

High Directivity

# Monolithic Amplifier

## VNA-28A+

50Ω    0.5 to 2.5 GHz

### The Big Deal

- 2.8 & 5V operation
- High directivity, 14-21 dB
- Footprint compatible with VNA-28



CASE STYLE: DL1020

**Not Recommended for New Designs**

please refer to PCN# 15-055 and recommended replacement at:

[http://www.minicircuits.com/support/product\\_change.html](http://www.minicircuits.com/support/product_change.html)

or PCN History on Dash Board

### Product Overview

VNA-28A+ is a wideband amplifier providing high directivity. It has built-in DC blocks at input and output and a separate lead for DC. It is fabricated using GaAs MESFET technology and enclosed in a 5x6 mm MCLP plastic package.

### Key Features

Feature	Advantages
Footprint compatible with VNA-28	Can be used as a replacement for obsolete part VNA-28 without PCB design change. Refer to AN-60-065
High directivity, 14-21 dB	Acts as a low cost isolator, minimizing the interaction of pre and post circuits.
Built-in DC blocks	Eliminates need for external DC blocks, lowering PCB size & cost.
Separate terminal for DC	Eliminates need for output bias-tee, further reducing external component count, cost & PCB size.
DC voltage, 2.8 to +5V	No voltage dropping resistor required, allowing low voltage operation.
5 x 6mm 8-lead MCLP package	Provides low inductance, repeatable transitions, and excellent thermal contact to PCB.
Footprint compatible to SOIC-8 lead package	Can be used in place of obsolete model VNA-28 without PCB redesign.

High Directivity

# Monolithic Amplifier

0.5-2.5 GHz

## Product Features

- 2.8V & 5V operation
- no external biasing circuit required
- internal DC blocking at RF input and output
- high directivity, 18 dB typ.
- wide bandwidth, 0.5 to 2.5 GHz
- low noise figure, 3.7 dB typ.
- output power, up to +8.7 dBm typ.
- potential replacement for VNA-28 (AN-60-065)
- low cost

150319



## VNA-28A+

CASE STYLE: DL1020  
PRICE: Contact Sales Dept.

## Typical Applications

- buffer amplifier
- cellular
- PCN

### Not Recommended for New Designs

please refer to PCN# 15-055 and recommended replacement at:

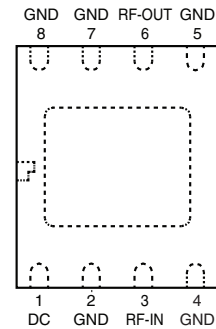
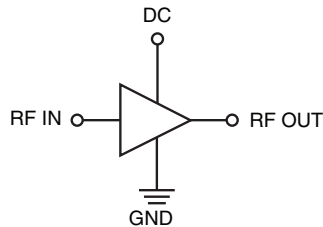
[http://www.minicircuits.com/support/product\\_change.html](http://www.minicircuits.com/support/product_change.html)

or PCN History on Dash Board

## General Description

VNA-28A+ is a wideband amplifier offering high dynamic range. It has repeatable performance from lot to lot. It is enclosed in an 8-lead 5X6 mm MCLP package, footprint compatible with SOIC-8 lead package. VNA-28A+ is fabricated using GaAs MESFET technology. It has a built-in DC blocks at RF-IN and RF-OUT ports and separate lead for DC eliminating the need for bias tee.

## simplified schematic and pad description



## Pad description

Function	Pad Number	Description
RF-IN	3	RF input pin.
RF-OUT	6	RF output pin.
DC	1	Bias pin
GND	2,4,5,7,8 and paddle	Connections to ground. Use via holes as shown in "Suggested Layout for PCB Design" to reduce ground path inductance for best performance.

### Electrical Specifications<sup>(1)</sup> at 25°C, 50Ω unless noted

Parameter	Condition (GHz)	Min.	Typ.		Max.	Units
Frequency Range		0.5			2.5	GHz
at DC Volts		5.0	5.0	2.8	5.0	V
Gain	0.5	—	16.6	15.8		dB
	1.0	—	21.2	20.0		
	1.5	—	21.6	20.2		
	2.0	18.6	20.7	19.4		
	2.5	—	18.0	16.9		
Input Return Loss	0.75 - 2.5		15.4	15.6		dB
Output Return Loss	0.75 - 2.5		14.7	11.8		dB
Output Power @ 1 dB compression	0.5 - 2.5		8.9	7.1		dBm
Output IP3	0.5 - 2.5		18.2	16.4		dBm
Noise Figure	0.5 - 2.5		3.7	3.7		dB
Directivity (Isolation - Gain)	0.5 - 2.5		14-20	15-21		dB
DC Current			27	24	45	mA
Thermal Resistance, junction-to-case <sup>(2)</sup>			78			°C/W

<sup>(1)</sup> Measured on Mini-Circuits Characterization test board TB-01. See Characterization Test Circuit (Fig. 1)

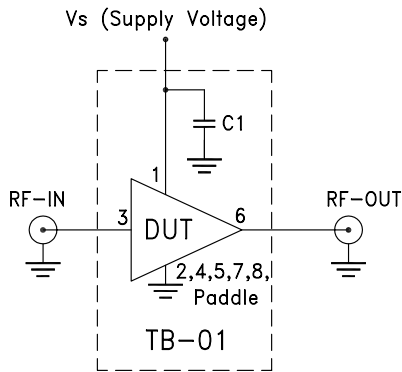
<sup>(2)</sup> Case is defined as ground leads.

### Absolute Maximum Ratings<sup>(3)</sup>

Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-65°C to 150°C
DC Voltage	7V at pad 1 10V at pads 3,6
Power Dissipation	500mW
Input Power	+5 dBm (continuous) +25 dBm (5 minutes max.)

<sup>(3)</sup> Permanent damage may occur if any of these limits are exceeded. These ratings are not intended for continuous normal operation.

### Characterization Test Circuit

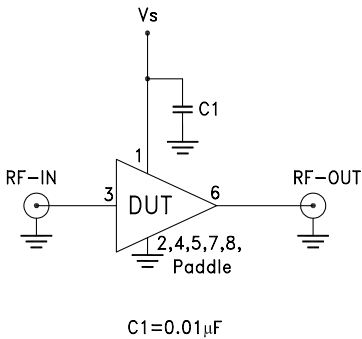


**Fig 1.** Block Diagram of Test Circuit used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-01) Gain, Return loss, Output power at 1dB compression (P1 dB), output IP3 (OIP3) and noise figure measured using Agilent's N5242A PNA-X microwave network analyzer.

#### Conditions:

1. Gain: Pin= -25dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, -5 dBm/tone at input.

### Recommended Application Circuit



**Fig 2.** Recommended Application Circuit

### Product Marking



Additional Detailed Technical Information	
<i>additional information is available on our dash board. To access this information <a href="#">click here</a></i>	
<b>Performance Data</b>	Data Table
	Swept Graphs
	S-Parameter (S2P Files) Data Set (.zip file)
<b>Case Style</b>	DL1020 <i>Plastic model, 8 lead, 5x6 mm MCLP, tin-silver over nickel</i>
<b>Tape &amp; Reel</b> Standard quantities available on reel	F68 <i>7" reels with 20, 50, 100, 200, 500 or 1K devices 13" reels with 2K, 4K devices</i>
<b>Suggested Layout for PCB Design</b>	PL-077
<b>Evaluation Board</b>	TB-01
<b>Environmental Ratings</b>	ENV08T1

### ESD Rating

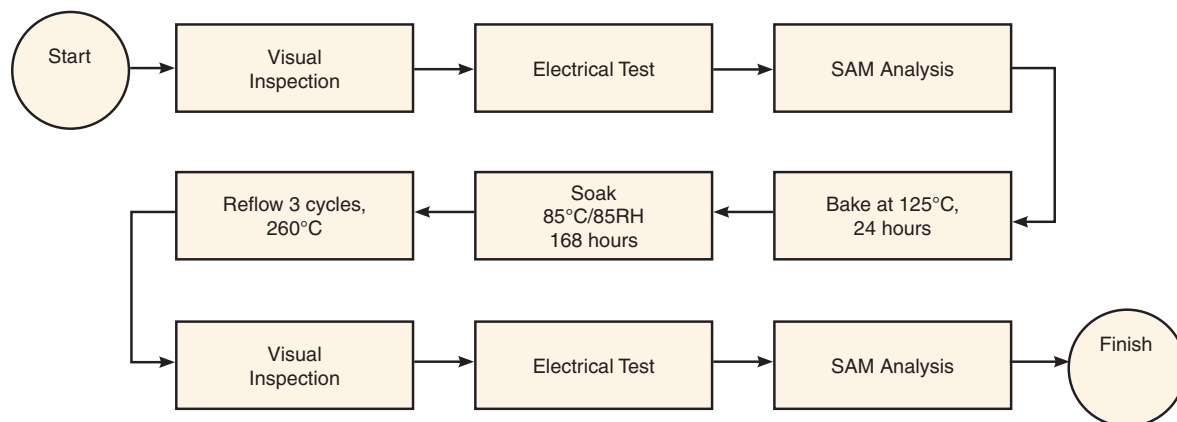
Human Body Model (HBM): Class 1B (500V to <1000V) in accordance with ANSI/ESD STM 5.1 - 2001

Machine Model (MM): Class M1 (Pass 50V) in accordance with ANSI/ESD STM5.2-1999

### MSL Rating

Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020D

### MSL Test Flow Chart



### Additional Notes

- Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuits' applicable established test performance criteria and measurement instructions.
- The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)

## Typical Performance Data

**NOTE: Use PDF Bookmarks to view DATA at required conditions**

**Definitions:**

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.00V, Id = 27.19mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
500.0	16.98	35.12	7.01	8.34	2.83	1.01	21.43	10.36	3.67
600.0	18.85	35.43	9.09	11.06	2.86	1.00	22.79	11.09	3.69
700.0	20.02	35.86	11.45	13.58	2.88	0.98	22.64	11.10	3.52
800.0	20.80	36.27	13.63	15.50	2.88	0.97	22.14	10.68	3.48
900.0	21.29	36.60	14.79	16.58	2.85	0.98	21.92	10.53	3.47
1000.0	21.63	36.91	14.56	16.86	2.82	0.99	21.01	9.93	3.43
1100.0	21.88	37.02	13.90	16.91	2.75	1.00	20.96	9.71	3.47
1200.0	22.01	37.16	13.05	16.55	2.72	1.01	20.42	9.23	3.51
1300.0	22.11	37.20	12.68	16.02	2.67	1.01	20.40	8.81	3.53
1400.0	22.17	37.39	12.65	15.62	2.70	1.01	20.09	8.80	3.54
1500.0	22.17	37.49	12.86	15.24	2.73	1.00	19.64	8.48	3.57
1600.0	22.12	37.64	13.67	14.97	2.81	0.99	19.61	8.40	3.60
1700.0	22.05	37.94	14.89	13.91	2.94	0.98	19.34	8.20	3.65
1800.0	21.80	38.24	17.20	14.26	3.18	0.97	19.55	8.37	3.69
1900.0	21.56	38.46	20.50	14.07	3.39	0.95	19.31	8.24	3.72
2000.0	21.24	38.84	26.85	13.88	3.69	0.95	19.02	7.95	3.70
2100.0	20.79	39.59	29.86	13.53	4.22	0.94	19.33	8.27	3.74
2200.0	20.29	40.50	21.01	13.57	4.92	0.95	19.06	8.01	3.81
2300.0	19.74	41.35	16.50	13.50	5.69	0.96	19.48	8.40	3.86
2400.0	19.10	42.71	13.51	13.39	6.99	0.99	19.87	8.85	3.92
2500.0	18.36	43.82	11.39	12.96	8.34	1.01	20.06	8.69	4.03
2600.0	17.45	45.06	9.65	12.50	10.19	1.04	20.31	8.93	4.16
2700.0	16.77	48.11	8.50	12.68	15.09	1.07	20.60	9.15	4.25
2800.0	15.84	48.69	7.52	12.09	17.00	1.10	20.82	9.22	4.27
2900.0	14.77	45.98	6.60	11.23	13.17	1.12	20.53	9.05	4.40
3000.0	13.71	43.62	5.52	10.45	10.30	1.16	20.59	8.88	4.51
3100.0	13.07	43.96	4.99	10.49	10.92	1.20	20.75	9.04	4.60
3200.0	12.07	40.87	4.30	9.72	7.76	1.22	20.82	8.63	4.83
3300.0	11.46	40.60	3.62	9.51	7.26	1.27	20.86	8.44	4.90
3400.0	10.94	41.73	3.23	9.54	8.18	1.31	21.21	8.98	5.06
3500.0	10.33	43.15	3.02	9.47	9.82	1.33	21.24	9.02	5.19
3600.0	9.67	43.15	2.76	9.20	9.87	1.34	21.42	9.36	5.33
3700.0	9.04	44.13	2.55	9.03	11.20	1.36	21.77	9.51	5.46
3800.0	8.40	45.36	2.41	8.84	13.18	1.36	22.17	9.85	5.62
3900.0	7.74	45.84	2.28	8.57	14.30	1.37	22.31	10.16	5.85
4000.0	7.10	46.69	2.16	8.35	16.13	1.37	22.61	10.06	5.88

