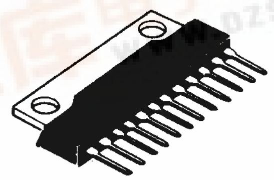
HA1394

Dual 6 to 8W Audio Power Amplifier

The HA1394 dual audio power amplifier is specifically designed for audio outputs in modular stereos and multiplex sound TV's. This amplifier can deliver 8.2W/channel when Vcc=25V, R_L=8Ω and THD=5%.

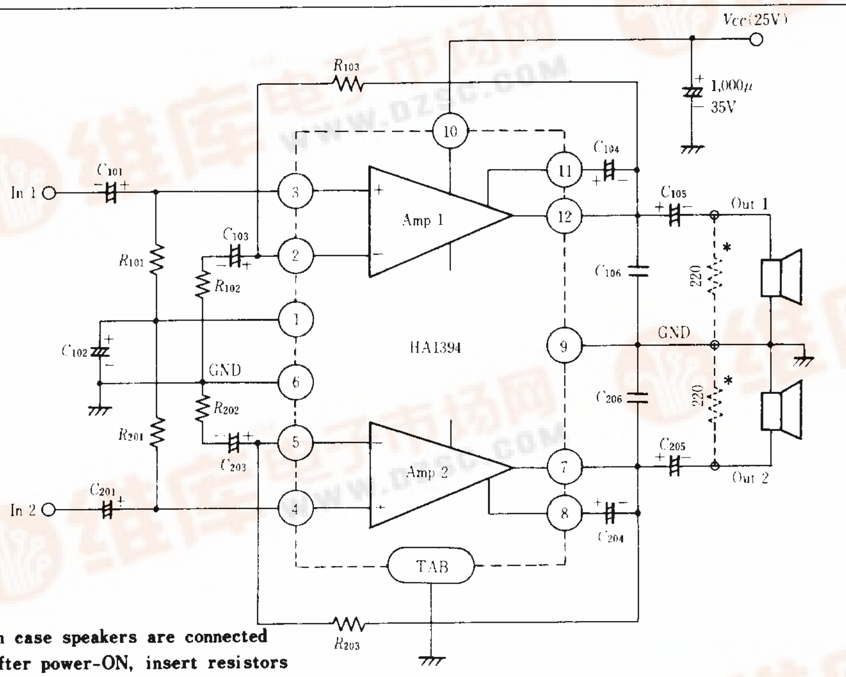
■ FEATURES

- Dual power amplifier; 7~8.2W per channel
- Low external components count (Capacitor: 11, Resistor: 6 per 2 channel)
- Wide supply voltage range: from 18 to 35V
- Low noise and low distortion
- Internal thermal protection.



(SP-12T)

■TYPICAL APPLICATION



Note: *In case speakers are connected after power-ON, insert resistors of approximately 220Ω for charging C_{105} and C_{205}. These resistors prevent the IC from deteriorating.

External Parts	Recommended Value
C_{101}, C_{201}	4.7μF (25V)
C_{102}	100μF (25V)
C_{103}, C_{203}	22μF (25V)
C_{104}, C_{204}	100μF (16V)
C_{105}, C_{205}	470μF (25V)
C_{106}, C_{206}	0.1μF
R_{101}, R_{201}	100kΩ
R_{102}, C_{202}	1kΩ
R_{103}, R_{203}	100kΩ

■ABSOLUTE MAXIMUM RATINGS (Ta=25℃)

