
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.

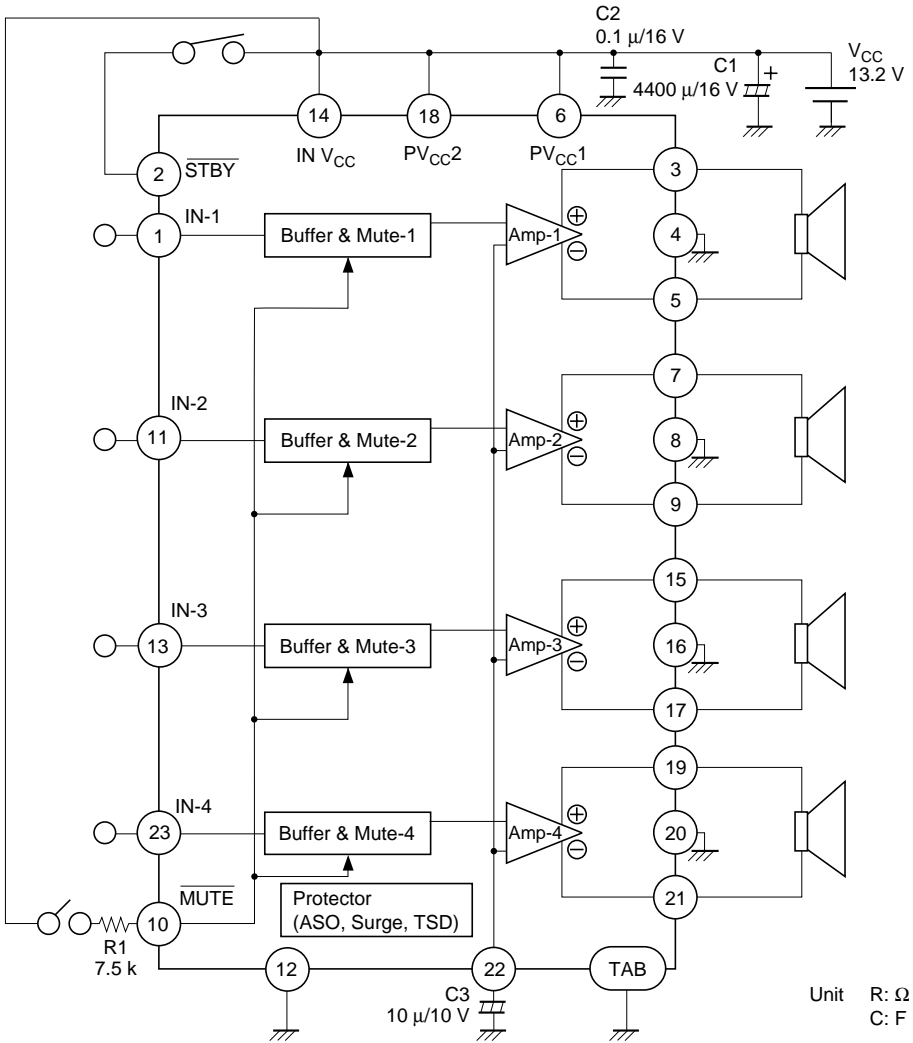
Function

- 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

Block Diagram



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

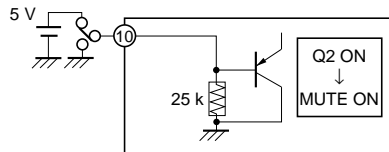
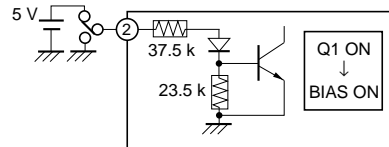
Notes: 1. Standby

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).

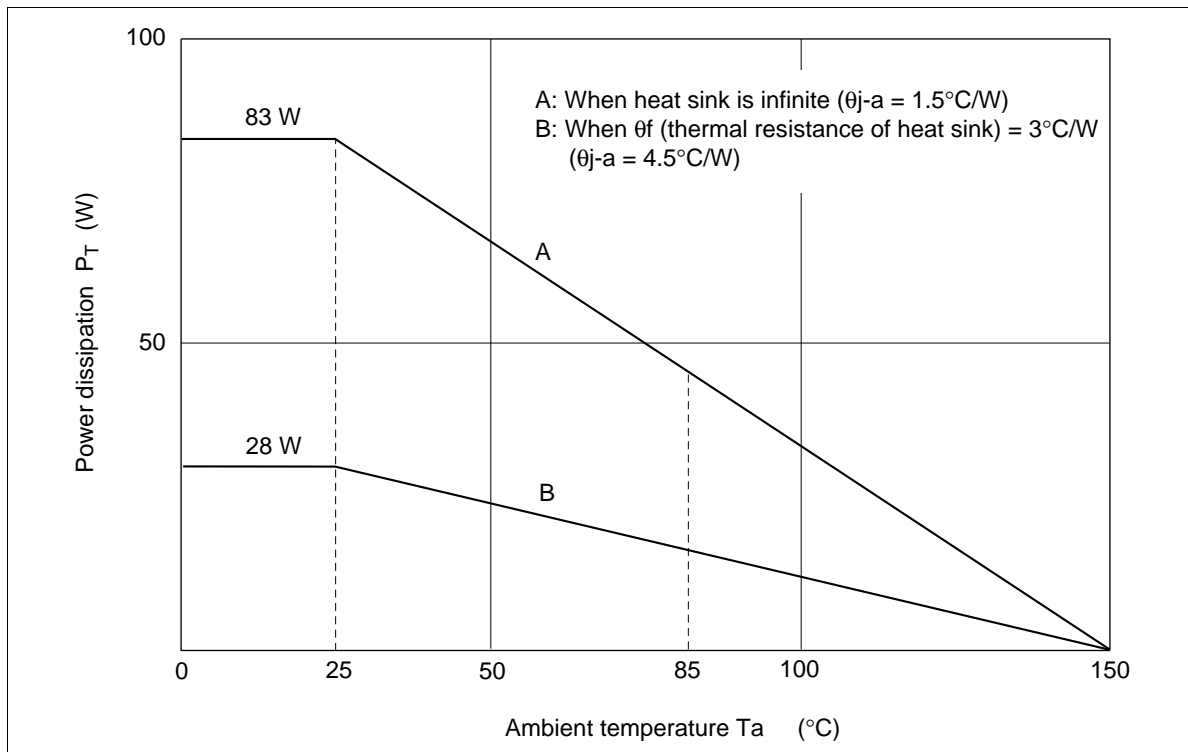
3. TAB (header of IC) connected to GND.



