

# Bluetooth LE Module

## ME54BS62



## Datasheet

V 1.1.0



# Version Note

| Version | Details            | Contributor(s) | Date       | Notes |
|---------|--------------------|----------------|------------|-------|
| 1.0.0   | First edit         | Michelle       | 2026.01.27 |       |
| 1.1.0   | Updated PCB Design | Michelle       | 2026.05.13 |       |

# Part Number

| Model    | Hardware Code |
|----------|---------------|
| ME54BS62 | 1Y15TE        |

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[https://en.minewsemi.com/file/ME54BS62-nRF54L15\\_Datasheet\\_K\\_EN.pdf](https://en.minewsemi.com/file/ME54BS62-nRF54L15_Datasheet_K_EN.pdf)



# ME54BS62-nRF54L15

## Ultra-Small Size, Ultra-Low Power, BLE 6.0 Supported Bluetooth Module with PCB Antenna

ME54BS62 is a highly flexible, ultra-low-power, cost-effective, and ultra-compact Bluetooth module based on the nRF54L15 WLCS. Measuring just 6.0 × 9.0 × 1.8 mm, it is ideal for space-constrained designs. The module features a powerful Arm® Cortex®-M33 processor running at up to 128 MHz, along with 1524KB NVM and 256 KB RAM to support advanced application development.

Equipped with an integrated PCB antenna, the ME54BS62 enables reliable wireless connectivity while simplifying product design and reducing external RF requirements. Leveraging the superior performance of the nRF54 series and offering abundant GPIO resources, the module delivers excellent RF performance and energy efficiency, making it an ideal choice for next-generation Bluetooth connectivity applications.

### FEATURES



Bluetooth 6.0



Ultra-low power



Ultra-small size,  
only 6\*9mm size



Support OTA



Integrated PCB antenna with a  
connectivity range of 10~70 meters



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

### KEY PARAMETER

| ME54BS62              |               |                    |             |
|-----------------------|---------------|--------------------|-------------|
| Chip Model            | nRF54L15      | Antenna            | PCB         |
| Module Size           | 6.0×9.0×1.8mm | GPIO               | 30          |
| Flash                 | 1524KB NVM    | RAM                | 256 KB      |
| Receiving Sensitivity | -96dBm        | Transmission Power | -40 ~ +8dBm |
| Emitting Current      | 0dBm-5mA      | Receiving Current  | 3.2mA       |
| Connection distance   | 10~70m        |                    |             |

