

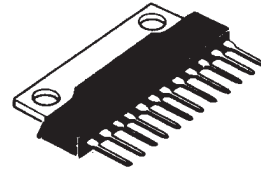
HA1394

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 $V_{CC}=25V$, $R_L=8\Omega$ and THD=5%.

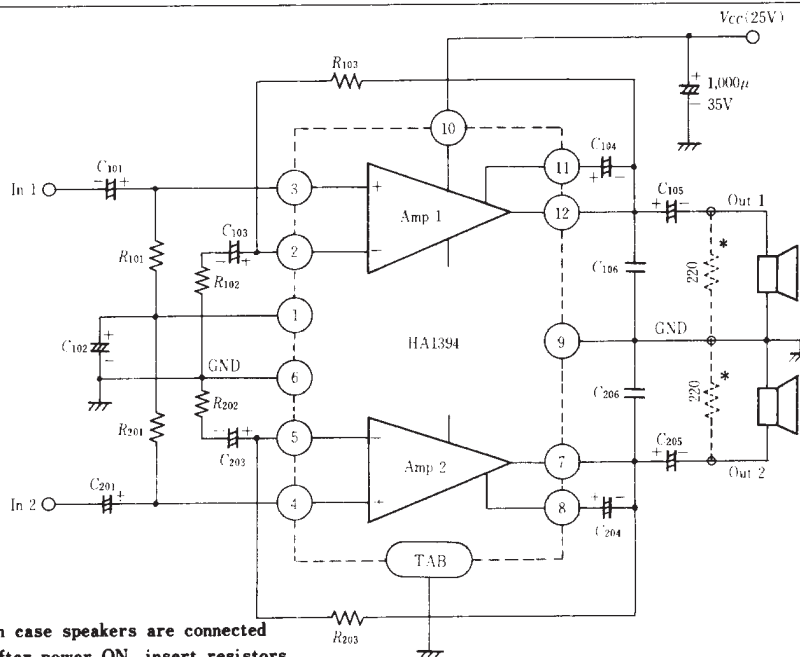
FEATURES

- 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



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

