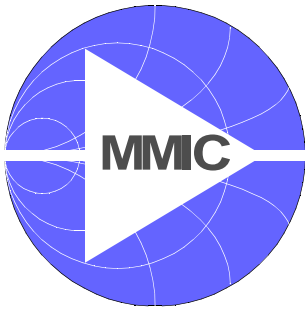


# BGA416

## RF Cascode Amplifier



Wireless  
Silicon Discretes



Never stop thinking.

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**BGA416****Data sheet****Revision History:        2002-06-14**Previous Version:        2001-10-30

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

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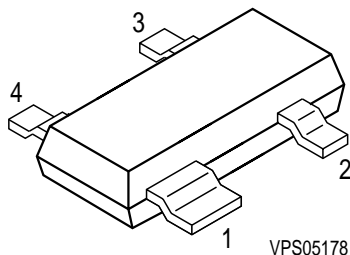
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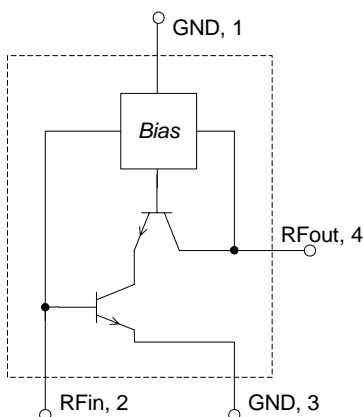
## Features

- $G_{MA} = 23\text{dB}$  at 900MHz
- Ultra high reverse isolation, 62 dB at 900MHz
- Low noise figure,  $F_{50\Omega} = 1.3\text{dB}$  at 900MHz
- On chip bias circuitry, 5.5 mA bias current at  $V_{CC} = 3\text{V}$
- Typical supply voltage: 2.5 to 5.0V
- SIEGET<sup>®</sup>-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 <sup>1)</sup>	$I_D$	20	mA
Input power	$P_{IN}$	8	dBm
Total power dissipation, $T_S < 123^{\circ}\text{C}$ <sup>2)</sup>	$P_{tot}$	100	mW
Junction temperature	$T_j$	150	$^{\circ}\text{C}$
Ambient temperature range	$T_A$	-65 ... +150	$^{\circ}\text{C}$
Storage temperature range	$T_{STG}$	-65 ... +150	$^{\circ}\text{C}$
Thermal resistance: junction-soldering point	$R_{thJS}$	270	K/W

Notes:

All Voltages refer to GND-Node

<sup>1)</sup> Device current is equal to current into pin RFout

<sup>2)</sup>  $T_S$  is measured on the ground lead at the soldering point

**Electrical Characteristics at  $T_A=25^{\circ}\text{C}$  (measured in test circuit specified in fig. 1)**

$V_{CC}=3\text{V}$ , 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 ( $Z_S=50\Omega$ ) f=0.9GHz f=1.8GHz	$F_{50\Omega}$		1.3 1.6		dB
Output power at 1dB gain compression ( $Z_S=Z_L=50\Omega$ ) f=0.9GHz f=1.8GHz	$P_{-1dB}$		-3 -3		dBm
Output third order intercept point ( $Z_S=Z_L=50\Omega$ ) f=0.9GHz f=1.8GHz	$OIP_3$		14 14		dBm
Device current	$I_D$		5.5		mA

