



MMIC DIE

# Wide Band Amplifier

## PMA3-14LN-D+

Mini-Circuits

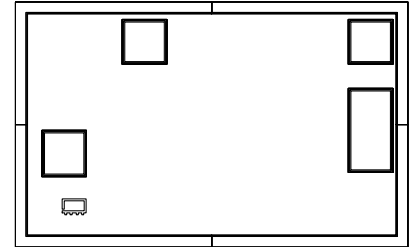
50Ω 0.05 to 10 GHz

### THE BIG DEAL

- Flat Gain, 22.6 ± 0.7 dB up to 10 GHz
- P1dB, +22 dBm Typ. vs. OIP3, +30.4 dBm Typ. up to 8 GHz
- Low Noise Figure, 1.8 dB Typ.
- Patent Pending

### APPLICATIONS

- 5G Infrastructure
- Wi-Fi 6E & IoT
- SatCom
- L, S, C Band Radar
- Test and Measurement Equipment



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

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### PRODUCT OVERVIEW

The PMA3-14LN-D+ is a GaAs PHEMT based wide band, low noise MMIC amplifier die with a unique combination of low Noise Figure, high IP3, and high Output Power, over a wide band making it ideal for sensitive, high-dynamic range receiver applications. This design operates on a single supply of +6V, is well matched for 50Ω.

### KEY FEATURES

Feature	Advantages
Low Noise, 1.8 dB Typ. up to 10 GHz	Enables lower system Noise Figure performance.
High Dynamic Range <ul style="list-style-type: none"> <li>• OIP3 +30.4 dBm Typ. up to 8 GHz</li> <li>• P1dB +22 dBm Typ. up to 8 GHz</li> </ul>	The PMA3-14LN-D+ matches industry leading IP3 performance relative to device size and power consumption. The combination of the design and PHEMT structure provides enhanced linearity over a board frequency range as evidence in the IP3 being approximately 9-11 dB above the P1dB point. This feature makes this amplifier ideal for use in: <ul style="list-style-type: none"> <li>• Driver Amplifiers for complex waveform up converter paths</li> <li>• Drivers in linearized transmit systems</li> <li>• Secondary amplifiers in ultra-high dynamic range receivers</li> </ul>
Unpackaged Die	Enables user to integrate it directly into hybrids.
Wide bandwidth with flat Gain <ul style="list-style-type: none"> <li>• ±0.7 dB up to 10 GHz</li> </ul>	Enables a single amplifier to be used in many wide band applications including defense, instrumentation and more.

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# Wide Band Amplifier

**PMA3-14LN-D+**

Mini-Circuits

**ELECTRICAL SPECIFICATIONS<sup>1</sup> AT 25°C, Z<sub>o</sub>=50Ω AND +6V, UNLESS NOTED OTHERWISE**

Parameter	Condition (MHz)	VDD = +6V			Units
		Min.	Typ.	Max.	
Frequency Range		50		10000	MHz
Gain	50		22.4		dB
	2000		22.6		
	4000		22.6		
	8000		23.1		
	10000		21.6		
Input Return Loss	50		20.0		dB
	2000		16.0		
	4000		14.0		
	8000		20.0		
	10000		13.0		
Isolation	50-10000		27.4		dB
Output Return Loss	50		17.0		dB
	2000		20.0		
	4000		18.0		
	8000		16.0		
	10000		18.0		
Output Power at 1 dB Compression	50		22.0		dBm
	2000		22.9		
	4000		22.0		
	8000		19.8		
	10000		16.6		
Output Third-Order Intercept P <sub>out</sub> = -5 dBm/Tone	50		31.2		dBm
	2000		31.8		
	4000		30.7		
	8000		28.7		
	10000		26.0		
Noise Figure	50		1.8		dB
	2000		1.0		
	4000		1.1		
	8000		1.2		
	10000		2.1		
Device Operating Voltage (VDD)		+5.75	+6.0	+6.25	V
Device Operating Current (IDD)			67	90	mA
Device Current Variation vs. Temperature <sup>2</sup>			-23.1		μA/°C
Device Current Variation vs Voltage <sup>3</sup>			0.032		mA/mV
Thermal Resistance, Junction-to-Ground Lead			53.9		°C/W

