

RG-BT10-04 型近距离蓝牙模块

一、概述

基于 Class 2 功率等级的 RG-BT10-04 型近距离蓝牙模块，采用了世界上领先的蓝牙芯片供应商 CSR（Cambridge Silicon Radio）公司的 BlueCore4-External 蓝牙芯片，完全遵循 Bluetooth V2.0 + EDR 蓝牙规范。具有全速 USB 和 UART 主设备接口，音频接口支持 I2S、PCM 及 SPDIF 协议。RG-BT10-04 型近距离蓝牙模块是深圳市红果电子有限公司专业打造的 Class 2 蓝牙精品，充分展示了公司在高频 PCB 板设计、防 EMI 电磁辐射及射频微带天线阻抗控制领域的技术成果。本模块具有收发灵敏性高、低成本、体积小、功耗低等优点。在无遮挡的情况下，同功率等级的模块点对点传输距离可达 10 米。



二、特征

- A single chip radio and baseband IC for Bluetooth 2.4GHz
- Fully Qualified Bluetooth v2.0+EDR, Enhanced Data Rate (EDR) compliant with v2.0.E.2 of specification for both 2Mbps and 3Mbps modulation modes.
- Integrated 15-bit Linear 8KHz Sample Frequency Audio CODEC in one chip
- Full Speed Bluetooth Operation with Full Piconet
- Standard HCI(UART or USB)
- Multi-configurable I2S, PCM or SPDIF Interface
- Support for 802.11 Co-Existence
- UART interface with programmable baud rate, Maximum baud rate: 3686400bps
- Scatternet Support
- RoHS Compliant
- 工业级设计
- 安全认证、数据加密
- 内置 PCB 射频天线
- 支持 DFU 软件升级
- 支持连接 7 个从设备
- 支持 USB 和 UART 接口
- 支持 SPI 编程接口
- 支持 PCM 音频输入、输出接口
- 低电压电源，2.7V to 3.6V
- 内置 8Mbit Flash
- 同功率等级点对点传输距离可达 10 多米
- 支持低功耗模式: Park, Sniff, Hold 和 Deep Sleep
- 支持 A2DP、AVRCP、PBAP、DUN、FTP、HF1.5、HID、OPP、PAN、SPP 等多种蓝牙应用规范。

地址：深圳市龙岗区龙城街道爱联社区爱联锦秀村五巷 10 号 1 楼 电话：0755-89728163；13392443131

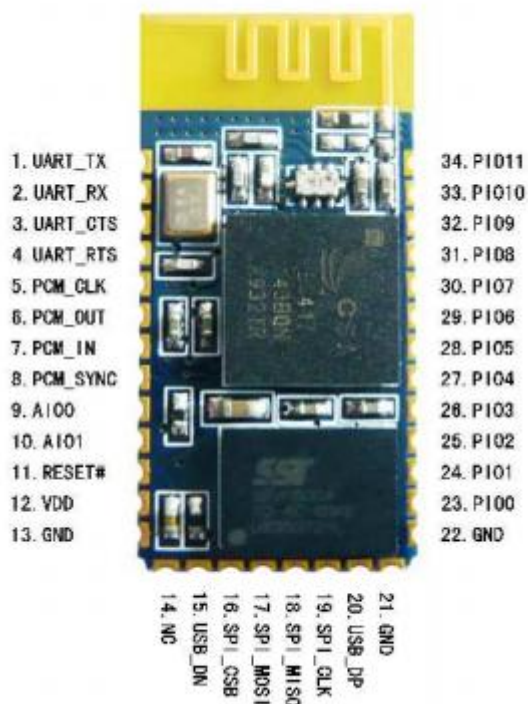
E-mail: redgoo@163.com QQ: 827212011; 1529670393

网址: www.redgoo.com.cn; <http://ldy13823370089.cn.alibaba.com>

三、 应用领域

- 医疗设备数据采集与传输
- 蓝牙投影设备
- 蓝牙无线数据传输
- 蓝牙无线工业控制
- 蓝牙 RS232/485 转接
- 电脑部件 (CF 卡, USB 适配器, PCMCIA, RS232 适配器等)
- 局域网接入点和/或拨号网络
- 蓝牙话筒、蓝牙音响、蓝牙音频网关
- 蓝牙耳机、手持设备
- 蓝牙鼠标、蓝牙键盘
- 蓝牙操纵杆、蓝牙游戏手柄
- 蓝牙打印机
- 蓝牙遥控玩具
- 蓝牙 GPS 导航
- 蓝牙车载免提
- 蓝牙无线仪器仪表
- ...

