

HA13127, HA13130

17W Dual BTL Audio Power Amplifier



Rev. 0
June 1989
Preliminary

The HA13127/HA13130 are high output and low distortion dual BTL power IC designed for car stereo amplifiers.

At 14.4V to 4Ω load, this power IC provides an output power 17W with 10% distortion.

Ordering Information

Type No.	Voltage gain	Package
HA13127	50dB	16 pin SIP
HA13130	40dB	with heat sink

Features

- Stand-by circuit included.
Can be switched on & off easily by microcomputer.
- Output capacitors not required.
These IC employ internal ASO protection circuit of high reliability current shutdown type, which can protect speaker.
- Surge protection circuit and thermal shutdown circuit are included.
Thermal shutdown is high speed and hysteresis on & off type.
- Can be used without bootstrap capacitor.
- Low total harmonic distortion in wide frequency range
THD=0.05% Typ (f=50Hz), THD=0.05% Typ (f=1kHz), THD=0.07% Typ (f=10kHz)
THD=0.1% or less (Pout=1.5W, f=20Hz to 20kHz)

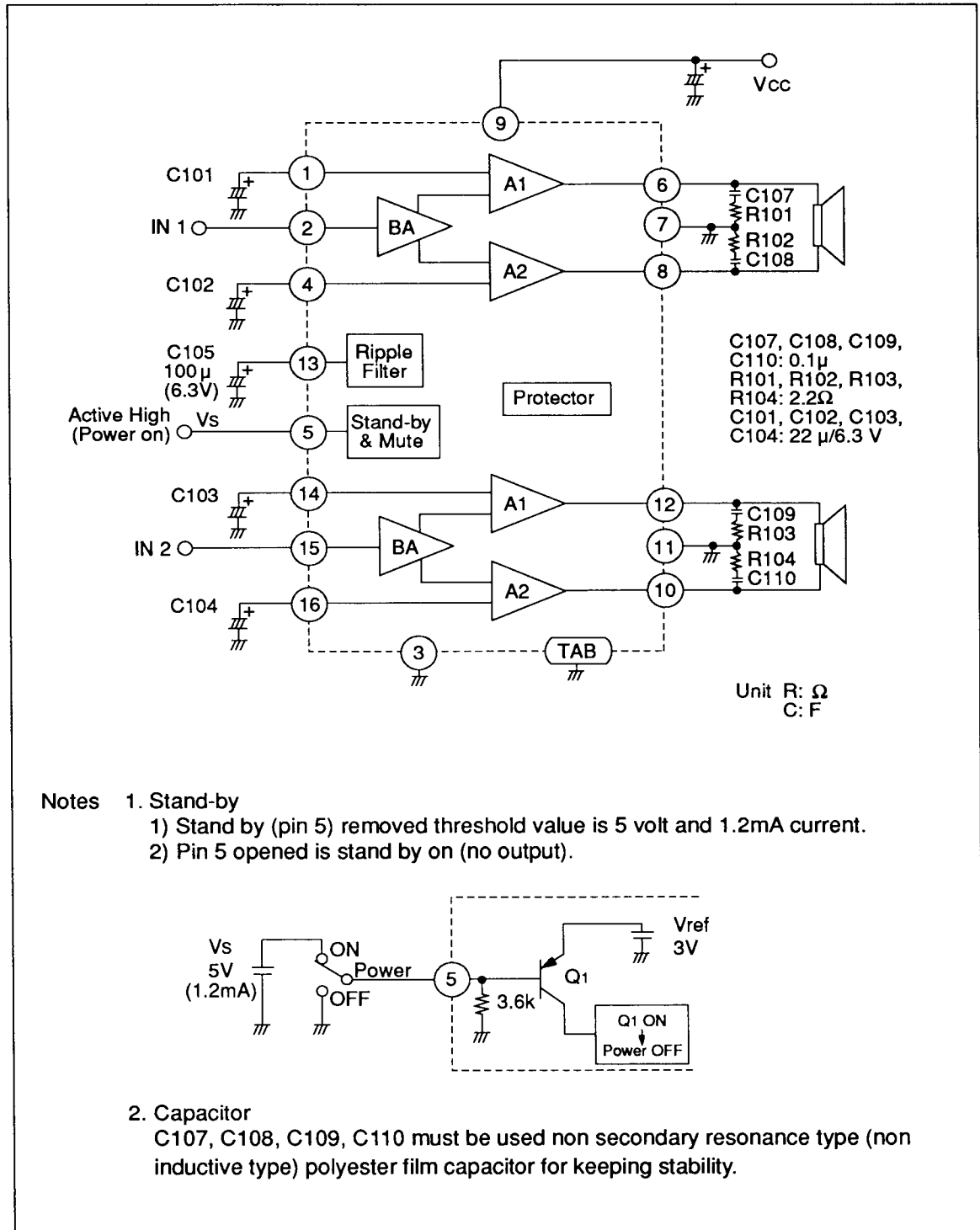


Figure 1 Block Diagram

HA13127, HA13130

Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Rating	Unit	Notes
Operating supply voltage	Vcc	18	V	
DC supply voltage	Vcc (DC)	26	V	1
Peak supply voltage	Vcc (Peak)	50	V	2
Output current	Io (peak)	4	A	Per channel
Power dissipation	P _T	25	W	
Junction temperature	T _j	150	°C	
Operating temperature	Topr	-30 to +85	°C	
Storage temperature	Tstg	-55 to +125	°C	

