



# STB7002

## 1.8GHz THREE GAIN LEVEL LNA

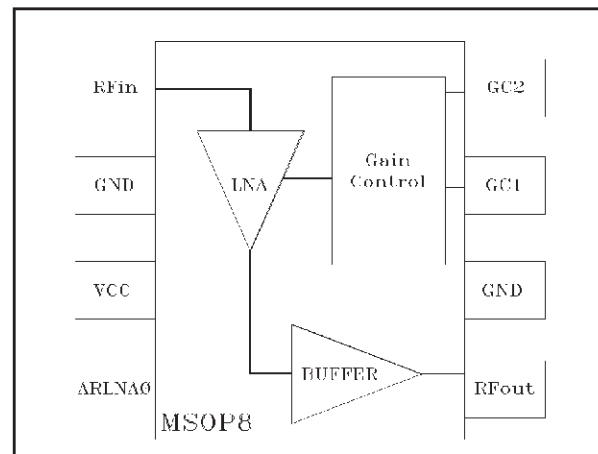
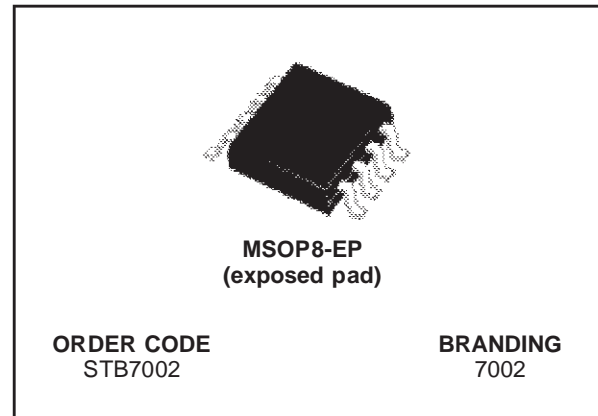
- FULLY INTEGRATED 1.8GHz LNA
- THREE GAIN LEVELS (0dB, 18dB, 26dB typ. @ 2.8V)
- LOW NOISE FIGURE
- TEMPERATURE COMPENSATED

### APPLICATIONS

- DCS HANDSETS

### DESCRIPTION

The STB7002 is a Silicon monolithic amplifier, that offers low noise figure and three gain levels for 1.8GHz applications. STB7002 is housed in a small industry-standard MSOP8-EP surface mount package, requiring very little board space (50% reduction vs SO8 Package). MSOP8-EP dimensions are 3mmx5mm with a 1.1mm thickness. STB7002 is ESD protected and requires minimum external components in the application circuit, for the on-chip bias and gain control. Furthermore, temperature and supply voltage compensation ensures high stability over a wide range of operating conditions.



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V <sub>cc</sub>	Supply voltage	4	V
T <sub>j</sub>	Junction Temperature	150	°C
T <sub>stg</sub>	Storage temperature	-40 to +85	°C

### THERMAL DATA

Symbol	Parameter	Value	Unit
R <sub>th(j-a)</sub>	Junction -ambient Thermal Resistance	TBD	°C/W

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### ELECTRICAL SPECIFICATION ( $T_{amb} = 25^{\circ}\text{C}$ , $V_{cc} = 2.8\text{V}$ )

Symbol	Parameters	Test Conditions	Min.	Typ.	Max.	Unit
$V_{cc}$	Supply voltage		2.7	2.8	2.9	V
$I_{bias}$	Bias current	for $G_{p1}^{(1)}$ $G_{p2}^{(1)}$ $G_{p3}^{(1)}$	8 14 10	11.5 17.5 15.0	15.0 22.5 19	mA
$I_{stby}$	Standby current				20	$\mu\text{A}$
f	Frequency range		1805		1880	MHz
$G_{p1,2,3}$	Power gain	$G_{p1}$ $G_{p2}$ $G_{p3}$	-3.0 16.0 24.0	0.0 18.0 26.0	3.0 20.0 28.0	dB
$NF_{1,2,3}$	Noise figure	for $G_{p1}$ $G_{p2}$ $G_{p3}$		9 2.9 2.6		dB
$P1dB_{1,2,3}$	Input 1 dB Compr.Power	for $G_{p1}$ $G_{p2}$ $G_{p3}$		-15.5 -19 -27		dBm
$IIP3_{1,2,3}$	Input Third Order Intercept	for $G_{p1}$ $G_{p2}$ $G_{p3}$		-4 -9 -17		dBm
VSWRi	Input VSWR	for $G_{p1}$ $G_{p2}$ $G_{p3}$			2.5:1 2.2:1 1.5:1	
VSWRo	Output VSWR	for $G_{p1}$ $G_{p2}$ $G_{p3}$			1.3:1 1.5:1 1.8:1	
AZout	Zout LNA on/off				15	%

