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# HA13153A, HA13154A

15 W × 4-Channel BTL Power IC

## HITACHI

ADE-207-181B (Z)

3rd Edition  
Jul. 1999

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### 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  $\Omega$  load, this power IC provides output power 15 W with 10% distortion.

### Functions

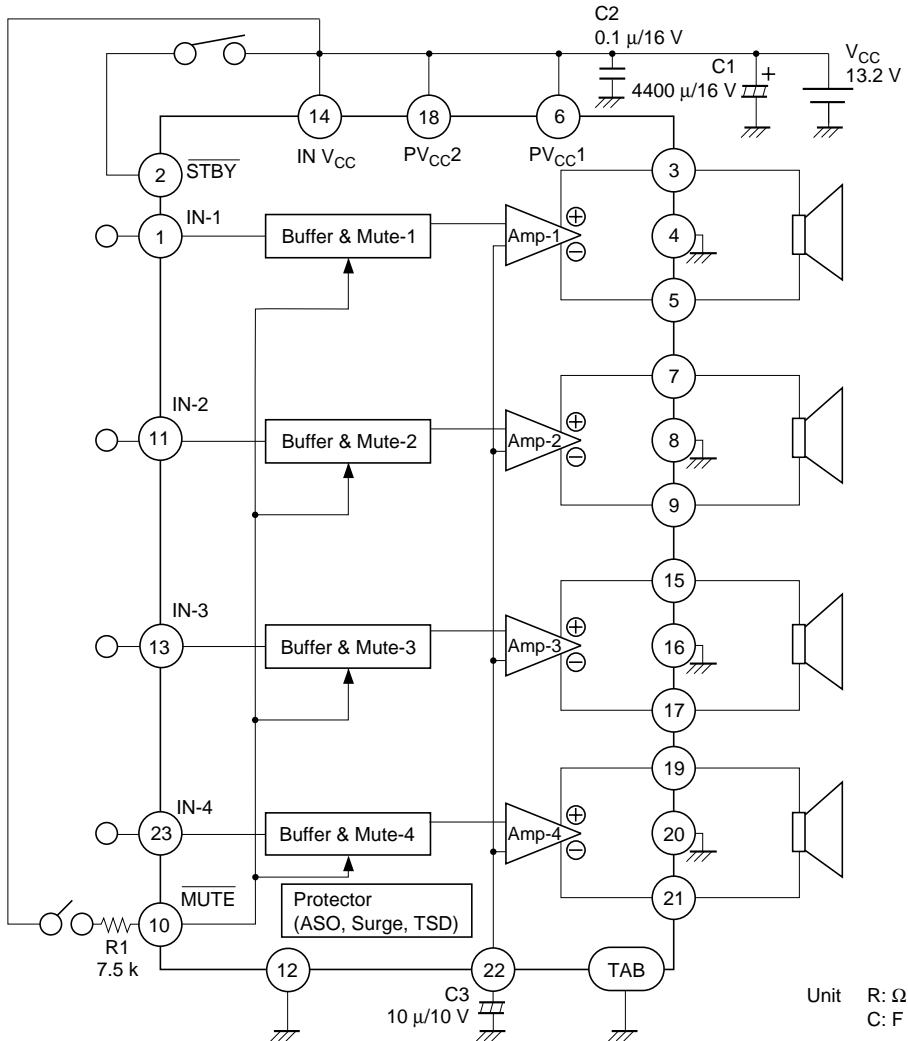
- 4 ch BTL power amplifiers
- Built-in standby circuit
- Built-in muting circuit
- Built-in protection circuit (surge, T.S.D, and ASO)

### 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

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## Block Diagram



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

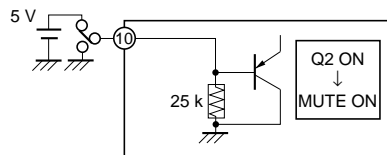
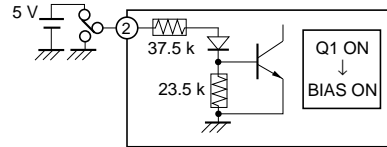
**Notes:** 1. Standby

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).

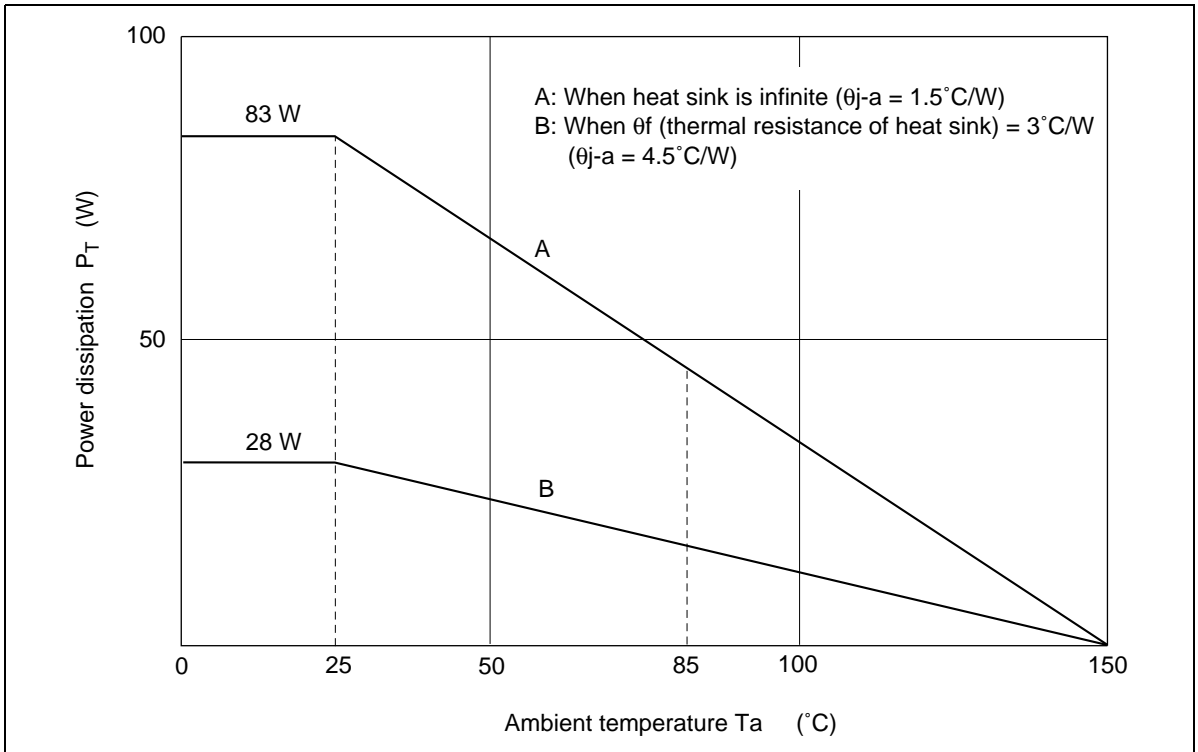
3. TAB (header of IC) connected to GND.



## Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Operating supply voltage	$V_{CC}$	18	V
Supply voltage when no signal* <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)	3	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

- 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

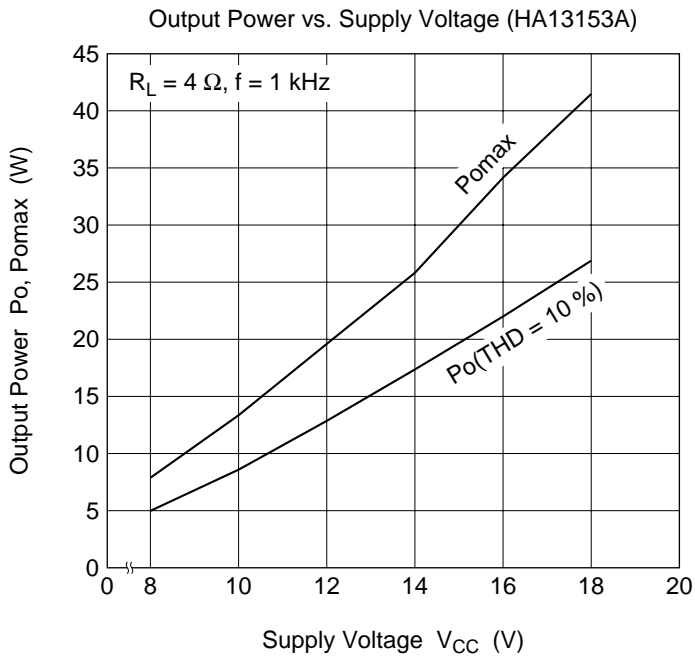
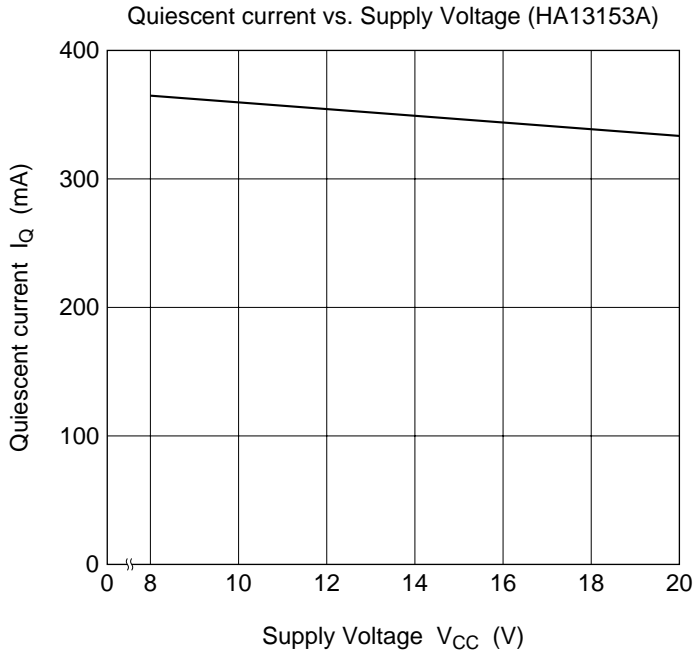
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Quiescent current	$I_{Q1}$	—	350	—	mA	$V_{in} = 0$
Output offset voltage	$\Delta V_Q$	-300	0	+300	mV	
Gain	$G_V$	30.5	32	33.5	dB	
Gain difference between channels	$\Delta G_V$	-1.0	0	+1.0	dB	
Rated output power	$P_o$	—	15	—	W	$V_{cc} = 13.2 \text{ V}$ THD = 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 $\Omega$	
Standby current	$I_{Q2}$	—	—	10	$\mu\text{A}$	
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	$V_{out} = 0 \text{ dBm}$

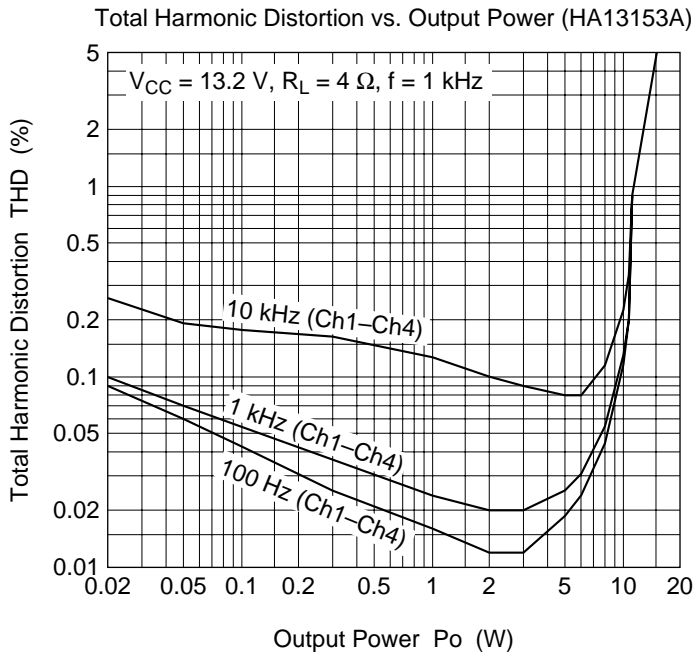
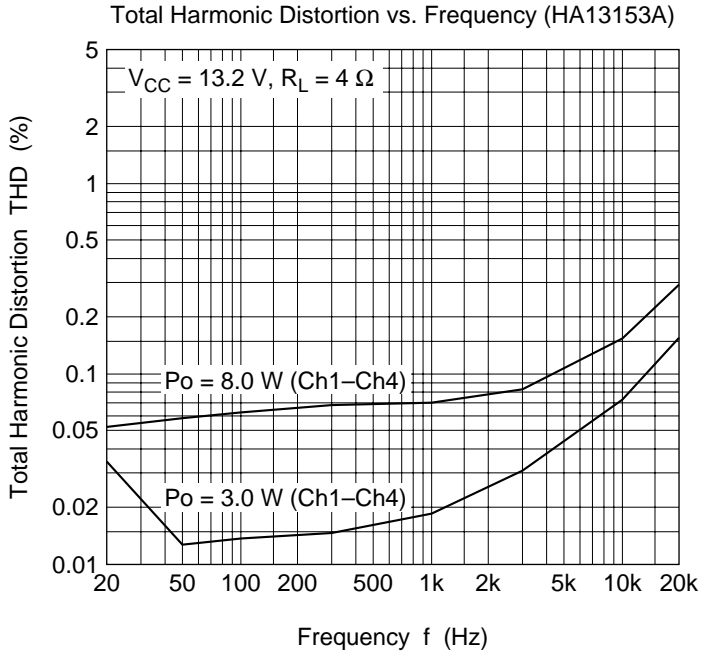
**HA13154A**

