HA21009MS

Preliminary

BS Tuner Use GaAs IC

Application

GaAs monolithic IC
BS tuner

Features

- 5V Operation
- BS tuner IC consists of mixer, RF AGC, IF AGC
- Operational in all BS frequency (0.95 to 2.05 GHz)
- Surface mount package

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Supply voltage	V_{CC}*	7	V
Maximum current	I_t	75	mA
Maximum input voltage	V_{in}**	±1	V
AGC voltage	V_{AGC}***	V_{CC} to 0	V
Power dissipation	P_d****	400	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.
** Applied to 3, 10, 15 and 16 pin.
*** Applied to 15 pin. At normal operation (V_{CC} = 4.5 to 5.5 V) AGC Voltage is 2.5 V to 0.
**** When mounted on glass epoxy PCB (40 mm x 40 mm x 1.5 mm^t) covered with copper more than 30%. (Ta = 70 °C)

Caution

This product uses GaAs. Since dust and fumes from GaAs are highly poisonous to the human body, do not treat the product mechanically or chemically in a manner which might release hazardous substances into the air. It should never be thrown out with general industrial or domestic wastes.

Electrical Characteristics (Ta = 25°C, V_{CC} = 5 V)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Quiescent current	I_Q	33	—	70	mA	No signal
Conversion gain	CG	18	25	34	dB	V_{agc} = 2.0 V
Gain reduction	GR	30	40	60	dB	V_{agc} = 2.0 V to 0.3 V

Note 1 All characteristics are measured with test fixture.
Note 2 Test condition is as follows unless otherwise specified.
RF = 990 MHz, IF = 480 MHz, P_{LOCAL} = 4 dBm, P_{RF} = –50 dBm

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

Item	Symbol	Typ	Unit	Test Conditions
Conversion gain	CG	35	dB	Vagc = 2.0 V
Gain reduction	GR	50	dB	Vagc = 2.0 V to 0.3 V
Noise figure	NF	8	dB	
2nd order intermodulation distortion	IM2	40	dB	GR = 30 dB, –25 dBm, 2 RF signal input
3rd order intermodulation distortion	IM3	50	dB	GR = 30 dB, –25 dBm, 2 RF signal input
Local leak level	LL_{RF}	–30	dBm	Leak to RF input
Local leak level	LL_{IF}	–15	dBm	Leak to IF output

Note 1 All characteristics are measured with evaluation circuit.
Note 2 Test condition is as follows unless otherwise specified.
RF = 990 MHz, IF = 480 MHz, P_{LOCAL} = 4 dBm, P_{RF} = –50 dBm

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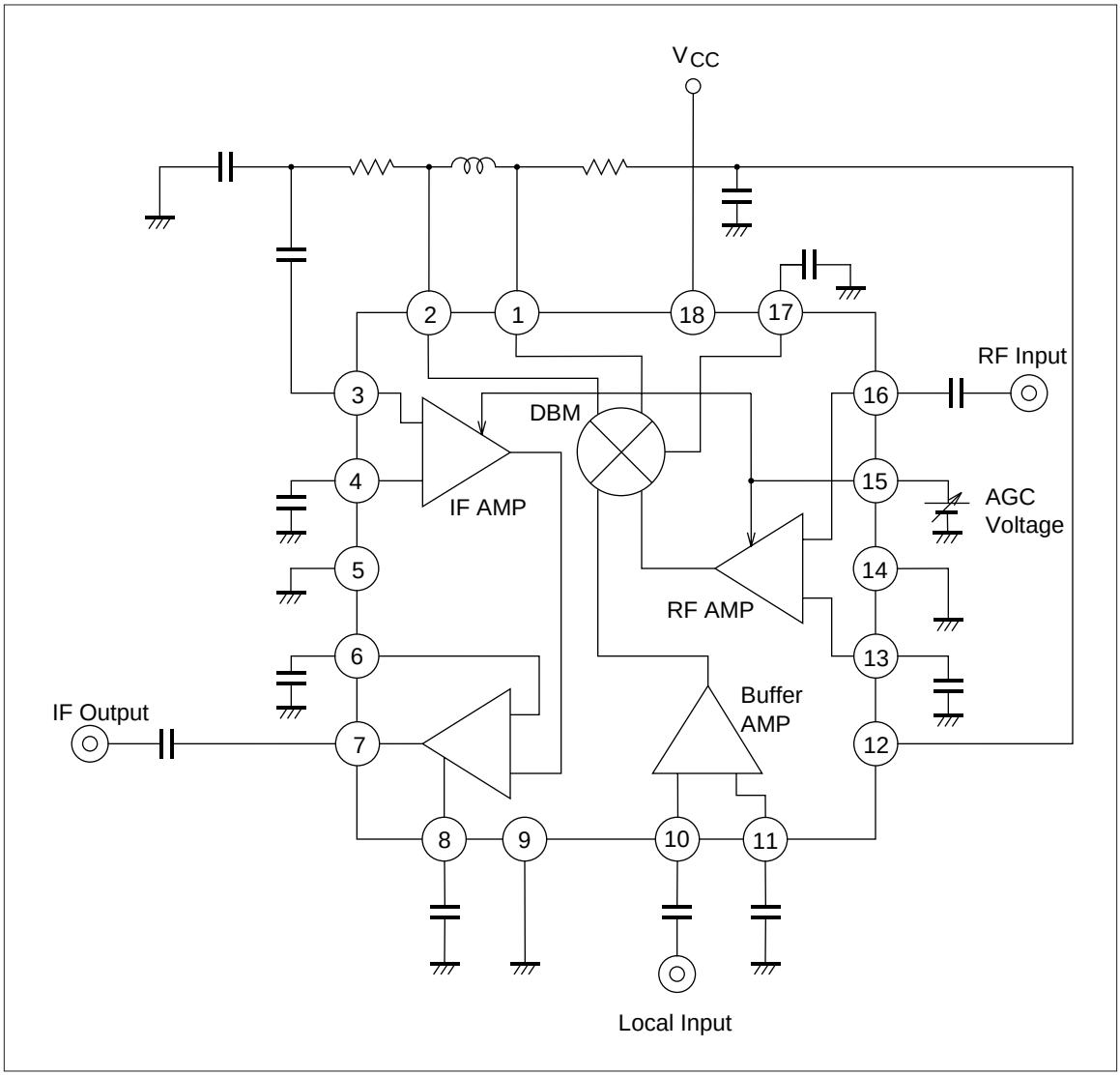
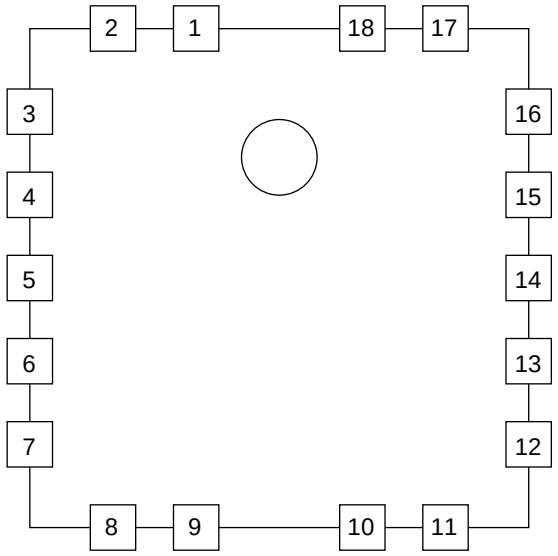
Block Diagram



