



蓝牙模块 F-3288-35 使用说明书

一、产品概述：

F-3288-35 蓝牙模块为本公司自主开发的智能型无线音频数据传输产品，是低成本的高效率的立体声无线传输方案，模块采用了 CSR8635 芯片为模块提供了高品质的音质和兼容性，整体性能更优化。F-3288-35 蓝牙模块采用免驱动方式，客户只需要把模块接入应用产品，就可以快捷地实现音乐的无线传输，享受无线音乐的乐趣。

二、应用领域：

该模块主要用于短距离的音乐传输，可以方便地和笔记本电脑，手机，PDA 等数码产品的蓝牙设备相连，实现音乐的无线传输。

- ※ 蓝牙音响
- ※ 蓝牙立体声耳机
- ※ 免提电话
- ※ 蓝牙无线传输音频

三、基本特性：

Bluetooth Profiles

- ※ Bluetooth v4.0 specification support
- ※ HFP v1.6 wideband speech (HD voice ready)
- ※ HSP v1.2
- ※ A2DP v1.2
- ※ AVRCP v1.4
- ※ Support for smartphone applications (apps)

Improved Audio Quality

CSR' s latest 1-mic CVC audio enhancements for narrowband and wideband connections including:

- ※ 1-mic far-end audio enhancements
- ※ Near-end audio enhancements (noise suppression and AEQ)
- ※ Wind noise reduction
- ※ Packet loss concealment
- ※ Bit error concealment
- ※ Automatic gain control and automatic volume control
- ※ Frequency expansion for improved speech intelligibility
- ※ mSBC codec support for wideband speech

Music Enhancements

- ※ Configurable 5-band EQ for music playback (rock, pop, classical, jazz, dance etc)
- ※ SBC, MP3, AAC and Faststream decoder
- ※ Stereo widening (S3D)
- ※ Volume Boost Additional Functionality Additional Functionality
- ※ Support for voice recognition
- ※ Support for multi-language programmable audio prompts
- ※ CSR's proximity pairing and CSR's proximity connection

