



# LA4620

## Two-channel Audio Power Amplifier

### Overview

The LA4620 is a two-channel high-power audio amplifier for automotive stereo and general-purpose audio amplification equipment.

The LA4620 has a 6 to 22V operating supply voltage range. Each channel uses a bridge configuration to obtain high output power from low supply voltages. Typical output power is 17W per channel.

The LA4620 incorporates a thermal protection circuit, an output short-circuit protection circuit and a pop suppression circuit. It has low-power, logic-level standby control and mute control inputs.

The LA4620 is available in 23-pin SIPs and operates from a 15V supply.

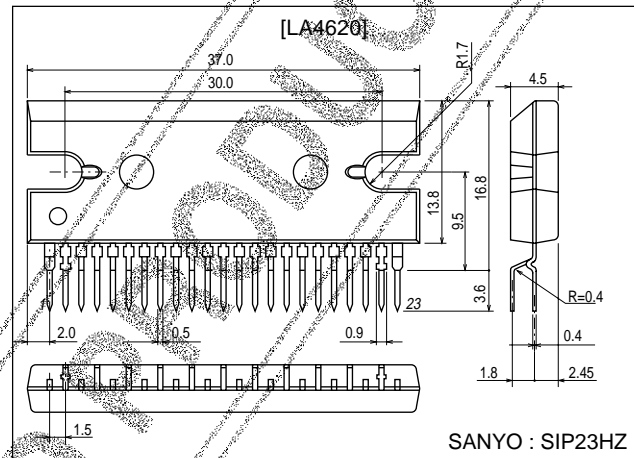
### Features

- 17W output power per channel.
- 6 to 22V supply voltage range.
- Pop suppression.
- Logic-controlled standby mode.
- Thermal protection.
- Short-circuit protection.
- 60dB channel separation.
- 58dB supply voltage ripple rejection.
- 0.2% harmonic distortion.
- 23-pin SIP.

### Package Dimensions

unit:mm

3160-SIP23HZ



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## Specifications

### Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	$V_{CC}$ max		24	V
Allowable power dissipation	$P_d$ max		37.5	W
Operating temperature	$T_{opr}$		-20 to +75	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-40 to +150	$^\circ\text{C}$

### Recommended Operating Conditions at $T_a = 25^\circ\text{C}$

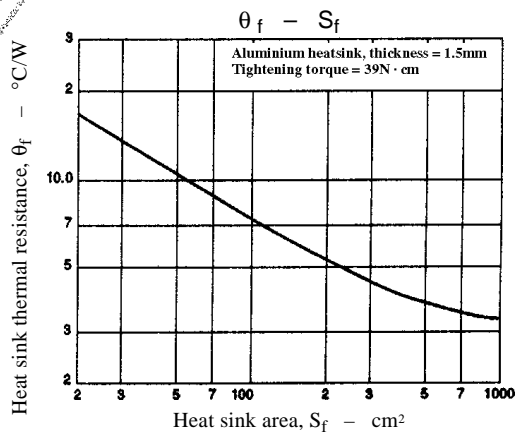
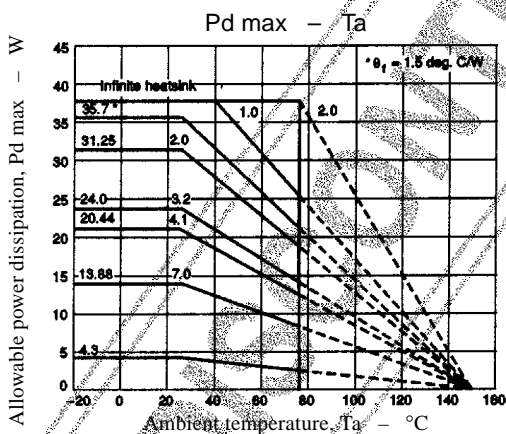
Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	$V_{CC}$		12, 15	V
Supply voltage range	$V_{CC}$		6 to 22	V
Load resistance	$R_L$		4	$\Omega$

