Ordering number:ENN1277E

Monolithic Linear IC

LA4445

5.5W 2-Channel AF Power Amplifier

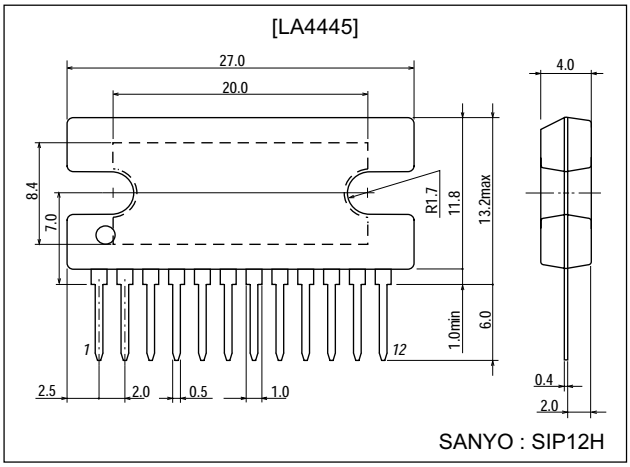
Features

- Dual channels.
  Output : 5.5W×2 (typ.)
- Minimun number of external parts required.
- Small pop noise at the time of power supply ON/OFF and good starting balance.
- Good ripple rejection : 46dB (typ.)
- Good channel separation.
- Small residual noise (Rg=0).
- Built-in protectors.
  a. Thermal protector
  b. Overvoltage, surge protector
  c. Adjacent pins (9-10, 9-8) short protector

Package Dimensions

unit:mm

3049A-SIP12H



Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max1	Quiescent (t=30s)	25	V
	V_{CC} max2	Operating	18	V
Surge supply voltage	V_{CC}(surge)	t≤0.2s	50	V
Maximum output current	I_O peak	1 channel	3.5	A
Allowable power dissipation	Pd max	See Pd max – Ta characteristic.	15	W
Operating temperature	Topr		–20 to +75	˚C
Storage temperature	Tstg		–40 to +150	˚C

Operating Conditions at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		13.2	V
Recommended load resistance	R_L	2 channels	4	Ω
Operating voltage range	V_{CC} op		10 to 16	V