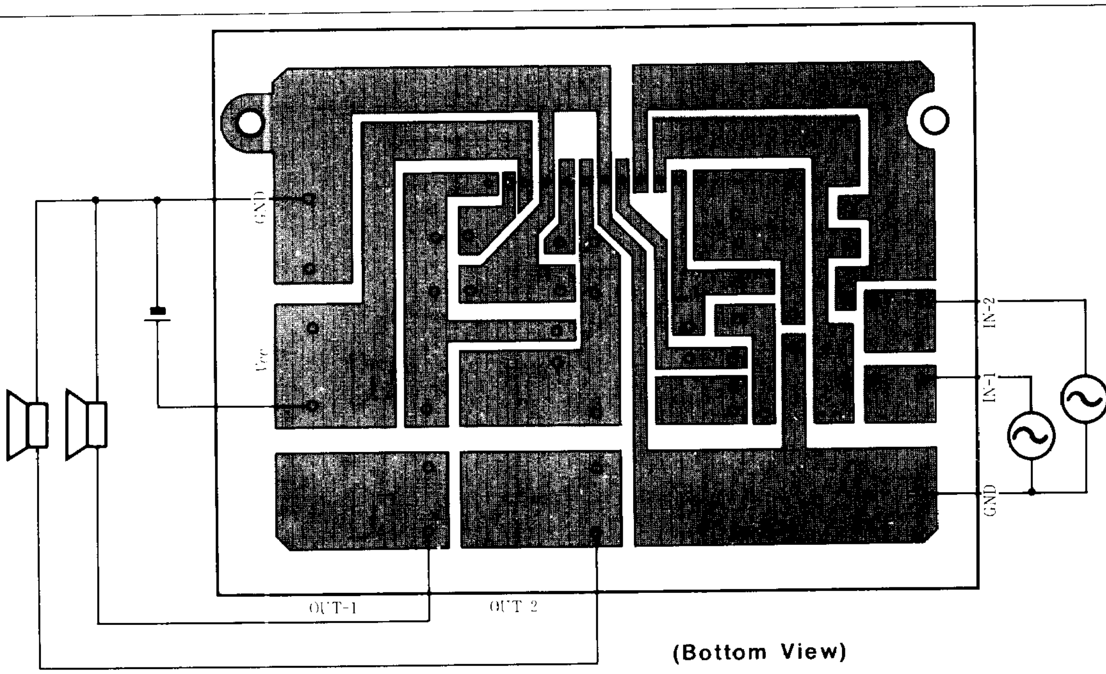
Item	Symbol	Rating	Unit
Supply Voltage	V_{CC}	35	V
Output Current per channel	$I_{O(peak)}$	4.5	A
Power Dissipation *	P_T	15	W
Junction Temperature	T_j	150	℃
Operating Temperature	T_{opr}	−20 to +70	℃
Storage Temperature	T_{stg}	−55 to +125	℃

*Value at T_C=90℃ (T_C: Temperature of IC Header)

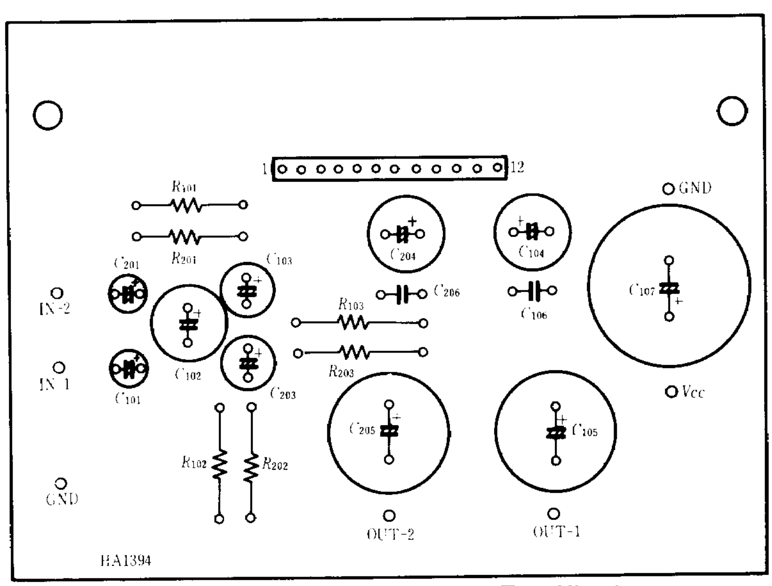
■ELECTRICAL CHARACTERISTICS (V_{CC}=25V, R_L=8Ω, Ta=25℃, 2-channel operation)

