17 W Dual BTL Audio Power Amplifier

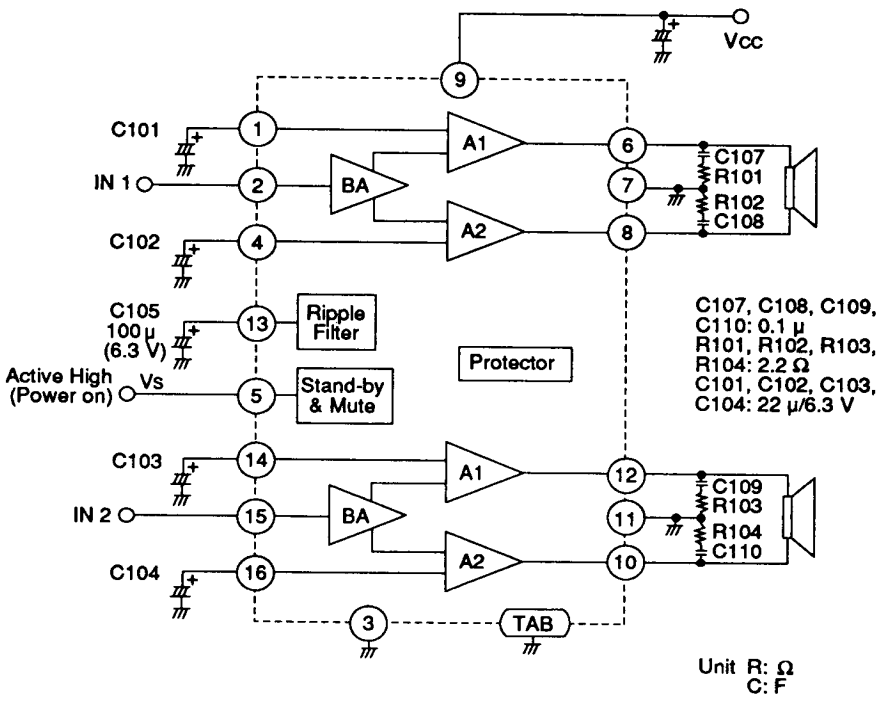
The HA13127/HA13130 are high output and low distortion dual BTL power IC designed for car stereo amplifiers.
At 14.4 V to 4 Ω load, this power IC provides an output power 17 W with 10 % distortion.

Features

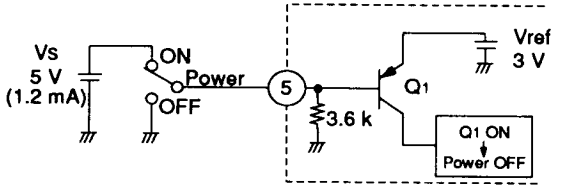
- Stand-by circuit included.
  Can be switched on & off easily by microcomputer.
- Output capacitors not required.
  These IC employ internal ASO protection circuit of high reliability current shutdown type, which can protect speaker.
- Surge protection circuit and thermal shutdown circuit are included.
  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	



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.

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	Per channel
Power dissipation	P_T	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)

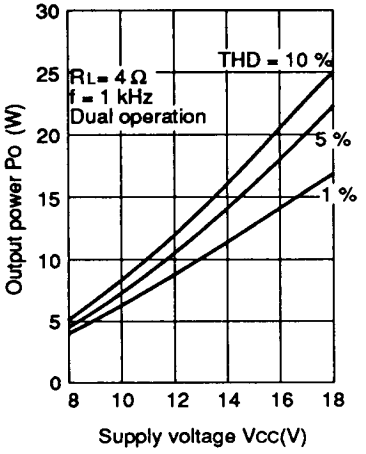
Electrical Characteristics (V_{CC} = 13.2 V, f = 1 kHz, R_L = 4 Ω, dual operation, Ta = 25 °C)