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 3.90V, Id = 25.99mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
500.0	16.70	35.28	6.98	8.31	2.96	1.01	20.64	9.68	3.69
600.0	18.53	35.58	9.06	10.86	3.00	0.99	21.95	10.31	3.72
700.0	19.67	35.99	11.39	13.07	3.02	0.98	21.72	10.28	3.54
800.0	20.41	36.34	13.50	14.58	3.00	0.97	21.32	9.82	3.49
900.0	20.88	36.59	14.59	15.35	2.95	0.97	21.21	9.70	3.48
1000.0	21.20	36.82	14.40	15.52	2.90	0.98	20.17	9.06	3.45
1100.0	21.42	36.82	13.81	15.56	2.81	0.99	20.18	8.86	3.50
1200.0	21.53	36.86	13.02	15.28	2.75	1.00	19.61	8.38	3.50
1300.0	21.62	36.83	12.70	14.85	2.68	1.00	19.66	7.95	3.51
1400.0	21.67	36.92	12.67	14.46	2.68	1.00	19.29	7.91	3.56
1500.0	21.67	36.91	12.89	14.08	2.68	1.00	18.88	7.60	3.59
1600.0	21.62	36.94	13.65	13.76	2.72	0.98	18.89	7.55	3.65
1700.0	21.55	37.20	14.82	12.77	2.82	0.96	18.68	7.33	3.64
1800.0	21.31	37.33	17.03	12.94	2.99	0.95	18.76	7.49	3.73
1900.0	21.10	37.41	20.14	12.65	3.12	0.94	18.66	7.34	3.70
2000.0	20.80	37.64	26.12	12.36	3.33	0.93	18.31	7.05	3.75
2100.0	20.38	38.20	31.87	11.96	3.71	0.92	18.54	7.37	3.75
2200.0	19.91	38.85	21.82	11.88	4.19	0.92	18.26	7.11	3.83
2300.0	19.40	39.45	16.95	11.71	4.68	0.93	18.70	7.46	3.86
2400.0	18.78	40.44	13.80	11.54	5.49	0.95	19.03	7.92	3.93
2500.0	18.06	41.27	11.56	11.14	6.31	0.97	19.17	7.75	4.07
2600.0	17.18	42.18	9.75	10.79	7.41	1.00	19.47	7.99	4.18
2700.0	16.50	44.30	8.54	10.88	9.81	1.04	19.65	8.26	4.26
2800.0	15.58	45.27	7.50	10.40	11.52	1.06	19.85	8.32	4.31
2900.0	14.52	44.31	6.56	9.75	10.88	1.08	19.65	8.17	4.45
3000.0	13.47	42.41	5.49	9.28	8.97	1.12	19.67	8.00	4.52
3100.0	12.82	43.22	4.93	9.30	10.02	1.16	19.84	8.19	4.63
3200.0	11.82	40.60	4.23	8.72	7.50	1.18	19.87	7.80	4.86
3300.0	11.21	40.12	3.56	8.64	6.88	1.23	19.97	7.59	4.92
3400.0	10.66	41.07	3.17	8.68	7.60	1.27	20.32	8.15	5.10
3500.0	10.02	42.38	2.95	8.58	9.01	1.29	20.34	8.23	5.24
3600.0	9.33	42.52	2.69	8.32	9.20	1.30	20.52	8.58	5.39
3700.0	8.66	43.37	2.50	8.15	10.30	1.32	20.86	8.75	5.55
3800.0	7.99	44.49	2.35	7.94	11.95	1.32	21.22	9.06	5.68
3900.0	7.29	45.09	2.21	7.67	13.12	1.32	21.44	9.40	5.92
4000.0	6.61	45.88	2.09	7.45	14.70	1.32	21.70	9.28	5.97

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.25V, Id = 27.56mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
500.0	17.03	35.09	7.02	8.35	2.80	1.01	21.66	10.50	3.64
600.0	18.91	35.39	9.09	11.10	2.83	1.00	22.98	11.23	3.71
700.0	20.09	35.83	11.46	13.69	2.86	0.98	22.71	11.25	3.51
800.0	20.87	36.25	13.66	15.73	2.85	0.98	22.24	10.85	3.44
900.0	21.37	36.59	14.82	16.90	2.83	0.98	22.21	10.70	3.45
1000.0	21.72	36.91	14.60	17.22	2.80	0.99	21.05	10.09	3.46
1100.0	21.96	37.04	13.92	17.25	2.74	1.00	21.06	9.88	3.45
1200.0	22.10	37.22	13.05	16.87	2.71	1.01	20.59	9.40	3.52
1300.0	22.20	37.28	12.69	16.31	2.67	1.01	20.52	8.96	3.50
1400.0	22.27	37.50	12.66	15.92	2.71	1.01	20.23	8.92	3.55
1500.0	22.27	37.63	12.85	15.55	2.75	1.01	19.78	8.61	3.58
1600.0	22.22	37.77	13.68	15.29	2.83	1.00	19.82	8.57	3.63
1700.0	22.15	38.09	14.92	14.22	2.96	0.98	19.54	8.35	3.64
1800.0	21.89	38.46	17.30	14.63	3.24	0.97	19.66	8.52	3.67
1900.0	21.65	38.70	20.62	14.46	3.46	0.96	19.54	8.39	3.70
2000.0	21.32	39.13	27.20	14.31	3.79	0.95	19.20	8.12	3.70
2100.0	20.86	39.93	29.39	13.97	4.37	0.95	19.52	8.45	3.74
2200.0	20.35	40.86	20.76	14.04	5.12	0.96	19.28	8.17	3.82
2300.0	19.80	41.78	16.38	14.00	5.96	0.97	19.74	8.56	3.84
2400.0	19.15	43.25	13.44	13.90	7.41	0.99	20.11	9.01	3.93
2500.0	18.41	44.57	11.34	13.49	9.07	1.02	20.24	8.83	4.02
2600.0	17.49	45.77	9.60	12.95	11.05	1.05	20.50	9.09	4.16
2700.0	16.81	49.25	8.48	13.16	17.18	1.08	20.72	9.33	4.24
2800.0	15.88	49.49	7.51	12.54	18.66	1.11	20.96	9.39	4.27
2900.0	14.81	46.20	6.61	11.62	13.53	1.13	20.76	9.23	4.42
3000.0	13.74	43.78	5.52	10.74	10.51	1.17	20.82	9.05	4.50
3100.0	13.10	44.02	5.00	10.78	11.01	1.21	20.97	9.20	4.59
3200.0	12.10	40.89	4.31	9.96	7.79	1.23	21.01	8.80	4.80
3300.0	11.50	40.66	3.64	9.70	7.33	1.28	21.06	8.59	4.90
3400.0	10.98	41.86	3.24	9.73	8.29	1.31	21.46	9.13	5.03
3500.0	10.38	43.33	3.03	9.67	10.03	1.33	21.44	9.19	5.19
3600.0	9.72	43.25	2.77	9.39	9.99	1.35	21.61	9.51	5.33
3700.0	9.10	44.29	2.57	9.23	11.43	1.36	21.93	9.64	5.46
3800.0	8.47	45.54	2.42	9.05	13.48	1.37	22.30	10.00	5.62
3900.0	7.81	46.02	2.29	8.77	14.60	1.38	22.58	10.31	5.82
4000.0	7.18	46.83	2.16	8.56	16.37	1.38	22.82	10.19	5.82



## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.00V, Id = 26.83mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
500.0	17.54	35.35	6.96	8.22	2.70	1.00	21.75	10.49	2.91
600.0	19.39	35.75	9.11	10.82	2.78	0.99	23.15	11.13	3.51
700.0	20.56	36.27	11.48	13.22	2.83	0.98	22.88	11.13	2.82
800.0	21.35	36.70	13.83	15.15	2.84	0.97	22.29	10.66	2.80
900.0	21.87	37.05	15.34	16.26	2.82	0.97	22.19	10.53	2.78
1000.0	22.24	37.41	15.13	16.44	2.80	0.98	21.20	9.88	2.73
1100.0	22.52	37.54	14.44	16.53	2.72	0.99	21.15	9.67	2.78
1200.0	22.70	37.67	13.54	16.29	2.68	1.00	20.45	9.16	2.82
1300.0	22.85	37.73	13.05	15.85	2.62	1.00	20.50	8.71	2.81
1400.0	22.95	37.90	12.95	15.31	2.63	1.00	20.23	8.73	2.83
1500.0	23.00	38.02	13.13	14.73	2.64	1.00	19.75	8.34	2.87
1600.0	23.00	38.19	13.79	14.47	2.70	0.99	19.72	8.30	2.90
1700.0	22.98	38.12	14.58	13.16	2.67	0.97	19.34	8.04	2.91
1800.0	22.77	38.82	16.94	13.49	3.02	0.96	19.62	8.28	2.95
1900.0	22.57	39.01	19.84	13.29	3.19	0.95	19.46	8.12	2.97
2000.0	22.29	39.37	24.99	13.17	3.45	0.94	19.10	7.83	2.95
2100.0	21.88	40.13	29.83	12.60	3.92	0.93	19.46	8.22	2.98
2200.0	21.41	40.97	21.64	12.55	4.53	0.94	19.15	7.87	3.06
2300.0	20.88	41.93	16.99	12.48	5.29	0.95	19.68	8.35	3.06
2400.0	20.25	43.34	13.89	12.29	6.52	0.97	19.98	8.81	3.14
2500.0	19.53	44.51	11.77	11.87	7.83	0.99	20.25	8.65	3.22
2600.0	18.66	45.74	10.00	11.50	9.55	1.01	20.49	9.00	3.37
2700.0	17.97	48.59	8.73	11.66	13.79	1.05	20.69	9.17	3.43
2800.0	17.06	49.12	7.72	11.28	15.48	1.08	20.93	9.27	3.47
2900.0	16.00	46.30	6.77	10.63	11.83	1.10	20.77	9.14	3.56
3000.0	14.81	43.64	5.51	9.70	8.92	1.14	20.84	8.99	3.63
3100.0	14.19	43.74	5.05	9.75	9.23	1.17	21.06	9.21	3.68
3200.0	13.13	40.61	4.35	8.99	6.56	1.19	21.03	8.69	3.93
3300.0	12.46	40.19	3.53	8.74	5.93	1.25	21.02	8.48	3.99
3400.0	11.99	41.35	3.12	8.81	6.62	1.29	21.31	8.98	4.11
3500.0	11.42	43.14	2.91	8.81	8.27	1.31	21.27	8.97	4.25
3600.0	10.71	42.62	2.61	8.52	7.73	1.33	21.51	9.39	4.34
3700.0	10.10	43.73	2.41	8.40	8.89	1.34	21.84	9.50	4.50
3800.0	9.46	45.22	2.24	8.25	10.69	1.35	22.19	9.86	4.64
3900.0	8.75	45.85	2.11	7.97	11.71	1.35	22.42	10.18	4.86
4000.0	8.11	46.58	1.98	7.73	12.94	1.35	22.73	10.09	4.86

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 3.90V, Id = 25.01mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
500.0	17.21	35.49	6.92	8.21	2.84	1.01	20.87	9.83	2.93
600.0	19.03	35.88	9.07	10.64	2.92	0.99	22.21	10.46	3.59
700.0	20.16	36.37	11.38	12.72	2.97	0.97	21.89	10.42	2.88
800.0	20.92	36.74	13.62	14.25	2.96	0.97	21.40	9.89	2.80
900.0	21.42	37.01	15.02	15.08	2.92	0.97	21.23	9.77	2.79
1000.0	21.75	37.28	14.85	15.18	2.88	0.97	20.14	9.12	2.80
1100.0	22.01	37.30	14.26	15.27	2.78	0.98	20.18	8.91	2.81
1200.0	22.17	37.35	13.45	15.10	2.71	0.99	19.59	8.41	2.82
1300.0	22.30	37.32	13.00	14.74	2.64	1.00	19.56	7.97	2.81
1400.0	22.39	37.39	12.94	14.24	2.62	0.99	19.32	7.93	2.87
1500.0	22.43	37.41	13.13	13.70	2.60	0.99	18.81	7.54	2.88
1600.0	22.42	37.46	13.75	13.40	2.63	0.98	18.76	7.47	2.90
1700.0	22.40	37.41	14.51	12.20	2.59	0.96	18.56	7.23	2.91
1800.0	22.20	37.86	16.79	12.39	2.85	0.95	18.68	7.40	3.00
1900.0	22.02	37.90	19.53	12.11	2.94	0.93	18.57	7.23	2.97
2000.0	21.76	38.12	24.45	11.90	3.13	0.92	18.17	6.93	2.98
2100.0	21.38	38.67	31.90	11.32	3.46	0.91	18.51	7.28	3.01
2200.0	20.95	39.31	22.74	11.17	3.88	0.91	18.19	6.93	3.07
2300.0	20.45	39.99	17.57	11.02	4.38	0.92	18.68	7.38	3.09
2400.0	19.85	41.01	14.20	10.78	5.13	0.93	18.99	7.84	3.17
2500.0	19.16	41.83	11.97	10.38	5.89	0.95	19.13	7.69	3.25
2600.0	18.31	42.75	10.12	10.07	6.90	0.97	19.49	8.00	3.38
2700.0	17.64	44.76	8.78	10.14	9.02	1.01	19.61	8.19	3.46
2800.0	16.73	45.75	7.71	9.80	10.63	1.04	19.82	8.27	3.46
2900.0	15.68	44.88	6.73	9.29	10.13	1.06	19.67	8.17	3.61
3000.0	14.52	42.53	5.48	8.69	7.91	1.10	19.76	7.99	3.68
3100.0	13.88	43.26	4.99	8.71	8.78	1.13	19.95	8.25	3.74
3200.0	12.82	40.55	4.28	8.11	6.53	1.15	19.90	7.73	3.95
3300.0	12.16	39.87	3.47	8.01	5.76	1.21	19.93	7.52	4.07
3400.0	11.67	40.86	3.06	8.10	6.32	1.25	20.16	8.04	4.17
3500.0	11.05	42.52	2.85	8.06	7.77	1.27	20.14	8.05	4.31
3600.0	10.33	42.15	2.54	7.78	7.39	1.29	20.36	8.46	4.44
3700.0	9.67	43.10	2.35	7.65	8.33	1.30	20.80	8.60	4.56
3800.0	8.99	44.52	2.18	7.47	9.93	1.31	21.13	9.02	4.75
3900.0	8.26	45.19	2.05	7.19	10.94	1.31	21.28	9.31	4.92
4000.0	7.58	45.96	1.92	6.95	12.12	1.30	21.67	9.24	4.92

