



**SUPER WIDEBAND, MEDIUM POWER**

# Monolithic Amplifier Die

**AVA-20453BL-D+**

Mini-Circuits

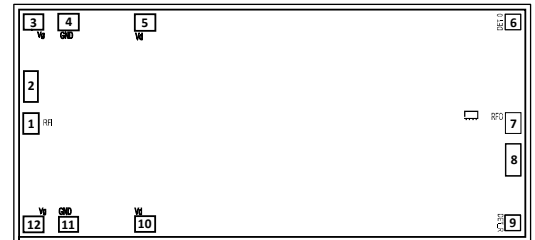
50Ω 20 to 45 GHz

## THE BIG DEAL

- Super Wideband & Flat Gain, 23.5±2.2 dB @20 to 45 GHz
- Medium Power +23.4 dBm Typ. @20 to 40 GHz
- Potential Replacement for AMMC-6345<sup>a,b</sup>

## APPLICATIONS

- 5G MIMO and Back Haul Radio Systems
- Satellite Ka-band Communications
- Test and Measurement Equipment
- Radar, EW, and ECM Defense Systems



**+RoHS Compliant**  
 The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

SEE ORDERING INFORMATION ON THE LAST PAGE

## PRODUCT OVERVIEW

The AVA-20453BL-D+ is a GaAs PHEMT MMIC Medium Power Amplifier Die designed for use in microwave and millimeter wave transmitter systems operating from 20 to 45 GHz. The amplifier provides 23.5 dB of gain, +23 dBm P1dB and +30 dBm OIP3 while operating from a +5V supply with 480 mA current consumption. The amplifier is constructed using a balanced configuration thus providing excellent input and output impedance matches which makes for easy cascading with other devices in multi-chip modules.

## KEY FEATURES

Feature	Advantages
Super-Wide Bandwidth with Flat Gain <ul style="list-style-type: none"> <li>• 23.5±2.2 dB over 20 to 45 GHz</li> </ul>	General purpose wideband amplifier is suitable for wide variety of applications.
Medium Power Over Wideband: <ul style="list-style-type: none"> <li>• +23.4 dBm over 20 to 40 GHz</li> </ul>	Excellent characteristics for use as a driver amplifier for mmW transmitter systems.
High Output IP3 <ul style="list-style-type: none"> <li>• +30 dBm Typ. from 20 to 45 GHz</li> </ul>	Excellent return loss and linearity enable easy integration while maintaining system performance requirements.
Good Wideband In/Out Return Loss <ul style="list-style-type: none"> <li>• &gt;12 dB from 20 to 45 GHz</li> </ul>	
Unpackaged Die	Suitable for chip and wire hybrid assemblies

A. Suitability for model replacement within a particular system must be determined by and is solely the responsibility of the customer based on, among other things, electrical performance criteria, stimulus conditions, application and compatibility with other components and environmental conditions and stresses.  
 B. The AMMC-6345 part number is used for identification and comparison purposes only

REV. OR  
 ECO-012492  
 AVA-20453BL-D+  
 MCLNY  
 220325





SUPER WIDEBAND, MEDIUM POWER

# Monolithic Amplifier Die

# AVA-20453BL-D+

Mini-Circuits

### ELECTRICAL SPECIFICATIONS<sup>1</sup> AT 25°C, 50Ω, UNLESS NOTED OTHERWISE

Parameter	Condition (GHz)	VDD = 5V, IDD = 480mA			Units
		Min.	Typ.	Max.	
Frequency Range		20		45	GHz
Gain	20		21.8		dB
	30		21.3		
	35		22.1		
	40		24.0		
	45		25.7		
Input Return Loss	20		16.5		dB
	30		17.7		
	35		13.9		
	40		14.9		
	45		22.2		
Output Return Loss	20		24.1		dB
	30		18.6		
	35		19.2		
	40		15.2		
	45		15.0		
Directivity	20 - 45		45.0		dB
P1dB <sup>2</sup>	20		20.5		dBm
	30		23.4		
	35		23.4		
	40		21.8		
	45		19.7		
OIP3 Pout = +12 dBm/Tone	20		30.9		dBm
	30		31.2		
	35		29.4		
	40		28.9		
	45		31.5		
Noise Figure	20		10.1		dB
	30		8.4		
	35		8,7		
	40		9.0		
	45		12.5		
VDD		4.75	5.0	5.25	V
IG to get IDD = 480mA			17.0		uA
VG to get IDD = 480mA		-0.7	-0.53	-0.4	V
Thermal Resistance θjc @Ground-Lead Temperature = 85°C			19.9		°C/W

1. Measured on Mini-Circuits Characterization Test Board MB-083. See Recommended Application and Characterization Circuit (Fig. 1)

2. IDD can increase up to 600 mA at P1dB

### MAXIMUM RATINGS<sup>3</sup>

Parameter	Ratings
Operating temperature (ground lead)	-40°C to 85°C
Junction Temperature	150°C <sup>4</sup>
Total Power Dissipation	3.5 W
Input Power (CW)	23 dBm
DC Voltage at VDD	5.5V
DC voltage at VG	-2.5V to 0.5V
Pinch-Off Voltage (VG)	-1.2V

3. Permanent damage may occur if any of those limits are exceeded. Electrical maximum ratings are not intended for continuous normal operation.

4. Tj = 85 °C + (VDD)\*(IDD)\*θ(JC) = 132 °C. Keeping Tj below 132°C will ensure MTTF >100 Years.





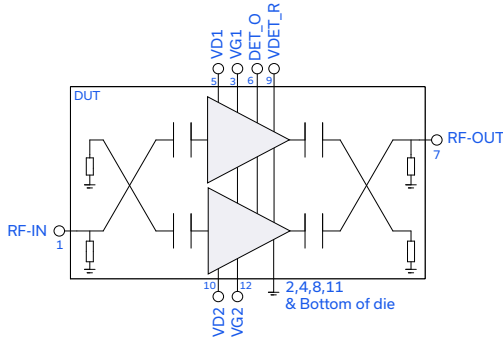
SUPER WIDEBAND, MEDIUM POWER

# Monolithic Amplifier Die

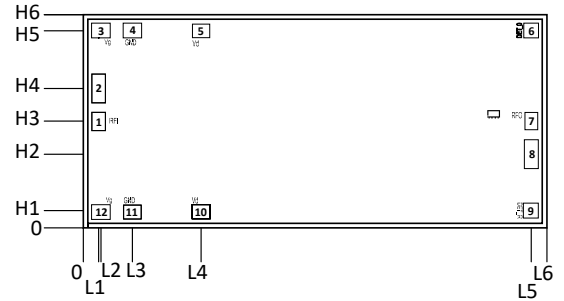
# AVA-20453BL-D+

Mini-Circuits

## SIMPLIFIED SCHEMATIC



## BONDING PAD POSITION



## PAD DESCRIPTION

Function	Pad#	Description
RF-IN	1	RF Input Pad
VG1	3	Gate voltage, VGG can be supplied at either VG1 and VG2
VD1	5	Drain Voltage, connects to VDD
VDET_O	6	Voltage Detector Output
RF-OUT	7	RF Output Pad
VDET_R	9	Reference Voltage for Output Detector
VD2	10	Drain Voltage, Connects to VDD
VG2	12	Gate Voltage, VGG can be supplied at either VG1 and VG2
GND	2,4,8,11 & Bottom of Die	The bond pads are connected to backside through vias and do not required wire-bond connections to ground

## DIMENSION IN $\mu\text{m}$ , TYP.

H1	H2	H3	H4	H5	H6
93	398	575	752	1062	1150

L1	L2	L3	L4	L5	L6
83	95	265	635	2415	2500

Thickness	Die size	Pad size 1 & 7	Pad size 2 & 8	Pad size 3-5,10-12	Pad size 6 & 9
100	1150 x 2500	68 x 93	68 x 150	93 x 73	73 x 73

## RECOMMENDED APPLICATION AND CHARACTERIZATION TEST CIRCUIT

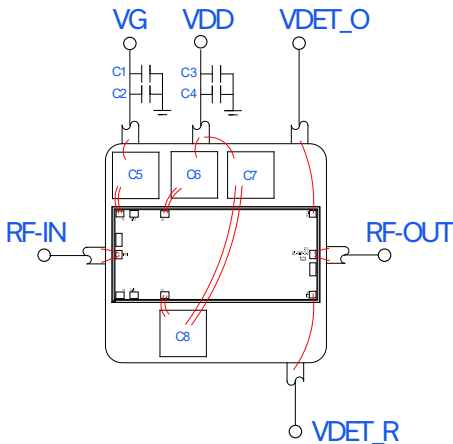


Figure 1. Characterization, Application Circuit & Assembly Drawing

Note: This block diagram is used for characterization. (DUT is soldered on test board of Mini-Circuits Characterization Test Board MB-083). Gain, Return Loss, Output Power at 1dB Compression (P1dB), Output IP3 (OIP3) and Noise Figure are measured using Agilent's N5242A PNA-X Microwave Network Analyzer.

### Condition:

1. VDD = 5V, IDD = 480mA
2. Gain & Return Loss: Pin = -30dBm
3. Output IP3 ( OIP3): Two Tones, Spaced 1MHz apart, 12 dBm/Tone at Output (Use ZVA-02443HP+ as Pre-Amp)

### ON Sequence:


1. Turn ON VG = -1.5V
2. Turn ON VDD = 5V,
3. Increase VG until IDD =480mA, Typical VG = -0.53V

### OFF Sequence:

1. Decrease VG back to -1.5V
2. Turn OFF VDD
3. Turn OFF VG.

Component #	Size	Value	Manufacturer	P/N
C1, C3	1206	10uF	SAMSUNG	CL31B106KBHNNNE
C2, C4	0402	0.1uF	MURATA	GRM115R71C04KA88D
C5, C6, C7, C8	22mil x 22mil	100pF	MACOM	MA4M3100

## ASSEMBLY PROCEDURE

1. Storage  
Dice should be stored in a dry nitrogen purged desiccators or equivalent.
2.  ESD  
MMIC PHEMT amplifier dice are susceptible to electrostatic and mechanical damage. Die are supplied in antistatic protected material, which should be open in clean room conditions at an appropriately grounded anti-static workstation.
3. Die Handling and Attachment  
Devices need careful handling using correctly designed collets, it is recommended to handle the chip along the edges with a custom design collet. The die mounting surface must be clean and flat. Using conductive silver filled epoxy, recommended epoxies are Ablestik 84-1 LMISR4 or equivalents. Apply sufficient epoxy to meet required epoxy bond line thickness, epoxy fillet height and epoxy coverage around total periphery. Parts shall be cured in a nitrogen filled atmosphere per manufacturer's cure condition. The surface of the chip has exposed air bridges and should not be touched with vacuum collet, tweezers or fingers.
4. Wire Bonding  
Bond pad openings in the surface passivation above the bond pads are provided to allow wire bonding to the dice gold bond pads. Thermo-sonic bonding is used with minimized ultrasonic content. Bond force, time, ultrasonic power and temperature are all critical parameters. Suggested wire is pure gold, 1mil diameter. Bonds must be made from the bond pads on the die to the packaged or substrate. All bond wires should be kept as short as low as reasonable to minimize performance degradation due to undesirable series inductance.





**ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD.**

<b>Performance Data</b>	Data Table Swept Graphs S-Parameter (S2P Files) Data Set with and without port extension(.zip file)								
<b>Case Style</b>	Die								
<b>Die Ordering and packaging information</b>	<table border="0"> <tr> <td>Quantity, Package</td> <td>Model No.</td> </tr> <tr> <td>Small, Gel - Pak: 5,10,50,100 KGD*</td> <td>AVA-20453BL-DG+</td> </tr> <tr> <td>Medium†, Partial wafer: KGD*&lt;700</td> <td>AVA-20453BL-DP+</td> </tr> <tr> <td>Full Wafer</td> <td>AVA-20453BL-DF+</td> </tr> </table> <p>†Available upon request contact sales representative Refer to AN-60-067</p>	Quantity, Package	Model No.	Small, Gel - Pak: 5,10,50,100 KGD*	AVA-20453BL-DG+	Medium†, Partial wafer: KGD*<700	AVA-20453BL-DP+	Full Wafer	AVA-20453BL-DF+
Quantity, Package	Model No.								
Small, Gel - Pak: 5,10,50,100 KGD*	AVA-20453BL-DG+								
Medium†, Partial wafer: KGD*<700	AVA-20453BL-DP+								
Full Wafer	AVA-20453BL-DF+								
<b>Die Marking</b>	EL-AMP-2-1								
<b>Environmental Ratings</b>	ENV80								

\*Known Good Die ("KGD") means that the dice in question have been subjected to Mini-Circuits DC test performance criteria and measurement instructions and that the parametric data of such dice fall within a predefined range. While DC testing is not definitive, it does provide a higher degree of confidence that die are capable of meeting typical RF electrical parameters specified by Mini-Circuits.

