

BGA416

RF Cascode Amplifier

Small Signal Discretes



Never stop thinking

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BGA416, RF Cascode Amplifier**Revision History: 2008-04-21, Rev. 2.1****Previous Version: 2005-07-26**

Page	Subjects (major changes since last revision)
All	Document layout change
4-5	Electrical Characteristics slightly changed
7-8	Figures updated

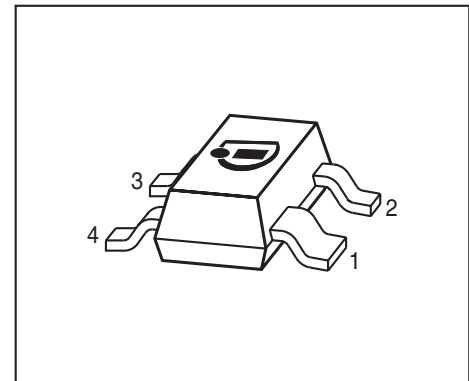
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1 RF Cascode Amplifier

Feature

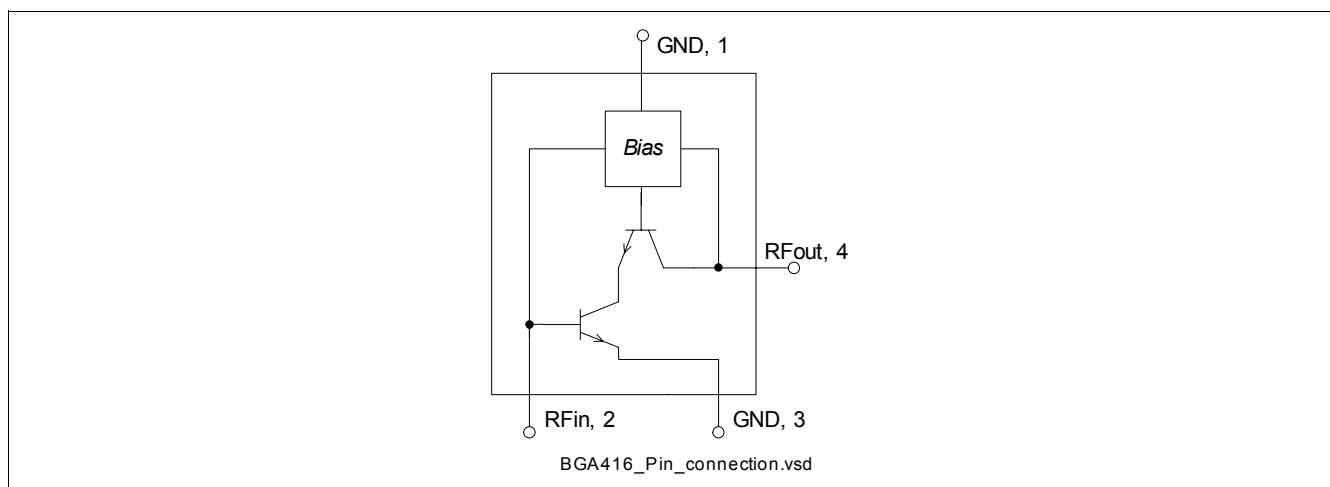
- $G_{MA} = 23$ dB at 900 MHz
- Ultra high reverse isolation, 60 dB at 900 MHz
- Low noise figure, $F_{50\Omega} = 1.2$ dB at 900 MHz
- On chip bias circuitry, 5.5 mA bias current at $V_{CC} = 3$ V
- Typical supply voltage: 2.5 to 5.0 V
- SIEGET[®]-25 technology
- Pb-free (RoHS compliant) package



SOT143

Applications

- Buffer amplifier
- LNAs
- Oscillator active devices


Figure 1 Pin connection

Description

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

Type	Package	Marking
BGA416	SOT143	C1s

Note: **ESD:** Electrostatic discharge sensitive device, observe handling precaution

Maximum Ratings

Table 1 Maximum ratings

Parameter	Symbol	Limit Value	Unit
Voltage at pin RFout	V_{OUT}	6	V
Device current ¹⁾	I_D	20	mA
Current into pin RFin	I_{in}	0.5	mA
Input power	P_{in}	8	dBm
Total power dissipation, $T_S < 123^{\circ}\text{C}^{2)}$	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	$^{\circ}\text{C}$

1) Device current is equal to current into pin RFout

2) T_S is measured on the ground lead at the soldering point

Note: All Voltages refer to GND-Node

Thermal resistance

Table 2 Thermal resistance

Parameter	Symbol	Value	Unit
Junction - soldering point ¹⁾	R_{thJS}	270	K/W

1) For calculation of R_{thJA} please refer to Application Note Thermal Resistance

