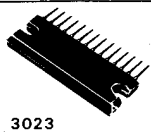




No. 754A



3023

# LA4460,4461

Monolithic Linear Integrated Circuit  
12W AF POWER AMPLIFIER  
FOR CAR RADIO OR CAR STEREO

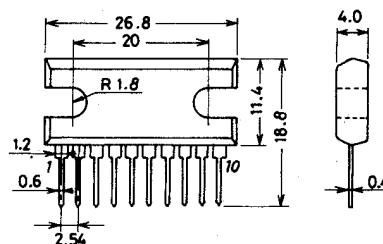
## Features

- . High gain of 51dB typ. and high power output of 12W typ.
- . Possible to delete output and bootstrap capacitors, this encourages cost and space reductions due to external parts reduction.
- . Reduced external components (8 pieces recommended, 6 pieces minimum).
- . Almost no shock noises heard during power on or off operation.
- . Soft tonal quality in saturated power output.
- . Low distortion over low to high ranges of the audio frequencies.
- . Low residual noises ( $R_g=0$ ).
- . Good operation conditions because of SEP (single ended pins) package having been employed to LA4460.
- . All pin terminal layouts of the LA4461 are reversed for easy stereo PC board pattern arrangement.
- . Two ground terminals for pre-amplifier and power amplifier are provided for easy PC board pattern arrangement and for stabilizing distortion characteristics depending on signal source impedance.
- . Voltage gain is fixed at 51dB, however, lowering the gain is possible by adding a resistor.
- . IC is not damaged, if it is connected reversely.
- . Audio muting functions (AC mute & DC mute) are equipped.
- . Several protection circuits are installed, including.
  - a. Thermal runaway protection circuit.
  - b. Over voltage & surge voltage protection circuit.
  - c. Load short-circuit current limiting protection circuit.
  - d. Output pins DC short-circuit protection circuit.  
(grounding protection between OUT & GND, and speaker protection provided.)

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

			unit
Maximum Supply Voltage	$V_{CC\text{max}1}$	quiescent(30sec)	25 V
	$V_{CC\text{max}2}$	with signal	18 V
Supply Current	$I_{10\text{peak}}$	Instantaneous value duty $\leq$ 5%, pulse width $\leq$ 1ms flow-in only	4.5 A
Output Current	$I_7, I_9\text{peak}$	Instantaneous value duty $\leq$ 5%, pulse width $\leq$ 1ms	4.5 A
Surge Supply Voltage	$V_{\text{surge}}$	$t \leq 0.2\text{sec}$	50 V
Allowable Power Dissipation	$P_{D\text{max}}$	$T_c=75^\circ\text{C}$ , See $P_{D\text{max}}$ - $T_a$ graph.	25 W
Package Thermal Resistance	$\theta_{j-c}$		3 $^\circ\text{C/W}$

Case Outline 3024  
(unit:mm)



These specifications are subject to change without notice.

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Operating Temperature	$T_{opg}$	-20 to +75 °C
Storage Temperature	$T_{stg}$	-40 to +150 °C

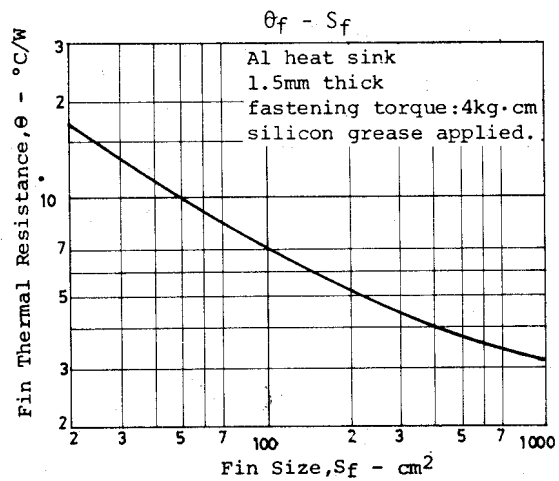
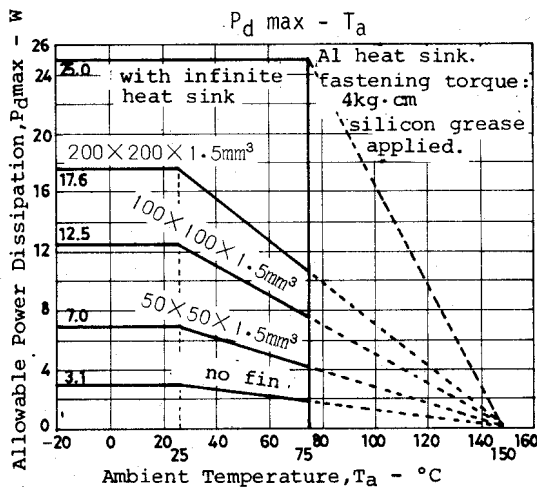
Recommended Operation Condition at  $T_a=25^\circ\text{C}$

