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Model ZB-L258-RSA1 Datasheet

IEEE 802.15.4 Module

[SoC TLSR8258F512ET32]

for IEEE802.15.4

Version: 1.0

<Specification may be changed without prior notice>

Qingdao Yeelink Information Technology Co., Ltd.

Model : ZB-L258-RSA1

➤ **Compatible WLAN Standards**

IEEE Std. 802.15.4

➤ **SoC**

TLSR8258F512ET32

➤ **Product Size**

23.6mm×13.1mm×2.0mm

➤ **Product Weight**

1.1 g





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1 General Description

1.1 System Overview

Model ZB-L258-RSA1 is a highly integrated Zigbee module by AI-Link, based on the Telink SoC TLSR8258F512ET32.

The TLSR8258F512's embedded 512kB FLASH enables dynamic stack and profile configuration, and the final end product functionality is configurable via software, providing ultimate flexibility. The TLSR8258F512 also has hardware OTA upgrades support and multiple boot switching, allowing convenient product feature roll outs and upgrades.

1.2 System Properties

| | |
|-----------------------|---|
| Dimension | Typically, 23.6mm×13.1mm×2.0mm |
| Chipset | TLSR8258F512ET32 |
| Operating Frequency | 2.4GHz:2.412~2.484 GHz |
| Antenna | Internal PCB Trace Antenna |
| Operating Voltage | 3.3V±10% |
| PCB Information | 4-layers design (0.8+/-0.15mm) |
| Peripheral Interface | UART |
| Rate | 250kbps |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -50°C to +125°C |
| Flash | 512KB |
| Low Power Consumption | Whole Chip TX mode: 4.8mA @ 0dBm with DCDC |
| | Whole Chip RX mode: 5.3mA |
| | Deep sleep without SRAM retention: 0.4uA |
| | Deep sleep with SRAM retention: 1uA (with 8kB SRAM retention), 1.2uA (with 16kB SRAM retention), 1.4uA (with 32kB SRAM retention) |