### Note

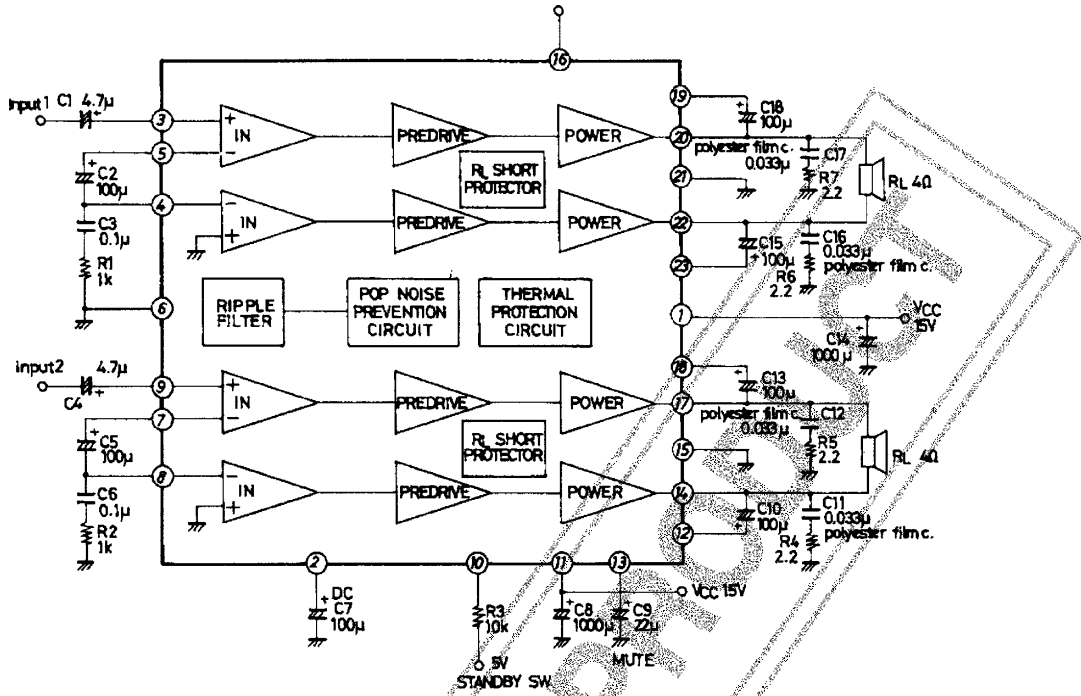
When operating at 22V with a load of  $4\Omega$ , ensure that the output power,  $P_O$ , does not exceed 1W per channel.

### Electrical Characteristics at $T_a = 25^\circ\text{C}$ , $V_{CC}=15\text{V}$ , $f=1\text{kHz}$ , $R_L=4\text{k}\Omega$ , $R_g=600\Omega$ unless otherwise noted

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent current	$I_{CCO}$		50	75	120	mA
Standby current	$I_{ST}$			1	10	$\mu\text{A}$
Output power	$P_{O1}$	$V_{CC}=12\text{V}$ , THD=10%	10	13		W
	$P_{O2}$	$V_{CC}=15\text{V}$ , THD=10%	14	17		W
Total harmonic distortion	THD	$P_O=1\text{W}$		0.2	1.0	%
Input resistance	$R_{IN}$		17	24	31	$\text{k}\Omega$
Voltage gain	VG		42	44	46	dB
Output noise voltage	$V_{NO1}$	$R_g=0\Omega$ , bandpass frequency range=20Hz to 20kHz		0.2	0.5	mV
	$V_{NO2}$	$R_g=10\text{k}\Omega$ , bandpass frequency range=20Hz to 20kHz		0.5	1.0	mV
Channel separation	CH SEP	$R_g=10\text{k}\Omega$ , $V_O=0\text{dBm}$	45	60		dB
Supply voltage ripple rejection	SVRR	$R_g=0\Omega$ , $f_r=100\text{Hz}$ , $V_{CCR}=0\text{dBm}$	45	58		dB
Offset voltage	VOS	$R_g=0\Omega$	-180		+180	mV

