OTOMO

GC386

Low Voltage Audio Power Amplifier

Overview

The GC386 audio power amplifier is mainly used in low-voltage consumer products. To minimize external components, the voltage gain is built-in to 20. But by adding an external resistor and capacitor between pins 1 and 8, the voltage gain can be adjusted to any value, up to 200. The inputs are referenced to ground, while the outputs are automatically biased to half the supply voltage. At 6V supply voltage, its static power consumption is only 24mW, making GC386 especially suitable for battery-powered occasions.

The package form of GC386 is DIP8 or SOP8.

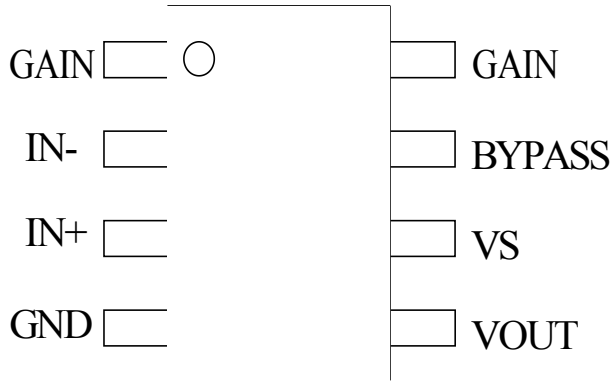
Main feature

- Low static power consumption, about 4mA, can be powered by battery
- Voltage gain is adjustable from 20 to 200
- Vcc=4~12VWide power supply voltage range, Vcc=4~12V
- Fewer peripheral components
- low distortion

Scope of application

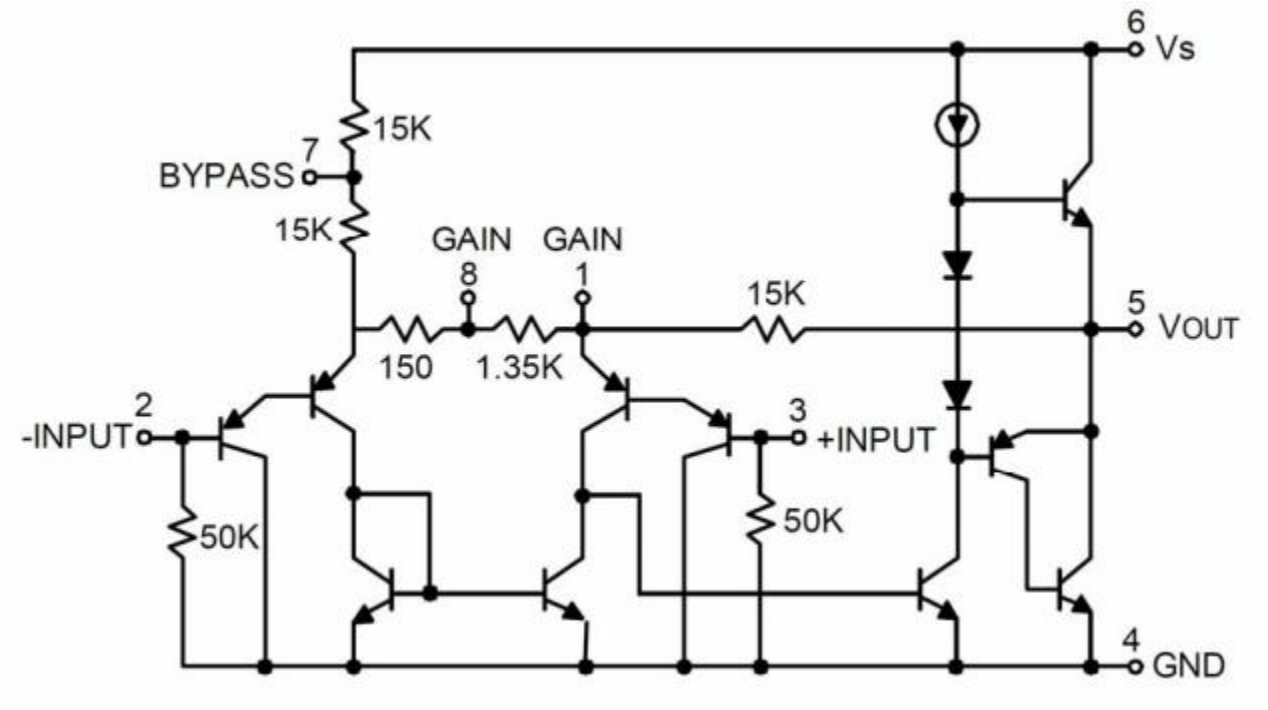
- AM/FM Radio Audio Amplifier
- Speakerphone system for speakerphone
- Small Servo Drive
- Portable Voice Recorder Audio Power Amplifier
- TV audio system
- Ultrasonic driver
- power converter

