

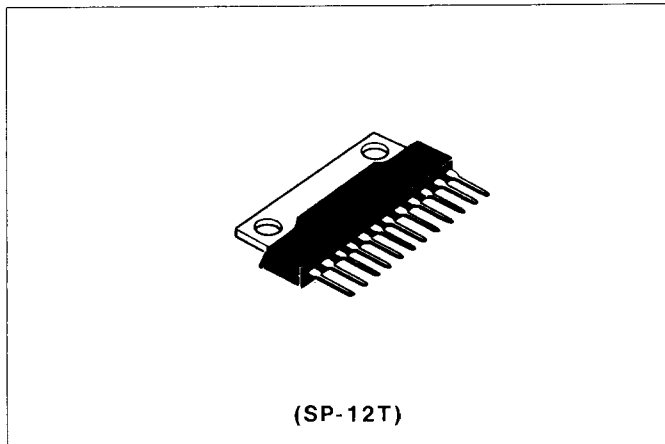
# HA1394

## Dual 6 to 8W Audio Power Amplifier

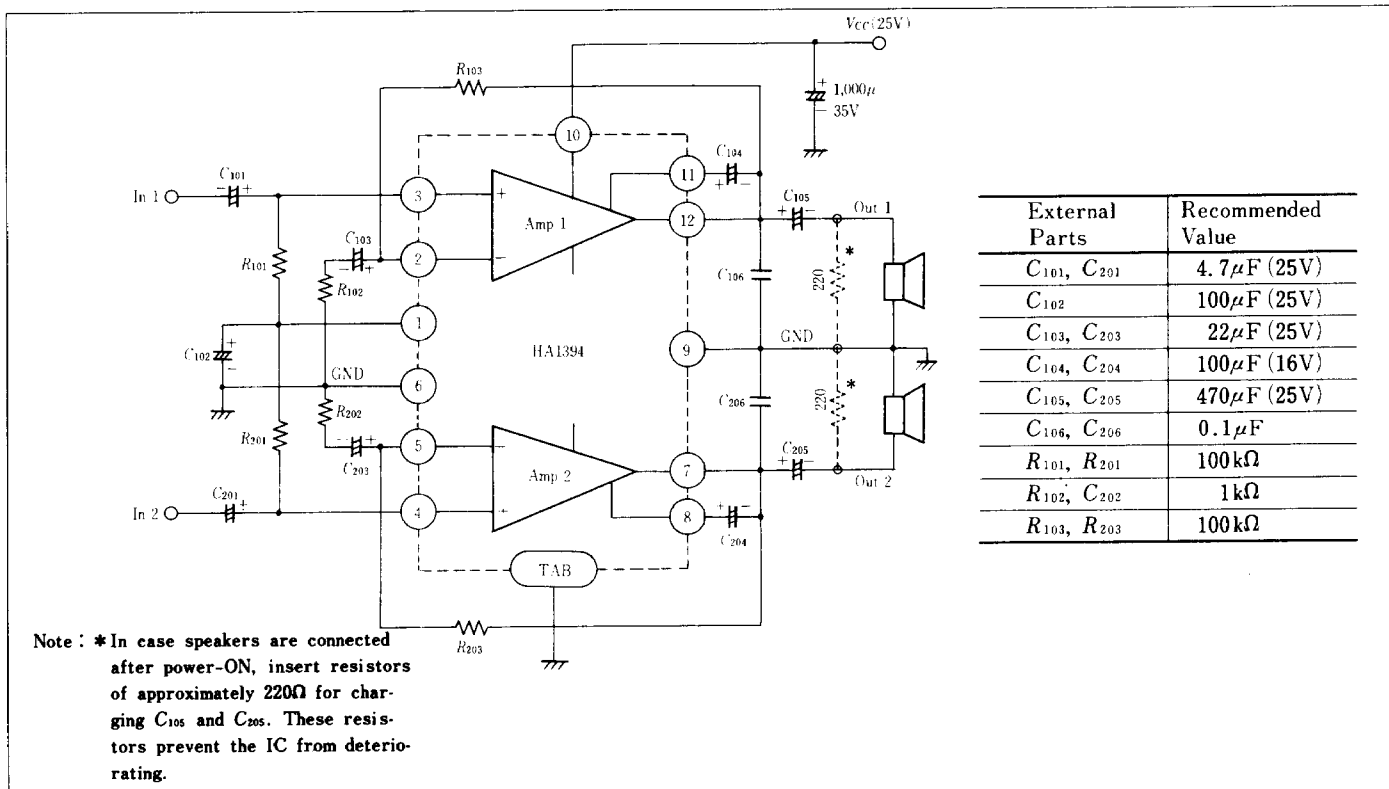
The HA1394 dual audio power amplifier is specifically designed for audio outputs in modular stereos and multiplex sound TV's. This amplifier can deliver 8.2W/channel when  $V_{CC}=25V$ ,  $R_L=8\Omega$  and THD=5%.