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	T_j	150	°C
Operating temperature	T_{opr}	-30 to +85	°C
Storage temperature	T_{stg}	-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 $T_a = 25\text{ °C}$.
 The derating curve is as shown in the graph below.



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Electrical Characteristics ($V_{CC} = 13.2\text{ V}$, $f = 1\text{ kHz}$, $R_L = 4\ \Omega$, $R_g = 600\ \Omega$, $T_a = 25^\circ\text{C}$)

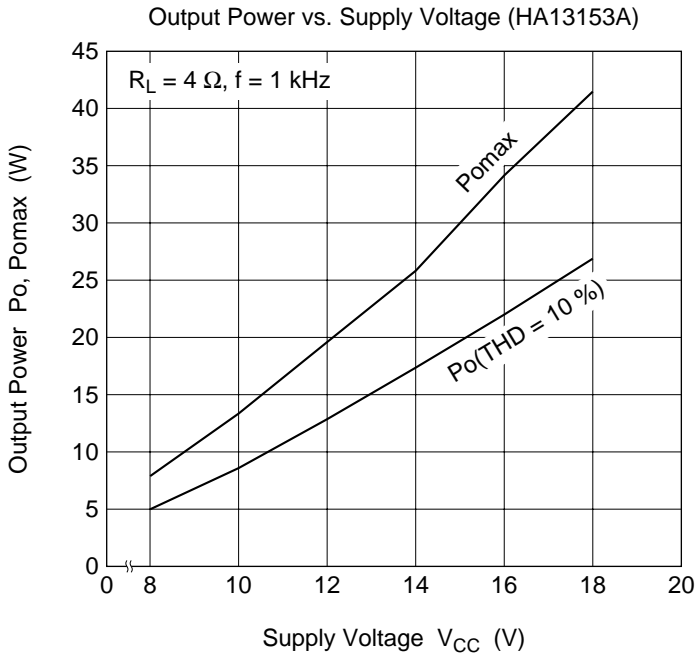
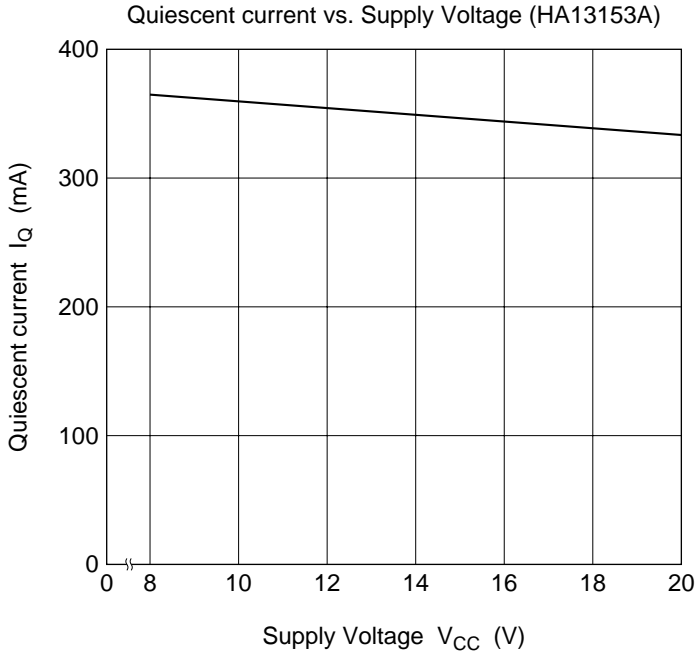
HA13153A

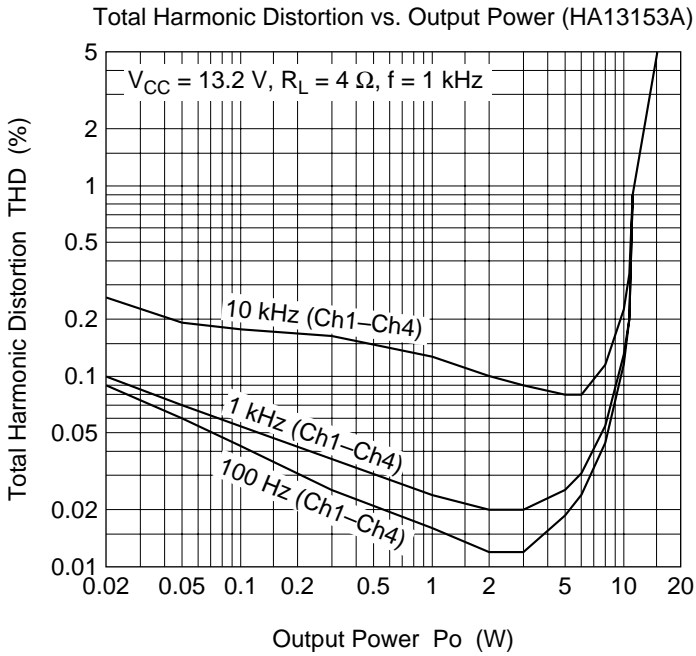
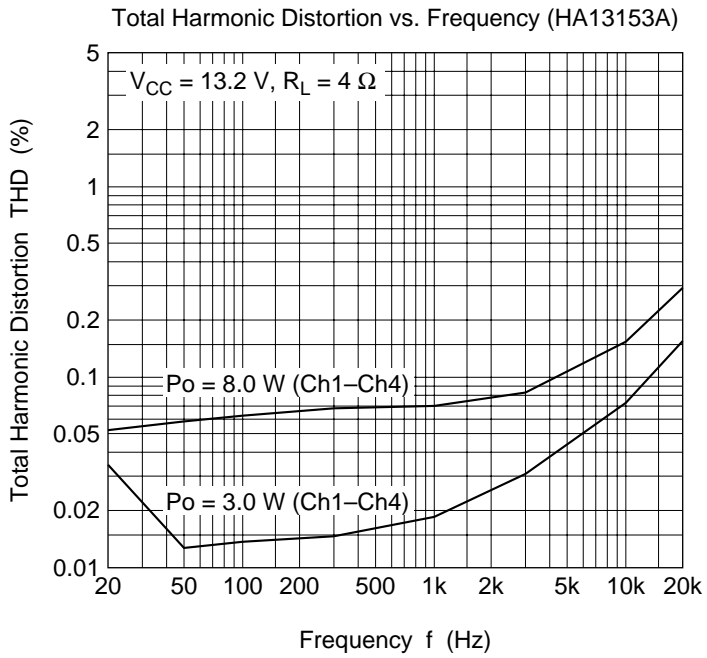
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Quiescent current	I_{Q1}	—	350	—	mA	$V_{in} = 0$
Output offset voltage	ΔV_Q	-300	0	+300	mV	
Gain	G_V	30.5	32	33.5	dB	
Gain difference between channels	ΔG_V	-1.0	0	+1.0	dB	
Rated output power	P_o	—	15	—	W	$V_{CC} = 13.2\text{ V}$ THD = 10%, $R_L = 4\ \Omega$
Max output power	P_{omax}	—	25	—	W	$V_{CC} = 13.7\text{ V}$, $R_L = 4\ \Omega$
Total harmonic distortion	T.H.D.	—	0.02	—	%	$P_o = 3\text{ W}$
Output noise voltage	WBN	—	0.15	—	mVrms	$R_g = 0\ \Omega$ BW = 20 to 20 kHz
Ripple rejection	SVR	—	55	—	dB	$R_g = 600\ \Omega$, $f = 120\text{ Hz}$
Channel cross talk	C.T.	—	70	—	dB	$R_g = 600\ \Omega$ $V_{out} = 0\text{ dBm}$
Input impedance	R_{in}	—	25	—	k Ω	
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	$V_{out} = 0\text{ dBm}$

