HA21008

BS Tuner Use GaAs IC

Preliminary

Application

GaAs monolithic IC
BS tuner wide band amplifier

Features

- 5V Operation
- Operational in all BS frequency (0.95 to 2.05 GHz)
- Stable input impedance (VSWR = 2 typ)
- Surface mount package

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Supply voltage	V_{cc}*	7	V
Maximum current	I_t	40	mA
Power dissipation	P_d**	200	mW
Channel temperature	Tch	125	°C
Storage temperature	Tstg	-55 to +125	°C
Operation temperature	Topr	-10 to +70	°C

* Operation voltage is 4.5 to 5.5V.

** Tc = 70 °C

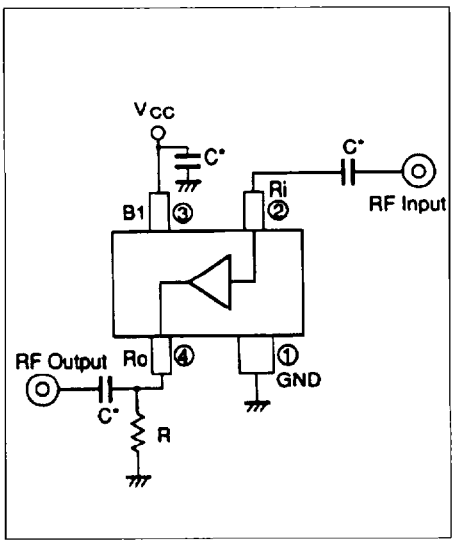
Electrical Characteristics (Ta = 25 °C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Quiescent current	I_o	18	—	32	mA	No signal
Power gain	PG	8	10.5	—	dB	f = 900 MHz
Noise figure	NF	—	8.5	—	dB	f = 900 MHz

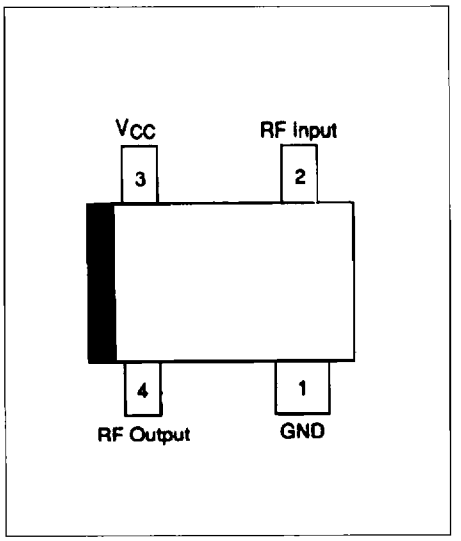
Typical Performance (Ta = 25 °C, V_{CC} = 5V)

Item	Symbol	Typ	Unit	Test Conditions
Power gain	PG	8	dB	f = 1.75 GHz
Noise figure	NF	9	dB	f = 1.5 GHz
3rd order intermodulation	IM3	55	dB	f = 900 MHz, Δf = 10 MHz -25 dBm, 2 RF input
Voltage standing wave ratio	VSWR	2	—	