**NOTES**

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## 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 = 3.8V, Id = 480mA @ 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)
18000	15.32	45.58	10.23	13.72	14.16	1.05	24.39	16.75	12.70
20000	22.59	44.96	11.32	19.34	6.02	1.06	24.13	17.52	9.50
21000	24.57	42.82	16.06	47.54	4.05	1.01	24.14	18.34	8.80
22000	26.75	39.73	14.84	13.21	2.13	0.95	24.99	19.28	8.40
23000	25.55	39.87	10.36	9.06	2.24	0.89	24.92	19.18	8.10
24000	23.76	40.49	12.12	10.58	2.99	0.95	25.47	18.15	8.10
25000	24.07	40.53	19.13	17.54	3.29	0.97	25.92	19.31	8.00
26000	25.46	39.92	22.33	16.40	2.66	0.95	26.49	19.82	8.00
27000	25.33	42.21	12.86	12.62	3.18	0.98	26.47	20.11	7.90
28000	23.87	45.46	10.52	12.16	5.23	1.01	27.50	20.70	7.80
29000	22.83	46.86	10.80	12.56	6.84	1.03	27.89	21.00	7.60
30000	22.29	49.23	12.76	14.28	10.19	1.01	28.08	21.11	7.60
30500	22.06	50.06	14.04	14.95	11.73	1.00	28.22	21.03	7.70
31000	21.86	47.49	14.42	14.58	8.90	1.00	28.28	20.96	7.80
31500	21.65	49.38	13.75	13.61	11.14	1.00	27.96	20.94	8.10
32000	21.55	46.50	12.99	12.91	8.00	0.99	28.17	20.83	8.20
32500	21.64	45.93	12.30	12.71	7.36	0.99	28.52	21.15	8.50
33000	21.94	45.19	11.80	12.97	6.54	1.00	28.41	21.10	8.70
33500	22.34	44.40	11.44	13.41	5.71	1.01	28.14	20.92	8.60
34000	22.87	42.94	10.73	13.39	4.51	1.01	27.65	20.26	8.60
34500	23.41	41.34	10.08	12.42	3.47	1.00	28.14	20.43	8.50
35000	23.88	40.95	9.61	11.52	3.07	1.00	28.02	20.30	8.30
35500	24.33	39.40	9.68	11.78	2.43	1.01	28.51	20.41	8.10
36000	24.39	39.34	10.28	14.58	2.48	1.04	28.44	20.49	7.80
36500	23.91	39.71	10.53	19.11	2.86	1.05	28.65	20.32	7.70
37000	23.16	40.53	10.30	16.14	3.36	1.04	28.54	19.98	7.80
37500	22.47	40.44	9.91	12.95	3.38	1.04	27.75	20.20	8.10
38000	22.23	40.65	9.89	11.85	3.48	1.03	26.27	19.73	8.40
38500	22.65	40.89	11.09	12.90	3.64	1.00	24.42	18.76	8.70
39000	23.75	38.90	13.74	17.11	2.80	0.98	25.38	19.37	9.00
39500	25.46	39.49	19.50	35.61	2.59	0.97	26.27	19.79	9.10
40000	27.18	36.44	18.70	13.81	1.52	0.87	27.15	19.67	9.20
41000	27.32	37.65	10.54	6.66	1.41	0.71	26.14	19.11	9.10
42000	25.61	42.47	9.59	7.11	2.56	0.88	24.82	17.69	9.20
43000	25.34	45.64	10.52	10.96	4.32	1.01	22.59	18.01	9.10
44000	26.19	43.10	14.86	20.95	3.44	1.00	22.09	17.62	9.40
45000	28.30	47.11	22.90	25.96	4.38	0.99	21.49	17.65	10.50
46000	29.02	54.16	16.02	17.57	8.66	1.01	21.49	16.78	12.10
47000	20.85	49.11	10.17	11.64	10.88	1.02	21.36	13.53	12.70

## 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 = 4V, Id = 480mA @ 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)
18000	14.70	44.23	10.24	13.71	13.04	1.05	24.70	17.19	12.80
20000	21.72	43.19	11.22	18.40	5.41	1.06	24.63	18.38	9.60
21000	23.90	40.96	16.80	34.89	3.56	1.00	24.76	18.92	8.90
22000	26.42	37.36	13.94	12.17	1.68	0.92	25.80	19.72	8.50
23000	24.84	38.02	9.80	8.64	1.96	0.87	25.51	19.46	8.20
24000	22.93	39.17	11.89	10.57	2.82	0.96	25.91	18.92	8.10
25000	23.43	38.59	19.34	19.02	2.88	0.97	26.41	20.15	8.00
26000	25.10	37.77	20.64	15.49	2.19	0.93	27.31	20.75	8.00
27000	24.79	39.71	12.00	11.89	2.50	0.97	27.44	20.90	8.00
28000	23.11	42.82	10.33	11.93	4.22	1.00	28.10	21.28	7.90
29000	22.07	47.18	10.95	12.65	7.80	1.03	28.52	21.60	7.60
30000	21.57	46.74	13.02	14.58	8.37	1.01	28.68	21.89	7.70
30500	21.37	46.14	14.38	15.27	8.16	1.00	28.92	21.93	7.70
31000	21.20	47.15	14.73	14.93	9.28	1.00	28.96	21.92	7.90
31500	21.04	44.55	14.06	13.94	6.90	1.00	28.72	21.82	8.10
32000	21.00	44.59	13.33	13.32	6.90	0.99	29.03	21.69	8.40
32500	21.13	45.81	12.56	13.10	7.76	1.00	29.44	21.81	8.60
33000	21.42	46.88	11.86	13.21	8.41	1.01	29.32	21.71	8.70
33500	21.80	44.77	11.22	13.42	6.31	1.01	28.95	21.59	8.70
34000	22.28	43.38	10.39	13.08	5.01	1.02	28.16	21.03	8.70
34500	22.77	40.93	9.76	12.11	3.53	1.01	28.65	21.22	8.60
35000	23.19	39.64	9.46	11.48	2.86	1.00	28.37	21.13	8.30
35500	23.58	39.71	9.70	11.97	2.74	1.02	28.96	21.24	8.10
36000	23.60	39.30	10.44	15.18	2.72	1.05	28.92	21.32	7.90
36500	23.14	39.90	10.79	20.03	3.20	1.05	29.03	21.18	7.80
37000	22.46	39.87	10.54	16.51	3.40	1.04	29.09	20.89	7.90
37500	21.86	40.72	10.08	13.26	3.78	1.04	28.59	21.08	8.10
38000	21.67	40.09	10.11	12.20	3.52	1.03	27.56	20.68	8.50
38500	22.13	40.96	11.35	13.36	3.92	1.01	26.16	19.82	8.70
39000	23.23	38.02	14.12	18.04	2.71	0.98	26.77	20.47	9.10
39500	24.89	36.55	19.68	30.99	2.02	0.94	27.33	20.58	9.20
40000	26.52	35.09	17.25	12.90	1.40	0.85	27.88	20.41	9.20
41000	26.40	36.73	10.19	6.44	1.40	0.69	26.69	19.97	9.10
42000	24.63	41.96	9.47	7.25	2.69	0.89	25.47	18.62	9.20
43000	24.44	41.55	10.82	11.54	3.06	1.01	23.15	17.89	9.30
44000	25.56	44.88	16.19	20.77	4.53	1.00	22.69	17.76	9.50
45000	27.98	44.09	25.03	24.17	3.25	0.98	21.49	17.75	10.70
46000	27.79	47.70	13.73	16.33	4.65	1.01	21.36	16.78	12.10
47000	19.43	46.34	10.71	11.74	9.42	1.02	21.35	15.27	12.80

## 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 = 4.2V, Id = 480mA @ 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)
18000	14.26	43.40	10.26	13.68	12.46	1.04	24.97	17.45	12.90
20000	21.16	41.76	11.16	17.81	4.88	1.06	25.37	19.02	9.70
21000	23.52	39.45	17.50	29.47	3.15	0.99	25.71	19.49	8.90
22000	26.27	36.13	12.95	11.33	1.47	0.91	26.67	20.27	8.50
23000	24.33	37.27	9.44	8.44	1.89	0.86	26.16	19.88	8.30
24000	22.39	38.35	11.79	10.69	2.73	0.96	26.53	19.64	8.20
25000	23.11	37.33	19.70	20.68	2.62	0.97	27.17	20.75	8.10
26000	25.01	36.53	18.52	14.29	1.93	0.90	27.96	21.36	8.10
27000	24.41	38.87	11.31	11.35	2.31	0.98	28.05	21.58	8.00
28000	22.57	43.26	10.25	11.87	4.70	1.00	28.90	21.87	7.90
29000	21.57	46.58	11.17	12.89	7.77	1.02	29.09	22.13	7.70
30000	21.15	48.59	13.33	15.02	10.93	1.01	29.27	22.46	7.80
30500	20.98	46.82	14.73	15.72	9.27	1.00	29.58	22.49	7.80
31000	20.85	46.96	15.15	15.37	9.52	1.00	29.71	22.53	8.00
31500	20.72	46.15	14.43	14.37	8.66	1.00	29.47	22.46	8.20
32000	20.70	45.89	13.57	13.67	8.32	1.00	29.79	22.31	8.40
32500	20.83	45.26	12.61	13.35	7.55	1.00	30.14	22.42	8.70
33000	21.10	44.95	11.72	13.25	7.00	1.01	29.89	22.29	8.80
33500	21.42	45.21	10.96	13.24	6.87	1.02	29.53	22.16	8.80
34000	21.83	43.20	10.09	12.78	5.12	1.02	28.65	21.60	8.80
34500	22.27	41.04	9.68	12.06	3.76	1.01	29.12	21.75	8.60
35000	22.67	40.72	9.55	11.64	3.42	1.01	28.88	21.62	8.40
35500	23.04	39.44	9.92	12.38	2.86	1.02	29.47	21.72	8.20
36000	23.07	39.22	10.75	15.82	2.89	1.05	29.46	21.80	8.00
36500	22.68	39.69	11.12	21.39	3.32	1.05	29.64	21.62	7.90
37000	22.08	40.24	10.79	17.18	3.72	1.04	29.67	21.41	8.00
37500	21.56	39.74	10.32	13.68	3.54	1.04	29.44	21.58	8.20
38000	21.41	41.20	10.36	12.66	4.18	1.04	28.63	21.28	8.60
38500	21.87	38.86	11.57	13.87	3.22	1.01	27.66	20.76	8.80
39000	22.93	38.51	14.16	18.92	2.95	0.99	27.83	21.15	9.20
39500	24.48	36.59	18.87	25.92	2.10	0.95	28.54	21.20	9.30
40000	25.96	35.51	16.59	12.62	1.52	0.88	28.81	20.94	9.30
41000	25.77	36.66	10.31	6.62	1.47	0.72	27.24	20.47	9.20
42000	24.12	42.36	9.63	7.40	3.03	0.89	26.06	19.14	9.40
43000	24.03	44.72	11.05	11.85	4.65	1.01	24.02	18.04	9.40
44000	25.28	44.90	17.13	19.72	4.68	1.00	23.35	17.83	9.70
45000	27.72	45.98	23.70	23.51	4.12	0.99	21.70	17.87	10.80
46000	27.09	49.86	13.37	15.38	6.40	1.01	21.67	17.20	12.20
47000	18.83	51.23	10.87	11.82	17.85	1.01	22.51	16.16	12.90

