XL1007-QT

Low Noise Amplifier
3.5 - 8.0 GHz

Rev. V1

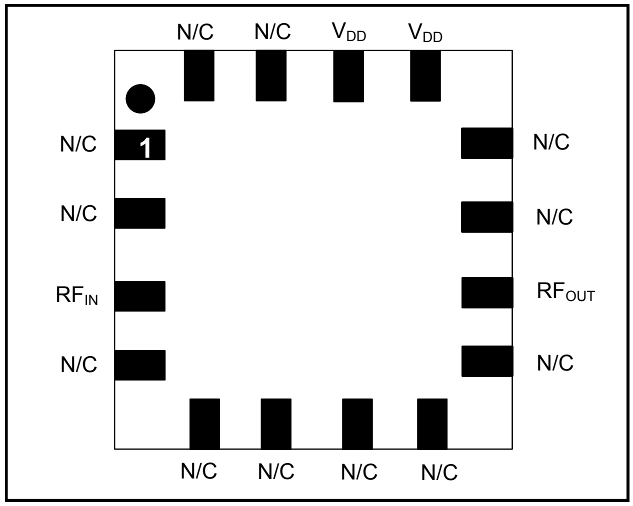
Features

- 12 dB Gain
- 2 dB Noise Figure
- Single Power Supply
- 3-5 V, 40 mA Self Bias
- Lead-Free 3mm PQFN-16LD Package
- Halogen-Free “Green” Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible

Description

The XL1007-QT is a 3.5 to 8.0 GHz low noise amplifier in a lead free 3 mm PQFN-16LD plastic surface mount package. The device is a self-biased, single supply design with 12 dB gain and 2 dB noise figure. This MMIC uses an optical pHEMT process.

Functional Schematic



Pin Configuration[3]

Pin No.	Pin Name	Description
1	N/C	No Connection
2	N/C	No Connection
3	RF_{IN}	RF Input
4	N/C	No Connection
5	N/C	No Connection
6	N/C	No Connection
7	N/C	No Connection
8	N/C	No Connection
9	N/C	No Connection
10	RF_{OUT}	RF Output
11	N/C	No Connection
12	N/C	No Connection
13	V_{DD}	Bias Voltage
14	V_{DD}	Bias Voltage
15	N/C	No Connection
16	N/C	No Connection

3. The exposed pad centered on the package bottom must be connected to RF and DC ground.

Ordering Information [1,2]

Part Number	Package
XL1007-QT-0G0T	3000 piece reel
XL1007-QT-EV3	Sample Test Board

1. Reference Application Note M513 for reel size information.
2. All sample boards include 5 loose parts.

* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

Electrical Specifications: T_A = 25°C, V_{DD} = 5 V, Z_0 = 75 Ω

Parameter	Units	Min.	Typ.	Max.
Gain 4 GHz 8 GHz	dB	12.0 6.5	15.0 10.0	—
Input Return Loss 4 GHz 8 GHz	dB	—	-6 -10	—
Output Return Loss 4 GHz 8 GHz	dB	—	-8 -10	—
Noise Figure 4 GHz 8 GHz	dB	—	1.7 2.4	2.6 3.8
Current	mA	—	44	70

Typical Parameters

Parameter	Units	4 GHz	5 GHz	6 GHZ	7 GHz	8 GHz
Gain	dB	15.0	15.0	13.5	11.5	10.0
Noise Figure	dB	1.7	1.6	1.7	2.0	2.4
Output P1dB	dBm	13.0	14.0	14.5	14.0	13.0
Output IP3 (Pout = OP1dB - 10, 10 MHZ Spacing)	dBm	25.0	28.0	29.0	29.0	28.5
Current	mA	11.0	44.0	44.0	44.0	44.0

Absolute Maximum Ratings [4,5]

Parameter	Absolute Maximum
Supply Voltage	+6 Volts
Input Power	+10 dBm
Junction Temperature	175°C
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +125°C

4. Exceeding any one or combination of these limits may cause permanent damage to this device.
5. M/A-COM does not recommend sustained operation near these survivability limits.