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.25V, Id = 27.15mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
500.0	17.59	35.32	6.97	8.23	2.67	1.00	21.96	10.62	2.91
600.0	19.45	35.71	9.11	10.86	2.75	0.99	23.36	11.27	3.53
700.0	20.63	36.24	11.49	13.33	2.81	0.98	23.07	11.28	2.85
800.0	21.42	36.69	13.86	15.36	2.82	0.97	22.46	10.81	2.77
900.0	21.95	37.04	15.38	16.55	2.80	0.97	22.48	10.69	2.77
1000.0	22.32	37.43	15.17	16.74	2.78	0.98	21.32	10.04	2.74
1100.0	22.61	37.56	14.48	16.82	2.71	0.99	21.32	9.85	2.78
1200.0	22.78	37.72	13.53	16.57	2.67	1.00	20.69	9.32	2.82
1300.0	22.94	37.78	13.05	16.12	2.62	1.00	20.57	8.89	2.79
1400.0	23.05	38.00	12.97	15.57	2.63	1.00	20.35	8.87	2.84
1500.0	23.10	38.12	13.14	14.99	2.65	1.00	19.86	8.52	2.87
1600.0	23.09	38.31	13.81	14.73	2.72	0.99	19.86	8.46	2.91
1700.0	23.08	38.29	14.57	13.38	2.70	0.97	19.53	8.24	2.90
1800.0	22.86	39.02	17.01	13.79	3.07	0.96	19.75	8.46	2.95
1900.0	22.66	39.23	19.97	13.60	3.24	0.95	19.61	8.30	2.96
2000.0	22.37	39.66	25.17	13.51	3.55	0.94	19.24	8.02	2.95
2100.0	21.95	40.44	29.45	12.93	4.05	0.94	19.69	8.40	2.98
2200.0	21.48	41.25	21.44	12.85	4.65	0.94	19.31	8.07	3.03
2300.0	20.94	42.37	16.86	12.87	5.55	0.96	19.83	8.54	3.06
2400.0	20.30	43.93	13.78	12.70	6.96	0.98	20.26	8.99	3.14
2500.0	19.58	45.11	11.71	12.24	8.37	0.99	20.38	8.85	3.22
2600.0	18.70	46.49	9.96	11.87	10.39	1.02	20.78	9.20	3.33
2700.0	18.02	49.42	8.71	12.03	15.15	1.06	20.90	9.36	3.43
2800.0	17.10	49.73	7.71	11.63	16.60	1.09	21.12	9.45	3.42
2900.0	16.04	46.47	6.77	10.96	12.07	1.11	21.04	9.33	3.56
3000.0	14.84	43.86	5.50	9.95	9.15	1.15	21.09	9.17	3.64
3100.0	14.22	43.75	5.06	10.00	9.26	1.18	21.33	9.40	3.71
3200.0	13.16	40.57	4.36	9.20	6.53	1.20	21.26	8.87	3.90
3300.0	12.50	40.24	3.54	8.91	5.96	1.25	21.28	8.66	3.96
3400.0	12.03	41.45	3.13	8.97	6.69	1.29	21.49	9.16	4.08
3500.0	11.46	43.27	2.92	8.98	8.39	1.32	21.52	9.15	4.25
3600.0	10.76	42.75	2.62	8.68	7.85	1.33	21.71	9.55	4.38
3700.0	10.15	43.82	2.42	8.57	8.98	1.35	22.08	9.67	4.49
3800.0	9.52	45.37	2.26	8.42	10.89	1.36	22.44	10.04	4.62
3900.0	8.82	45.95	2.12	8.14	11.86	1.36	22.70	10.34	4.82
4000.0	8.19	46.68	1.99	7.91	13.11	1.36	22.98	10.26	4.85

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.00V, Id = 29.89mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
500.0	16.49	35.06	7.03	8.30	2.97	1.00	21.89	10.78	4.24
600.0	18.36	35.31	8.97	10.92	2.96	1.00	23.33	11.55	4.20
700.0	19.54	35.71	11.18	13.29	2.97	0.98	23.03	11.66	4.09
800.0	20.31	36.10	13.15	15.15	2.95	0.98	22.80	11.31	4.06
900.0	20.79	36.41	14.14	16.21	2.92	0.98	22.61	11.10	4.06
1000.0	21.13	36.67	13.98	16.59	2.88	0.99	21.65	10.54	4.02
1100.0	21.34	36.80	13.35	16.63	2.83	1.00	21.65	10.31	4.08
1200.0	21.47	36.89	12.67	16.41	2.78	1.01	21.10	9.87	4.14
1300.0	21.52	36.98	12.32	15.91	2.76	1.02	21.02	9.48	4.12
1400.0	21.58	37.24	12.37	15.60	2.82	1.01	20.79	9.44	4.18
1500.0	21.53	37.20	12.66	15.47	2.83	1.01	20.39	9.18	4.20
1600.0	21.46	37.33	13.53	15.33	2.93	1.00	20.34	9.12	4.24
1700.0	21.32	37.42	14.79	14.65	3.02	0.98	20.13	8.96	4.25
1800.0	21.13	37.89	17.28	14.63	3.31	0.97	20.21	9.03	4.33
1900.0	20.82	38.22	21.22	14.76	3.61	0.96	20.10	8.95	4.33
2000.0	20.47	38.63	28.72	14.55	3.95	0.95	19.85	8.74	4.32
2100.0	20.02	39.15	27.91	14.11	4.40	0.95	20.07	9.02	4.40
2200.0	19.46	39.98	19.98	14.07	5.12	0.96	19.89	8.85	4.47
2300.0	18.89	40.99	15.73	13.97	6.03	0.97	20.31	9.12	4.50
2400.0	18.22	42.42	13.02	13.85	7.46	1.00	20.61	9.57	4.60
2500.0	17.47	43.45	11.05	13.35	8.84	1.02	20.80	9.42	4.70
2600.0	16.50	44.70	9.39	12.76	10.86	1.05	21.07	9.52	4.84
2700.0	15.85	47.49	8.32	12.92	15.53	1.08	21.29	9.82	4.93
2800.0	14.92	48.08	7.36	12.30	17.54	1.11	21.52	9.86	4.97
2900.0	13.86	45.46	6.47	11.43	13.72	1.13	21.23	9.65	5.12
3000.0	12.80	43.16	5.49	10.73	10.89	1.17	21.24	9.40	5.23
3100.0	12.26	44.41	4.89	10.89	12.61	1.21	21.39	9.51	5.31
3200.0	11.29	41.07	4.27	10.14	8.76	1.24	21.50	9.27	5.55
3300.0	10.68	40.65	3.65	9.91	8.12	1.28	21.59	9.02	5.62
3400.0	10.15	41.66	3.29	9.94	9.09	1.31	22.01	9.53	5.80
3500.0	9.56	43.30	3.05	9.91	11.15	1.34	22.06	9.66	5.93
3600.0	8.88	43.50	2.84	9.60	11.63	1.35	22.17	9.87	6.13
3700.0	8.23	43.86	2.64	9.38	12.32	1.36	22.45	10.06	6.26
3800.0	7.61	45.34	2.49	9.18	14.95	1.37	22.88	10.33	6.44
3900.0	6.95	45.93	2.37	8.90	16.45	1.37	23.10	10.62	6.65
4000.0	6.32	47.32	2.26	8.66	19.85	1.37	23.31	10.55	6.67

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 3.90V, Id = 28.72mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
500.0	16.24	35.24	7.01	8.24	3.11	1.00	21.31	10.09	4.22
600.0	18.07	35.49	8.94	10.69	3.10	0.99	22.62	10.84	4.26
700.0	19.21	35.86	11.13	12.73	3.11	0.98	22.37	10.93	4.13
800.0	19.96	36.19	13.03	14.17	3.08	0.97	21.99	10.54	4.07
900.0	20.41	36.44	13.98	14.92	3.03	0.98	21.83	10.40	4.06
1000.0	20.72	36.60	13.85	15.18	2.96	0.99	20.92	9.83	4.04
1100.0	20.92	36.65	13.29	15.24	2.89	1.00	20.94	9.63	4.07
1200.0	21.04	36.62	12.67	15.11	2.81	1.01	20.42	9.23	4.14
1300.0	21.08	36.63	12.34	14.70	2.77	1.01	20.35	8.86	4.14
1400.0	21.13	36.79	12.40	14.39	2.79	1.01	20.20	8.81	4.17
1500.0	21.08	36.65	12.69	14.23	2.77	1.00	19.73	8.57	4.20
1600.0	21.01	36.66	13.54	14.01	2.82	0.99	19.76	8.47	4.21
1700.0	20.88	36.67	14.75	13.32	2.88	0.97	19.52	8.35	4.26
1800.0	20.71	37.04	17.12	13.14	3.11	0.96	19.52	8.40	4.33
1900.0	20.42	37.16	20.88	13.11	3.30	0.94	19.42	8.30	4.34
2000.0	20.09	37.44	28.07	12.79	3.54	0.93	19.20	8.06	4.33
2100.0	19.67	37.87	29.36	12.32	3.89	0.93	19.43	8.33	4.41
2200.0	19.14	38.43	20.62	12.16	4.37	0.93	19.18	8.18	4.46
2300.0	18.59	39.20	16.08	11.97	4.98	0.94	19.55	8.44	4.50
2400.0	17.95	40.24	13.24	11.79	5.88	0.96	19.88	8.89	4.59
2500.0	17.21	40.95	11.18	11.35	6.68	0.98	20.04	8.72	4.70
2600.0	16.27	41.92	9.46	10.90	7.93	1.01	20.25	8.81	4.87
2700.0	15.62	43.89	8.32	10.99	10.29	1.05	20.51	9.10	4.93
2800.0	14.69	44.83	7.34	10.49	12.04	1.07	20.70	9.15	5.00
2900.0	13.63	43.84	6.42	9.85	11.34	1.09	20.43	8.94	5.15
3000.0	12.59	42.14	5.44	9.42	9.63	1.13	20.42	8.72	5.24
3100.0	12.04	43.28	4.83	9.58	11.00	1.18	20.59	8.83	5.31
3200.0	11.07	40.69	4.20	9.01	8.33	1.20	20.68	8.58	5.59
3300.0	10.45	40.14	3.58	8.91	7.62	1.24	20.81	8.33	5.66
3400.0	9.89	40.95	3.22	8.96	8.35	1.28	21.18	8.85	5.80
3500.0	9.27	42.37	2.99	8.89	9.99	1.30	21.26	8.97	5.97
3600.0	8.55	42.75	2.77	8.59	10.62	1.31	21.40	9.18	6.15
3700.0	7.87	43.10	2.57	8.38	11.27	1.32	21.66	9.34	6.30
3800.0	7.21	44.41	2.43	8.17	13.41	1.32	22.08	9.60	6.46
3900.0	6.52	45.09	2.30	7.90	14.90	1.32	22.21	9.86	6.72
4000.0	5.84	46.37	2.20	7.65	17.76	1.32	22.53	9.79	6.74

