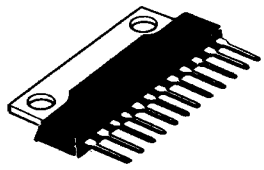
HA1377A

Dual 5.8W Audio Power Amplifiers

This audio power IC is specifically designed for car stereo amplifiers encapsulated in 12-lead single-in-line plastic package.
This IC provides an output power of 5.8 watts per channel under the condition of 4 ohm loaded, 10 percent distrotion and 13.2 volts power supply.
When the two amplifiers are connected BTL, 17 watts can be obtained under the condition of 4 ohm loaded, 10 percent distortion and 13.2 volt power supply.

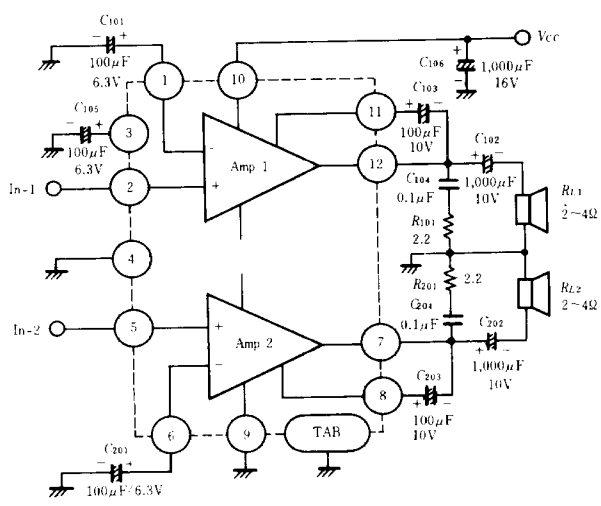


(SP-12T)

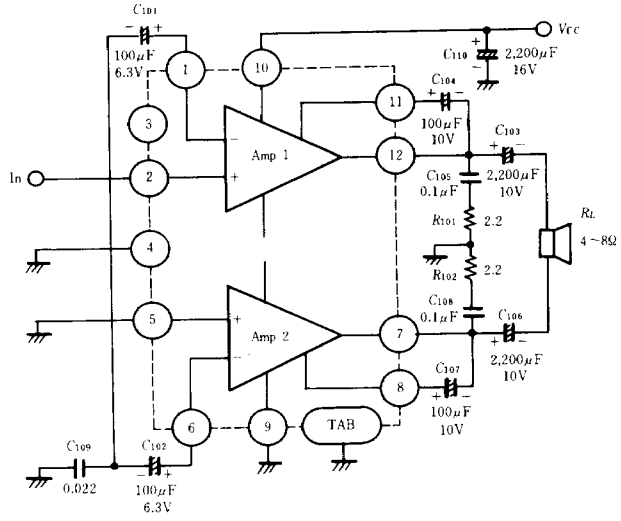
■ FEATURES

- Easy to mount a chassis by heat-sink, due to the single-in-line package with no electrical isolation.
- Over voltage handling capability up to 50 volts for 200 msec pulse duration.
- Thermal shut-down circuit included.
- Less number of external components.

■TYPICAL APPLICATION



Circuit 1 Dual Amplifier



Circuit 2 BTL Amplifier

■ABSOLUTE MAXIMUM RATINGS (Ta=25℃)

Item	Symbol	Rating	Unit	Notes
Operating Supply Voltage	V_{CC}	18	V	
DC Supply Voltage	$V_{CC(DC)}$	26	V	1
Peak Supply Voltage	$V_{CC(peak)}$	50	V	2
Output Current per channel	I_O	4	A	
Power Dissipation	P_T	15	W	
Thermal Resistance (Junction-Case)	θ_{j-c}	3	℃/W	
Junction Temperature	T_j	150	℃	
Operating Temperature	T_{opr}	−20~+70	℃	
Storage Temperature	T_{stg}	−55~+125	℃	

Notes) 1. Value at 30 sec.
2. This rating is for dual amplifier use. The rating for BTL use is 40V.
Pulse Width = 200 ms, $t_r \geq 1$ ms.

HITACHI

■ELECTRICAL CHARACTERISTICS (Ta=25℃, V_{CC}=13.2V, f=1kHz, R_L=4Ω)

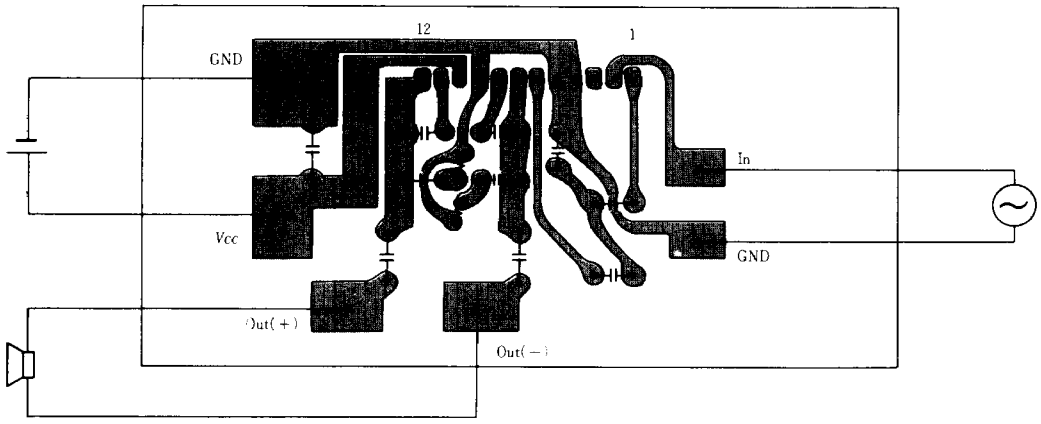
●Dual Amplifier (Circuit 1 : One-half operation)

