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# HA13156

38 W × 4-Channel BTL Power IC

# HITACHI

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

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## 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.

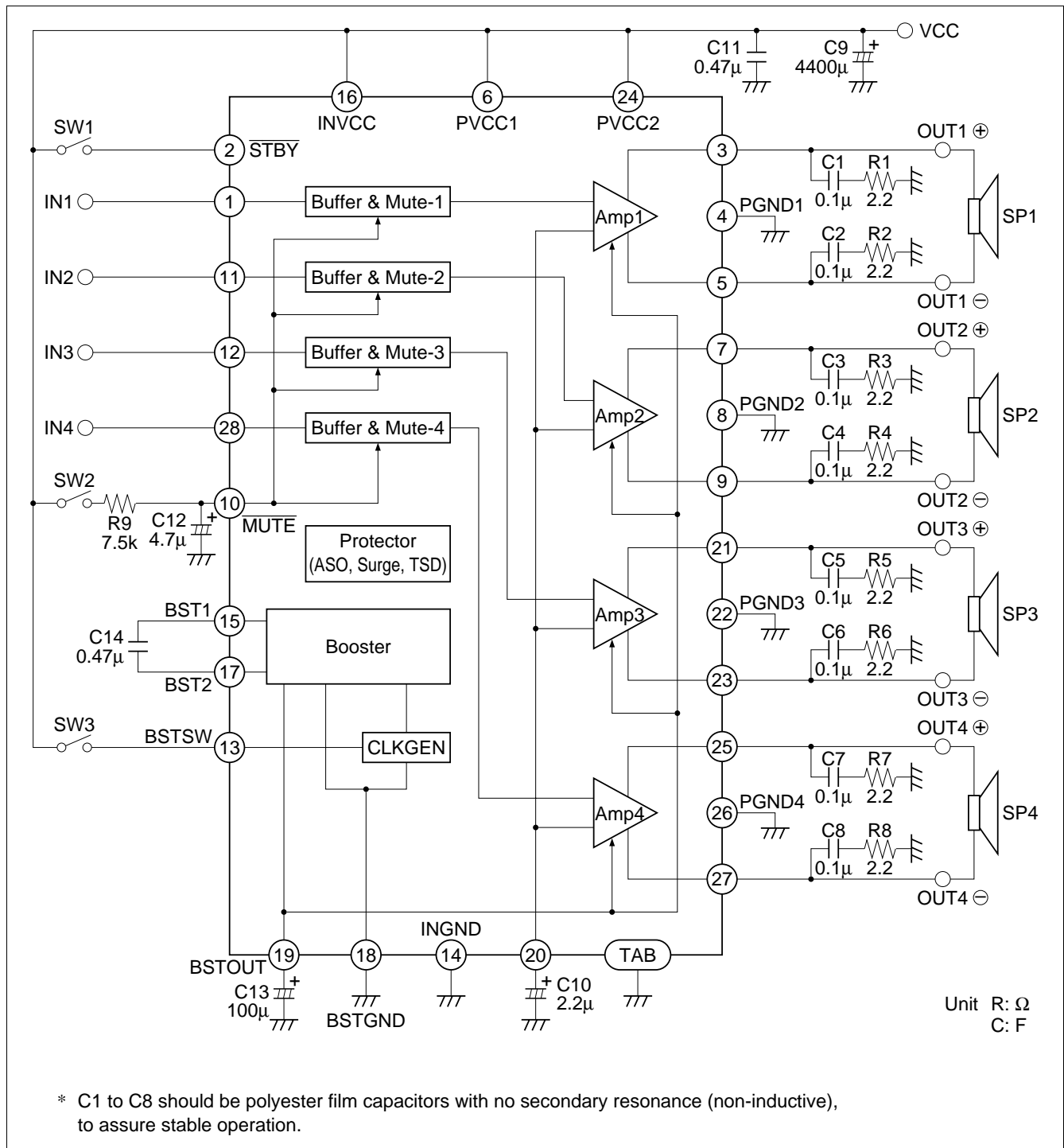
## Functions

- 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

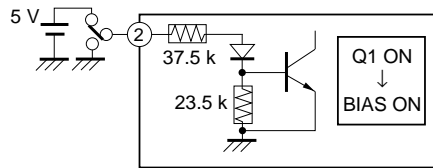
- High power for booster circuit
- Popping noise minimized
- Low output noise
- Built-in high reliability protection circuit

## Block Diagram



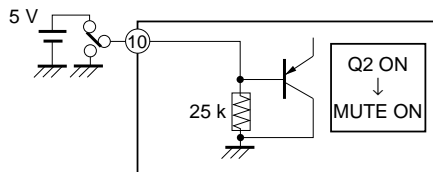
Note: 1. Standby

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).



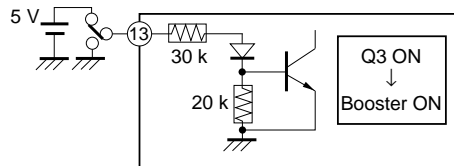
3. DC-DC converter (Booster)

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

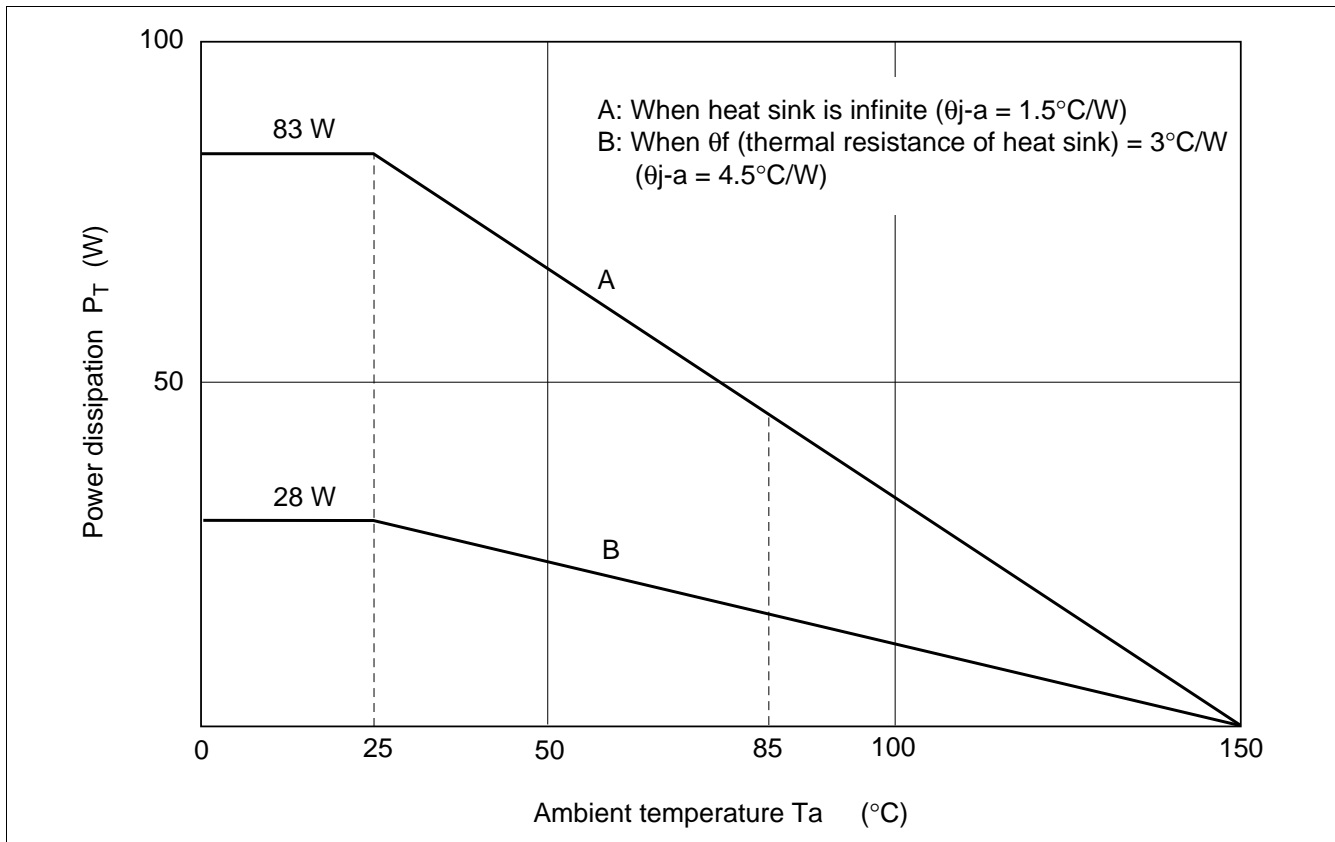
Consequently if you use radio tuner (AM), I recommend DC-DC converter (Booster) off.



## Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Operating supply voltage	$V_{CC}$	18	V
Supply voltage when no signal* <sup>1</sup>	$V_{CC}$ (DC)	26	V
Peak supply voltage* <sup>2</sup>	$V_{CC}$ (PEAK)	50	V
Output current* <sup>3</sup>	$I_o$ (PEAK)	4	A
Power dissipation* <sup>4</sup>	$P_T$	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.

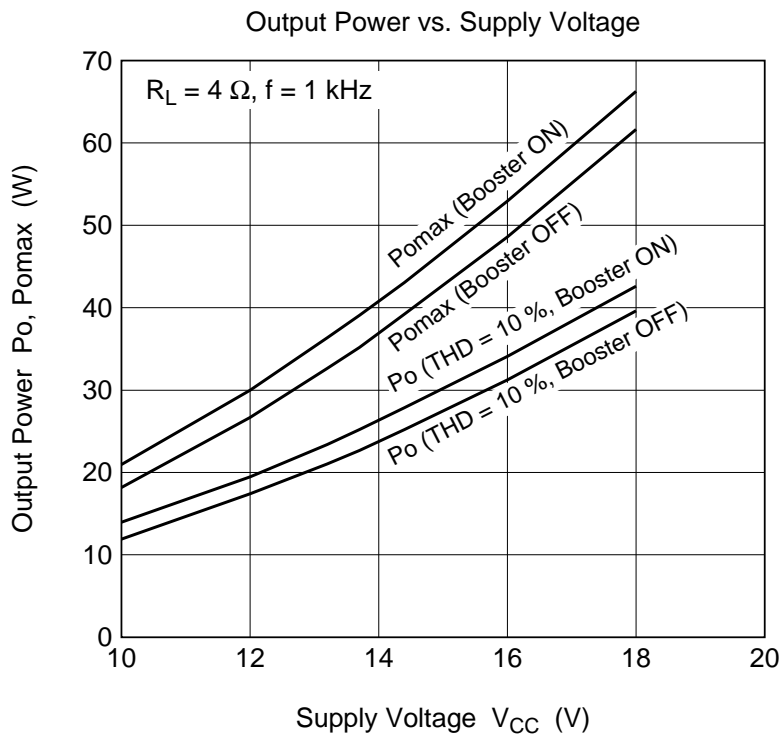
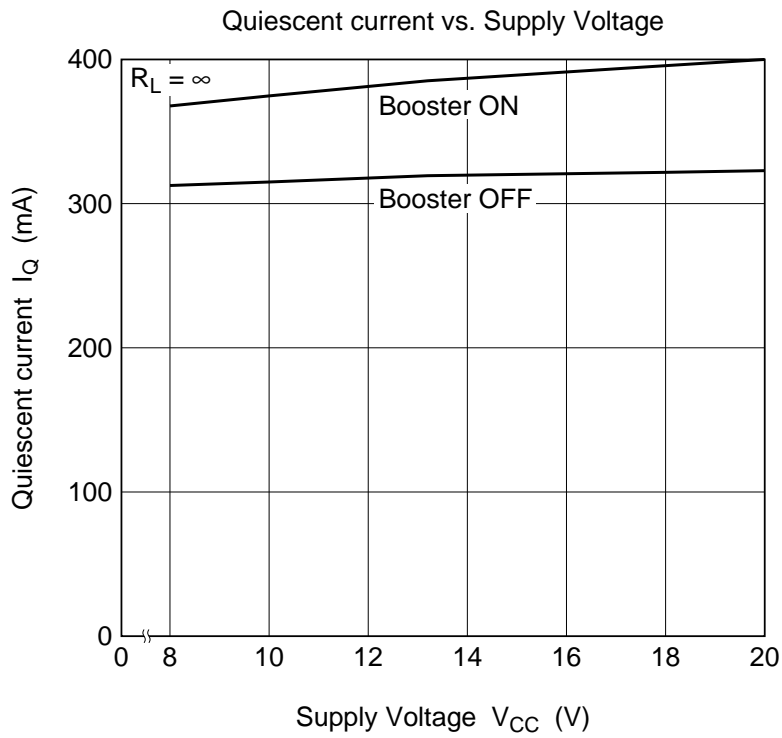