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.25V, Id = 30.09mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
500.0	16.54	35.01	7.04	8.32	2.94	1.00	21.95	10.88	4.20
600.0	18.41	35.26	8.96	10.98	2.93	1.00	23.50	11.70	4.21
700.0	19.60	35.66	11.17	13.44	2.94	0.98	23.20	11.79	4.10
800.0	20.38	36.05	13.16	15.42	2.92	0.98	22.94	11.42	4.05
900.0	20.86	36.39	14.16	16.57	2.90	0.98	22.85	11.23	4.05
1000.0	21.20	36.67	13.98	16.98	2.87	0.99	21.74	10.64	4.01
1100.0	21.42	36.82	13.35	17.02	2.81	1.00	21.86	10.42	4.07
1200.0	21.55	36.94	12.66	16.78	2.77	1.01	21.22	9.99	4.11
1300.0	21.61	37.04	12.30	16.24	2.76	1.02	21.21	9.59	4.08
1400.0	21.67	37.34	12.35	15.94	2.83	1.02	20.91	9.54	4.15
1500.0	21.62	37.33	12.65	15.82	2.85	1.01	20.47	9.27	4.19
1600.0	21.54	37.47	13.52	15.70	2.96	1.00	20.47	9.21	4.22
1700.0	21.40	37.59	14.82	15.05	3.07	0.99	20.31	9.06	4.25
1800.0	21.21	38.06	17.34	15.05	3.36	0.97	20.25	9.17	4.30
1900.0	20.89	38.45	21.37	15.26	3.69	0.96	20.23	9.05	4.33
2000.0	20.53	38.90	29.05	15.08	4.07	0.96	19.91	8.85	4.35
2100.0	20.08	39.52	27.49	14.68	4.58	0.95	20.27	9.11	4.37
2200.0	19.50	40.37	19.83	14.66	5.34	0.96	20.03	8.96	4.47
2300.0	18.92	41.44	15.64	14.59	6.34	0.98	20.40	9.25	4.49
2400.0	18.26	42.97	12.97	14.47	7.94	1.00	20.76	9.71	4.59
2500.0	17.50	44.09	11.02	13.95	9.52	1.03	20.90	9.55	4.69
2600.0	16.53	45.42	9.37	13.29	11.81	1.06	21.17	9.67	4.84
2700.0	15.89	48.57	8.30	13.49	17.61	1.09	21.40	9.94	4.93
2800.0	14.95	48.92	7.35	12.82	19.37	1.12	21.62	9.98	4.97
2900.0	13.88	45.74	6.48	11.88	14.23	1.14	21.38	9.77	5.11
3000.0	12.82	43.35	5.49	11.09	11.16	1.18	21.35	9.53	5.20
3100.0	12.29	44.61	4.90	11.24	12.95	1.22	21.47	9.64	5.30
3200.0	11.32	41.14	4.28	10.44	8.85	1.25	21.65	9.40	5.52
3300.0	10.71	40.74	3.66	10.17	8.23	1.29	21.72	9.12	5.58
3400.0	10.18	41.82	3.30	10.19	9.28	1.32	22.14	9.66	5.76
3500.0	9.60	43.50	3.06	10.17	11.43	1.35	22.26	9.79	5.93
3600.0	8.92	43.64	2.85	9.86	11.84	1.36	22.35	10.00	6.09
3700.0	8.28	44.06	2.65	9.64	12.63	1.37	22.70	10.17	6.25
3800.0	7.67	45.53	2.50	9.44	15.31	1.38	23.05	10.46	6.39
3900.0	7.03	46.17	2.38	9.17	16.96	1.38	23.20	10.73	6.62
4000.0	6.40	47.58	2.27	8.92	20.49	1.39	23.43	10.69	6.69



## Typical Performance Data

**NOTE: Use PDF Bookmarks to view DATA at required conditions**

**Definitions:**

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 2.80V, Id = 24.97mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
500.0	16.21	35.53	6.94	8.20	3.20	1.00	19.86	8.72	3.67
600.0	17.97	35.83	9.02	10.45	3.25	0.99	21.00	9.30	3.72
700.0	19.05	36.18	11.28	12.17	3.26	0.97	20.59	9.24	3.55
800.0	19.74	36.42	13.26	13.19	3.21	0.96	20.29	8.83	3.50
900.0	20.16	36.53	14.27	13.67	3.13	0.96	20.14	8.62	3.53
1000.0	20.45	36.60	14.17	13.77	3.03	0.97	19.26	8.07	3.50
1100.0	20.63	36.49	13.68	13.80	2.91	0.98	19.23	7.86	3.49
1200.0	20.72	36.37	13.03	13.62	2.81	0.99	18.80	7.46	3.59
1300.0	20.78	36.24	12.78	13.32	2.72	0.99	18.78	7.02	3.53
1400.0	20.81	36.17	12.80	13.00	2.68	0.99	18.48	7.01	3.60
1500.0	20.80	36.08	13.07	12.64	2.65	0.98	18.05	6.70	3.63
1600.0	20.74	35.94	13.87	12.33	2.64	0.97	18.07	6.60	3.71
1700.0	20.65	36.05	15.10	11.49	2.69	0.94	17.83	6.41	3.68
1800.0	20.45	36.02	17.26	11.44	2.78	0.93	17.90	6.49	3.77
1900.0	20.25	35.98	20.49	11.09	2.85	0.91	17.72	6.34	3.75
2000.0	19.97	36.03	27.09	10.72	2.97	0.90	17.43	6.03	3.74
2100.0	19.58	36.41	33.84	10.25	3.22	0.88	17.69	6.29	3.80
2200.0	19.14	36.84	21.82	10.06	3.52	0.88	17.34	6.09	3.89
2300.0	18.66	37.19	16.89	9.79	3.81	0.89	17.73	6.37	3.89
2400.0	18.06	37.87	13.64	9.54	4.28	0.90	17.97	6.81	4.00
2500.0	17.36	38.44	11.39	9.17	4.75	0.92	18.15	6.65	4.11
2600.0	16.50	39.14	9.55	8.90	5.40	0.94	18.40	6.83	4.25
2700.0	15.82	40.54	8.31	8.87	6.55	0.98	18.55	7.12	4.33
2800.0	14.90	41.42	7.25	8.48	7.57	1.00	18.72	7.20	4.36
2900.0	13.84	41.47	6.31	8.04	7.97	1.02	18.53	7.04	4.50
3000.0	12.83	40.31	5.26	7.81	7.15	1.06	18.54	6.88	4.57
3100.0	12.14	41.35	4.70	7.80	8.18	1.10	18.70	7.05	4.72
3200.0	11.14	39.69	4.02	7.42	6.83	1.13	18.71	6.73	4.96
3300.0	10.52	39.17	3.38	7.44	6.25	1.18	18.96	6.53	5.01
3400.0	9.91	39.91	3.01	7.45	6.77	1.21	19.19	7.12	5.17
3500.0	9.21	41.12	2.80	7.32	7.93	1.23	19.26	7.22	5.31
3600.0	8.47	41.39	2.55	7.08	8.22	1.24	19.39	7.60	5.53
3700.0	7.74	42.10	2.37	6.91	9.07	1.25	19.75	7.80	5.68
3800.0	7.01	43.13	2.23	6.70	10.44	1.25	20.08	8.13	5.82
3900.0	6.25	43.80	2.11	6.46	11.58	1.24	20.25	8.45	6.12
4000.0	5.52	44.49	1.99	6.25	12.85	1.24	20.57	8.35	6.12

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 2.55V, Id = 24.72mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
500.0	16.07	35.59	6.93	8.17	3.27	1.00	19.57	8.37	3.69
600.0	17.81	35.89	9.00	10.35	3.32	0.99	20.63	8.93	3.73
700.0	18.88	36.21	11.26	11.96	3.32	0.97	20.34	8.92	3.62
800.0	19.55	36.42	13.19	12.87	3.26	0.96	19.96	8.47	3.56
900.0	19.96	36.50	14.18	13.30	3.17	0.96	19.89	8.30	3.53
1000.0	20.23	36.54	14.10	13.38	3.07	0.97	18.94	7.75	3.51
1100.0	20.41	36.38	13.65	13.43	2.94	0.98	18.99	7.53	3.53
1200.0	20.49	36.22	13.04	13.28	2.82	0.98	18.45	7.14	3.54
1300.0	20.55	36.06	12.80	13.00	2.73	0.99	18.54	6.72	3.56
1400.0	20.57	35.98	12.86	12.68	2.68	0.98	18.26	6.68	3.61
1500.0	20.55	35.84	13.14	12.33	2.64	0.97	17.80	6.38	3.63
1600.0	20.49	35.68	13.94	12.02	2.62	0.96	17.73	6.29	3.70
1700.0	20.41	35.84	15.17	11.18	2.68	0.94	17.52	6.09	3.68
1800.0	20.20	35.71	17.41	11.14	2.75	0.92	17.61	6.16	3.78
1900.0	20.01	35.63	20.63	10.77	2.80	0.91	17.49	5.98	3.77
2000.0	19.74	35.65	27.53	10.39	2.90	0.89	17.16	5.68	3.77
2100.0	19.35	35.97	33.88	9.92	3.12	0.88	17.40	5.94	3.84
2200.0	18.93	36.36	21.70	9.70	3.39	0.87	17.10	5.71	3.89
2300.0	18.44	36.66	16.79	9.42	3.64	0.88	17.43	5.96	3.90
2400.0	17.85	37.28	13.55	9.16	4.06	0.89	17.66	6.43	3.99
2500.0	17.16	37.84	11.29	8.79	4.49	0.91	17.84	6.25	4.12
2600.0	16.30	38.49	9.46	8.51	5.06	0.93	18.04	6.45	4.24
2700.0	15.62	39.81	8.23	8.48	6.08	0.97	18.24	6.72	4.34
2800.0	14.69	40.65	7.16	8.11	6.98	0.99	18.37	6.81	4.42
2900.0	13.64	40.80	6.22	7.70	7.42	1.01	18.18	6.66	4.53
3000.0	12.63	39.84	5.19	7.50	6.80	1.05	18.18	6.48	4.62
3100.0	11.93	40.87	4.63	7.48	7.77	1.09	18.37	6.69	4.74
3200.0	10.94	39.41	3.95	7.13	6.63	1.11	18.35	6.33	4.95
3300.0	10.30	38.85	3.33	7.15	6.06	1.16	18.60	6.15	5.06
3400.0	9.68	39.60	2.96	7.15	6.54	1.20	18.83	6.76	5.21
3500.0	8.96	40.78	2.75	7.02	7.65	1.21	18.86	6.86	5.40
3600.0	8.21	41.08	2.50	6.79	7.96	1.22	19.04	7.25	5.58
3700.0	7.47	41.76	2.32	6.62	8.75	1.23	19.39	7.42	5.67
3800.0	6.72	42.83	2.19	6.42	10.13	1.23	19.68	7.78	5.91
3900.0	5.95	43.50	2.07	6.19	11.26	1.22	19.86	8.11	6.12
4000.0	5.21	44.34	1.96	5.98	12.70	1.21	20.16	8.02	6.13



## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 3.00V, Id = 25.02mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
500.0	16.33	35.48	6.95	8.22	3.15	1.00	20.09	8.96	3.67
600.0	18.11	35.79	9.03	10.55	3.19	0.99	21.21	9.51	3.73
700.0	19.20	36.15	11.32	12.36	3.20	0.97	20.97	9.47	3.58
800.0	19.90	36.42	13.33	13.46	3.16	0.96	20.56	9.04	3.52
900.0	20.34	36.56	14.36	13.99	3.09	0.97	20.48	8.84	3.52
1000.0	20.63	36.66	14.24	14.10	3.01	0.97	19.50	8.26	3.48
1100.0	20.82	36.56	13.73	14.14	2.88	0.98	19.55	8.07	3.52
1200.0	20.91	36.48	13.04	13.94	2.79	0.99	18.95	7.63	3.57
1300.0	20.98	36.36	12.76	13.61	2.70	0.99	19.03	7.23	3.54
1400.0	21.01	36.34	12.78	13.27	2.68	0.99	18.70	7.18	3.59
1500.0	21.00	36.24	13.04	12.90	2.64	0.98	18.24	6.86	3.62
1600.0	20.95	36.15	13.81	12.58	2.65	0.97	18.23	6.78	3.66
1700.0	20.87	36.35	14.99	11.67	2.72	0.95	17.98	6.57	3.69
1800.0	20.66	36.31	17.19	11.70	2.82	0.93	18.12	6.68	3.74
1900.0	20.46	36.27	20.37	11.35	2.89	0.92	17.91	6.52	3.75
2000.0	20.18	36.35	26.63	10.99	3.02	0.90	17.65	6.21	3.78
2100.0	19.79	36.75	33.55	10.54	3.29	0.89	17.85	6.50	3.79
2200.0	19.35	37.23	21.95	10.36	3.62	0.89	17.55	6.25	3.86
2300.0	18.85	37.61	17.00	10.12	3.93	0.90	17.92	6.57	3.87
2400.0	18.25	38.35	13.74	9.88	4.46	0.91	18.19	7.03	3.98
2500.0	17.55	38.97	11.46	9.52	4.99	0.93	18.36	6.86	4.10
2600.0	16.69	39.67	9.63	9.22	5.67	0.96	18.60	7.07	4.25
2700.0	16.01	41.22	8.39	9.22	7.01	0.99	18.79	7.34	4.32
2800.0	15.09	42.10	7.33	8.82	8.11	1.01	18.96	7.42	4.35
2900.0	14.03	42.01	6.39	8.34	8.42	1.04	18.76	7.26	4.48
3000.0	13.01	40.75	5.32	8.07	7.46	1.08	18.79	7.12	4.58
3100.0	12.33	41.75	4.76	8.07	8.50	1.11	18.96	7.29	4.67
3200.0	11.34	39.90	4.08	7.65	6.95	1.14	18.96	6.93	4.89
3300.0	10.71	39.35	3.42	7.65	6.34	1.19	19.16	6.73	5.01
3400.0	10.12	40.14	3.05	7.67	6.89	1.22	19.43	7.32	5.14
3500.0	9.43	41.37	2.83	7.55	8.08	1.24	19.43	7.41	5.33
3600.0	8.70	41.59	2.58	7.30	8.34	1.25	19.67	7.78	5.51
3700.0	7.98	42.36	2.39	7.13	9.25	1.26	19.99	7.94	5.65
3800.0	7.27	43.43	2.25	6.93	10.68	1.26	20.32	8.31	5.81
3900.0	6.52	44.08	2.13	6.68	11.82	1.26	20.52	8.62	6.07
4000.0	5.80	44.82	2.02	6.47	13.21	1.25	20.76	8.52	6.05