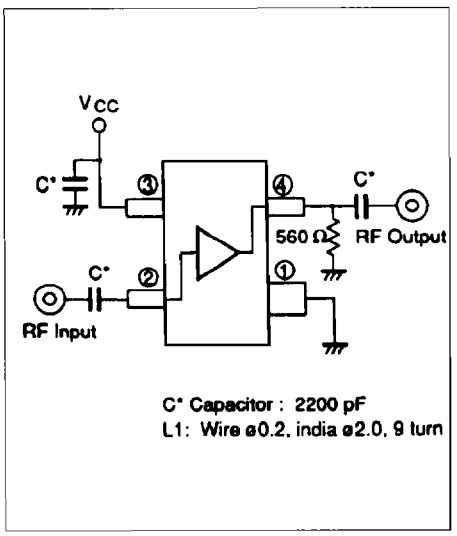
Block Diagram



Pin Arrangement



Test Fixture



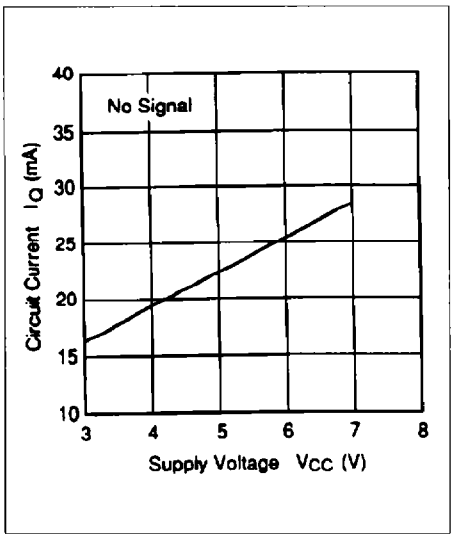


Figure 1 Circuit Current vs. Supply Voltage

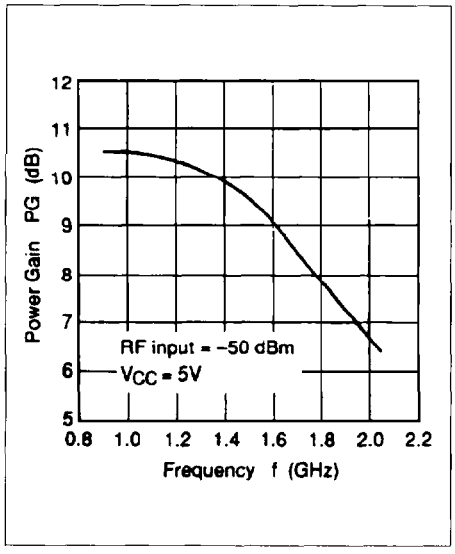


Figure 2 Power Gain vs. Frequency

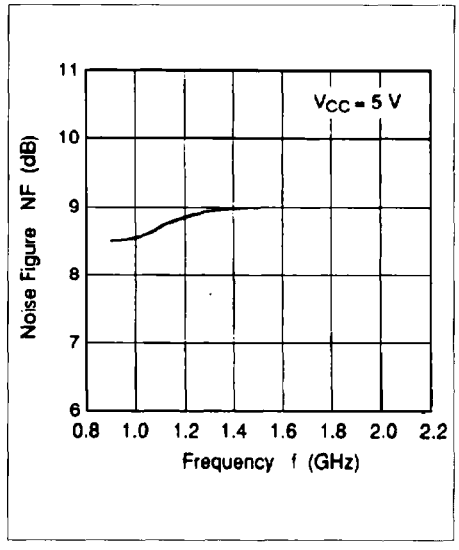


Figure 3 Noise Gain vs. Frequency

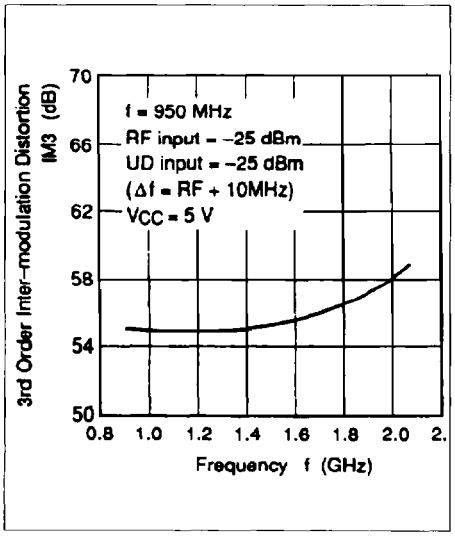


Figure 4 3rd Order Inter-modulation Distortion vs. Frequency

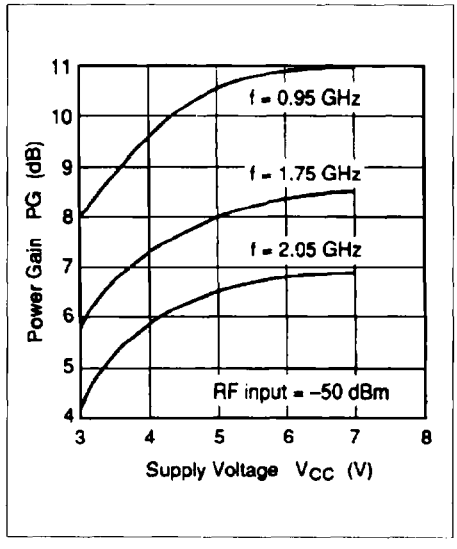


Figure 5 Power Gain vs. Supply Voltage

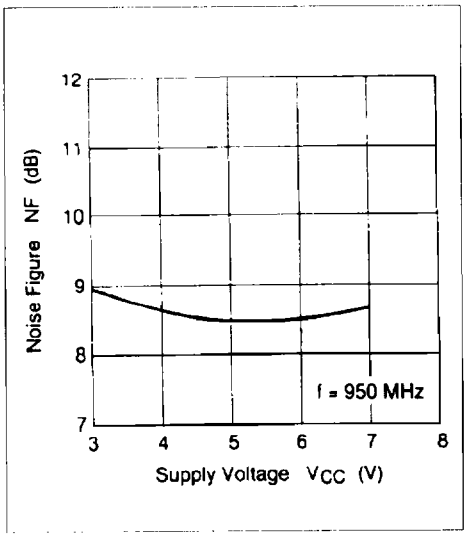


Figure 6 Noise Figure vs. Supply Voltage

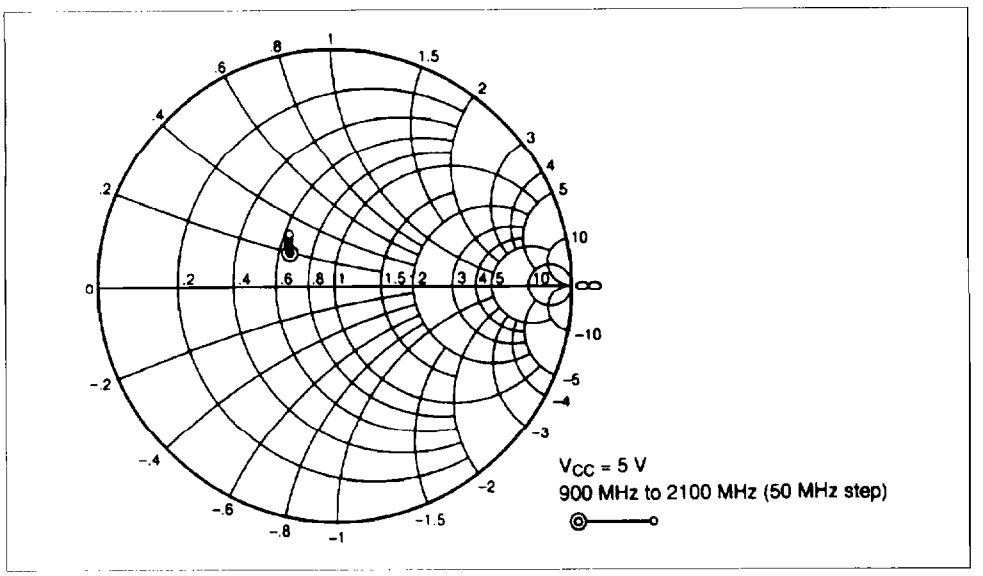


Figure 7 S_{11} vs. Frequency

