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.

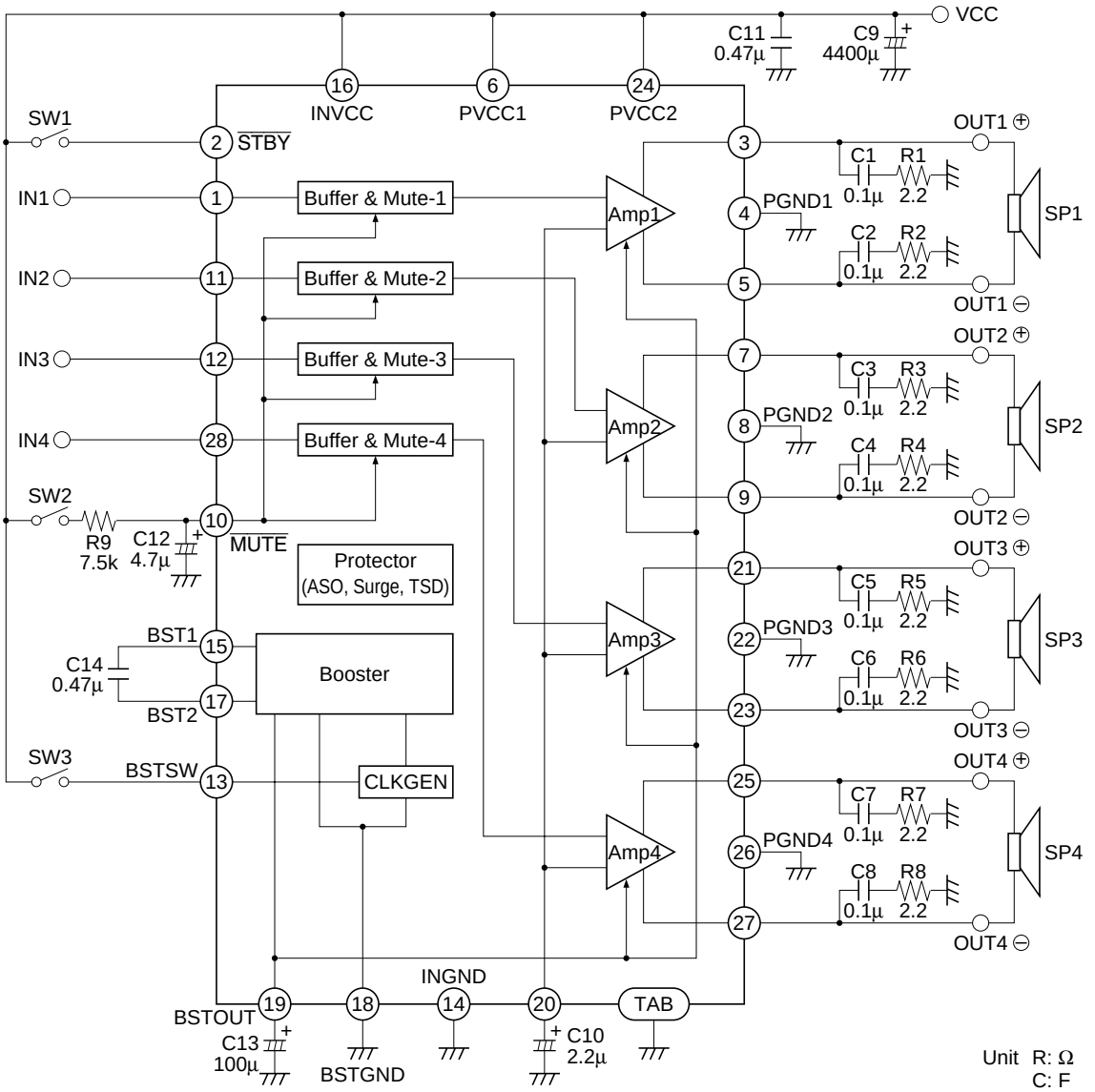
Functions

- 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

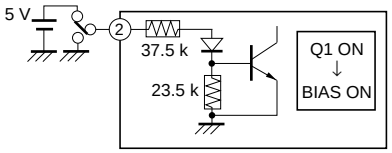


* C1 to C8 should be polyester film capacitors with no secondary resonance (non-inductive), to assure stable operation.

Note: 1. Standby

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

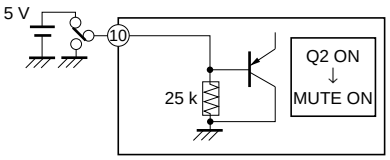
When pin 2 is open or connected to GND, standby is turned on (output off).



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).



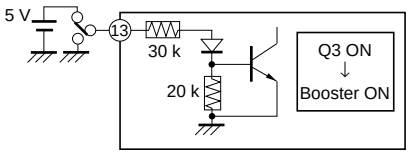
3. DC-DC converter (Booster)

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).