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 2.80V, Id = 23.19mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
500.0	16.78	35.79	6.89	8.10	3.07	1.00	19.80	8.82	3.05
600.0	18.52	36.19	9.05	10.22	3.17	0.98	20.98	9.39	3.44
700.0	19.59	36.61	11.33	11.81	3.21	0.96	20.55	9.35	2.94
800.0	20.30	36.88	13.45	12.84	3.17	0.96	20.19	8.89	2.93
900.0	20.75	37.00	14.76	13.36	3.09	0.96	20.03	8.71	2.90
1000.0	21.05	37.12	14.68	13.39	3.01	0.96	19.11	8.10	2.88
1100.0	21.28	37.00	14.21	13.46	2.87	0.97	19.12	7.92	2.91
1200.0	21.41	36.87	13.50	13.37	2.76	0.98	18.48	7.43	2.96
1300.0	21.52	36.73	13.14	13.11	2.66	0.98	18.62	7.02	2.94
1400.0	21.59	36.64	13.13	12.68	2.59	0.98	18.29	6.97	2.98
1500.0	21.61	36.56	13.35	12.19	2.55	0.97	17.85	6.59	3.00
1600.0	21.59	36.43	13.99	11.89	2.52	0.96	17.80	6.50	3.03
1700.0	21.57	36.41	14.77	10.85	2.49	0.93	17.53	6.24	3.04
1800.0	21.38	36.54	17.03	10.89	2.63	0.92	17.70	6.39	3.12
1900.0	21.23	36.44	19.90	10.54	2.66	0.90	17.52	6.20	3.07
2000.0	20.99	36.44	25.23	10.23	2.74	0.89	17.19	5.87	3.08
2100.0	20.64	36.82	35.18	9.65	2.95	0.87	17.43	6.17	3.11
2200.0	20.24	37.21	22.84	9.40	3.20	0.86	17.02	5.85	3.20
2300.0	19.78	37.57	17.53	9.13	3.46	0.87	17.52	6.22	3.19
2400.0	19.20	38.26	14.11	8.83	3.87	0.87	17.70	6.64	3.28
2500.0	18.52	38.82	11.79	8.45	4.29	0.89	17.91	6.49	3.38
2600.0	17.71	39.47	9.93	8.18	4.83	0.91	18.18	6.77	3.49
2700.0	17.03	40.77	8.56	8.15	5.78	0.94	18.29	7.01	3.56
2800.0	16.12	41.67	7.46	7.87	6.69	0.97	18.46	7.08	3.59
2900.0	15.07	41.83	6.46	7.51	7.12	0.99	18.32	6.96	3.71
3000.0	13.95	40.43	5.24	7.21	6.21	1.03	18.35	6.78	3.80
3100.0	13.27	41.54	4.74	7.18	7.17	1.06	18.55	7.04	3.87
3200.0	12.21	39.80	4.04	6.78	5.95	1.08	18.49	6.55	4.07
3300.0	11.55	39.04	3.27	6.80	5.21	1.14	18.62	6.33	4.18
3400.0	10.99	39.77	2.88	6.86	5.58	1.18	18.79	6.91	4.28
3500.0	10.31	41.23	2.67	6.77	6.68	1.20	18.84	6.94	4.47
3600.0	9.53	41.14	2.39	6.53	6.59	1.21	19.01	7.39	4.59
3700.0	8.81	41.93	2.20	6.39	7.29	1.22	19.38	7.52	4.73
3800.0	8.06	43.18	2.05	6.21	8.53	1.22	19.72	7.93	4.92
3900.0	7.27	43.96	1.92	5.96	9.49	1.21	19.92	8.27	5.16
4000.0	6.52	44.70	1.81	5.74	10.51	1.21	20.29	8.21	5.12

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 2.55V, Id = 23.58mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
500.0	16.54	35.82	6.86	8.09	3.15	1.00	19.40	8.51	2.97
600.0	18.26	36.20	9.00	10.13	3.25	0.98	20.51	9.11	3.41
700.0	19.32	36.59	11.24	11.60	3.29	0.96	20.13	9.05	2.91
800.0	20.00	36.82	13.28	12.54	3.24	0.95	19.81	8.62	2.85
900.0	20.44	36.90	14.54	13.01	3.15	0.95	19.66	8.44	2.87
1000.0	20.73	36.96	14.46	13.09	3.05	0.96	18.67	7.86	2.85
1100.0	20.95	36.83	14.07	13.12	2.91	0.97	18.75	7.64	2.85
1200.0	21.07	36.66	13.42	13.05	2.79	0.98	18.22	7.17	2.90
1300.0	21.17	36.50	13.09	12.82	2.68	0.98	18.24	6.78	2.88
1400.0	21.22	36.37	13.11	12.43	2.61	0.97	17.98	6.74	2.93
1500.0	21.24	36.25	13.35	11.97	2.56	0.97	17.52	6.40	2.93
1600.0	21.21	36.10	14.03	11.67	2.53	0.95	17.53	6.28	2.95
1700.0	21.18	36.01	14.82	10.75	2.48	0.93	17.23	6.13	2.98
1800.0	21.00	36.14	17.13	10.68	2.61	0.92	17.40	6.17	3.03
1900.0	20.84	36.02	20.03	10.34	2.64	0.90	17.14	5.95	3.03
2000.0	20.61	35.99	25.67	10.02	2.71	0.88	16.81	5.64	3.05
2100.0	20.26	36.31	36.94	9.42	2.89	0.86	17.06	5.90	3.08
2200.0	19.87	36.61	22.71	9.14	3.10	0.85	16.71	5.61	3.13
2300.0	19.42	36.99	17.43	8.88	3.34	0.86	17.07	5.96	3.13
2400.0	18.84	37.63	14.01	8.57	3.73	0.87	17.31	6.35	3.21
2500.0	18.18	38.14	11.70	8.18	4.08	0.88	17.50	6.18	3.31
2600.0	17.37	38.77	9.84	7.92	4.59	0.90	17.70	6.45	3.44
2700.0	16.69	39.94	8.47	7.86	5.40	0.93	17.82	6.66	3.52
2800.0	15.79	40.84	7.35	7.59	6.23	0.96	17.98	6.75	3.56
2900.0	14.75	41.16	6.36	7.25	6.74	0.98	17.83	6.62	3.67
3000.0	13.64	39.93	5.17	6.99	5.99	1.02	17.85	6.45	3.77
3100.0	12.94	41.06	4.66	6.94	6.92	1.05	18.03	6.69	3.84
3200.0	11.89	39.54	3.97	6.58	5.88	1.07	18.03	6.20	4.07
3300.0	11.22	38.77	3.22	6.60	5.16	1.13	18.12	5.98	4.12
3400.0	10.65	39.49	2.83	6.65	5.51	1.17	18.29	6.56	4.27
3500.0	9.95	40.88	2.63	6.55	6.56	1.18	18.35	6.63	4.44
3600.0	9.16	40.85	2.35	6.32	6.50	1.20	18.52	7.04	4.59
3700.0	8.43	41.63	2.16	6.18	7.18	1.20	18.93	7.20	4.70
3800.0	7.67	42.82	2.02	5.99	8.35	1.20	19.27	7.61	4.84
3900.0	6.86	43.63	1.89	5.75	9.33	1.20	19.39	7.93	5.16
4000.0	6.11	44.40	1.78	5.54	10.37	1.19	19.78	7.87	5.12

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 3.00V, Id = 24.57mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
500.0	16.88	35.71	6.90	8.13	3.01	1.00	20.11	9.06	2.99
600.0	18.64	36.11	9.06	10.33	3.10	0.98	21.17	9.65	3.43
700.0	19.72	36.55	11.34	12.03	3.15	0.97	20.84	9.59	2.90
800.0	20.44	36.84	13.50	13.16	3.12	0.96	20.46	9.16	2.83
900.0	20.90	36.99	14.83	13.73	3.05	0.96	20.26	8.98	2.83
1000.0	21.20	37.14	14.72	13.78	2.98	0.97	19.30	8.36	2.81
1100.0	21.44	37.06	14.21	13.84	2.85	0.97	19.36	8.15	2.82
1200.0	21.58	36.96	13.53	13.74	2.74	0.98	18.76	7.69	2.88
1300.0	21.69	36.83	13.09	13.46	2.65	0.98	18.83	7.26	2.84
1400.0	21.76	36.79	13.08	13.01	2.59	0.98	18.50	7.21	2.89
1500.0	21.78	36.72	13.29	12.52	2.55	0.97	18.03	6.83	2.90
1600.0	21.77	36.62	13.92	12.21	2.54	0.96	18.09	6.74	2.95
1700.0	21.73	36.55	14.70	11.19	2.50	0.94	17.77	6.47	2.99
1800.0	21.56	36.78	16.92	11.18	2.66	0.93	17.91	6.65	3.01
1900.0	21.39	36.71	19.73	10.86	2.70	0.91	17.67	6.48	3.01
2000.0	21.16	36.76	24.83	10.57	2.81	0.89	17.35	6.14	3.02
2100.0	20.80	37.15	34.34	9.97	3.03	0.88	17.66	6.42	3.05
2200.0	20.40	37.55	23.07	9.73	3.29	0.87	17.30	6.10	3.10
2300.0	19.93	38.00	17.61	9.49	3.60	0.88	17.75	6.50	3.10
2400.0	19.34	38.77	14.18	9.21	4.08	0.89	18.00	6.91	3.21
2500.0	18.67	39.35	11.87	8.82	4.53	0.90	18.19	6.77	3.29
2600.0	17.85	40.05	10.01	8.56	5.15	0.92	18.42	7.05	3.42
2700.0	17.17	41.44	8.63	8.54	6.22	0.96	18.54	7.27	3.50
2800.0	16.26	42.37	7.54	8.25	7.25	0.98	18.75	7.33	3.52
2900.0	15.22	42.45	6.53	7.86	7.66	1.01	18.59	7.23	3.64
3000.0	14.09	40.87	5.31	7.51	6.54	1.05	18.61	7.07	3.72
3100.0	13.42	41.92	4.80	7.49	7.51	1.08	18.82	7.30	3.79
3200.0	12.36	40.00	4.10	7.06	6.10	1.10	18.80	6.82	4.01
3300.0	11.70	39.22	3.32	7.06	5.33	1.16	18.86	6.59	4.07
3400.0	11.16	40.01	2.93	7.13	5.74	1.20	19.08	7.12	4.21
3500.0	10.49	41.47	2.72	7.04	6.88	1.22	19.09	7.18	4.35
3600.0	9.72	41.34	2.42	6.80	6.73	1.23	19.30	7.62	4.50
3700.0	9.02	42.15	2.23	6.66	7.47	1.24	19.68	7.77	4.68
3800.0	8.29	43.42	2.08	6.47	8.76	1.24	20.02	8.16	4.84
3900.0	7.50	44.21	1.94	6.22	9.75	1.24	20.17	8.51	5.02
4000.0	6.78	44.95	1.83	5.99	10.79	1.23	20.55	8.41	5.00

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 2.80V, Id = 27.76mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
500.0	15.76	35.51	6.96	8.11	3.36	1.00	20.52	9.19	4.30
600.0	17.52	35.76	8.89	10.28	3.36	0.99	21.61	9.87	4.26
700.0	18.60	36.08	11.01	11.87	3.36	0.97	21.39	9.92	4.20
800.0	19.30	36.31	12.81	12.84	3.30	0.96	21.05	9.59	4.13
900.0	19.71	36.42	13.70	13.32	3.22	0.97	20.93	9.42	4.14
1000.0	19.99	36.44	13.65	13.49	3.11	0.97	20.02	8.97	4.09
1100.0	20.16	36.34	13.21	13.57	2.99	0.98	20.07	8.77	4.11
1200.0	20.25	36.18	12.70	13.51	2.87	0.99	19.54	8.42	4.18
1300.0	20.28	36.06	12.46	13.23	2.80	0.99	19.66	8.05	4.18
1400.0	20.31	36.11	12.57	12.94	2.80	0.99	19.36	8.05	4.23
1500.0	20.26	35.84	12.91	12.78	2.74	0.98	18.94	7.81	4.26
1600.0	20.19	35.72	13.78	12.53	2.74	0.97	18.97	7.75	4.29
1700.0	20.07	35.63	14.98	11.87	2.75	0.95	18.71	7.60	4.29
1800.0	19.90	35.83	17.44	11.59	2.91	0.93	18.79	7.60	4.38
1900.0	19.64	35.80	21.27	11.42	3.02	0.92	18.66	7.51	4.39
2000.0	19.34	35.90	29.34	11.02	3.16	0.90	18.37	7.31	4.40
2100.0	18.95	36.20	30.13	10.51	3.39	0.89	18.58	7.50	4.45
2200.0	18.45	36.53	20.65	10.26	3.69	0.89	18.34	7.39	4.51
2300.0	17.92	37.08	16.00	9.99	4.08	0.90	18.70	7.58	4.53
2400.0	17.30	37.79	13.11	9.74	4.62	0.91	18.94	7.98	4.65
2500.0	16.58	38.31	10.99	9.34	5.10	0.93	19.10	7.83	4.76
2600.0	15.66	39.07	9.27	9.00	5.86	0.96	19.29	7.91	4.93
2700.0	15.00	40.42	8.10	8.98	7.06	0.99	19.49	8.19	5.02
2800.0	14.07	41.30	7.09	8.59	8.16	1.01	19.66	8.24	5.09
2900.0	13.00	41.23	6.18	8.15	8.49	1.04	19.43	8.04	5.24
3000.0	11.98	40.33	5.22	7.92	7.88	1.07	19.42	7.79	5.35
3100.0	11.40	41.32	4.62	8.04	8.86	1.12	19.56	7.93	5.41
3200.0	10.43	39.74	4.01	7.65	7.51	1.14	19.66	7.68	5.65
3300.0	9.78	39.20	3.41	7.62	6.90	1.19	19.87	7.43	5.77
3400.0	9.17	39.87	3.07	7.63	7.46	1.22	20.20	7.98	5.92
3500.0	8.49	41.03	2.85	7.53	8.69	1.24	20.23	8.09	6.09
3600.0	7.72	41.60	2.64	7.26	9.44	1.24	20.39	8.28	6.32
3700.0	6.99	41.95	2.45	7.07	10.02	1.25	20.63	8.45	6.47
3800.0	6.27	43.17	2.31	6.86	11.83	1.25	20.97	8.69	6.63
3900.0	5.53	43.84	2.20	6.62	13.16	1.24	21.03	8.91	6.93
4000.0	4.80	44.88	2.10	6.40	15.32	1.24	21.31	8.86	6.94