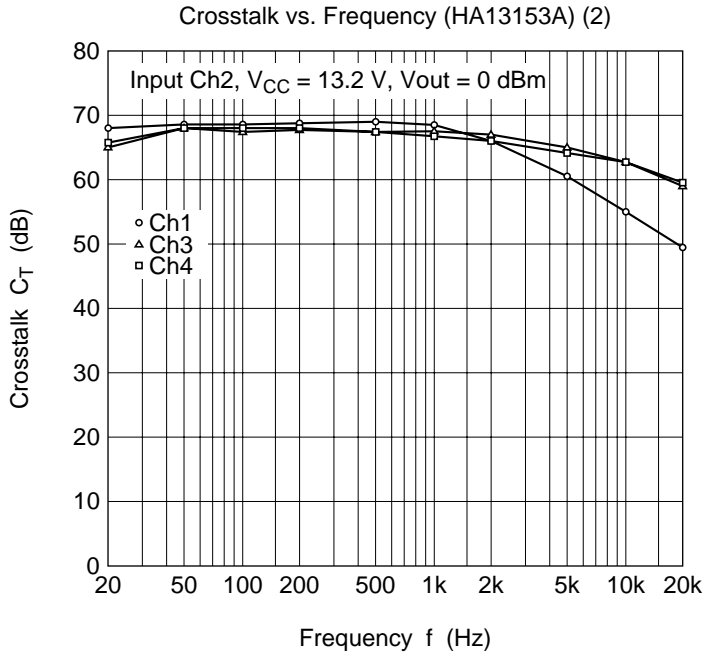
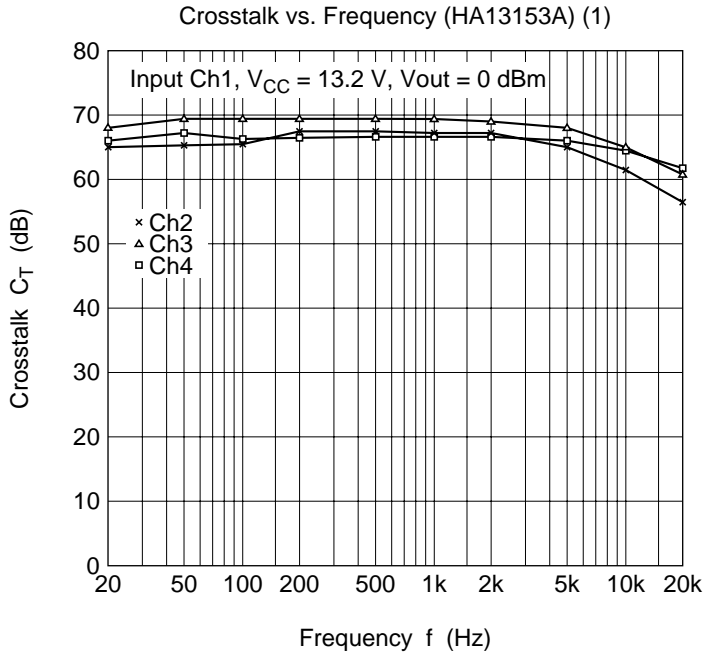
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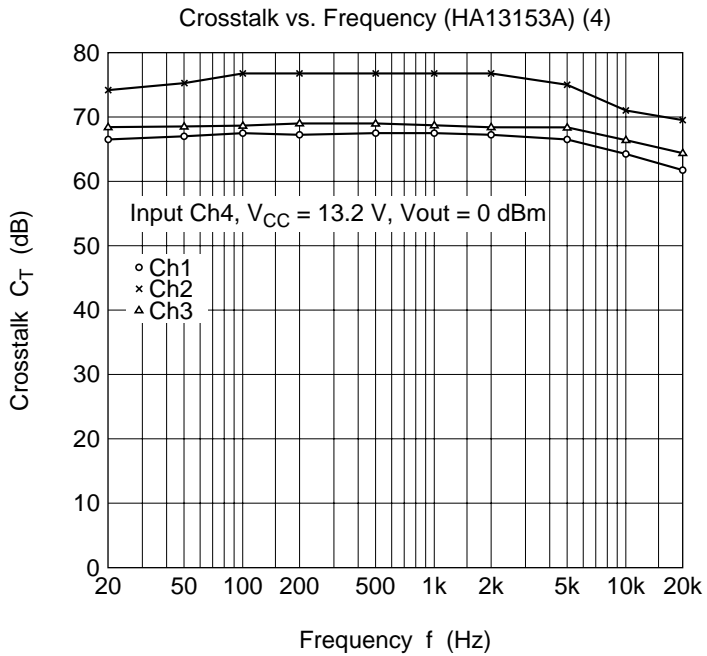
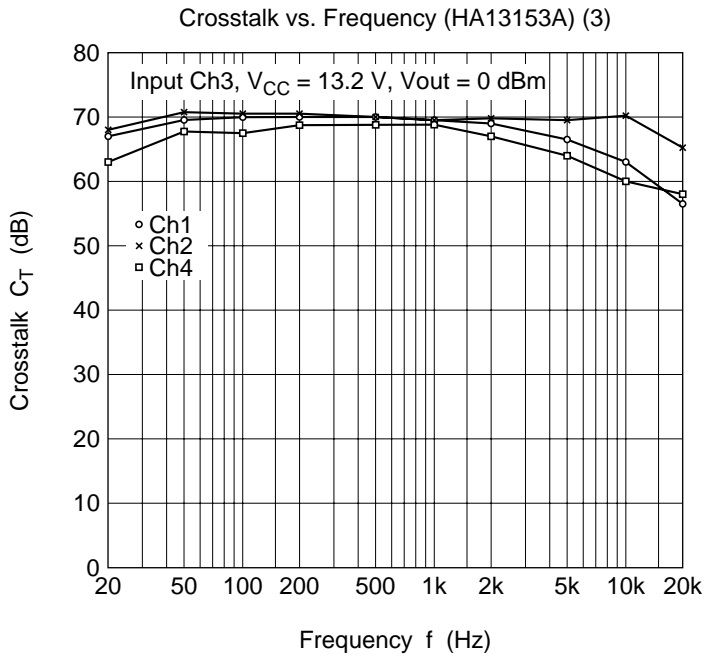
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Quiescent current	I_{Q1}	—	350	—	mA	$V_{in} = 0$
Output offset voltage	ΔV_Q	-300	0	+300	mV	
Gain	G_V	38.5	40	41.5	dB	
Gain difference between channels	ΔG_V	-1.0	0	+1.0	dB	
Rated output power	P_o	—	15	—	W	$V_{CC} = 13.2\text{ V}$ THD = 10%, $R_L = 4\ \Omega$
Max output power	P_{omax}	—	25	—	W	$V_{CC} = 13.7\text{ V}$, $R_L = 4\ \Omega$
Total harmonic distortion	T.H.D.	—	0.02	—	%	$P_o = 3\text{ W}$
Output noise voltage	WBN	—	0.25	—	mVrms	$R_g = 0\ \Omega$ BW = 20 to 20 kHz
Ripple rejection	SVR	—	45	—	dB	$R_g = 600\ \Omega$, $f = 120\text{ Hz}$
Channel cross talk	C.T.	—	60	—	dB	$R_g = 600\ \Omega$ $V_{out} = 0\text{ dBm}$
Input impedance	R_{in}	—	25	—	k Ω	
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	$V_{out} = 0\text{ dBm}$