Recommended Supply Voltage	$V_{CC}$	13.2 V
Load Resistance	$R_L$	4 to 8 ohm

Operation Characteristics at  $T_a=25^\circ\text{C}$ ,  $V_{CC}=13.2\text{V}$ ,  $R_L=4\text{ohm}$ ,  $f=1\text{kHz}$ ,  $R_G=600\text{ohm}$ , with 100x100x1.5mm<sup>3</sup> Al heat sink at specified test circuit.

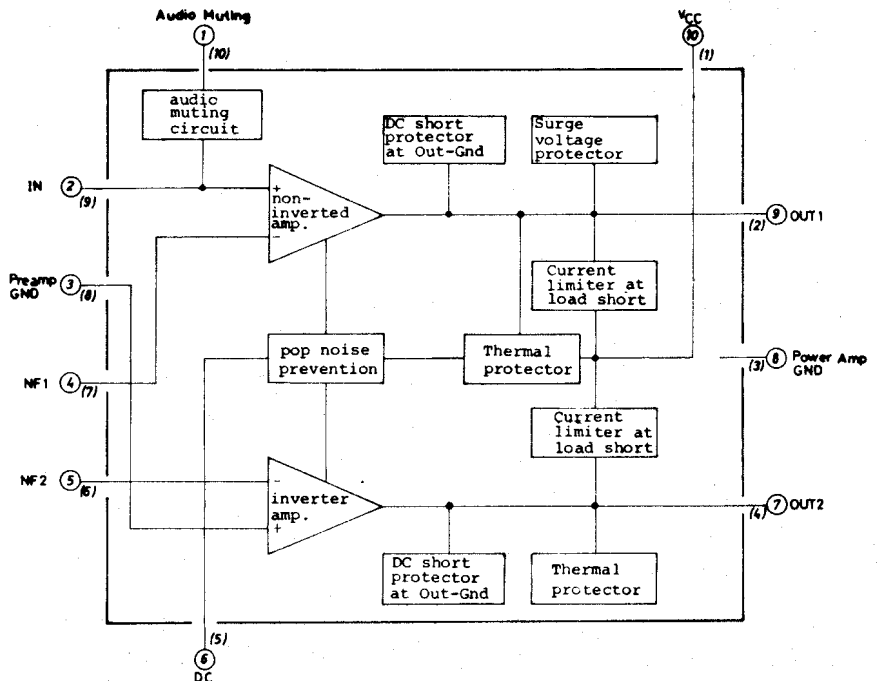
			min	typ	max	unit
Quiescent Current	$I_{CCO}$			65	120	mA
Voltage Gain	VG	closed loop, at specified recommended circuit.	49	51	53	dB
Output Power	$P_O$	THD=10%	10	12		W
Total Harmonic Distortion	THD	$P_O=1\text{W}$		0.1	1.0	%
Input Resistance	$r_i$		21	30		kohm
Output Noise Voltage	$V_{NO 1}$	$R_G=0, f=20\text{Hz to } 20\text{kHz}$ Band Pass Filter		0.4	1.0	mV
	$V_{NO 2}$	$R_G=10\text{kohm}, f=20\text{Hz to } 20\text{kHz}$ , Band Pass Filter		0.6	2.0	mV
Output Offset Voltage	$V_{Off}$		-300		+300	mV
Muting Suppression (AC)	$A_{TT}$	$V_O=0\text{dBm}, V_M=9\text{V}$		38		dB

