TinySine

Bluetooth Module Datasheet

Model: TS3008

Version: V1.0

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List of Contents

1 Introduction

Tinysine Electronics introduces the pioneer of the Bluetooth
5.0 modules TS3008 which is a high performance, cost effective, low power and compact solution. The Bluetooth module provides a complete 2.4GHz Bluetooth system based on the QCC3008 QFN chipset which is a single
chip radio and baseband IC for Bluetooth 2.4GHz systems,. This module is fully qualified single-chip dual mode Bluetooth@v5.0 system.

2 Key Features

Bluetooth Profiles
- Bluetooth v5.0 specification supported
- Qualcomm® Bluetooth® Low Energy secure connection
- A2DP v1.3.1
- AVRCP v1.6
- HFP v1.7
- HSP v1.2
- SPP v1.2
- DID v1.3
- HOGP v1.0
- PXP v1.0.1
- FMP v1.0
- BAS v1.0
- QTIL's proximity pairing and QTIL's proximity connection

Music Enhancements
- aptX, aptX Low Latency, SBC, and AAC audio codecs
- Qualcomm TrueWireless™ Stereo (TWS), which allows two devices to be configured as a stereo pair
- Configurable Signal Detection to trigger events
- 1 bank of up to 10-stage Speaker Parametric EQ
- 6 banks of up to 5-stage User Parametric EQ for music enhancement
- Qualcomm® meloD™ Expansion audio processing: 3D stereo widening
- Compander to compress or expand the dynamic range of the audio
- Post Mastering to improve DAC fidelity
- Dual I^{2}S outputs with crossover

Additional Functionality
- Support for multi-language programmable audio prompts
- Multipoint support for A2DP connection to 2 A2DP sources for music playback
- Talk-time extension, which automatically reduces processor functions to extend use when a low battery condition is detected
- Slim module with 28.5mm x 13mm x 2.0mm

3 Applications

- Stereo Headsets
- Wired Stereo headsets and headphones
- Portable Bluetooth Stereo speakers

4 Block Diagram
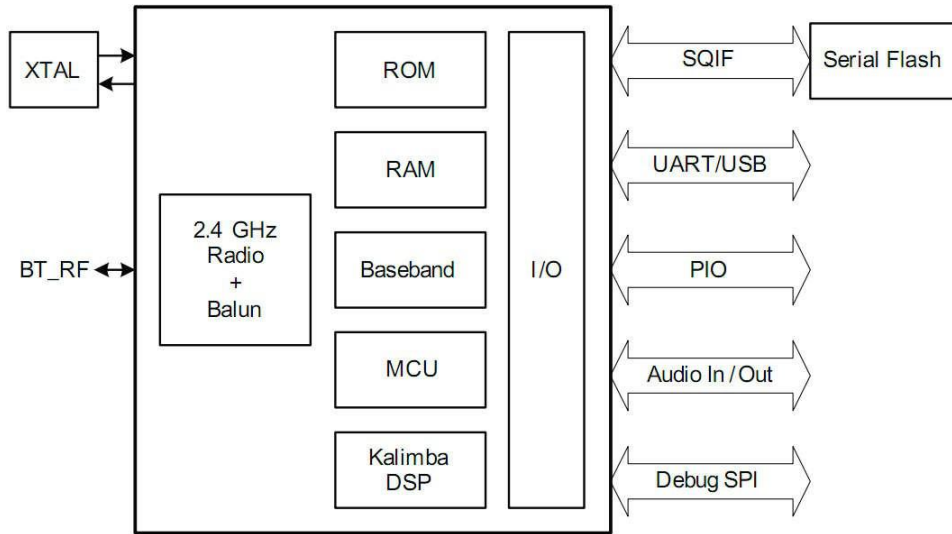
5 General specifications

| Model Name	SJR-BTM308
Product Description	**Bluetooth 5.0 Class2 Module**
Bluetooth Standard	Bluetooth 5.0
Chipset	QCC3008 QFN
Dimension	28.5mm x 13mm x 2.0mm
Operating Conditions	
Voltage	2.8~4.2V
Temperature	-10～+70℃
Storage Temperature	-40～+85℃
Electrical Specifications	
Frequency Range	2402～2480MHz
Maximum RF Transmit Power	9dBm
π/4 DQPSK Receive Sensitivity	-92dBm
8DPSK Receive Sensitivity	-82dBm