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

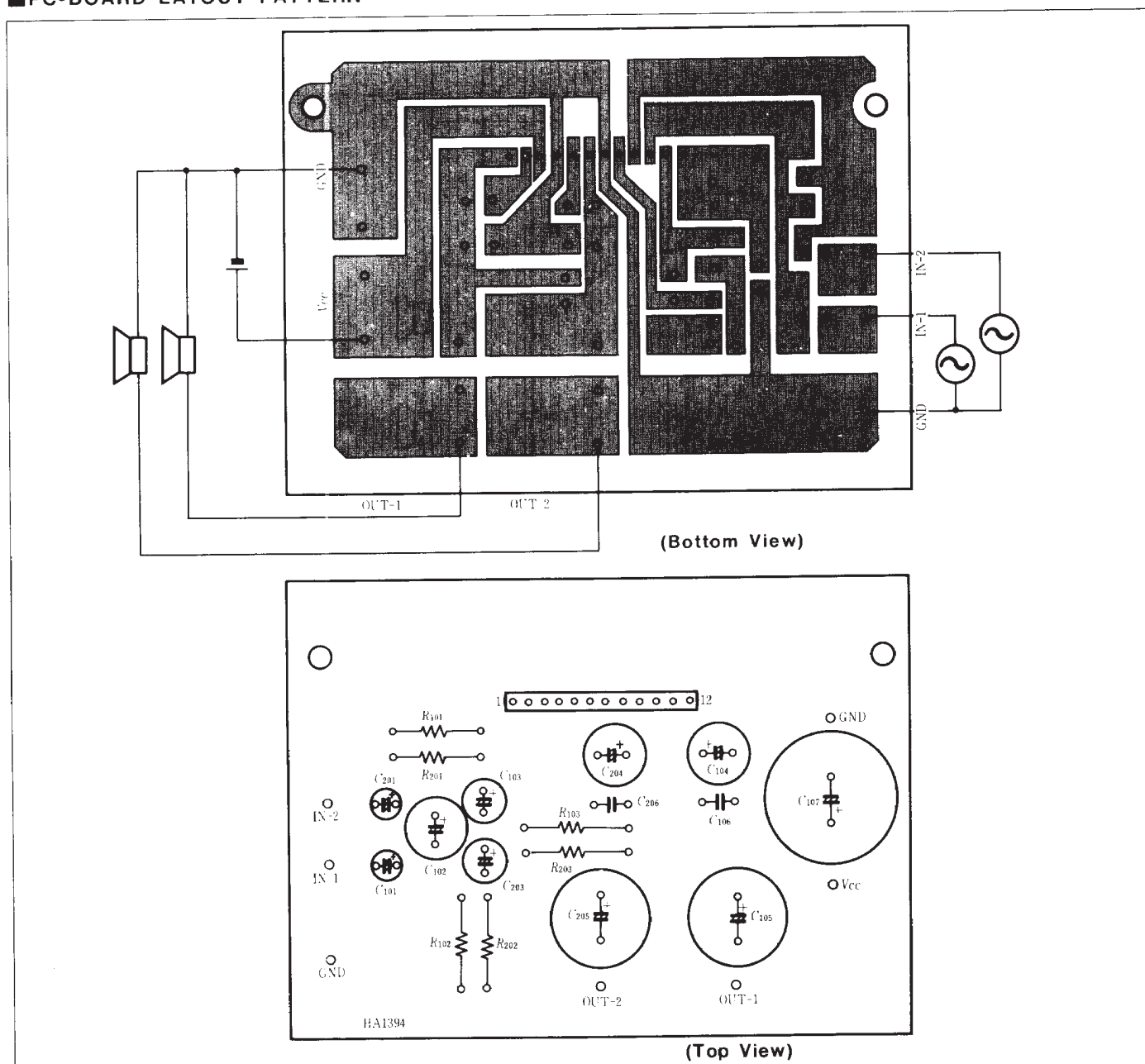
ABSOLUTE MAXIMUM RATINGS ($T_a=25^\circ\text{C}$)

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

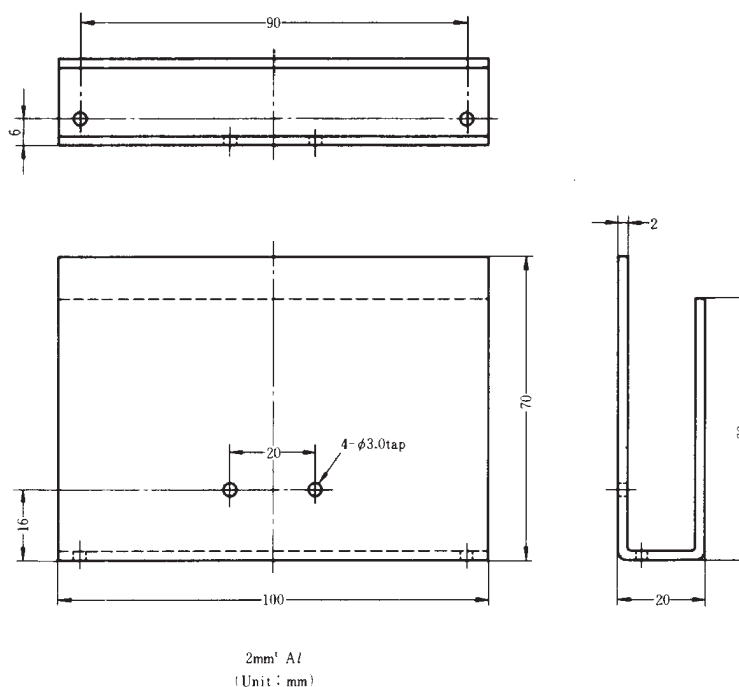
*Value at $T_c=90^\circ\text{C}$ (T_c : Temperature of IC Header)