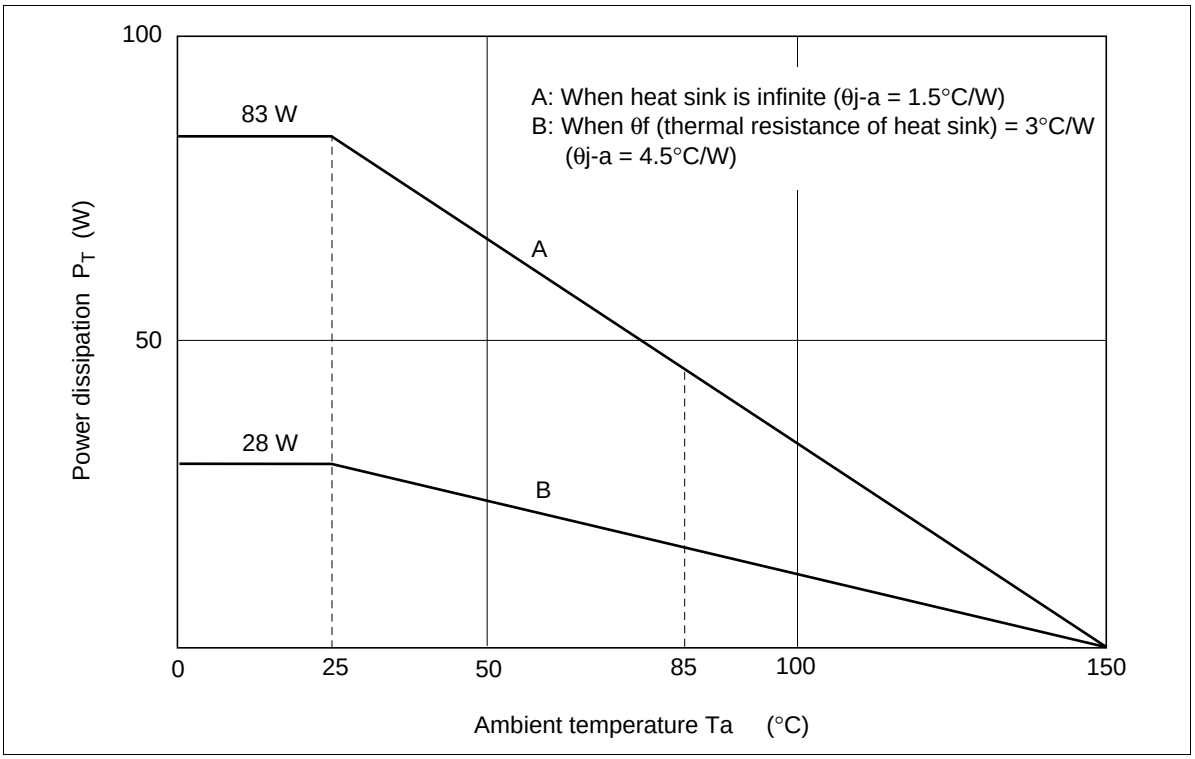
Consequently if you use radio tuner (AM), I recommend DC-DC converter (Booster) off.



Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Operating supply voltage	V_{CC}	18	V
Supply voltage when no signal*[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	Tj	150	°C
Operating temperature	Topr	–30 to +85	°C
Storage temperature	Tstg	–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 Ta = 25 °C.
The derating carve is as shown in the graph below.



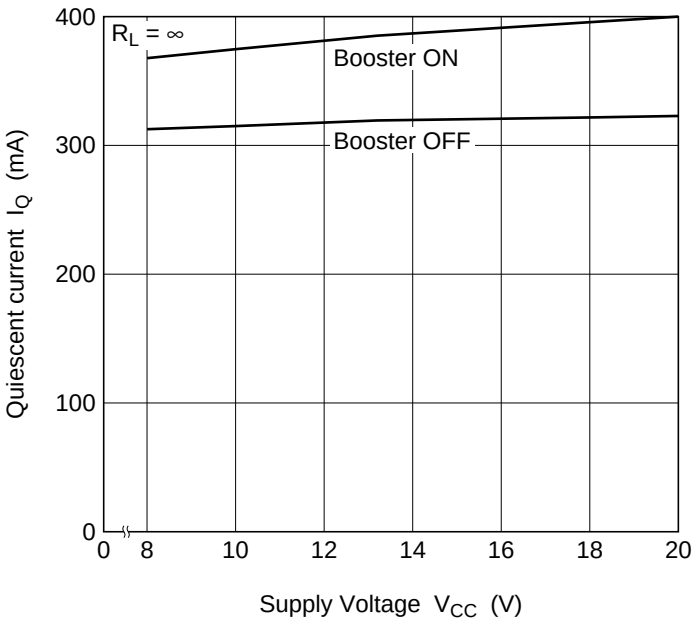
Electrical Characteristics (V_{CC} = 13.2 V, R_L = 4 Ω, f = 1 kHz, Rg = 600 Ω, Ta = 25°C, when there is no description in test conditions)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Quiescent current1	I_{Q1}	275	380	480	mA	Vin = 0 V, boost on, R_L = ∞
Quiescent current2	I_{Q2}	190	320	420	mA	Vin = 0 V, boost off, R_L = ∞
Total harmonic distortion	T.H.D.	—	0.02	0.1	%	Po = 3 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 V, boost on, R_L = 4 Ω, THD = 10%
Rated output power2	P_{O2}	17	20	—	W	V_{CC} = 13.2 V, boost off, R_L = 4 Ω, THD = 10%
Max output power1	P_{OMAX1}	35	38	—	W	V_{CC} = 13.7 V, boost on, R_L = 4 Ω
Max output power2	P_{OMAX2}	31	34	—	W	V_{CC} = 13.7 V, boost off, R_L = 4 Ω
Output noise voltage1	WBN1	—	0.15	0.3	mVrms	Rg = 0 Ω, mute off, BW = 20 to 20 kHz
Output noise voltage2	WBN2	—	0.08	0.2	mVrms	Rg = 0 Ω, mute on, BW = 20 to 20 kHz
Ripple rejection	SVR	45	55	—	dB	f = 120 Hz
Output offset voltage1	ΔV_{Q1}	–250	0	250	mV	Vin = 0 V, mute off
Output offset voltage2	ΔV_{Q2}	–250	0	250	mV	Vin = 0 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	Vout = 6.7 Vrms
Channel cross talk	C.T.	60	80	—	dB	Vout = 6.7 Vrms
Input impedance	Zin	18	25	33	kΩ	
Input voltage muted completly	ATTin	7	—	—	Vp-p	

