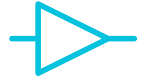
MP531



X-band Low Noise Amplifier

- frequency range 8…12 GHz
- small-signal gain > 26 dB
- output power (P1dB) > 12 dBm
- noise figure < 2.5 dB

Application

- satellite communication
- radars
- telecommunications

The MP531 is a MMIC low-noise amplifier based on 0.25 µm GaAs pHEMT technology and designed to work as part of hybrid-integrated microwave modules with general sealing.

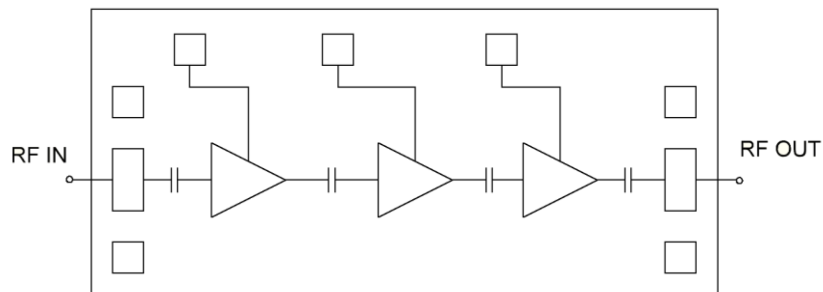
Electrical Specifications (Vdd1 = Vdd2 = Vdd3 = +5 V, T = 25 °C, Idd = 45 mA)

Symbol	Parameter	Min.	Typ.	Mac.	Unit
ΔF	Frequency range	8	—	12	GHz
G	Gain	26	—	29	dB
RL	Return loss	5	—	—	dB
NF	Noise figure	—	—	2,5	dB
VD	Supply voltage	—	5	—	V
I_VD	DC for Supply Bus (VD=+5B)	—	—	90	mA

Absolute maximum ratings

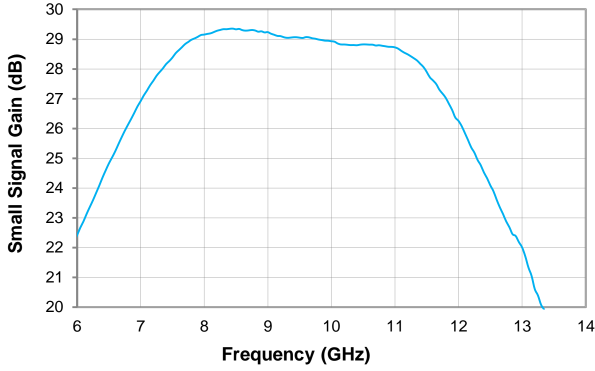
Parameter	Value	Unit
Supply voltage	+5,5	V
RF Input Power	+5	dBm
Operating temperature	-60…+85	°C
Storage temperature	-55…+125	°C

Functional diagram

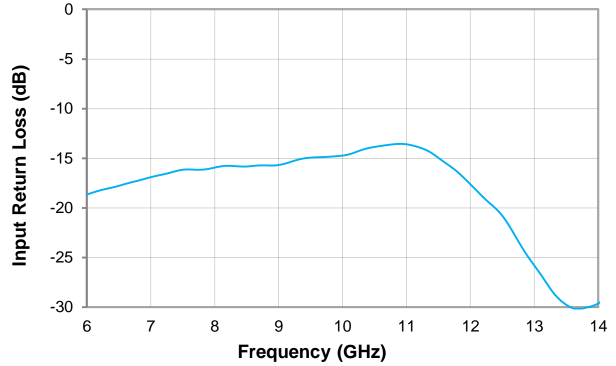


Typical characteristics (Vdd1 = Vdd2 = Vdd3 = +5 V, T = 25 °C, Idd = 45 mA)