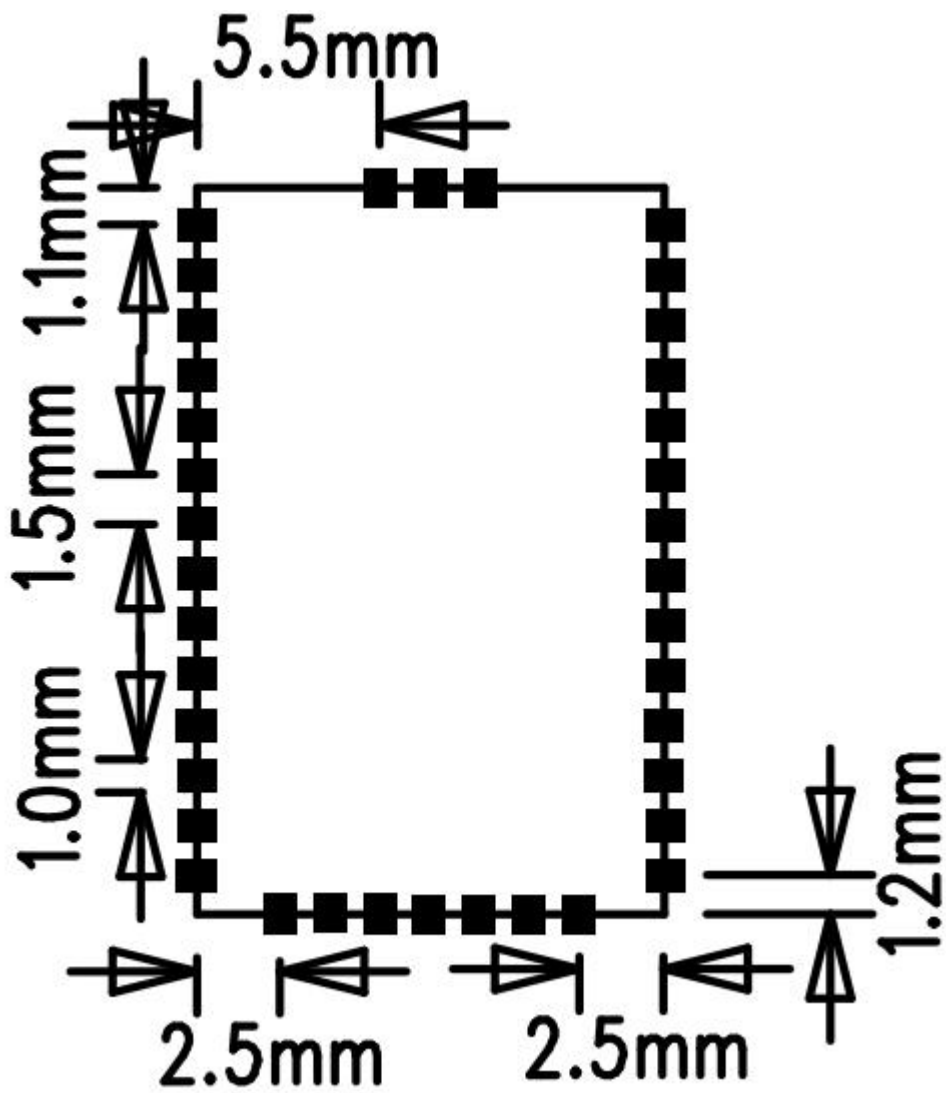


- ※ Multipoint support for HFP connection to 2 handsets for voice
- ※ Multipoint support for A2DP connection to 2 A2DP sources for music playback
- ※ Talk-time extension

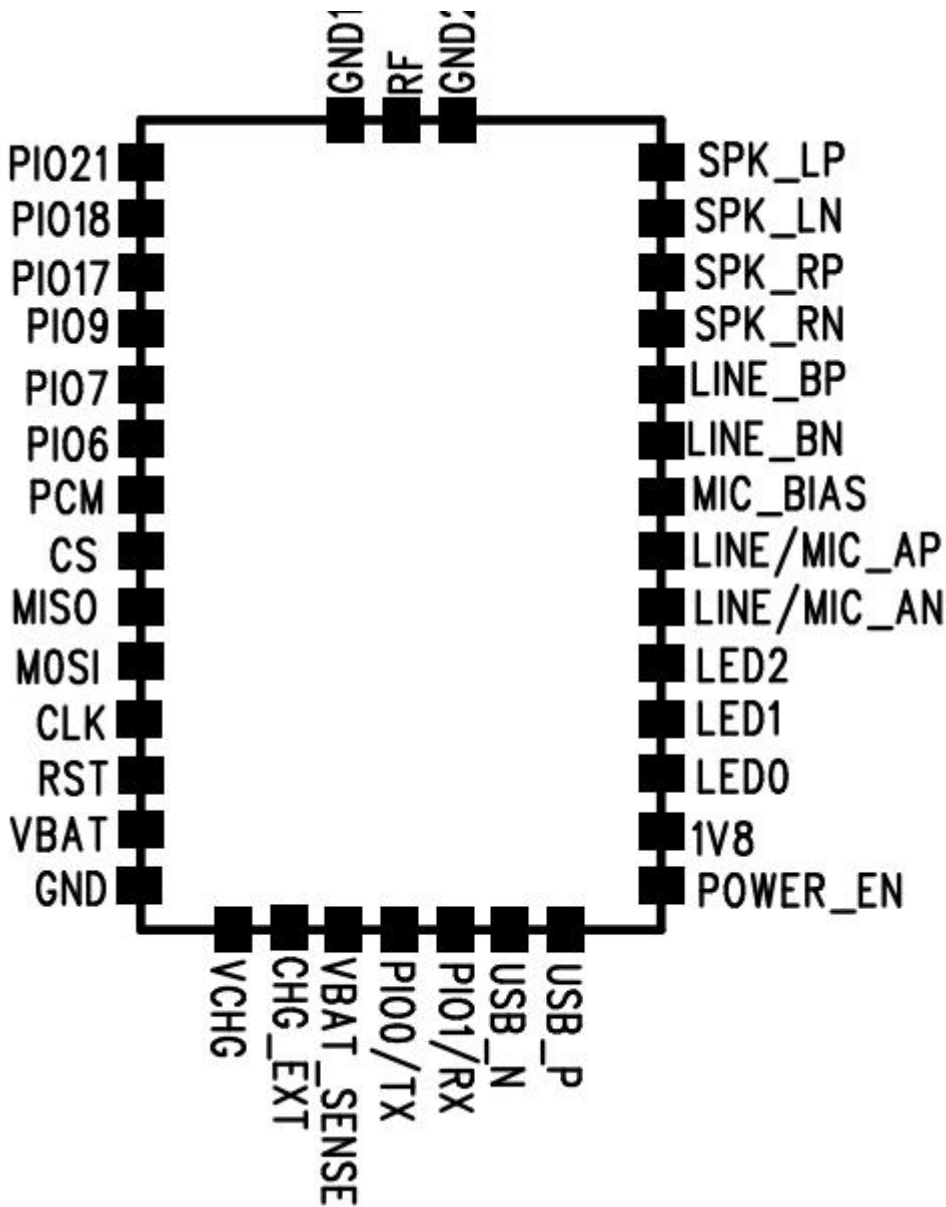
四、性能参数:

型号	F-3288-35
蓝牙规格	Bluetooth V4.0
调制方式	GFSK, $\pi/4$ DQPSK, 8DPSK
供电电压:	3.3-4.2V
支持蓝牙协议	HFP V1.6, HSP V1.2, A2DP V1.2, AVRCP V1.4, DI V1.3
工作电流	$\leq 30\text{mA}$
待机电流	$< 50\mu\text{A}$
温度范围	-40°C to $+80^{\circ}\text{C}$
无线传输范围:	大于 10 米
传输功率:	支持 CLASS1/CLASS2/CLASS3 最大可调 8dBm
灵敏度:	$-80\text{dBm} < 0.1\% \text{BER}$
频率范围:	2.4GHz-2.480GHz
对外接口:	PIO, SPI, Audio in/out, USB
音频性能	支持 AAC, MP3, SBC, 立体声
音频信噪比:	$\geq 75\text{dB}$
失真度	$\leq 0.1\%$
模块尺寸	21.9X14.1*1.8MM

五、模块尺寸图：



六、模块脚位定义图



七、引脚功能说明

Pin	Symb	I/O	Description
1	PIO21	Bi-directional with strong pull-down	Programmable input/output
2	PIO18	Bi-directional with strong pull-down	Programmable input/output
3	PIO17	Bi-directional with strong pull-down	Programmable input/output
4	PIO9	Bi-directional with strong pull-down	Programmable input/output

		pull-down	
5	PIO7	Bi-directional with strong pull-down	Programmable input/output
6	PIO6	Bi-directional with strong pull-down	Programmable input/output
7	PCM	Input with weak pull-down	SPI/PCM select input 0: PCM/PIO interface 1: SPI
8	CS	Bi-directional with weak pull-down	Programmable input/output Alternative function: SPI data Output PCM1 synchronous data sync
9	MISO	Bi-directional with weak pull-down	Programmable input/output Alternative function: SPI data Output PCM1 synchronous data Output
10	MOSI	Bi-directional with weak pull-down	Programmable input/output Alternative function: SPI data input PCM1 synchronous data output
11	CLK	Bi-directional with weak pull-down	Programmable input/output Alternative function: SPI clock PCM1 synchronous data Clock
12	RST		Reset if low,pull low minimum 5ms to case a reset
13	VBAT	Battery positive terminal	3.3-4.2V
14	GND	Ground	Ground connect battery negative
15	VCHG	Charger input	
16	CHG_EXT	External Battery charger	Charge
17	VBAT_SENSE	Battery charger sense input	BAT_SENSE
18	TX	Bi-directional with strong pull-down	Programmable input/output Alternative function: UART data output
19	RX	Bi-directional with weak pull-down	Programmable input/output Alternative function: UART data input
20	USB_N	Bi-directional	USB data plus with selectable internal 1.5K pull up resistor
21	USB_P	Bi-directional	USB data minus
22	POWER_EN	Input with weak pull-down	Regulator enable input
23	1V8	POWER	+1.8V Output
24	LED0	Bi-directional	LED Driver



25	LED1	Bi-directional	LED Driver
26	LED2	Bi-directional	LED Driver
27	LINE/MIC_AN	Analogue in	LINE or Microphone input positive ,channel A
28	LINE/MIC_AP	Analogue in	LINE or Microphone input negative ,channel A
29	MIC_BIAS	Analogue out	Microphone bias
30	LINE_BN	Analogue in	LINE input negative ,channel B
31	LINE_BP	Analogue in	LINE input negative ,channel B
32	SPK_RN	Analogue out	Speaker output negative, right
33	SPK_RP	Analogue out	Speaker output positive, right
34	SPK_LN	Analogue out	Speaker output negative, right
35	SPK_LP	Analogue out	Speaker output positive, right
36	GND2	Ground	Ground connect battery negative
37	RF	radio-frequency signal	RF signal output
38	GND1	Ground	Ground connect battery negative

八、设计中 IO 口注意事项:

PIO21, PIO18, PIO17, PIO9, PIO7, PIO6 有这 6 个 IO 口可以用来做按键, 其他的口做输出。

九、电路连接注意:

F-3288-35 外接功放的时候, 必须接差分输入的功放, 如果不接差分输入的功放, 必须接一个运放平衡两个差分的电平, 否则会有“啪啪”的冲击声。

十、注意事项

A. 如果模组天线旁边有电池, 金属物, 液晶屏, 喇叭等, 要求离天线距离至少 15mm

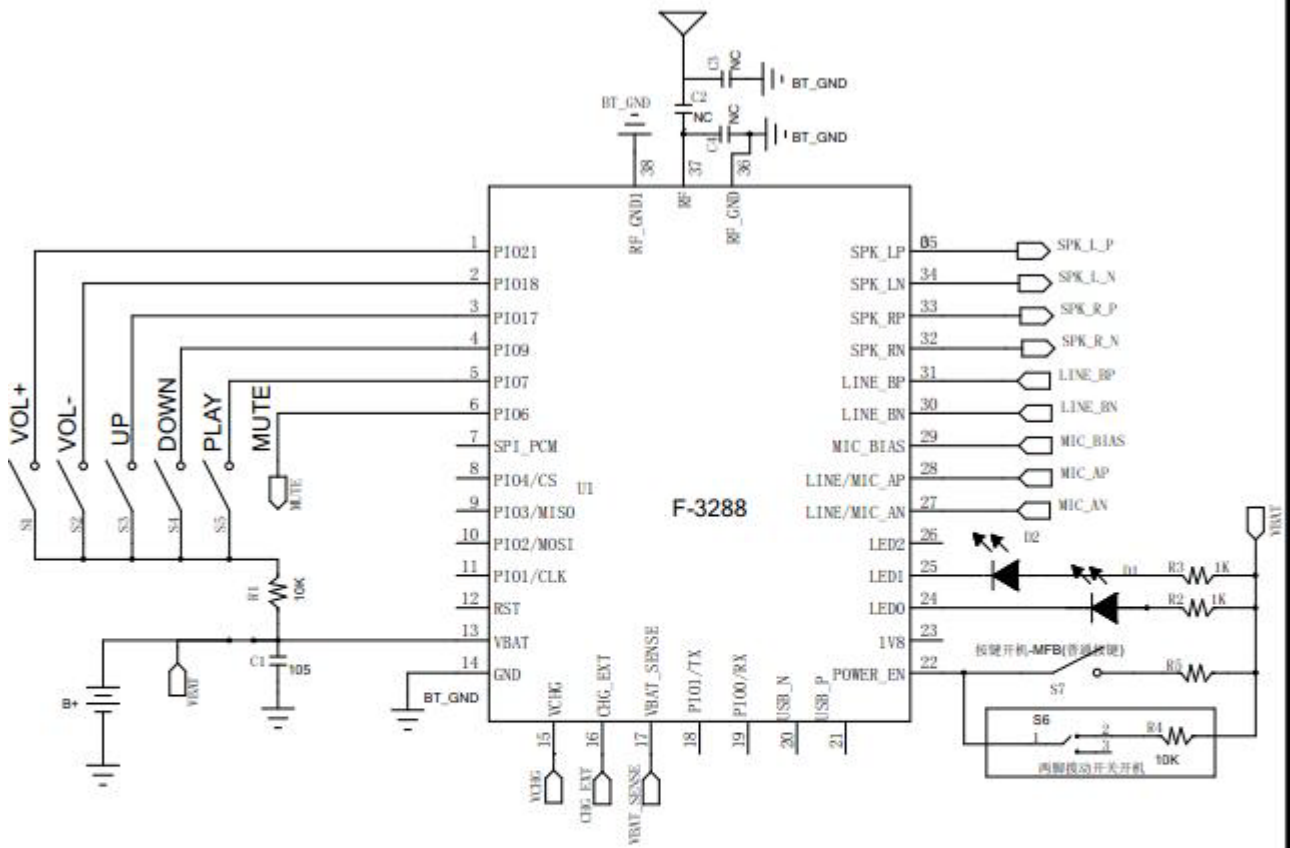


B. layout 时供电线路建议使用星形走线，并确保蓝牙模组供电线性度要好，还有 BT 的地须与运放，功放，MCU 等的地分开，而且 BT 下侧不可有其他干扰地

