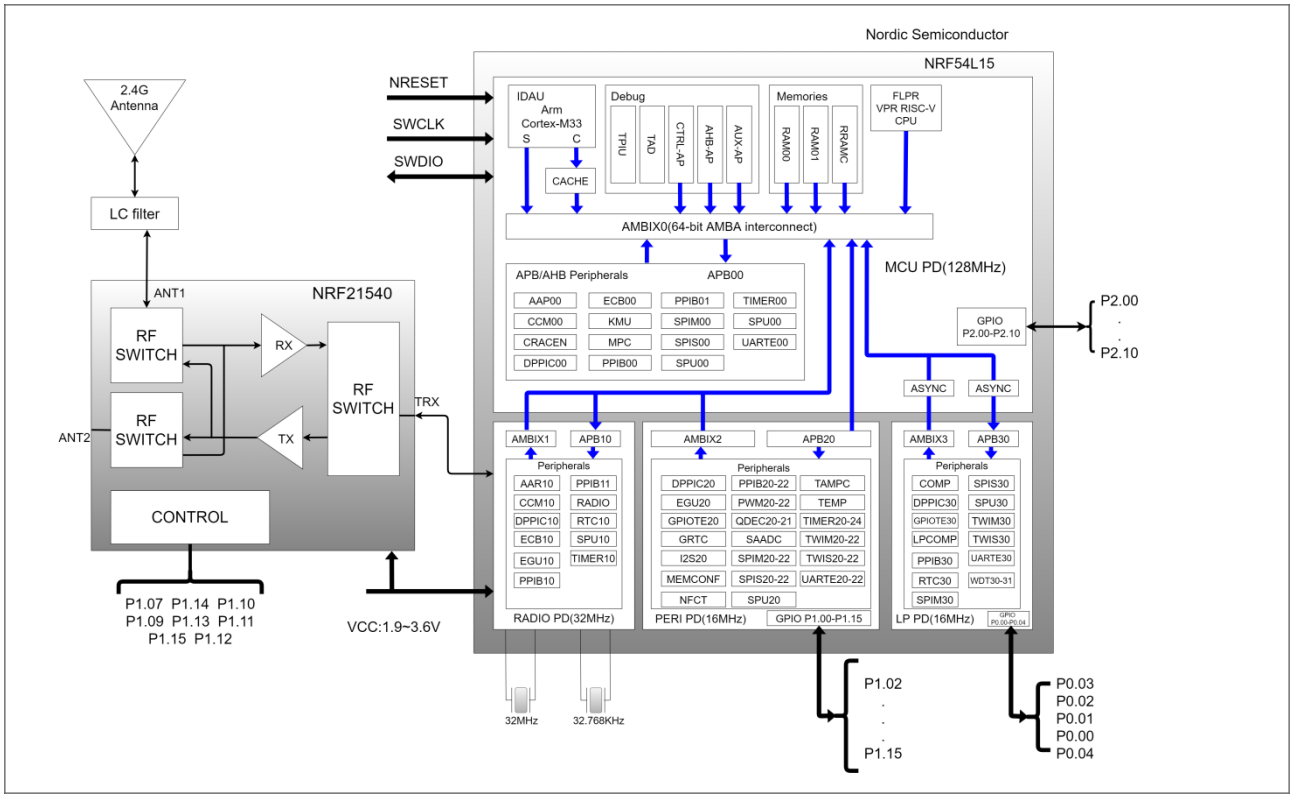
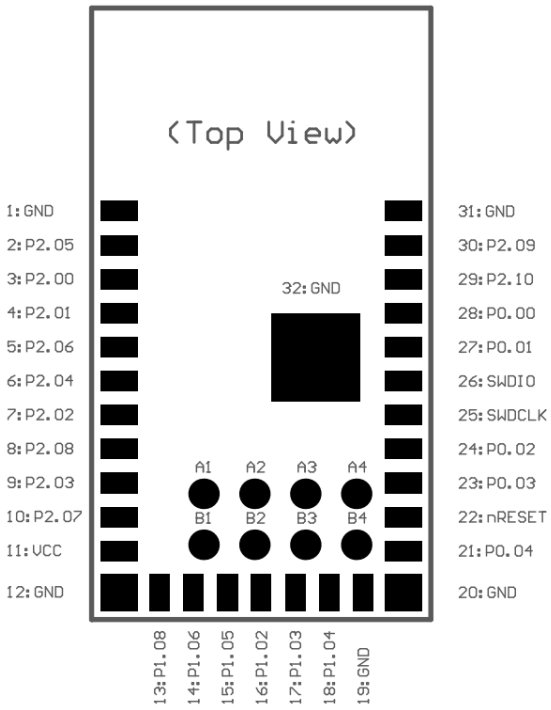
1 BLOCK DIAGRAM