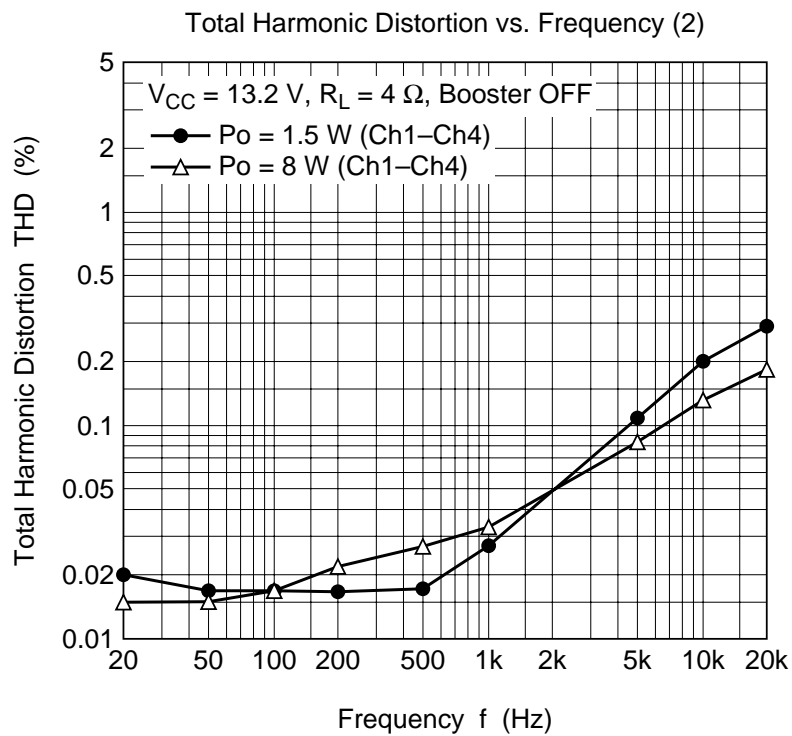
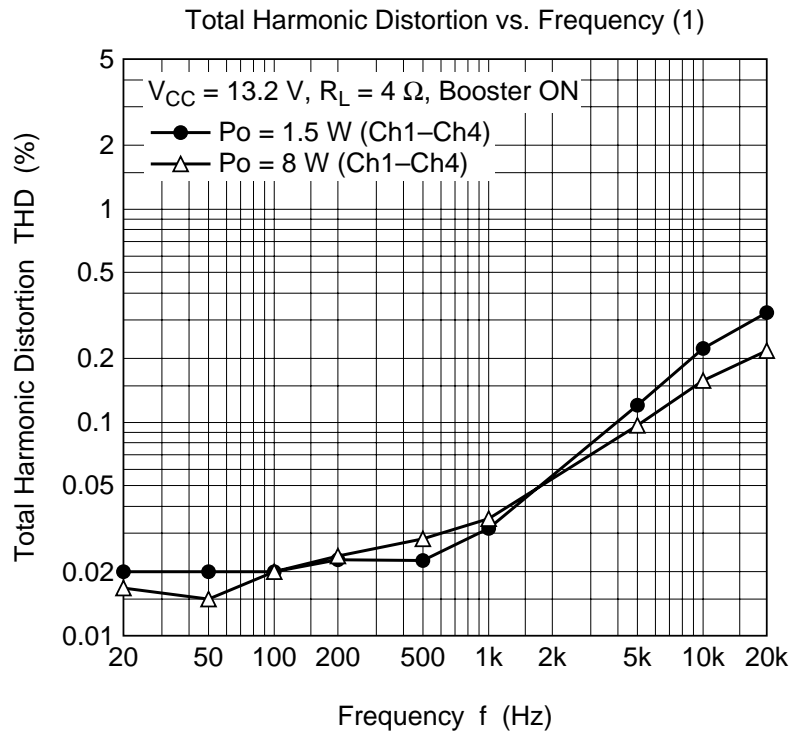
**Electrical Characteristics** ( $V_{CC} = 13.2\text{ V}$ ,  $R_L = 4\ \Omega$ ,  $f = 1\text{ kHz}$ ,  $R_g = 600\ \Omega$ ,  $T_a = 25^\circ\text{C}$ , when there is no description in test conditions)

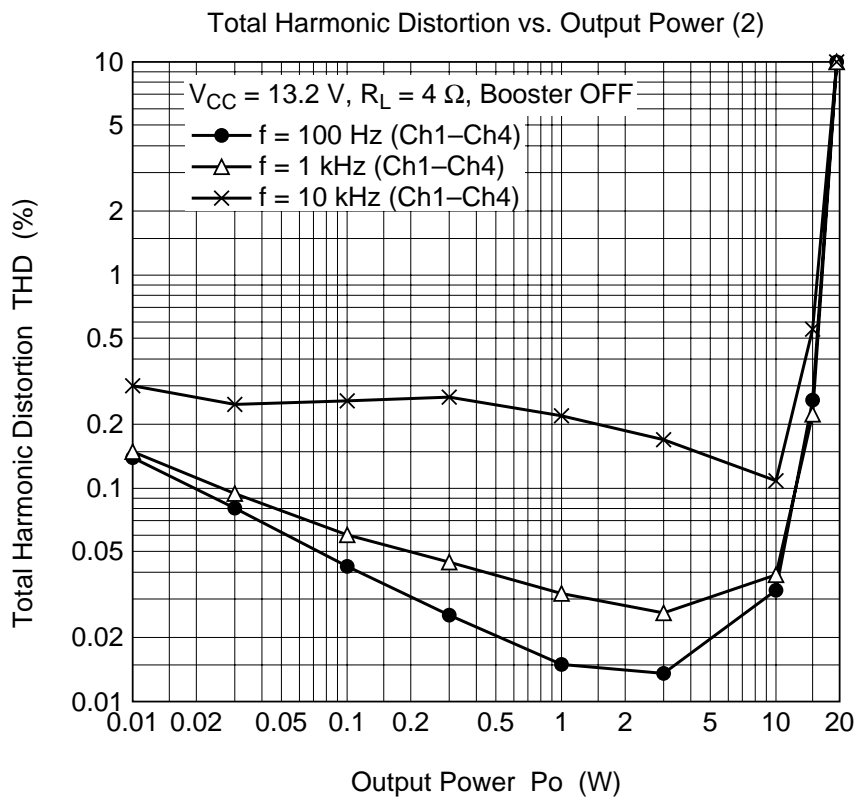
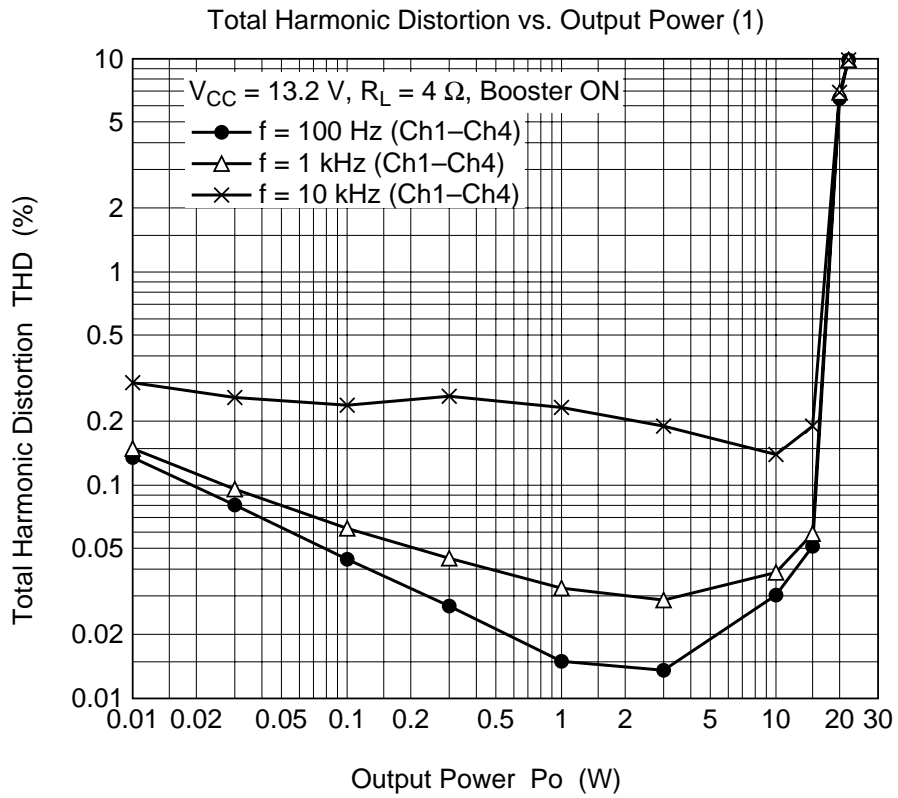
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Quiescent current1	$I_{Q1}$	275	380	480	mA	$V_{in} = 0\text{ V}$ , boost on, $R_L = \infty$
Quiescent current2	$I_{Q2}$	190	320	420	mA	$V_{in} = 0\text{ V}$ , boost off, $R_L = \infty$
Total harmonic distortion	T.H.D.	—	0.02	0.1	%	$P_o = 3\text{ W}$ , boost on, off
Gain	$G_V$	30.5	32	33.5	dB	
Gain difference between channels	$\Delta G_V$	-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	$\Delta V_{Q1}$	-250	0	250	mV	$V_{in} = 0\text{ V}$ , mute off
Output offset voltage2	$\Delta V_{Q2}$	-250	0	250	mV	$V_{in} = 0\text{ V}$ , change value of mute on $\rightarrow$ off
Standby current	$I_{ST}$	—	1	10	$\mu\text{A}$	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	$\text{k}\Omega$	
Input voltage muted completely	ATTin	7	—	—	Vp-p	