Item	Symbol	Test Condition		min	typ	max	Unit
Quiescent Current	I_Q	V_{in}=0 (2-channel)		—	80	150	mA
Voltage Gain	G_V	f=1kHz		—	40	—	dB
Difference of Voltage Gain	ΔG_V	f=1kHz		—	—	1.5	dB
Output Power per Channel	P_{out}	R_L=8Ω, THD=5%		7.0	8.2	—	W
Total Harmonic Distortion	THD	P_{out}=1W, f=1kHz		—	0.04	0.8	%
Noise Output	WBN	R_g=10kΩ, BW=20Hz to 20kHz		—	0.22	1.0	mV
Input Resistance	R_{in}	f=1kHz		—	100	—	kΩ
Cross-Talk	$C.T$	f=1kHz, R_g=600Ω		50	62	—	dB
Supply Voltage Rejection Ratio	SVR	f=100Hz, R_g=600Ω		45	57	—	dB
Roll-off Frequency	f_L	ΔG_V=−3dB from f=1kHz Ref.	Low	—	40	—	Hz
	f_H		High	—	80	—	kHz

■PC-BOARD LAYOUT PATTERN

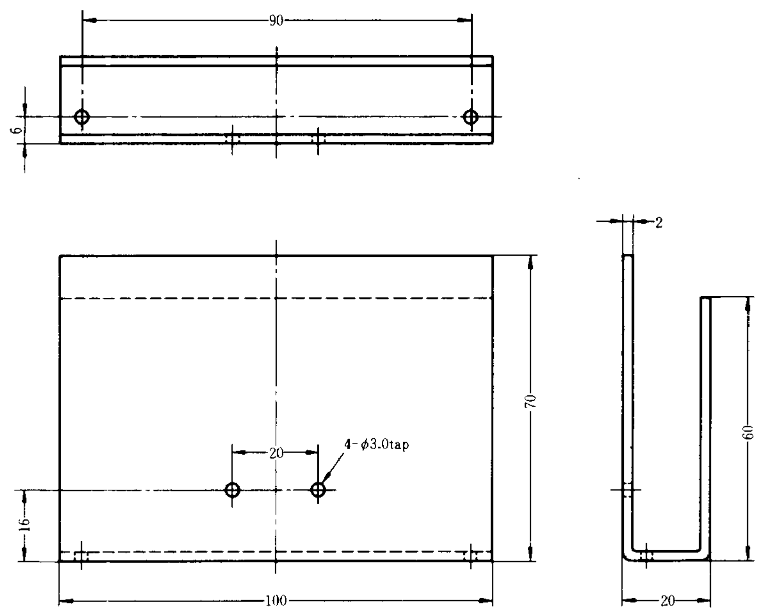


(Bottom View)



(Top View)

■HEAT SINK

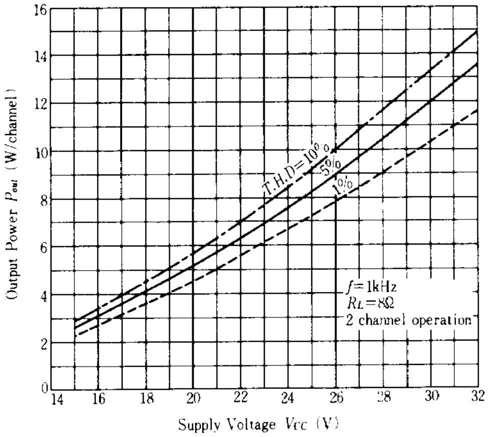


2mm' Al
(Unit : mm)