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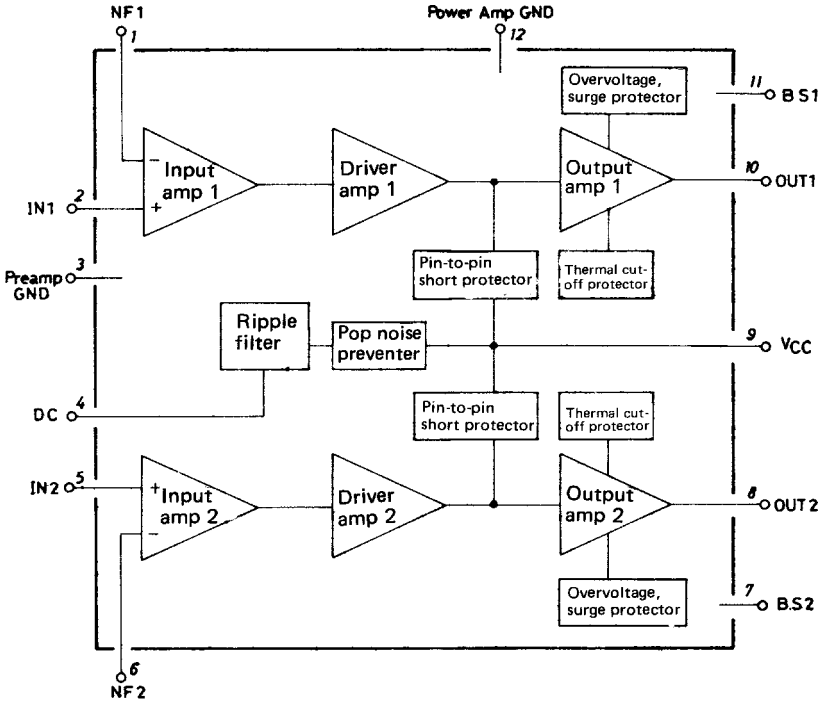
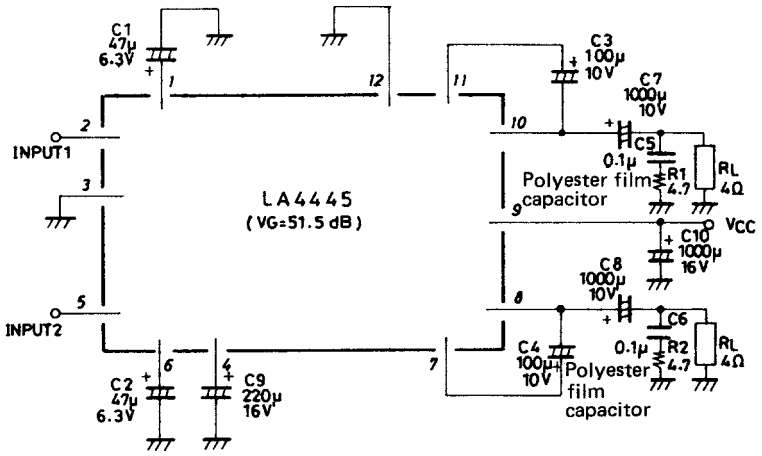
Operating Characteristics at Ta = 25°C, V_{CC}=13.2V, R_L=4Ω, f=1kHz, Rg=600Ω, with 100×100×1.5mm³ Al heat sink, See specified Test Circuit.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent current	I_{CCO}			75	150	mA
Voltage gain	V_G		49.5	51.5	53.5	dB
Output power	P_O	THD=10%, 2 channels	5.0	5.5		W
Total harmonic distortion	THD	P_O=1W		0.15	1.0	%
Input resistance	r_i			30		kΩ
Output noise voltage	V_{NO}	Rg=0		0.6	1.0	mV
		Rg=10kΩ		1.0	2.0	mV
Ripple rejection	R_r	Rg=0, V_R=200mV, f_R=100Hz		46		dB
Channel separation	Ch sep	Rg=10kΩ, V_O=0dBm	45	55		dB

