

# Bluetooth LE Module **ME54BS12**



## Datasheet

V 1.0.0



# Version Note

| Version | Details    | Contributor(s) | Date       | Notes |
|---------|------------|----------------|------------|-------|
| 1.0.0   | First edit | Michelle       | 2025.08.07 |       |
|         |            |                |            |       |
|         |            |                |            |       |

# Part Number

| Model    | Hardware Code |
|----------|---------------|
| ME54BS12 | 1Y15TI        |
|          |               |

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[https://en.minewsemi.com/file/ME54BS12-nRF54L15\\_Datasheet\\_K\\_EN.pdf](https://en.minewsemi.com/file/ME54BS12-nRF54L15_Datasheet_K_EN.pdf)





# ME54BS12-nRF54L15

## Highly Flexible, Cost-effective, Ultra-low Power Bluetooth Module

The ME54BS12 is a highly flexible, ultra-low-power, and cost-effective Bluetooth module based on the nRF54L15. It features a powerful Arm® Cortex®-M33 CPU running at up to 128 MHz, along with 1.5 MB of NVM and 256 KB of RAM. The hardware includes an onboard antenna with an integrated design that highlights the enhanced performance of the nRF54 series. It also offers more GPIOs for development, ultra-low system power consumption, excellent RF performance, and a range of powerful supporting resources, making it an ideal solution for Bluetooth connectivity.

### FEATURES



Bluetooth 6.0



High cost  
Performance



Ultra-low  
Power

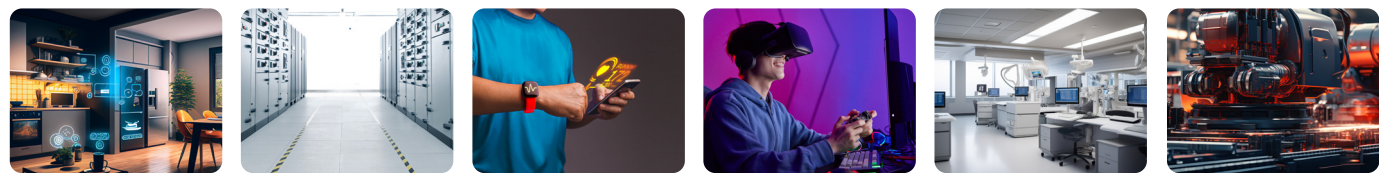


Multi-Protocol support: Bluetooth LE 6.0 Channel Sounding, Bluetooth Mesh, Zigbee, Thread, Matter, and proprietary 2.4 GHz protocols.

### KEY PARAMETER

| ME54BS12              |             |                    |             |
|-----------------------|-------------|--------------------|-------------|
| Chip Model            | nRF54L15    | Antenna            | PCB         |
| Module Size           | 15.8×12×2mm | GPIO               | 29          |
| Flash                 | 1.5MB       | RAM                | 256 KB      |
| Receiving Sensitivity | -96dBm      | Transmission Power | -40 ~ +7dBm |
| Current(TX)           | 0dBm-5mA    | Current(RX)        | 3.2mA       |