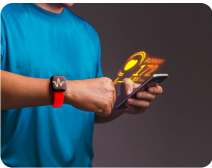
### APPLICATION



Smart Home



Computer Accessories



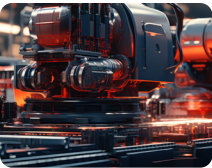
Virtual reality and Augmented reality



Game controllers and Remotes



Medical Devices

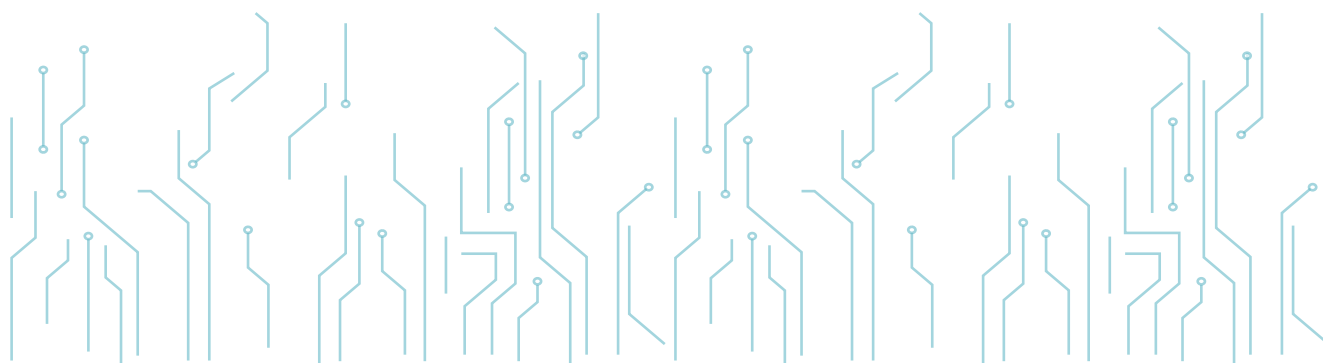


Industrial IoT



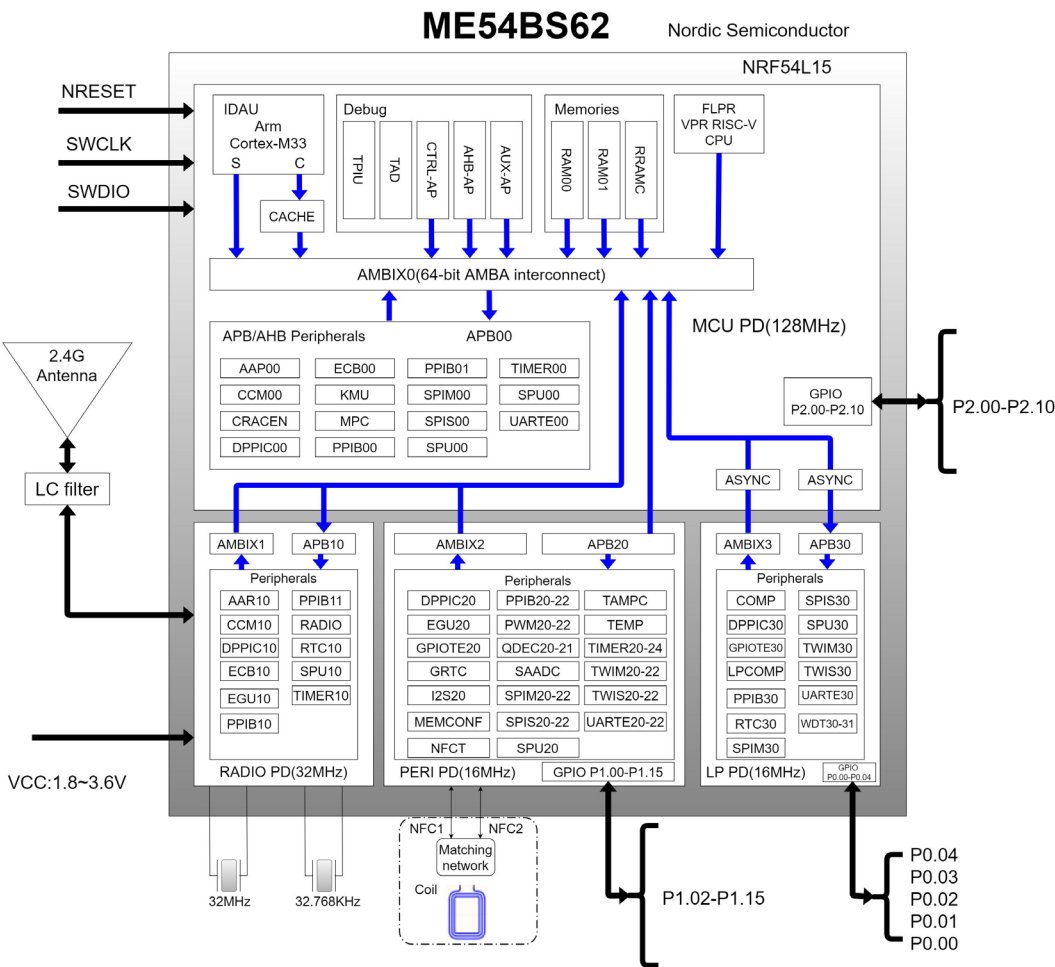
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BLOCK DIAGRAM