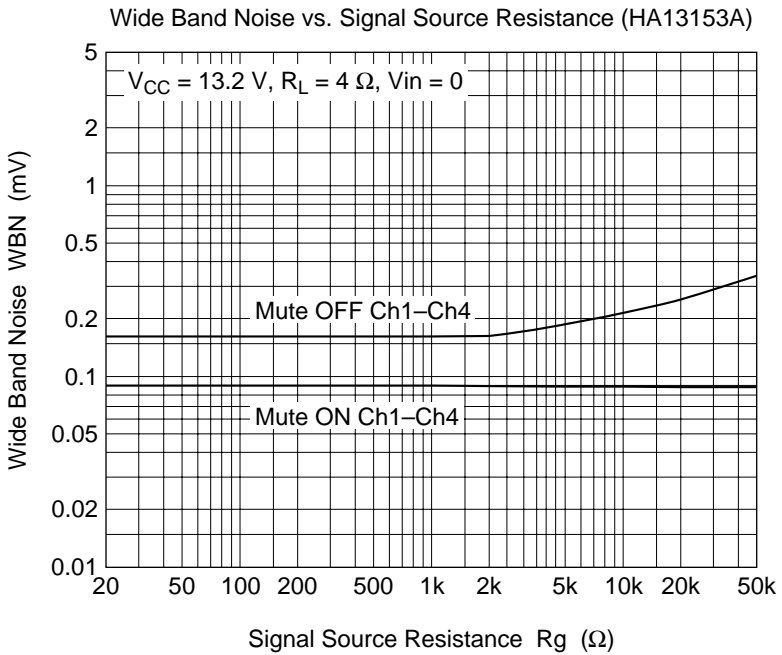
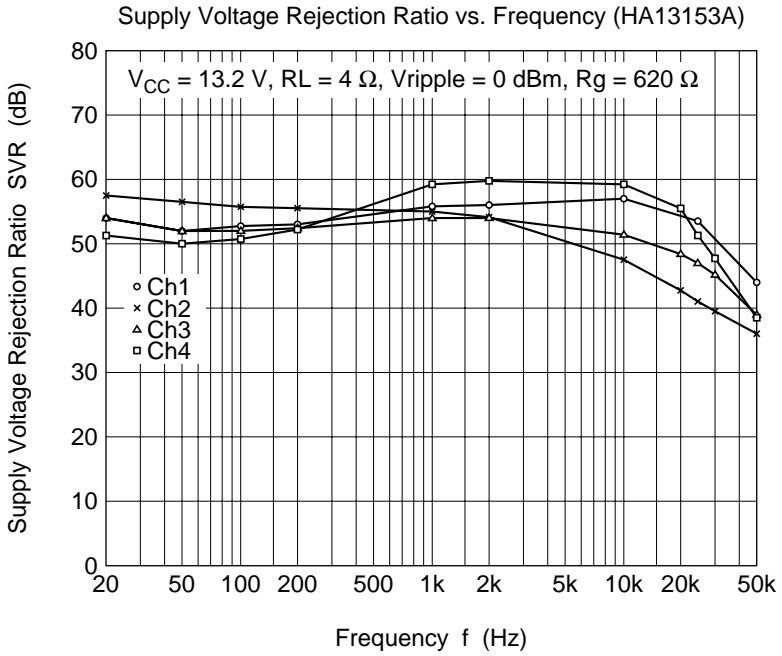
Characteristics Curve

