

IEEE 802.11 b/g/n 1T/1R+BLE 5.0 无线模组

型号: AM-03-GSD630
(TG6210A)

客户认可 Custom Approval Section		
客户名称		
部门		
批准		时间:

拟制 DESIGN	审核 CHECK	批准 APPROVAL

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文件修订历史

版本	日期	作者	变更描述
V1.0	2022-04-19		Draft
V1.1	2022-05-31		更新模组图片

1. 概述

本文档旨在明确 802.11b/g/n 和 BLE5.0 1T1R AIOT 音频模块的产品要求。它基于符合 IEEE 802.11n 标准的 TG6210A 低功耗芯片组，并在 2.4~2.5GHz 范围内符合 IEEE 802.11b/g 标准。支持 802.11n 的所有数据速率，包括 MCS0 到 MCS7。

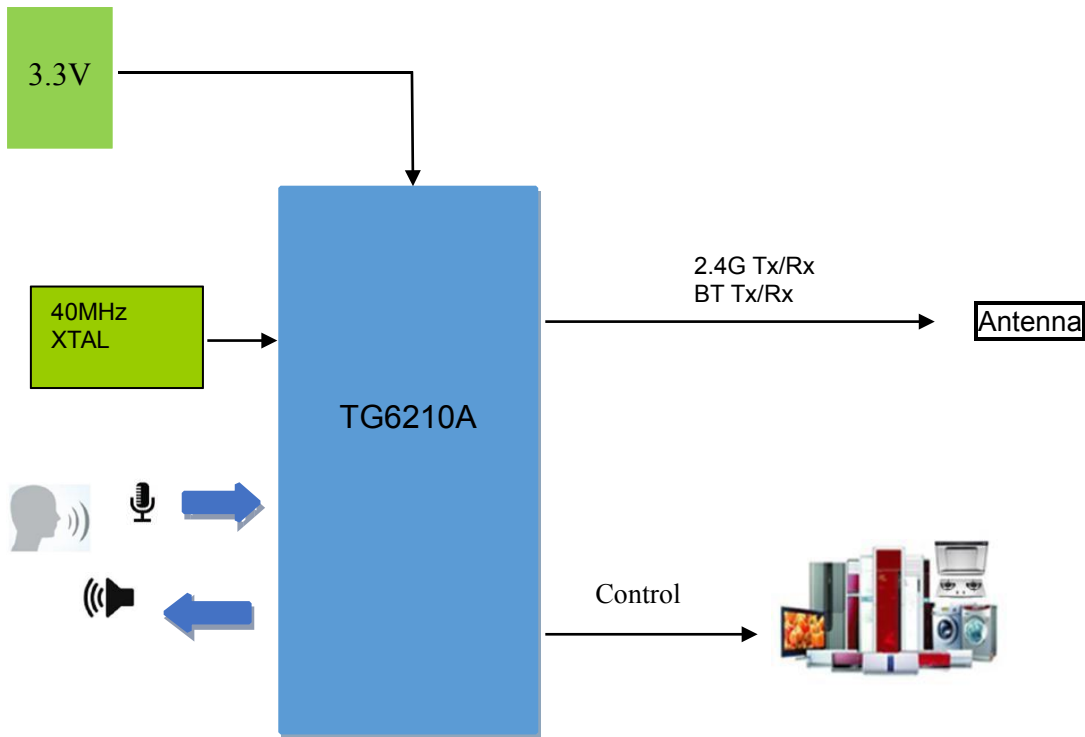
TG6210A 是一款高度集成的 AIoT 芯片组，具有 Wi-Fi/BLE、多核 CPU、音频编解码器和用于高性能和低功耗应用的 AI 硬件加速器。无线子系统包括 2.4g 无线、Wi-Fi 802.11b/G/N、BLE5.0 基带/MAC 设计。微控制器子系统包含一个多核 RISC-V CPU，带有浮点单元、矢量单元、缓存、DMA 和用于无线通信和音频芯片控制的内存。多媒体子系统包括音频编码、解码器和显示接口。电源管理单元控制低功耗模式。此外，还支持各种安全特性。外设接口包括 USB2.0、以太网、SD/MMC、SF_Ctrl、SPI、UART、I2C、I2S、PDM、PWM、GPDAC/GPADC、ACOMP、PIR、IR Remote、GPIO 等。支持灵活的 GPIO 配置，TG6210A 最多可配置 27 个 GPIO。

2. 特征

- 支持 IEEE 802.11b/g/n+BLE5.0
- 支持所有 802.11g 的数据速率，包括 6、9、12、18、24、36、48 和 54Mbps
- 支持短 GI 和 802.11n 的所有数据速率，包括 MCS0 ~ MCS7
- 支持多云连接
- 支持 STA、Soft AP、Sniffer 模式
- 支持加密协议:WPS/WEP/WPA/WPA2 个人/WPA2 企业/WPA3
- 支持 WiFi 和 BT 共存
- 嵌入式 4MB PSRAM 和 8MB 闪存
- 丰富的外设，如 SPI, UART, I2C, IR Remote, PWM, ADC, DAC, PIR 和 GPIO
- 符合 HSF

