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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.

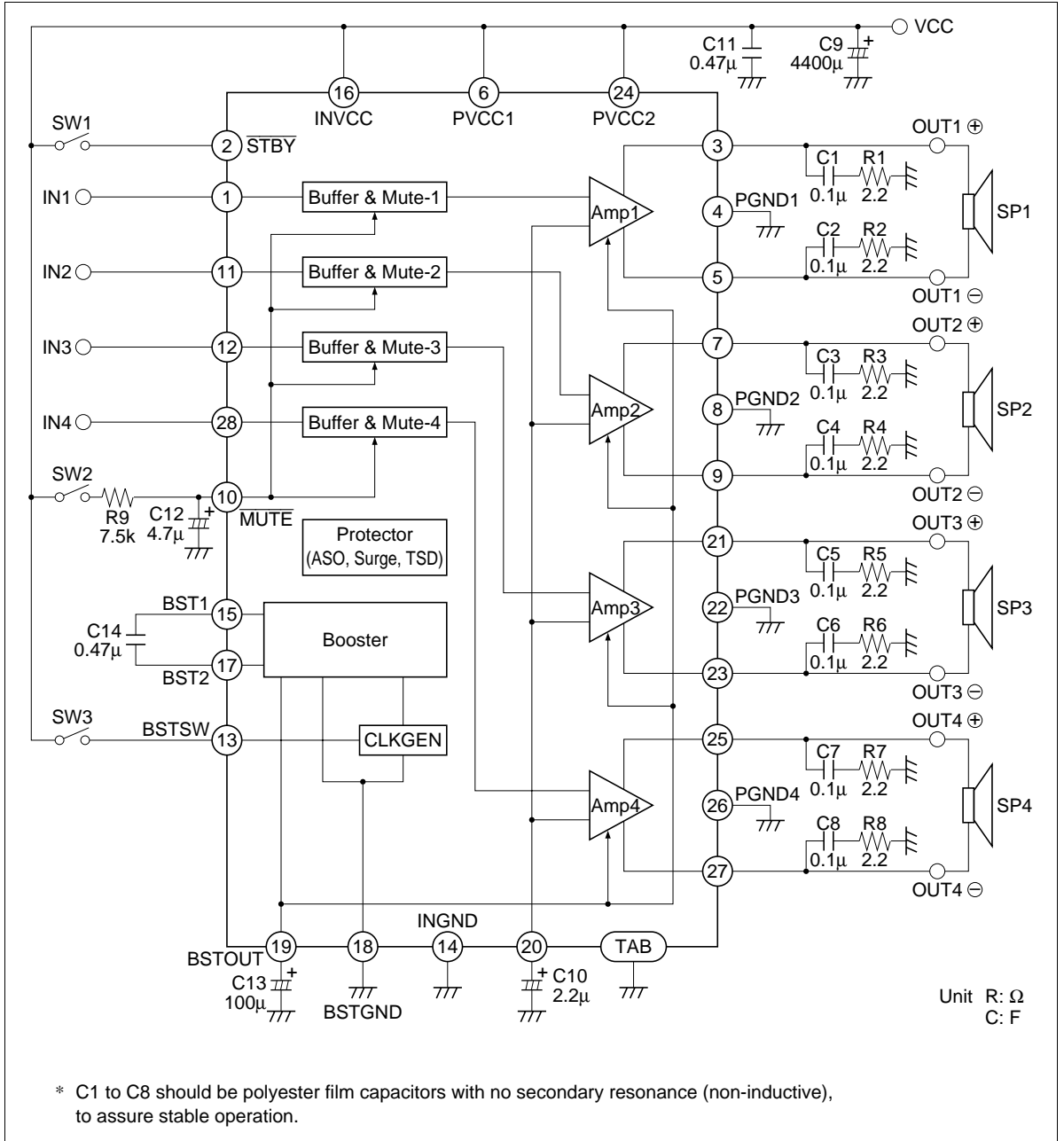
## Functions

- 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

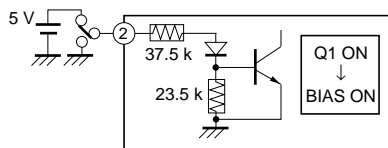
## Block Diagram



Note: 1. Standby

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

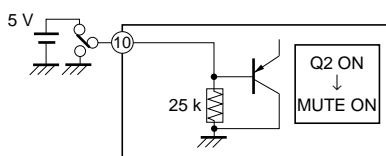
When pin 2 is open or connected to GND, standby is turned on (output off).



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).



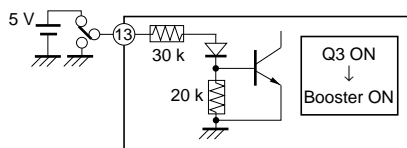
3. DC-DC converter (Booster)