1.3 Diagram

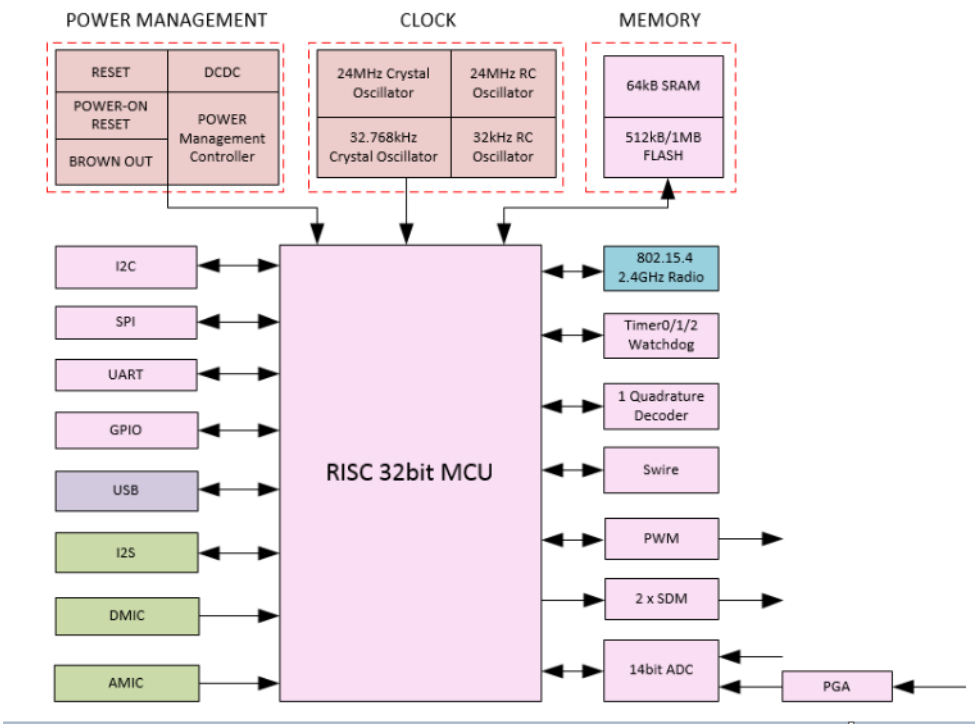


Figure 1: ZB-L258-RSA1 Block Diagram

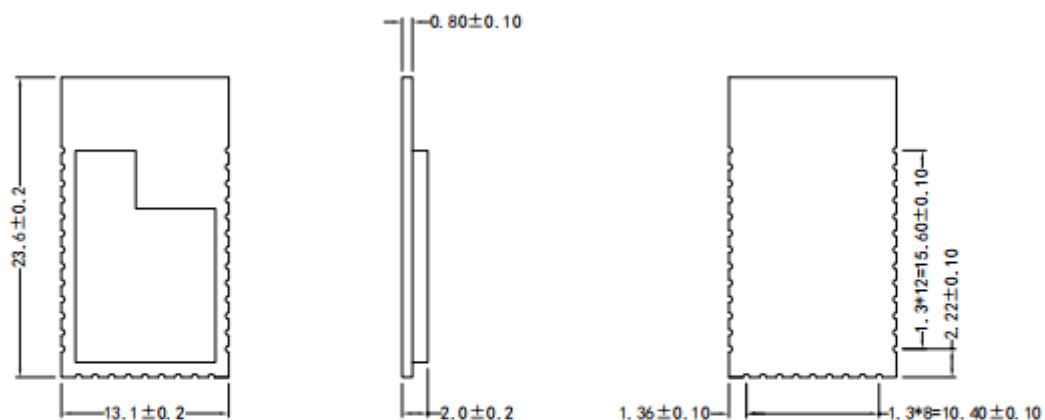
2 Mechanical Dimensions

2.1 Mechanical Outline Drawing

✚ Typical Dimension (W x L x T): 23.6mmx 13.1mm x 2.0mm

✚ General tolerance: $\pm 0.2\text{mm}$

✚ PCB Thickness: 0.8mm (+/-0.15mm)