### APPLICATION



Smart  
Home

Computer  
Accessories

Virtual reality and  
Augmented reality

Game controllers  
and Remotes

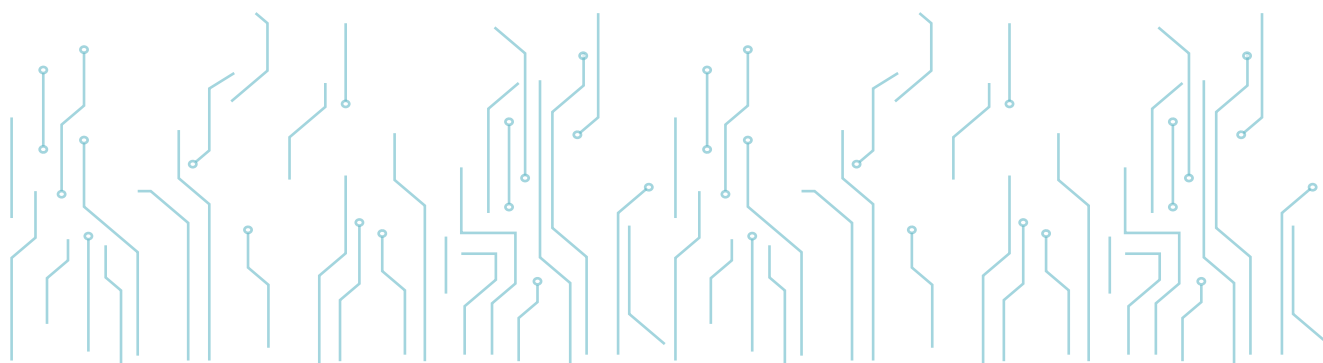
Medical Devices

Industrial IoT

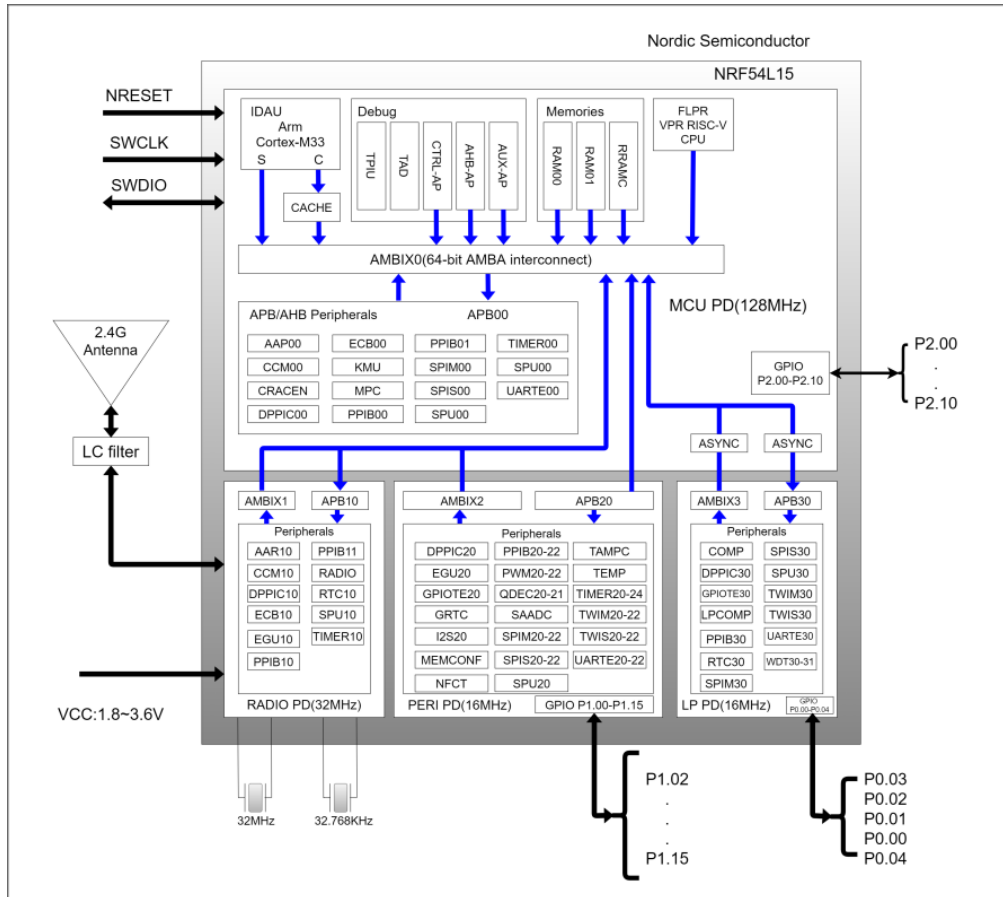


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# 1 BLOCK DIAGRAM

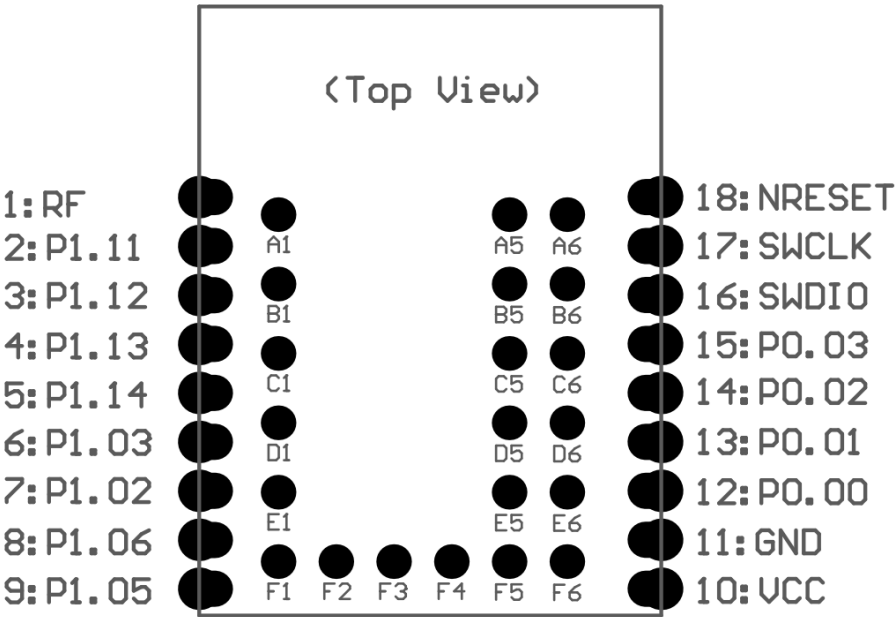


# 2 ELECTRICAL SPECIFICATION

| Parameter           | Values      | Notes                                                                               |
|---------------------|-------------|-------------------------------------------------------------------------------------|
| Working Voltage     | 1.7V-3.6V   | To ensure RF work, it is recommended that the supply voltage is not lower than 2.3V |
| Working Temperature | -40℃~+105℃  | Operating temperature from -40℃ to 105℃                                             |
| Transmission Power  | -40 ~ +7dBm | Configurable                                                                        |
| Current(RX)         | 3.2mA       | RF receiving current under 1Mbps pattern                                            |
| Current(TX)         | 5mA         | RF transmission current under 0dBm pattern                                          |
| Module Dimensions   | 15.8x12x2mm |                                                                                     |
| Quantity of IO Port | 29          |                                                                                     |

3

PIN DESCRIPTION



4

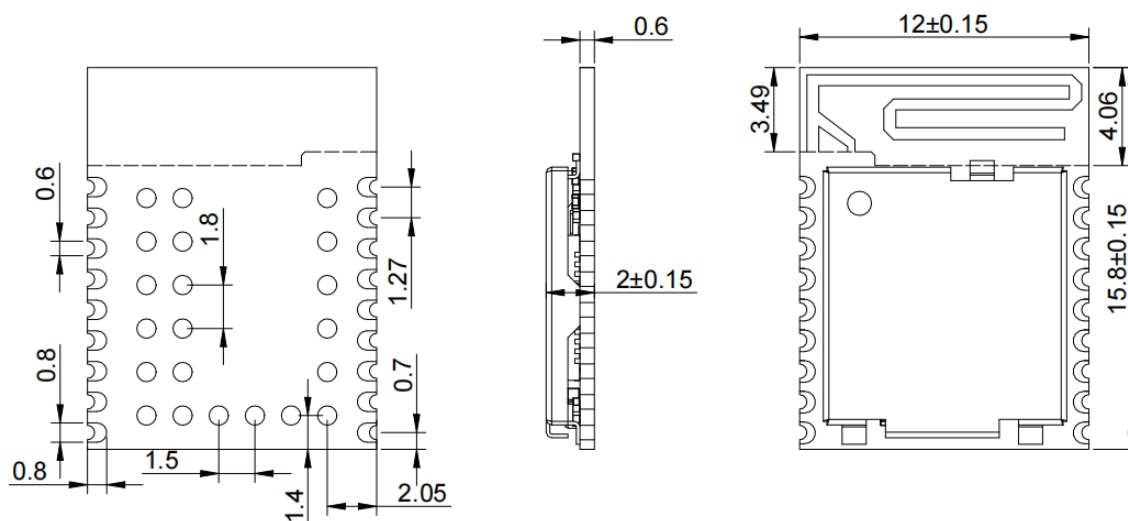
PIN DEFINITION

| Pin Number | Symbol | Type                 | Definition                                                                                                                                                                                                                                                                                                              |
|------------|--------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1          | RF     | External Antenna Pin | <p>If using the module's built-in antenna, this pin should be left unconnected.</p> <p>If not using the module's built-in antenna, an external antenna can be connected through this pin. When connecting an external antenna, a resistor that connects to the antenna should be soldered horizontally to this pin.</p> |
| 2          | P1.11  | GPIO                 | General-purpose IO                                                                                                                                                                                                                                                                                                      |
| 3          | P1.12  | GPIO                 | General-purpose IO                                                                                                                                                                                                                                                                                                      |
| 4          | P1.13  | GPIO                 | General-purpose IO                                                                                                                                                                                                                                                                                                      |
| 5          | P1.14  | GPIO                 | General-purpose IO                                                                                                                                                                                                                                                                                                      |
| 6          | P1.03  | GPIO                 | General-purpose IO                                                                                                                                                                                                                                                                                                      |
| 7          | P1.02  | GPIO                 | General-purpose IO                                                                                                                                                                                                                                                                                                      |
| 8          | P1.06  | GPIO                 | General-purpose IO                                                                                                                                                                                                                                                                                                      |
| 9          | P1.05  | GPIO                 | General-purpose IO                                                                                                                                                                                                                                                                                                      |
| 10         | VCC    | Power Supply         |                                                                                                                                                                                                                                                                                                                         |

