BGB707L7ESD application circuits

Multi-purpose LNA with integrated ESD protection and active biasing

About this document

Scope and purpose

This measurement report catalog provides a comprehensive overview of various configurations of the BGB707L7ESD evaluation board (EVB). It summarizes the key aspects of the EVB, including the circuit schematic, bill of materials (BOM), and measurement results. Additionally, the document provides PCB and layout information and guides customers through the process of requesting an EVB.

Intended audience

This document serves as a guide for customers seeking to request an EVB for the BGB707L7ESD multi-purpose low-noise amplifier (LNA) MMIC. It also outlines various configuration options that cater to different customer needs.

Requesting an EVB

To obtain the BGB707L7ESD BOARD, customers can place an order through the Integrated Distribution Solution (IDIS) tool, the Infineon Sample Request (ISaR) tool, or contact their designated business partner, using the part number: **SP000555586**.

This device can also be tuned to meet specific requirements. For more information, please refer to Section 3.

About this product

Product description

The BGB707L7ESD is a broadband LNA MMIC featuring active biasing and housed in a compact 2.0 x 1.3 mm^2 package. This device provides a versatile amplification solution for a range of wireless communication systems, including GNSS, UWB, ISM bands, WLAN (2.4 GHz and 5–6 GHz), and sub-1 GHz applications.

Key features

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

Disclaimer

The content of this report is based on data from multiple measurement reports. However, performance may vary from the reported results due to factors such as PCB panel variations, soldering issues, and tolerances of SMA components during circuit replication. As a result, consistent performance with the results presented herein cannot be guaranteed, and deviations may occur.

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1 Available application circuits

1.1 LNA with BGB707L7ESD for 500 MHz

1.1.1 Summary of measurement results

Table 1 Electrical characteristics at T = 25°C, V_{cc} = 3.3 V, V_{ctrl} = 3.3 V

Parameter	Result			Unit	Note or Test condition
Vcc	3.3			V	
Icc	6.6			mA	
Frequency	470	490	510	MHz	
Gain	18.2	18.3	18.3	dB	
Noise figure	1.4			dB	PCB loss 0.10 dB subtracted
Input return loss	11.1	11.7	12.2	dB	
Output return loss	7.5	7.6	7.7	dB	
Reverse isolation	23.9	23.7	23.7	dB	
Output P1dB	9.1			dBm	Measured at 490 MHz
Output IP3	23.9			dBm	f1 = 500 MHz, f2 = 501 MHz, P_{IN} = -30 dBm per tone
Stability (K factor)	>1			–	Stability measured from 10 MHz to 15 GHz

Note: Board results are measured from SMA connector to SMA connector

1.1.2 Circuit schematic

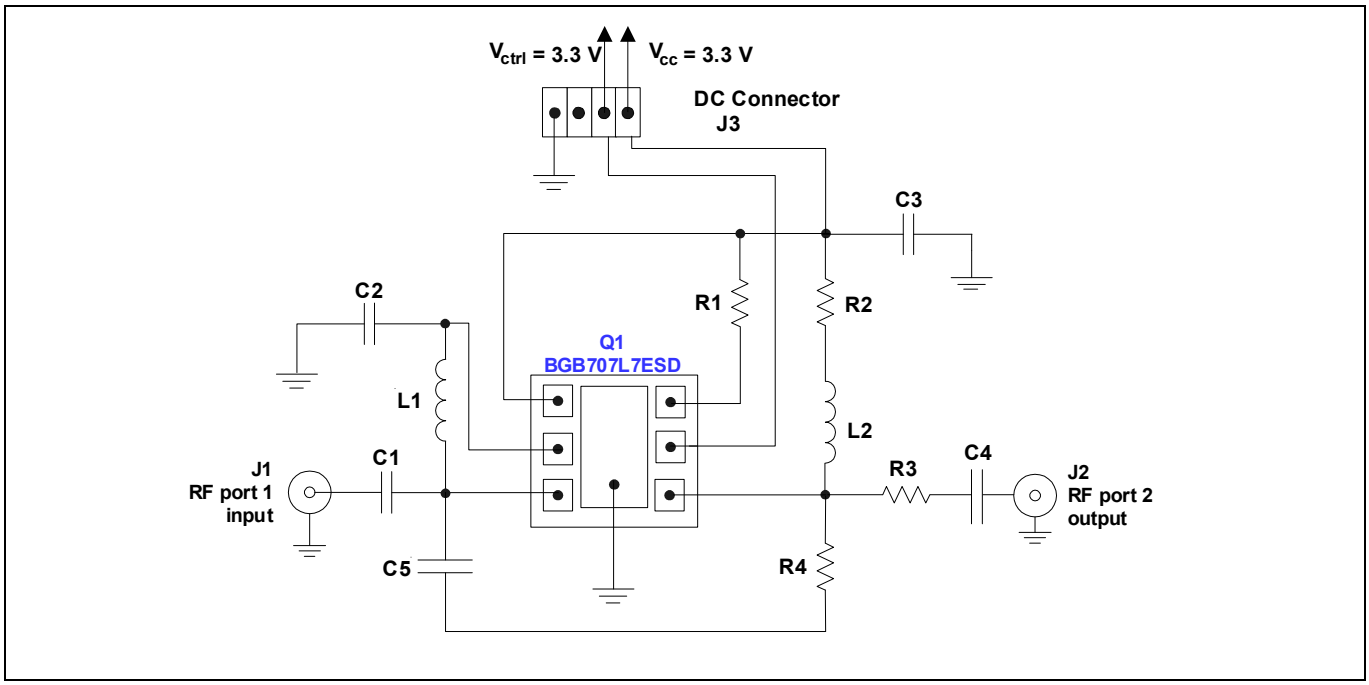


Figure 1 Circuit schematic

1.1.3 Bill of materials

Table 2 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	120	pF	0402	Various	Input matching and DC block
C2	47	nF	0402	Various	RF decoupling
C3	47	pF	0402	Various	RF decoupling
C4	330	pF	0402	Various	Output matching and DC block
C5	330	pF	0402	Various	Feedback DC block
L1	22	nH	0603	Murata LQW	Input matching and RF chock
L2	68	nH	0402	Murata LQG	Output matching and RF chock
R1	2.4	kΩ	0402	Various	Base bias
R2	47	Ω	0402	Various	Output matching and stability improvement
R3	15	Ω	0402	Various	Stability improvement
R4	820	Ω	0402	Various	Negative feedback

1.2 LNA with BGB707L7ESD for 869 MHz

1.2.1 Summary of measurement results

Table 3 Electrical characteristics at T = 25°C, V_{cc} = 3.0 V, V_{ctrl} = 3.0 V

Parameter	Result	Unit	Note or Test condition
Vcc	3.0	V	
Icc	869	mA	
Frequency	5.8	MHz	
Gain	16.0	dB	
Noise figure	1.11	dB	PCB loss 0.20 dB subtracted
Input return loss	15.7	dB	
Output return loss	12.3	dB	
Reverse isolation	21.9	dB	Measured at 490 MHz
Output P1dB	8.2	dBm	Two-tone 1 MHz apart, -30 dBm input power
Output IP3	–	dBm	
Stability (K factor)	>1	–	Stability measured from 10 MHz to 15 GHz

Note: Board results are measured from SMA connector to SMA connector

1.2.2 Circuit schematic

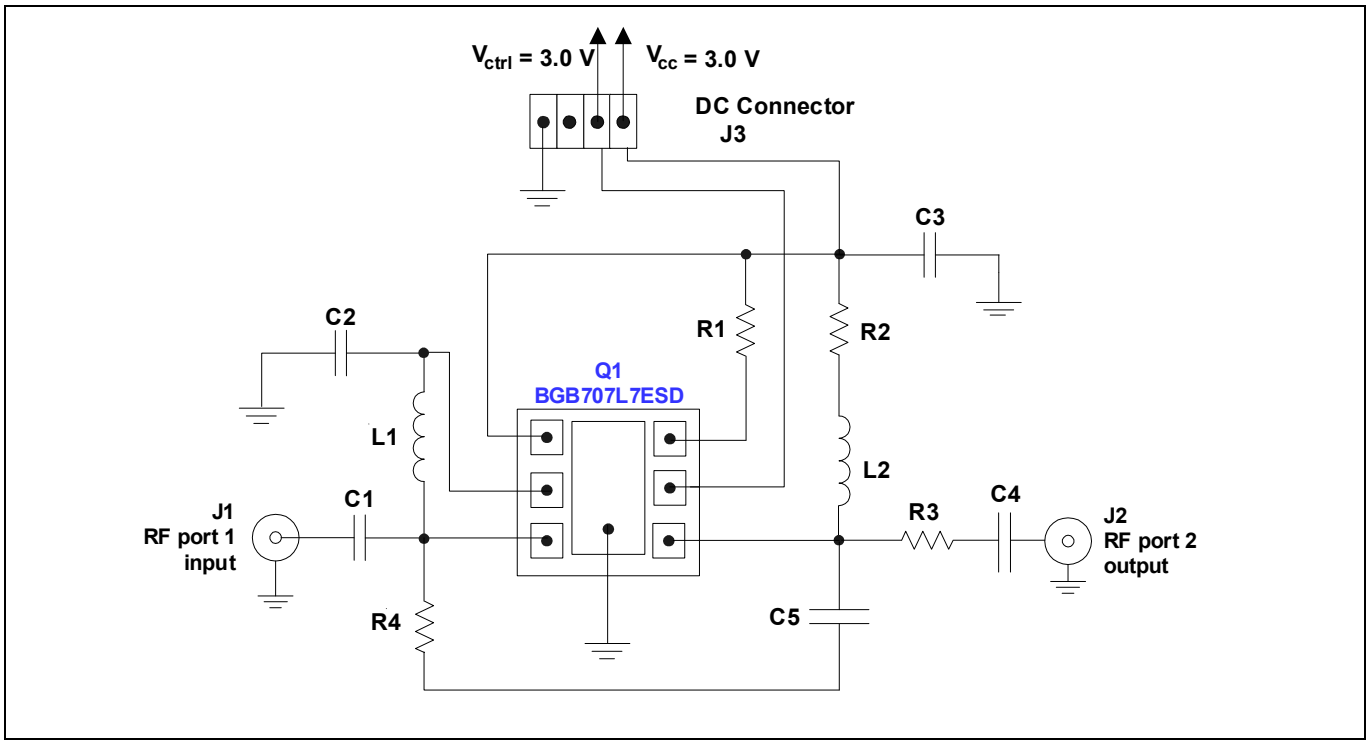


Figure 2 Circuit schematic

1.2.3 Bill of materials

Table 4 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	68	pF	0402	Various	Input matching and DC blocking
C2	47	pF	0402	Various	RF decoupling
C3	47	nF	0402	Various	RF decoupling
C4	820	pF	0402	Various	Output matching and DC blocking
C5	820	pF	0402	Various	DC blocking
L1	40	nH	0402	Murata LQW	Input matching and RF chock
L2	33	nH	0402	Murata LQG	Output matching and RF chock
R1	2.4	kΩ	0402	Various	Base bias
R2	56	Ω	0402	Various	Stability improvement
R3	15	Ω	0402	Various	Stability improvement
R4	560	Ω	0402	Various	Negative feedback

1.3 LNA with BGB707L7ESD for 1100 MHz

1.3.1 Summary of measurement results

Table 5 Electrical characteristics at T = 25°C, V_{cc} = 3.0 V, V_{ctrl} = 3.0 V

Parameter	Result			Unit	Note or Test condition
Vcc	3.0			V	
Icc	6.4			mA	
Frequency	1080	1090	1100	MHz	
Gain	18.7	18.6	18.7	dB	
Noise figure	1.1			dB	PCB loss 0.10 dB subtracted
Input return loss	11.0	11.1	11.1	dB	
Output return loss	9.4			dB	
Reverse isolation	22.9	22.7	22.7	dB	
Output P1dB	6.4			dBm	
Output IP3	9.3			dBm	Measured at 1090 MHz
Stability (K factor)	>1			–	Stability measured from 10 MHz to 15 GHz

