LoRa Multi-band Module
ME25LS04

Datasheet
V 1.0.0

Version Note

Version	Details	Contributor(s)	Date	Notes
1.0.0	First edit	Vincle	2026.01.21	

Part Number

Model	Hardware Code
ME25LS04	-

Note: The meaning of "X"	0	AS923，Support 923MHz frequency
	1	AU915，Support 915-928MHz frequency
	2	CN470，Support 470-510MHz frequency
	3	CN779，Support 779-787MHz frequency
	4	EU433，Support 433MHz frequency
	5	EU868，Support 863-870MHz frequency
	6	IN865，Support 865-867MHz frequency
	7	KR920，Support 920-923MHz frequency
	8	RU864，Support 864-870MHz frequency
	9	US915，Support 902-928MHz frequency

⚠️ The marking on the product's shielding cover is subject to change based on certification updates.
The actual marking on the shielding cover at the time of shipment shall prevail.

Please be aware that changes in the marking do not affect product performance or usage; therefore, no separate notification will be issued regarding such changes.

For customization requests, please contact MinewSemi's sales team for confirmation.

Click the icon to view and download the latest product documents electronically.
https://en.minewsemi.com/file/ME25LS04_Datasheet_K_EN.pdf

ME25LS03-LR1121

Long-range, ultra-low-power, multi-band LoRa module

ME25LS04 is based on Semtech's third-generation LoRa wireless transceiver LR1121, supporting global ISM Sub-GHz and 2.4 GHz frequency bands as well as S-band satellite connectivity. It is an ultra-low-power, long-range, compact LoRa® transceiver module with an easy-to-use SPI interface.

In receive mode, the current consumption is only 12 mA. With an integrated high-efficiency power amplifier, the module delivers up to +22 dBm output power in LoRa mode and provides enhanced receiver sensitivity down to –126 dBm. It complies with the physical layer requirements of the LoRaWAN® standard and also supports LoRa® point-to-point (P2P) communication. In addition, it supports Long-Range Frequency Hopping Spread Spectrum (LR-FHSS) transmission, enabling customers to rapidly deploy private long-range LoRa® networks, standard LoRaWAN® communication, and satellite communication.

FEATURES

Built-in industrial-grade TXCO crystal oscillator	Support ISM Sub-Ghz and 2.4GHz frequency bands	Supports SPI interface, compatible with various MCUs	Supports LR-FHSS long-range frequency hopping spread spectrum transmission	More flexible design: MCU-less architecture, controlled by an external MCU via SPI interface	LoRa communication range up to 4 km

KEY PARAMETERS

ME25LS04			
Chip Model	LR1121	**Antenna**	2.4G/S-band: PCB/U.FL SubGHz: ANT PIN
Module Size	25x16.8x3.6mm	**GPIO**	2
Receiving Sensitivity	SubGhz: -126dBm@SF7	**Transmission Power**	SubGHz: +22dBm 2.4GHz: +11.5dBm
Current(TX)	118mA (maximum)	**Current(RX)**	12mA

APPLICATION

Smart cities	Environmental monitoring	Smart meters	Asset tracking	Smart agriculture

INDEX

1 BLOCK DIAGRAM

2 ELECTRICAL SPECIFICATION

| Parameter	Values	Notes
Operating Voltage	1.8V-3.7V	Standard power supply voltage 3.3V
Operating Temperature	-40℃~+85℃	
Operating Frequency	150MHz - 960MHz 2.4GHz	SubGHz optional frequency bands, Default set is 868MHz/915MHz 2.4G: PCB antenna is used by default，If you need U.FL, please contact sales.
Transmission Power	SubGHz: +22dBm 2.4GHz: +11.5dBm	Configurable
Current(RX)	12mA	Receiving mode maximum (long receiving mode)
Current(TX)	118mA	TX mode maximum
Module Dimensions	25*16.8*3.6mm	
Quantity of IO Port	2	DIO7, DIO8

