

RF Driver Amplifier
250 - 4000 MHz

MAAMSS0050
V1

Features

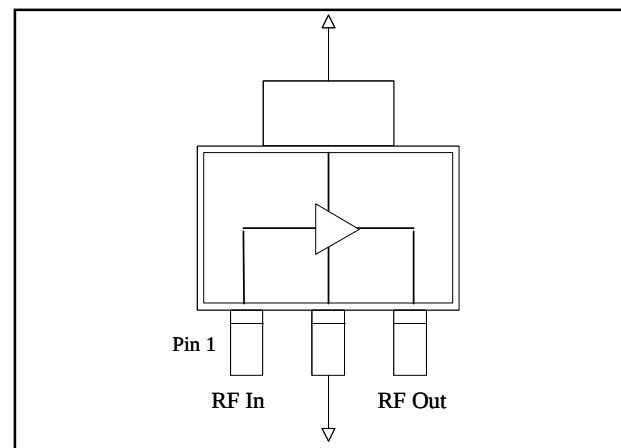
- Broadband Operation
- Output Intercept Point: 40 dBm over a 20 dB Power Range
- Excellent ACPR performance
- High Efficiency
- Lead-Free SOT-89 Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible

Description

M/A-COM's MAAMSS0050 RF driver amplifier is a GaAs MMIC which exhibits exceptional linearity performance as well as featuring high gain in a lead-free miniature SOT-89 surface mount plastic package. The device runs off a single +5 volt supply and draws 420 mA typically.

The MAAMSS0050 is fabricated using an HBT process to realize low current and high power functionality. The process features full passivation for increased performance and reliability.

Functional Schematic



Pin Configuration

Pin No.	Function	Pin No.	Function
1	RF Input	3	RF Output/ Bias
2	Ground		

Ordering Information ¹

Part Number	Package
MAAMSS0050	Bulk Packaging
MAAMSS0050SMB-01	900 MHz Configuration
MAAMSS0050SMB-02	1900 MHz Configuration
MAAMSS0050SMB-03	2140 MHz Configuration
MAAMSS0050TR-3000	3000 piece reel

1. Reference Application Note M513 for reel size information.

Maximum Operating Conditions ²

Parameter	Maximum Operating Conditions
Junction Temperature	160°C
RF Output Power	30 dBm

2. Operating at, or below this condition, at or below 85°C will give a MTTF > 1 x 10⁶ hours.

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

Absolute Maximum Ratings ^{3,4}

Parameter	Absolute Maximum
RF Output Power	31 dBm
Voltage	6 volts
Operating Temperature	-40 °C to +85 °C
Storage Temperature	-65 °C to +150 °C
Junction Temperature ⁵	200°C

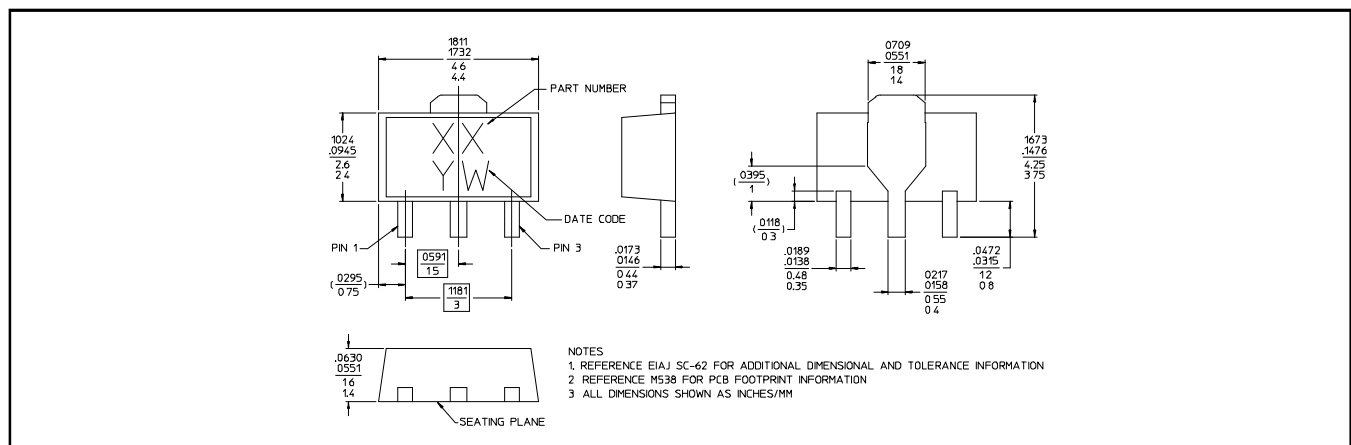
3. Exceeding any one or combination of these limits may cause permanent damage to this device.