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 2.55V, Id = 27.51mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
500.0	15.59	35.58	6.93	8.07	3.44	1.00	20.18	8.89	4.32
600.0	17.34	35.82	8.86	10.17	3.45	0.99	21.34	9.55	4.28
700.0	18.40	36.12	10.96	11.67	3.43	0.97	21.08	9.57	4.19
800.0	19.08	36.32	12.71	12.55	3.37	0.96	20.75	9.26	4.14
900.0	19.49	36.40	13.59	12.98	3.27	0.96	20.65	9.15	4.14
1000.0	19.76	36.38	13.56	13.15	3.16	0.97	19.74	8.72	4.10
1100.0	19.92	36.27	13.16	13.22	3.03	0.98	19.86	8.53	4.12
1200.0	20.01	36.05	12.69	13.18	2.90	0.99	19.32	8.18	4.17
1300.0	20.03	35.92	12.48	12.93	2.83	0.99	19.35	7.86	4.17
1400.0	20.06	35.94	12.62	12.67	2.82	0.99	19.14	7.84	4.23
1500.0	20.00	35.65	12.97	12.50	2.75	0.98	18.68	7.62	4.26
1600.0	19.93	35.50	13.84	12.24	2.74	0.97	18.75	7.53	4.31
1700.0	19.81	35.39	15.10	11.60	2.75	0.95	18.49	7.40	4.30
1800.0	19.65	35.56	17.52	11.31	2.89	0.93	18.57	7.41	4.38
1900.0	19.39	35.48	21.46	11.12	2.98	0.91	18.41	7.32	4.41
2000.0	19.09	35.56	29.95	10.71	3.11	0.90	18.17	7.08	4.39
2100.0	18.71	35.81	29.93	10.19	3.32	0.88	18.30	7.30	4.46
2200.0	18.22	36.12	20.50	9.92	3.59	0.88	18.09	7.16	4.55
2300.0	17.70	36.62	15.92	9.64	3.95	0.89	18.43	7.34	4.58
2400.0	17.08	37.30	13.02	9.38	4.43	0.90	18.65	7.74	4.64
2500.0	16.36	37.77	10.91	8.97	4.86	0.92	18.85	7.60	4.79
2600.0	15.44	38.50	9.20	8.65	5.56	0.94	19.05	7.66	4.94
2700.0	14.78	39.75	8.03	8.61	6.61	0.98	19.19	7.93	5.03
2800.0	13.84	40.63	7.03	8.24	7.63	1.00	19.35	7.96	5.11
2900.0	12.78	40.67	6.11	7.84	8.03	1.02	19.10	7.78	5.25
3000.0	11.77	39.92	5.17	7.64	7.58	1.06	19.10	7.55	5.35
3100.0	11.18	40.84	4.56	7.74	8.46	1.11	19.28	7.67	5.44
3200.0	10.20	39.45	3.95	7.38	7.33	1.13	19.35	7.45	5.67
3300.0	9.55	38.96	3.37	7.36	6.78	1.17	19.56	7.19	5.76
3400.0	8.93	39.56	3.03	7.36	7.28	1.21	19.87	7.71	5.95
3500.0	8.23	40.72	2.81	7.26	8.46	1.22	19.93	7.83	6.15
3600.0	7.45	41.34	2.61	6.99	9.26	1.23	20.07	8.02	6.32
3700.0	6.70	41.69	2.42	6.81	9.86	1.23	20.35	8.18	6.47
3800.0	5.97	42.82	2.29	6.61	11.51	1.23	20.62	8.37	6.70
3900.0	5.22	43.53	2.18	6.37	12.87	1.23	20.77	8.65	6.99
4000.0	4.48	44.63	2.08	6.16	15.09	1.22	20.96	8.58	6.96



## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

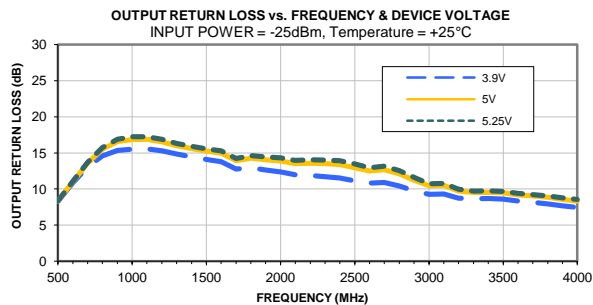
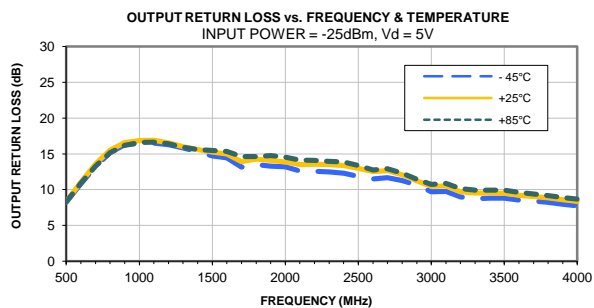
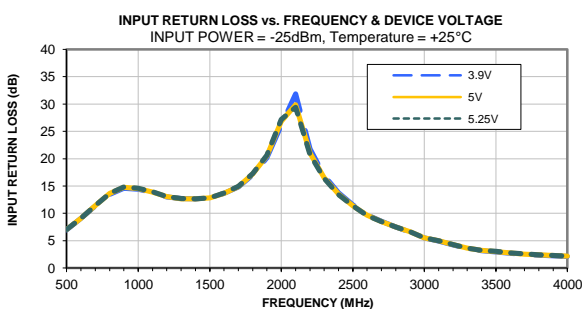
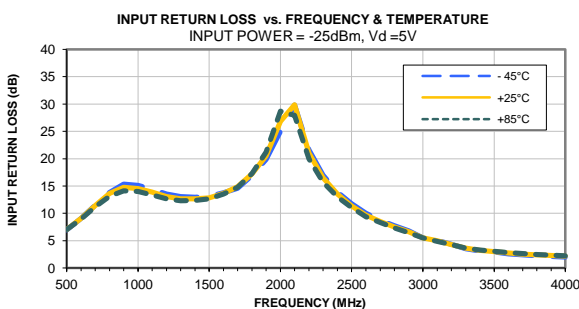
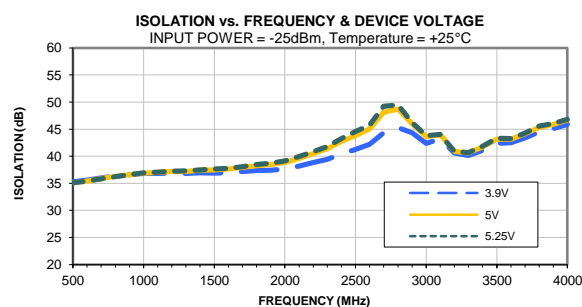
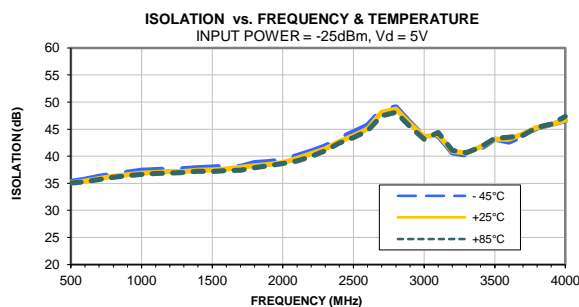
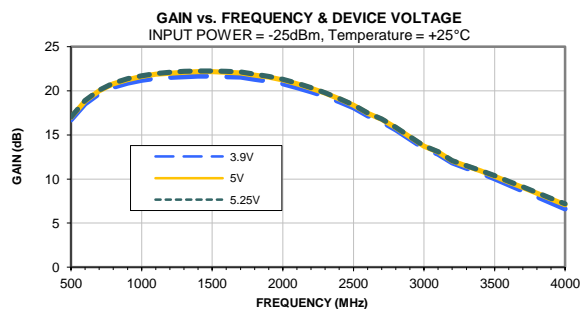
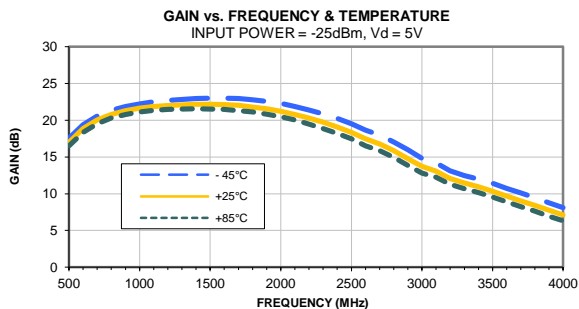
Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 3.00V, Id = 27.94mA @ Temperature = +85°C