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

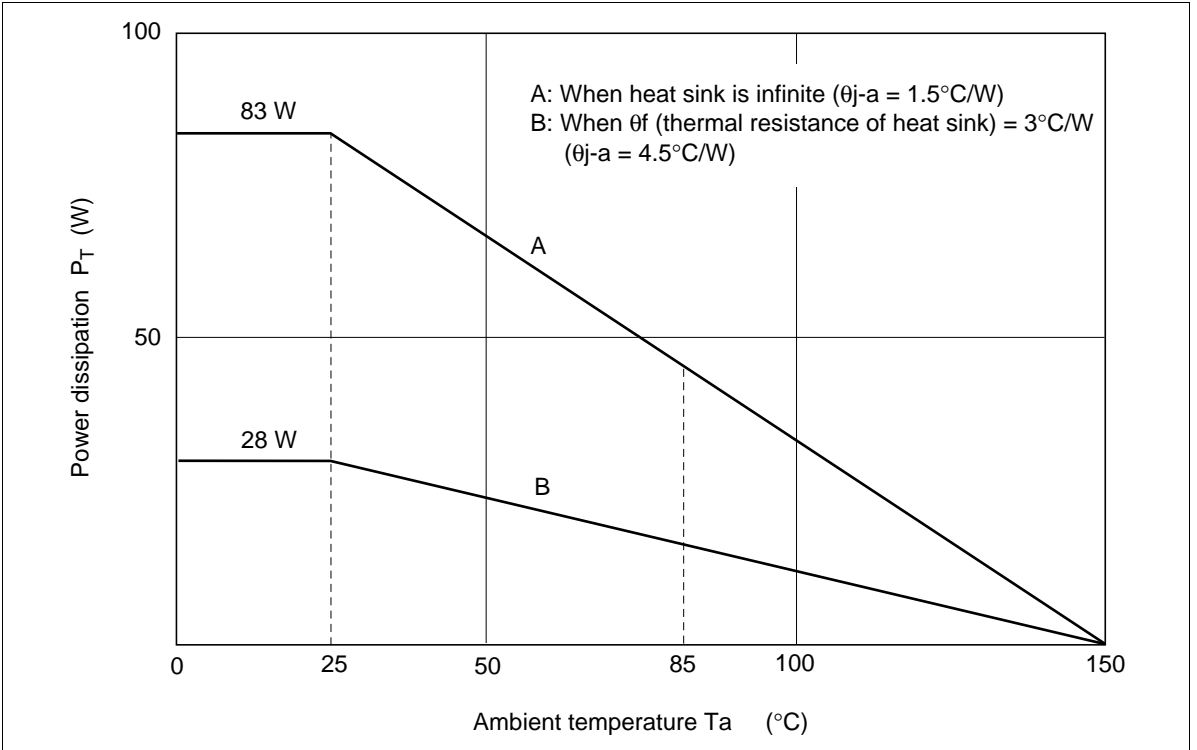
Consequently if you use radio tuner (AM), I recommend DC-DC converter (Booster) off.



## 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  $T_a = 25^\circ\text{C}$ .  
The derating curve is as shown in the graph below.

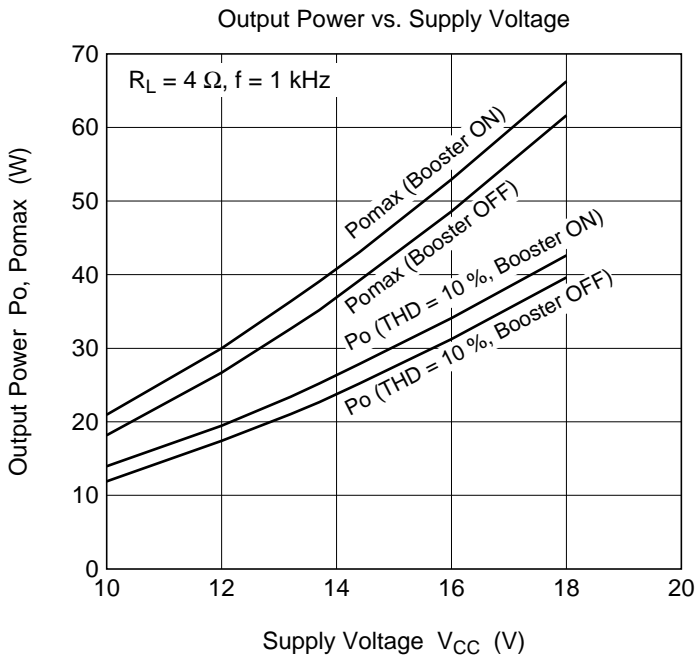
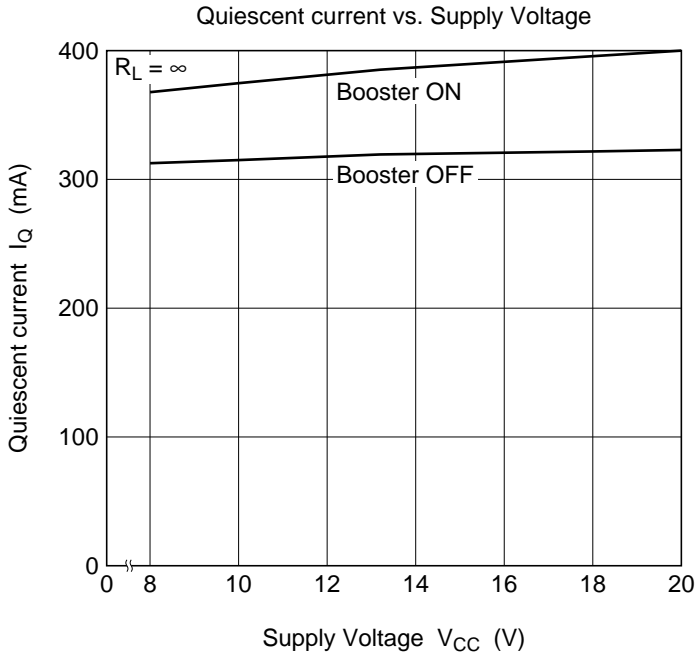


**Electrical Characteristics** ( $V_{CC} = 13.2\text{ V}$ ,  $R_L = 4\ \Omega$ ,  $f = 1\text{ kHz}$ ,  $R_g = 600\ \Omega$ ,  $T_a = 25^\circ\text{C}$ , when there is no description in test conditions)