		HA13127 (Gv = 50 dB)			HA13130 (Gv = 40 dB)				
Item	Symbol	Min	Typ	Max	Min	Typ	Max	Unit	Test Conditions
Quiescent current	I_{Q1}	60	150	250	60	150	250	mA	Vin = 0 V
Input bias voltage	V_B	—	20	40	—	20	40	mV	Vin = 0 V
Output offset voltage	ΔV_O	—	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)	P_{O1}	10	14	—	10	14	—	W	Vcc = 13.2 V THD = 10 %
Output power (2)	P_{O2}	—	17	—	—	17	—	W	Vcc = 14.4 V THD = 10 %
Output power (3)	P_{O3}	—	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)

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	Δ Gv = −3 dB from
High roll-off frequency	$f_R\alpha$	—	20	—	30	70	140	kHz	f = 1 kHz
Stand-by current	I_{02}	—	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 % R_L = 8 Ω
Output power (5)	P_{O5}	—	7	—	—	7	—	W	THD = 1 % R_L = 8 Ω

Output power vs. supply voltage (1)



Output power vs. supply voltage (2)

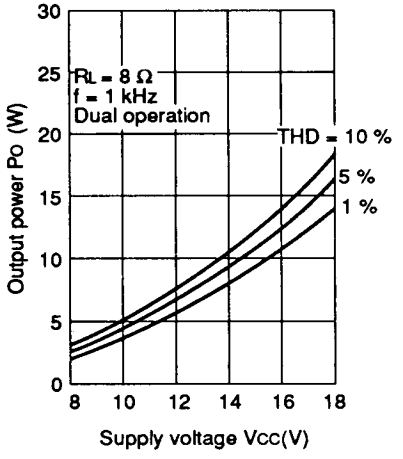


Figure 2 HA13130 Characteristic Curves

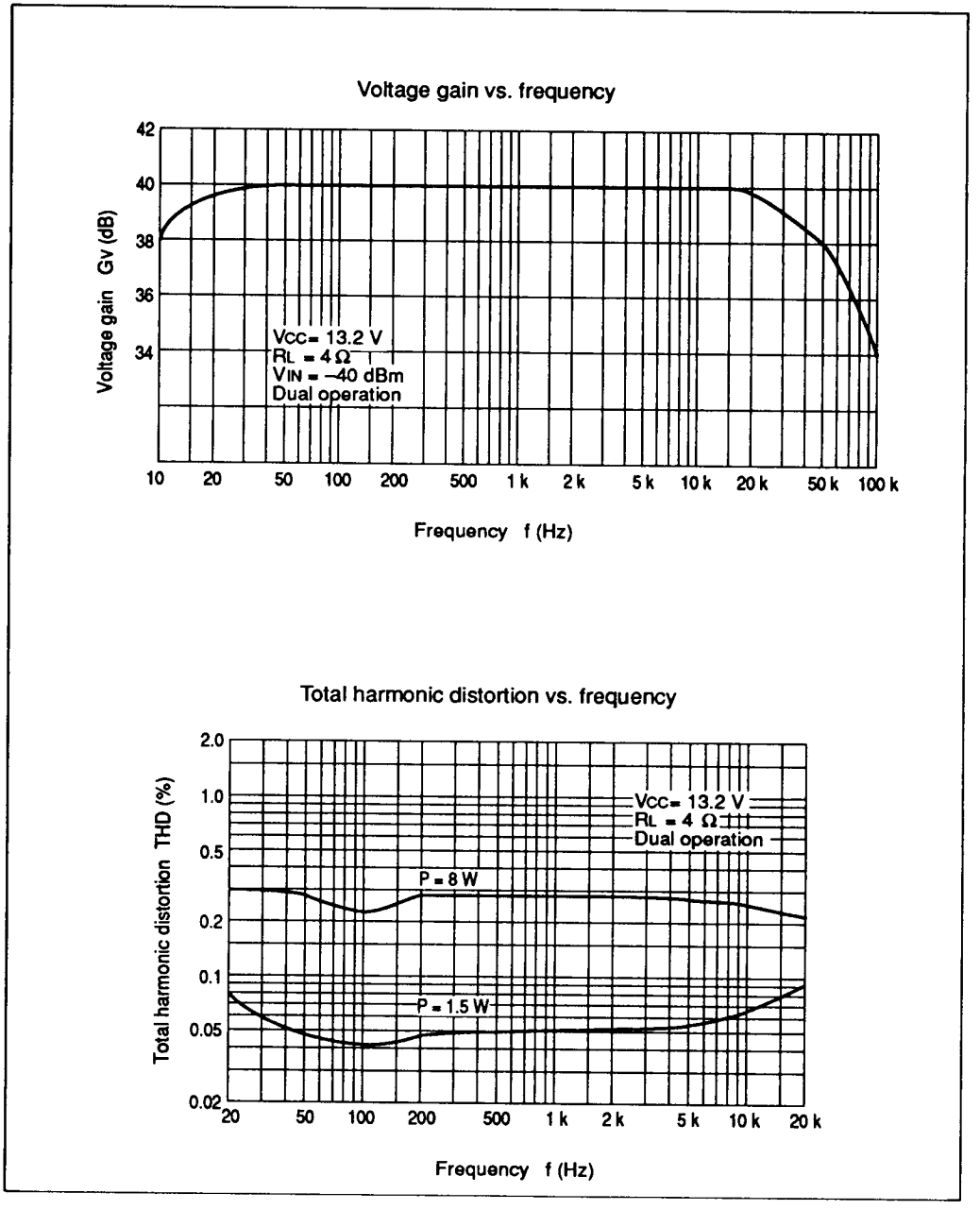


Figure 2 HA13130 Characteristic Curves (cont)