Pin Arrangement



Pin No	Pin Name	Pin No	Pin Name
1	Mixer Out 1	10	Local Input
2	Mixer Out 2	11	AC GND 4
3	IF Input	12	Vcc1
4	AC GND 1	13	AC GND 2
5	GND	14	GND
6	AC GND 3	15	AGC
7	IF Output	16	RF Input
8	AC GND 5	17	Mixer AC GND
9	GND	18	Vcc2

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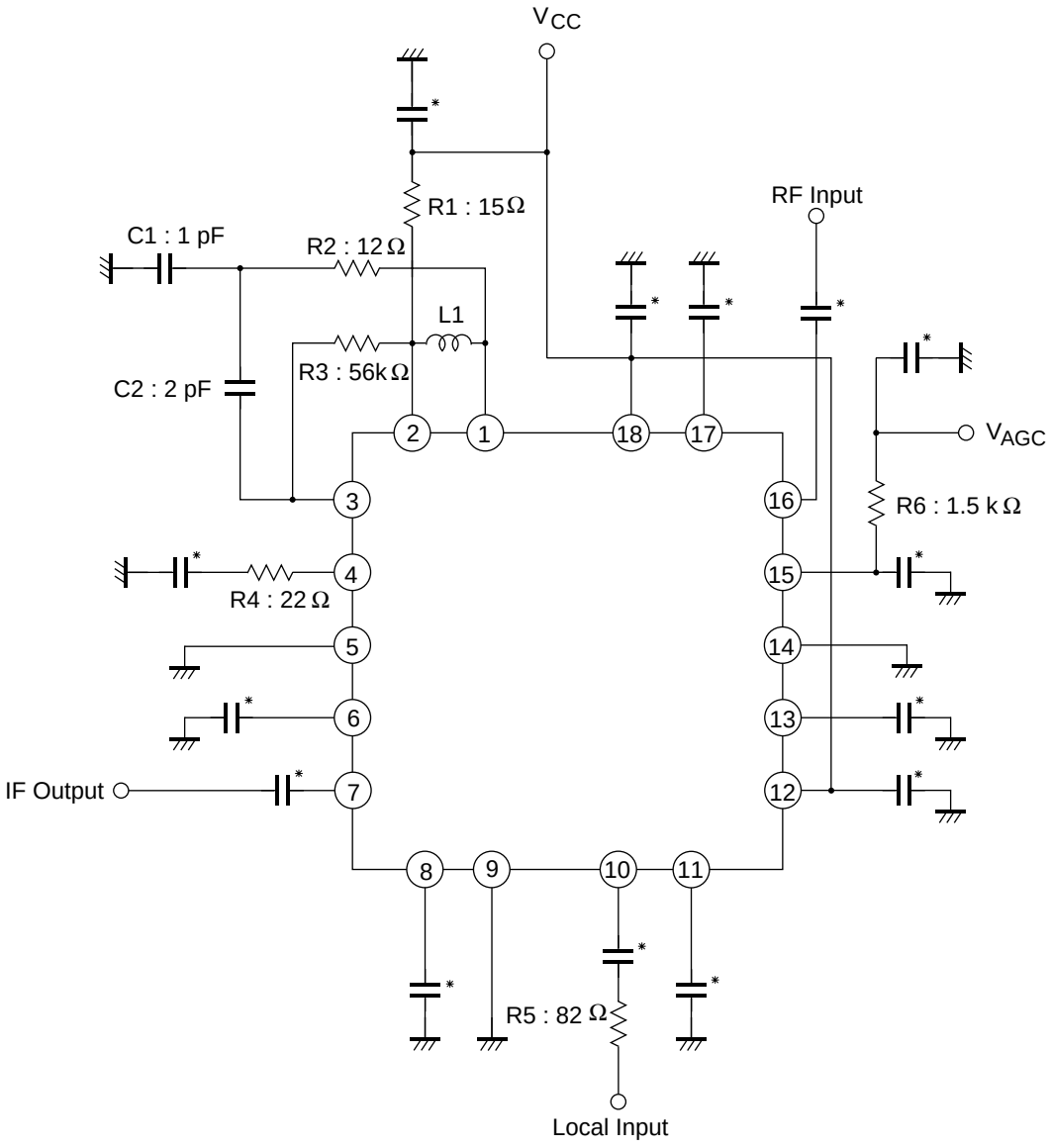
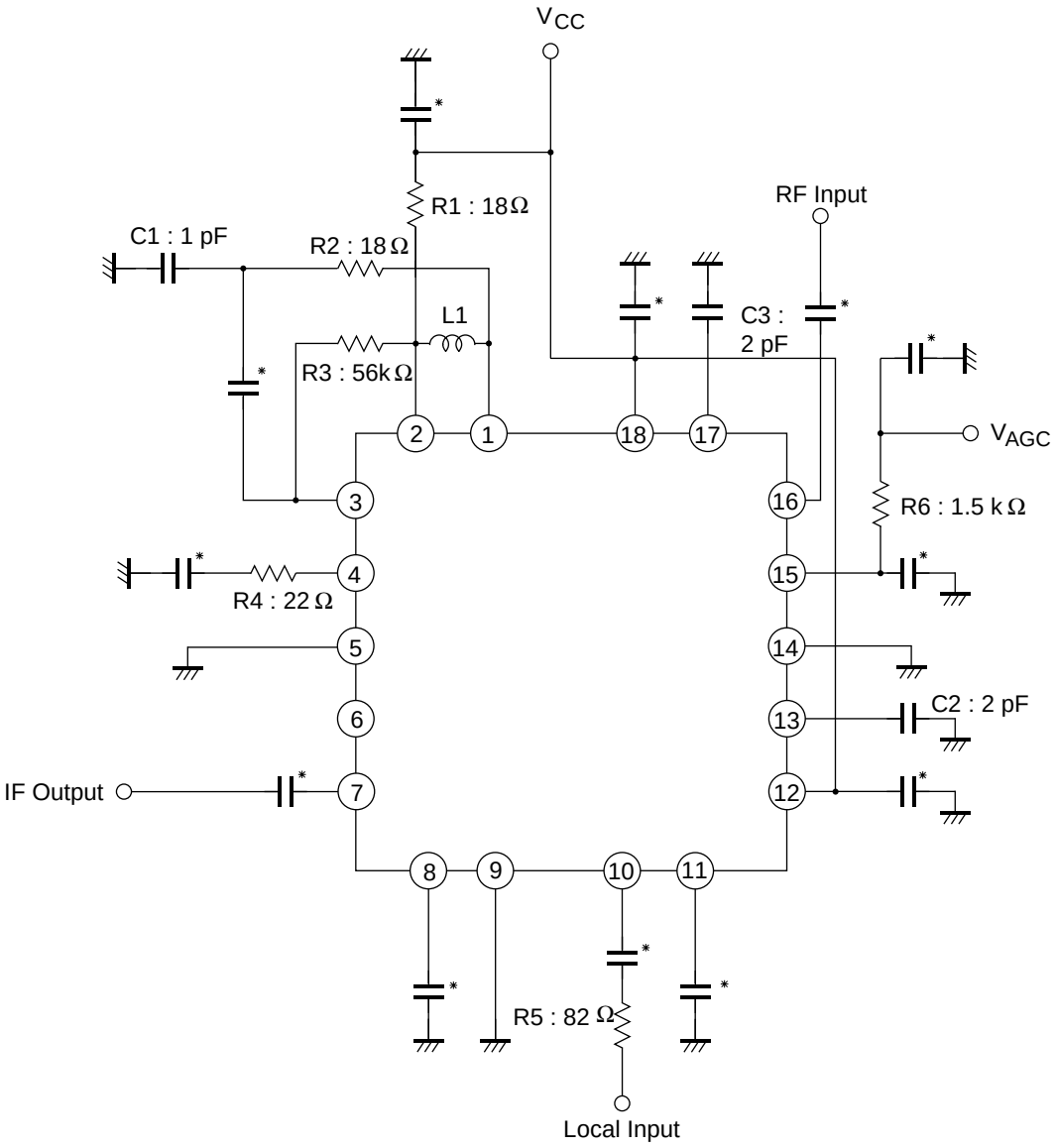
Test Fixture



Note 1. * Capacitor : 2200 pF

Note 2. L1 : ϕ0.5 mm Enameled Copper wire, Internal diameter = ϕ2.3 mm, t = 2.5 Turn.