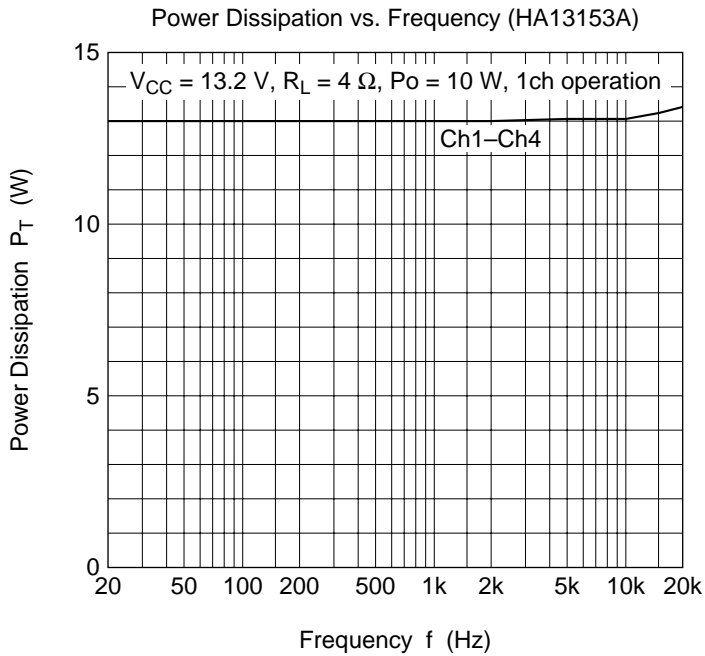
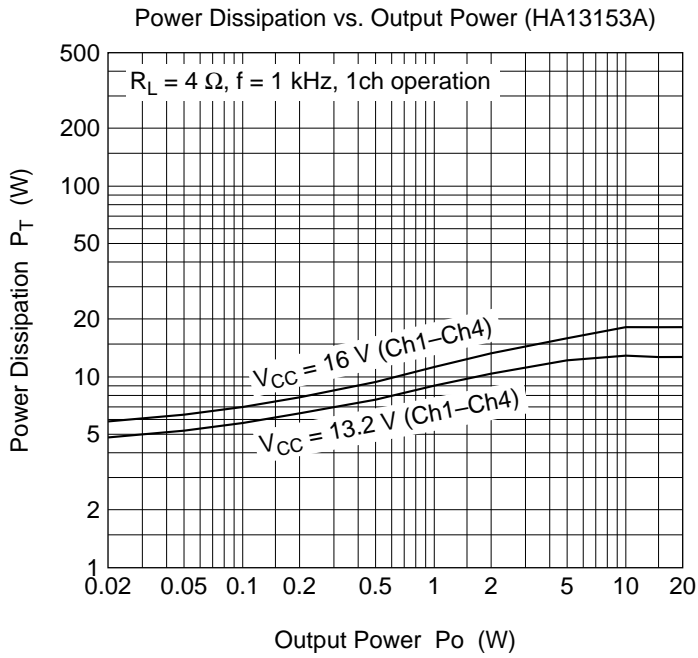