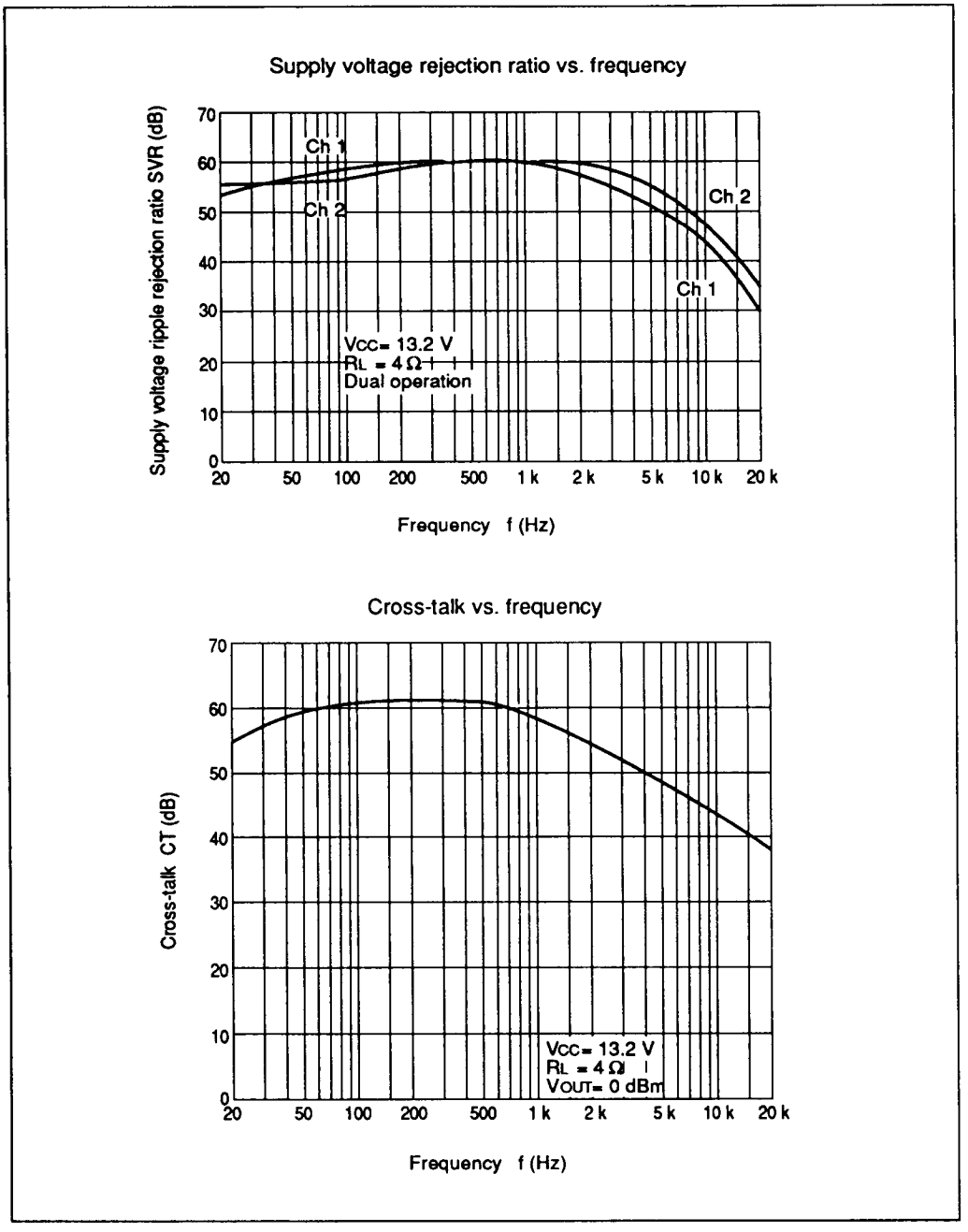


Figure 2 HA13130 Characteristic Curves (cont)

