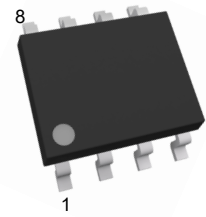


## 概述

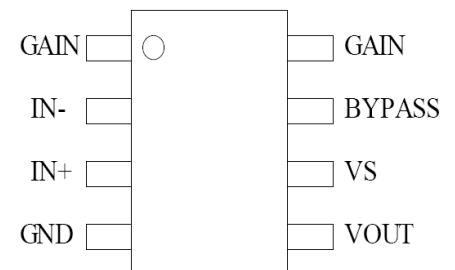
LM386音频功率放大器主要应用于低电压消费类产品。为使外围元件最少，电压增益内置为20，但是在1脚和8脚之间增加一直外接电阻和电容，便可将电压增益调为任意值，直至200.输入端以地为参考，同时输出端被自动偏置到电源电压的一半，在6V电源电压下，它的静态功耗仅为24mW,使得LM386特别适用于电池供电的场合。

**SOP-8**

## 特点

- 静态功耗低，约为4mA,可用于电池供电
- 电压增益由20~200可调
- 电源电压范围宽， $V_{CC}=4\sim 12V$
- 外围元件少
- 失真度低

## 引脚图



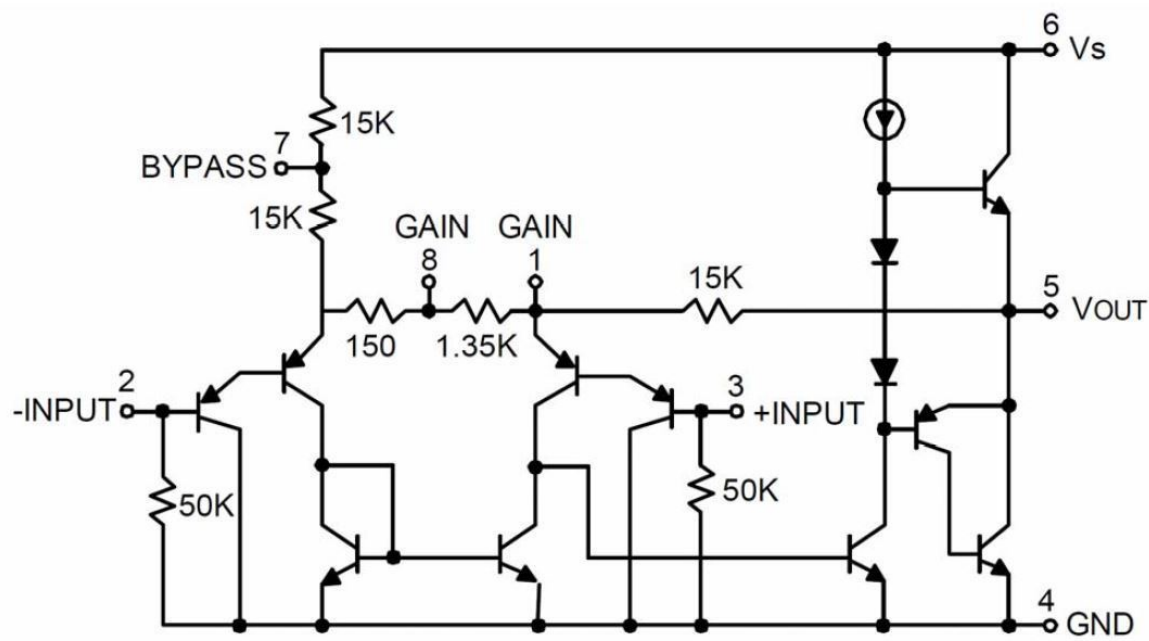
## 应用

- AM/FM收音机音频放大器
- 免提电话机扬声器
- 小型伺服驱动器
- 便捷式录音机音频功率放大器
- 电视机音频系统
- 超声波驱动器
- 电源变换器

## 引脚功能

引脚序号	符号	功能	引脚序号	符号	功能
1	GAIN	增益	5	VOUT	输出
2	IN-	负输入	6	$V_S$	电源
3	IN+	正输入	7	BYPASS	旁路
4	GND	地	8	GAIN	增益

内部原理图



极性参数

参数名称	符号	数值	单位
最大输入电压	$V_{IN}$	$\pm 0.4$	V
电源电压	$V_{CC}$	15	V
最大允许功耗	$P_D$	660	mW
焊接温度（10 秒）	$T_s$	260	°C
结温	$T_J$	150	°C
工作温度	$T_{amb}$	0~70	°C
储存温度	$T_{STG}$	-40~125	°C