2 ELECTRICAL SPECIFICATION

Parameter	Values	Notes
Working Voltage	1.9V-3.6V	To ensure normal operation of the RF circuit, the supply voltage should not be less than 2.3V.
Working Temperature	-30℃~+80℃	Operating temperature from -40°C to 85°C
Transmission Power	~ +20dBm	Configurable
Current(RX)	7mA	RF receiving current under 1Mbps pattern
Current(TX)	150mA	RF transmission current under 20dBm pattern
Module Dimensions	18x10x1.7mm	
Quantity of IO Port	30	

3 PIN DESCRIPTION



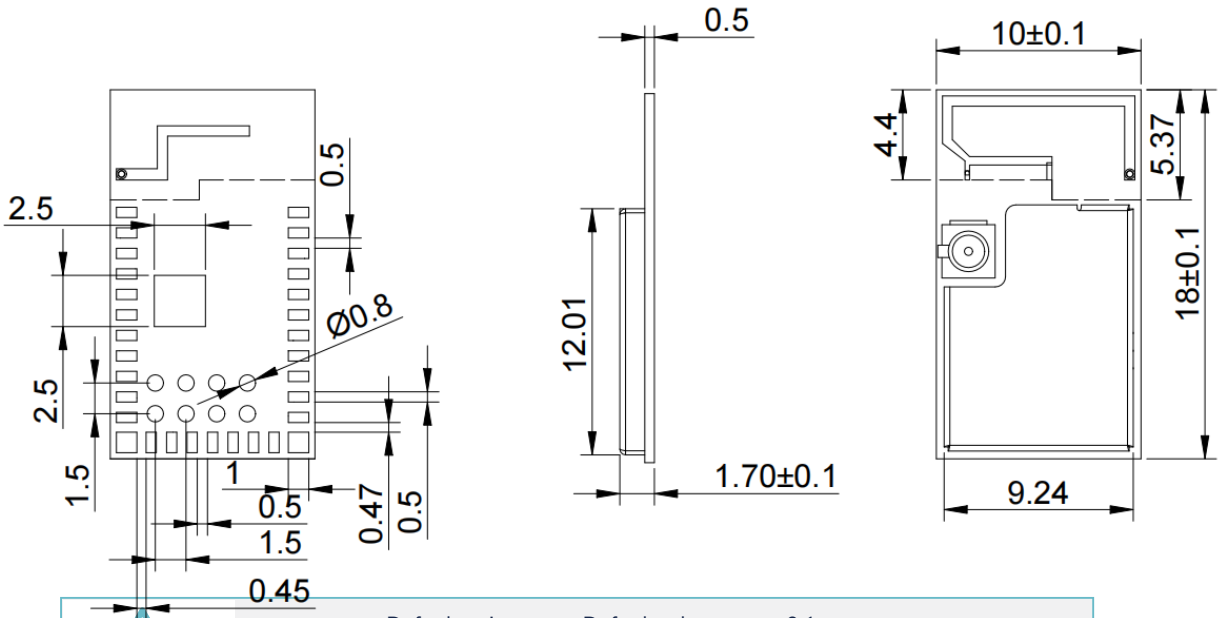
4 PIN DEFINITION

Pin Number	Symbol	Type	Definition
1	GND	GND	
2	P2.05	GPIO	General-purpose I/O port
3	P2.00	GPIO	General-purpose I/O port
4	P2.01	GPIO/CK	General-purpose I/O port
5	P2.06	GPIO/CK	General-purpose I/O port
6	P2.04	GPIO	General-purpose I/O port
7	P2.02	GPIO	General-purpose I/O port
8	P2.08	GPIO	General-purpose I/O port
9	P2.03	GPIO	General-purpose I/O port
10	P2.07	GPIO/SWO	General-purpose I/O port
11	VCC	VCC	
12	GND	GND	