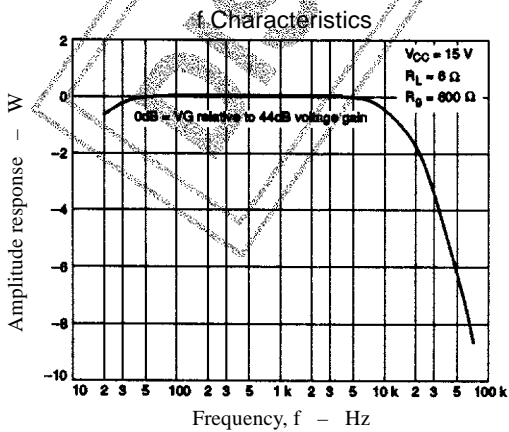
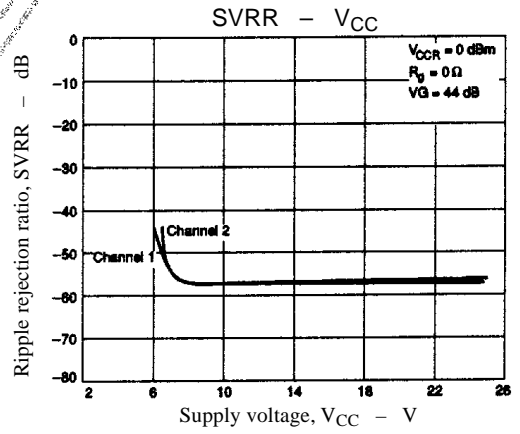
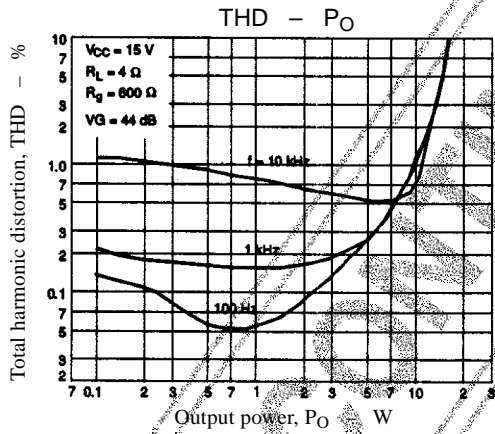
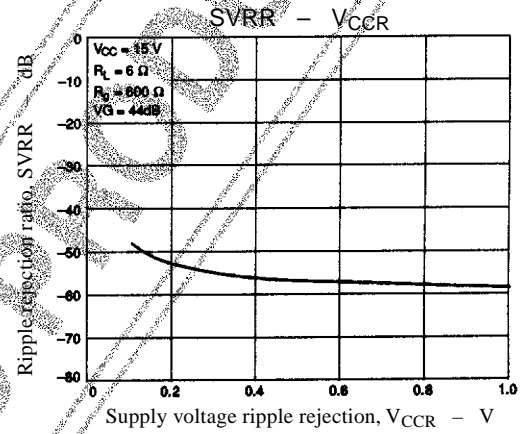
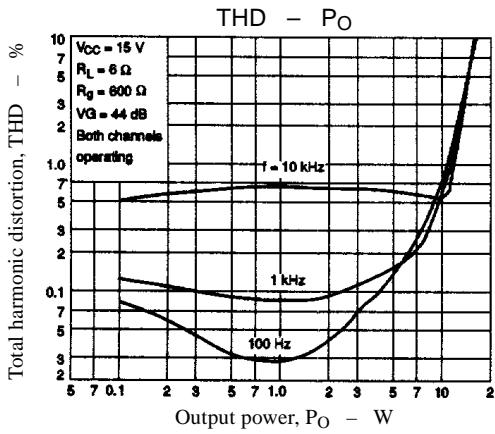
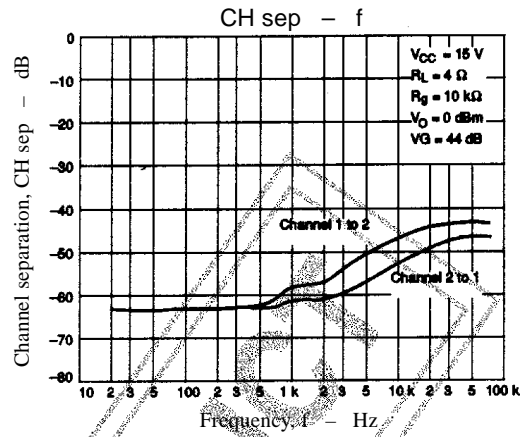
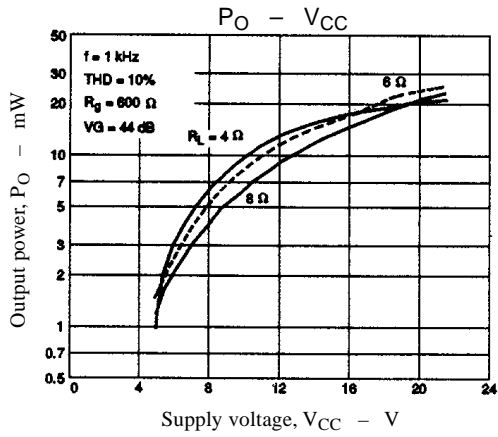


