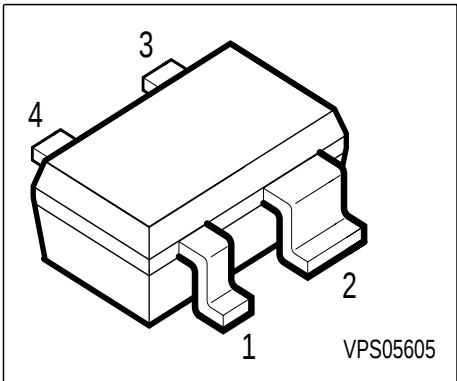


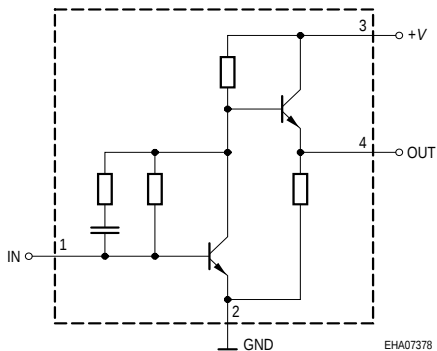
Si-MMIC-Amplifier in SIEGET® 25-Technologie

Preliminary data

- Cascadable 50 Ω-gain block
- Unconditionally stable
- Gain $|S_{21}|^2 = 18,5 \text{ dB}$ at 1.8 GHz (appl.1)
gain $|S_{21}|^2 = 22 \text{ dB}$ at 1.8 GHz (appl.2)
 $IP_{3out} = +7 \text{ dBm}$ at 1.8 GHz ($V_D=3V$, $I_D=9.4mA$)
- Noise figure $NF = 2.2 \text{ dB}$ at 1.8 GHz
- typical device voltage $V_D = 2 \text{ V}$ to 5 V
- Reverse isolation $< 35 \text{ dB}$ (appl.2)



Circuit Diagram



ESD: Electrostatic discharge sensitive device, observe handling precaution!

Type	Marking	Ordering Code	Pin Configuration				Package
BGA 427	BMs	Q62702-G0067	1, IN	2, GND	3, +V	4, Out	SOT-343

Maximum Ratings

Parameter	Symbol	Value	Unit
Device current	I_D	25	mA
Device voltage	$V_D, +V$	6	V
Total power dissipation, $T_S \leq tbd \text{ } ^\circ\text{C}$	P_{tot}	150	mW
R_F input power	P_{RFin}	-10	dBm
Junction temperature	T_j	150	$^\circ\text{C}$
Ambient temperature	T_A	-65 ...+150	
Storage temperature	T_{stg}	-65 ...+150	

Thermal Resistance

Junction - soldering point ¹⁾	R_{thJS}	$\leq tbd$	K/W
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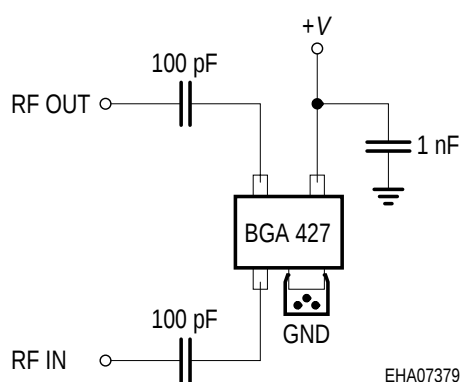
1) T_S is measured on the emitter (GND) lead at the soldering point to the pcb

Electrical Characteristics at $T_A = 25\text{ }^\circ\text{C}$, unless otherwise specified.