主视图

侧视图

背视图

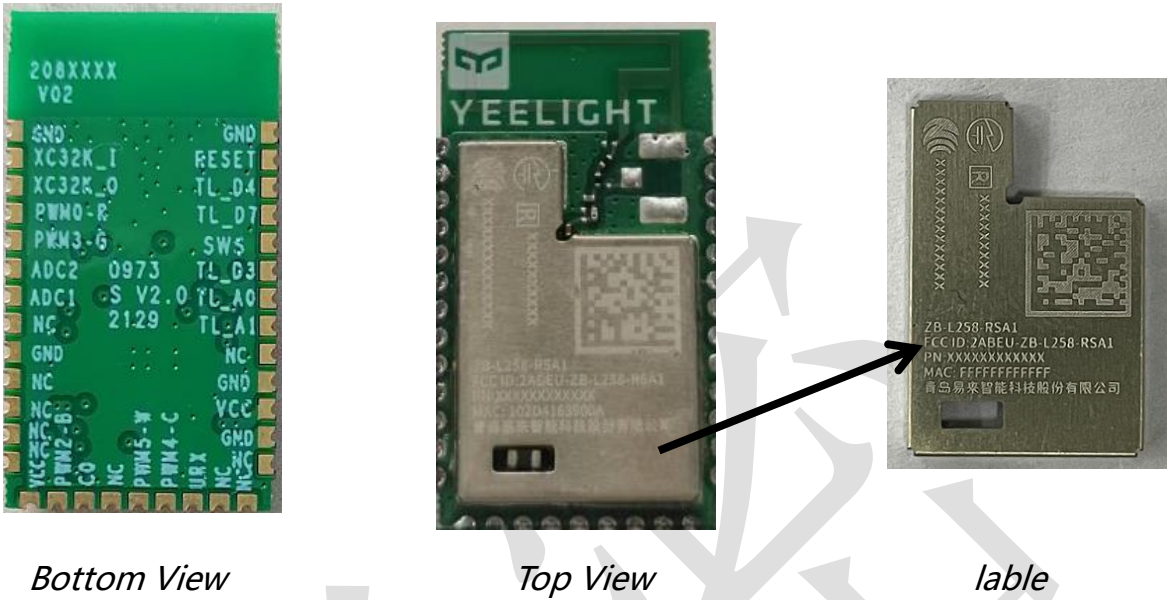


2.2 Pin definitions



| NO. | Definition | Description | NO. | Definition | Description |
|-----|------------|-------------------|-----|------------|---------------------|
| 1 | GND | Connected to | 19 | NC | NOT CONNECTED |
| 2 | RESET | RESET | 20 | C0 | GPIO |
| 3 | TL_D4 | GPIO | 21 | PWM2_B | GPIO |
| 4 | TL_D7 | GPIO | 22 | VCC | +3.3V DC power |
| 5 | SWS | SINGLE WIRE SLAVE | 23 | NC | NOT CONNECTED |
| 6 | TL_D3 | GPIO | 24 | NC | NOT CONNECTED |
| 7 | TL_A0 | GPIO | 25 | NC | NOT CONNECTED |
| 8 | TL_A1 | GPIO | 26 | NC | NOT CONNECTED |
| 9 | NC | NOT CONNECTED | 27 | GND | Connected to ground |
| 10 | GND | Connected to | 28 | NC | NOT CONNECTED |
| 11 | VDD | +3.3V DC power | 29 | ADC1 | Analog-to-Digital |
| 12 | GND | Connected to | 30 | ADC2 | Analog-to-Digital |
| 13 | NC | NOT CONNECTED | 31 | PWM3_G | GPIO |
| 14 | NC | NOT CONNECTED | 32 | PWM0_R | GPIO |
| 15 | NC | NOT CONNECTED | 33 | XC32K_O | 32.768khz out |
| 16 | URX | UART_RX | 34 | XC32K_I | 32.768khz in |
| 17 | PWM4_C | GPIO | 35 | GND | Connected to ground |
| 18 | PWM5_W | GPIO | | | |

2.3 Product Photos



3 RF Characteristics

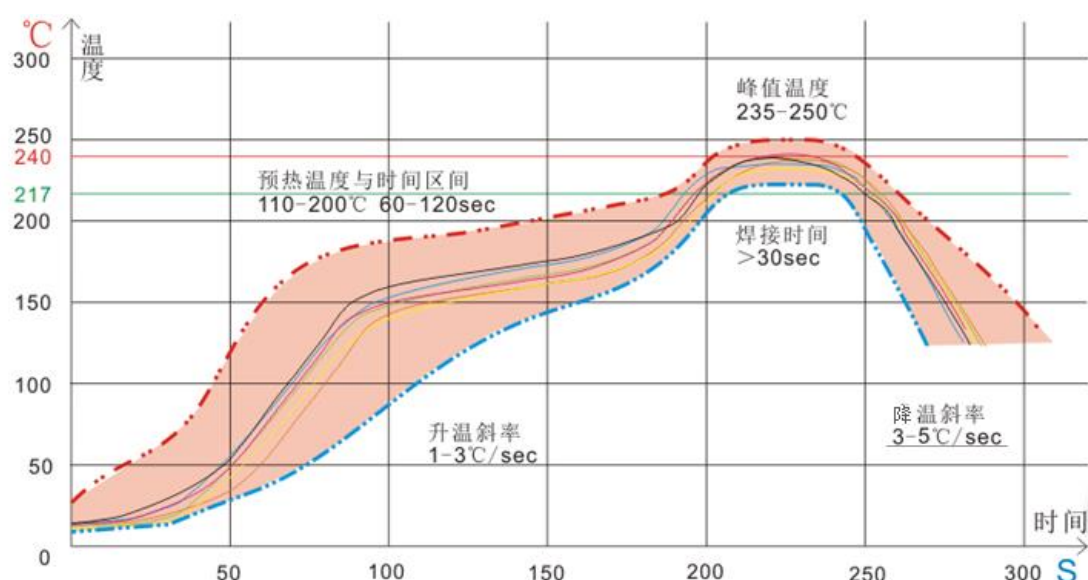
Zigbee Specification

| Items | Contents | | | | |
|--|----------------|------|-------|------|--------|
| Specification | IEEE802.15.4 | | | | |
| Frequency | 2400~2483.5MHz | | | | |
| Channel | CH10 to CH26 | | | | |
| Data rate | 250kbps | | | | |
| | Min. | Typ. | Max. | Unit | Remark |
| TX Characteristics | | | | | |
| 1. Power Levels(Configured to 8.5dBm) | 3.5 | 6 | 8.5 | dBm | |
| 2. Spectrum Mask @ target power | / | 0% | 5.12% | | |
| 3 Constellation Error(EVM)@ target power | 0% | 10% | 35% | | |
| 4. Frequency Error | -40 | -13 | 40 | ppm | |