电性参数

$V_{CC}=6V$ ,  $R_L=8\Omega$ ,  $f=1KHz$ ,  $T_{amb}=25^{\circ}C$

参数	符号	测试条件	规范值			单位
			最小	典型	最大	
工作电源电压	$V_{CC}$		4	--	12	V
静态电源电流	$I_{CC}$	$V_{CC}=6V$ , $V_{IN}=0V$	--	4	8	mA
输出功率	$P_O$	$V_{CC}=6V$ , $R_L=8\Omega$ , THD=10%	250	325	--	mW
		$V_{CC}=9V$ , $R_L=8\Omega$ , THD=10%	500	700	--	mW
电压增益	$A_V$	$V_{CC}=6V$ , $f=1KHz$		26	--	dB
		1 脚、8 脚间接 $10\mu F$ 电容		46	--	
带宽	BW	$V_{CC}=6V$ , 脚 1、8 开路	--	300	--	KHz
全谐波失真	THD	$V_{CC}=6V$ , $R_L=8\Omega$ , $P_O=125mW$ , $f=1KHz$ , 脚 1、8 开路	--	0.2	--	%
电源纹波抑制比	PSRR	$V_{CC}=6V$ , $C_{BYPASS}=10\mu F$ , $f=1KHz$ , 脚 1、8 开路, 输出为参考	--	50	--	dB
输入电阻	$R_{IN}$		--	50	--	K $\Omega$
输入偏置电流	$I_B$	$V_{CC}=6V$ , 2、3 脚开路	--	250	--	nA

应用图

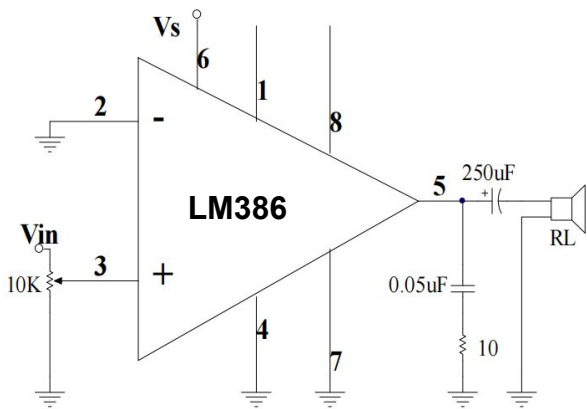


图1 放大器增益=20(最少器件)

