

MR82-50B

Low power Bluetooth module

summary

The MR82-50B is a compact, cost-effective Bluetooth module developed on the Telink TSLR 8250 platform, supporting BLE5.0 with backward compatibility. Featuring a 32-bit RISC 48MHz core controller, it delivers robust performance for IoT applications and BLE Mesh networks. The module's stamp-pin design enables small footprint production and surface-mount assembly, significantly reducing RF development efforts for engineers during product development.

Key characteristics

❖ Working frequency band BLE 2402~2480MHz	❖ Bluetooth version BLE 5.0 and backward compatibility
❖ Master parameters High performance 32-bit RISC core 512kB Flash 48kB SRAM	❖ Communication interface UART/SWS
❖ Power consumption parameters 1.8~3.6V power supply The emission peak current is less than 4.8mA@0dBm/DC-DC and the receiving current is less than 5.3mA Deep sleep current: 0.4μA (SRAM not running & 32KB RC off) 1.4μA (retains 32kB SRAM running & 32KB RC turned off)	❖ Module size 10*15*2.6mm
❖ Radio frequency parameters Maximum transmission power: +5dBm receiving sensitivity : -96dBm@1Mbps (BLE mode) -93dBm@2Mbps (BLE mode) -99dBm@500kbps (LongRange mode) -101dBm@125kbps (LongRange mode)	❖ working temperature -40°C ~ +85°C ❖ Storage temperature -40°C ~ +150°C ❖ Packaging information Minimum package 1300pcs ❖ Packaging method roll packaging

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1. Function Description

1.1 Summary

The MR82-50B is a compact, cost-effective Bluetooth module developed on the Telink TSLR8258 platform, supporting BLE5.0 with backward compatibility. Featuring a 32-bit RISC 48MHz core controller, it delivers robust performance for IoT applications and BLE Mesh networks. The module's stamp-pin design enables small footprint production and surface-mount technology (SMT) integration, significantly reducing RF development efforts for engineers during product development.

1.2 Functional Parameter

The detailed functional features of MR82-50B are shown in Table 1.1.

Table 1.1 MR82-50B Module Functional Parameters

function	Detailed parameters
master control	32 A RISC kernel
Flash	512kB
RAM	48kB
service frequency	2402MHz~2480MHz
BLE edition	BLE5.0 backward compatibility
transmission speed	1Mbps, 2Mbps (BLE mode)/ 125kbps, 500kbps (Long Rang mode)
transmitting power	Maximum +5dBm
receiving sensitivity	-96dBm@1Mbps (BLE mode) -93dBm@2Mbps (BLE mode) -99dBm@500kbps (LongRange mode) -101dBm@125kbps (LongRange mode)
power dissipation	TX peak current: 4. 8mA@0dBm/DC-DC RX peak current: 5. 3mA Deep sleep current — — 0.4μA (SRAM not running & 32KB RC off) 1.4μA (retains 32kB SRAM running & 32KB RC turned off)
signal interface	UART / SWS/PWM
working voltage	1.8~3.6V
working temperature	-40°C~85°C
Storage temperature	-40°C~150°C
Encapsulation form	Postage stamp hole SMD (16 pins)
Encapsulation size	10*15*2.6mm

2. Pin Definition

2.1 Pin Arrangement

Figure 2.1 shows the top view of the pins of the MR82-50B module.

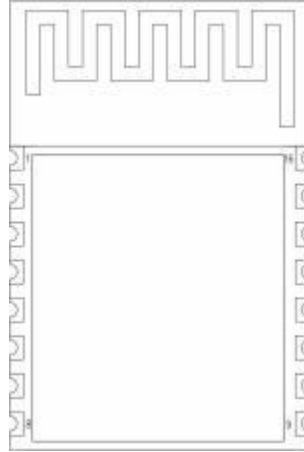


Figure 2.1 Schematic Diagram of MR82-50B Module

2.2 Pin Description

The pin definitions of MR82-50B module are shown in detail in Table 2.1 .

Table 2.1 MR82-50B Module Pin Definition and Description

order number	Pin name	function declaration
1	GND	Module grounding
2	PD4	figure IO
3	PD7	figure IO
4	PA0	figure IO
5	PA1	figure IO
6	PA7	SWS single line signal from interface
7	PB1	Analog input/digital I/O
8	GND	Module grounding
9	VDD	Module power supply (3V3)
10	GND	Module grounding
11	PC2	Module UART transmission
12	PC3	Module UART receiver
13	PC4	Debug interface UART_TX_LOG
14	RESET	Module reset signal (low effective)
15	RF	Radio frequency antenna output (default connection to onboard antenna)
16	GND	Module grounding

3. Specifications

3.1 Absolute Rating

The limiting parameters of the MR82-50B module are shown in Table 3.1.