3. 应用

3.1 功能框图



3.2 性能要求

3.2.1 IEEE 802.11b Section

	Feature	Detailed Description
3.2.1.1	Standard	<ul style="list-style-type: none"> IEEE 802.11b
3.2.1.2	Radio and Modulation Schemes	<ul style="list-style-type: none"> DQPSK , DBPSK and CCK with DSSS
3.2.1.3	Operating Frequency	<ul style="list-style-type: none"> 2400 ~ 2483.5MHz ISM band
3.2.1.4	Channel Numbers	<ul style="list-style-type: none"> 13 channels for Worldwide
3.2.1.5	Data Rate	<ul style="list-style-type: none"> at most 11Mbps
3.2.1.6	Media Access Protocol	<ul style="list-style-type: none"> CSMA/CA with ACK
3.2.1.7	Transmitter Output Power at Antenna Connector	<ul style="list-style-type: none"> Typical RF Output Power at each RF chain, and at room Temp. 25°C 16±2 dBm at 11Mbps
3.2.1.8	Receiver Sensitivity at Antenna Connector	<ul style="list-style-type: none"> Typical Sensitivity at each RF chain. @Frame (1000-byte PDUs) Error Rate<8% at room Temp 25°C -83 dBm for 11Mbps

3.2.2 IEEE 802.11g Section

	Feature	Detailed Description
3.2.2.1	Standard	<ul style="list-style-type: none"> IEEE 802.11g
3.2.2.2	Radio and Modulation Type	<ul style="list-style-type: none"> QPSK , BPSK , 16QAM ,64QAM with OFDM
3.2.2.3	Operating Frequency	<ul style="list-style-type: none"> 2400 ~ 2483.5MHz ISM band
3.2.2.4	Channel Numbers	<ul style="list-style-type: none"> 13 channels for Worldwide
3.2.2.5	Data Rate	<ul style="list-style-type: none"> at most 54Mbps
3.2.2.6	Media Access Protocol	<ul style="list-style-type: none"> CSMA/CA with ACK
3.2.2.7	Transmitter Output Power at Antenna Connector	<ul style="list-style-type: none"> Typical RF Output Power at each RF chain, at room Temp. 25°C 15±2 dBm at 54Mbps
3.2.2.8	Receiver Sensitivity at Antenna Connector	<ul style="list-style-type: none"> Typical Sensitivity at each RF chain. @Frame (1000-byte PDUs) Error Rate<10% at room Temp 25°C -71 dBm for 54Mbps

3.2.3 IEEE 802.11n Section

	Feature	Detailed Description
3.2.3.1	Standard	<ul style="list-style-type: none"> IEEE 802.11n
3.2.3.2	Radio and Modulation Type	<ul style="list-style-type: none"> BPSK , QPSK , 16QAM ,64QAM with OFDM
3.2.3.3	Operating Frequency	<ul style="list-style-type: none"> 2.4GHz :2400 ~ 2483.5MHz ISM band
3.2.3.4	Data Rate	<ul style="list-style-type: none"> at most 72.2 Mbps
3.2.3.5	Media Access Protocol	<ul style="list-style-type: none"> CSMA/CA with ACK
3.2.3.6	Transmitter Output Power at Antenna Connector	<ul style="list-style-type: none"> Typical RF Output Power at each RF chain, at room Temp 25°C
		<ul style="list-style-type: none"> 2.4GHz Band/HT20 15±2 dBm at MCS7
3.2.3.7	Receiver Sensitivity at Antenna Connector	<ul style="list-style-type: none"> Typical Sensitivity at each RF chain. @Frame (1000-byte PDUs) Error Rate=10% and at room Temp 25°C
		<ul style="list-style-type: none"> 2.4GHz Band/HT20 -68dBm at MCS7

3.2.4 Bluetooth Section

Feather		Description	
General specification			
Bluetooth standard	BluetoothLE V5.0		
Frequency band	2402MHz-2480MHz		
Channel Numbers	40 channels for BLE		
RF specification			
	Min (dBm)	Type (dBm)	Max (dBm)
BLE Output Power		6	
Sensitive @PER=30.8% FOR BLE		-90	