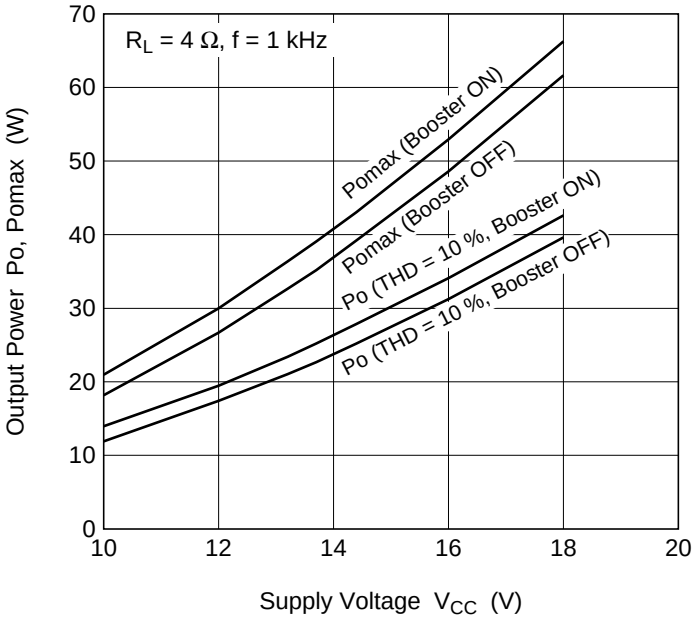
Note: boost on; Boost control voltage (high),
mute on; Muting control voltage (low)

Characteristic Curves

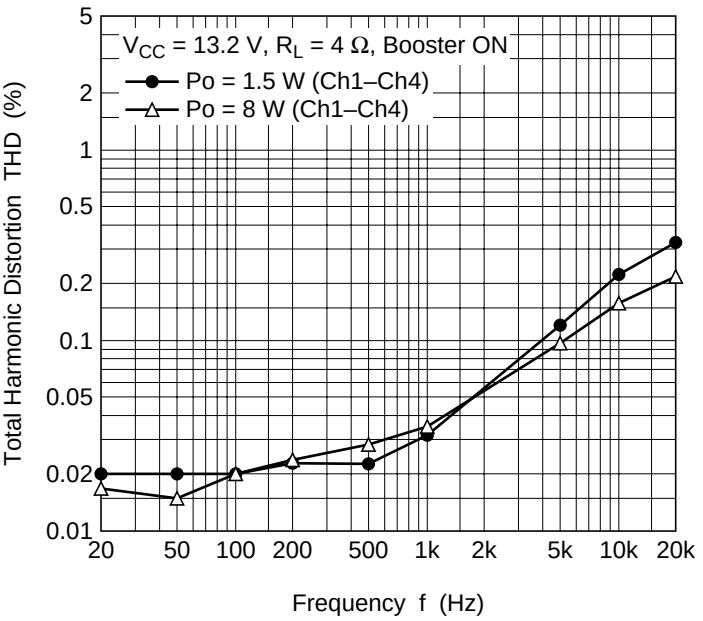
Quiescent current vs. Supply Voltage



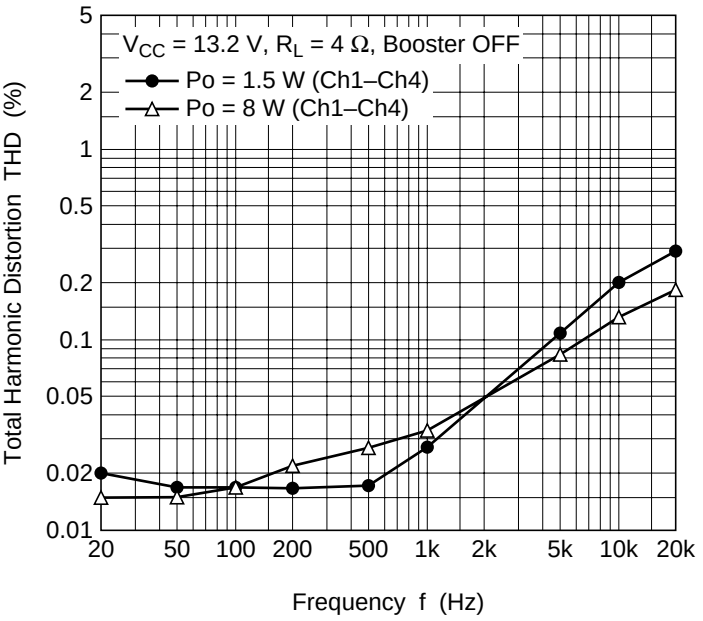
Output Power vs. Supply Voltage



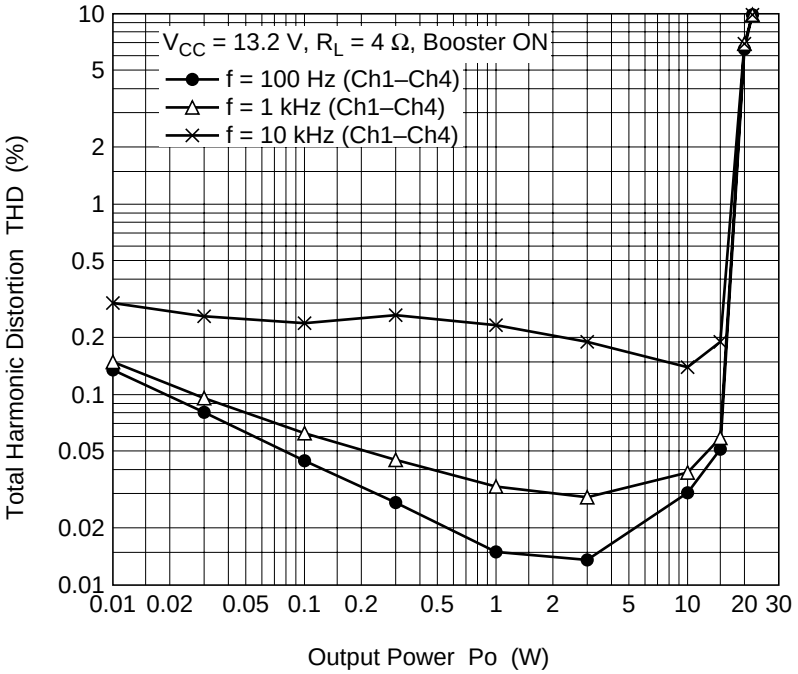
Total Harmonic Distortion vs. Frequency (1)