S21



S11



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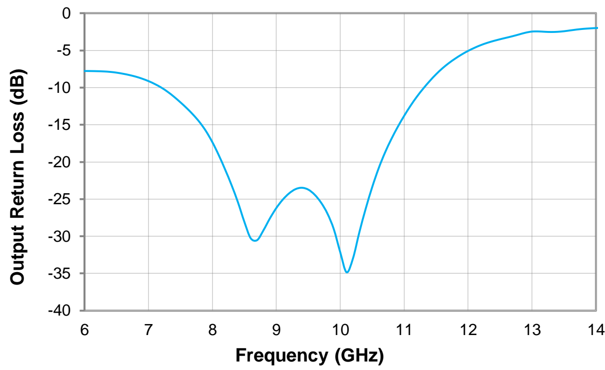
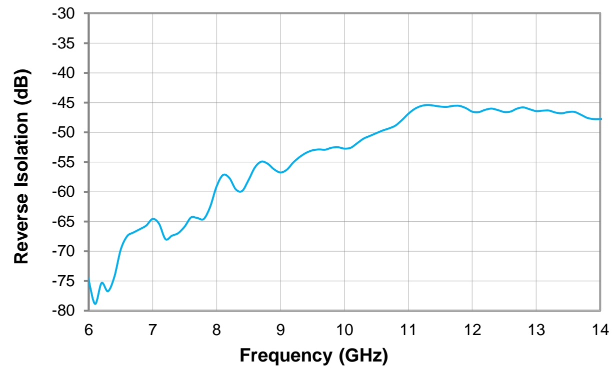
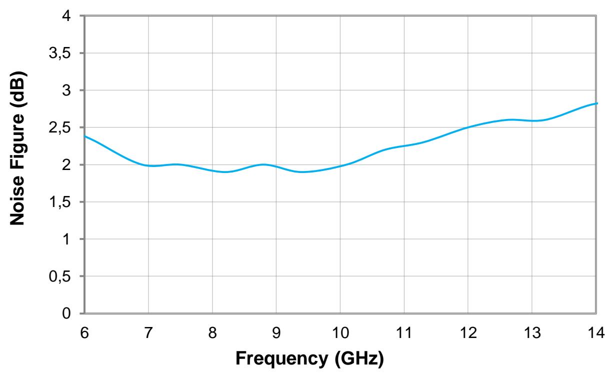


