HA13127, HA13130

17 W Dual BTL Audio Power Amplifier

The HA13127/HA13130 are high output and low distortion dual BTL power IC designed for car stereo amplifiers.

At 14.4 V to 4 Ω load, this power IC provides an output power 17 W with 10 % distortion.

Features

- Stand-by circuit included.
  Can be switched on & off easily by microcomputer.
- Output capacitors not required.
  These IC employ internal ASO protection circuit of high reliability current shutdown type, which can protect speaker.
- Surge protection circuit and thermal shutdown circuit are included.
  Thermal shutdown is high speed and hysteresis on & off type.
- Can be used without bootstrap capacitor.
- Low total harmonic distortion in wide frequency range
  THD = 0.05 % Typ (f = 50 Hz)
  THD = 0.05 % Typ (f = 1 kHz)
  THD = 0.07 % Typ (f = 10 kHz)
  THD = 0.1 % or less
  (Pout = 1.5 W, f = 20 Hz to 20 kHz)

Ordering Information

Type No.	Voltage gain	Package
HA13127	50 dB	16 pin SIP with heat sink
HA13130	40 dB	

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Figure 1 Block Diagram

Notes: 1. Stand-by
  1) Stand by (pin 5) removed threshold value is 5 volt and 1.2 mA current.
  2) Pin 5 opened is stand by on (no output).

2. Capacitor
  C107, C108, C109, C110 must be non secondary resonance type (non inductive type) polyester film capacitor for keeping stability.
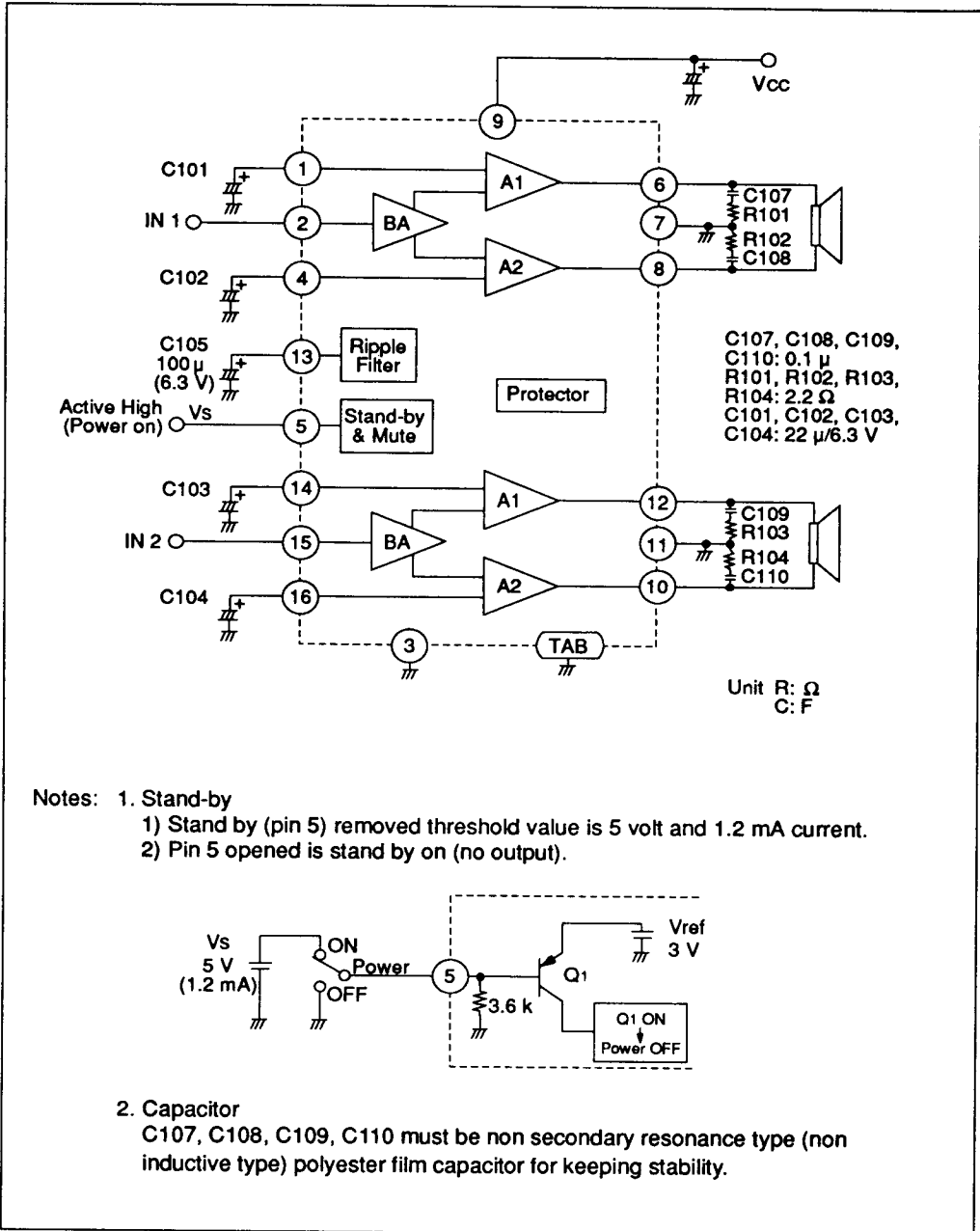
HA13127, HA13130