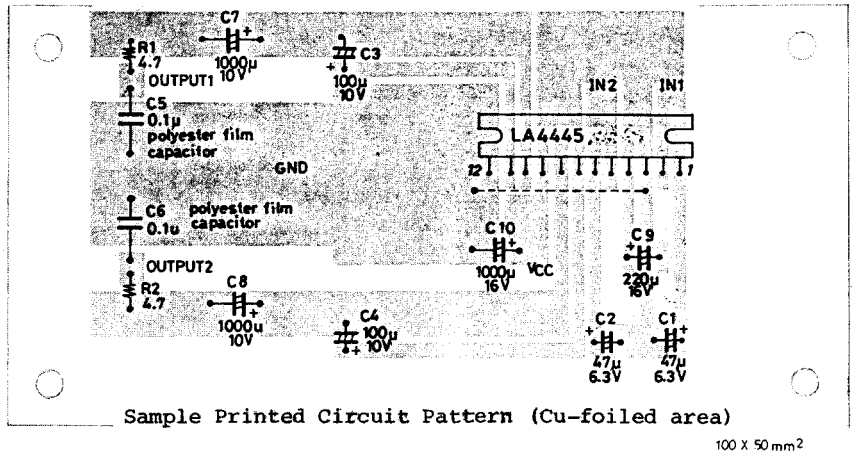
Equivalent Circuit Block Diagram

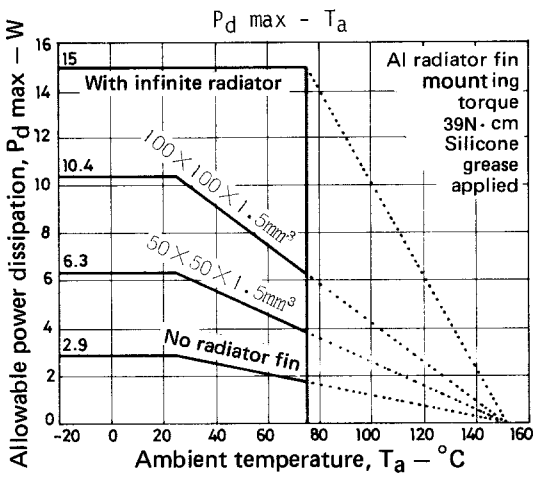


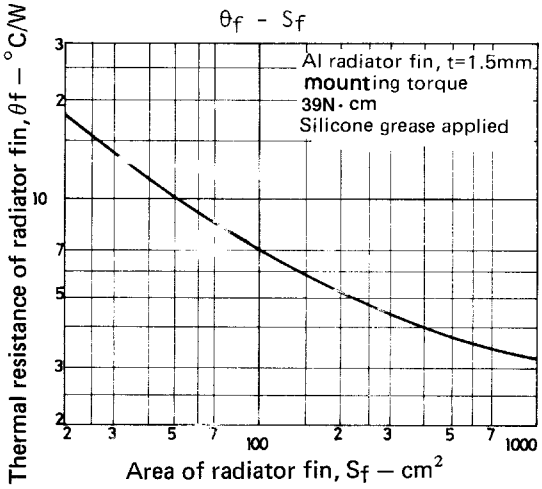
Sample Application Circuit



Sample Printed Circuit Pattern

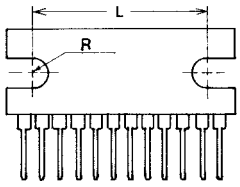






Proper Cares in Mounging Radiator Fin

1. The mounting torque is in the range of 39 to 59N · cm.
2. The distance between screw holes of the radiator fin must coincide with the distance between screw holes of the IC. With case outline dimensions L and R referred to, the screws must be tightened with the distance between them as close to each other as possible.



3. The screw to be used must have a head equivalent to the one of truss machine screw or binder machine screw defined by JIS. Washers must be also used to protect the IC case.
4. No foreign matter such as cutting particles shall exist between heat sink and radiator fin. When applying grease on the junction surface, it must be applied uniformly on the whole surface.
5. IC lead pins are soldered to the printed circuit board after the radiator fin is mounted on the IC.

Description of External Parts

C1 (C2) : Feedback capacitor
Low cutoff frequency f_L depends on this feedback capacitor. Increasing the capacitor value makes the starting time later

C3 (C4) : Bootstrap capacitor
If the capacitor value is decreased, the output at low frequencies goes lower.
(Recommended value : 47μF min.)

C5 (C6) : Oscillation blocking capacitor
Polyester film capacitor, being excellent in temperature characteristic, frequency characteristic, is recommended. The capacitor value can be reduced to 0.047μF depending on the stability of the board.

C7 (C8) : Output capacitor
The low cutoff frequency depends on this output capacitor. In bridge connection applications the output capacitor must be normally connected.

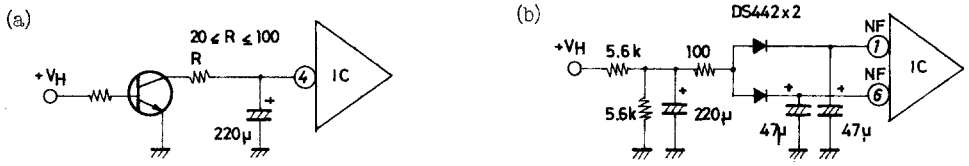
C9 : Decoupling capacitor
Used for the ripple filter. Since the rejection effect is saturated at a certain capacitor value, it is meaningless to increase the capacitor value more than needed. This capacitor, being also used for the time constant of the pop noise preventer, affects the starting time. Too small a capacitor value makes the pop noise level higher.

C10 : Power source capacitor.

R1 (R2) : Oscillation blocking filter resistor.