## 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 = 4.75V, Id = 480mA @ 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)
18000	13.04	43.42	10.29	13.80	14.39	1.05	25.58	18.21	13.20
20000	20.18	42.05	11.46	19.08	5.70	1.06	26.85	20.28	9.90
21000	22.58	40.04	16.96	36.30	3.72	1.00	27.66	20.87	9.10
22000	24.96	36.93	13.35	12.10	1.85	0.94	28.36	21.61	8.70
23000	23.34	37.47	10.19	9.17	2.20	0.89	27.57	21.02	8.40
24000	21.75	38.47	12.62	11.40	3.06	0.96	27.77	21.11	8.30
25000	22.48	37.64	22.13	20.86	2.90	0.97	28.55	22.26	8.20
26000	23.95	36.91	17.58	13.53	2.20	0.92	29.39	22.72	8.20
27000	23.07	39.46	11.63	11.65	2.90	0.98	29.68	22.81	8.20
28000	21.33	43.58	10.68	12.22	5.67	1.00	29.95	23.12	8.10
29000	20.43	45.86	11.58	13.22	8.25	1.02	30.06	23.23	7.90
30000	20.04	46.34	13.71	15.31	9.63	1.01	30.02	23.42	7.90
30500	19.89	48.08	15.03	16.03	12.18	1.00	30.42	23.51	8.00
31000	19.77	47.67	15.37	15.67	11.73	1.00	30.48	23.50	8.10
31500	19.65	46.17	14.55	14.59	9.86	1.00	30.10	23.39	8.40
32000	19.62	46.93	13.52	13.73	10.63	1.00	30.57	23.22	8.60
32500	19.70	46.63	12.31	13.21	9.99	1.01	30.77	23.25	8.80
33000	19.90	45.99	11.33	12.96	8.93	1.01	30.64	23.16	9.00
33500	20.17	44.35	10.56	12.81	7.09	1.02	30.36	23.15	9.00
34000	20.52	43.04	9.83	12.52	5.77	1.03	29.66	22.75	9.00
34500	20.92	41.91	9.63	12.15	4.81	1.02	30.09	22.89	8.80
35000	21.29	41.53	9.73	11.98	4.39	1.02	29.75	22.72	8.60
35500	21.64	40.36	10.30	12.99	3.76	1.03	30.26	22.81	8.40
36000	21.70	40.10	11.30	16.79	3.80	1.05	30.30	22.87	8.20
36500	21.39	40.03	11.71	23.59	4.03	1.05	30.43	22.69	8.10
37000	20.91	40.91	11.29	18.32	4.63	1.04	30.25	22.56	8.30
37500	20.49	40.98	10.77	14.44	4.69	1.04	30.21	22.68	8.50
38000	20.41	39.62	10.75	13.41	3.99	1.04	29.57	22.55	8.80
38500	20.89	39.03	11.99	15.01	3.71	1.02	29.20	22.19	9.00
39000	21.87	38.54	14.25	20.32	3.33	1.01	29.02	22.24	9.40
39500	23.23	37.68	17.50	20.54	2.65	0.98	30.14	22.20	9.40
40000	24.35	35.86	14.91	11.84	1.79	0.92	30.76	21.91	9.40
41000	23.95	38.04	10.75	7.22	2.06	0.81	28.71	21.54	9.30
42000	22.69	40.14	10.09	8.07	2.90	0.91	27.09	20.68	9.50
43000	22.84	42.24	11.73	12.51	4.10	1.01	24.93	20.22	9.60
44000	24.25	43.80	17.69	17.98	4.64	0.99	24.16	19.59	9.90
45000	26.43	45.27	20.12	23.27	4.37	0.99	22.32	18.94	11.10
46000	25.03	54.66	12.85	14.34	13.84	1.01	22.42	18.47	12.50
47000	16.74	52.14	11.24	11.81	25.37	1.01	23.58	17.25	13.30



## 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 = 5V, Id = 480mA @ 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)
18000	12.61	43.04	10.32	13.86	14.51	1.05	25.71	18.46	13.30
20000	19.72	41.57	11.42	18.87	5.67	1.06	27.45	20.69	10.00
21000	22.20	39.15	17.20	33.12	3.52	1.00	28.45	21.36	9.20
22000	24.73	36.08	13.17	11.88	1.73	0.94	28.92	22.10	8.80
23000	23.01	37.00	10.07	9.11	2.15	0.89	27.92	21.41	8.50
24000	21.40	37.82	12.60	11.49	2.96	0.96	28.13	21.73	8.40
25000	22.19	37.03	22.46	21.43	2.81	0.97	28.93	22.85	8.30
26000	23.66	36.36	17.23	13.23	2.14	0.91	29.54	23.17	8.30
27000	22.69	39.22	11.59	11.59	2.94	0.98	29.89	23.26	8.20
28000	20.95	43.05	10.74	12.27	5.59	1.00	29.67	23.39	8.20
29000	20.04	45.32	11.56	13.16	8.09	1.02	29.49	23.40	8.00
30000	19.62	46.77	13.61	15.14	10.59	1.01	29.02	23.61	8.10
30500	19.45	45.71	14.96	15.91	9.76	1.00	29.56	23.72	8.10
31000	19.32	46.84	15.27	15.57	11.23	1.00	29.43	23.71	8.20
31500	19.19	45.27	14.58	14.55	9.36	1.00	29.06	23.61	8.50
32000	19.18	45.50	13.61	13.73	9.48	1.00	29.49	23.44	8.70
32500	19.28	45.50	12.45	13.29	9.23	1.00	29.79	23.49	8.90
33000	19.50	45.87	11.40	13.05	9.23	1.01	29.54	23.39	9.10
33500	19.79	43.45	10.59	12.95	6.70	1.02	29.30	23.38	9.10
34000	20.17	42.57	9.82	12.51	5.69	1.03	29.35	23.00	9.10
34500	20.57	41.48	9.46	11.92	4.73	1.02	29.92	23.16	9.00
35000	20.92	40.05	9.50	11.74	3.86	1.01	29.59	22.98	8.70
35500	21.22	39.68	10.09	12.82	3.63	1.03	30.04	23.08	8.50
36000	21.20	39.99	11.14	16.85	3.95	1.05	30.02	23.14	8.30
36500	20.85	40.46	11.61	23.39	4.49	1.05	30.14	22.98	8.30
37000	20.34	40.54	11.31	17.92	4.73	1.04	29.66	22.87	8.30
37500	19.94	39.38	10.82	14.35	4.16	1.04	29.76	23.10	8.60
38000	19.92	39.68	10.93	13.52	4.27	1.03	29.20	23.00	8.90
38500	20.48	38.33	12.25	15.35	3.61	1.02	29.14	22.60	9.20
39000	21.57	36.39	14.94	22.12	2.74	0.99	29.06	22.53	9.50
39500	23.00	35.18	17.63	19.16	2.08	0.95	30.28	22.48	9.50
40000	24.06	35.54	13.92	10.81	1.73	0.91	30.92	22.20	9.50
41000	23.29	36.65	10.44	7.06	1.90	0.79	28.89	21.85	9.40
42000	22.07	40.16	10.14	8.28	3.15	0.92	27.24	21.21	9.60
43000	22.40	43.08	12.08	12.99	4.81	1.01	24.77	20.97	9.70
44000	23.97	45.53	18.71	17.16	5.81	0.99	23.99	20.37	10.10
45000	26.12	45.99	18.94	21.85	4.88	1.00	22.84	19.48	11.30
46000	24.41	55.77	12.52	13.88	16.78	1.01	22.81	18.83	12.60
47000	16.10	52.61	11.28	11.80	28.88	1.01	24.30	17.71	13.50

## 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 = 480mA @ 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)
18000	12.18	43.13	10.32	13.82	15.38	1.05	25.77	18.67	13.50
20000	19.36	41.39	11.55	19.09	5.81	1.06	28.07	20.95	10.10
21000	21.91	38.94	17.30	34.19	3.56	1.00	29.04	21.72	9.30
22000	24.34	35.99	12.86	11.90	1.77	0.94	29.32	22.52	8.90
23000	22.58	37.02	10.21	9.35	2.28	0.90	28.07	21.91	8.60
24000	21.10	37.75	12.88	11.83	3.07	0.97	28.48	22.24	8.50
25000	22.02	36.58	24.11	22.40	2.74	0.96	29.01	23.17	8.40
26000	23.42	36.21	16.08	12.54	2.13	0.91	28.85	23.44	8.30
27000	22.19	39.07	11.39	11.54	3.03	0.99	29.19	23.49	8.30
28000	20.45	43.64	10.88	12.41	6.35	1.01	28.78	23.55	8.20
29000	19.61	46.69	11.87	13.50	10.06	1.02	27.85	23.55	8.00
30000	19.26	48.50	13.92	15.61	13.53	1.01	26.62	23.77	8.00
30500	19.12	51.15	15.28	16.45	18.98	1.00	27.71	23.91	8.10
31000	19.02	49.07	15.49	16.03	15.09	1.00	27.10	23.89	8.30
31500	18.91	49.04	14.80	14.91	15.01	1.00	26.51	23.81	8.60
32000	18.88	47.06	13.56	13.97	11.73	1.00	27.18	23.64	8.80
32500	18.95	46.31	12.22	13.29	10.46	1.01	27.76	23.71	9.00
33000	19.13	46.58	11.04	12.83	10.34	1.02	27.28	23.59	9.20
33500	19.35	45.73	10.26	12.64	9.01	1.03	27.09	23.57	9.10
34000	19.65	43.83	9.63	12.35	6.90	1.03	27.77	23.21	9.20
34500	20.01	43.53	9.55	12.06	6.36	1.03	28.73	23.38	9.00
35000	20.35	42.14	9.80	12.19	5.26	1.02	28.60	23.19	8.80
35500	20.67	40.42	10.57	13.46	4.28	1.03	29.10	23.30	8.60
36000	20.72	41.01	11.71	17.66	4.76	1.05	29.09	23.38	8.40
36500	20.47	40.11	12.17	26.00	4.55	1.05	29.31	23.23	8.30
37000	20.08	40.10	11.76	19.23	4.68	1.04	28.68	23.13	8.40
37500	19.76	40.53	11.23	15.27	4.92	1.04	28.94	23.39	8.60
38000	19.77	40.59	11.20	14.32	4.88	1.04	28.45	23.30	9.00
38500	20.28	39.17	12.36	16.08	4.08	1.02	28.61	22.90	9.20
39000	21.22	36.89	14.37	21.01	2.98	1.00	28.44	22.77	9.50
39500	22.40	36.41	16.15	17.58	2.49	0.97	29.46	22.71	9.50
40000	23.25	36.81	13.95	11.25	2.17	0.94	30.27	22.46	9.60
41000	22.77	38.75	11.08	7.63	2.55	0.85	28.63	22.10	9.50
42000	21.82	41.09	10.54	8.51	3.66	0.92	26.97	21.59	9.70
43000	22.16	45.97	12.25	12.82	6.89	1.01	24.38	21.31	9.80
44000	23.60	44.10	17.81	16.77	5.14	0.99	23.74	20.71	10.20
45000	25.55	46.20	18.62	22.87	5.34	1.00	23.22	19.89	11.40
46000	23.88	45.57	12.60	14.13	5.53	1.01	23.33	19.13	12.70
47000	15.55	49.44	11.34	11.86	21.39	1.01	24.47	18.06	13.60

