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

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.

Not Recommended for New Designs

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

http://www.minicircuits.com/support/product_change.html

or PCN History on Dash Board

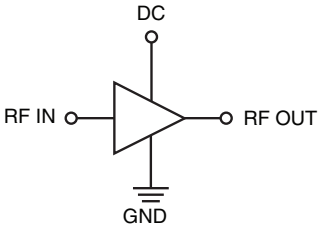
Typical Applications

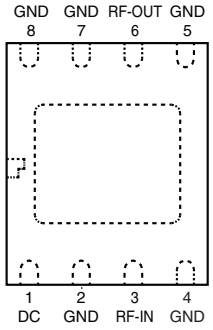
- buffer amplifier
- cellular
- PCN

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[1] 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 1.0 1.5 2.0 2.5	— — — 18.6 —	16.6 21.2 21.6 20.7 18.0	15.8 20.0 20.2 19.4 16.9		dB
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[2]				78		°C/W

[1] Measured on Mini-Circuits Characterization test board TB-01. See Characterization Test Circuit (Fig. 1)
[2] Case is defined as ground leads.

Absolute Maximum Ratings[3]

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.)

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

Characterization Test Circuit

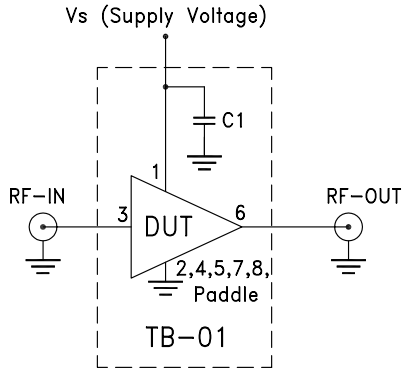


Fig 1. Block Diagram of Test Circuit used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-01) Gain, Return loss, Output power at 1dB compression (P1 dB), output IP3 (OIP3) and noise figure measured using Agilent's N5242A PNA-X microwave network analyzer.

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

Recommended Application Circuit

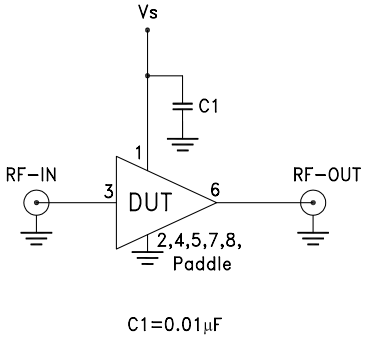


Fig 2. Recommended Application Circuit

Product Marking

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

ESD Rating

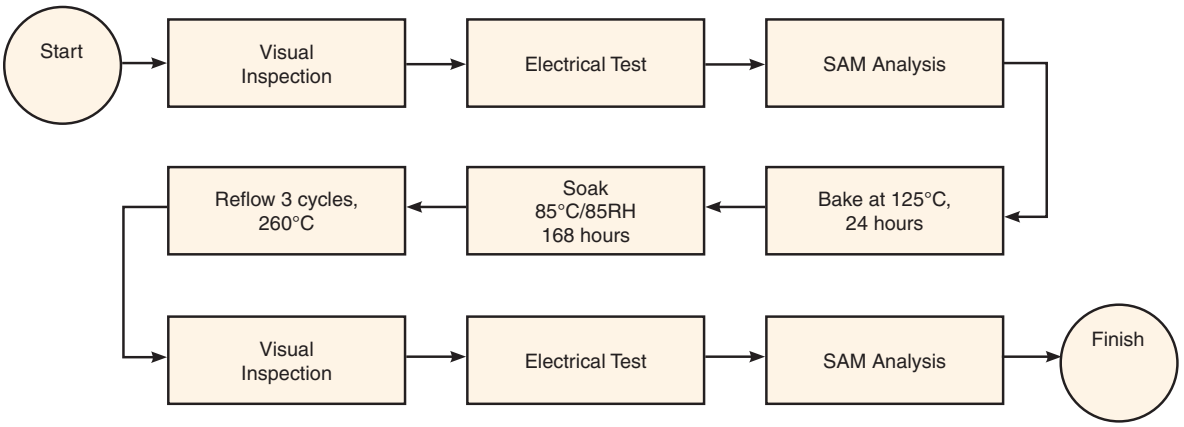
Human Body Model (HBM): Class 1B (500V to <1000V) in accordance with ANSI/ESD STM 5.1 - 2001

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

A. 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.

B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.

