
HA13156

38 W × 4-Channel BTL Power IC

HITACHI

ADE-207-241 (Z)
1st. Edition
July 1997

Description

The HA13156 is four-channel BTL amplifier IC designed for car audio, featuring high output and low distortion, and applicable to digital audio equipment. It provides 38 W output per channel, with a 13.7 V power supply and at Max distortion.

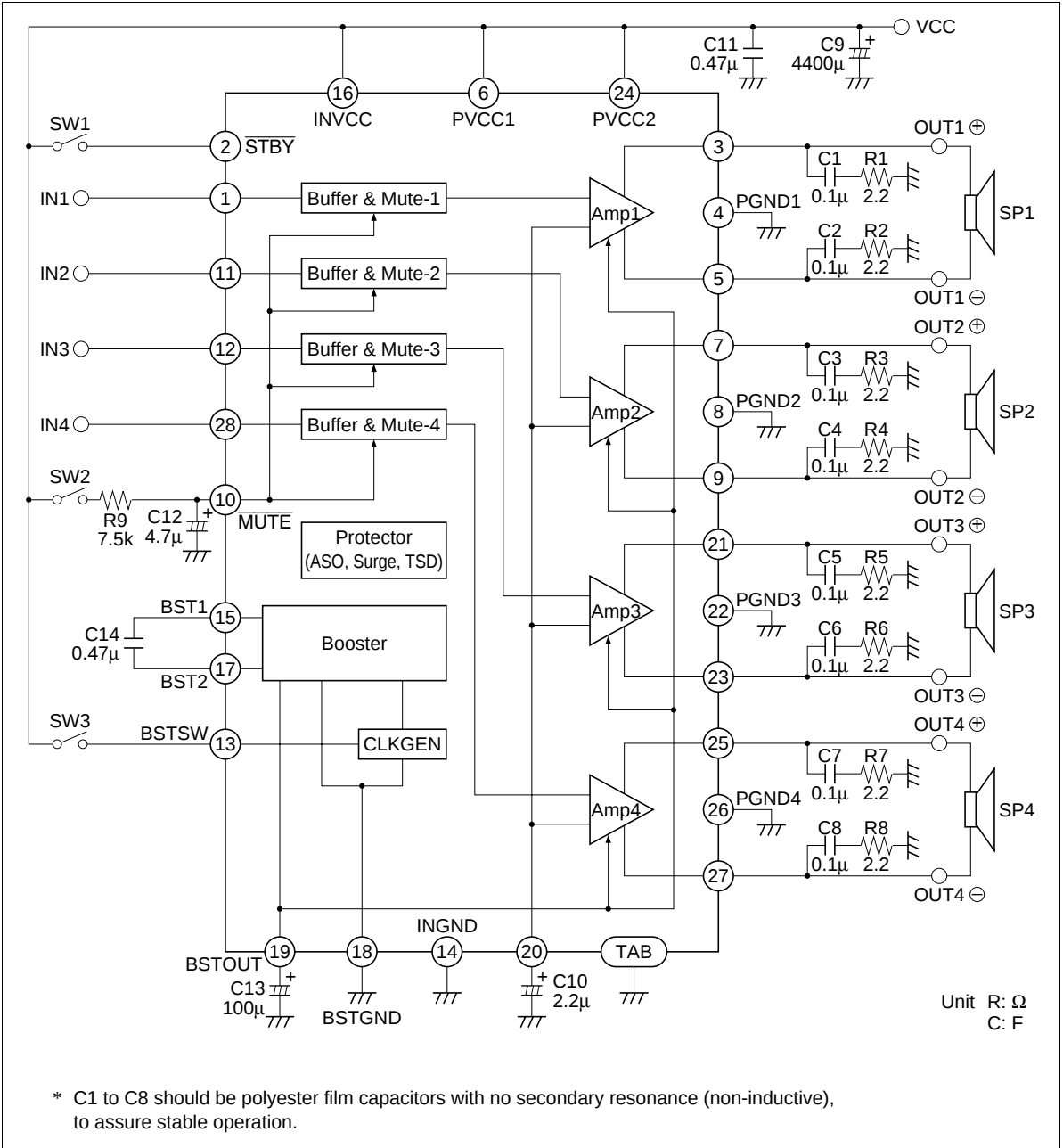
Functions

- 4 ch BTL power amplifiers
- Built-in standby circuit
- Built-in muting circuit
- Built-in protection circuit (surge, T.S.D, and ASO)
- Built-in change booster ON/OFF circuit

Features

- High power for booster circuit
- Popping noise minimized
- Low output noise
- Built-in high reliability protection circuit

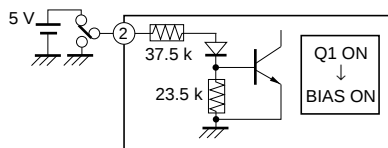
Block Diagram



Note: 1. Standby

Power is turned on when a signal of 3.5 V or 0.05 mA is impressed at pin 2.

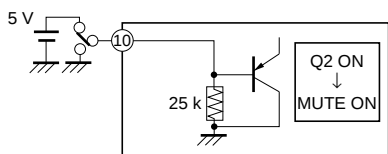
When pin 2 is open or connected to GND, standby is turned on (output off).



2. Muting

Muting is turned off (output off) when a signal of 3.5 V or 0.2 mA is impressed at pin 10.

When pin 10 is open or connected to GND, muting is turned on (output off).



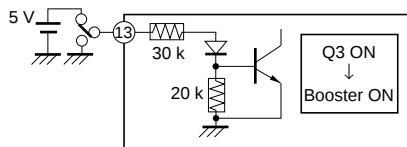
3. DC-DC converter (Booster)

DC-DC converter (Booster) in IC is turned on when a signal of 3.5 V over or 0.04 mA over is impressed at pin 13, and get large max output power.

When pin 13 is open or connected to GND, DC-DC converter (Booster) is turned off.

This IC generated noise, because built-in DC-DC converter (Booster).

