

HA13150

21 W × 4-Channel BTL Power IC



Preliminary
Rev. 0
Sep. 1991

Description

HA13150 is a four-channel BTL amplifier IC designed for car audio, featuring high output and low distortion, and applicable to digital audio equipment. It provides 21 W output per channel, with a 14.4 V power supply and at 10% distortion.

Functions

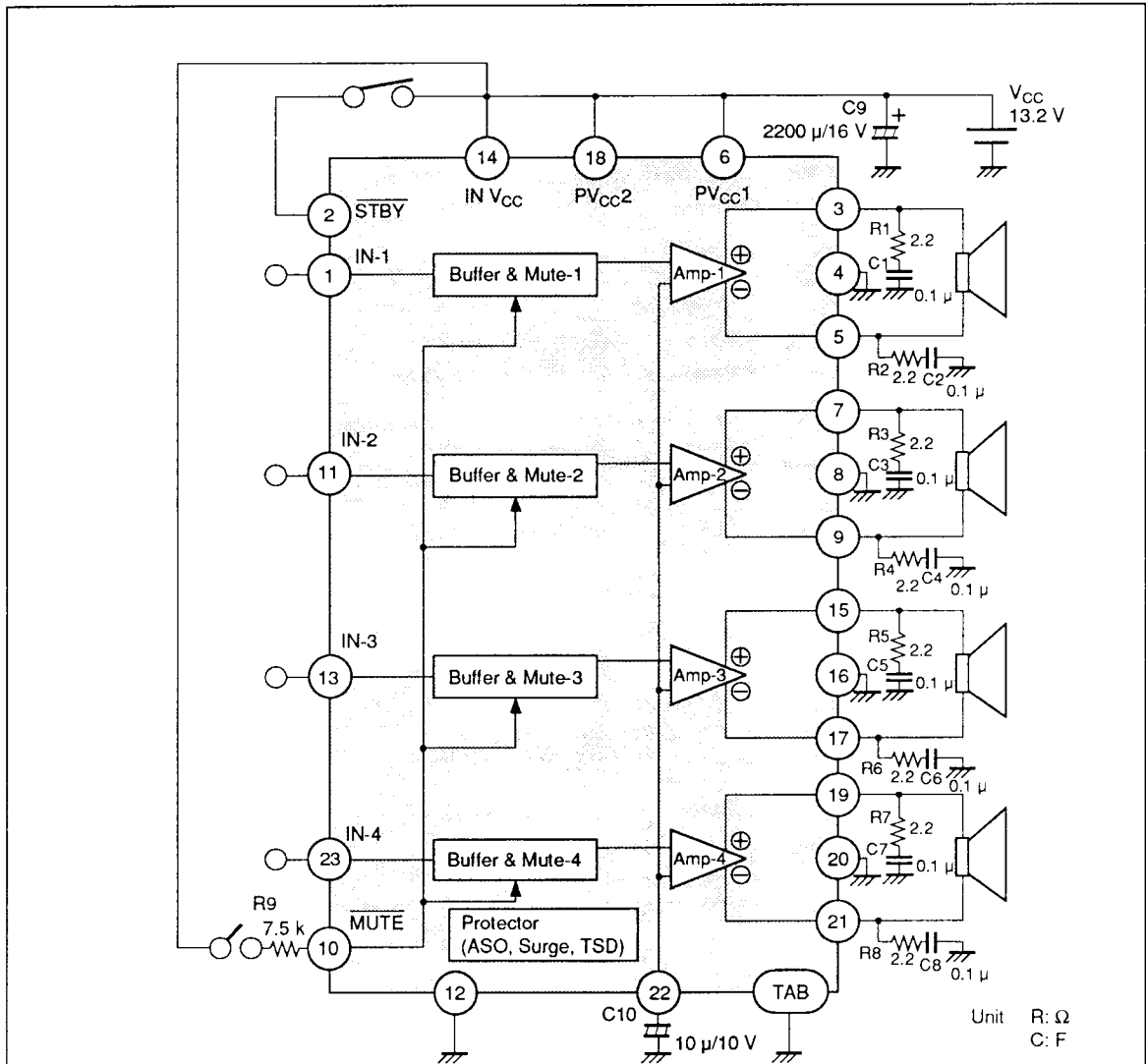
- Built-in standby circuit
- Built-in muting circuit
- Built-in protection circuits (surge, TSD, and ASO)

Features

- Requires few external parts
- Low distortion (total harmonic distortion = 0.01% at 3 W)
- Low noise (at $R_g = 620 \Omega$, noise is 0.15 mV (muting off) or 0.1 mV (muting on))
- Popping noise minimized
- Highly reliable current-limiting ASO protector keeps speakers safe from all kinds of trouble. Reliability is further enhanced by a fast-acting thermal shutdown protection circuit with on/off hysteresis.