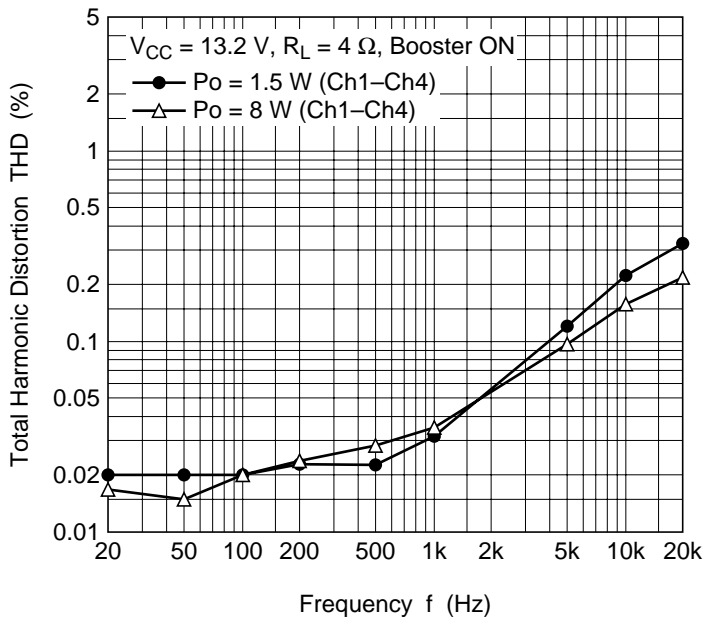
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Quiescent current1	$I_{Q1}$	275	380	480	mA	$V_{in} = 0\text{ V}$ , boost on, $R_L = \infty$
Quiescent current2	$I_{Q2}$	190	320	420	mA	$V_{in} = 0\text{ V}$ , boost off, $R_L = \infty$
Total harmonic distortion	T.H.D.	—	0.02	0.1	%	$P_o = 3\text{ W}$ , boost 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	$\Delta V_{O1}$	-250	0	250	mV	$V_{in} = 0\text{ V}$ , mute off
Output offset voltage2	$\Delta V_{O2}$	-250	0	250	mV	$V_{in} = 0\text{ V}$ , change value of mute on → 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	k $\Omega$	
Input voltage muted completely	ATTin	7	—	—	Vp-p	

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

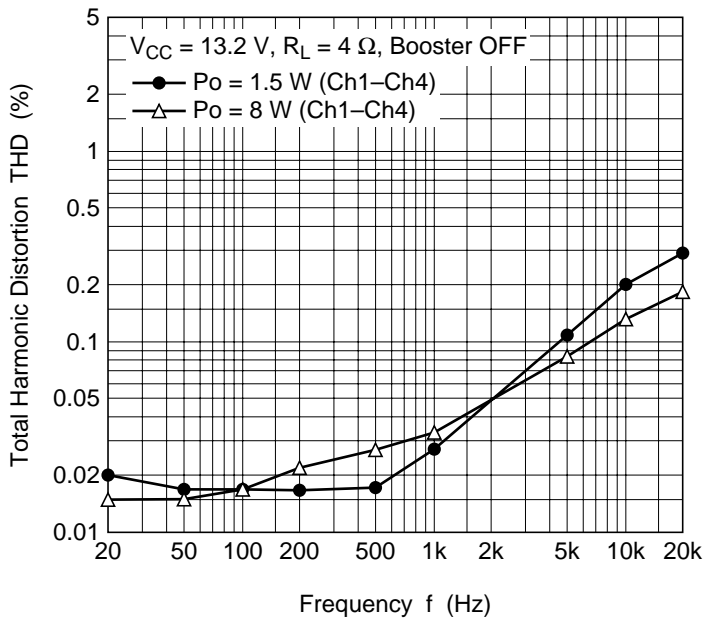
Characteristic Curves

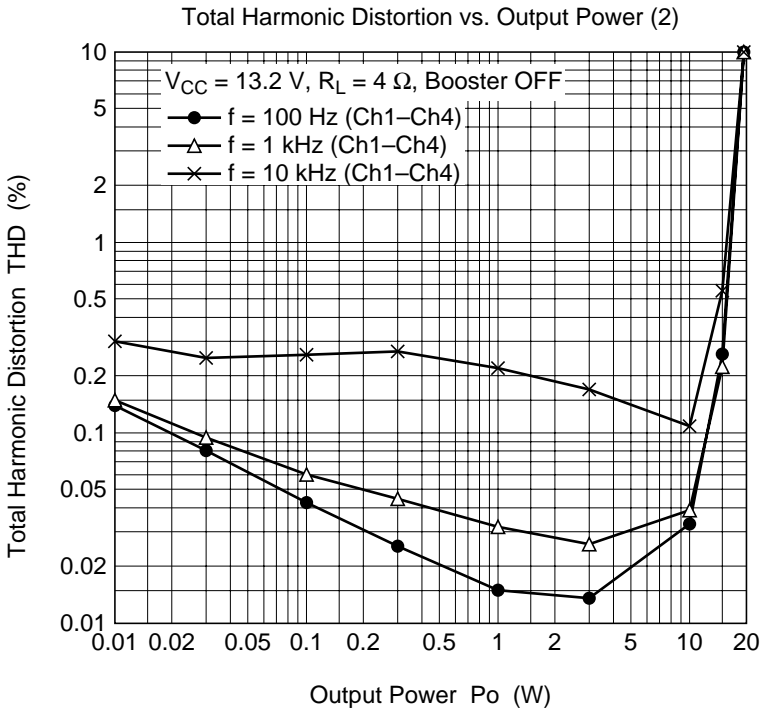
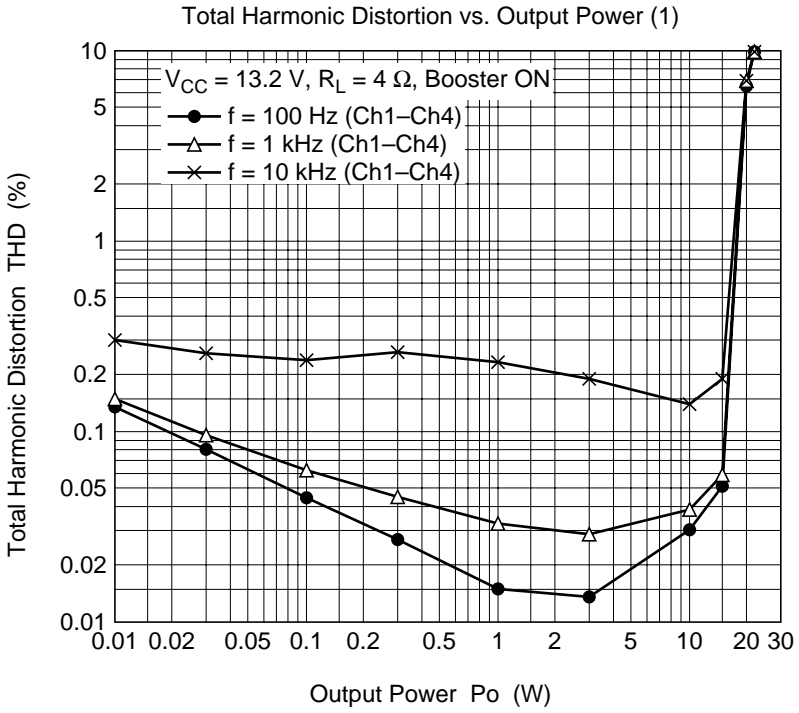