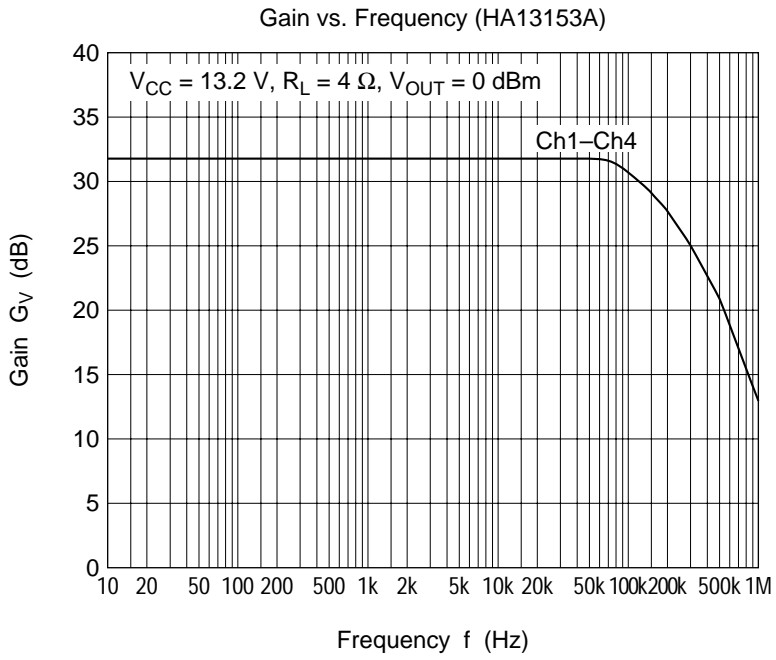




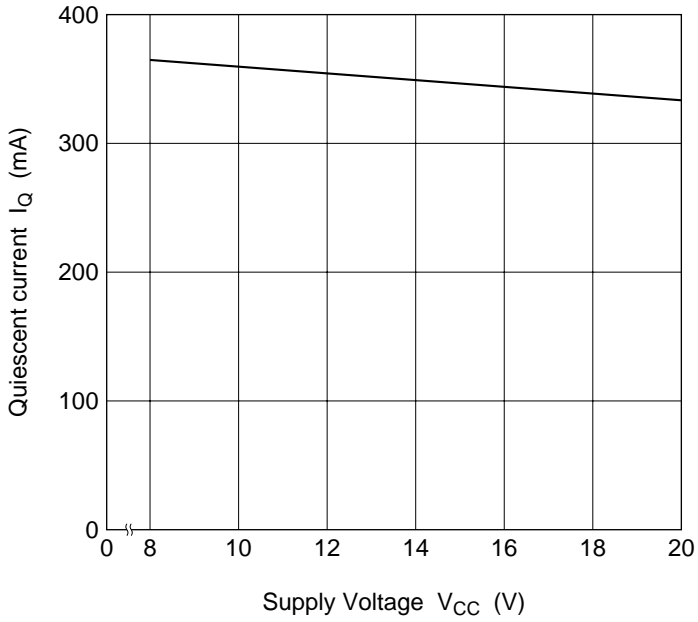




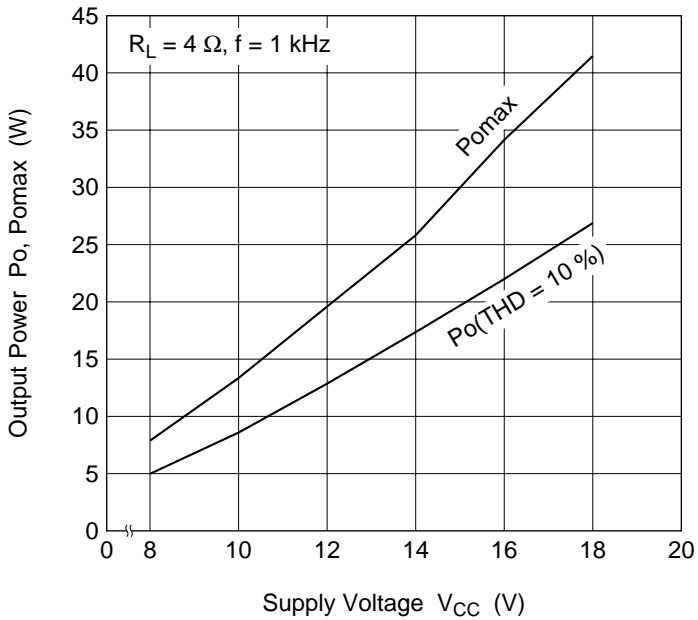


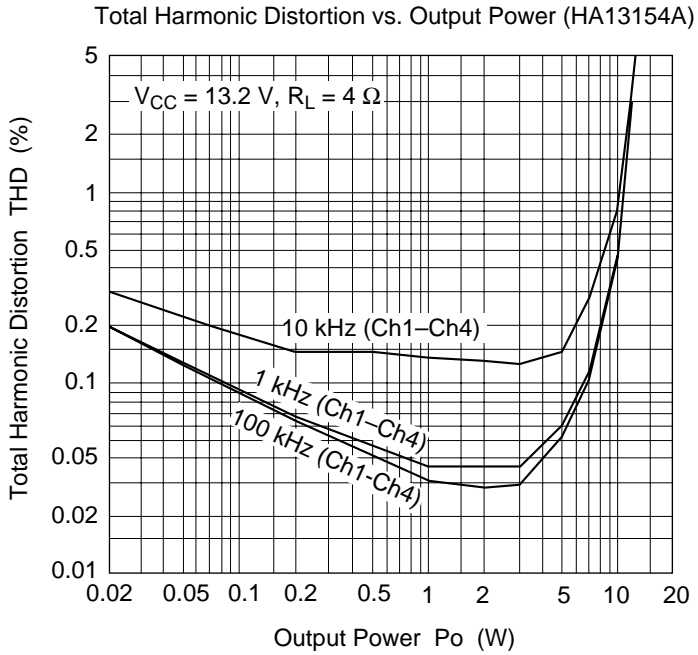
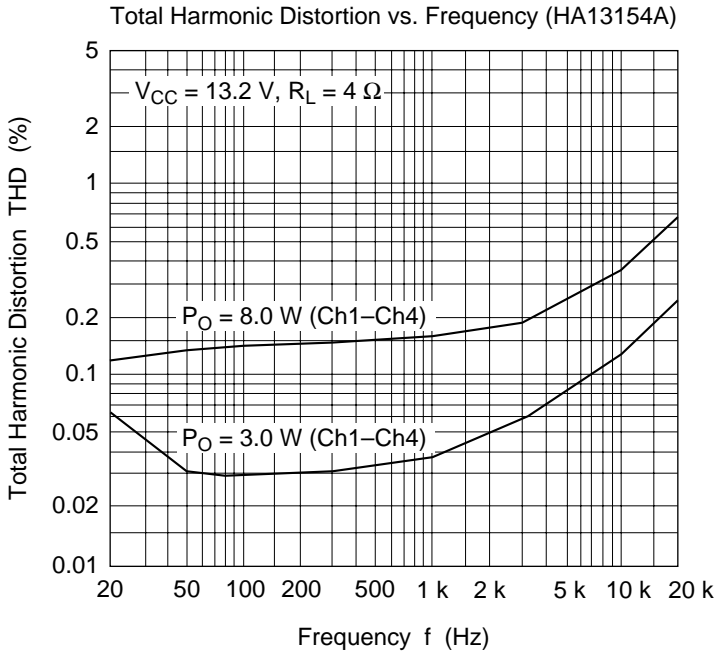


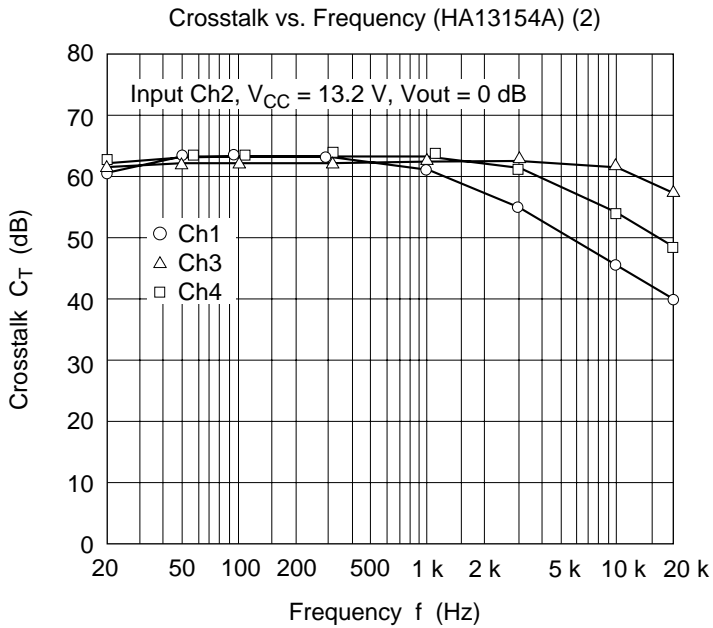
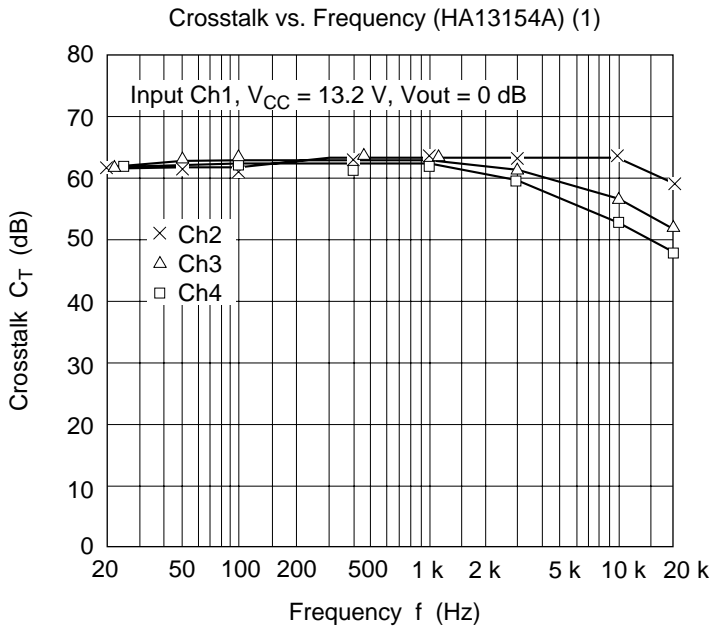
Quiescent current vs. Supply Voltage (HA13154A)