Note: Board results are measured from SMA connector to SMA connector

1.3.2 Circuit schematic

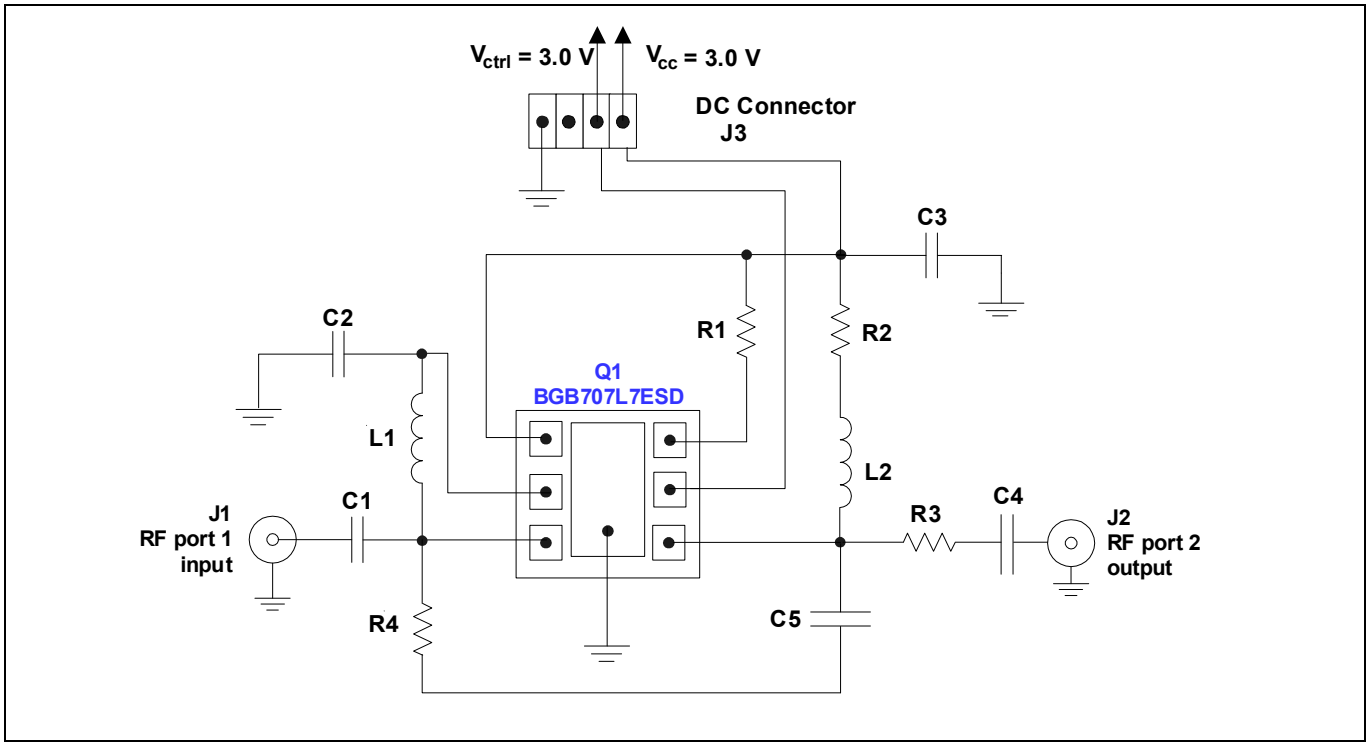


Figure 3 Circuit schematic

1.3.3 Bill of materials

Table 6 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	82	pF	0402	Various	Input matching and DC blocking
C2	47	nF	0402	Various	RF decoupling
C3	47	nF	0402	Various	RF decoupling
C4	100	pF	0402	Various	Output matching and DC blocking
C5	820	pF	0402	Various	DC blocking
L1	15	nH	0402	Murata LQG	Input matching and RF chock
L2	27	nH	0402	Murata LQG	Output matching and RF chock
R1	2000	Ω	0402	Various	Base bias
R2	110	Ω	0402	Various	Stability improvement
R3	0	Ω	0402	Various	Stability improvement
R4	820	Ω	0402	Various	Negative feedback

1.4 LNA with BGB707L7ESD for 1176 – 1575 MHz

1.4.1 Summary of measurement results

Table 7 Electrical characteristics at T = 25°C, V_{cc} = 3.0 V, V_{ctrl} = 3.0 V

Parameter	Result			Unit	Note or Test condition
Vcc	3.0			V	
Icc	10.8			mA	
Frequency	1176	1227	1575	MHz	
Gain	20.4	20.4	19.8	dB	
Noise figure	1.03	1.04	1.01	dB	PCB loss 0.10 dB subtracted
Input return loss	9.6	9.5	9.2	dB	
Output return loss	13.1	13.0	12.9	dB	
Reverse isolation	27.1	27.1	26.6	dB	
Output P1dB	7.3	6.9	7.5	dBm	
Output IP3	15.1	15.5	15.8	dBm	P_{IN} = -30 dBm per tone, Tone spacing is 1 MHz
Stability (K factor)	>1			–	Stability measured from 10 MHz to 15 GHz

Note: Board results are measured from SMA connector to SMA connector

1.4.2 Circuit schematic

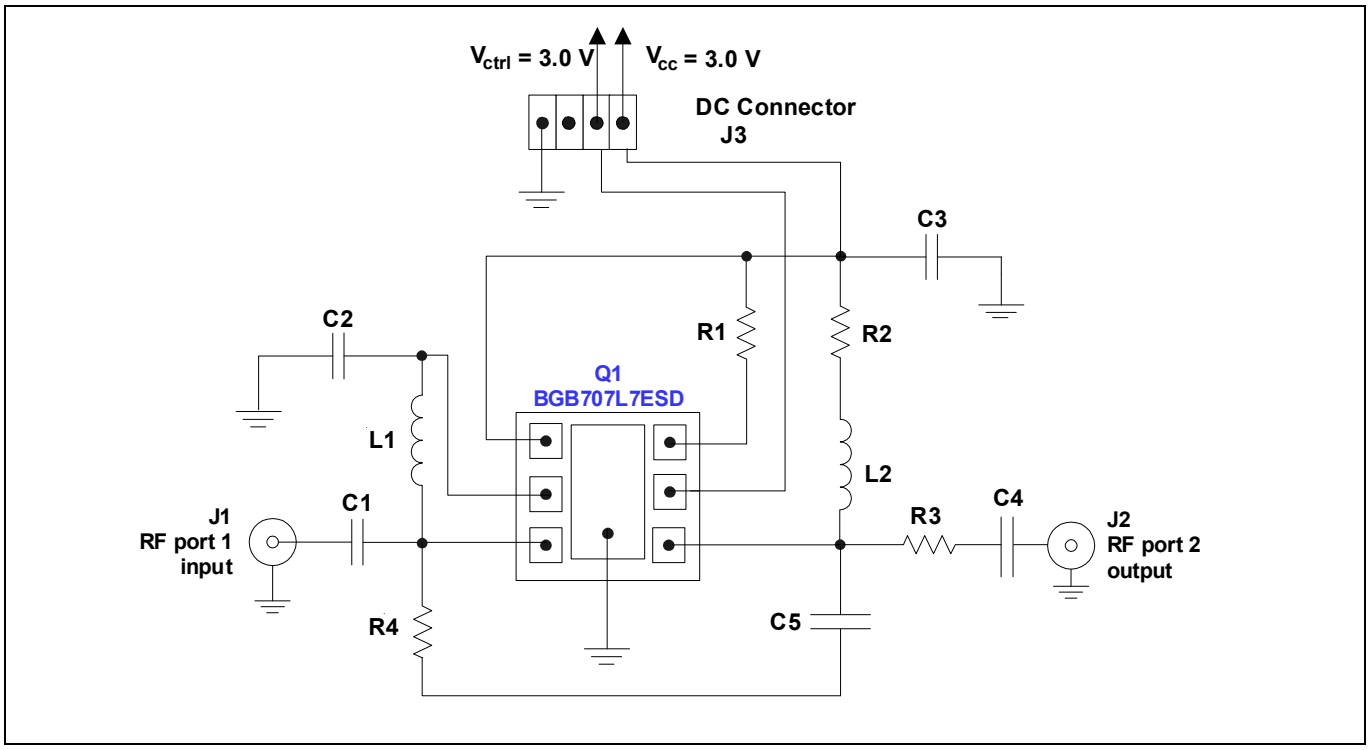


Figure 4 Circuit schematic

1.4.3 Bill of materials

Table 8 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	68	pF	0402	Various	Input matching and DC blocking
C2	47	pF	0402	Various	RF decoupling
C3	47	nF	0402	Various	RF decoupling
C4	10	pF	0402	Various	Output matching and DC blocking
C5	10	pF	0402	Various	RF decoupling and DC blocking
R1	820	Ω	0402	Various	Base bias
R2	56	Ω	0402	Various	Stability improvement
R3	15	Ω	0402	Various	Stability improvement
R4	1.2	kΩ	0402	Various	Feedback
L1	22	nH	0402	Various	Input matching
L2	15	nH	0402	Murata LQG	Output matching

1.5 LNA with BGB707L7ESD for 1575 MHz

1.5.1 Summary of measurement results

Table 9 Electrical characteristics at T = 25°C, V_{cc} = 3.0 V, V_{ctrl} = 3.0 V

Parameter	Result	Unit	Note or Test condition
Vcc	3.0	V	
Icc	10.6	mA	
Frequency	1575	MHz	
Gain	19.4	dB	
Noise figure	0.86	dB	PCB loss 0.15 dB subtracted
Input return loss	9.3	dB	
Output return loss	9.0	dB	
Reverse isolation	26.9	dB	
Output P1dB	5.5	dBm	Measured at 1090 MHz
Output IP3	18.9	dBm	
Stability (K factor)	>1	–	Stability measured from 10 MHz to 15 GHz

Note: Board results are measured from SMA connector to SMA connector

1.5.2 Circuit schematic

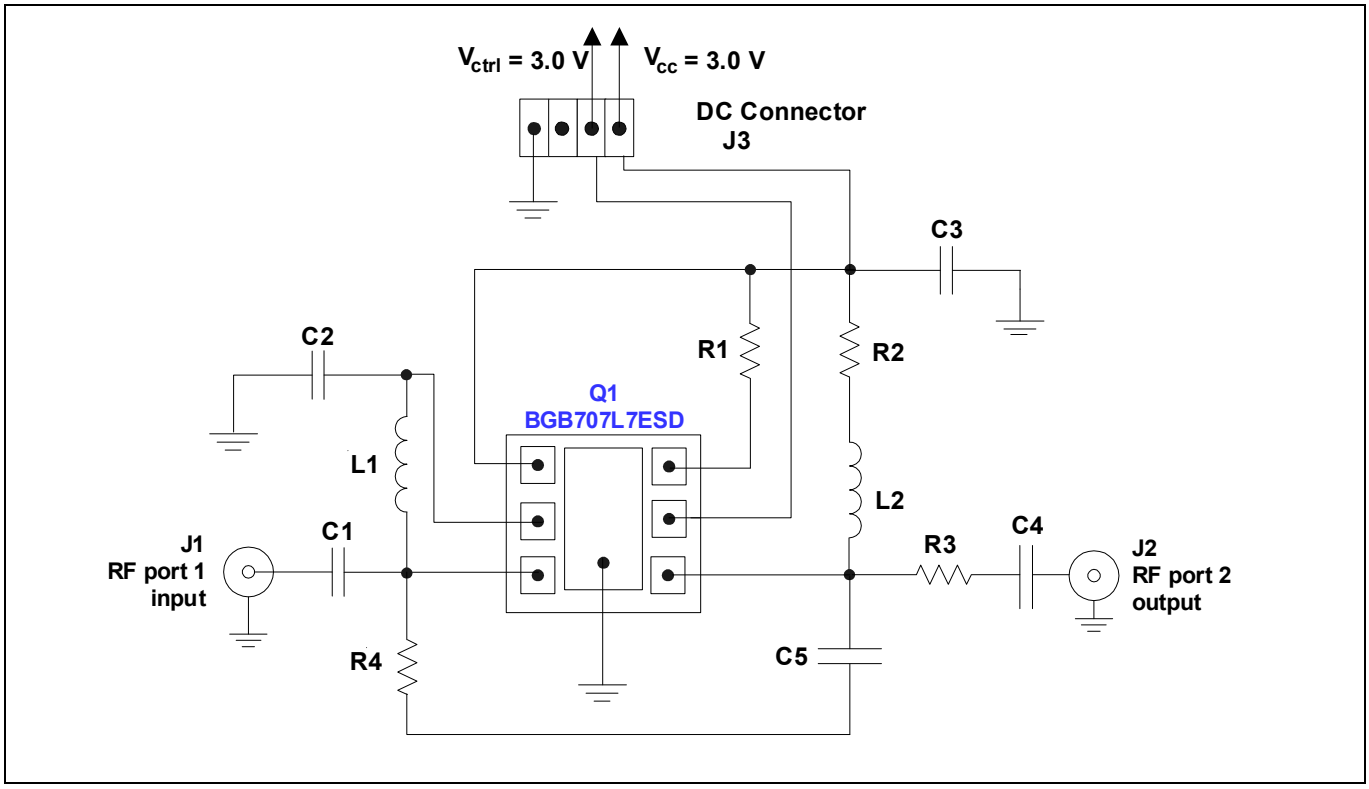


Figure 5 Circuit schematic

1.5.3 Bill of materials

Table 10 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	68	pF	0402	Various	Input matching and DC blocking
C2	47	pF	0402	Various	RF decoupling
C3	47	pF	0402	Various	RF decoupling
C4	10	pF	0402	Various	Output matching and DC blocking
C5	10	pF	0402	Various	RF decoupling and DC blocking
R1	820	Ω	0402	Various	Base bias
R2	56	Ω	0402	Various	Stability improvement
R3	15	Ω	0402	Various	Stability improvement
R4	1.2	kΩ	0402	Various	Feedback
L1	22	nH	0402	Murata LQG	Input matching
L2	15	nH	0402	Murata LQG	Output matching

1.6 LNA with BGB707L7ESD for 1600 – 1740 MHz

1.6.1 Summary of measurement results

Table 11 Electrical characteristics at T = 25°C, V_{cc} = 2.8 V, V_{ctrl} = 2.8 V