6 Module Package Information

6.1 Pinout Diagram and package dimensions
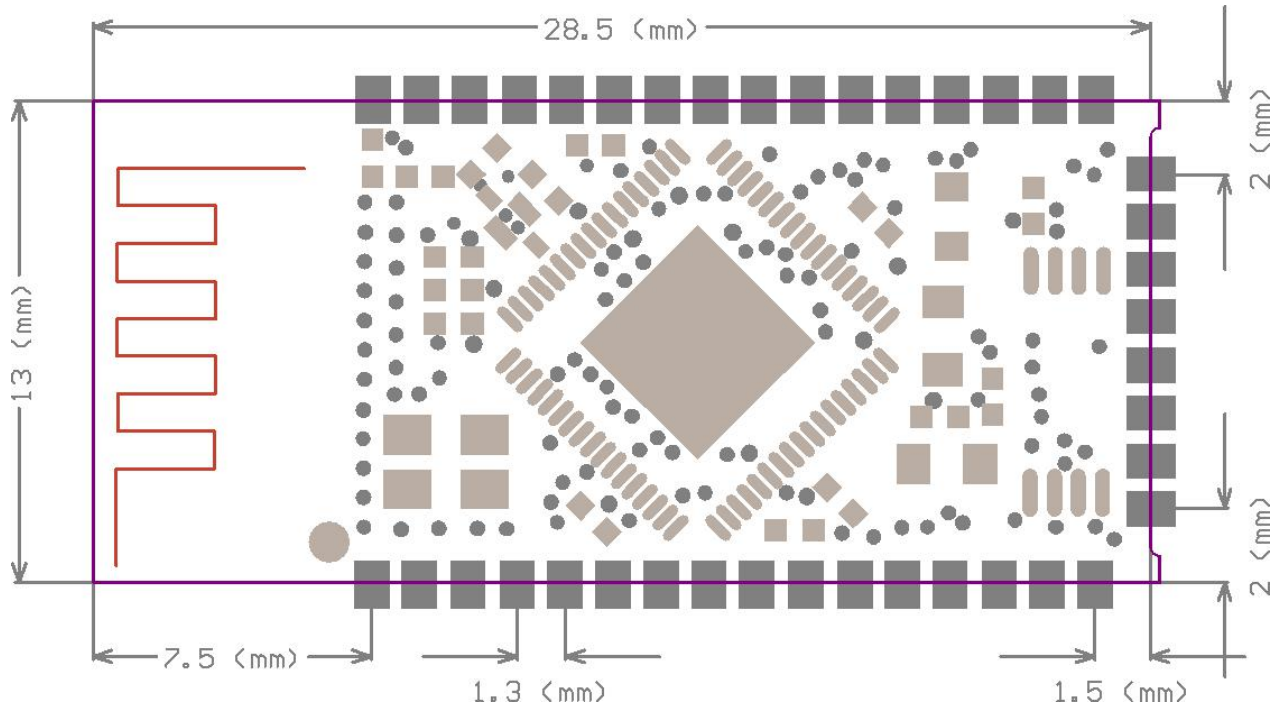
Unit：MM

Recommended PCB layout footprint

6.2 Module Pin descriptions
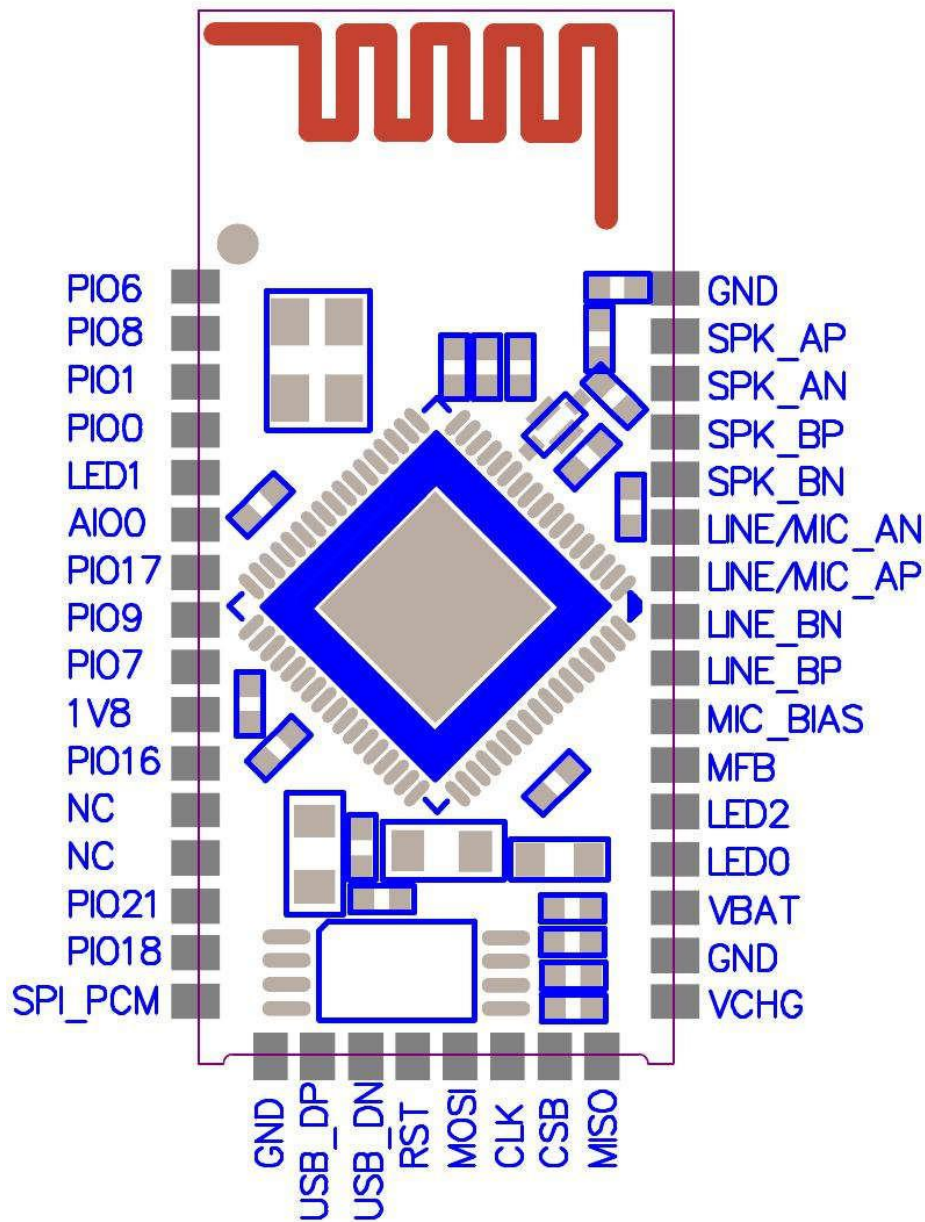
Pin No.	Pin Name	Pin Type	Description
1	PIO6	Bidirectional with strong pull-down	Programmable input/output line 6
2	PIO8	Bidirectional with strong pull-up	Programmable input/output line 8
3	PIO1	Bidirectional with strong pull-up	Programmable input/output line 1
4	PIO0	Bidirectional with strong pull-up	Programmable input/output line 0
5	LED1	Bidirectional	LED driver
6	AIO0	Bidirectional	Analogue programmable input/output line
7	PIO17	Bidirectional with strong pull-down	Programmable input/output line 17
8	PIO9	Bidirectional with strong pull-down	Programmable input/output line 9

9	PIO7	Bidirectional with strong pull-down	Programmable input/output line 7
10	1V8	1.8V output	1.8V output for keys
11	PIO16	Bidirectional with strong pull-up	Programmable input/output line 16
12	NC	NC	NC
13	NC	NC	NC
14	PIO21	Bidirectional with weak pull-down	Programmable input/output line 21
15	PIO18	Bidirectional with weak pull-down	Programmable input/output line 18
16	SPI_PCM#	Input with weak pull-down	SPI/PCM select input: 0 = PCM/PIO interface 1 = SPI
17	GND	VSS	Ground