ELECTRICAL CHARACTERISTICS ($V_{CC}=25V$, $R_L=8\Omega$, $T_a=25^\circ C$, 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}	$R_L=8\Omega$, $THD=5\%$	7.0	8.2	—	W
Total Harmonic Distortion	THD	$P_{out}=1W$, $f=1kHz$	—	0.04	0.8	%
Noise Output	WBN	$R_s=10k\Omega$, $BW=20Hz$ to $20kHz$	—	0.22	1.0	mV
Input Resistance	R_{in}	$f=1kHz$	—	100	—	$k\Omega$
Cross-Talk	$C.T$	$f=1kHz$, $R_s=600\Omega$	50	62	—	dB
Supply Voltage Rejection Ratio	SVR	$f=100Hz$, $R_s=600\Omega$	45	57	—	dB
Roll-off Frequency	f_L	$\Delta G_v=-3dB$ from $f=1kHz$ Ref.	Low	—	40	Hz
	f_H		High	—	80	kHz

PC-BOARD LAYOUT PATTERN


■ HEAT SINK

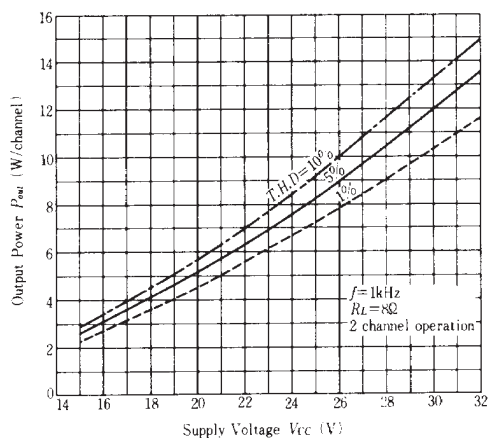


■ EXTERNAL COMPONENTS

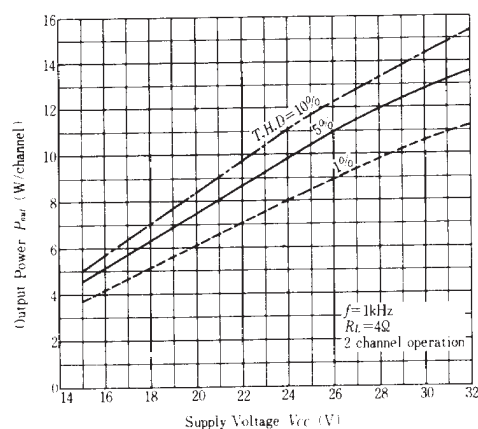
Parts No.	Recommended Value	Purpose	Influence	
			Smaller than recommended value	Larger than recommended value
C ₁₀₁ C ₂₀₁	4.7 μF (25V)	Input coupling	Increase of signal source resistance; Higher 1/f noise	—
C ₁₀₂	100 μF (25V)	Supply voltage ripple rejection	Deterioration of supply voltage ripple rejection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

Note : * $G_v = 20 \log \left(\frac{R_{102} + R_{103}}{R_{102}} \right)$ (dB)

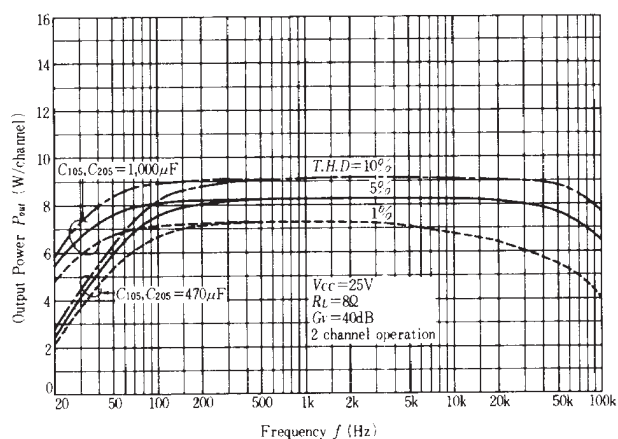
OUTPUT POWER VS. SUPPLY VOLTAGE (1)