Table 3.1 Limiting Parameters of MR82-50B Module

Parameter items	least value	crest value	unit	Conditions note
service voltage VDD	-0.3	+3.6	V	Recommended 3.3V power supply
I/O, port voltage	-0.3	VDD+0.3	V	VDD voltage $\leq 3.6V$
working temperature (°C)	-40	+85	°C	
Storage temperature (°C)	-40	+150	°C	
welding temperature	*	+260	°C	

3.2 Rated Working Parameters

The recommended operating conditions for the MR82-50B module are shown in Table 3.2.

Table 3.2 MR82-50B, Recommended Working Conditions of the Module

Parameter items	least value	representative value	crest value	unit
Module power supply voltage VDD	+1.8	+3.3	+3.6	V
Working temperature T _{opr}	*	+25	*	°C
Storage temperature T _{sto}	*	+25	*	°C

3.3 Reference Power Consumption

The power consumption parameters of MR82-50B module are shown in Table 3.3.

Table 3.3 Power Consumption Parameters of MR82-50B Module

Parameter items	representative value	unit	remarks
Peak emission current	4.8	mA	0dBm with DC-DC
receive current	5.3	mA	
Deep sleep mode	0.4	μA	SRAM is not running and 32K RC is off
Deep sleep mode	1.4	μA	Retain 32kB SRAM running & 32KB RC off

[Note]: The above power consumption parameters are based on VDD=3.3V, normal temperature 25°C.

3.4 Radio Frequency Parameters

The radio frequency parameters of the MR82-50B module are shown in Table 3.4.

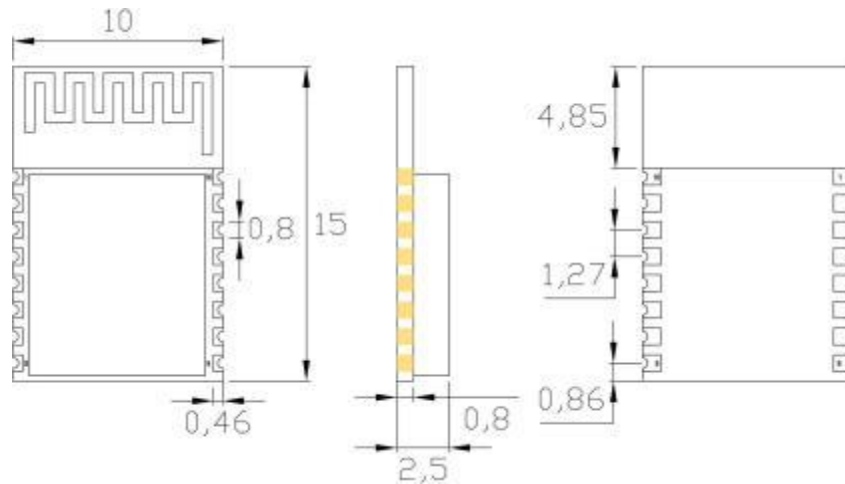
Table 3.4 MR82-50B, Wireless RF Parameters of the Module

Parameter items	representative value	unit	remarks
frequency range	2380~2500	MHz	BLE mode, step 1MHz
maximumoutput	+10	dBm	
receiving sensitivity	-96	dBm	1MbpsBLE pattern
receiving sensitivity	-93	dBm	2MbpsBLE pattern
receiving sensitivity	-99	dBm	500kbps LongRange mode
receiving sensitivity	-101	dBm	125kbps LongRange mode

4. Size Parameters

4.1 Module Size

The size of MR82-50B module is shown in Figure 4.1 below.



unit : mm

Figure 4.1 MR82-50B Module Size Diagram (top View)

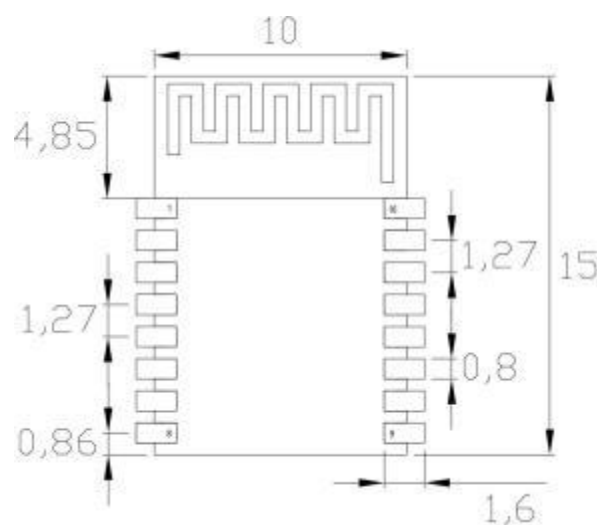
The specific size parameters of the module are shown in Table 4.1 below.