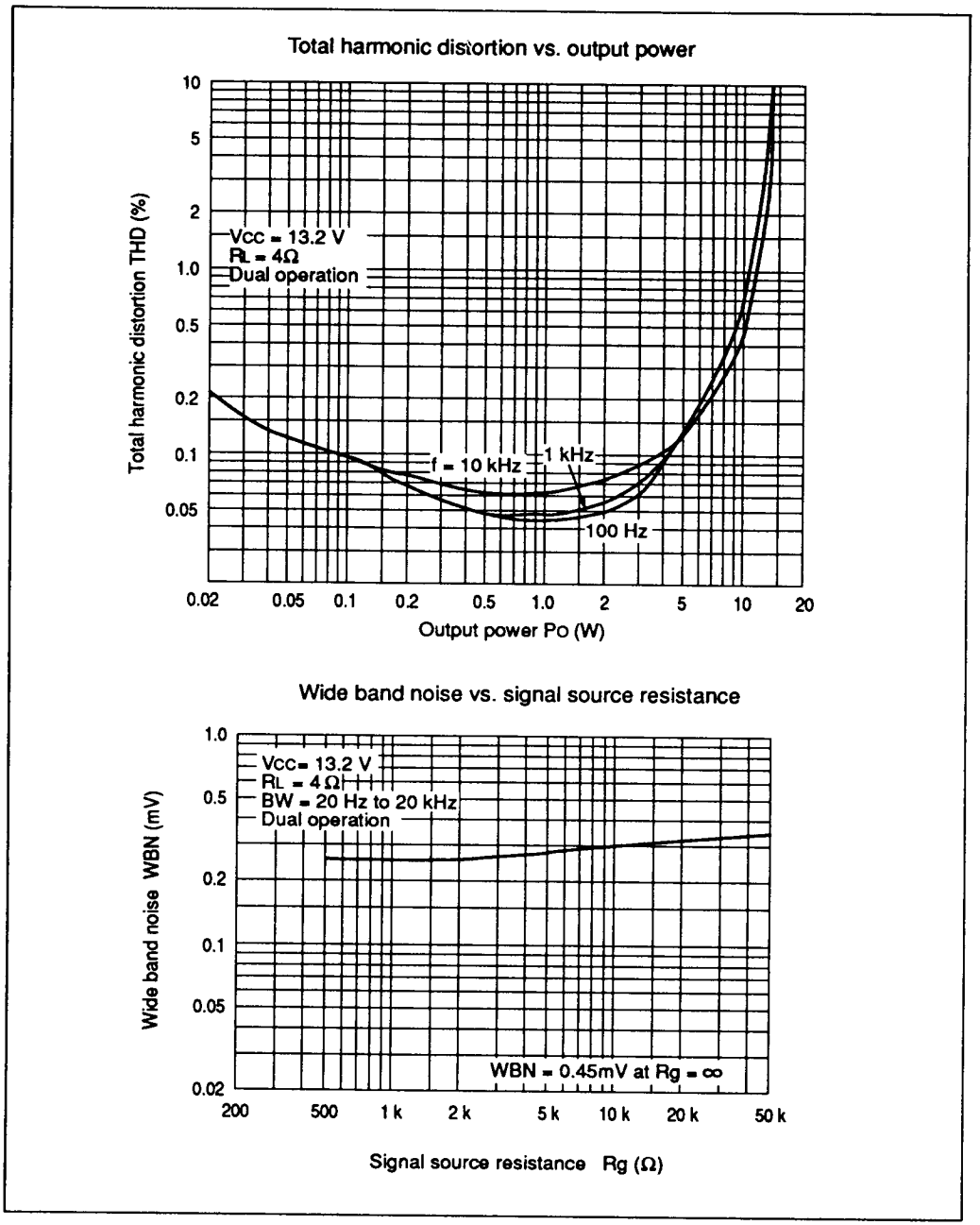


Figure 2 HA13130 Characteristic Curves (cont)

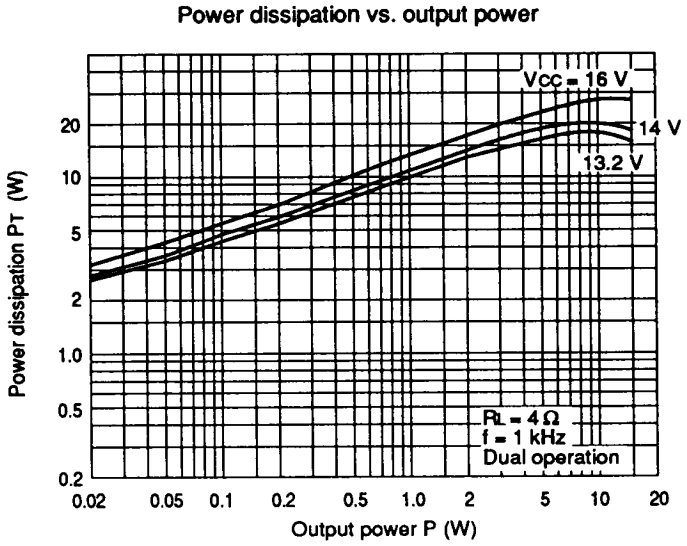
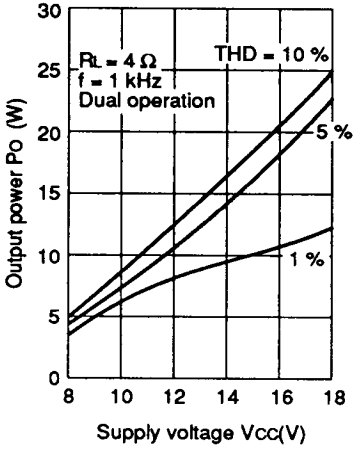


Figure 2 HA13130 Characteristic Curves (cont)

Power dissipation vs. output power (1)



