

General purpose LNA MMIC with integrated ESD protection and active biasing









Product description

The BGB707L7ESD is a high performance low noise amplifier (LNA) MMIC based on Infineon's silicon germanium carbon (SiGe:C) bipolar technology.



Feature list

- Minimum noise figure NF_{min} = 0.6 dB at 2.4 GHz, 3 V, 3 mA
- Supply voltage V_{CC} = 1.8 V to 4.0 V at T_A = 25 °C
- Integrated ESD protection: 2 kV HBM at all pins

Product validation

Qualified for industrial applications according to the relevant tests of JEDEC47/20/22.

Potential applications

- Satellite navigation systems (e.g. GPS, GLONASS, BeiDou, Galileo)
- Wireless communications: WLAN 2.4 GHz and 5-6 GHz bands, broadband LTE or WiMAX LNA
- ISM applications like RKE and smart meter, as well as for emerging wireless applications such as DVB-Terrestrial

Device information

Table 1 Part information

Product name / Ordering code	Package	Pin configu	Marking	Pieces / Reel			
BGB707L7ESD / BGB707L7ESDE6327XTSA1	TSLP-7-1	$1 = V_{CC}$ $5 = V_{Ctrl}$	2 = V _{Bias} 6 = Current adjust	3 = <i>RF</i> _{in} 7 = Ground	4 = <i>RF</i> _{out}	AZ	7500

Attention: ESD (Electrostatic discharge) sensitive device, observe handling precautions

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Functional block diagram

Functional block diagram

This functional block diagram explains how the BGB707L7ESD is used. The RF power on/off function is controlled by applying $V_{\rm Ctrl}$. By using an external resistor $R_{\rm ext}$, the pre-set current of 2.1 mA (when $R_{\rm ext}$ is omitted) can be increased. Base $V_{\rm B}$ and collector $V_{\rm C}$ voltages are applied to the respective pins $RF_{\rm in}$ and $RF_{\rm out}$ by external inductors $L_{\rm B}$ and $L_{\rm C}$.

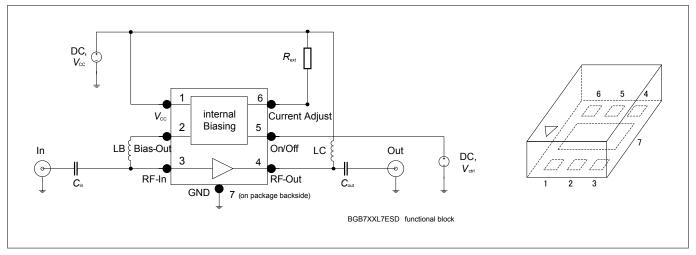


Figure 1 Functional block diagram

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Operating conditions

1 Operating conditions

Table 2 Operation conditions at $T_A = 25$ °C

Parameter	Symbol		Values		Unit	Note or test condition
		Min.	Тур.	Max.		
Supply voltage	V _{CC}	1.8	3	4	V	_
Control voltage in on-mode	V _{Ctrl-on}	1.2	_	V _{CC}		
Control voltage in off-mode	V _{Ctrl-off}	-0.3		0.3		

2 Absolute maximum ratings

Table 3 Absolute maximum ratings at $T_A = 25$ °C (unless otherwise specified)

Parameter	Symbol	Values		Unit	Note or test condition	
		Min.	Max.			
Supply voltage	V_{CC}	_	4	V	T _A = 25 °C	
			3.5		T _A = -55 °C	
Supply current	I _{CC}		25	mA	-	
DC current at RF _{in}	I _B		2			
Control voltage	V_{Ctrl}		4	V		
Total power dissipation ¹⁾	P _{tot}		100	mW	<i>T</i> _S ≤ 112 °C	
Junction temperature	TJ		150	°C	-	
Storage temperature	T_{Stg}	-55				

Attention: Stresses above the max. values listed here may cause permanent damage to the device.

Exposure to absolute maximum rating conditions for extended periods may affect device reliability. Exceeding only one of these values may cause irreversible damage to the integrated circuit.

 T_S is the soldering point temperature. T_S is measured on the emitter lead at the soldering point of the PCB.



Thermal characteristics

3 Thermal characteristics

Table 4 Thermal resistance

Parameter	Symbol		Values		Unit	Note or test condition
		Min.	Тур.	Max.		
Junction - soldering point	R _{thJS}	_	375	_	K/W	-

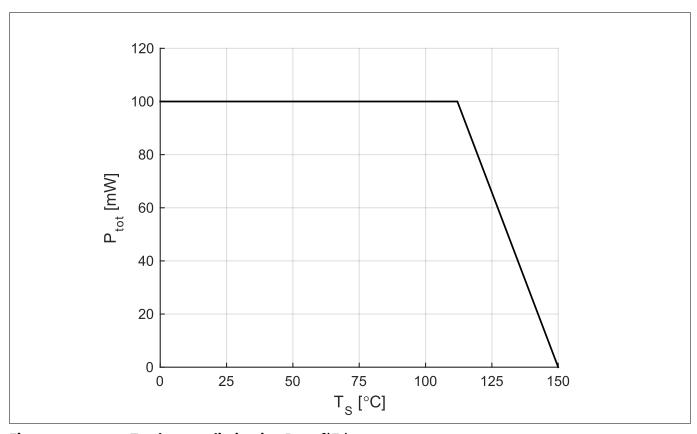


Figure 2 Total power dissipation $P_{\text{tot}} = f(T_S)$

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Electrical characteristics

4 Electrical characteristics

4.1 DC characteristics

Table 5 DC characteristics at $V_{CC} = 3 \text{ V}$, $T_A = 25 ^{\circ}\text{C}$