Module type	wide	long	tall	Module PCB thickness	Welding pad spacing
MR82-50B	10mm	15mm	2.6mm	0.8mm	1.27mm

Table 4.1 MR82-50B module size parameters

4.2 Module Package Size

As shown in Figure 4.2, the recommended package size diagram of MR82-50B is shown.



unit : mm

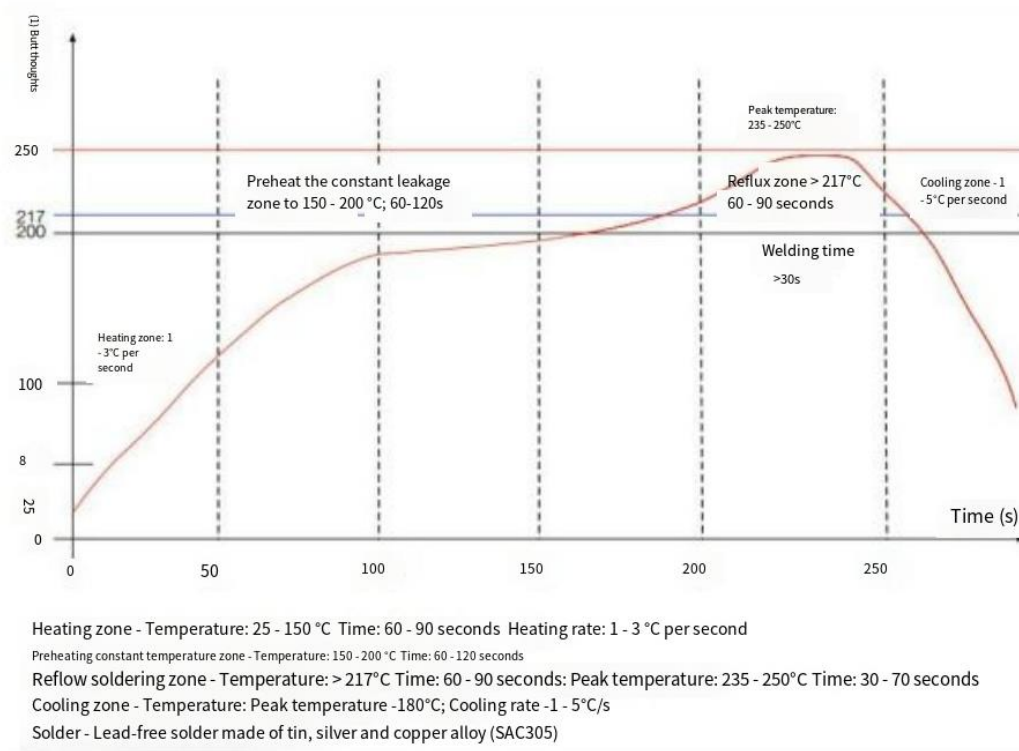
Figure 4.2 MR82-50B Module Package Size Diagram

5. Furnace Temperature Curve

5.1 Furnace Temperature Curve

The temperature curve of the MR82-50B module is shown in Figure 5.1 below.

Figure 5.1 Furnace Temperature Curve



6. Explanation

Regulatory Compliance:

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.

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.

Warning: changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains FCC ID: 2AABZ-MR8250B" any similar wording that expresses the same meaning may be used.

A separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and difference antenna configurations.

There is requirement that the host manufacturer for compliance with Part 15B and ICES requirements.
The module complies with FCC Part 15.247 and applies for Single module approval.

Integral PCB Antenna, change antennas with higher gain or different type is strictly prohibited without filing the C2PC application.

RF Exposure Compliance:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated minimum distance 20cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference; and (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage;

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

Cet équipement est conforme aux limites d'exposition au rayonnement du CI établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à une distance minimale de 20 cm entre le radiateur et votre corps.

Please notice that if the ISED certification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains IC: 28850-MR8250B" any similar wording that expresses the same meaning may be used.

l'appareil hôte doit porter une étiquette donnant le numéro de certification du module d'Industrie Canada, précédé des mots « Contient un module d'émission », du mot 28850-MR8250B ou d'une formulation similaire exprimant le même sens, comme suit

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux rayonnements établies par l'ISED pour un environnement non contrôlé. Cet équipement doit être installé et fonctionné avec une distance minimale de 20 cm entre le radiateur et votre corps. Ce transmetteur ne doit pas être placé côte à côte ou fonctionner en combinaison avec toute autre antenne ou émetteur.

7. History of Version Revisions

version number	date	revision note	Maintenance personnel
V1.0	2025.03.27	Initial version	D.Z
V1.1	2025.08.01	Correct module height parameters and minimum packaging	H.Z.Q

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