(Note) : For DC muting,  $A_{TT}=\infty$

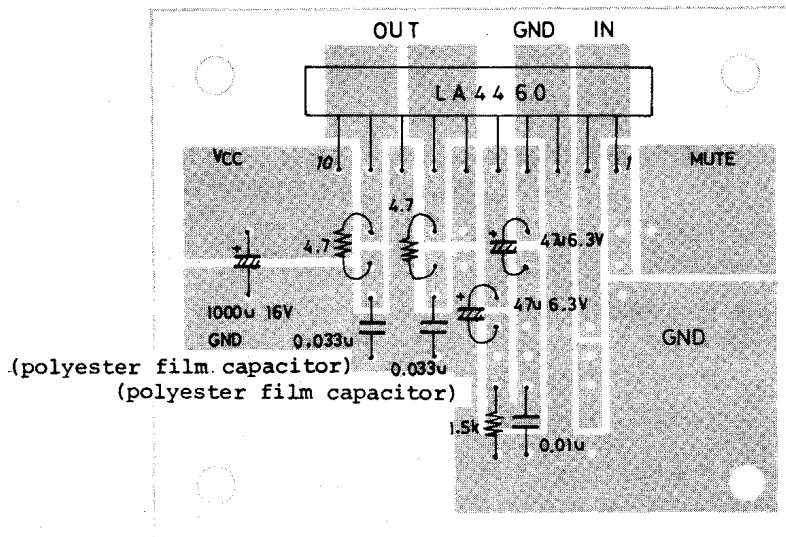
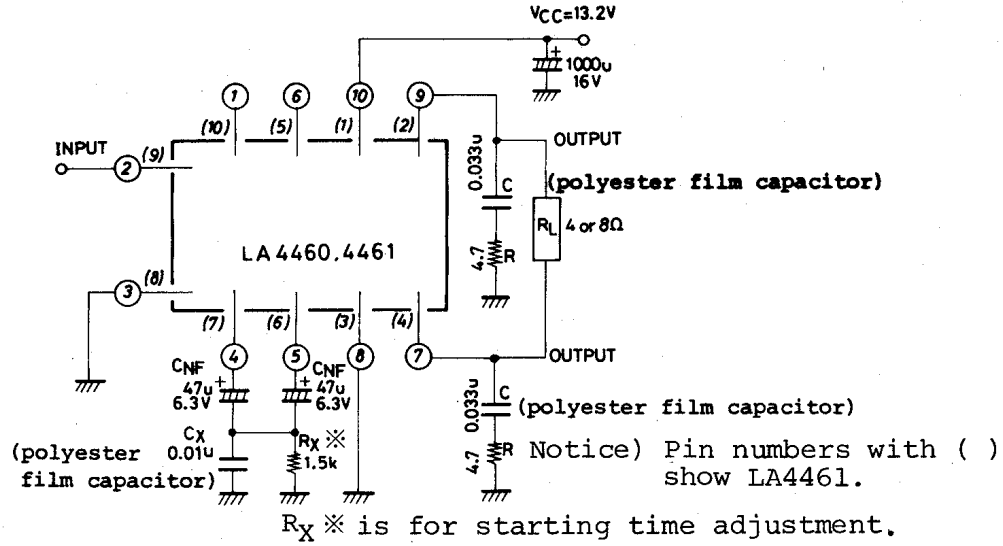


