HA13153A, HA13154A

15 W × 4-Channel BTL Power IC

HITACHI

ADE-207-181B (Z)
3rd Edition
Jul. 1999

Description

The HA13153A/HA13154A is high output and low distortion 4 ch BTL power IC designed for digital car audio.

At 13.2 V to 4 Ω load, this power IC provides output power 15 W with 10% distortion.

Function

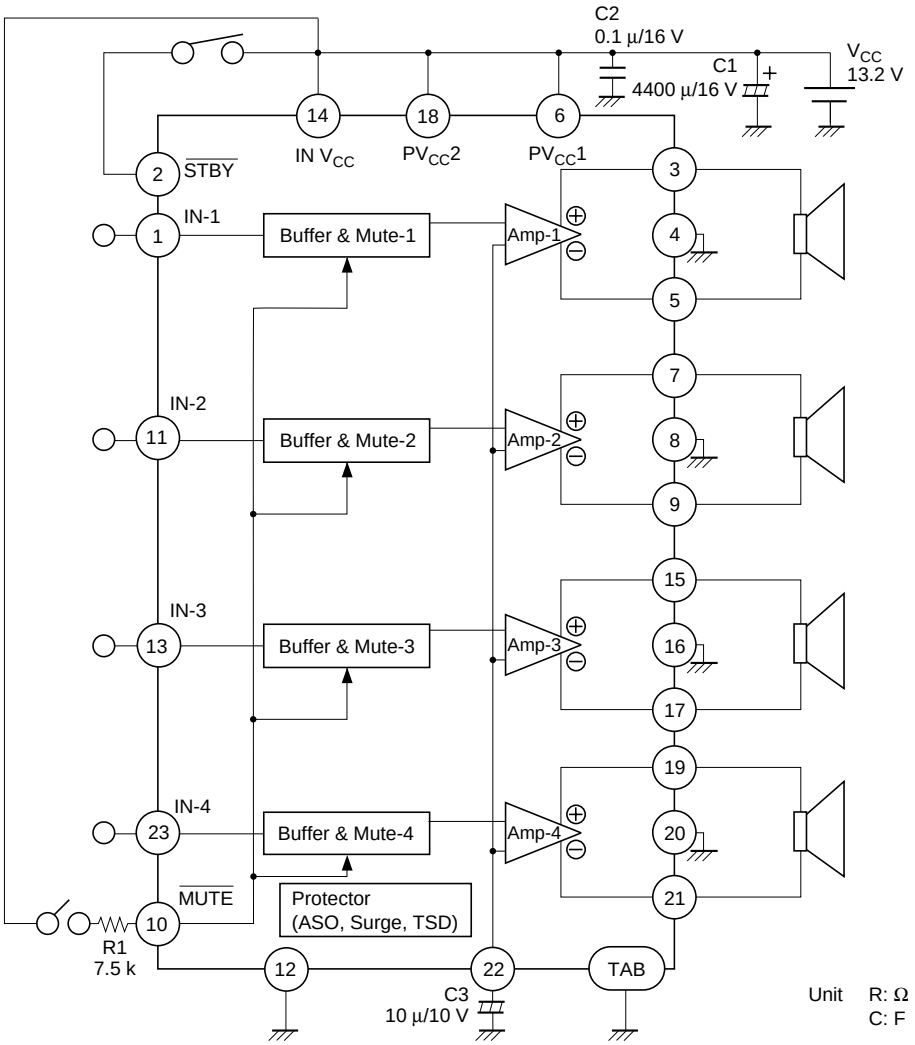
- 4 ch BTL power amplifiers
- Built-in standby circuit
- Built-in muting circuit
- Built-in protection circuit (surge, T.S.D, and ASO)

Features

- Few external parts lead to compact set-area possibility than HA13150A/HA13151/HA13152 (C: 3, R: 1)
- Popping noise minimized
- Low output noise
- Built-in high reliability protection circuit
- Pin to pin with HA13150A/HA13151/HA13152/HA13155

Hitachi semiconductor

Block Diagram

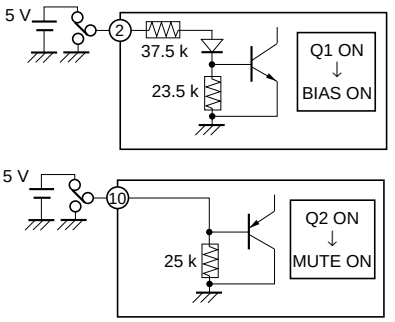


C2 should be polyester film capacitors with no secondary resonance (non-inductive), to assure stable operation.

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 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).

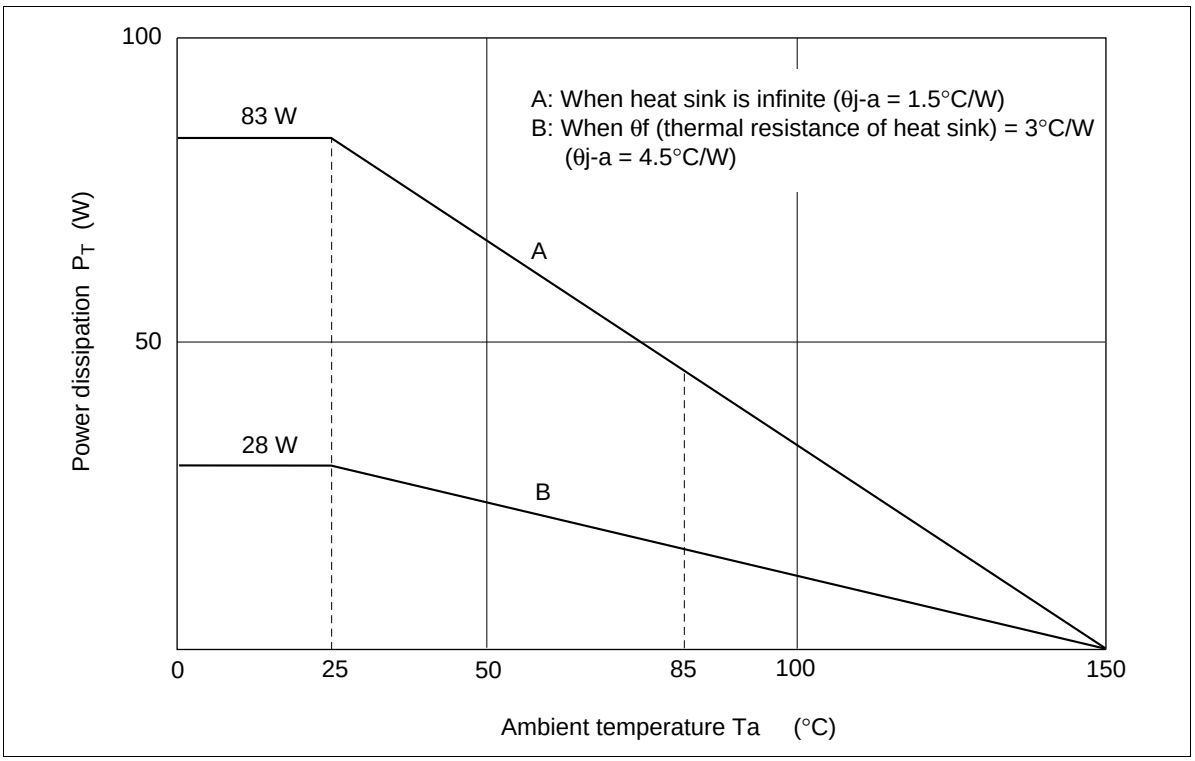
3. TAB (header of IC) connected to GND.



