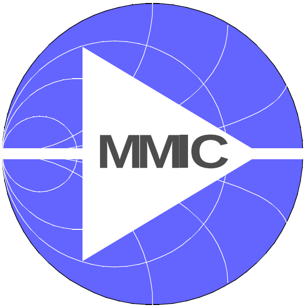
Data sheet, BGA416, June 2002

BGA416

RF Cascode Amplifier



Wireless
Silicon Discretes

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Never stop thinking.

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BGA416
Data sheet
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Page	Subjects (major changes since last revision)
	Preliminary status removed

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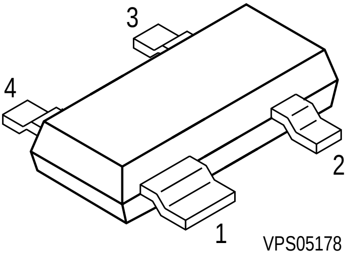
RF Cascode Amplifier **BGA416**

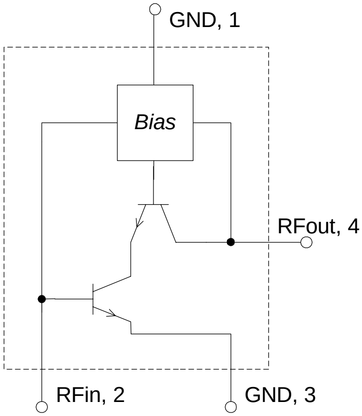
Features

- G_{MA} = 23dB at 900MHz
- Ultra high reverse isolation, 62 dB at 900MHz
- Low noise figure, $F_{50\Omega}$ = 1.3dB at 900MHz
- On chip bias circuitry, 5.5 mA bias current at V_{CC} = 3V
- Typical supply voltage: 2.5 to 5.0V
- SIEGET®-25 technology



Applications

- Buffer amplifiers
- LNAs
- Oscillator active devices



Description

BGA416 is a monolithic silicon cascode amplifier with high reverse isolation. A bias network is integrated for simplified biasing.

ESD: Electrostatic discharge sensitive device, observe handling precaution!

Type	Package	Marking	Chip
BGA416	SOT143	C1s	T0553

Maximum Ratings

Parameter	Symbol	Value	Unit
Voltage at pin RFout	V_{OUT}	6	V
Current into pin RFin	I_{IN}	0.5	mA
Device current [1]	I_D	20	mA
Input power	P_{IN}	8	dBm
Total power dissipation, T_S < 123°C [2]	P_{tot}	100	mW
Junction temperature	T_j	150	°C
Ambient temperature range	T_A	-65 ... +150	°C
Storage temperature range	T_{STG}	-65 ... +150	°C
Thermal resistance: junction-soldering point	$R_{th\ JS}$	270	K/W

Notes:
All Voltages refer to GND-Node
[1] Device current is equal to current into pin RFout
[2] T_S is measured on the ground lead at the soldering point

Electrical Characteristics at T_A=25°C (measured in test circuit specified in fig. 1)
V_{CC}=3V, unless otherwise specified

Parameter		Symbol	min.	typ.	max.	Unit
Maximum available power gain	f=0.9GHz f=1.8GHz	G_{MA}		23 14		dB
Insertion power gain	f=0.9GHz f=1.8GHz	$\|S_{21}\|^2$		17 11		dB
Reverse isolation	f=0.9GHz f=1.8GHz	$\|S_{12}\|$		62 40		dB
Noise figure (Z_S=50Ω)	f=0.9GHz f=1.8GHz	$F_{50\Omega}$		1.3 1.6		dB
Output power at 1dB gain compression (Z_S=Z_L=50Ω)	f=0.9GHz f=1.8GHz	P_{-1dB}		-3 -3		dBm
Output third order intercept point (Z_S=Z_L=50Ω)	f=0.9GHz f=1.8GHz	OIP_3		14 14		dBm
Device current		I_D		5.5		mA

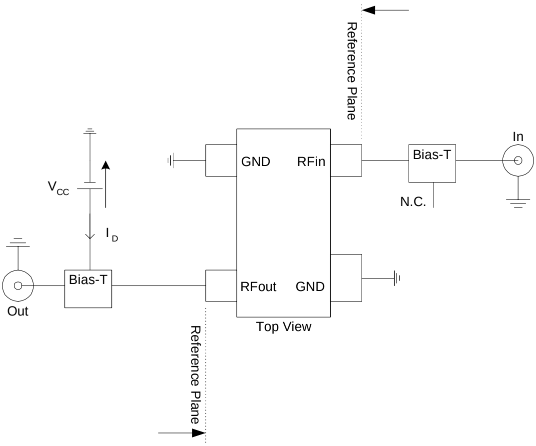


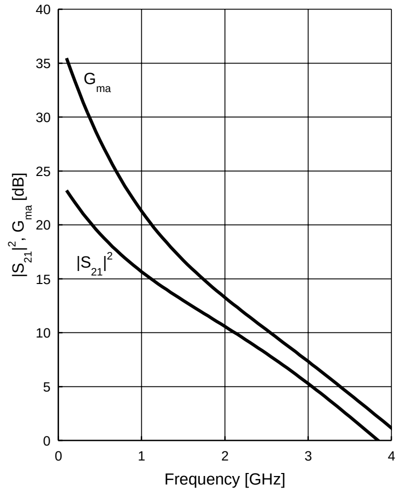
Fig. 1: Test Circuit for Electrical Characteristics and S-Parameter