### 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.



### TYPICAL APPLICATION



### ABSOLUTE MAXIMUM RATINGS ( $T_a=25^\circ C$ )

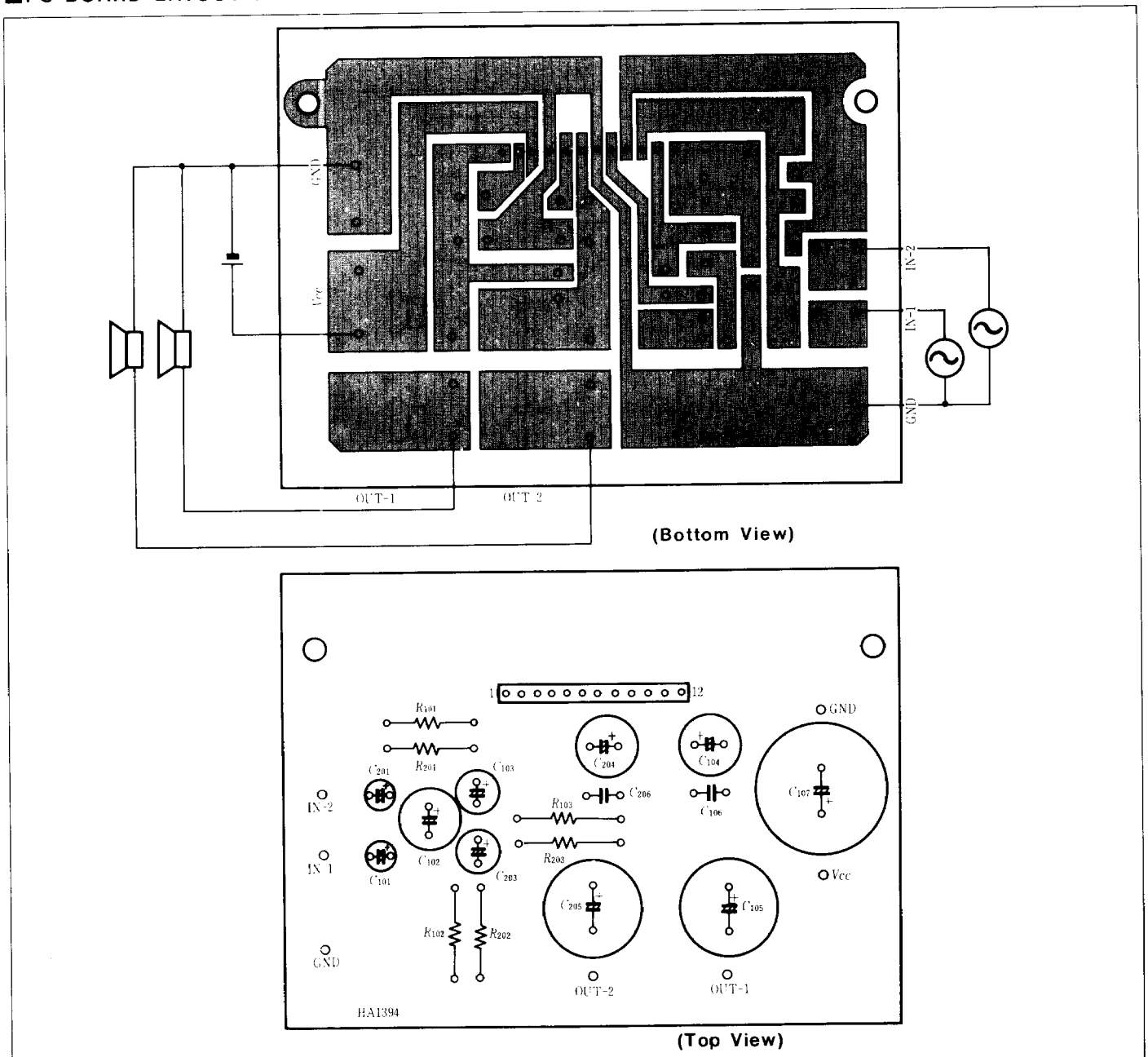
Item	Symbol	Rating	Unit
Supply Voltage	$V_{CC}$	35	V
Output Current per channel	$I_{O(peak)}$	4.5	A
Power Dissipation *	$P_T$	15	W
Junction Temperature	$T_j$	150	$^\circ C$
Operating Temperature	$T_{opr}$	-20 to +70	$^\circ C$
Storage Temperature	$T_{stg}$	-55 to +125	$^\circ C$