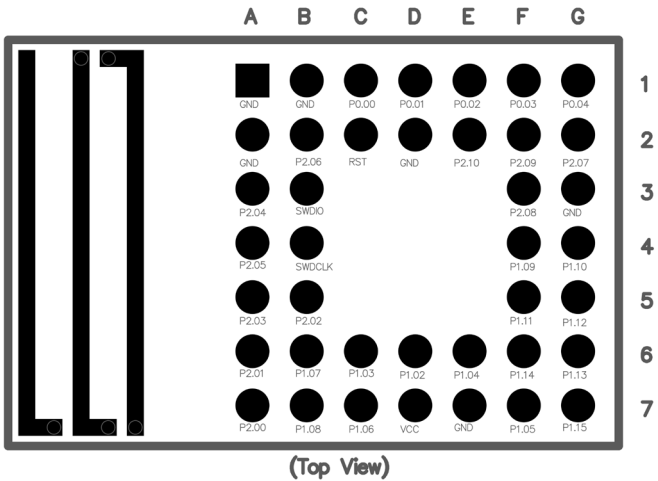


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ELECTRICAL SPECIFICATION

| Parameter           | Values        | Notes                                                                                             |
|---------------------|---------------|---------------------------------------------------------------------------------------------------|
| Working Voltage     | 1.7V-3.6V     | To ensure proper RF performance, 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 ~ +8dBm   | Configurable                                                                                      |
| Current(RX)         | 3.2mA         | RF receiving current under 1Mbps pattern                                                          |
| Current(TX)         | 5mA           | RF transmission current under 0dBm pattern                                                        |
| Module Dimension    | 6.0*9.0*1.8mm |                                                                                                   |
| Quantity of IO Port | 30            |                                                                                                   |

### 3 PIN DESCRIPTION

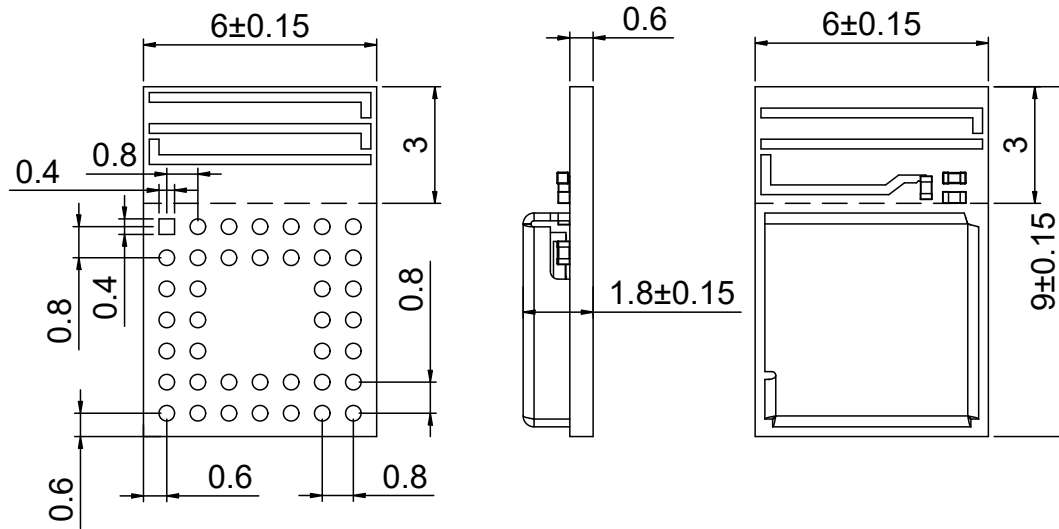


Note: The pad positions and dimensions of ME54BS62 and ME54BS61 are identical. However, note that the antenna part of the ME54BS62 module is located on the left side of the ME54BS61 module rather than on the top. Pay attention to the placement position of the modules when switching between these two models.

