WLT2564M module manual

TI CC2564 BR/EDR/LE

MVsilicon BM5064

Spec

V2.0

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1 Summary

WLT2564M is a dual mode Bluetooth module with embedded Bluetopia™ protocol stack, support for all Bluetooth profiles and BLE profiles.

WLT2564M is based on TI CC2564. It is a Bluetooth BR/EDR/BLE single chip solution. CC2564 has best-in-class RF performance (TX power, RX sensitivity, blocking) and advanced power management for very low-power applications.

WLT2564M has a high efficiency audio SOC inside. It is BM5064 from MVSilicon which integrates ARM Cortex-M3 MCU, Bluetooth stack, MP3/WMA decoder, MP2 encoder, OTG, SD/MMC card controller, Audio DAC, Audio ADC, RTC in a single chip.

1.1 Functions

Bluetooth BR/EDR/LE
Support all Bluetooth profiles, such as SPP, SPPLE, HFP, MAP, PXP, A2DP, ANP, HID, AVRCP…
Embedded ARM Cortex-M3, running @ 96MHz
Built-in 128K byte SRAM
Support booting from SPI-flash and the firmware can be updated through SD or USB disk
Built-in MP2/MP3/WMA/FLAC(8/16/24bit)/WAV(IMA-ADPCM and raw PCM) decoder and MP2 encoder
Embedded 20-bit Audio DAC and 16-bit Audio ADC
Built-in Capless Earphone driver
Built-in MIC amplify block with AGC
Support audio input
Onboard 2.4GHz antenna， support external antenna optional
Support AT+Command Set for Configuration
Single power supply: 3.35V~4.2V
Smallest size: 18x35mm
Flexible Software Platform, customized software service

1.2 Application Field

Bluetooth Speaker
True wireless stereo Audio system
Bluetooth handsfree
Fitness
Wireless POS
Portable printer

2 Electrical characters

2.1 Basic characters

Absolute Maximum Ratings	Min	Max	Unit
Power supply Voltage (LDOIN)	–0.5	+5.5	V
Voltage of I/O pins	–0.5	+3.6	V
Storage Temperature	–55	+125	°C

Table 1. Absolute Maximum Ratings

Recommended Operating Conditions	Min	TYP	Max	Unit
Power supply Voltage (LDOIN)	3.35		4.2	V
Voltage of I/O pins	3.0	3.3	3.6	V
Operating Temperature	-30	25	75	°C

Table 2. Recommend Working Condition

Wireless Standard	Bluetooth BR/EDR/LE	
Frequency	2.402GHz～2.480GHz	
Max TX power	9dBm	
Antenna		
	internal：ceramic antenna	High gain as external antenna

Table 3. Bluetooth features

I/O pins	Test Conditions	Min	Max	Unit
Logic input low, V_{IL}		0	0.75	V
Logic input high, V_{IH}		2.1	3.6	V
Logic output low, V_{OL}	6mA	0	0.6	V
Logic output high, V_{OH}	6mA	2.7	3.3	V

Table 4. DC Characteristics of I/O pins

3 power supply

3.1 module power supply

Power supply input pin 20 (LDO_IN); pin 21 (POWER_ON) to enable the power, this feature temporarily can not be used, need to be pulled high; supply voltage range of 3.35 ~ 4.2V, Recommended bypass capacitor 10uF, 0.1uF combination filter (if you use the audio function, power supply program see the next section). Pin 10,18,22,26,40,47,48 are the module's "ground", where pin 10 is analog audio ground, directly with the "ground" when not using audio. WLT2564M module pin 13 (3.3V), 45 (3.3V) 3.3V output pin for the module (external power supply can not be cut from the external power supply), you can use this output power to do some simple pull-up, Drive LED indicator. This power supply output current is only 100mA, not as a high-power device power supply

3.2 The use of audio power supply

WLT2564M module with audio playback, voice calls and other functions;

Due to the working mechanism of Bluetooth, will cause the supply current fluctuations, if you need to use the audio function, the need to minimize the impact of power supply ripple; module power supply is recommended to do the following.

