



TPL3937 Dual Module Datasheet

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一、Introduction

TPL3937 is a BLE 5.1 dual mode Bluetooth module with a built-in Bluetooth protocol stack, which can be used for short distance music transmission and can be easily connected to Bluetooth devices such as mobile phones to achieve wireless music transmission. And synchronization can support data transmission function, which can be widely used in various application scenarios that require both audio transmission and data transmission.

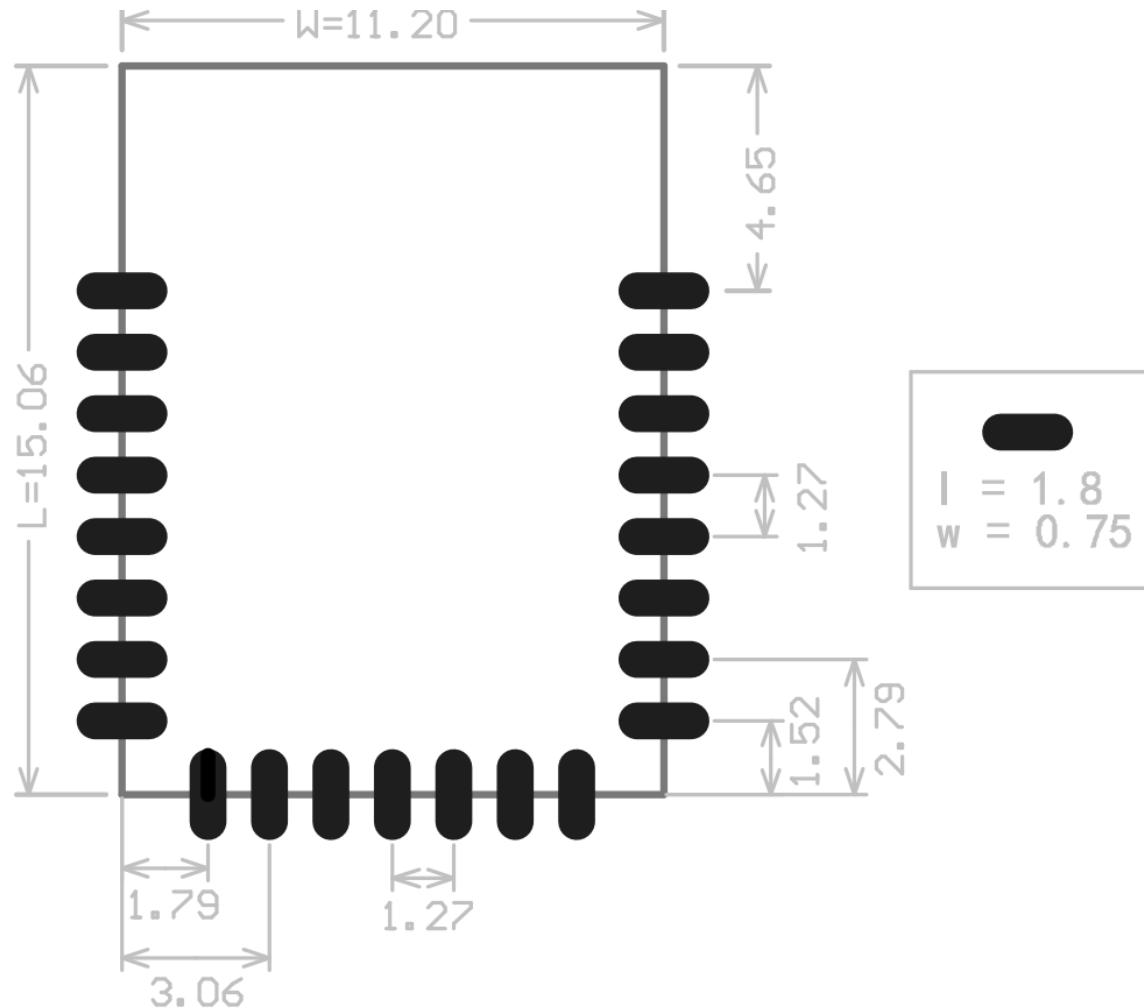
The other main features of the module are as follows:

- 64KB SRAM Built in 8Mbit flash,
- Support various profiles such as A2DP, BLE, AVRCP, HFP, SPP, HID, etc
- Support low power Bluetooth data transparent transmission
- Support AT command control
- Ultra small package