S-Parameter V_{CC}=3V, I_D=5.5mA (see Electrical Characteristics for conditions)

Frequency [GHz]	**S11 Mag**	**S11 Ang**	**S21 Mag**	**S21 Ang**	**S12 Mag**	**S12 Ang**	**S22 Mag**	**S22 Ang**
0.1	0.7881	-6.9	12.1310	166.8	0.0017	10.9	0.8974	-4.9
0.2	0.7832	-13.3	11.9280	156.0	0.0004	-16.6	0.8895	-9.0
0.4	0.6986	-23.8	10.3940	134.3	0.0009	41.6	0.8708	-17.5
0.6	0.6335	-31.4	8.9867	116.3	0.0016	20.7	0.8489	-25.7
0.8	0.5666	-37.3	7.5805	100.8	0.0006	-5.4	0.8143	-34.2
1.0	0.5158	-41.6	6.4187	87.7	0.0006	-7.2	0.7776	-42.1
1.2	0.4744	-44.5	5.4350	76.6	0.0014	-103.4	0.7257	-49.6
1.4	0.4503	-47.4	4.6957	66.2	0.0034	-132.9	0.6850	-56.7
1.6	0.4272	-50.4	4.0607	57.5	0.0059	-143.2	0.6530	-64.0
1.8	0.4204	-53.3	3.5686	49.2	0.0092	-152.6	0.6195	-71.1
2.0	0.4056	-56.4	3.1353	41.0	0.0129	-156.9	0.5867	-78.2
2.4	0.4071	-63.5	2.4957	26.7	0.0233	-170.1	0.5298	-92.9
3.0	0.4168	-78.1	1.7687	6.0	0.0465	171.9	0.4562	-117.4
4.0	0.4615	-110.1	0.9839	-24.7	0.1017	143.4	0.3892	-163.8
5.0	0.5467	-148.7	0.4451	-46.1	0.1758	113.0	0.3894	152.0
6.0	0.6187	176.8	0.1983	-21.9	0.2483	84.2	0.4008	120.6

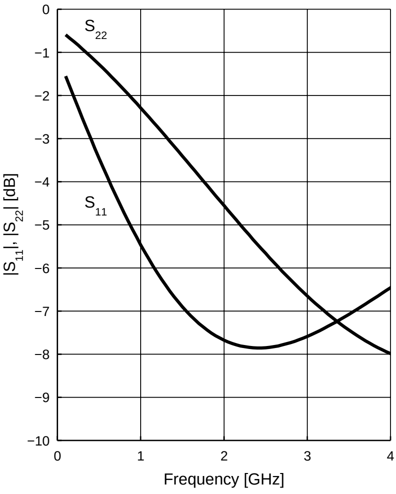
Power Gain $|S_{21}|^2$, G_{ma} = f(f)

V_{CC} = 3V, I_D = 5.5mA



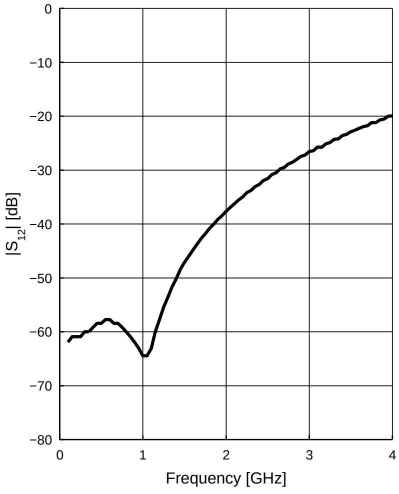
Matching $|S_{11}|$, $|S_{22}|$ = f(f)

V_{CC} = 3V, I_D = 5.5mA



Reverse Isolation $|S_{12}|$ = f(f)

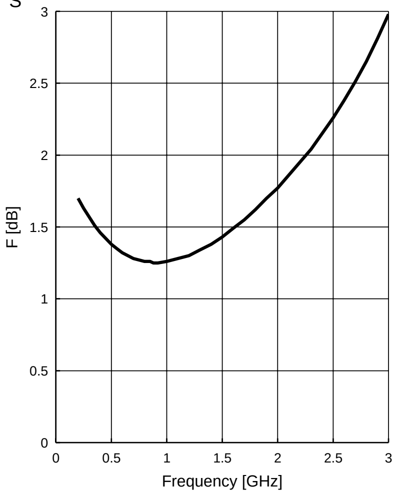
V_{CC} = 3V, I_D = 5.5mA



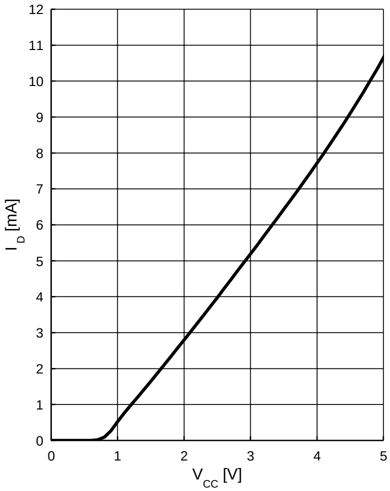
Noise figure F = f(f)

V_{CC} = 3V, I_D = 5.5mA

Z_S=50Ω



Device Current $I_D = f(V_{CC})$



Package Outline