C. 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

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
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(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
(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
(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
(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
(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
(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
(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
(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
(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
(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
(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
(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
(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
(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
(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
(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
(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

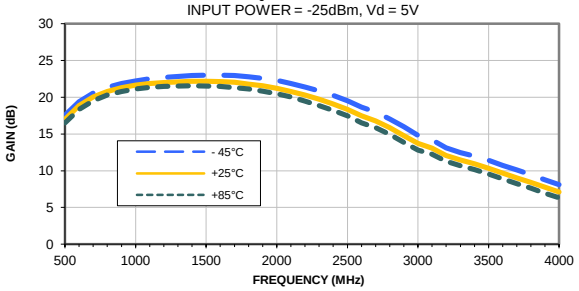
Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

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

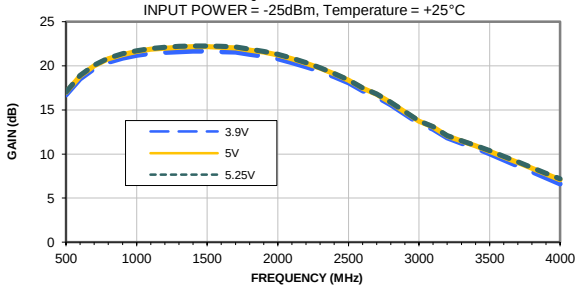
FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
500.0	15.87	35.46	6.97	8.14	3.30	1.00	20.73	9.41	4.28
600.0	17.65	35.71	8.91	10.37	3.31	0.99	21.86	10.08	4.23
700.0	18.74	36.04	11.04	12.05	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

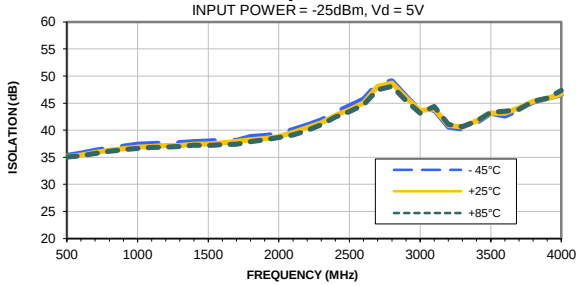
GAIN vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 5V



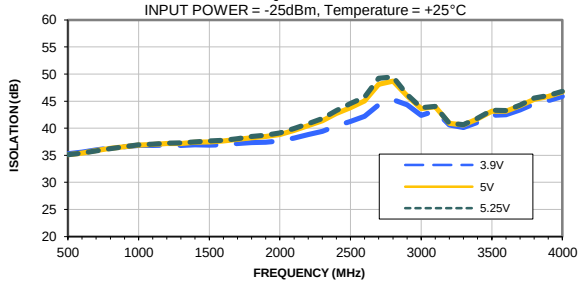
GAIN vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C



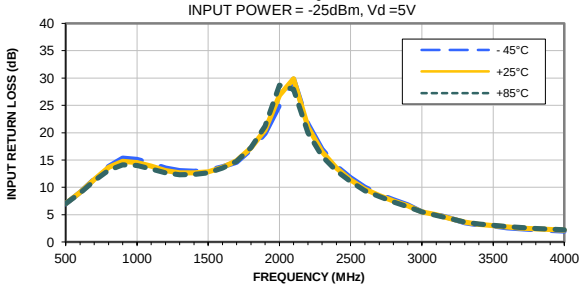
ISOLATION vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 5V



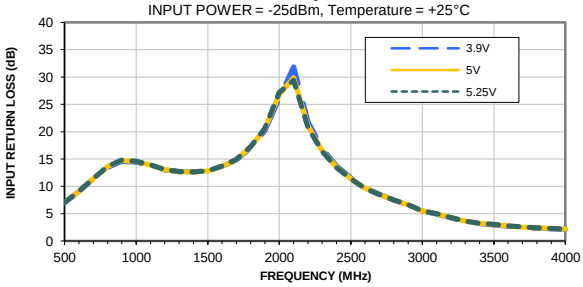
ISOLATION vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C



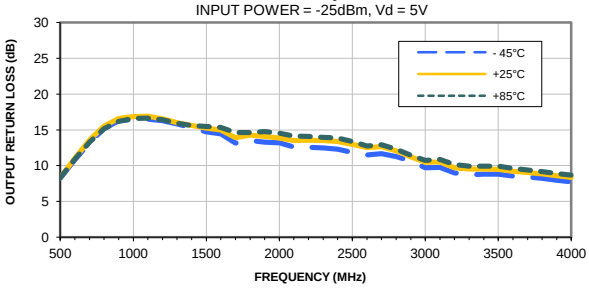
INPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd =5V