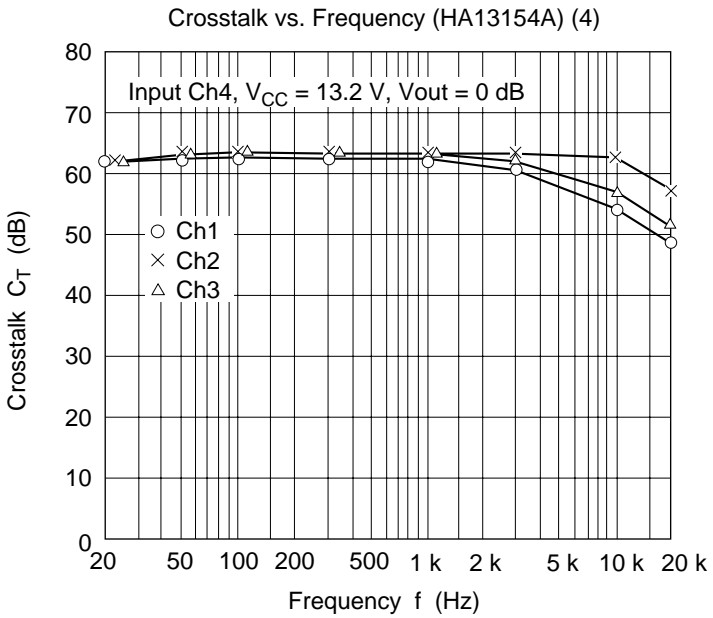
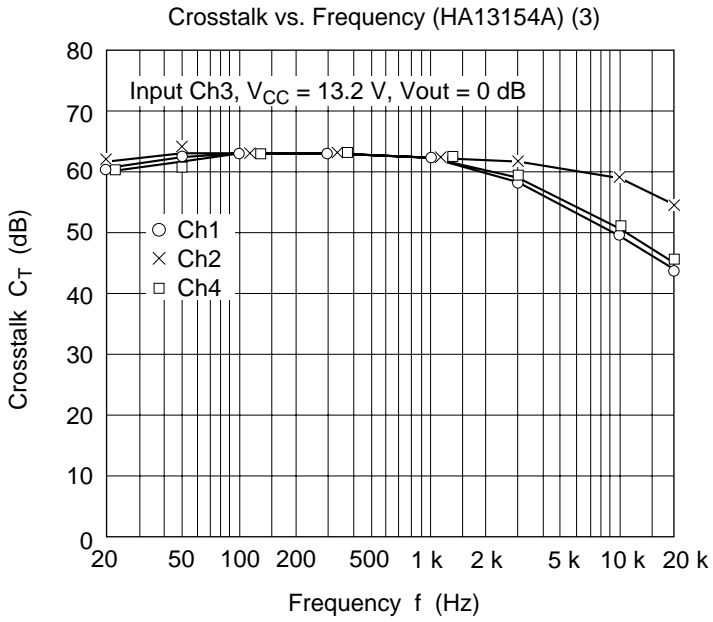


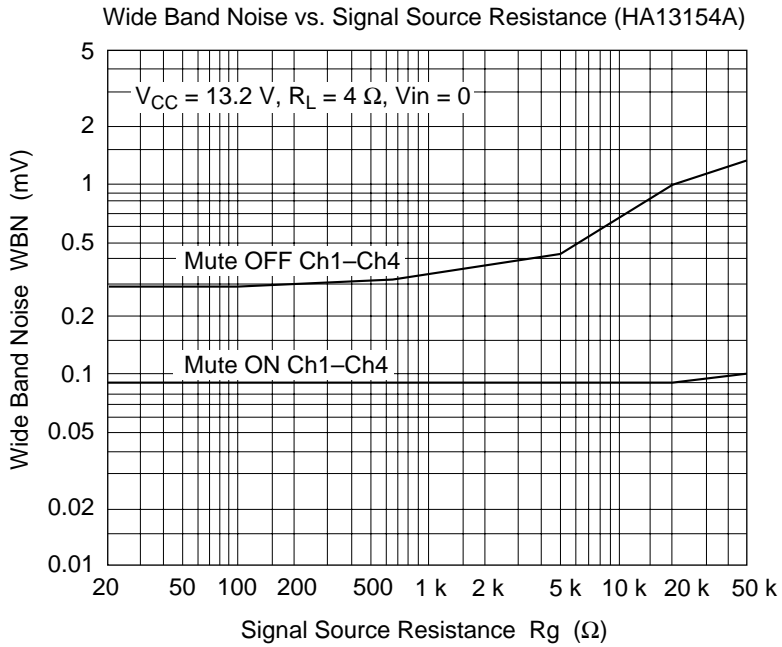
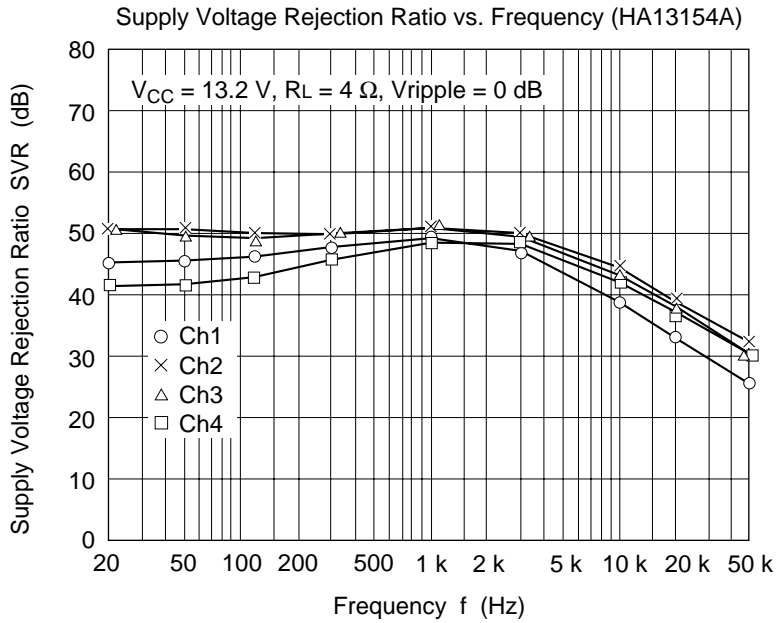
Output Power vs. Supply Voltage (HA13154A)