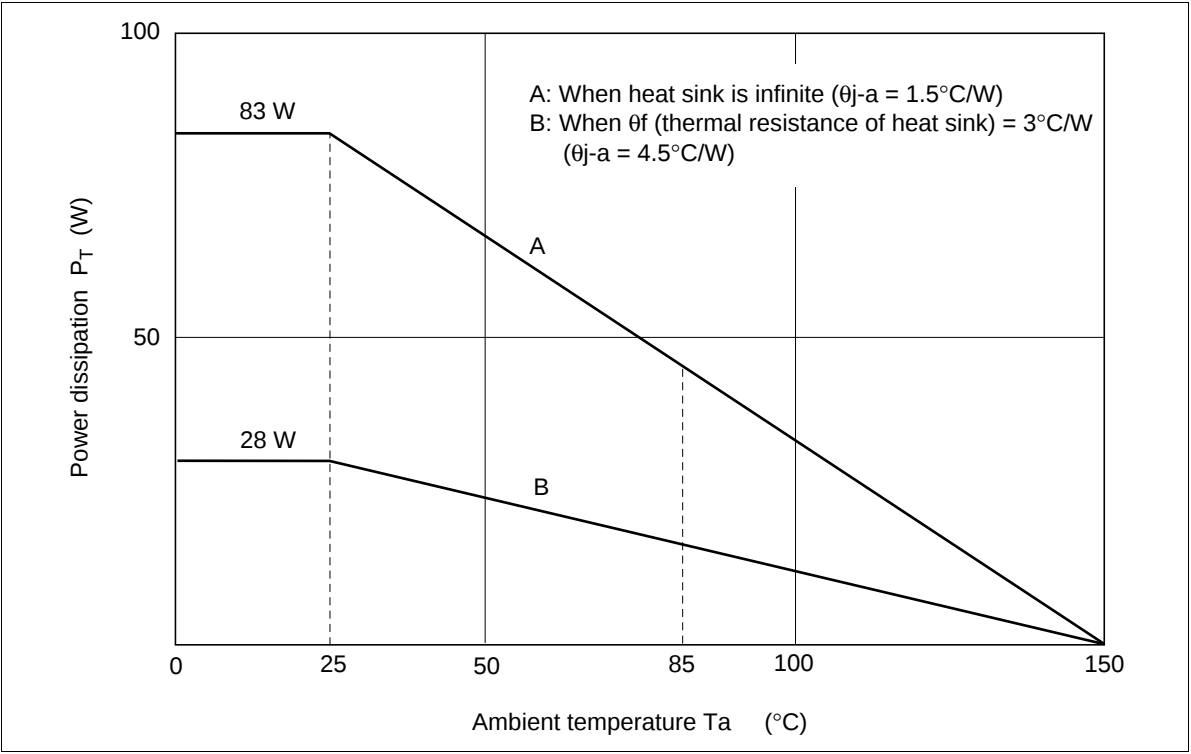
Consequently if you use radio tuner (AM), I recommend DC-DC converter (Booster) off.



Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Operating supply voltage	V_{CC}	18	V
Supply voltage when no signal* ¹	V_{CC} (DC)	26	V
Peak supply voltage* ²	V_{CC} (PEAK)	50	V
Output current* ³	I_O (PEAK)	4	A
Power dissipation* ⁴	P_T	83	W
Junction temperature	T_J	150	°C
Operating temperature	T_{opr}	−30 to +85	°C
Storage temperature	T_{stg}	−55 to +125	°C

- Note:
- 1. Tolerance within 30 seconds.
 - 2. Tolerance in surge pulse waveform.
 - 3. Value per 1 channel.
 - 4. Value when attached on the infinite heat sink plate at $T_a = 25\text{ °C}$.
- The derating curve is as shown in the graph below.

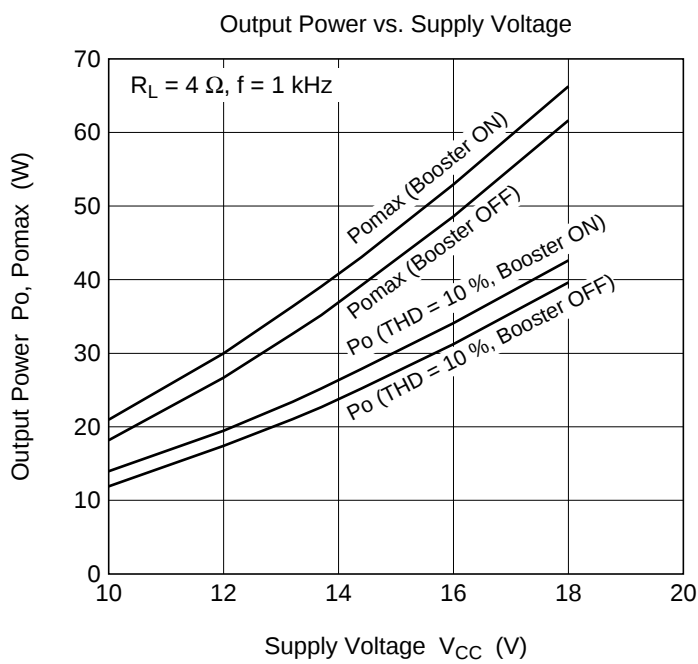
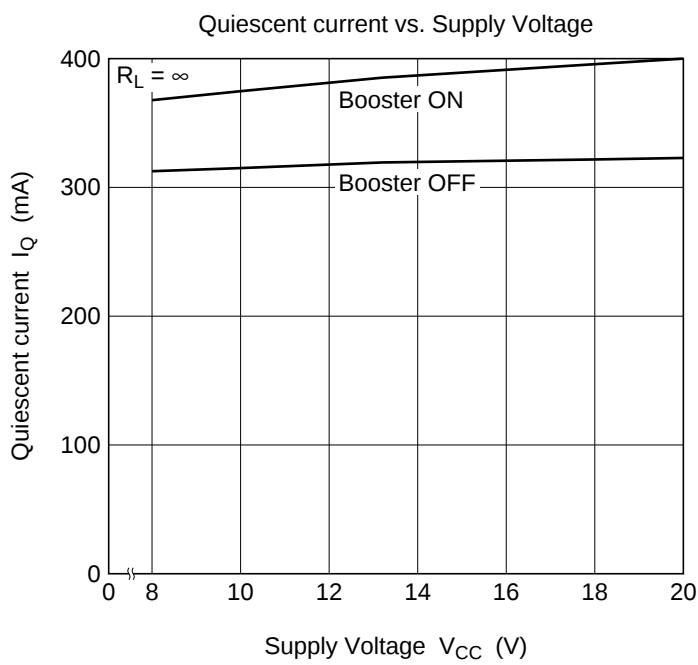