Notes: 1. Value at t ≤ 30sec
 2. Value at surge wave-form (rise time t ≥ 1ms)

Electrical Characteristics (V_{CC}=13.2V, f=1kHz, R_L=4Ω, Dual Operation, Ta=25°C)

Item	Symbol	HA13127 (G _V =50dB)			HA13130 (G _V =40dB)			Unit	Test Condition
		Min.	Typ.	Max.	Min.	Typ.	Max.		
Quiescent current	I _{Q1}	60	150	250	60	150	250	mA	Vin=0V
Input bias voltage	V _B	—	20	40	—	20	40	mV	Vin=0V
Output offset voltage	ΔV _Q	—	0	150	—	0	150	mV	Vin=0V
Voltage gain	G _V	48.5	50	51.5	38.5	40	41.5	dB	
Difference of voltage gain	ΔG _V	—	—	1.5	—	—	1.5	dB	
Output power (1)	P _{o1}	10	14	—	10	14	—	W	Vcc=13.2V THD=10%
Output power (2)	P _{o2}	—	17	—	—	17	—	W	Vcc=14.4V THD=10%
Output power (3)	P _{o3}	—	6	—	—	11	—	W	Vcc=13.2V THD=1%
Total harmonic distortion	THD	—	0.2	0.7	—	0.04	0.15	%	Pout=1.5W

HA13127, HA13130

Electrical Characteristics ($V_{CC}=13.2V$, $f=1kHz$, $R_L=4\Omega$, Dual Operation, $T_a=25^\circ C$) (cont)

Noise output (1)	WBN_1	—	1.0	2.0	—	0.35	0.7	mV	$R_g=10k\Omega$ $BW=20Hz$ to $20kHz$
Noise output (2)	WBN_2	—	0.8	1.7	—	0.25	0.5	mV	$R_g=0$ $BW=20Hz$ to $20kHz$
Supply voltage rejection ratio	SVR	32	40	—	45	60	—	dB	$f=500Hz$, $V_{ripple}=0dBm$
Low roll-off Frequency	$f_L \alpha$	—	20	—	—	10	—	Hz	$\Delta G_V=-3dB$ from $f=1kHz$
High roll-off frequency	$f_H \alpha$	—	20	—	30	70	140	kHz	
Stand-by current	I_{Q2}	—	50	200	—	50	200	μA	V 5 Open
Stand-by threshold voltage	$V_{TH} (H)$	5	—	$V_{CC}-1$	5	—	$V_{CC}-1$	V	$V_{in}=50dBm$ Output on
	$V_{TH} (L)$	0	—	1	0	—	1	V	Output off
Stand-by (Mute) signal reduction level	ATT	45	60	—	45	60	—	dB	$V_{in}=-50dBm$
Stand-by (Mute) on time	t_F	—	10	—	—	10	—	μs	$V_1=3V$ to Open (Power on to off)
Stand-by (Mute) off time	t_R	—	0.2	—	—	0.2	—	sec	$V_1=Open$ to $3V$ (Power off to on)
Input impedance	R_{in}	20	30	40	20	30	40	$k\Omega$	
Channel cross-talk	CT	—	60	—	45	60	—	dB	$V_{out}=0dBm$
Output power (4)	P_{O4}	—	10	—	—	10	—	W	THD=10% $R_L=8\Omega$
Output power (5)	P_{O5}	—	7	—	—	7	—	W	THD=1% $R_L=8\Omega$

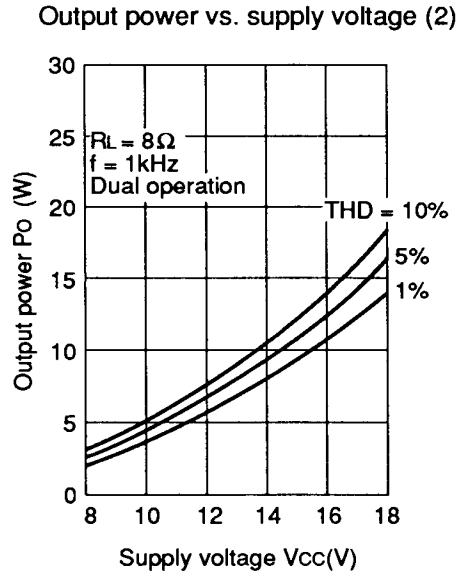
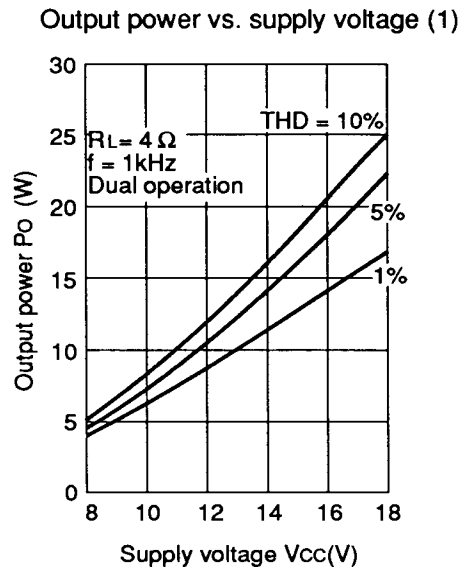