四、 管脚分布

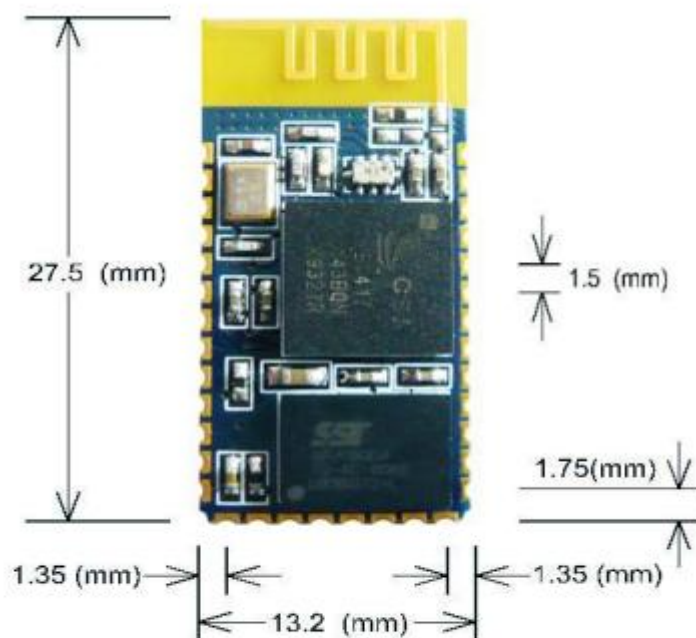


五、管脚描述

管脚序号	名称	类型	描述
1	UART_TX	CMOS output Tri-stable with weak internal pull-up	UART Data output
2	UART_RX	CMOS input with weak internal pull-down	UART Data input
3	UART_CTS	CMOS input with weak internal pull-down	UART clear to send, active low
4	UART_RTS	CMOS output, tri-stable with weak internal pull-up	UART request to send, active low
5	PCM_CLK	Bi-Directional	PCM data clock
6	PCM_OUT	CMOS output	PCM data output
7	PCM_IN	CMOS Input	PCM data input
8	PCM_SYNC	Bi-Directional	PCM data strobe
9	AI00	Bi-Directional	Analogue / programmable input/output line
10	AI01	Bi-Directional	Analogue / programmable input/output line
11	RESET#	CMOS input with weak internal pull-up	internal pull-up Reset if low. Input debounced so must be low for >5ms to cause a reset
12	VDD	3.3V	3.3V (+) supply with On-chip Input within 3.0~3.3V
13	GND	VSS	Ground
14	NC	—	Leave unconnected
15	USB_DN	Bi-Directional	USB data minus
16	SPI_CSB	CMOS input with weak internal pull-up	Chip select for serial peripheral interface, active low
17	SPI_MOSI	CMOS input with weak internal pull-down	Serial peripheral interface data input
18	SPI_MISO	CMOS input with weak internal pull-down	Serial peripheral interface data Output
19	SPI_CLK	CMOS input with weak internal pull-down	Serial peripheral interface clock

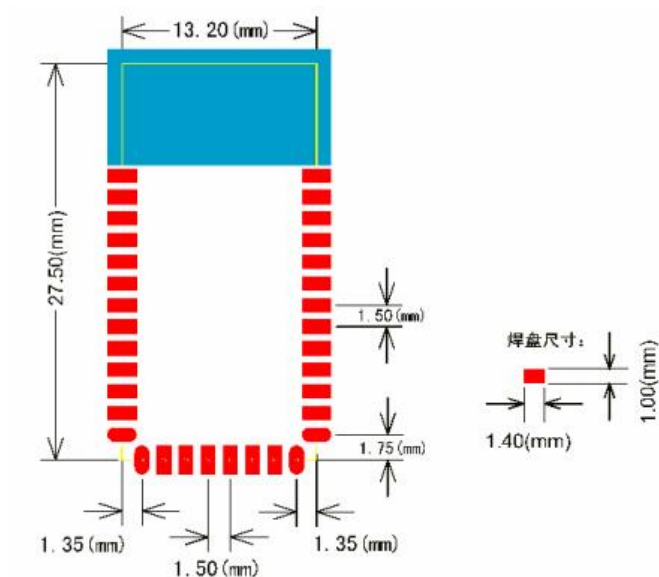
20	USB_DP	Bi -Di recti onal	USB data plus with selectable internal 1.5k pull-up resistor
21	GND	VSS	Ground pot
22	GND	VSS	Ground pot
23	PI00	Bi -Di recti onal RX EN	Programmable input/output line, control output for LNA(if fitted)
24	PI01	Bi -Di recti onal TX EN	Programmable input/output line, control output for PA(if fitted)
25	PI02	Bi -Di recti onal	Programmable input/output line
26	PI03	Bi -Di recti onal	Programmable input/output line
27	PI04	Bi -Di recti onal	Programmable input/output line
28	PI05	Bi -Di recti onal	Programmable input/output line
29	PI06	Bi -Di recti onal	Programmable input/output line
30	PI07	Bi -Di recti onal	Programmable input/output line
31	PI08	Bi -Di recti onal	Programmable input/output line
32	PI09	Bi -Di recti onal	Programmable input/output line
33	PI010	Bi -Di recti onal	Programmable input/output line
34	PI011	Bi -Di recti onal	Programmable input/output line