Parameter	Symbol		Values		Unit	Note or test
		Min.	Тур.	Max.		condition
Supply current in on-mode	I _{CC-on}				mA	<i>V</i> _{Ctrl} = 3 V
		1.6	2.1	2.6		$R_{\rm ext}$ = open
		_	3	_		$R_{\rm ext} = 12 \text{ k}\Omega$
		_	4.2	_		$R_{\rm ext} = 4.7 \text{ k}\Omega$
		_	6	_		$R_{\rm ext} = 2.4 \text{ k}\Omega$
		_	10	_		$R_{\rm ext} = 1 \rm k\Omega$
Supply current in off-mode	I _{CC-off}	_	_	6	μΑ	V _{Ctrl} = 0 V
Control current in on-mode	I _{Ctrl-on}		14	20		V _{Ctrl} = 3 V
Control current in off-mode	/ _{Ctrl-off}		_	0.1		V _{Ctrl} = 0 V



4.2 Characteristic DC diagrams

The measurement setup is an application circuit according to Figure 1 on page 2, using the integrated biasing. $T_A = 25$ °C (unless otherwise specified).

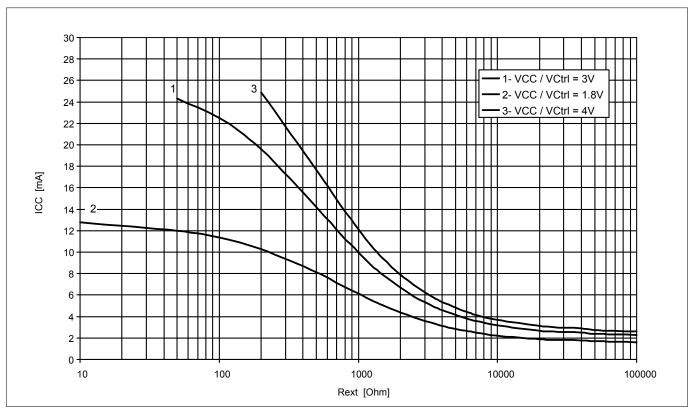


Figure 3 Supply current vs external resistance $I_{CC} = f(R_{ext})$, $V_{CC} / V_{Ctrl} = parameter$

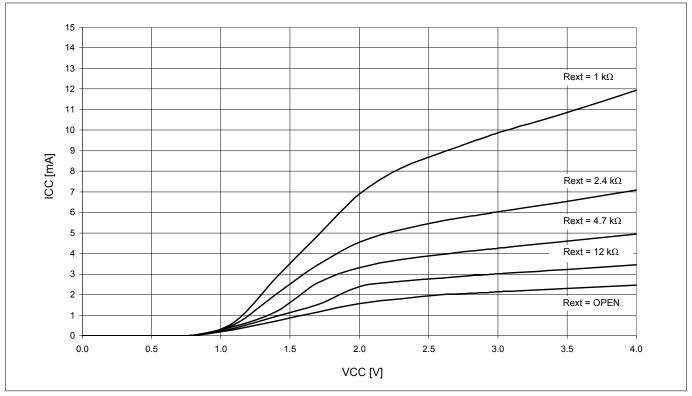


Figure 4 Supply current vs supply voltage $I_{CC} = f(V_{CC})$, $V_{Ctrl} = 3 \text{ V}$, $R_{ext} = \text{parameter}$

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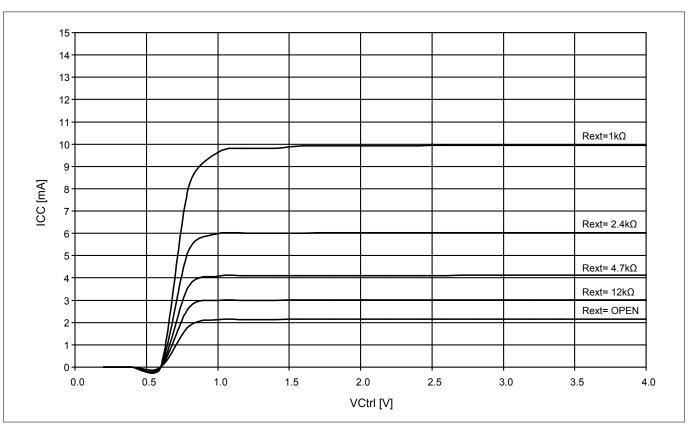


Figure 5 Supply current vs control voltage $I_{CC} = f(V_{Ctrl})$, $V_{CC} = 3 \text{ V}$, $R_{ext} = \text{parameter}$

