HA13128, HA13135

22 W Dual BTL Audio Power Amplifier

The HA13128/HA13135 provide high output power 22 W with 10 % THD at Vcc = 14.4 V, RL = 4 Ω, and built -in 2ch BTL amplifiers, stand-by circuit and 4 type protectors.

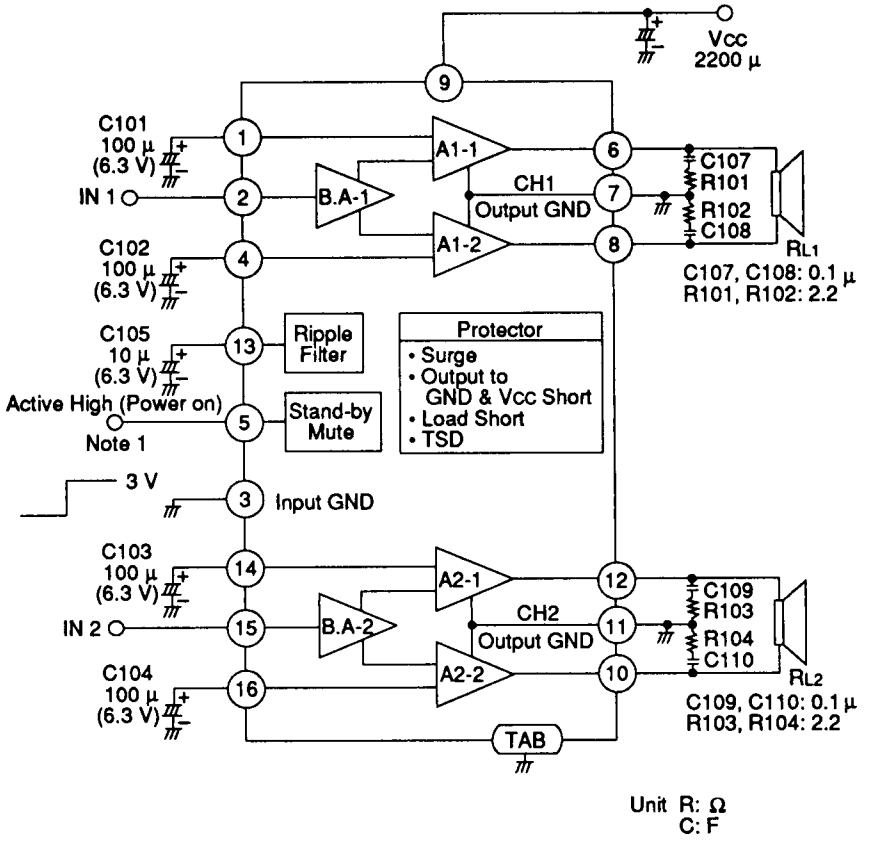
HA13128/HA13135 are pin to pin with HA13127/130,17 W output power.

Features

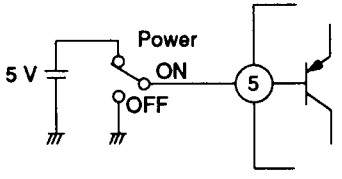
- Small pop noise
- Less external component counts
- Smaller size package and easy to mount (16 pins)
- Built-in 4 type protectors (Surge protector, TSD, output to GND short protect, output to Vcc short protect)
- Built-in stand-by (Mute) circuit

Ordering Information

Type No.	Voltage gain	Package
HA13128	50 dB	16 pin SIP with heat sink
HA13135	40 dB	



Notes: 1. Stand-by



2. C107, C108, C109, C110 must be non secondary resonance type (non inductive) polyester film capacitor for keeping stability.

Figure 1 Block Diagram

Absolute Maximum Ratings (Ta = 25 °C)

Item	Symbol	Rating	Unit	Notes
Operating supply voltage	Vcc	18	V	
DC supply voltage	Vcc (DC)	26	V	1
Peak supply voltage	Vcc (peak)	50	V	2
Output current	Io (peak)	4	A	3
Power dissipation	P_T	25	W	
Thermal resistance	θj-c	3	°C/W	
Junction temperature	Tj	150	°C	
Operating temperature	Topr	–30 to +85	°C	
Storage temperature	Tstg	–55 to +125	°C	

Notes: 1. Value at t ≤ 30 sec
2. Value at surge pulse width ≤ 200 ms (rise time tr ≥ 1 ms)
3. Value at per channel