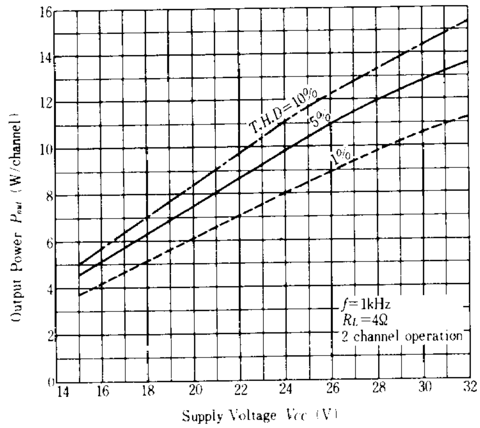
■EXTERNAL COMPONENTS

Parts No.	Recommended Value	Purpose	Influence: Smaller than recommended value	Influence: Larger than recommended value
C_{101} C_{201}	4.7μF (25V)	Input coupling	Increase of signal source resistance; Higher 1/f noise	—
C_{102}	100μF (25V)	Supply voltage ripple rejection	Deterioration of supply voltage ripple rejection	More time required for some sound supply after power-ON
C_{103} C_{203}	22μF (25V)	Feedback	Higher low frequency roll-off	Pop sound at switch-on
C_{104} C_{204}	100μF (16V)	Bootstrap	Narrower power bandwidth	—
C_{105} C_{205}	470μF (25V)	Output coupling	Higher low frequency roll-off	Values larger than 1000μF may cause IC deterioration
C_{106} C_{206}	0.1μF	Frequency Stability	Causes oscillation	Increase current consumption at high frequency
R_{101} R_{201}	100kΩ	DC bias for input pins 3 and 4; Determination of input resistance	Smaller input resistance	—
R_{102} R_{202}	1kΩ	Determination of voltage gain*	—	—
R_{103} R_{203}	100kΩ		Deviation of pins 7 and 12 voltages from the Vcc/2 (R_{103}/R_{203} values should be the same as R_{101}/R_{201}.)	

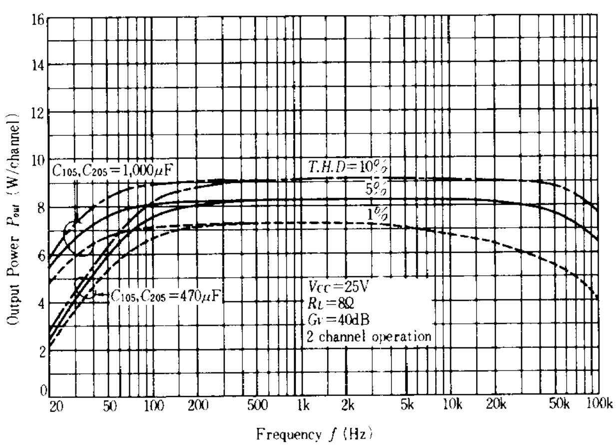
OUTPUT POWER VS. SUPPLY VOLTAGE (1)



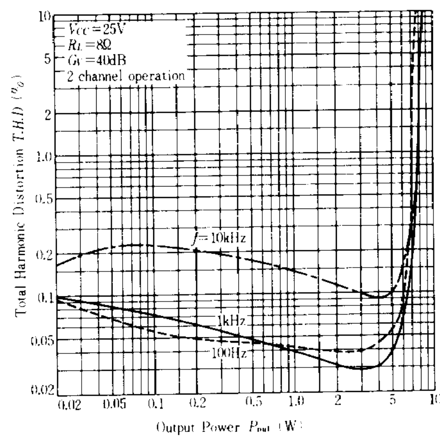
OUTPUT POWER VS. SUPPLY VOLTAGE (2)