Figure 2 HA13130 Characteristic Curves

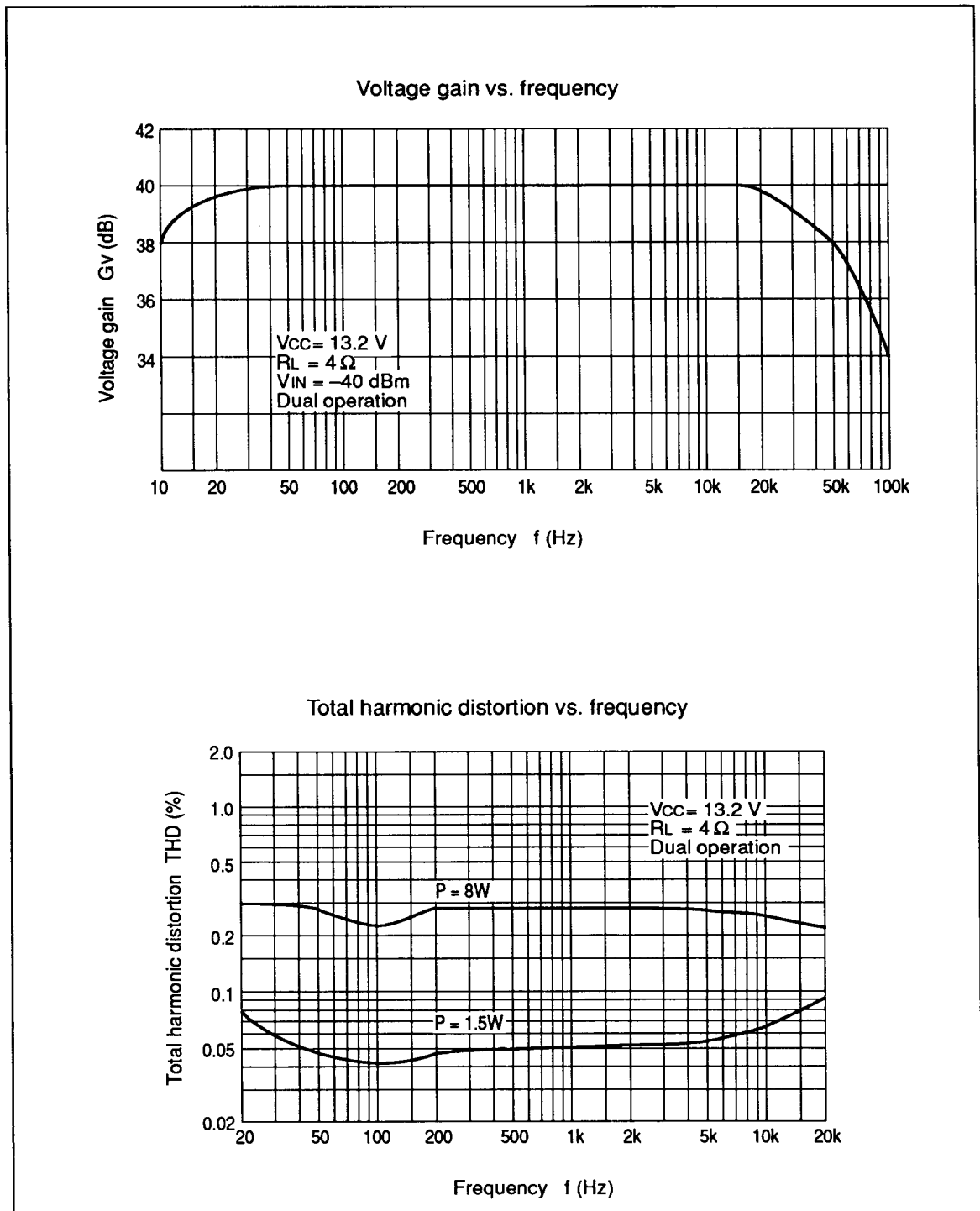


Figure 2 HA13130 Characteristic Curves (cont)