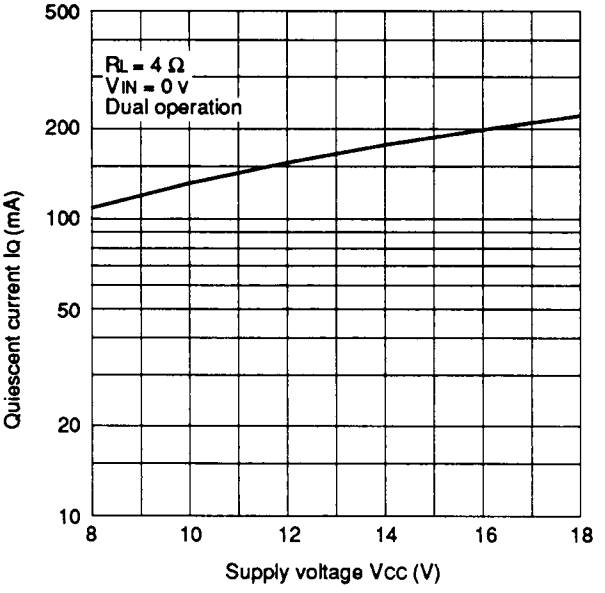
Electrical Characteristics (Vcc = 13.2 V, f = 1 kHz, R_L = 4 Ω)

		HA13128 (Gv = 50 dB)			HA13135 (Gv = 40 dB)				
Item	Symbol	Min	Typ	Max	Min	Typ	Max	Unit	Test Condition
Quiescent current	I_{Q1}	60	150	250	60	150	250	mA	Vin=0 V
Input bias voltage	V_B	—	20	40	—	20	40	mA	Vin=0 V
Output offset voltage	ΔVo	—	—	150	—	—	150	mV	Vin=0 V
Voltage gain	Gv	48.5	50	51.5	38.5	40	41.5	dB	
Difference of voltage gain	ΔGv	—	—	1.5	—	—	1.5	dB	
Output power (1)	P_{O1}	14	18	—	14	18	—	W	THD=10 %, R_L=4 Ω
Output power (2)	P_{O2}	—	13	—	—	14	—	W	THD=1 %, R_L=4 Ω
Total harmonic distortion	THD	—	0.15	0.7	—	0.04	0.15	%	Po=3 W 1 kHz
		—	0.18	—	—	0.15	—		Po=1.5 W 20 kHz

Electrical Characteristics (V_{CC} = 13.2 V, f = 1 kHz, R_L = 4 Ω) (cont)

Noise Output	WBN_1	—	1.0	2.0	—	0.35	0.7	mV	Rg=10 kΩ, BW=20 Hz to 20 kHz
	WBN_2	—	0.8	1.7	—	0.25	0.5	mV	Rg=0, BW=20 Hz to 20 kHz
Supply voltage ripple rejections	SVR	32	40	—	45	60	—	dB	f=500 Hz
Roll-off frequency		—	20	—	—	10	—	Hz	ΔGv=–3 dB from f=1 kHz Low
		10	20	40	30	70	140	kHz	High
Stand-by (Mute) current	I_{Q2}	—	50	200	—	50	200	μA	Vin=0, V⑤=1.0 V
Stand-by (Mute) threshold voltage	V_{TH} (H)	5	—	Vcc-1	5	—	Vcc-1	V	Vin= –40 dBm Output on
	V_{TH} (L)	0	—	1.0	0	—	1.0	V	Output off
Mute attenuation	ATT	45	60	—	45	60	—	dB	Vin=–55 dB V⑤=1.0 V
Input impedance	Rin	20	30	40	20	30	40	kΩ	
Mute on time		—	10	—	—	10	—	μs	
Mute off time		—	0.8	—	—	0.8	—	sec	
Vout rise time		—	0.8	—	—	0.8	—	sec	
Channel cross-talk	CT	40	50	—	45	60	—	dB	Vout=0 dBm
Output power	P_O	—	19	—	—	19	—	W	THD=10 % 1 channel operation
Output power (3)	P_{O3}	—	22	—	—	22	—	W	Vcc=14.4 V, THD=10 %, R_L=4 Ω
Output power (4)	P_{O4}	—	11	—	—	11	—	W	THD=10 %, R_L=8 Ω
Output Power (5)	P_{O5}	—	8	—	—	8	—	W	THD=1 %, R_L=8 Ω

Quiescent current vs. supply voltage



Output power vs. supply voltage (1)

