
HA13153A, HA13154A

15 W $\times$ 4-Channel BTL Power IC

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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

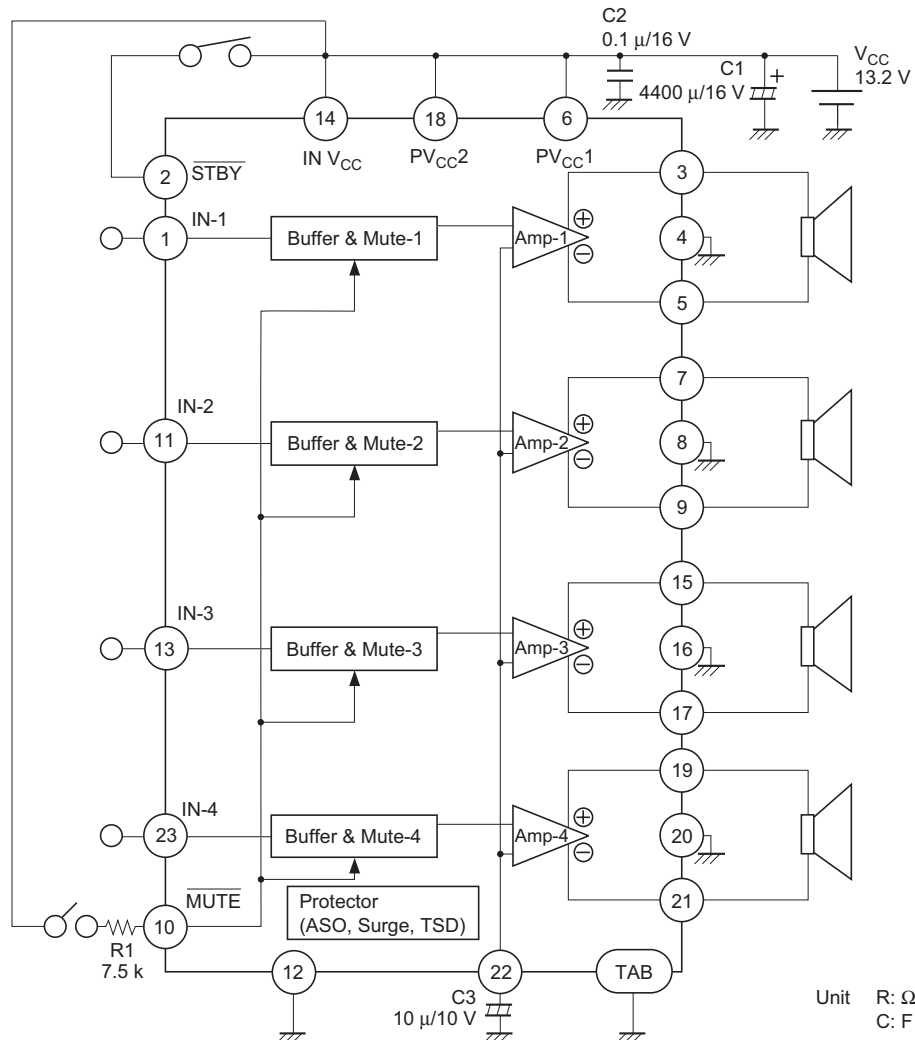
- 4 ch BTL power amplifiers
- Built-in standby circuit
- Built-in muting circuit
- Built-in protection circuit (surge, T.S.D, and ASO)

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

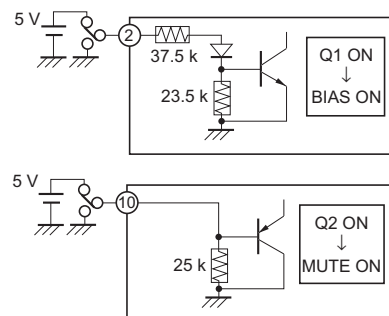
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Block Diagram



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.