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	Per channel
Power dissipation	PT	25	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 wave-form (rise time t ≥ 1 ms)

Electrical Characteristics (Vcc = 13.2 V, f = 1 kHz, R_L = 4 Ω, dual operation, Ta = 25 °C)

Item	Symbol	HA13127 (Gv = 50 dB)			HA13130 (Gv = 40 dB)			Unit	Test Conditions
		Min	Typ	Max	Min	Typ	Max		
Quiescent current	IQ1	60	150	250	60	150	250	mA	Vin = 0 V
Input bias voltage	VB	—	20	40	—	20	40	mV	Vin = 0 V
Output offset voltage	ΔVo	—	0	150	—	0	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)	Po1	10	14	—	10	14	—	W	Vcc = 13.2 V THD = 10 %
Output power (2)	Po2	—	17	—	—	17	—	W	Vcc = 14.4 V THD = 10 %
Output power (3)	Po3	—	6	—	—	11	—	W	Vcc = 13.2 V THD = 1 %
Total harmonic distortion	THD	—	0.2	0.7	—	0.04	0.15	%	Pout = 1.5 W

Electrical Characteristics (V_{CC} = 13.2 V, f = 1 kHz, R_L = 4 Ω, dual operation, Ta = 25 °C) (cont)

Parameter	Symbol	min	typ	max	min	typ	max	unit	Conditions
Noise output (1)	WBN_1	—	1.0	2.0	—	0.35	0.7	mV	Rg = 10 kΩ, BW = 20 Hz to 20 kHz
Noise output (2)	WBN_2	—	0.8	1.7	—	0.25	0.5	mV	Rg = 0, BW = 20 Hz to 20 kHz
Supply voltage rejection ratio	SVR	32	40	—	45	60	—	dB	f = 500 Hz, Vripple = 0 dBm
Low roll-off Frequency	$f_L\alpha$	—	20	—	—	10	—	Hz	ΔGv = −3 dB from f = 1 kHz
High roll-off frequency	$f_R\alpha$	—	20	—	30	70	140	kHz	
Stand-by current	I_{Q2}	—	50	200	—	50	200	μA	V 5 Open
Stand-by	$V_{TH(H)}$	5	—	Vcc−1	5	—	Vcc−1	V	Vin=50 dBm Output on
threshold voltage	$V_{TH(L)}$	0	—	1	0	—	1	V	Output off
Stand-by (Mute) signal reduction level	ATT	45	60	—	45	60	—	dB	Vin = −50 dBm
Stand-by (Mute) on time	t_F	—	10	—	—	10	—	μs	V1 = 3 V to Open (Power on to off)
Stand-by (Mute) off time	t_R	—	0.2	—	—	0.2	—	sec	V1 = Open to 3 V (Power off to on)
Input impedance	Rin	20	30	40	20	30	40	kΩ	
Channel cross-talk	CT	—	60	—	45	60	—	dB	Vout = 0 dBm
Output power (4)	P_{O4}	—	10	—	—	10	—	W	THD = 10 %, RL = 8 Ω
Output power (5)	P_{O5}	—	7	—	—	7	—	W	THD = 1 %, RL = 8 Ω