Parameter	Result			Unit	Note or Test condition
Vcc	2.8			V	
Icc	9.8			mA	
Frequency	1600	1670	1740	MHz	
Gain	15.1	14.9	14.7	dB	
Noise figure	1.4			dB	PCB loss 0.10 dB subtracted
Input return loss	10.1	8.8	7.7	dB	
Output return loss	18.0	17.5	16.8	dB	
Reverse isolation	30.5	30.4	30.6	dB	
Output P1dB	0.2			dBm	Measured at 1650 MHz
Output IP3	–			dBm	
Stability (K factor)	>1			–	Stability measured from 10 MHz to 15 GHz

Note: Board results are measured from SMA connector to SMA connector

1.6.2 Circuit schematic

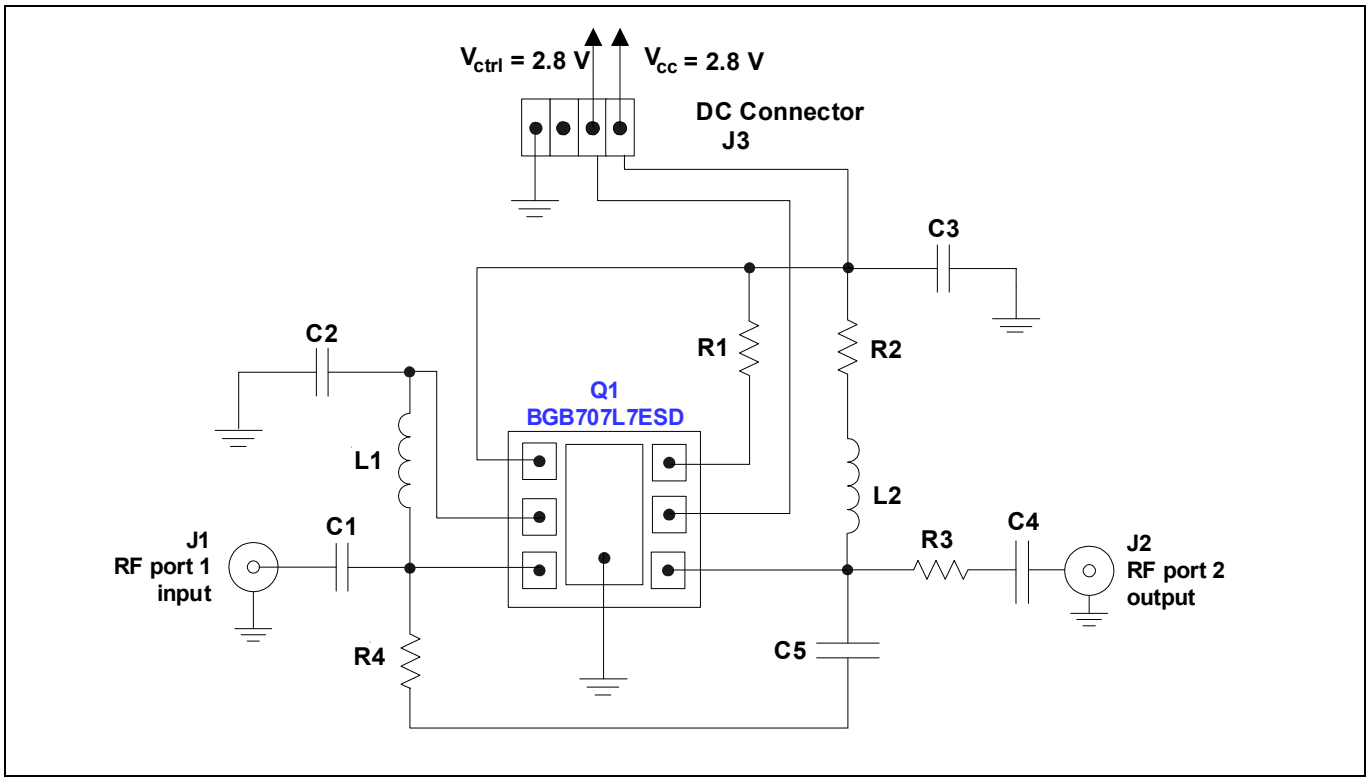


Figure 6 Circuit schematic

1.6.3 Bill of materials

Table 12 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	1.8	pF	0402	various	Input matching and DC blocking
C2	47	nF	0402	various	RF bypass
C3	47	nF	0402	various	RF bypass
C4	470	pF	0402	various	Output matching and DC blocking
C5	10	pF	0402	various	RF decoupling and DC blocking
L1	3.3	nH	0402	Murata LQW	Input matching/DC Feed
L2	1	nH	0402	Murata LQW	Output matching/DC Feed
R1	820	Ω	0402	various	Base Bias
R2	47	Ω	0402	Various	Stability improvement
R3	36	Ω	0402	various	Stability improvement
R4	1.8	kΩ	0402	various	Feedback

1.7 LNA with BGB707L7ESD for 1.0 – 2.0 GHz (V_{cc} = 2.5 V)

1.7.1 Summary of measurement results

Table 13 Electrical characteristics at T = 25°C, V_{cc} = 2.5 V, V_{ctrl} = 2.5 V

Parameter	Result			Unit	Note or Test condition
Vcc	2.5			V	
Icc	10			mA	
Frequency	1000	1500	2000	MHz	
Gain	20.3	19.6	18.7	dB	
Noise figure	0.86	0.87	0.86	dB	PCB loss 0.15 dB subtracted
Input return loss	8.9	8.9	8.4	dB	
Output return loss	11.5	11.1	11.4	dB	
Reverse isolation	26.7	26.5	26.5	dB	
Output P1dB	5.0	4.8	4.5	dBm	
Output IP3	13.2	12.9	12.8	dBm	Two-tone 1 MHz apart, -30 dBm input power
Stability (K factor)	>1			–	Stability measured from 10 MHz to 15 GHz

Note: Board results are measured from SMA connector to SMA connector

1.7.2 Circuit schematic

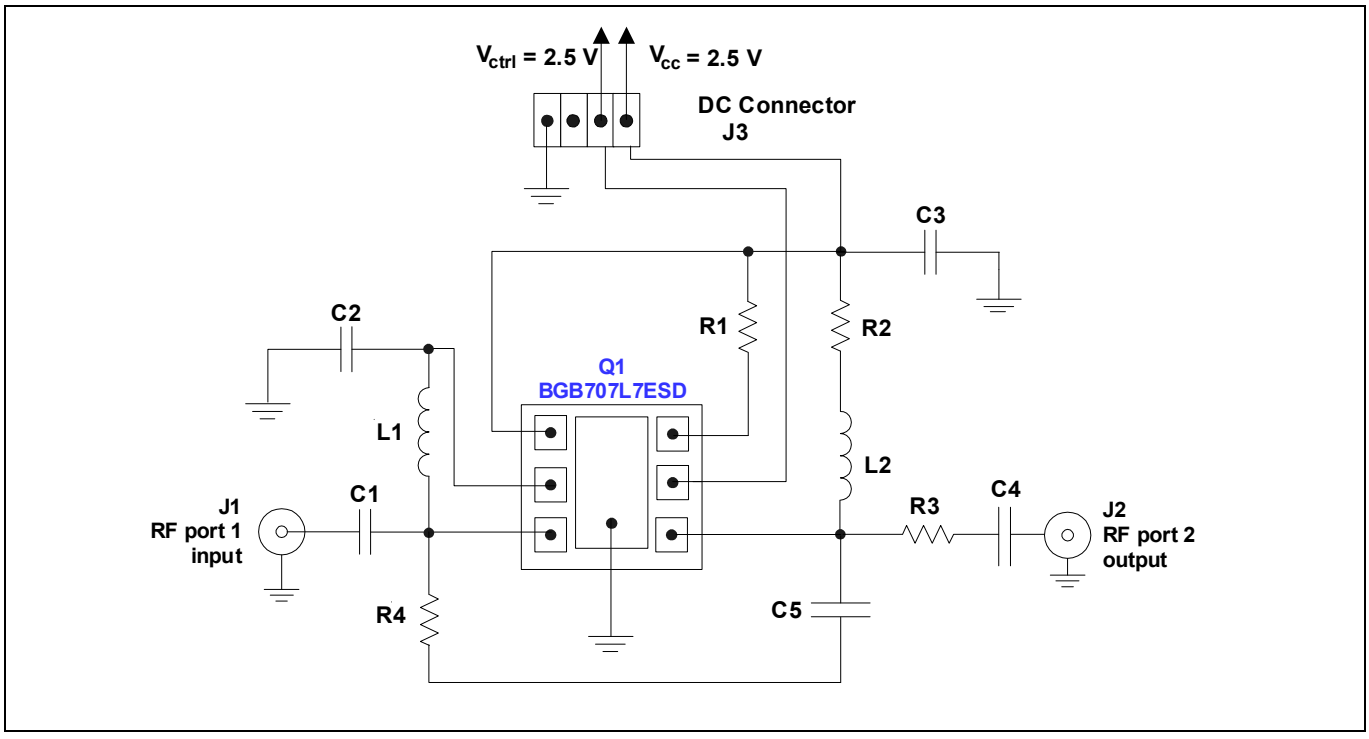


Figure 7 Circuit schematic

1.7.3 Bill of materials

Table 14 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	68	pF	0402	Various	Input matching and DC blocking
C2	47	pF	0402	Various	RF decoupling
C3	47	nF	0402	Various	RF decoupling
C4	10	pF	0402	Various	Output matching and DC blocking
C5	10	pF	0402	Various	RF decoupling and DC blocking
R1	820	Ω	0402	Various	Base bias
R2	56	Ω	0402	Various	Stability improvement
R3	15	Ω	0402	Various	Stability improvement
R4	1.2	kΩ	0402	Various	Feedback
L1	22	nH	0402	Various	Input matching
L2	15	nH	0402	Murata LQG	Output matching

1.8 LNA with BGB707L7ESD for 1.0 – 2.0 GHz (V_{cc} = 3.0 V)

1.8.1 Summary of measurement results

Table 15 Electrical characteristics at T = 25°C, V_{cc} = 3.0 V, V_{ctrl} = 3.0 V

Parameter	Result			Unit	Note or Test condition
Vcc	3.0			V	
Icc	5.8			mA	
Frequency	1000	1500	2000	MHz	
Gain	16.1	15.7	14.8	dB	
Noise figure	1.15	1.18	1.19	dB	PCB loss 0.20 dB subtracted
Input return loss	17.8	14.3	10.9	dB	
Output return loss	12.1	11.5	11.3	dB	
Reverse isolation	21.7	22.0	22.7	dB	
Output P1dB	8.0	7.3	6.4	dBm	
Output IP3	14.2	14.7	12.3	dBm	Two-tone 1 MHz apart, -30 dBm input power
Stability (K factor)	>1			–	Stability measured from 10 MHz to 15 GHz

Note: Board results are measured from SMA connector to SMA connector

1.8.2 Circuit schematic

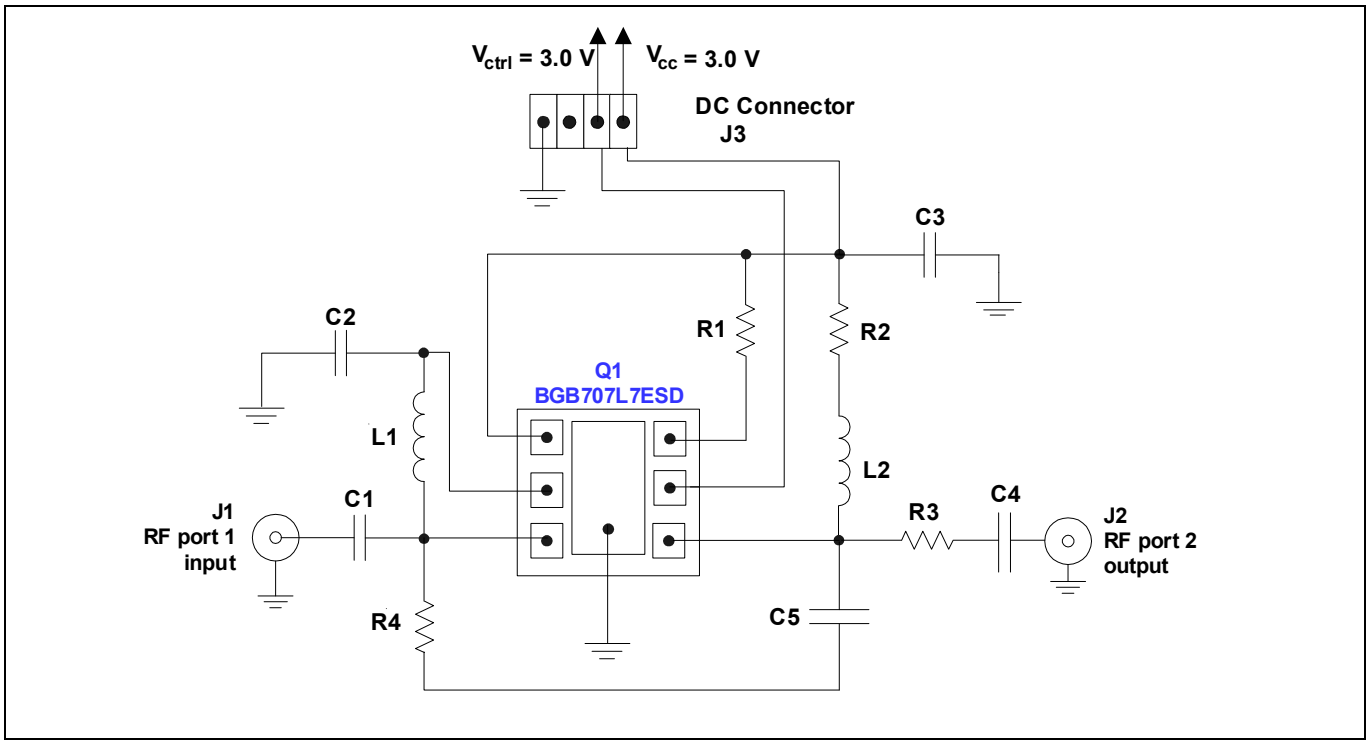


Figure 8 Circuit schematic

1.8.3 Bill of materials

Table 16 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	68	pF	0402	Various	Input matching and DC blocking
C2	47	pF	0402	Various	RF decoupling
C3	47	nF	0402	Various	RF decoupling
C4	820	pF	0402	Various	Output matching and DC blocking
C5	820	pF	0402	Various	DC blocking
L1	40	nH	0402	Murata LQW	Input matching and RF chock
L2	33	nH	0402	Murata LQG	Output matching and RF chock
R1	2.4	kΩ	0402	Various	Base bias
R2	56	Ω	0402	Various	Stability improvement
R3	15	Ω	0402	Various	Stability improvement
R4	560	Ω	0402	Various	Negative feedback