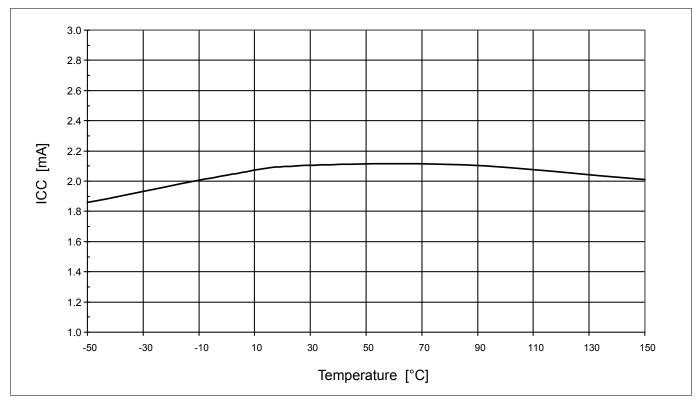


Figure 6 Supply current vs temperature $I_{CC} = f(T_A)$, $V_{Ctrl} = V_{CC} = 3 \text{ V}$, $R_{ext} = \text{open}$



4.3 AC characteristics

AC characteristics are described for higher frequencies in a 50 Ω environment.

4.3.1 AC characteristics in test fixture

Measurement setup is a test fixture with Bias-T's in a 50 Ω system according to Figure 7, for frequencies f from 150 MHz to 10 GHz at V_C = 3 V, T_A = 25 °C. The collector current I_C is controlled by the external base voltage V_B . Which is not dependent of the biasing reference voltage V_{Bias} . The bias voltage V_C at the output RF_{out} allows direct measurement of the amplifier performance, as a function of bias conditions without passive components.

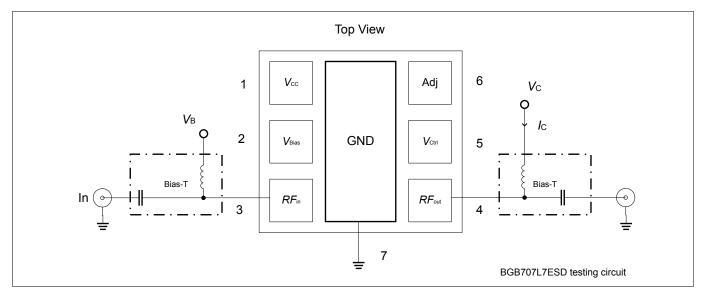


Figure 7 Testing circuit for frequencies f from 150 MHz to 10 GHz

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Table 6 AC characteristics, $V_C = 3 \text{ V}, f = 150 \text{ MHz}$

Parameter	Symbol	Values			Unit	Note or test conditions	
		Min.	Тур.	Max.			
Minimum noise figure	NF _{min}	_	0.4	_	dB	I _C = 2.1 mA	
			0.4			$I_{\rm C} = 3 \rm mA$	
			0.5			$I_{C} = 6 \text{ mA}$	
			0.55			$I_{\rm C}$ = 10 mA	
Transducer gain	$ S_{21} ^2$		17	1		I _C = 2.1 mA	
			19			$I_{\rm C} = 3 \rm mA$	
			24			$I_{C} = 6 \text{ mA}$	
			27			$I_{\rm C}$ = 10 mA	
Maximum power gain	G _{ms}		31.5			I _C = 2.1 mA	
			33			$I_{\rm C} = 3 \rm mA$	
			35			$I_{C} = 6 \text{ mA}$	
			37			$I_{\rm C}$ = 10 mA	
Output 1 dB gain compression	OP _{1dB}		3.5		dBm	$I_{Cq} = 2.1 \text{ mA}, I_{Ccomp} = 11 \text{ mA}$	
point ²⁾			4			$I_{Cq} = 3 \text{ mA}, I_{Ccomp} = 11 \text{ mA}$	
			4.5			$I_{Cq} = 6 \text{ mA}, I_{Ccomp} = 11 \text{ mA}$	
			3			$I_{Cq} = 10 \text{ mA}, I_{Ccomp} = 11 \text{ mA}$	
Output 3 rd order intercept point	OIP ₃		2			I _C = 2.1 mA	
			6			$I_{\rm C} = 3 \text{mA}$	
			14.5			$I_{\rm C} = 6 \text{mA}$	
			19.5			I _C = 10 mA	

 $^{^2}$ OP_{1dB} is the output compression point achieved in a 50 Ω application circuit according to Figure 1 using the integrated biasing.

 I_{Cq} is the quiescent current at small input power levels. I_{Cq} increases up to I_{Ccomp} as RF input power approaches IP_{1dB} , cf. Figure 14.

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Table 7 AC characteristics, $V_C = 3 \text{ V}, f = 450 \text{ MHz}$

Parameter	Symbol	Values			Unit	Note or test conditions
		Min.	Тур.	Мах.		
Minimum noise figure	NF _{min}	_	0.45	_	dB	I _C = 2.1 mA
			0.45			$I_{\rm C} = 3 \text{mA}$
			0.5			$I_{\rm C} = 6 \text{mA}$
			0.6			$I_{\rm C}$ = 10 mA
Transducer gain	$ S_{21} ^2$		17			I _C = 2.1 mA
			19			$I_{\rm C} = 3 \text{mA}$
			24			$I_{C} = 6 \text{ mA}$
			27			$I_{\rm C} = 10 {\rm mA}$
Maximum power gain	G _{ms}		27			I _C = 2.1 mA
			28			$I_{\rm C} = 3 \rm mA$
			30.5			$I_{C} = 6 \text{ mA}$
			32			$I_{\rm C}$ = 10 mA
Output 1 dB gain compression	OP _{1dB}		11.5		dBm	$I_{Cq} = 2.1 \text{ mA}, I_{Ccomp} = 11 \text{ mA}$
point ²⁾			12			$I_{Cq} = 3 \text{ mA}, I_{Ccomp} = 14 \text{ mA}$
			11.5			$I_{Cq} = 6 \text{ mA}, I_{Ccomp} = 16 \text{ mA}$
			9.5			$I_{Cq} = 10 \text{ mA}, I_{Ccomp} = 15 \text{ mA}$
Output 3 rd order intercept point	OIP ₃		2			I _C = 2.1 mA
			5.5			$I_{\rm C} = 3 \text{mA}$
			14			$I_{\rm C} = 6 \text{mA}$
			19.5			I _C = 10 mA