Output power vs. supply voltage (1)
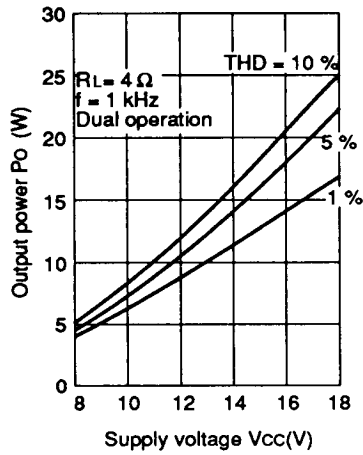
Output power vs. supply voltage (2)

Figure 2   HA13130 Characteristic Curves

Voltage gain vs. frequency

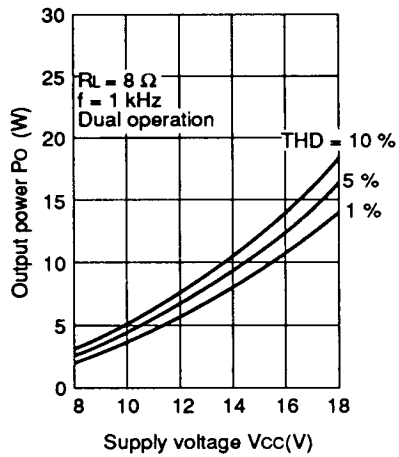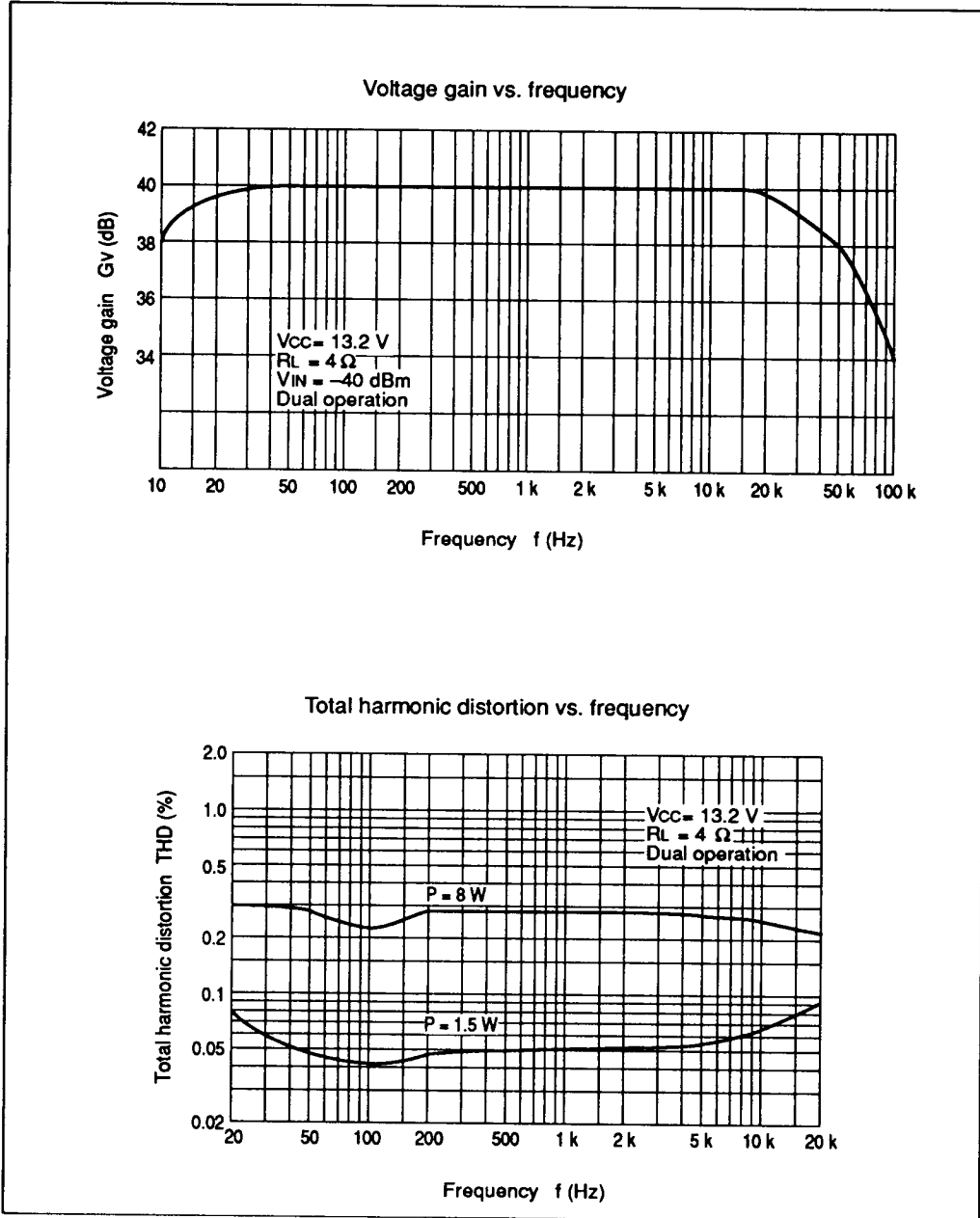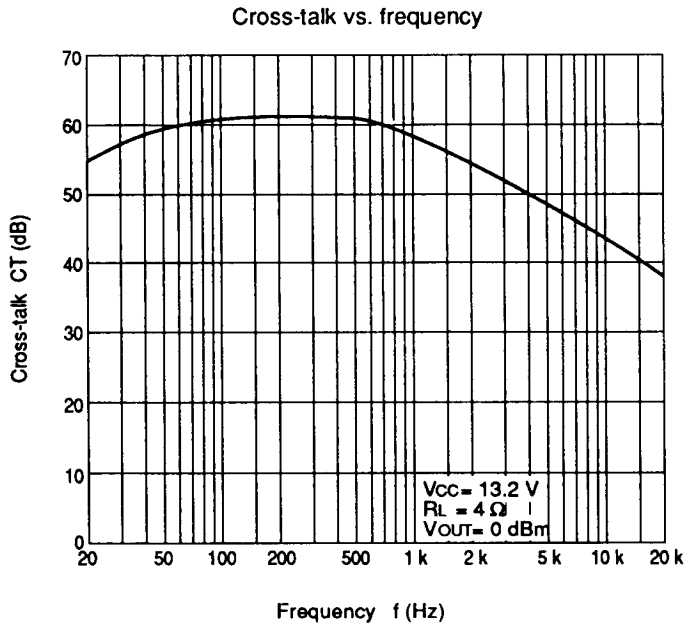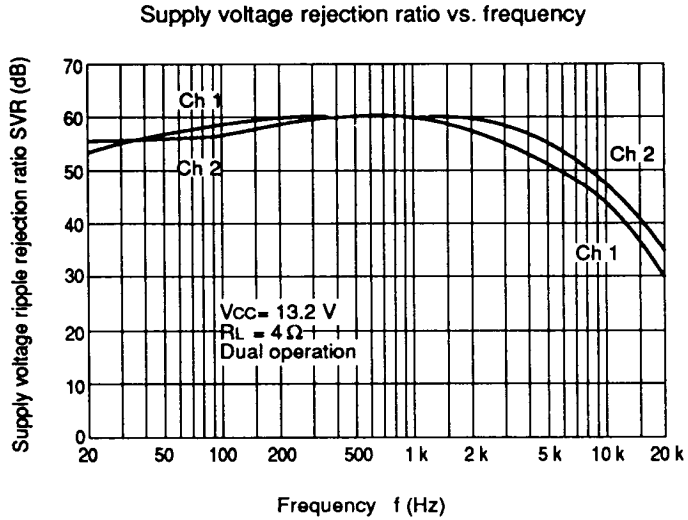Total harmonic distortion vs. frequency