3 PIN DESCRIPTION
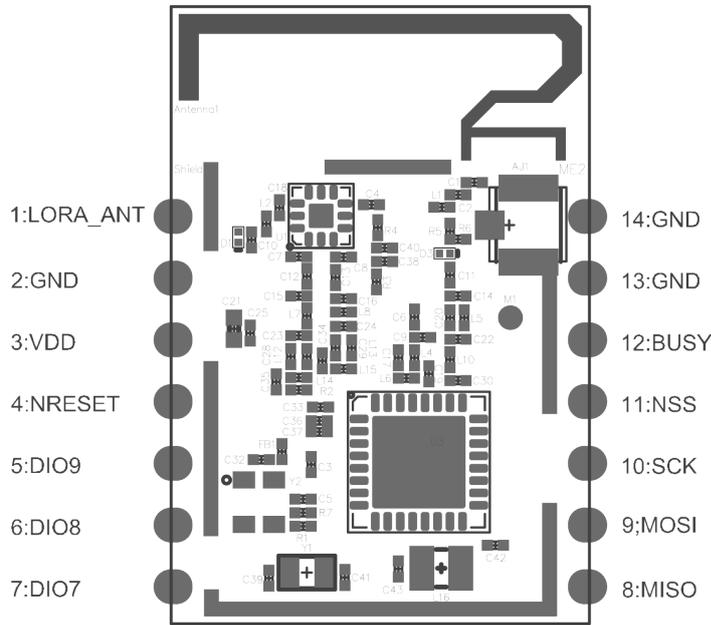
4 PIN DEFINITION

| Number	Symbol	Type	Definition	Notes
1	LoRa ANT	RF	LoRa antenna RF pin	External antenna pin
2	GND	-	Grounded	Negative power supply
3	VDD	I	Positive power supply	Normal 3.3V
4	NRESET	I/O	Reset	Module reset pin，Active low
5	DIO9	I/O	General IO port	Provides an interrupt output (IRQ) to notify the main MCU of events; the signal is active high
6	DIO8	I/O	General IO port	
7	DIO7	I/O	General IO port	
8	MISO	O	SPI Slave output	
9	MOSI	I	SPI Slave input	
10	SCK	I	SPI clock	
11	NSS	I	SPI chip select (CS)	
12	BUSY	O	Busy instruct	
13	GND	-	Grounded	Negative power supply
14	GND	-	Grounded	Negative power supply