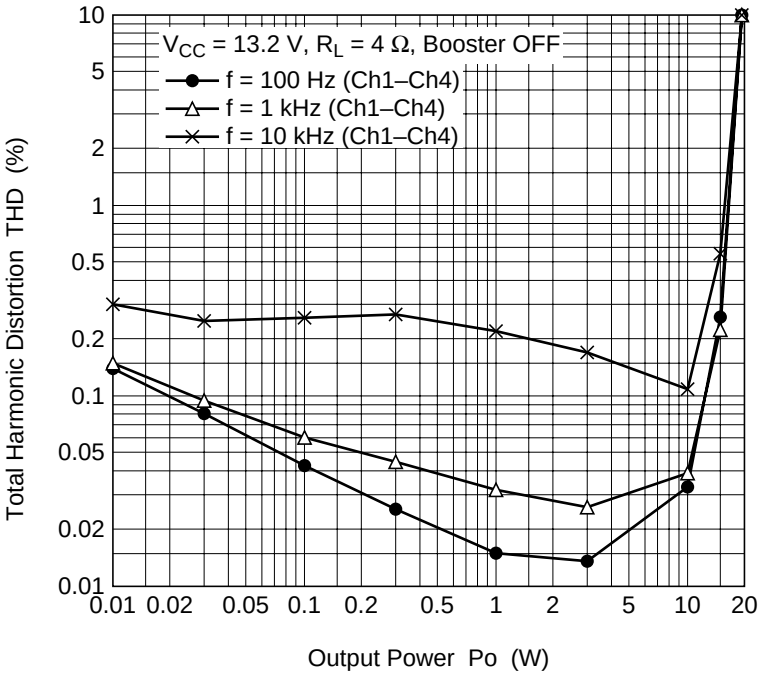
Total Harmonic Distortion vs. Frequency (2)



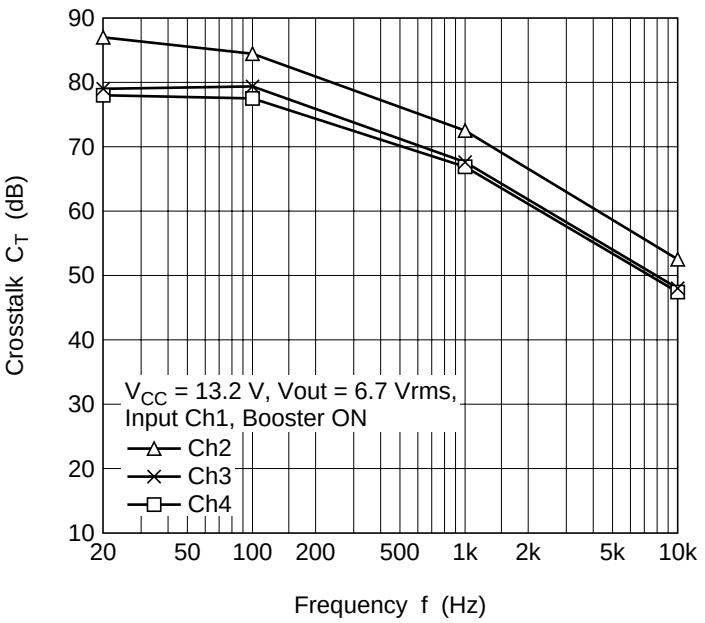
Total Harmonic Distortion vs. Output Power (1)



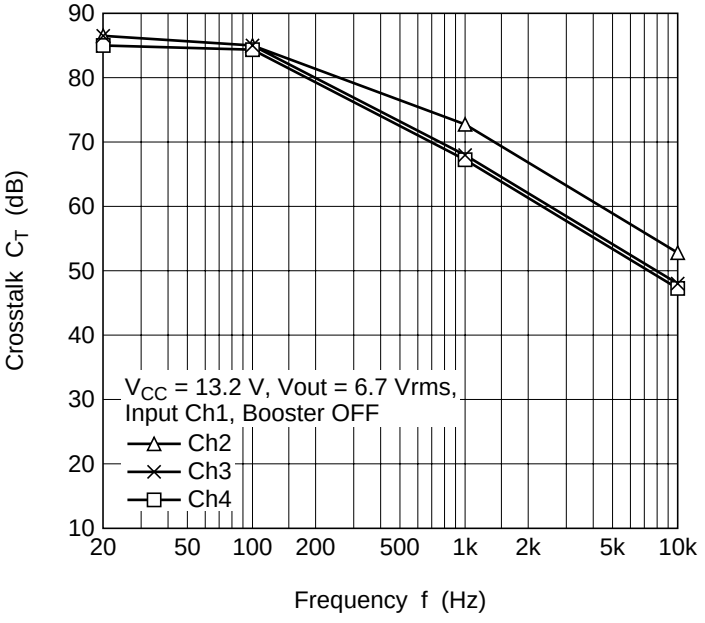
Total Harmonic Distortion vs. Output Power (2)



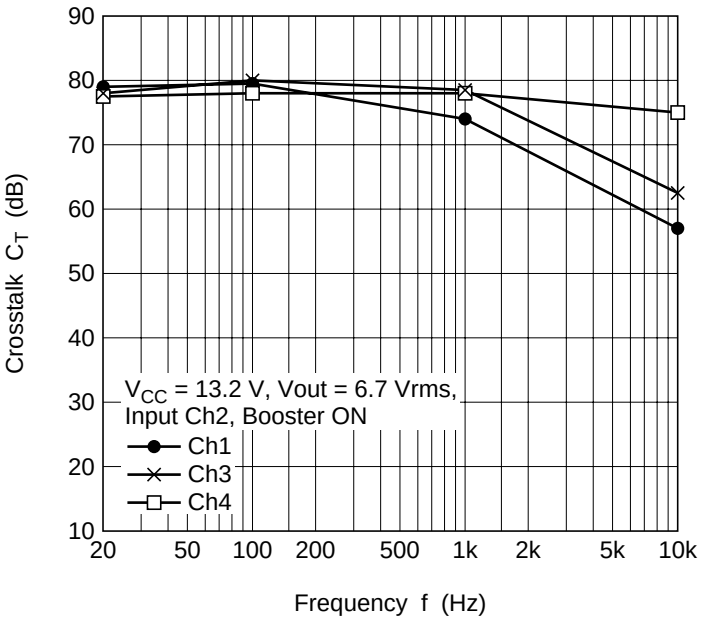
Crosstalk vs. Frequency (1)