### Equivalent Circuit and Block Diagram

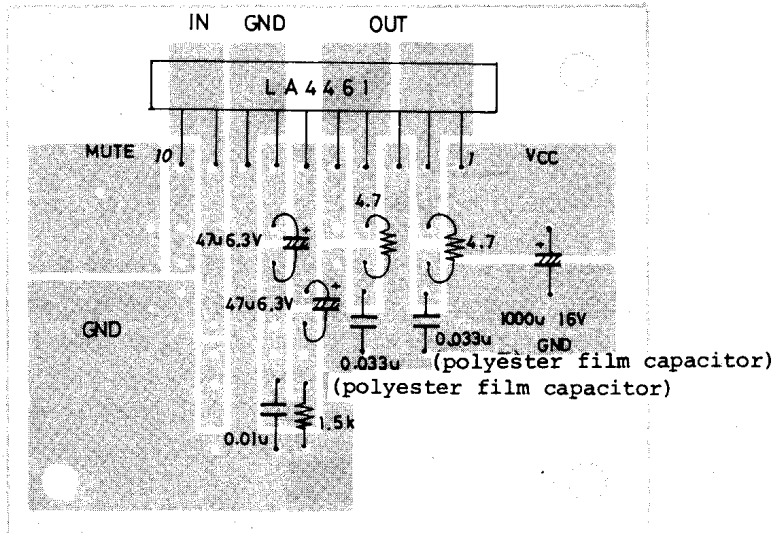
Pin numbers with ( ) show LA4461.



Application 1 : Recommended Circuit



LA4460 An Example of Printed Pattern, (40x50mm<sup>2</sup>,bottom view)

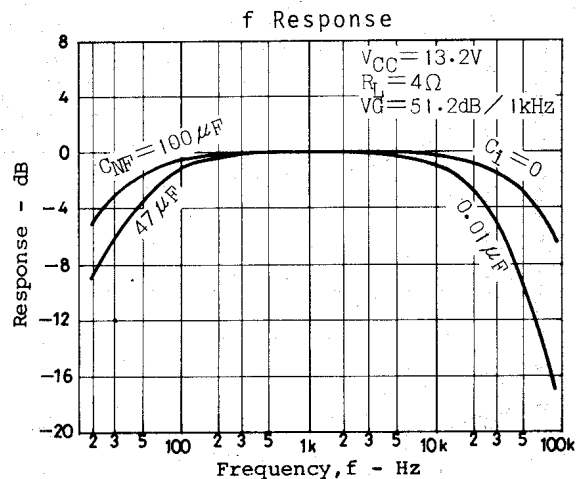
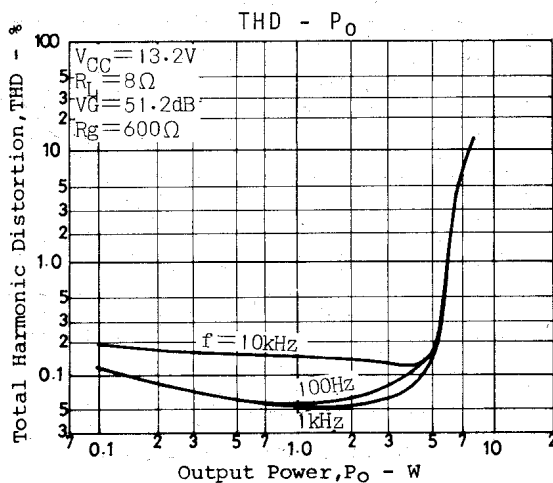
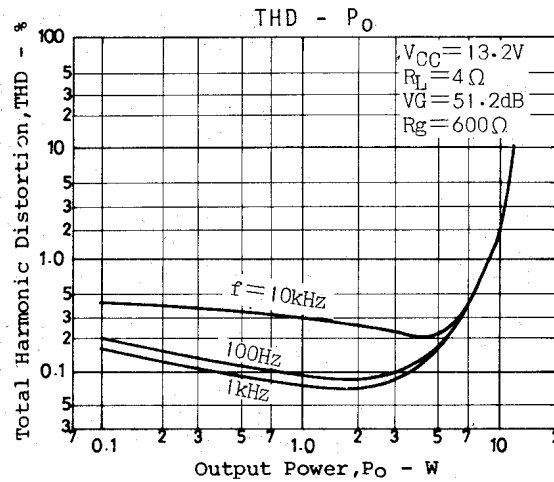
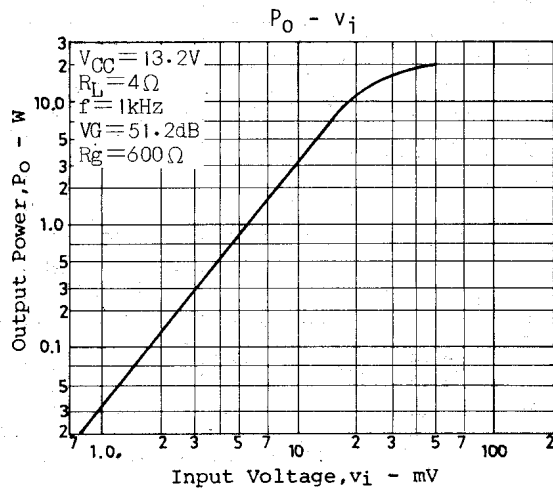
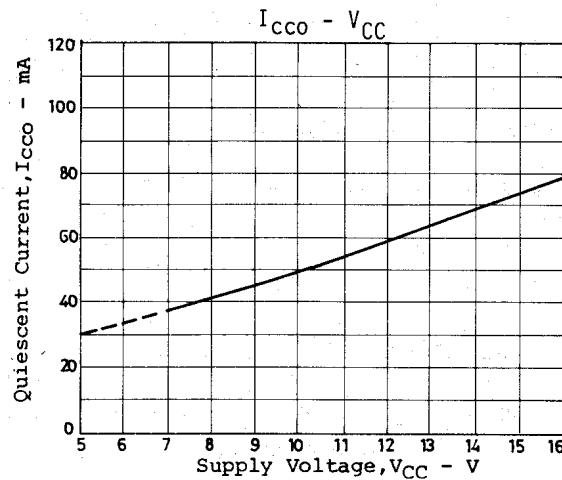