1.9 LNA with BGB707L7ESD for 100 – 2150 MHz

1.9.1 Summary of measurement results

Table 17 Electrical characteristics at T = 25°C, V_{cc} = 2.7 V, V_{ctrl} = 2.7 V

Parameter	Result			Unit	Note or Test condition
Vcc	2.7			V	
Icc	14.9			mA	
Frequency	100	900	1800	MHz	
Gain	19.9	20.2	19.7	dB	
Noise figure	1.4	1.15	1.21	dB	PCB loss 0.10 dB subtracted
Input return loss	15.3	9.9	8.4	dB	
Output return loss	20.9	34.3	15.7	dB	
Reverse isolation	27.7	26.9	26.4	dB	
Output P1dB	100	900	1800	dBm	
Output IP3	–			dBm	
Stability (K factor)	>1			–	Stability measured from 10 MHz to 15 GHz

Note: Board results are measured from SMA connector to SMA connector

1.9.2 Circuit schematic

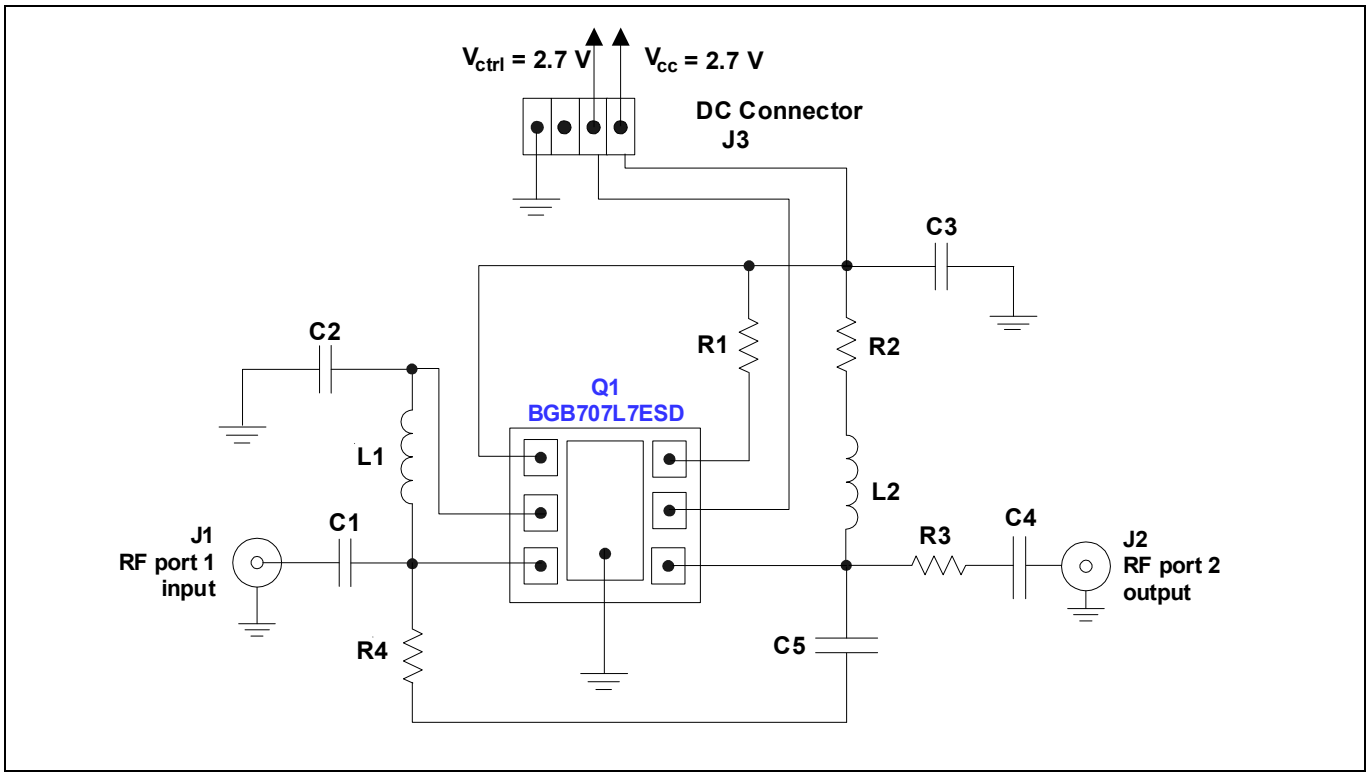


Figure 9 Circuit schematic

1.9.3 Bill of materials

Table 18 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	330	pF	0402	Various	Input matching and DC blocking
C2	47	nF	0402	Various	RF decoupling
C3	47	nF	0402	Various	RF decoupling
C4	1.2	nF	0402	Various	Output matching and DC blocking
C5	820	pF	0402	Various	DC blocking
L1	180	nH	0402	Murata LQG	Input matching and RF chock
L2	16	nH	0402	Murata LQG	Output matching and RF chock
R1	240	Ω	0402	Various	Base bias
R2	110	Ω	0402	Various	Stability improvement
R3	8.2	Ω	0402	Various	Stability improvement
R4	820	Ω	0402	Various	Negative feedback

1.10 LNA with BGB707L7ESD for 900 – 2400 MHz

1.10.1 Summary of measurement results

Table 19 Electrical characteristics at T = 25°C, V_{cc} = 3.0 V, V_{ctrl} = 3.0 V

Parameter	Result			Unit	Note or Test condition
Vcc	3.0			V	
Icc	10.5			mA	
Frequency	900	1500	2400	MHz	
Gain	20	19.5	17.3	dB	
Noise figure	1.4	1.4	1.3	dB	PCB loss 0.20 dB subtracted
Input return loss	9.8	8.7	7.6	dB	
Output return loss	9.9	8.7	9.2	dB	
Reverse isolation	27.5	26.8	26.8	dB	
Output P1dB	900	1500	2400	dBm	Measured at 1.5 GHz
Output IP3	–			dBm	
Stability (K factor)	>1			–	Stability measured from 10 MHz to 15 GHz

Note: Board results are measured from SMA connector to SMA connector

1.10.2 Circuit schematic

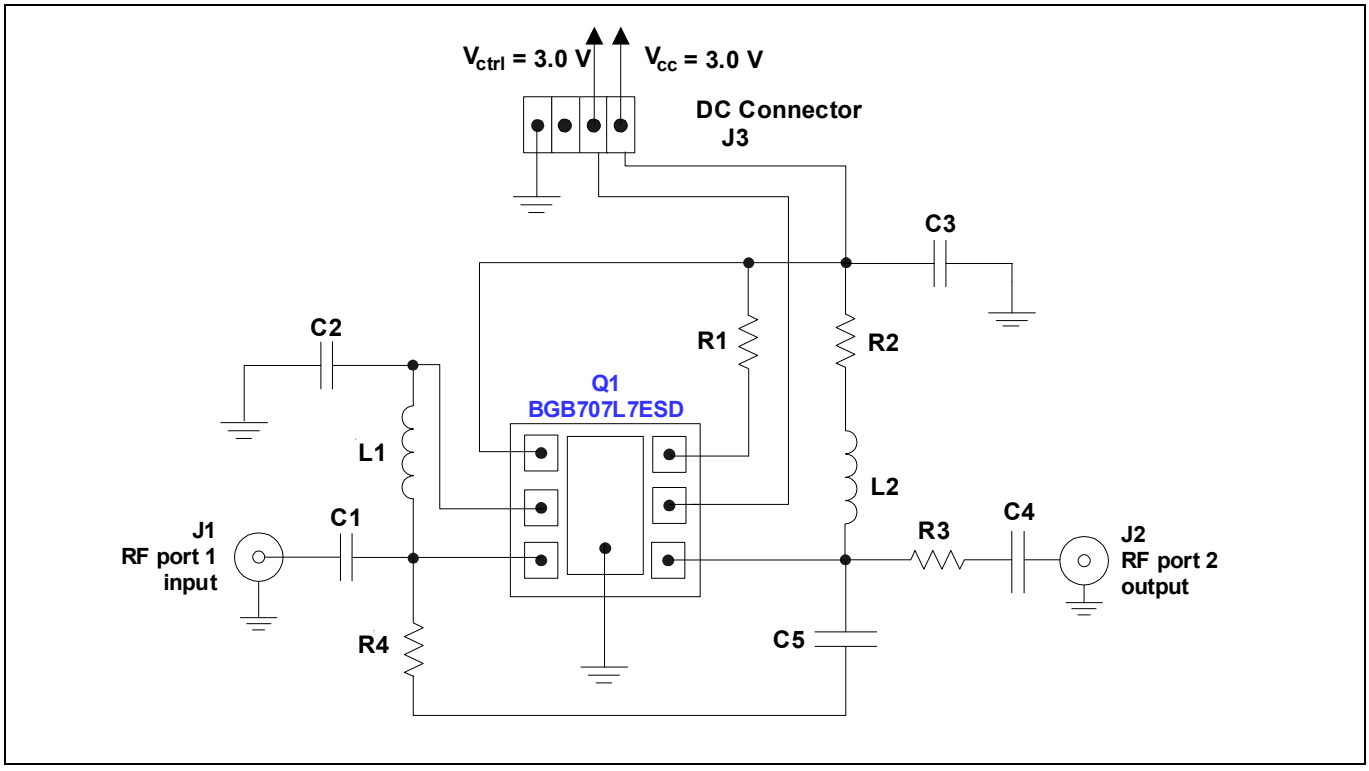


Figure 10 Circuit schematic

1.10.3 Bill of materials

Table 20 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	68	pF	0402	Various	Input matching and DC blocking
C2	47	pF	0402	Various	RF decoupling
C3	47	nF	0402	Various	RF decoupling
C4	10	pF	0402	Various	Output matching and DC blocking
C5	10	pF	0402	Various	RF decoupling and DC blocking
R1	820	Ω	0402	Various	Base bias
R2	56	Ω	0402	Various	Stability improvement
R3	15	Ω	0402	Various	Stability improvement
R4	1.2	kΩ	0402	Various	Feedback
L1	22	nH	0402	Murata LQG	Input matching
L2	15	nH	0402	Murata LQG	Output matching

1.11 LNA with BGB707L7ESD for 50 – 4000 MHz

1.11.1 Summary of measurement results

Table 21 Electrical characteristics at T = 25°C, V_{cc} = 2.7 V, V_{ctrl} = 2.7 V

Parameter	Result				Unit	Note or Test condition
Vcc	2.7				V	
Icc	14.9				mA	
Frequency	50	900	2150	4000	MHz	
Gain	19.1	20.2	19.2	16.7	dB	
Noise figure	1.4	1.15	1.25	1.3	dB	PCB loss 0.10 dB subtracted
Input return loss	10.1	9.9	8.4	9.2	dB	
Output return loss	16.3	34.3	13.4	16.6	dB	
Reverse isolation	28.2	26.9	26.4	26.5	dB	
Output P1dB	–				dBm	
Output IP3	–				dBm	
Stability (K factor)	>1				–	Stability measured from 10 MHz to 15 GHz