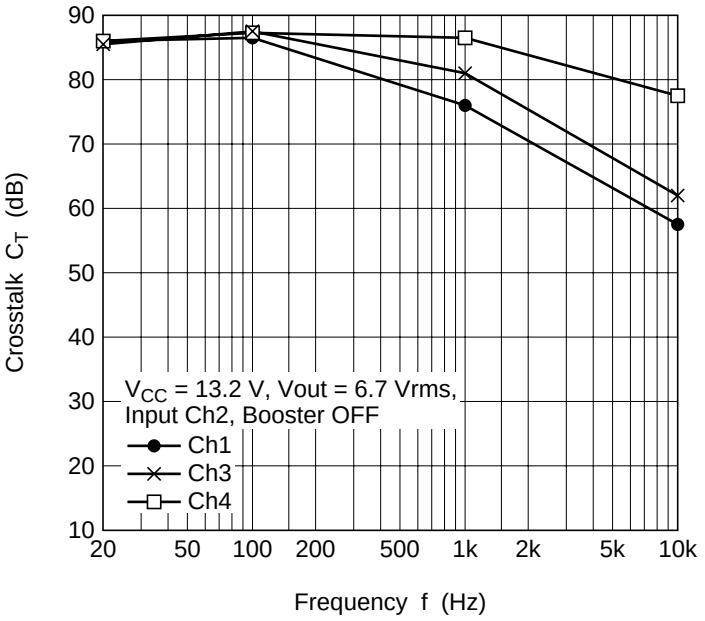
Crosstalk vs. Frequency (2)



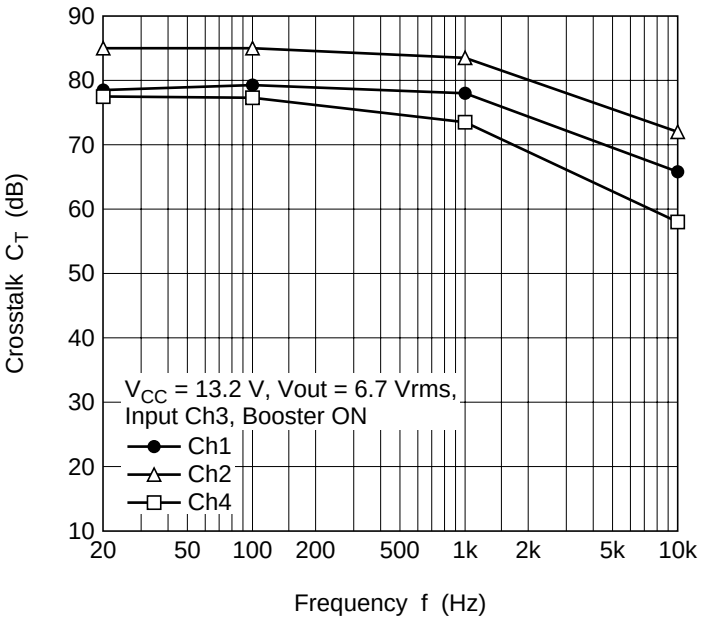
Crosstalk vs. Frequency (3)



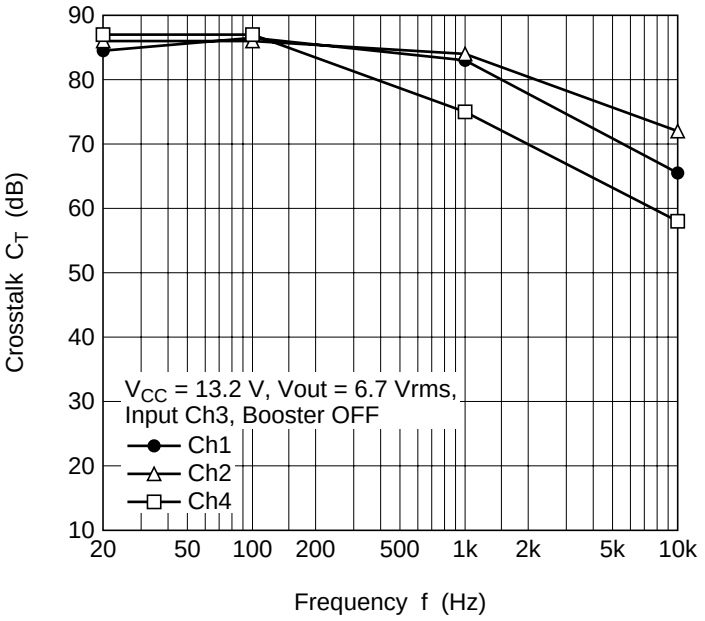
Crosstalk vs. Frequency (4)



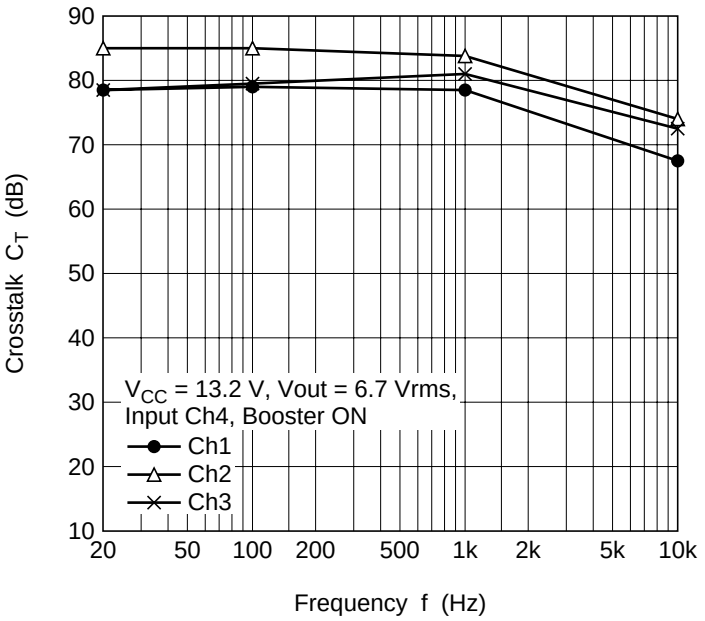
Crosstalk vs. Frequency (5)