 $^{^2}$ OP_{1dB} is the output compression point achieved in a 50 Ω application circuit according to Figure 1 using the integrated biasing.

 I_{Cq} is the quiescent current at small input power levels. I_{Cq} increases up to I_{Ccomp} as RF input power approaches IP_{1dB} , cf. Figure 14.

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Table 8 AC characteristics, $V_C = 3 \text{ V}, f = 900 \text{ MHz}$

Parameter	Symbol	Values			Unit	Note or test conditions	
		Min.	Тур.	Max.			
Minimum noise figure	NF _{min}	_	0.55	_	dB	I _C = 2.1 mA	
			0.55			$I_{\rm C} = 3 \rm mA$	
			0.6			$I_{\rm C} = 6 \rm mA$	
			0.7			I _C = 10 mA	
Transducer gain	$ S_{21} ^2$		17			I _C = 2.1 mA	
			19			$I_C = 3 \text{ mA}$	
			23.5			$I_{\rm C}$ = 6 mA	
			26			$I_{\rm C} = 10 {\rm mA}$	
Maximum power gain	G _{ms}		24			I _C = 2.1 mA	
			25			$I_{\rm C} = 3 \text{mA}$	
			27.5			$I_C = 6 \text{ mA}$	
			29			$I_{\rm C} = 10 {\rm mA}$	
Output 1 dB gain compression	OP _{1dB}		11		dBm	$I_{Cq} = 2.1 \text{ mA}, I_{Ccomp} = 13 \text{ mA}$	
point ²⁾			11			$I_{Cq} = 3 \text{ mA}, I_{Ccomp} = 15 \text{ mA}$	
			10			$I_{Cq} = 6 \text{ mA}, I_{Ccomp} = 14 \text{ mA}$	
			8.5			$I_{Cq} = 10 \text{ mA}, I_{Ccomp} = 14 \text{ mA}$	
Output 3 rd order intercept point	OIP ₃		3.5			I _C = 2.1 mA	
			8			$I_{\rm C} = 3 \text{mA}$	
			17			$I_{\rm C} = 6 \text{mA}$	
			19.5			I _C = 10 mA	

 $^{^2}$ OP_{1dB} is the output compression point achieved in a 50 Ω application circuit according to Figure 1 using the integrated biasing.

 I_{Cq} is the quiescent current at small input power levels. I_{Cq} increases up to I_{Ccomp} as RF input power approaches IP_{1dB} , cf. Figure 14.

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Table 9 AC characteristics, $V_C = 3 \text{ V}, f = 1.5 \text{ GHz}$

Parameter	Symbol		Values		Unit	Note or test conditions
		Min.	Тур.	Мах.		
Minimum noise figure	NF _{min}	_	0.6	_	dB	I _C = 2.1 mA
			0.6			$I_{\rm C} = 3 \text{mA}$
			0.6			$I_{C} = 6 \text{ mA}$
			0.7			$I_{\rm C}$ = 10 mA
Transducer gain	$ S_{21} ^2$		16			I _C = 2.1 mA
			18.5			$I_{\rm C} = 3 \text{mA}$
			22.5			$I_{\rm C} = 6 \text{mA}$
			24.5			$I_{\rm C} = 10 {\rm mA}$
Maximum power gain	G _{ms}		21.5			I _C = 2.1 mA
			23			$I_{\rm C} = 3 \text{mA}$
			25.5			$I_{C} = 6 \text{ mA}$
			27			$I_{\rm C} = 10 {\rm mA}$
Output 1 dB gain compression	OP _{1dB}		10.5		dBm	$I_{Cq} = 2.1 \text{ mA}, I_{Ccomp} = 14 \text{ mA}$
point ²⁾			10			$I_{Cq} = 3 \text{ mA}, I_{Ccomp} = 16 \text{ mA}$
			9			$I_{Cq} = 6 \text{ mA}, I_{Ccomp} = 15 \text{ mA}$
			8			$I_{Cq} = 10 \text{ mA}, I_{Ccomp} = 15 \text{ mA}$
Output 3 rd order intercept point	OIP ₃		3.5]		I _C = 2.1 mA
			8			$I_{\rm C} = 3 \text{mA}$
			17			$I_{\rm C} = 6 \text{mA}$
			19.5			I _C = 10 mA

 $^{^2}$ OP_{1dB} is the output compression point achieved in a 50 Ω application circuit according to Figure 1 using the integrated biasing.

 I_{Cq} is the quiescent current at small input power levels. I_{Cq} increases up to I_{Ccomp} as RF input power approaches IP_{1dB} , cf. Figure 14.