Note: Board results are measured from SMA connector to SMA connector

1.11.2 Circuit schematic

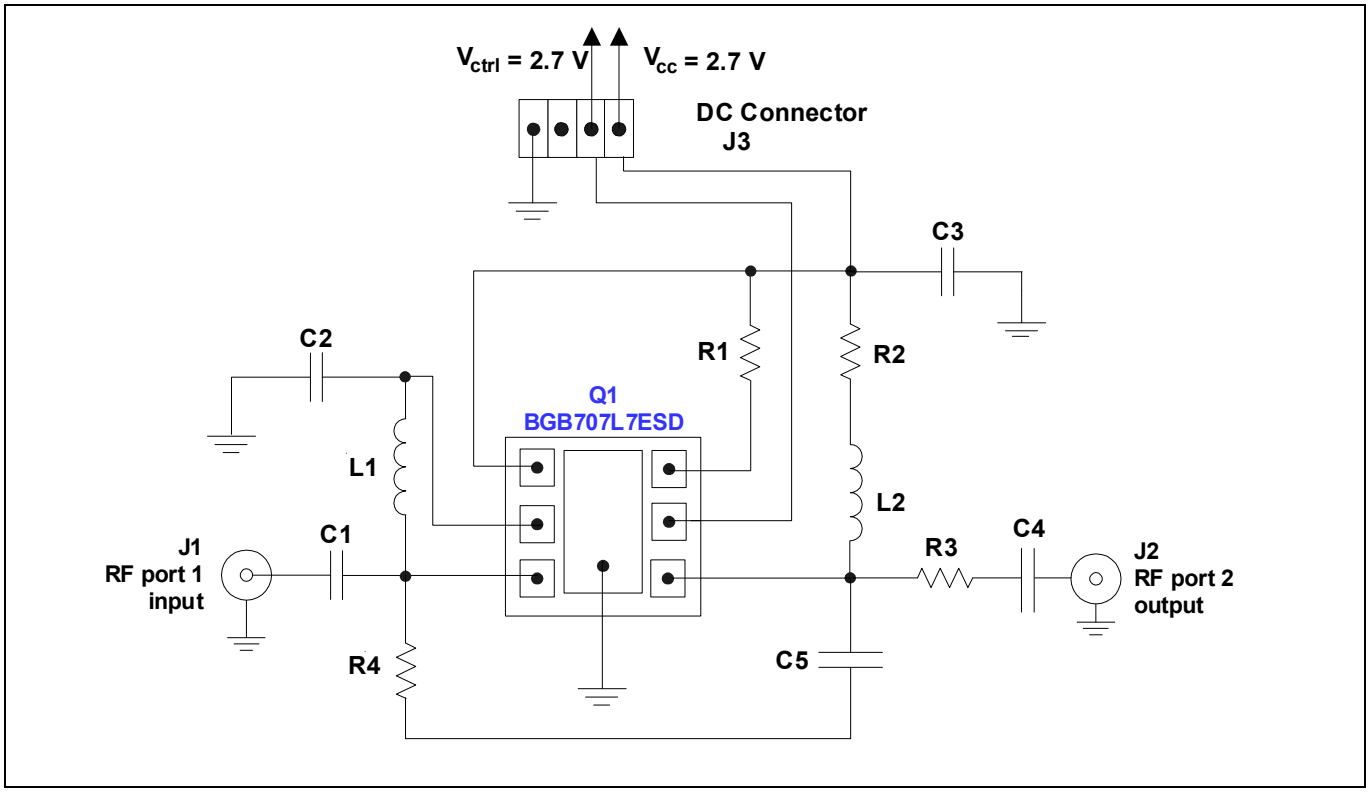


Figure 11 Circuit schematic

1 Available application circuits

1.11.3 Bill of materials

Table 22 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	330	pF	0402	Various	Input matching and DC blocking
C2	47	nF	0402	Various	RF decoupling
C3	47	nF	0402	Various	RF decoupling
C4	1.2	nF	0402	Various	Output matching and DC blocking
C5	820	pF	0402	Various	DC blocking
L1	180	nH	0402	Murata LQG	Input matching and RF chock
L2	16	nH	0402	Murata LQG	Output matching and RF chock
R1	240	Ω	0402	Various	Base bias
R2	110	Ω	0402	Various	Stability improvement
R3	8.2	Ω	0402	Various	Stability improvement
R4	820	Ω	0402	Various	Negative feedback

1.12 LNA with BGB707L7ESD for 5.45 – 5.65 GHz

1.12.1 Summary of measurement results

Table 23 Electrical characteristics at T = 25°C, V_{cc} = 3.0 V, V_{ctrl} = 3.0 V

Parameter	Result		Unit	Note or Test condition
Vcc	3.0		V	
Icc	4.9		mA	
Frequency	5450	5650	MHz	
Gain	13.0	12.9	dB	
Noise figure	1.50	1.55	dB	PCB loss 0.15 dB subtracted
Input return loss	14.9	16.9	dB	
Output return loss	12.8	12.7	dB	
Reverse isolation	24.2	24.0	dB	
Output P1dB	5.0	4.7	dBm	
Output IP3	15.8		dBm	f1 = 5500 MHz, f2 = 5501 MHz, P_{IN} = - 30 dBm per tone
Stability (K factor)	>1		–	Stability measured from 10 MHz to 15 GHz

Note: Board results are measured from SMA connector to SMA connector

1.12.2 Circuit schematic

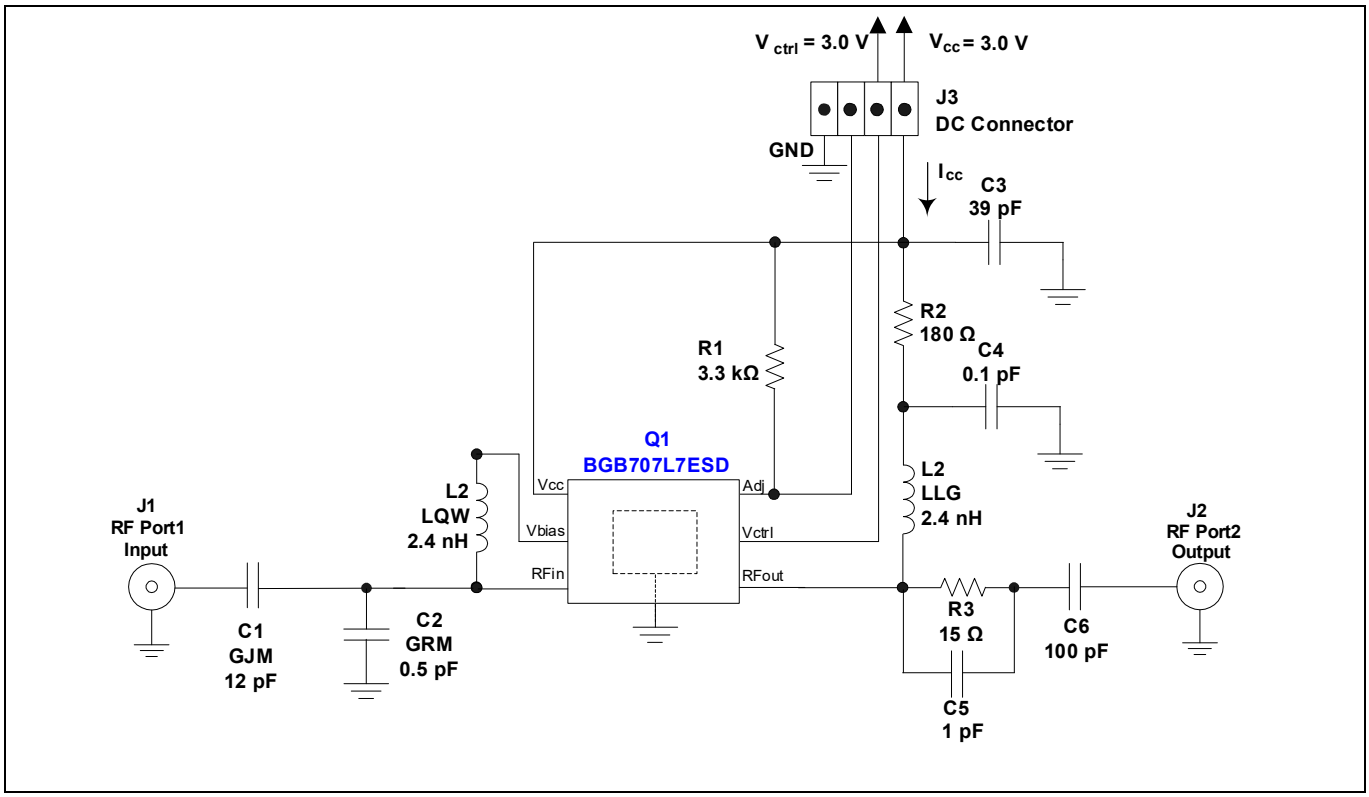


Figure 12 Circuit schematic

1.12.3 Bill of materials

Table 24 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	12	pF	0402	various	Input matching and DC blocking
C2	0.5	pF	0402	various	Input matching
C3	39	pF	0402	various	RF bypass
C4	0.1	pF	0402	various	Output matching
C5	1	pF	0402	various	Output matching
C6	100	pF	0402	various	Output matching and DC block
R1	3.3	kΩ	0402	various	Base bias
R2	180	Ω	0402	various	Stability improvement
R3	15	Ω	0402	various	Stability improvement
L1	2.4	nH	0402	Murata LQG	DC feed and input matching
L2	2.4	nH	0402	Murata LQG	DC feed and output matching

1.13 LNA with BGB707L7ESD for 2.6 – 6.0 GHz

1.13.1 Summary of measurement results

Table 25 Electrical characteristics at T = 25°C, V_{cc} = 3.3 V, V_{ctrl} = 3.3 V

Parameter	Result				Unit	Note or Test condition
Vcc	3.3				V	
Icc	10.4				mA	
Frequency	2600	3500	5000	6000	MHz	
Gain	16.2	16.0	16.0	15.0	dB	
Noise figure	1.6	1.5	1.4	1.55	dB	PCB loss 0.20 dB subtracted
Input return loss	17.4	17.9	11.6	8.4	dB	
Output return loss	17.5	16.2	31.0	13.2	dB	
Reverse isolation	22.5	23.2	24.0	24.5	dB	
Output P1dB	6.6	4.1	3.7	3.5	dBm	
Output IP3	–	8.7	5.7	15.0	dBm	Two-tone 1 MHz apart, -30 dBm input power
Stability (K factor)	>1				–	Stability measured from 10 MHz to 15 GHz

Note: Board results are measured from SMA connector to SMA connector

1.13.2 Circuit schematic

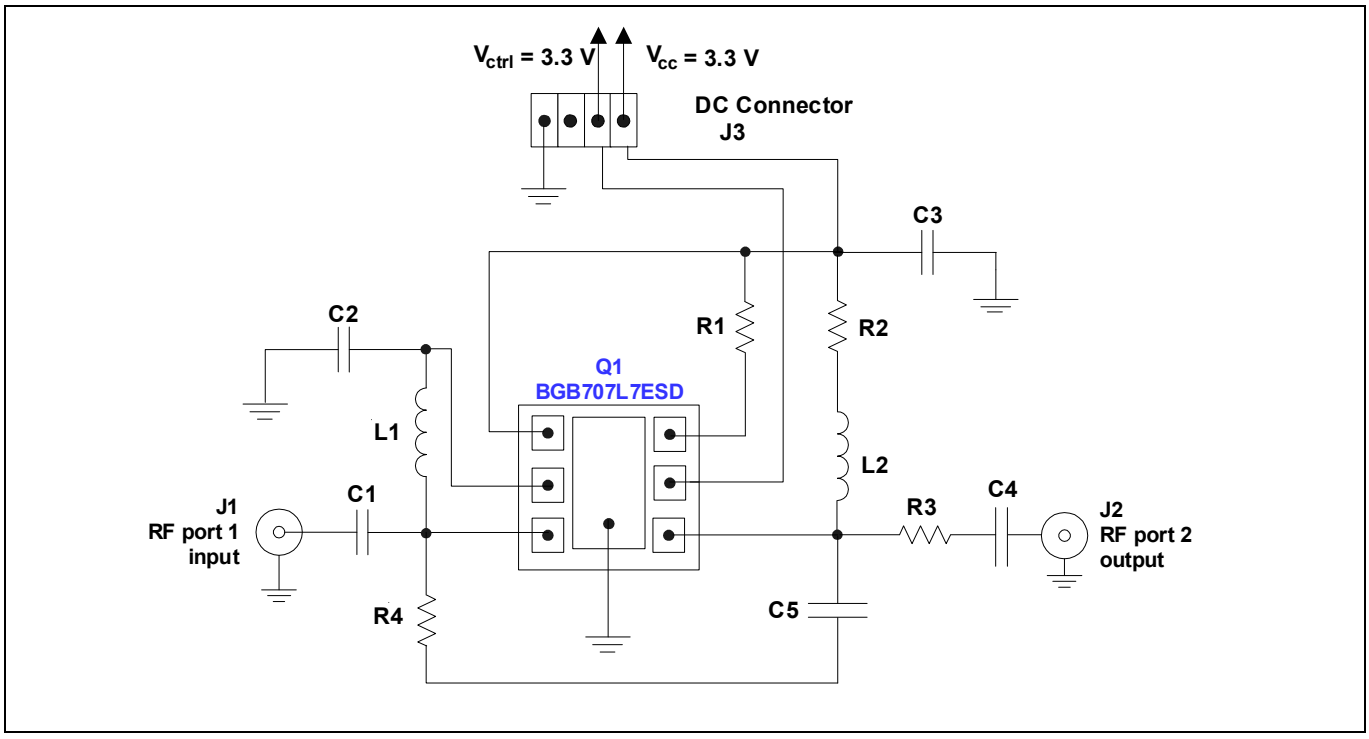


Figure 13 Circuit schematic

1.13.3 Bill of materials

Table 26 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	82	pF	0402	Various	Input matching and DC blocking
C2	47	pF	0402	Various	RF decoupling
C3	47	nF	0402	Various	RF decoupling
C4	100	pF	0402	Various	Output matching and DC blocking
C5	820	pF	0402	Various	DC blocking
L1	15	nH	0402	Murata LQW	Input matching and RF chock
L2	15	nH	0402	Murata LQG	Output matching and RF chock
R1	1	kΩ	0402	Various	Base bias
R2	56	Ω	0402	Various	
R3	15	Ω	0402	Various	Stability improvement
R4	360	Ω	0402	Various	Negative feedback