C. 天线周围不可走控制线，电源线，音频线，MIC 等干扰线。

D. 如果模组天线附近有排座，外壳有金属铁网等对信号有影响的，建议选用专业的高增益天线

十、应用电路：



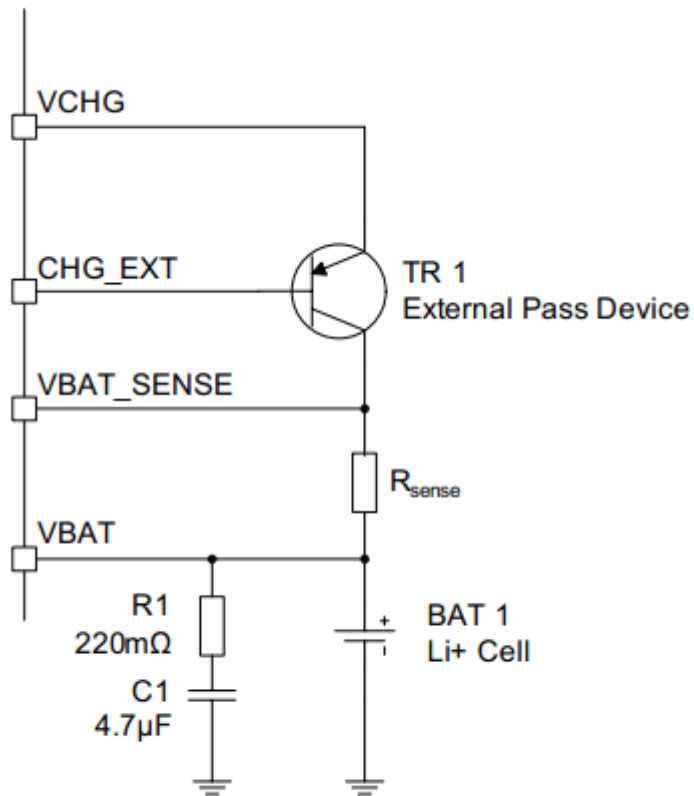


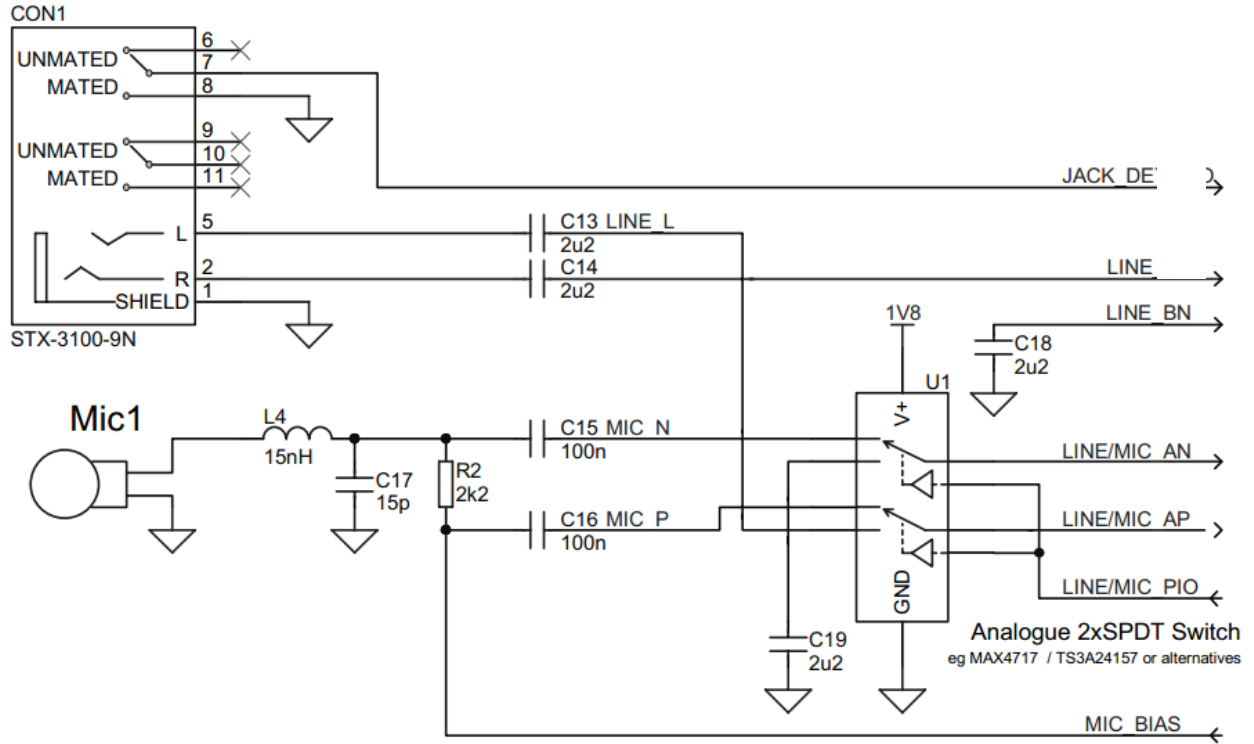
Figure 11.2: Battery Charger External Mode Typical Configuration

- 注意：1.使用内部充电电流最大到250mA,
2.使用外部充电电流最大到750mA.