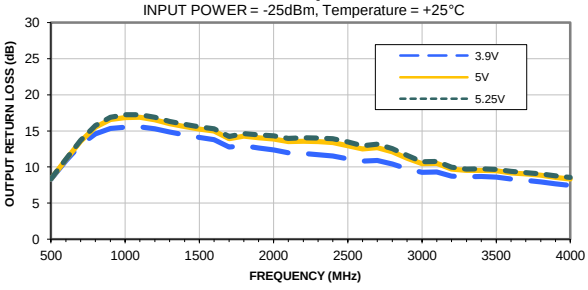
INPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C



OUTPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 5V

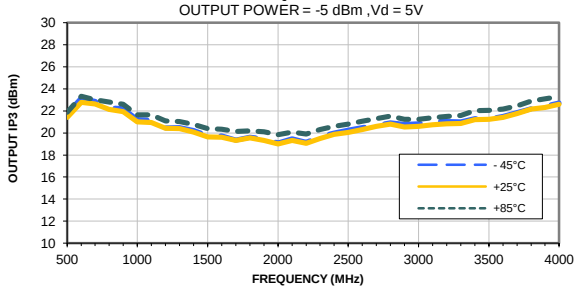


OUTPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C

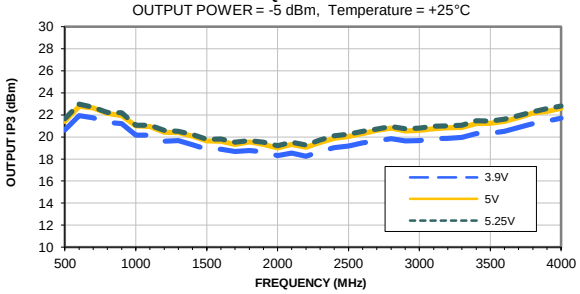


Typical Performance Curves

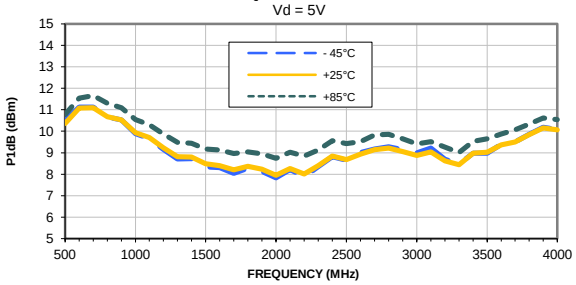
OUTPUT IP3 vs. FREQUENCY & TEMPERATURE
OUTPUT POWER = -5 dBm ,Vd = 5V



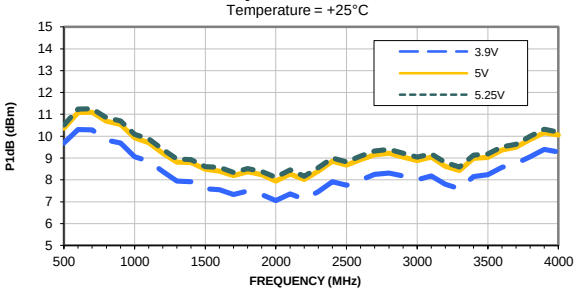
OUTPUT IP3 vs. FREQUENCY & DEVICE VOLTAGE
OUTPUT POWER = -5 dBm, Temperature = +25°C



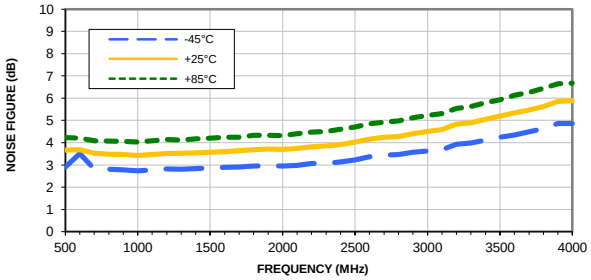
P1dB vs. FREQUENCY & TEMPERATURE
Vd = 5V