Pin Number	Symbol	Type	Definition
13	P1.08	GPIO	General-purpose I/O port
14	P1.06	GPIO/AIN2	General-purpose I/O port
15	P1.05	GPIO/AIN1	General-purpose I/O port
16	P1.02	GPIO/NFC1	General-purpose I/O port
17	P1.03	GPIO/NFC2/CK	General-purpose I/O port
18	P1.04	GPIO/AIN0/CK	General-purpose I/O port
19	GND	GND	
20	GND	GND	
21	P0.04	GPIO/CK	General-purpose I/O port
22	NRESET	Reset	Low-level reset, high-level operation
23	P0.03	GPIO/CK	General-purpose I/O port
24	P0.02	GPIO	General-purpose I/O port
25	SWCLK	Programming clock pin	For firmware programming
26	SWDIO	Programming data pin	For firmware programming
27	P0.01	GPIO	General-purpose I/O port
28	P0.00	GPIO	General-purpose I/O port
29	P2.10	GPIO	General-purpose I/O port
30	P2.09	GPIO	General-purpose I/O port
31	GND	GND	
32	GND	GND	
A1	P1.07	GPIO/AN3	General-purpose I/O port
A2	P1.14	GPIO/AN7	General-purpose I/O port
A3	P1.10	GPIO	General-purpose I/O port
A4	P1.09	GPIO	General-purpose I/O port
B1	P1.13	GPIO/AIN6	General-purpose I/O port

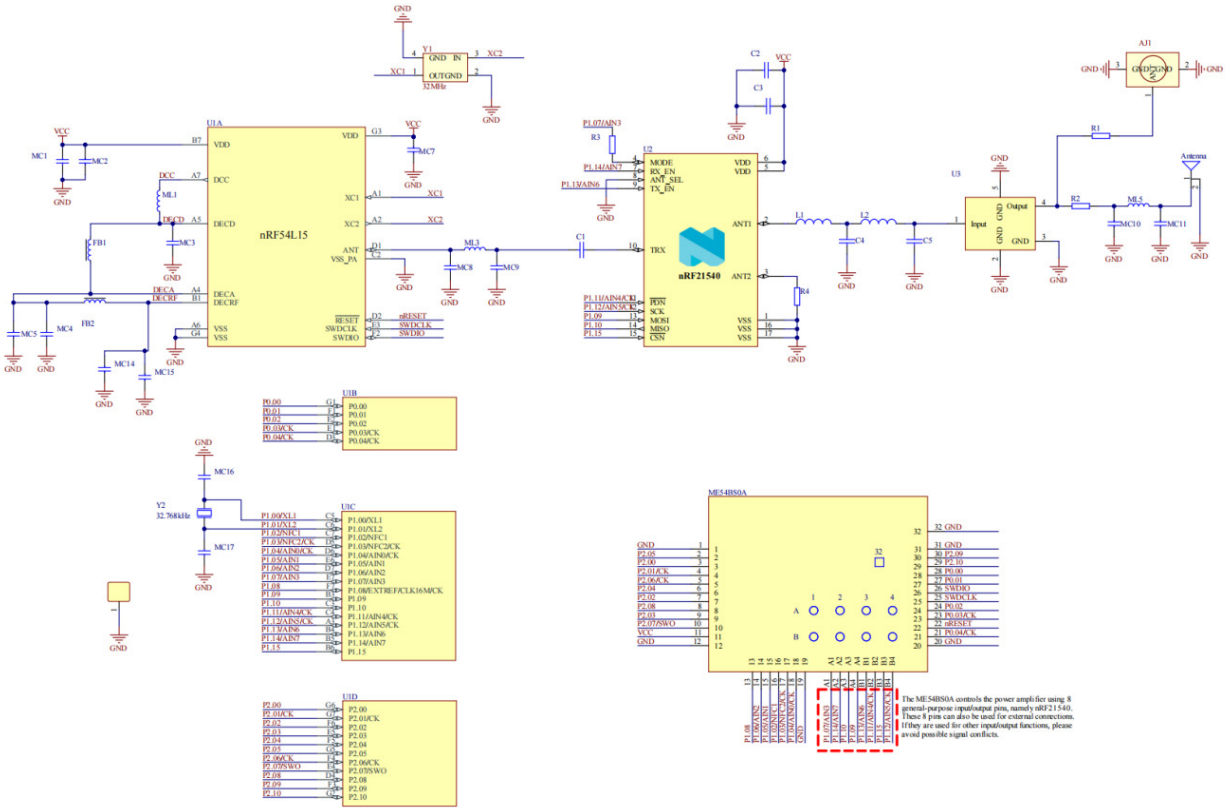
Note:
The ME54BS0A uses pins A1 to B4 as eight general-purpose input/output pins to control the power amplifier (nRF21540). These pins can also be used for external connections. If they are repurposed for other I/O functions, ensure that no signal conflicts occur.