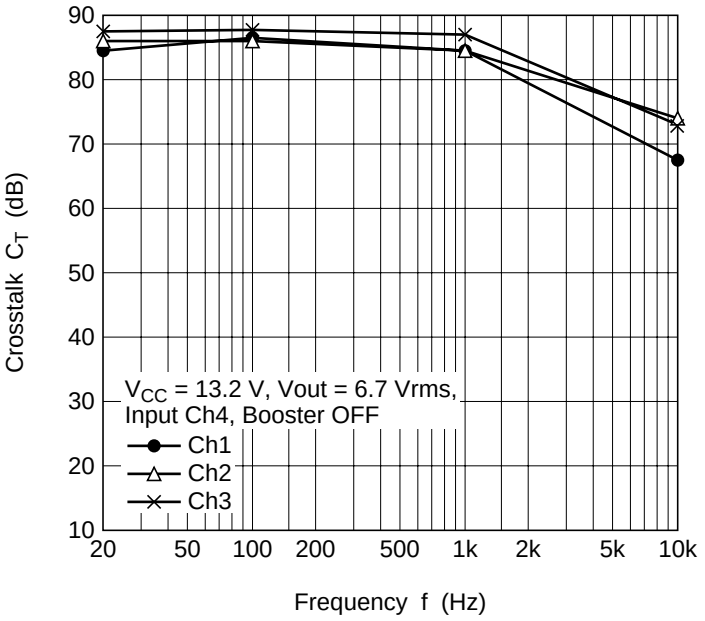
Crosstalk vs. Frequency (6)



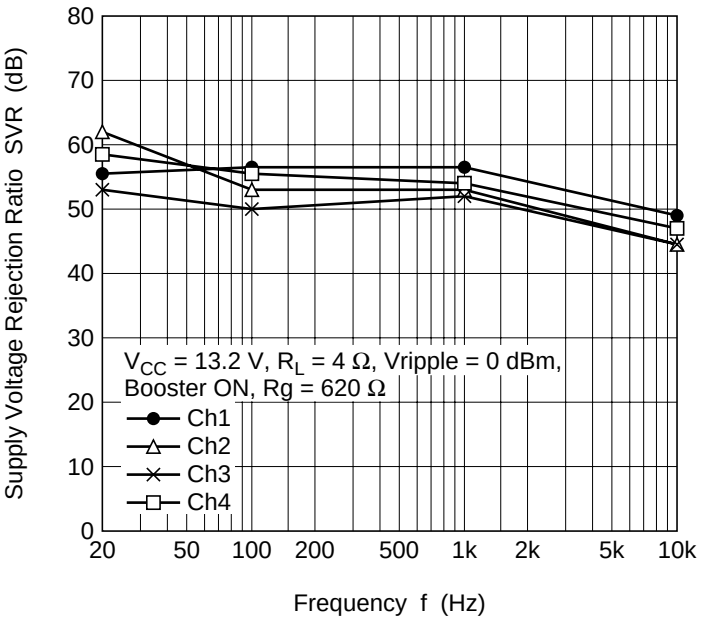
Crosstalk vs. Frequency (7)



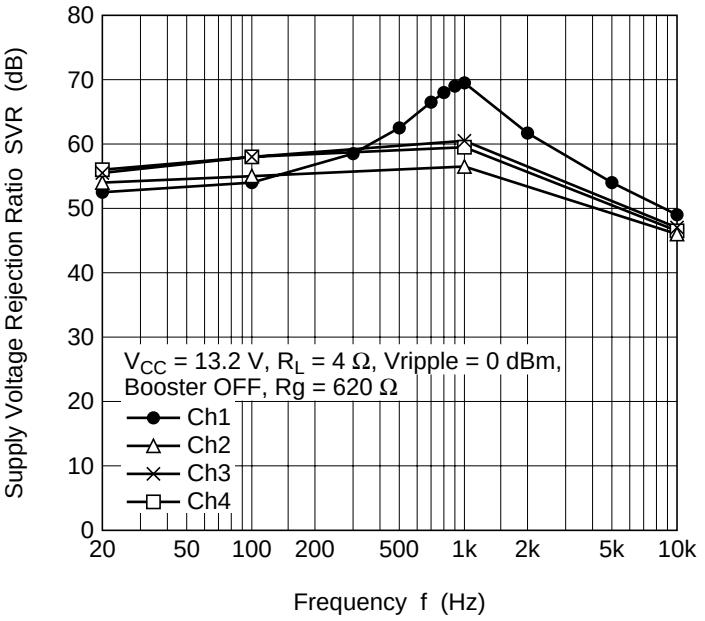
Crosstalk vs. Frequency (8)



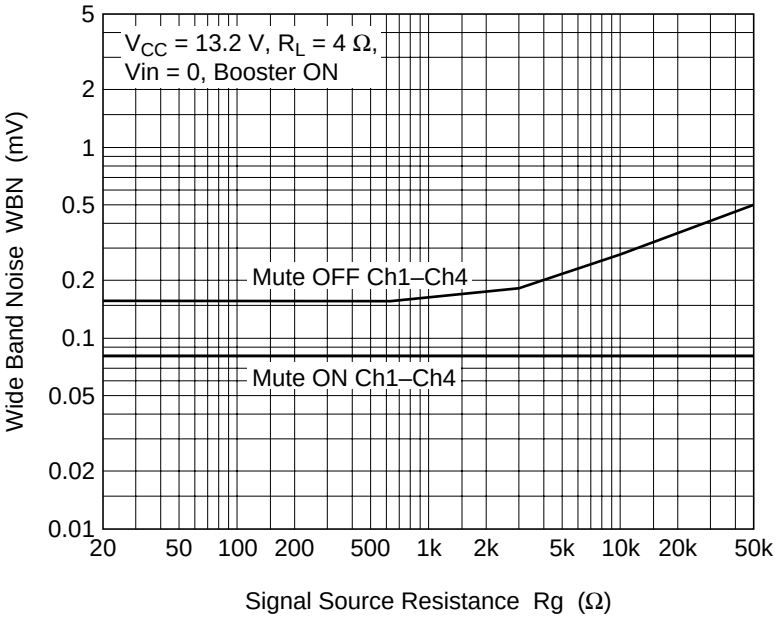
Supply Voltage Rejection Ratio vs. Frequency (1)