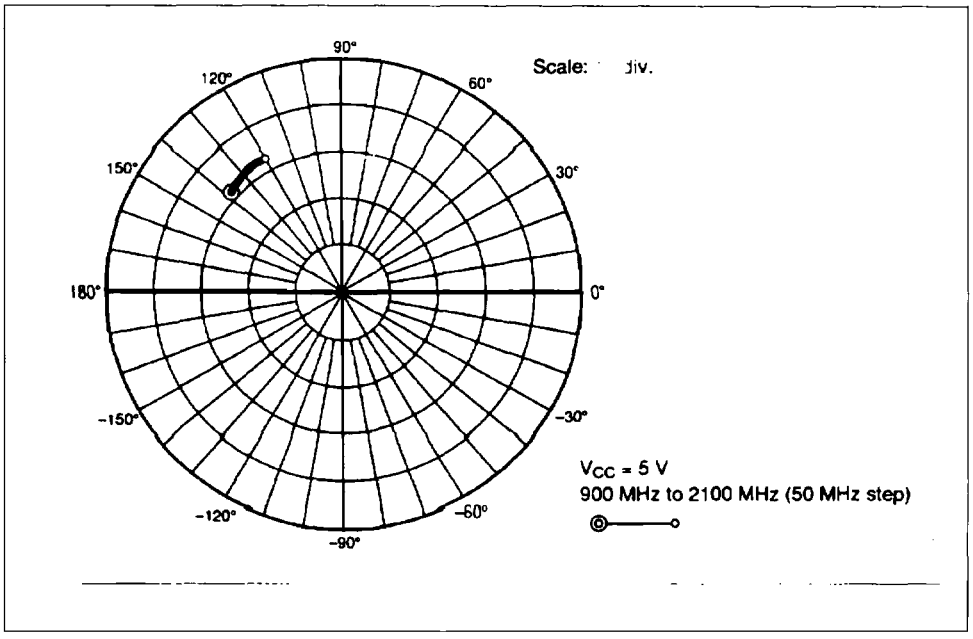


Figure 8 S_{21} vs. Frequency

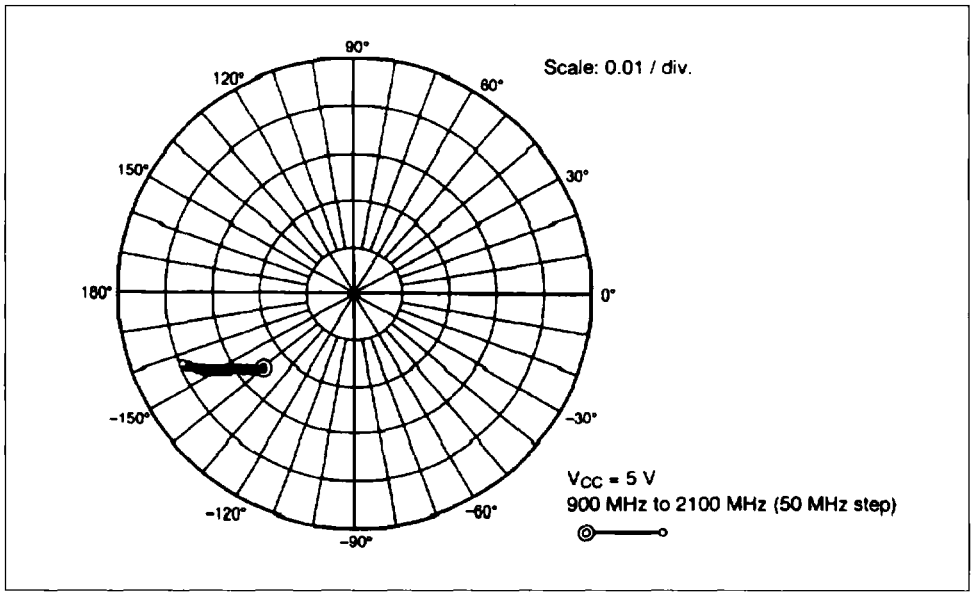


Figure 9 S_{12} vs. Frequency

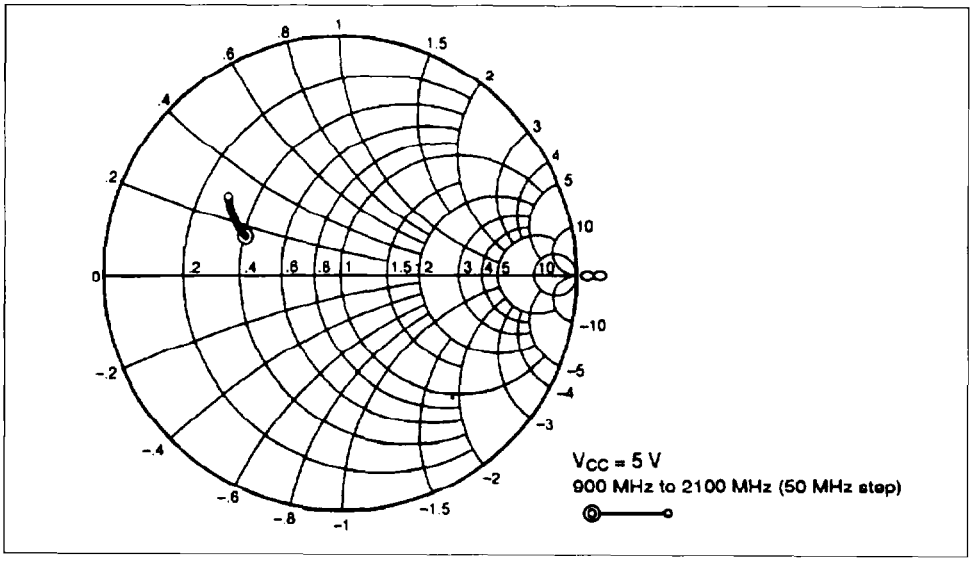
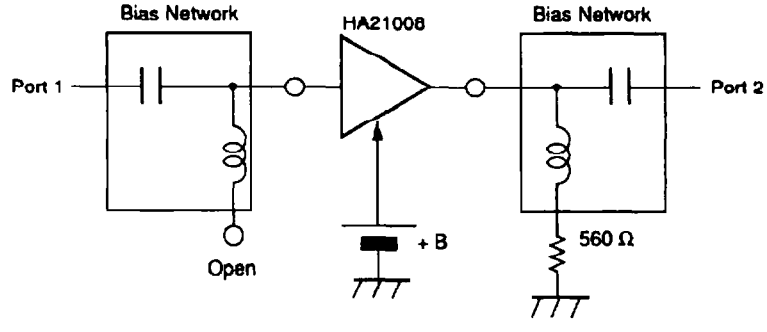


Figure 10 S_{22} vs. Frequency



Note: The output pin of HA21008 is connected FET's source so that the dissipation current is dependent of load resistor (560 Ω).
The S-parameters without load resistor are shown as follows, note the influences for load resistor at the circuit desining.

Figure 11 Equivalent Circuit for S-Parameter Measurement

S Parameter (HA21008) (Vcc = 5 V)

Frequency	S11		S21		S12		S22	
(MHz)	MAG	DEG	MAG	DEG	MAG	DEG	MAG	DEG