IC Application

1. V.G. can be reduced by connecting R_{NF}' to the N.F. pin (pins 1, 6)
   V.G. is calculated by the following formula.
   $VG=20\log R_f / (R_{NF}+R_{NF}')$
   where R_f=20kΩ, R_{NF}=50Ω
   The usable lower limit of VG is 36dB or thereabouts. When setting VG, oscillation and high cutoff frequency f_H must be considered.
2. External audio muting method



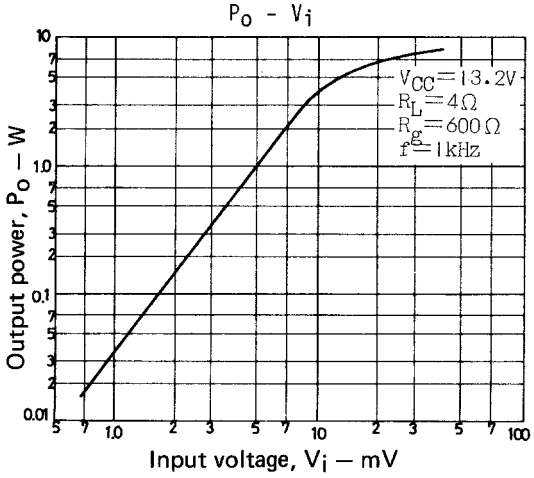
Proper Cares in Using IC

· If the IC is used in the vicinity of the maximum rating, even a slight variation in conditions may cause the maximum rating to be exceeded, thereby leading to breakdown. Allow an ample margin of variation for supply voltage, etc. and use the IC in the range where the maximum ratings is not exceeded.

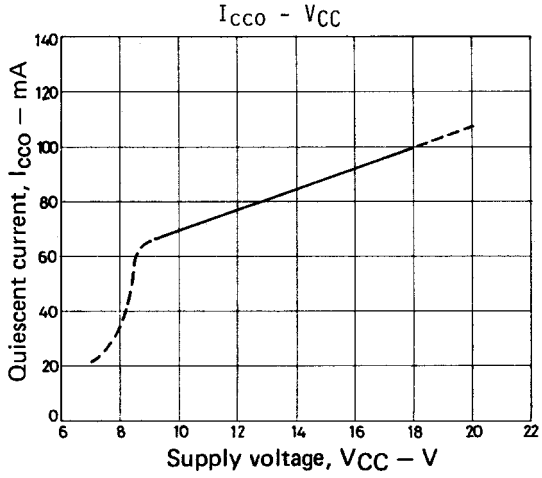
· Printed circuit board
When making the board, refer to the sample printed circuit pattern. No feedback loop must be formed between input and output. Both Pins GND and Power GND must be shorted at the root of IC pin so that the common impedance can be reduced.

· Others
The radiator fin on the package must be normally connected to GND.
Some plug jacks to be used for connecting to the external speaker are such that both poles are shorted once when connecting. In this case, the load is shorted, which may break down the IC.