1. The module power supply and audio amplification circuit separate power supply.
2. Power supply "RC" filter after the supply module, the power supply circuit in series resistance of 10 ohm resistor, the resistance power should be greater than 0.1W.

4 module placement and clearance area

WLT2564M for the RF module, its layout in the PCB layout and copper routing will affect its RF performance, the following specific details of several cases.

4.1 Description of placement

Module placement can be roughly divided into the following three cases

1 "placed in the PCB board corner, in this case, the module antenna on both sides without obstacles, the best performance.

2 "placed in the PCB board edge, in which case, the module antenna unilateral obstacle, better performance.

3 "placed inside the PCB board, in which case, there are obstacles around the module antenna, RF performance is poor,

Will affect its communication distance and communication speed.

4.2 on the clearance area instructions

WLT2564M module antenna to be done below the clearance area, the clearance area should not have any layer of copper and traces, there should not be copper stud screws and other metal objects.

1 "Clearance area should not have any metal objects, the module from the headroom edge should be greater than 10mm, if the board edge of the device, the board edge all the better as a clearance area,

If the clearance area under the hollow, that is removed under the clearance area FR4 sheet performance better.

2 "According to the use of the environment, if the module antenna part of the probe out of the PCB board, the better.

5 Use audio precautions

Use of audio features (including music playback and voice calls) on the module performance requirements are higher. Use the following issues need attention. Power supply on the second chapter has been introduced, not to emphasize here.

5.1 on the sub-"land"

WLT2564M analog module will be separated out, the user should try to use the audio function to separate analog to help improve sound quality

5.2 Used by MIC_IN

WLT2564M module supports MIC IN, for voice calls and audio pickup, the use of MIC_IN when the microphone or the microphone to the ground and the analog module (AGND) connected.

MIC_IN pickup amplitude is 50mV, when used directly to the microphone output and MIC_IN connected, must not be amplified microphone signal input to the MIC_IN.

5.3 LINE_OUT

WLT2564M module LIN OUT interface can drive headphones or external power amplifier to supply speakers. Can drive 32 European headphones, the maximum output power of 20mW.

Audio signal lines need to "land" package, to prevent external interference, avoid parallel wiring with the power cord.

6 PCB Design

6.1 Label

WLT2564M module FCC ID:2AKDB-WLT2564M ,please refer the below :

PRODUCT: Buletooth module
MODEL: WLT2564M
FCC ID:2AKDB-WLT2564M
IC :22145-WLT2564M