Item	Symbol	Test Condition		min.	typ.	max.	Unit
Quiescent Current	I_Q	V_{in}=0		—	80	160	mA
Input Bias Voltage	V_B	V_{in}=0		—	—	40	mV
Voltage Gain	G_V	V_{in}=2.45mV		53	55	57	dB
Difference of Voltage Gain	$\triangle G_V$	V_{in}=2.45mV		—	—	± 1.5	dB
Output Power per Channel	P_{out}	R_L=4Ω	V_{CC}=13.2V	5.0	5.8	—	W
		T.H.D=10%	V_{CC}=14.4V	—	7.0	—	
		R_L=2Ω	V_{CC}=13.2V	—	9.0	—	
		T.H.D=10%	V_{CC}=14.4V	—	10	—	
Total Harmonic Distortion	T.H.D	P_{out}=0.5W		—	0.15	1.0	%
Noise Output	WBN	R_g=10kΩ, BW=20Hz to 20kHz		—	1.0	2.0	mV
Supply Voltage Rejection Ratio	SVR	R_g=600Ω, f=500Hz		30	40	—	dB
Input Resistance	R_{in}	f=1kHz		—	30	—	kΩ
Rolloff Frequency	f_L	G_V=−3dB from	Low	—	40	—	Hz
	f_H	f=1kHz Ref.	High	—	25	—	kHz
Cross-talk	CT	f=500Hz, R_g=600Ω		40	58	—	dB

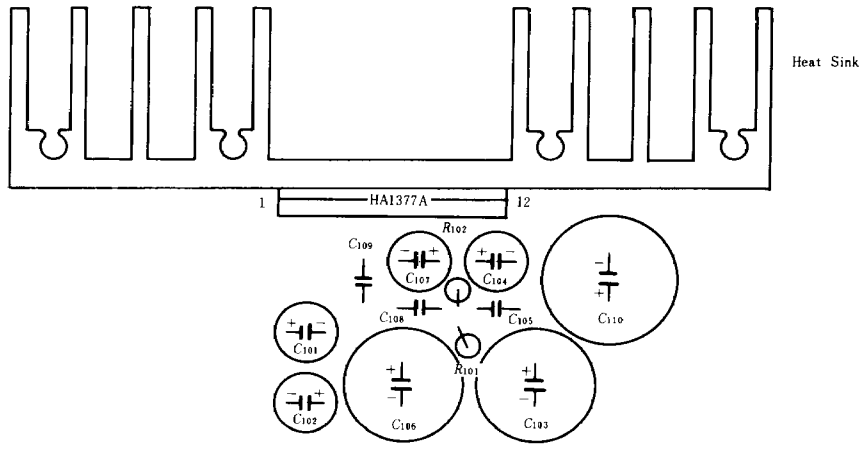
●BTL Amplifier (Circuit 2)

Item	Symbol	Test Condition		min.	typ.	max.	Unit
Voltage Gain	G_V	V_{in}=2.45mV		—	55	—	dB
Output Power	P_{out}	T.H.D=10%	R_L=4Ω	14	17	—	W
			R_L=8Ω	—	11	—	
Total Harmonic Distortion	T.H.D	P_{out}=1.5W		—	0.15	—	%
Supply Voltage Rejection Ratio	SVR	R_g=600Ω, f=500Hz		30	46	—	dB

■PC-BOARD LAYOUT PATTERN (Circuit 2)



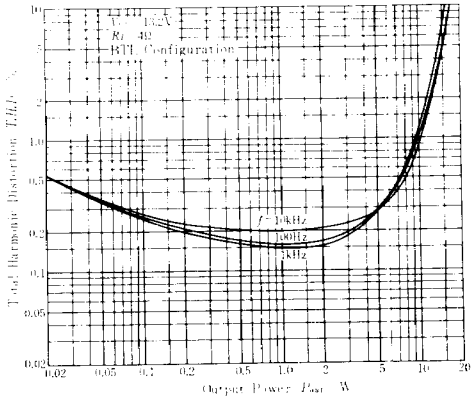
(Bottom View)



