XL1010-QT

Low Noise Amplifier
20 - 38 GHz

Rev. V1

Features

- 17.0 dB Small Signal Gain
- 3.0 dB Noise Figure
- Single, Positive Bias Supply
- 3x3mm QFN Package
- 100% RF Tested
- RoHS* Compliant and 260°C Reflow Compatible

Description

The XL1010-QT is a three stage 20.0-38.0 GHz GaAs MMIC low noise amplifier has a small signal gain of 17.0 dB with a noise figure of 3.0 dB. The device comes in a RoHS compliant, 3x3mm QFN package and requires only a single positive bias supply.

The devices uses MACOM's GaAs pHEMT device model technology, and is based upon electron beam lithography to ensure high repeatability and uniformity.

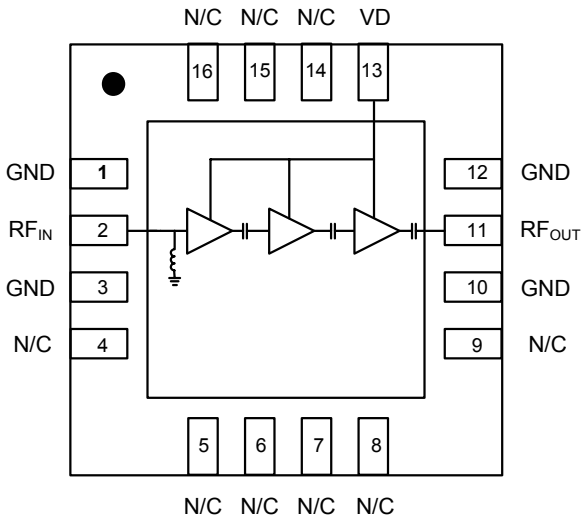
The device is well suited to multiple receiver applications which require broadband performance with simple bias requirements and the ease of volume manufacturing with 3x3mm QFN packaging.

Ordering Information[1]

Part Number	Package
XL1010-QT-0G00	bulk quantity
XL1010-QT-0G0T	tape and reel
XL1010-QT-EV1	evaluation board

1. Reference Application Note M513 for reel size information.

Functional Block Diagram/Board Layout



Pin Configuration

Pin No.	Function
1	Ground
2	RF Input
3	Ground
4-9	No Connection
10	Ground
11	RF Output
12	Ground
13	Drain Bias
14-16	Not Connected
17[2]	Paddle

2. The exposed pad centered on the package bottom must be connected to ground.

Electrical Specifications: 20 - 38 GHz (Ambient Temperature T = 25°C)

Parameter	Units	Min.	Typ.	Max.
Input Return Loss	dB	-	12	-
Output Return Loss	dB	-	15	-
Small Signal Gain	dB	15[3]	17	-
Gain Flatness	dB	-	+/-2	-
Reverse isolation	dB	-	45	-
Noise Figure	dB	-	3	-
Average Output Power for 1dB Compression	dBm	-	6	-
Drain Bias Voltage	VDC	3	4	5
Supply Current	mA	-	45	60

3. Specified over 24.0 - 36.5 GHz

Absolute Maximum Ratings

Parameter	Absolute Max.
Supply Voltage	+7 VDC
Supply Current	70 mA
Input Power	+12 dBm
Storage Temperature	-65ºC to +165ºC
Operating Temperature	MTTF Graph[4]
Channel Temperature	MTTF Graph[4]

4. Channel temperature directly affects a device's MTTF. It is recommended to keep channel temperature as low as possible to maximize lifetime.