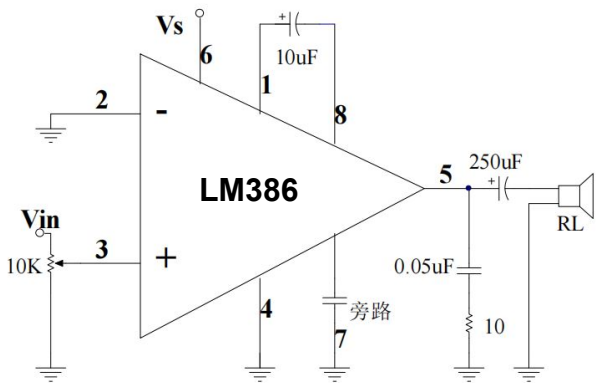


图2 放大器增益=200

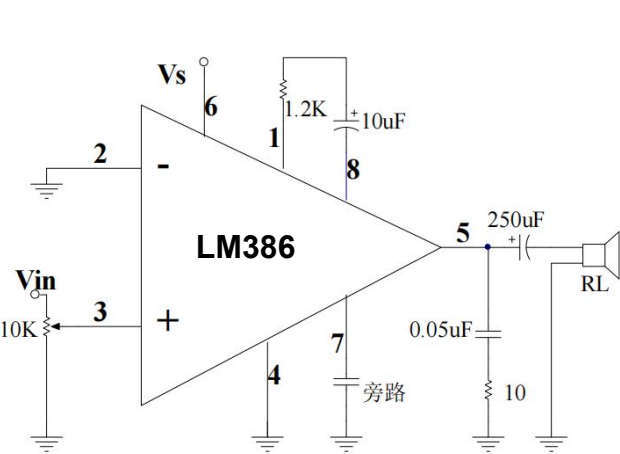


图 3 放大器增益=50

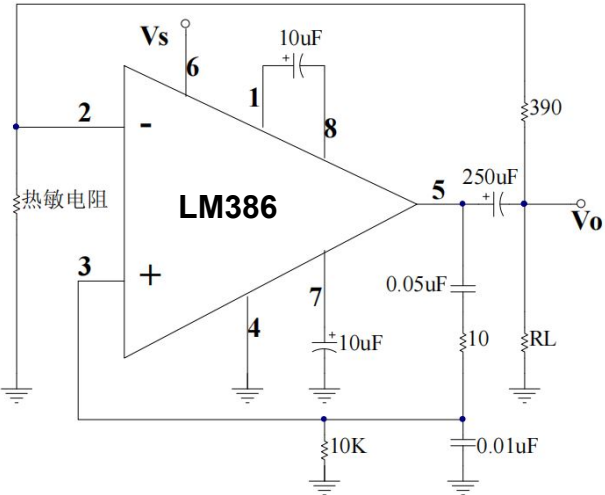


图 4 低失真电桥振荡器

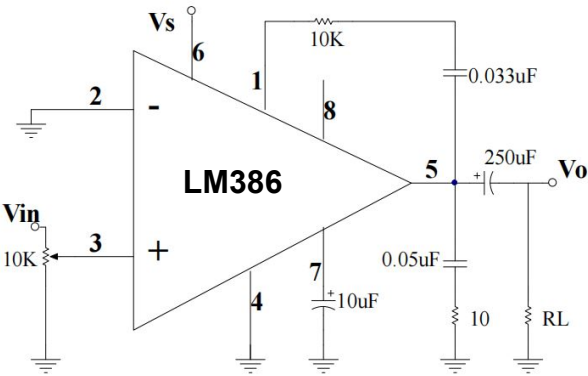


图 5 低频提升放大器

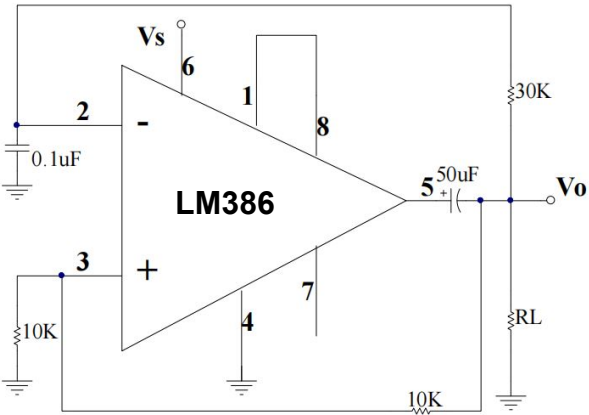


图 6 方波振荡器

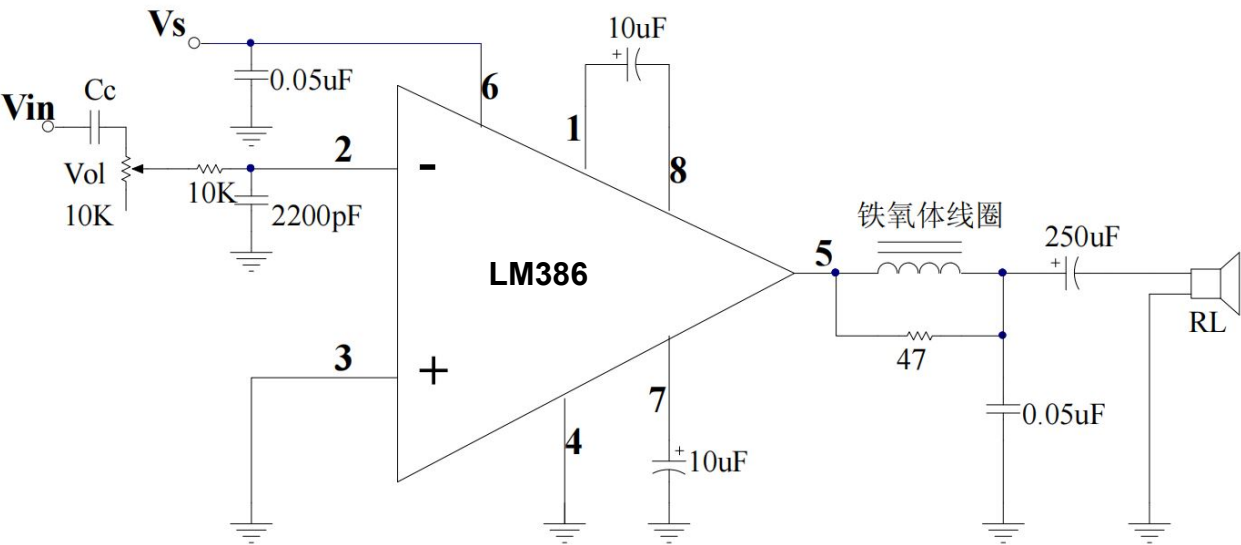


图 7 调幅收音机音频放大器

## 应用要点

### 增益控制

为了使LM386应用起来更灵活些，提供了两条增益控制管脚（1脚和8脚）。当1脚和8脚开路时， $1.35\text{K}\Omega$ 的电阻增益置为20（26dB）。当1脚和8脚外接一只电容将 $1.35\text{K}\Omega$ 的电阻旁路时，增益上升到200（46dB）。如果外接一只电阻和电容串联，增益将在20至200之间可以任意调节。增益的控制也可以通过1脚和地之间交流耦合一只电阻(FET)来实现。