Total Harmonic Distortion vs. Frequency (1)

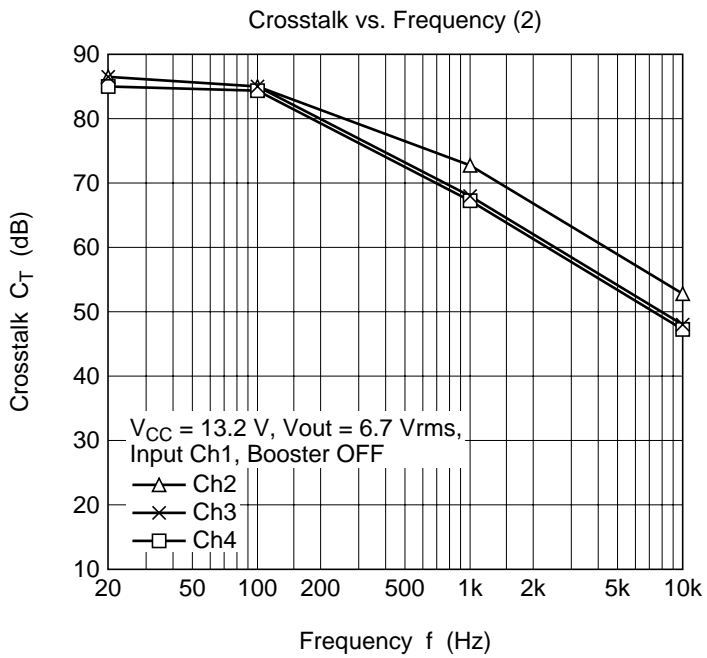
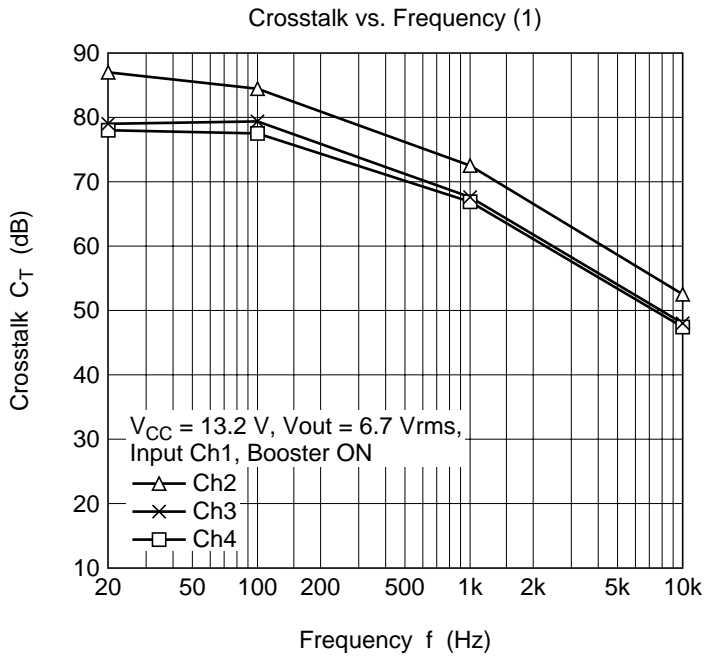


