BGA616

Silicon Germanium Broadband MMIC Amplifier

RF & Protection Devices



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BGA616, Silicon Germanium Broadband MMIC Amplifier

Revision History: 2011-09-02, Rev. 2.1

Previous Version: 2003-04-16

Page	Subjects (major changes since last revision)		
All	New Chip Version with integrated ESD protection		
5	Electrical Characteristics slightly changed		
7-8	Figures updated		
All	Document layout change		

Trademarks

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Data Sheet 3 Rev. 2.1, 2011-09-02



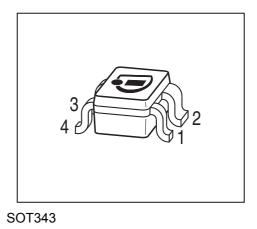
Silicon Germanium Broadband MMIC Amplifier

1 Silicon Germanium Broadband MMIC Amplifier

Feature

- Cascadable 50 Ω-gain block
- 3 dB-bandwidth: DC to 2.7 GHz with 19.0 dB typical gain at 1.0 GHz
- Compression point P_{-1dB} = 18 dBm at 2.0 GHz
- Noise figure $F_{50\Omega}$ = 2.60 dB at 2.0 GHz
- · Absolute stable
- 70 GHz f_T Silicon Germanium technology
- 1 kV HBM ESD protection (Pin-to-Pin)
- Pb-free (RoHS compliant) package





Applications

- Driver amplifier for GSM/PCS/SCDMA/UMTS
- Broadband amplifier for SAT-TV & LNBs
- Broadband amplifier for CATV

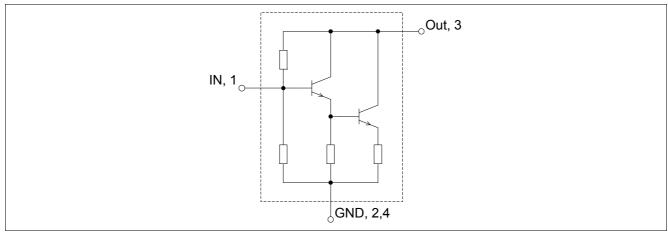


Figure 1 Pin connection

Description

The BGA616 is a broadband matched general purpose MMIC amplifier in a Darlington configuration. It is optimized for a typical supply current of 60 mA.

The BGA616 is based on Infineon Technologies' B7HF Silicon Germanium technology.

Туре	Package	Marking
BGA616	SOT343	BPs

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



Electrical Characteristics

Maximum Ratings

Table 1 Maximum ratings

Parameter	Symbol	Limit Value	Unit	
Device voltage	V_{D}	4.5	V	
Device current	I_{D}	80	mA	
Current into pin In	I_{in}	0.7	mA	
Input power ¹⁾	P_{in}	10	dBm	
Total power dissipation, $T_{\rm S}$ < 78 °C ²⁾	P_{tot}	360	mW	
Junction temperature	T_{J}	150	°C	
Ambient temperature range	T_{A}	-65 150	°C	
Storage temperature range	T_{STG}	-65 150	°C	
ESD capability all pins (HBM: JESD22-A114)	V _{ESD}	1000	V	

¹⁾ Valid for $Z_{\rm S}$ = $Z_{\rm L}$ = 50 Ω , $V_{\rm CC}$ = 6 V, $R_{\rm Bias}$ = 33 Ω

Note: All Voltages refer to GND-Node

Thermal resistance

Table 2 Thermal resistance

Parameter	Symbol	Value	Unit
Junction - soldering point ¹⁾	R_{thJS}	200	K/W

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

2 Electrical Characteristics

Electrical characteristics at $T_{\rm A}$ = 25 °C (measured in test circuit specified in **Figure 2**) $V_{\rm CC}$ = 6 V, $R_{\rm Bias}$ = 33 Ω , Frequency = 2 GHz, unless otherwise specified

Table 3 Electrical Characteristics

Parameter	Symbol	Values			Unit	Note /
		Min.	Тур.	Max.		Test Condition
Insertion power gain	$ S_{21} ^2$		20.0		dB	f = 0.1 GHz
			19.0		dB	f= 1 GHz
			18.0		dB	f = 2 GHz
Noise figure ($Z_{\rm S}$ = 50 Ω)	$F_{50\Omega}$		2.2		dB	f = 0.1 GHz
			2.5		dB	f=1 GHz
			2.6		dB	f = 2 GHz
Output power at 1 dB gain compression	$P_{ ext{-1dB}}$		18		dBm	
Output third order intercept point	OIP ₃		29		dBm	
Input return loss	$RL_{\sf in}$		15		dB	
Output return loss	RL_{out}		15		dB	
Total device current	I_{D}		60		mA	