900	0.219	144.5	3.24	137.5	0.0249	-140.5	0.428	160.7
950	0.223	143.9	3.26	136.8	0.0250	-139.9	0.434	160.3
1000	0.224	143.6	3.26	136.1	0.0264	-141.2	0.438	159.8
1050	0.226	142.9	3.27	135.5	0.0267	-140.8	0.445	159.2
1100	0.230	142.5	3.29	134.7	0.0272	-142.6	0.450	158.8
1150	0.235	142.7	3.28	133.8	0.0276	-142.7	0.455	158.2
1200	0.234	142.2	3.28	133.0	0.0279	-144.5	0.461	157.6
1250	0.235	141.3	3.28	132.2	0.0289	-143.8	0.467	157.1
1300	0.241	141.7	3.28	131.8	0.0291	-144.9	0.471	156.5
1350	0.239	141.2	3.28	131.0	0.0297	-146.1	0.477	156.0
1400	0.240	139.8	3.28	130.1	0.0306	-146.6	0.482	155.4
1450	0.244	139.3	3.28	129.6	0.0311	-146.3	0.489	154.7
1500	0.250	139.1	3.31	129.0	0.0320	-147.4	0.495	154.2
1550	0.249	139.2	3.31	128.1	0.0323	-148.2	0.501	153.4
1600	0.257	138.9	3.31	127.5	0.0329	-149.6	0.507	152.8
1650	0.256	138.6	3.31	127.0	0.0337	-150.3	0.514	152.1
1700	0.256	137.1	3.33	125.6	0.0340	-151.1	0.520	151.4
1750	0.263	136.8	3.31	125.0	0.0352	-151.2	0.526	150.9
1800	0.263	135.9	3.32	124.3	0.0354	-151.7	0.532	150.3
1850	0.270	135.5	3.32	123.4	0.0361	-153.0	0.538	149.6
1900	0.274	135.8	3.32	122.5	0.0367	-153.9	0.544	149.0
1950	0.275	135.0	3.31	122.0	0.0375	-154.6	0.551	148.3
2000	0.273	134.4	3.31	121.1	0.0379	-14.9	0.557	147.7
2050	0.278	133.5	3.32	120.6	0.0392	-156.0	0.564	146.9
2100	0.281	133.5	3.32	120.0	0.0397	-156.5	0.570	146.2