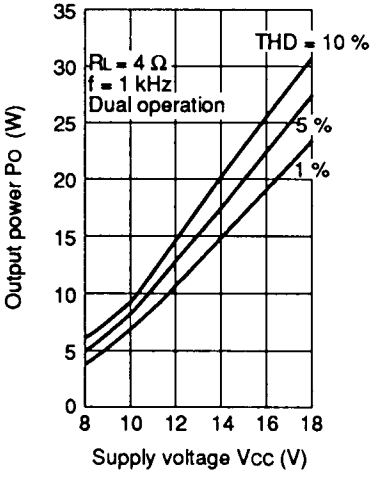
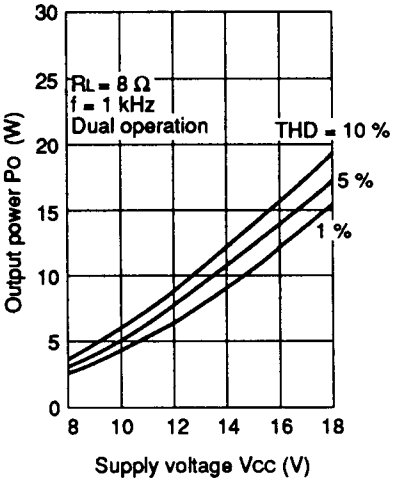


Figure 2 HA13135 Characteristic Curves

Output power vs. supply voltage (2)



Voltage gain vs. frequency

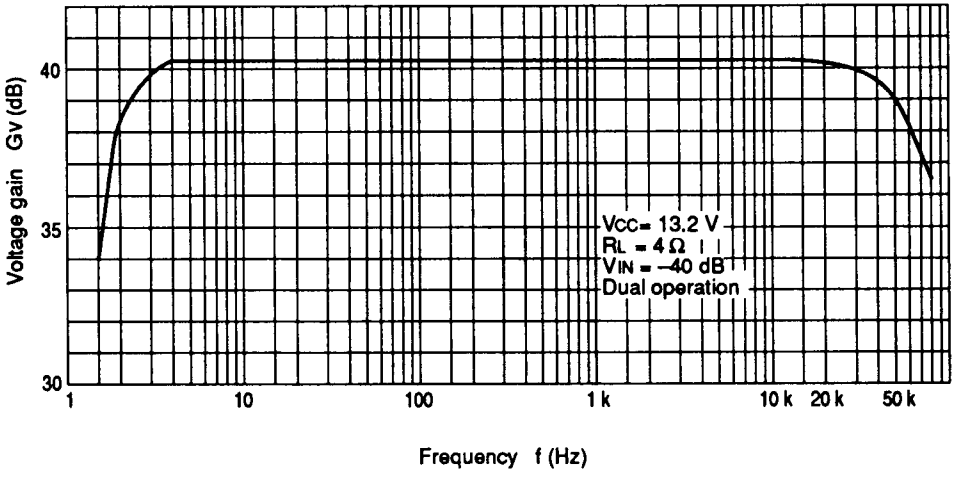
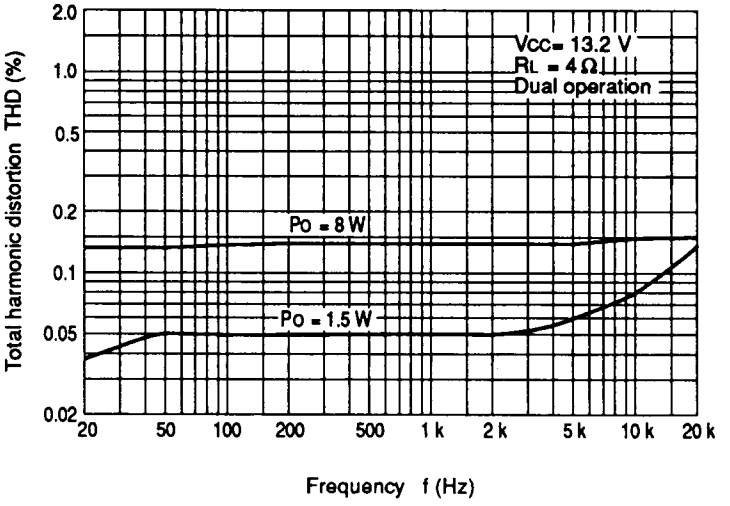


Figure 2 HA13135 Characteristic Curves (cont)