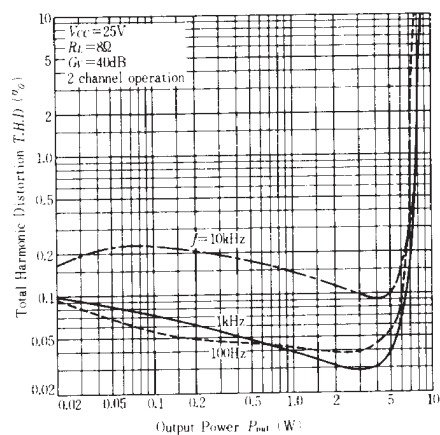
OUTPUT POWER VS. SUPPLY VOLTAGE (2)



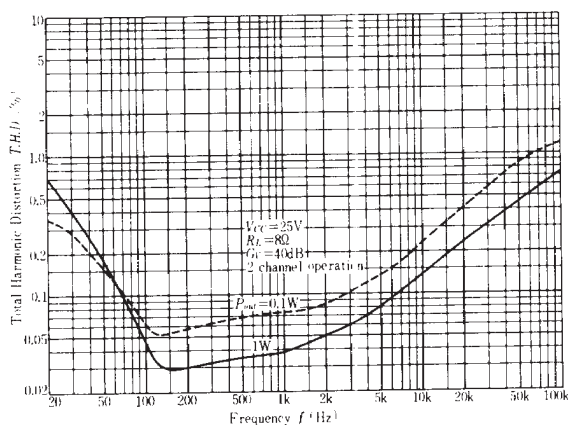
OUTPUT POWER VS. FREQUENCY



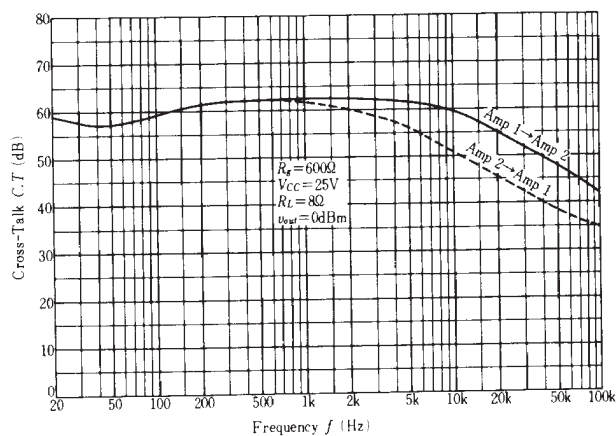
TOTAL HARMONIC DISTORTION VS. OUTPUT POWER