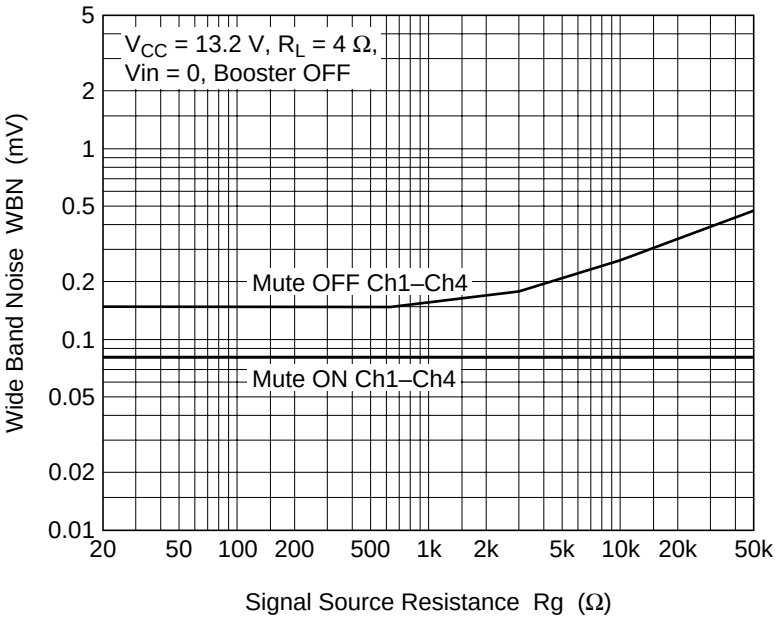
Supply Voltage Rejection Ratio vs. Frequency (2)



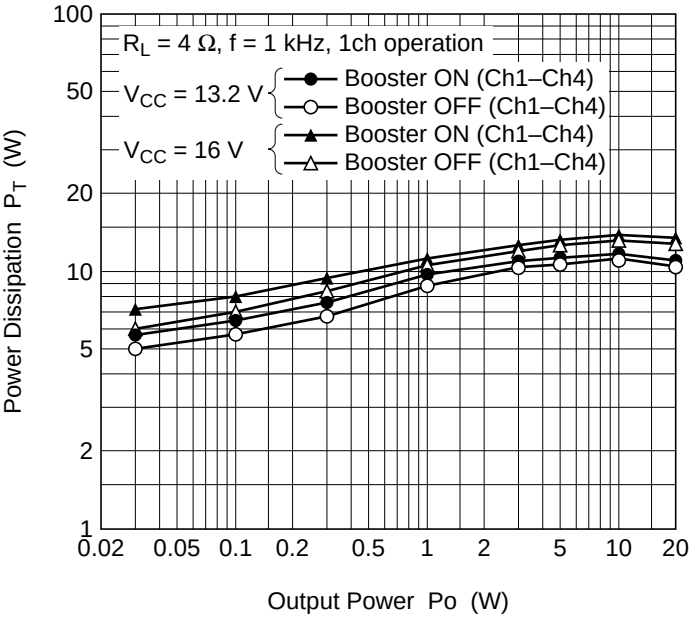
Wide Band Noise vs. Signal Source Resistance (1)



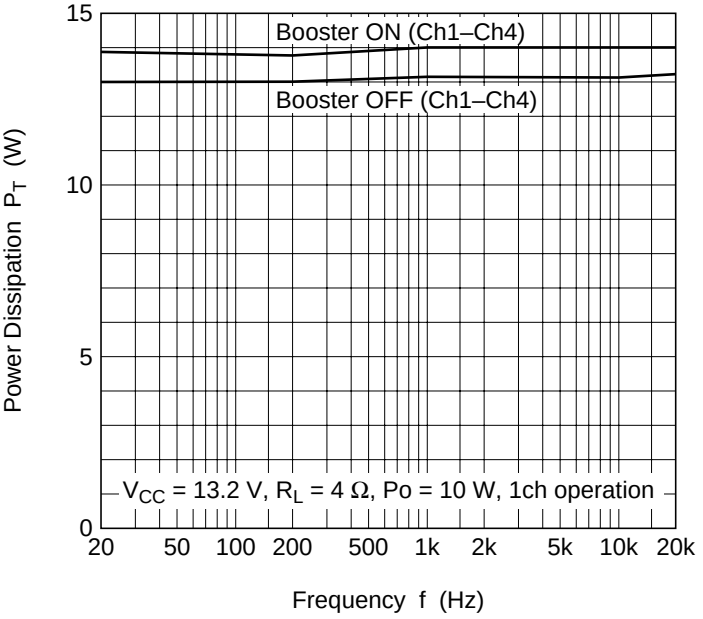
Wide Band Noise vs. Signal Source Resistance (2)