Total harmonic distortion vs. frequency



Total harmonic distortion vs. output power

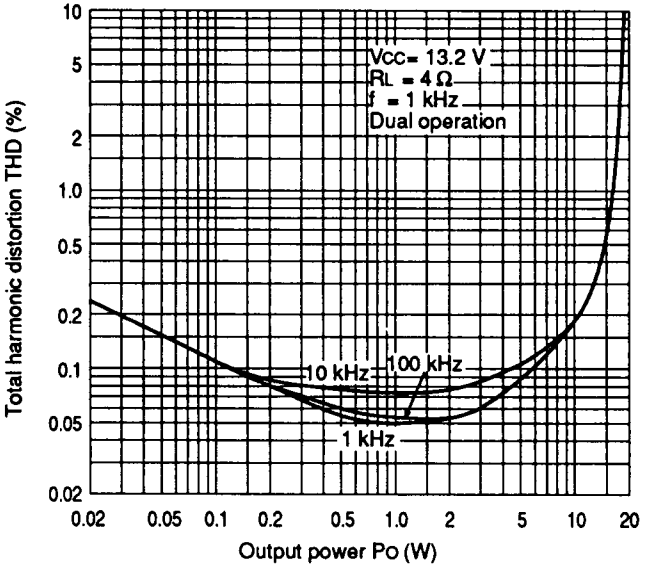
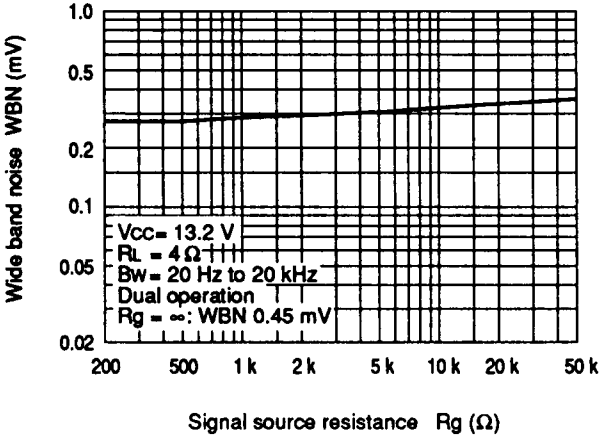


Figure 2 HA13135 Characteristic Curves (cont)

Wide band noise vs. signal source resistance



Supply voltage ripple rejection ratio vs. frequency

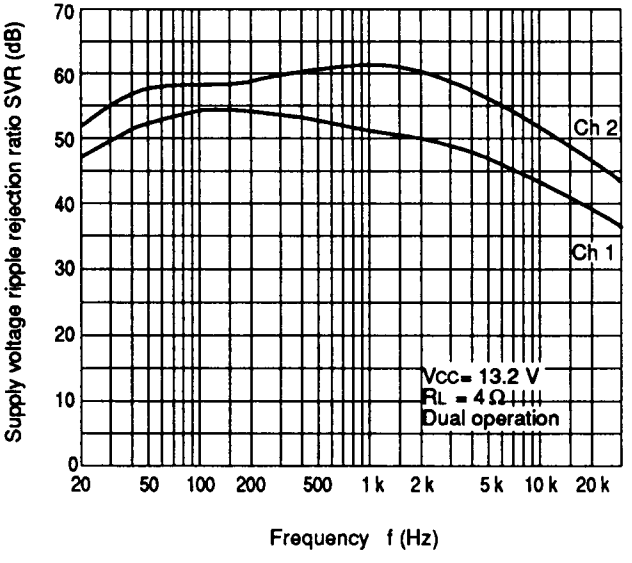
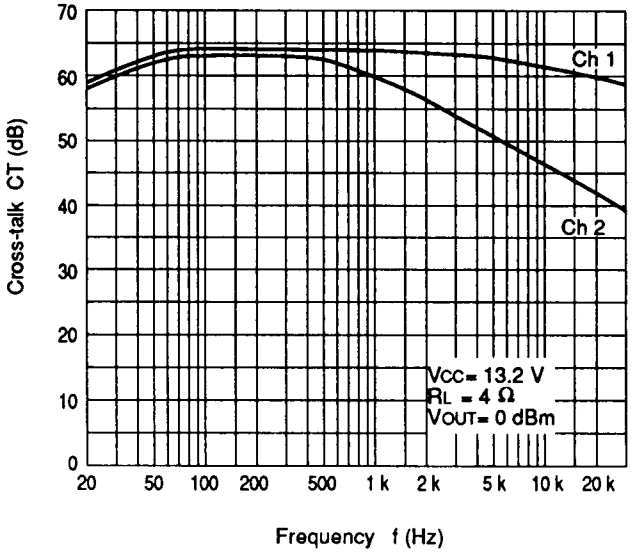


Figure 2 HA13135 Characteristic Curves (cont)

Cross-talk vs. frequency



Power dissipation vs. output power (1)