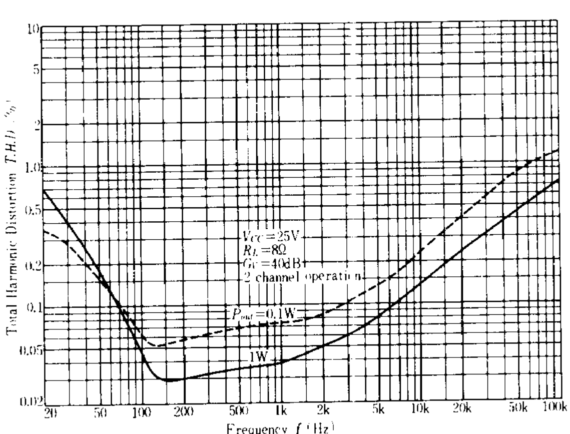
OUTPUT POWER VS. FREQUENCY



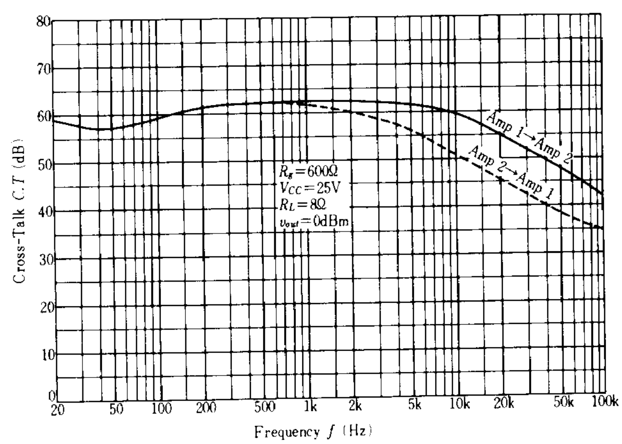
TOTAL HARMONIC DISTORTION VS. OUTPUT POWER