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Table 10 AC characteristics, $V_C = 3 \text{ V}, f = 1.9 \text{ GHz}$

Parameter	Symbol	Values			Unit	Note or test conditions	
		Min.	Тур.	Max.			
Minimum noise figure	NF _{min}	_	0.6	_	dB	I _C = 2.1 mA	
			0.6			$I_{\rm C} = 3 \rm mA$	
			0.6			$I_{C} = 6 \text{ mA}$	
			0.7			I _C = 10 mA	
Transducer gain	$ S_{21} ^2$		16			I _C = 2.1 mA	
			18			$I_C = 3 \text{ mA}$	
			21.5			$I_C = 6 \text{ mA}$	
			23			$I_{\rm C}$ = 10 mA	
Maximum power gain	G _{ms}		21			I _C = 2.1 mA	
			22			$I_{\rm C} = 3 \text{mA}$	
			24			$I_C = 6 \text{ mA}$	
			26			$I_{\rm C}$ = 10 mA	
Output 1 dB gain compression	OP _{1dB}		10		dBm	$I_{Cq} = 2.1 \text{ mA}, I_{Ccomp} = 15 \text{ mA}$	
point ²⁾			10			$I_{Cq} = 3 \text{ mA}, I_{Ccomp} = 16 \text{ mA}$	
			8.5			$I_{Cq} = 6 \text{ mA}, I_{Ccomp} = 14 \text{ mA}$	
			8			$I_{Cq} = 10 \text{ mA}, I_{Ccomp} = 14 \text{ mA}$	
Output 3 rd order intercept point	OIP ₃		3.5			I _C = 2.1 mA	
			7.5			$I_{\rm C} = 3 \text{mA}$	
			17			$I_{\rm C} = 6 \text{mA}$	
			19.5			I _C = 10 mA	

 $^{^2}$ OP_{1dB} is the output compression point achieved in a 50 Ω application circuit according to Figure 1 using the integrated biasing.

 I_{Cq} is the quiescent current at small input power levels. I_{Cq} increases up to I_{Ccomp} as RF input power approaches IP_{1dB} , cf. Figure 14.

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Table 11 AC characteristics, $V_C = 3 \text{ V}, f = 2.4 \text{ GHz}$

Parameter	Symbol	Values			Unit	Note or test conditions	
		Min.	Тур.	Мах.			
Minimum noise figure	NF _{min}	_	0.65	_	dB	I _C = 2.1 mA	
			0.6			$I_{\rm C} = 3 \rm mA$	
			0.6			$I_{\rm C} = 6 \rm mA$	
			0.7			I _C = 10 mA	
Transducer gain	$ S_{21} ^2$		15.5			I _C = 2.1 mA	
			17			$I_C = 3 \text{ mA}$	
			20			$I_{\rm C} = 6 \text{mA}$	
			21.5			$I_{\rm C} = 10 {\rm mA}$	
Maximum power gain	G _{ms}		20			I _C = 2.1 mA	
			21			$I_{\rm C} = 3 \text{mA}$	
			23			$I_{\rm C} = 6 \text{mA}$	
			25			$I_{\rm C} = 10 {\rm mA}$	
Output 1 dB gain compression	OP _{1dB}		10		dBm	$I_{Cq} = 2.1 \text{ mA}, I_{Ccomp} = 15 \text{ mA}$	
point ²⁾			10			$I_{Cq} = 3 \text{ mA}, I_{Ccomp} = 16 \text{ mA}$	
			9			$I_{Cq} = 6 \text{ mA}, I_{Ccomp} = 14 \text{ mA}$	
			8			$I_{Cq} = 10 \text{ mA}, I_{Ccomp} = 14 \text{ mA}$	
Output 3 rd order intercept point	OIP ₃		4.5			I _C = 2.1 mA	
			9			$I_{\rm C}$ = 3 mA	
			17.5			$I_{\rm C}$ = 6 mA	
			19.5			$I_{\rm C}$ = 10 mA	

 $^{^2}$ OP_{1dB} is the output compression point achieved in a 50 Ω application circuit according to Figure 1 using the integrated biasing.

 I_{Cq} is the quiescent current at small input power levels. I_{Cq} increases up to I_{Ccomp} as RF input power approaches IP_{1dB} , cf. Figure 14.

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Table 12 AC characteristics, $V_C = 3 \text{ V}, f = 3.5 \text{ GHz}$

Parameter	Symbol	Values			Unit	Note or test conditions
		Min.	Тур.	Мах.		
Minimum noise figure	NF _{min}	_	0.8	_	dB	I _C = 2.1 mA
			0.75			$I_{\rm C} = 3 \text{mA}$
			0.7			$I_{\rm C}$ = 6 mA
			0.75			I _C = 10 mA
Transducer gain	$ S_{21} ^2$		13.5			I _C = 2.1 mA
			15.5			$I_C = 3 \text{ mA}$
			18			$I_{\rm C}$ = 6 mA
			19			$I_{\rm C} = 10 {\rm mA}$
Maximum power gain	G_{ms}		18.5			I _C = 2.1 mA
			20			$I_{\rm C} = 3 \text{mA}$
			22			$I_{\rm C}$ = 6 mA
			23.5			$I_{\rm C} = 10 {\rm mA}$
Output 1 dB gain compression point ²⁾	OP _{1dB}		10		dBm	$I_{Cq} = 2.1 \text{ mA}, I_{Ccomp} = 16 \text{ mA}$
			10			$I_{Cq} = 3 \text{ mA}, I_{Ccomp} = 16 \text{ mA}$
			9			$I_{Cq} = 6 \text{ mA}, I_{Ccomp} = 15 \text{ mA}$
			8			$I_{Cq} = 10 \text{ mA}, I_{Ccomp} = 15 \text{ mA}$
Output 3 rd order intercept point	OIP ₃		5.5			I _C = 2.1 mA
			12			$I_{\rm C}$ = 3 mA
			17.5			$I_{\rm C}$ = 6 mA
			19			$I_{\rm C} = 10 {\rm mA}$