2 Electrical Characteristics

Electrical characteristics at $T_A = 25^{\circ}\text{C}$ (measured in test circuit specified in [Figure 2](#))

$V_{CC} = 3\text{ V}$, unless otherwise specified

Table 3 Electrical Characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Maximum available power gain	G_{MA}		23		dB	$f = 0.9\text{ GHz}$
			14		dB	$f = 1.8\text{ GHz}$
Insertion power gain	$ S_{21} ^2$		17		dB	$f = 0.9\text{ GHz}$
			11		dB	$f = 1.8\text{ GHz}$
Reverse isolation	$ S_{12} $		60		dB	$f = 0.9\text{ GHz}$
			40		dB	$f = 1.8\text{ GHz}$
Noise figure ($Z_S = 50\ \Omega$)	$F_{50\Omega}$		1.2		dB	$f = 0.9\text{ GHz}$
			1.6		dB	$f = 1.8\text{ GHz}$
Output power at 1 dB gain compression ($Z_S = Z_L = 50\ \Omega$)	P_{-1dB}		-3		dBm	$f = 0.9\text{ GHz}$
			-3		dBm	$f = 1.8\text{ GHz}$
Output third order intercept point ($Z_S = Z_L = 50\ \Omega$)	OIP_3		14		dBm	$f = 0.9\text{ GHz}$
			14		dBm	$f = 1.8\text{ GHz}$
Device current	I_D		5.5		mA	

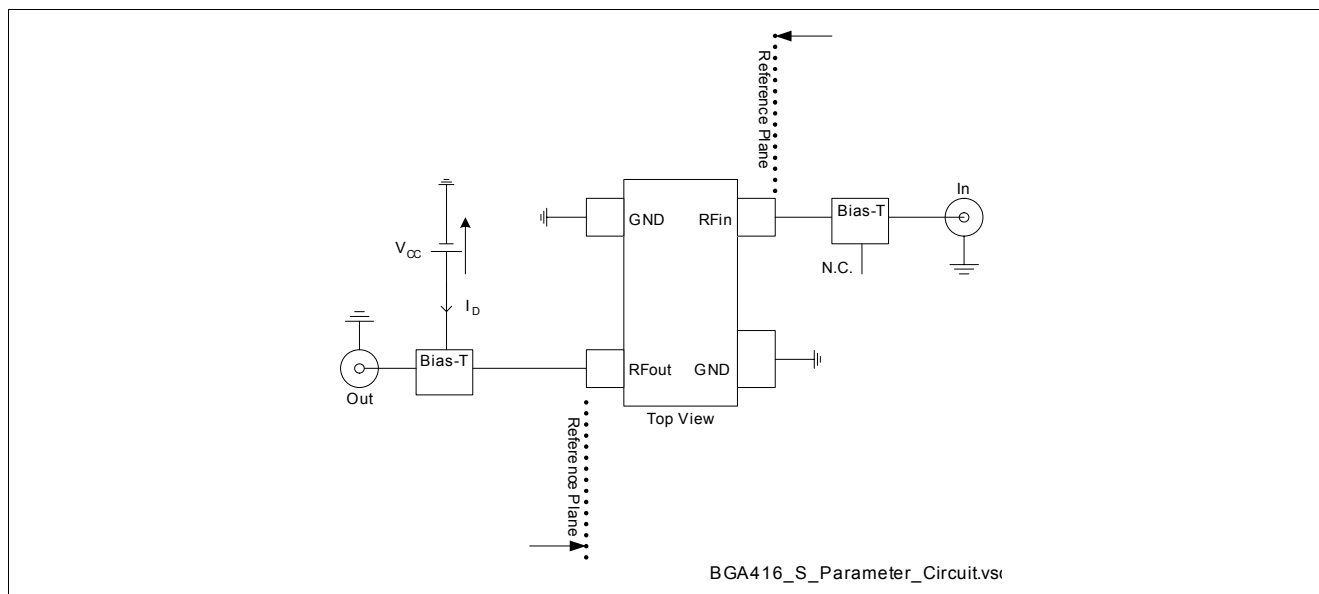
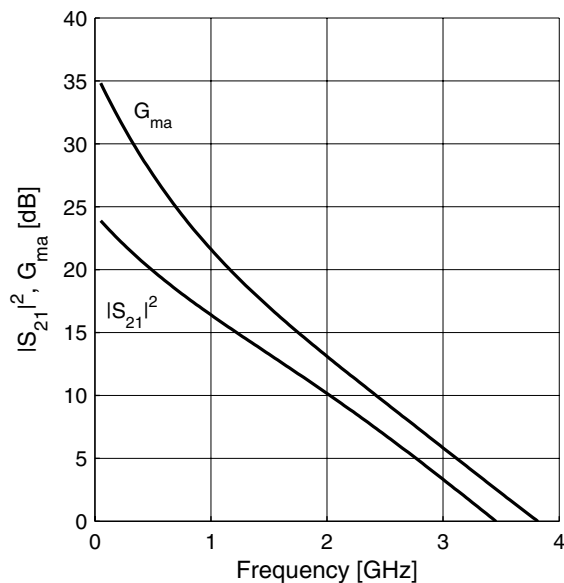