Evaluation Circuit



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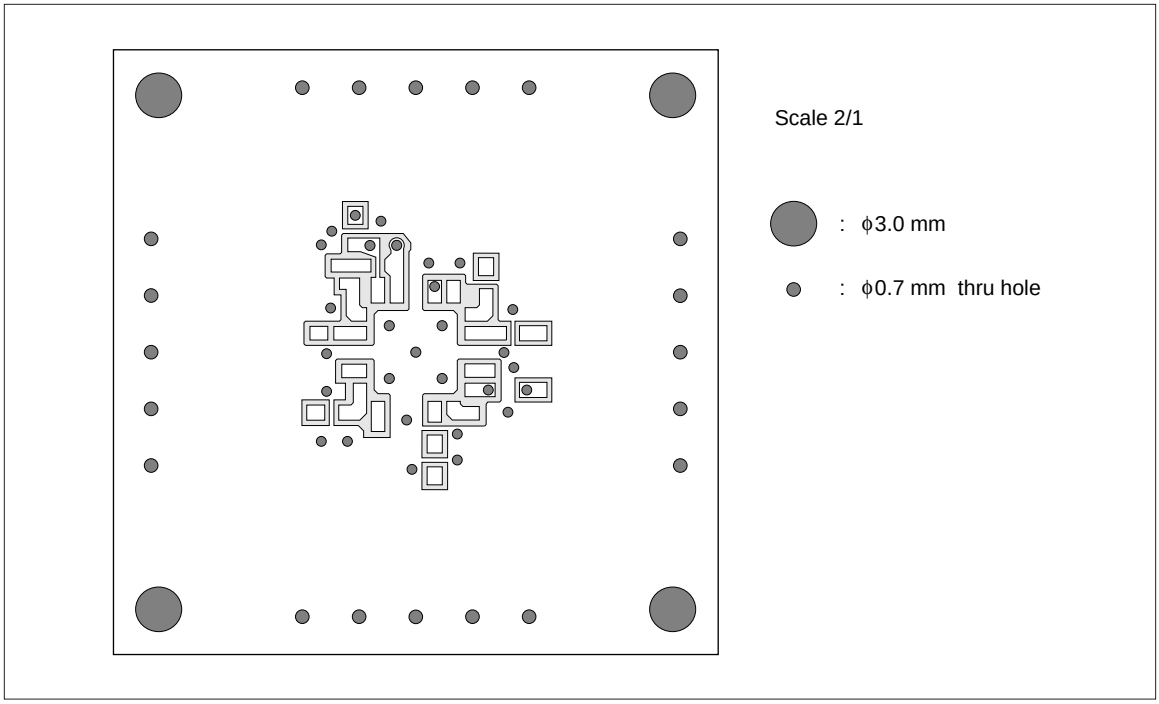