4. M/A-COM does not recommend sustained operation near these survivability limits.

5. Typical thermal resistance (θ_{jc}) = 40°C/W.

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Electrical Specifications: $T_A = 25^\circ\text{C}$, $V_{CC} = 5\text{ V}$, $Z_0 = 50\ \Omega$

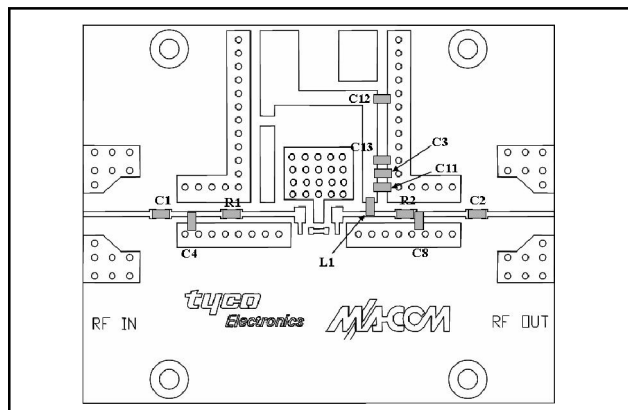
Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	900 MHz	dB	—	20	—
	1900 MHz	dB	—	14	—
	2140 MHz	dB	11.5	13	—
Input Return Loss	900 MHz	dB	—	-10	—
	1900 MHz	dB	—	-10	—
	2140 MHz	dB	—	-15	—
Output Return Loss	900 MHz	dB	—	-15	—
	1900 MHz	dB	—	-15	—
	2140 MHz	dB	—	-15	—
Output P1dB	900 MHz	dB	—	30	—
	1900 MHz	dB	—	30	—
	2140 MHz	dB	—	30	—
Output IP3	(+22 dBm / tone, 1 MHz spacing)				
	900 MHz	dBm	—	43	—
	1900 MHz	dBm	—	43	—
Channel Power	2140 MHz	dBm	38	43	—
	(@ -45 dBc ACPR, IS-95 9 channels fwd)				
	900 MHz	dBm	—	23	—
Noise Figure	1900 MHz	dB	—	21	—
	2140 MHz	dB	—	20	—
		dB	—	4.5	—
Device / Supply Voltage	900 MHz	V	—	5	—
	1900 MHz	V	—	5	—
	2140 MHz	V	—	5	—
Quiescent Current		mA	—	420	—
Current @ 20 dBm Output	2140 MHz	mA	—	430	550

Lead-Free SOT-89 Plastic Package[†]

[†] Reference Application Note M538 for lead-free solder reflow recommendations.