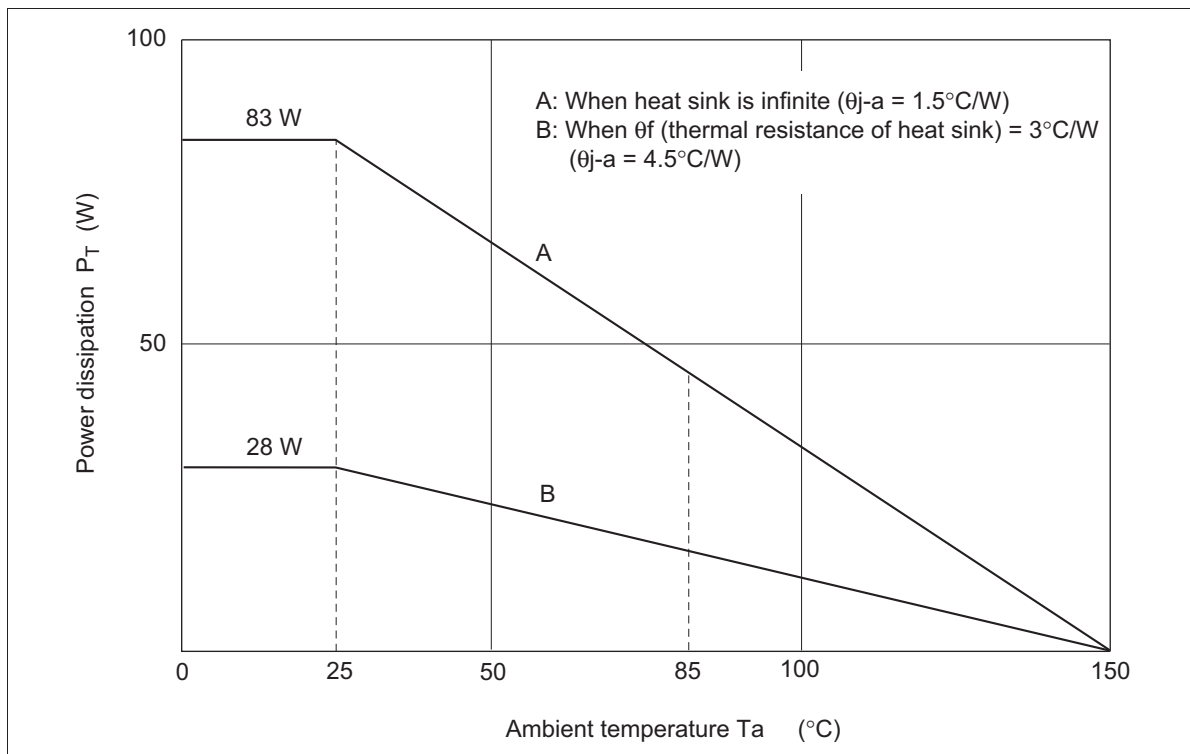


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Absolute Maximum Ratings

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

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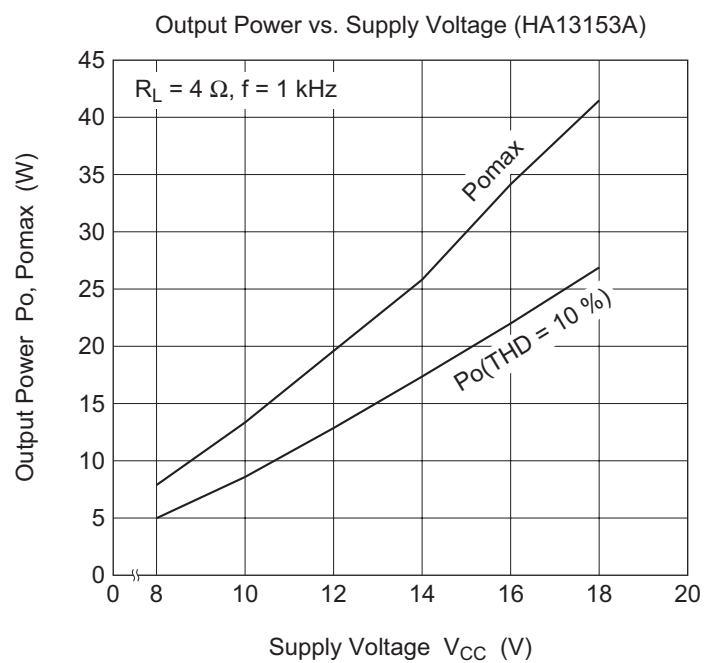
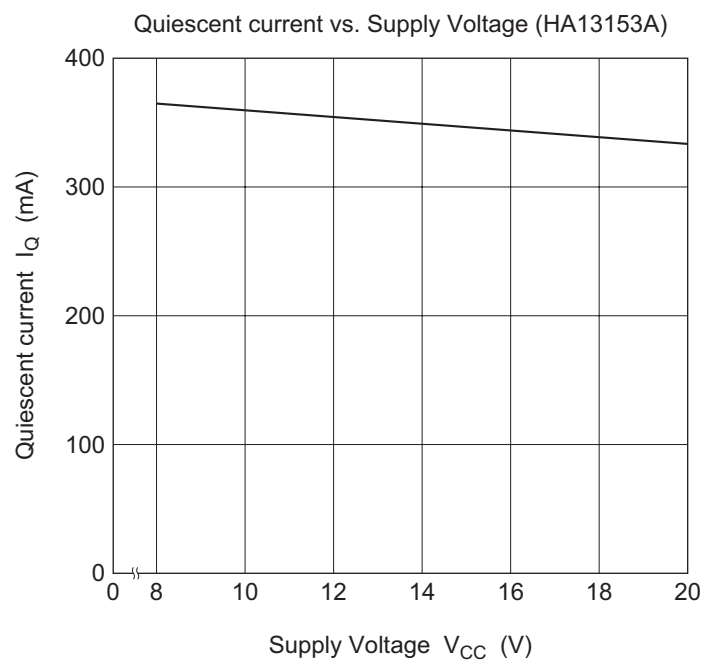
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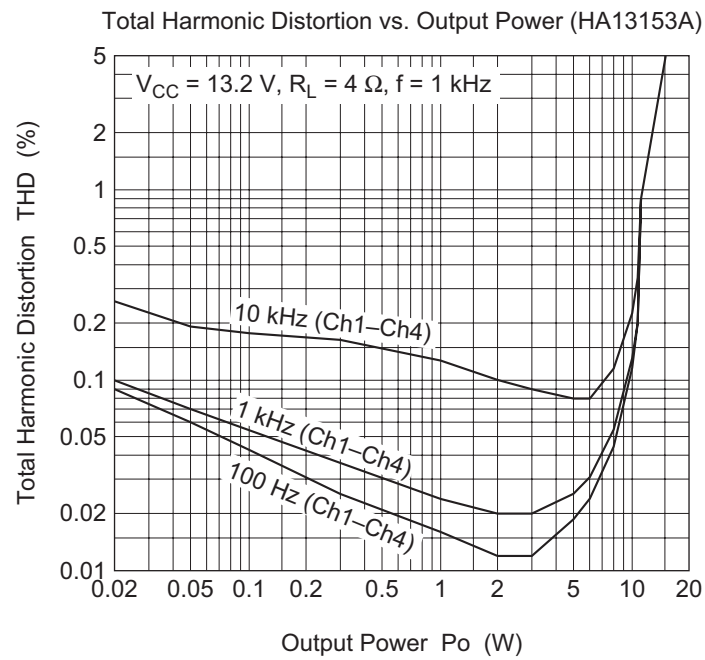
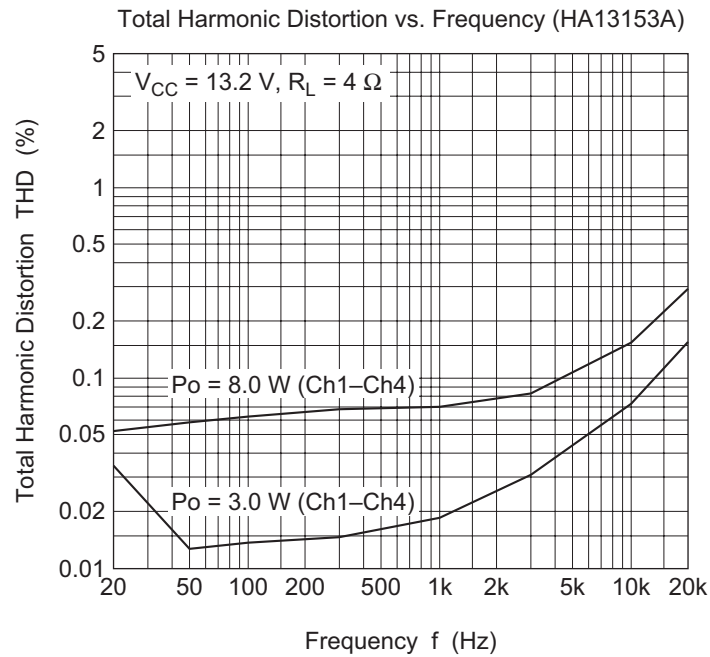
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Quiescent current	I_{Q1}	—	350	—	mA	$V_{in} = 0$
Output offset voltage	ΔV_Q	−300	0	+300	mV	
Gain	G_V	38.5	40	41.5	dB	
Gain difference between channels	ΔG_V	−1.0	0	+1.0	dB	
Rated output power	P_o	—	15	—	W	$V_{CC} = 13.2 \text{ V}$ THD = 10%, $R_L = 4 \Omega$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