Electrical Characteristics ($V_{CC} = 13.2\text{ V}$, $R_L = 4\ \Omega$, $f = 1\text{ kHz}$, $R_g = 600\ \Omega$, $T_a = 25^\circ\text{C}$, when there is no description in test conditions)

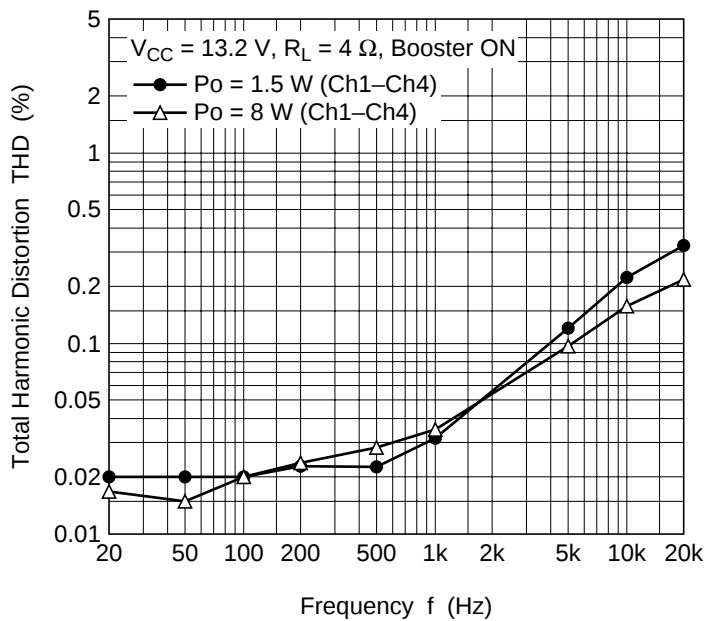
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Quiescent current1	I_{Q1}	275	380	480	mA	$V_{in} = 0\text{ V}$, boost on, $R_L = \infty$
Quiescent current2	I_{Q2}	190	320	420	mA	$V_{in} = 0\text{ V}$, boost off, $R_L = \infty$
Total harmonic distortion	T.H.D.	—	0.02	0.1	%	$P_o = 3\text{ W}$, boost on, off
Gain	G_V	30.5	32	33.5	dB	
Gain difference between channels	ΔG_V	-1.0	0	1.0	dB	
Rated output power1	P_{O1}	20	23	—	W	$V_{CC} = 13.2\text{ V}$, boost on, $R_L = 4\ \Omega$, THD = 10%
Rated output power2	P_{O2}	17	20	—	W	$V_{CC} = 13.2\text{ V}$, boost off, $R_L = 4\ \Omega$, THD = 10%
Max output power1	P_{OMAX1}	35	38	—	W	$V_{CC} = 13.7\text{ V}$, boost on, $R_L = 4\ \Omega$
Max output power2	P_{OMAX2}	31	34	—	W	$V_{CC} = 13.7\text{ V}$, boost off, $R_L = 4\ \Omega$
Output noise voltage1	WBN1	—	0.15	0.3	mVrms	$R_g = 0\ \Omega$, mute off, BW = 20 to 20 kHz
Output noise voltage2	WBN2	—	0.08	0.2	mVrms	$R_g = 0\ \Omega$, mute on, BW = 20 to 20 kHz
Ripple rejection	SVR	45	55	—	dB	$f = 120\text{ Hz}$
Output offset voltage1	ΔV_{Q1}	-250	0	250	mV	$V_{in} = 0\text{ V}$, mute off
Output offset voltage2	ΔV_{Q2}	-250	0	250	mV	$V_{in} = 0\text{ V}$, change value of mute on → off
Standby current	I_{ST}	—	1	10	μA	boost off
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	
Boost control voltage (high)	V_{BH}	3.5	—	V_{CC}	V	
Boost control voltage (low)	V_{BL}	0	—	1.5	V	
Muting attenuation	ATTM	70	90	—	dB	$V_{out} = 6.7\text{ Vrms}$
Channel cross talk	C.T.	60	80	—	dB	$V_{out} = 6.7\text{ Vrms}$
Input impedance	Z_{in}	18	25	33	k Ω	
Input voltage muted completely	ATTin	7	—	—	Vp-p	

Note: boost on; Boost control voltage (high),
mute on; Muting control voltage (low)