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)	3	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

Notes: 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, f = 1 kHz, R_L = 4 Ω, Rg = 600 Ω, Ta = 25°C)

HA13153A

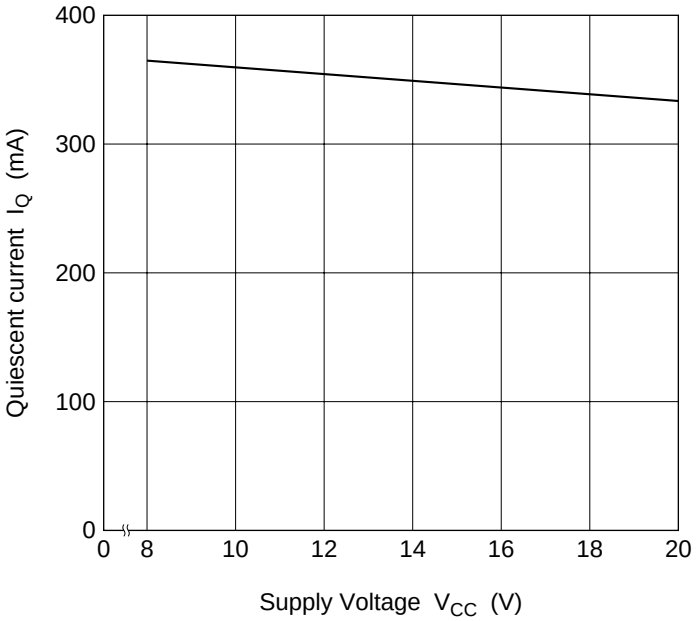
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Quiescent current	I_Q1	—	350	—	mA	Vin = 0
Output offset voltage	ΔV_Q	–300	0	+300	mV	
Gain	G_V	30.5	32	33.5	dB	
Gain difference between channels	ΔG_V	–1.0	0	+1.0	dB	
Rated output power	Po	—	15	—	W	V_{CC} = 13.2 V THD = 10%, R_L = 4 Ω
Max output power	Pomax	—	25	—	W	V_{CC} = 13.7 V, R_L = 4 Ω
Total harmonic distortion	T.H.D.	—	0.02	—	%	Po = 3 W
Output noise voltage	WBN	—	0.15	—	mVrms	Rg = 0 Ω BW = 20 to 20 kHz
Ripple rejection	SVR	—	55	—	dB	Rg = 600 Ω, f = 120 Hz
Channel cross talk	C.T.	—	70	—	dB	Rg = 600 Ω Vout = 0 dBm
Input impedance	Rin	—	25	—	kΩ	
Standby current	I_Q2	—	—	10	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	ATTM	—	70	—	dB	Vout = 0 dBm

HA13154A

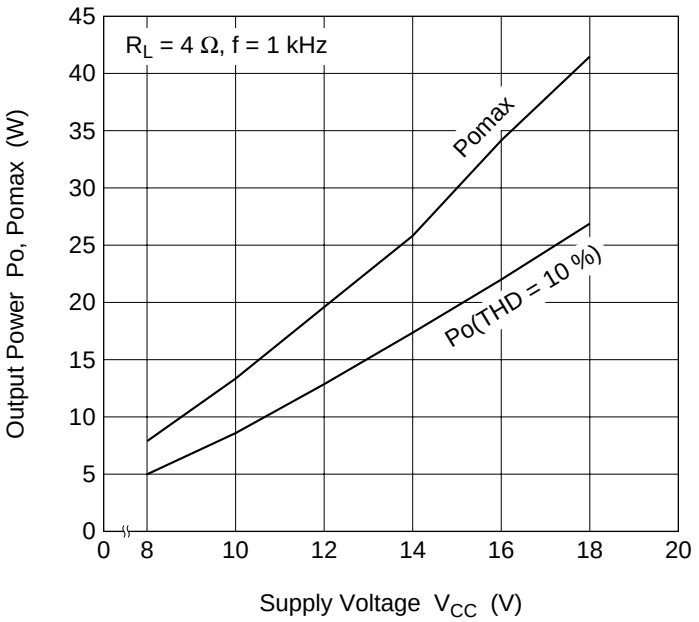
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Quiescent current	I_Q1	—	350	—	mA	Vin = 0
Output offset voltage	ΔV_Q	–300	0	+300	mV	
Gain	G_V	38.5	40	41.5	dB	
Gain difference between channels	ΔG_V	–1.0	0	+1.0	dB	
Rated output power	Po	—	15	—	W	V_{CC} = 13.2 V THD = 10%, R_L = 4 Ω
Max output power	Pomax	—	25	—	W	V_{CC} = 13.7 V, R_L = 4 Ω
Total harmonic distortion	T.H.D.	—	0.02	—	%	Po = 3 W
Output noise voltage	WBN	—	0.25	—	mVrms	Rg = 0 Ω BW = 20 to 20 kHz
Ripple rejection	SVR	—	45	—	dB	Rg = 600 Ω, f = 120 Hz
Channel cross talk	C.T.	—	60	—	dB	Rg = 600 Ω Vout = 0 dBm
Input impedance	Rin	—	25	—	kW	
Standby current	I_Q2	—	—	10	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	ATTM	—	60	—	dB	Vout = 0 dBm