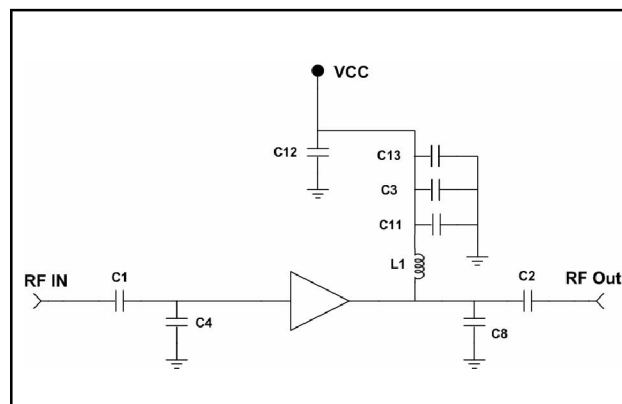
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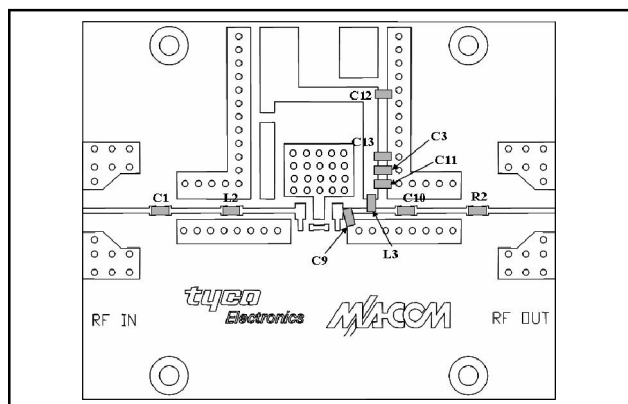
900 MHz PCB Layout



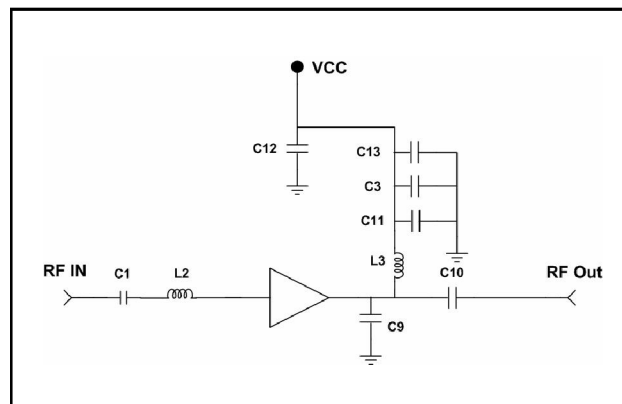
900 MHz Schematic



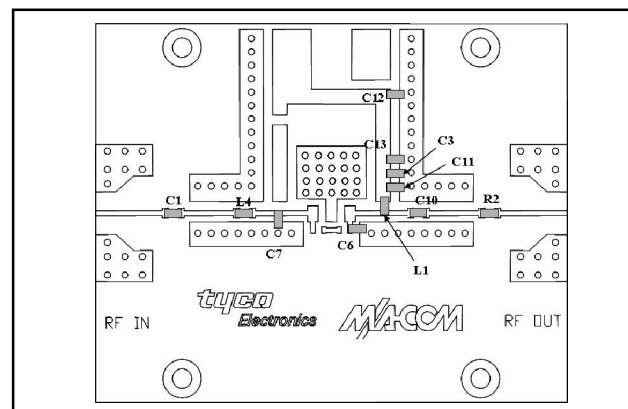
1900 MHz PCB Layout



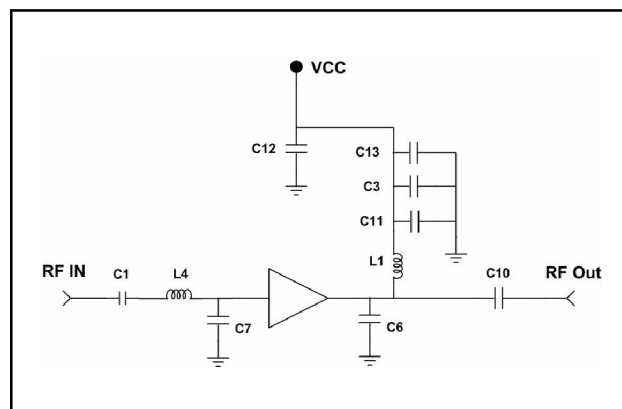
1900 MHz Schematic



2140 MHz PCB Layout



2140 Schematic



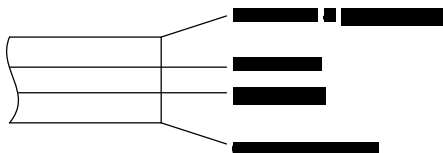
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Parts List