| RX Characteristics | Min. | Typ. | Max. | Unit | |
|---|------|------|------|------|--|
| 5 Minimum Input Level Sensitivity(each chain) | / | -97 | -87 | dBm | |
| 6 Maximum Input Level | / | / | -20 | dBm | |

*** Note: [1] Typical RF Output Power are tested at room temp.25°C**

4 Refelow Standard Condition



Heating zone: temperature: < 150 °C, time: between 60 and 90 seconds, the slope is controlled between 1 ~ 3 °C / S.

Preheating constant temperature zone: temperature: 150 °C ~ 200 °C,

time: between 60-120 seconds, slope between 0.3-0.8.

Reflow soldering area: peak temperature 235 °C ~ 250 °C

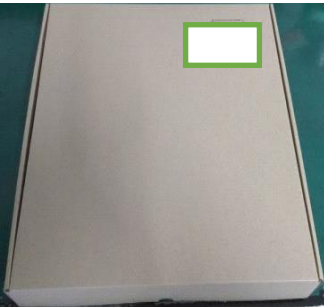
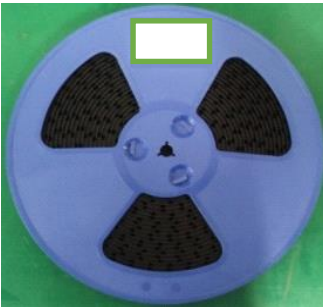
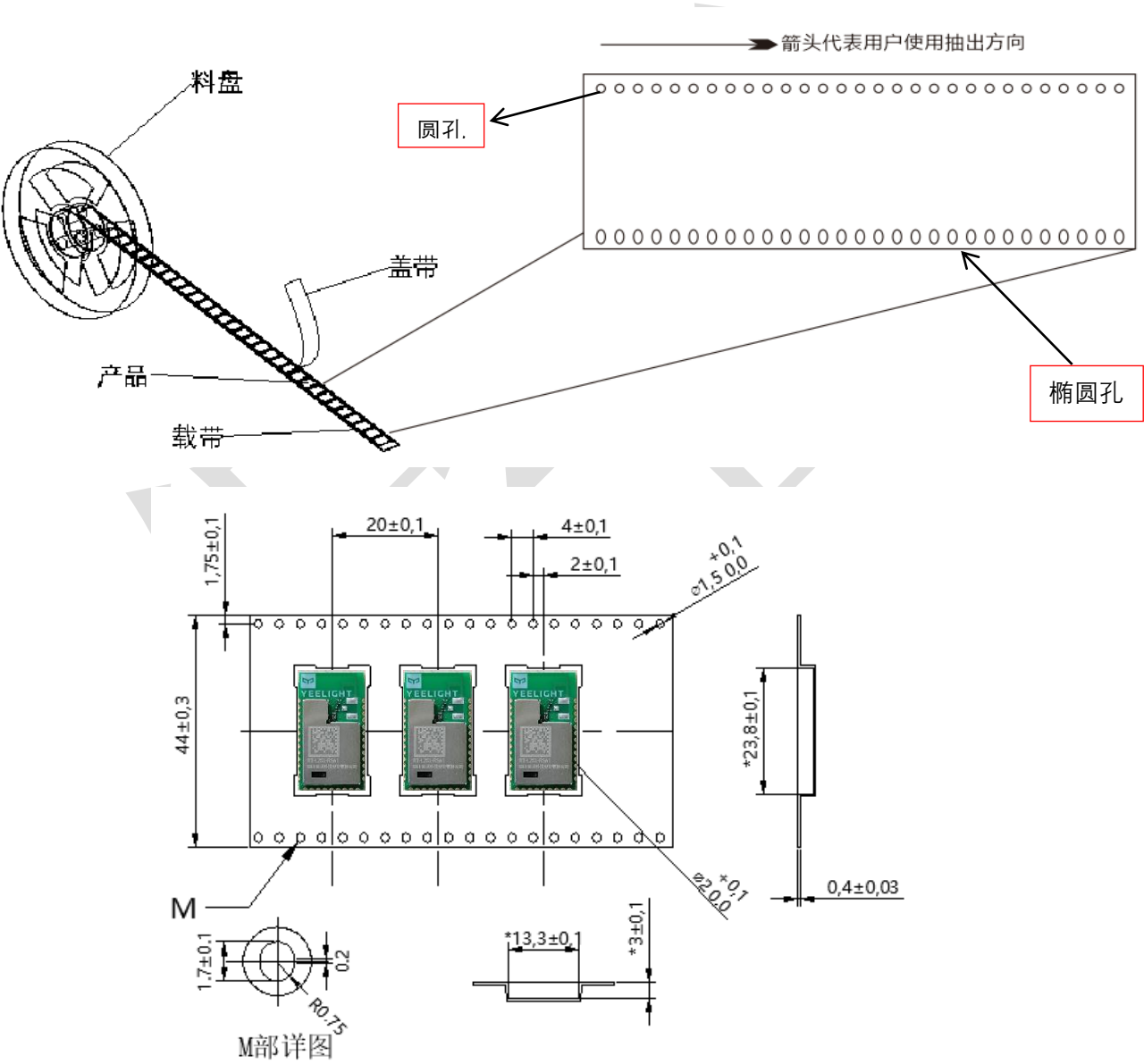
(recommended peak temperature < 245 °C), time 30-70 seconds.