5 Mechanical Drawing
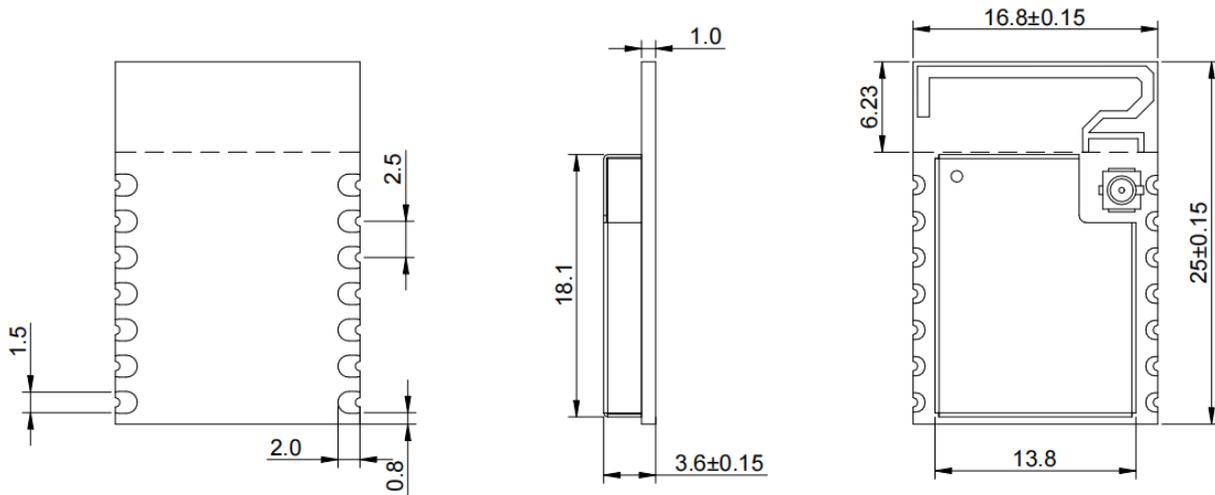
| ⚠ | Default unit：mm   Default tolerance：±0.15 |

6 MODULE CONNECTION DESCRIPTION

6.1 Connection Diagram
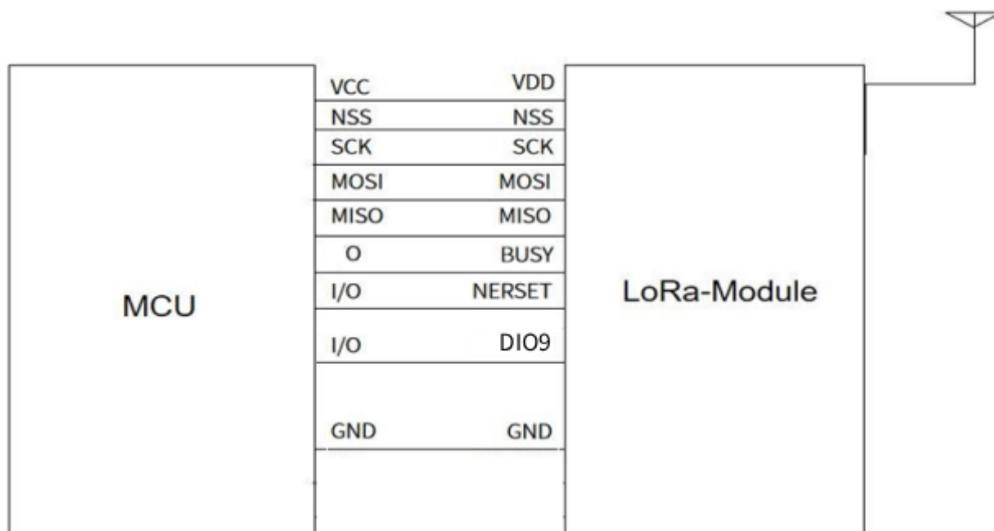
6.2 Power Supply

The operating voltage range of the chip is 1.8V to 3.7V. To ensure proper operation, it is recommended to maintain the supply voltage at 3.3V.

6.3 SPI Interface Character

The SPI operates with an external SCK clock, allowing a maximum data rate of up to 16 MHz.
Data transmission begins when the NSS pin goes low. When NSS is high, the MISO line is in a high-impedance state.
The SPI timing requirements (the chip only functions as an SPI Slave).

> ⚠ Note: All time data in the table below are given under the condition that the maximum load capacitance is 10pF.

Symbol	Description	Minimum	Typical	Maximum	Unit
t1	NSS falling edge to SCK setup time	31.25	-	-	ns
t2	SCK period	61.5	-	-	ns
t3	SCK high-level time	31.25	-	-	ns
t4	MOSI to SCK hold time	5	-	-	ns
t5	MOSI to SCK setup time	15	-	-	ns
t6	NSS falling edge to MISO delay time	0	-	15	ns
t7	SCK falling edge to MISO delay time	0	-	15	ns

6.3.1 Module Internal TX, RX, Shutdown Mode Control

J1 and J3 are the transmit (TX) pins, and J2 is the receive (RX) pin. J1 is the HP (high power transmit) pin, and J3 is the LP (low power transmit) pin. V1 (RFSW0) and V2 (RFSW1) are the transmit/receive switch control pins:
1)When pin V1 (RFSW0) is low level and pin V2 (RFSW1) is low level, the mode is shutdown.
2)When pin V1 (RFSW0) is high level and pin V2 (RFSW1) is low level, the mode is RX mode.
3)When pin V1 (RFSW0) is low level and pin V2 (RFSW1) is high level, the mode is HP-TX mode.
4)When pin V1 (RFSW0) is high level and pin V2 (RFSW1) is high level, the mode is LP-TX mode.