1.14 LNA with BGB707L7ESD for 3.3 – 6.5 GHz

1.14.1 Summary of measurement results

Table 27 Electrical characteristics at T = 25°C, V_{cc} = 3.3 V, V_{ctrl} = 3.3 V

Parameter	Result			Unit	Note or Test condition
Vcc	3.3			V	
Icc	10.5			mA	
Frequency	3500	5000	6500	MHz	
Gain	17.4	15.6	13.7	dB	
Noise figure	1.08	1.10	1.15	dB	PCB loss 0.20 dB subtracted
Input return loss	5.8	9.7	6.4	dB	
Output return loss	7.0	11.5	11.8	dB	
Reverse isolation	28.3	25.9	25.5	dB	
Output P1dB	1.6	5.3	7.5	dBm	
Output IP3	–			dBm	
Stability (K factor)	>1			–	Stability measured up to 18 GHz

Note: Board results are measured from SMA connector to SMA connector

1.14.2 Circuit schematic

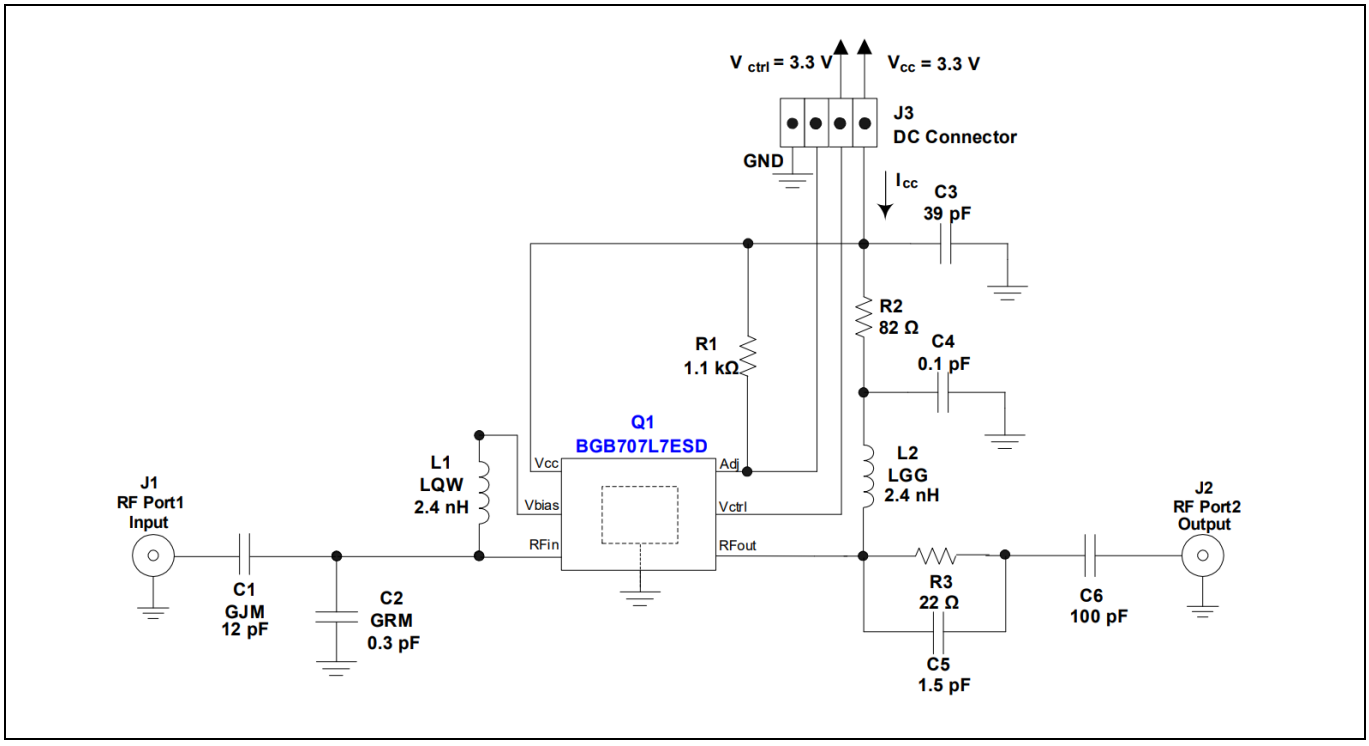


Figure 14 Circuit schematic

1.14.3 Bill of materials

Table 28 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	12	pF	0402	Various	Input matching and DC block
C2	0.3	pF	0402	Various	RF bypass
C3	39	pF	0402	Various	Output matching
C4	0.1	pF	0402	Various	RF bypass
C5	1.5	pF	0402	Various	Low-frequency stability improvement
C6	100	pF	0402	Various	Output matching and DC block
L1	2.4	nH	0402	Murata LQW	DC feed and input matching
L2	2.4	nH	0402	Murata LQG	DC feed and output matching
R1	1.1	kΩ	0402	Various	Base bias
R2	82	Ω	0402	Various	Stability improvement
R3	22	Ω	0201	Various	Stability improvement

1.15 LNA with BGB707L7ESD for 3.5 – 7.125 GHz

1.15.1 Summary of measurement results

Table 29 Electrical characteristics at T = 25°C, V_{cc} = 3.0 V, V_{ctrl} = 3.0 V

Parameter	Result			Unit	Note or Test condition
Vcc	3.0			V	
Icc	8.8			mA	
Frequency	5000	6000	7125	MHz	
Gain	15.4	14.3	12.7	dB	
Noise figure	1.10	1.10	1.2	dB	PCB loss 0.20 dB subtracted
Input return loss	9.1	6.6	5.2	dB	
Output return loss	10.3	14.4	9.1	dB	
Reverse isolation	25.4	25.2	24.8	dB	
Output P1dB	–			dBm	
Output IP3	–			dBm	
Stability (K factor)	>1			–	Stability measured up to 18 GHz

Note: Board results are measured from SMA connector to SMA connector

1.15.2 Circuit schematic

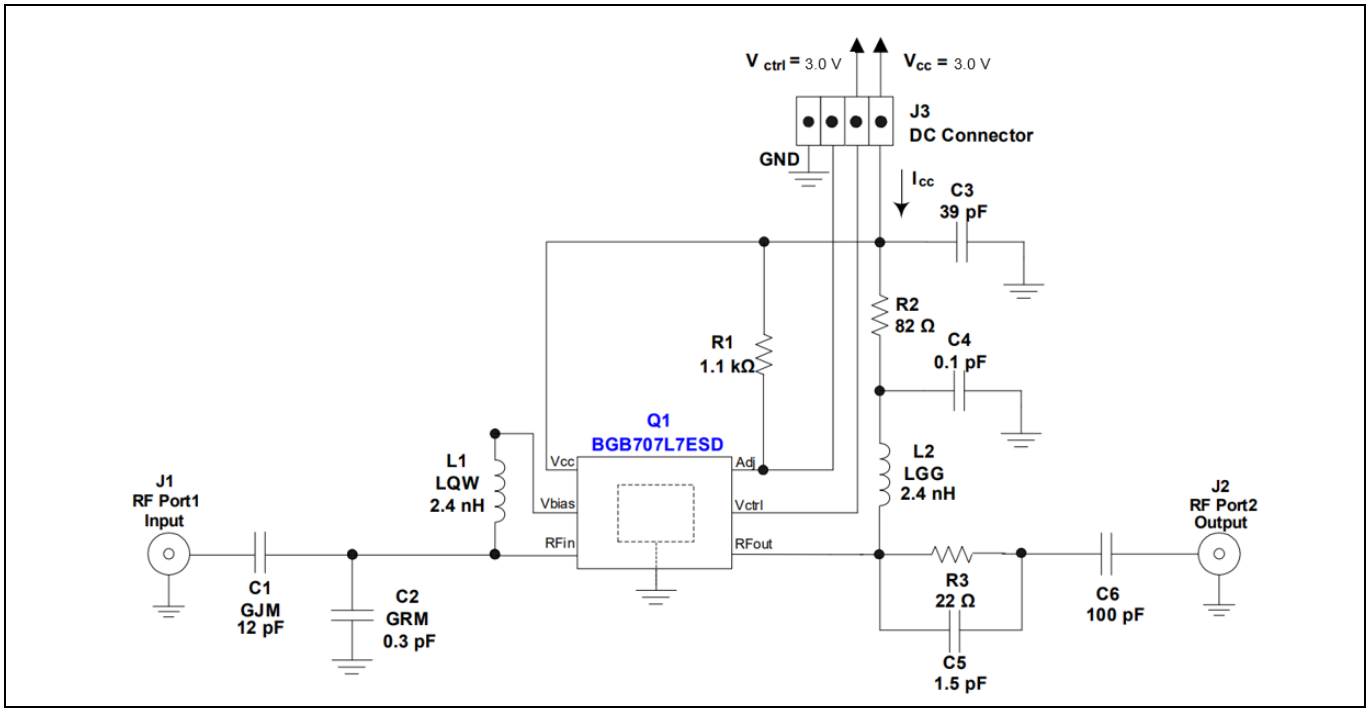


Figure 15 Circuit schematic

1.15.3 Bill of materials

Table 30 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	12	pF	0201	Various	Input matching and DC block
C2	0.3	pF	0402	Various	RF bypass
C3	39	pF	0402	Various	Output matching
C4	0.1	pF	0402	Various	RF bypass
C5	1.5	pF	0402	Various	Low-frequency stability improvement
C6	100	pF	0402	Various	Output matching and DC block
L1	2.4	nH	0402	Murata LQW	DC feed and input matching
L2	2.4	nH	0402	Murata LQG	DC feed and output matching
R1	1.1	kΩ	0402	Various	Base bias
R2	82	Ω	0402	Various	Stability improvement
R3	22	Ω	0201	Various	Stability improvement

1.16 LNA with BGB707L7ESD for 3.5 – 8.5 GHz

1.16.1 Summary of measurement results

Table 31 Electrical characteristics at T = 25°C, V_{cc} = 3.3 V, V_{ctrl} = 3.3 V

Parameter	Result				Unit	Note or Test condition
Vcc	3.3				V	
Icc	9.7				mA	
Frequency	3500	5000	7000	8500	MHz	
Gain	15.5	15.6	13.5	10.6	dB	
Noise figure	1.8	1.7	1.7	1.8	dB	PCB loss is not considered
Input return loss	15.3	13.4	11.4	17.4	dB	
Output return loss	16.6	26.3	8.4	4.5	dB	
Reverse isolation	23.0	23.6	22.7	22.3	dB	
Output P1dB	3.9	2.7	3.4	6.2	dBm	
Output IP3	-4.0	0.6	3.5	9.4	dBm	Two-tone 1 MHz apart, -30 dBm input power
Stability (K factor)	>1				–	Stability measured from 10 MHz to 15 GHz

Note: Board results are measured from SMA connector to SMA connector

1.16.2 Circuit schematic

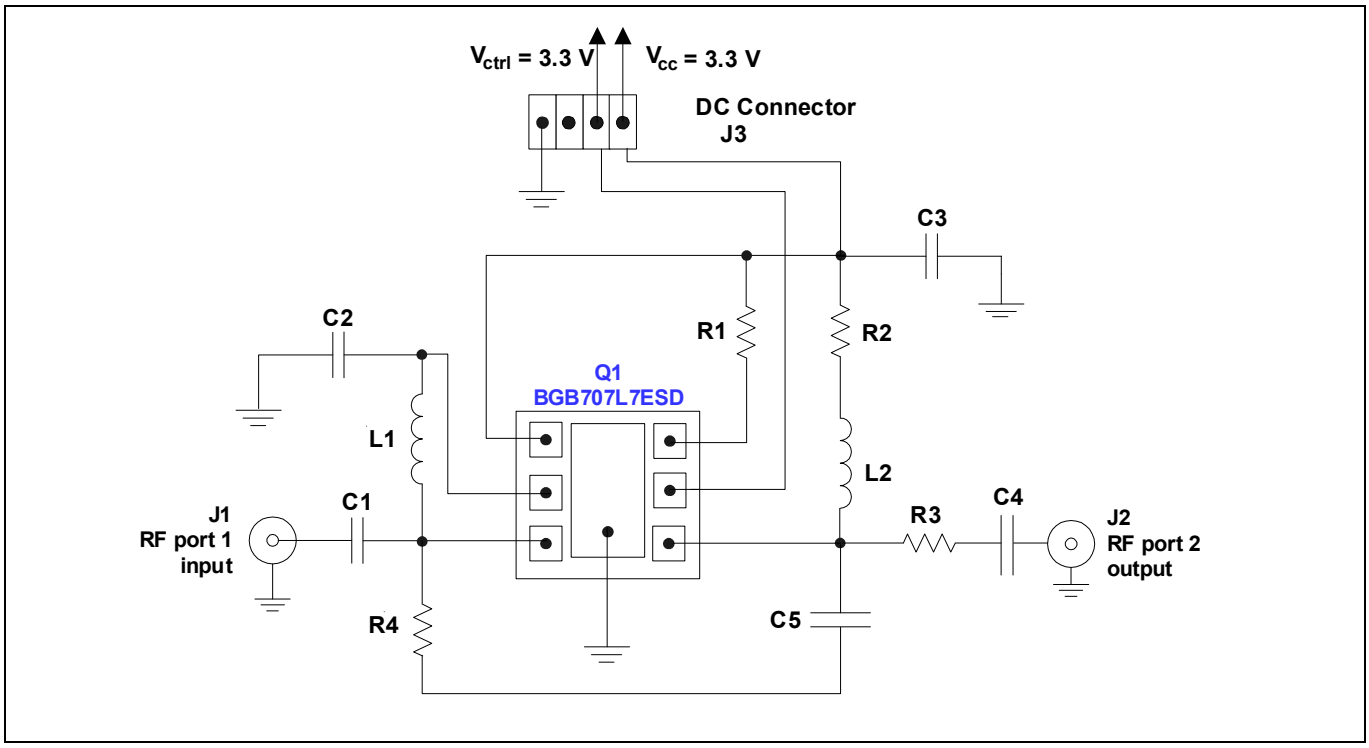


Figure 16 Circuit schematic

1.16.3 Bill of materials

Table 32 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	82	pF	0402	Various	Input matching and DC blocking
C2	47	pF	0402	Various	RF decoupling
C3	47	nF	0402	Various	RF decoupling
C4	100	pF	0402	Various	Output matching and DC blocking
C5	820	pF	0402	Various	DC blocking
L1	15	nH	0402	Murata LQW	Input matching and RF chock
L2	15	nH	0402	Murata LQG	Output matching and RF chock
R1	1	kΩ	0402	Various	Base bias
R2	56	Ω	0402	Various	
R3	15	Ω	0402	Various	Stability improvement
R4	360	Ω	0402	Various	Negative feedback