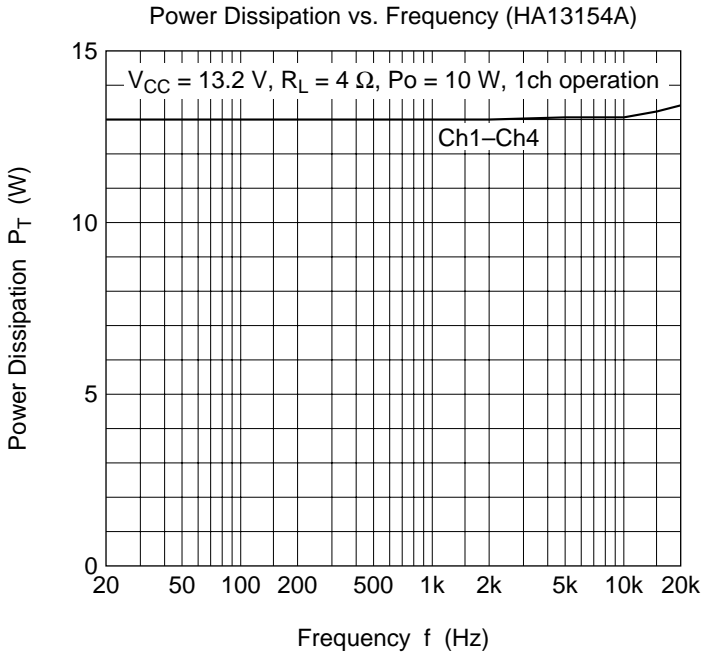
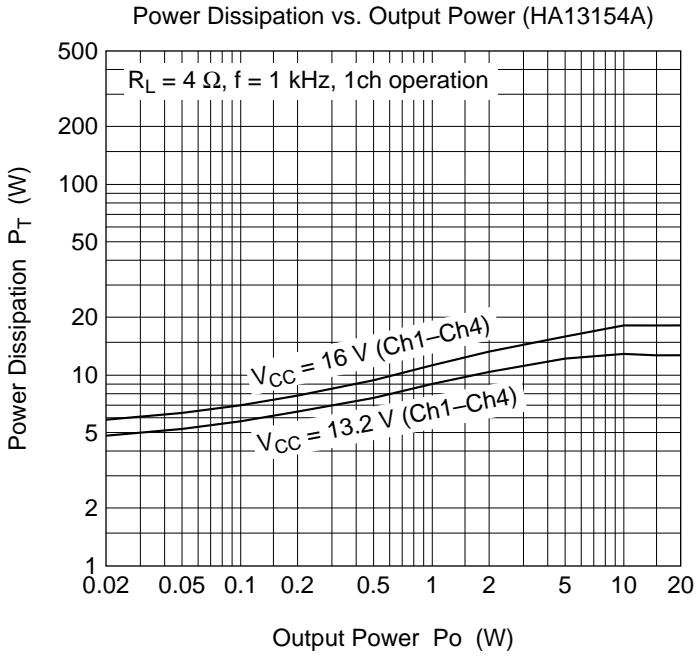


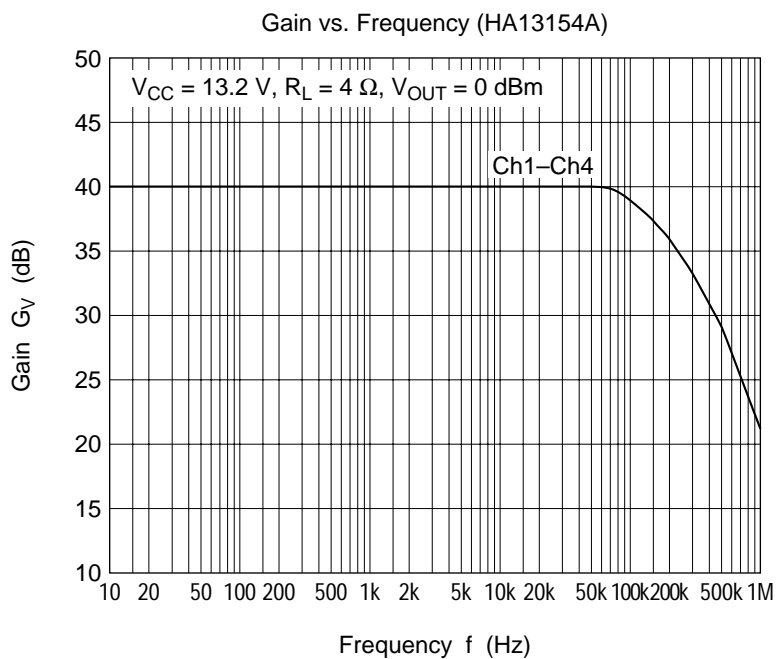






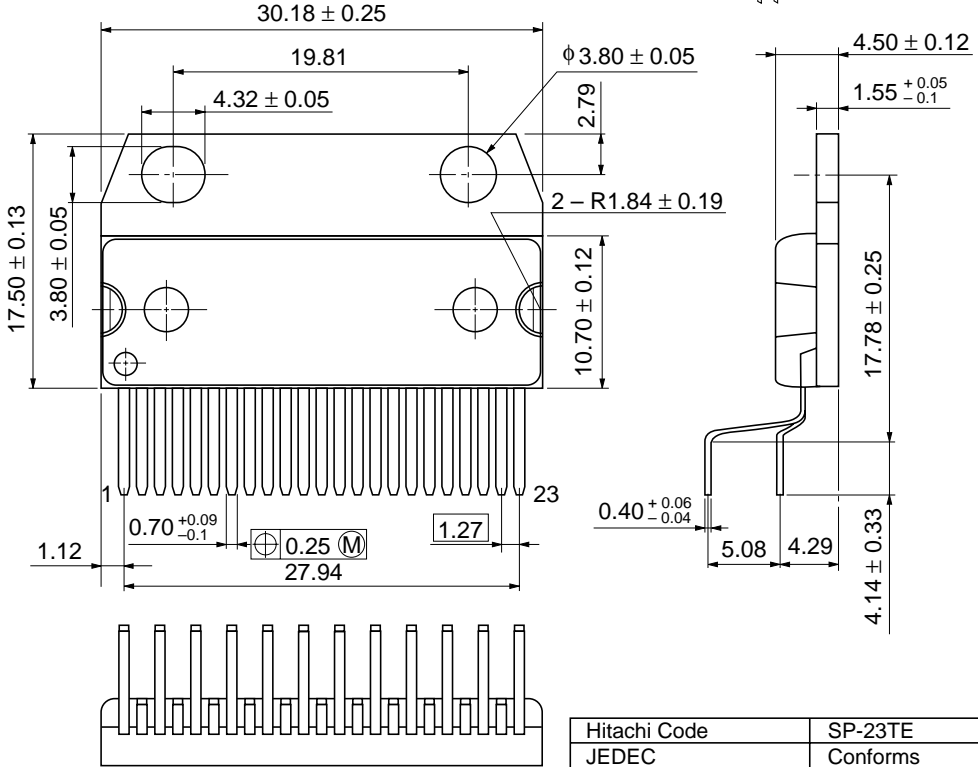
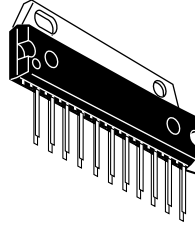






Package Dimensions

Unit: mm



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

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