Characteristics Curve

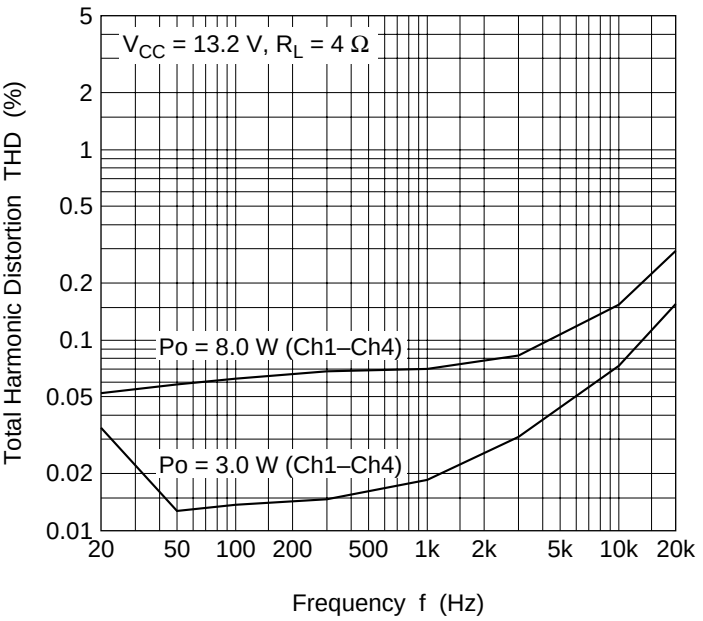
Quiescent current vs. Supply Voltage (HA13153A)



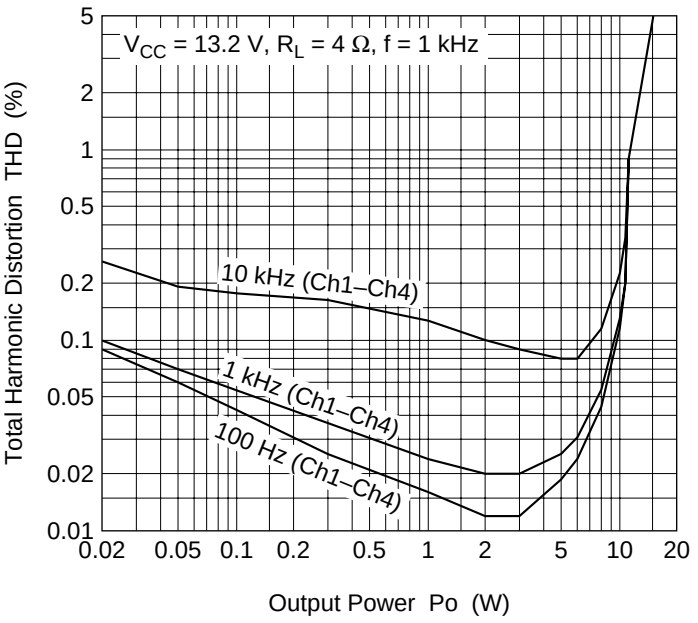
Output Power vs. Supply Voltage (HA13153A)



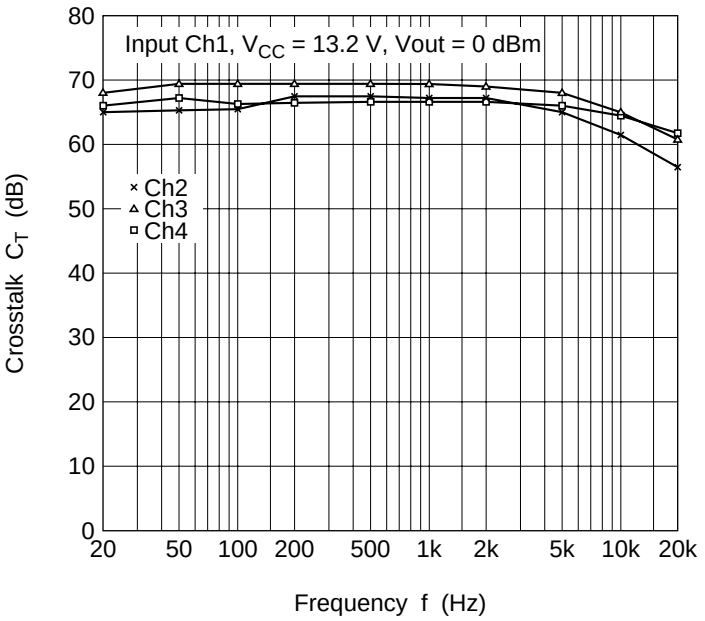
Total Harmonic Distortion vs. Frequency (HA13153A)



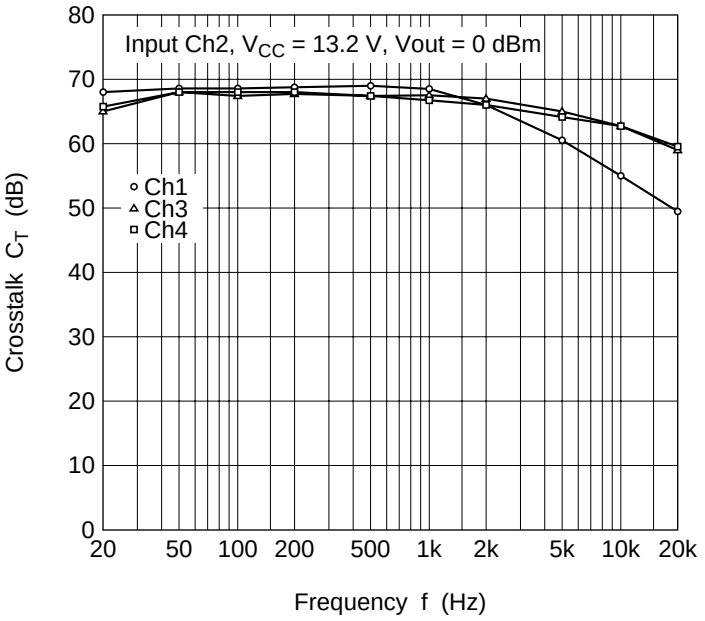
Total Harmonic Distortion vs. Output Power (HA13153A)



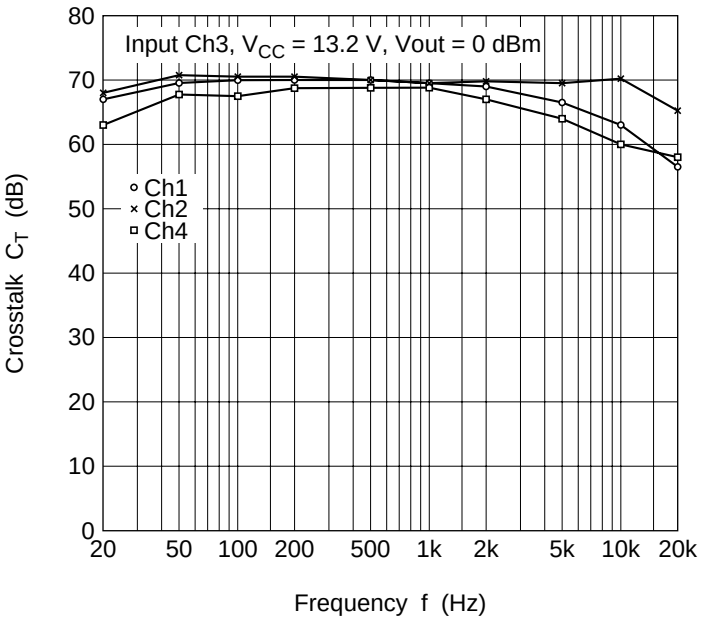
Crosstalk vs. Frequency (HA13153A) (1)