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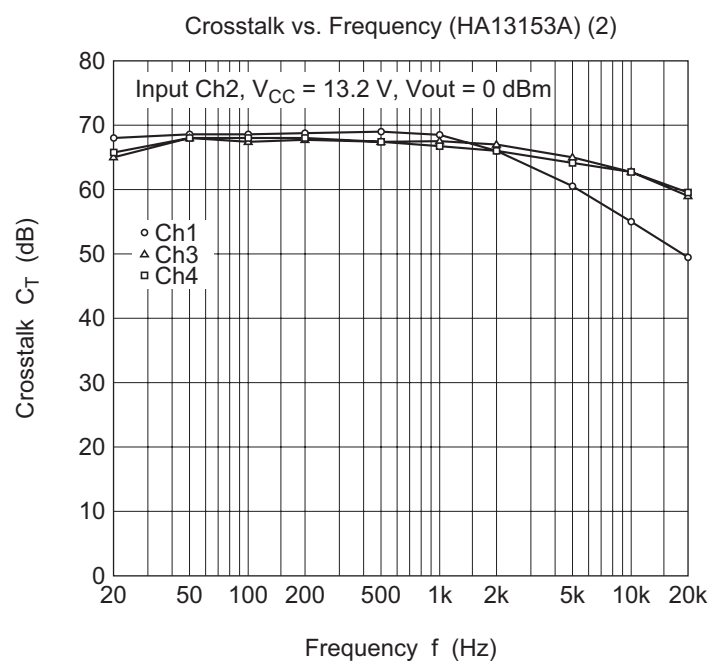
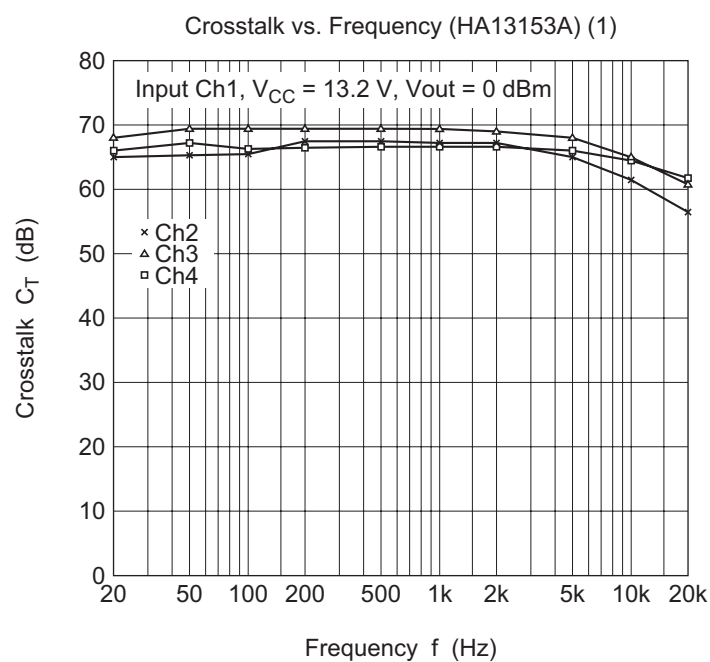
Characteristics Curve