MODE	V1(RFSW0)	V2(RFSW1)
Shutdown	0	0
RX	1	0
HP-TX	0	1
LP-TX	1	1

7 ELECTRICAL SCHEMATIC
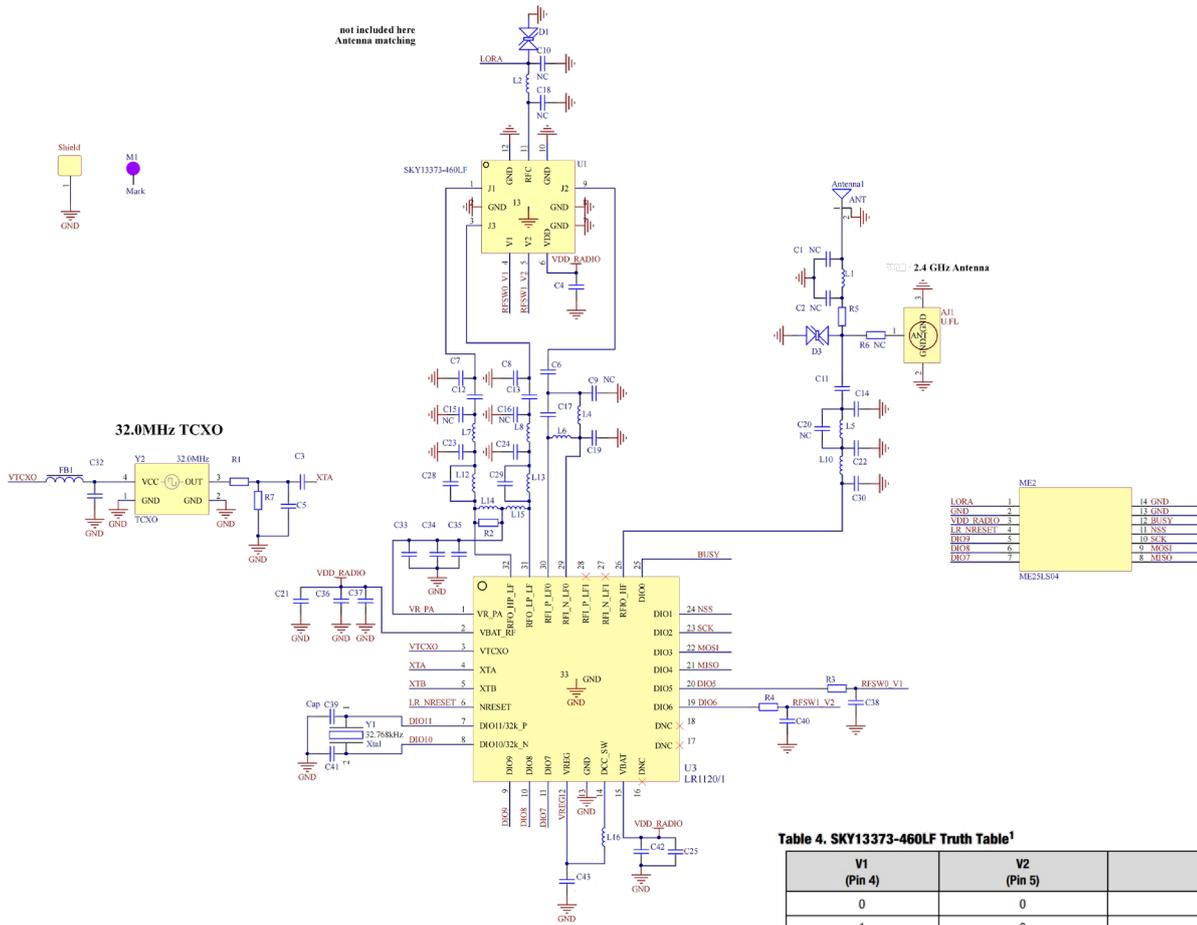
Table 4. SKY13373-460LF Truth Table[1]

V1 (Pin 4)	V2 (Pin 5)	State
0	0	Shutdown
1	0	RFC to J2
0	1	RFC to J1
1	1	RFC to J3

⚠ * Note: If you need a different LoRa frequency bandsolution, please contact the sales representative.