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

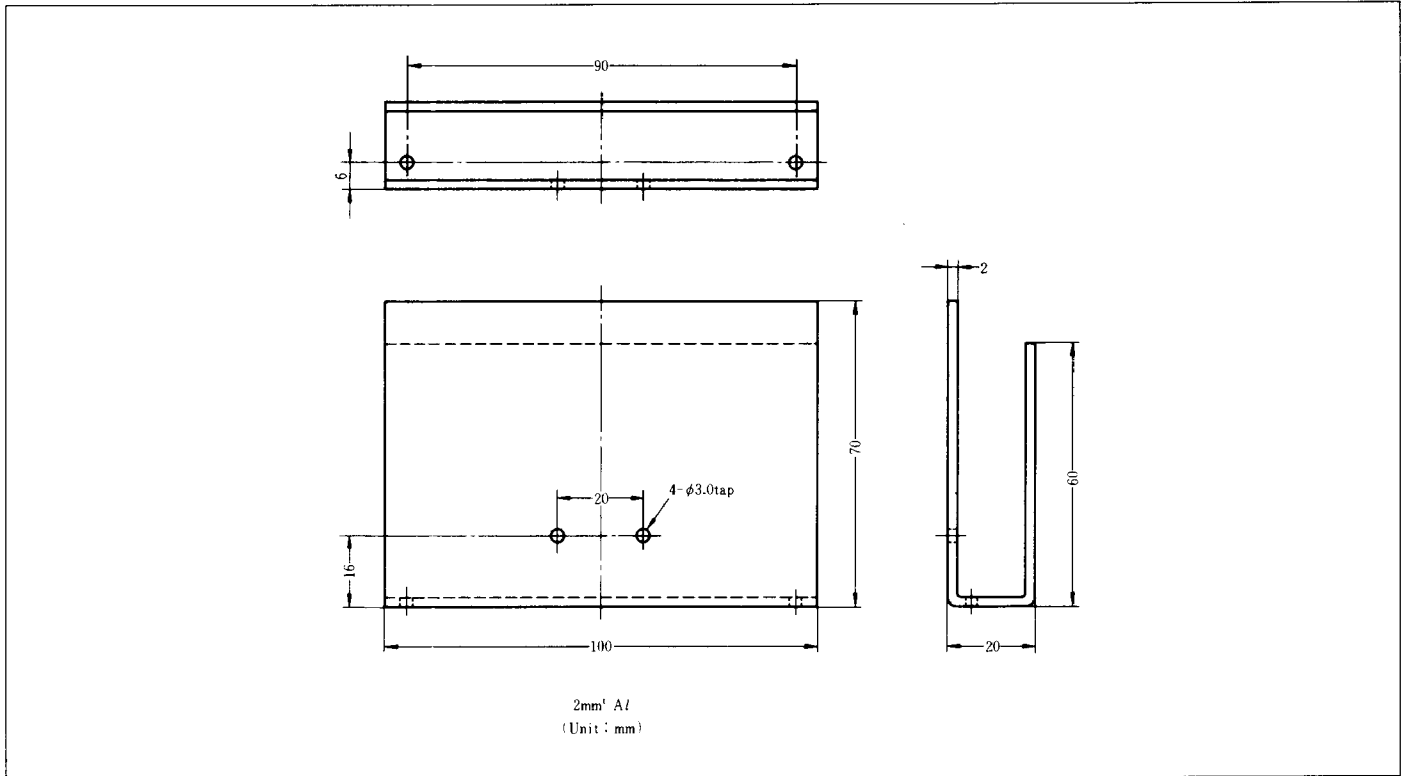
■ ELECTRICAL CHARACTERISTICS ( $V_{CC}=25V$ ,  $R_L=8\Omega$ ,  $T_a=25^\circ C$ , 2-channel operation)