Figure 1 Front Side view of PCB Pattern

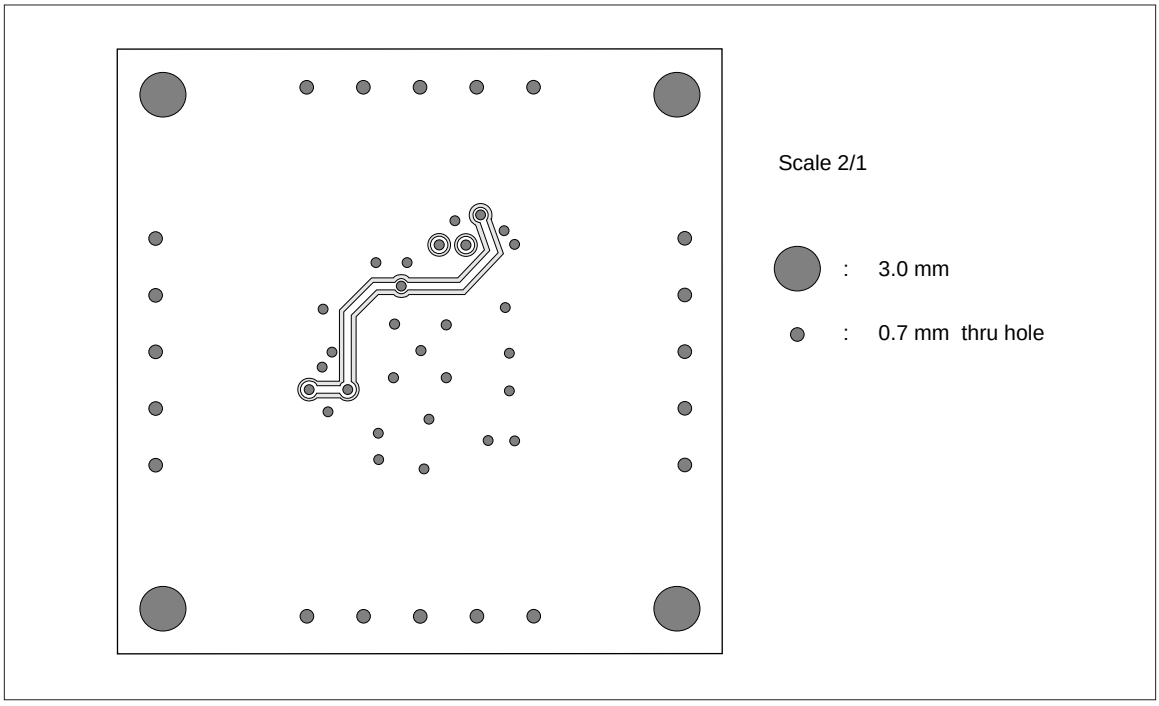

Figure 2 Back Side view of PCB Pattern

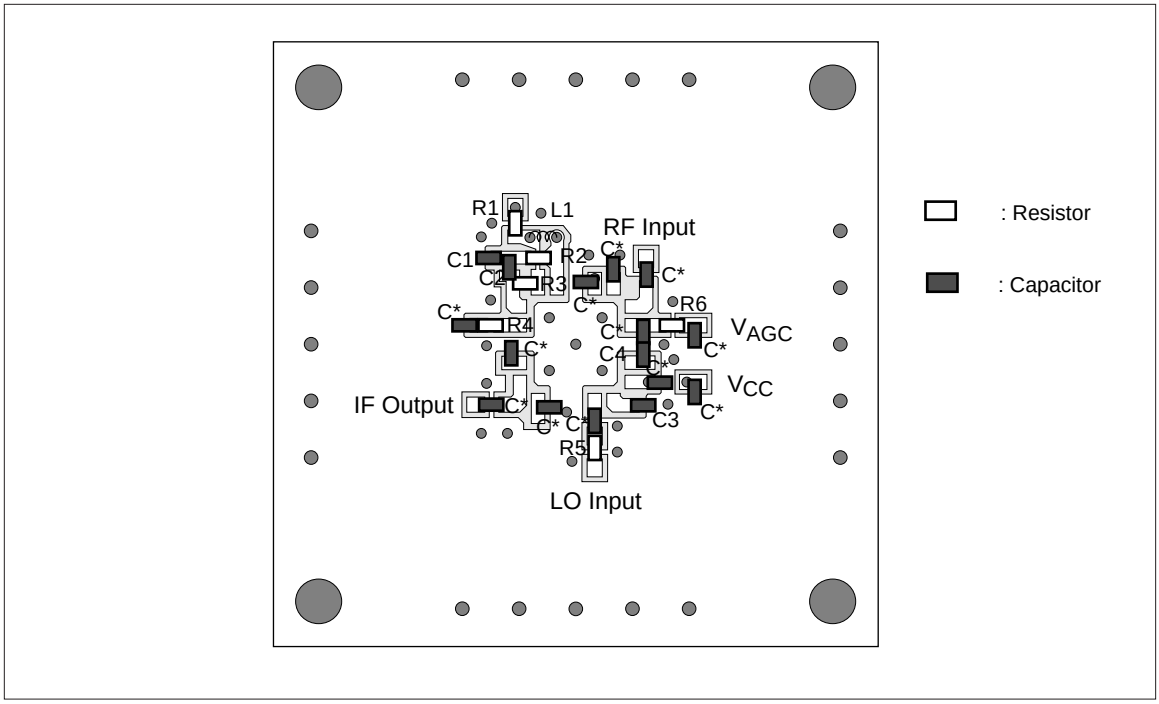

Figure 3 Front Side view of Parts Layout

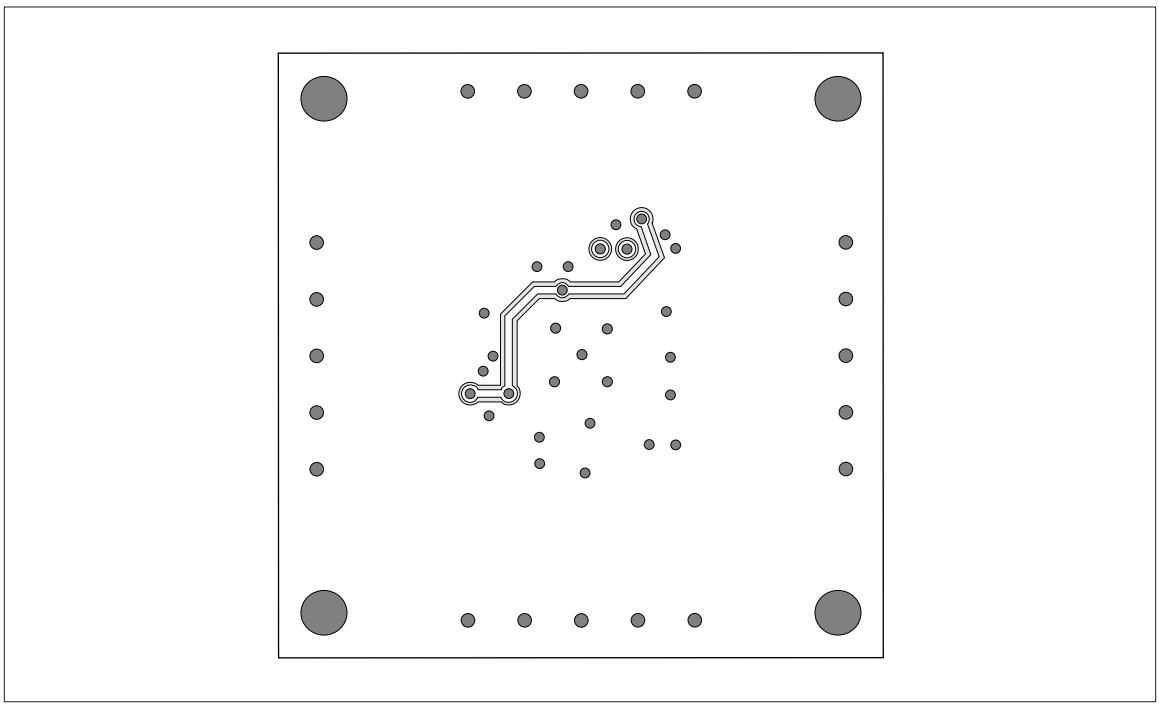

Figure 4 Back Side view of Parts Layout