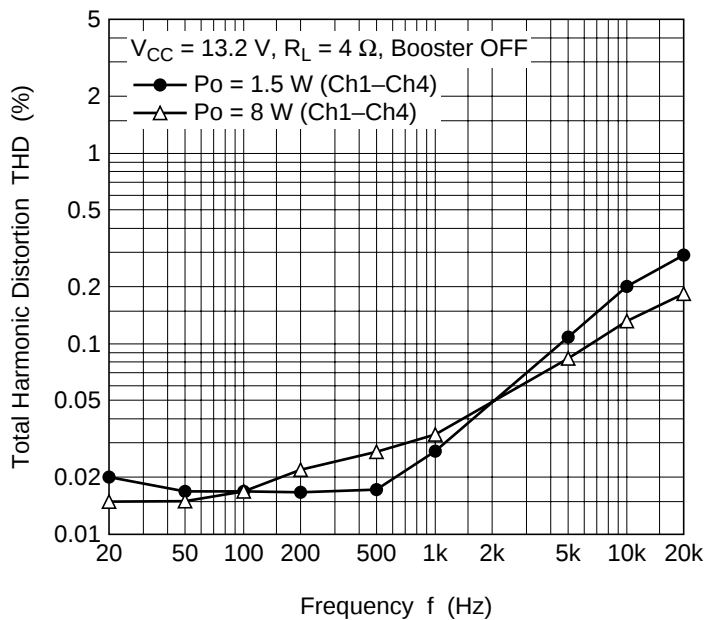
Characteristic Curves

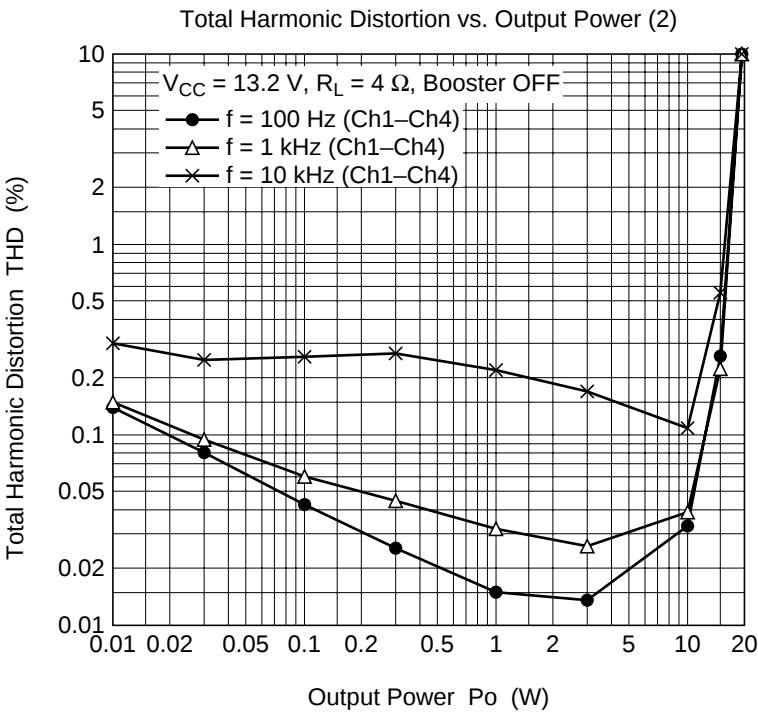
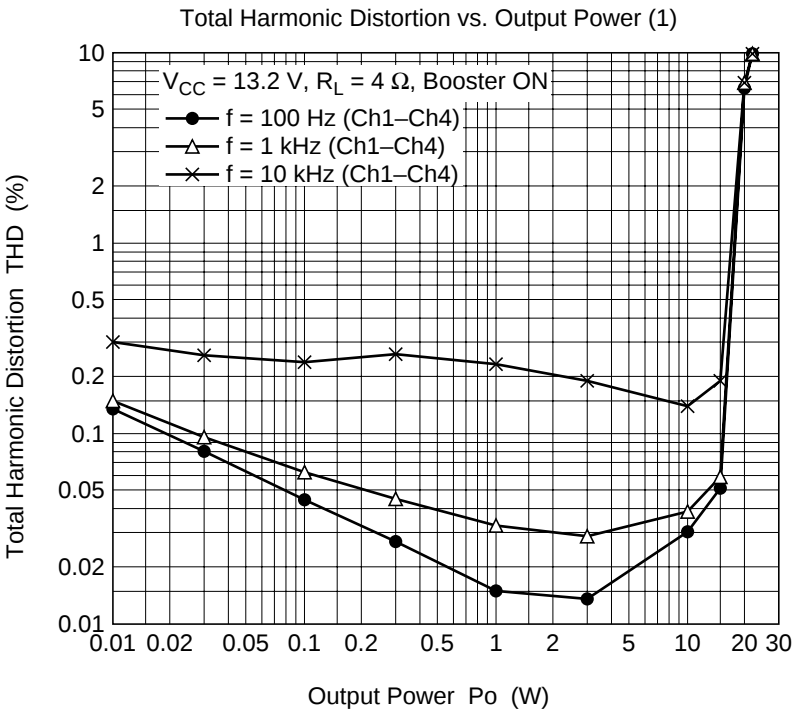


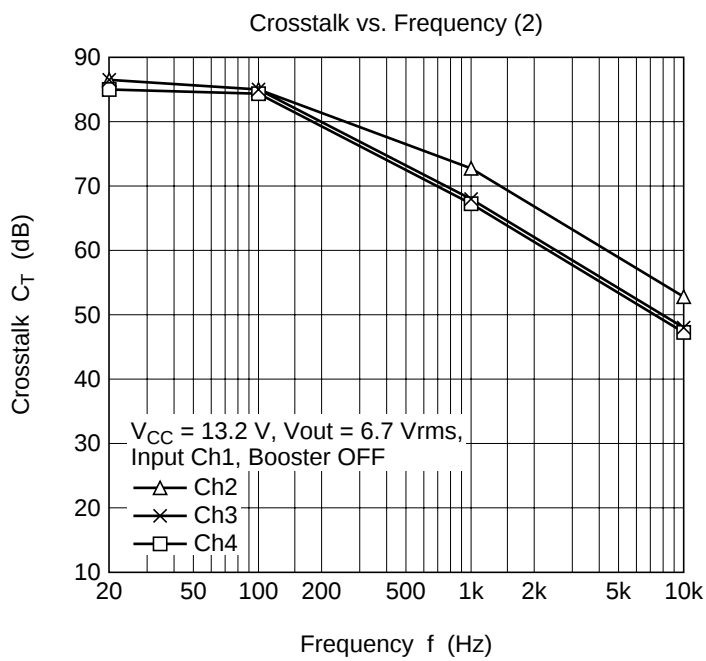
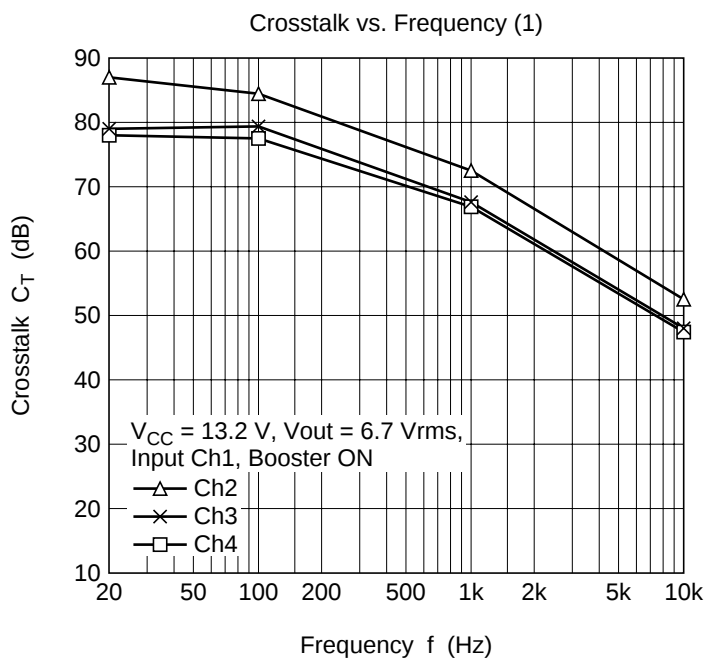
Total Harmonic Distortion vs. Frequency (1)