²⁾ $T_{\rm S}$ is measured on the ground lead at the soldering point



Electrical Characteristics

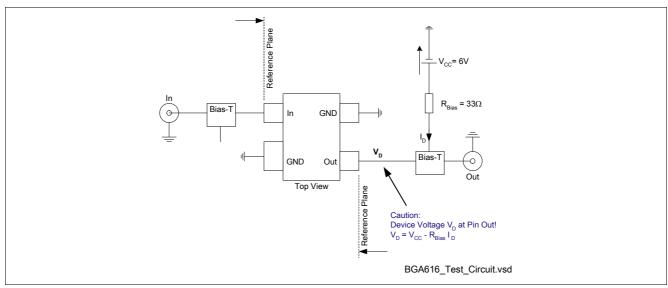
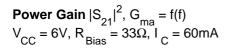


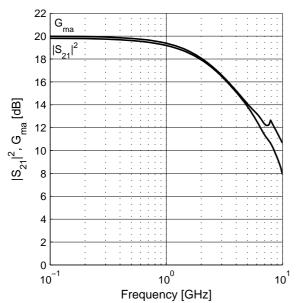
Figure 2 Test Circuit for Electrical Characteristics and S-Parameter



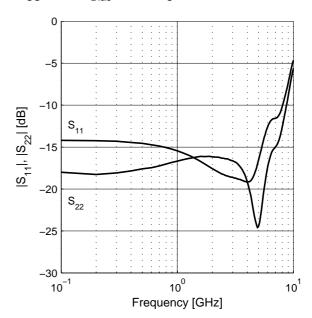
Measured Parameters

3 Measured Parameters

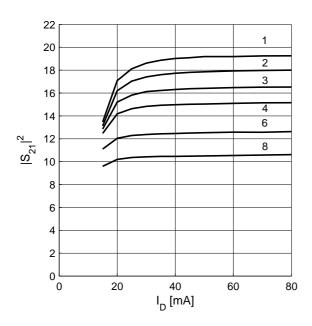




$$\begin{aligned} & \textbf{Matching} \ |S_{11}|, \ |S_{22}| = \textbf{f(f)} \\ & \textbf{V}_{CC} = \textbf{6V}, \ \textbf{R}_{Bias} = 33\Omega, \ \textbf{I}_{C} = \textbf{60mA} \end{aligned}$$

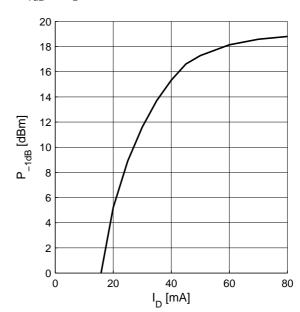


Power Gain $|S_{21}| = f(I_D)$ f = parameter in GHz



Output Compression Point

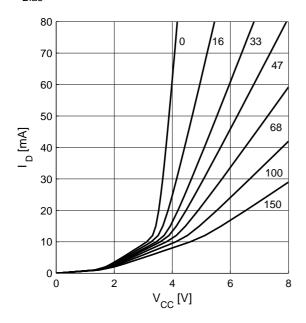
$$P_{-1dB} = f(I_D), f = 2GHz$$



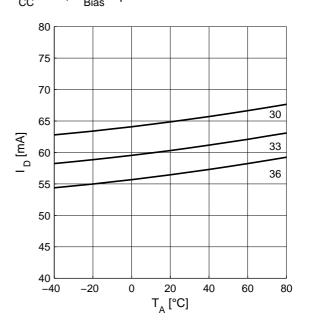


Measured Parameters

Device Current I
$$_{\rm D}$$
 = f(V $_{\rm CC}$) R $_{\rm Bias}$ = parameter in Ω

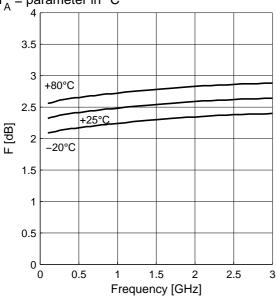


Device Current I $_{\rm D}$ = f(T $_{\rm A}$) V $_{\rm CC}$ = 6V, R $_{\rm Bias}$ = parameter in Ω



Noise figure F = f(f)

$$V_{CC} = 6V$$
, $R_{Bias} = 33\Omega$, $Z_{S} = 50\Omega$
 $T_{A} = parameter in °C$





Package Information

4 Package Information

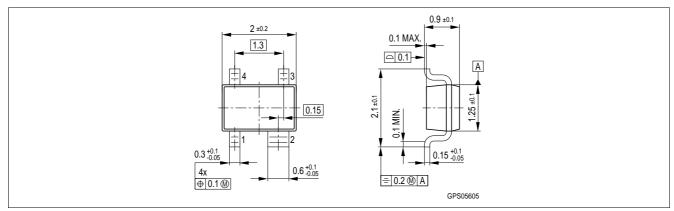


Figure 3 Package Outline SOT343

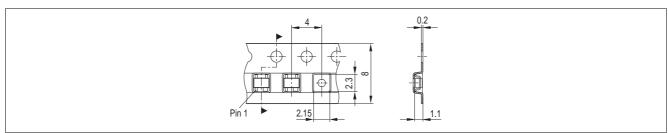


Figure 4 Tape for SOT343