Note(1) : Gp1 min gain, Gp2 mid gain and Gp3 max gain.

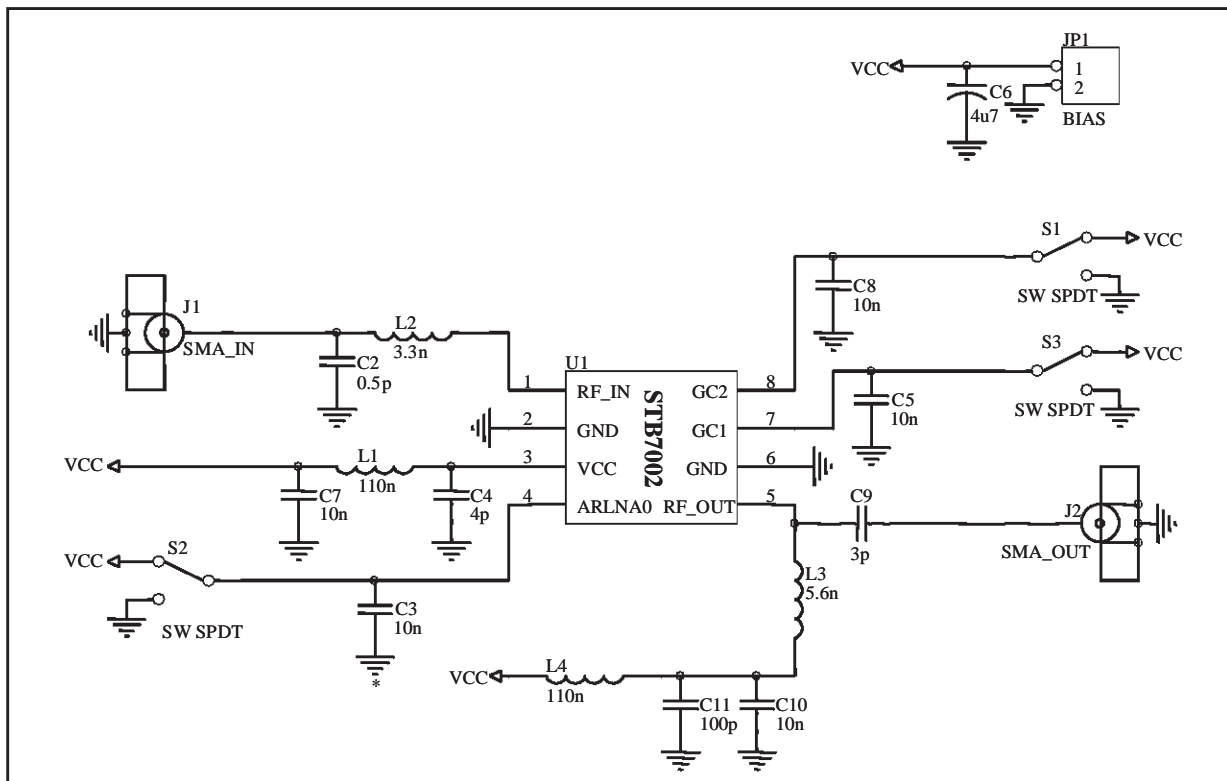
### PINOUT

Pin Number	Symbol	Description	Evaluation circuit components
1	RFin	RF input	$L2 = 3.3\text{nH}$ , $C2 = 0.5\text{pF}$
2	Gnd	Ground	
3	Vcc	Voltage supply	$C4 = 4\text{pF}$ , $L1 = 110\text{nH}$ , $C7 = 10\text{nF}$
4	ARLNA0	Enable for power down	$C3 = 10\text{nF}$
5	RFout	RF output	$C9 = 3\text{pf}$ , $L3 = 5.6\text{nH}$ , $C10 = 10\text{nF}$ , $C11 = 100\text{pF}$ , $L4 = 110\text{nH}$
6	Gnd	Ground	
7	GC1	Gain selection	$C5 = 10\text{nF}$
8	GC2	Gain selection	$C8 = 10\text{nF}$