| Pin Number | Symbol | Type              | Definition                       |
|------------|--------|-------------------|----------------------------------|
| 11         | GND    | GND               |                                  |
| 12         | P0.00  | GPIO              | General-purpose IO               |
| 13         | P0.01  | GPIO              | General-purpose IO               |
| 14         | P0.02  | GPIO              | General-purpose IO               |
| 15         | P0.03  | GPIO              | General-purpose IO               |
| 16         | SWDIO  | Programming Data  | Used for firmware programming    |
| 17         | SWCLK  | Programming Clock | Used for firmware programming    |
| 18         | NRESET | Reset             | Low level reset, high level work |
| A1         | GND    | GND               |                                  |
| A5         | GND    | GND               |                                  |
| A6         | P0.04  | GPIO              | General-purpose IO               |
| B1         | P1.09  | GPIO              | General-purpose IO               |
| B5         | GND    | GND               |                                  |
| B6         | P2.09  | GPIO              | General-purpose IO               |
| C1         | P1.10  | GPIO              | General-purpose IO               |
| C5         | GND    | GND               |                                  |
| C6         | P2.10  | GPIO              | General-purpose IO               |
| D1         | P2.00  | GPIO              | General-purpose IO               |
| D5         | P2.08  | GPIO              | General-purpose IO               |
| D6         | P2.07  | GPIO              | General-purpose IO               |
| E1         | P1.08  | GPIO              | General-purpose IO               |
| E5         | P2.05  | GPIO              | General-purpose IO               |
| E6         | P2.06  | GPIO              | General-purpose IO               |
| F1         | P1.07  | GPIO              | General-purpose IO               |
| F2         | P1.04  | GPIO              | General-purpose IO               |
| F3         | P2.01  | GPIO              | General-purpose IO               |
| F4         | P2.03  | GPIO              | General-purpose IO               |
| F5         | P2.02  | GPIO              | General-purpose IO               |
| F6         | P2.04  | GPIO              | General-purpose IO               |