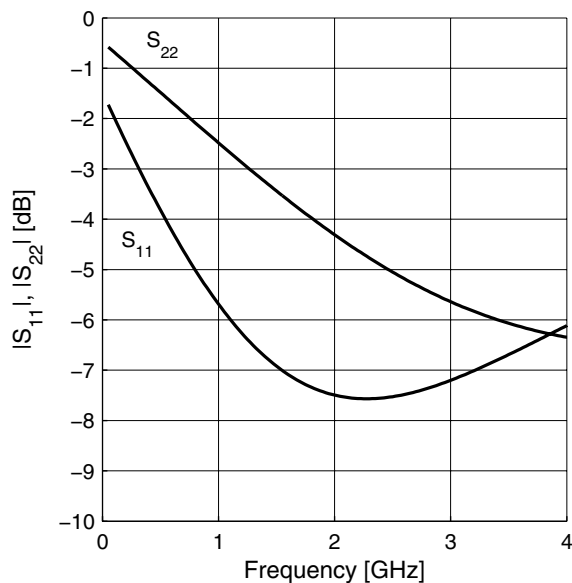
Figure 2 **Test Circuit for Electrical Characteristics**

3 Measured Parameters

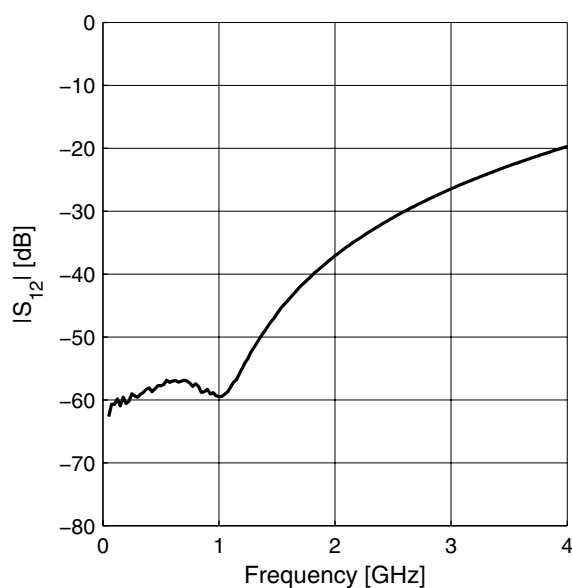
Power Gain $|S_{21}|^2$, $G_{ma} = f(f)$
 $V_{CC} = 3V$, $I_D = 5.5mA$



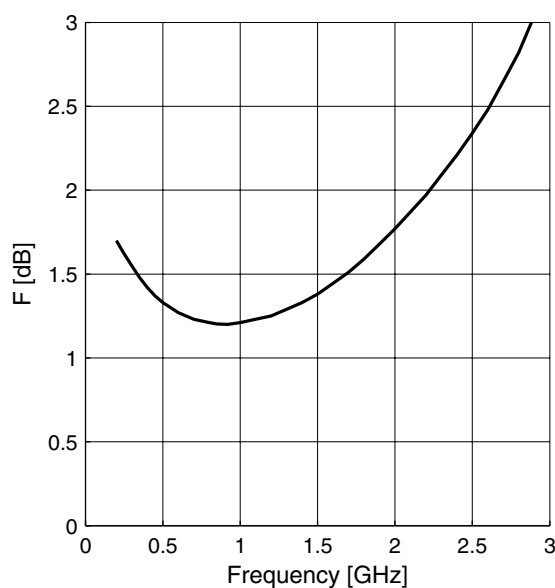
Matching $|S_{11}|$, $|S_{22}| = f(f)$
 $V_{CC} = 3V$, $I_D = 5.5mA$