## 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 = 3.8V, Id = 480mA @ 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)			(dBm)	(dBm)	(dB)
18000	19.25	53.16	9.55	12.74	20.89	1.05	24.65	16.29	11.00
20000	29.19	57.50	11.85	26.72	12.16	1.06	22.17	19.03	8.20
21000	30.78	57.42	12.65	20.28	10.07	1.04	22.85	20.19	7.70
22000	30.84	56.61	12.35	14.31	8.80	1.02	22.90	21.42	7.30
23000	29.85	58.57	12.74	12.01	12.17	0.98	23.06	22.08	7.00
24000	29.46	55.32	13.71	11.62	8.78	0.97	23.43	20.88	6.90
25000	29.76	52.37	18.18	14.28	6.42	0.98	22.87	20.76	6.80
26000	30.20	51.28	18.50	13.89	5.37	0.97	23.81	20.63	6.70
27000	30.03	49.91	13.58	11.62	4.42	0.97	23.31	20.81	6.70
28000	28.63	47.79	10.77	11.21	3.97	0.97	22.96	20.82	6.60
29000	27.55	50.92	11.65	12.92	6.50	1.02	24.78	19.62	6.40
30000	27.50	54.01	15.05	16.26	10.03	1.01	26.13	19.78	6.30
30500	27.60	52.00	16.84	16.94	8.00	0.99	25.69	19.93	6.30
31000	27.72	61.26	16.89	16.29	22.77	1.00	24.99	19.77	6.40
31500	27.65	55.15	15.03	14.60	11.10	0.99	24.26	19.77	6.60
32000	27.45	66.00	13.14	12.99	38.20	1.00	24.52	19.64	6.90
32500	27.25	57.49	11.46	11.55	13.97	1.00	25.63	19.01	7.10
33000	27.20	56.58	10.23	10.57	12.10	1.00	26.95	19.08	7.30
33500	27.24	60.08	9.42	10.19	17.50	1.01	26.56	19.19	7.30
34000	27.33	60.56	9.20	10.38	18.34	1.02	25.62	18.63	7.30
34500	27.62	62.76	9.65	11.18	23.60	1.02	25.08	19.10	7.20
35000	27.81	59.36	10.51	12.45	16.19	1.03	24.93	18.96	7.00
35500	28.15	55.33	12.12	14.67	10.36	1.02	24.59	19.31	6.80
36000	28.56	57.53	13.48	19.26	13.27	1.03	24.87	19.54	6.60
36500	28.99	60.97	13.75	29.01	19.00	1.04	25.46	19.55	6.30
37000	29.22	57.77	13.03	28.02	12.70	1.05	25.19	19.32	6.40
37500	29.27	61.90	11.74	19.10	19.69	1.05	24.34	20.26	6.70
38000	29.29	55.79	10.47	15.34	9.32	1.06	22.76	20.71	7.00
38500	29.37	58.43	10.03	13.87	12.26	1.05	20.57	21.43	7.10
39000	29.42	50.32	9.66	13.81	4.85	1.04	28.84	20.14	7.40
39500	29.44	55.56	9.97	14.70	8.87	1.06	22.74	20.23	7.50
40000	29.81	50.37	11.32	16.74	4.92	1.04	23.53	18.38	7.40
41000	30.98	48.17	13.82	11.42	3.30	0.94	24.02	19.06	7.30
42000	30.59	47.40	12.10	6.62	2.50	0.84	23.03	19.34	7.40
43000	31.47	52.93	11.96	6.81	4.35	0.85	22.75	19.41	7.10
44000	31.51	68.27	12.34	13.72	31.10	1.01	25.84	18.41	6.90
45000	32.03	57.50	16.03	22.60	9.12	1.02	23.42	18.86	7.30
46000	34.26	53.82	16.80	12.81	4.49	0.95	25.00	18.00	8.70
47000	36.27	48.62	10.13	10.96	1.79	0.98	23.86	16.52	10.60

## 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 = 4V, Id = 480mA @ 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)
18000	17.45	49.26	9.62	12.85	16.49	1.05	25.11	16.98	11.20
20000	26.13	50.62	11.30	23.10	7.73	1.07	22.17	19.18	8.30
21000	27.87	48.85	13.96	26.63	5.40	1.03	22.47	20.45	7.80
22000	28.97	46.86	13.89	14.46	3.66	1.00	22.90	21.50	7.40
23000	28.07	46.50	11.69	10.43	3.67	0.94	23.11	22.12	7.00
24000	26.98	46.64	12.39	10.43	4.15	0.96	23.28	20.58	6.90
25000	27.04	45.45	17.21	14.85	3.99	0.98	23.07	20.74	6.80
26000	27.95	43.82	22.79	15.75	3.08	0.96	24.32	20.78	6.80
27000	28.17	43.41	13.31	11.06	2.60	0.94	23.60	20.99	6.70
28000	26.48	44.71	10.25	10.74	3.52	0.97	23.42	20.88	6.70
29000	25.27	48.57	11.50	12.73	6.41	1.02	25.73	19.90	6.40
30000	25.20	52.30	14.66	15.98	10.69	1.01	26.79	20.31	6.40
30500	25.25	55.08	16.25	16.37	14.82	1.00	26.43	20.40	6.40
31000	25.29	58.91	16.15	15.64	22.80	1.00	25.69	20.16	6.50
31500	25.17	60.02	14.83	14.18	25.72	0.99	24.98	20.04	6.60
32000	25.01	54.86	13.16	12.89	13.99	1.00	25.28	19.85	6.90
32500	24.92	59.09	11.67	11.70	22.16	1.00	26.48	19.63	7.20
33000	24.96	60.37	10.49	10.88	24.64	1.00	27.71	19.84	7.40
33500	25.02	56.62	9.65	10.53	15.52	1.01	27.32	19.86	7.30
34000	25.17	61.36	9.46	10.74	26.20	1.02	26.22	19.16	7.40
34500	25.47	55.60	9.88	11.52	13.42	1.02	25.75	19.49	7.30
35000	25.72	55.85	10.75	12.78	13.90	1.03	25.61	19.31	7.10
35500	26.20	53.61	12.12	14.64	10.62	1.03	25.39	19.60	6.80
36000	26.75	58.19	13.18	17.82	17.44	1.03	25.57	19.88	6.60
36500	27.21	53.27	13.05	23.80	9.53	1.04	26.09	19.94	6.40
37000	27.37	49.46	12.10	28.61	6.00	1.05	26.00	19.69	6.50
37500	27.22	51.64	10.54	17.75	7.44	1.07	25.09	20.61	6.80
38000	26.83	49.28	9.28	13.41	5.57	1.07	23.50	20.97	7.00
38500	26.37	45.08	8.97	11.87	3.60	1.03	20.75	21.43	7.30
39000	26.05	44.61	9.22	12.23	3.64	1.02	24.97	21.58	7.50
39500	26.14	43.54	10.37	14.22	3.34	1.02	22.82	20.24	7.60
40000	27.02	41.30	13.13	20.56	2.53	1.00	24.37	18.70	7.50
41000	30.06	38.03	19.10	8.70	1.31	0.68	24.71	19.41	7.40
42000	29.05	39.86	10.22	4.48	1.07	0.67	23.64	19.61	7.50
43000	28.20	44.41	9.58	7.67	2.39	0.92	22.32	19.65	7.20
44000	28.24	47.01	12.60	20.46	4.14	1.03	24.81	18.91	7.00
45000	30.38	45.49	18.33	17.54	2.86	0.96	23.00	19.14	7.50
46000	35.38	46.02	17.16	29.06	1.82	0.93	24.75	18.36	9.10
47000	29.02	45.58	9.05	8.86	2.56	0.98	23.38	16.72	10.80

## 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 = 4.2V, Id = 480mA @ 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)
18000	16.25	48.69	9.66	12.87	17.72	1.05	25.52	17.62	11.30
20000	24.67	49.76	11.63	24.55	8.35	1.06	22.43	19.25	8.30
21000	26.54	48.44	14.07	24.49	5.99	1.03	22.27	20.59	7.80
22000	27.56	46.47	13.54	14.38	4.09	1.00	23.03	21.53	7.40
23000	26.73	47.25	12.07	10.98	4.69	0.96	23.03	21.95	7.10
24000	25.90	46.70	13.07	11.05	4.84	0.96	23.14	20.31	7.00
25000	26.02	45.32	18.08	14.91	4.43	0.98	23.67	20.86	6.80
26000	26.76	43.94	20.11	14.62	3.51	0.96	25.36	20.93	6.80
27000	26.63	44.80	13.15	11.61	3.63	0.96	24.45	21.16	6.80
28000	25.10	47.40	10.40	11.46	5.62	1.00	24.01	20.78	6.70
29000	23.98	50.20	11.43	13.09	9.00	1.02	26.72	20.38	6.50
30000	23.78	51.47	14.26	15.75	11.37	1.01	27.71	20.85	6.40
30500	23.74	56.30	15.63	16.15	20.20	1.00	27.37	20.95	6.40
31000	23.69	53.40	15.57	15.32	14.47	1.00	26.83	20.59	6.60
31500	23.53	56.51	14.36	13.99	20.60	1.00	26.26	20.45	6.70
32000	23.41	52.41	13.10	12.89	12.70	1.00	26.72	20.14	7.00
32500	23.40	54.08	11.87	11.93	14.95	1.00	27.79	20.15	7.20
33000	23.54	56.46	10.78	11.21	18.74	1.00	28.63	20.56	7.40
33500	23.67	60.29	10.01	10.89	28.13	1.01	28.18	20.56	7.40
34000	23.87	52.28	9.64	10.78	10.86	1.01	27.02	19.78	7.40
34500	24.15	51.50	9.94	11.22	9.74	1.01	26.68	20.00	7.30
35000	24.39	50.93	10.76	12.14	9.20	1.01	26.48	19.81	7.10
35500	24.80	49.57	11.99	14.17	7.80	1.02	26.42	19.95	6.90
36000	25.15	50.34	13.28	18.69	8.55	1.03	26.62	20.14	6.70
36500	25.35	50.14	13.44	29.44	8.30	1.04	27.13	20.18	6.50
37000	25.33	50.13	12.84	23.33	8.23	1.04	26.99	20.12	6.60
37500	25.20	52.62	11.74	16.99	10.73	1.05	25.90	21.16	6.80
38000	25.14	50.04	10.99	14.46	7.78	1.04	24.10	21.38	7.10
38500	25.26	47.80	11.17	14.02	5.99	1.03	21.63	21.10	7.30
39000	25.63	48.62	12.02	15.37	6.47	1.02	22.94	21.46	7.60
39500	26.43	46.53	13.80	17.53	4.83	1.01	23.11	20.27	7.60
40000	27.43	44.45	16.04	16.12	3.46	0.98	25.98	19.06	7.60
41000	28.14	44.68	13.07	8.66	2.91	0.86	25.89	19.78	7.50
42000	27.31	48.49	10.83	7.06	4.22	0.87	24.18	19.84	7.50
43000	27.41	45.87	10.65	9.39	3.35	0.97	22.72	20.01	7.30
44000	27.95	56.22	13.68	17.48	12.21	1.02	23.65	19.40	7.20
45000	29.52	49.03	18.78	26.49	4.71	1.00	22.50	19.38	7.80
46000	31.24	52.62	23.42	15.44	5.72	0.97	24.12	18.67	9.50
47000	26.84	52.97	9.61	10.41	8.24	1.00	21.40	16.89	10.90

## 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 = 4.75V, Id = 480mA @ 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)			(dBm)	(dBm)	(dB)
18000	14.27	48.85	9.77	13.05	22.77	1.05	26.55	18.88	11.70
20000	22.54	49.82	11.92	25.86	10.81	1.06	24.24	19.95	8.60
21000	24.49	49.17	13.80	22.53	8.18	1.03	23.36	20.95	8.00
22000	25.42	47.31	13.31	14.54	5.72	1.01	24.25	21.60	7.50
23000	24.80	47.39	12.70	11.77	6.04	0.97	24.36	21.80	7.20
24000	24.27	47.00	14.12	11.87	6.19	0.97	23.96	20.08	7.10
25000	24.42	45.56	18.68	14.57	5.46	0.97	25.32	21.03	7.00
26000	24.85	44.37	17.70	13.34	4.46	0.96	27.39	21.77	7.00
27000	24.32	45.99	12.91	11.90	5.40	0.98	26.66	21.79	6.90
28000	22.86	46.82	10.95	12.10	6.90	1.00	27.31	21.67	6.80
29000	21.93	50.55	11.97	13.65	12.07	1.02	29.62	22.81	6.60
30000	21.74	55.14	14.34	16.15	21.99	1.01	30.16	23.44	6.70
30500	21.67	53.96	15.58	16.45	19.59	1.00	30.39	23.23	6.60
31000	21.60	56.80	15.54	15.54	27.22	1.00	29.98	23.35	6.70
31500	21.43	56.76	14.34	14.20	27.05	1.00	29.53	22.97	6.90
32000	21.32	52.31	13.07	13.01	15.96	1.00	29.96	22.95	7.20
32500	21.31	50.74	11.72	11.99	12.93	1.00	30.88	23.22	7.40
33000	21.41	55.75	10.54	11.20	21.99	1.01	31.13	23.28	7.60
33500	21.51	56.09	9.83	10.82	22.12	1.01	30.42	23.12	7.60
34000	21.69	54.67	9.52	10.78	18.25	1.01	29.29	21.81	7.60
34500	21.94	51.22	9.91	11.29	12.19	1.01	29.29	21.71	7.50
35000	22.20	53.92	10.78	12.34	16.71	1.02	29.00	21.54	7.20
35500	22.59	51.70	12.14	14.63	12.95	1.02	29.33	21.71	7.00
36000	22.90	55.62	13.71	19.37	20.47	1.03	29.43	21.91	6.80
36500	23.08	50.78	13.93	31.77	11.65	1.04	29.88	21.79	6.70
37000	23.10	51.58	13.35	23.63	12.62	1.04	29.72	21.43	6.80
37500	23.04	50.45	12.33	17.77	10.85	1.04	28.84	21.96	7.00
38000	23.06	47.80	11.56	15.39	7.77	1.04	26.28	21.74	7.30
38500	23.25	48.45	11.86	15.21	8.26	1.03	21.71	21.19	7.50
39000	23.68	45.60	12.60	16.25	5.79	1.02	22.07	21.36	7.80
39500	24.43	45.12	14.08	16.24	5.12	1.01	27.24	21.40	7.90
40000	25.15	48.75	14.64	13.41	7.02	0.98	29.65	21.26	7.90
41000	25.27	44.03	12.49	8.70	3.68	0.88	28.15	21.23	7.70
42000	24.77	50.04	11.23	7.97	7.08	0.91	25.38	20.68	7.80
43000	25.09	47.96	11.46	10.64	5.86	0.99	21.71	21.14	7.70
44000	25.92	50.11	15.12	16.80	7.71	1.01	21.54	20.27	7.80
45000	27.61	58.18	19.10	29.12	16.67	1.01	21.41	19.98	8.70
46000	28.01	51.90	16.13	15.23	7.41	0.99	22.38	19.41	10.40
47000	21.20	52.43	10.49	10.44	15.08	0.99	21.67	17.36	11.30