Part	Value	Used on Freq. Band	Case Style	Manufacturer	Purpose
C1, C2	1000 pF	All	0402	Murata	DC Block
C3	1000 pF	All	0402	Murata	Bypass
C4	7 pF	900	0402	Murata	Input Tuning
C5	3.3 pF	1900	0402	Murata	Input Tuning
C6	2.2 pF	2140	0402	Murata	Output Tuning
C7	2.2 pF	2140	0402	Murata	Input Tuning
C8	8.2 pF	900	0402	Murata	Output Tuning
C9	3 pF	1900	0402	Murata	Output Tuning
C10	39 pF	1900,2140	0402	Murata	DC Block
C11	15 pF	All	0402	Murata	Bypass
C12	0.1 uF	All	0402	Murata	Bypass
L1	7.5 nH	900,2140	0402	Coilcraft	Bias Injection
L2	3.3 nH	1900	0402	Coilcraft	Input Tuning
L3	10 nH	1900	0402	Coilcraft	Bias Injection
L4	5.1 nH	2140	0402	Coilcraft	Input Tuning
R1, R2	0 Ohms	All	0402	Panasonic	Jumper

Cross Section View



The PCB dielectric between RF traces and RF ground layers should be chosen to reduce RF discontinuities between 50 Ω lines and package pins. M/A-COM recommends an FR-4 dielectric thickness of 0.008" (0.20 mm) yielding a 50 Ω line width of 0.015" (0.38 mm). The recommended RF metalization is 1 ounce copper.

Handling Procedures

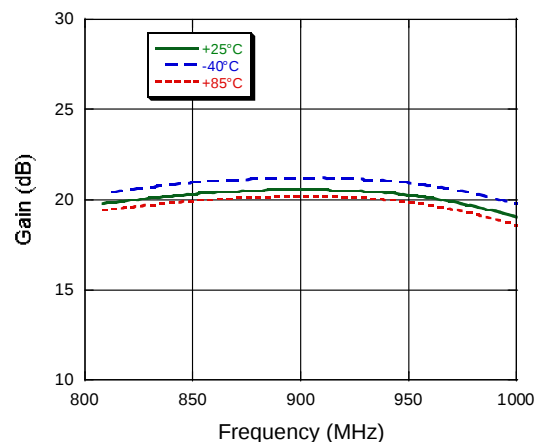
Please observe the following precautions to avoid damage:

Static Sensitivity

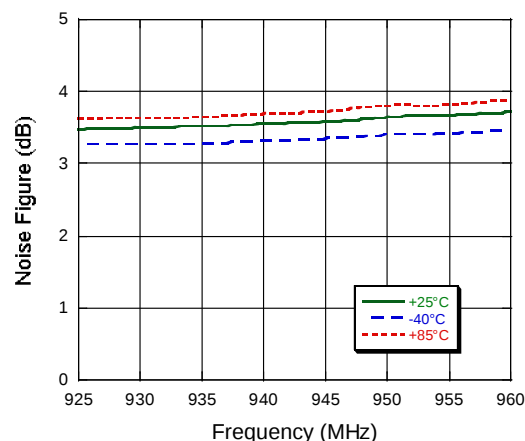
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Typical Performance Curves, 900 MHz Configuration, $V_{CC} = +5\text{ V}$