Figure 4. Label

6.2 Example Board Layout

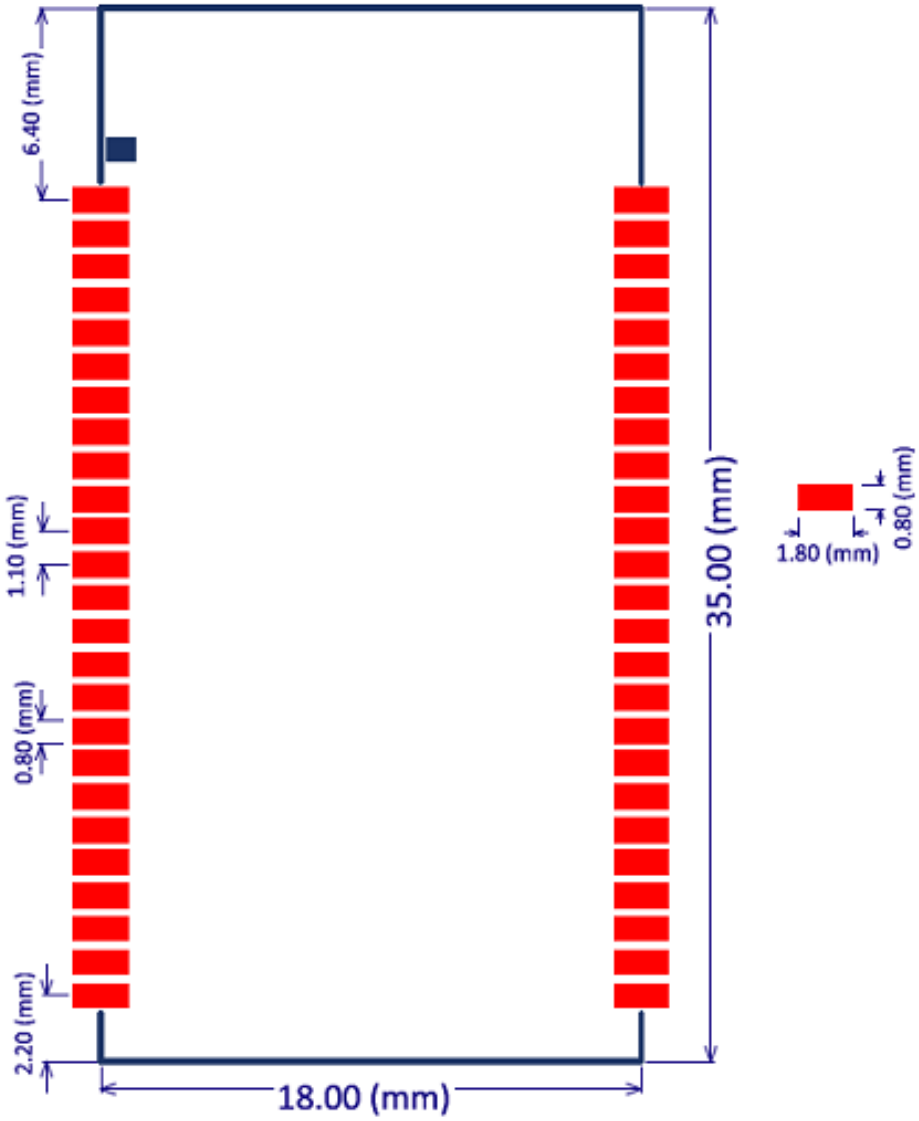

Figure 5. Footprint dimensions

6.3 PCB Layout Guide

Bluetooth works in a frequency of 2.4GHz, the design of PCB and Mechanical should be careful to avoid the impact of various factors on the RF performance. Please note the following:

1. Outer casing surrounding WLT2564M module should avoid using metal materials. If the casing is metal, it is recommended to use an external 2.4GHz antenna.
2. Metal screws should be far away from RF part of module.
3. Module should be placed on the edge of motherboard, ensure the antenna towards outside. Please make sure that all layers have no trace or copper under the Antenna region.

7 FCC Warning:

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

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.

The modular transmitter must be equipped with either a permanently affixed label or must be capable of electronically displaying its FCC identification number：
If using a permanently affixed label, the modular transmitter must be labeled with its own FCC identification number. and, 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:2AKDB-WLT2564M.” Any similar wording that expresses the same meaning may be used. The Grantee may either provide such a label, an example of which must be included in the application for equipment authorization, or, must provide adequate instructions along with the module which explain this requirement. In the latter case, a copy of these instructions must be included in the application for equipment authorization.

FCC Radiation Exposure Statement:

To satisfy FCC RF Exposure requirements for this transmission devices, a separation distance of 20cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operation at closer than this distance is not recommended. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

8 ISED RSS Warning:

This device complies with Innovation,Science and Economic Development Canada licence-exempt RSS standard(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'ISED applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

ISED RF exposure statement :

This equipment complies with ISED 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.

Cet équipement est conforme aux ISED RF limites d'exposition aux radiations dans un environnement non contrôlé. Cet émetteur ne doit pas être situé ou opérant en conjonction avec une autre antenne ou émetteur.