Cold area: temperature: 217 °C ~ 170 °C, slope between 3 ~ 5 °C / S.

The solder is lead-free solder in tin-silver copper alloys/Sn&Ag&Cu Lead-free solder (SAC305).

5 Package, Storage & Disposal

5.1 Package



- 1、The product placement direction, label pasting position and packaging shall be carried out according to the Figure;
- 2、There are 1000 products in each roll and 1 roll in each small box. There are 5 small boxes in the large box. The total number of products is 5000 / large box;
- 3、Outer box size: 370mm*300mm*370mm, small box size: 355mm*355mm*55mm;
- 4、Place 2 bags of 2g desiccant and 1 6-color humidity card in the vacuum bag;
- 5、Other matters not covered shall be implemented according to the customer's packaging requirements.

5.2 Storage

All electronic components must be stored in a clean, well-ventilated place free of corrosive gas. Unless otherwise specified, the temperature and humidity of the storage place must meet below requirements:

- ✚ Temperature: -40~125°C;
- ✚ Humidity: 20%~75%;
- ✚ Humidity sensitivity grade: MSL 3
- ✚ Container Requirement: products shall be placed in a container well-functioning as an electrostatic shielding.

5.3 Disposal

The waste disposal of this product and the package should comply with the applicable local/regional /state/ international regulations.

6 FCC ID UM Requirement

FCC Compliance Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

Caution: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

product should not collocate with other radio

This device is designed to comply with the FCC Rules. The FCC ID is 2ABEU-ZB-L258-RSA1. The host system using this device should have label

indicated such as the following: Contains Transmitter module FCC ID:
2ABEU-ZB-L258-RSA1 or contains FCC ID: 2ABEU-ZB-L258-RSA1

7 Antenna information :

7.1Antenna Describe

| | |
|----------------------|-----------------|
| Antenna plate | PCB antenna |
| Make name/model name | Zigbee module |
| Antenna gain | 1dBi |
| Frequency range | 2405MHz-2480MHz |

| Zigbee module | | | | | | | | | | | |
|---------------|------|------|------|------|------|------|------|------|------|------|------|
| 频率 (MHz) | 2400 | 2410 | 2420 | 2430 | 2440 | 2450 | 2460 | 2470 | 2480 | 2490 | 2500 |
| 效率 (%) | 51 | 49 | 45 | 41 | 40 | 38 | 34 | 33 | 33 | 32 | 31 |
| 增益 (dBi) | 1 | 0.8 | 0.4 | 0 | -0.6 | -0.9 | -1.5 | -1.9 | -1.8 | -2.2 | -2.5 |

7.2 Picture of antenna

