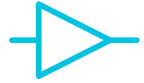
MP502

1…4 GHz Gain Block Amplifier



- frequency range 1…4 GHz
- small signal gain 18…20 dB
- output power (P1dB) 13 dBm
- low noise figure
- input/output return loss <−12 dB

Application

- telecommunications
- radars
- test and measurement equipment

The MP502 is a monolithic integrated circuit of microwave buffer amplifier based on the GaAs pHEMT technological process with a topological norm of 0.25 μm.

Electrical Specifications (T = 25 °C, Idd = 80 mA)

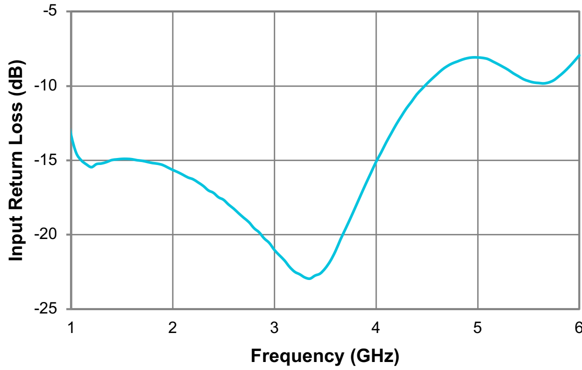
Symbol	Parameter	Min.	Typ.	Max.	Unit
ΔF	Frequency range	1	—	4	GHz
G	Gain	18	—	20	dB
RL	Return loss	12	—	—	dB
NF	Noise figure	—	—	4,5	dB
P1dB	Output power at 1dB compression point	13	—	—	dBm
I	Current	—	—	90	mA
VDD	Supply voltage	—	5	—	V

Absolute maximum ratings

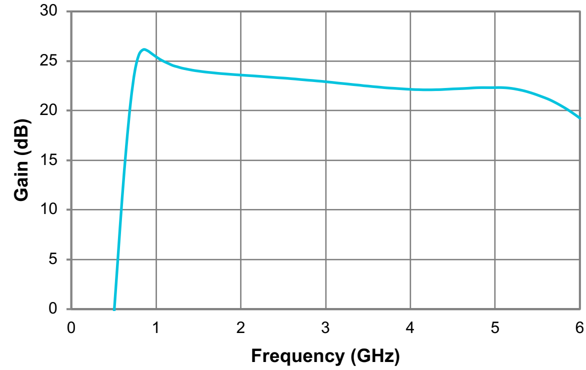
Parameter	Value	Unit
Supply voltage	6	V
Operating temperature	−40…+85	°C
Storage temperature	−55…+125	°C

Typical characteristics (Vdd1 = Vdd2 = +5 V, T = 25 °C, Idd = 80 mA)