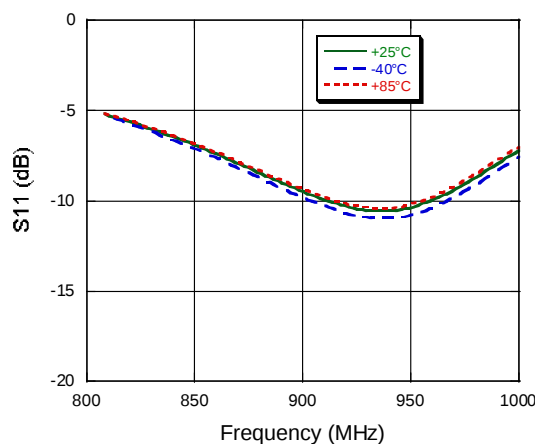
Gain



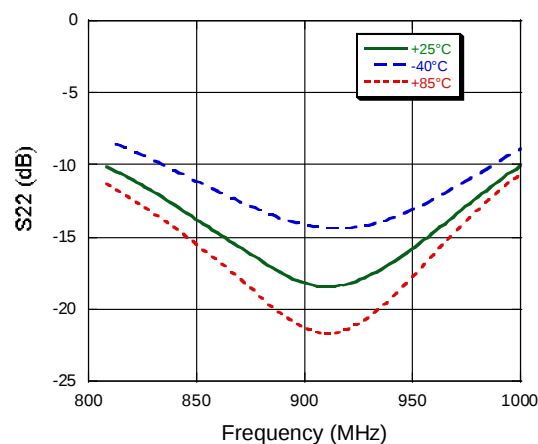
Noise Figure



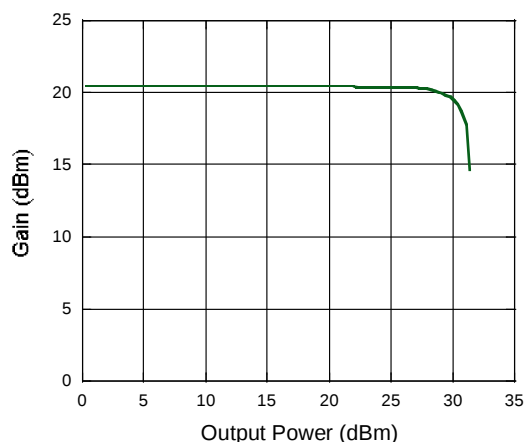
Input Return Loss



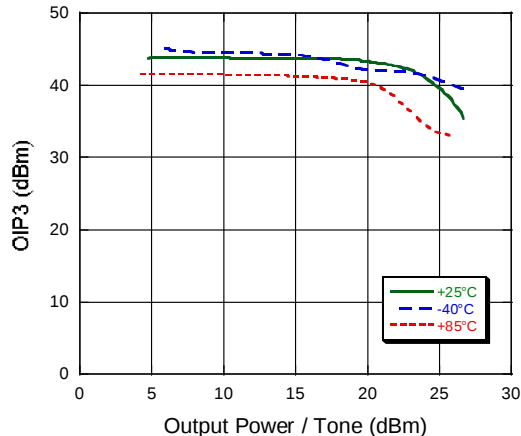
Output Return Loss



P1dB

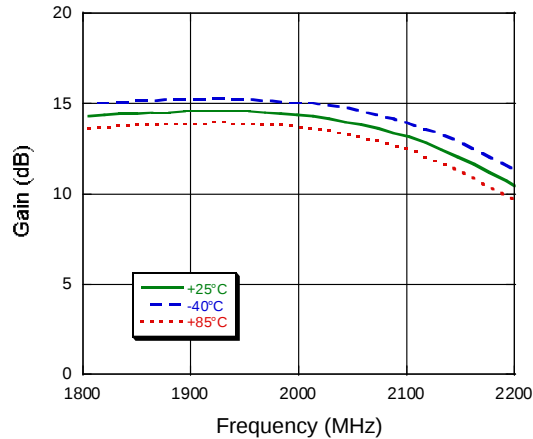


Output IP3

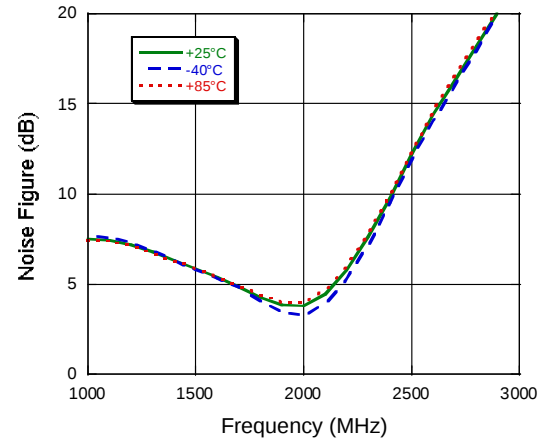