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

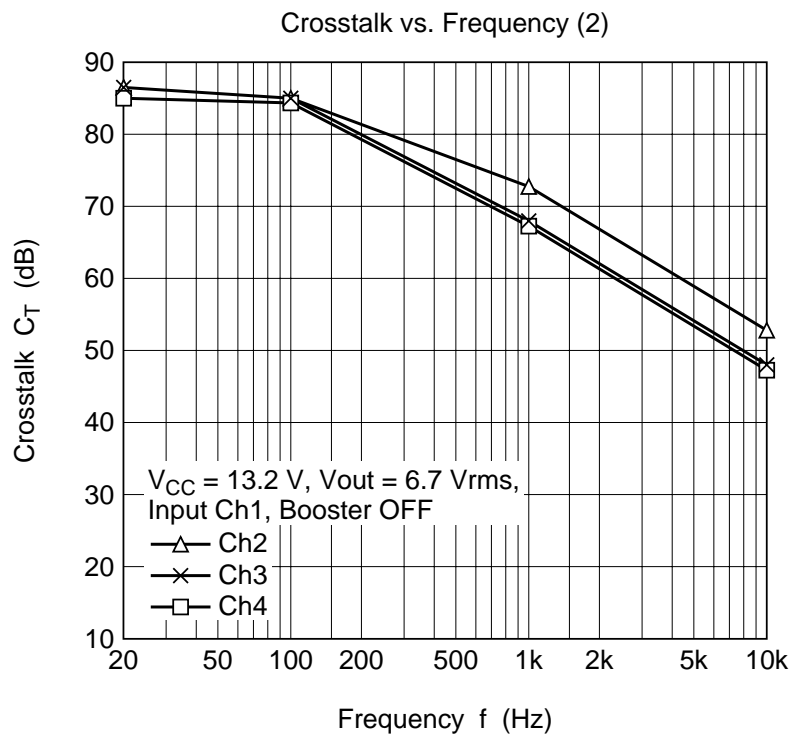
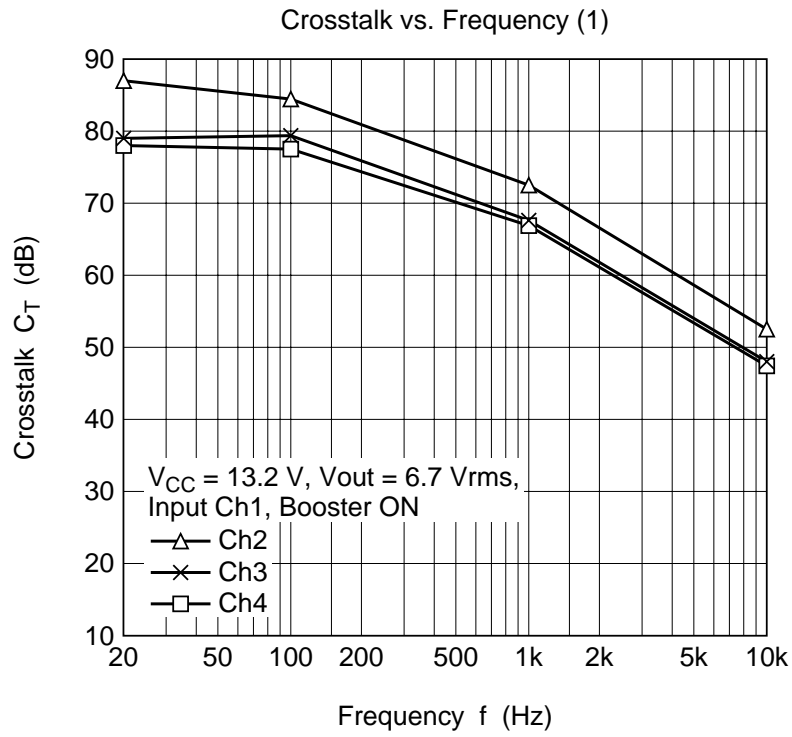
Characteristic Curves

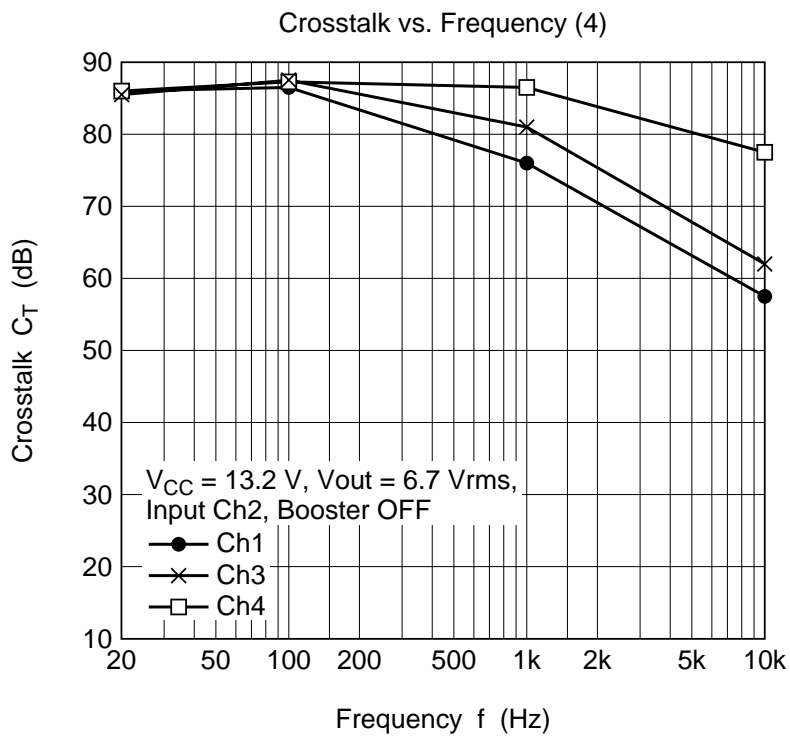
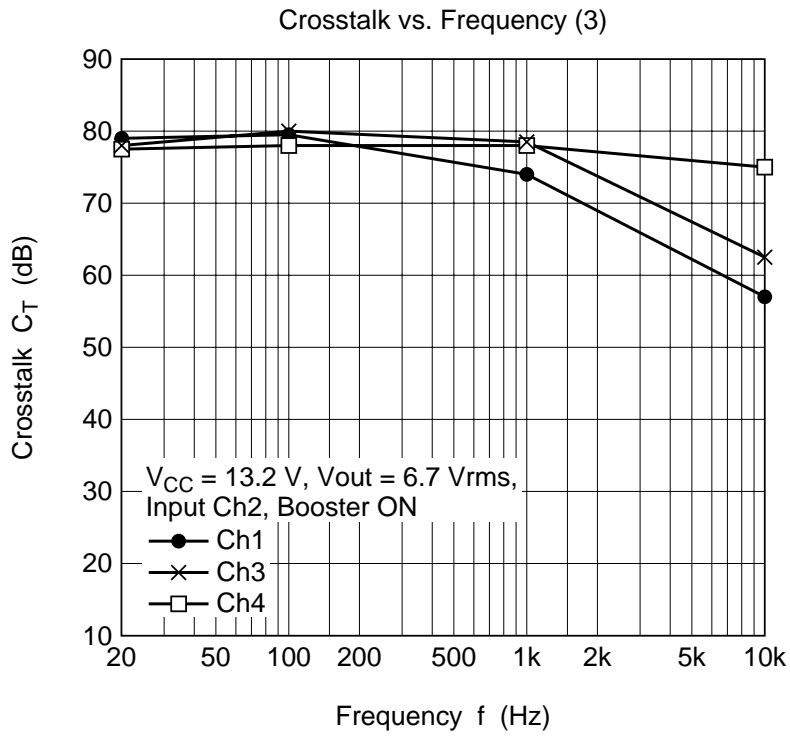