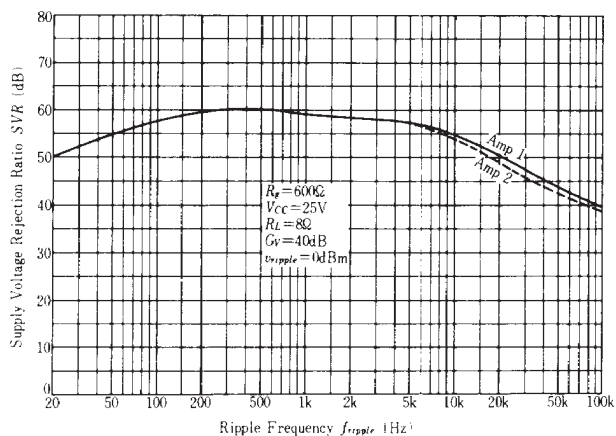
TOTAL HARMONIC DISTORTION VS. FREQUENCY



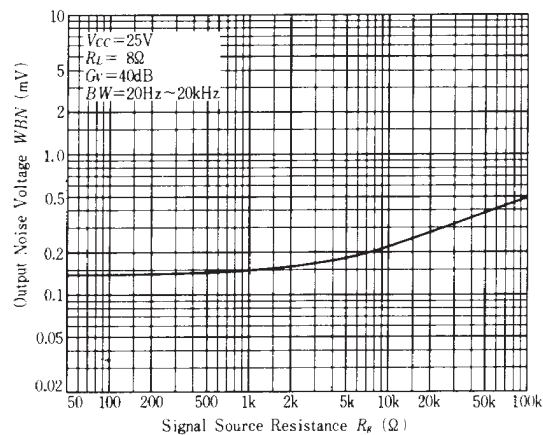
CROSS-TALK VS. FREQUENCY



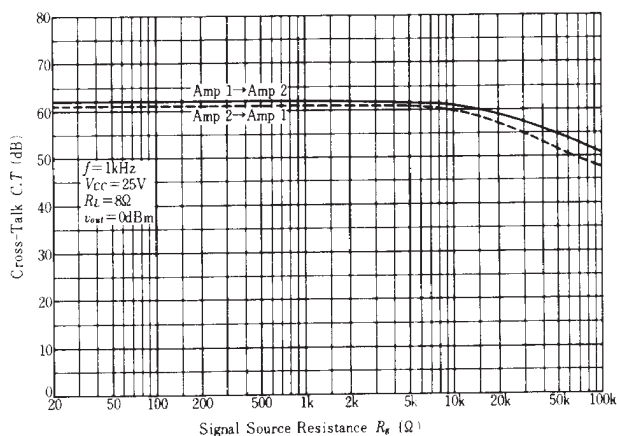
SUPPLY VOLTAGE REJECTION RATIO VS. RIPPLE FREQUENCY



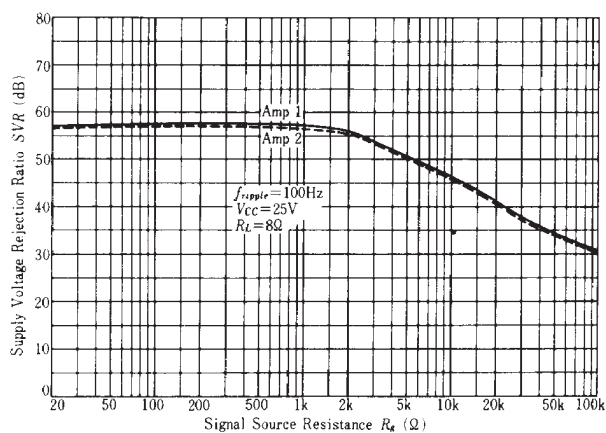
OUTPUT NOISE VOLTAGE VS. SIGNAL SOURCE RESISTANCE