Test Circuit

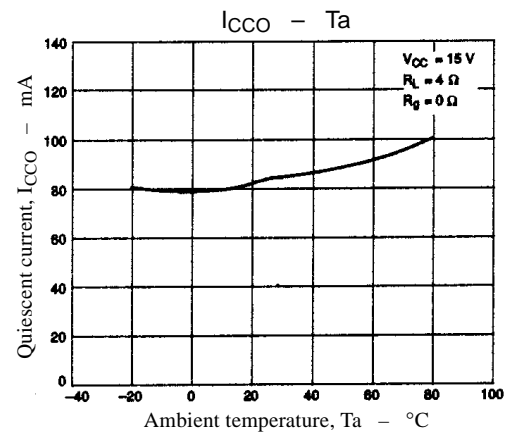
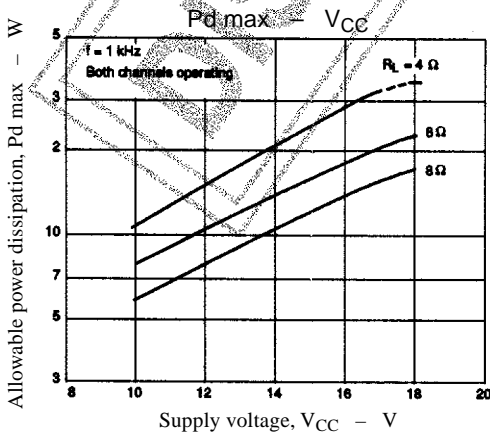
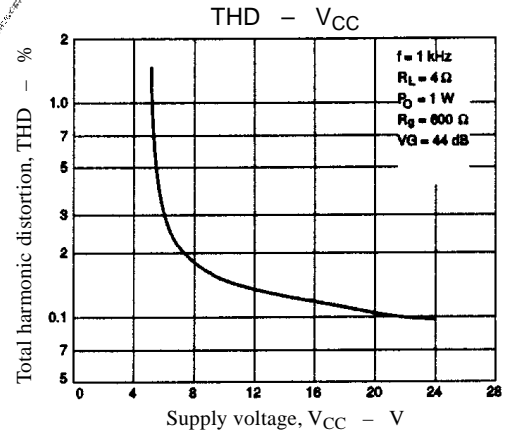
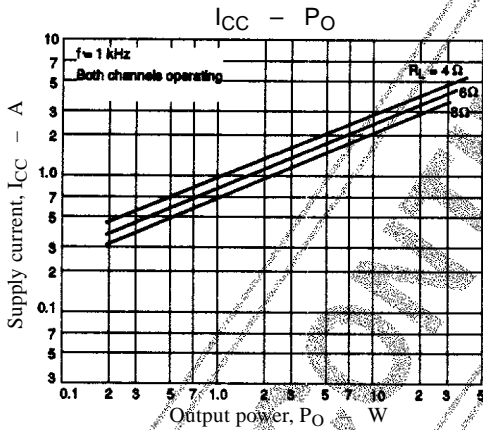
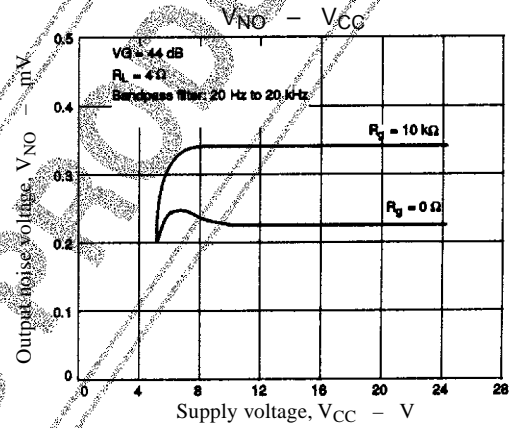
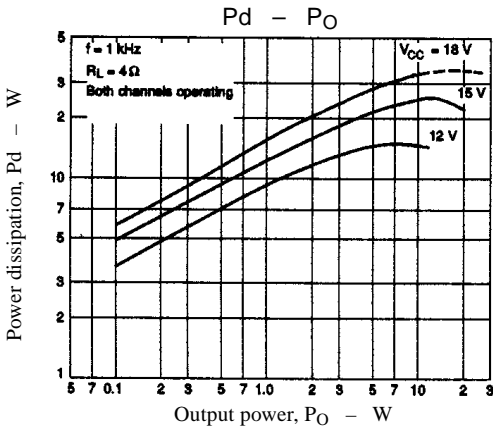
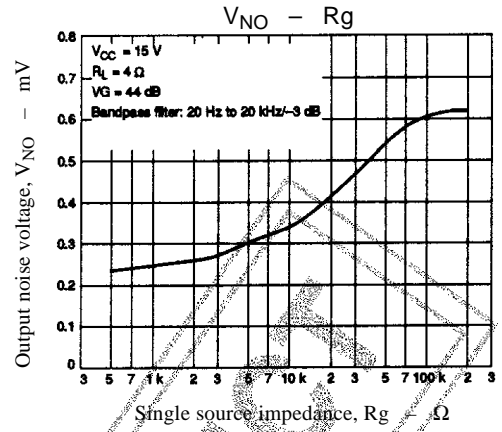
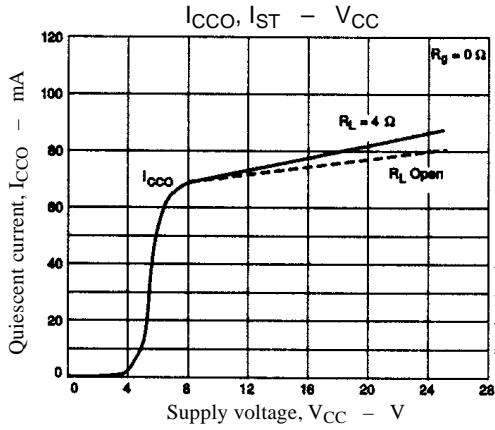