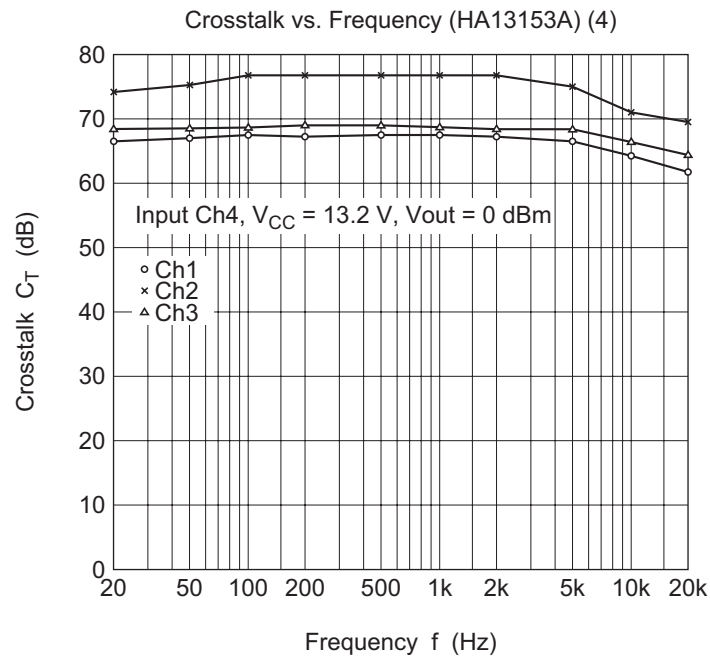
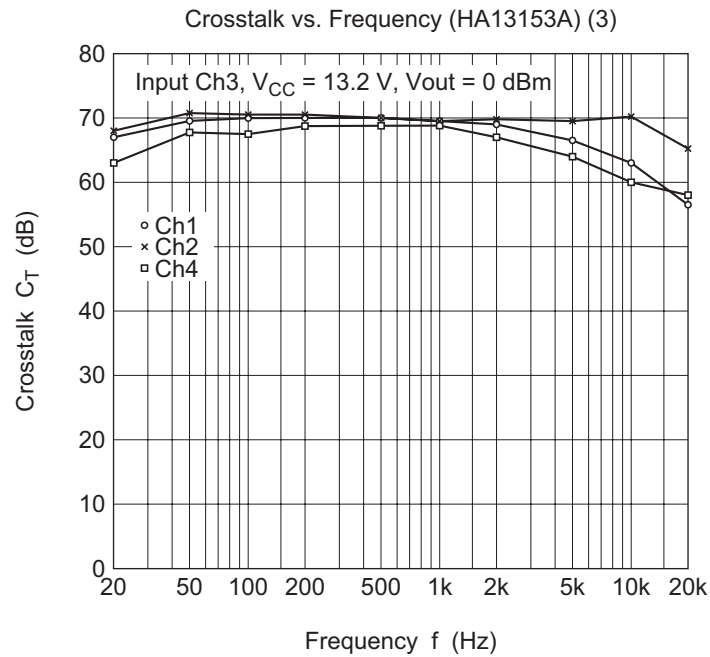
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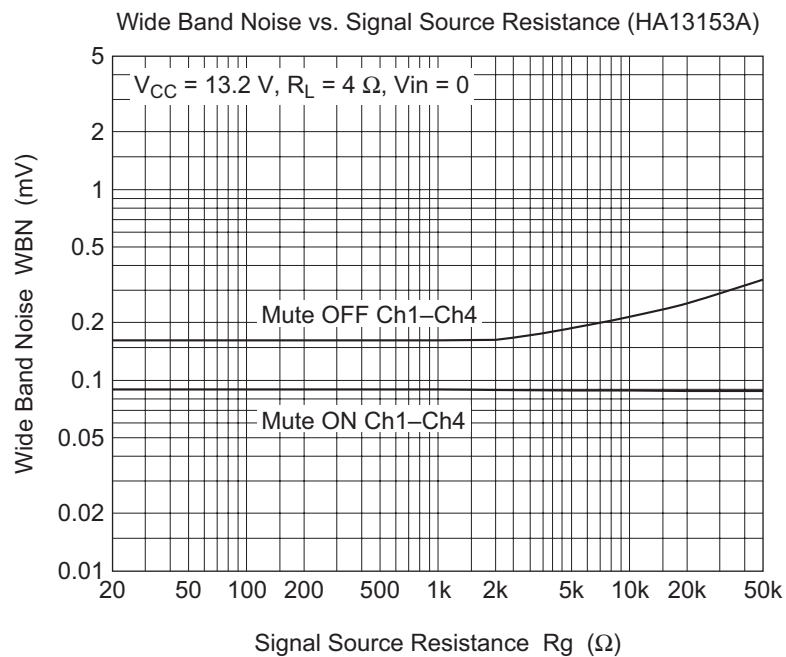
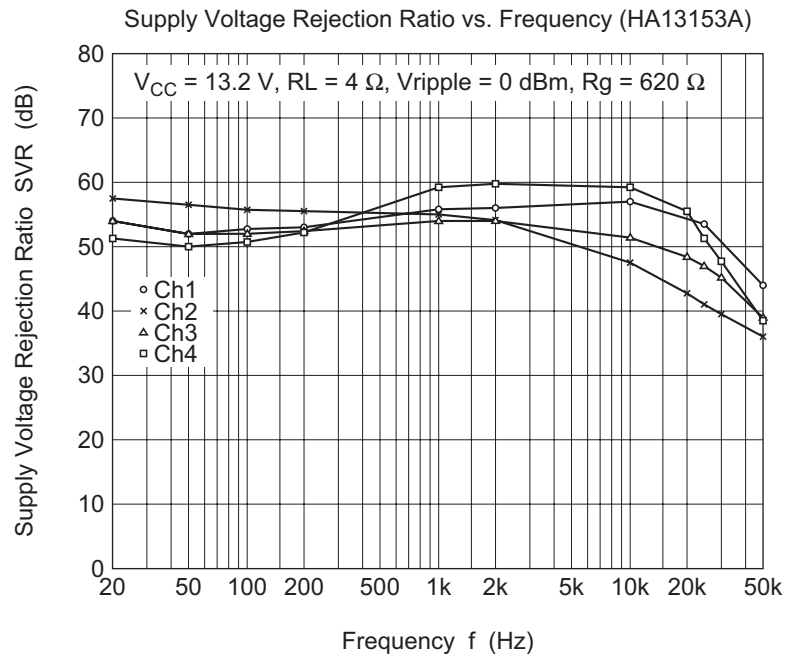
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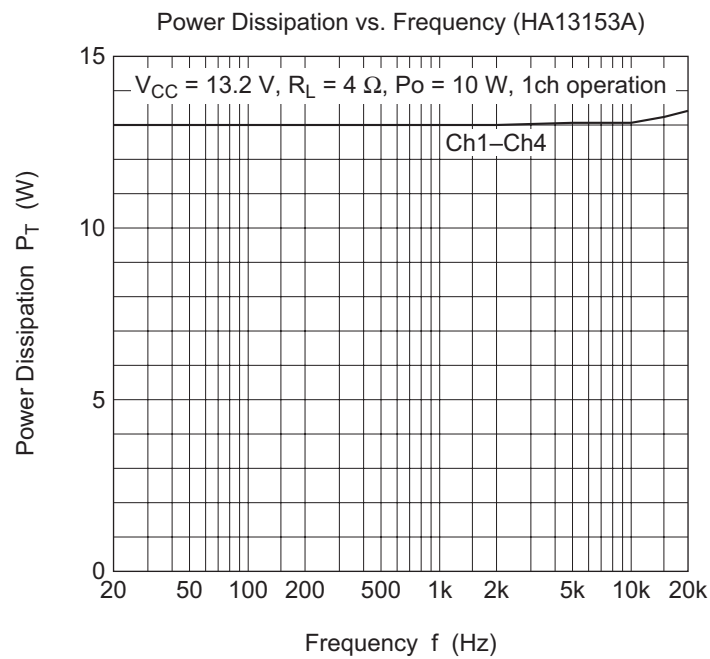
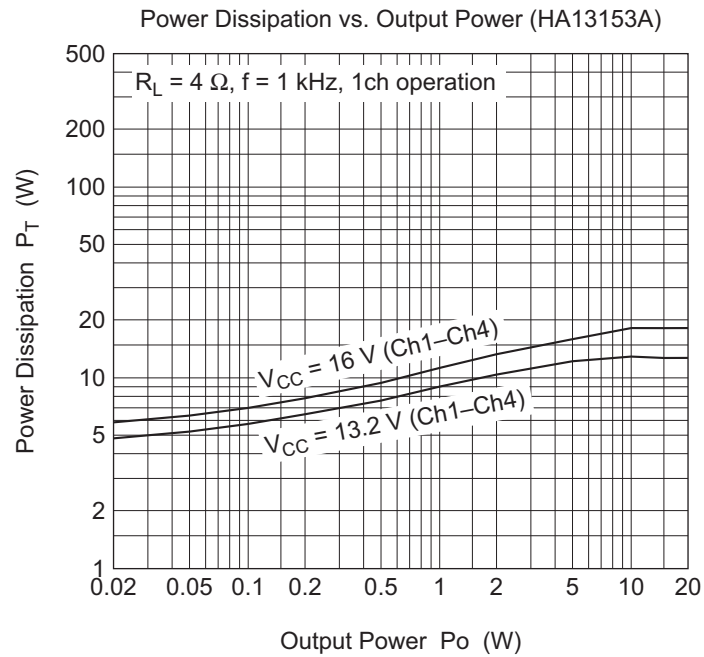
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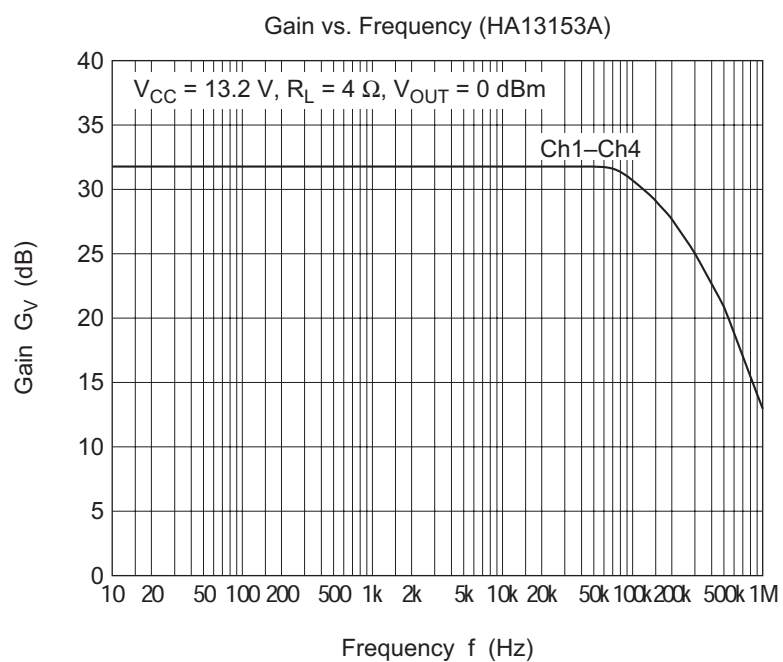
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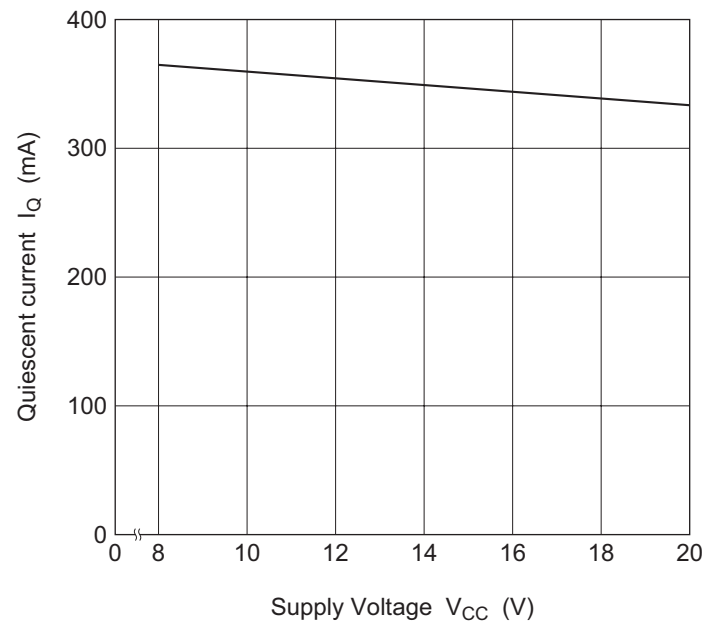