1.17 LNA with BGB707L7ESD for 6.5 – 8.5 GHz

1.17.1 Summary of measurement results

Table 33 Electrical characteristics at T = 25°C, V_{cc} = 3.3 V, V_{ctrl} = 3.3 V

Parameter	Result					Unit	Note or Test condition
Vcc	3.3					V	
Icc	10.2					mA	
Frequency	6500	7000	7500	8000	8500	MHz	
Gain	13.4	12.6	12.0	11.7	11.3	dB	
Noise figure	1.24	1.20	1.21	1.22	1.40	dB	PCB loss 0.20 dB subtracted
Input return loss	11.8	7.4	5.3	4.9	4.9	dB	
Output return loss	12.3	16.1	22.6	23.1	12.4	dB	
Reverse isolation	27.3	27.1	26.9	26.9	26.6	dB	
Output P1dB	5.5	5.2	5.6	6.1	7.3	dBm	
Output IP3	6500	7000	7500	8000	8500	dBm	Two-tone 1 MHz apart, -30 dBm input power
Stability (K factor)	>1					–	Stability measured up to 18 GHz

Note: Board results are measured from SMA connector to SMA connector

1.17.2 Circuit schematic

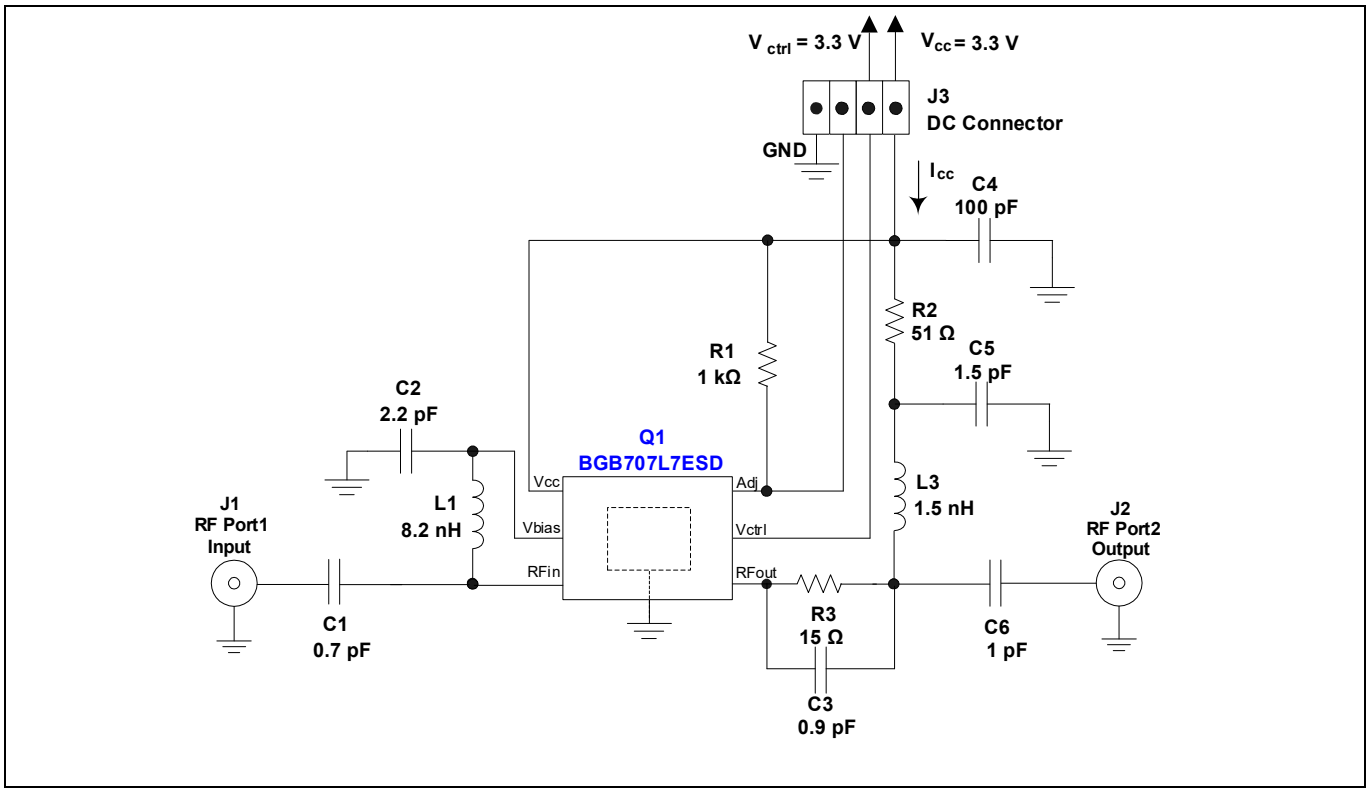


Figure 17 Circuit schematic

1.17.3 Bill of materials

Table 34 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	0.7	pF	0402	Various	Input matching and DC block
C2	2.2	pF	0402	Various	RF bypass
C3	0.9	pF	0402	Various	Output matching
C4	100	pF	0402	Various	RF bypass
C5	1.5	pF	0402	Various	Low-frequency stability improvement
C6	1	pF	0402	Various	Output matching and DC block
L1	8.2	nH	0402	Murata LQW	DC feed and input matching
L2	1.5	nH	0402	Murata LQG	DC feed and output matching
R1	1	kΩ	0402	Various	Base bias
R2	51	Ω	0402	Various	Low-frequency stability improvement
R3	15	Ω	0201	Various	High-frequency stability improvement

1.18 LNA with BGB707L7ESD for 9.3 – 9.5 GHz

1.18.1 Summary of measurement results

Table 35 Electrical characteristics at T = 25°C, V_{cc} = 3.3 V, V_{ctrl} = 3.3 V

Parameter	Result			Unit	Note or Test condition
Vcc	3.3			V	
Icc	10.3			mA	
Frequency	9300	9400	9500	MHz	
Gain	9.9	9.7	9.5	dB	
Noise figure	1.65			dB	PCB loss 0.20 dB subtracted
Input return loss	4.0	4.2	4.2	dB	
Output return loss	8.2	8.2	8.1	dB	
Reverse isolation	27.5	27.4	27.4	dB	
Output P1dB	7.5			dBm	
Output IP3	–			dBm	
Stability (K factor)	>1			–	Stability measured from 100 MHz to 10 GHz

Note: Board results are measured from SMA connector to SMA connector

1.18.2 Circuit schematic

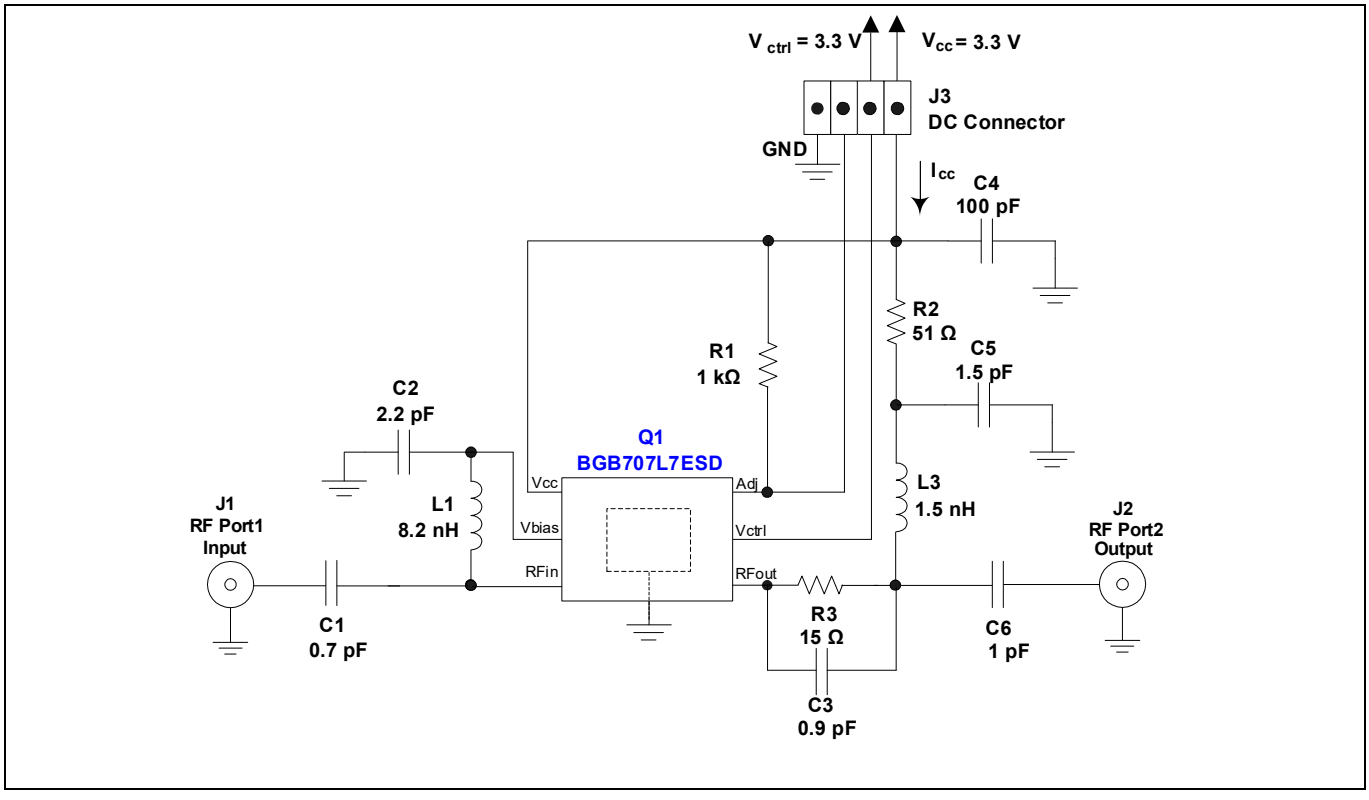


Figure 18 Circuit schematic

1.18.3 Bill of materials

Table 36 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	0.7	pF	0402	various	Input matching and DC block
C2	2.2	pF	0402	various	RF bypass
C3	0.9	pF	0402	various	Output matching
C4	100	pF	0402	various	RF bypass
C5	1.5	pF	0402	various	Low-frequency stability improvement
C6	1	pF	0402	various	Output matching and DC block
L1	8.2	nH	0402	Murata LQW	DC feed and input matching
L2	1.5	nH	0402	Murata LQG	DC feed and output matching
R1	1	kΩ	0402	Various	Base bias
R2	51	Ω	0402	Various	Low-frequency stability improvement
R3	15	Ω	0201	Various	High-frequency stability improvement

1.19 LNA with BGB707L7ESD for 9.5 GHz

1.19.1 Summary of measurement results

Table 37 Electrical characteristics at T = 25°C, V_{cc} = 4.0 V, V_{ctrl} = 4.0 V

Parameter	Result		Unit	Note or Test condition
Vcc	4.0		V	
Icc	10.4		mA	
Frequency	9300	9500	MHz	
Gain	10.4	10.2	dB	
Noise figure	1.7	1.7	dB	PCB loss 0.15 dB subtracted
Input return loss	5.4	5.9	dB	
Output return loss	8.7	8.4	dB	
Reverse isolation	26.8	26.0	dB	
Output P1dB	4.2		dBm	
Output IP3			dBm	
Stability (K factor)	>1		–	Stability measured from 100 MHz to 10 GHz