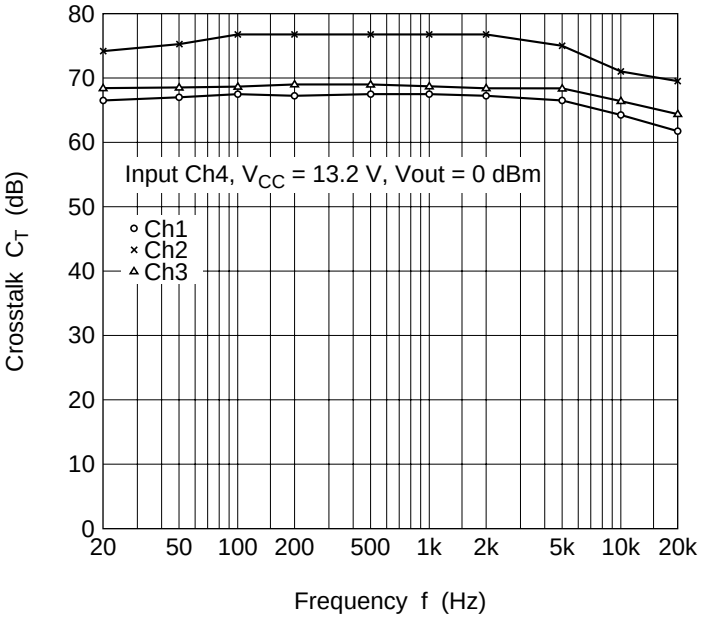
Crosstalk vs. Frequency (HA13153A) (2)



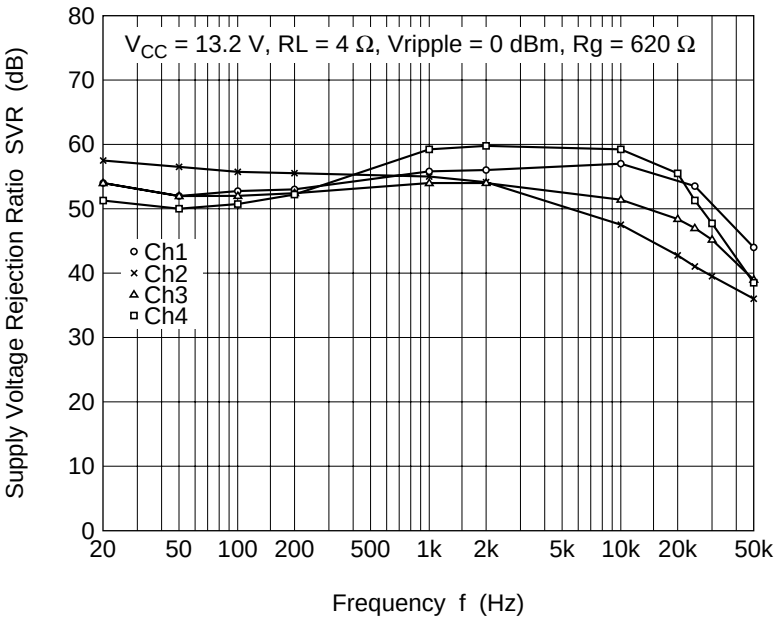
Crosstalk vs. Frequency (HA13153A) (3)



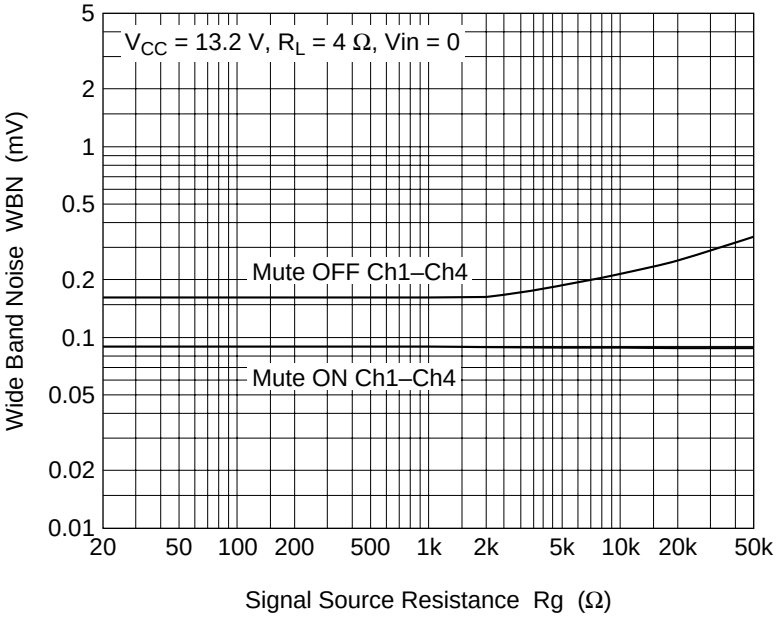
Crosstalk vs. Frequency (HA13153A) (4)



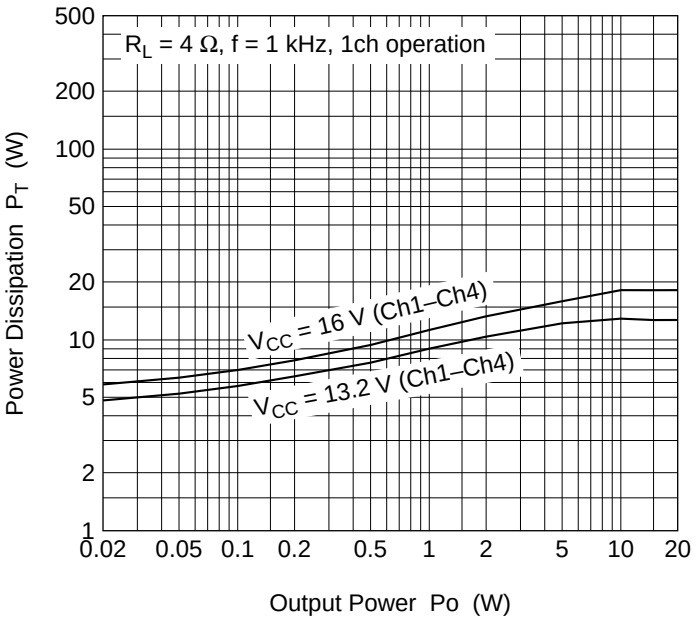
Supply Voltage Rejection Ratio vs. Frequency (HA13153A)