## 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 = 5V, Id = 480mA @ 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)
18000	13.59	45.13	9.80	13.13	16.11	1.05	26.57	19.26	11.90
20000	21.54	45.81	11.45	22.36	7.56	1.06	25.76	20.56	8.80
21000	23.75	43.56	15.19	29.21	4.78	1.02	24.97	21.15	8.10
22000	25.50	41.03	13.87	13.34	2.77	0.98	25.55	21.72	7.60
23000	24.40	41.21	11.14	10.08	3.02	0.93	25.66	21.93	7.30
24000	23.19	41.85	12.79	11.25	3.80	0.96	25.21	20.05	7.20
25000	23.59	40.59	19.86	17.20	3.49	0.98	26.75	20.71	7.10
26000	24.68	39.42	19.29	13.59	2.66	0.94	28.72	22.11	7.10
27000	24.03	40.80	12.10	11.35	3.04	0.97	28.37	22.34	7.00
28000	22.23	44.36	10.66	11.90	5.57	1.00	28.95	22.90	6.90
29000	21.29	46.31	11.97	13.60	7.96	1.02	30.28	23.71	6.70
30000	21.07	53.94	14.34	16.05	20.67	1.01	30.40	23.89	6.60
30500	20.98	53.02	15.70	16.38	19.06	1.00	31.22	24.00	6.60
31000	20.89	52.05	15.73	15.68	17.13	1.00	30.33	23.97	6.80
31500	20.75	48.75	14.57	14.43	11.68	1.00	29.94	23.78	7.00
32000	20.70	51.70	13.40	13.40	16.13	1.00	30.41	23.68	7.20
32500	20.74	49.09	12.03	12.46	11.54	1.00	31.43	23.76	7.50
33000	20.85	55.15	10.77	11.71	22.16	1.01	30.99	23.72	7.60
33500	20.98	55.16	10.02	11.33	21.44	1.02	30.23	23.68	7.60
34000	21.16	47.94	9.54	11.14	9.06	1.02	30.17	23.09	7.70
34500	21.39	49.16	9.89	11.59	10.31	1.02	30.66	22.88	7.60
35000	21.65	49.68	10.69	12.69	10.98	1.02	30.29	22.67	7.30
35500	21.99	49.84	11.96	15.05	11.22	1.03	30.90	22.63	7.10
36000	22.25	50.94	13.63	20.25	12.90	1.03	30.95	22.81	6.90
36500	22.38	48.82	14.03	35.87	10.10	1.04	31.38	22.48	6.70
37000	22.42	51.64	13.47	23.28	13.76	1.04	31.02	22.30	6.80
37500	22.40	48.73	12.46	17.84	9.62	1.04	30.96	22.38	7.10
38000	22.45	51.32	11.82	15.65	12.60	1.04	28.93	21.97	7.40
38500	22.70	46.99	12.14	15.67	7.49	1.03	28.92	21.48	7.60
39000	23.21	45.54	13.03	16.93	6.11	1.02	28.91	21.08	7.90
39500	24.01	45.87	14.54	16.46	5.87	1.01	28.92	22.57	8.00
40000	24.72	45.63	14.55	13.17	5.13	0.98	30.77	22.21	8.00
41000	24.75	46.73	12.32	8.93	5.27	0.90	29.59	21.83	7.80
42000	24.30	48.35	11.21	8.61	6.35	0.93	26.27	21.00	7.90
43000	24.67	56.26	11.58	11.33	16.33	0.99	21.25	21.45	7.90
44000	25.63	50.56	15.08	15.72	8.35	1.00	20.96	20.54	8.00
45000	27.06	58.43	18.75	31.45	18.25	1.01	21.02	20.17	9.00
46000	27.20	63.10	15.57	14.81	29.28	0.99	21.20	19.67	10.60
47000	20.27	49.48	10.53	10.64	11.99	1.00	21.41	17.59	11.50



## 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 = 480mA @ 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)
18000	13.01	45.72	9.89	13.20	18.48	1.05	26.27	19.44	12.10
20000	20.91	45.75	11.27	20.79	8.02	1.07	27.60	21.27	8.90
21000	22.93	43.34	14.68	30.11	5.10	1.02	27.60	21.54	8.10
22000	24.74	40.73	14.51	14.38	2.97	0.98	27.71	22.03	7.70
23000	23.85	40.76	11.26	10.17	3.08	0.93	27.51	21.61	7.40
24000	22.54	40.95	12.70	11.16	3.69	0.96	27.58	20.79	7.30
25000	22.91	39.92	19.93	17.83	3.51	0.98	28.60	22.94	7.20
26000	24.13	38.76	18.38	13.67	2.63	0.94	28.53	23.54	7.10
27000	23.17	40.65	11.79	11.80	3.29	0.99	28.94	23.45	7.00
28000	21.37	44.39	11.19	12.83	6.30	1.01	29.45	23.90	7.00
29000	20.77	49.33	12.82	14.82	12.28	1.02	29.18	23.94	6.80
30000	20.67	55.46	14.60	16.91	25.93	1.01	27.18	24.12	6.70
30500	20.55	58.27	15.61	17.02	36.67	1.01	28.74	24.27	6.80
31000	20.41	70.39	15.42	16.04	149.26	1.00	26.73	24.28	6.90
31500	20.23	65.50	14.35	14.61	85.27	1.00	26.25	24.06	7.10
32000	20.14	54.50	13.08	13.44	23.68	1.00	27.09	23.98	7.30
32500	20.13	53.46	11.64	12.44	20.33	1.01	28.92	24.04	7.60
33000	20.19	57.30	10.47	11.73	30.45	1.02	28.16	23.99	7.80
33500	20.29	54.33	9.83	11.47	20.97	1.02	27.26	23.97	7.70
34000	20.44	61.32	9.55	11.48	45.75	1.03	28.73	23.59	7.80
34500	20.66	53.85	10.18	12.25	19.48	1.03	30.15	23.72	7.70
35000	20.95	54.94	11.24	13.68	22.22	1.03	30.07	23.53	7.40
35500	21.33	59.45	12.85	16.08	37.29	1.03	30.33	23.64	7.20
36000	21.71	53.97	14.68	19.79	19.61	1.02	30.49	23.67	6.90
36500	22.00	66.53	15.12	27.24	81.41	1.03	30.83	23.44	6.90
37000	22.18	54.12	14.26	27.41	18.99	1.04	29.97	23.13	6.90
37500	22.22	51.80	12.92	20.10	14.15	1.04	30.50	23.28	7.20
38000	22.24	53.14	11.87	16.63	16.03	1.04	29.26	22.70	7.50
38500	22.36	52.77	11.91	15.80	15.07	1.04	28.20	21.71	7.70
39000	22.73	48.77	12.47	15.71	9.21	1.03	29.14	23.01	8.00
39500	23.33	50.84	13.44	14.81	10.95	1.01	30.39	22.92	8.10
40000	23.83	49.44	13.72	12.70	8.68	0.98	32.11	22.62	8.10
41000	23.84	51.56	12.74	9.80	10.40	0.94	30.76	22.44	7.90
42000	23.79	54.21	12.11	9.73	14.01	0.94	27.47	21.29	8.10
43000	24.53	55.71	12.77	11.28	15.83	0.98	21.61	21.51	8.00
44000	25.63	53.65	14.56	13.43	11.64	0.98	21.90	20.89	8.20
45000	26.35	49.51	15.63	27.87	7.01	1.02	20.60	20.33	9.20
46000	25.45	49.79	15.15	13.16	7.67	0.97	20.05	19.80	10.90
47000	19.71	55.56	11.46	11.64	26.83	1.00	21.21	17.68	11.70



## 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 = 3.8V, Id = 480mA @ 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)
18000	14.16	64.76	10.80	14.49	149.83	1.04	24.40	16.40	13.70
20000	22.23	60.89	11.74	20.37	39.60	1.06	25.07	17.95	10.50
21000	23.31	65.38	12.42	17.44	58.73	1.04	25.82	18.66	9.70
22000	23.78	63.31	14.29	15.36	44.31	1.01	26.62	19.49	9.30
23000	23.99	65.49	16.46	13.76	55.65	0.98	25.86	18.76	9.00
24000	24.16	64.36	17.42	12.31	47.30	0.96	26.51	19.28	8.90
25000	23.86	65.27	16.18	11.84	53.63	0.96	26.90	20.14	8.90
26000	23.34	64.01	14.71	12.65	49.42	0.98	27.48	20.62	8.90
27000	22.56	60.10	13.10	13.78	34.33	1.00	27.86	20.85	8.90
28000	21.70	57.98	11.59	13.51	28.92	1.02	28.13	21.10	8.80
29000	20.93	57.85	11.77	13.63	31.35	1.02	28.18	21.24	8.60
30000	20.49	56.08	13.96	15.63	28.08	1.01	28.29	21.47	8.70
30500	20.40	58.14	15.62	16.29	36.62	1.00	28.66	21.51	8.70
31000	20.40	54.10	16.07	15.70	23.00	1.00	28.81	21.42	8.90
31500	20.32	61.52	15.26	14.13	53.55	0.99	28.58	21.42	9.10
32000	20.24	56.35	13.56	12.67	28.88	0.99	28.90	21.22	9.30
32500	20.15	58.15	11.57	11.32	34.16	0.99	29.17	21.32	9.60
33000	20.09	55.14	10.17	10.47	23.16	1.00	28.86	21.15	9.70
33500	20.05	67.87	9.53	10.37	99.16	1.01	28.56	21.07	9.70
34000	20.17	58.22	9.57	11.00	32.62	1.02	28.04	20.64	9.70
34500	20.49	57.74	10.30	12.16	31.01	1.03	28.60	20.86	9.60
35000	20.81	57.84	11.33	13.81	31.55	1.03	28.35	20.81	9.30
35500	21.22	60.46	12.73	16.80	42.45	1.03	28.99	20.89	9.20
36000	21.49	59.02	14.16	24.31	36.08	1.03	28.87	20.97	8.90
36500	21.71	62.33	13.86	37.93	51.48	1.04	28.84	20.76	8.90
37000	21.78	56.73	12.48	21.18	26.21	1.05	28.68	20.65	9.00
37500	21.71	56.30	11.18	16.52	24.23	1.05	27.80	20.78	9.30
38000	21.75	53.64	10.39	14.71	17.23	1.06	27.30	20.68	9.60
38500	21.91	57.24	10.14	14.09	25.32	1.06	27.58	20.39	9.90
39000	22.04	57.87	10.06	13.52	26.58	1.05	27.70	20.35	10.20
39500	22.29	51.32	10.67	12.78	12.21	1.03	28.01	20.31	10.20
40000	22.50	54.50	11.36	11.89	17.18	1.01	27.64	20.03	10.20
41000	22.30	48.38	11.72	10.62	8.68	0.97	26.14	19.37	10.10
42000	21.85	54.78	11.12	10.50	18.67	0.98	25.43	18.38	10.20
43000	22.48	58.94	12.21	14.26	30.09	1.02	24.88	17.67	10.30
44000	23.93	63.32	15.89	18.96	44.87	1.01	23.96	16.68	10.80
45000	24.87	58.21	16.16	29.10	22.65	1.02	22.39	15.68	12.00
46000	23.30	52.85	14.54	13.84	13.93	0.99	22.27	15.19	13.00
47000	15.31	62.50	12.85	12.65	102.67	0.99	22.95	15.38	13.90