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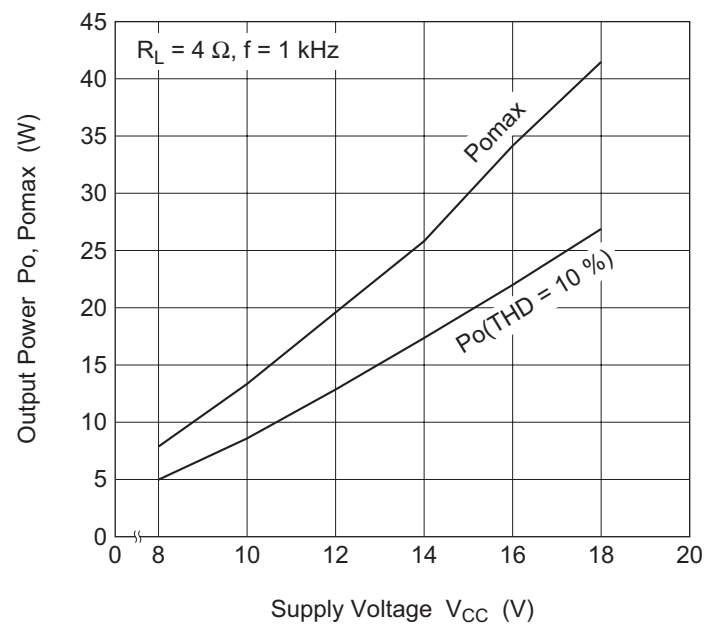


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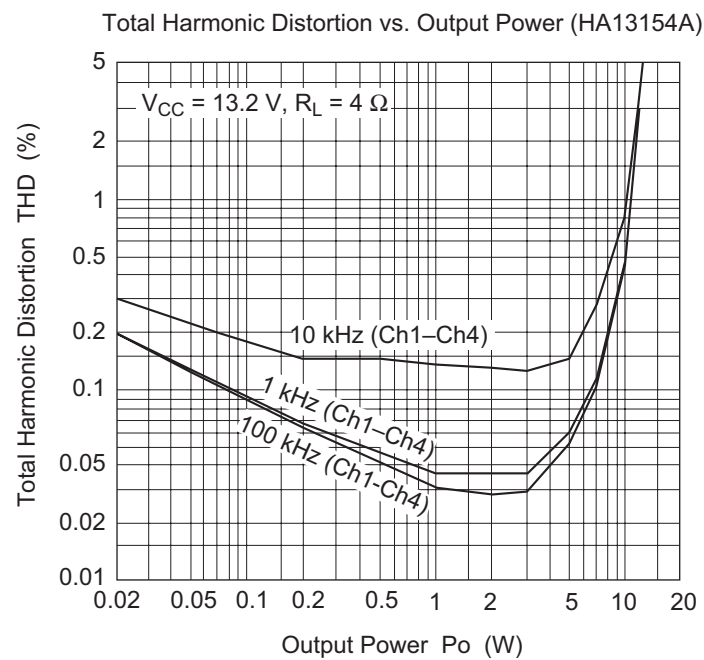
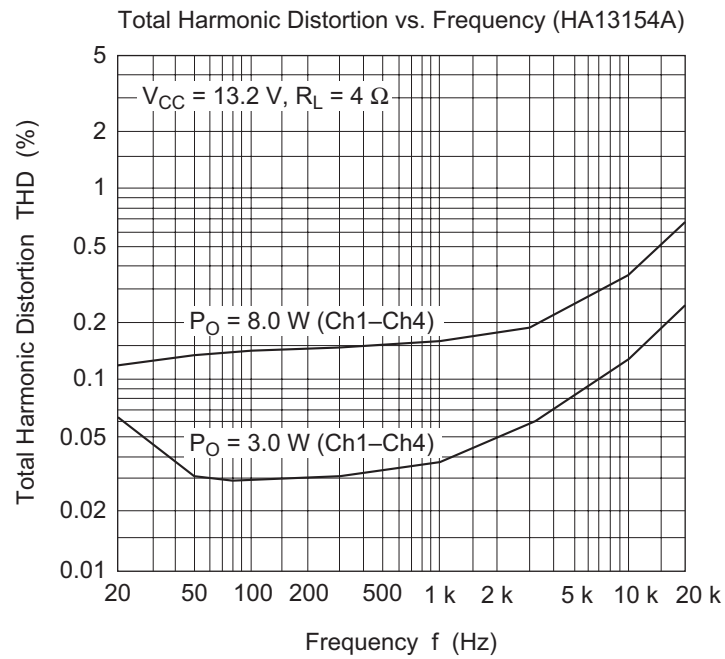
Quiescent current vs. Supply Voltage (HA13154A)