### 4 PIN DEFINITION

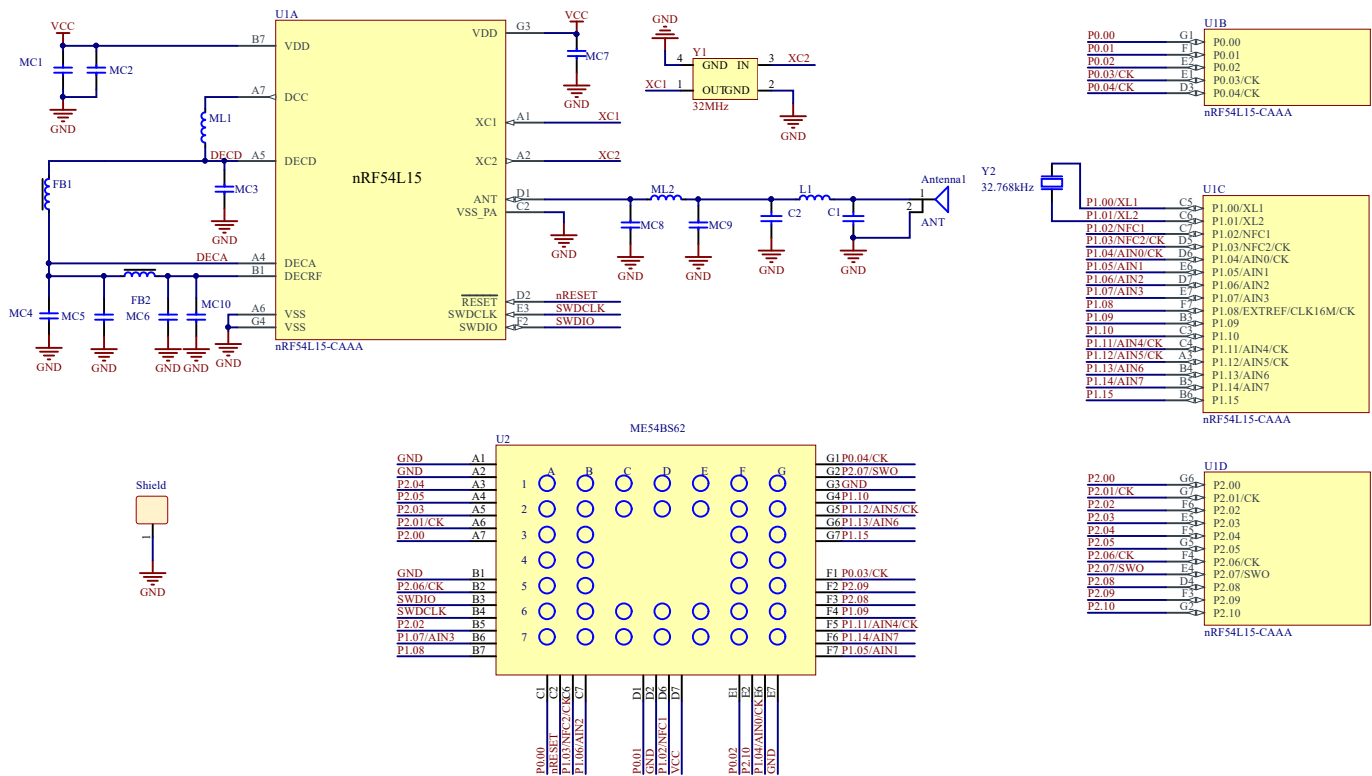
| Pin Number        | Symbol                                    | Type              | Definition                            |
|-------------------|-------------------------------------------|-------------------|---------------------------------------|
| A1/A2/B1/D2/E7/G3 | GND                                       | GND               | Ground                                |
| D7                | VCC                                       | Power Supply      |                                       |
| B3                | SWDIO                                     | Programming Data  | Used for firmware programming         |
| B4                | SWCLK                                     | Programming Clock | Used for firmware programming         |
| C2                | RST                                       | Reset             | Low level reset, high level operation |
| A3-A7             | P2.04/P2.05/P2.03/P2.01/P2.00             | GPIO              | General-purpose IO                    |
| B2/B5-B7          | P2.06/P2.02/P1.07/P1.08                   | GPIO              | General-purpose IO                    |
| C1/C6 C7          | P0.00/P1.03/P1.06                         | GPIO              | General-purpose IO                    |
| D1/D6             | P0.01/P1.02                               | GPIO              | General-purpose IO                    |
| E1/E2 E6          | P0.02/P2.10/P1.04                         | GPIO              | General-purpose IO                    |
| F1-F7             | P0.03/P2.09/P2.08/P1.09/P1.11/P1.14/P1.05 | GPIO              | General-purpose IO                    |
| G1-G7             | P0.04/P2.07/P1.10/P1.12/P1.13/P1.15       | GPIO              | General-purpose IO                    |

## 5 MECHANICAL DRAWING



Default unit: mm Default tolerance:  $\pm 0.15$

## 6 ELECTRICAL SCHEMATIC



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

# 7

## PCB DESIGN

### 7.1 Disclaimer

This document is provided as a recommended design reference for wireless modules and does not constitute any explicit or implied guarantee of performance or compliance. Due to differences in PCB layout, enclosure structure, antenna selection, and application environments of the end product, this document cannot guarantee RF performance in all scenarios. Users must conduct sufficient RF performance and compliance verification after completing the final product design and shall bear full responsibility for design and application outcomes. Our company reserves the right to modify the contents of this document without prior notice.