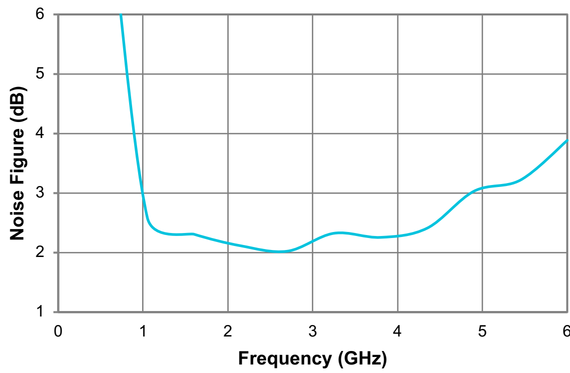
Input Return Loss



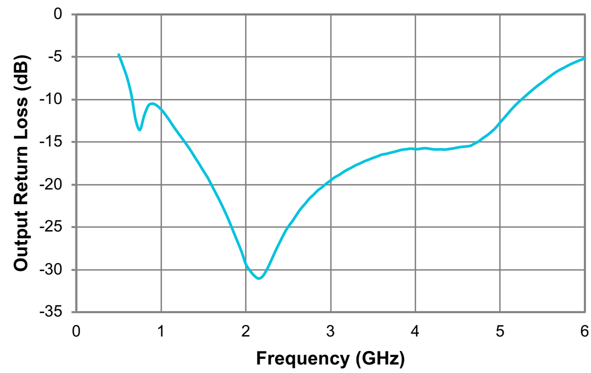
Insertion Gain



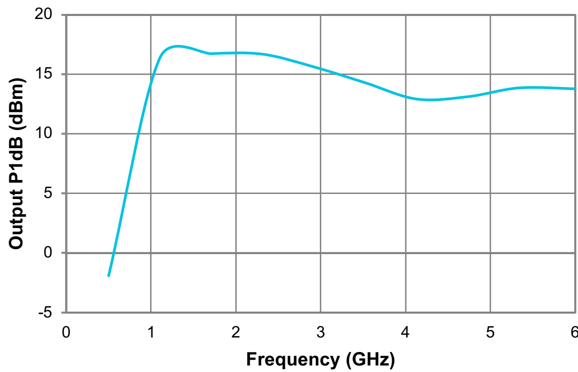
Noise Figure



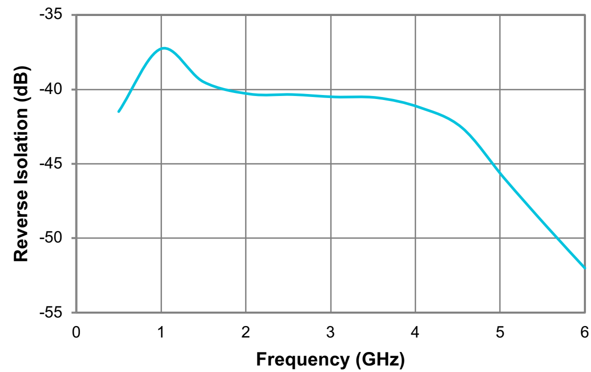
Output Return Loss



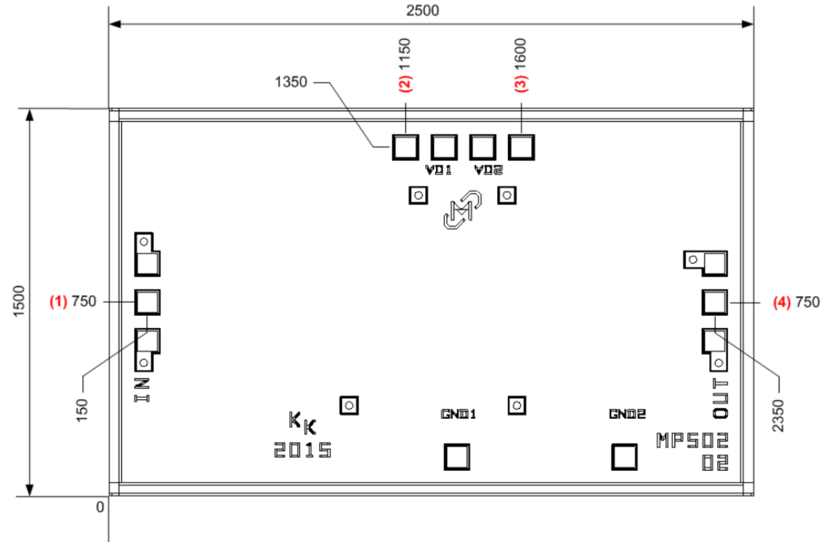
Output P1dB



Reverse Isolation



Mechanical data



— Chip size 1500×2500 µm (before wafer dicing), thickness 100 µm;
— Bond pad dimensions are shown in the bond pad center;
— RF pads are 100 × 100 µm.

Pad number	Pad ID	Description
1	RF IN	RF Input
2,3	VD1,VD2	Drain bias for LNA
4	RF OUT	RF Output

Specifications are subject to change without notice.

Application notes

Mounting
The chip is back-metallized and can be die mounted with AuSn eutectic preforms or with electrically conductive epoxy. The mounting surface should be clean and flat. The 50 Ohm Microstrip transmission lines on 0.127mm thick alumina thin film substrates are recommended for bringing RF to and from the chip (Figure 1). One way to accomplish this is to attach the 0.102 mm thick die to a 0.150 mm thick molybdenum heat spreader (molytab) which is then attached to the ground plane (Figure 2). Microstrip substrates should be located as close to the die as possible in order to minimize bond wire length. Typical die-to-substrate spacing is 0.1mm.

Wire Bonding
A recommendation for RF pads (1 and 4) is one wire: diameter 25 μm, length 450 μm. The recommendation for DC and control pads (2 to 3) is one wire: diameter 25 μm, length 700 - 1000 μm.

Bias Arrangement
The pads VD1 and VD2 need to have DC bypass capacitances of 100pF as close to the device as possible.

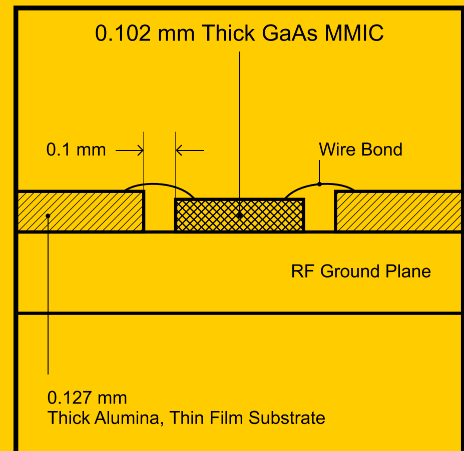


Figure 1.

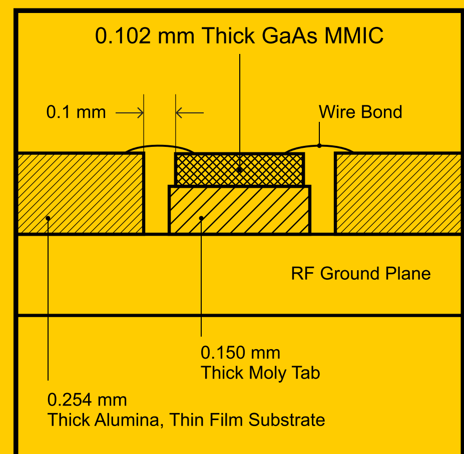


Figure 2.

Recommended ESD Management

This device is susceptible to electrostatic and mechanical damage. Dies are supplied in antistatic containers, which should be opened in cleanroom conditions at an appropriately grounded antistatic workstation. Devices need careful handling using correctly designed collets, vacuum pickups or, with care, sharp tweezers.

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