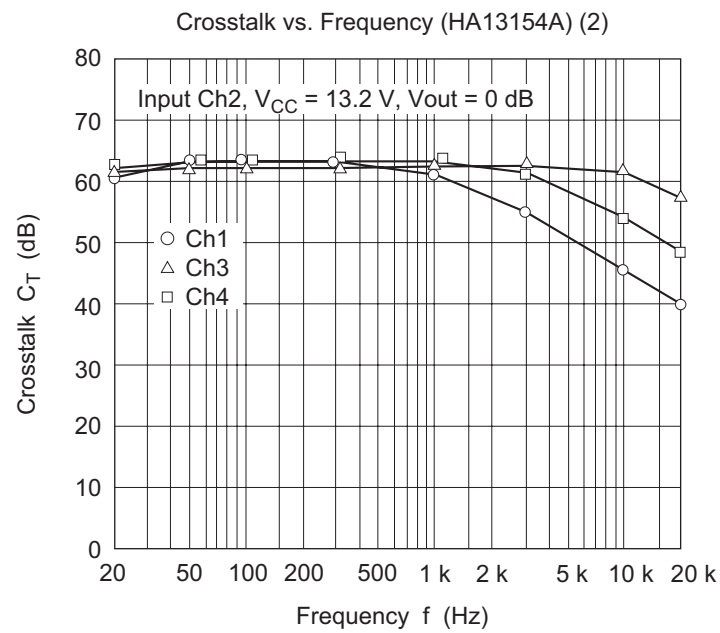
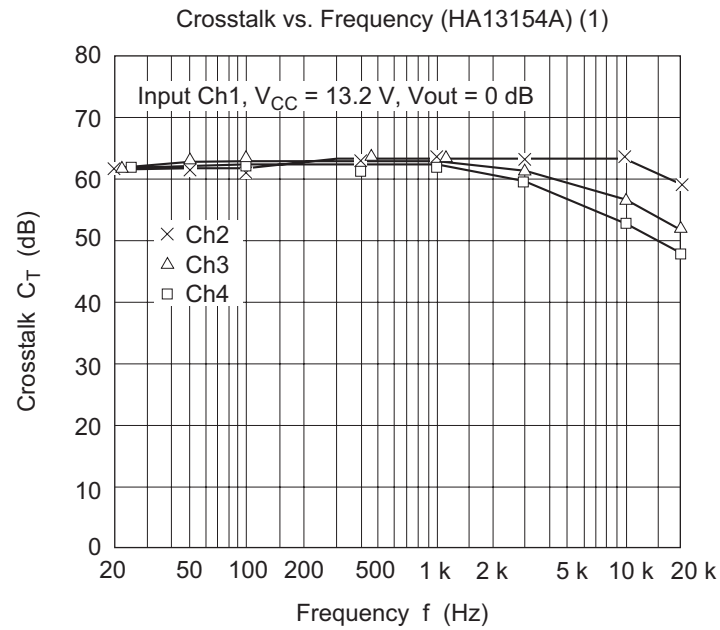
Output Power vs. Supply Voltage (HA13154A)

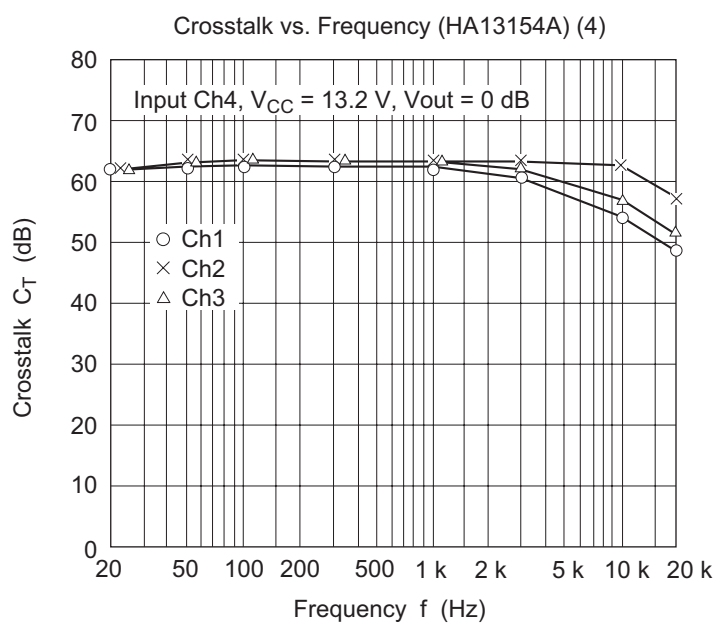
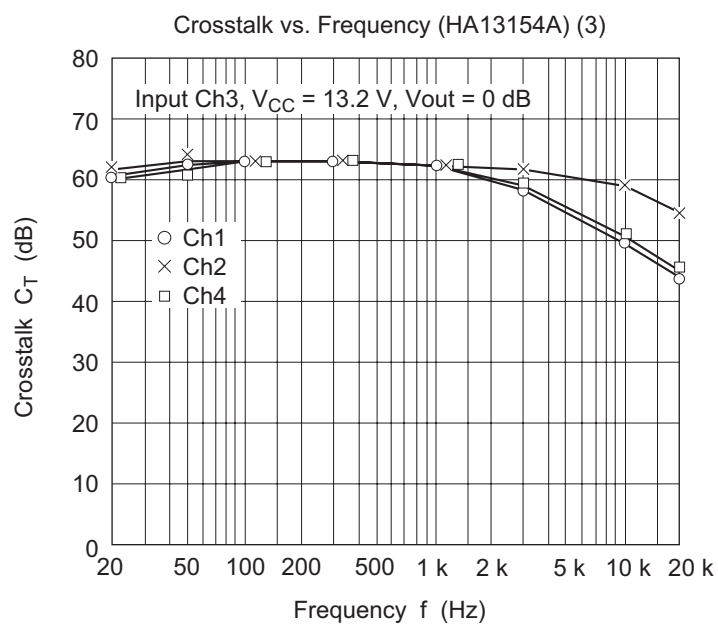