5 MECHANICAL DRAWING



Default unit: mm Default tolerance: ±0.1

6 ELECTRICAL SCHEMATIC



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

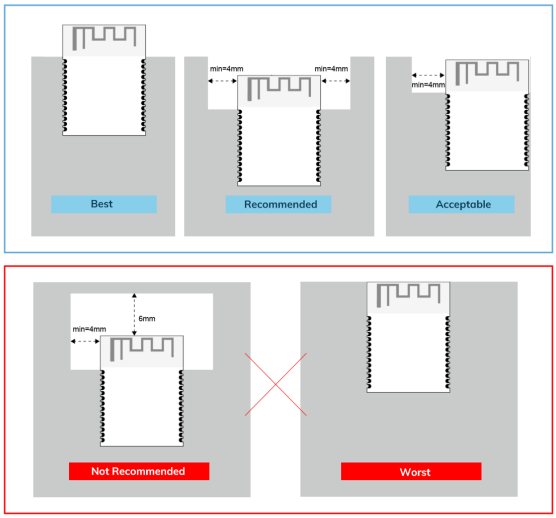
7 PCB LAYOUT

There should be no GND plane or metal cross wiring in the module antenna area, and no components should be placed nearby. It is best to make a hollow or clear area, or place it on the edge of the PCB board. The reference example is as follows:

> Notice: It is strongly recommended to use the first design method. The module antenna design is debugged according to the first wiring.

Layout Notes:

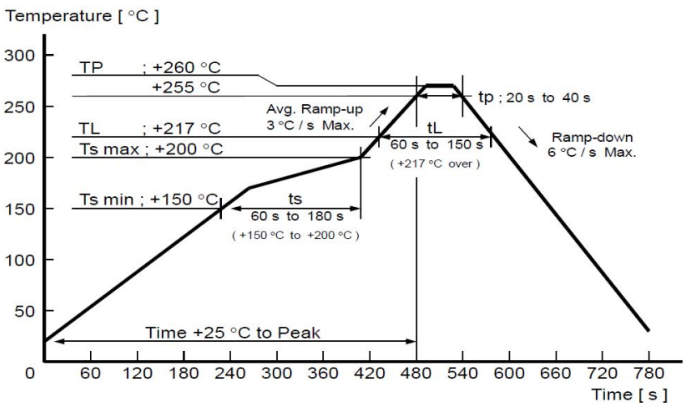
1)The module's antenna area should be completely clear of any metal obstructions to avoid affecting antenna performance (as shown in the diagram).
2)Outside the module's antenna area, try to maintain a solid copper pour to minimize interference from the mainboard signal lines or other sources.
3)A clear area of at least 4mm should surround the module's antenna (including its casing) to reduce interference with the antenna.
4)Ensure good grounding for components to minimize parasitic inductance.
5)Do not place copper under the module's antenna to prevent interference with signal radiation, which could affect transmission distance.
6)The antenna should be kept away from other circuits to maintain radiation efficiency and avoid impacting the normal operation of other circuits.
7)Position the module as close to the edge of the circuit board as possible, away from other circuitry.
8) It is recommended to use a ferrite bead for isolation when connecting the module to the power supply.