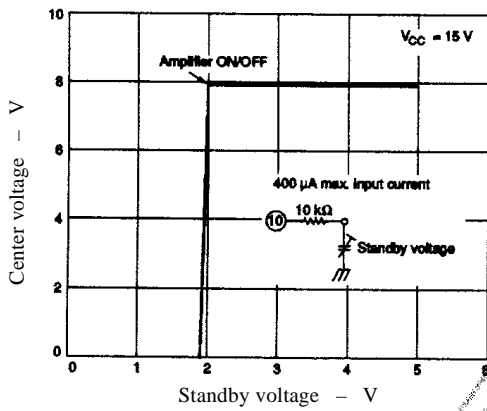
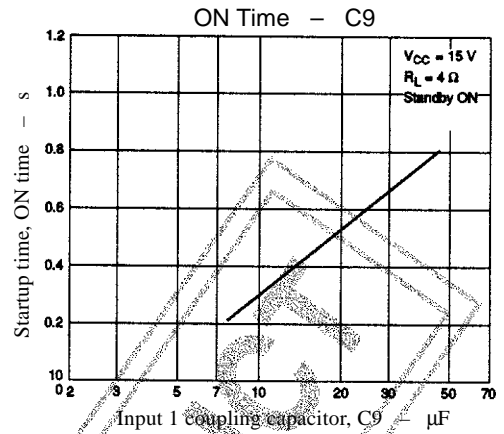
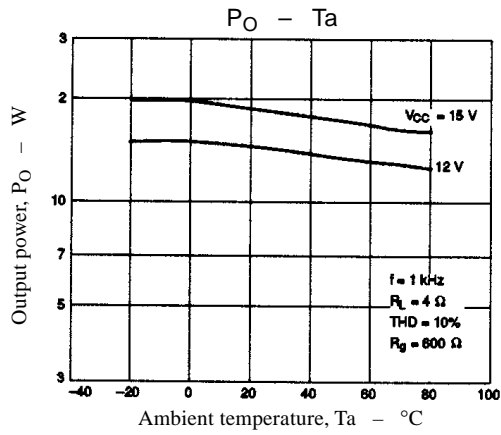
Pin Description