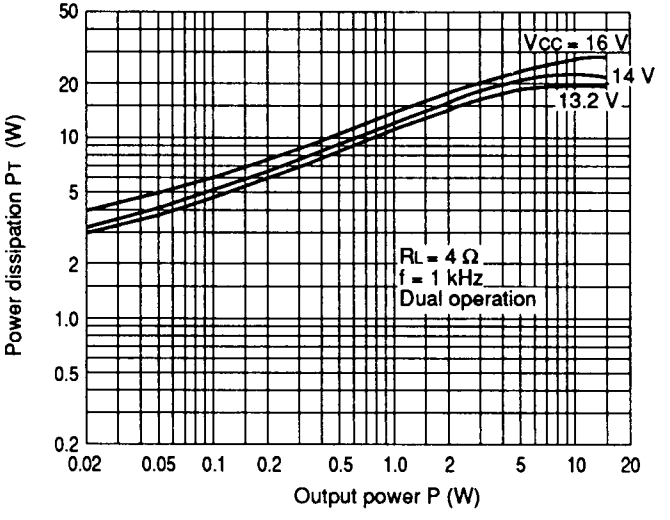
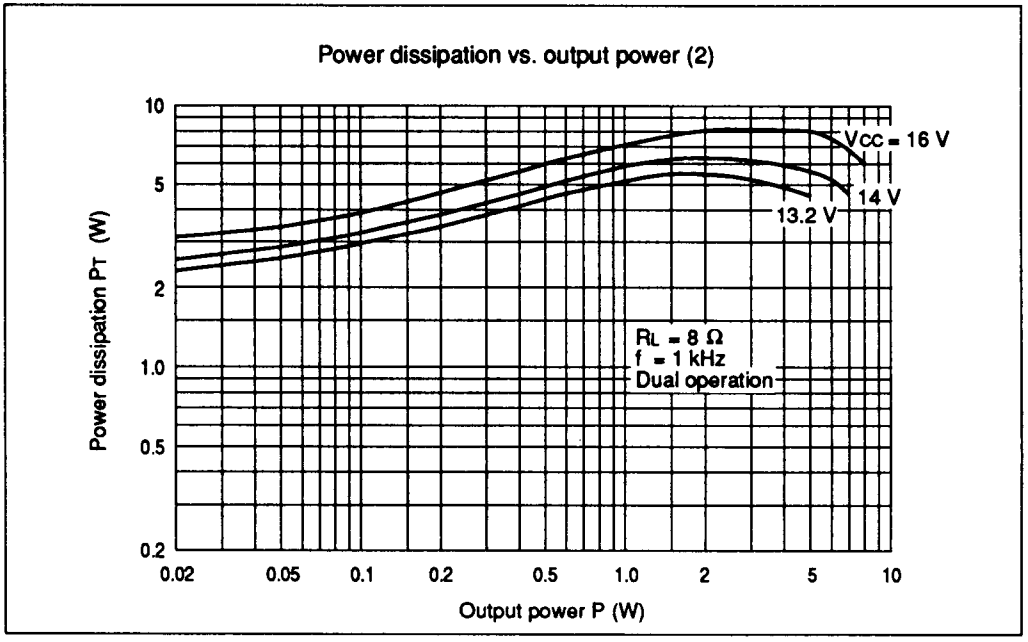


Figure 2 HA13135 Characteristic Curves (cont)