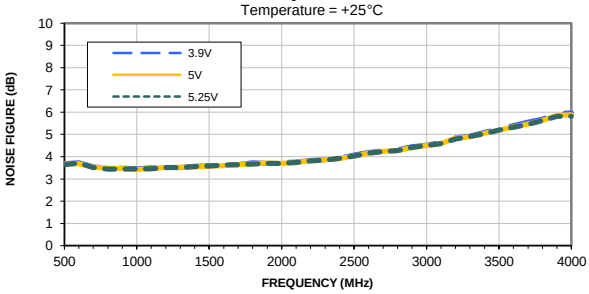
P1dB vs. FREQUENCY & DEVICE VOLTAGE
Temperature = +25°C



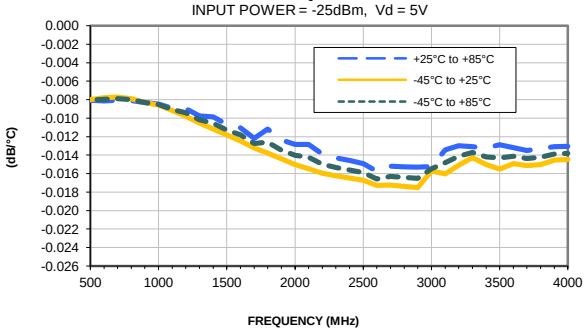
NOISE FIGURE vs. FREQUENCY & TEMPERATURE
Vd = 5V



NOISE FIGURE vs. FREQUENCY & DEVICE VOLTAGE
Temperature = +25°C

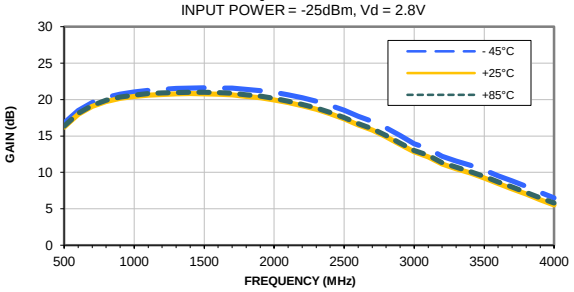


GAIN VARIATION vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 5V

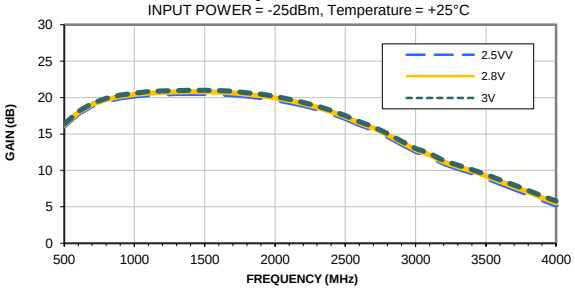


Typical Performance Curves

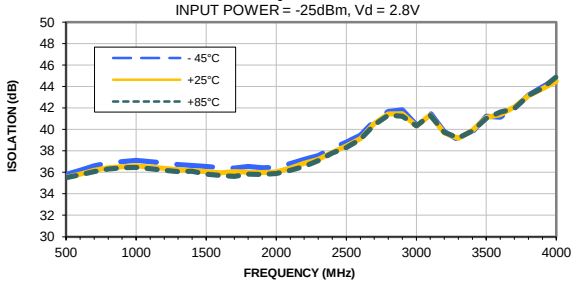
GAIN vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 2.8V



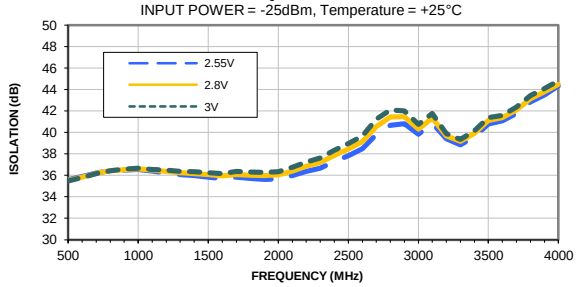
GAIN vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C



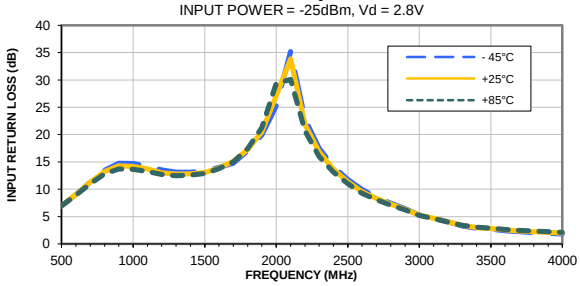
ISOLATION vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 2.8V