## 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 = 4V, Id = 480mA @ 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)
18000	13.79	66.71	10.78	14.52	195.62	1.04	24.65	16.82	13.90
20000	21.99	61.51	11.77	20.74	43.77	1.06	25.55	18.55	10.60
21000	23.15	67.57	12.44	17.68	77.05	1.04	26.46	19.26	9.80
22000	23.68	61.15	14.32	15.54	34.99	1.01	27.08	20.09	9.40
23000	23.90	61.51	16.44	13.87	35.58	0.98	26.09	19.18	9.10
24000	24.07	61.46	17.35	12.36	34.22	0.96	26.91	19.76	9.00
25000	23.76	62.15	16.17	11.88	37.93	0.96	27.42	20.64	9.00
26000	23.22	64.70	14.65	12.67	54.19	0.98	27.93	21.08	9.00
27000	22.41	60.18	13.04	13.85	35.19	1.01	28.17	21.34	9.00
28000	21.52	75.80	11.63	13.57	230.29	1.02	28.53	21.53	8.90
29000	20.75	54.65	11.75	13.80	22.15	1.02	28.66	21.69	8.80
30000	20.31	61.34	13.93	15.88	52.63	1.01	28.82	21.94	8.90
30500	20.20	57.31	15.55	16.43	34.03	1.00	29.22	21.98	8.90
31000	20.19	56.02	16.00	15.83	29.42	1.00	29.27	21.93	9.00
31500	20.11	55.57	15.28	14.28	27.73	0.99	29.06	21.92	9.20
32000	20.03	54.09	13.55	12.84	22.88	0.99	29.29	21.73	9.40
32500	19.95	54.68	11.59	11.51	23.53	1.00	29.51	21.81	9.70
33000	19.92	54.68	10.20	10.70	22.57	1.01	29.27	21.65	9.80
33500	19.90	56.40	9.55	10.61	27.06	1.02	28.97	21.56	9.80
34000	20.03	58.81	9.55	11.13	35.58	1.03	28.26	21.08	9.80
34500	20.35	62.01	10.24	12.23	51.52	1.03	28.89	21.30	9.60
35000	20.67	62.44	11.27	13.81	54.36	1.03	28.62	21.22	9.40
35500	21.09	59.94	12.65	16.71	40.56	1.03	29.14	21.30	9.20
36000	21.36	56.68	14.09	23.38	27.90	1.03	29.02	21.39	9.00
36500	21.60	57.76	13.79	48.24	30.81	1.04	29.09	21.20	9.00
37000	21.71	55.26	12.52	22.90	22.35	1.05	29.12	21.13	9.10
37500	21.69	55.85	11.28	17.69	23.22	1.06	28.76	21.23	9.40
38000	21.75	53.81	10.39	15.46	17.65	1.06	28.31	21.18	9.70
38500	21.90	53.99	10.12	14.64	17.48	1.06	27.91	20.90	10.00
39000	22.03	54.37	10.03	13.74	17.80	1.06	27.64	20.83	10.30
39500	22.27	63.39	10.63	12.80	49.19	1.03	27.98	20.76	10.30
40000	22.50	54.16	11.28	11.79	16.53	1.00	28.02	20.50	10.30
41000	22.37	57.52	11.73	10.43	24.34	0.97	26.56	19.95	10.20
42000	21.99	56.87	11.10	10.01	23.11	0.97	26.09	19.08	10.30
43000	22.49	55.62	12.06	13.11	20.18	1.01	25.33	18.58	10.40
44000	23.84	57.97	15.96	17.71	24.39	1.01	24.26	17.61	10.90
45000	24.88	51.44	16.23	30.13	10.40	1.02	22.59	15.62	12.20
46000	23.43	50.38	14.48	13.70	10.34	0.99	22.76	16.16	13.20
47000	15.51	60.03	12.82	12.33	75.11	0.99	23.03	15.88	14.20

## 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 = 4.2V, Id = 480mA @ 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)
18000	13.36	69.13	10.78	14.51	271.45	1.05	24.94	17.18	14.00
20000	21.59	64.10	11.81	20.94	61.84	1.06	25.96	19.14	10.70
21000	22.82	64.09	12.49	17.81	53.66	1.04	26.94	19.95	9.90
22000	23.40	61.99	14.38	15.66	39.85	1.01	27.64	20.49	9.50
23000	23.64	73.75	16.41	13.90	150.16	0.98	26.48	19.41	9.20
24000	23.79	67.34	17.28	12.36	69.53	0.96	27.25	20.31	9.10
25000	23.47	69.92	16.13	11.85	95.74	0.96	27.82	21.26	9.10
26000	22.91	66.56	14.64	12.64	69.51	0.98	28.42	21.57	9.10
27000	22.08	62.96	13.08	13.82	50.41	1.01	28.58	21.73	9.10
28000	21.17	62.96	11.65	13.60	54.80	1.02	28.90	21.86	9.00
29000	20.39	60.02	11.84	13.82	42.98	1.02	29.02	22.06	8.80
30000	19.94	58.14	13.96	15.84	37.96	1.01	29.27	22.39	8.90
30500	19.83	57.50	15.61	16.44	36.32	1.00	29.69	22.48	8.90
31000	19.81	54.58	16.06	15.75	26.04	1.00	29.76	22.46	9.10
31500	19.72	55.35	15.29	14.31	28.28	0.99	29.53	22.43	9.30
32000	19.64	57.30	13.58	12.83	34.61	0.99	29.79	22.23	9.50
32500	19.56	54.74	11.61	11.51	24.82	0.99	29.97	22.28	9.70
33000	19.53	51.32	10.25	10.74	16.04	1.01	29.64	22.12	9.90
33500	19.53	60.13	9.57	10.66	43.54	1.02	29.30	22.03	9.90
34000	19.67	57.45	9.59	11.23	31.81	1.03	28.56	21.51	9.90
34500	20.00	69.28	10.26	12.26	124.07	1.03	29.05	21.65	9.70
35000	20.32	74.60	11.26	13.80	229.37	1.03	28.77	21.60	9.50
35500	20.73	56.89	12.67	16.66	29.75	1.03	29.31	21.71	9.30
36000	21.01	54.78	14.16	23.10	23.37	1.03	29.30	21.84	9.10
36500	21.25	65.61	13.88	43.77	79.23	1.04	29.39	21.68	9.10
37000	21.38	54.43	12.70	23.39	21.18	1.05	29.49	21.65	9.20
37500	21.39	65.07	11.39	18.09	69.78	1.06	29.24	21.73	9.50
38000	21.45	65.55	10.48	15.70	71.04	1.06	28.80	21.67	9.80
38500	21.58	69.37	10.15	14.73	106.93	1.06	28.40	21.35	10.10
39000	21.68	60.41	10.01	13.64	37.14	1.05	28.18	21.24	10.40
39500	21.89	55.43	10.62	12.70	20.50	1.03	28.48	21.14	10.40
40000	22.08	53.42	11.24	11.69	15.91	1.00	28.39	20.82	10.30
41000	21.97	52.62	11.72	10.45	14.55	0.97	26.90	20.30	10.30
42000	21.69	59.13	11.21	10.09	31.09	0.97	26.49	19.68	10.40
43000	22.19	51.29	12.06	12.95	12.65	1.01	25.58	19.45	10.50
44000	23.47	53.20	16.01	17.11	14.67	1.00	24.75	18.41	11.10
45000	24.44	67.19	16.26	29.24	66.93	1.02	22.87	15.45	12.30
46000	22.91	61.00	14.12	13.70	36.96	0.99	23.16	16.95	13.30
47000	15.06	64.58	12.72	12.26	133.17	0.99	23.04	16.32	14.40

## 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 = 4.75V, Id = 480mA @ 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)
18000	12.36	64.87	10.81	14.59	186.85	1.05	25.51	17.92	14.30
20000	20.68	61.34	11.89	21.56	50.06	1.06	27.20	20.25	10.90
21000	22.08	64.46	12.60	18.17	61.16	1.04	28.27	21.02	10.20
22000	22.78	64.78	14.46	15.88	59.19	1.01	28.73	21.80	9.70
23000	23.07	67.79	16.42	13.98	80.78	0.98	27.34	20.72	9.40
24000	23.18	63.88	17.21	12.35	50.03	0.96	27.96	21.50	9.30
25000	22.81	71.90	16.09	11.83	129.74	0.96	28.68	22.41	9.30
26000	22.19	65.75	14.65	12.60	68.84	0.98	29.06	22.67	9.30
27000	21.31	62.78	13.10	13.79	53.95	1.01	29.29	22.77	9.30
28000	20.35	68.29	11.72	13.60	111.20	1.02	29.33	22.88	9.20
29000	19.54	56.71	11.97	13.90	32.41	1.02	29.41	22.95	9.00
30000	19.08	59.16	14.00	15.88	47.19	1.01	29.37	23.15	9.10
30500	18.96	54.55	15.61	16.48	28.62	1.00	29.66	23.24	9.10
31000	18.92	61.98	16.18	15.80	67.56	1.00	29.84	23.19	9.30
31500	18.83	62.37	15.34	14.25	70.28	0.99	29.47	23.13	9.50
32000	18.74	54.77	13.64	12.85	28.74	0.99	29.76	22.93	9.70
32500	18.67	59.73	11.72	11.61	49.02	0.99	29.75	22.97	10.00
33000	18.67	56.96	10.38	10.87	34.16	1.00	29.58	22.86	10.20
33500	18.70	54.95	9.70	10.79	26.53	1.02	29.36	22.83	10.10
34000	18.89	62.37	9.65	11.35	61.61	1.03	28.84	22.38	10.10
34500	19.21	60.66	10.25	12.29	50.47	1.03	29.26	22.58	9.90
35000	19.53	61.23	11.20	13.69	53.86	1.03	28.96	22.47	9.70
35500	19.92	58.16	12.56	16.47	37.73	1.03	29.34	22.55	9.50
36000	20.20	61.37	14.06	22.40	54.63	1.03	29.34	22.67	9.30
36500	20.46	58.14	13.89	36.36	36.75	1.04	29.36	22.51	9.30
37000	20.59	64.57	12.64	25.15	74.55	1.05	29.11	22.50	9.40
37500	20.59	59.99	11.26	19.07	42.66	1.06	29.01	22.61	9.70
38000	20.56	56.24	10.22	16.05	26.82	1.07	28.73	22.54	10.00
38500	20.54	55.38	9.88	14.65	23.87	1.07	28.69	22.20	10.30
39000	20.52	57.74	9.88	13.44	31.02	1.05	28.70	22.01	10.60
39500	20.72	56.15	10.61	12.47	25.39	1.03	29.27	21.94	10.60
40000	20.95	51.26	11.44	11.41	14.10	1.00	29.36	21.72	10.60
41000	20.99	49.71	12.21	10.29	11.71	0.95	27.29	21.36	10.50
42000	21.01	51.17	11.74	10.11	13.58	0.96	26.44	20.87	10.70
43000	21.57	53.59	12.58	12.69	17.81	1.00	25.16	20.52	10.90
44000	22.81	56.79	16.29	16.12	23.83	1.00	24.65	19.84	11.40
45000	23.73	50.27	16.46	27.73	10.38	1.02	23.73	18.90	12.60
46000	22.02	58.55	13.74	13.32	30.59	0.99	23.99	18.27	13.70
47000	14.20	60.45	12.81	12.01	91.21	0.99	22.93	17.21	14.80