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	$\Delta G_v$	$f=1kHz$	—	—	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	$WBN$	$R_g=10k\Omega$ , $BW=20Hz$ to $20kHz$	—	0.22	1.0	mV	
Input Resistance	$R_{in}$	$f=1kHz$	—	100	—	k $\Omega$	
Cross-Talk	$C.T$	$f=1kHz$ , $R_g=600\Omega$	50	62	—	dB	
Supply Voltage Rejection Ratio	$SVR$	$f=100Hz$ , $R_g=600\Omega$	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

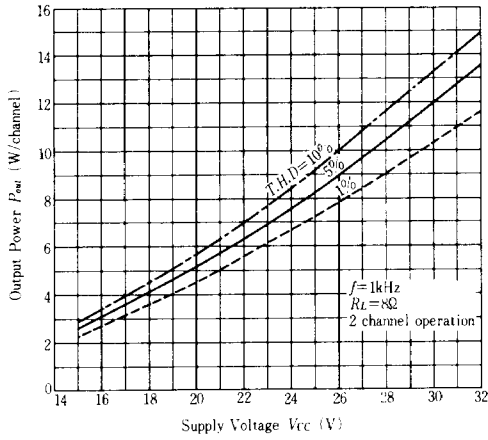


■ EXTERNAL COMPONENTS

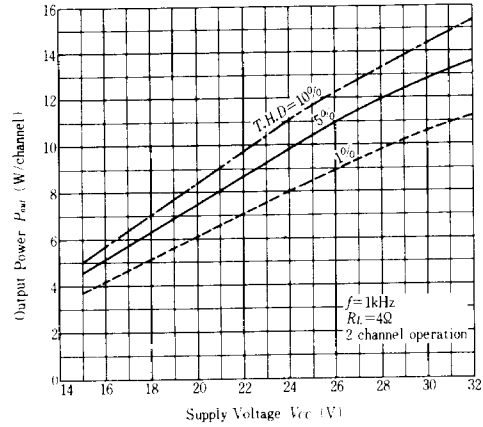
Parts No.	Recommended Value	Purpose	Influence	
			Smaller than recommended value	Larger than recommended value
C <sub>101</sub> C <sub>201</sub>	4.7μF (25V)	Input coupling	Increase of signal source resistance; Higher 1/f noise	—
C <sub>102</sub>	100μF (25V)	Supply voltage ripple rejection	Deterioration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