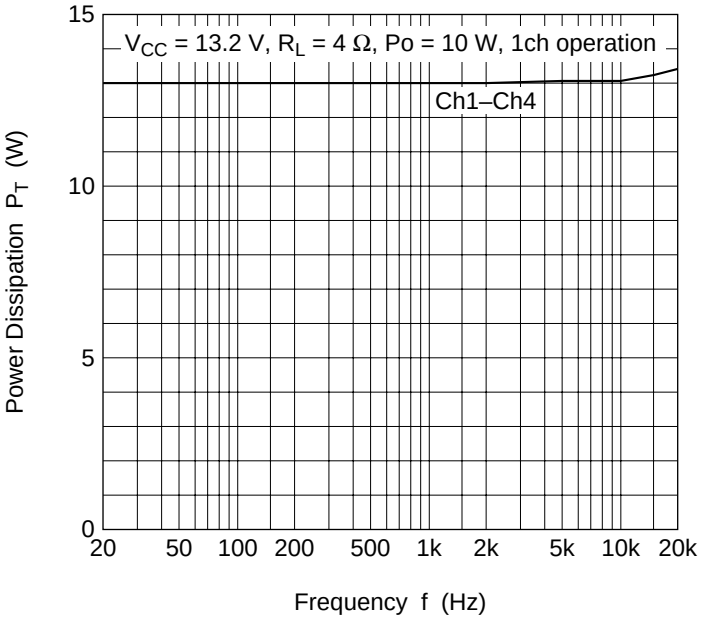
Wide Band Noise vs. Signal Source Resistance (HA13153A)



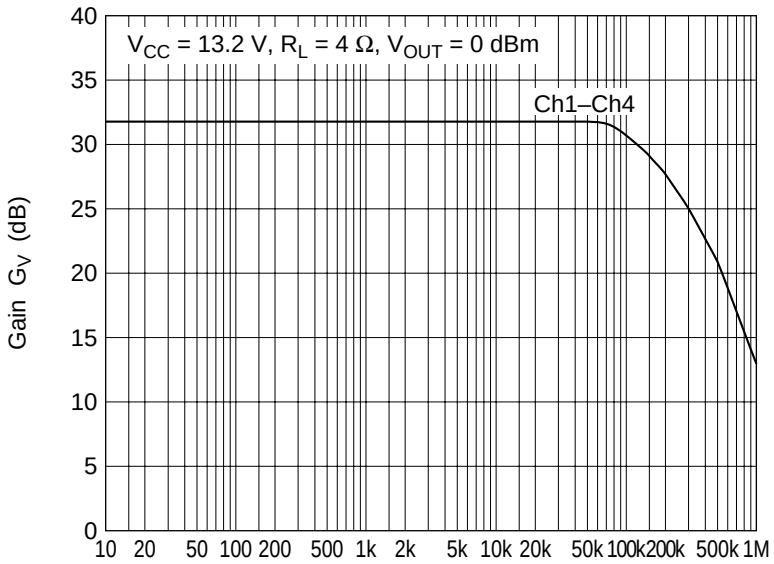
Power Dissipation vs. Output Power (HA13153A)



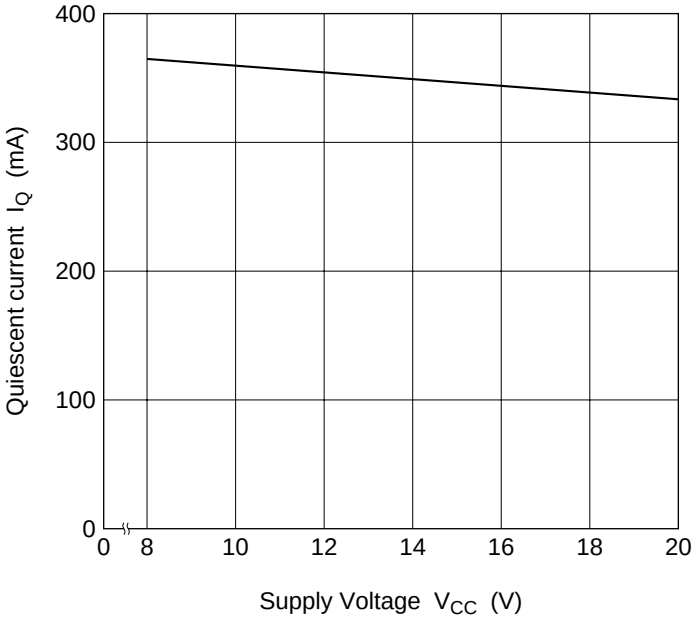
Power Dissipation vs. Frequency (HA13153A)



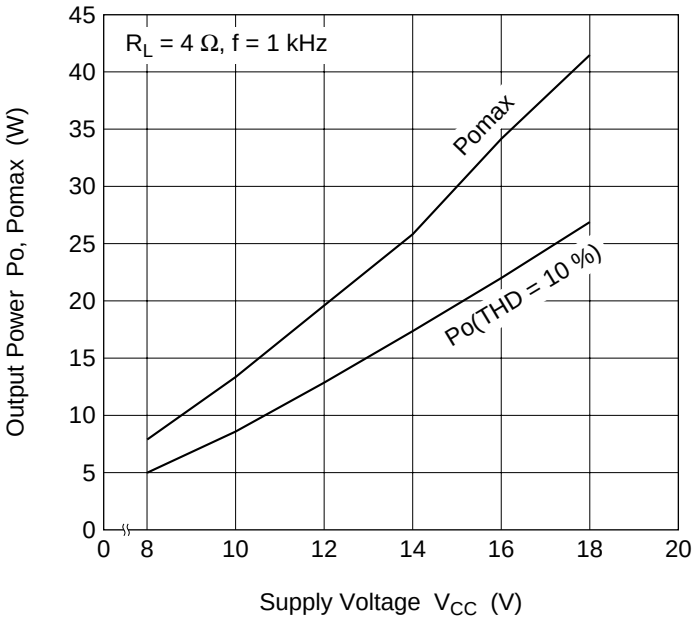
Gain vs. Frequency (HA13153A)