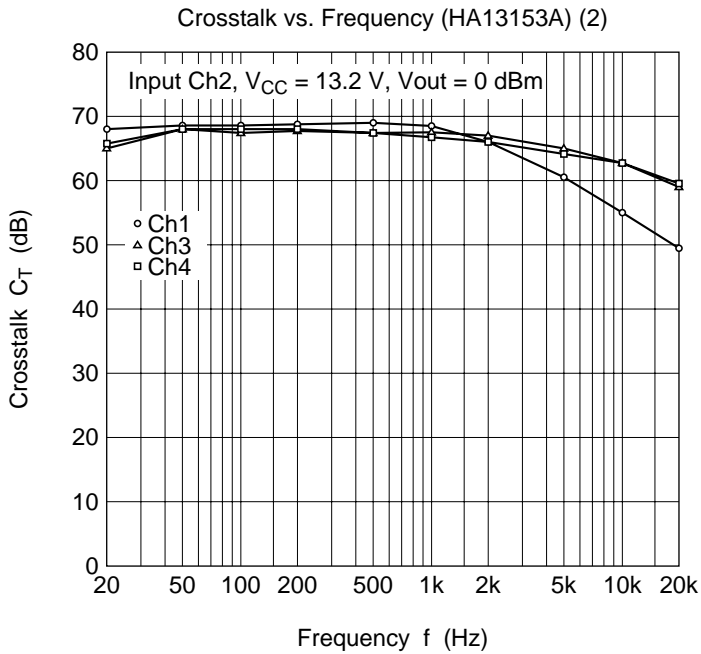
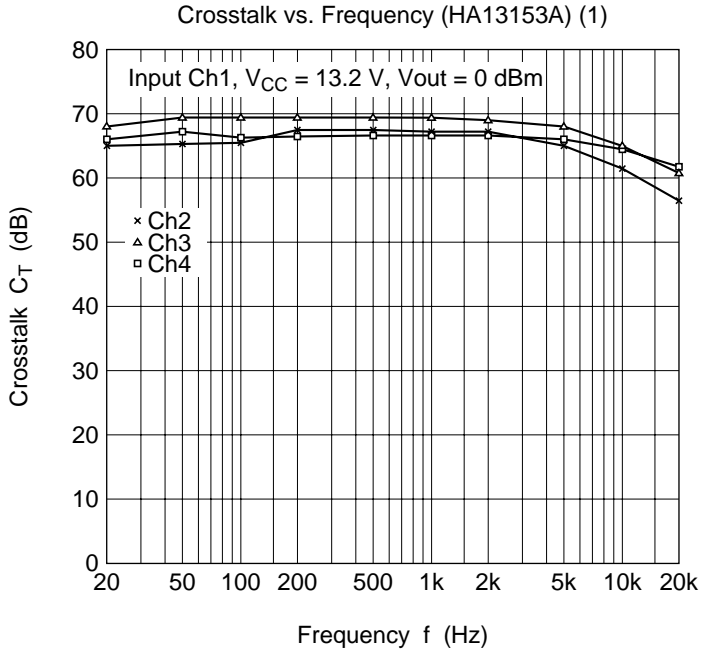
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Quiescent current	$I_{Q1}$	—	350	—	mA	$V_{in} = 0$
Output offset voltage	$\Delta V_o$	-300	0	+300	mV	
Gain	$G_V$	38.5	40	41.5	dB	
Gain difference between channels	$\Delta G_V$	-1.0	0	+1.0	dB	
Rated output power	$P_o$	—	15	—	W	$V_{CC} = 13.2\text{ V}$ THD = 10%, $R_L = 4\ \Omega$
Max output power	$P_{o\max}$	—	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 $\Omega$	
Standby current	$I_{Q2}$	—	—	10	$\mu\text{A}$	
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	$V_{out} = 0\text{ dBm}$

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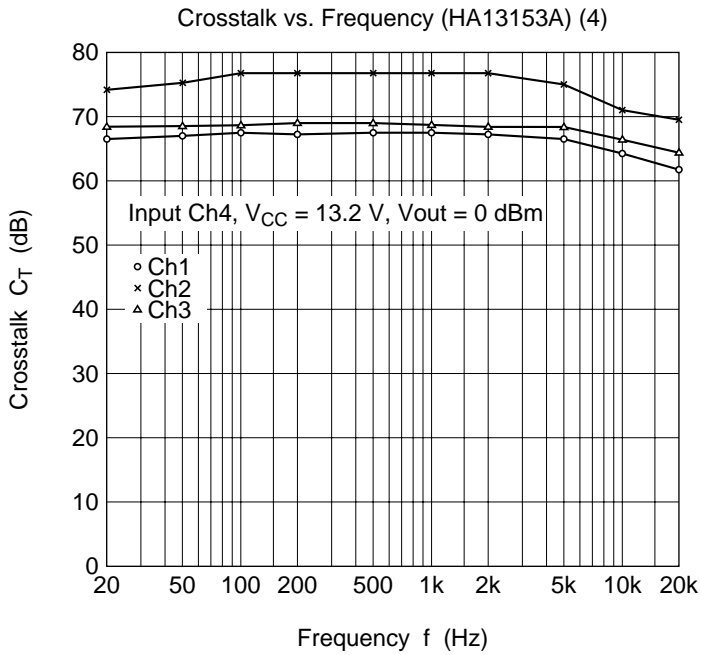
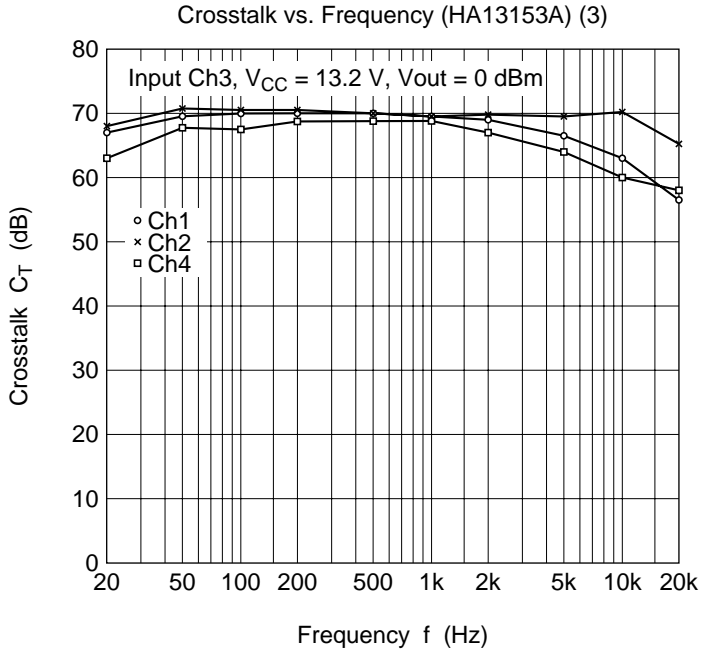
## Characteristics Curve