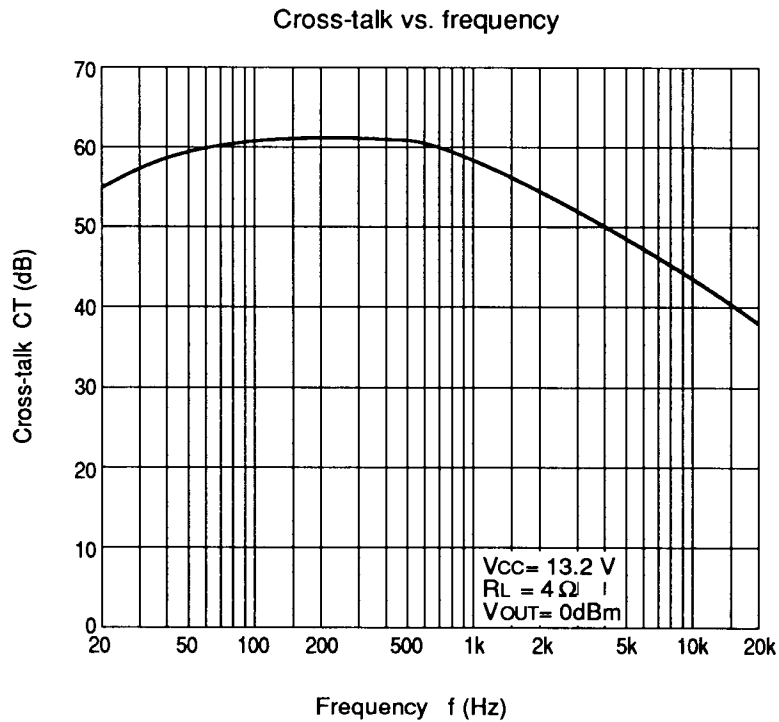
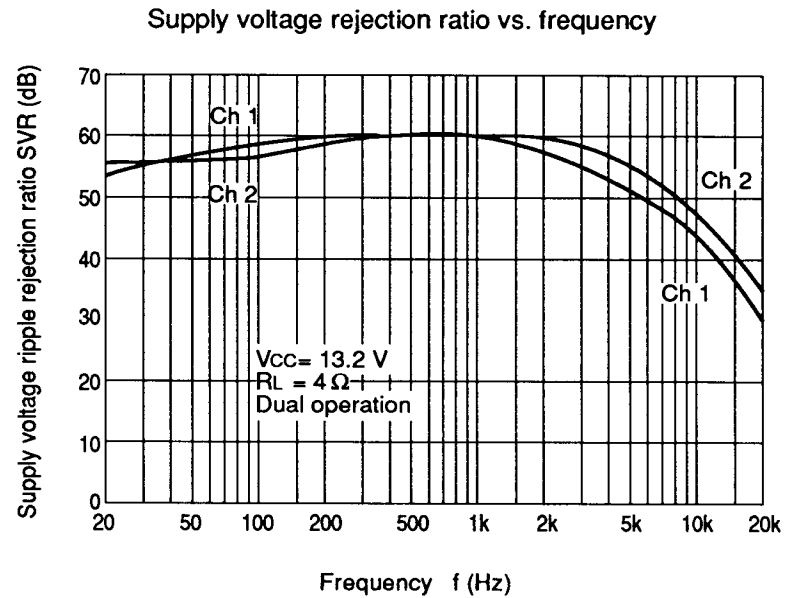


Figure 2 HA13130 Characteristic Curves (cont)