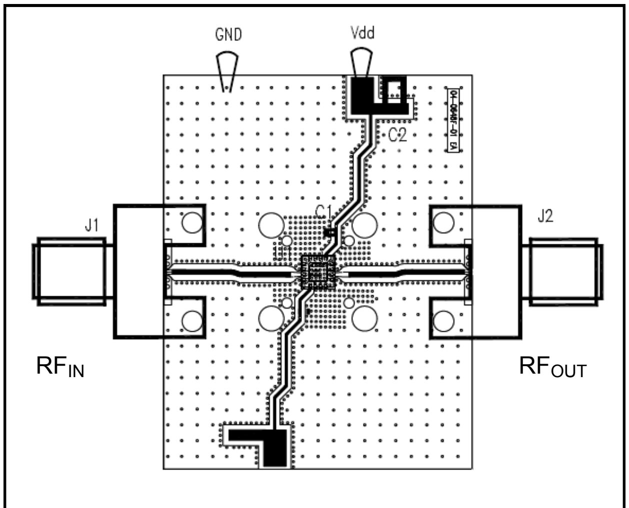
Handling Procedures

Please observe the following precautions to avoid damage:

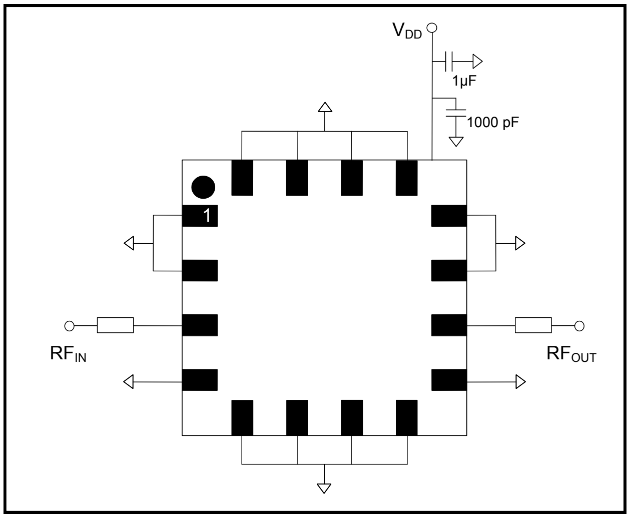
Static Sensitivity

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 devices.