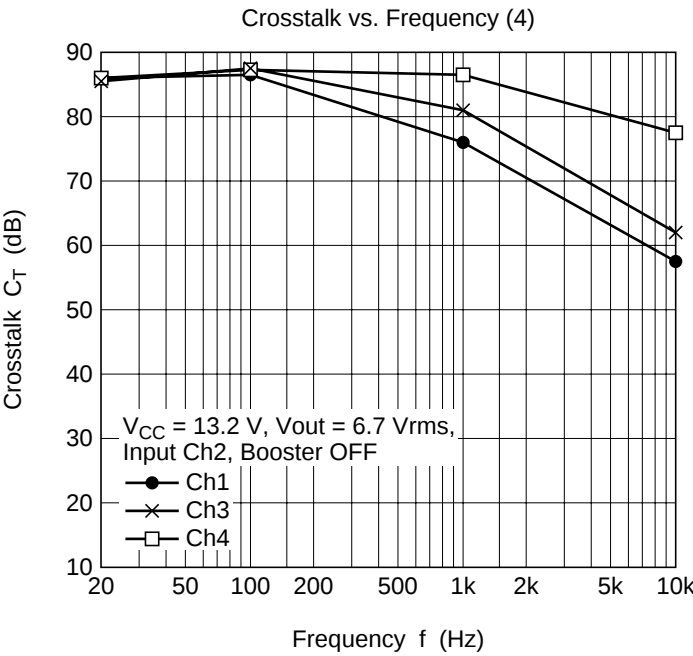
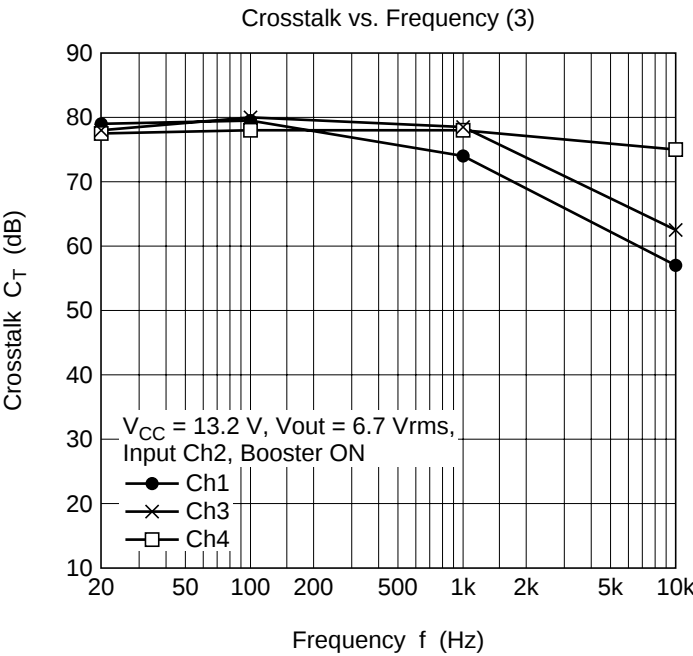


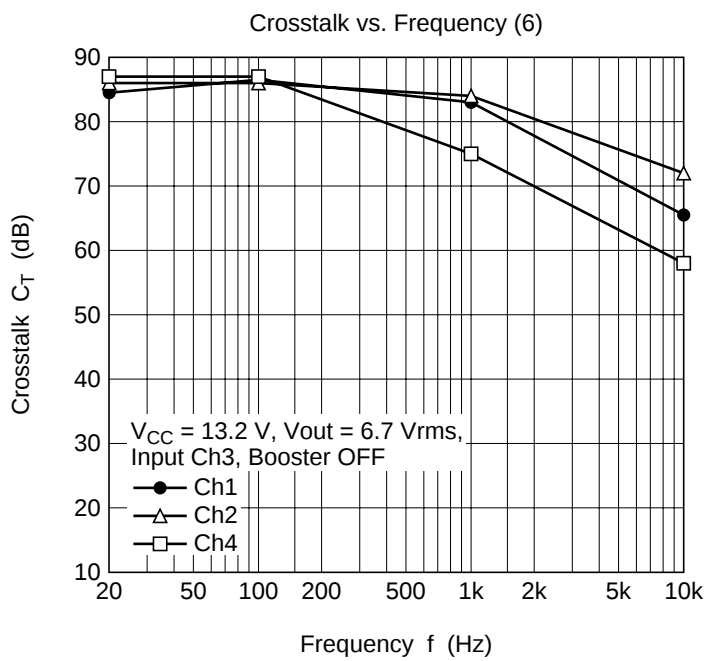
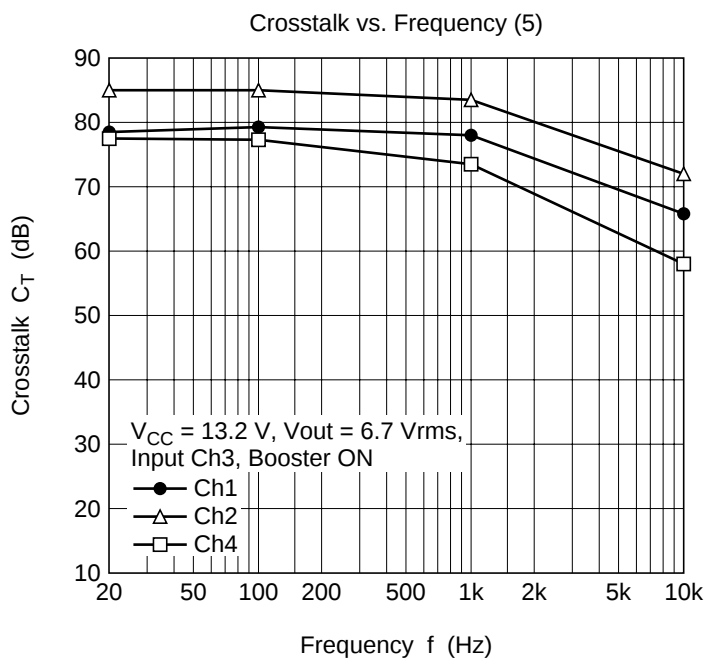
Total Harmonic Distortion vs. Frequency (2)