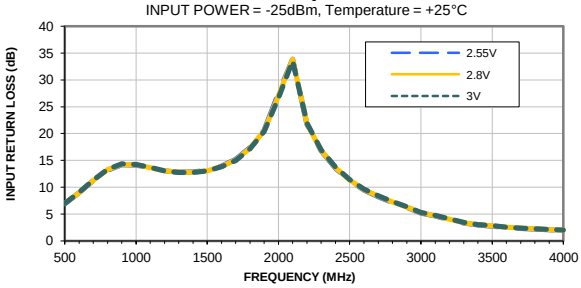
ISOLATION vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C



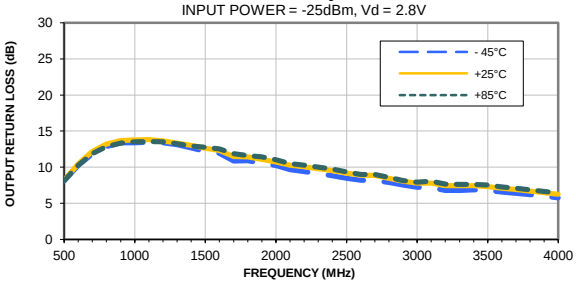
INPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 2.8V



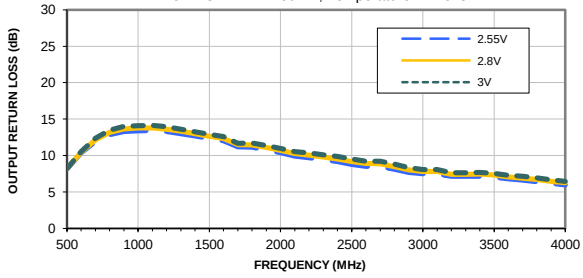
INPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C



OUTPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 2.8V

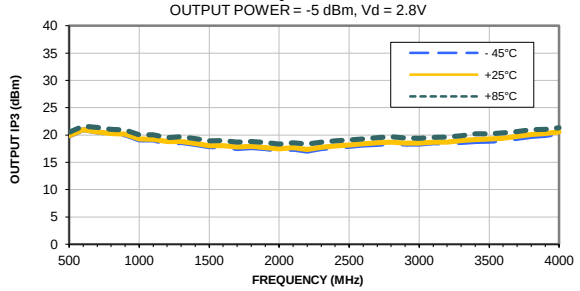


OUTPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C

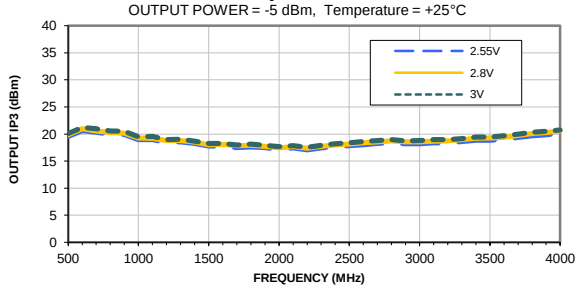


Typical Performance Curves

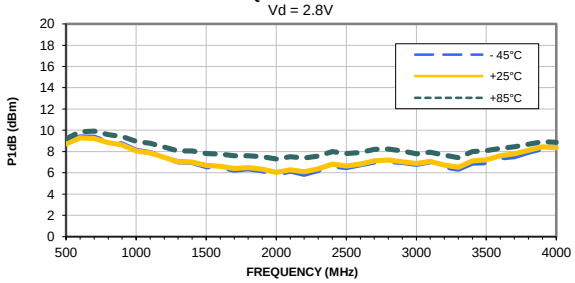
OUTPUT IP3 vs. FREQUENCY & TEMPERATURE
OUTPUT POWER = -5 dBm, Vd = 2.8V



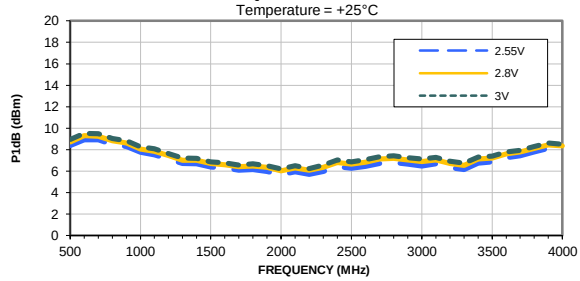
OUTPUT IP3 vs. FREQUENCY & DEVICE VOLTAGE
OUTPUT POWER = -5 dBm, Temperature = +25°C