Handling Procedures

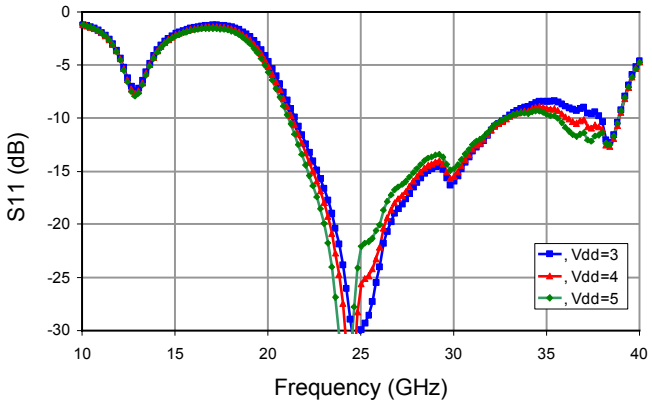
Please observe the following precautions to avoid damage:

Static Sensitivity

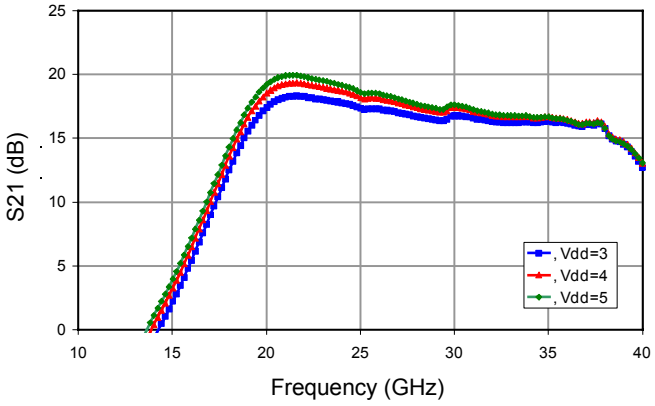
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these class 2 devices.