## 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 = 5V, Id = 480mA @ 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)
18000	11.91	61.63	10.81	14.58	135.55	1.04	25.62	18.16	14.50
20000	20.25	61.99	11.92	21.74	56.75	1.06	27.70	20.58	11.10
21000	21.70	60.26	12.64	18.30	39.47	1.04	28.77	21.42	10.20
22000	22.44	65.02	14.51	15.93	63.29	1.01	28.95	22.25	9.80
23000	22.75	63.41	16.42	13.98	50.65	0.98	27.53	21.13	9.50
24000	22.83	68.86	17.13	12.32	92.39	0.96	28.21	21.94	9.40
25000	22.43	66.64	16.06	11.81	73.91	0.96	28.70	22.79	9.30
26000	21.79	65.88	14.68	12.54	73.09	0.98	28.90	22.99	9.40
27000	20.88	80.31	13.16	13.74	426.40	1.00	29.10	23.04	9.40
28000	19.89	65.59	11.83	13.56	86.13	1.02	28.98	23.09	9.30
29000	19.07	60.29	12.20	13.87	51.89	1.02	28.62	23.15	9.20
30000	18.63	64.00	14.24	15.91	87.04	1.01	28.16	23.36	9.20
30500	18.51	56.49	15.90	16.40	37.72	1.00	28.66	23.47	9.30
31000	18.46	61.65	16.34	15.71	68.63	1.00	28.71	23.43	9.40
31500	18.36	55.08	15.42	14.24	32.10	0.99	28.22	23.36	9.70
32000	18.27	54.07	13.76	12.75	27.98	0.99	28.54	23.17	9.90
32500	18.20	56.29	11.81	11.54	34.81	0.99	28.62	23.22	10.10
33000	18.20	59.16	10.49	10.89	46.61	1.00	28.55	23.09	10.20
33500	18.24	58.21	9.86	10.88	40.91	1.01	28.50	23.06	10.20
34000	18.44	59.97	9.79	11.37	49.37	1.03	28.39	22.63	10.20
34500	18.75	61.95	10.36	12.29	61.80	1.03	28.84	22.83	10.00
35000	19.06	67.81	11.30	13.80	121.54	1.03	28.52	22.71	9.80
35500	19.44	49.85	12.70	16.68	15.38	1.03	28.91	22.80	9.70
36000	19.71	57.02	14.31	22.68	35.15	1.03	28.88	22.92	9.40
36500	19.96	62.40	14.13	36.44	63.62	1.04	28.90	22.79	9.40
37000	20.08	60.96	12.82	25.34	52.28	1.05	28.54	22.79	9.50
37500	20.07	70.40	11.45	19.20	150.62	1.06	28.47	22.91	9.80
38000	20.02	59.84	10.36	16.11	43.36	1.07	28.26	22.83	10.10
38500	19.97	59.62	10.04	14.60	41.72	1.06	28.28	22.48	10.40
39000	19.95	56.86	10.18	13.32	30.14	1.05	28.22	22.28	10.70
39500	20.18	54.80	10.99	12.23	23.27	1.02	29.01	22.21	10.70
40000	20.41	53.26	11.94	11.31	18.99	0.99	29.09	22.01	10.70
41000	20.54	62.42	13.10	10.46	53.80	0.95	27.17	21.64	10.60
42000	20.88	59.85	13.04	10.48	38.50	0.95	26.06	21.19	10.80
43000	21.59	49.85	13.49	12.79	11.74	0.99	24.87	20.84	11.00
44000	22.71	50.52	16.28	15.82	11.69	1.00	24.36	20.22	11.60
45000	23.43	60.44	16.37	27.08	34.56	1.02	24.11	19.32	12.80
46000	21.55	52.29	13.73	12.97	15.71	0.99	24.33	18.61	13.80
47000	13.79	59.41	12.72	12.11	84.85	0.99	22.83	17.53	15.00

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

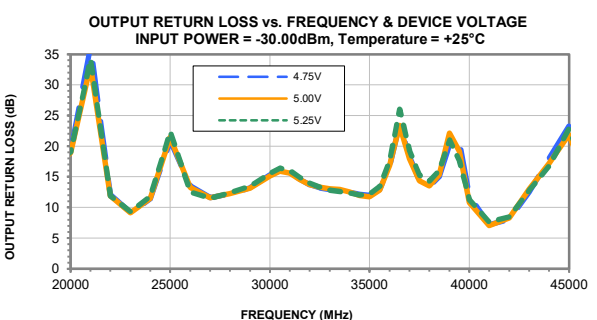
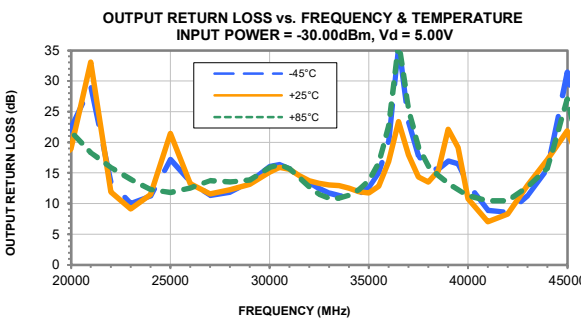
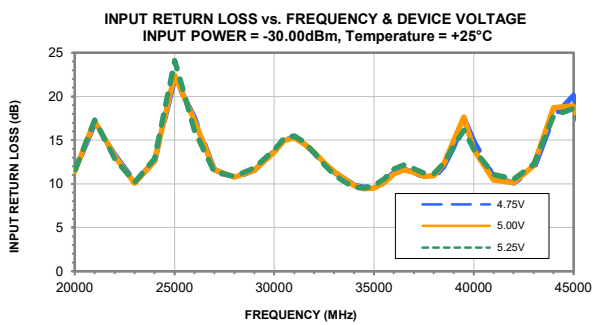
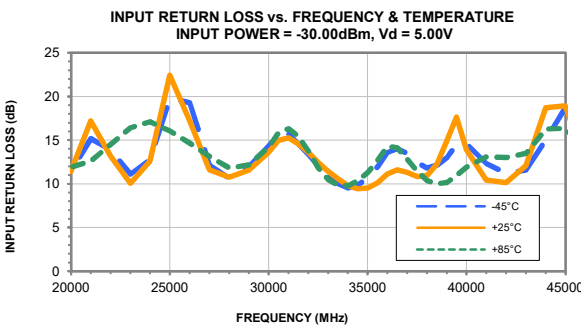
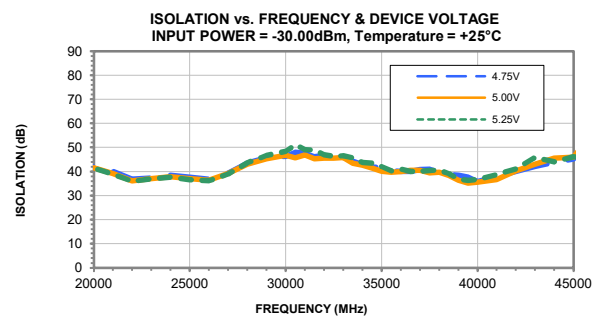
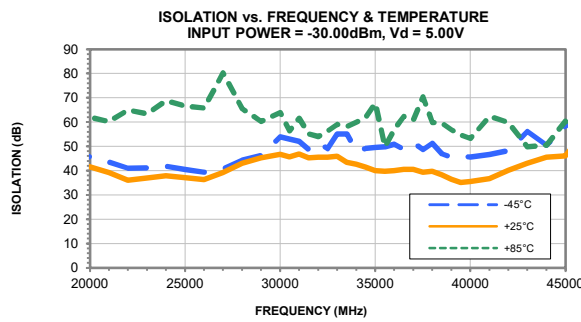
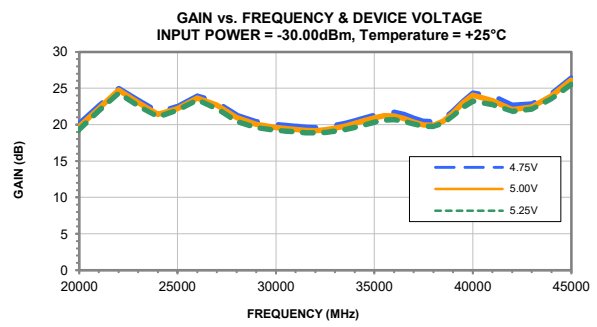
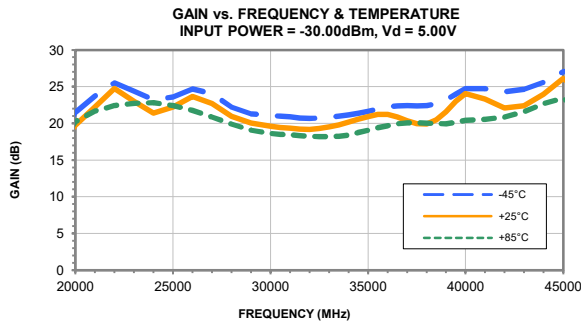
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.25V, Id = 480mA @ Temperature = +85°C

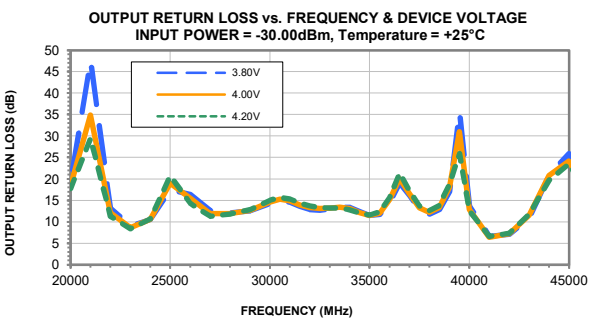
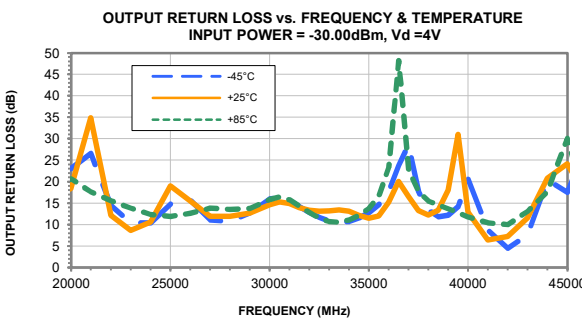
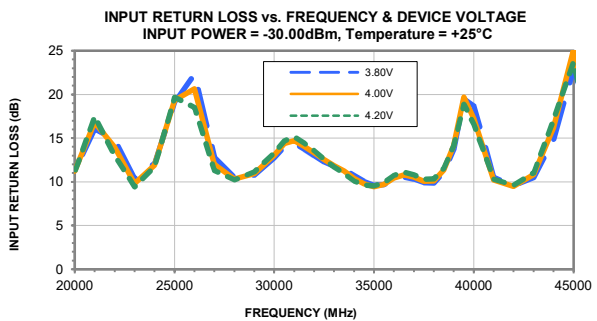
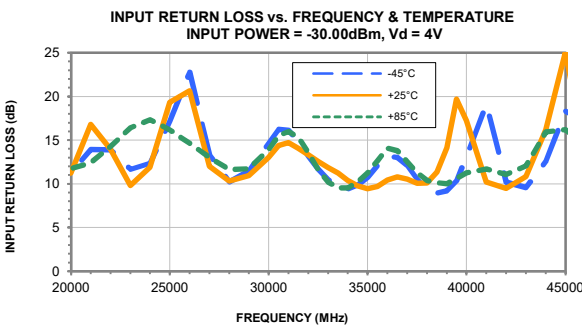
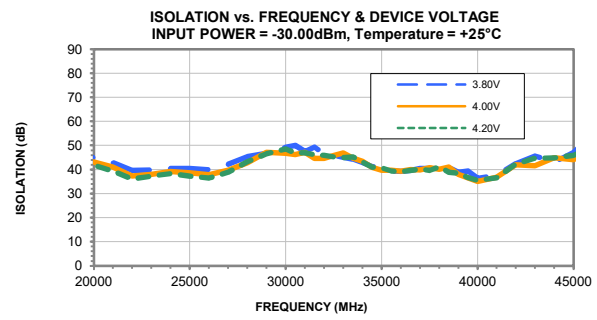
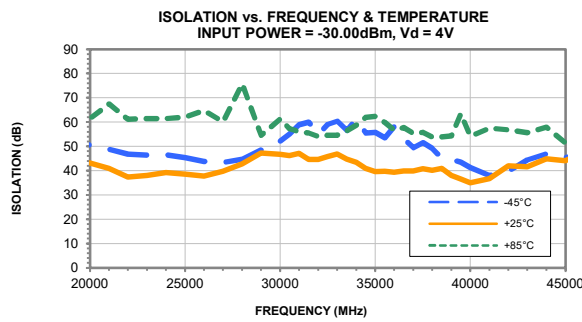
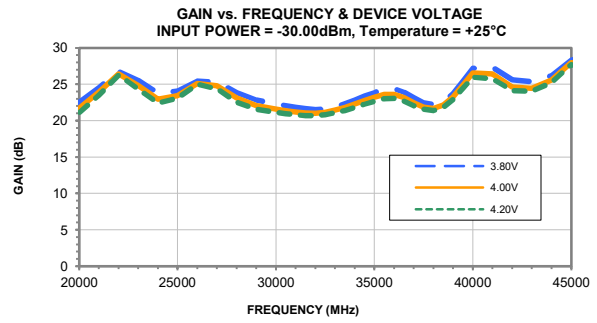
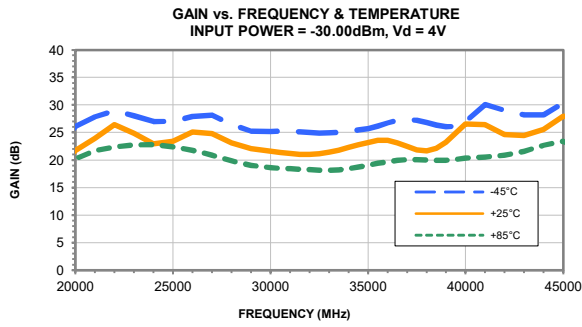
FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
18000	11.54	69.41	10.82	14.60	346.30	1.05	25.83	18.36	14.70
20000	19.92	61.36	11.94	21.98	54.93	1.06	28.12	20.77	11.20
21000	21.42	63.01	12.66	18.44	55.92	1.04	29.16	21.68	10.40
22000	22.20	64.71	14.52	15.98	62.78	1.01	29.01	22.59	9.90
23000	22.51	65.19	16.39	13.98	63.85	0.98	27.47	21.53	9.60
24000	22.55	73.04	17.17	12.33	154.46	0.96	28.28	22.27	9.50
25000	22.14	71.22	16.41	11.86	130.00	0.96	28.42	23.03	9.40
26000	21.48	61.30	15.10	12.48	44.78	0.97	28.24	23.22	9.50
27000	20.56	72.20	13.58	13.59	174.66	1.00	28.47	23.23	9.50
28000	19.57	56.89	12.38	13.60	33.18	1.01	28.15	23.26	9.40
29000	18.84	53.45	12.78	14.03	24.52	1.01	26.93	23.32	9.30
30000	18.44	56.52	14.60	15.84	37.66	1.01	26.33	23.55	9.30
30500	18.31	61.16	16.11	16.32	66.10	1.00	26.99	23.68	9.40
31000	18.25	57.00	16.63	15.59	41.19	0.99	27.00	23.62	9.60
31500	18.12	57.90	15.83	14.12	45.67	0.99	26.38	23.56	9.80
32000	18.04	54.36	14.11	12.73	29.78	0.98	26.83	23.37	10.00
32500	17.98	55.62	12.08	11.53	33.22	0.99	26.98	23.43	10.20
33000	18.00	57.94	10.72	10.94	41.76	1.00	26.69	23.29	10.40
33500	18.05	62.71	10.06	10.95	70.79	1.01	26.85	23.25	10.30
34000	18.25	62.90	9.89	11.43	71.14	1.02	27.25	22.83	10.30
34500	18.53	85.56	10.44	12.28	961.77	1.03	27.90	23.02	10.20
35000	18.83	58.28	11.43	13.83	41.80	1.03	27.58	22.91	9.90
35500	19.19	59.82	12.91	16.64	49.90	1.03	28.15	23.02	9.70
36000	19.49	53.96	14.70	22.38	25.42	1.03	28.07	23.16	9.50
36500	19.75	70.69	14.54	33.94	169.84	1.03	28.18	23.01	9.50
37000	19.88	62.82	13.31	26.34	66.77	1.04	27.76	23.02	9.60
37500	19.88	58.18	11.90	19.64	38.02	1.05	27.81	23.15	9.90
38000	19.84	72.97	10.83	16.30	203.09	1.06	27.62	23.08	10.20
38500	19.80	52.71	10.51	14.49	19.42	1.05	27.70	22.73	10.50
39000	19.86	61.16	10.78	13.07	50.56	1.03	27.67	22.50	10.80
39500	20.18	56.11	11.75	11.98	27.31	1.00	28.08	22.44	10.90
40000	20.48	58.87	12.71	11.21	36.32	0.97	28.74	22.25	10.80
41000	20.88	64.60	14.31	10.69	67.65	0.95	26.96	21.89	10.70
42000	21.47	80.26	13.83	10.70	381.52	0.95	25.67	21.45	10.90
43000	21.93	70.82	12.91	12.18	123.92	0.99	24.66	21.09	11.20
44000	22.66	52.83	13.84	15.63	15.03	1.01	24.13	20.53	11.70
45000	23.27	58.02	14.39	26.82	26.28	1.03	24.34	19.67	12.90
46000	21.48	57.38	12.74	13.18	28.16	1.00	24.75	18.90	14.00
47000	13.51	52.47	10.94	12.09	38.35	1.01	24.15	17.81	15.20