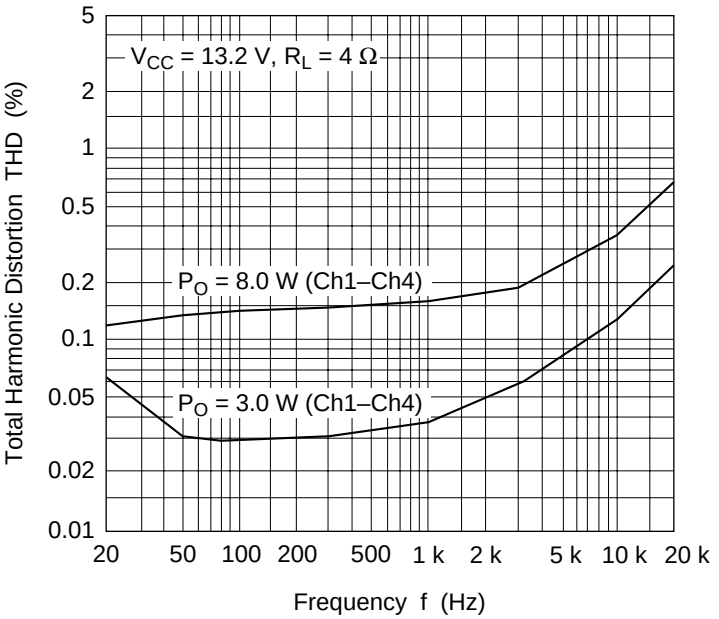
Quiescent current vs. Supply Voltage (HA13154A)



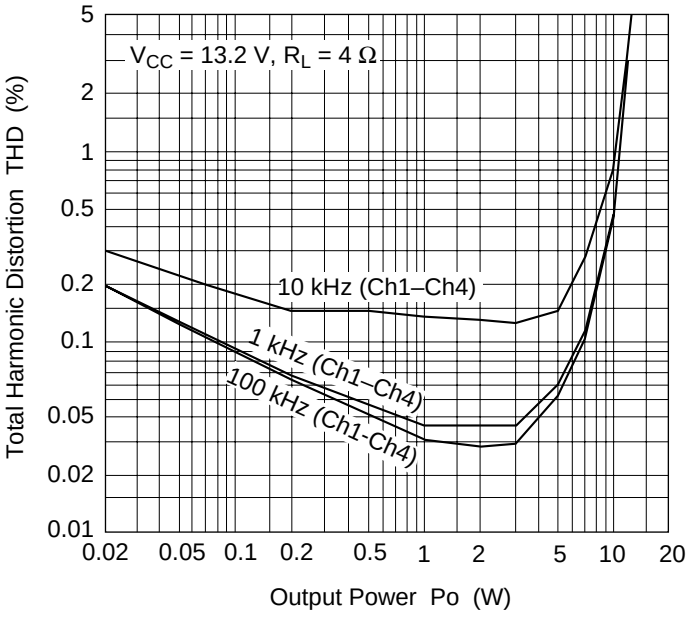
Output Power vs. Supply Voltage (HA13154A)



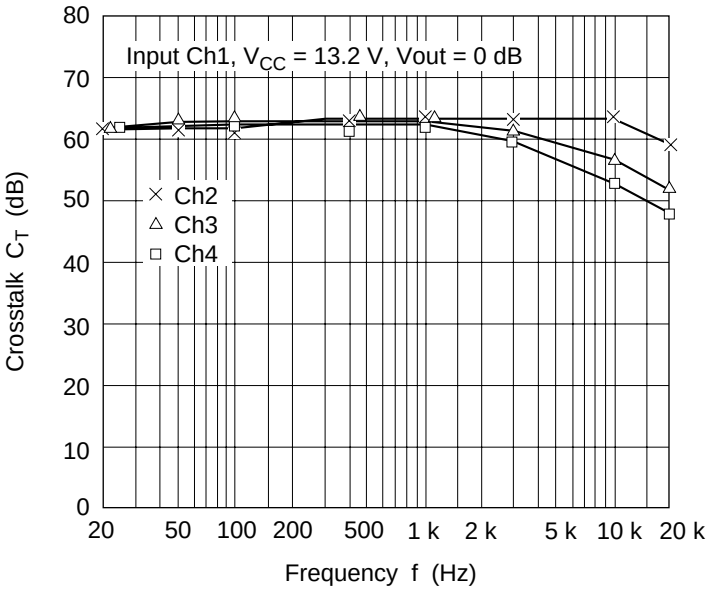
Total Harmonic Distortion vs. Frequency (HA13154A)



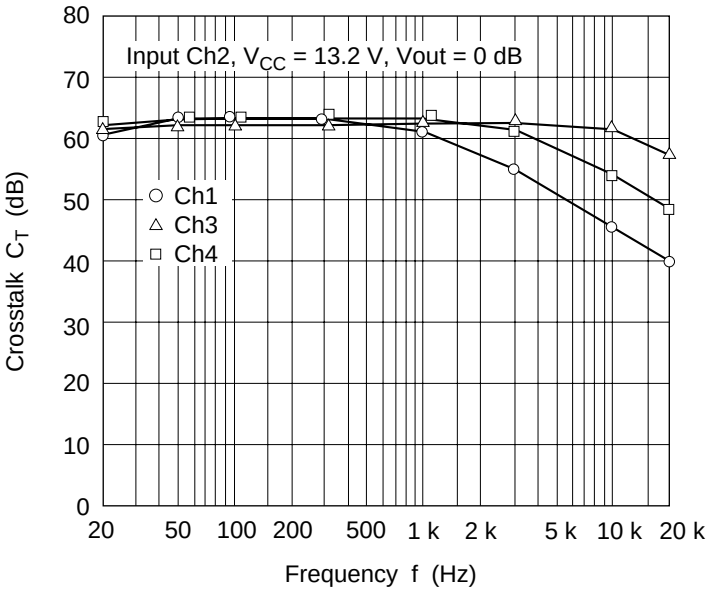
Total Harmonic Distortion vs. Output Power (HA13154A)



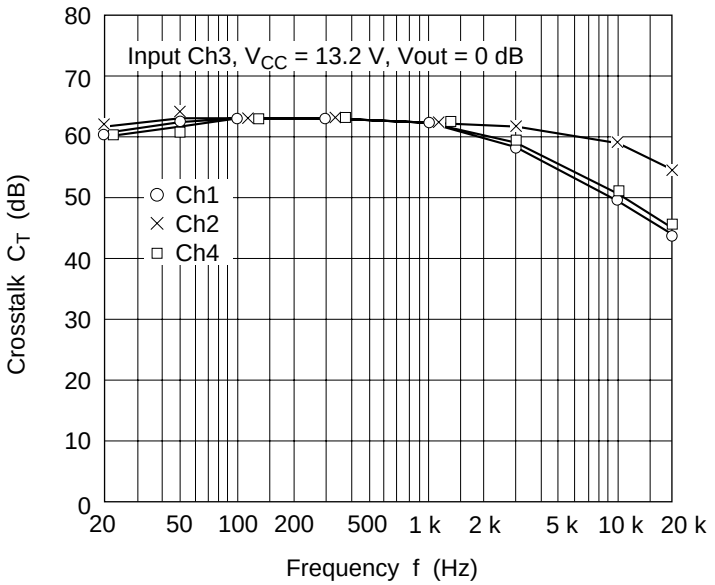
Crosstalk vs. Frequency (HA13154A) (1)