4. 电气性能

4.1 温度限制

参数	最低	最高	单位
储存温度	-40	+85	℃
环境工作温度	0	+70	℃

4.2 基本描述

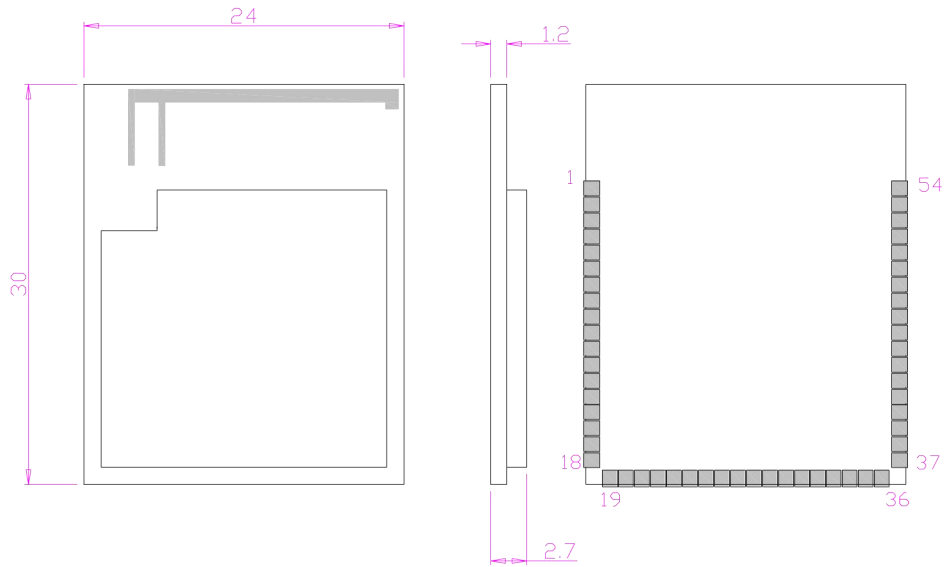
	类型	详细说明
4.2.1	天线类型	<ul style="list-style-type: none"> PCB 天线
4.2.2	工作电压	<ul style="list-style-type: none"> 3.3V±10%
4.2.3	工作电流	<ul style="list-style-type: none"> <100mA@RX <500mA@TX

4.3 模组尺寸

	类型	详细说明

4.3.1	长	● 30mm
4.3.2	宽	● 24mm
4.3.3	高	● 1.2mm (PCB)

5. 机械尺寸



尺寸误差范围:

DIM (MM)	Tolerance (MM)
0-5	±0.15
5-10	±0.20
10-50	±0.30

6. Pin 脚定义

Pin	Name	Description	IO Type
1	GND	Ground connections	G
2	CHIP_EN	Chip enable pin (active low)	I/O
3	GPIO41	XTAL32K_OUT/ GPIO41	I/O
4	GPIO40	XTAL32K_IN/ GPIO40	I/O

产品规格书

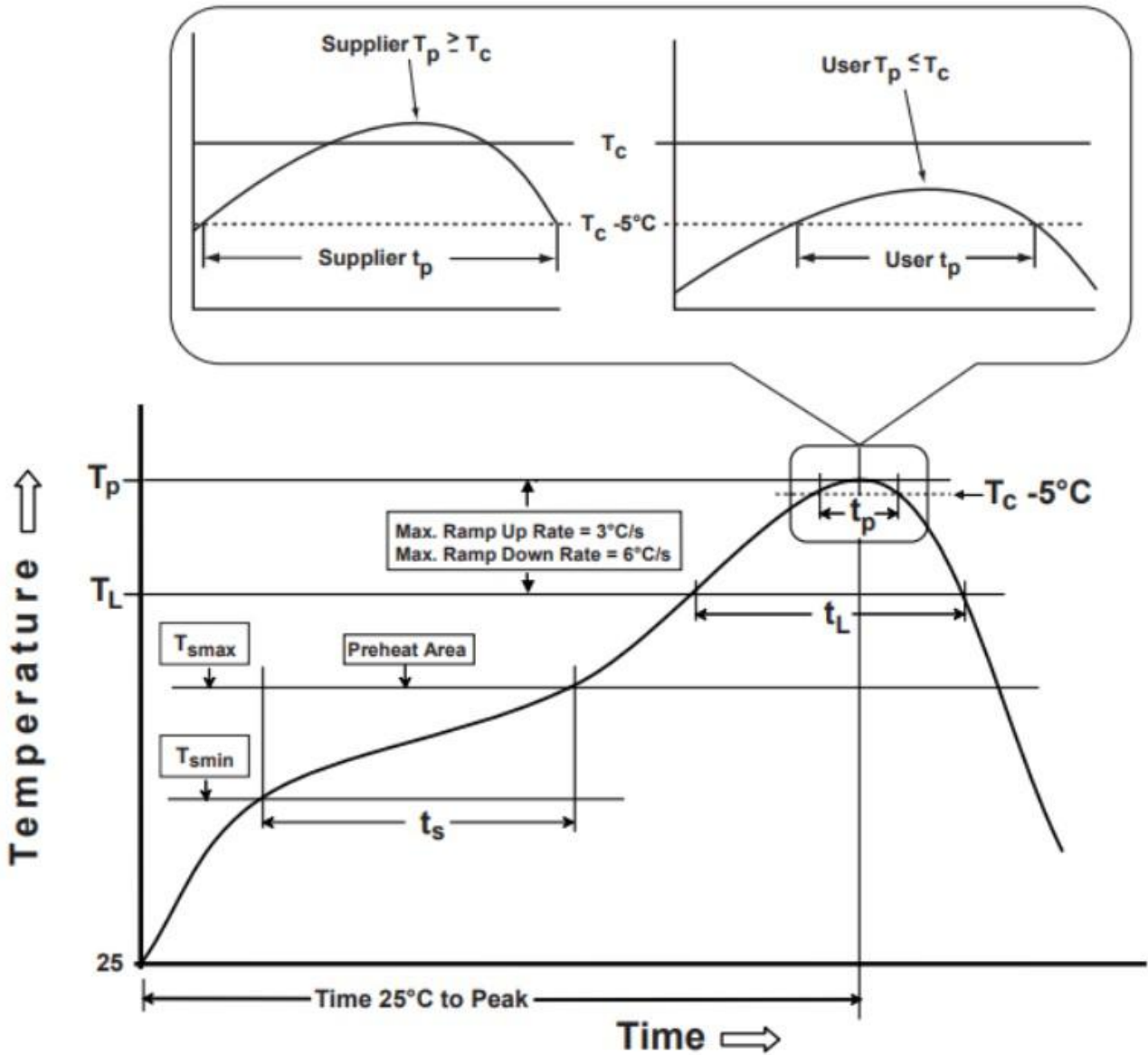
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5	GPIO11	GPIO11	I/O
6	GPIO12	GPIO12	I/O
7	GND	Ground connections	G
8	AVDD33_CODEC	Power supply. 3.3V is required	P
9	MIC_1P	MIC1+ of microphone	I
10	MIC_1N	MIC1- of microphone	I