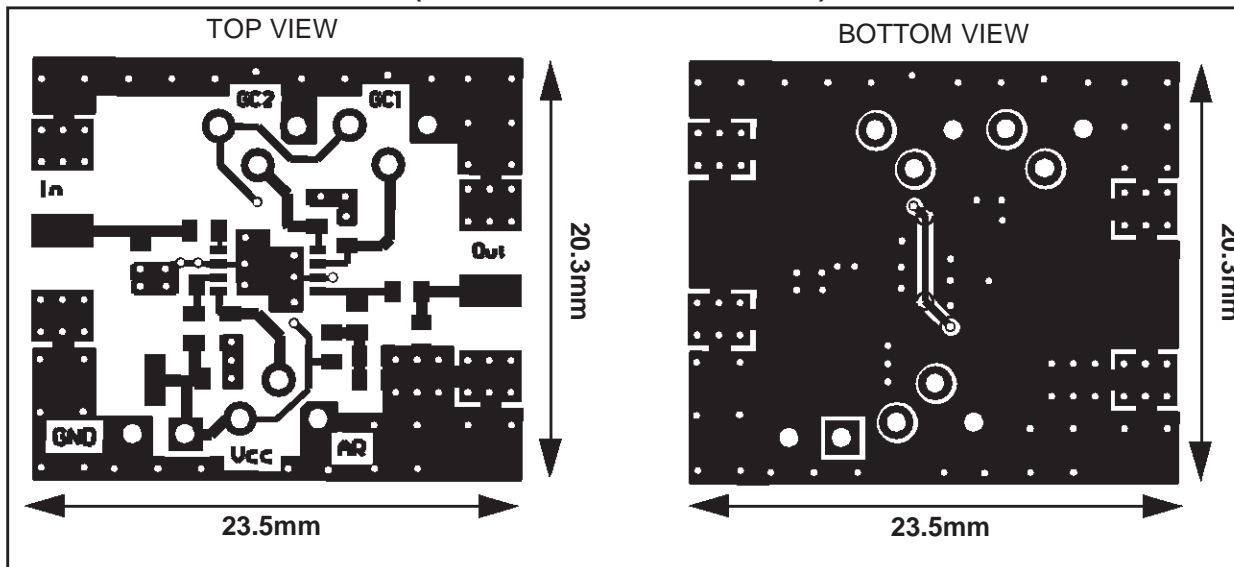
### GAIN SELECTION

	$G_{p1}$	$G_{p2}$	$G_{p3}$
GC1	0	0	1
GC2	0	1	1

TEST CIRCUIT SCHEMATIC



TEST CIRCUIT PHOTOMASTER (board dimensions 23.5x20.3mm)



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### INPUT/OUTPUT VSWR, ISOLATION AND GAIN PARAMETERS (MEASURED DATA)

#### MAX GAIN

Freq.	VSWR <sub>i</sub>	VSWR <sub>o</sub>	Isolation	Gain
1802	1.48	1.94	-36.91	24.83
1813	1.45	1.94	-36.37	24.79
1824	1.43	1.94	-35.51	24.76
1835	1.41	1.93	-35.14	24.75
1846	1.38	1.92	-34.95	24.74
1857	1.36	1.91	-34.03	24.71
1868	1.35	1.89	-34.17	24.68
1879	1.33	1.87	-33.08	24.59
1890	1.32	1.84	-33.53	24.52
1901	1.30	1.83	-32.87	24.45
1912	1.29	1.79	-33.03	24.38
1923	1.28	1.77	-32.55	24.29