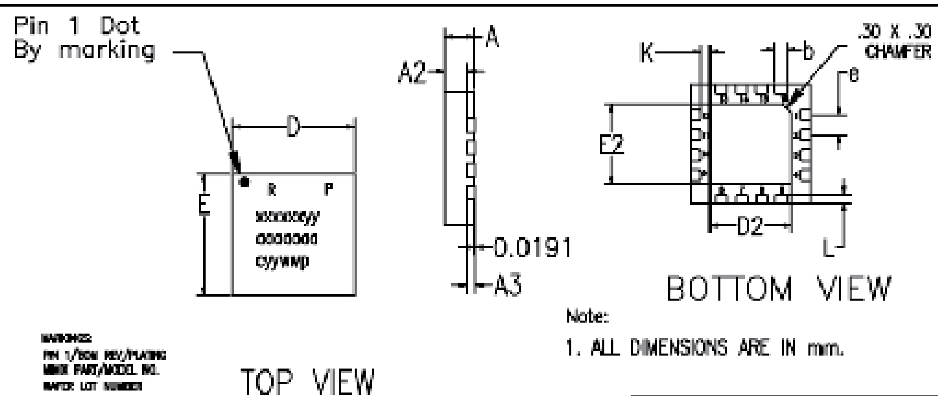
Evaluation Board Layout

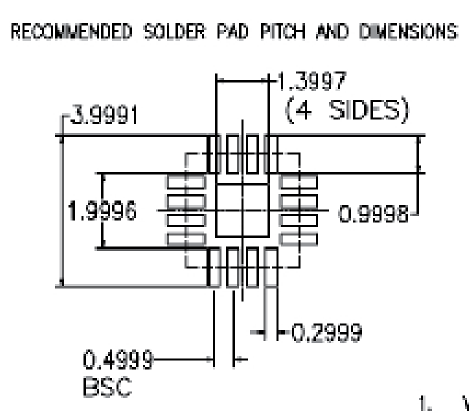


Evaluation Board Schematic



Lead-Free 3 mm 16-Lead PQFN†





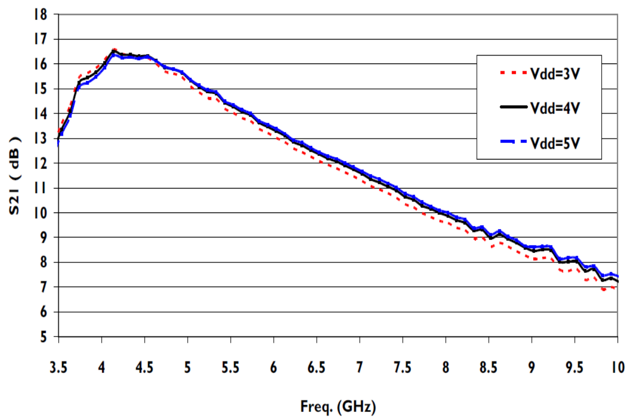
	MIN	TYP	MAX
A	0.80	0.90	1.00
A3	0.20 REF		
A2	0.00	0.65	1.00
b	0.20	0.25	0.30
K	0.20	–	–
D	3.00 BSC		
E	3.00 BSC		
e	0.50		
D2	1.50	1.65	1.80
E2	1.50	1.65	1.80
L	0.16	0.26	0.36

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

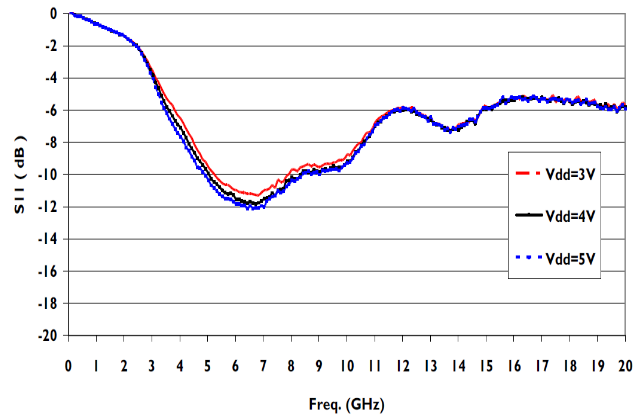
† Reference Application Note S2083 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level 1 requirements.
Plating is 100% matte tin plating over copper

Typical Performance Curves:

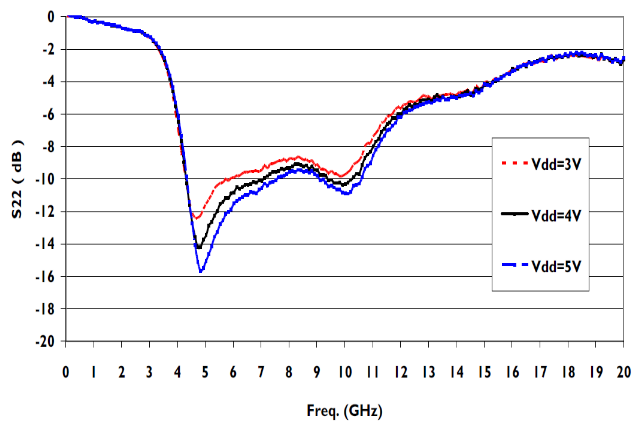
Gain vs. Voltage



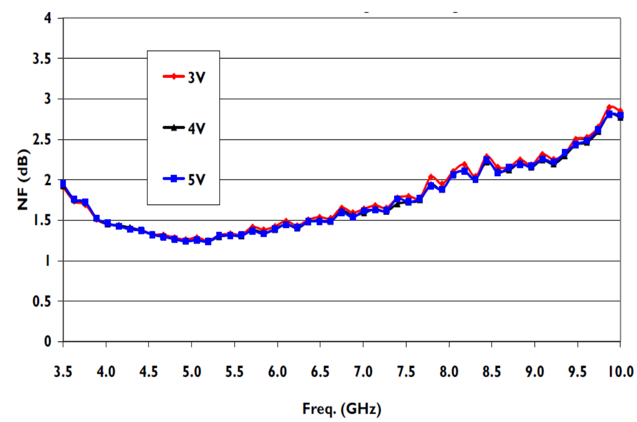
Input Return Loss vs. Voltage



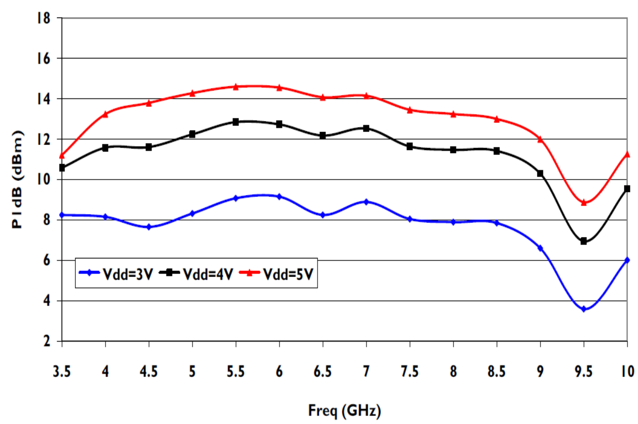
Output Return Loss vs. Voltage



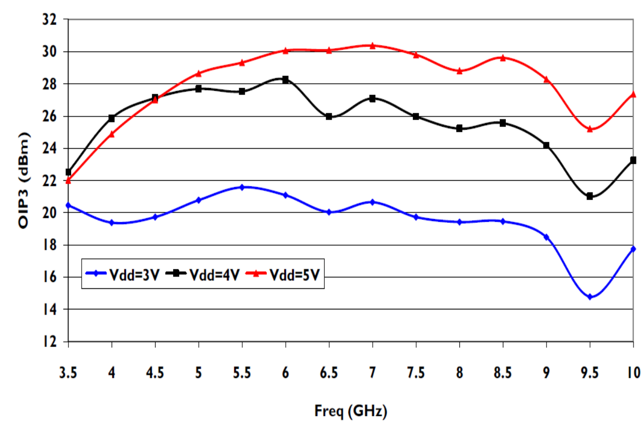
Noise Figure vs. Voltage



P1dB vs. Voltage

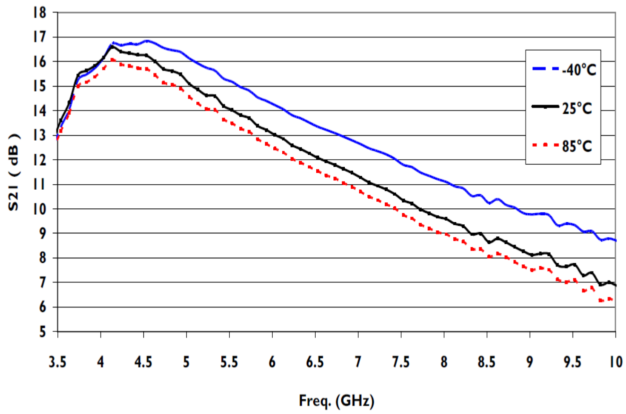


Output IP3 vs. Voltage