11	MIC_2P	MIC2+ of microphone	I
12	MIC_2N	MIC2- of microphone	I
13	MICBIAS	Microphone bias voltage	P
14	GND	Ground connections	G
15	MIC_3P	MIC3+ of microphone	I
16	MIC_3N	MIC3- of microphone	I
17	LINEOUT_1P	SPK1+ of speaker	O
18	LINEOUT_1N	SPK1- of speaker	O
19	LINEOUT_2P	SPK2+ of speaker	O
20	LINEOUT_2N	SPK2- of speaker	O
21	GPIO16	GPIO16	I/O
22	GPIO17	GPIO17	I/O
23	GPIO18	GPIO18	I/O
24	GPIO19	GPIO19	I/O
25	GPIO20	GPIO20	I/O
26	GPIO21	GPIO21	I/O
27	VDDIO3	Power supply. 3.3V is required	P
28	GND	Ground connections	G
29	GPIO24	GPIO24	I/O
30	GPIO25	GPIO25	I/O
31	GPIO26	GPIO26	I/O
32	GPIO27	GPIO27	I/O
33	GPIO28	GPIO28	I/O
34	GND	Ground connections	G
35	VDDIO4	Power supply. 3.3V is required	P
36	GPIO36	GPIO36	I/O
37	GPIO38	GPIO38	I/O
38	GPIO37	GPIO37	I/O
39	GPIO34	GPIO34	I/O
40	GPIO35	GPIO35	I/O
41	BOOT_TRAP	The Bootstrap pin	I

42	AVDD33_AON	Power supply. 3.3V is required	P
43	GND	Ground connections	G
44	USB_DP	USB_DP	I/O
45	USB_DN	USB_DN	I/O
46	GND	Ground connections	G
47	VDDIO1	Power supply. 3.3V is required	P
48	GPIO0	GPIO0	I/O
49	GPIO1	GPIO1	I/O
50	GPIO2	GPIO2	I/O
51	GPIO3	GPIO3	I/O
52	GPIO4	GPIO4	I/O
53	GPIO5	GPIO5	I/O
54	GND	Ground connections	G

7. 推荐炉温



参考 IPC/JEDEC 标准。峰值温度: $245 \pm 5^\circ\text{C}$ 次数: $\leq 2\text{s}$

附件 1：关键材料清单

	名称	厂家	使用状态
1	集成电路	平头哥	在用
2	贴片电容	村田/太诱/华新科	在用
3	贴片电感	村田/奇立新	在用
4	贴片电阻	国巨/大毅/华新科/旺诠	在用
5	贴片晶振	加高/晶宝时频/TXC/晶威特/长兴	在用
6	功率电感	奇立新/佳邦	在用
7	印制板	富智祥/科翔/宝信欣旺/生溢快捷	在用

附件 2 : 模组图片