六、外型尺寸



(模块厚度: 2mm)

七、PCB 封装



警示：蓝牙模组粘贴区域内 PCB 顶层尽量不要走线或铺铜(建议加铺丝印油)；模组底部射频测试点区域 PCB 顶层严禁走线或铺铜；天线区域(蓝色标示区域)应尽可能远离金属物，PCB 板各层不得在此区域走线、铺铜，电源层和电源参考层也不得穿过此区域。通常将蓝牙模块天线部位靠近 PCB 板边缘安放，PCB 板天线区域开槽。

八、电气特性

1、最大绝对额定值：

项目	最小	最大	单位
存储温度	-40	+150	℃
电流峰值	0	70	mA
电源电压 (VDD)	-0.4	3.7	V
其它端口电压	VSS-0.4	VDD+0.4	V

2、推荐使用条件：

操作条件	最小	正常	最大	单位
工作温度	-40	25	+80	℃
RF性能保证温度	-40	25	+80	℃
电源电压 (VDD)	3.0	3.3	3.6	V

3、输入/输出端口特性（数字）

数字端口	最小	典型	最大	单位
Input Voltage Levels				
V _{IL} input logic level low	-0.4	-	+0.8	V
V _{IH} input logic level high	0.7VDD	-	VDD+0.4	V
Output Voltage Levels				
V _{OL} output logic level low, (I _o = 4.0mA)	-	-	0.2	V
V _{OH} output logic level high, (I _o = -4.0mA)	VDD-0.2	-	-	V
Input and Tri-state Current with				
Strong pull-up	-100	-40	-10	μA
Strong pull-down	+10	+40	+100	μA
Weak pull-up	-5.0	-1.0	-0.2	μA
Weak pull-down	+0.2	+1.0	+5.0	μA
I/O pad leakage current	-1	0	+1	μA
C _I Input Capacitance	1.0	-	5.0	pF

4、输入/输出端口特性（USB）

USB端口	最小	典型	最大	单位
VDD_USB for correct USB operation (VDD_USB equal to VDD)	3.1		3.6	V
Input Threshold				
V _{IL} input logic level low	-	-	0.3VDD_USB	V
V _{IH} input logic level high	0.7VDD_USB	-	-	V
Input Leakage Current				
VSS_PADS < VIN < VDD_USB ^(a) (VSS_PADS equal to VDD)	-1	1	5	μA
C _I Input capacitance	2.5	-	10.0	pF
Output Voltage Levels to Correctly Terminated USB Cable				
V _{OL} output logic level low	0.0	-	0.2	V
V _{OH} output logic level high	2.8	-	VDD_USB	V

(a) Internal USB pull-up disabled

5、输入/输出端口特性 (Auxiliary ADC)

Auxiliary ADC		最小	典型	最大	单位
Resolution(a)		-	-	8	Bits
Input voltage range (LSB size = VDD_ANA/255)		0	-	VDD_ANA	V
Accuracy (Guaranteed monotonic)	INL	-1	-	1	LSB
	DNL	0	-	1	LSB
Offset		-1	-	1	LSB
Gain Error		-0.8	-	0.8	%
Input Bandwidth		-	100	-	kHz
Conversion time		-	2.5	-	s
Sample rate(b)		-	-	700	Samples/s

(a) VDD_ANA = +1.8V (Internal voltage regulation)

(b) ADC is accessed through the VM function. The sample rate given is achieved as part of this function