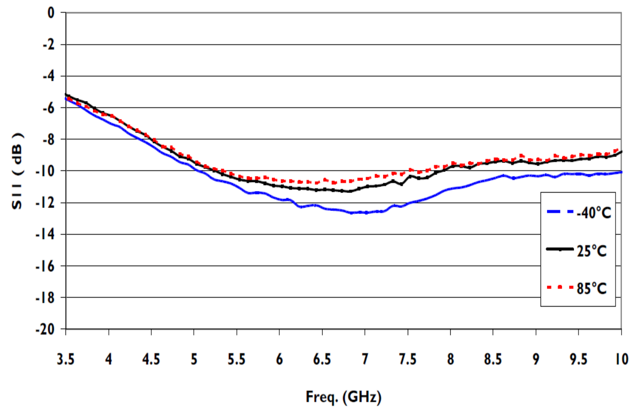


Typical Performance Curves: V_{DD} = 3 V

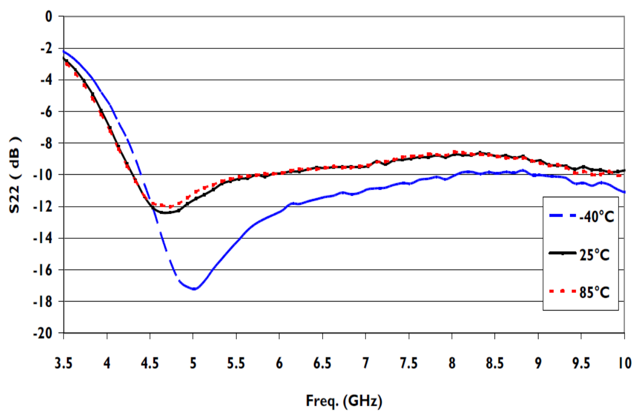
Gain



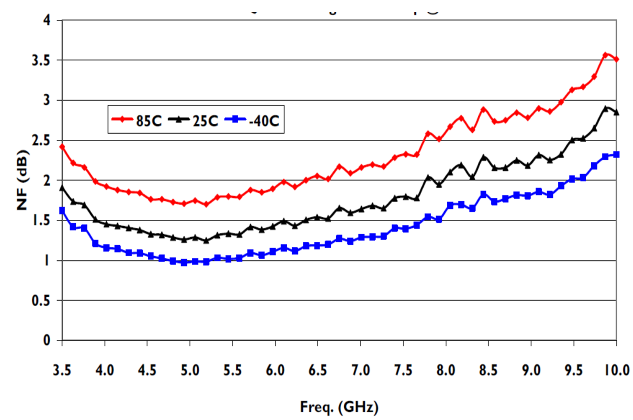
Input Return Loss



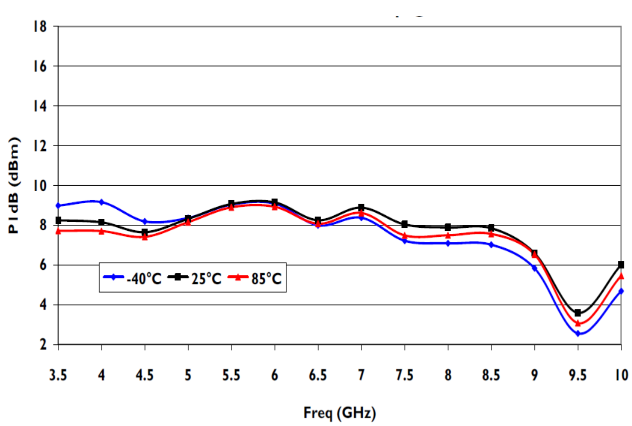
Output Return Loss



Noise Figure

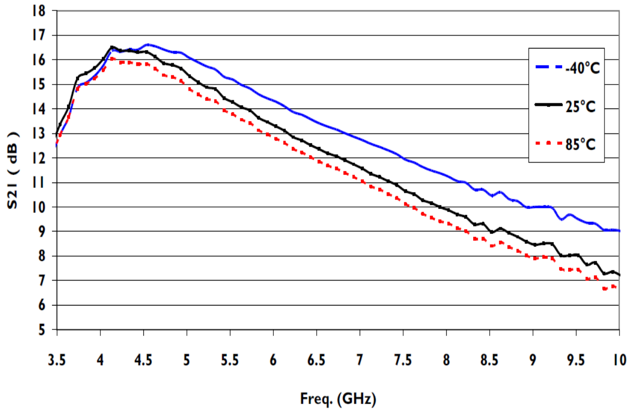


P1dB