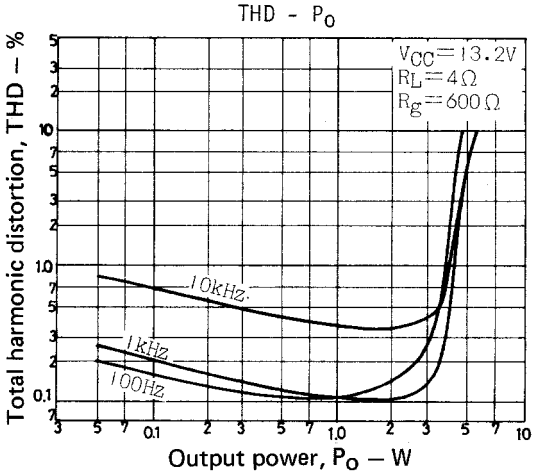
P_O - V_i



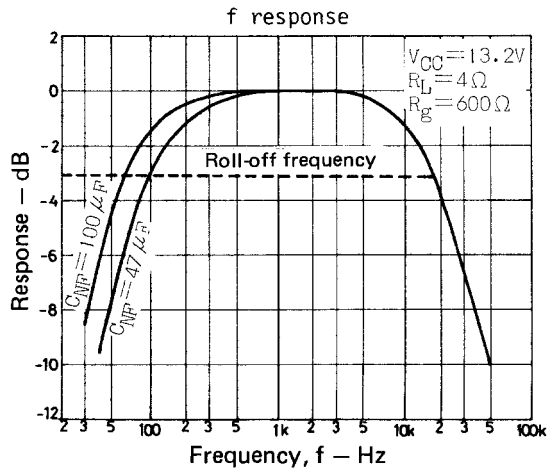
I_{CCO} - V_{CC}



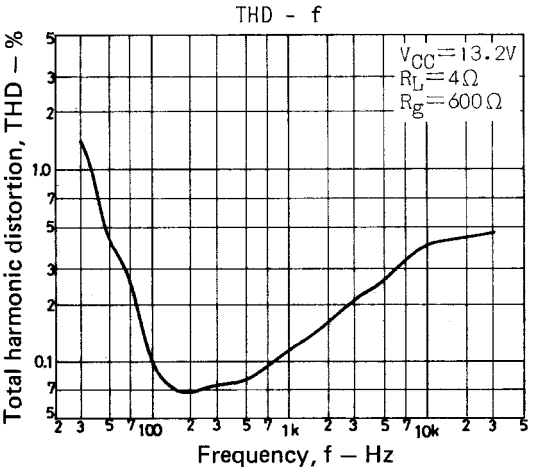
THD - P_O



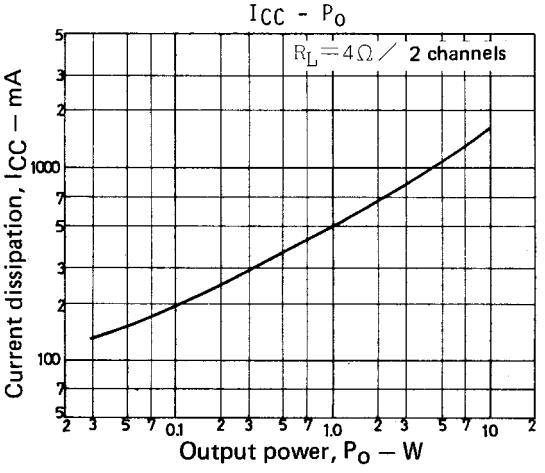
f response



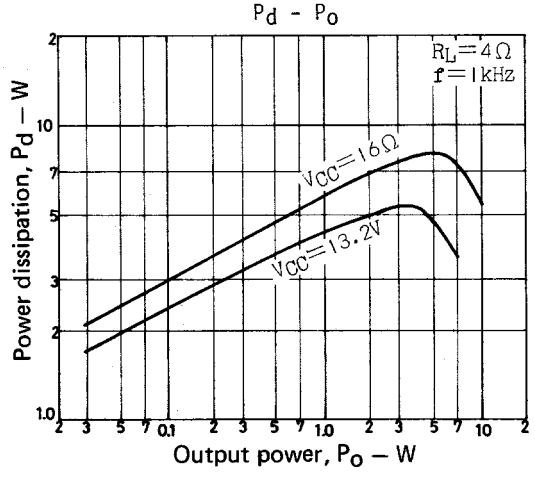
THD - f



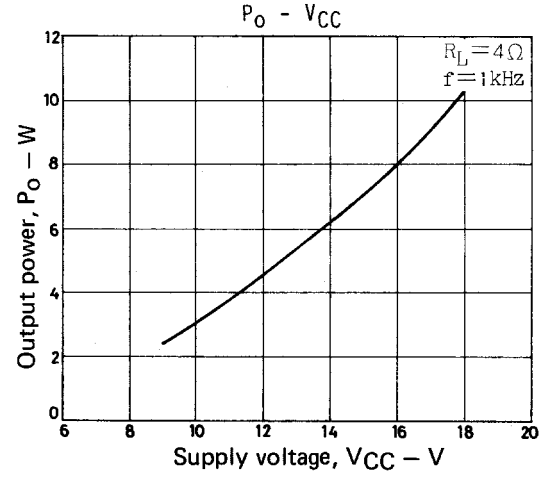