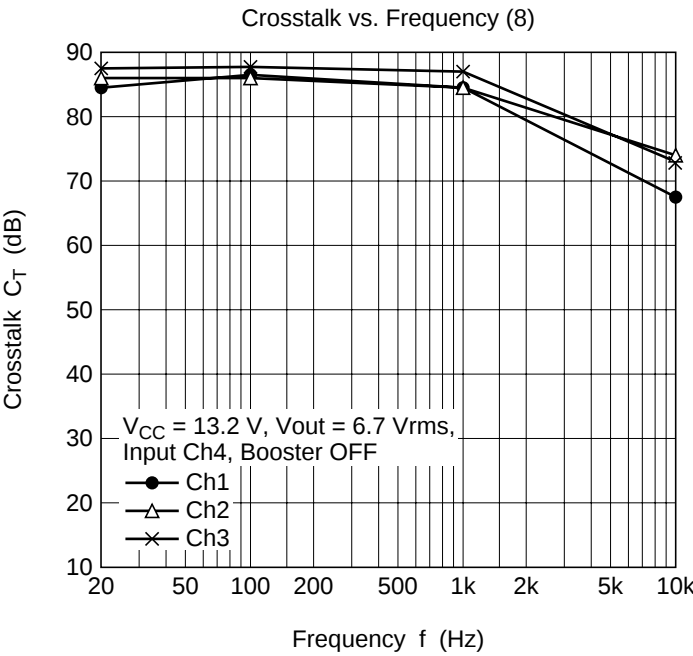
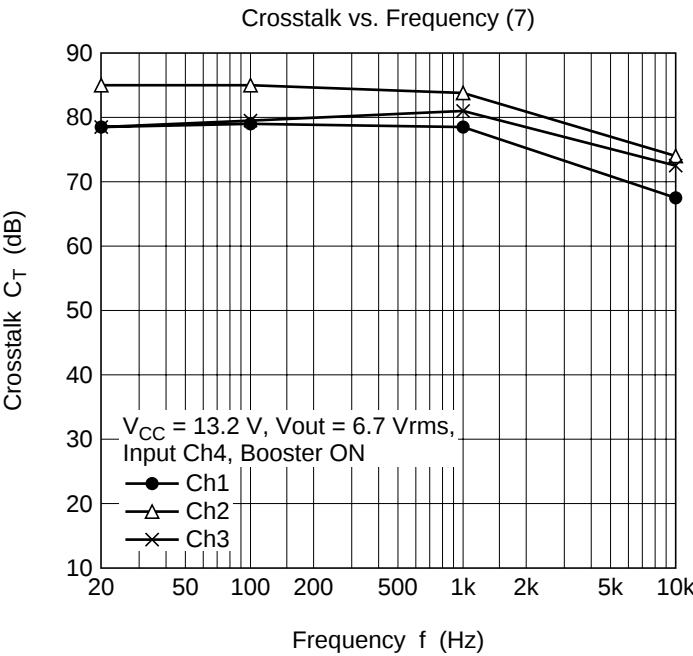


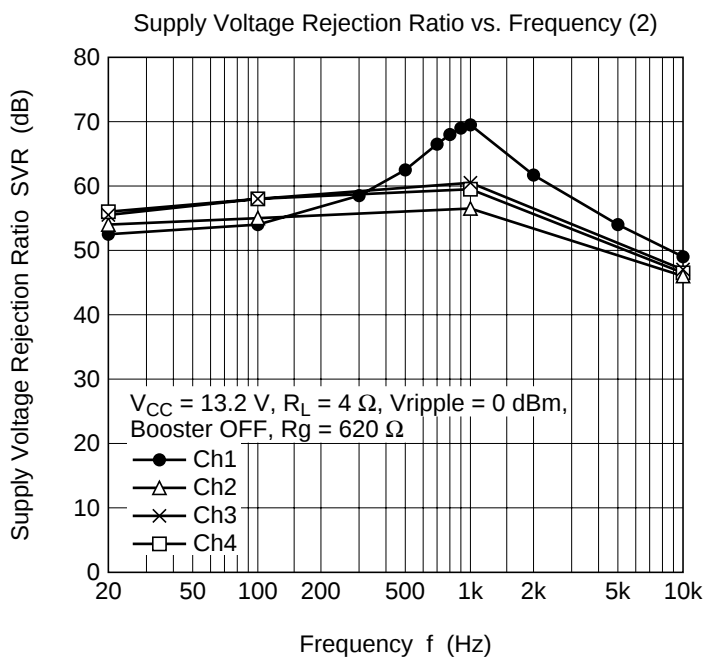
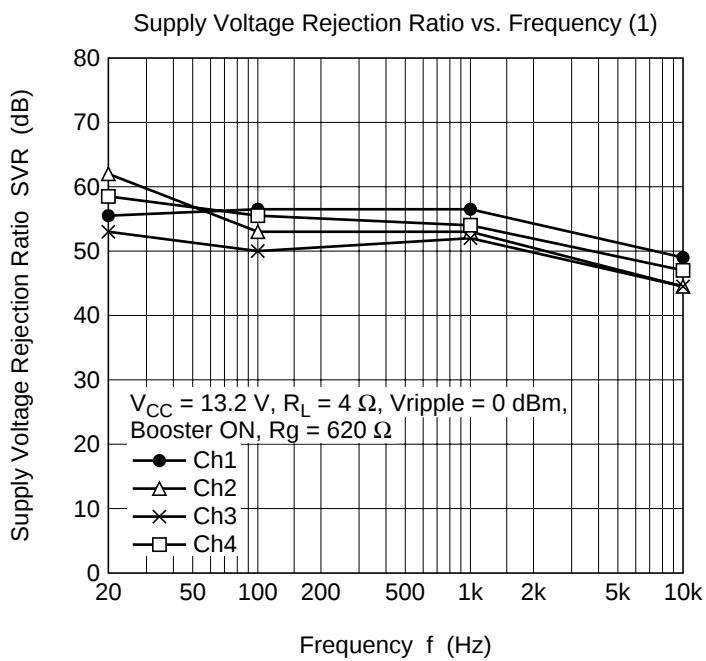