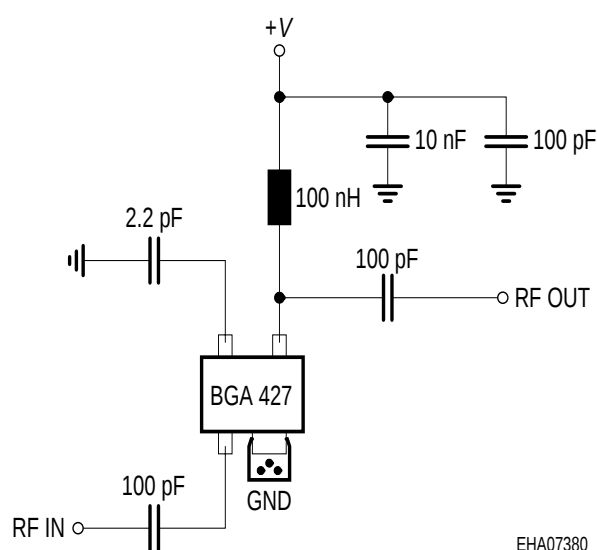
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC characteristics $V_D = 3\text{ V}$, $Z_0 = 50\Omega$, Testfixture Appl..1					
Insertion power gain $f = 0.1\text{ GHz}$ $f = 1\text{ GHz}$ $f = 1.8\text{ GHz}$	$ S_{21} ^2$	- - -	27 22 28.5	- - -	dB
Reverse isolation $f = 1.8\text{ GHz}$	S12	-	22	-	
Noise figure $f = 0.1\text{ GHz}$ $f = 1\text{ GHz}$ $f = 1.8\text{ GHz}$	NF	- - -	1.9 2 2.2	- - -	
Intercept point at the output $f = 1.8\text{ GHz}$	IP_{3out}	-	+ 7	-	
Return loss input $f = 1.8\text{ GHz}$	RL_{in}	-	>12	-	dB
Return loss output $f = 1.8\text{ GHz}$	RL_{out}	-	>9	-	

Typical configuration

Appl.1



Appl.2

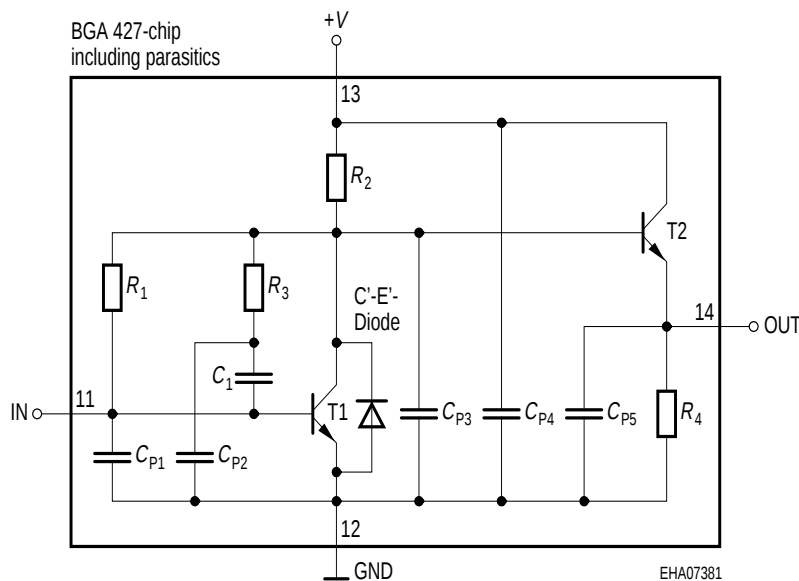


Note: 1) Large-value capacitors should be connected from pin 3 to ground right at the device to provide a low impedance path! (appl.1)
 2) The use of plated through holes right at pin 2 is essential for pc-board-applications. Thin boards are recommended to minimize the parasitic inductance to ground!

S-Parameters at $T_A = 25\text{ }^{\circ}\text{C}$, (Testfixture, Appl.1)

f GHz	S_{11}		S_{21}		S_{12}		S_{22}	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
-								
0.1	0.1382	-38.3	24.821	164.9	0.0022	50.7	0.6435	174.8
0.2	0.1179	-16	24.606	158.9	0.0046	71.8	0.6278	166.9
0.5	0.1697	-20.8	22.236	135.2	0.0104	83.8	0.54	147.3
0.8	0.1824	-56.9	18.258	115.4	0.0169	94.8	0.4453	140.2
0.9	0.1782	-69.1	17.152	109.4	0.0194	97.3	0.4326	139.4
1	0.176	-80.6	15.786	104	0.0225	98.3	0.4129	138.1
1.5	0.1827	-133.5	10.923	84.9	0.0385	99.7	0.3852	139.6
1.8	0.1969	-156.1	9.029	77	0.0479	99.3	0.3917	139.3
1.9	0.2021	-162.8	8.486	74.7	0.0517	98.9	0.3946	138.8
2	0.2116	-167.7	8.015	72.3	0.0549	98.8	0.3991	138.3
2.5	0.2437	172.8	6.259	63	0.0709	97.1	0.4202	134.6
3	0.258	153.3	5.103	55	0.0892	96.9	0.4477	131