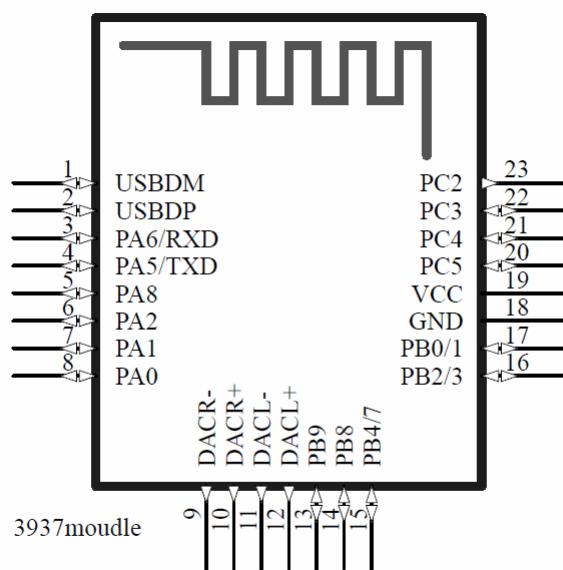
二、Module Parameters

Item	Parameters
Module Name	TPL3937
Package	SMT (Stamp Hole)
Size	11.20x15.06 (± 0.2)MM
Voltage Range	2.2V~4.4V, Recommend 3.3V
Wireless Standard	Bluetooth 5.1
Frequency Range	2400~2483.5MHz
Output Power	5dBm
Sensitivity	-92dBm
Default Communication interface	UART
FLASH Size	8Mbit
RAM Size	64KB
GPIO Number	17
Work Temperature	-40°C~+85°C
Storage Temperature	-65°C~+150°C

三、Module Size

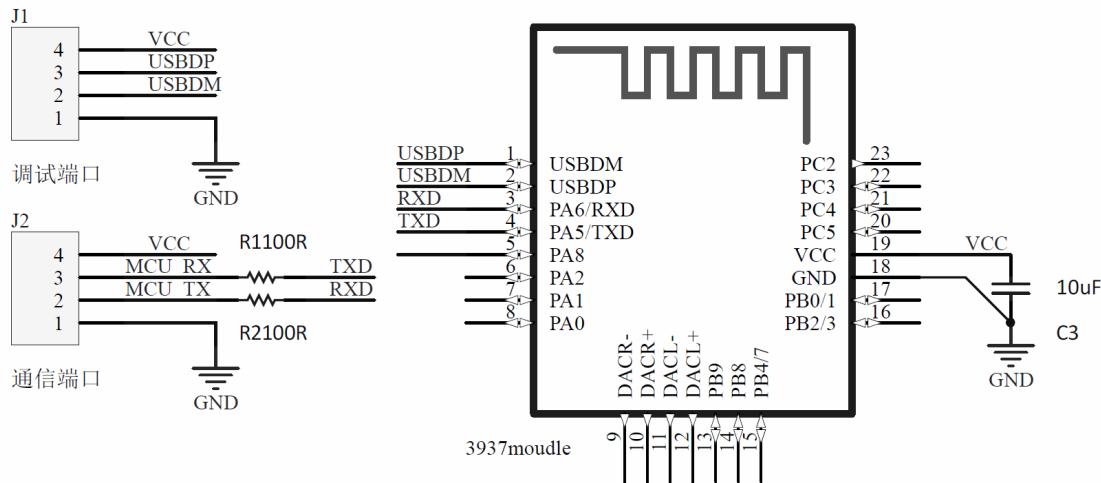


四、Pin Definition



序号	名称	管脚	功能	备注
1	USBDM	USB Data Minus	USB_D-	Debug Port
2	USBDP	USB Data Positive	USB_D+	Debug Port
3	PA6/UART_RX	Digital I/O	Communication serial port RXD	
4	PA5/UART_TX	Digital I/O	Communication serial port TXD	
5	PA8	Digital I/O	GPIO	
6	PA2	Digital I/O	GPIO	
7	PA2	Digital I/O	GPIO	
8	PA0	Digital I/O	GPIO	
9	DACR-	Audio output R-	The right channel outputs a negative level	Differential audio output
10	DACR+	Audio output R+	The right channel outputs a positive level	Differential audio output
11	DACL-	Audio output L-	The left channel outputs a negative level	Differential audio output
12	DACL+	Audio output L+	The left channel outputs a positive level	Differential audio output
13	PB9	Digital I/O	GPIO	
14	PB8	Digital I/O	GPIO	
15	PB4/7	Digital I/O	GPIO	
16	PB2/3	Digital I/O	GPIO	
17	PB0/1	Digital I/O	GPIO	
18	GND	Power Ground		
19	VCC	Power Supply	2.2V-4.4V	
20	PC5	Digital I/O	GPIO	
21	PC4	Digital I/O	GPIO	
22	PC3	Digital I/O	GPIO	
23	PC2	Digital I/O	GPIO	

五、Reference Design



六、Hardware Design Considerations

1、Module placement requirements on the bottom plate

(1) In order to meet the performance of the antenna on board, it is forbidden to place metal parts around the antenna, away from high frequency devices. Avoid using metal in the product housing and keep metal screw inside away from the RF part of the module.