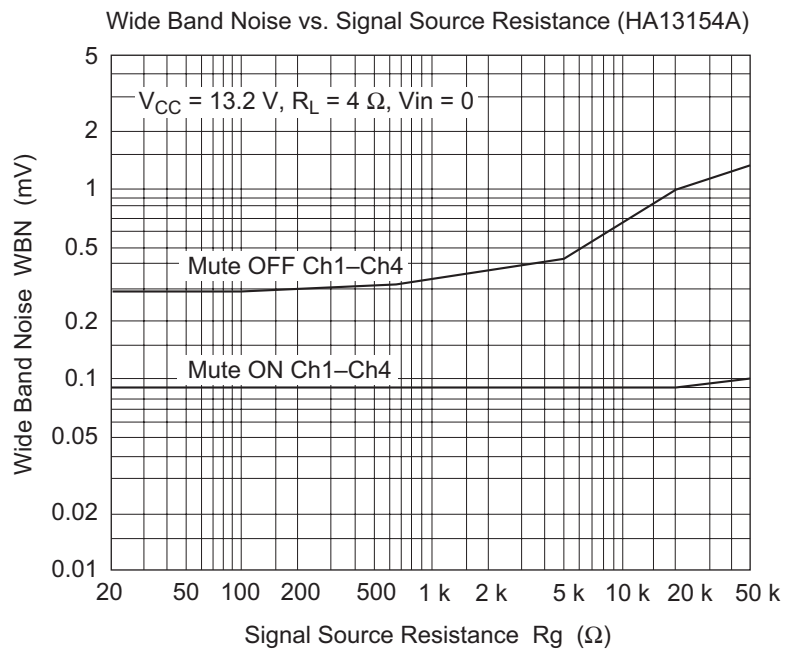
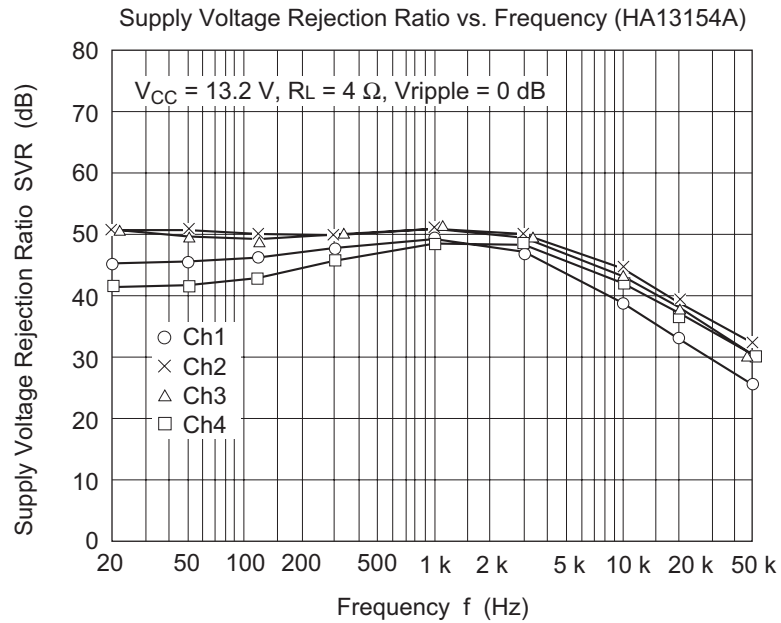
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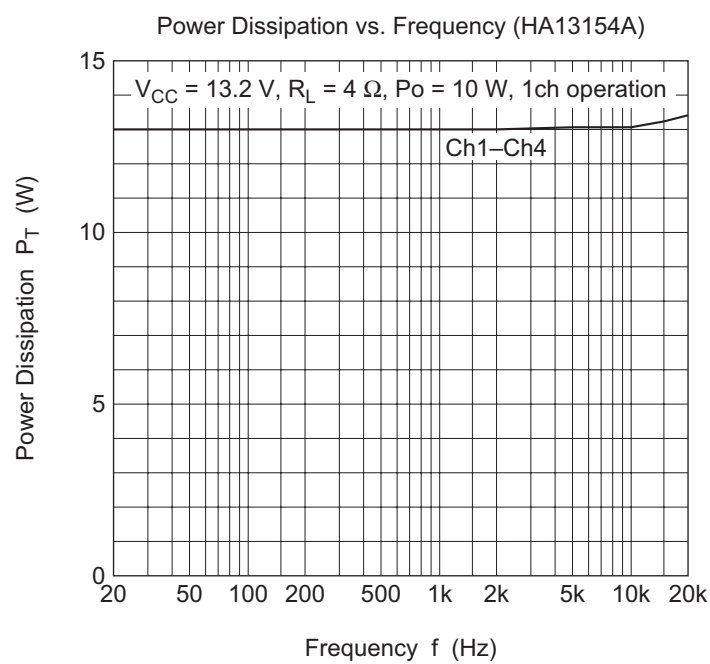
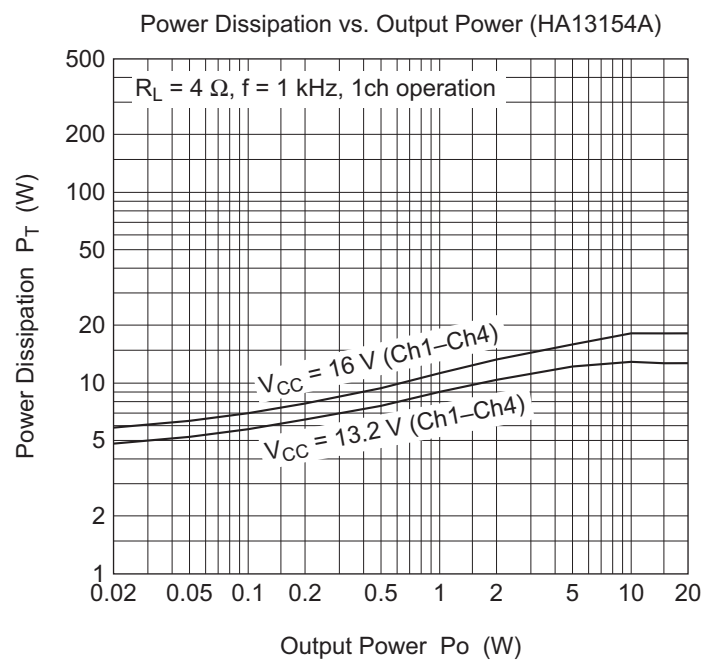
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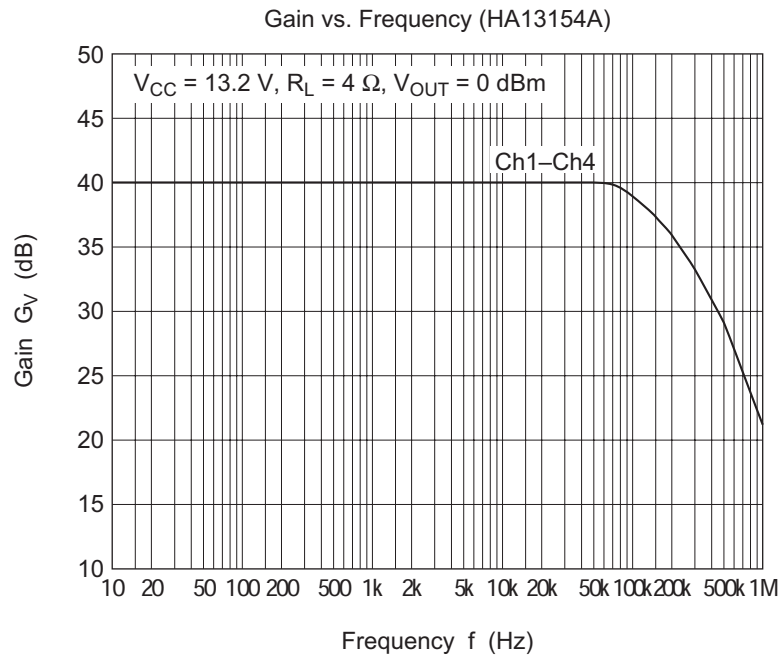




