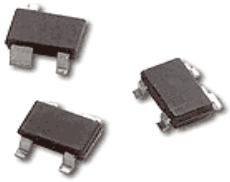
MGA-52543

5V LNA, 32dBm OIP3, 0.4-6GHz, SOT343(SC-70)

Description

Lead (PB) Free
RoHS 6 fully compliant

Lifecycle status: Active



Features

The MGA-52543 is an easy-to-use 5V high linearity low noise amplifier built on Avago's leading edge PHEMT technology.

The device is ideal as LNA or driver stages in basestation designs, as well as other high linearity low noise applications in the 450 MHz to 6 GHz frequency range

- Typical performance at 2 GHz 5V/53mA is NF=1.6dB, OIP3=32dBm, P1dB=17dBm and Ga=14dB.

MGA-52543
Low Noise Amplifier

Data Sheet

Description

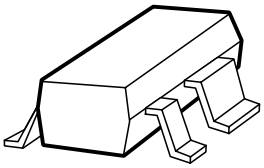
Avago Technologies' MGA-52543 is an economical, easy-to-use GaAs MMIC Low Noise Amplifier (LNA), which is designed for use in LNA and driver stages. While a capable RF/microwave amplifier for any low noise and high linearity 0.4 to 6 GHz application, the LNA focus is Cellular/PCS base stations.

To attain NF_{min} condition, some simple external matching is required. The MGA-52543 features a calculated NF_{min} of 1.61 dB and 15 dB associated gain at 1.9 GHz from a cascode stage, feedback FET amplifier. The input and output are partially matched to be near 50 Ω.

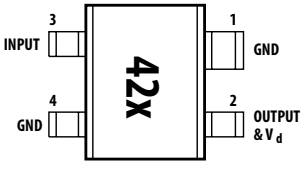
For base station radio card unit LNA application where better than 2:1 VSWR is required, a series inductor on the input and another series inductor on the output can be added externally. The resulting Noise Figure is typically 1.9 dB with 14 dB Gain at 1.9 GHz. With a single 5.0V supply, the LNA typically draws 53 mA. This alignment results in an Input Intercept Point of 17.5 dBm.

The MGA-52543 is a GaAs MMIC, fabricated using Avago Technologies' cost-effective, reliable PHEMT (Pseudomorphic High Electron Mobility Transistor) process. It is housed in the SOT-343 (SC70 4-lead) package. This package offers miniature size (1.2 mm by 2.0 mm), thermal dissipation, and RF characteristics.

Surface Mount Package
SOT-343/4-lead SC70



Pin Connections and Package Marking



Note:
Top View. Package marking provides orientation and identification.
"42" = Device Code
"x" = Data code character identifies month of manufacture

Features

- Lead-free Option Available
- Operating frequency:
  0.4 GHz ~ 6.0 GHz
- Minimum noise figure: 1.61 dB at 1.9 GHz
- Associated gain : 15 dB at 1.9 GHz
- 1.9 GHz performance tuned for VSWR < 2:1

  Noise figure: 1.9 dB

  Gain: 14 dB

  P_{1dB}: +17.5 dBm

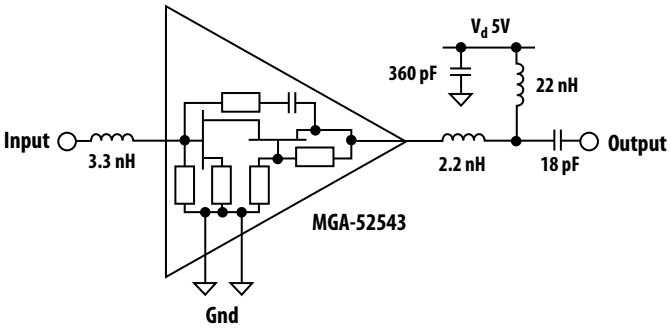
  Input IP3: +17.5 dBm
- Single supply 5.0 V operation

Applications

- Cellular/PCS base station radio card LNA
- High dynamic range amplifier for base stations, WLL, WLAN, and other applications

Attention: Observe precautions for handling electrostatic sensitive devices.
ESD Machine Model (Class A)
ESD Human Body Model (Class 1A)
Refer to Avago Application Note A004R:
Electrostatic Discharge Damage and Control.

Simplified Schematic



MGA-52543 Absolute Maximum Ratings[1]

Symbol	Parameter	Units	Absolute Maximum
V_d	Maximum Input Voltage	V	±0.5
V_d	Supply Voltage	V	7.0
P_d	Power Dissipation[2,3]	mW	425
P_{in}	CW RF Input Power	dBm	+20
T_j	Junction Temperature	°C	160
T_{STG}	Storage Temperature	°C	-65 to 150

Thermal Resistance:[2]

$\theta_{jc} = 150°C/W$

Notes:

1. Operation of this device in excess of any of these limits may cause permanent damage.
2. $T_{case} = 25°C$

Electrical Specifications

$T_c = +25°C, Z_0 = 50\ \Omega, V_d = 5V$, unless noted

Symbol	Parameter and Test Condition	Frequency	Units	Min.	Typ.	Max.	σ [3]
I_d test	Current drawn	N/A	mA	45	53	65	3.57
NF [1]	Noise Figure	1.9 GHz 0.9 GHz	dB		1.9 1.8	2.3	0.15
Gain [1]	Gain	1.9 GHz 0.9 GHz	dB	13	14.2 15	15.5	0.26
IIP3 [1]	Input Third Order Intercept Point	1.9 GHz 0.9 GHz	dBm	14	+17.5 +18		2.28
F_{min} [2]	Minimum Noise Figure	1.9 GHz 0.9 GHz	dB		1.6 1.5		
G_a [2]	Associated Gain at F_{min}	1.9 GHz 0.9 GHz	dB		15.0 16.2		
OIP3 [1]	Output Third Order Intercept Point	1.9 GHz 0.9 GHz	dBm		31.7 33.0		
P_{1dB} [1]	Output Power at 1 dB Gain Compression	1.9 GHz 0.9 GHz	dBm		+17.4 +18		
RL_{in} [1]	Input Return Loss	1.9 GHz 0.9 GHz	dB		11 15		
RL_{out} [1]	Output Return Loss	1.9 GHz 0.9 GHz	dB		20 22		
ISOL [1]	Isolation $\|s_{12}\|^2$	1.9 GHz 0.9 GHz	dB		-25 -25		

Notes:

1. Measurements obtained from a fixed narrow band tuning described in Figure 1. This circuit designed to optimize Noise Figure and IIP3 while maintaining VSWR better than 2:1.
2. Minimum Noise Figure and Associated Gain at F_{min} computed from S-parameter and Noise Parameter data measured in an automated NF system.
3. Standard deviation data are based on at least 400 part sample size and 11 wafer lots.

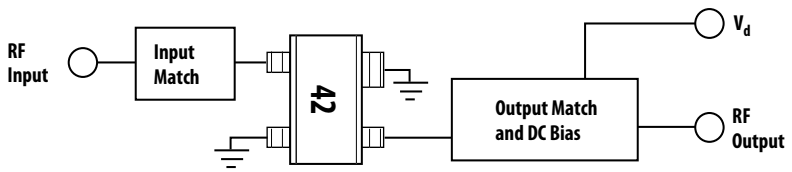
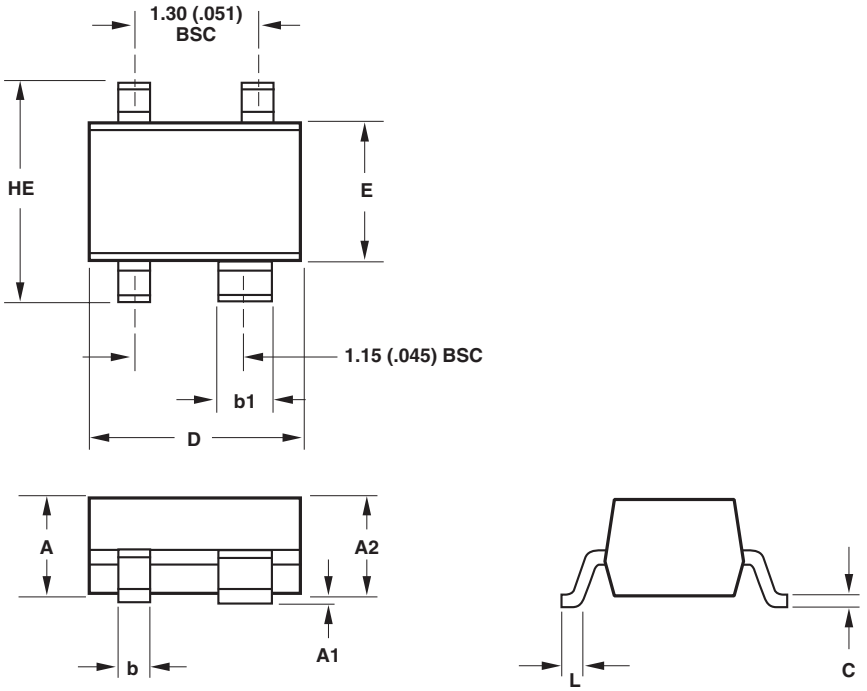


Figure 1. Block Diagram of Test Fixture.
See Figure 7 in the Applications section for an equivalent schematic of 1.9 GHz circuit; Figure 11 in the Applications section for 900 MHz circuit.

Part Number Ordering Information

Part Number	No. of Devices	Container
MGA-52543-TR1G	3000	7″ Reel
MGA-52543-TR2G	10000	13″ Reel
MGA-52543-BLKG	100	antistatic bag

Package Dimensions
Outline 43
SOT-343 (SC70 4-lead)



SYMBOL	DIMENSIONS (mm) MIN.	MAX.
E	1.15	1.35
D	1.85	2.25
HE	1.80	2.40
A	0.80	1.10
A2	0.80	1.00
A1	0.00	0.10
b	0.25	0.40
b1	0.55	0.70
c	0.10	0.20
L	0.10	0.46

NOTES:
1. All dimensions are in mm.
2. Dimensions are inclusive of plating.
3. Dimensions are exclusive of mold flash & metal burr.
4. All specifications comply to EIAJ SC70.
5. Die is facing up for mold and facing down for trim/form, ie: reverse trim/form.
6. Package surface to be mirror finish.