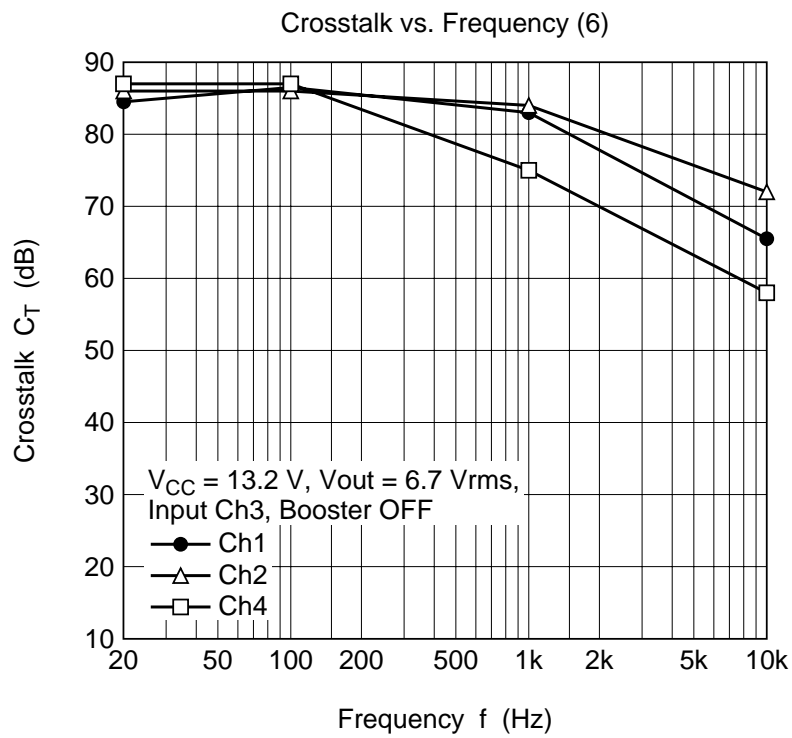
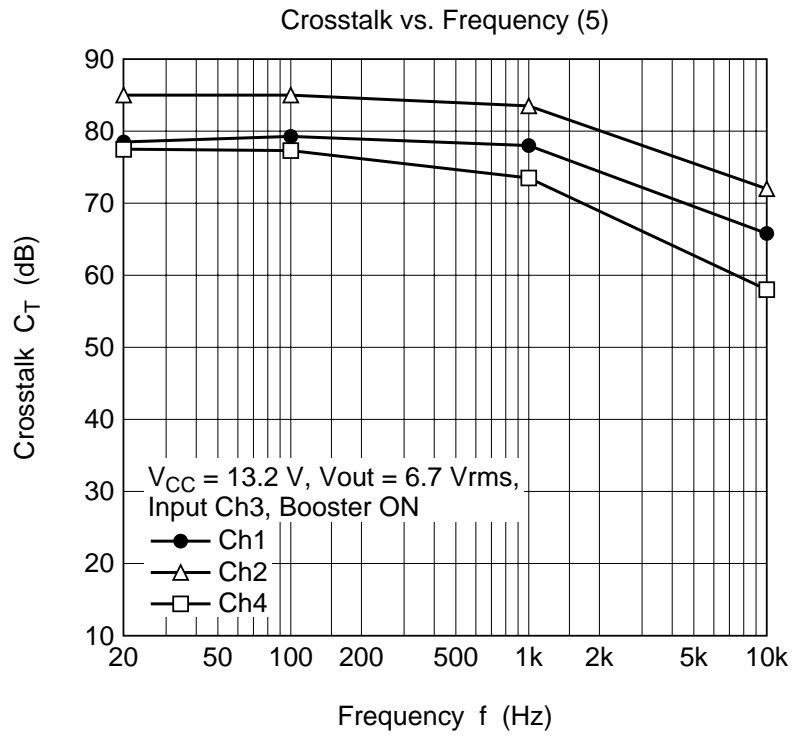