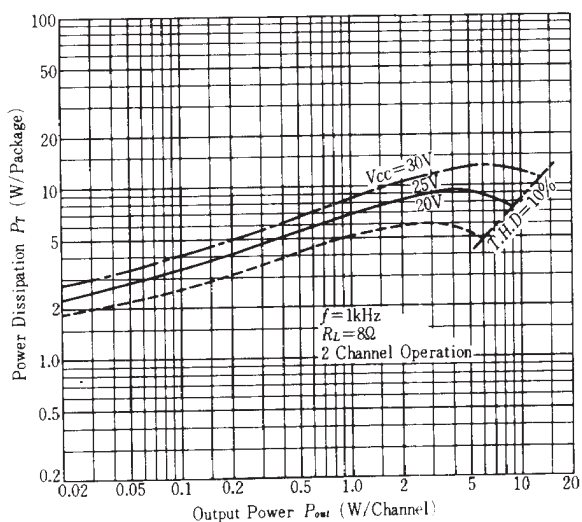
CROSS-TALK VS. SIGNAL SOURCE RESISTANCE



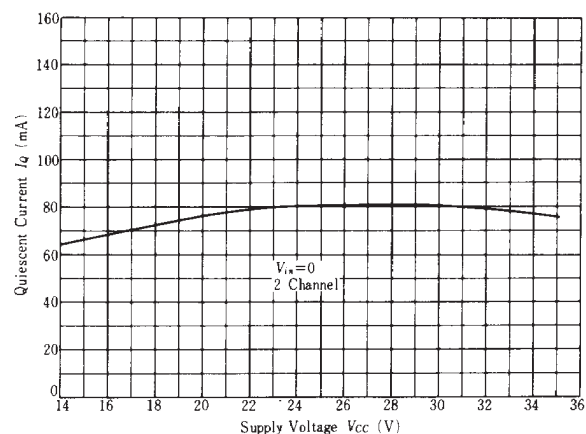
SUPPLY VOLTAGE REJECTION RATIO VS. SIGNAL SOURCE RESISTANCE



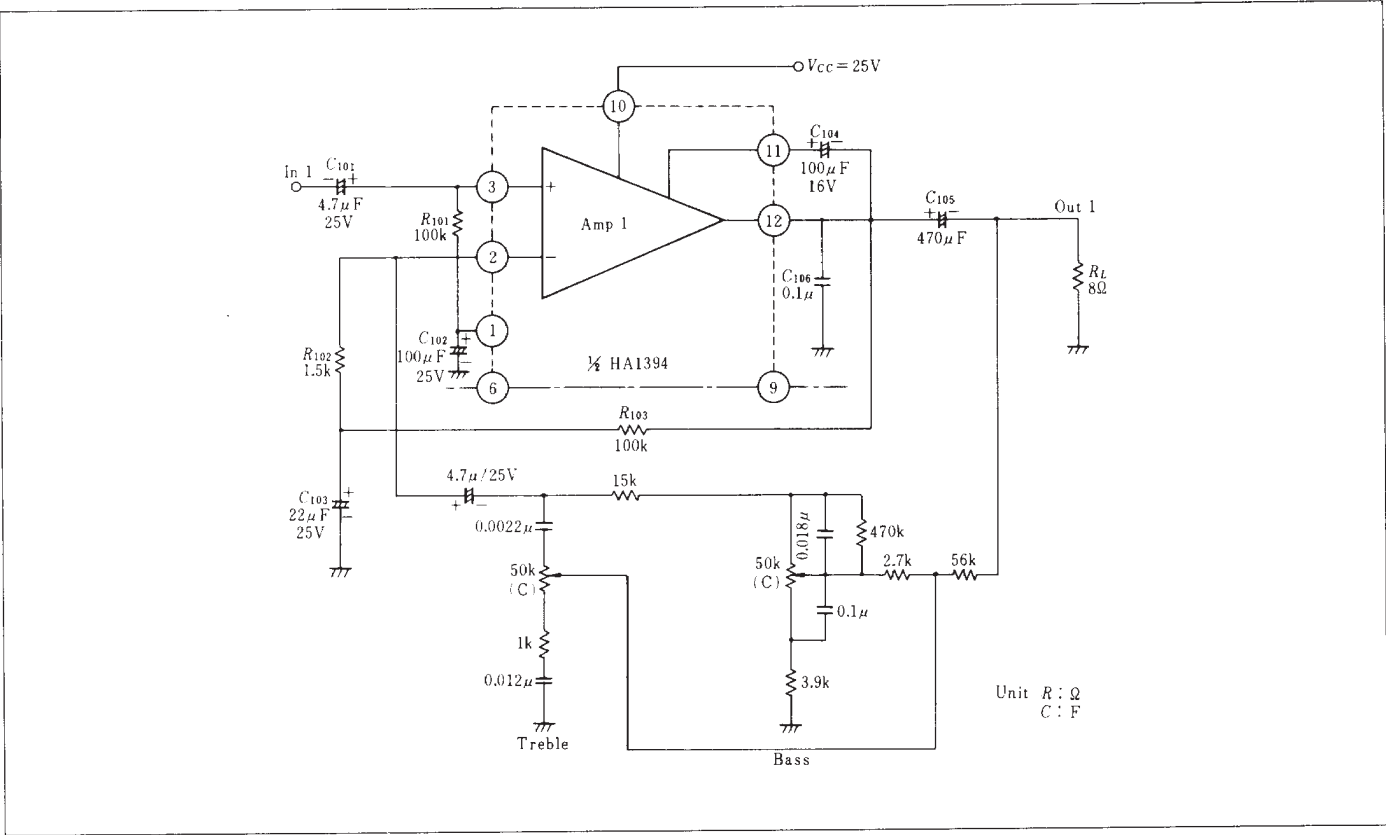
POWER DISSIPATION VS. OUTPUT POWER



QUIESCENT CURRENT VS. SUPPLY VOLTAGE



CIRCUIT EXAMPLE – NF Tone Control



VOLTAGE GAIN VS. FREQUENCY