LA4461 An Example of Printed Pattern, (40x50mm<sup>2</sup>,bottom view)

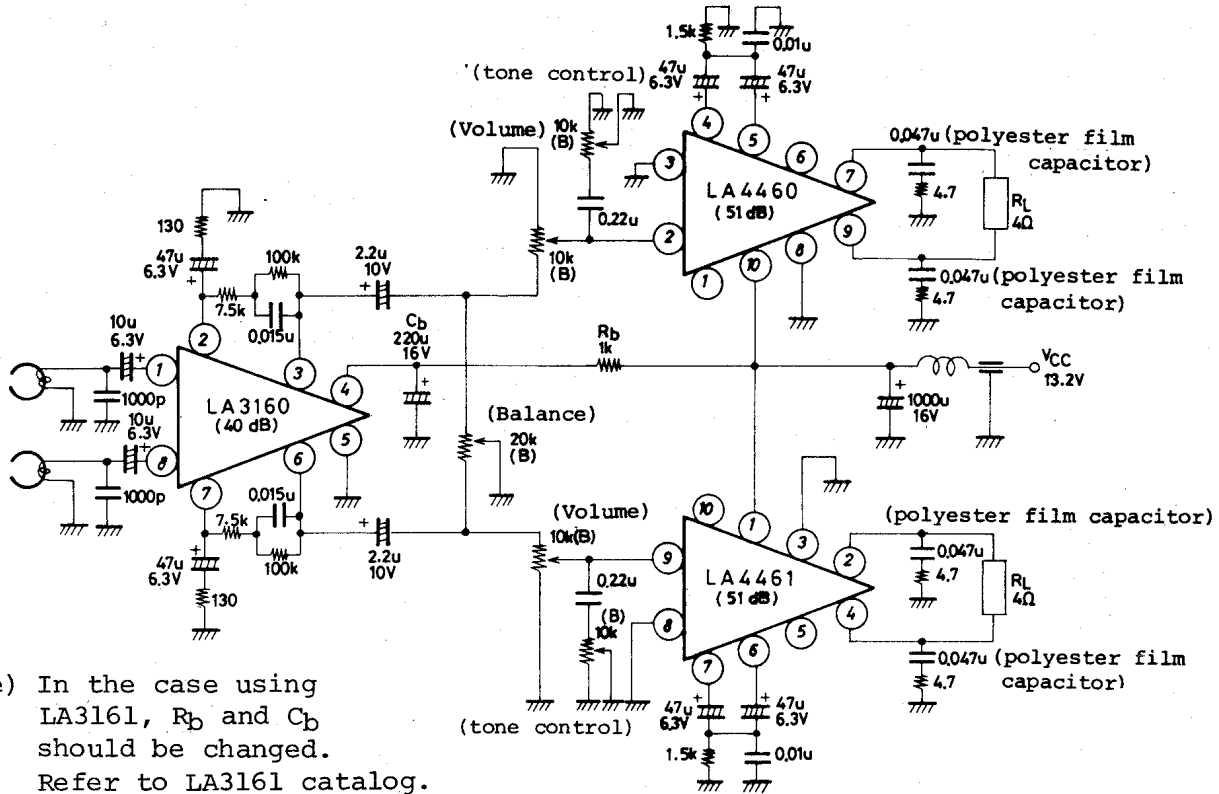
### 3. Pin Voltage (unit:V)