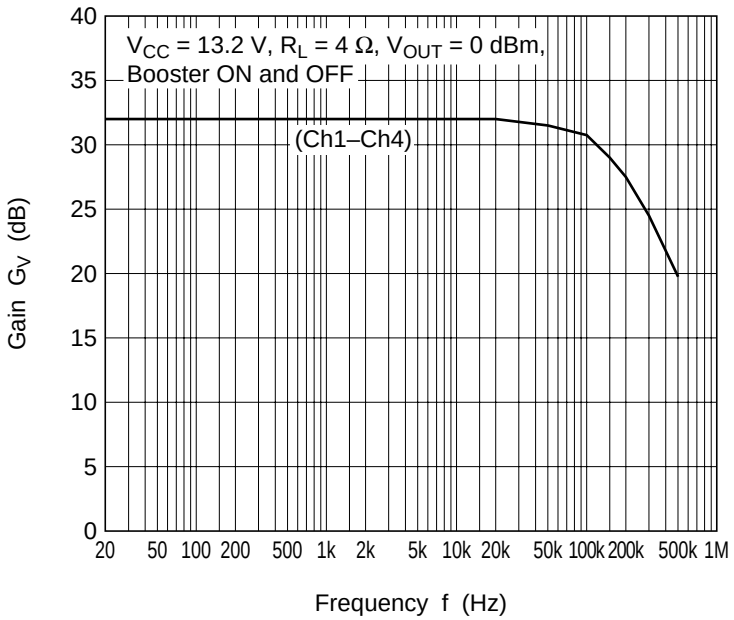
Power Dissipation vs. Output Power



Power Dissipation vs. Frequency

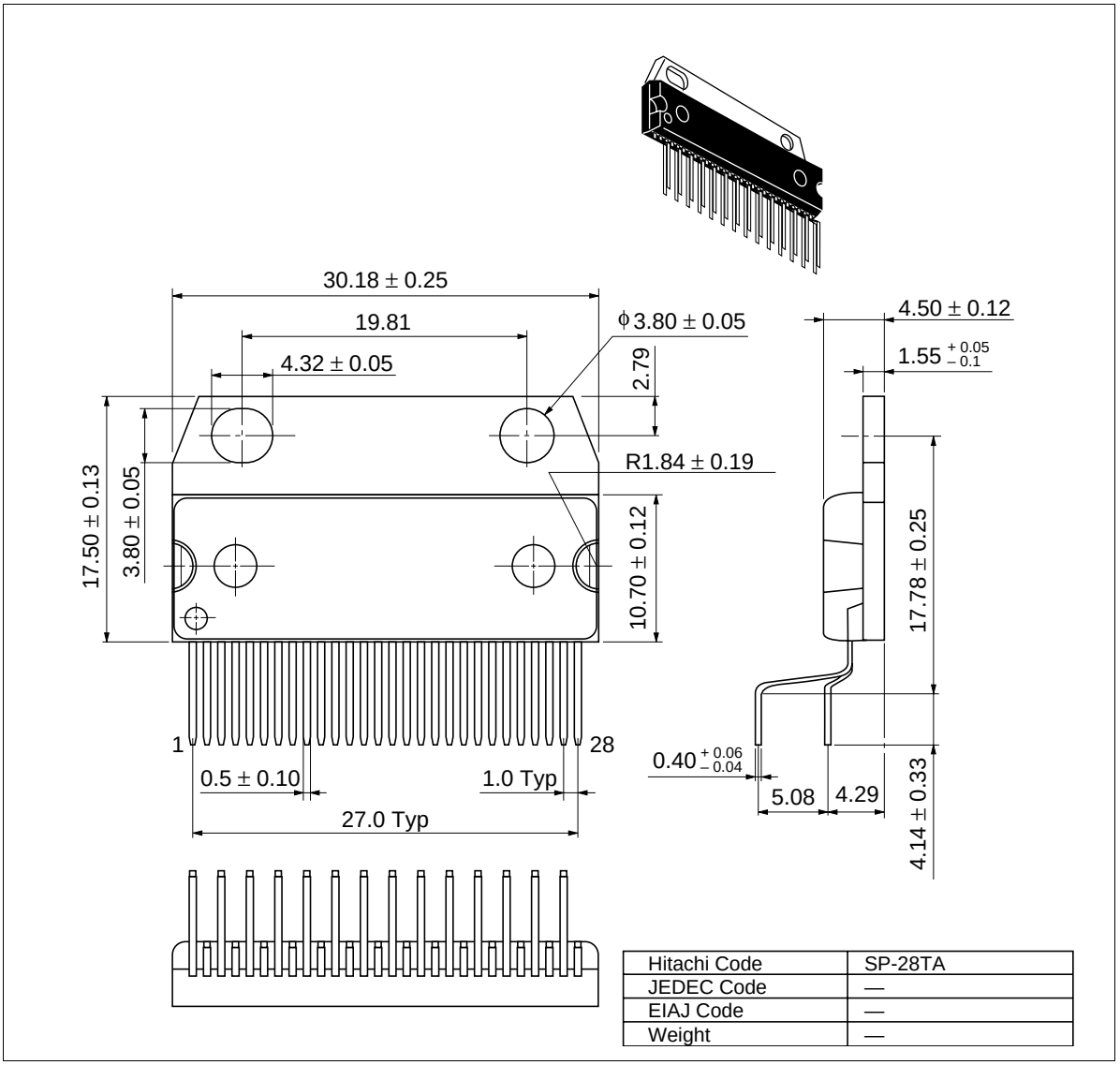


Gain vs. Frequency



Package Dimensions

Unit: mm



Hitachi Code	SP-28TA
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Weight	—

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Hitachi, Ltd.
Semiconductor & Integrated Circuits.
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

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For further information write to:

Hitachi Semiconductor
(America) Inc.
179 East Tasman Drive,
San Jose,CA 95134
Tel: <1> (408) 433-1990
Fax: <1>(408) 433-0223

Hitachi Europe GmbH
Electronic components Group
Dornacher Straße 3
D-85622 Feldkirchen, Munich
Germany
Tel: <49> (89) 9 9180-0
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.
Electronic Components Group.
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA, United Kingdom
Tel: <44> (1628) 585000
Fax: <44> (1628) 778322

Hitachi Asia Pte. Ltd.
16 Collyer Quay #20-00
Hitachi Tower
Singapore 049318
Tel: 535-2100
Fax: 535-1533

Hitachi Asia Ltd.
Taipei Branch Office
3F, Hung Kuo Building. No.167,
Tun-Hwa North Road, Taipei (105)
Tel: <886> (2) 2718-3666
Fax: <886> (2) 2718-8180

Hitachi Asia (Hong Kong) Ltd.
Group III (Electronic Components)
7/F., North Tower, World Finance Centre,
Harbour City, Canton Road, Tsim Sha Tsui,
Kowloon, Hong Kong
Tel: <852> (2) 735 9218
Fax: <852> (2) 730 0281
Telex: 40815 HITEC HX