Figure 2   HA13130 Characteristic Curves (cont)

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Total harmonic distortion vs. output power

Wide band noise vs. signal source resistance
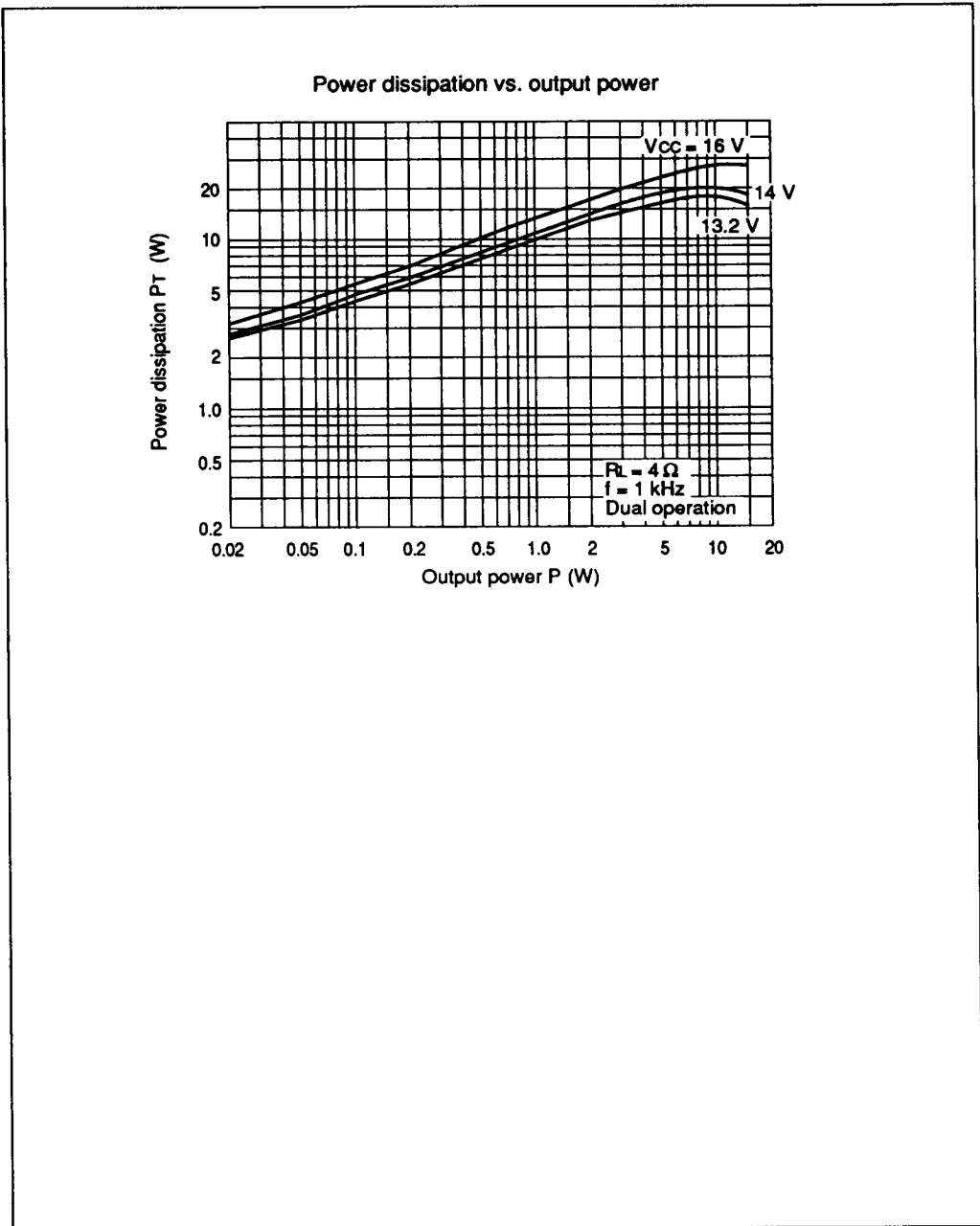
Figure 2   HA13130 Characteristic Curves (cont)
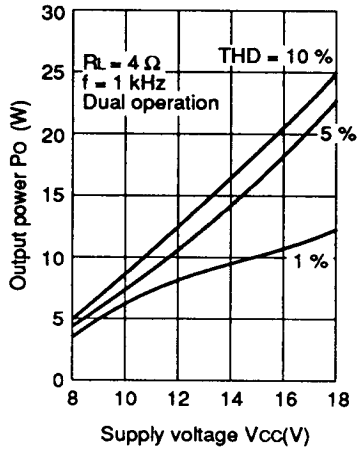
Power dissipation vs. output power

Figure 2   HA13130 Characteristic Curves (cont)

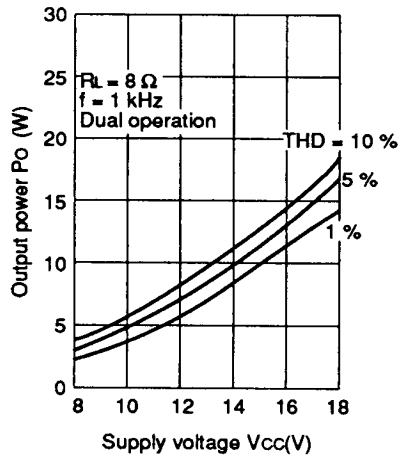⊚ **HITACHI**

Power dissipation vs. output power (1)