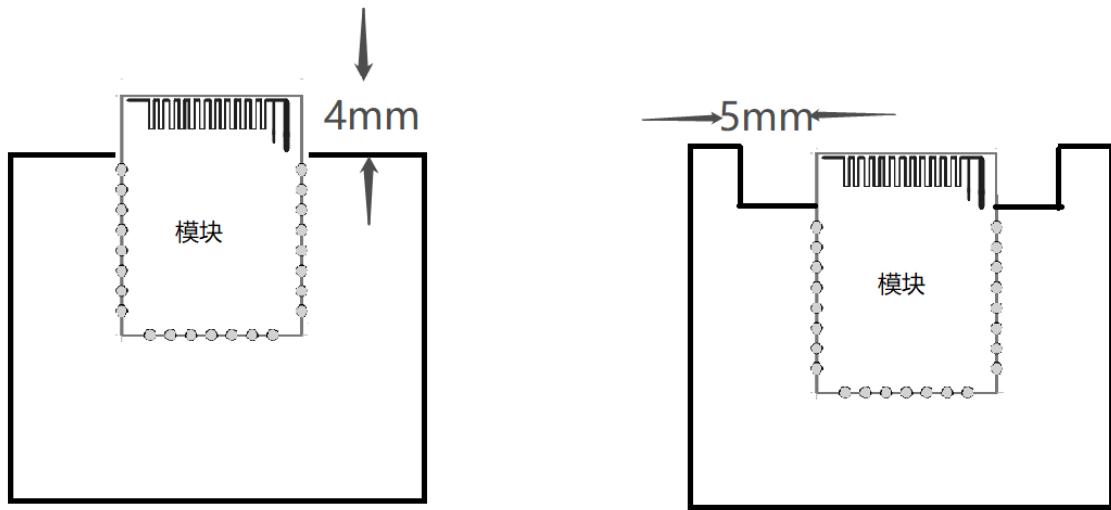
(2) Pay attention to the layout of the module on the soleplate, and minimize the impact of the soleplate on the performance of the module PCB antenna.

The following are suggested:

Option 1: Place the module at the edge of the motherboard and the antenna area extends beyond the edge of the motherboard.

Option 2: Place the module at the edge of the motherboard, which empties an area at the antenna position.

Option 3: If the above scheme is limited and cannot be implemented, make sure that the area of the module PCB antenna and the area of 5 mm extension need to be cleared (copper, wiring and placement of components are strictly prohibited).



2. power supply requirements

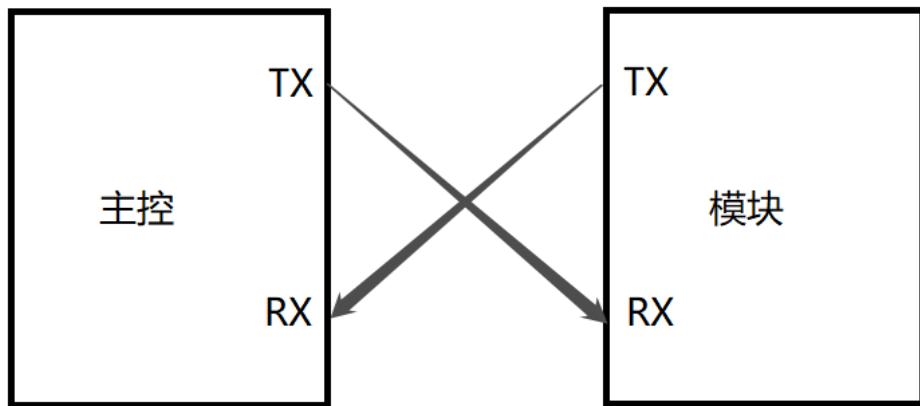
(1) It is recommended to use DC regulator power supply to supply power to the module. The power ripple factor is as small as possible and the module needs to be grounded reliably. Please note that the correct connection between the positive and negative poles of the power supply, such as reverse connection may cause permanent damage to the module.