Number	Name	Description
1	VCC	Supply voltage
2	RIP	Ripple filter
3	INPUT1	Channel 1 input
4	NF2	Channel 1 negative feedback input
5	NF1	Channel 1 negative feedback input
6	GND	Ground
7	NF3	Channel 2 negative feedback input
8	NF4	Channel 2 negative feedback input
9	INPUT2	Channel 2 input
10	STANDBY	Standby switch
11	VCC	Supply voltage
12	BS4	Channel 2 bootstrap capacitor
13	MUTE	Muting control
14	OUT4	Channel 2 output
15	GND	Ground
16	NC	No connection
17	OUT3	Channel 2 output
18	BS3	Channel 2 bootstrap capacitor
19	BS1	Channel 1 bootstrap capacitor
20	OUT1	Channel 1 output
21	GND	Ground
22	OUT2	Channel 1 output
23	BS2	Channel 1 bootstrap capacitor



# LA4620





## Functional Description

### Standby Mode Control

Applying 1.5V or more to R3 at STANDBY SW enables the amplifier. The maximum input current is 400 $\mu\text{A}$ .

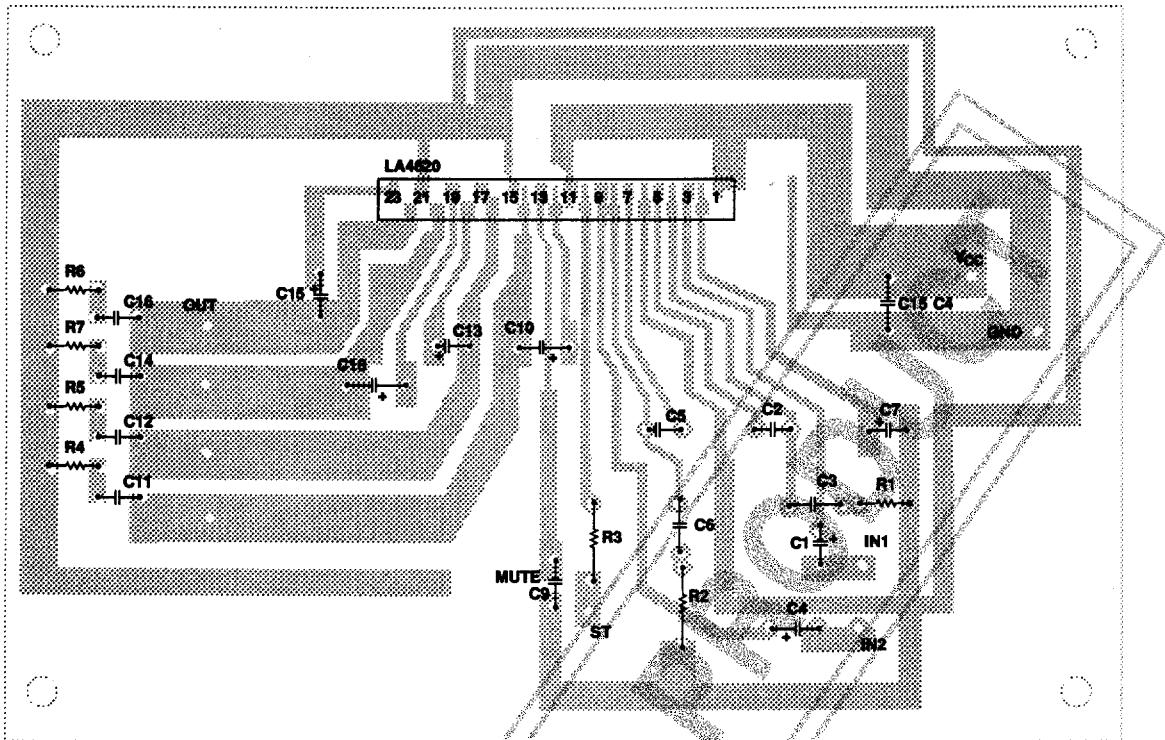
### Mute Control

Pulling MUTE to ground mutes the amplifier. The startup time and recovery time when MUTE is pulled HIGH can be adjusted by changing C9.

### Short-circuit Protection

The LA4620 incorporates a protection circuit for short circuits between output pins. However, this is inadequate for short circuits to ground or the supply. See the design notes.

## Sample Printed Circuit Pattern



### Note

Board size : 125 × 85mm  
 Surface finish : Copper foil

## Design Notes

### Input Capacitors

C1 and C4 are input coupling capacitors. They should both be  $4.7\mu\text{F}$  or less.

### Feedback Capacitors

C2 and C5 from the negative feedback network. They could both be between  $47$  and  $100\mu\text{F}$ .