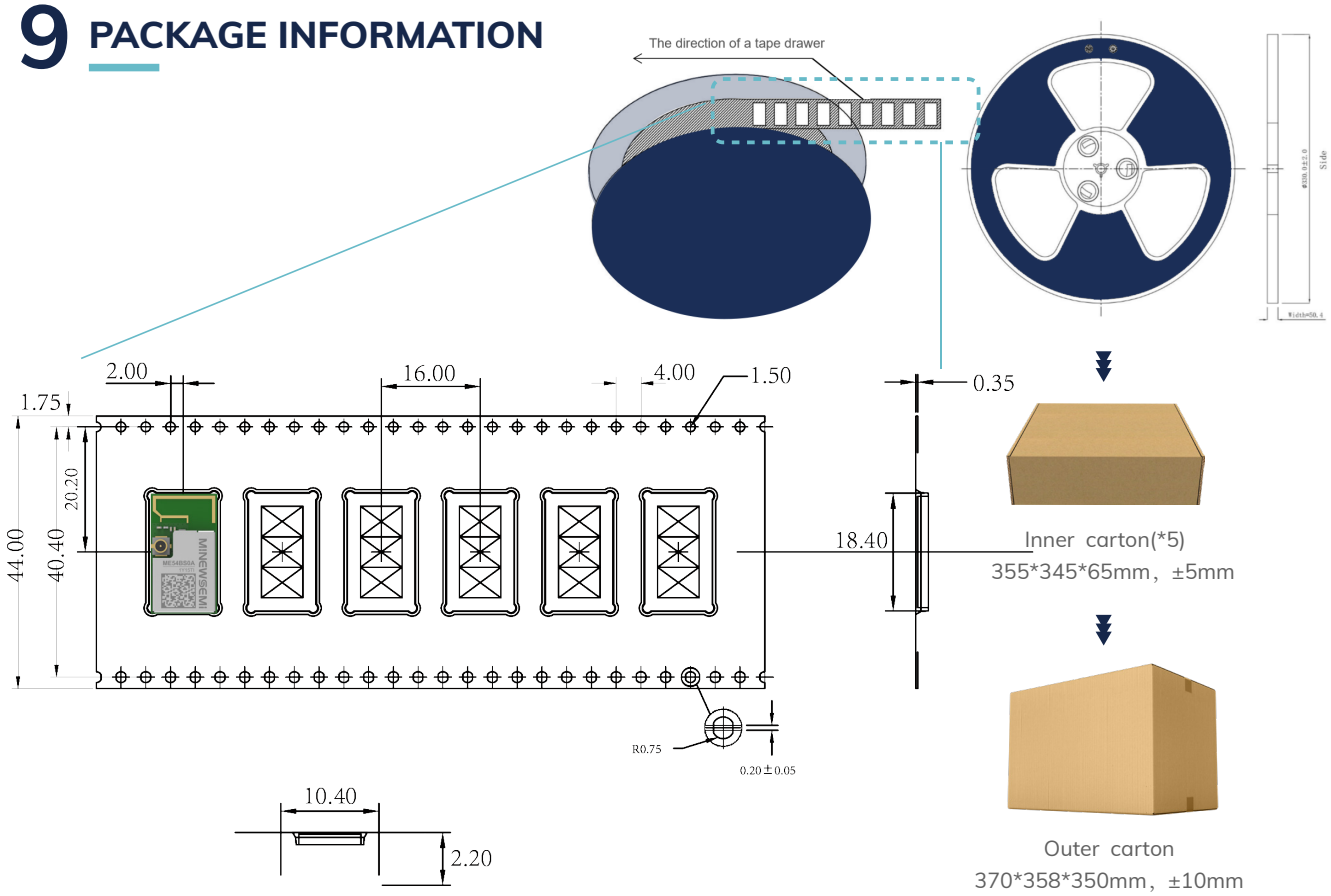
8 REFLOW AND SOLDERING

1) Perform SMT according to the reflow oven temperature profile provided below, with a maximum temperature of 260°C;
2) Follow IPC/JEDEC standards; Peak temperature: < 260°C; Number of reflows: ≤2 times; For SMT involving double-sided placement, it is recommended that the module side undergoes reflow soldering only once. For any special processes, please contact our company.

3）For module SMT, the recommended stencil thickness is 0.1-0.12mm. Pin 1:0.9 aperture, no expansion.;
4）After opening, if the entire package is not used at once, it should be stored in a vacuum to prevent long-term exposure to air, which can cause moisture absorption and pad oxidation. If there is a gap of 7 to 30 days before reuse, it is recommended to bake the tape at 65-70°C for 24 hours without unrolling it before returning to SMT.
5) ESD protection measures should be implemented before using SMT.



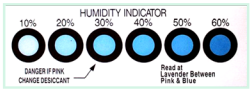
9 PACKAGE INFORMATION



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(*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	Dimensions
ME54BS0A	1300PCS	-	-	W=44mm，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 (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.

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, 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.

13 COPYRIGHT STATEMENT

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14 RELATED DOCUMENTS

- MinewSemi_Product_Naming_Reference_Manual
  https://en.minewsemi.com/file/MinewSemi_Product_Naming_Reference_Manual_EN.pdf
- MinewSemi_Connectivity_Module_Catalogue
  https://en.minewsemi.com/file/MinewSemi_Connectivity_Module_Catalogue_EN.pdf

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Innovative IoT Module Expert

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