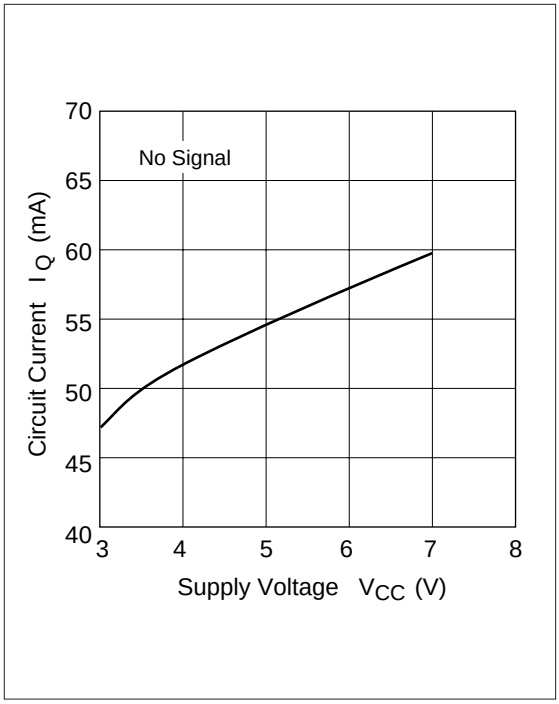

Figure 5 Circuit Current vs. Supply Voltage

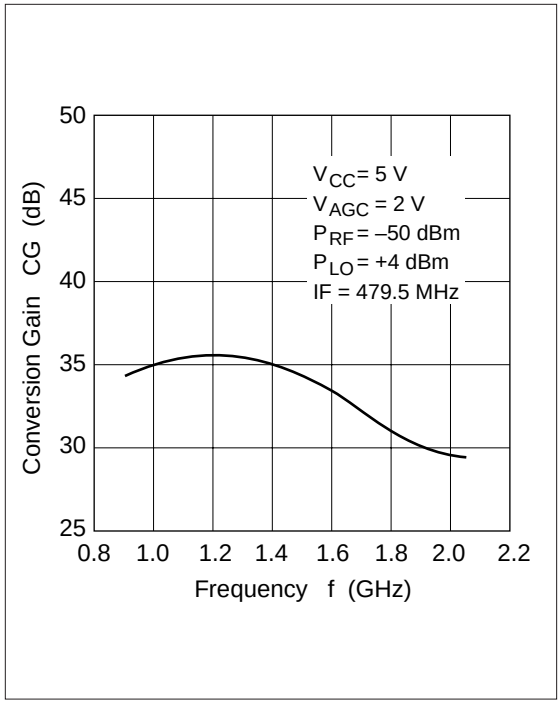

Figure 6 Conversion Gain vs. Frequency

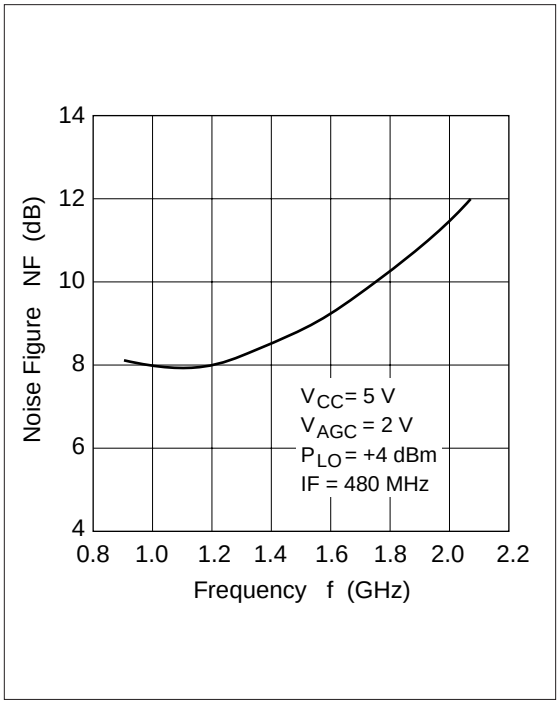

Figure 7 Noise Figure vs. Frequency

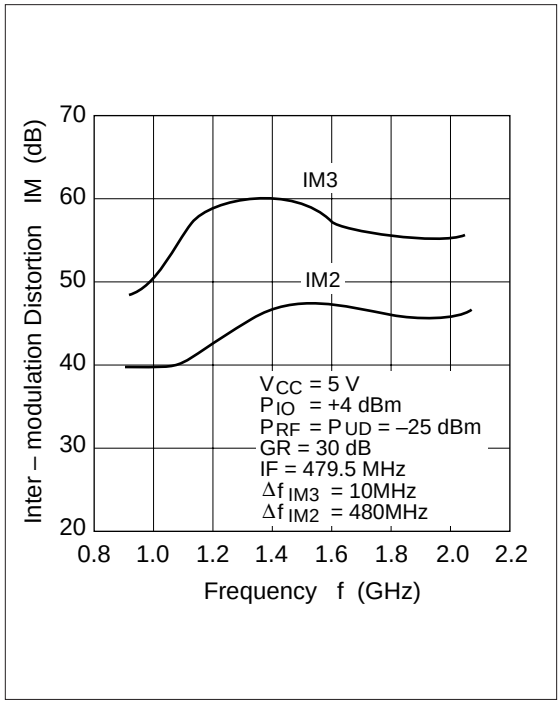