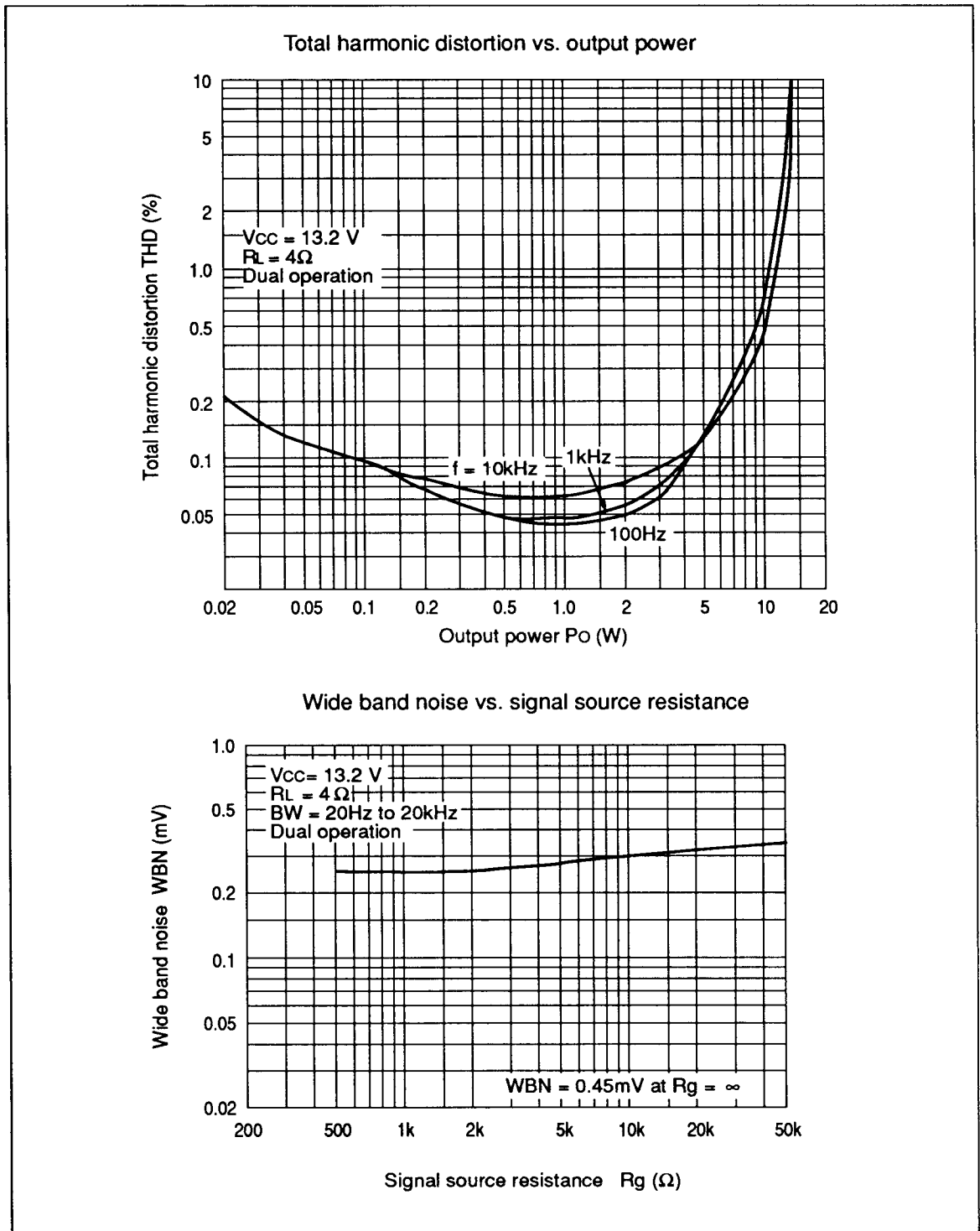


Figure 2 HA13130 Characteristic Curves (cont)

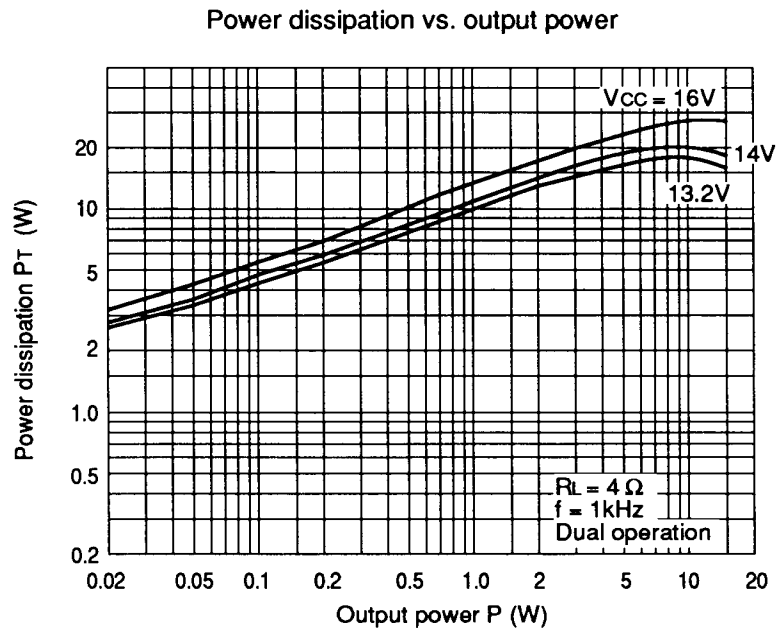
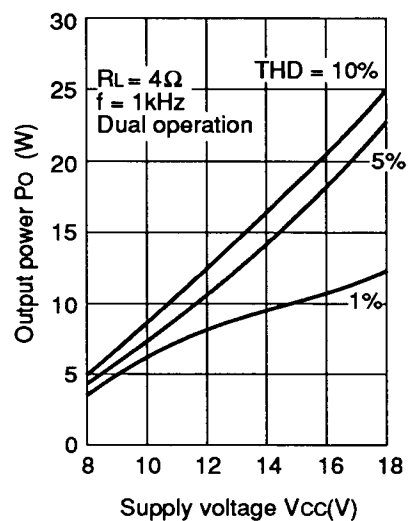


Figure 2 HA13130 Characteristic Curves (cont)

Power dissipation vs. output power (1)



Power dissipation vs. output power (2)