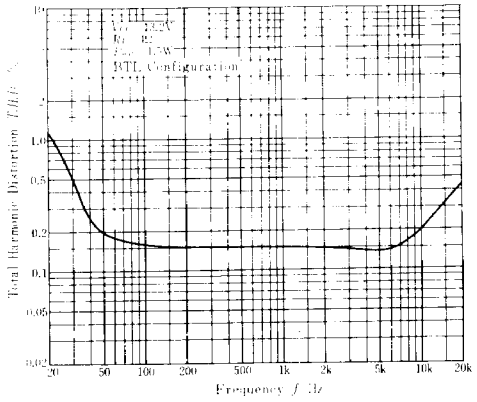
■EXTERNAL COMPONENTS (at the Circuit 2)

Parts No.	Recommended Value	Purpose	Larger than recommended value	Smaller than recommended value
C_{101}, C_{102}	100 μF	Inverting DC decoupling	Danger of burn-out	Higher low frequency rolloff
C_{103}, C_{106}	2200 μF	Output coupling to load	Danger of burn-out	Higher low frequency rolloff
C_{104}, C_{107}	100 μF	Boot strap	Danger of burn-out at load dump surge	Smaller power bandwidth
C_{105}, C_{108}	0.1 μF	Stabilization of operation	Increse of drain current at high frequency	Danger of oscillation
C_{109}	0.022 μF	Stabilization of operation	Smaller power bandwidth	Danger of oscillation
C_{110}	2200 μF	Supply bypassing		Danger of oscillation
R_{101}, R_{102}	2.2 Ω	Stabilization of operation	Danger of oscillation	Danger of oscillation

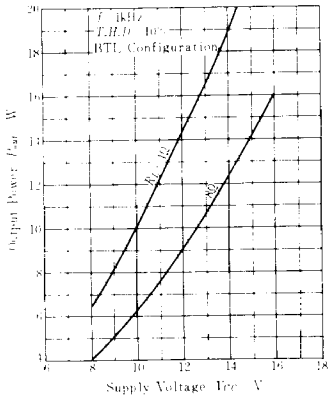
TOTAL HARMONIC DISTORTION VS. OUTPUT POWER



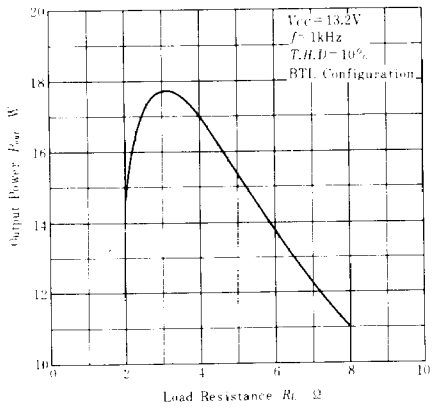
TOTAL HARMONIC DISTORTION VS. FREQUENCY



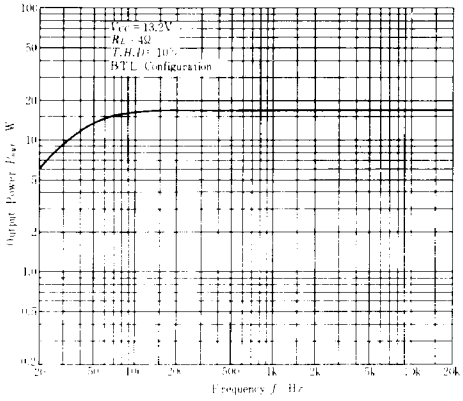
OUTPUT POWER VS. SUPPLY VOLTAGE



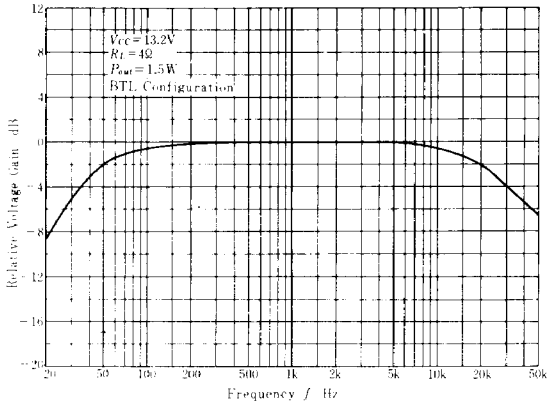
OUTPUT POWER VS. LOAD RESISTANCE



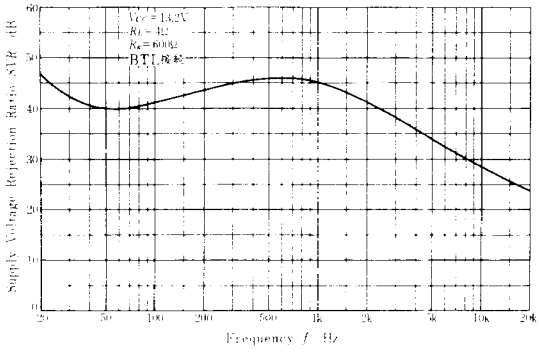
OUTPUT POWER VS. FREQUENCY



RELATIVE VOLTAGE GAIN VS. FREQUENCY



SUPPLY VOLTAGE REJECTION RATIO VS. FREQUENCY



POWER DISSIPATION VS. OUTPUT POWER