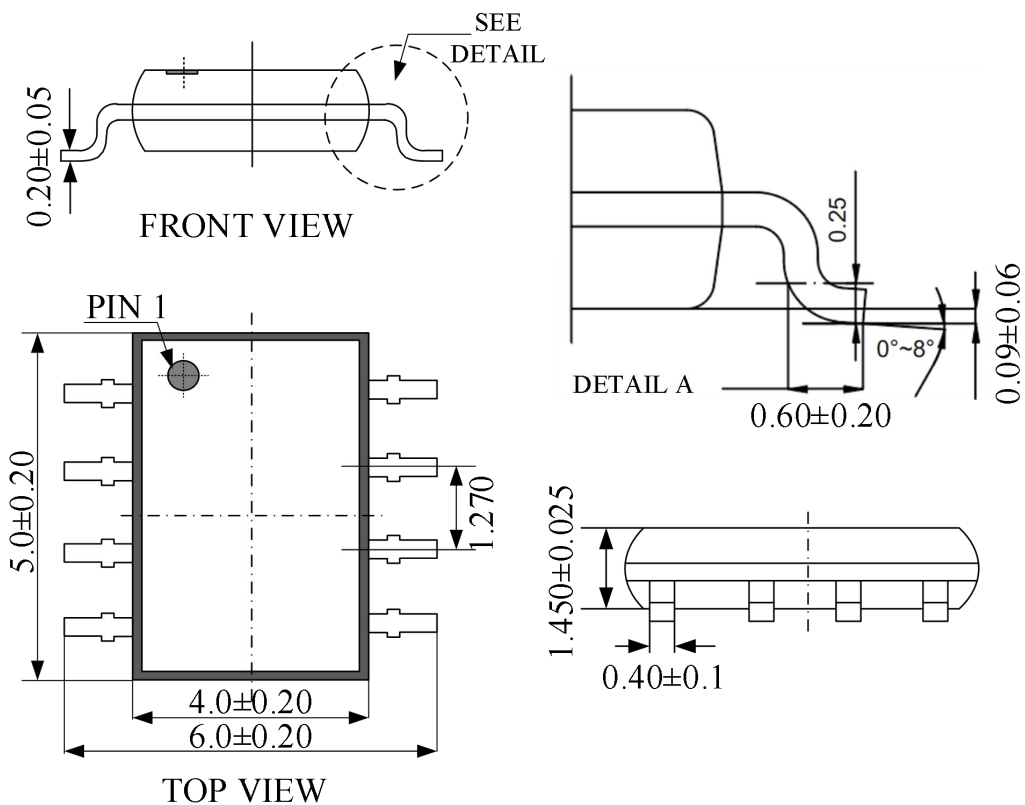
在一些特殊应用中，也可平行于内部负反馈电阻外接阻容元件来进行增益和频响调整。例如，我可以通过提升负反馈频响网络以补偿扬声器低频段灵敏度低的缺点，它可以识别它可以通过在1脚和5脚之间(平行于内部 $15\text{K}\Omega$ 电阻)接一个RC串联网路来实现。对于6dB的有效低频提升来说： $R \approx 15\text{k}\Omega$ ，当8脚开路时，能保证稳定工作的R最小值为 $R = 10\text{k}\Omega$ ，如果1脚和8脚之间有旁路电容，则R的最小值降为 $R = 2\text{k}\Omega$ ，有这项限制的原因为放大器内部补偿仅至闭环增益大于9。

### 输入偏置

从内部等效电路可以看到，两个输入端各有一只 $50\text{k}\Omega$ 的电阻接到地，输入晶体管的基极电流约为 $250\text{nA}$ ，所以输入端在开路时约有 $12.5\text{mV}$ 的电压。当驱动LM386直流信号源的内阻大于 $250\text{k}\Omega$ 时，它将产生很小的附加失调(输入端约为 $2.5\text{mV}$ ，输出端约为 $50\text{mV}$ )当直流信号源的内阻在上述两者之间时，我们可以通过在不用的那个输入端与地之间接一只与信号源内阻一样大的电阻来消除附加失调。当然，输入端用交流耦合时，上面提到的附加失调电压问题就不存在了。

当把LM386用在较高的电压增益(1脚和8脚之间的 $1.35\text{k}\Omega$ 电阻旁路)场合时，必须将不用的那个输入端旁路，防止增益的下降和可能出现的不稳定工作。它可以通过对地接一个 $0.1\mu\text{F}$ 的电容或直接对地短接来实现，取决于直流信号源的内阻。

Outline Drawing – SOP-8(Dimensions in mm)




Package Information

Package Type	Description	Quantity (pcs)	Standard
SOP-8	Reel -13" tape	4000	EIA-481

Contact Information

TANI website: <http://www.tanisemi.com> Email: [tani@tanisemi.com](mailto:tani@tanisemi.com)

For additional information, please contact your local Sales Representative.

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