 $^{^2}$ OP_{1dB} is the output compression point achieved in a 50 Ω application circuit according to Figure 1 using the integrated biasing.

 I_{Cq} is the quiescent current at small input power levels. I_{Cq} increases up to I_{Ccomp} as RF input power approaches IP_{1dB} , cf. Figure 14.

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Table 13 AC characteristics, $V_C = 3 \text{ V}, f = 5.5 \text{ GHz}$

Parameter	Symbol	Values			Unit	Note or test conditions
		Min.	Тур.	Мах.		
Minimum noise figure	NF _{min}	_	1.05	_	dB	I _C = 2.1 mA
			1			$I_{\rm C} = 3 \text{mA}$
			0.9			$I_{C} = 6 \text{ mA}$
			0.95			$I_{\rm C}$ = 10 mA
Transducer gain	$ S_{21} ^2$		11.5			I _C = 2.1 mA
			13			$I_C = 3 \text{ mA}$
			15			$I_{C} = 6 \text{ mA}$
			15.5			$I_{\rm C}$ = 10 mA
Maximum power gain	G _{ms}		17.5			I _C = 2.1 mA
			18.5			$I_C = 3 \text{ mA}$
			20			$I_{C} = 6 \text{ mA}$
			19			$I_{\rm C}$ = 10 mA
Output 1 dB gain compression point ²⁾	OP _{1dB}		10.5		dBm	$I_{Cq} = 2.1 \text{ mA}, I_{Ccomp} = 17 \text{ mA}$
			10			$I_{Cq} = 3 \text{ mA}, I_{Ccomp} = 17 \text{ mA}$
			9			$I_{Cq} = 6 \text{ mA}, I_{Ccomp} = 15 \text{ mA}$
			8			$I_{Cq} = 10 \text{ mA}, I_{Ccomp} = 15 \text{ mA}$
Output 3 rd order intercept point	OIP ₃		6.5			I _C = 2.1 mA
			12			$I_{\rm C} = 3 \text{mA}$
			22			$I_{\rm C} = 6 \text{mA}$
			21			I _C = 10 mA

 $^{^2}$ OP_{1dB} is the output compression point achieved in a 50 Ω application circuit according to Figure 1 using the integrated biasing.

 I_{Cq} is the quiescent current at small input power levels. I_{Cq} increases up to I_{Ccomp} as RF input power approaches IP_{1dB} , cf. Figure 14.

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Table 14 AC characteristics, $V_C = 3 \text{ V}, f = 10 \text{ GHz}$

Parameter	Symbol	Values			Unit	Note or test conditions
		Min.	Тур.	Мах.		
Minimum noise figure	NF _{min}	_	2	_	dB	I _C = 2.1 mA
			1.8			$I_{\rm C} = 3 \text{mA}$
			1.5			$I_{\rm C} = 6 \text{mA}$
			1.5			$I_{\rm C}$ = 10 mA
Transducer gain	$ S_{21} ^2$		5.5			I _C = 2.1 mA
			7			$I_{\rm C} = 3 \text{mA}$
			9			$I_{C} = 6 \text{ mA}$
			10			$I_{\rm C} = 10 {\rm mA}$
Maximum power gain	G _{ms}		14.5			I _C = 2.1 mA
			15			$I_{\rm C} = 3 \text{mA}$
			15.5			$I_{C} = 6 \text{ mA}$
			15.5			$I_{\rm C} = 10 {\rm mA}$
Output 1 dB gain compression point ²⁾	OP _{1dB}		6		dBm	$I_{Cq} = 2.1 \text{ mA}, I_{Ccomp} = 16 \text{ mA}$
			6			$I_{Cq} = 3 \text{ mA}, I_{Ccomp} = 16 \text{ mA}$
			4			$I_{Cq} = 6 \text{ mA}, I_{Ccomp} = 15 \text{ mA}$
			4			$I_{Cq} = 10 \text{ mA}, I_{Ccomp} = 15 \text{ mA}$
Output 3 rd order intercept point	OIP ₃		2.5			I _C = 2.1 mA
			7			$I_{\rm C} = 3 \text{mA}$
			19.5			$I_{\rm C} = 6 \text{mA}$
			18			I _C = 10 mA

 $^{^2}$ OP_{1dB} is the output compression point achieved in a 50 Ω application circuit according to Figure 1 using the integrated biasing.

 I_{Cq} is the quiescent current at small input power levels. I_{Cq} increases up to I_{Ccomp} as RF input power approaches IP_{1dB} , cf. Figure 14.