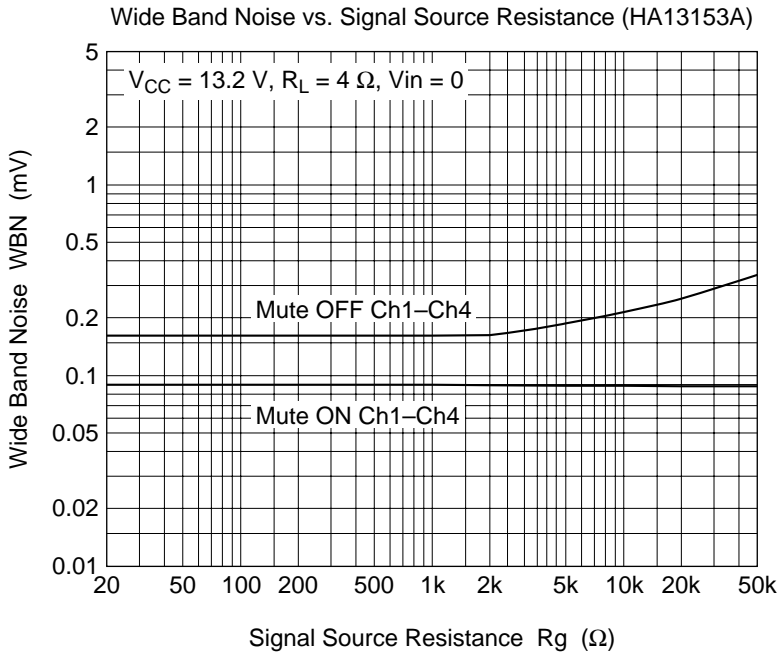
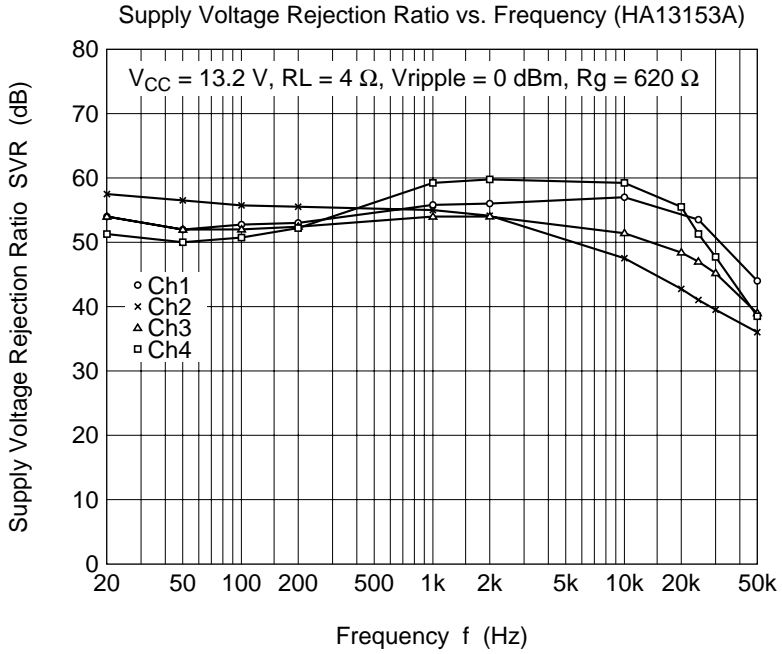


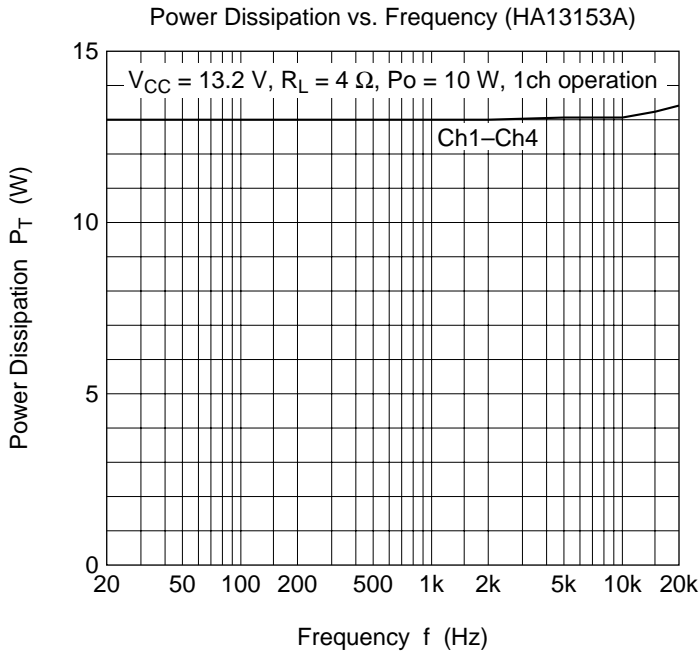
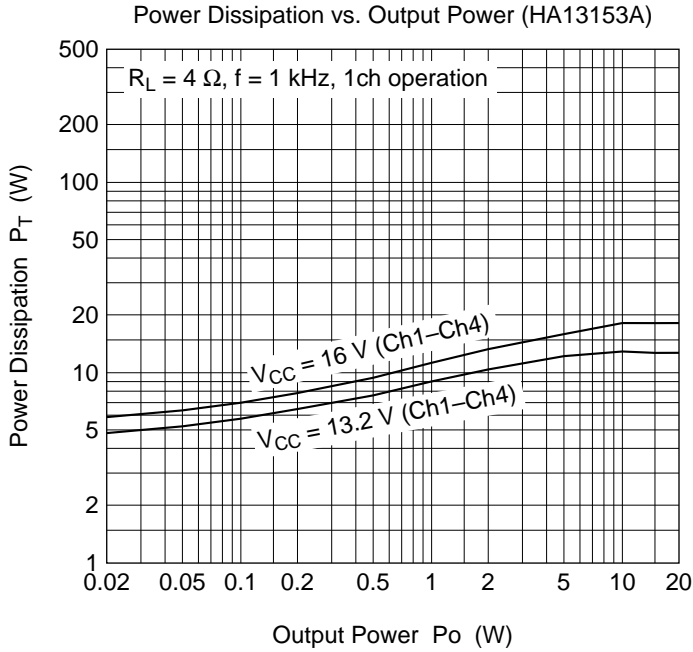