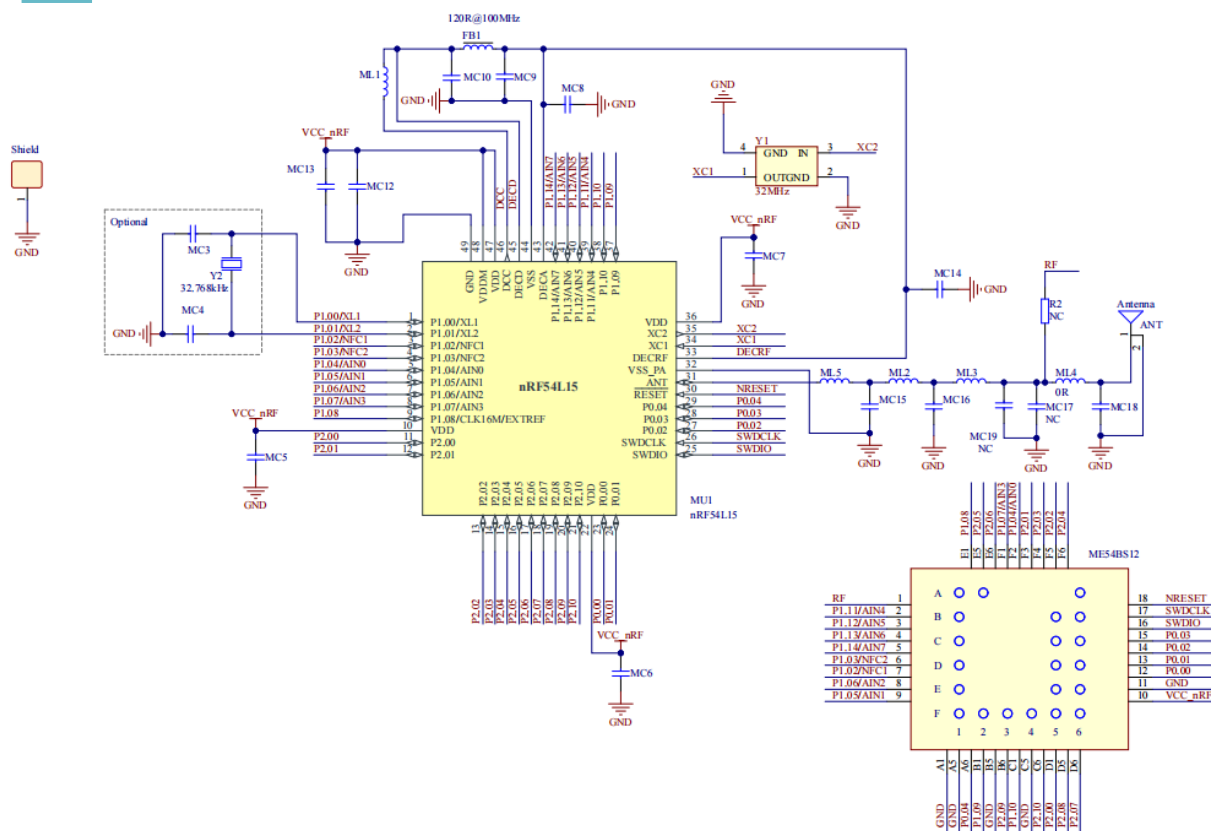


## 5 MECHANICAL DRAWING



Default unit: mm Default tolerance: ±0.15

## 6 ELECTRICAL SCHEMATIC



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





## 7 PCB LAYOUT

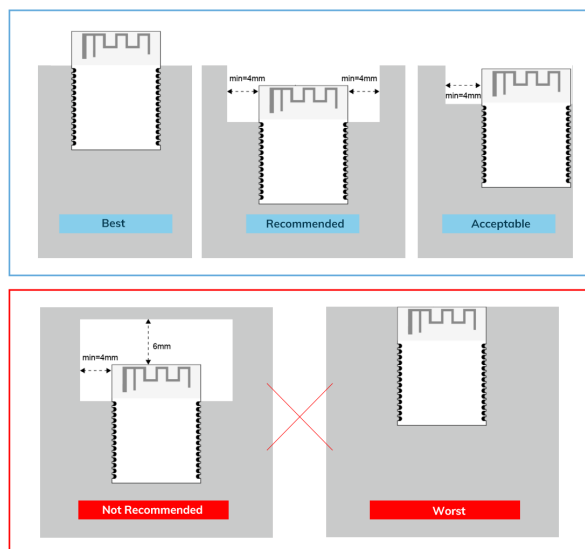
There should be no GND plane or metal cross wiring in the module antenna area, and no components should be placed nearby. It is best to make a hollow or clear area, or place it on the edge of the PCB board.



Notice: The reference example is as follows. It is strongly recommended to use the first design method. The module antenna design is debugged according to the first wiring.

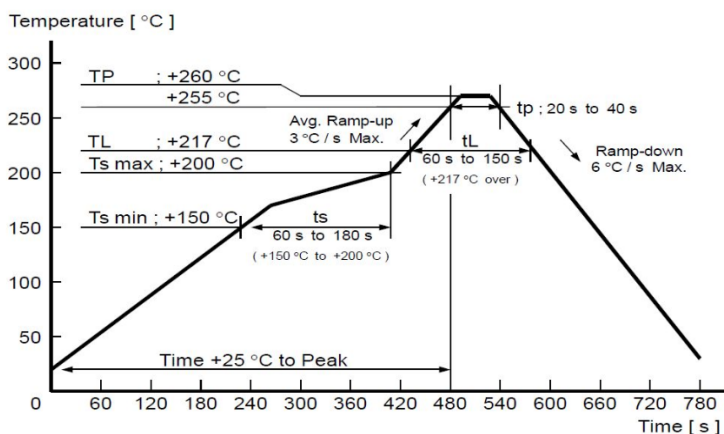
### Layout Notes:

- 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 4 mm 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.