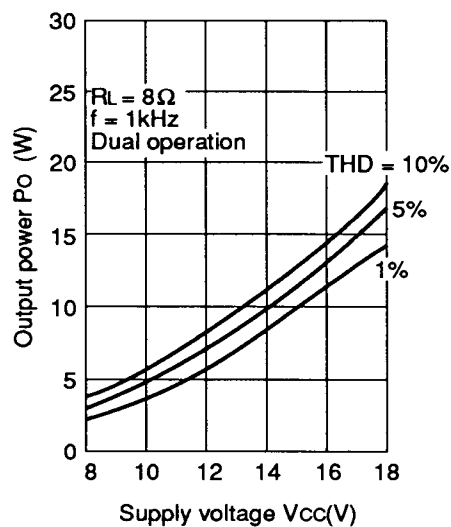


Figure 3 HA13127 Characteristic Curves

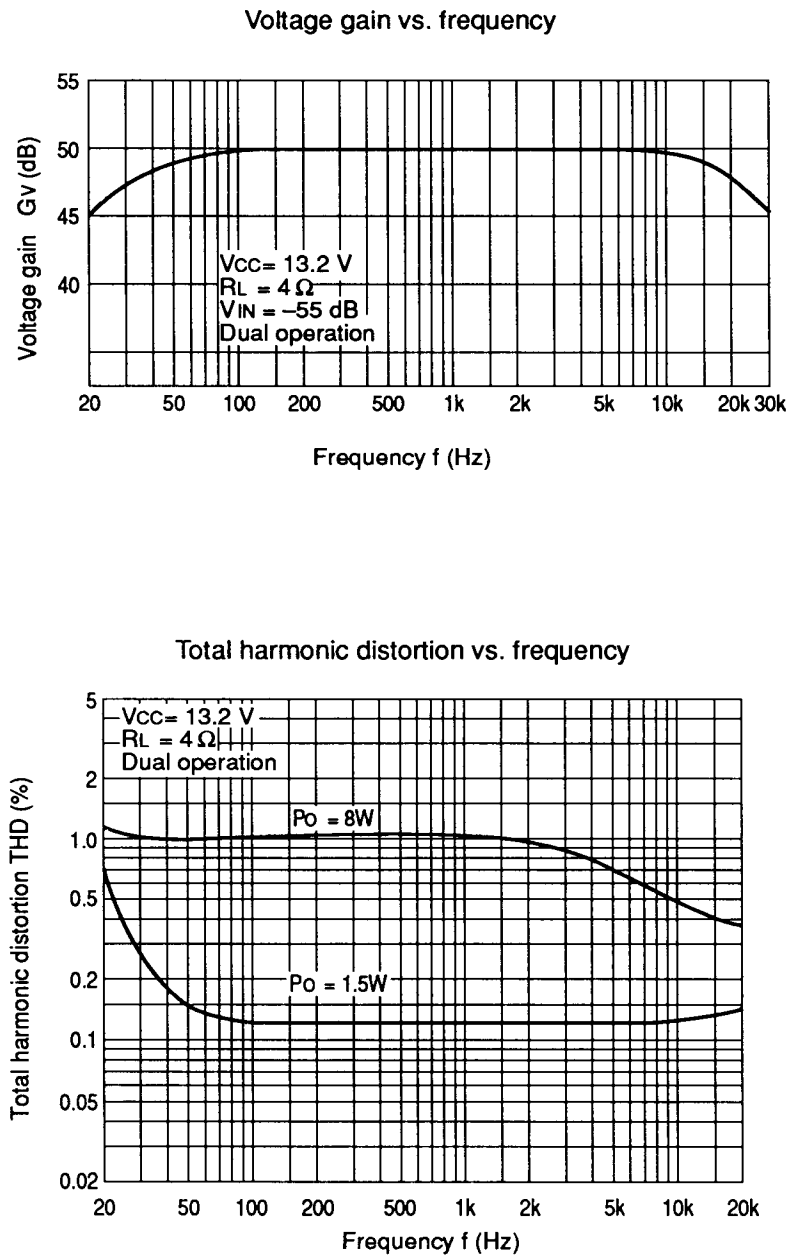


Figure 3 HA13127 Characteristic Curves (cont)