4.3.2 Typical AC characteristic curves

Measurement setup is as described in Figure 7 except for Figure 14, where the compression point is measured in a 50 Ω application circuit according to Figure 1 using the integrated biasing at $V_C = 3 \text{ V}$, $T_A = 25 \text{ °C}$.

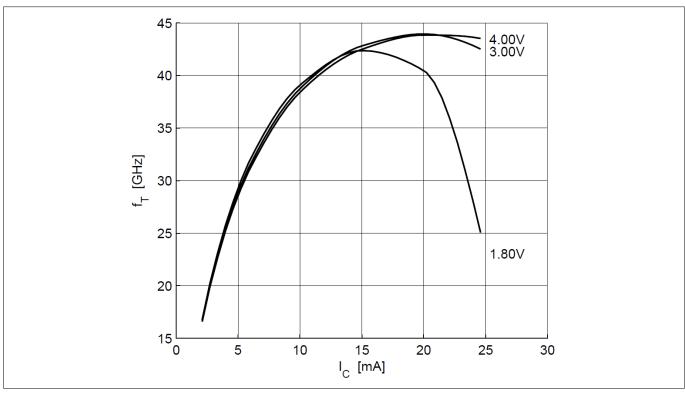


Figure 8 Transition frequency $f_T = f(I_C)$, $V_C =$ parameter

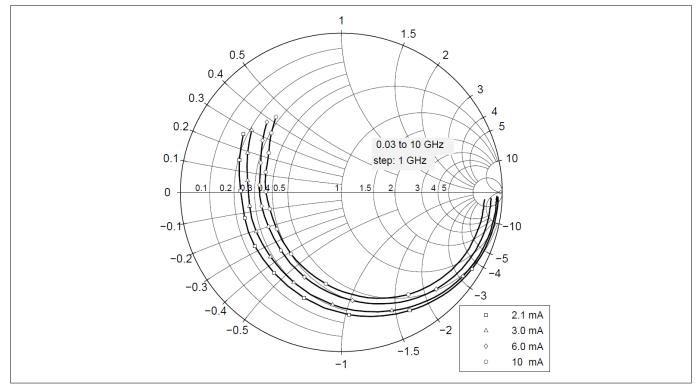


Figure 9 Input reflection coefficient $S_{11} = f(f)$, $I_C =$ parameter



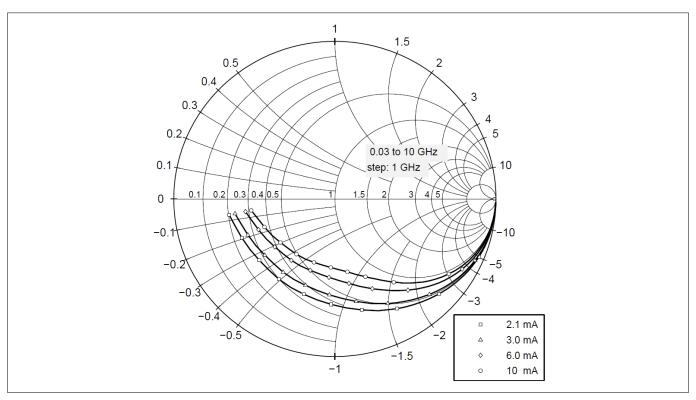


Figure 10 Output reflection coefficient $S_{22} = f(f)$, $I_C =$ parameter

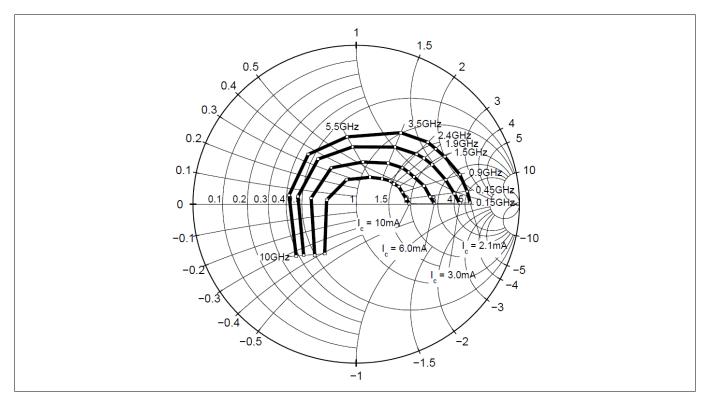


Figure 11 Source impedance for minimum noise figure $Z_{S,opt} = f(f)$, $I_C = parameter$

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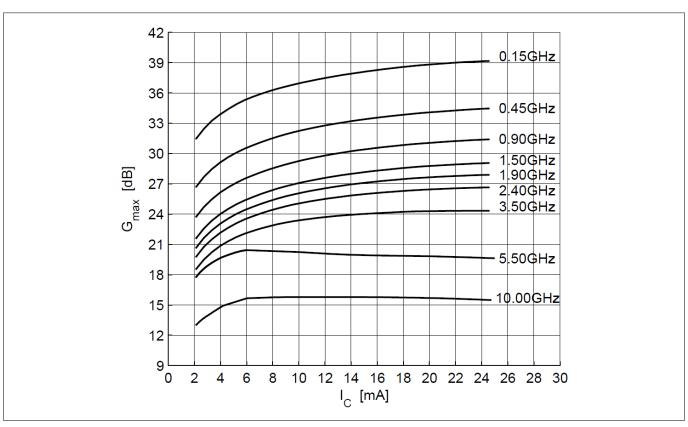