18	USB_P	Bidirectional	USB data plus
19	USB_N	Bidirectional	USB data minus
20	RSTn	Input with strong pull-up	Reset if low. Pull low for minimum 5ms to cause a reset.
21	SPI_MOSI	Bidirectional with weak pull-down	Programmable input / output line 2 Alternative function: SPI_MOSI: Debug SPI data input PCM1_IN: PCM1 synchronous data input I2S1_SD_IN: I²S1 synchronous data input SPDIF_IN: SPDIF input
22	SPI_CLK	Bidirectional with weak pull-down	Programmable input / output line 5 Alternative function: SPI_CLK: Debug SPI clock PCM1_CLK: PCM1 synchronous data clock I2S1_SCK: I²S1 synchronous data clock
23	SPI_CSB	Bidirectional with weak pull-down	Programmable input / output line 4 Alternative function: SPI_CS#: chip select for Debug SPI, active low PCM1_SYNC: PCM1 synchronous data sync I2S1_WS: I²S1 word select
24	SPI_MISO	Bidirectional with weak pull-down	Programmable input / output line 3 Alternative function: SPI_MISO: Debug SPI data output PCM1_OUT: PCM1 synchronous data output I2S1_SD_OUT: I²S1 synchronous data output
25	VCHG	Charger voltage input	Internal charger input for charging
26	GND	VSS	Ground
27	VBAT	Battery positive terminal	Power supply input for 2.7~4.2V
28	LED0	Bidirectional	LED driver
29	LED2	Bidirectional	LED driver
30	VREG_EN	Power on/off key input	Power on/off input key indication