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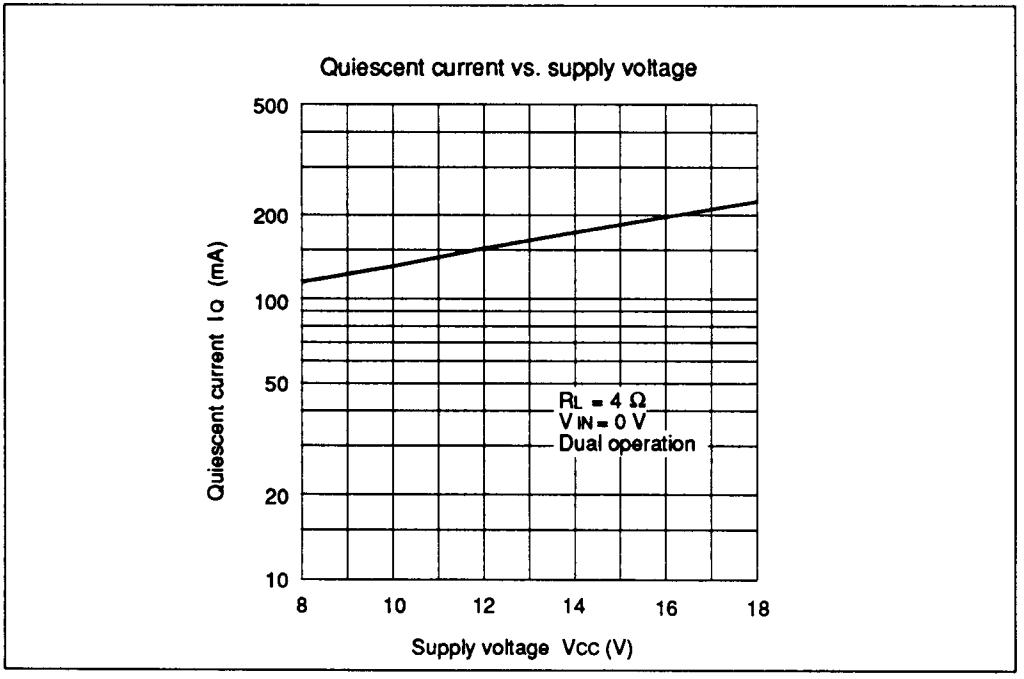
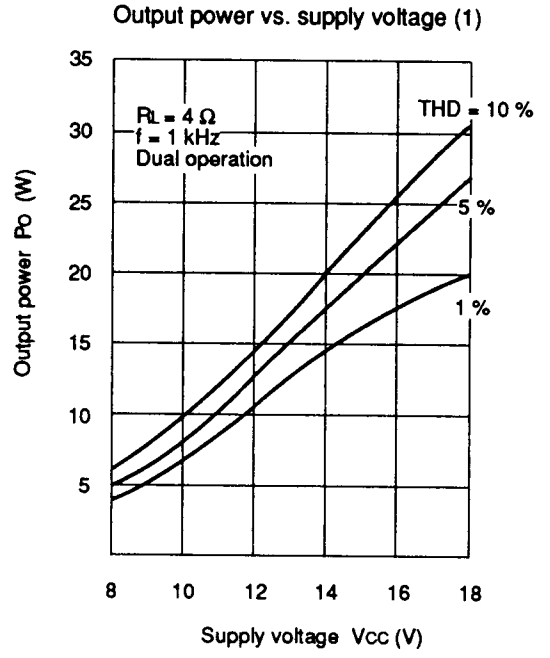


Figure 3 HA13128 Characteristic Curves



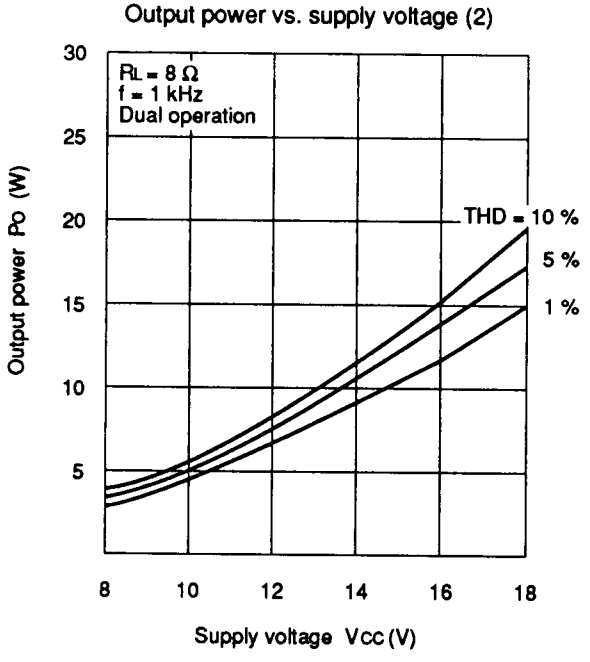
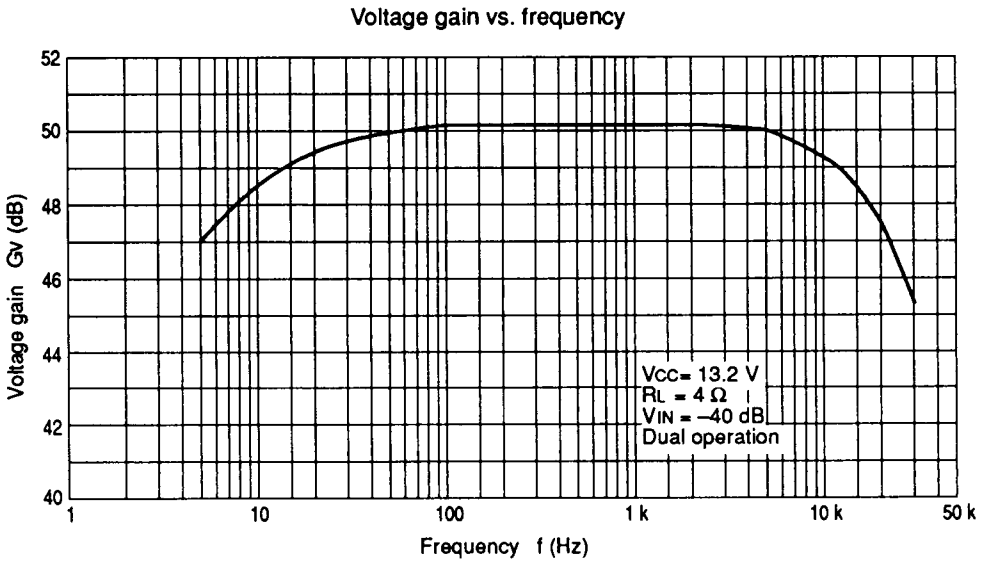