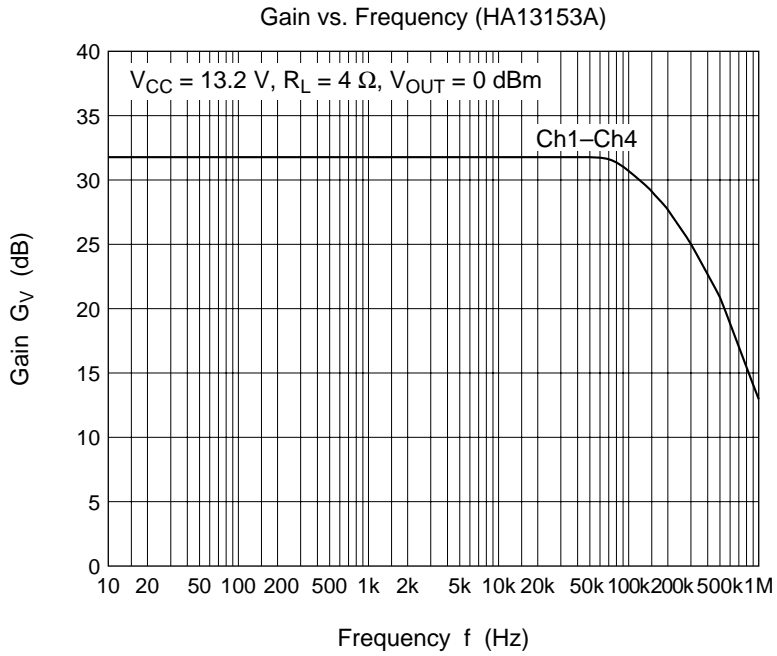


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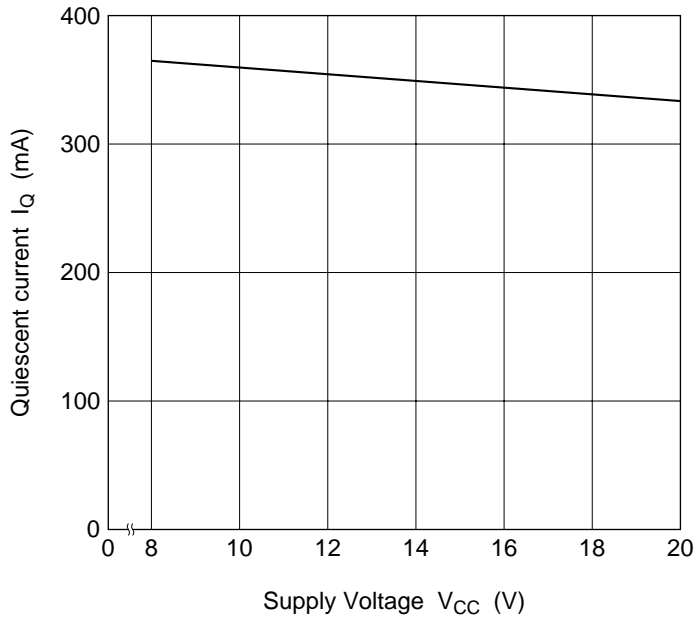




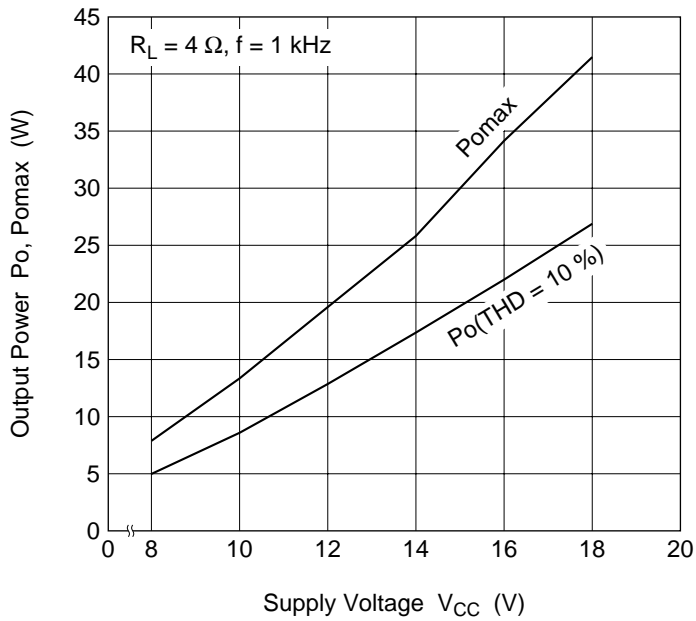
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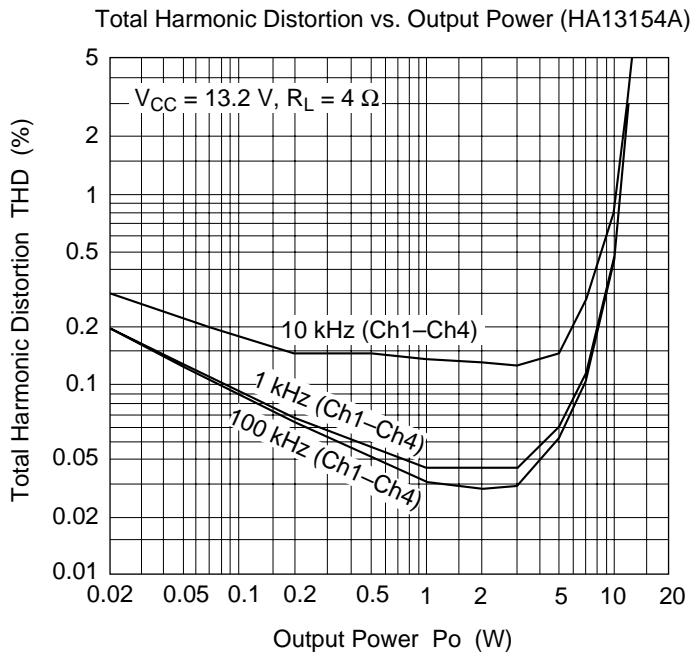
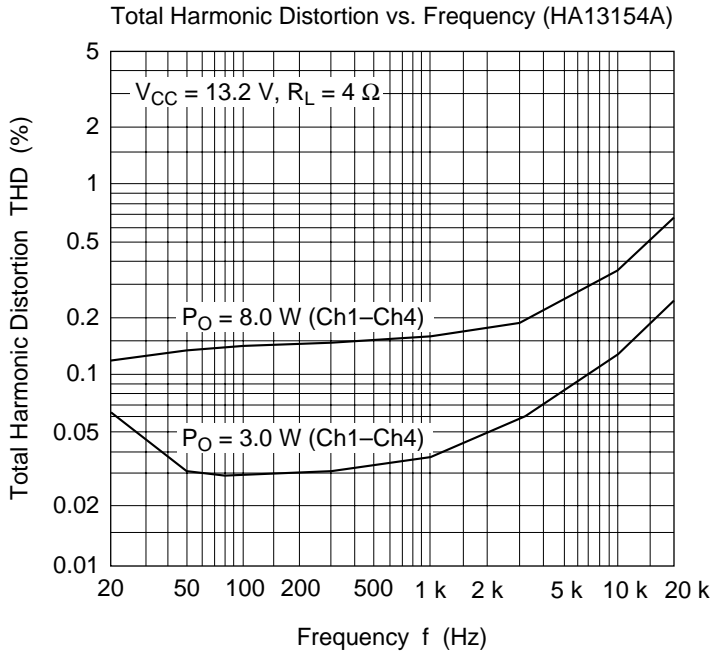
Quiescent current vs. Supply Voltage (HA13154A)