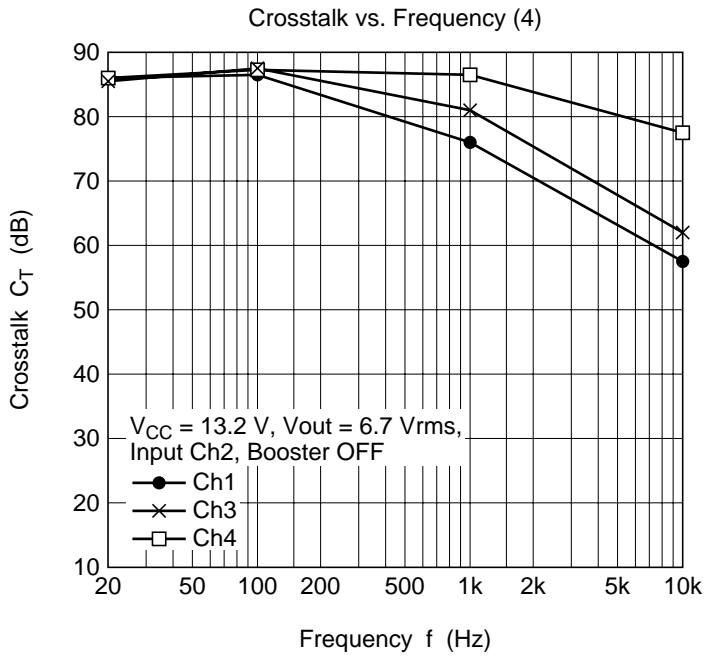
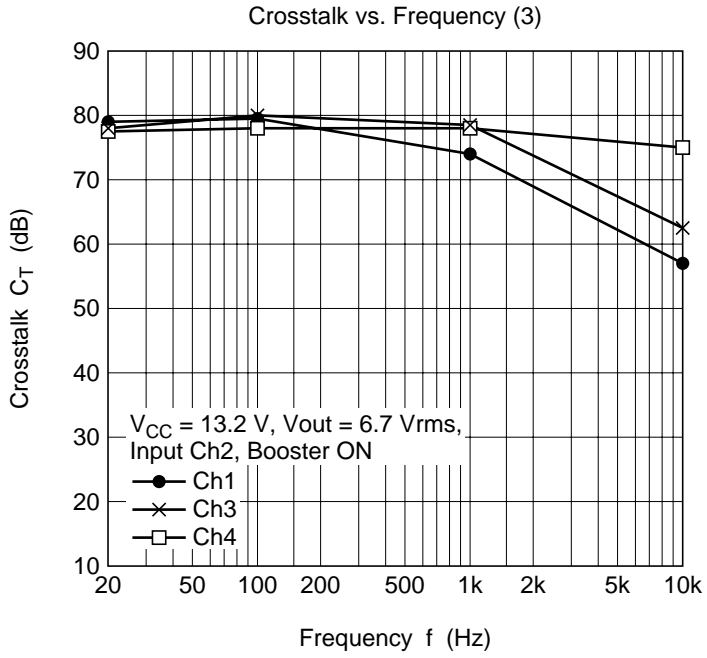
Total Harmonic Distortion vs. Frequency (2)

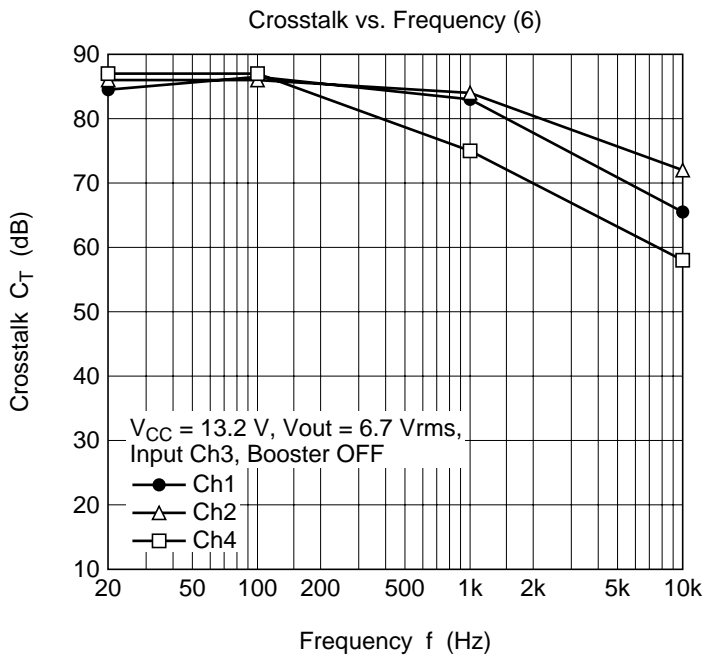
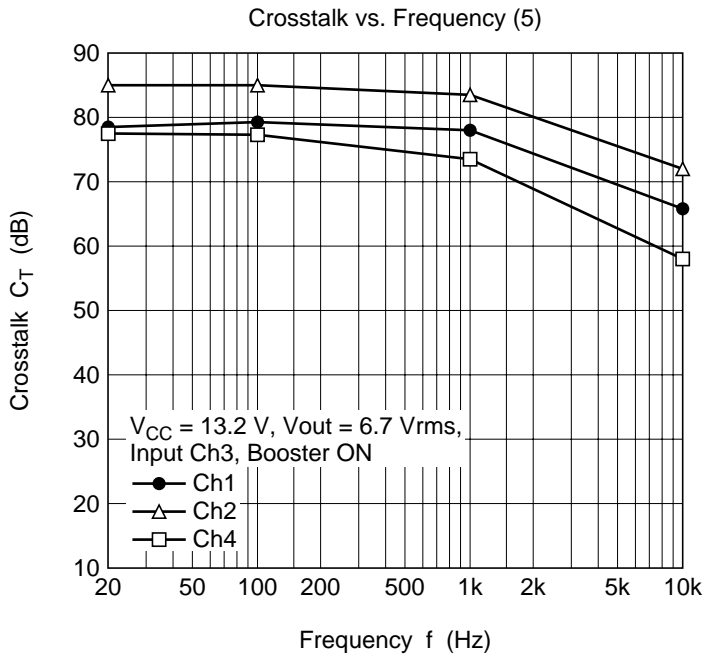