HA13150

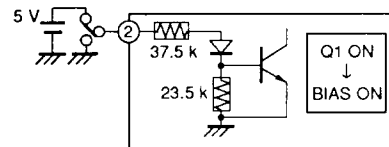
Block Diagram



* C1 to C8 should be polyester film capacitors with no secondary resonance (non-inductive), to assure stable operation.

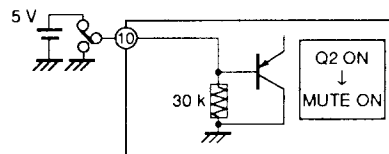
Notes: 1. Standby

Power is turned on when a signal of 3.5 V or 0.05 mA is impressed at pin 2. When pin 2 is open or connected to GND, standby is turned on (output off).



2. Muting

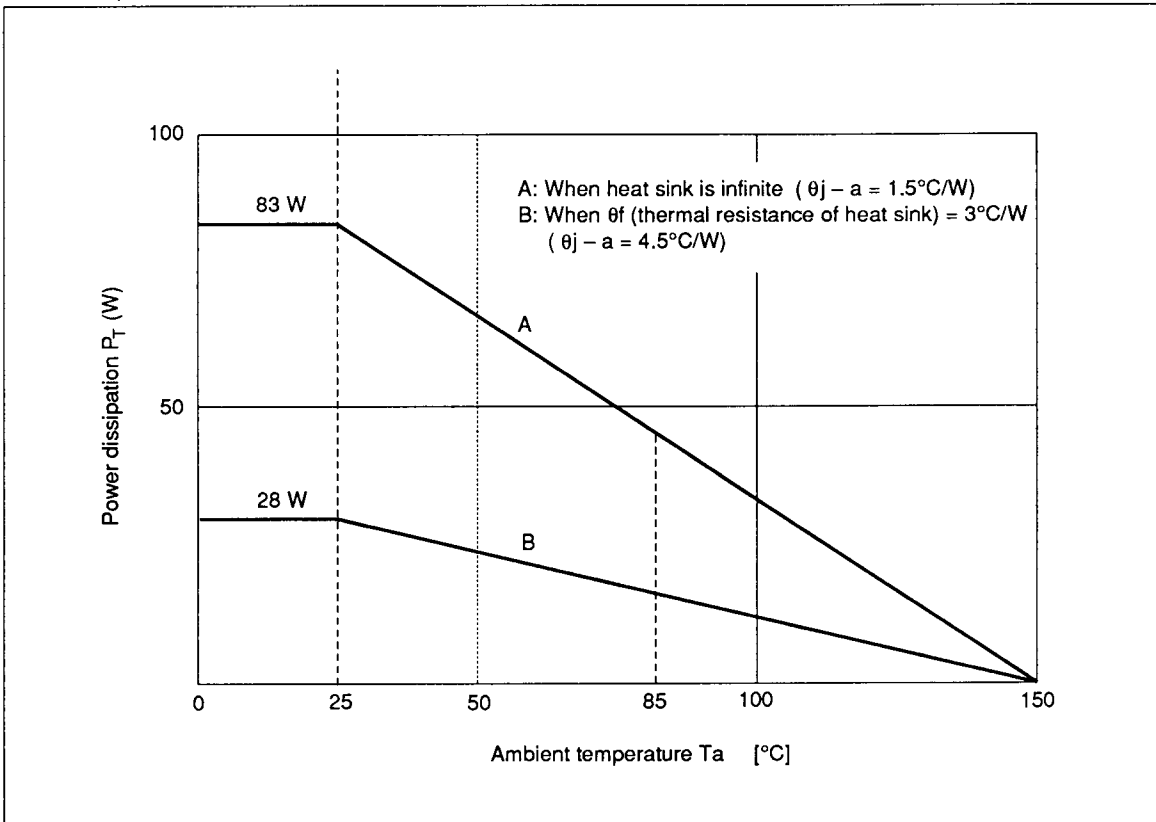
Muting is turned off (output on) when a signal of 5 V or 0.1 mA is impressed at pin 10. When pin 10 is open or connected to GND, muting is turned on (output off).



Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Item	Symbol	Rating	Unit	Remarks
Operating supply voltage	V_{CC}	18	V	
Supply voltage when no signal*	V_{CC} (DC)	26	V	
Peak supply voltage**	V_{CC} (PEAK)	50	V	
Output current	I_o	4	A	
Power dissipation***	P_T	83	W	
Junction temperature	T_j	150	$^\circ\text{C}$	
Operating temperature	T_{opr}	-30 to +85	$^\circ\text{C}$	
Storage temperature	T_{stg}	-55 to +125	$^\circ\text{C}$	

Notes: * Tolerance within 30 seconds
 ** Tolerance in surge pulse waveform
 *** Value when attached on the infinite heat sink plate at $T_a = 25^\circ\text{C}$.
 The derating curve is as shown in the graph below.



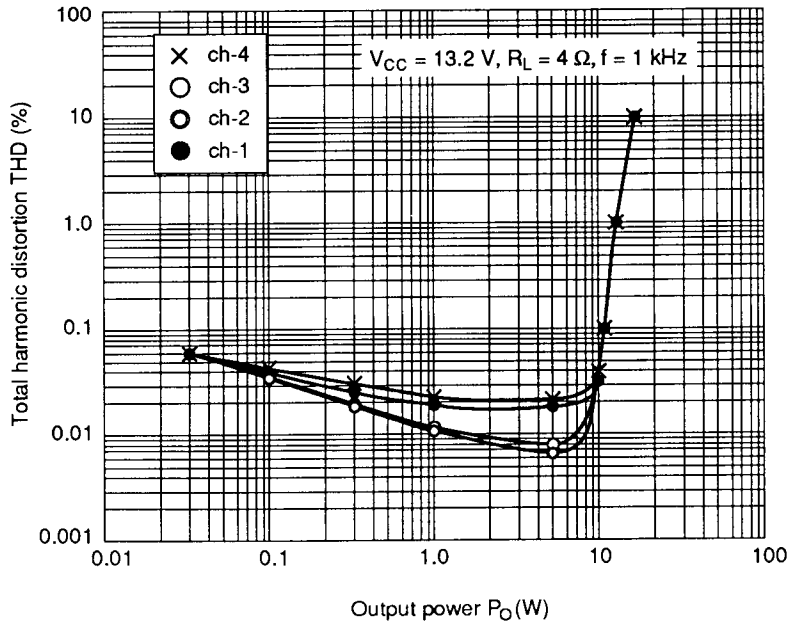
HA13150

Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Current when no signal	I_{q1}	—	240	—	mA	$V_{in} = 0$
Output offset voltage	ΔV_q	-250	0	+250	mV	
Gain	G_v	30.5	32	33.5	dB	
Gain difference between channels	ΔG_v	-1.5	0	+1.5	dB	
Rated output power	P_o	—	18	—	W	$V_{CC} = 13.2\text{ V}$ $R_L = 4\ \Omega$, THD = 10%
		—	21	—		$V_{CC} = 14.4\text{ V}$ $R_L = 4\ \Omega$, THD = 10%
Total harmonic distortion	T.H.D	—	0.01	—	%	$P_o = 3\text{ W}$
Output noise voltage	WBN	—	0.15	0.5	mV _{rms}	$R_g = 0\ \Omega$ SW = 20 to 20 kHz
Ripple rejection	SVR	—	55	—	dB	$R_g = 600\ \Omega$ $f = 120\text{ Hz}$
Channel crosstalk	C.T	—	70	—	dB	$R_g = 600\ \Omega$ $V_{00t} = 0\text{ dBm}$
Input impedance	R_{in}	21	30	39	k Ω	
Standby current	I_{q2}	—	—	200	μA	
Standby control voltage (high)	V_{STH}	3.5	—	V_{CC}	V	
Standby control voltage (low)	V_{STL}	0	—	1.5	V	
Muting control voltage (high)	V_{MH}	3.5	—	V_{CC}	V	
Muting control voltage (low)	V_{ML}	0	—	1.5	V	
Muting attenuation	A_{TTM}	—	70	—	dB	$V_{in} = 0\text{ dBm}$