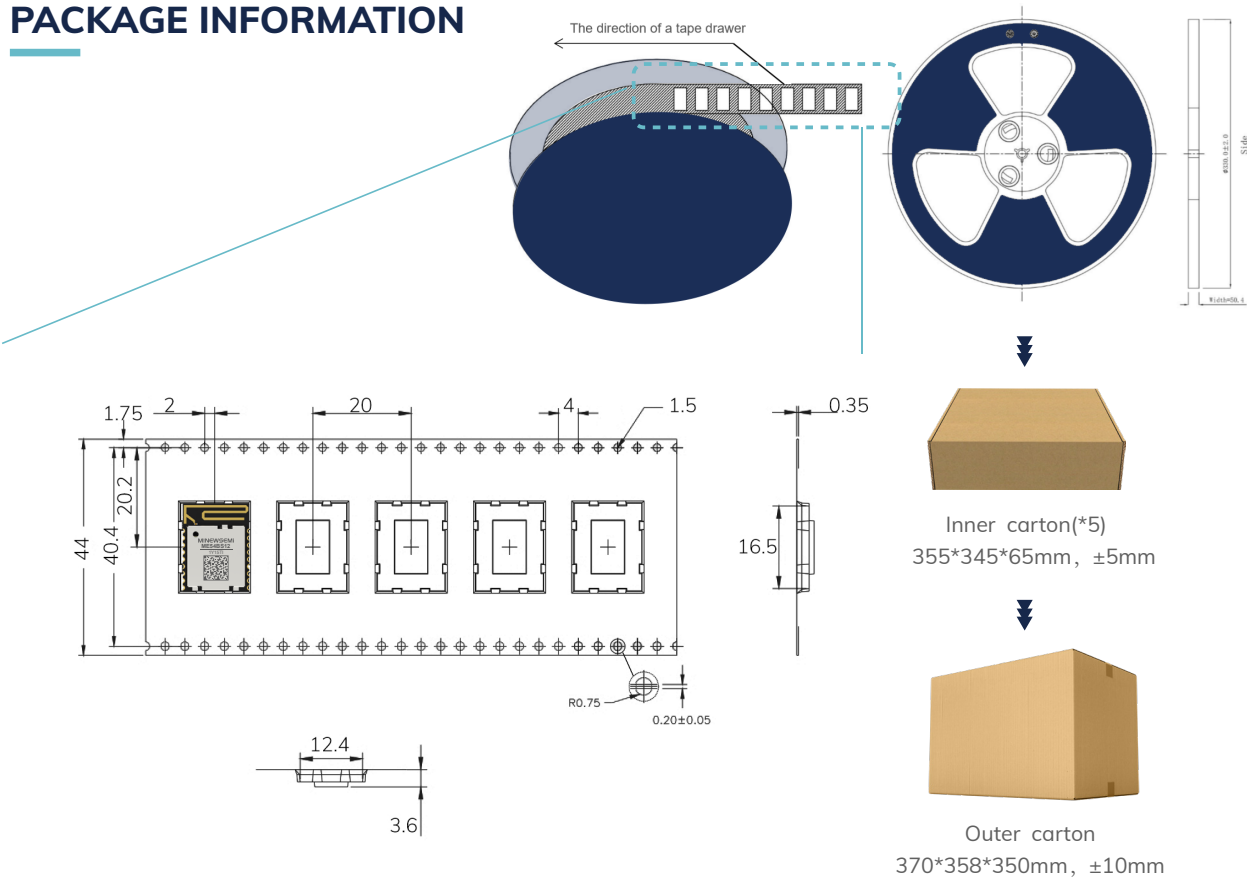
## 8 REFLOW AND SOLDERING

- 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) It is recommended that the thickness of the steel mesh for the module SMT be 0.13-0.15mm, the length of the two rows of pins be expanded outward by 1-1.3mm, and the internal pins have an opening of 1:0.9 without 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

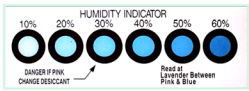


Remarks

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 | Dimension        |
|----------------|---------------|------------|--------------|------------------|
| ME54BS12       | 850PCS        | 484.5g     | 1061g        | 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 (Cl<sub>2</sub>, NH<sub>3</sub>, SO<sub>2</sub>, NO<sub>x</sub>, 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

- [MinewSemi\\_Product\\_Naming\\_Reference\\_Manual](https://en.minewsemi.com/file/MinewSemi_Product_Naming_Reference_Manual_EN.pdf)  
[https://en.minewsemi.com/file/MinewSemi\\_Product\\_Naming\\_Reference\\_Manual\\_EN.pdf](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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