Figure 8 Inter–modulation Distortion vs. Frequency

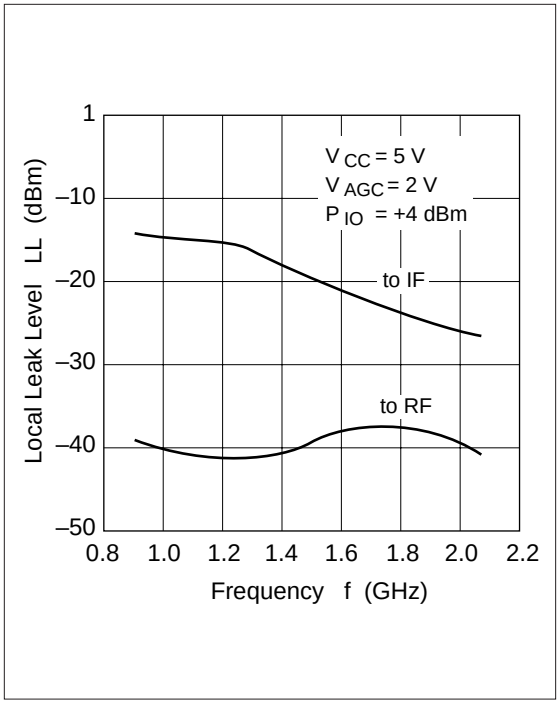

Figure 9 Local Leak Level vs. Frequency

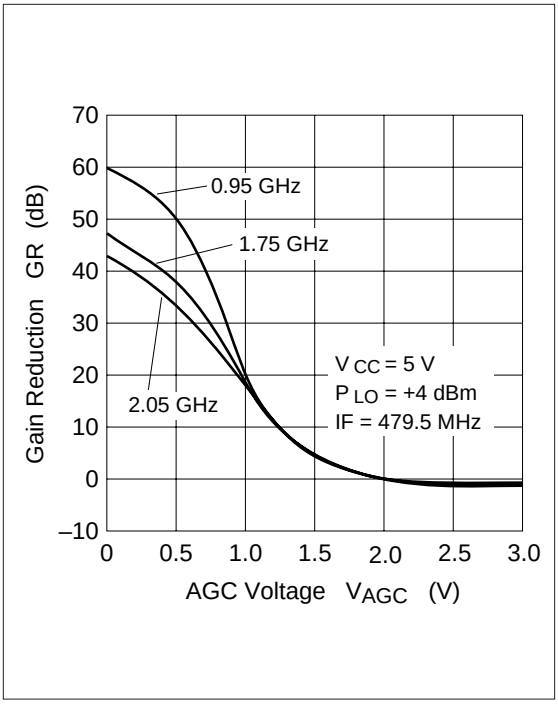

Figure 10 Gain Reduction vs. AGC Voltage

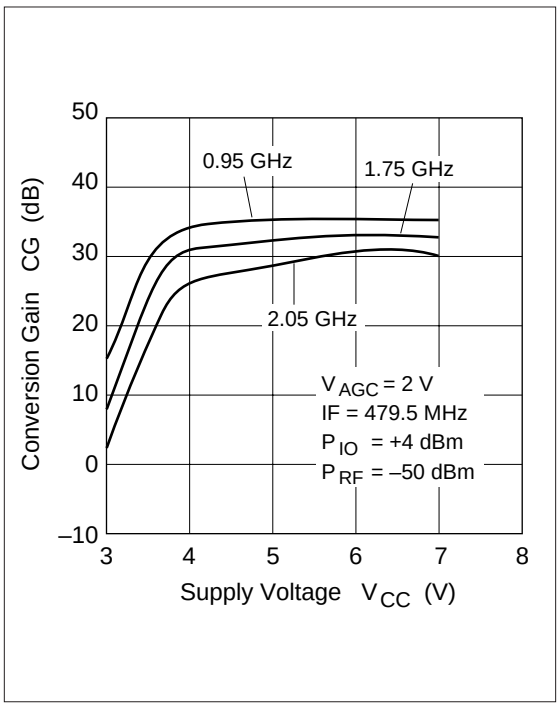

Figure 11 Conversion Gain vs. Supply Voltage