31	MIC BIAS	Analog	Microphone bias output
32	LINE_BP	Analog input	Line input positive, channel B
33	LINE_BN	Analog input	Line input negative, channel B
34	LINE/MIC_AP	Analog input	Line or microphone input positive, channel
35	LINE/MIC_AN	Analog input	Line or microphone input negative, channe
36	SPK_BN	Analog output	Speaker output negative right
37	SPK_BP	Analog output	Speaker output positive right
38	SPK_AN	Analog output	Speaker output negative left
39	SPK_AP	Analog output	Speaker output positive left
40	GND	VSS	Ground

7 Electrical Characteristics

7.1 Absolute Maximum Ratings

Rating	Minimum	Maximum
Storage temperature	-40℃	+85℃

7.2   Recommended Operating Conditions

Operating Condition	Minimum	Maximum
Operating temperature range	-10℃	+70℃
Supply voltage: VBAT	+2.8V	+4.2V

8 Recommended reflow temperature profile

推荐温度曲线图

温度(℃)   Max.:240℃

最高温度:230℃ (20～30sec) e

230
220

升温速度 3℃/sec 以下

180

升温速度 0.5～1.5℃/sec

220℃以上
30～60sec

冷却速度
3℃/sec以上

150

150～180℃ :60～90sec (Max.120sec)

3～4℃/sec

a   g

0   30   60   90   120   150   時間(sec)
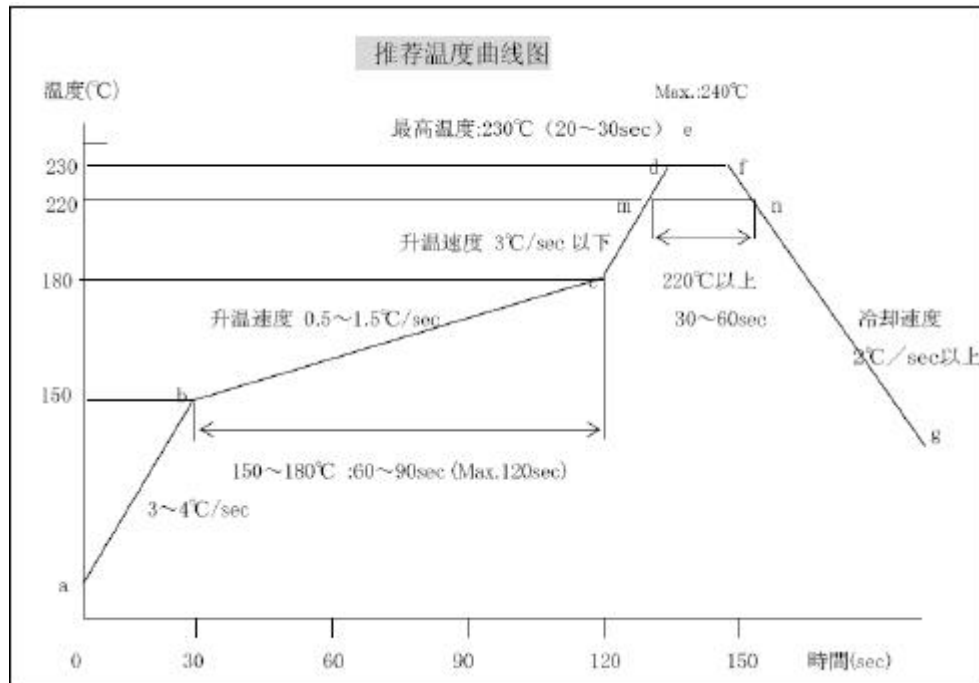
LEVEL
3

CAUTION
This bag contains
MOISTURE-SENSITIVE DEVICES

If Blank,see adjacent
bar code label

1. Calculated shelf life in sealed bag:12 months at < 40 ℃ and < 90%
   relative humidity (RH)
2. Peak package body temperature: _____260_____ ℃
                                    If Blank, see adjacent bar code label
3. After bag is opened.devices that will be subjected to reflow solder
   or other high temperature process must
   a) Mounted within: _____168_____ hours of factory
              If Blank, see adjacent bar code label
conditions ≤ 30 ℃ / 60 %
   b) stored at < 10%RH
4. Devices require bake, before mounting, if :
   a) Humidity Indicator Card is > 10 %when read at 23 ± 5 ℃
   b) 3a or 3b not met.
5. If baking is required, devices may be baked for 48 hours at 125 ± 5 ℃
Note: If device containers cannot be subjected to high temperature
or shorter bake times are desired,
         reference IPC /JEDEC J-STQ-033 for bake procedure

Bag Seal Date: _____ .
              If Blank,see adjacent bar code label
Note:Level and body temperature defined by IPC /JEDEC J-STQ-020

The module Must go through 125℃ baking for at least 9 hours before SMT AND IR reflow process!

若拆封后未立即上线，天嘉润科技建议让下次上线前务必以 **125℃**烘烤 **9** 小时以上！

Record of Changes

Data	Revision	Description
2019-06-04	V1.0	Original publication of this document.

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Record of Changes

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