Power dissipation vs. output power (2)

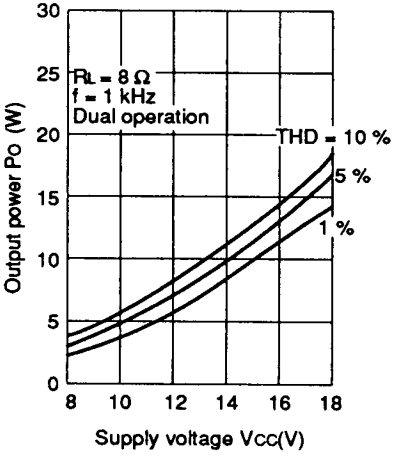
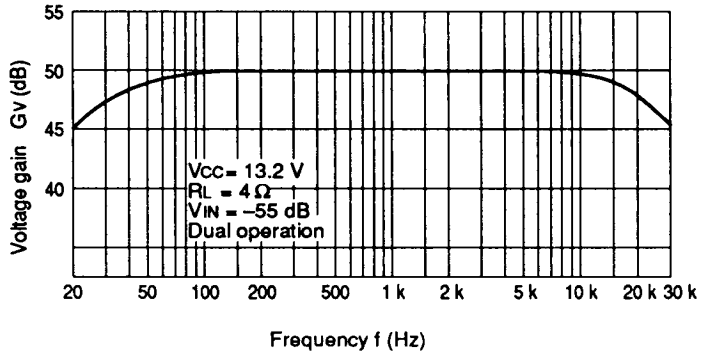


Figure 3 HA13127 Characteristic Curves

Voltage gain vs. frequency



Total harmonic distortion vs. frequency

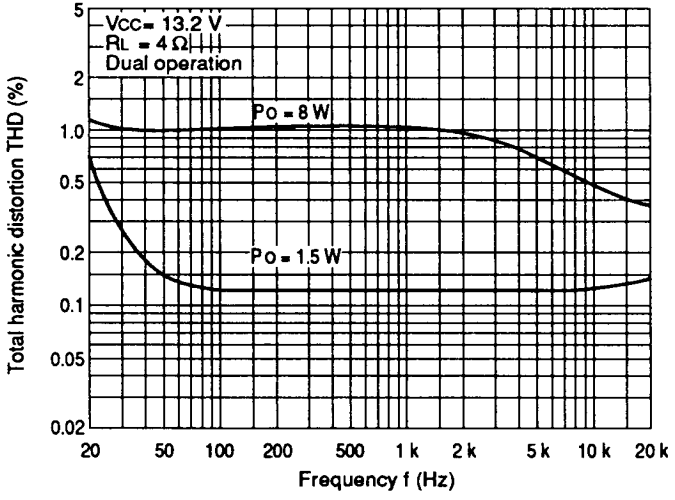
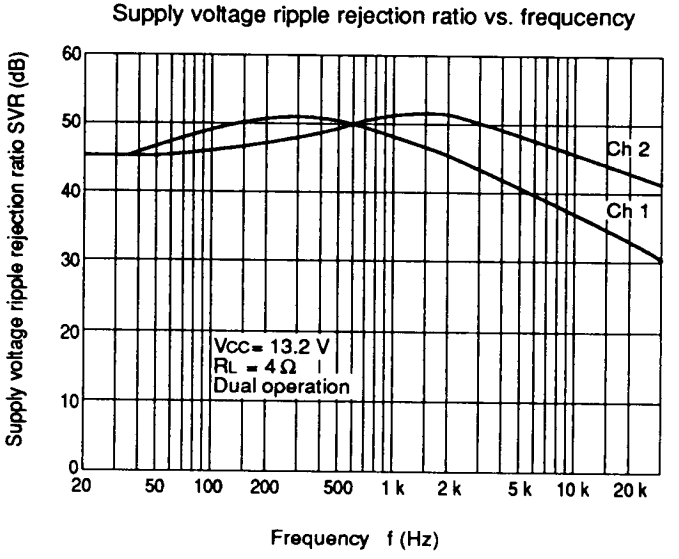