Typical Performance Curves, 1900 MHz Configuration, $V_{CC} = +5\text{ V}$

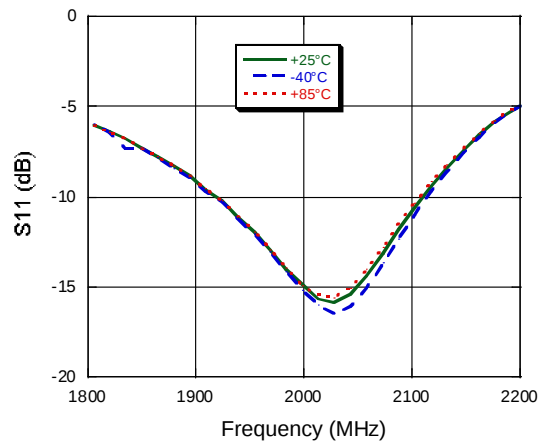
Gain



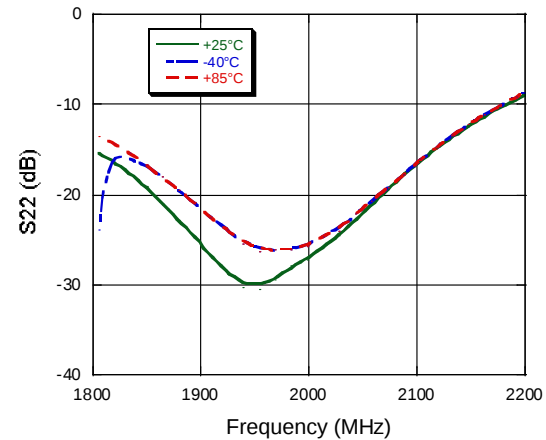
Noise Figure



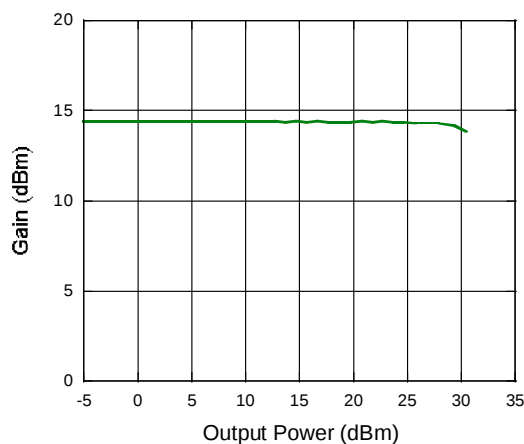
Input Return Loss



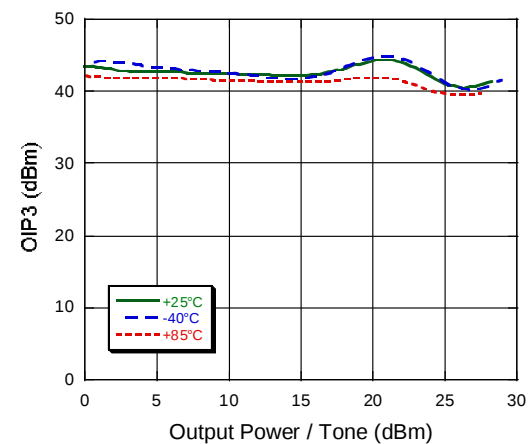
Output Return Loss



P1dB

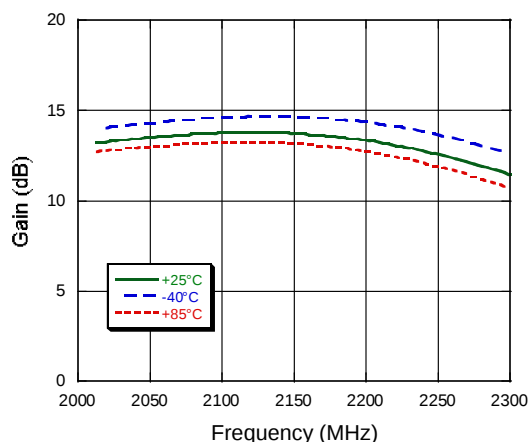