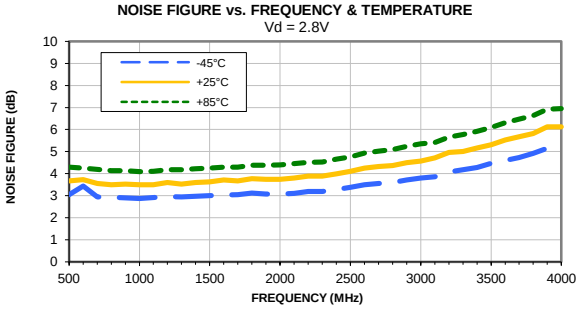
P1dB vs. FREQUENCY & TEMPERATURE
Vd = 2.8V



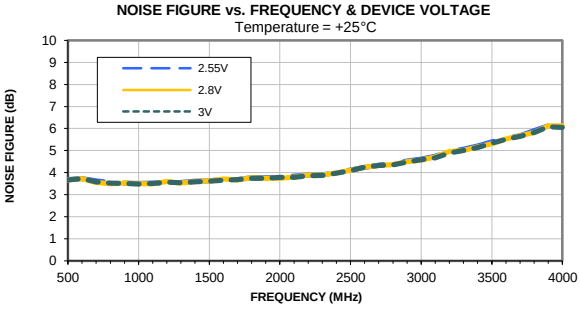
P1dB vs. FREQUENCY & DEVICE VOLTAGE
Temperature = +25°C



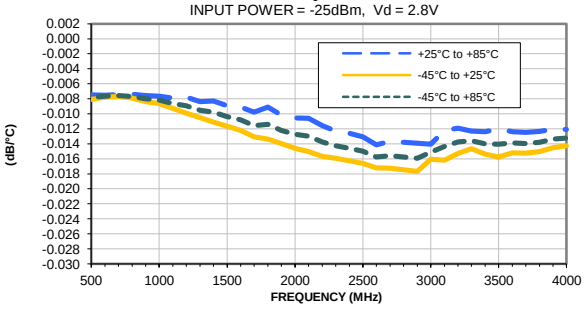
NOISE FIGURE vs. FREQUENCY & TEMPERATURE
Vd = 2.8V



NOISE FIGURE vs. FREQUENCY & DEVICE VOLTAGE
Temperature = +25°C

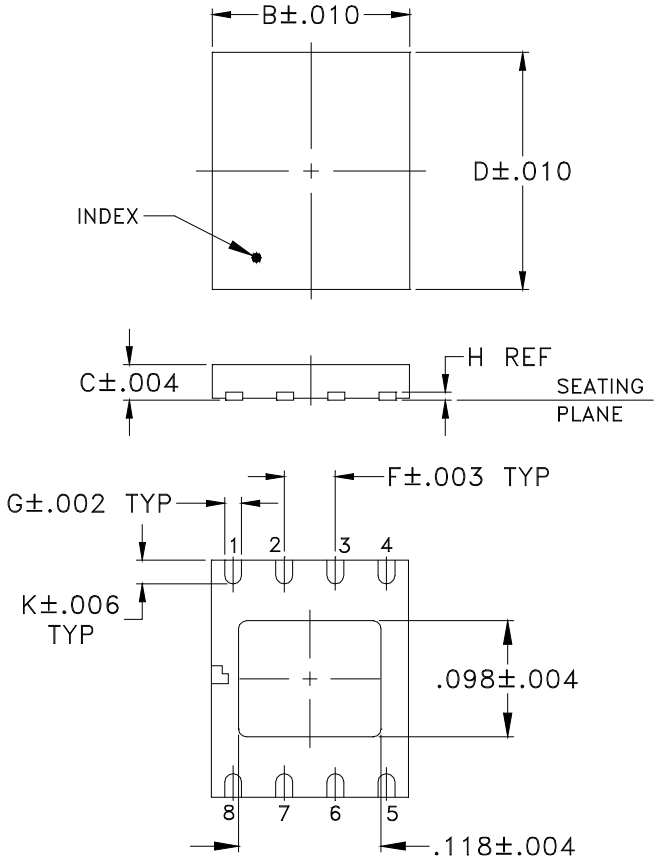


GAIN VARIATION vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 2.8V

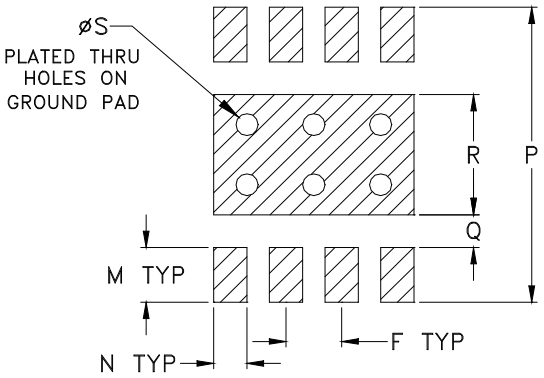


DL1020

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.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