(2) Check the power supply to ensure that between the recommended supply voltage, if the maximum value is exceeded, the module will be permanently damaged; check the power supply stability, the voltage should not fluctuate significantly and frequently;

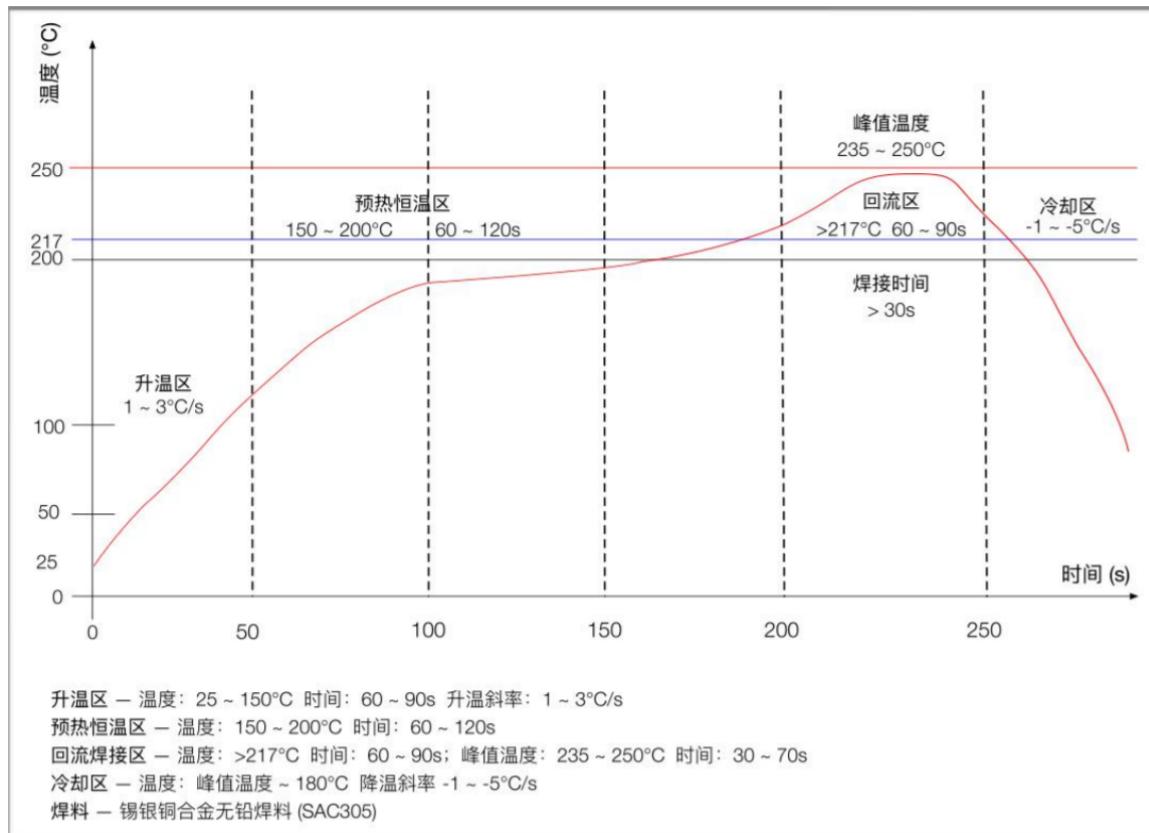
(3) Recommend 3.3V voltage, LDO power supply is recommended; if using DC-DC, ripple control is recommended within 30mV. The DC-DC power supply circuit suggests reserving the position of the dynamic response capacitance to optimize the output ripple when the load varies greatly.

3. UART Communication

UART communication between module and master MCU through serial port supports full duplex transmission and reception of TX and RX.



七、Reflow Profile



FCC Statement

FCC standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247
Device is equipped with PCB antenna , Antenna gain 3dBi

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.
Any changes or modifications 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.

FCC Radiation Exposure Statement

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

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 Transmitter Module FCC ID: 2BG7T-TPL3937 Or Contains FCC ID: 2BG7T-TPL3937"

When the module is installed inside another device, the user manual of the host must contain below warning statements;

1. 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;
- (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.

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

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

Any company of the host device which install the modular with modular approval should perform the test of radiated & conducted emission and spurious emission, etc. according to FCC part 15C : 15.247 and 15.209 & 15.207 ,15B Class B requirement, Only if the test result comply with FCC part 15C : 15.247 and 15.209 & 15.207 ,15B Class B requirement then the host can be sold legally.