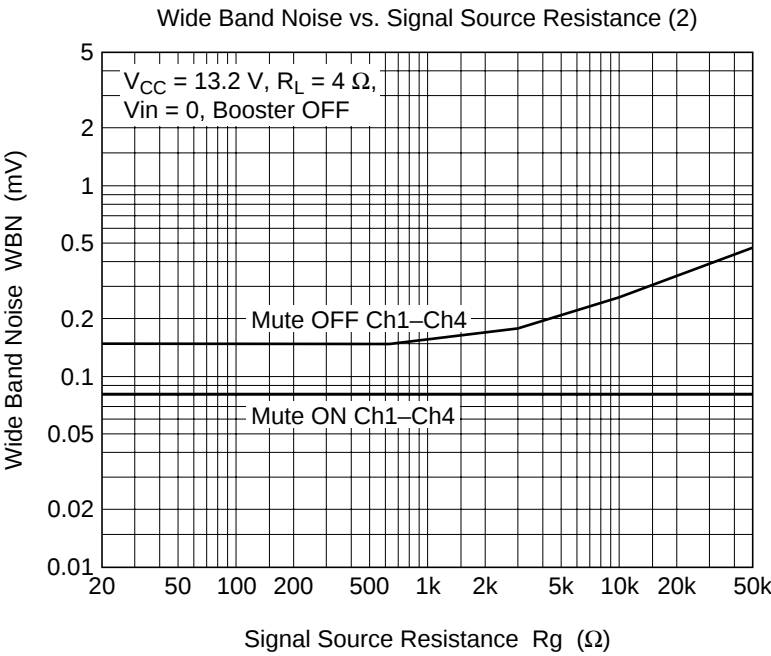
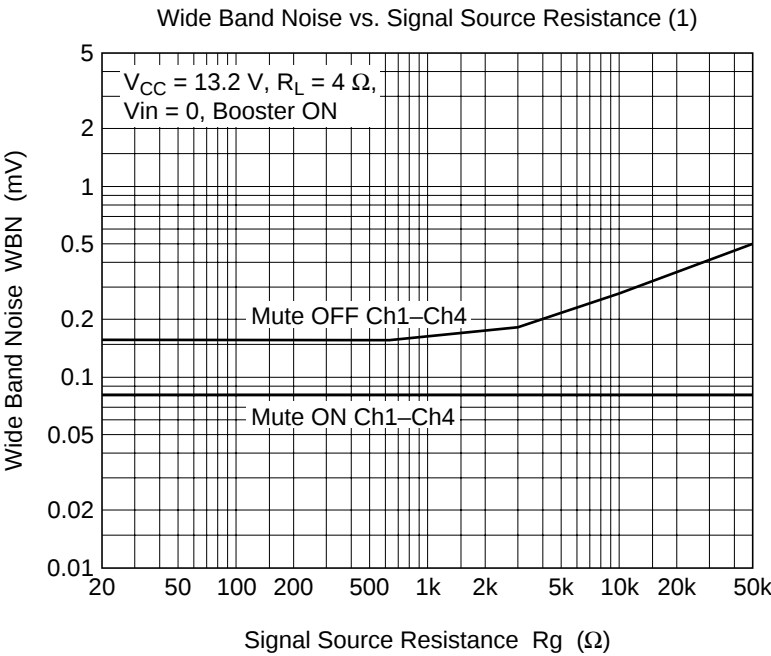


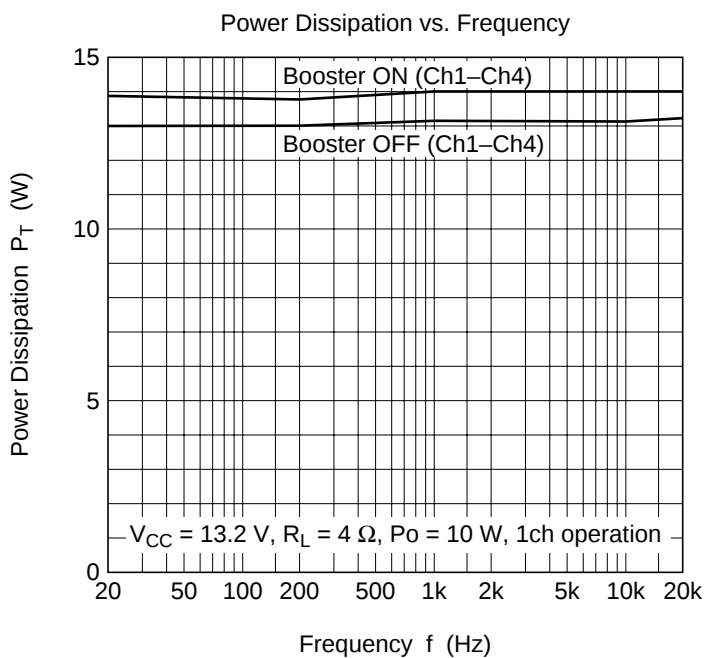
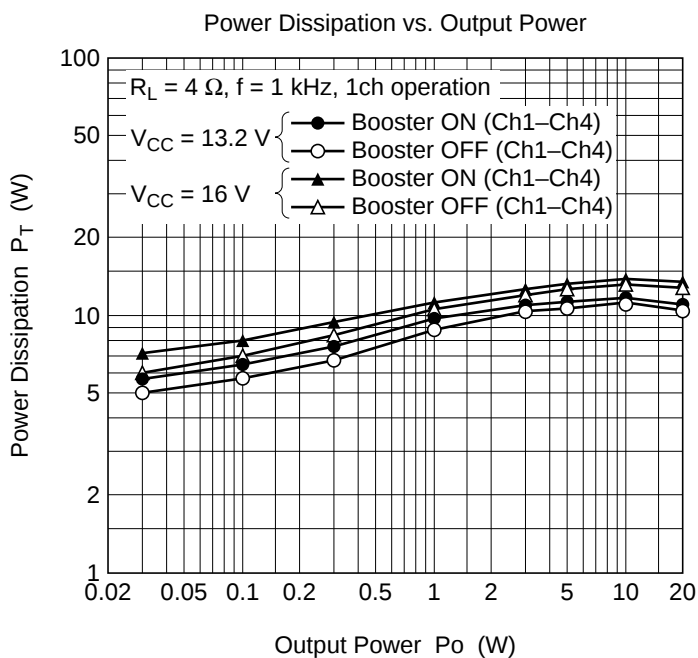