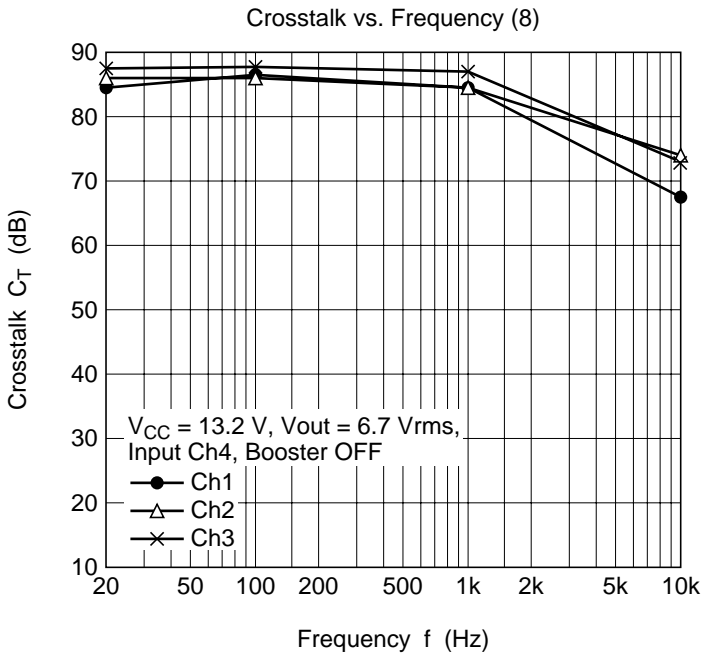
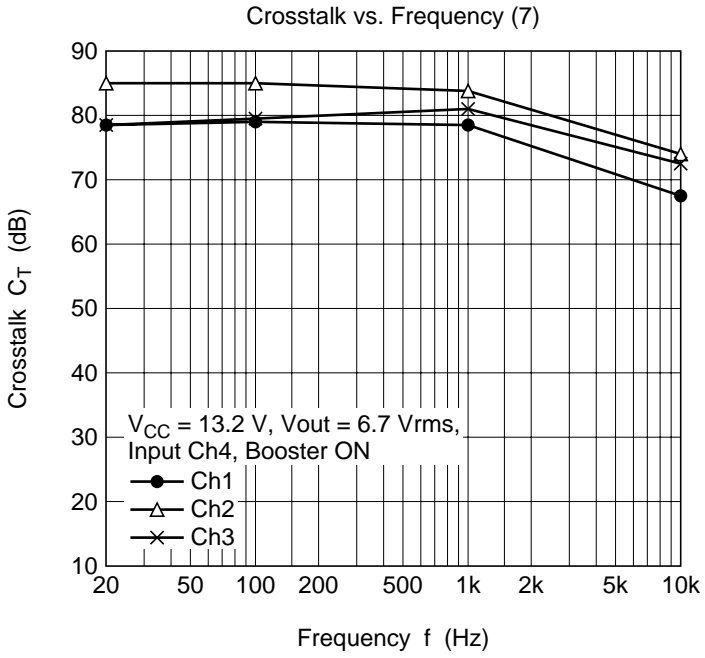


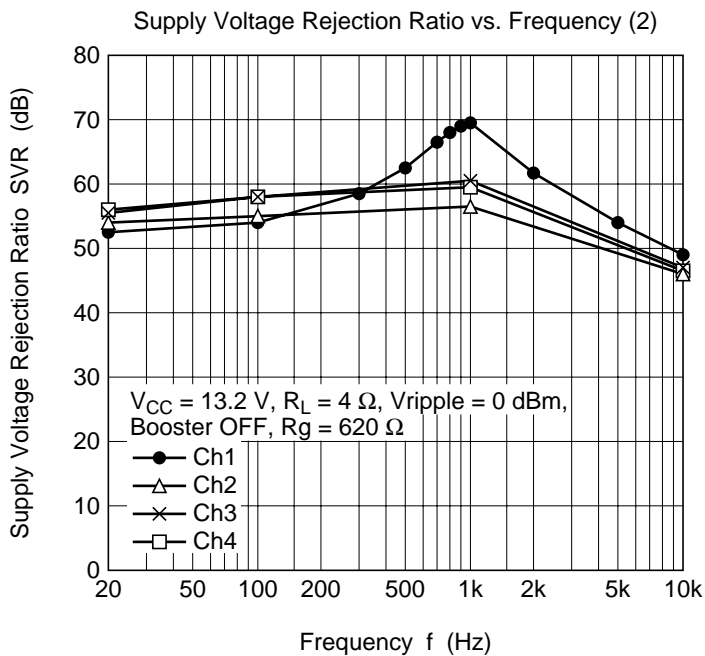
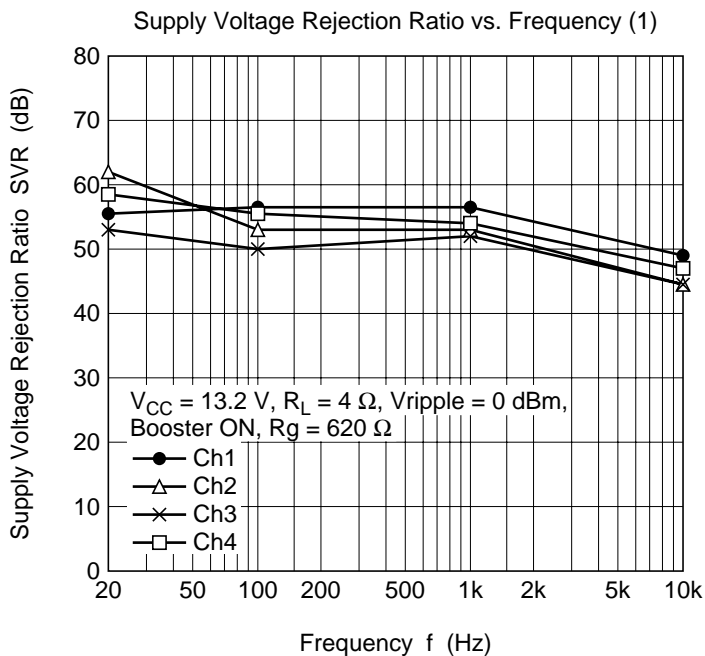