Spice-model BGA 427



T1	T501
T2	T501
R_1	14.5k Ω
R_2	280 Ω
R_3	2.4k Ω
R_4	170 Ω
C_1	2.3pF
C_{P1}	0.2pF
C_{P2}	0.2pF
C_{P3}	0.6pF
C_{P4}	0.1pF
C_{P5}	0.1pF
C'-E'-diode	T1

Transistor Chip Data T1 (Berkley-SPICE 2G.6 Syntax) :

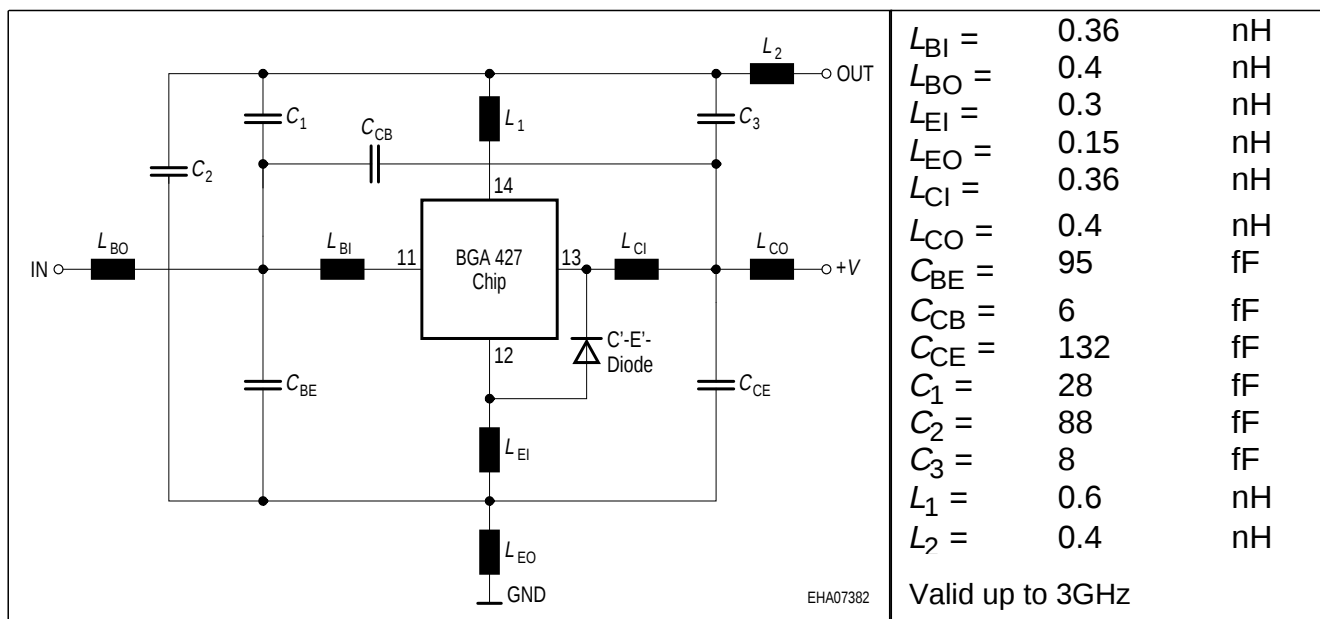
IS =	0.21024	aA	BF =	83.23	-	NF =	1.0405	-
VAF =	39.251	V	IKF =	0.16493	A	ISE =	15.761	fA
NE =	1.7763	-	BR =	10.526	-	NR =	0.96647	-
VAR =	34.368	V	IKR =	0.25052	A	ISC =	0.037223	fA
NC =	1.3152	-	RB =	15	Ω	IRB =	0.21215	mA
RBM =	1.3491	Ω	RE =	1.9289		RC =	0.12691	Ω
CJE =	3.7265	fF	VJE =	0.70367	V	MJE =	0.37747	-
TF =	4.5899	ps	XTF =	0.3641	-	VTF =	0.19762	V
ITF =	1.3364	mA	PTF =	0	deg	CJC =	96.941	fF
VJC =	0.99532	V	MJC =	0.48652	-	XCJC =	0.08161	-
TR =	1.4935	ns	CJS =	0	fF	VJS =	0.75	V
MJS =	0	-	XTB =	0	-	EG =	1.11	eV
XTI =	3	-	FC =	0.99469	-	TNOM	300	K