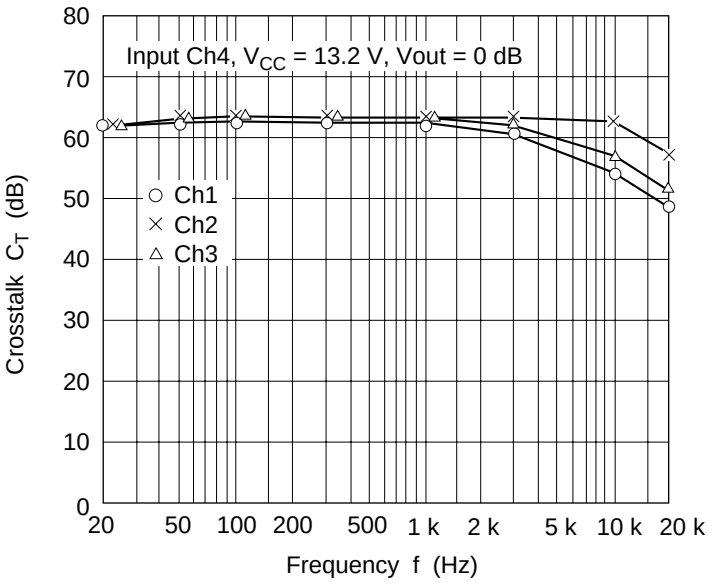
Crosstalk vs. Frequency (HA13154A) (2)



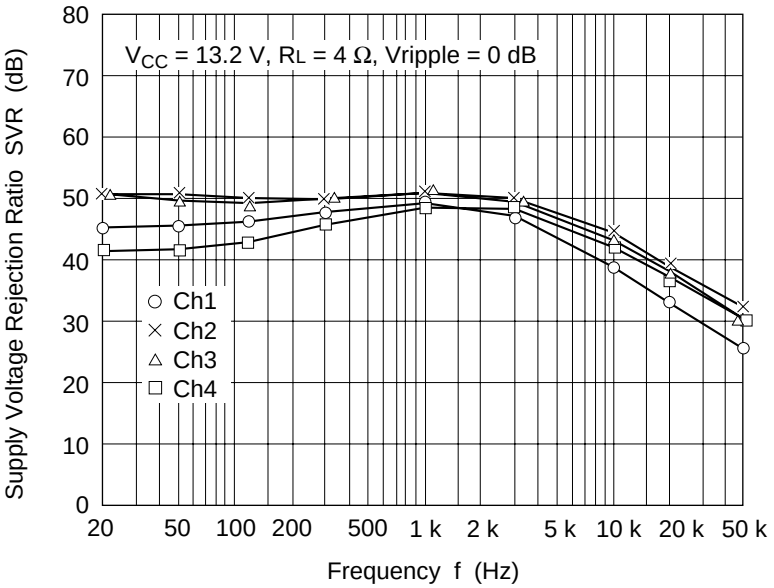
Crosstalk vs. Frequency (HA13154A) (3)



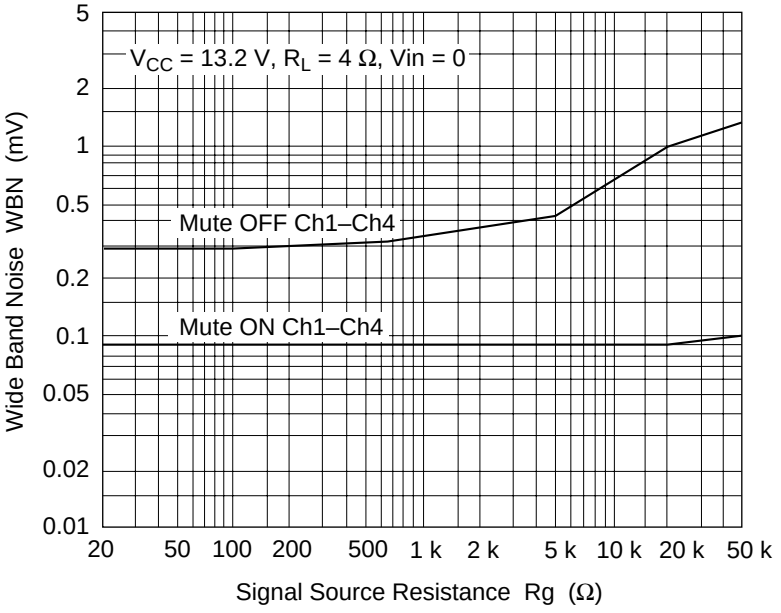
Crosstalk vs. Frequency (HA13154A) (4)



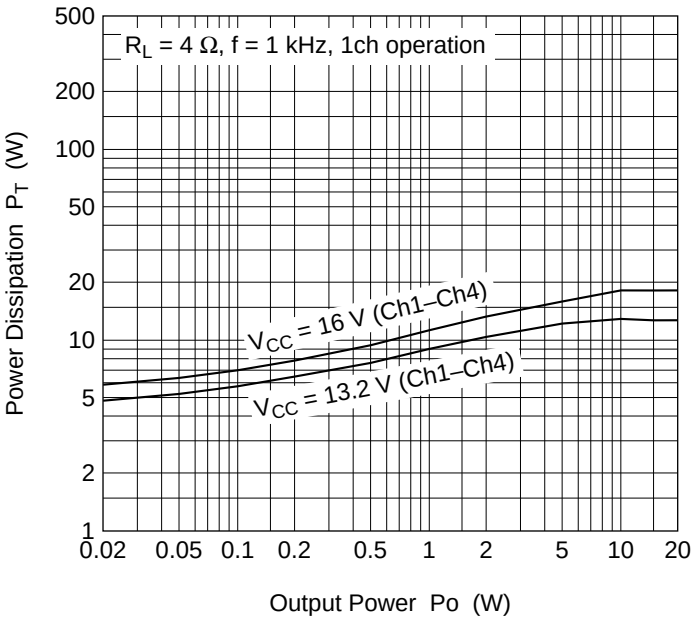
Supply Voltage Rejection Ratio vs. Frequency (HA13154A)