Figure 12 Maximum power gain $G_{\text{max}} = f(I_{\text{C}}), f = \text{parameter}$

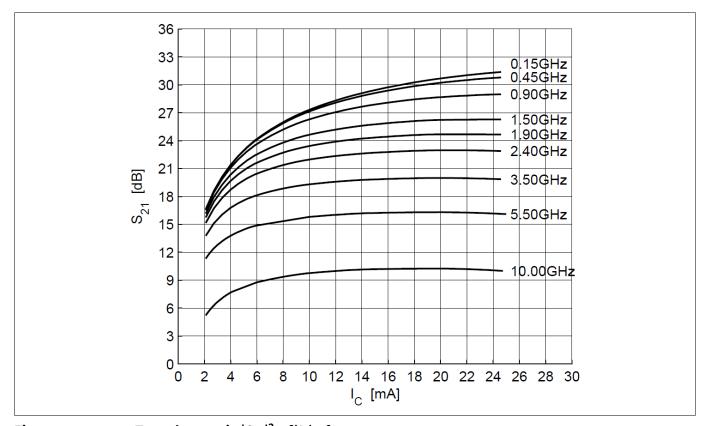


Figure 13 Transducer gain $|S_{21}|^2 = f(I_C)$, f = parameter



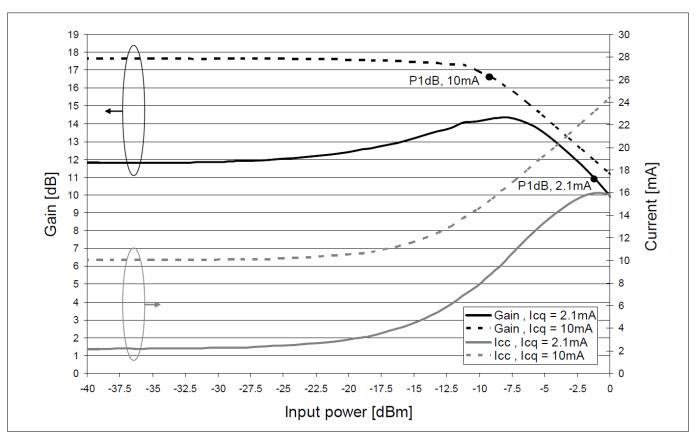


Figure 14 Power gain $G = f(P_{RFin})$ and supply current $I_{cc} = f(P_{RFin})$ at frequency f = 3.5 GHz, $I_{cq} = parameter$



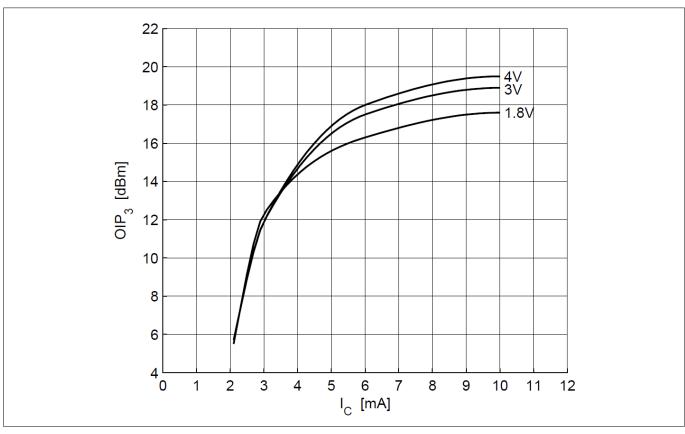


Figure 15 Output 3^{rd} order intercept point $OIP_3 = f(I_C)$ at frequency f = 3.5 GHz, $V_C =$ parameter



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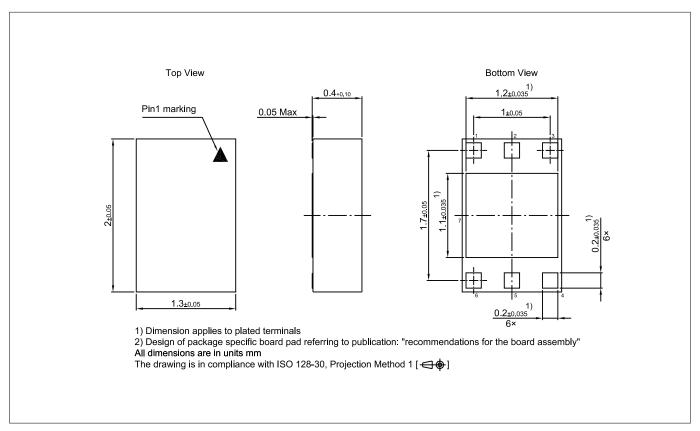


Figure 16 TSLP-7-1 package

Note: For package information including footprint, packing and assembly recommendation refer to:

https://www.infineon.com/cms/en/product/packages/PG-TSLP/PG-TSLP-7-1

General purpose LNA MMIC with integrated ESD protection and active biasing



Revision history

Revision history

Document version	Date of release	Description of changes
4.0	2018-09-26	New datasheet layout.
4.1	2021-07-14	Package outline marking corrected, link to Infineon package website added

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