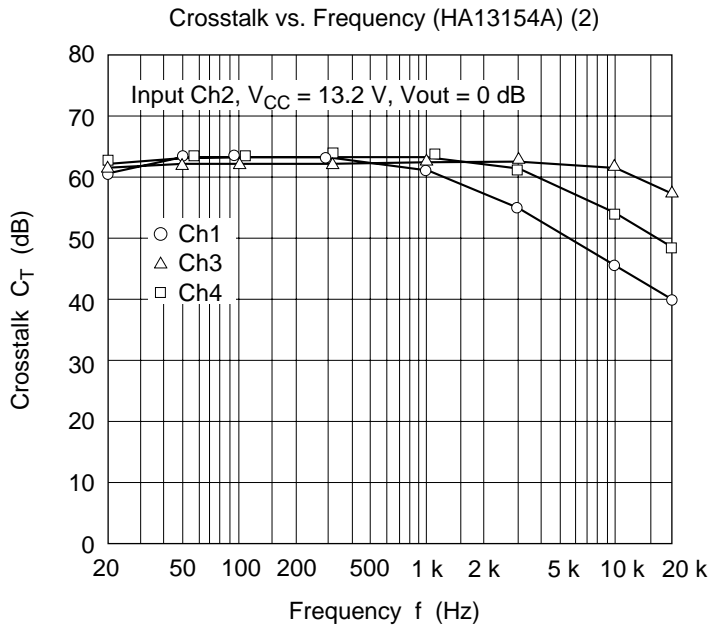
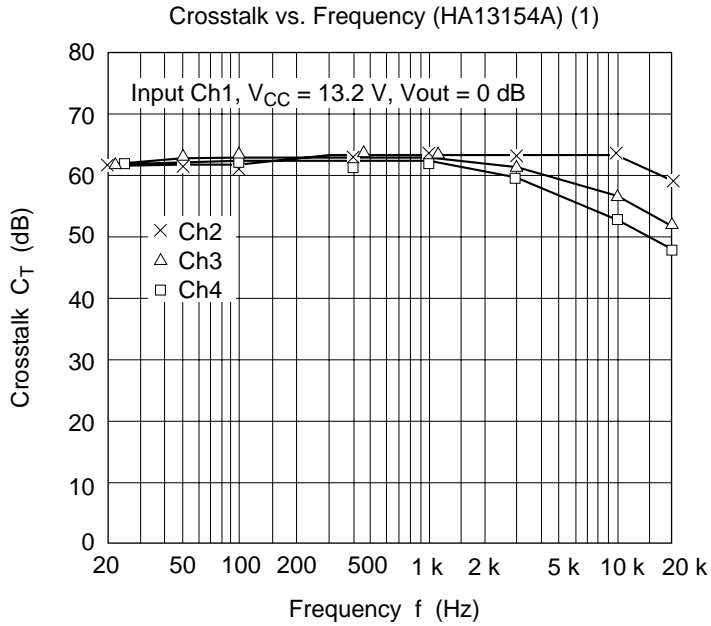


Output Power vs. Supply Voltage (HA13154A)

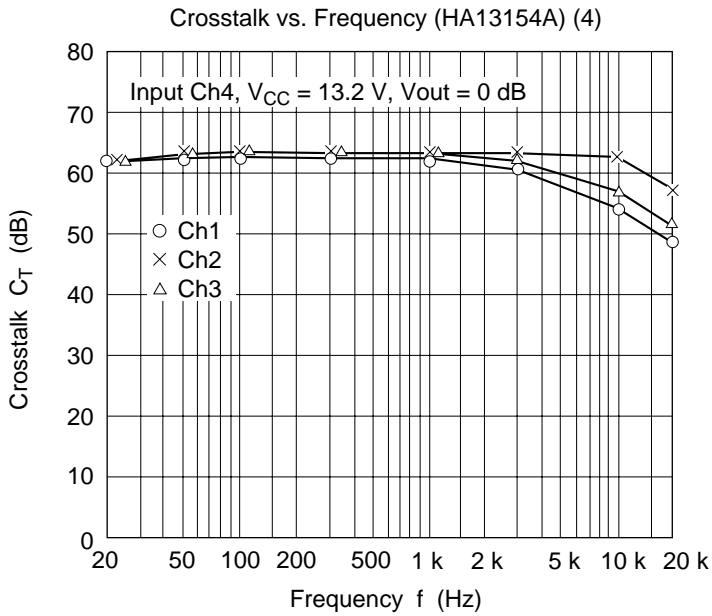
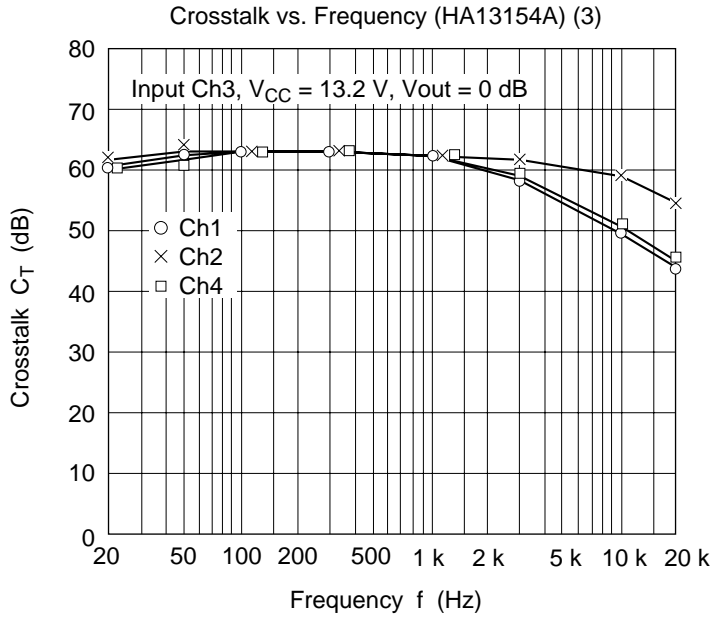