Pin Diagram and Pin Function



serial number	symbol	Function
1	GAIN	gain
2	IN-	negative input
3	IN+	positive input
4	GND	land
5	VOUT	output
6	V	power supply
7	BYPASS	bypass
8	GAIN	gain

Internal schematic



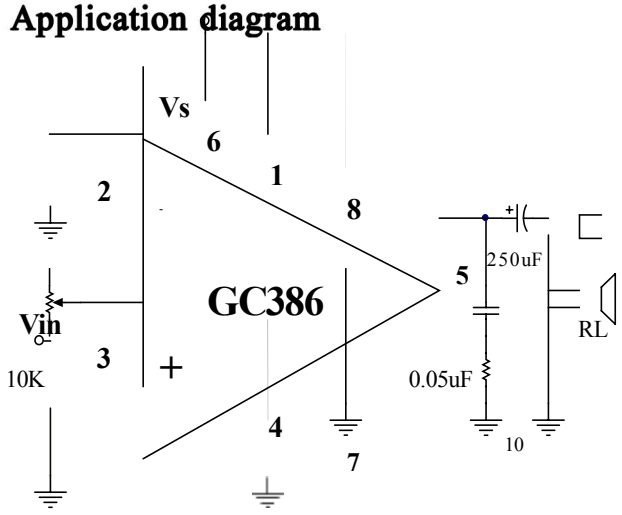
Limit parameters

parametername	symbol	value	unit
Maximum input voltage	VIN	±0.4	V
voltage	Vcc	15	V
Maximum allowable power consumption	PD	660	mW
Soldering temperature (10 seconds)	Ts	260	℃
Junction temperature	Tj	150	℃
Operating temperature	Tamb	0~70	℃
Storage temperature	Tstg	-40~125	℃

Electrical parameters (Vcc=6V , RL=8Ω , f=1kHz , Tamb=25℃)

Parameter	Symbol	Test condition	Canonical value			Unit
			MIN	TPY	MAX	
Working power voltage	Vcc		4		12	V
Quiescent supply current	Icc	Vcc=6V， VIN=0	.	4	8	mA
Output Power	Po	Vcc=6V, RL=8Ω，THD=10%	250	325	.	mW
		Vcc=9V, RL=8Ω，THD=10%	500	700	.	mW
Voltage gain	Av	Vcc=6V, f=1kHz	.	26	.	dB
		1-pin, 8-pin indirect 10μF capacitor	.	46	.	
bandwidth	BW	Vcc=6V， Pins 1 and 8 are open	.	300	.	kHz
total harmonic distortion,	THD	Vcc=6V，RL=8Ω，Po=125mW，f=1kHz Pins 1 and 8 are open	.	0.2	.	%
Power Ripple Rejection Ratio	PSRR	Vcc=6V，f=1kHz，CBYPASS=10μF，Pins 1 and 8 are open,output for reference		50		dB
input resistance	RIN		.	50	.	kΩ
Input bias current	IB	Vcc=6V，2, 3 feet open circuit	.	250	.	nA

Application diagram



picture 1 Amplifier gain = 20 (minimum parts)