I_{CC} - P_O

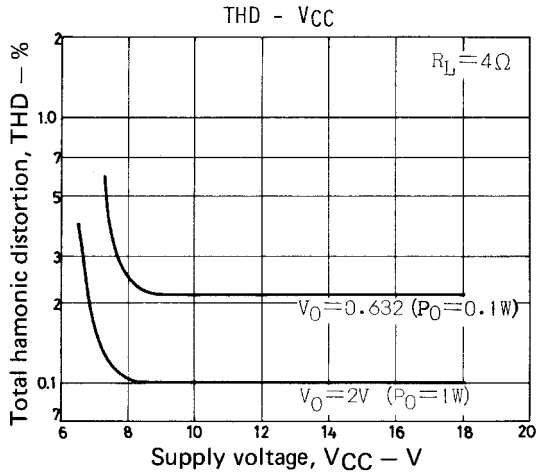


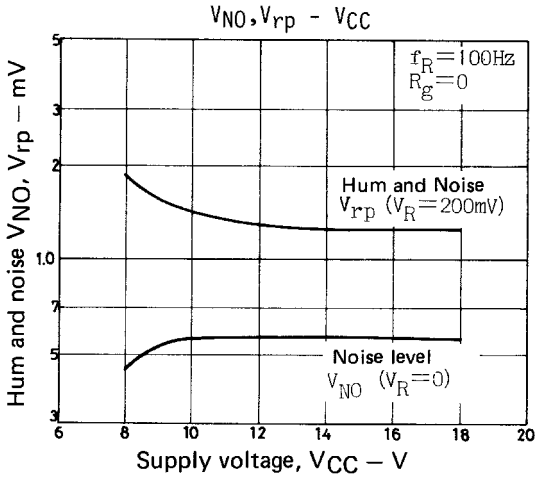
P_d - P_O

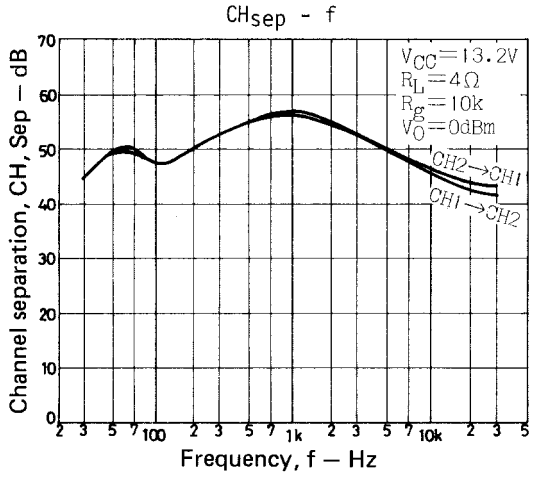


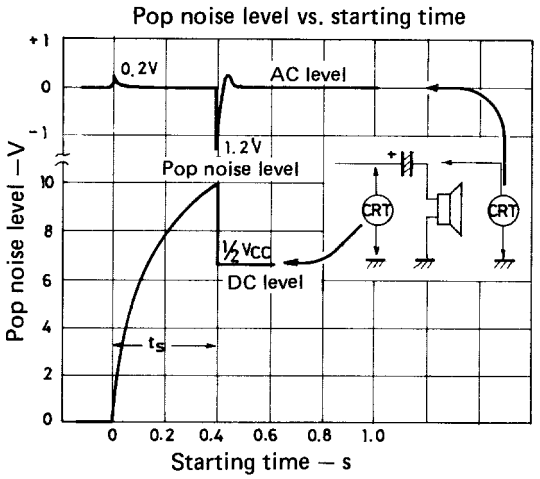
P_O - V_{CC}

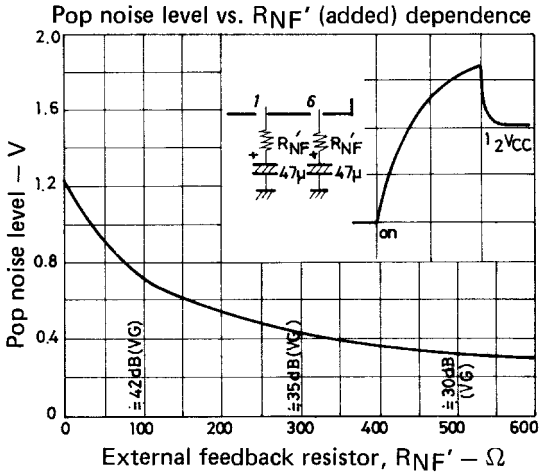












Sample Application Circuit : Bridge connection application