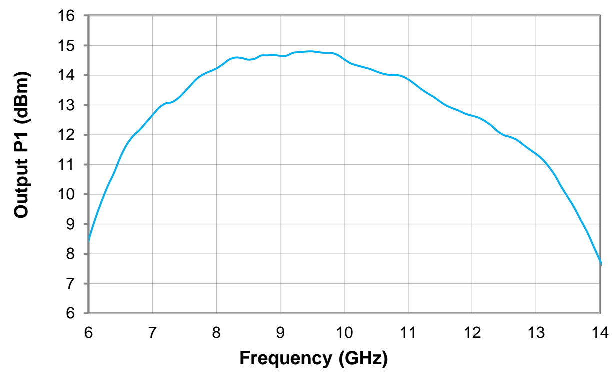
S12



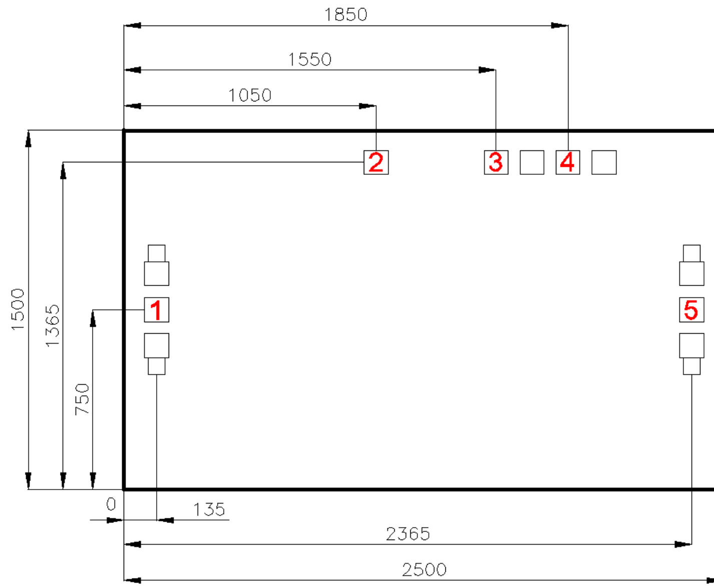
NF



P1dBm



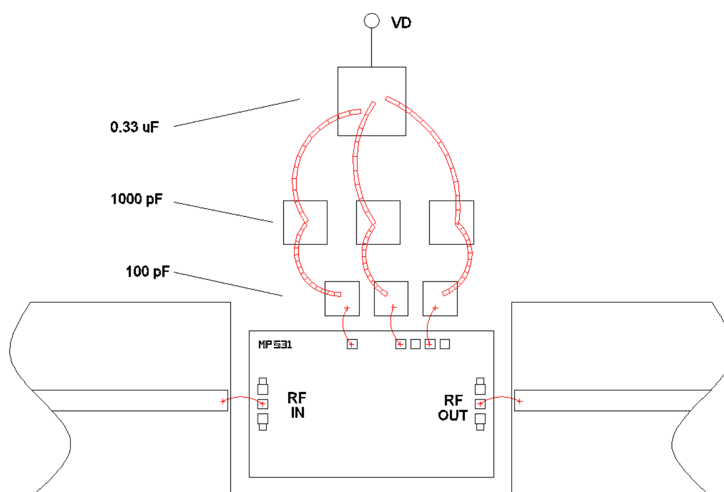
Mechanical data



- Chip size 1500×2500 μm (before wafer dicing), thickness 100 μm.
- Position coordinates are shown for the bond pad center.
- RF pads are 100×100 μm.

Pad number	Pad ID	Voltage, V	Description
1	IN	—	RF Input
2	Vdd1	+5	Power Supply Voltage for the 1, 2 and 3 amplifier's cascades
3	Vdd2		
4	Vdd3		
5	OUT	—	RF Output

Assembly diagram



Application notes

Mounting
The chip is back-metallized with gold and can be die mounted with AuSn eutectic alloy or with electrically conductive adhesive. The mounting surface should be clean and flat. The 50 Ohm Microstrip transmission, mounted on 0.127 mm thick alumina and thin film substrates, is 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
It is recommended for RF pads (1 and 5) to use one wire 25 µm in diameter and 450 µm in length. The recommendation for DC and control pads (2, 3, 4) is one wire 25 µm in diameter and 700…1000 µm in length.

Bias Arrangement
The pads VD2, VD3 and VD4 need to have DC bypass capacitances of 100pF as close to the device as possible.

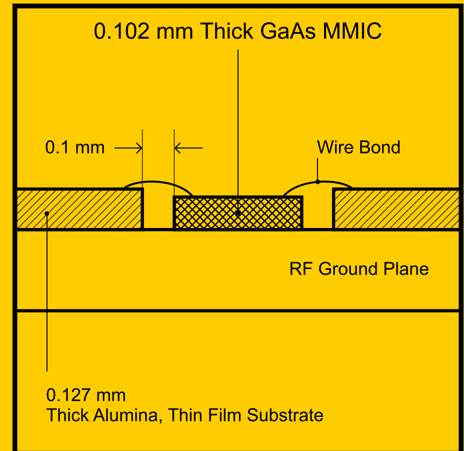


Figure 1.

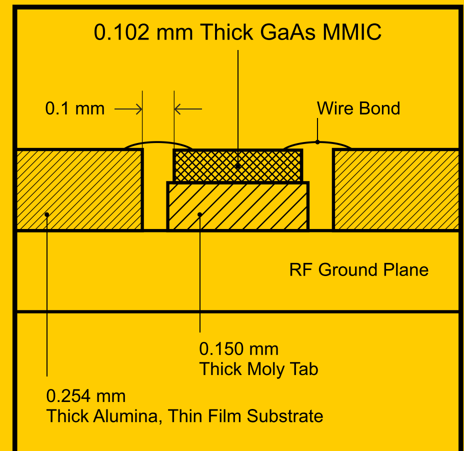


Figure 2.

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.