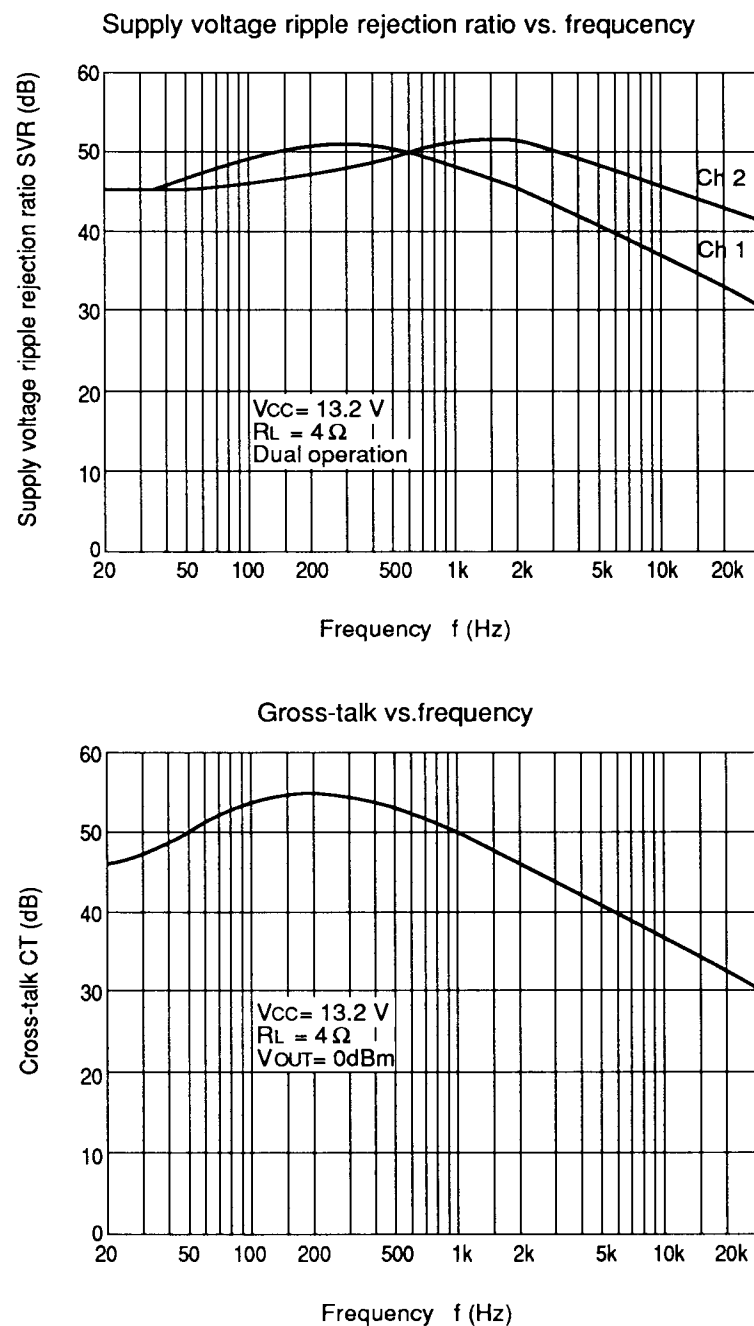


Figure 3 HA13127 Characteristic Curves (cont)

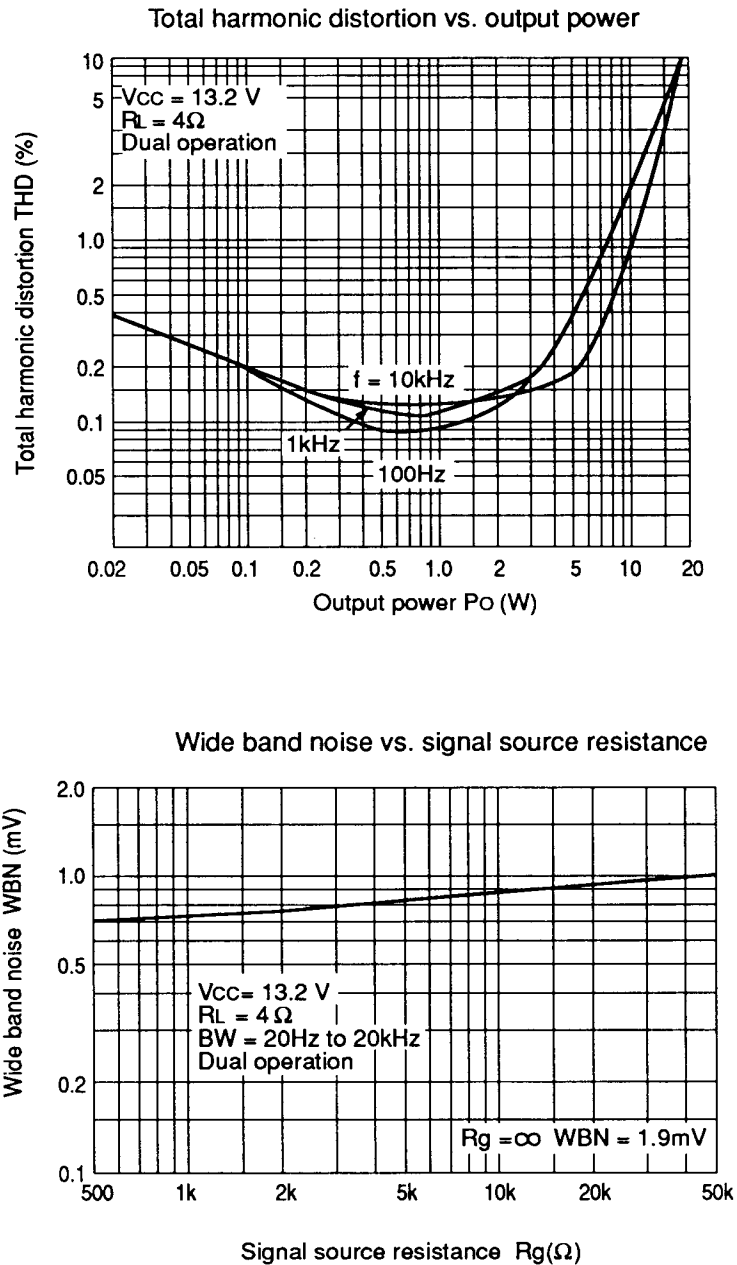


Figure 3 HA13127 Characteristic Curves (cont)