Output IP3

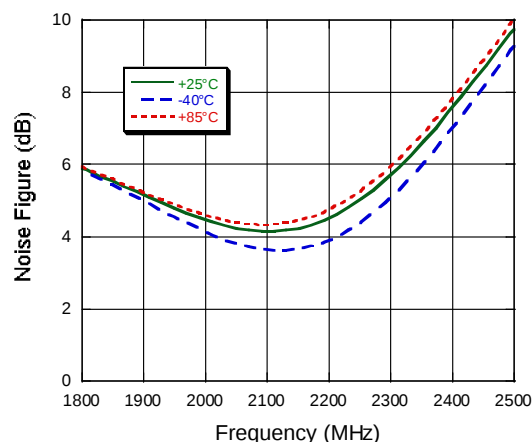


Typical Performance Curves, 2140 MHz Configuration, $V_{CC} = +5\text{ V}$

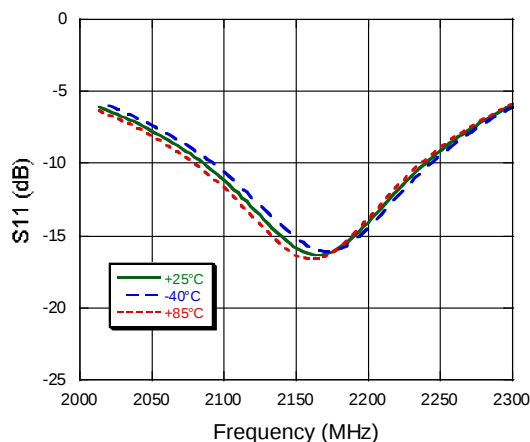
Gain



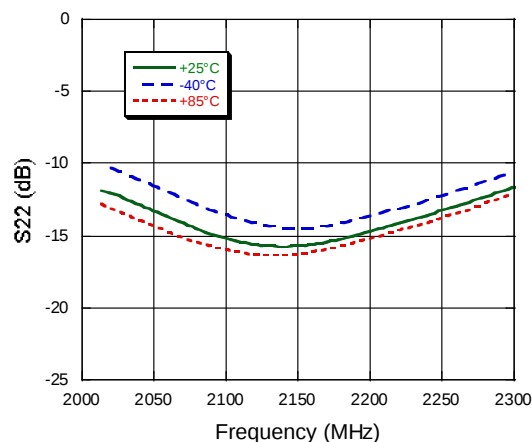
Noise Figure



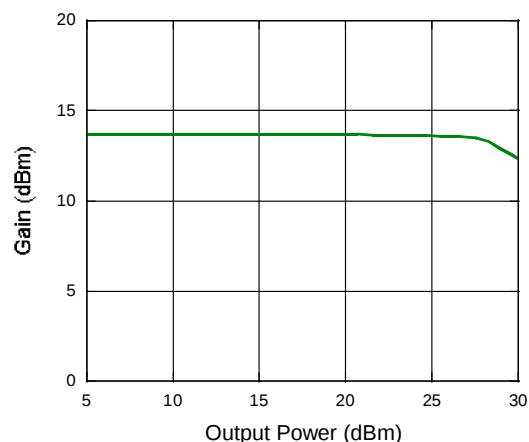
Input Return Loss



Output Return Loss



P1dB



Output IP3