Typical Performance Curves

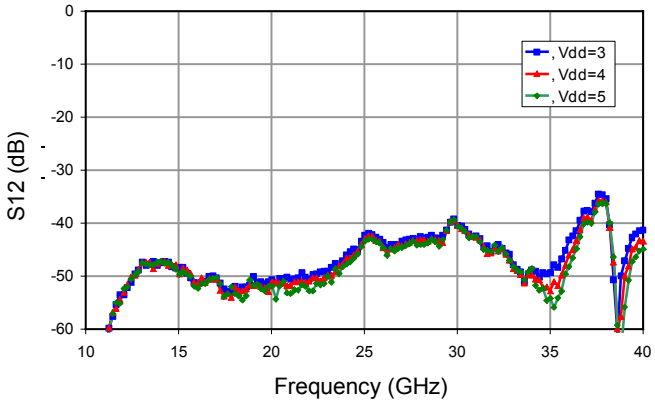
Input Return Loss vs. Frequency



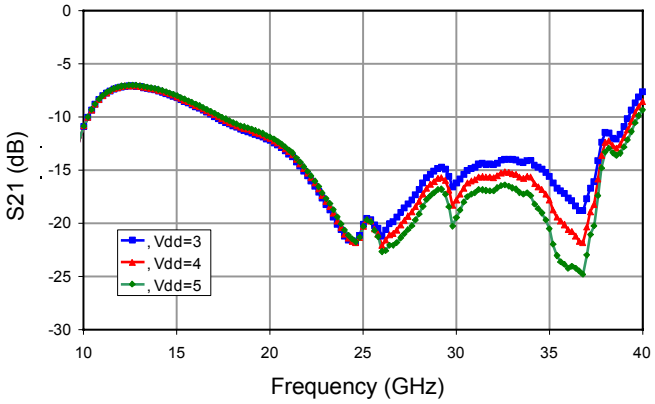
Small Signal Gain vs. Frequency



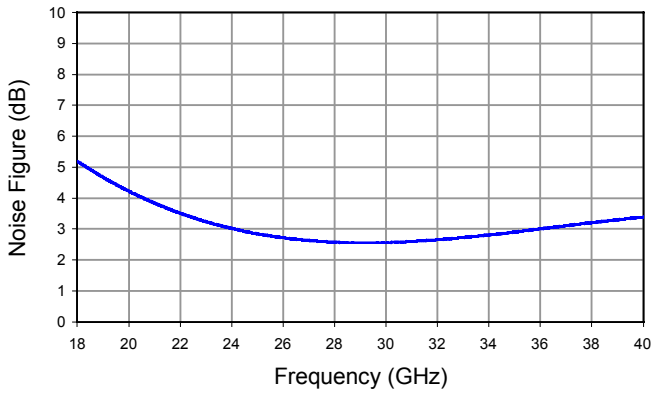
Reverse Isolation vs. Frequency



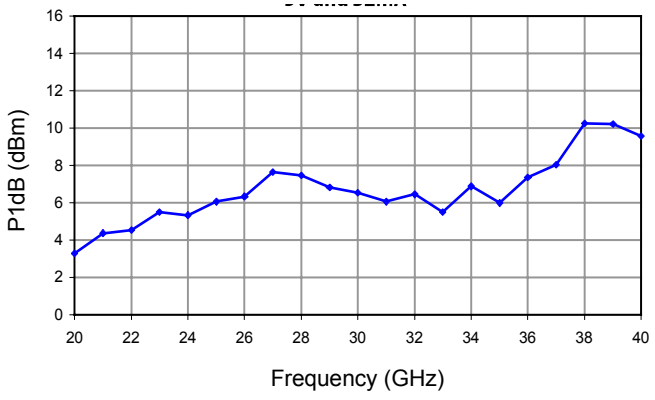
Output Return Loss vs. Frequency



Noise Figure vs. Frequency



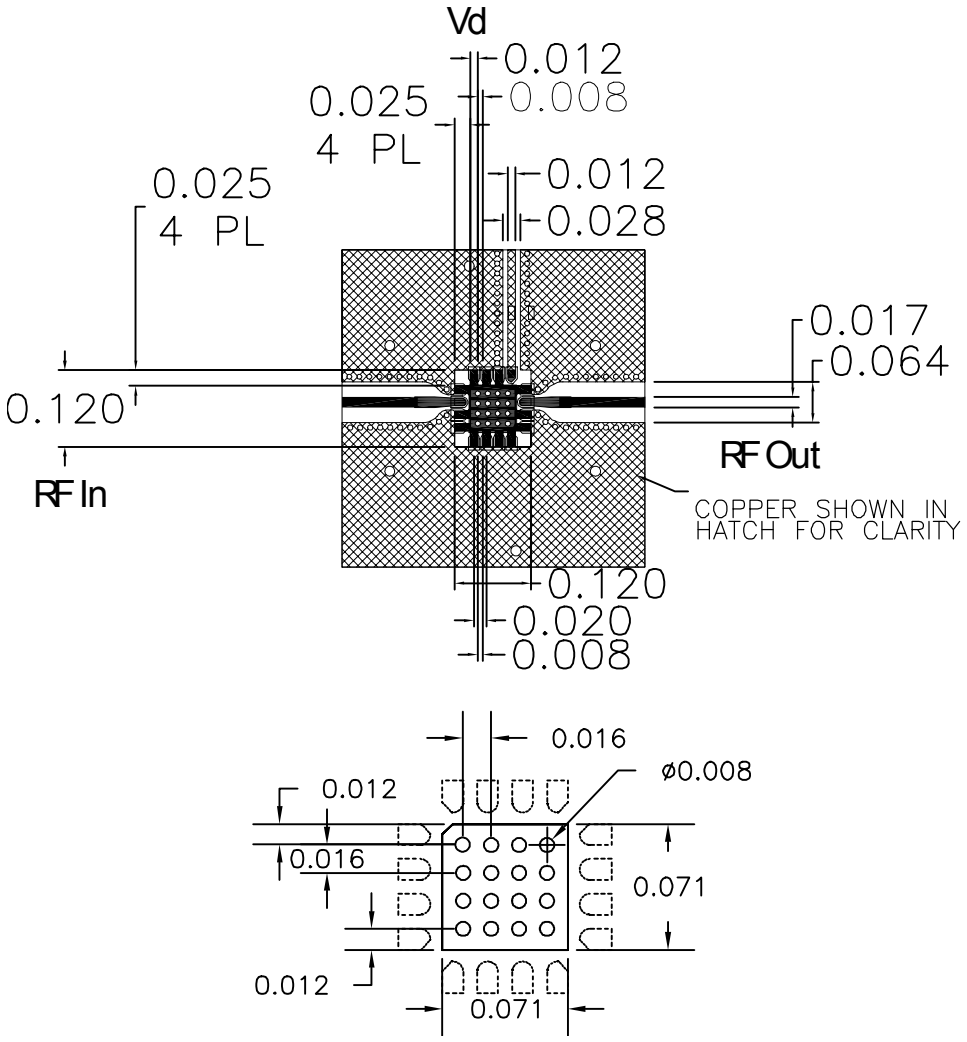
P1dB vs. Frequency, 5 V @ 52 mA



App Note [1] Biasing - The device is operated with a single, positive bias supply. The device performance is insensitive to changes in bias condition; however, gain and power handling can be slightly improved with higher bias conditions without significantly affecting the noise figure