### Supply Decoupling Capacitor

C7 should be  $100\mu\text{F}$ .

### Supply Ripple Filter Capacitors

C8 and C14 smooth the supply voltage. Both should be at least  $1,000\mu\text{F}$ , and one of at least  $2,000\mu\text{F}$  can be used.

### Startup Time Capacitor

C9 determines the amplifier startup time.

### Bootstrapping Capacitors

C10, C13, C15 and C18 improve the device linearity for a wide range of input signals. These capacitors should be between  $47\mu\text{F}$  and  $100\mu\text{F}$  to improve the low-frequency response.

### Oscillation Suppression

The R1 and C3, and R2 and C6 networks suppress oscillation. Use ceramic or mylar capacitors of  $0.1\mu\text{F}$  or more. Avoid using very large capacitances as these can cause high-frequency distortion.

C11, C12, C16, and C17 from RC networks with R4, R5, R6 and R7, respectively. Use mylar capacitors of  $33\text{nF}$  or more to prevent instability caused by circuit board layout.

### Standby Control Current Limiting Resistor

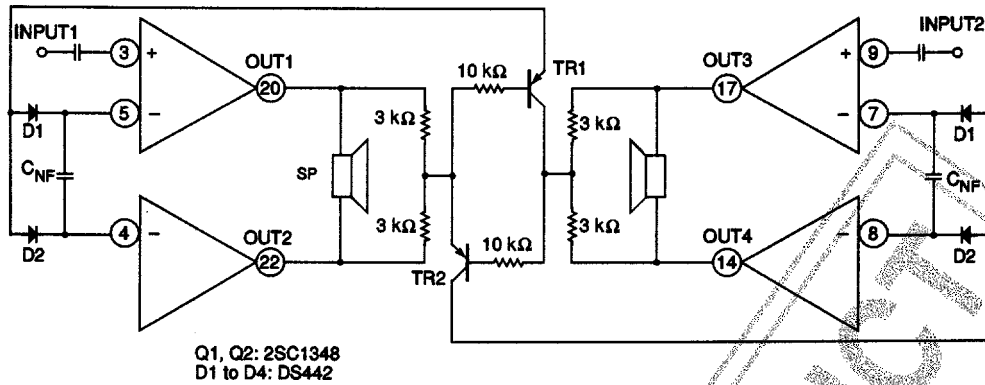
R3 limits the current applied to STANDBY SW. It should be  $10\Omega$  or more.

### Heatsinking

The LA4620 should always be operated with a heatsink. If the heatsink does not provide adequate thermal dissipation, the thermal protection circuit will attenuate the signal level when the device overheats to prevent long-term thermal stress.

### Short-circuit Protection

If outputs can be shorted either to ground or the supply, use an external circuit to protect the device as shown in the following figure.



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