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

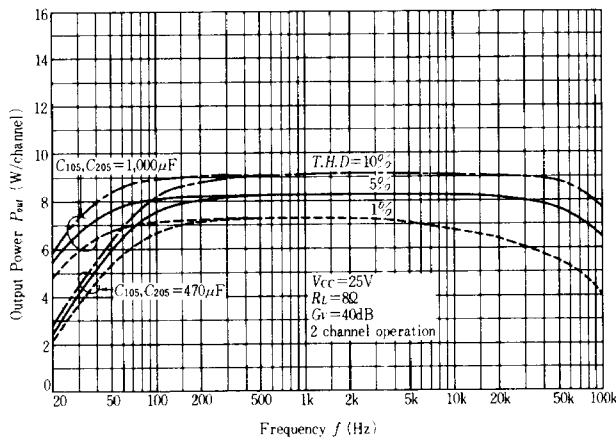
**OUTPUT POWER VS. SUPPLY VOLTAGE (1)**



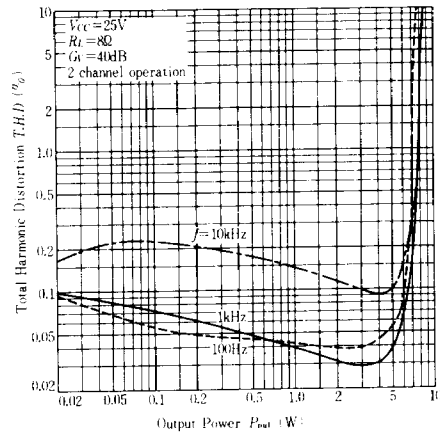
**OUTPUT POWER VS. SUPPLY VOLTAGE (2)**



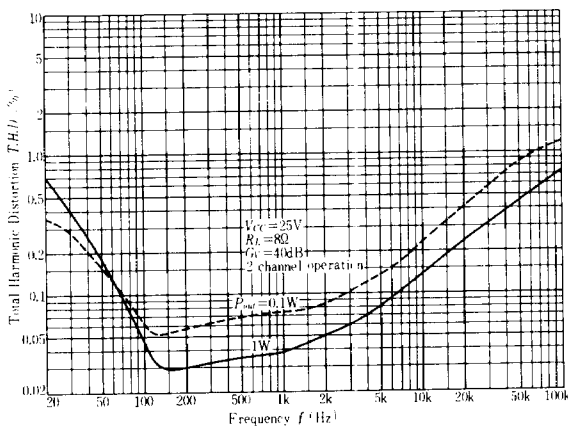
**OUTPUT POWER VS. FREQUENCY**



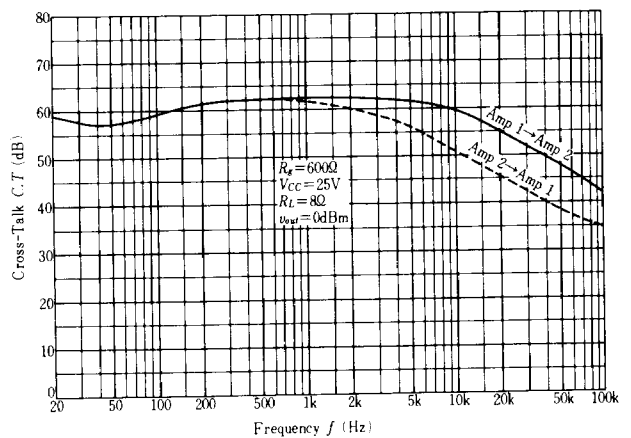
**TOTAL HARMONIC DISTORTION VS. OUTPUT POWER**



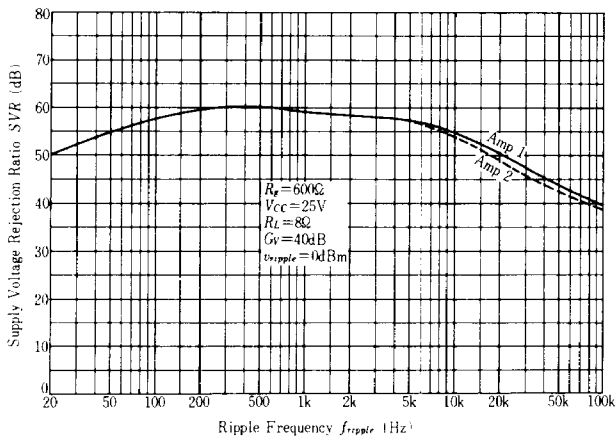
**TOTAL HARMONIC DISTORTION VS. FREQUENCY**