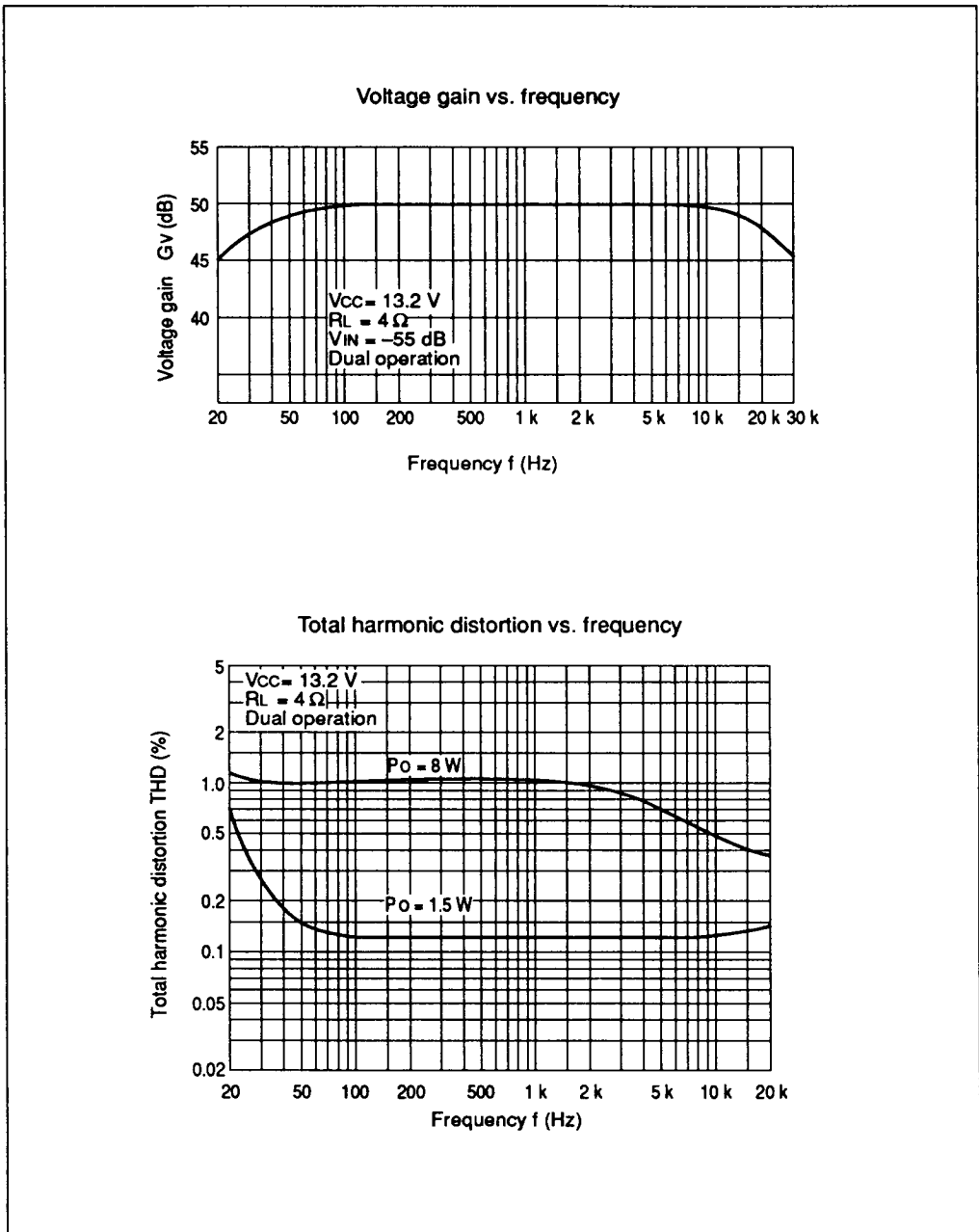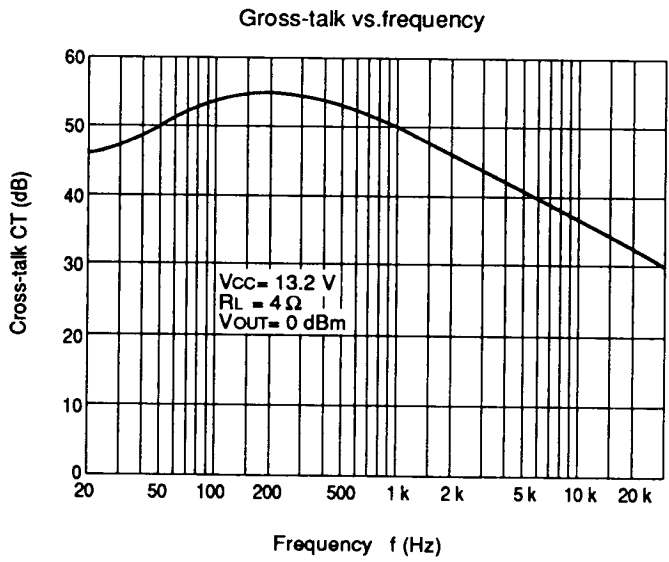Power dissipation vs. output power (2)