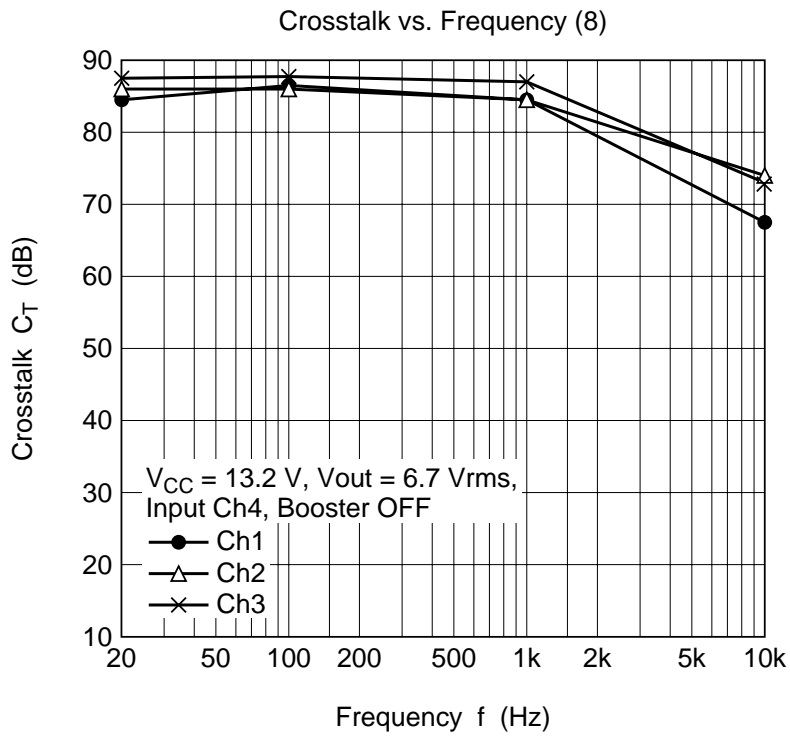
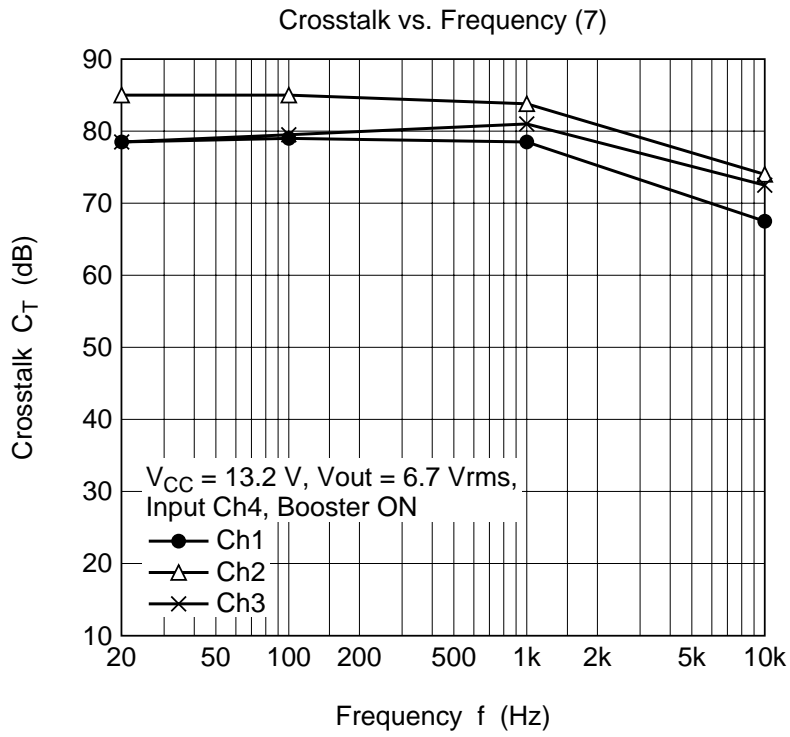


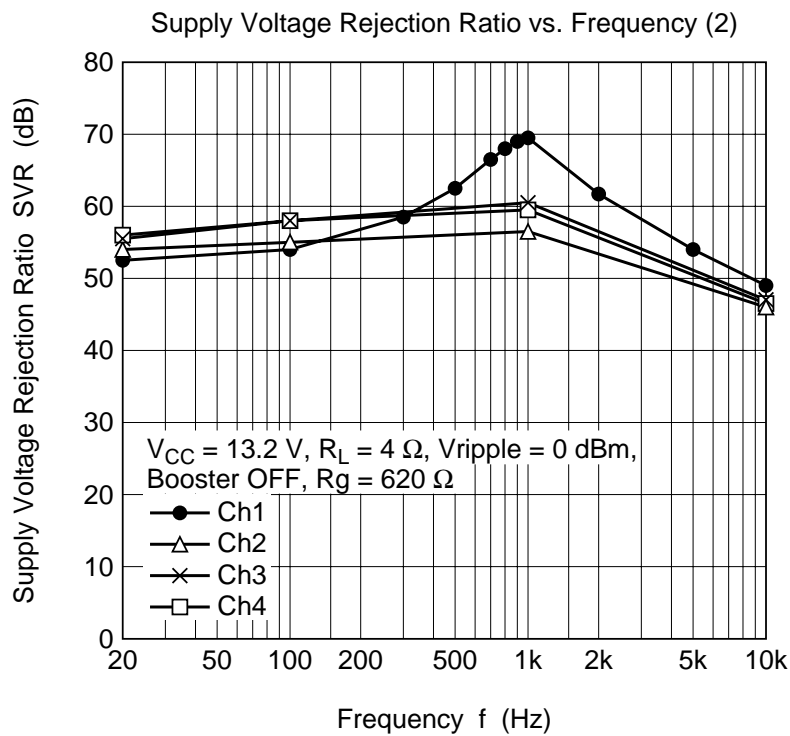
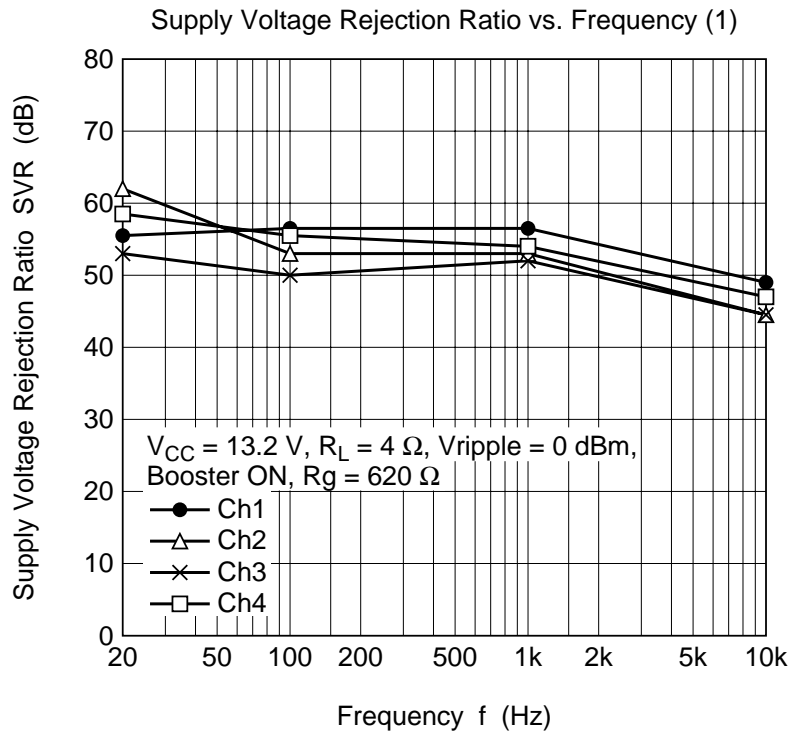