HA13127, HA13130

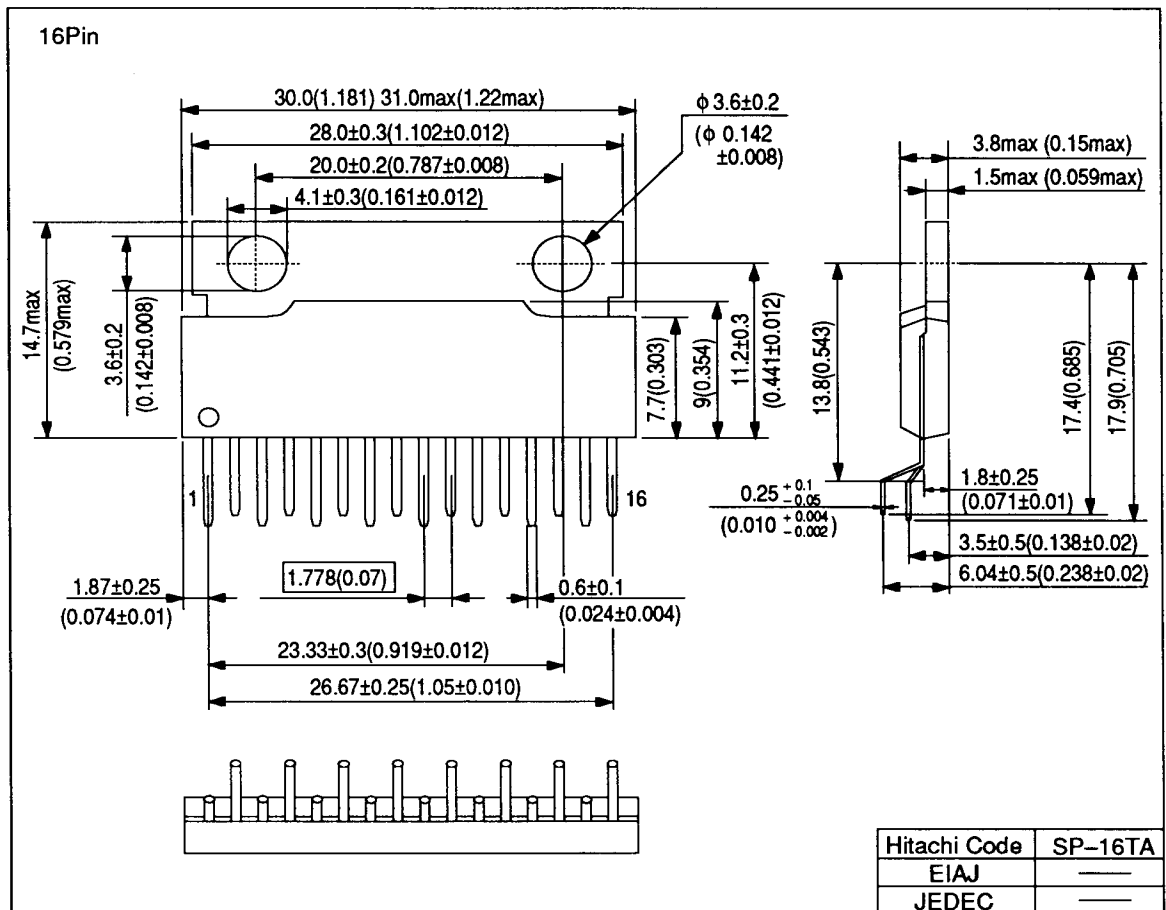


Figure 4 Dimensional Outline

When using this document, keep the following in mind:

1. This document may, wholly or partially, be subject to change without notice.
2. All rights are reserved: No one is permitted to reproduce or duplicate, in any form, the whole or part of this document without Hitachi's permission.
3. Hitachi will not be held responsible for any damage to the user that may result from accidents or any other reasons during operation of the user's unit according to this document.
4. Circuitry and other examples described herein are meant merely to indicate the characteristics and performance of Hitachi's semiconductor products. Hitachi assumes no responsibility for any intellectual property claims or other problems that may result from applications based on the examples described herein.
5. No license is granted by implication or otherwise under any patents or other rights of any third party or Hitachi, Ltd.
6. MEDICAL APPLICATIONS: Hitachi's products are not authorized for use in MEDICAL APPLICATIONS without the written consent of the appropriate officer of Hitachi's sales company. Such use includes, but is not limited to, use in life support systems. Buyers of Hitachi's products are requested to notify the relevant Hitachi sales offices when planning to use the products in MEDICAL APPLICATIONS.



Hitachi, Ltd.

New Marunouchi Bldg., 5-1, Marunouchi 1 chome, Chiyoda-ku, Tokyo 100, Japan

Tel: Tokyo (03) 212-1111

Telex: J22395, J22432, J24491, J26375 (HITACHY)

Cable: HITACHY TOKYO

For further information write to:

Hitachi America, Ltd.

Semiconductor & IC Div.

2000 Sierra Point Parkway

Brisbane, CA. 94005-1819,

U S A

Tel: 415-589-8300

Fax: 415-583-4207

Hitachi Europe GmbH

Electronic Components Div.

Central Europe Headquarters

Hans-Pinsel-Straße 10A,

8013 Haar bei München,

West Germany

Tel: 089-46140

Fax: 089-463068

Hitachi Europe Ltd.

Electronic Components Div.

Northern Europe Headquarters

21 Upton Road,

Watford, Herts WD1 7TB,

United Kingdom

Tel: 0923-246488

Fax: 0923-224422

Hitachi Asia (Hong Kong) Ltd.

Unit 512-513, North Tower,

World Finance Centre,

Harbour City, Canton Road,

Tsimshatsui, Kowloon,

Hong Kong

Tel: 852-3-7359218

Fax: 852-3-7306071