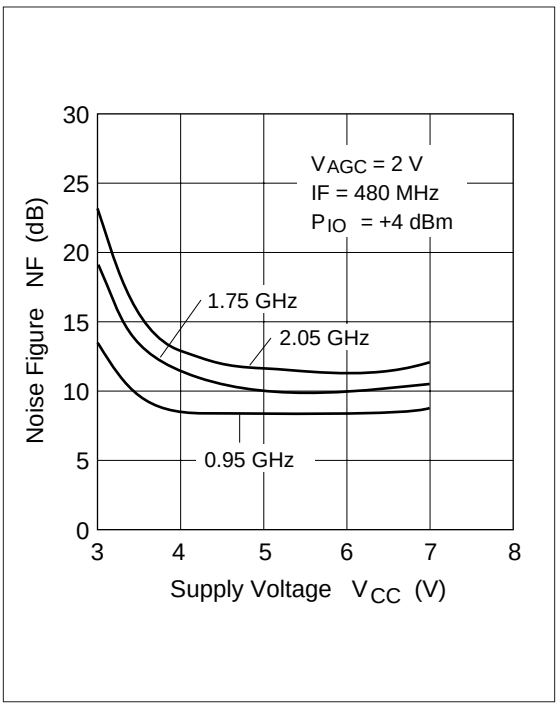

Figure 12 Noise Figure vs. Supply Voltage

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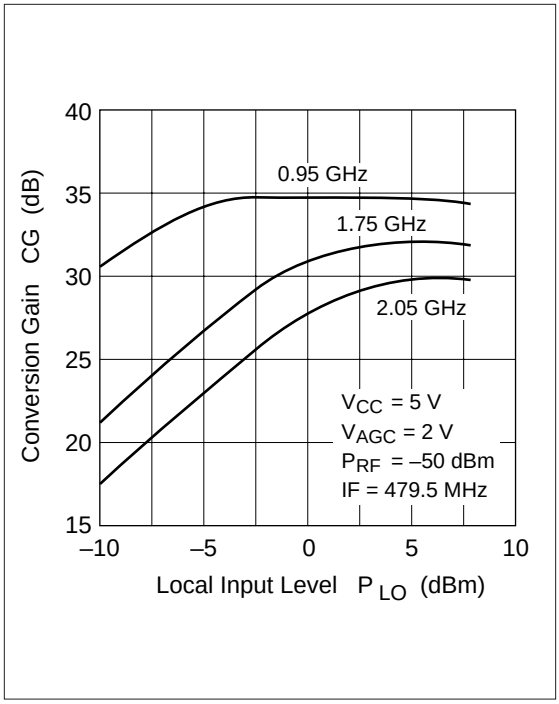

Figure 13 Conversion Gain vs. Local Input Level

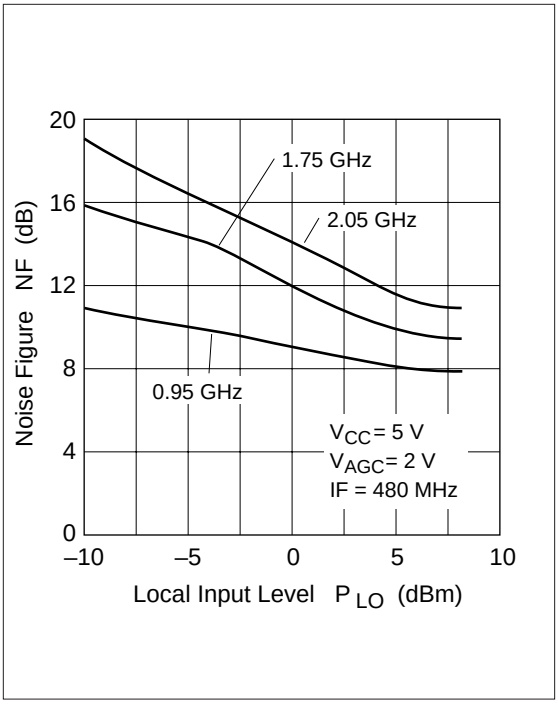

Figure 14 Noise Figure vs. Local Input Level