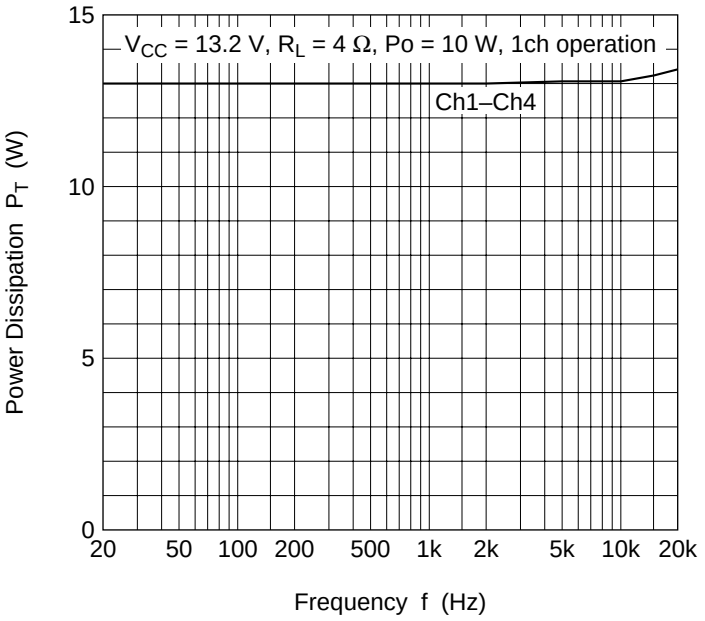
Wide Band Noise vs. Signal Source Resistance (HA13154A)



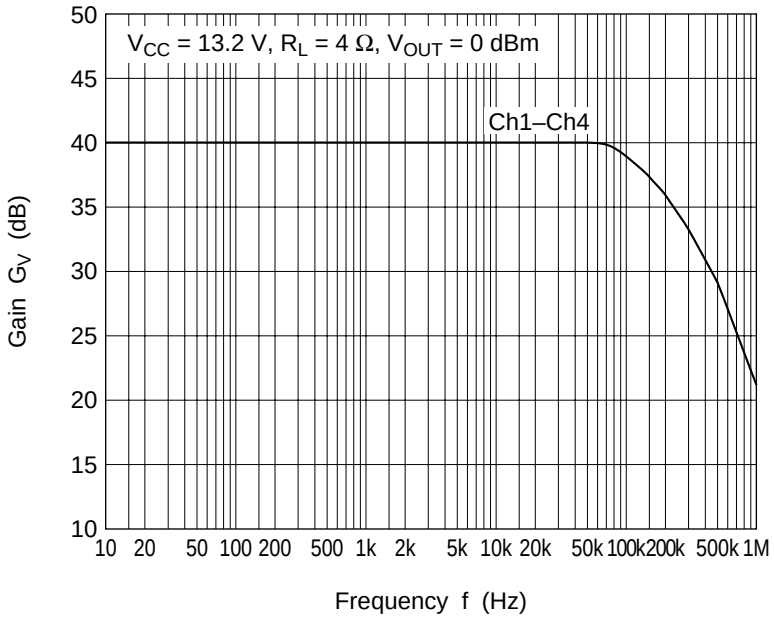
Power Dissipation vs. Output Power (HA13154A)



Power Dissipation vs. Frequency (HA13154A)

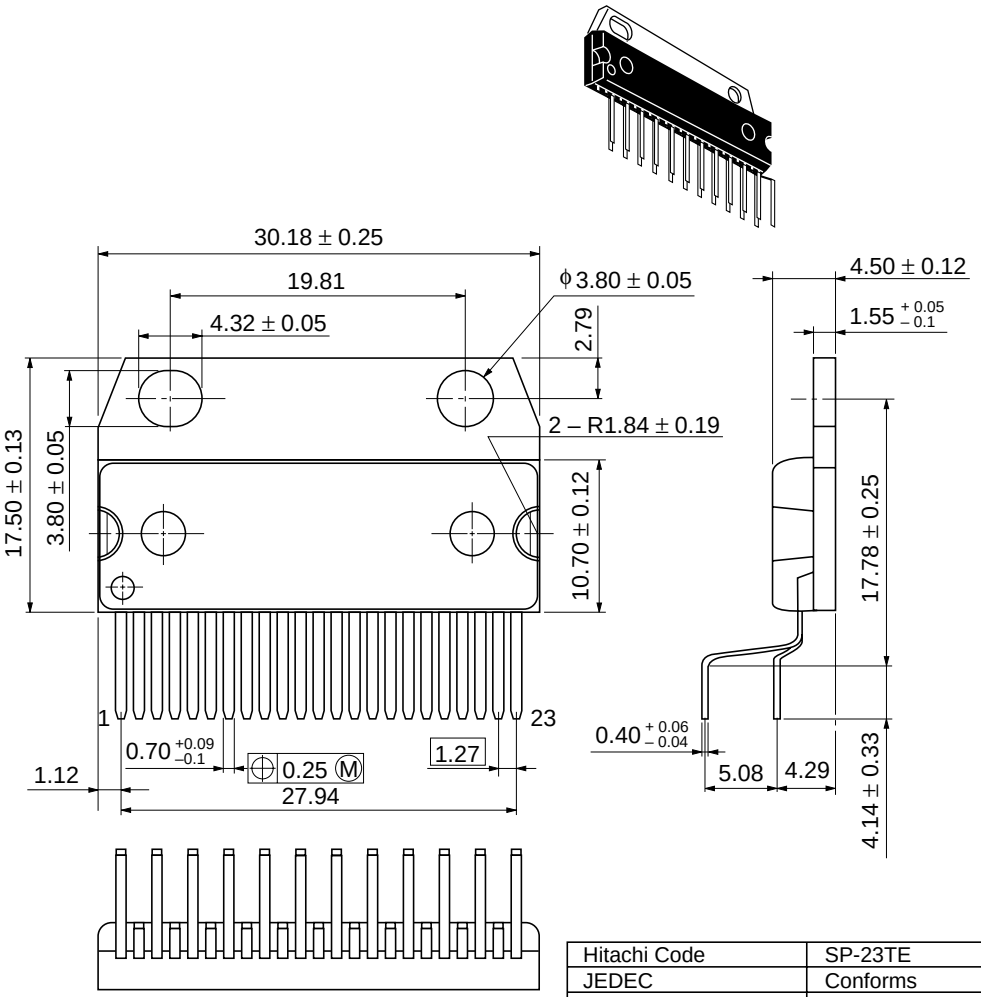


Gain vs. Frequency (HA13154A)



Package Dimensions

Unit: mm



Hitachi Code	SP-23TE
JEDEC	Conforms
EIAJ	—
Weight (reference value)	8.5 g

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