C'-E'-Diode Data (Berkley-SPICE 2G.6 Syntax) :

IS =	2	fA	N =	1.02	-	RS =	20	Ω
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All parameters are ready to use, no scaling is necessary

Package Equivalent Circuit:



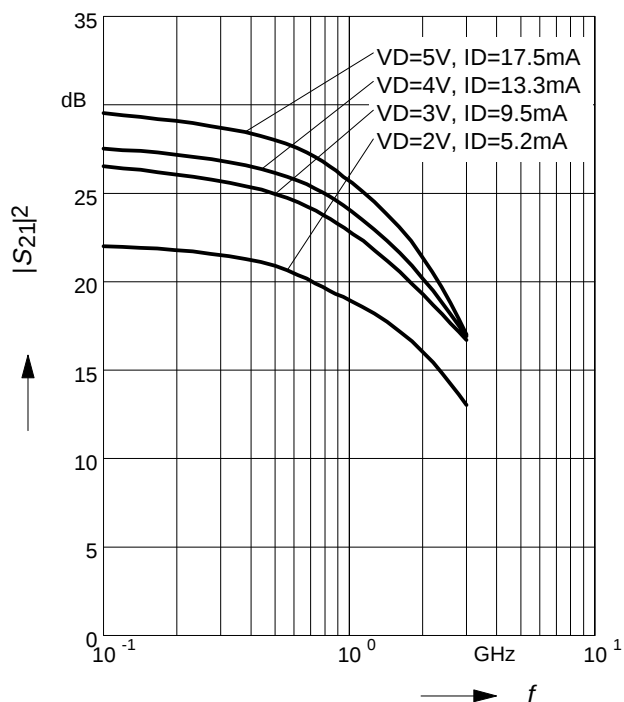
Extracted on behalf of SIEMENS Small Signal Semiconductors by
Institut für Mobil-und Satellitentechnik (IMST)

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For examples and ready to use parameters please contact your local Siemens distributor or salesoffice to
obtain a Siemens CD-ROM or see Internet: <http://www.siemens.de/Semiconductor/products/35/35.htm>

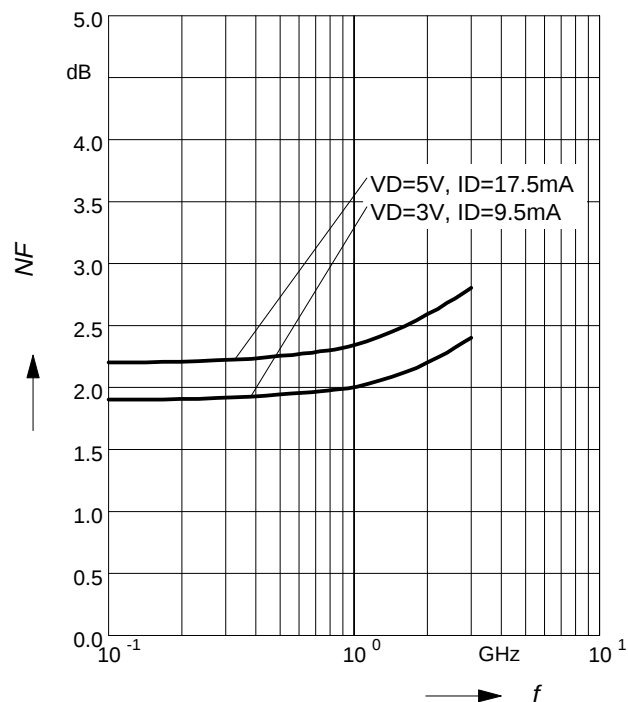
Insertion power gain $|S_{21}|^2 = f(f)$

V_D, I_D = parameter



Noise figure $NF = f(f)$

V_D, I_D = parameter



Intercept point at the output

$IP_{3out} = f(f)$

V_D, I_D = parameter