Figure 3 HA13128 Characteristic Curves (cont)



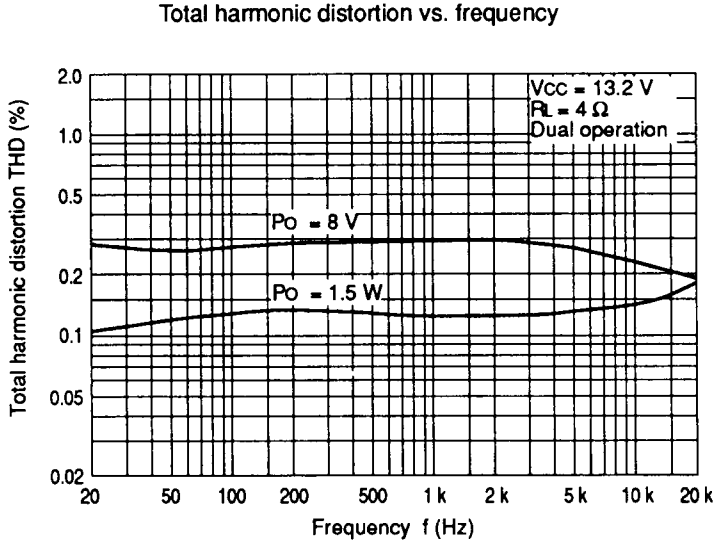
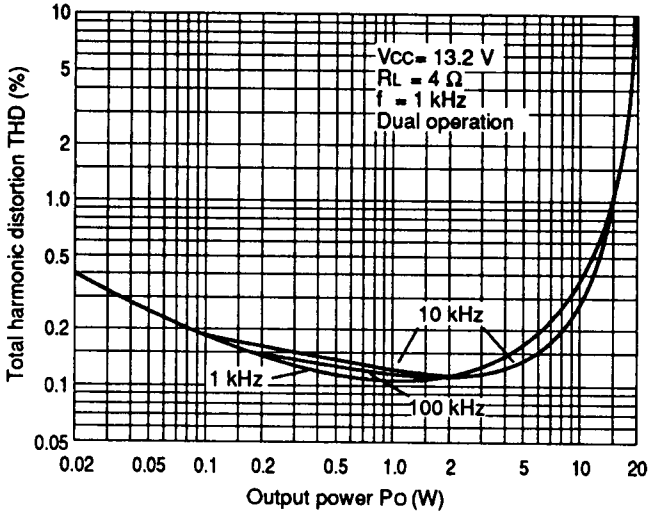
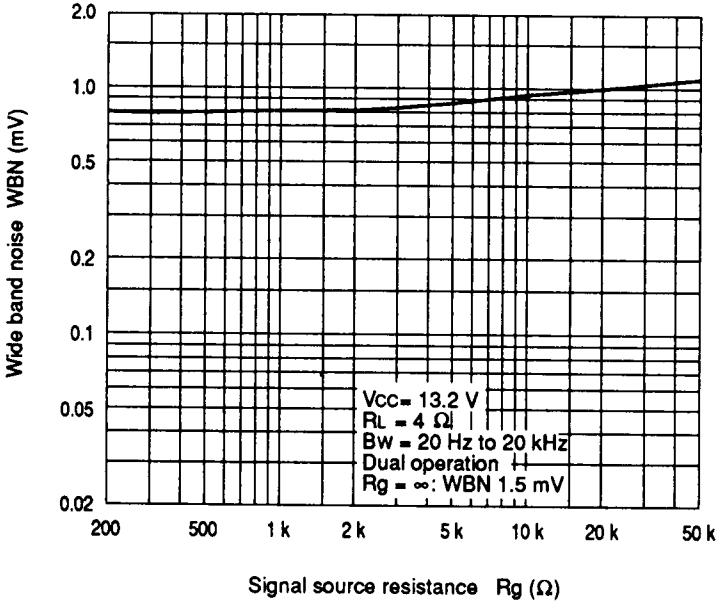