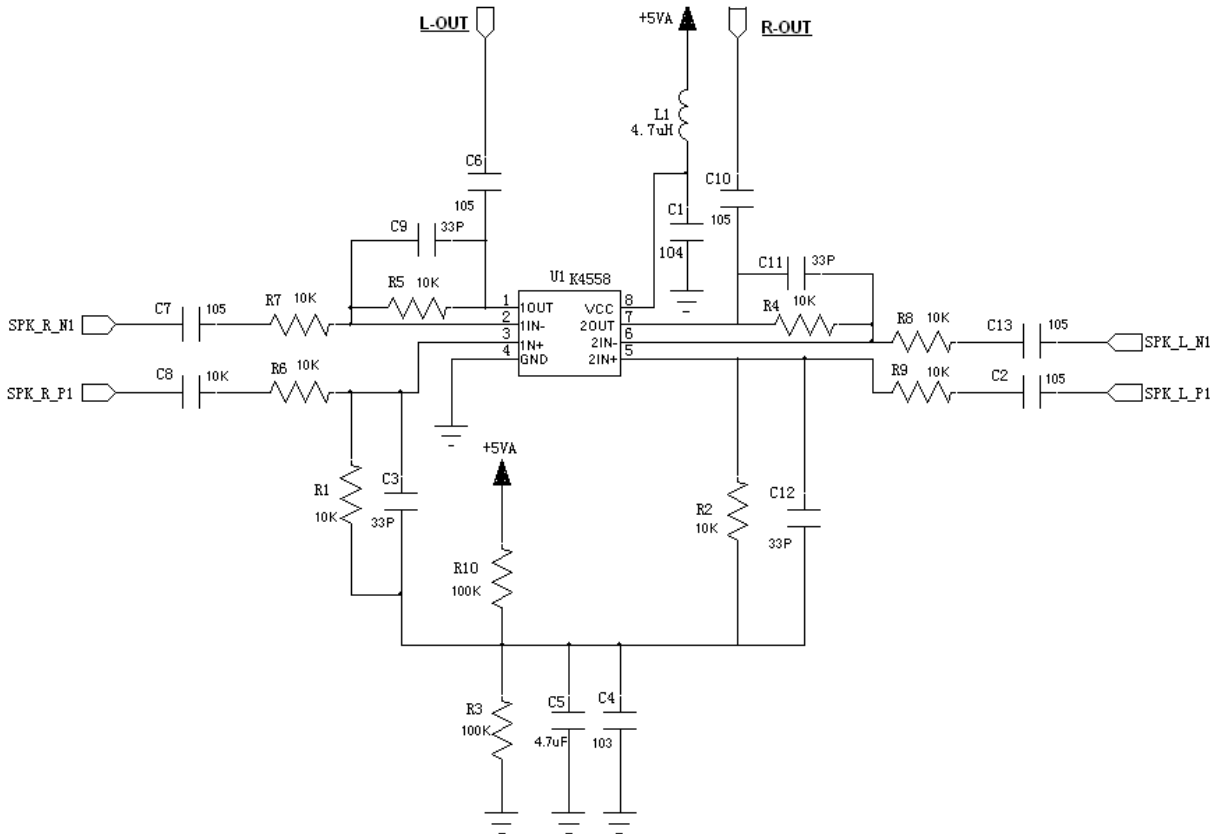


Line Jack

Line Input / Microphone Auto Switch Circuit



立体声 LINE IN 输入和 MIC 转换电路



十一. 印制PCB天线选用

Real Designs

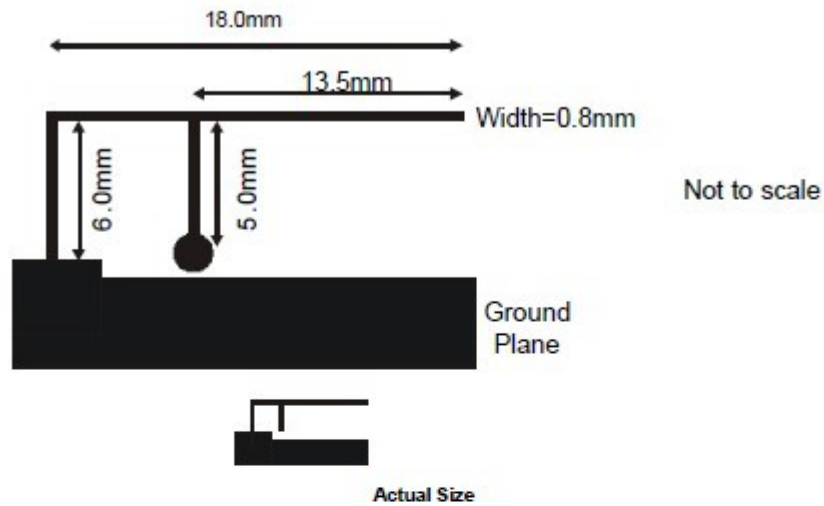
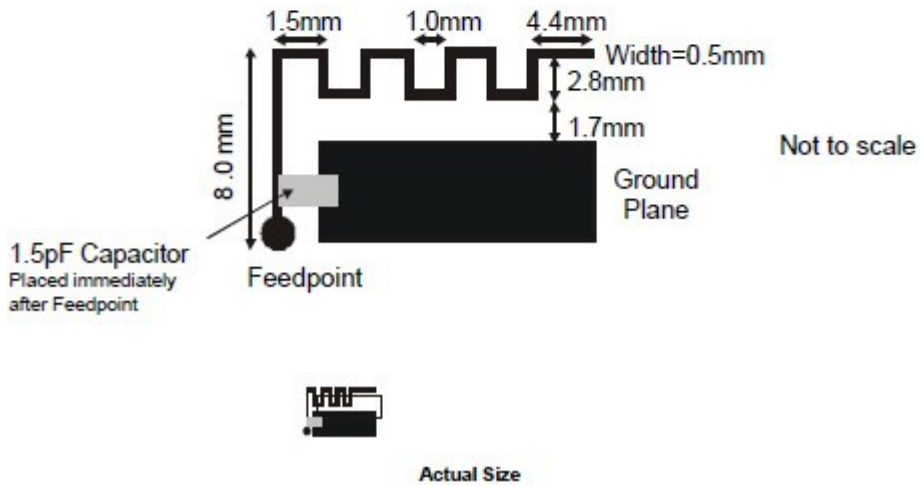