#### MID GAIN

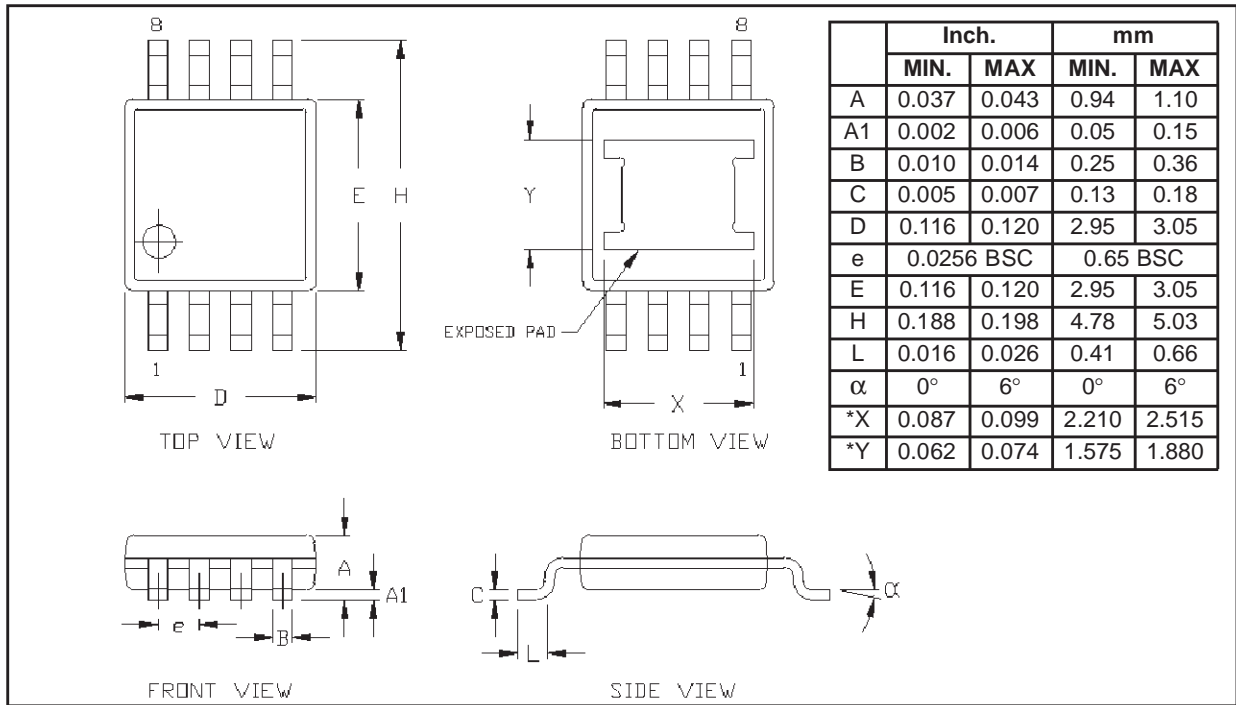
Freq.	VSWR <sub>i</sub>	VSWR <sub>o</sub>	Isolation	Gain
1802	2.14	1.67	-36.70	18.32
1813	2.15	1.68	-36.07	18.33
1824	2.14	1.69	-35.58	18.34
1835	2.14	1.69	-35.13	18.37
1846	2.13	1.69	-34.51	18.40
1857	2.12	1.69	-33.92	18.43
1868	2.11	1.68	-33.38	18.45
1879	2.10	1.68	-32.30	18.42
1890	2.10	1.67	-33.39	18.41
1901	2.09	1.66	-32.80	18.39
1912	2.08	1.65	-32.72	18.35
1923	2.08	1.63	-32.20	18.32

**MIN GAIN**

<b>Freq.</b>	<b>VSWRi</b>	<b>VSWRo</b>	<b>Isolation</b>	<b>Gain</b>
1802	2.26	1.21	-34.63	1.97
1813	2.30	1.21	-34.45	1.93
1824	2.33	1.21	-33.83	1.89
1835	2.36	1.21	-33.57	1.86
1846	2.38	1.22	-32.99	1.82
1857	2.41	1.22	-32.3	1.79
1868	2.43	1.22	-31.94	1.76
1879	2.46	1.22	-31.55	1.70
1890	2.48	1.22	-31.91	1.66
1901	2.50	1.22	-31.52	1.63
1912	2.52	1.22	-31.34	1.58
1923	2.53	1.22	-31.09	1.53

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## MSOP8-EP MECHANICAL DATA



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