LA4460	1	2	3	4	5	6	7	8	9	10
LA4461	10	9	8	7	6	5	4	3	2	1
Function	AC Audio Muting	IN PUT	Pre GND	NON INV NF	INV NF	DC Audio Muting	INV OUT	Power GND	NON INV OUT	V <sub>CC</sub>
Quiescent Pin Voltage	0	0.06	0	2.8	2.8	5.6	6.6	0	6.6	13.2

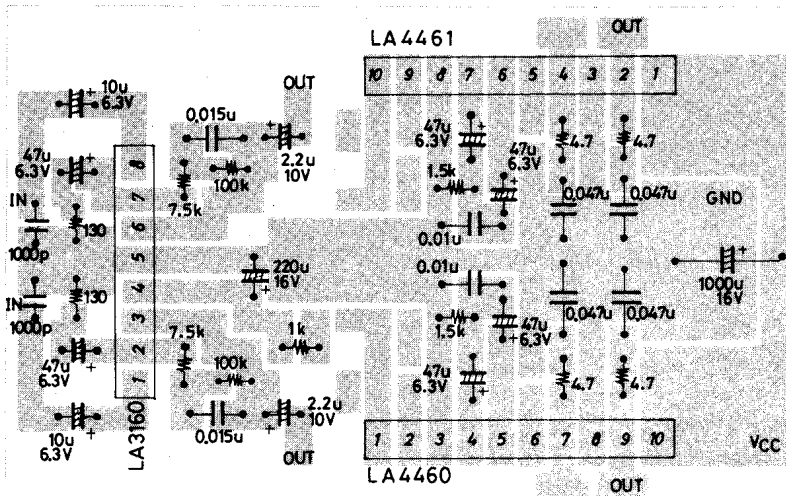
Much data on general characteristics are given for the application example #1, but these data can be applied to the application example #2 because of no characteristic changed. However, the data on "Shock noises at power turned on", "Starting time  $t_s$ " and "DC muting" are shown for only the application example #1. For the same characteristics to be applied to the application example #2, refer to 1-C on page 4.



# Application 3

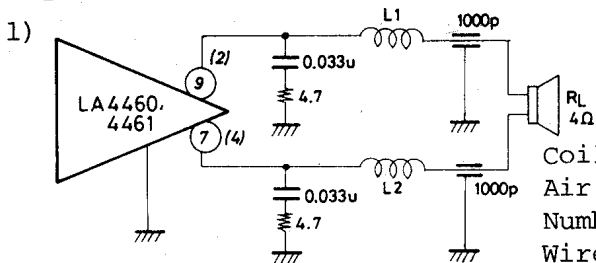


Notice) In the case using LA3161,  $R_b$  and  $C_b$  should be changed. Refer to LA3161 catalog.



An Example of Printed Pattern, (42x65mm<sup>2</sup>, bottom view)

Example of oscillation compensation where through line capacitors are used at the output terminals.



Coil Used :  
 Air core Innerdiameter : 8  $\phi$   
 Number of turns : 6 turns  
 Wire size : UEW 1.5 Winding method : solenoid (0.3uH)

Connect each coil,  $L_1$  and  $L_2$ , in series with each output terminal, where  $L_1=L_2$ .