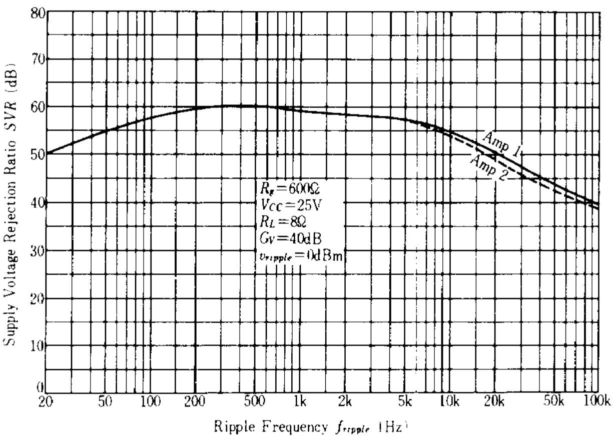
TOTAL HARMONIC DISTORTION VS. FREQUENCY



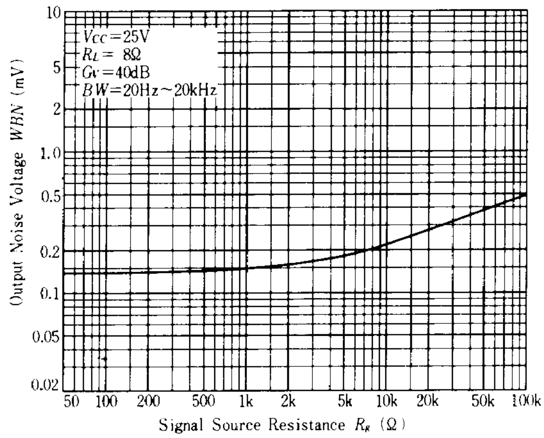
CROSS-TALK VS. FREQUENCY



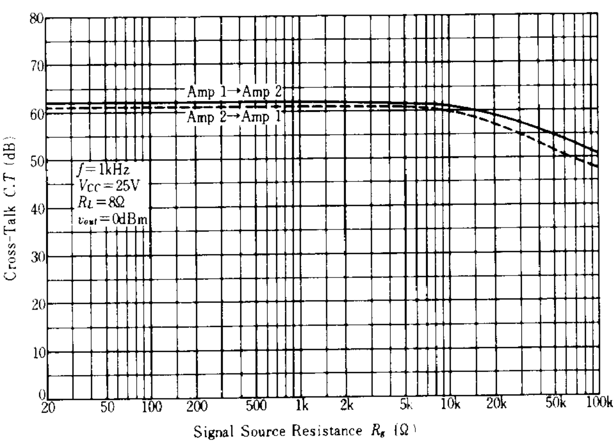
SUPPLY VOLTAGE REJECTION RATIO VS. RIPPLE FREQUENCY



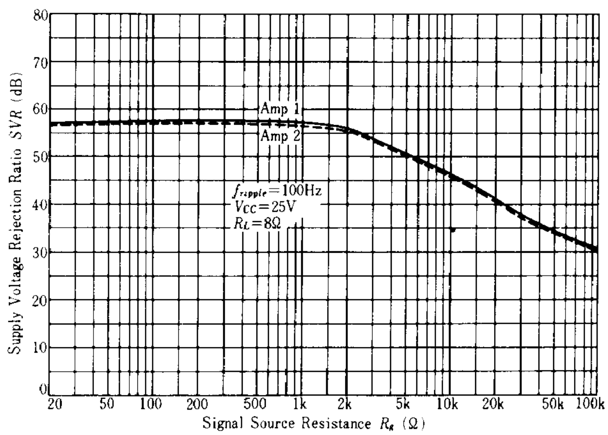
OUTPUT NOISE VOLTAGE VS. SIGNAL SOURCE RESISTANCE