Note: Board results are measured from SMA connector to SMA connector

1.19.2 Circuit schematic

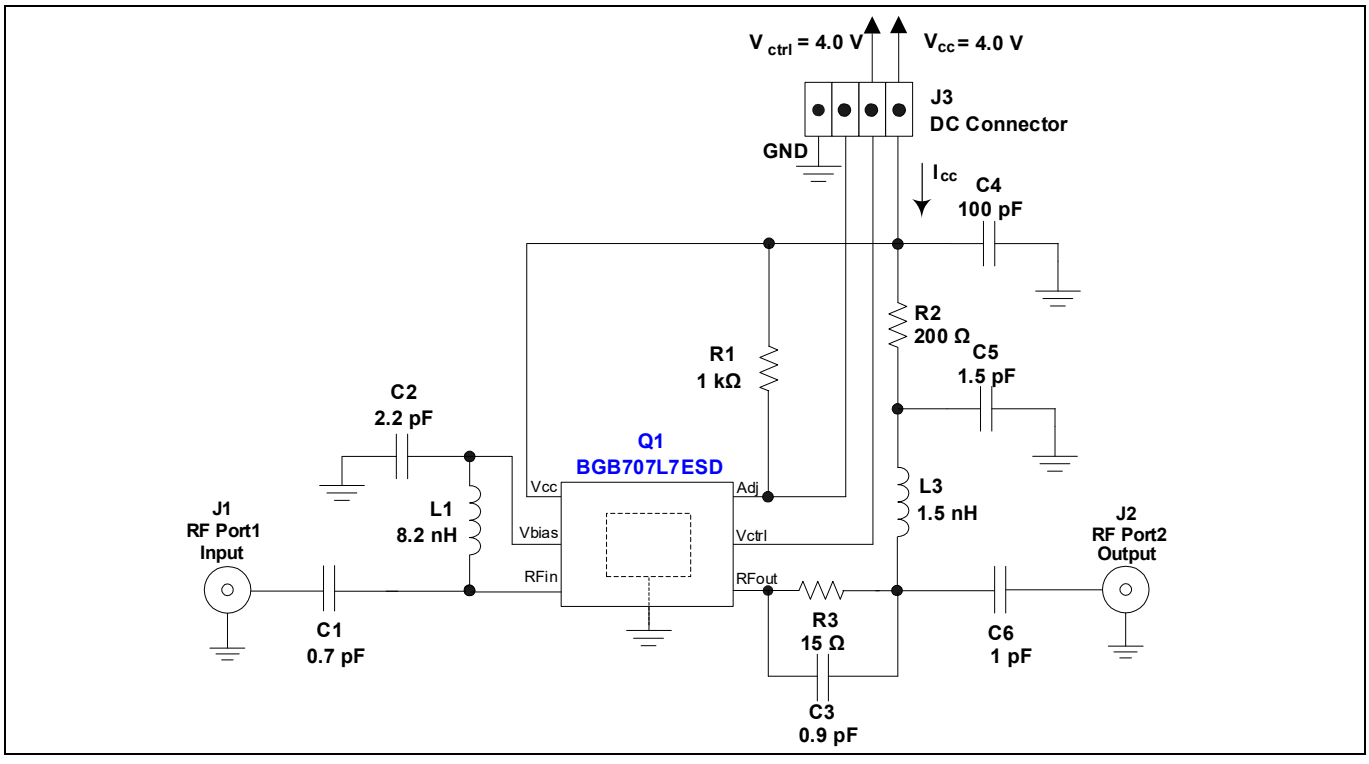


Figure 19 Circuit schematic

1.19.3 Bill of materials

Table 38 Bill of materials

Symbol	Value	Unit	Size	Manufacturer	Comment
Q1	BGB707L7ESD	–	PG-TSLP-7-1	Infineon	SiGe:C MMIC LNA
C1	0.7	pF	0402	various	Input matching and DC blocking
C2	2.2	pF	0402	various	Input matching
C3	0.9	pF	0402	various	RF bypass
C4	100	pF	0402	various	Output matching
C5	1.5	pF	0402	various	Output matching
C6	1	pF	0402	various	Output matching and DC block
R1	1	kΩ	0402	various	Base bias
R2	200	Ω	0402	various	Stability improvement
R3	15	Ω	0402	various	Stability improvement
L1	8.2	nH	0402	Murata LQG	DC feed and input matching
L2	1.5	nH	0402	Murata LQG	DC feed and output matching

2 Evaluation board and layout information

They are two options for the BGB707L7ESD EVB:

- PCB material: Rogers RO4003C
- PCB marking: BGB7 family V3.1 M141017

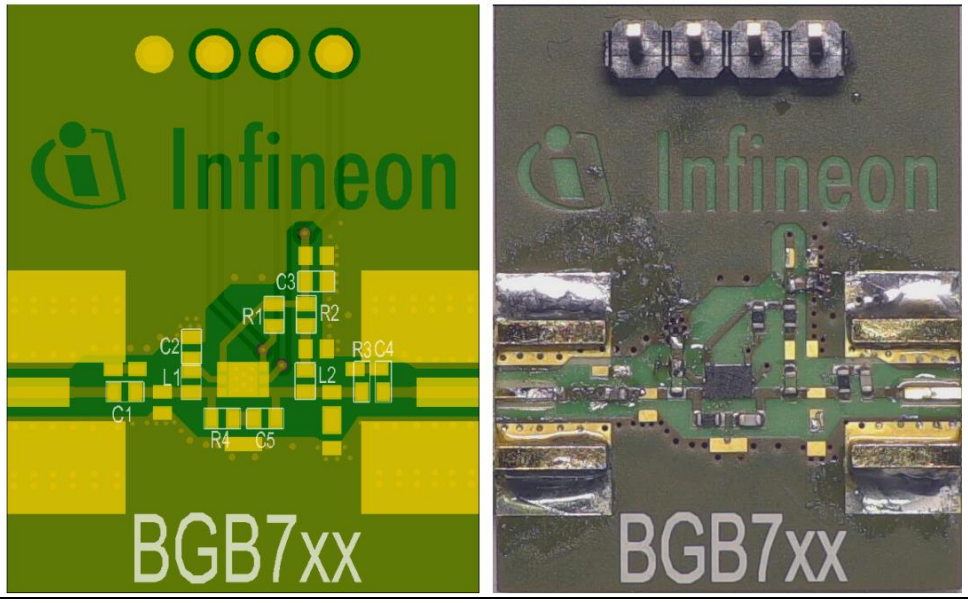


Figure 20 PCB layout and photo of the BGB707L7ESD evaluation board with feedback loop

- PCB material: Rogers RO4003C
- PCB marking: BGB7 family V5.1 M170302

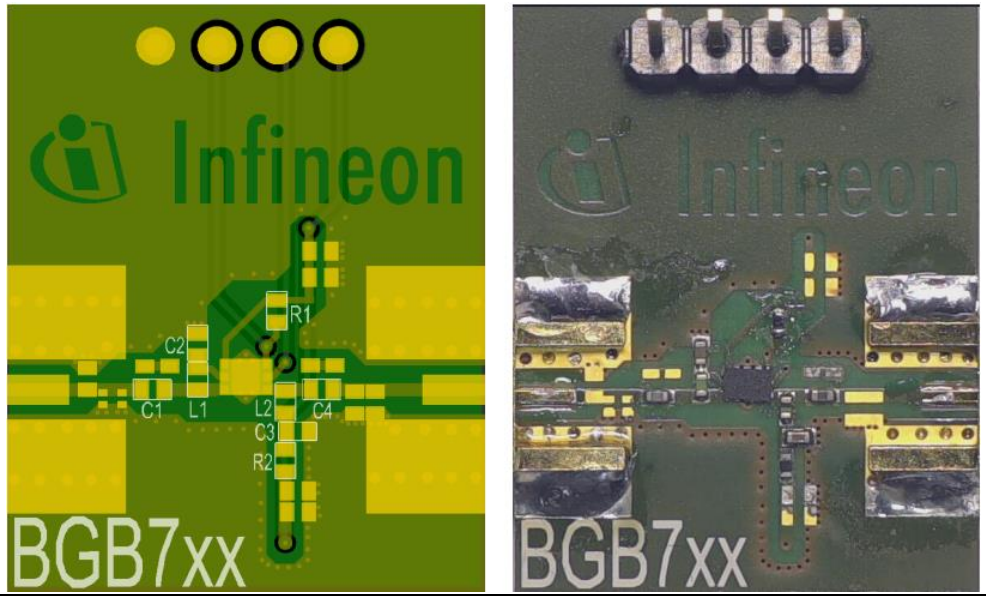


Figure 21 PCB layout and photo of the BGB707L7ESD evaluation board without feedback loop

2 Evaluation board and layout information

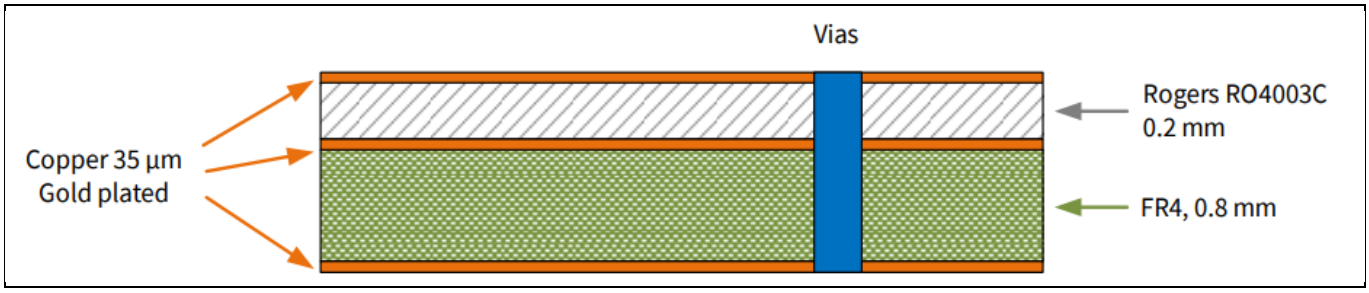


Figure 22 PCB stack information for the evaluation board

3 Requestion an evaluation board

To obtain the BGB707L7ESD EVB (BGB707L7ESD BOARD), customers can place an order through the Integrated Distribution Solution (IDIS) tool, the Infineon Sample Request (ISaR) tool, or by contacting their designated business partner while referencing the part number: **SP000555586**.

Please note that this device can be tuned to accommodate different requirements. Therefore, a standard EVB is not available. Each ISaR order must include the specific application requirements. There are two options for providing the application requirements:

3.1 Defined application circuits

If one of the available application circuits in Section 1 meets your requirements, simply indicate your preference in the “Remarks” section of the ISaR order. Refer to the example shown below:

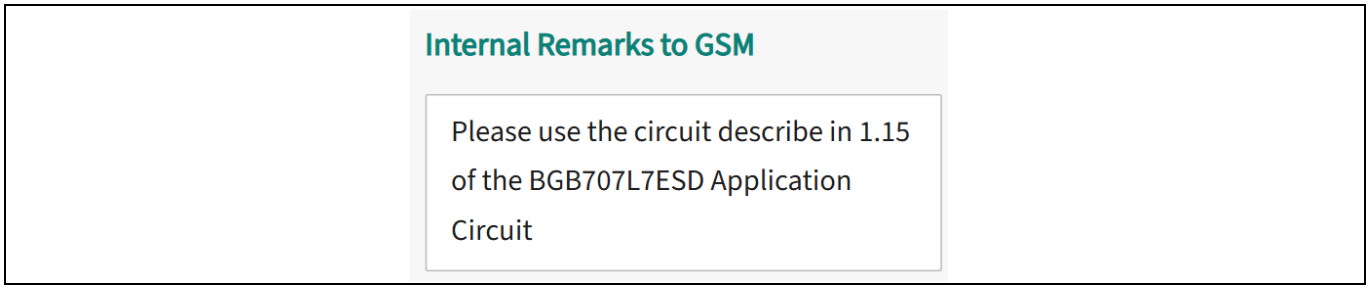


Figure 23 ISaR order remarks example

3.2 Customized application circuits

If none of the listed application circuits fully meet your requirements, you can request us to optimize the EVB to better suit your needs. Please provide the necessary information as outlined in Table 39 below.

Table 39 EVB optimization requirements

Parameter	Values			Unit
	Min.	Typ.	Max.	
Supply voltage				V
Input frequency range				MHz
Total operating current				mA
Gain				dB
Noise figure				dB
Input return loss				dB
Output return loss				dB
Output 1 dB gain compression point (OP1dB)				dBm
Output 3rd order intercept point (OIP3)				dBm

Please contact the sales team and include this information along with the ISaR order number.

References

[1] Infineon Technologies AG. *BGB707L7ESD MMIC LNA datasheet*; Available online

Glossary

BOM
bill of materials (BOM)

EVB
evaluation board (EVB)

GNSS
global navigation satellite system (GNSS)

ISaR
Infineon sample request (ISaR)

ISM
industrial, scientific, and medical (ISM)

IDIS
integrated distribution solution (IDIS)

LNA
low noise amplifier (LNA)

MMIC
monolithic microwave integrated circuit (MMIC)

NF
noise figure (NF)

OIP3
output 3rd order intercept point (OIP3)

OP1dB
output 1 dB gain compression point (OP1dB)

SiGe:C
silicon germanium carbon (SiGe:C)

UWB
ultra-wideband (UWB)

WLAN
wireless local area network (WLAN)

Revision history

Document revision	Date	Description of changes
1.00	2025-11-11	Initial release

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