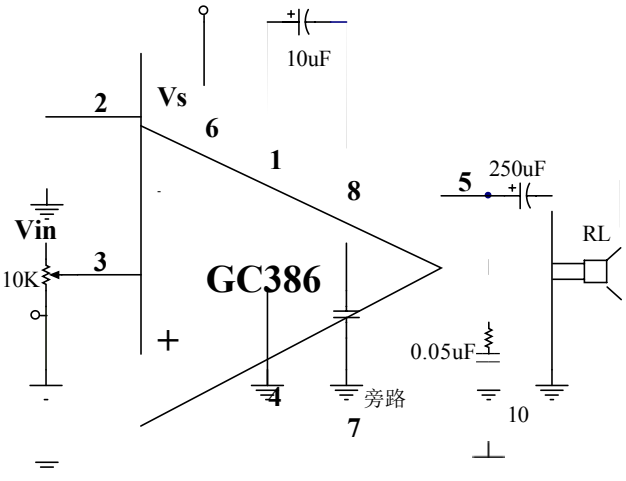


Figure 2 Amplifier Gain = 200

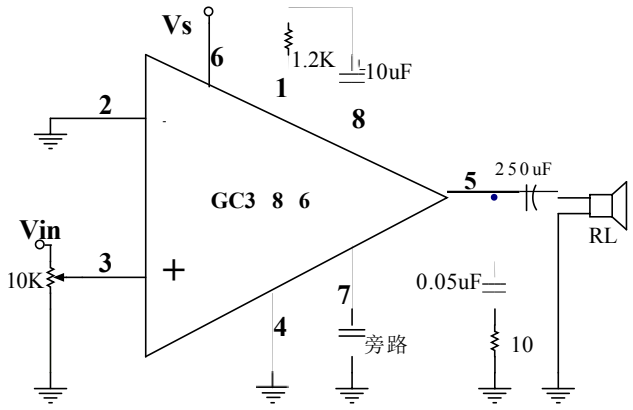


Figure 3 Amplifier Gain = 50

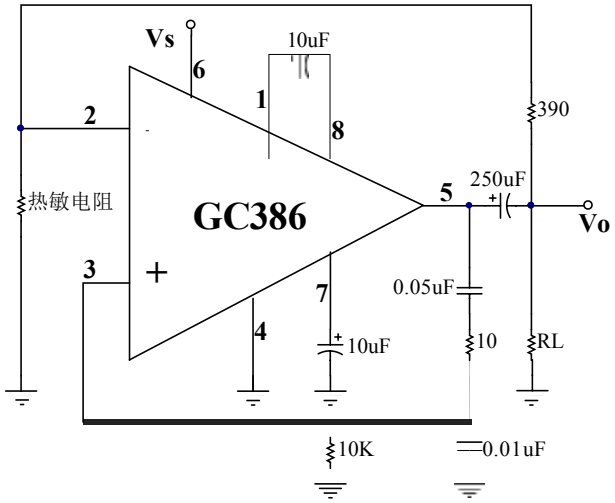


Figure 4 Low Distortion Bridge Oscillator

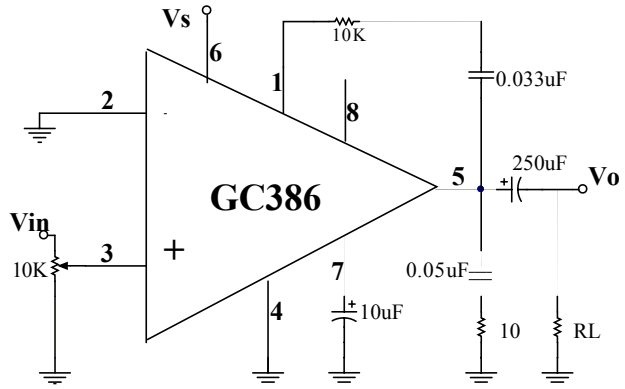


Figure 5 Low frequency boost amplifier

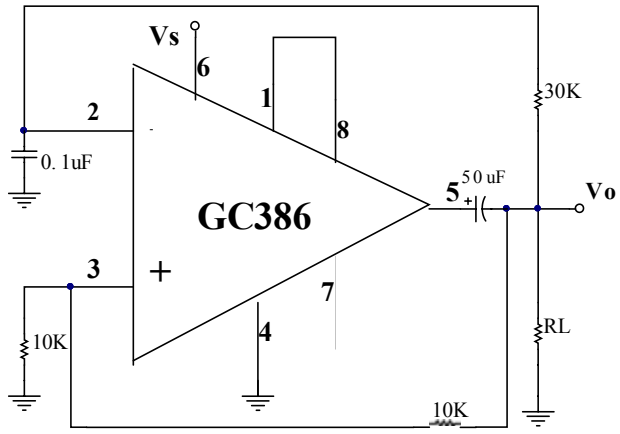


Figure 6 Square Wave Oscillator

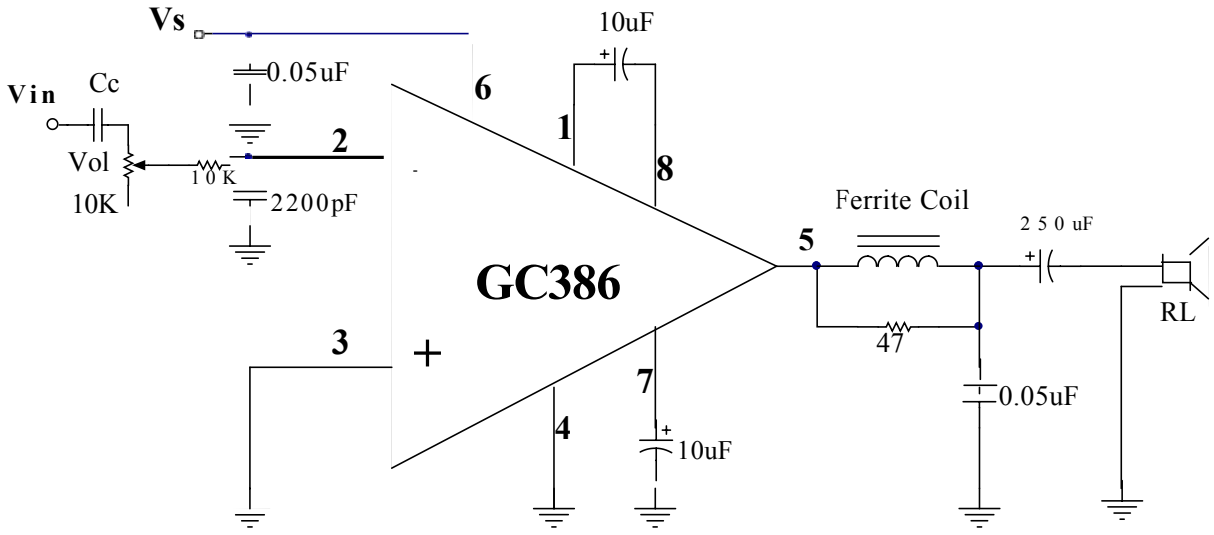


Figure 7 AM Radio Audio Amplifier

Application points

1. Gain control

To make the GC386 more flexible, two gain control pins (pin 1 and pin 8) are provided. When pin 1 and pin 8 are open, the 1.35k resistor will set the gain to 20 (26dB); when the 1.35k resistor is bypassed by connecting a capacitor between pins 1 and 8, the gain will rise to 200 (46dB). If an external resistor and capacitor are connected in series, the gain will be freely adjustable between 20 and 200. Gain control can also be achieved by AC coupling a resistor (FET) between pin 1 and ground.