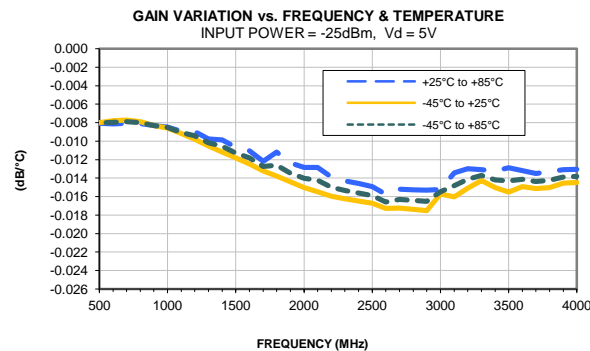
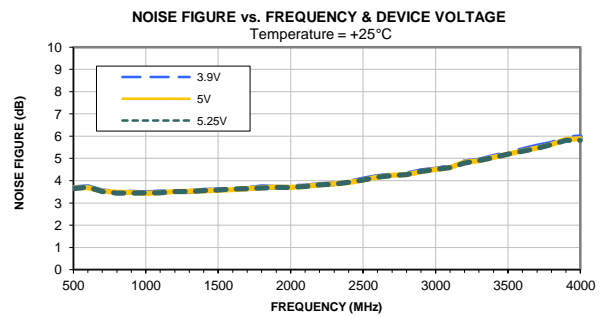
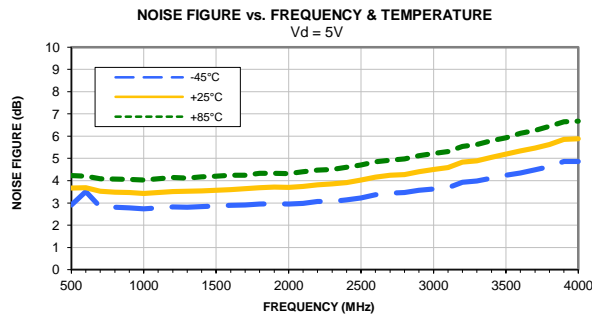
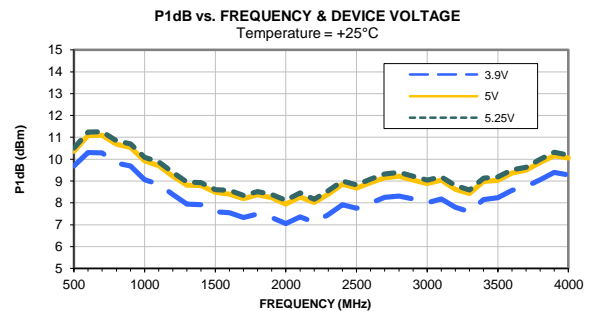
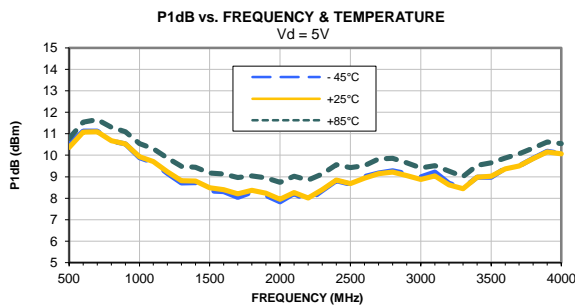
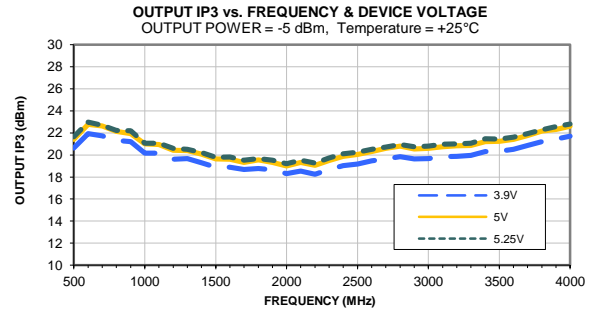
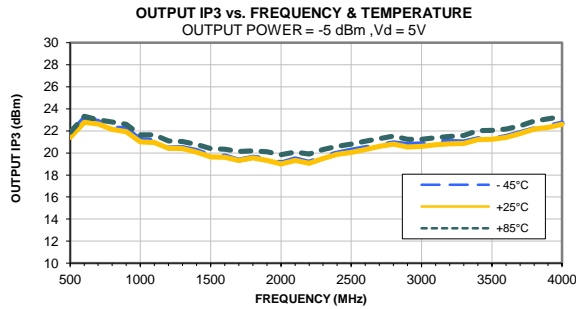
FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
500.0	15.87	35.46	6.97	8.14	3.30	1.00	20.73	9.41	4.28
600.0	17.65	35.71	8.91	10.37	3.31	0.99	21.86	10.08	4.23
700.0	18.74	36.04	11.04	12.05	3.30	0.97	21.59	10.14	4.18
800.0	19.44	36.29	12.86	13.11	3.25	0.97	21.27	9.78	4.12
900.0	19.87	36.42	13.76	13.63	3.17	0.97	21.14	9.63	4.13
1000.0	20.15	36.48	13.69	13.81	3.08	0.98	20.24	9.15	4.07
1100.0	20.33	36.42	13.22	13.88	2.97	0.99	20.31	8.95	4.13
1200.0	20.43	36.27	12.69	13.81	2.86	0.99	19.76	8.59	4.17
1300.0	20.46	36.18	12.44	13.51	2.79	1.00	19.74	8.26	4.14
1400.0	20.49	36.25	12.53	13.22	2.79	0.99	19.51	8.21	4.19
1500.0	20.44	36.01	12.84	13.05	2.74	0.99	19.06	7.98	4.25
1600.0	20.37	35.91	13.70	12.80	2.75	0.98	19.12	7.91	4.30
1700.0	20.25	35.86	14.91	12.13	2.78	0.96	18.90	7.75	4.30
1800.0	20.08	36.08	17.30	11.87	2.94	0.94	18.90	7.79	4.37
1900.0	19.81	36.08	21.08	11.72	3.06	0.92	18.81	7.68	4.37
2000.0	19.51	36.20	28.80	11.33	3.22	0.91	18.56	7.46	4.38
2100.0	19.11	36.51	30.19	10.83	3.47	0.90	18.76	7.67	4.43
2200.0	18.61	36.89	20.72	10.60	3.80	0.90	18.52	7.56	4.49
2300.0	18.08	37.46	16.09	10.34	4.22	0.91	18.85	7.75	4.55
2400.0	17.46	38.24	13.17	10.09	4.81	0.92	19.11	8.17	4.64
2500.0	16.73	38.81	11.07	9.69	5.36	0.94	19.29	8.00	4.76
2600.0	15.80	39.58	9.33	9.33	6.18	0.97	19.48	8.10	4.94
2700.0	15.15	41.06	8.18	9.34	7.55	1.00	19.72	8.40	5.00
2800.0	14.22	41.93	7.16	8.93	8.72	1.03	19.86	8.43	5.08
2900.0	13.16	41.74	6.25	8.46	8.97	1.05	19.63	8.22	5.20
3000.0	12.13	40.70	5.29	8.20	8.20	1.09	19.63	8.00	5.31
3100.0	11.56	41.70	4.68	8.33	9.23	1.13	19.77	8.10	5.39
3200.0	10.59	39.96	4.06	7.91	7.68	1.15	19.86	7.87	5.62
3300.0	9.95	39.40	3.46	7.87	7.05	1.20	20.04	7.60	5.73
3400.0	9.35	40.06	3.10	7.89	7.60	1.23	20.40	8.14	5.93
3500.0	8.68	41.31	2.88	7.80	8.92	1.25	20.44	8.27	6.06
3600.0	7.92	41.86	2.67	7.52	9.68	1.26	20.63	8.48	6.25
3700.0	7.20	42.16	2.47	7.33	10.21	1.26	20.86	8.64	6.43
3800.0	6.50	43.41	2.34	7.11	12.09	1.27	21.22	8.85	6.59
3900.0	5.76	44.05	2.23	6.87	13.42	1.26	21.35	9.15	6.87
4000.0	5.05	45.19	2.12	6.64	15.76	1.26	21.63	9.09	6.85

## Typical Performance Curves

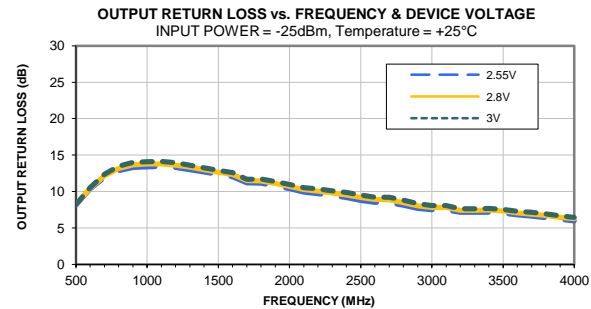
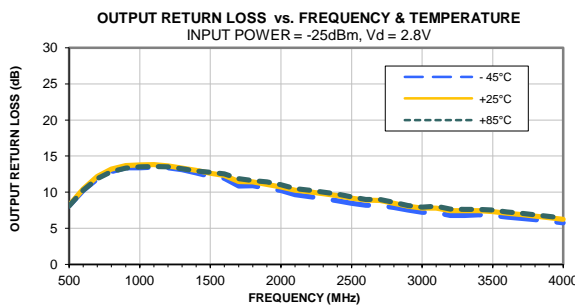
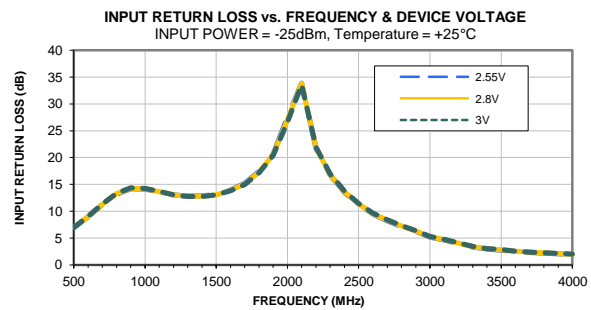
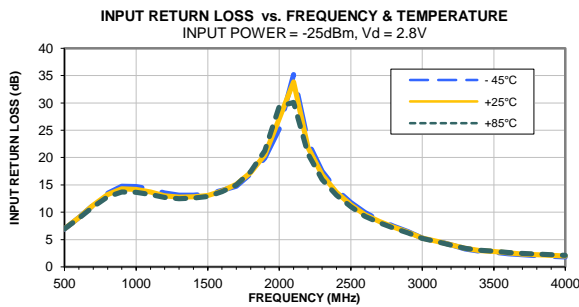
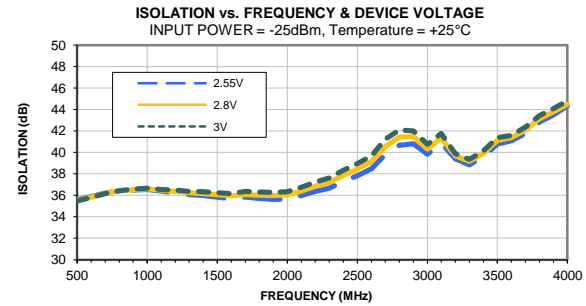
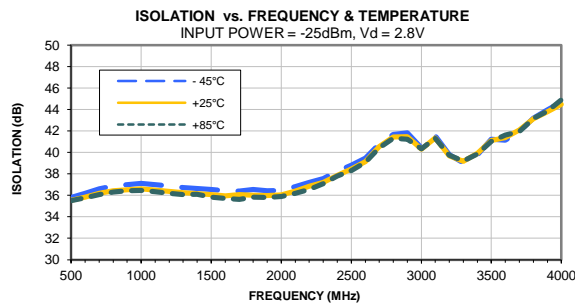
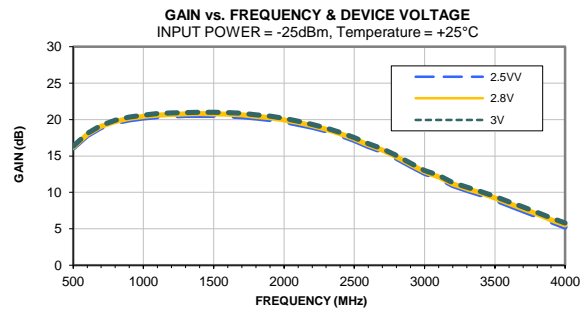
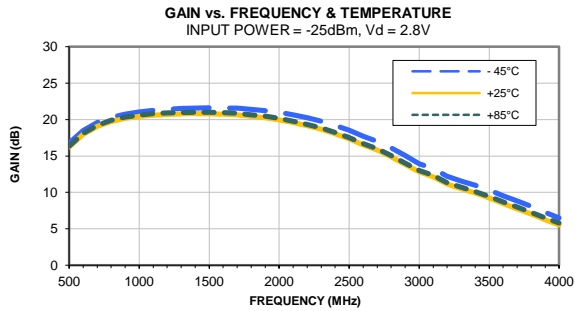




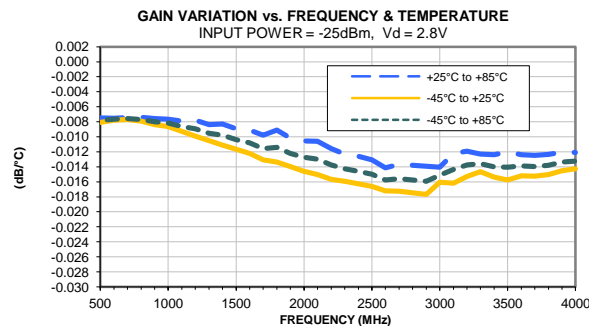
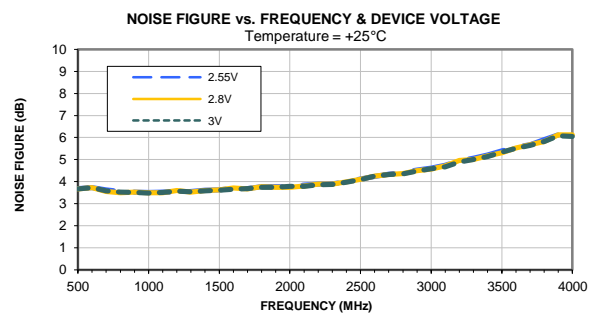
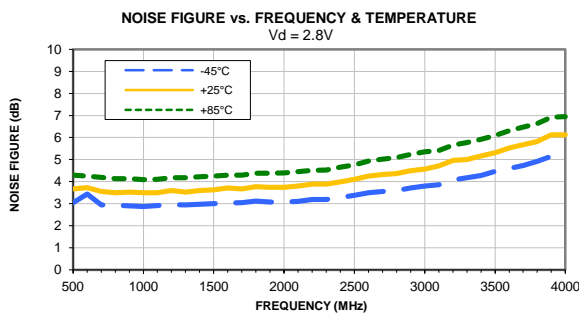
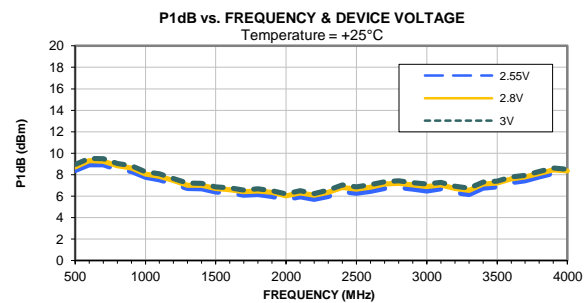
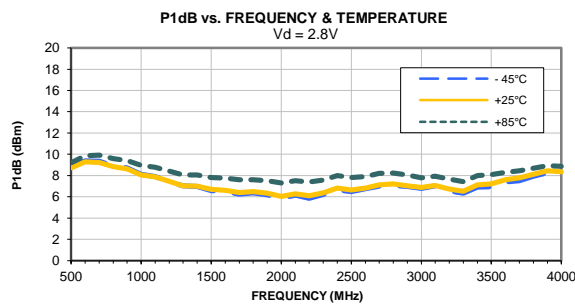
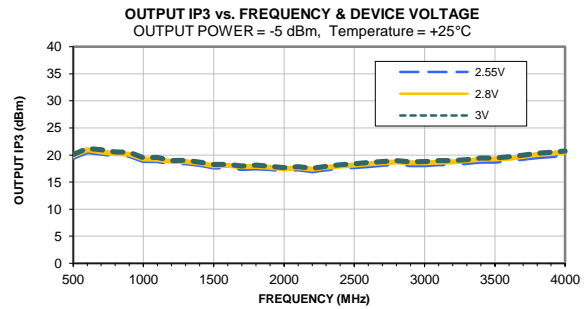
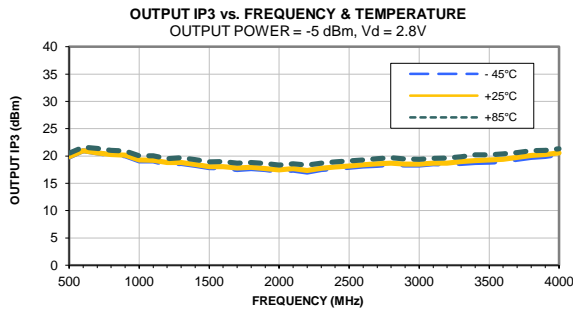
## Typical Performance Curves