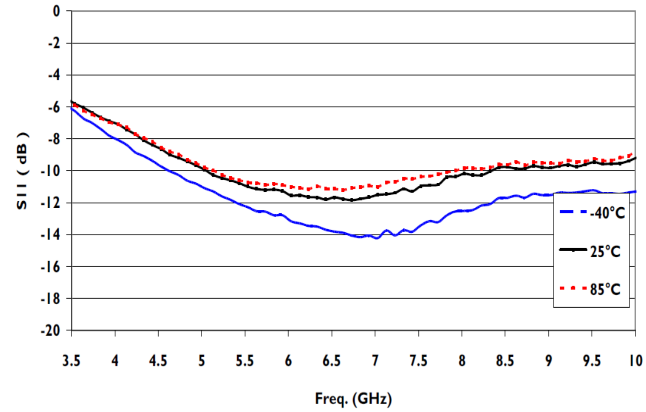


Typical Performance Curves: V_{DD} = 4 V

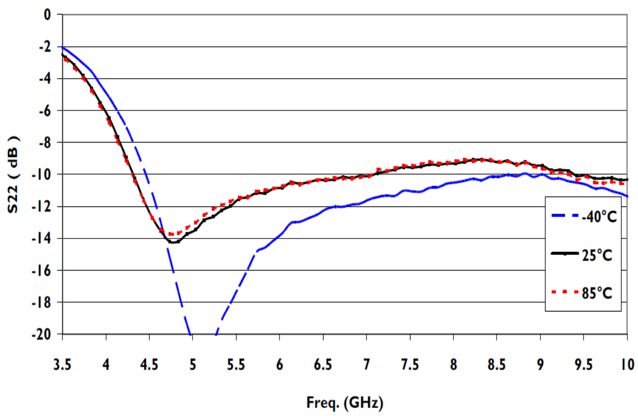
Gain



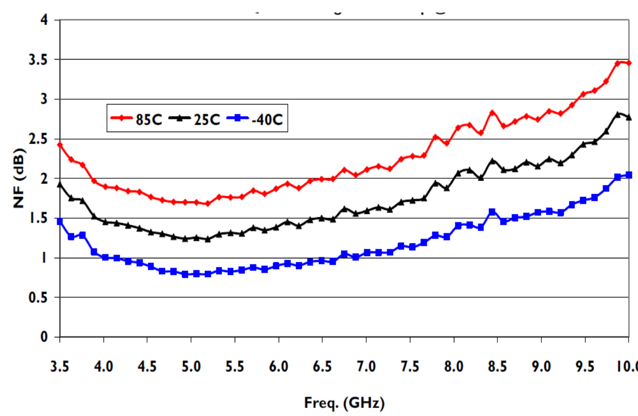
Input Return Loss



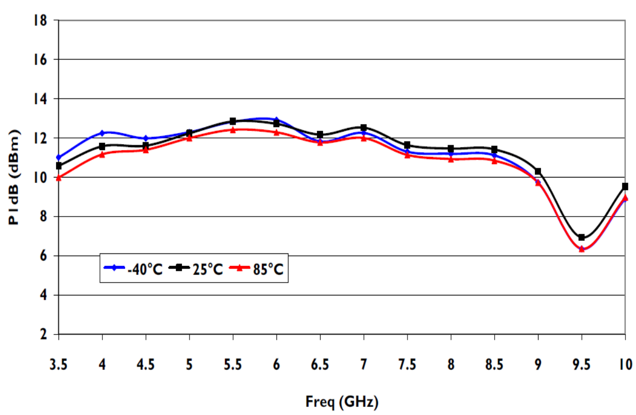
Output Return Loss



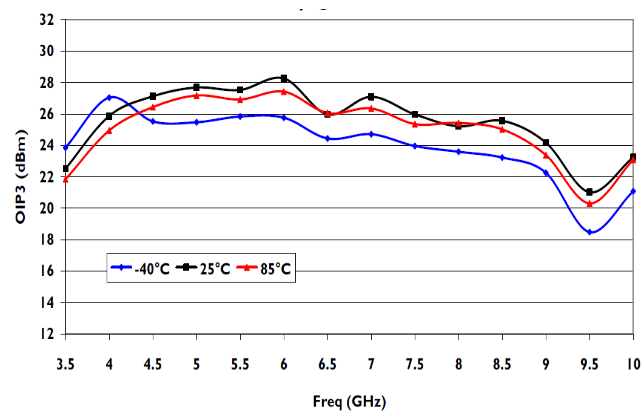
Noise Figure



P1dB

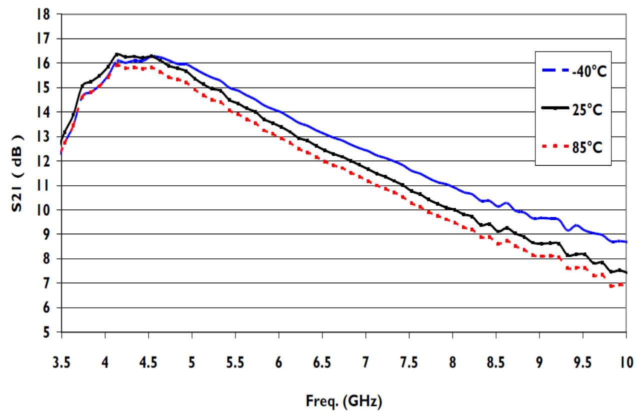