### 7.2 Core Rules for Module Placement

#### Board Edge Priority Rule

The RF output/antenna side of the module must face the edge of the main PCB to ensure that antenna radiation is directed outward from the board without obstruction. Placing the module in a closed central area of the PCB is strictly prohibited.

#### Keep-Out Area Rule

A 0.5 mm area around the module body must be kept clear. Non-ground components and non-ground signal traces are prohibited within this area. Within 4 mm around the RF side of the module, copper pours, unrelated components, and non-RF signal traces are strictly prohibited.

#### Interference Isolation Rule

The module must maintain a minimum safe distance from strong interference sources. Adjacent placement on the same layer is prohibited. Isolation using different PCB layers and shielding covers is recommended. General isolation requirements are as follows:

| Interference Source Type                                               | Minimum Recommended Isolation Distance |
|------------------------------------------------------------------------|----------------------------------------|
| DC-DC switching power supplies,<br>power inductors, power transformers | 20mm                                   |
| USB 3.0 / HDMI 2.0 / DDR<br>/ High-speed SDIO interfaces               | 20mm                                   |
| MCU high-frequency clock circuits,<br>Ethernet PHY chips               | 15mm                                   |
| Displays, cameras,<br>FPC cables with wiring                           | 25mm                                   |

#### Structural Clearance Rule

The minimum distance between the module and metal screws, clips, standoffs, and other structural parts must be  $\geq 5$  mm. At least 4 mm of SMT soldering and rework clearance must be reserved around the module. The RF side of the module must not be enclosed inside a fully metal cavity.

#### Multiple Modules on the Same PCB

When placing multiple wireless modules of the same or different types on the same PCB, the minimum spacing between modules must be  $\geq 50$  mm to avoid mutual interference.

## 7.3 GENERAL PCB DESIGN REQUIREMENTS

### Grounding Design

The main PCB must maintain a complete and continuous ground plane. Splitting the ground plane within the module projection area or RF surrounding area is strictly prohibited. All module ground pins must be soldered. At least one grounding via should be placed near each ground pad and connected to the main ground plane. A complete ground plane with dense grounding vias may be placed under the non-RF area of the module to improve shielding performance.

### Power Supply Design

Decoupling capacitor combinations must be placed close to the module power input pins. The trace length between capacitor pads and power pins should be  $\leq 0.5$  mm, and at least two grounding vias should be placed near the ground terminal. For switching power supply applications, a  $\pi$ -type filter circuit footprint must be reserved near the module power input pins.

### RF Trace Design

The entire RF path must maintain a strict  $50\ \Omega$  characteristic impedance (tolerance  $\pm 10\%$ ). RF traces should be as short as possible and routed preferably in straight lines. Sharp or right-angle corners are prohibited; curved routing with a radius  $\geq 3$  times the trace width is recommended. Branch traces and stub traces are prohibited. A continuous reference ground plane must exist beneath the RF traces, and no other signal traces should be routed within 3 times the trace width on either side. Ground shielding should be applied throughout the RF routing.

### Control Interface Design

Control signal traces such as UART, SPI, and I2C should be routed away from RF areas with short and simple routing paths and continuous ground shielding. Parallel routing adjacent to RF traces is prohibited. ESD protection devices must be placed close to external PCB connectors and must not be placed near module pins.

### Footprint Design

Strictly use the standard PCB footprint provided by our company. Unauthorized modification of pad size or spacing is prohibited to ensure soldering reliability.

## 7.4 DESIGN RESTRICTIONS

Do not place the RF side of the module facing the inside of the PCB or away from the board edge.

Do not place copper pours, components, or fully enclosed metal housings without openings over the antenna area.

Do not route RF traces across split ground planes, without a complete reference ground, or with right-angle corners.

Do not place modules adjacent to strong interference sources or split the ground plane in the module area.

Do not leave module ground pins unconnected or inadequately grounded.

## 7.5 MODULE PLACEMENT EXAMPLE

For end products, antenna position significantly affects overall system performance. The module should preferably be placed at the edge or corner of the PCB to maximize the clearance area and reduce interference from surrounding components. The PCB area directly beneath the module antenna should be hollowed out to keep the antenna region suspended, while no signal traces, metal objects, or other interference sources should exist within 3–5 mm around the antenna area. The figure below demonstrates an example of proper module placement on the main PCB for optimal RF performance. The first recommended layout method should be used whenever possible, as the module antenna design has been tuned and optimized based on this configuration.