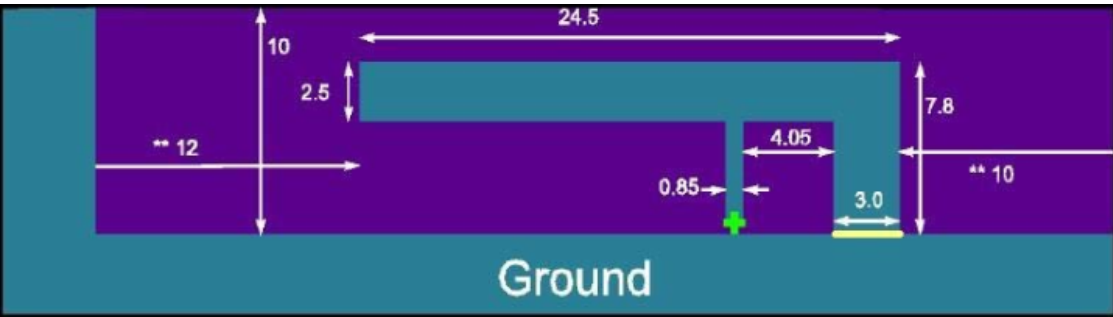
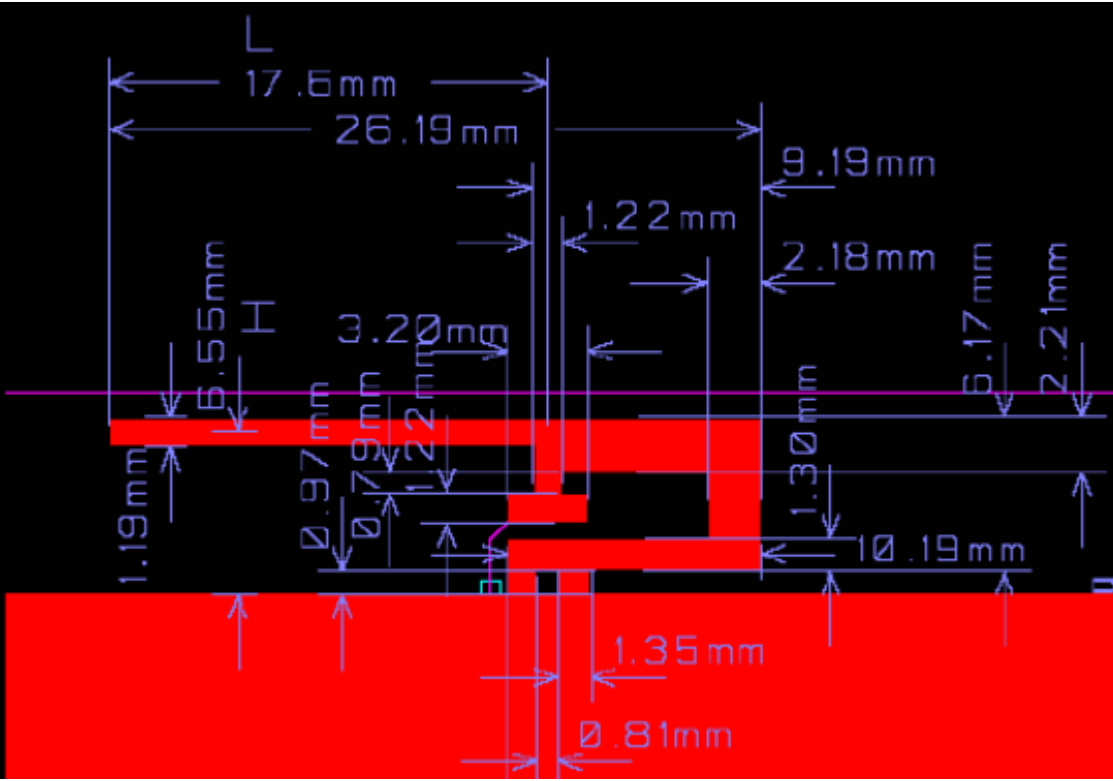
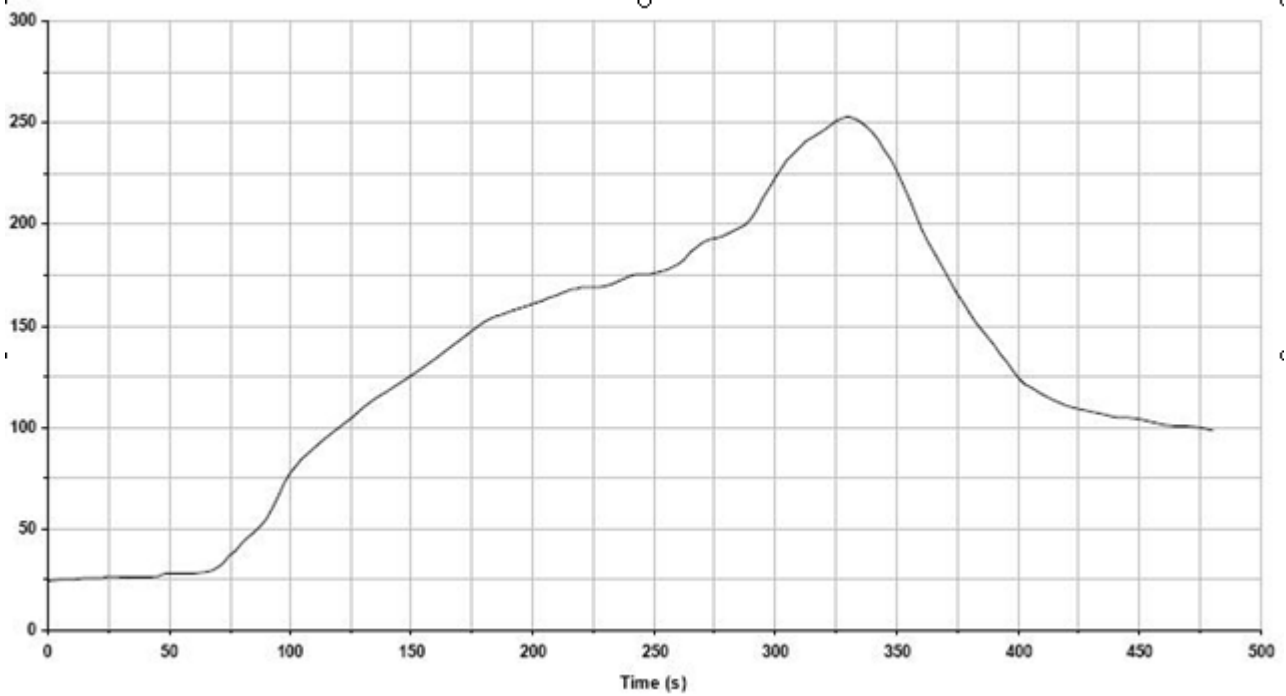


Figure 4.1: Approximate Dimensions of Inverted-F Antenna





十二、推荐回流温度



Key features of the profile:

- Initial Ramp=1-2.5°C/sec to 175°C equilibrium
- Equilibrium time=60 to 80 seconds
- Ramp to Maximum temperature (250°C)=3°C/sec Max
- Time above liquidus temperature(217°C): 45 - 90 seconds
- Device absolute maximum reflow temperature: 250°C