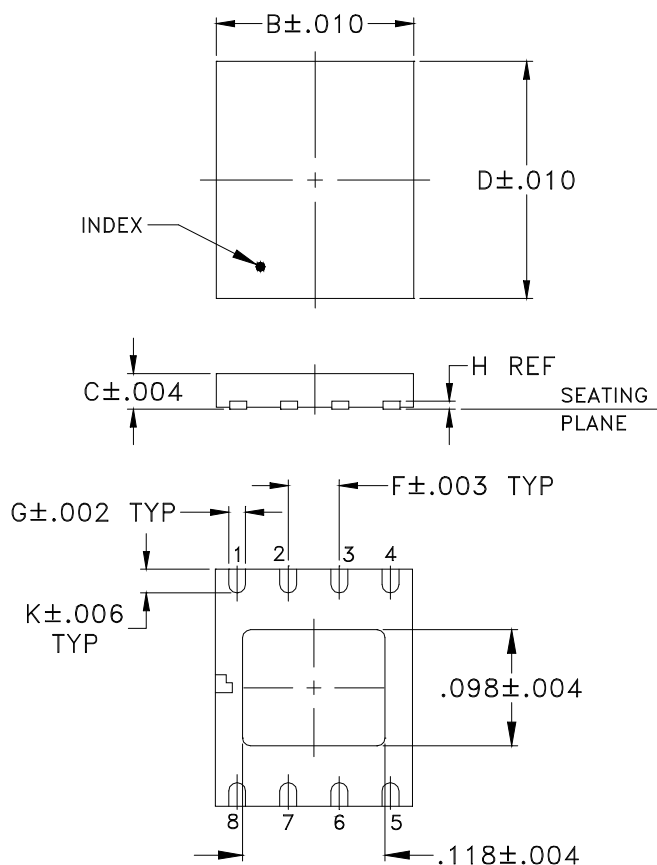
## Typical Performance Curves



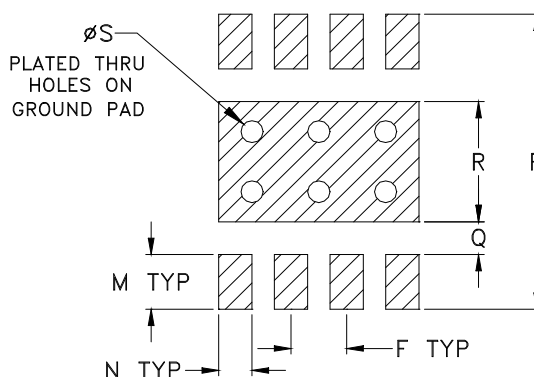
## Typical Performance Curves



### Outline Dimensions



### PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm .002$

CASE #	A	B	C	D	E	F	G	H	J	K	L	M	N
DL1020	--	.193 (4.90)	.035 (0.90)	.236 (6.00)	--	.050 (1.27)	.017 (0.42)	.008 (0.20)	--	.024 (0.60)	--	.050 (1.27)	.030 (0.76)

CASE #	P	Q	R	S	T	WT. GRAM
DL1020	.270 (6.86)	.030 (0.76)	.110 (2.79)	.020 (0.51)	--	.08

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm .01$ ; 3Pl.  $\pm .004$

#### Notes:

- Case material: Plastic.
- Termination finish:  
For RoHS Case Styles: Tin-Silver alloy plate over Nickel barrier. All models, (+) suffix.  
For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site

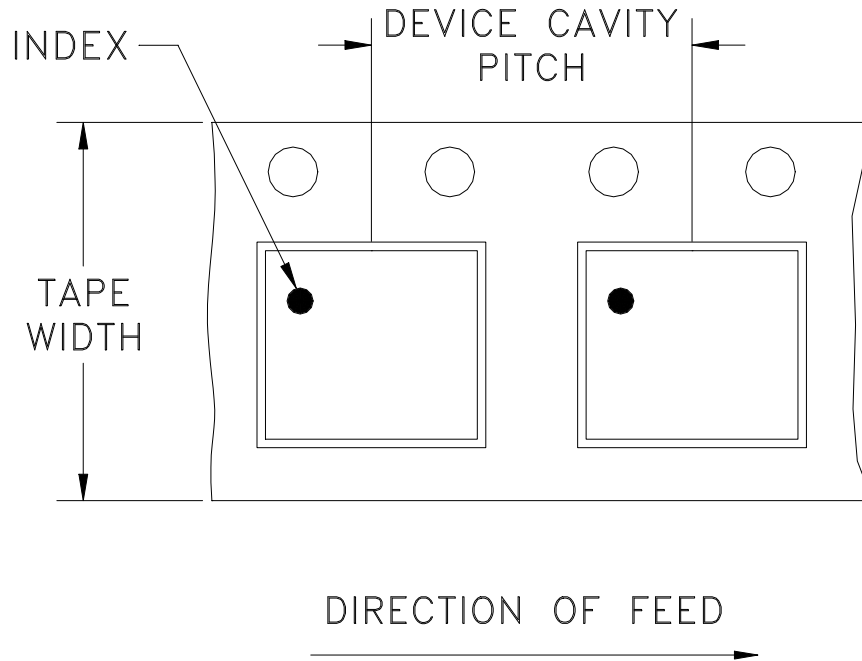


The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F68

## DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
12	8	7	Small quantity standard	20
				50
				100
				200
				500
		7	Standard	1000
		13	Standard	2000
				3000
4000				

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: [www.minicircuits.com/pages/pdfs/tape.pdf](http://www.minicircuits.com/pages/pdfs/tape.pdf)



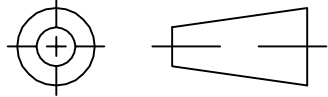
INTERNET <http://www.minicircuits.com>

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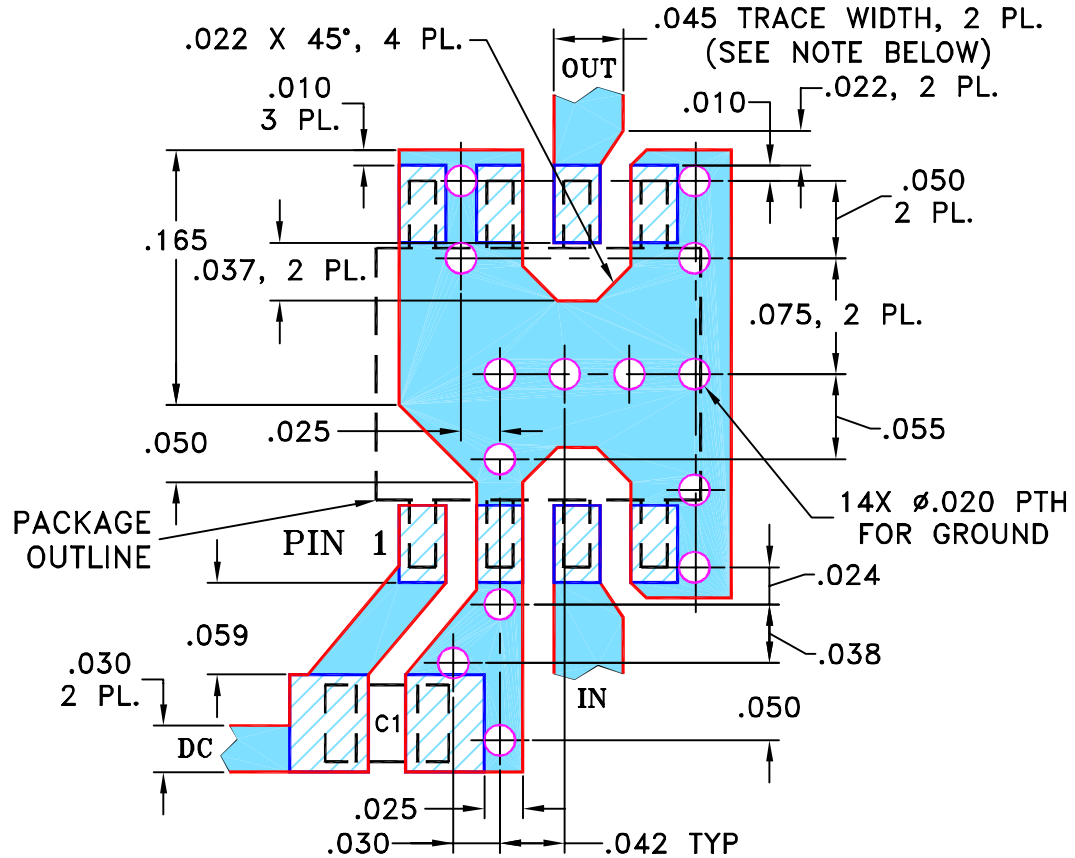
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M82272	NEW RELEASE	08/05/02	GF	DJ
A	M84246	UPDATED DRAWING	11/21/02	AV	LC
B	M91639	REMOVED NOTE 2, UPDATED DIMENSIONS	04/14/04	AV	DJ
C	M102713	UPDATED DWG. & ADDED "...WITH SMOBC"	01/25/08	MMG	DJ

**SUGGESTED MOUNTING CONFIGURATION FOR XX211 CASE STYLE, "hj" PIN CONNECTION**



CAPACITOR C1: .01 uF, 0805 SIZE

- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS  $.020 \pm .0015$ ; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED	INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN GF	07/19/02
TOLERANCES ON:	CHECKED LC	08/01/02
2 PL DECIMALS $\pm$	APPROVED DJ	08/05/02
3 PL DECIMALS $\pm$ .005		
ANGLES $\pm$		
FRACTIONS $\pm$		



**Mini-Circuits®**

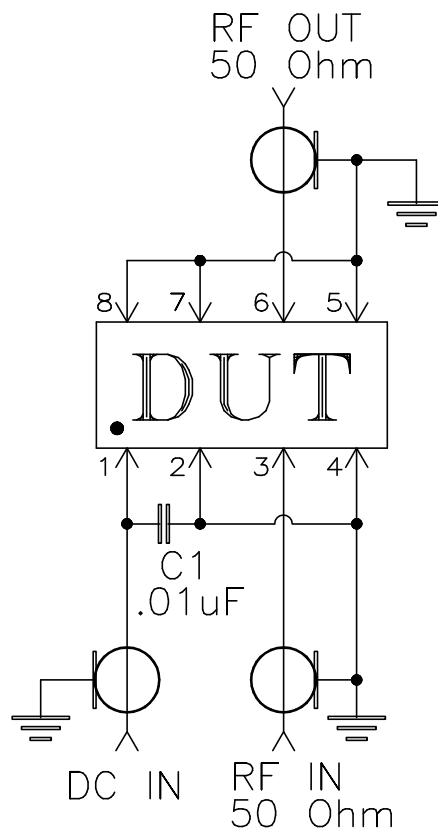
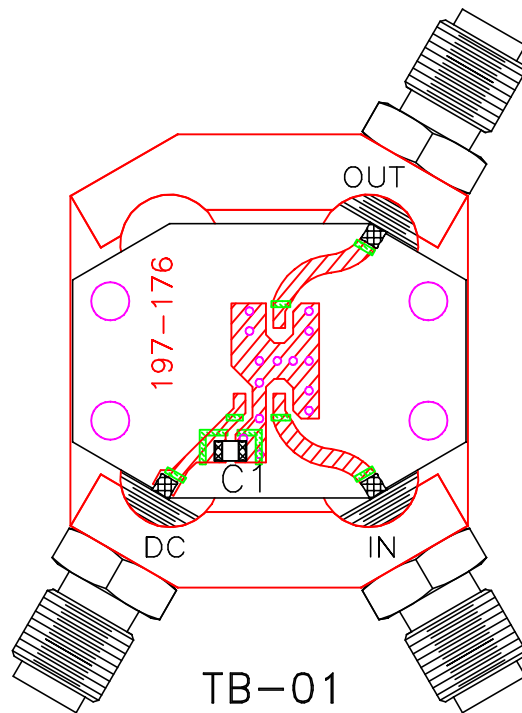
13 Neptune Avenue  
Brooklyn NY 11235

PL, hj, XX211, VNA, TB-01

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-077	C
FILE:	98PL077	SCALE:	8:1
		SHEET:	1 OF 1

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# Evaluation Board and Circuit



Schematic Diagram

## Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.020 inch.

 **Mini-Circuits®**

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85° C or -45° to 85° C or -55° to 105° C or -40° to 105° C or -40° to 95° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C or -65° to 150° Ambient Environment	Individual Model Data Sheet
HTOL	1000 hours at 125°C	MIL-STD-883, Method 1005, Condition B
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Mechanical Shock	1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only	MIL-STD-883, Method 2002, Condition B, except Y1 direction only
Vibration (Variable Frequency)	50g peak	MIL-STD-883, Method 2007, Condition B
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102, Condition C
HAST	130°C, 85% RH, 96 hours	JESD22-A110
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Solder Reflow Heat	Sn-Pb Eutetic Process: 240°C peak Pb-Free Process: 260°C peak	J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1
Moisture Sensitivity: Level 1	Bake at 125°C for 24 hours Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 260°C peak	J-STD-020



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

<b>Specification</b>	<b>Test/Inspection Condition</b>	<b>Reference/Spec</b>
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215