

APPLICATION INFORMATION

Demoboard for the BGA2001 (900 and 1800 MHz)

Application Note

**Demoboard for the BGA2001
(900 and 1800 MHz)**

Application Note**SUMMARY****• Description of products**

BGA2001: RF transistor with internal bias circuit. Benefit is lower component count, internal compensation for temperature and current gain spread.

• Application Area

Low noise amplifiers for systems like GSM, DECT, DCS with low component count.

• Presented Applications

The applications present low noise amplifiers at 900 and 1800 MHz at 3 V supply voltage and 4.4 mA supply current with matching components.

• Main results

An amplifier has been designed and tested with 16.6 dB gain, IIP3 = -7.4 dBm, VSWR_{in} = 2.0, VSWR_{out} = 2.1, 1.65 dB Noise Figure at 900 MHz, 3 V and 4.4 mA supply.

An amplifier has been designed and tested with 13 dB gain, IIP3 = -4.5 dBm, VSWR_{in} = 1.3, VSWR_{out} = 1.2, 1.6 dB Noise Figure at 1800 MHz, 3 V and 4.4 mA supply.

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APPLICATION 900 MHz WITH MINIMUM COMPONENTS

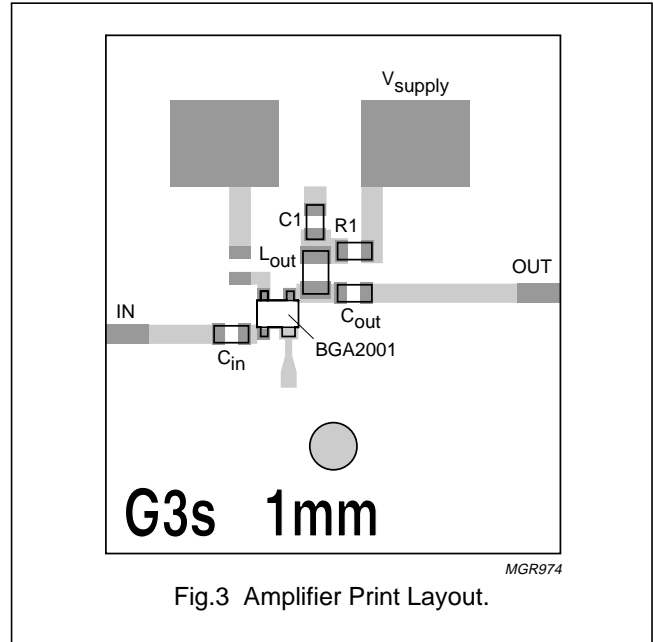
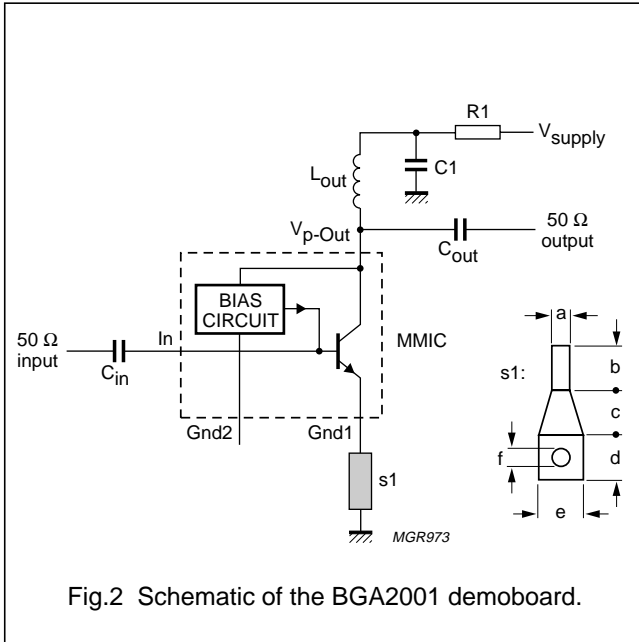


Table 1 Used components for the BGA2001, 900 MHz version of the demoboard

COMPONENT	VALUE	UNIT	SIZE - MANUFACTURER	PURPOSE, COMMENT
R1	120	Ω	0603 Philips	DC-bias
C1	47	pF	0603 Philips	RF-short to ground
C _{in}	470	pF	0603 Philips	DC-decoupling
L _{out}	15	nH	0603 TDK MLG1608	output match
C _{out}	1.8	pF	0603 Philips	output match
s1	–	–	PCB-stripline 50 Ω, via	a = 0.5 mm, b = c = d = e = 1 mm and f = 0.4 mm
MMIC	BGA2001	–	Philips SOT343R2	marking A1
PCB	–	–	FR4	ε _R ~ 4.6, H = 0.5 mm

Table 2 Measured values

V_{supply} = 3.0 V, I_{supply} = 4.38 mA.

S-PARAMETER	800 MHz	900 MHz	1000 MHz	UNIT
S ₁₁	-6.123	-9.314	-11.109	dB
S ₂₁	17.774	16.601	15.269	dB
S ₁₂	-25.817	-25.432	-25.251	dB
S ₂₂	-15.079	-8.879	-6.319	dB
NF	1.65	1.60	1.70	dB
IIP3; note 1	–	-7.4	–	dBm

Note

1. IIP3 measured at -28 dBm input level, Δf = 200 kHz.

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APPLICATION 1.8 GHz WITH MINIMUM COMPONENTS

Table 3 Used components for the BGA2001, 1800 MHz version of the demoboard

COMPONENT	VALUE	UNIT	SIZE - MANUFACTURER	PURPOSE, COMMENT
R1	120	Ω	0603 Philips	DC-bias
C1	6.8	pF	0603 Philips	RF-short to ground
C _{in}	18	pF	0603 Philips	input match, DC-decoupling
L _{out}	5.6	nH	0603 TDK MLG1608	output match
C _{out}	1.2	pF	0603 Philips	output match
s1	–	–	PCB-stripline 50 Ω , via	a = 0.5 mm, b = c = d = e = 1 mm and f = 0.4 mm
MMIC	BGA2001	–	Philips SOT343R2	marking A1
PCB	–	–	FR4	$\epsilon_R \sim 4.6$, H = 0.5 mm

Table 4 Measured values

$V_{\text{supply}} = 3.0 \text{ V}$; $I_{\text{supply}} = 4.45 \text{ mA}$.

S-PARAMETER	1.7 GHz	1.8 GHz	1.9 GHz	UNIT
S ₁₁	–9.675	–11.974	–13.7	dB
S ₂₁	12.066	11.244	10.9	dB
S ₁₂	–18.735	–18.453	–17.8	dB
S ₂₂	–15.805	–10.424	–9.3	dB
NF	1.47	1.48	1.62	dB
IIP3; note 1	–	–4.5	–	dBm

Note

1. IIP3 measured at –25 dBm input level, $\Delta f = 200 \text{ kHz}$.

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NOTES

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