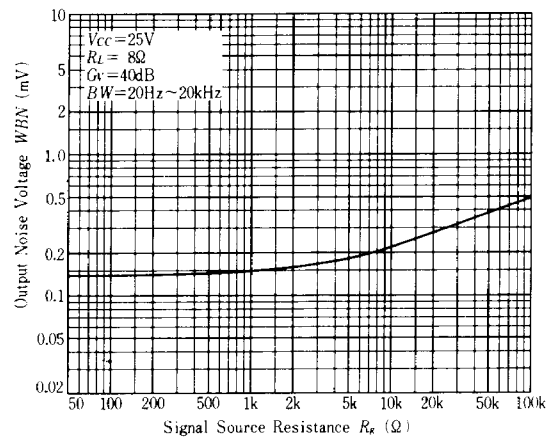
**CROSS-TALK VS. FREQUENCY**



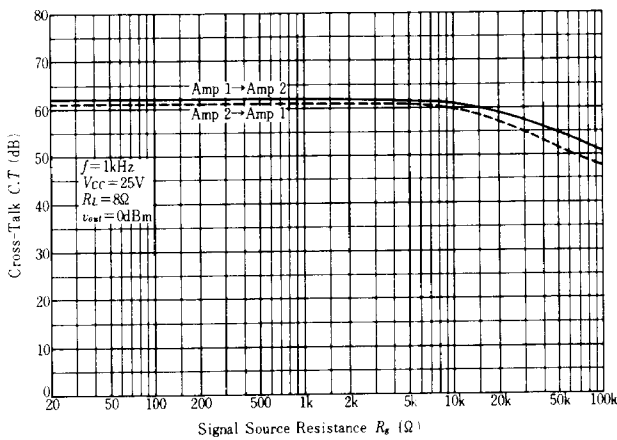
**SUPPLY VOLTAGE REJECTION RATIO VS. RIPPLE FREQUENCY**



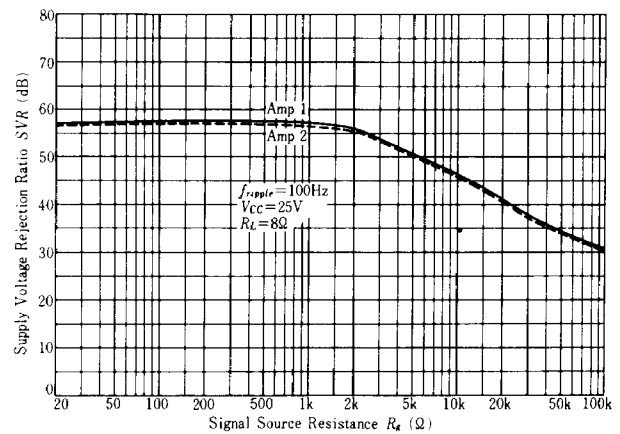
**OUTPUT NOISE VOLTAGE VS. SIGNAL SOURCE RESISTANCE**



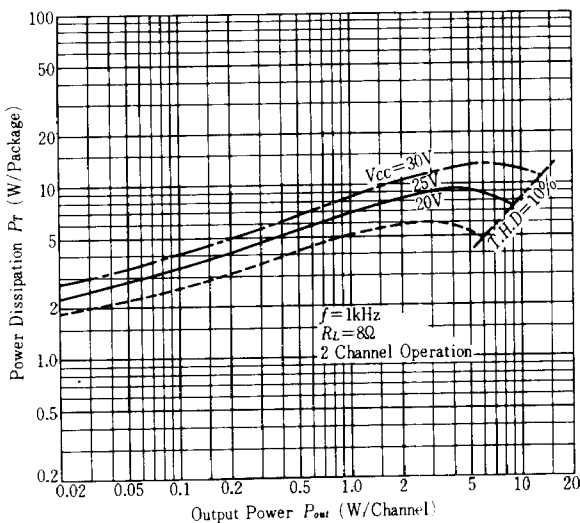
**CROSS-TALK VS. SIGNAL SOURCE RESISTANCE**