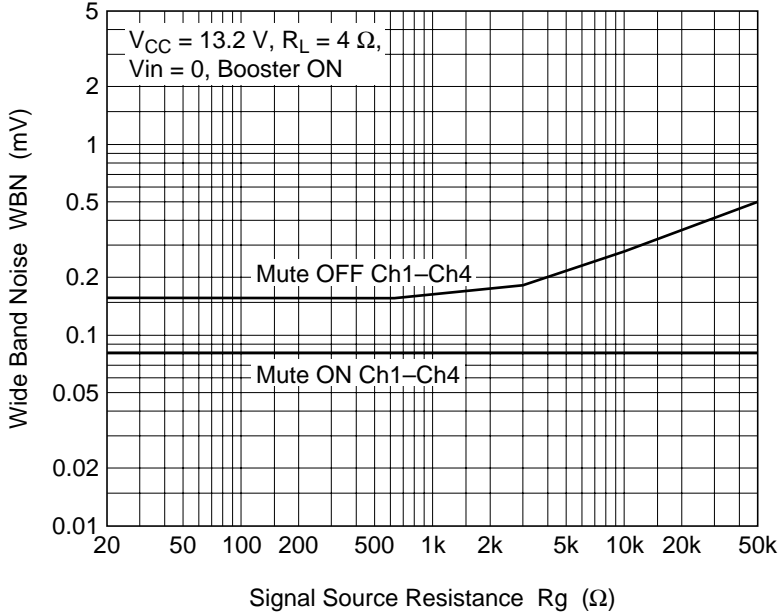




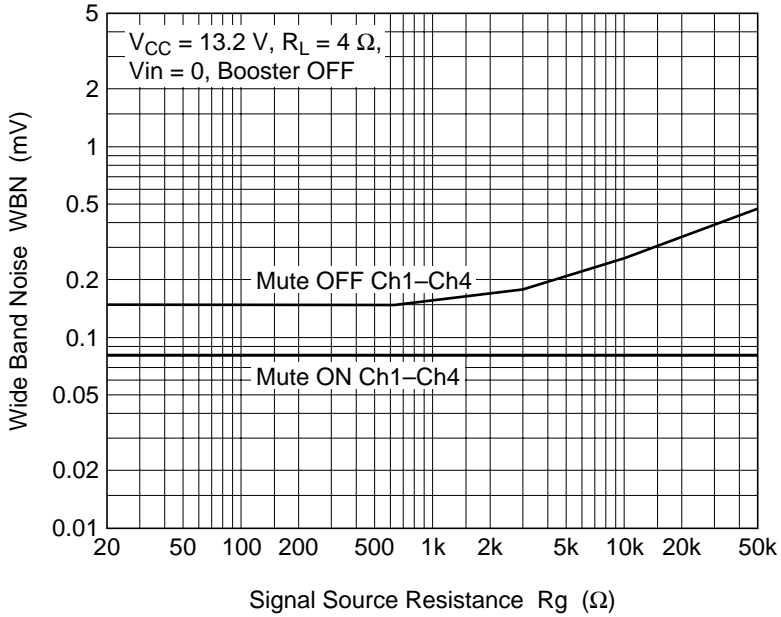


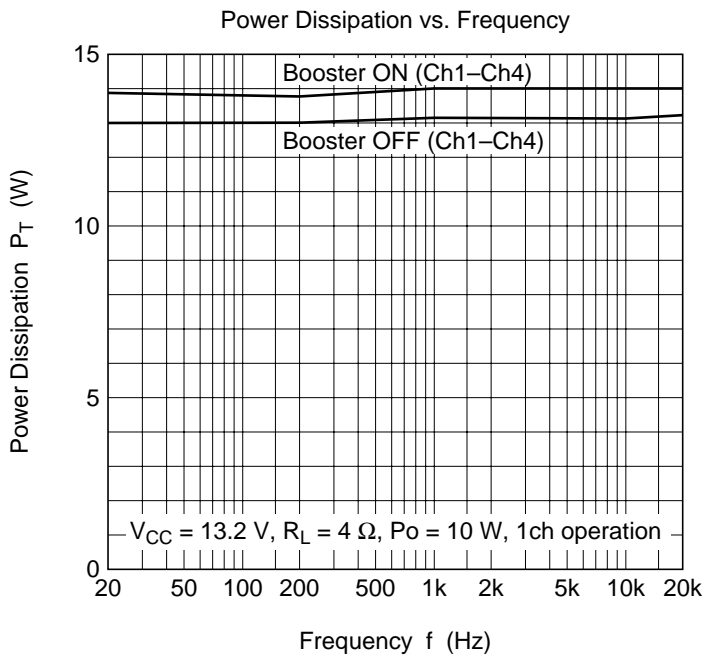
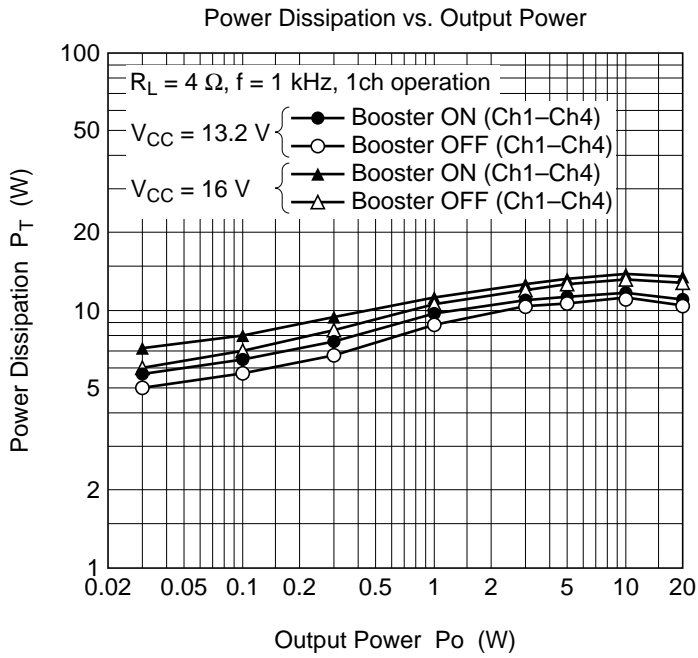