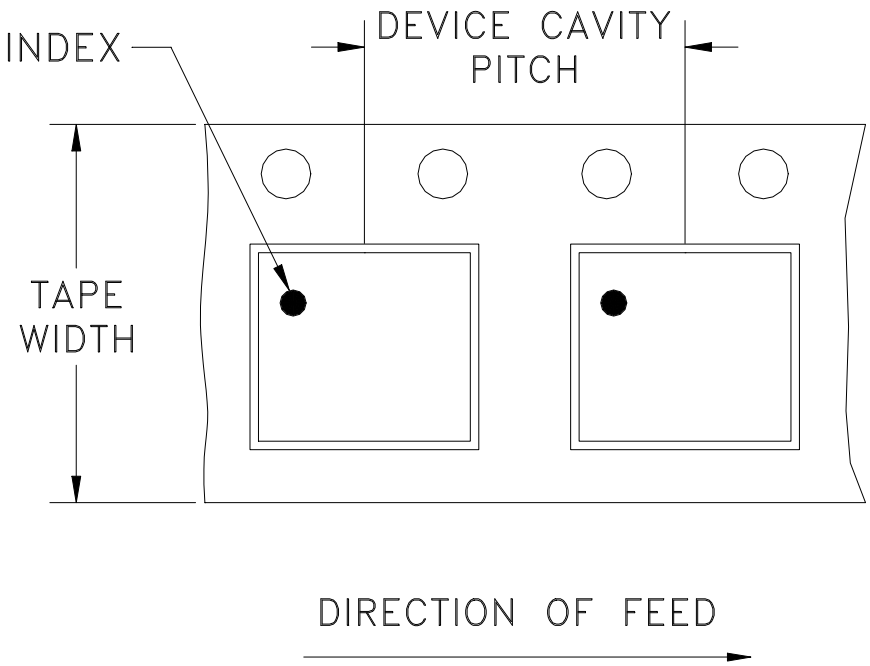
Dimensions are in inches (mm). Tolerances: 2 Pl. ± .01; 3Pl. ± .004

Notes:

1. Case material: Plastic.
2. 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.

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.

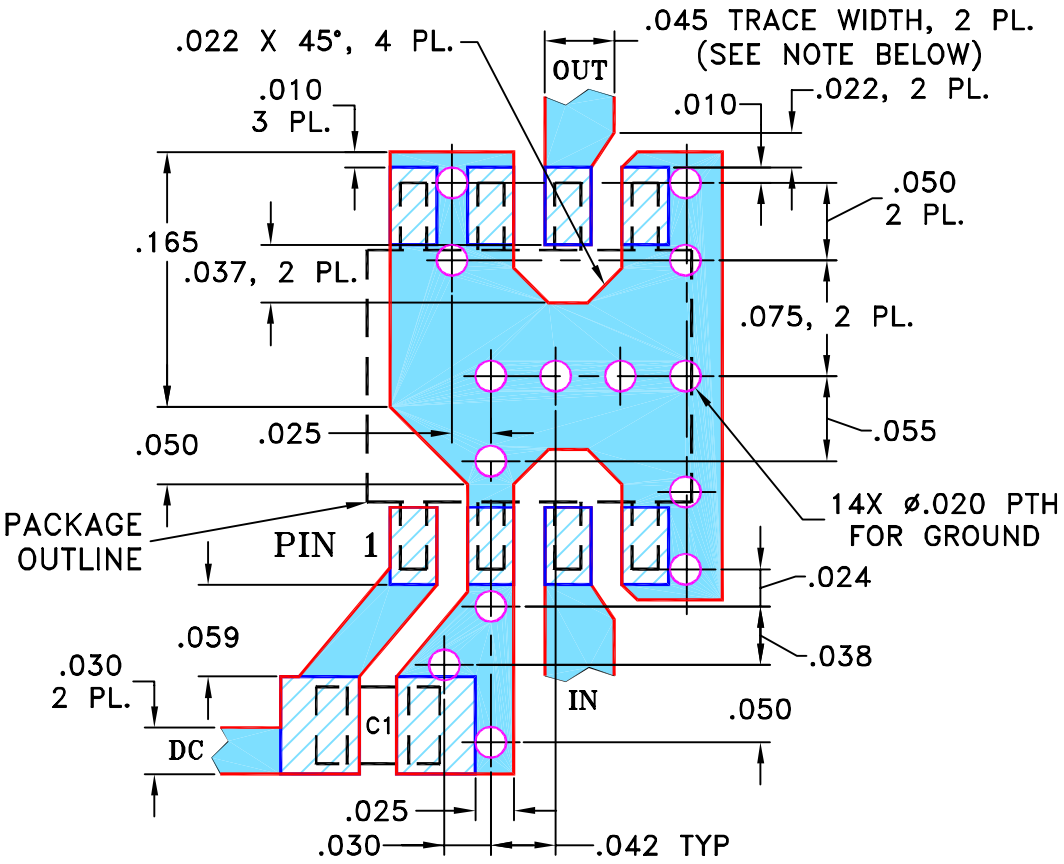
Go to: www.minicircuits.com/pages/pdfs/tape.pdf