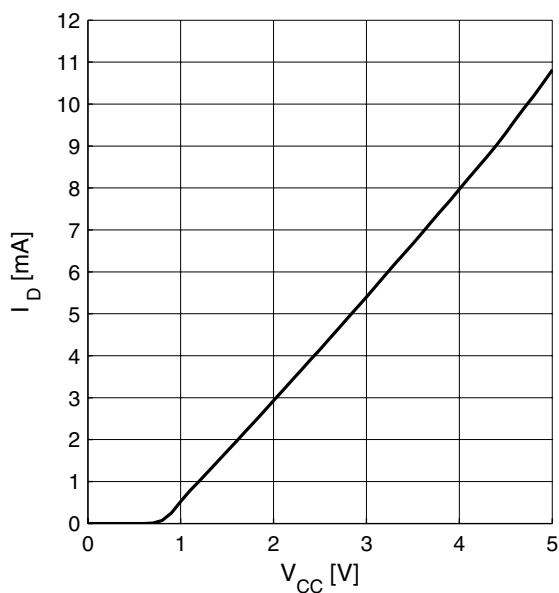
Reverse Isolation $|S_{12}| = f(f)$
 $V_{CC} = 3V$, $I_D = 5.5mA$



Noise figure $F = f(f)$
 $V_{CC} = 3V$, $I_D = 5.5mA$



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



4 Package Information

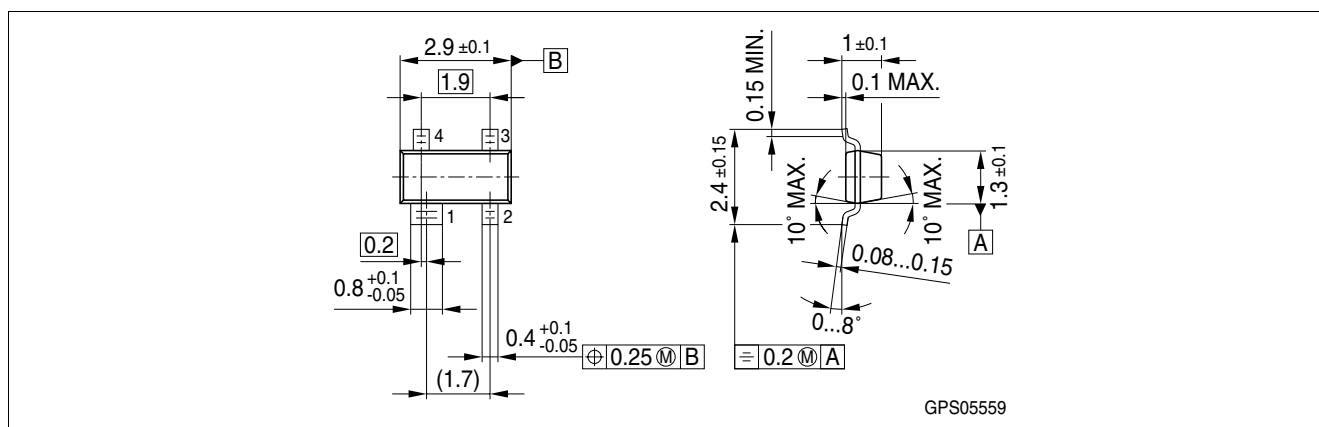


Figure 3 Package Outline SOT143

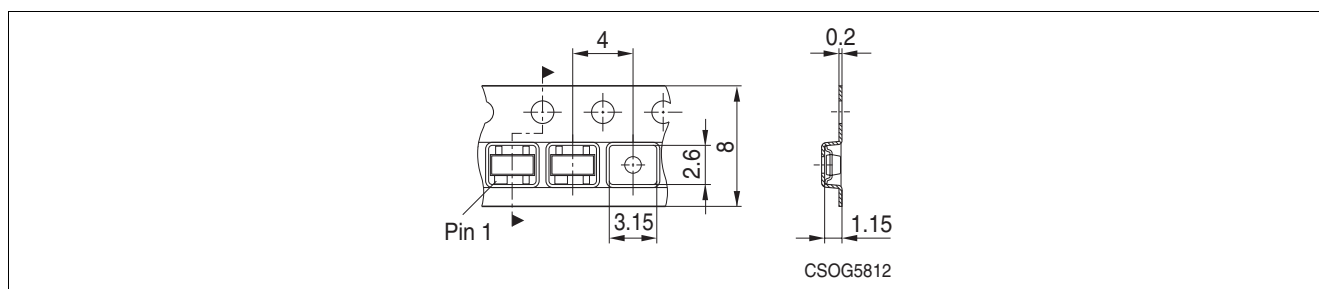


Figure 4 **Tape for SOT143**