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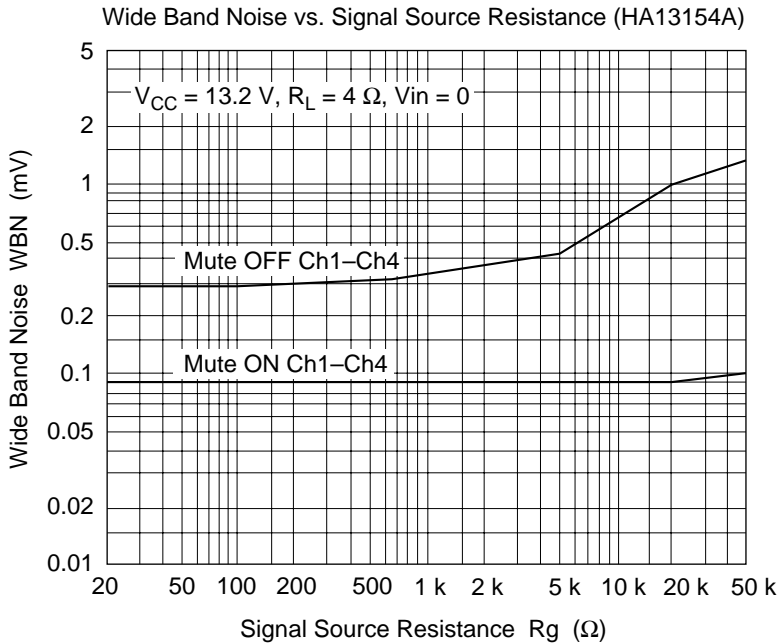
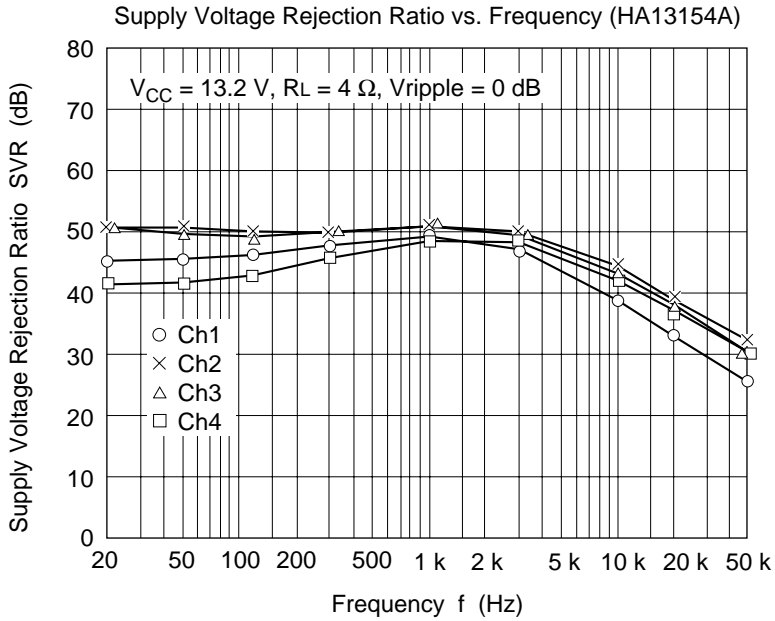