Figure 3 HA13127 Characteristic Curves (cont)



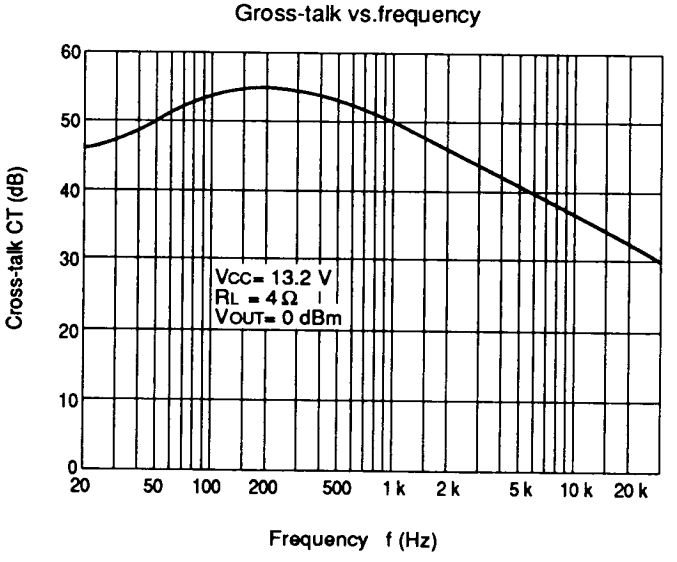
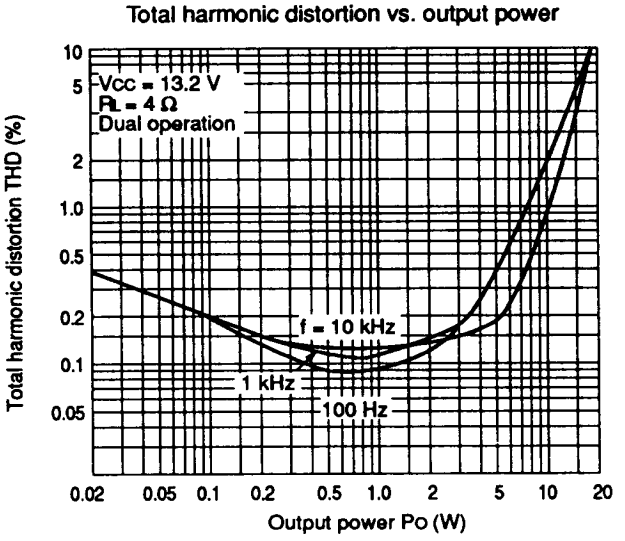


Figure 3 HA13127 Characteristic Curves (cont)



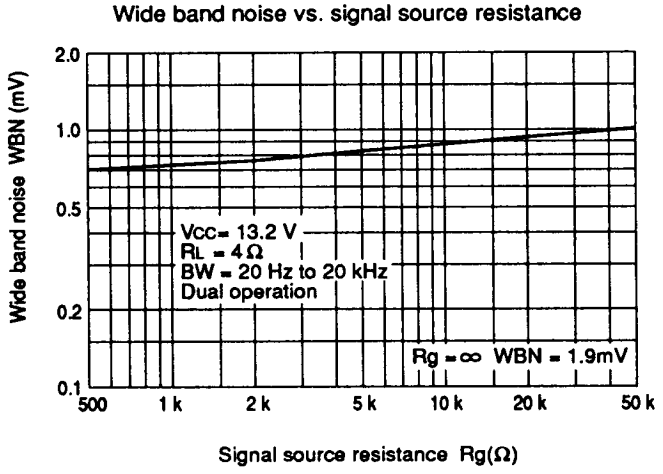


Figure 3 HA13127 Characteristic Curves (cont)