## Typical Performance Curves

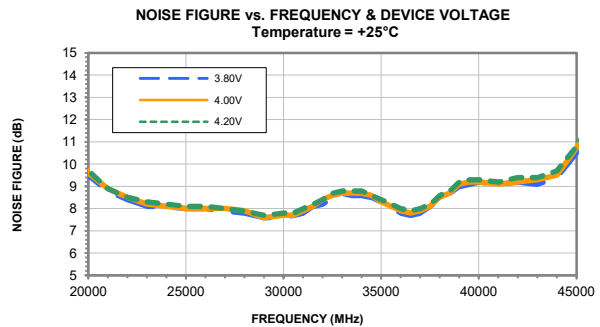
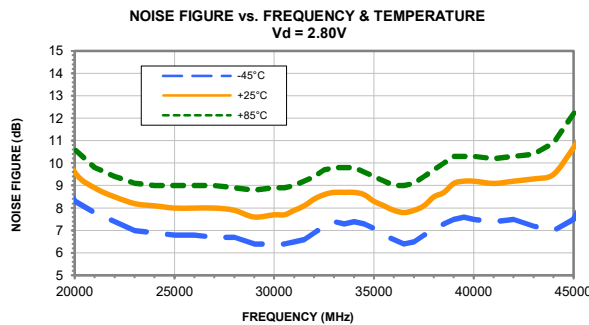
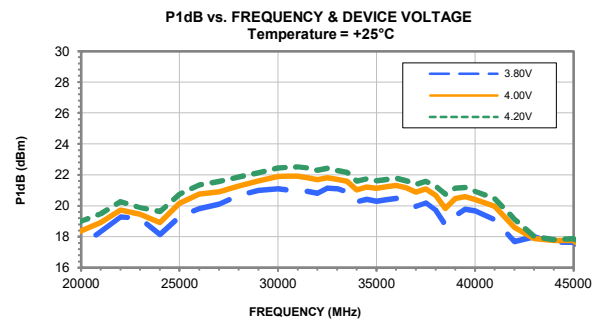
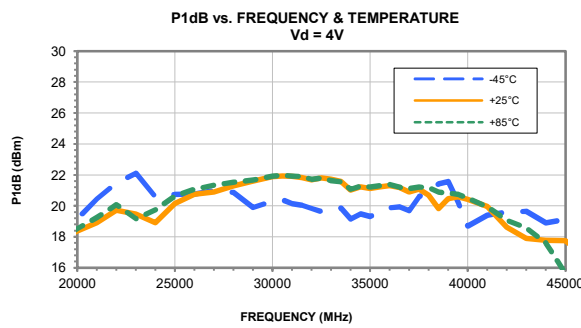
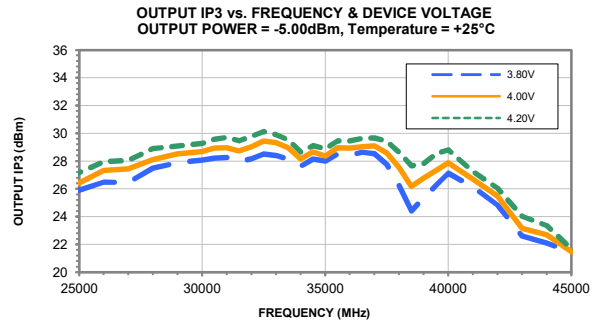
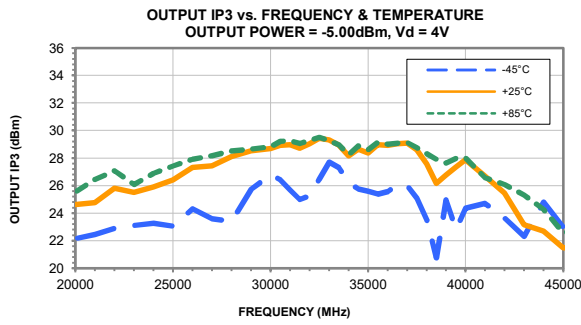


## Typical Performance Curves

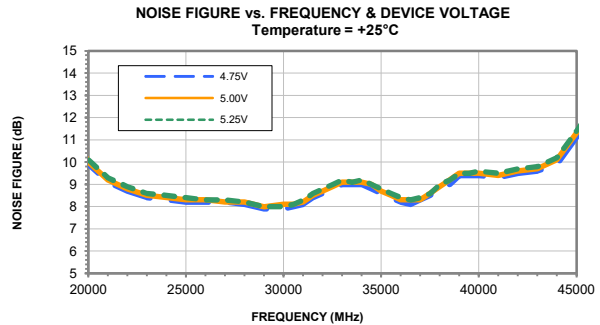
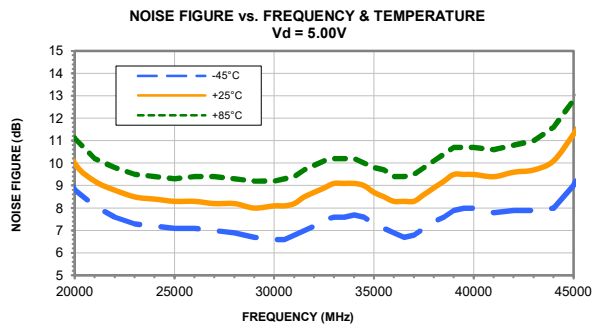
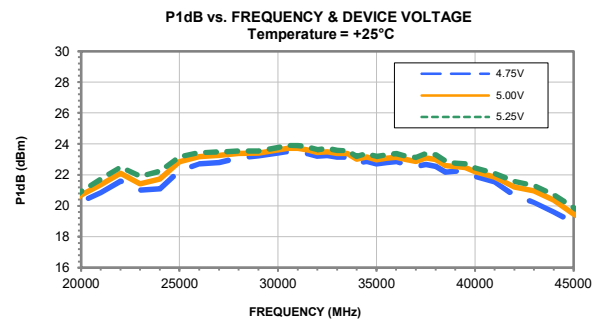
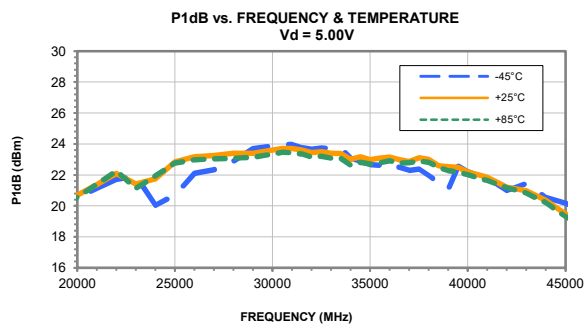
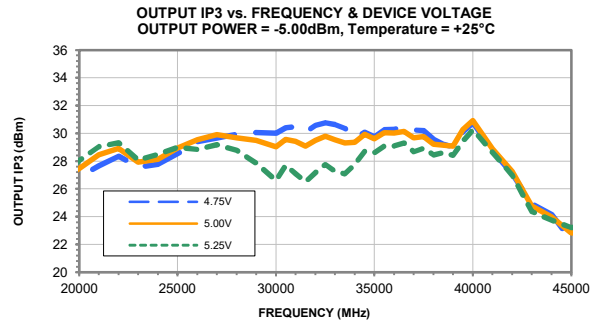
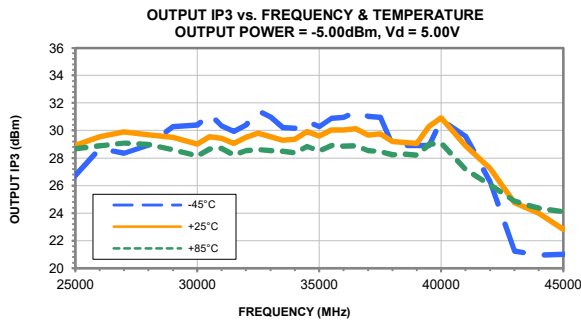




## Typical Performance Curves



## Typical Performance Curves



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 -40° to 105° C or -55° to 105° C or -45° to 105° C Ambient Environment	Refer to Individual Model Data Sheet
Storage Environment (Die)	-65° to 150°C	Individual Model Data Sheet
Storage Environment(Packaging)	-40° to 70°C and 40 to 60% humidity (In Factory Shipped Package)	