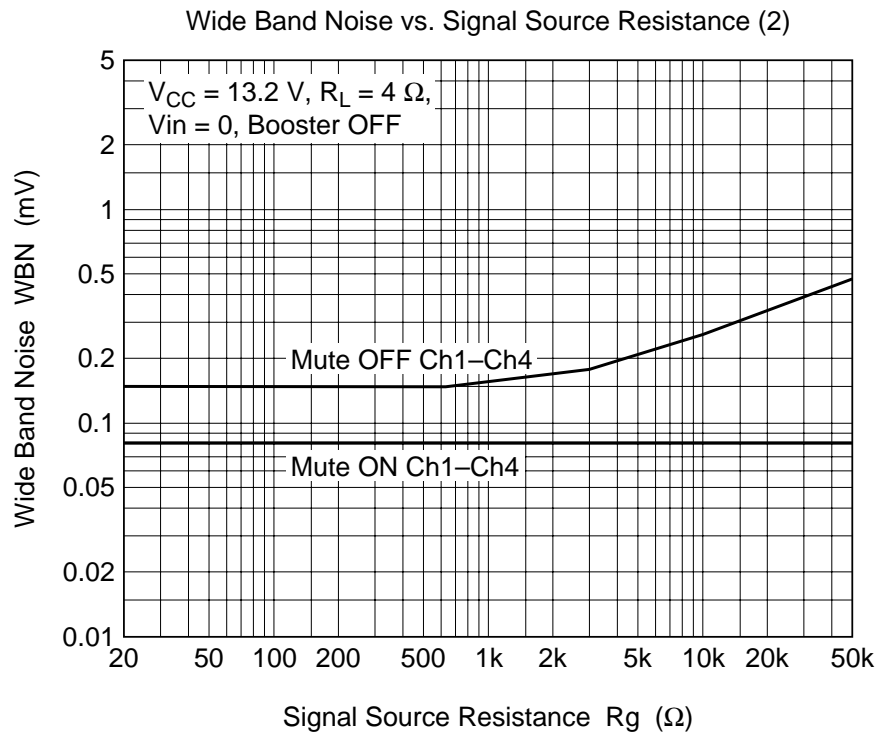
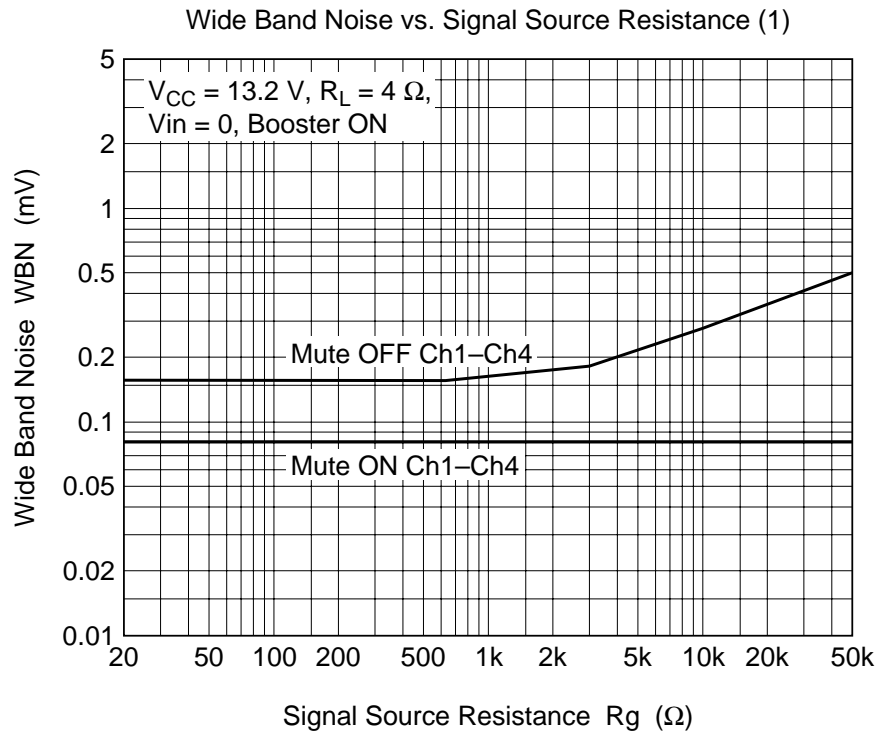


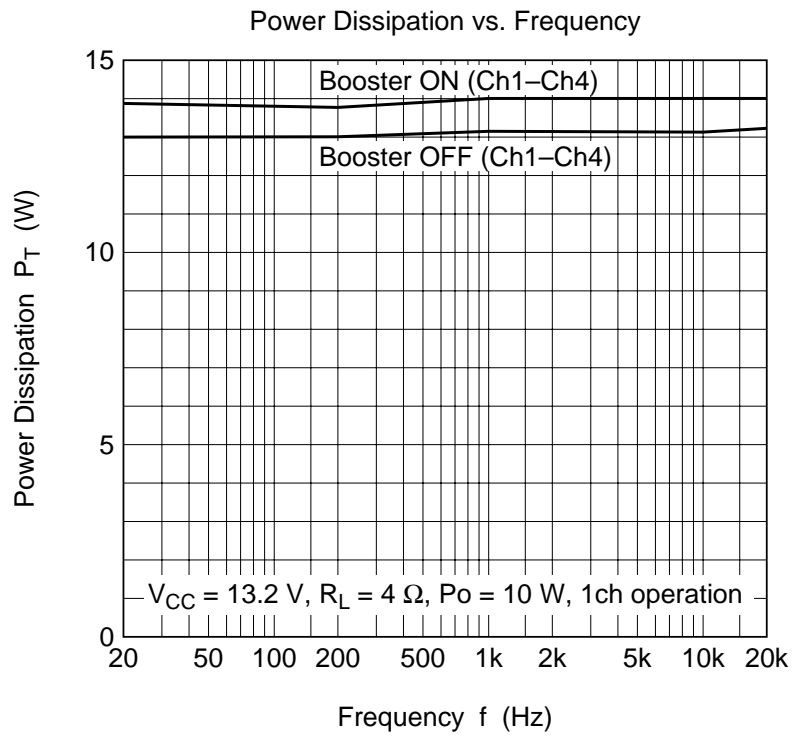
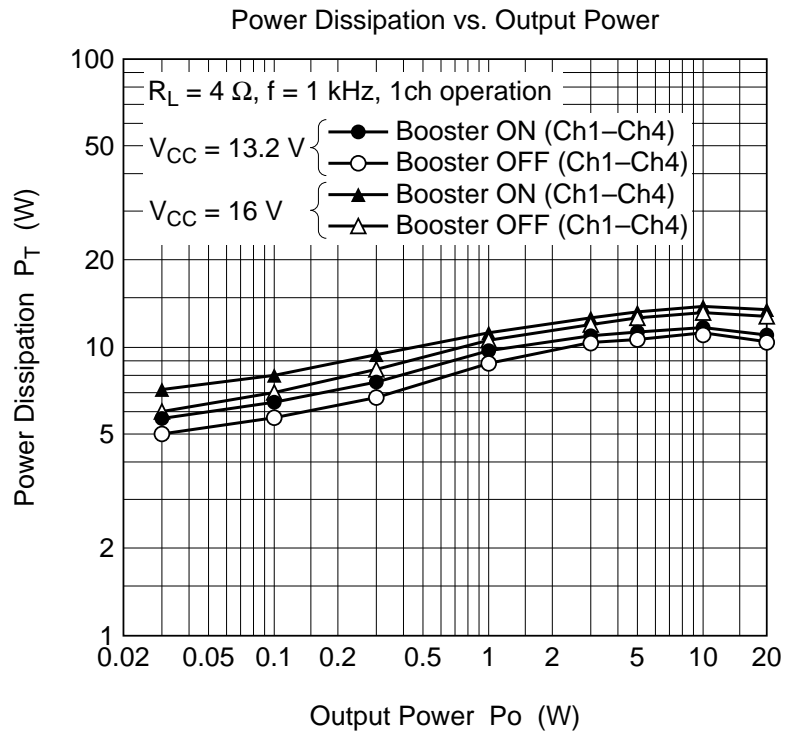