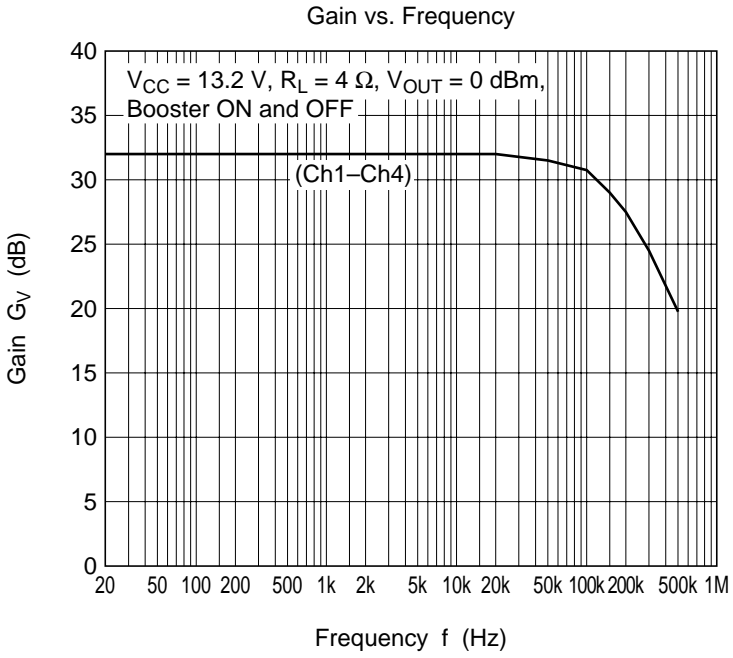
Wide Band Noise vs. Signal Source Resistance (1)



Wide Band Noise vs. Signal Source Resistance (2)



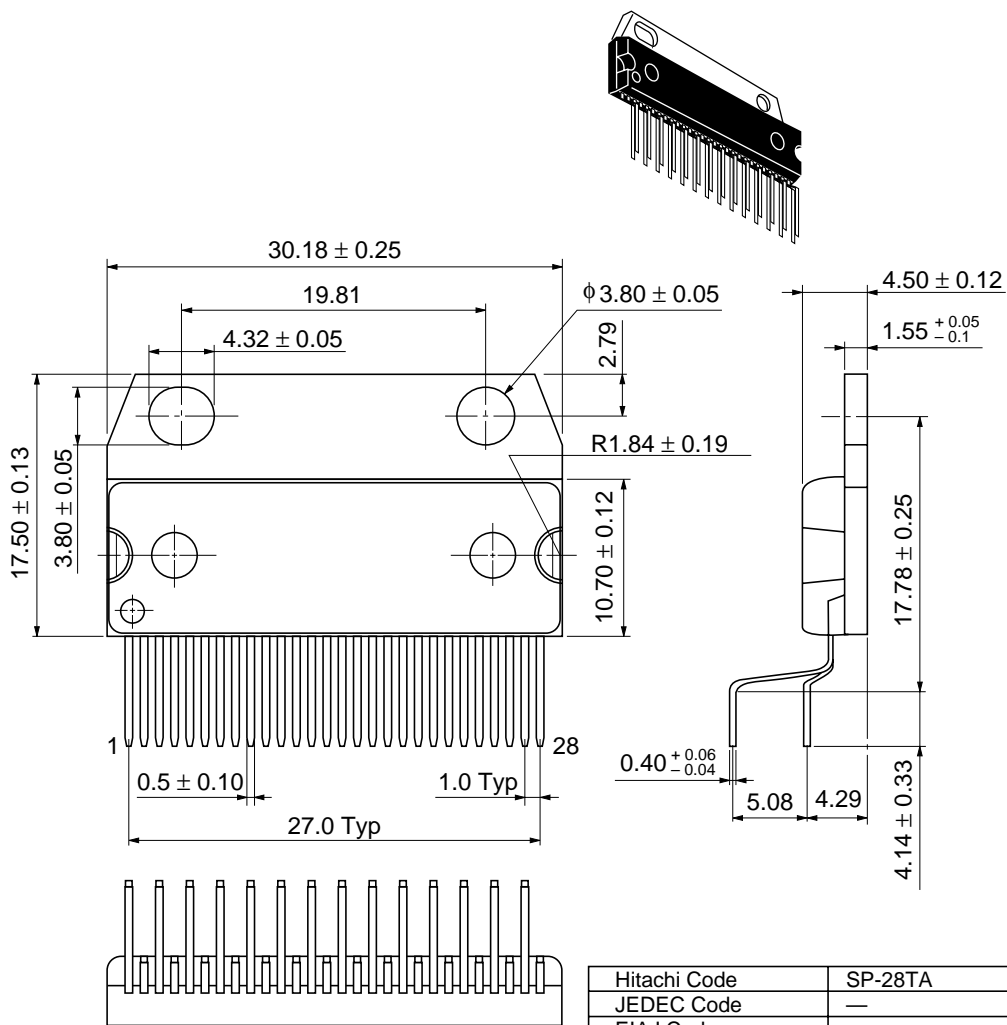






Package Dimensions

Unit: mm



Hitachi Code	SP-28TA
JEDEC Code	—
EIAJ Code	—
Weight	—

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