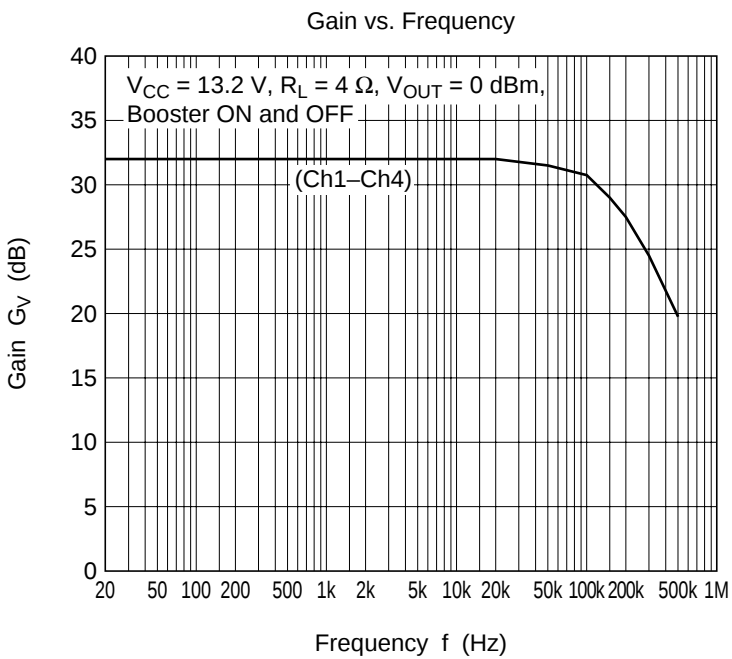






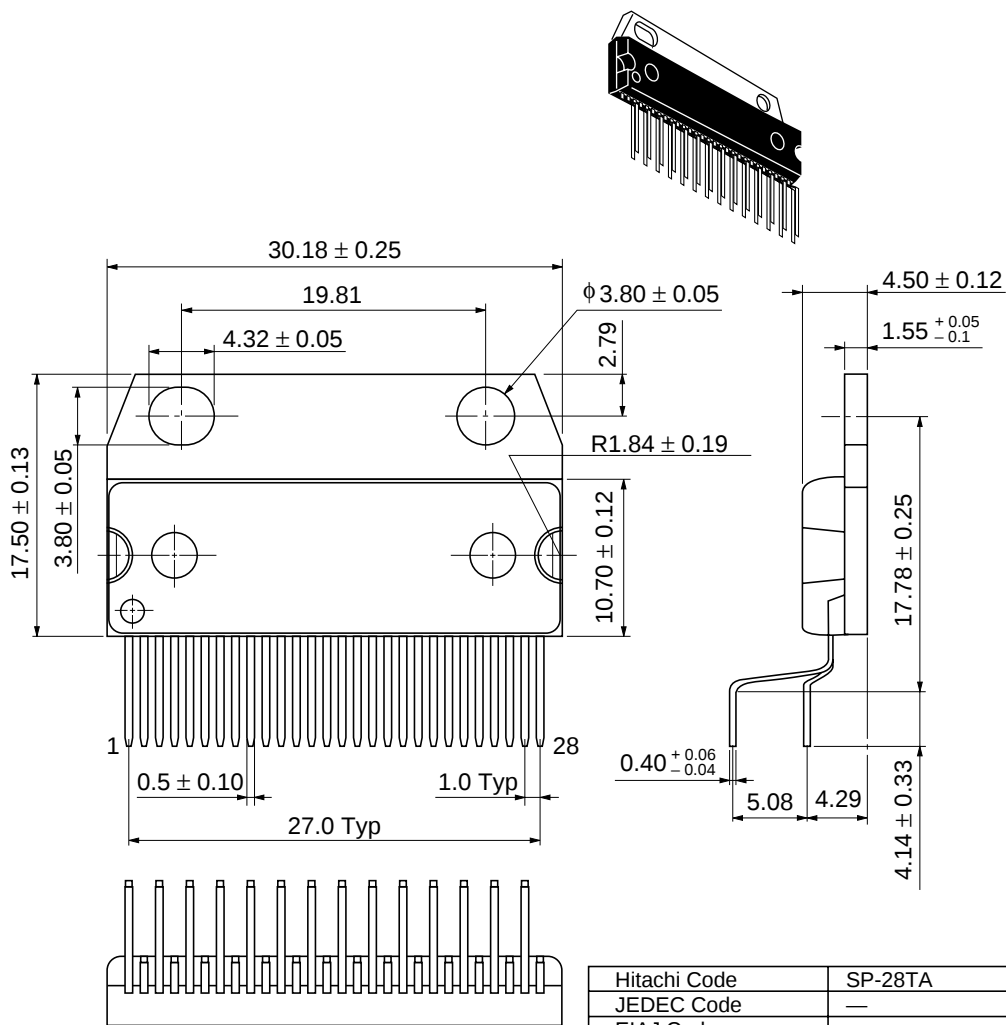






Package Dimensions

Unit: mm



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