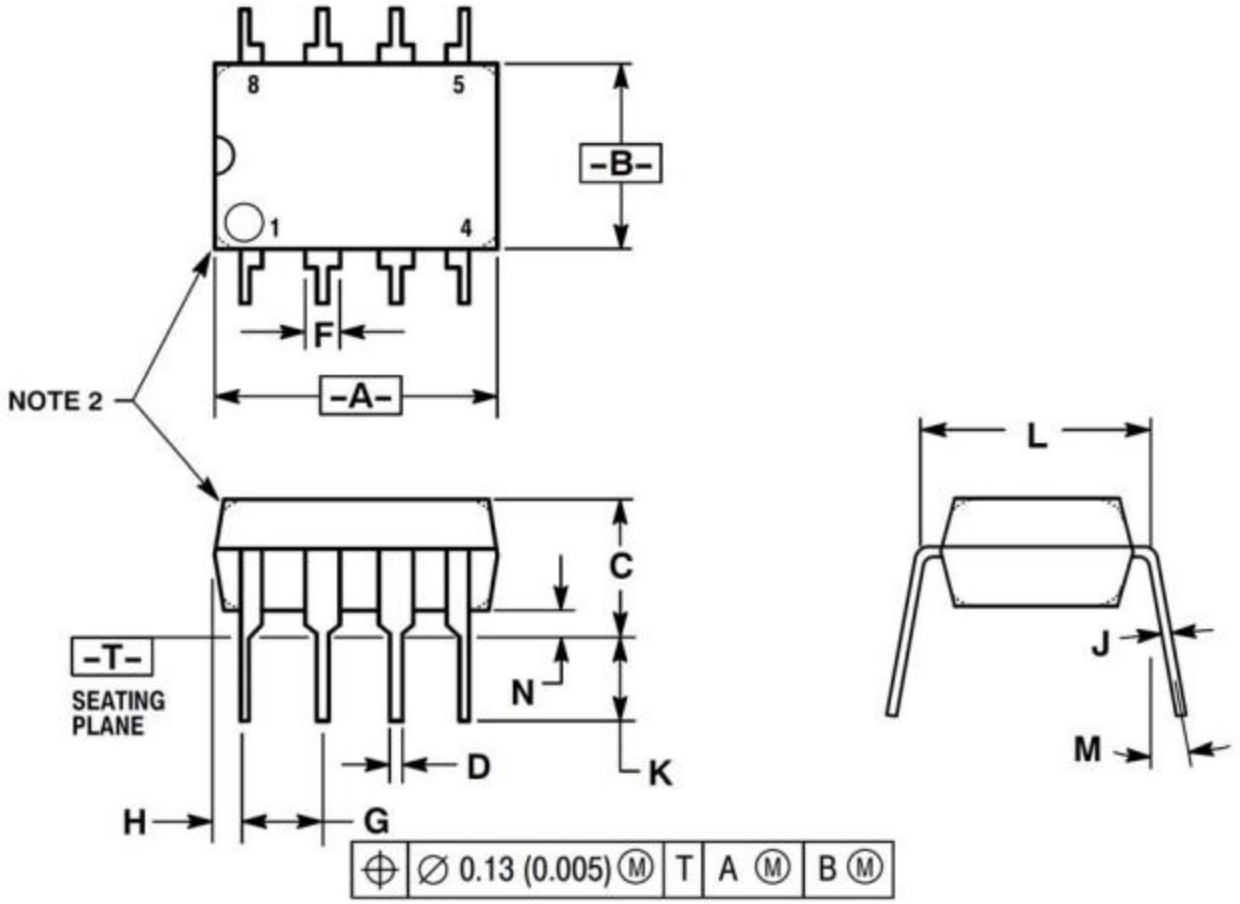
In some special applications, the gain and frequency response can be adjusted by connecting an external resistor-capacitor element in parallel with the internal negative feedback resistor. For example, I can compensate for the speaker's low low-frequency sensitivity by boosting the negative feedback network, which can be accomplished by placing an RC series network between pins 1 and 5 (parallel to the internal 15k resistor). For an effective low-frequency boost of 6 dB: R 15 k, when pin 8 is open, the minimum value of R that can ensure stable operation is R=10 k, if there is a bypass capacitor between pin 1 and pin 8, then the value of R The minimum value is reduced to R=2 k, and the reason for this limitation is that the amplifier is internally compensated only until the closed-loop gain is greater than 9.

2. Input bias

It can be seen from the internal equivalent circuit that each of the two input terminals has a 50k resistor connected to ground, and the base current of the input transistor is about 250nA, so the input terminal has a voltage of about 12.5mV when it is open. .When the internal resistance driving the GC386 DC signal source is greater than 250 kΩ, it will produce a small additional offset (about 2.5mV at the input and about 50mV at the output). When the internal resistance of the DC signal source is between the above two, we can eliminate the additional offset by connecting a resistor as large as the internal resistance of the signal source between the unused input and ground. Of course, when the input is AC coupled, the additional offset voltage problem mentioned above does not exist.

When the GC386 is used in higher voltage gain (bypass the 1.35k resistor between pin 1 and pin 8), the unused input must be bypassed to prevent gain drop and possible unstable operation. It can be achieved by connecting a 0.1F capacitor to ground or directly shorting to ground, depending on the internal resistance of the DC signal source.

Encapsulated data



Note: 1. The L dimension is the dimension when the pins are parallel; 2. The shape has two rounded corners and square corners.

label	millimeter		inch	
	MIN	MAX	MIN	MAX
A	9.4	10.16	0.37	0.4
B	6.1	6.6	0.24	0.26
C	3.94	4.45	0.155	0.175
D	0.38	0.51	0.015	0.02
F	1.02	1.78	0.04	0.07
G	2.54		0 1	
H	0.76	1.27	0.03	0.05
J	0.2	0.3	0.008	0.012
K	2.92	3.43	0.115	0.135
L	7.62		0 3	
M	. . .	10°	. . .	10°
N	0.76	1.01	0.03	0.04