performance. Typical biasing conditions within the specified performance ranges are Vd=3 V, 35 mA, Vd=4 V, 45 mA, Vd=5 V, 55 mA.

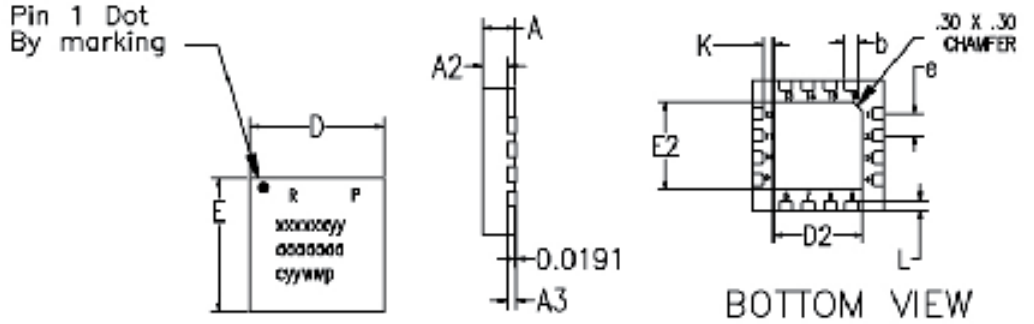
Recommended Board Layout

(DXF file available from website)



Lead-Free Package Dimensions/Layout

QT (3x3 mm)

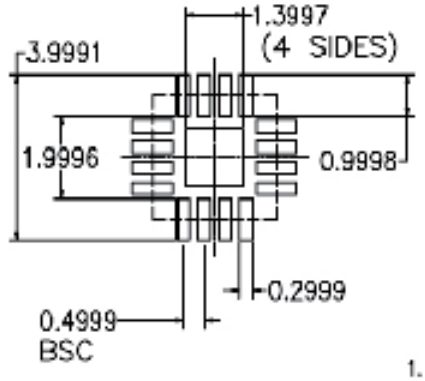


Note:

1. ALL DIMENSIONS ARE IN mm.

TOP VIEW

RECOMMENDED SOLDER PAD PITCH AND DIMENSIONS



	MIN	TYP	MAX
A	0.80	0.90	1.00
A3		0.20 REF	
A2	0.00	0.65	1.00
b	0.20	0.25	0.30
K	0.20	–	–
D		3.00 BSC	
E		3.00 BSC	
e		0.50	
D2	1.50	1.65	1.80
E2	1.50	1.65	1.80
L	0.16	0.26	0.36

1. VIEWS ARE NOT TO SCALE: USE DIMENSIONS AND TABLE.

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MACOM:
XL1010-QT-0G0T