Output IP3, P_{OUT}/Tone = P1dB - 10 dB

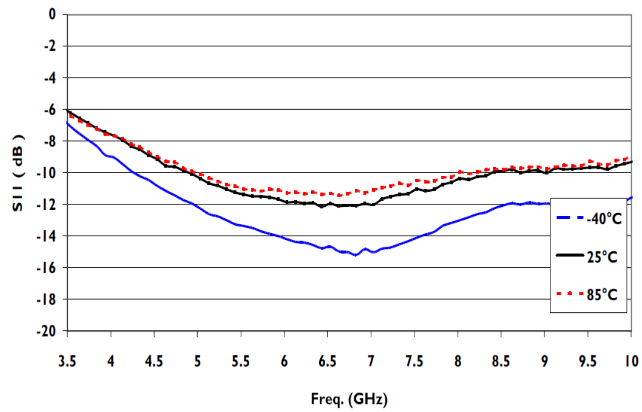


Typical Performance Curves: V_{DD} = 5 V

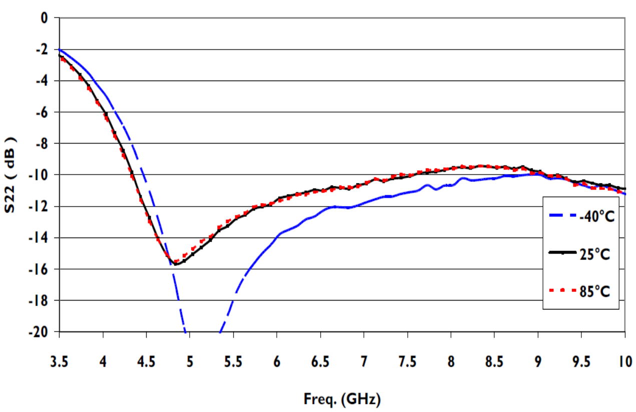
Gain



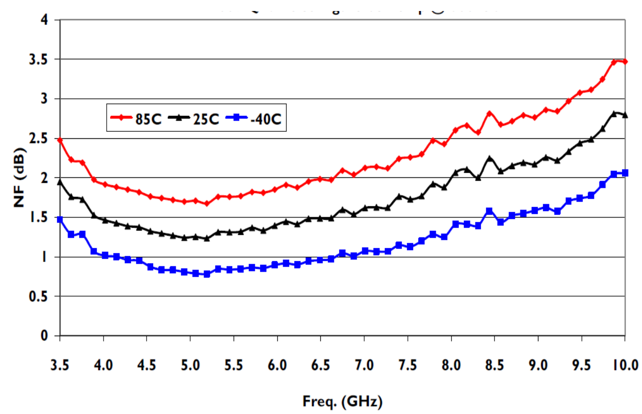
Input Return Loss



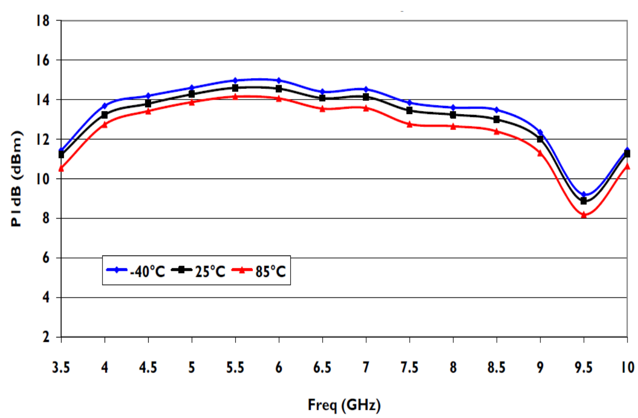
Output Return Loss



Noise Figure



P1dB



Output IP3, P_{OUT}/Tone = P1dB - 10 dB