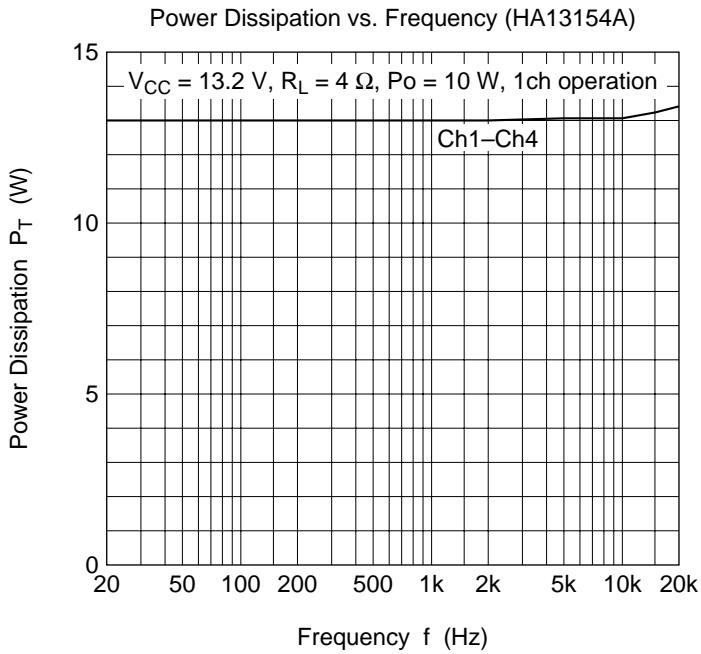
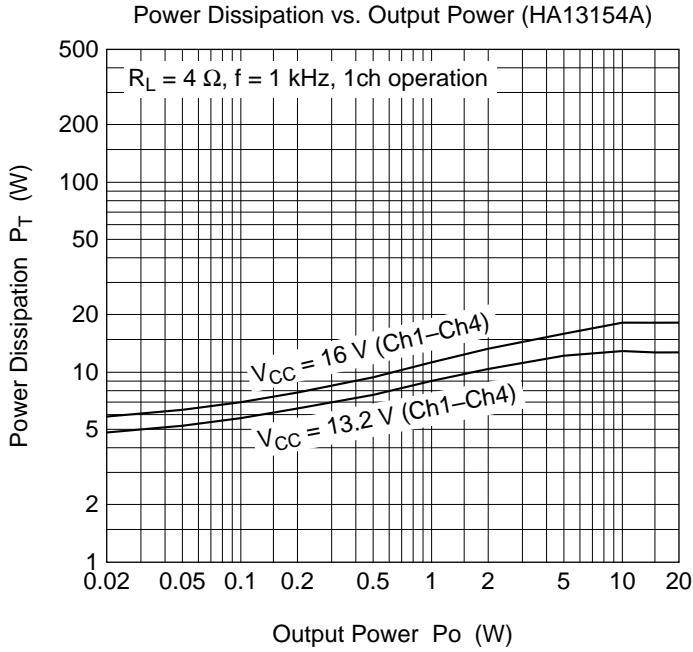
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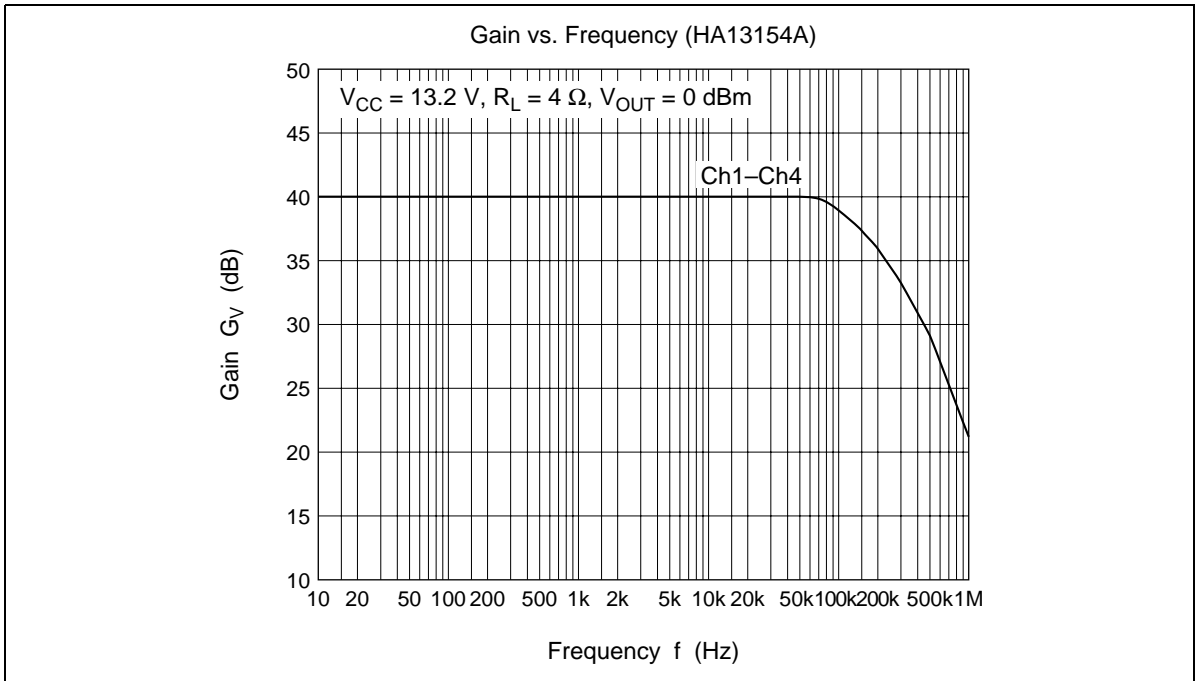






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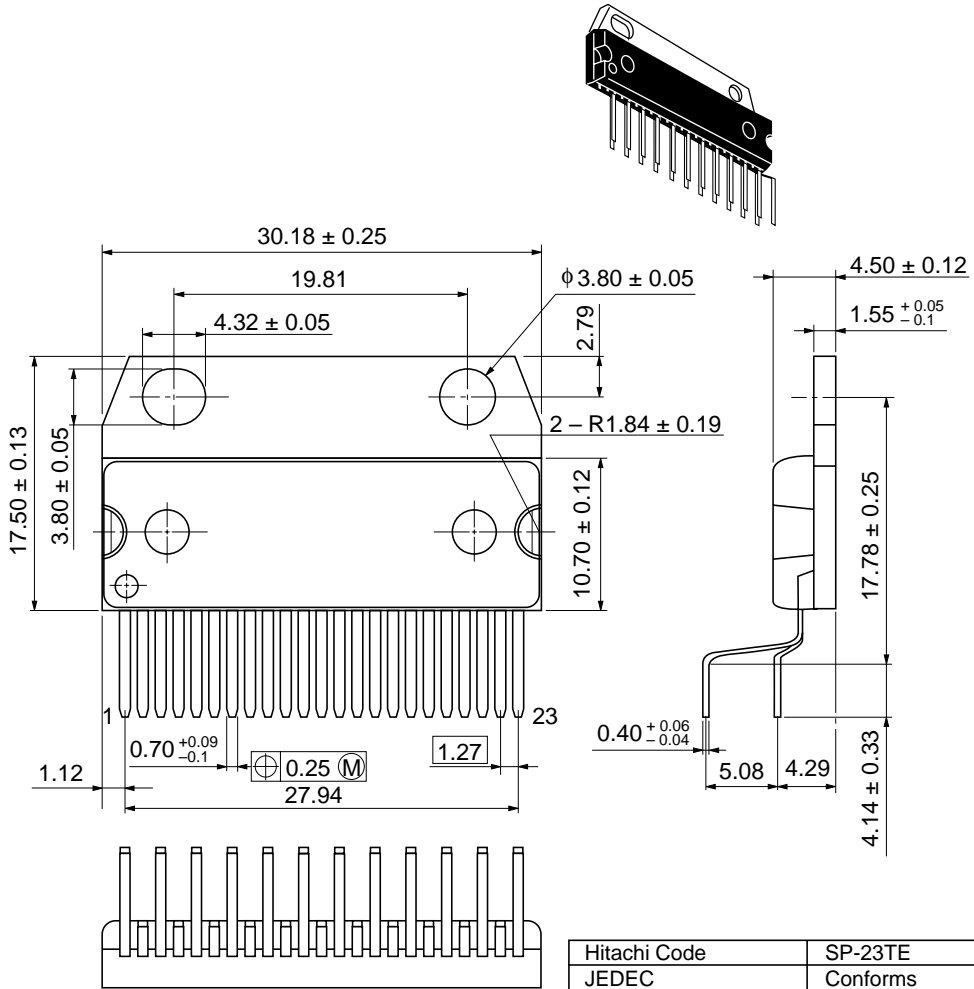




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## Package Dimensions

Unit: mm



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

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