HA13150 THD vs. P_O , and THD vs. f

Total Harmonic Distortion vs. Output Power (1)

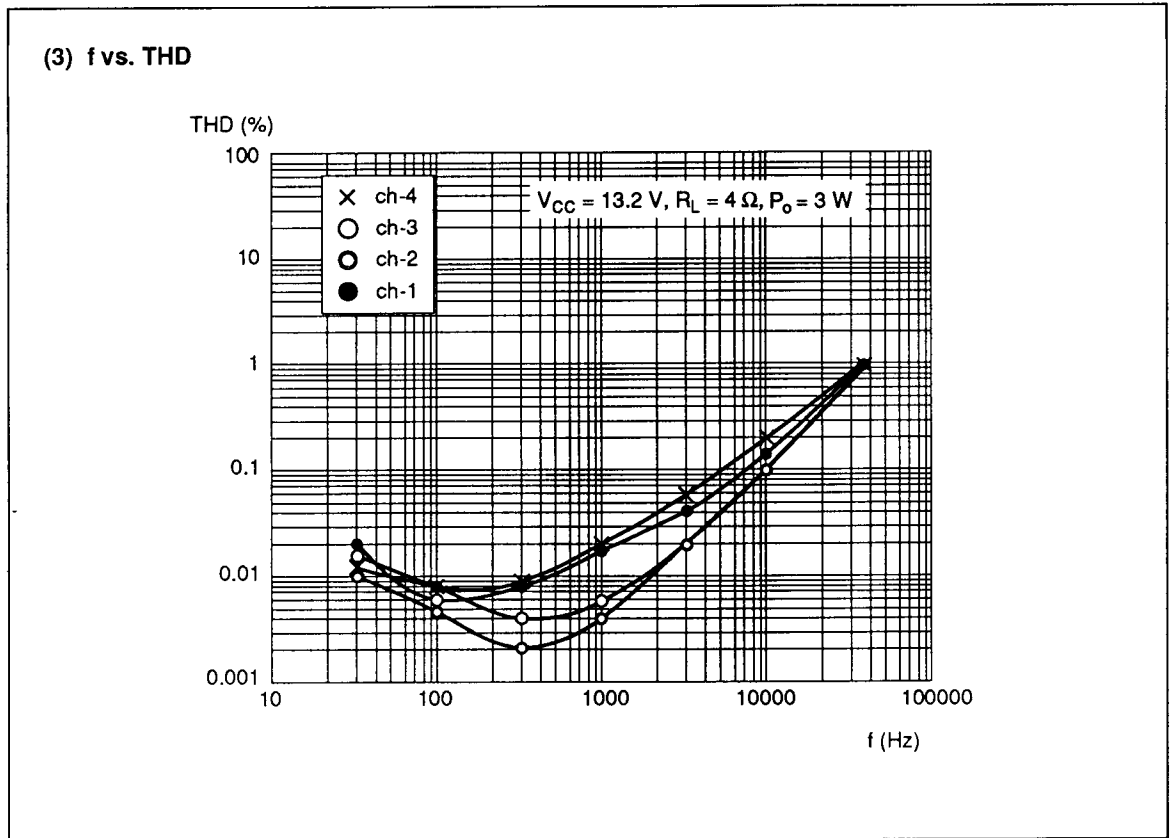


Total Harmonic Distortion vs. Output Power (2)