Figure 3 HA13128 Characteristic Curves (cont)

Total harmonic distortion vs. output power



Wide band noise vs. signal source resistance



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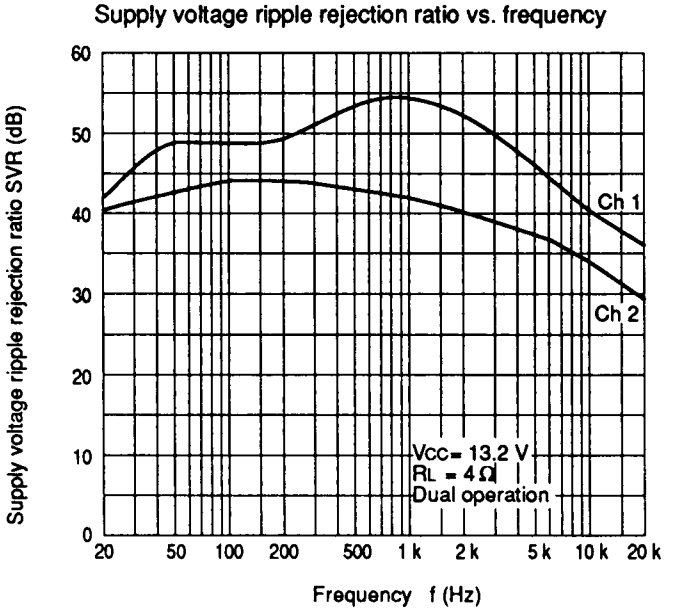

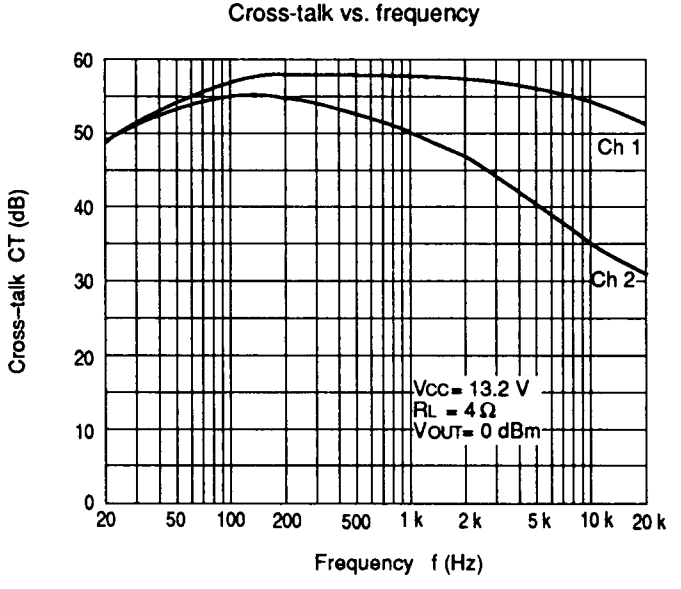

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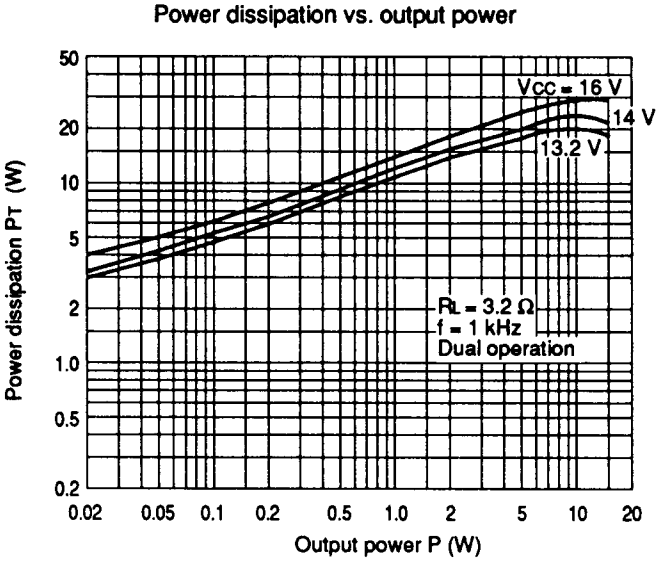

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