8 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.
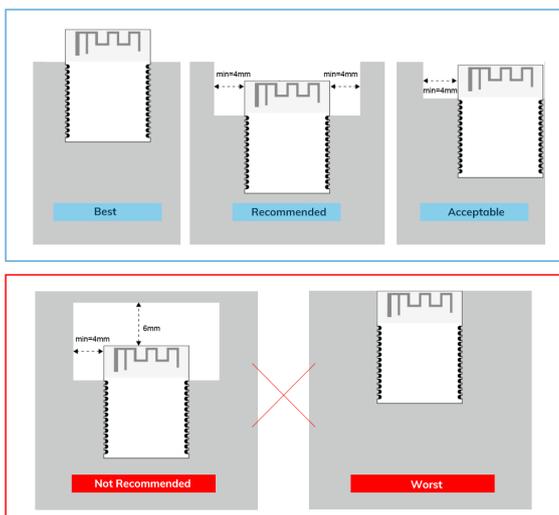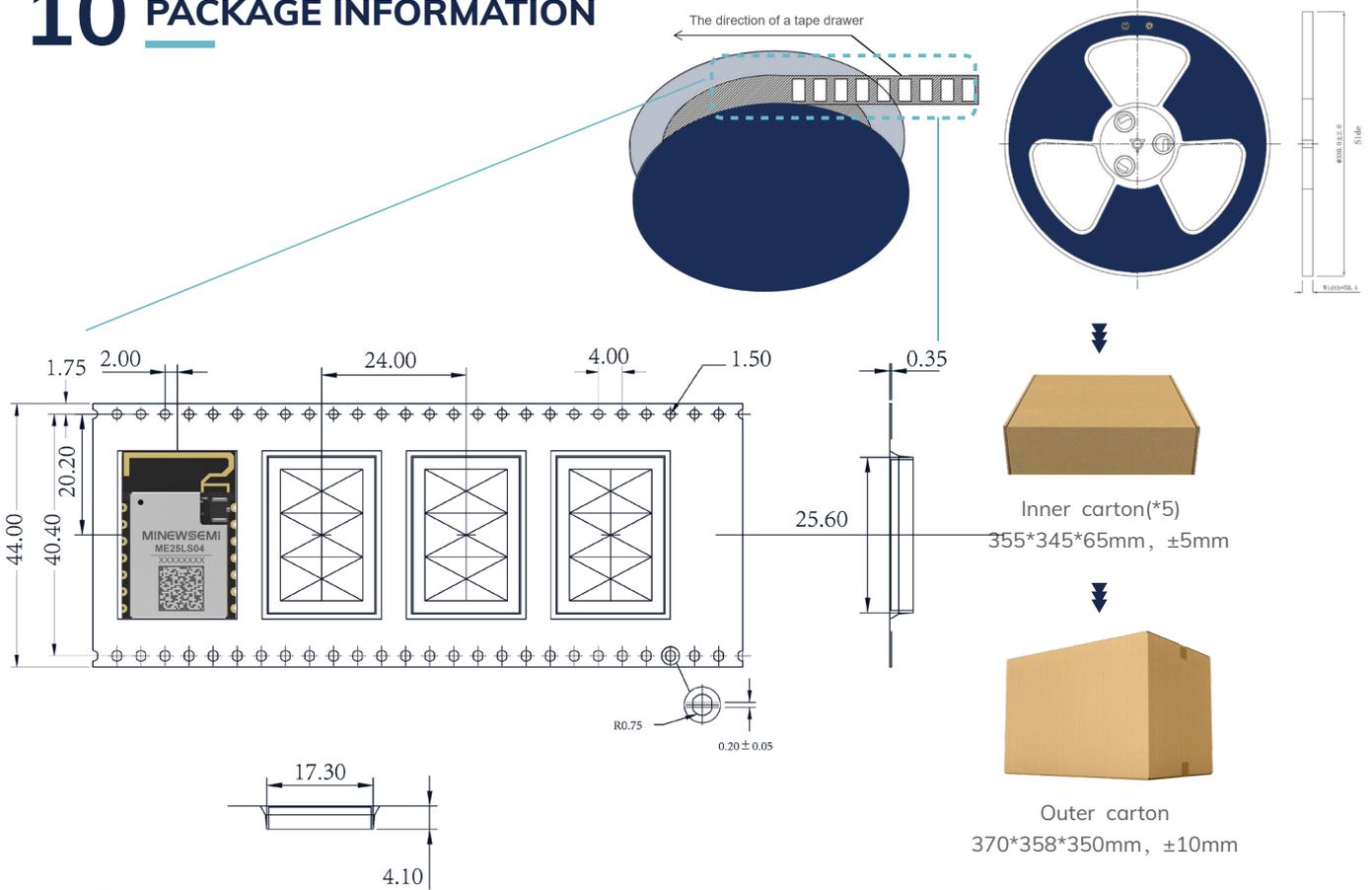
Layout Notes:

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.

9 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, it is recommended to make a local step steel mesh with a thickness of 0.2mm and a pin length of 0.8mm.

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.

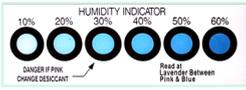5) ESD protection measures should be implemented before using SMT.

10 PACKAGE INFORMATION

The direction of a tape drawer

Inner carton(*5)
355*345*65mm, ±5mm
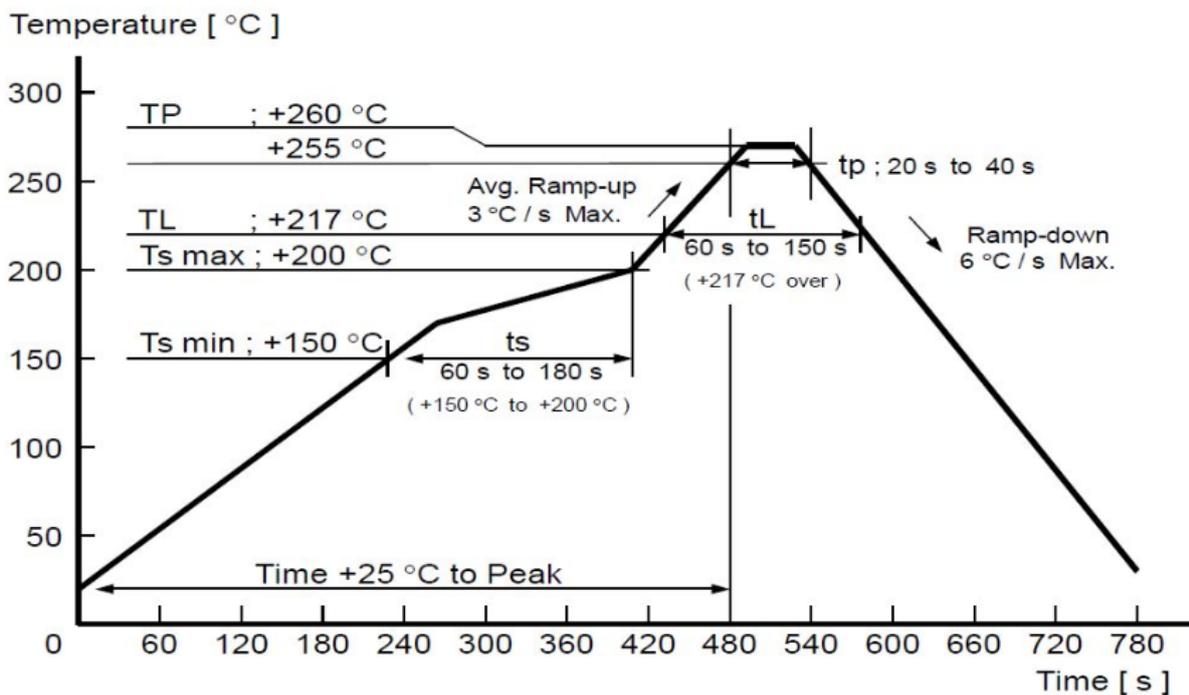
Outer carton
370*358*350mm, ±10mm

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
ME25LS04	620PCS	1171.8g	–	W=44mm, T=0.35mm

⚠ Note: Weight tolerance:±10 g (unless specified).

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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15 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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