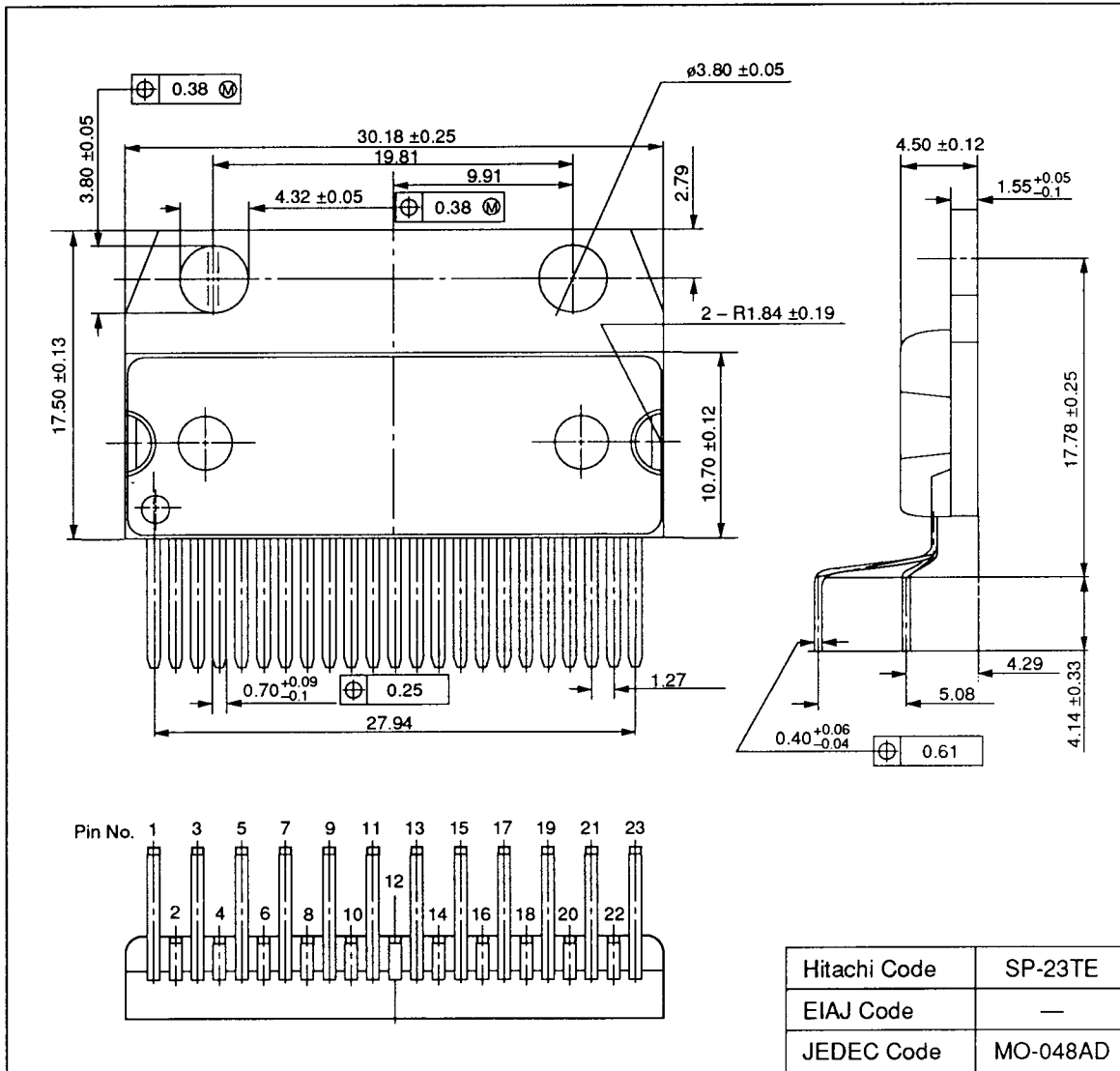
HA13150

HA13150 THD vs. P_O , and THD vs. f (cont)



Package Dimension

Unit: mm



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.

Semiconductor & IC Div.
Karukozaka MN Bldg., 2-1, Ageba-cho, Shinjuku-ku, Tokyo 162, Japan
Tel: Tokyo (03) 3266-9376
Fax: (03) 3235-2375

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
F. R. Germany
Tel: 089-46140
Fax: 089-463068

Hitachi Europe Ltd.
Electronic Components Div.
Northern Europe Headquarters
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA
United Kingdom
Tel: 0628-585000
Fax: 0628-778322

Hitachi Asia (Hong Kong) Ltd.
Unit 706, North Tower,
World Finance Centre,
Harbour City, Canton Road
Tsimshatsui, Kowloon
Hong Kong
Tel: 852-7359218
Fax: 852-7306071

8

030514 ✓ - R