## Correct Example

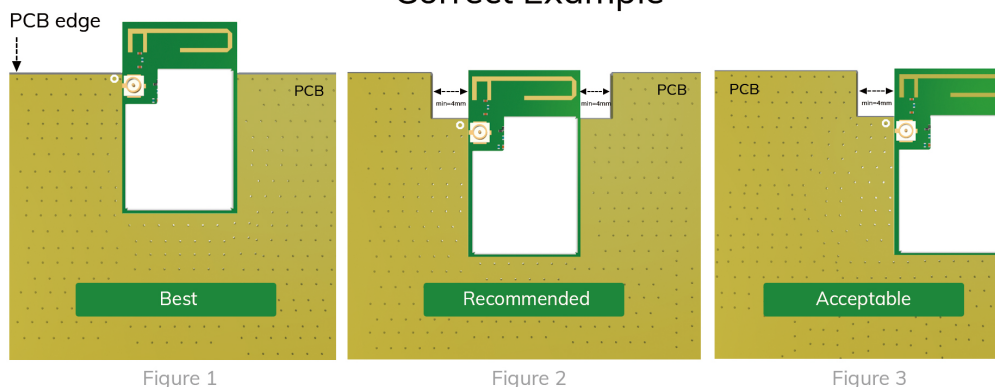


Figure 1

Figure 2

Figure 3

## Incorrect Example

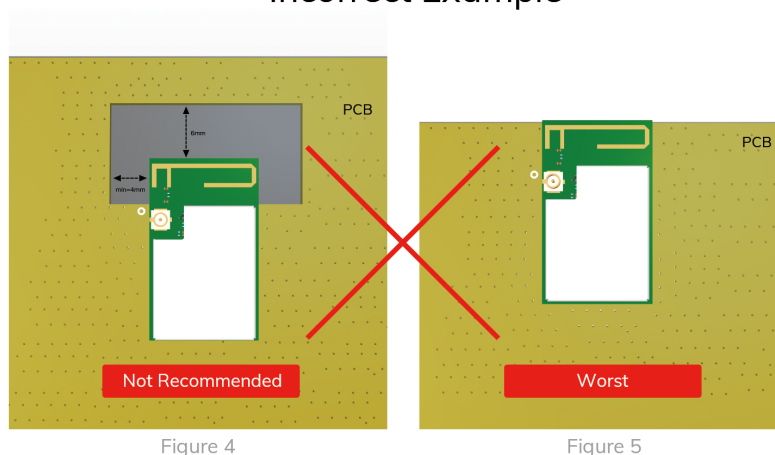


Figure 4

Figure 5



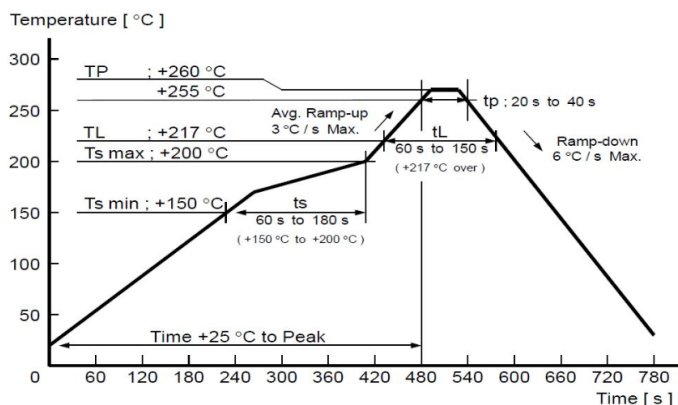
Antenna position



Ground Plane

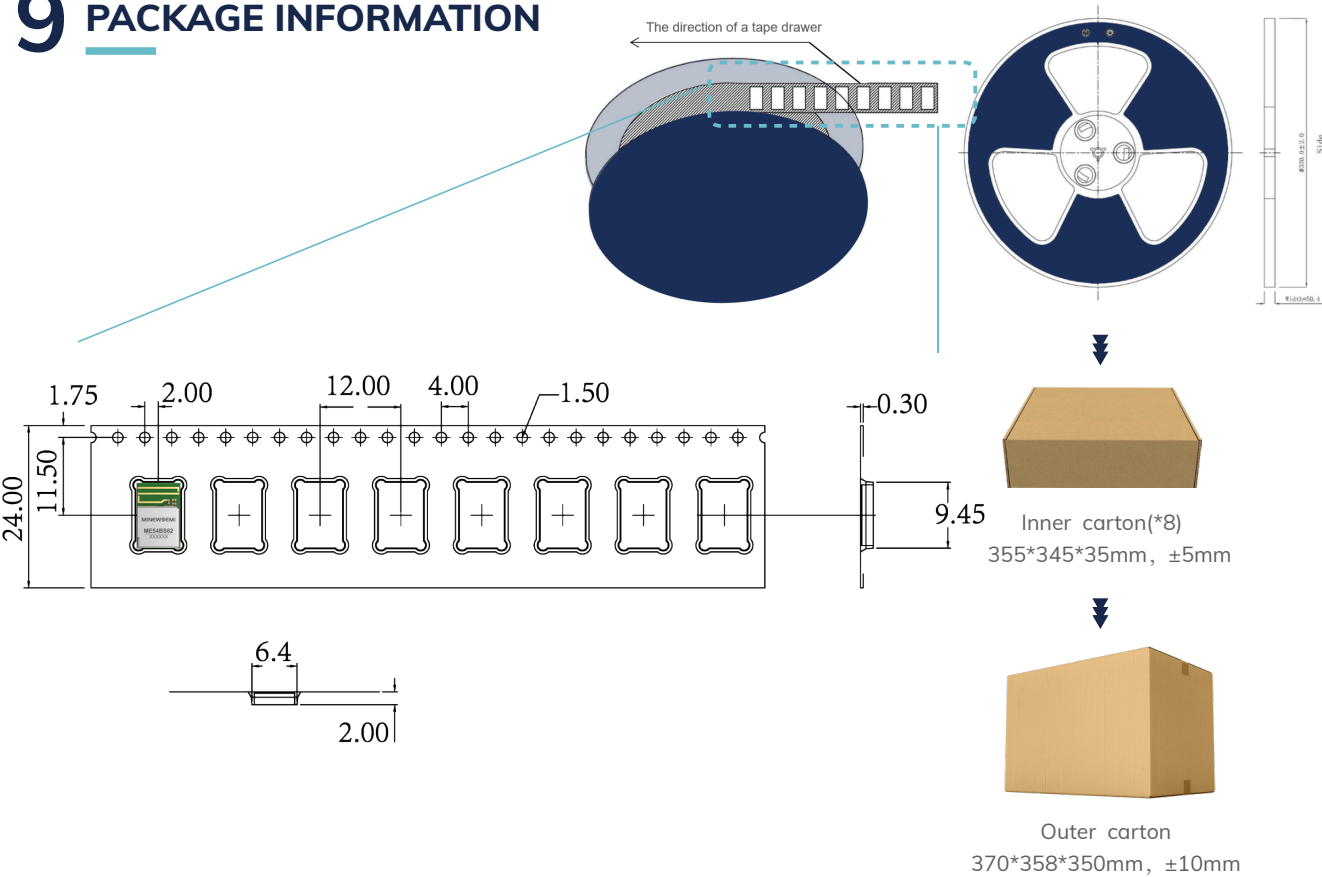
## 8 REFLOW AND SOLDERING

- 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) Module SMT recommended stencil thickness 0.1-0.12mm, pin 1:0.9 opening, not expanded;
- 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.

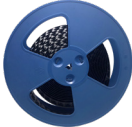


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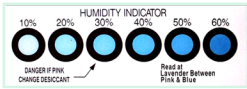
PACKAGE INFORMATION



**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\*345\*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        |
|----------------|---------------|------------|--------------|------------------|
| ME54BS62       | 1900PCS       | 319.2g     | 1709.2g      | W=24mm, T=0.30mm |

- Note: Default weight tolerance all are within 10g (except the special notes)
- Net Weight: Weight of a single roll of the module product, excluding packaging materials;  
Gross Weight: Weight of a single roll of the product, including the carrier tape, industrial inner box, and outer carton.

## 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)  
[https://en.minewsemi.com/file/MinewSemi\\_Connectivity\\_Module\\_Catalogue\\_EN.pdf](https://en.minewsemi.com/file/MinewSemi_Connectivity_Module_Catalogue_EN.pdf)



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