Mini-Circuits®
INTERNET http://www.minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010
Mini-Circuits ISO 9001 & ISO 14001 Certified

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"	01/25/06	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 ± .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 ±	APPROVED	DJ	08/05/02
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

ASHEETA1.DWG REV:A DATE:01/12/95

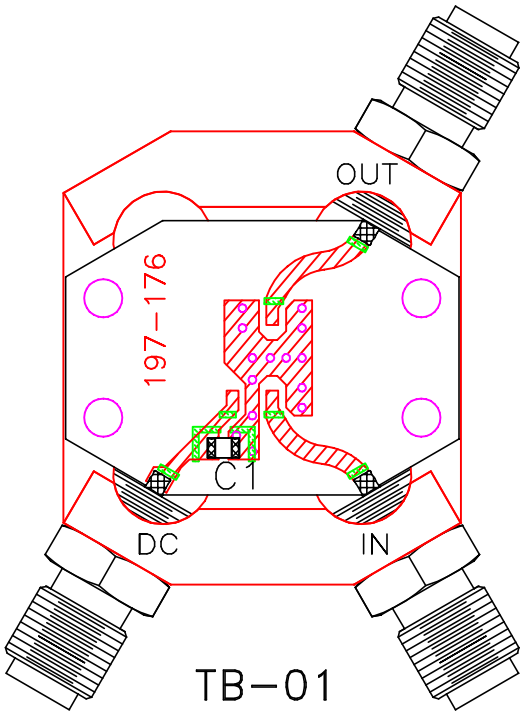
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, hj, XX211, VNA, TB-01

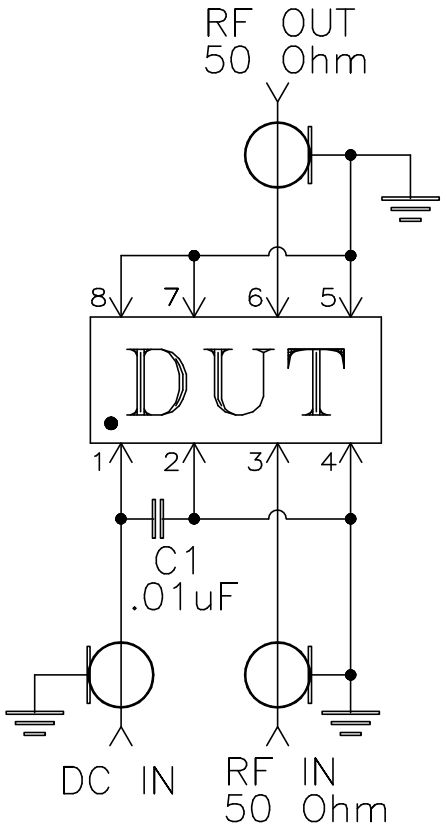
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-077	C

FILE:	SCALE:	SHEET:
98PL077	8:1	1 OF 1

Evaluation Board and Circuit



TB-01



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.020 inch.

Mini-Circuits®

Mini-Circuits

Environmental Specifications **ENV08T1**

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.

Specification	Test/Inspection Condition	Reference/Spec
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