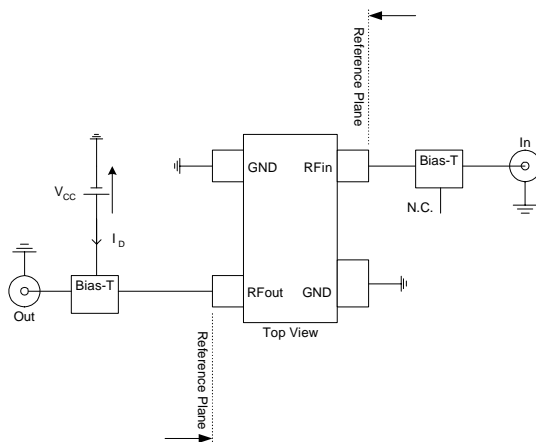


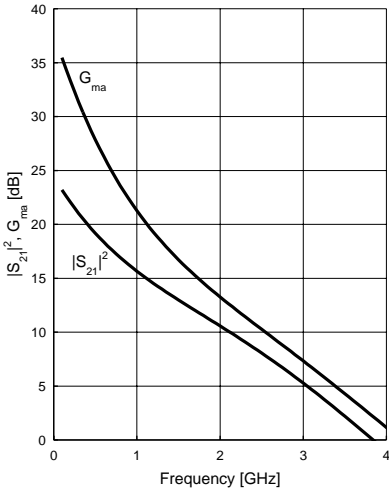
Fig. 1: Test Circuit for Electrical Characteristics and S-Parameter

**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

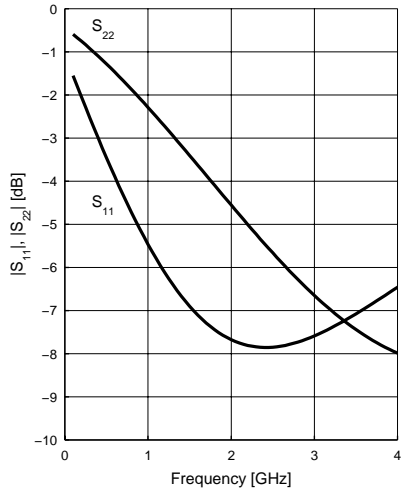
**Power Gain**  $|S_{21}|^2, G_{ma} = f(f)$

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



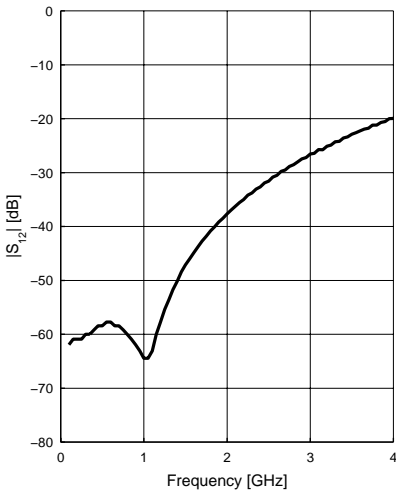
**Matching**  $|S_{11}|, |S_{22}| = f(f)$

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



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

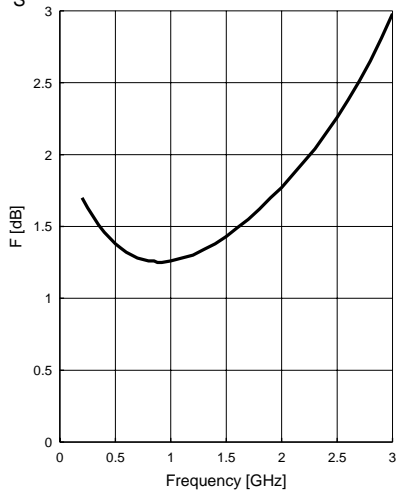
$V_{CC} = 3V, I_D = 5.5mA$



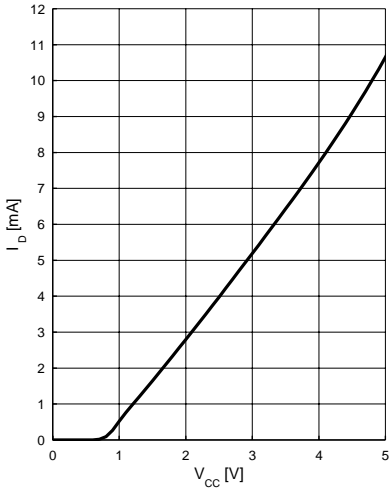
**Noise figure**  $F = f(f)$

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

$Z_S = 50\Omega$



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



Package Outline