6、功耗

操作模式	连接类型	串口波特率 (kbps)	平均	单位
Page scan	-	115.2	0.42	mA
Inquiry and page scan	-	115.2	0.76	mA
ACL No traffic	Master	115.2	4.60	mA
ACL With file transfer	Master	115.2	10.3	mA
ACL No traffic	Slave	115.2	17.0	mA
ACL With file transfer	Slave	115.2	24.7	mA
ACL 40ms sniff	Master	38.4	2.40	mA
ACL 1.28s sniff	Master	38.4	0.37	mA
SCO HV1	Master	38.4	39.2	mA
SCO HV3	Master	38.4	20.3	mA
SCO HV3 30ms sniff	Master	38.4	19.8	mA
ACL 40ms sniff	Slave	38.4	2.11	mA
ACL 1.28s sniff	Slave	38.4	0.42	mA
Parked 1.28s beacon	Slave	38.4	0.20	mA
SCO HV1	Slave	38.4	39.1	mA
SCO HV3	Slave	38.4	24.8	mA
SCO HV3 30ms sniff	Slave	38.4	19.0	mA
Standby Host connection(a)	-	38.4	40	μA
Reset (RESETB low)(a)	-	-	34	μA

(a) Low power mode on the linear regulator is entered and exited automatically when the chip enters/leaves Deep Sleep mode.

7、典型峰值电流

Typical Peak Current Temperature = +20°C	
Device Activity/State	Current (m A)
Peak current during cold boot	57.9
Peak TX current Master	51.5
Peak RX current Master	39.0
Peak TX current Slave	52.0
Peak RX current Slave	45.5
Test Conditions	
Firmware	HCI 19.2
VDD	3.15V
Host Interface	UART
Baud rate	115200
Clock source	26MHz crystal
Output power	0dBm

九、射频特性

1、Transmitter - Basic Data Rate

Radio Characteristics Temperature = +20°C					
	Min	Typ	Max	Bluetooth Specification	Unit
Maximum RF transmit power ⁽¹⁾⁽²⁾	-	2.5	-	-6 to +4 ⁽³⁾	dBm
Variation in RF power over temperature range with compensation enabled (\pm) ⁽⁴⁾	-	1.5	-	-	dB
Variation in RF power over temperature range with compensation disabled (\pm) ⁽⁴⁾	-	2	-	-	dB
RF power control range	-	35	-	≥ 1	dB
RF power range control resolution ⁽⁵⁾	-	0.5	-	-	dB

Notes:

- (1) BlueCore4 firmware maintains the transmit power to be within the Bluetooth v2.0 + EDR specification limits.
- (2) Measurement made using a PSKEY_LC_MAX_TX_POWER setting corresponds to a PSKEY_LC_POWER_TABLE power table entry of 63.
- (3) Class 2 RF transmit power range, Bluetooth v2.0 + EDR specification.
- (4) To some extent these parameters are dependent on the matching circuit used, and its behaviour over temperature. Therefore these parameters may be beyond CSR's direct control.
- (5) Resolution guaranteed over the range -5dB to -25dB relative to maximum power for TX Level >20.

2、Transmitter - Enhanced Data Rate

Radio Characteristics Temperature = +20°C					
	Min	Typ	Max	Bluetooth Specification	Unit
Maximum RF transmit power ⁽¹⁾	-	1.5	-	-6 to +4 ⁽²⁾	dBm
EDR Differential Phase Encoding	-	No errors	-	≥99	%

Notes:

- (1) BlueCore4-External firmware maintains the transmit power to be within the Bluetooth v2.0 + EDR Specification limits.
- (2) Class 2 RF transmit power range, Bluetooth v2.0 + EDR specification.

3、Receiver – Basic Data Rate

Radio Characteristics Temperature = +20°C						
	Frequency (GHz)	Min	Typ	Max	Bluetooth Specification	Unit
Sensitivity at 0.1% BER for all packet types	2.402	-	-84	-	≤-70	dBm
	2.441	-	-84	-		
	2.480	-	-85	-		
Maximum received signal at 0.1% BER		-	10	-	≥-20	dBm

4、Receiver –Enhanced Data Rate

Radio Characteristics Temperature = +20°C						
	Modulation	Min	Typ	Max	Bluetooth Specification	Unit
Sensitivity at 0.01% BER ⁽¹⁾	π/4 DQPSK	-	-87	-	≤-70	dBm
	8DPSK	-	-78	-	≤-70	dBm
Maximum received signal at 0.1% BER ⁽¹⁾	π/4 DQPSK	-	-8	-	≥-20	dBm
	8DPSK	-	-10	-	≥-20	dBm

(1) Measurements methods are in accordance with the EDR RF Test Specification v2.0.E.2