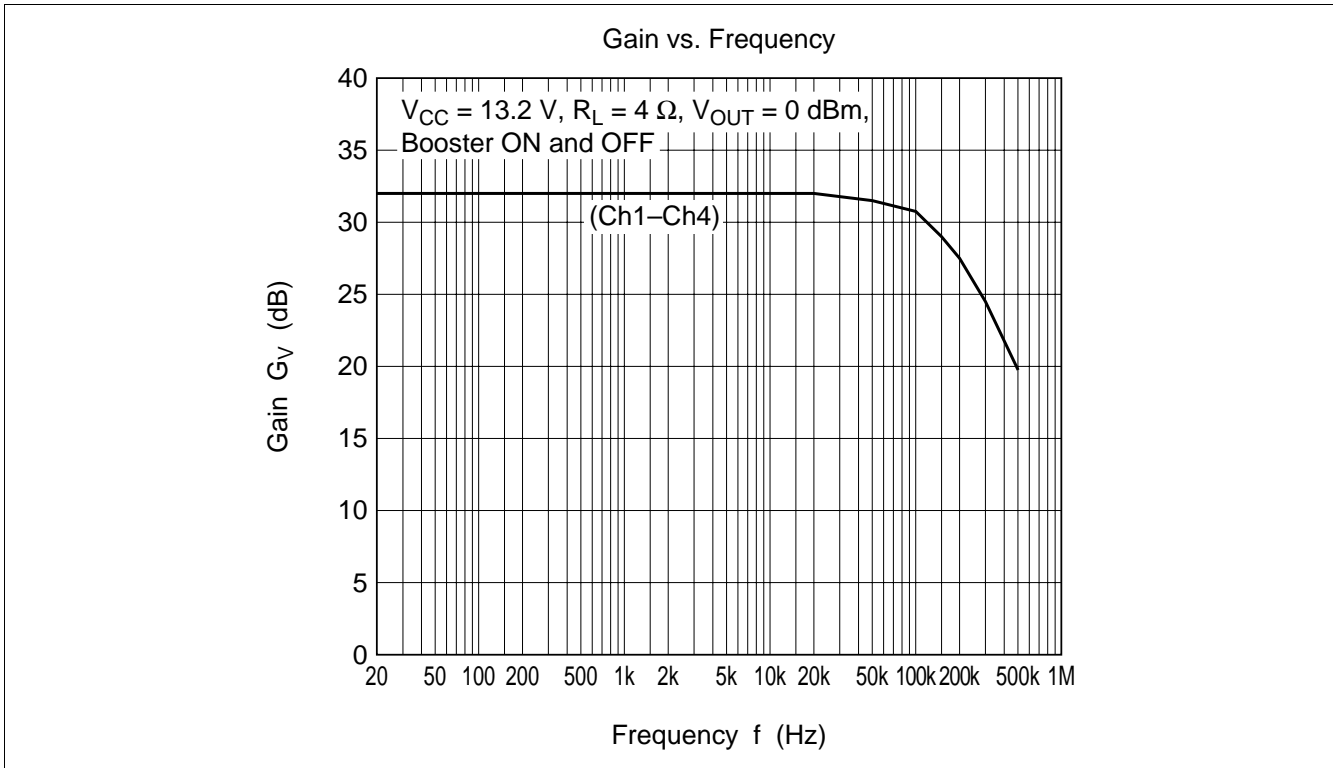








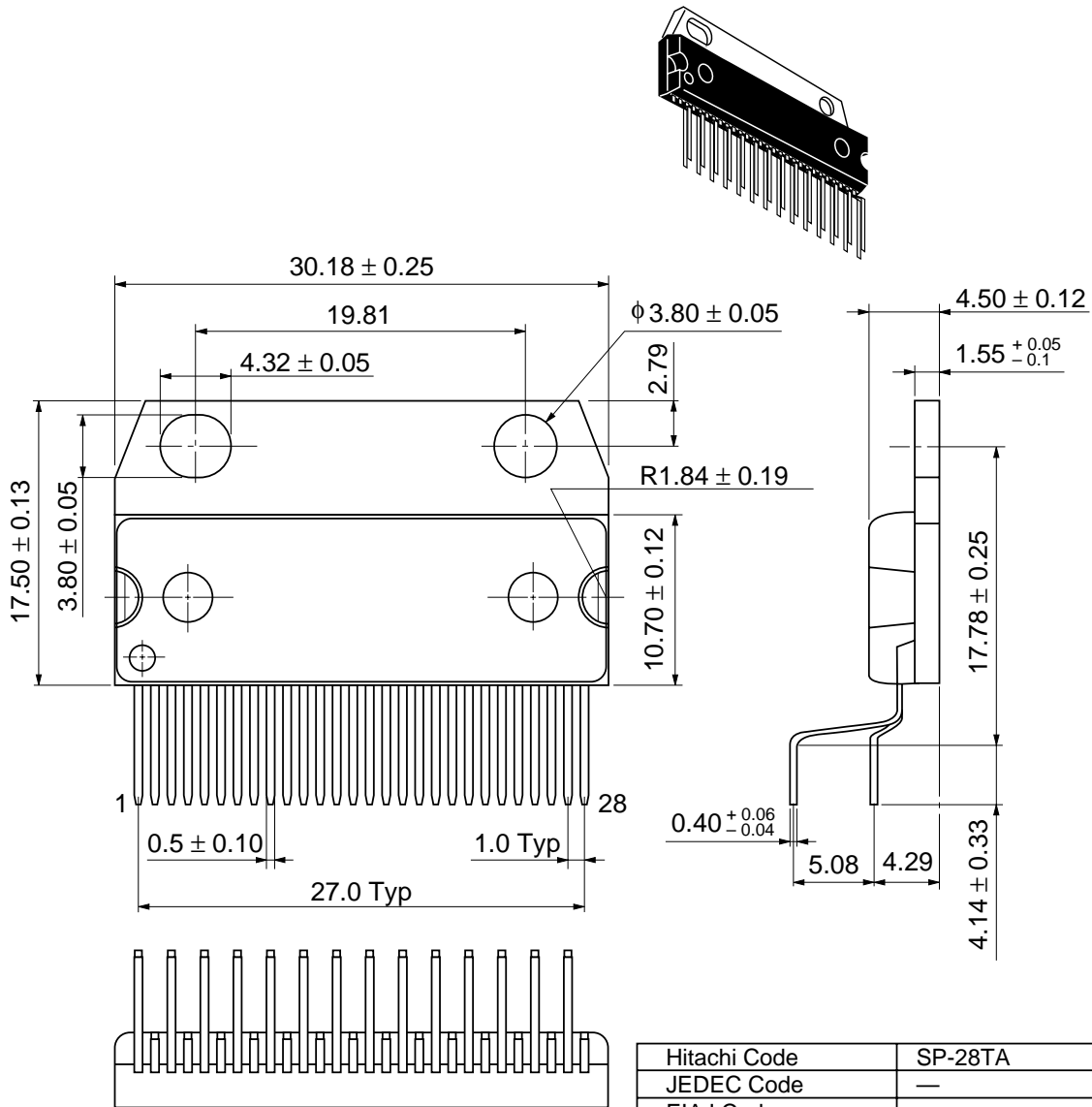






Package Dimensions

Unit: mm



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