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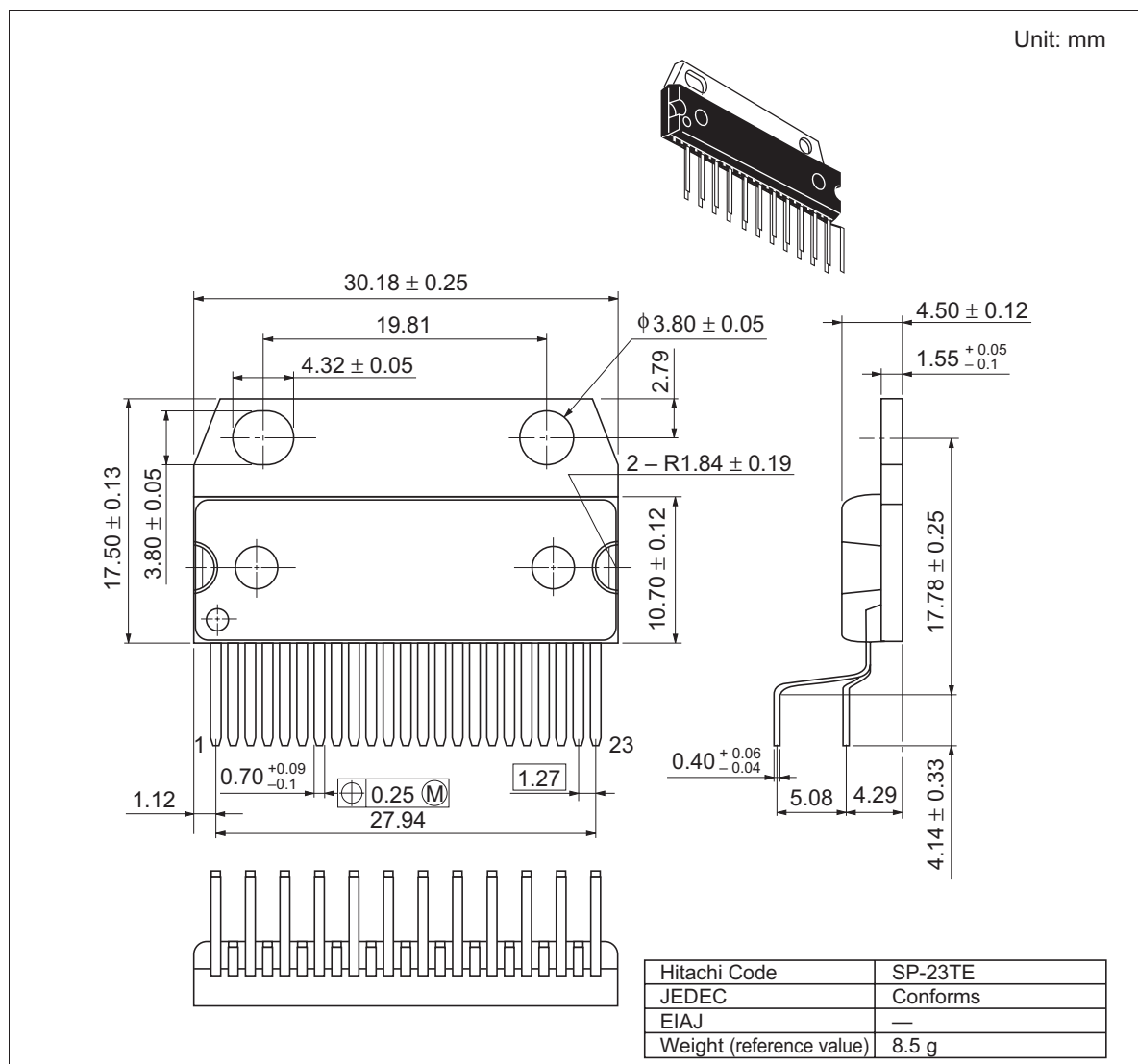


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Package Dimensions



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