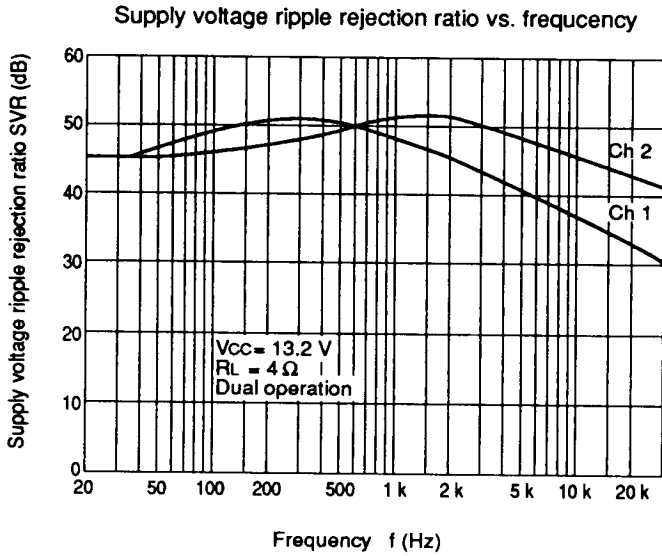Figure 3   HA13127 Characteristic Curves

Voltage gain vs. frequency

Vcc = 13.2 V
RL = 4 Ω
VIN = −55 dB
Dual operation

Frequency f (Hz)

Total harmonic distortion vs. frequency

Vcc = 13.2 V
RL = 4 Ω
Dual operation

Po = 8 W

Po = 1.5 W

Frequency f (Hz)

Figure 3   HA13127 Characteristic Curves (cont)

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Supply voltage ripple rejection ratio vs. frequcency

Supply voltage ripple rejection ratio SVR (dB)

Ch 2

Ch 1

Vcc= 13.2 V
RL = 4 Ω
Dual operation

Frequency   f (Hz)

Gross-talk vs.frequency

Cross-talk CT (dB)

Vcc= 13.2 V
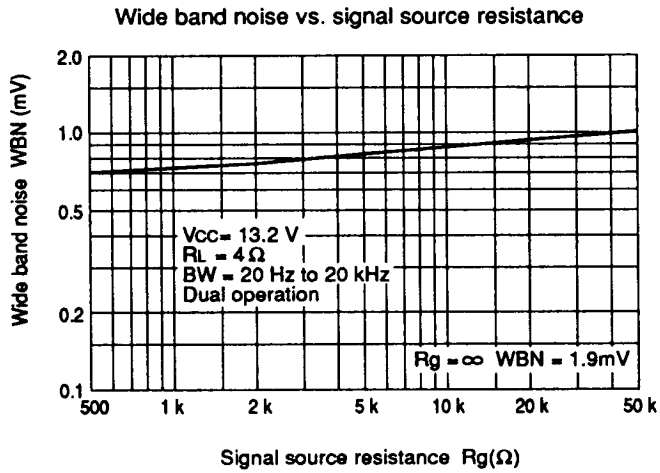RL = 4 Ω
VOUT= 0 dBm

Frequency   f (Hz)

Figure 3   HA13127 Characteristic Curves (cont)

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Total harmonic distortion vs. output power

Vcc = 13.2 V
RL = 4 Ω
Dual operation

f = 10 kHz
1 kHz
100 Hz

Total harmonic distortion THD (%)

Output power Po (W)

Wide band noise vs. signal source resistance

Wide band noise WBN (mV)

Vcc = 13.2 V
RL = 4 Ω
BW = 20 Hz to 20 kHz
Dual operation

Rg = ∞ WBN = 1.9mV

Signal source resistance Rg(Ω)

Figure 3   HA13127 Characteristic Curves (cont)