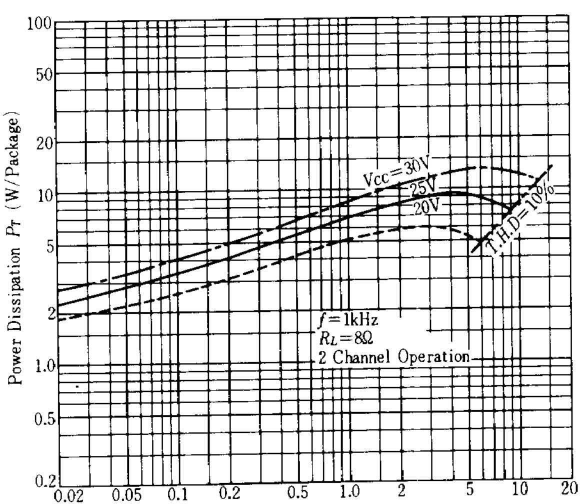
CROSS-TALK VS. SIGNAL SOURCE RESISTANCE



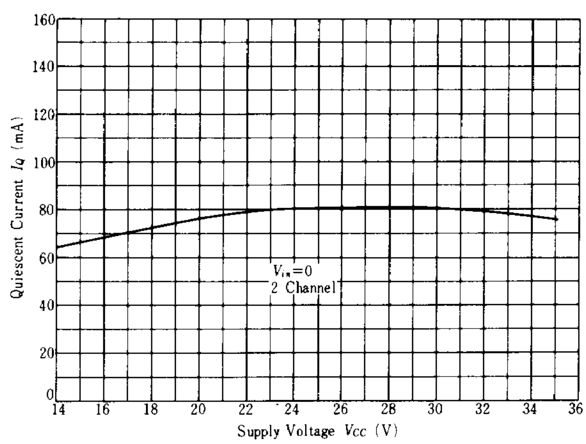
SUPPLY VOLTAGE REJECTION RATIO VS. SIGNAL SOURCE RESISTANCE



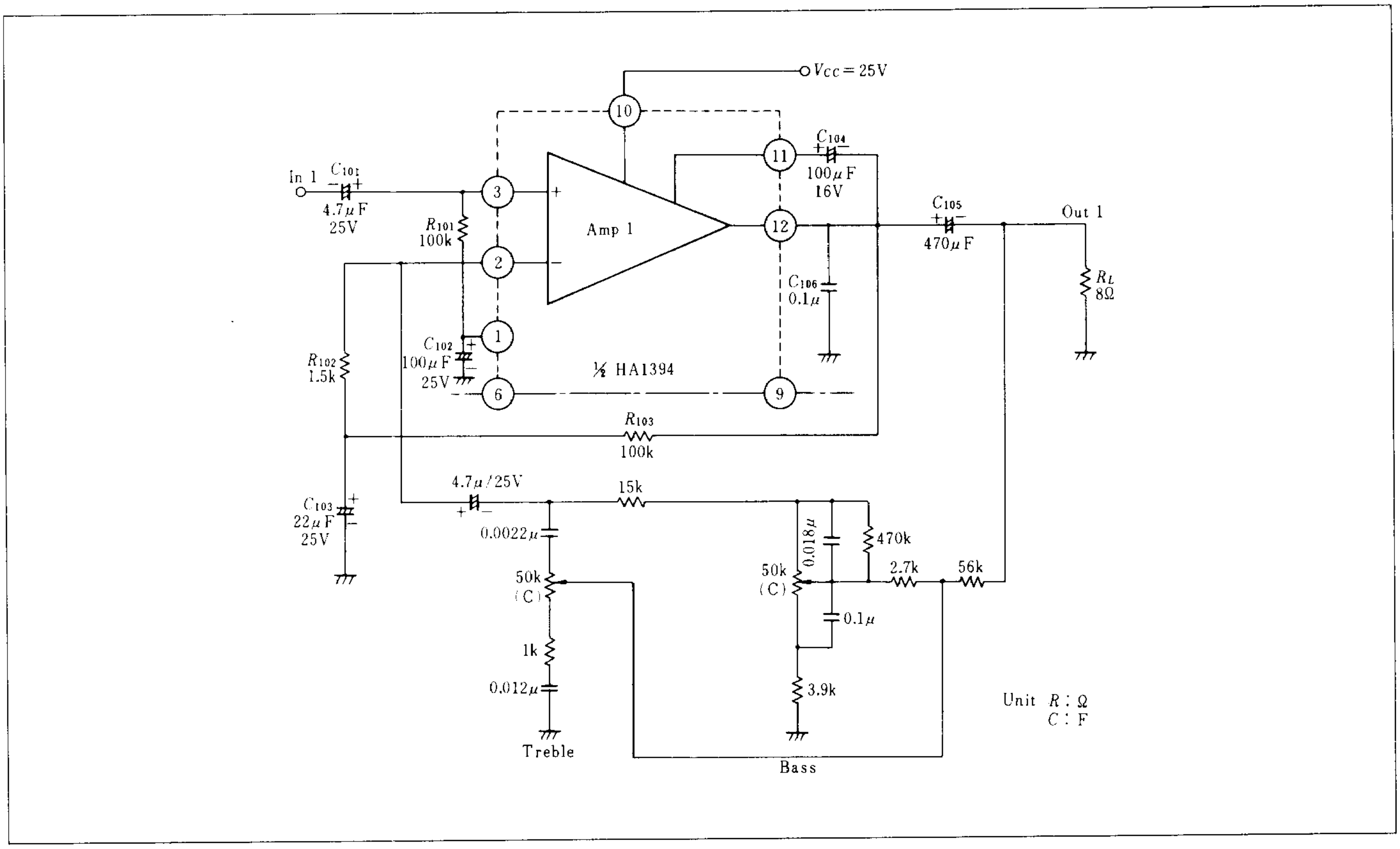
POWER DISSIPATION VS. OUTPUT POWER



QUIESCENT CURRENT VS. SUPPLY VOLTAGE



■CIRCUIT EXAMPLE – NF Tone Control



VOLTAGE GAIN VS. FREQUENCY