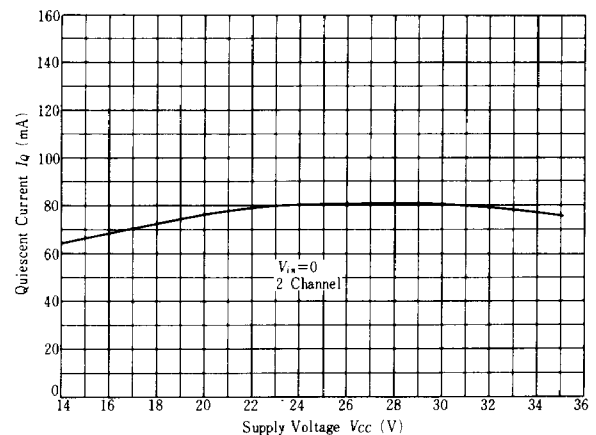
**SUPPLY VOLTAGE REJECTION RATIO VS. SIGNAL SOURCE RESISTANCE**



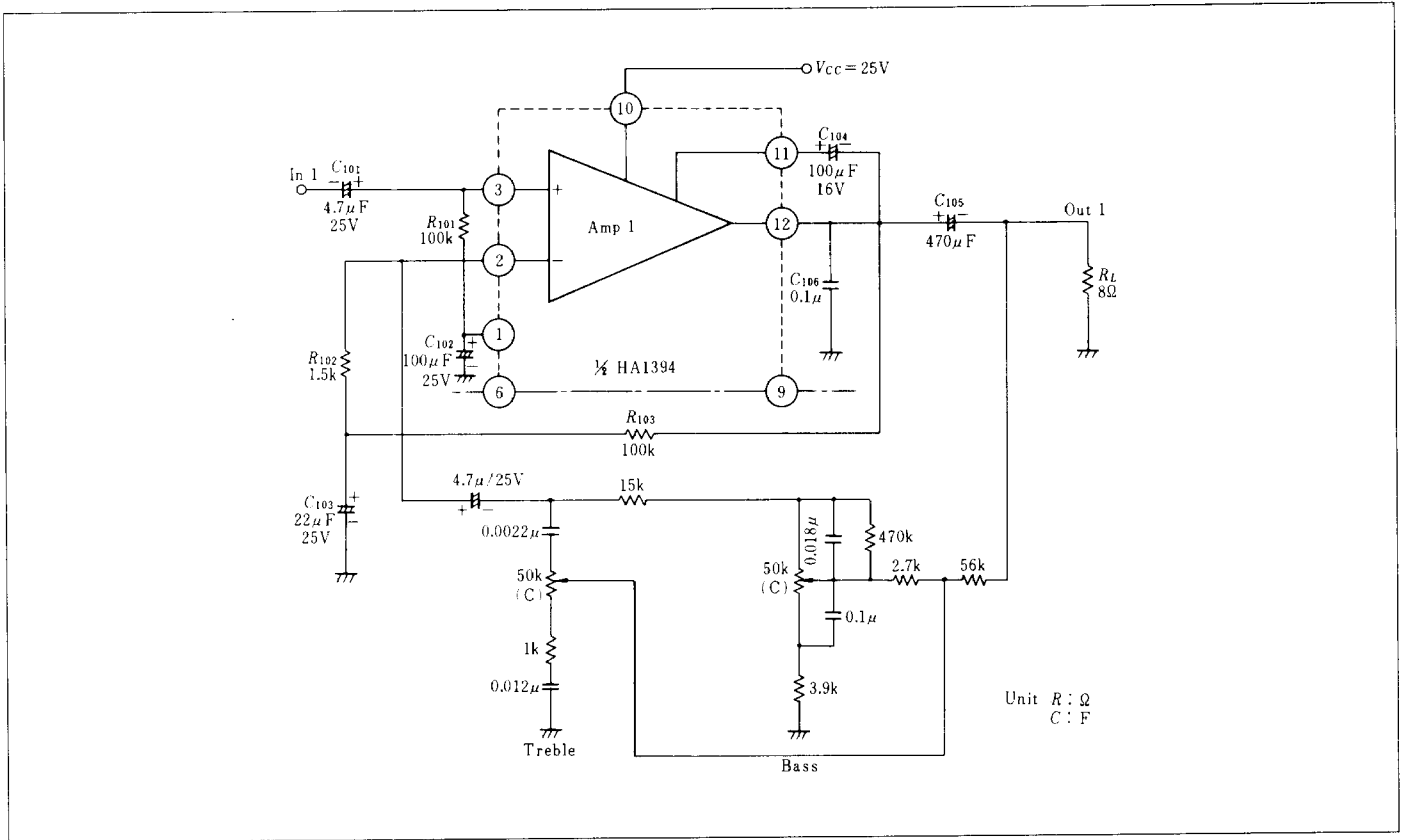
**POWER DISSIPATION VS. OUTPUT POWER**



**QUIESCENT CURRENT VS. SUPPLY VOLTAGE**



■CIRCUIT EXAMPLE – NF Tone Control



VOLTAGE GAIN VS. FREQUENCY