1. Die is soldered in 3x3 mm 12L MCLP and measured on Mini-Circuits Characterization Test Board TB-PMA3-14LN+.

2. Device Current Variation vs. Temperature= (Current in mA at 85°C - Current in mA at -45°C)/130°C

3. Device Current Variation vs. Voltage = (Current in mA at +6.25V - Current in mA at +5.75V) / ((+6.25V-+5.75V) \*1000 mA/mV)

**MAXIMUM RATINGS<sup>4</sup>**

Parameter	Ratings
Operating Temperature (ground lead)	-40°C to 85°C
Junction Temperature	150°C <sup>5</sup>
Total Power Dissipation	1.2 W
Input Power (CW)	+25 dBm (5 minutes max.) +12 dBm (continuous)
DC Voltage at VDD	+8V

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

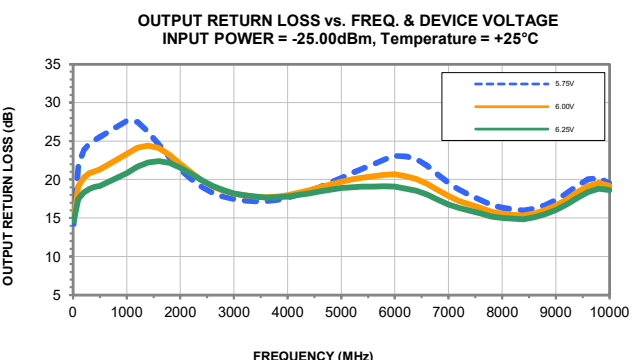
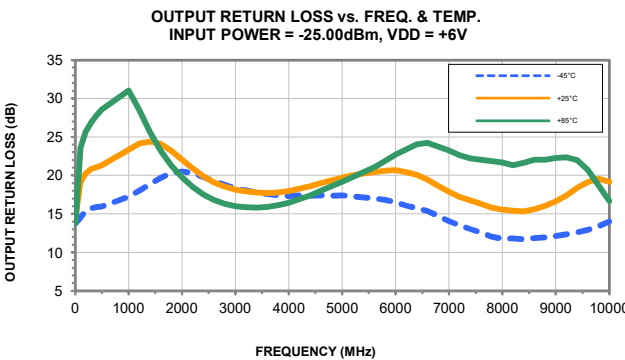
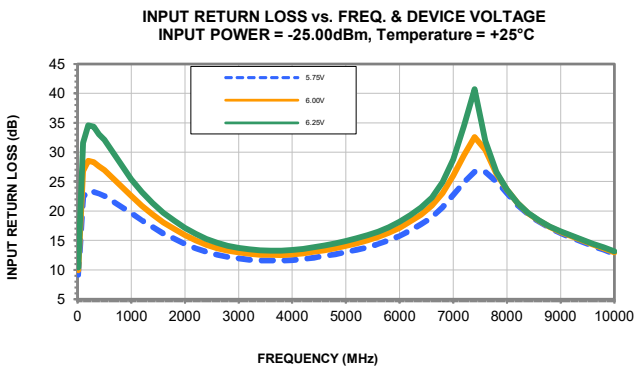
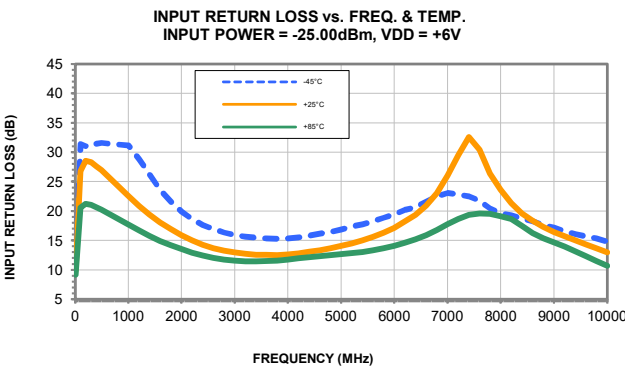
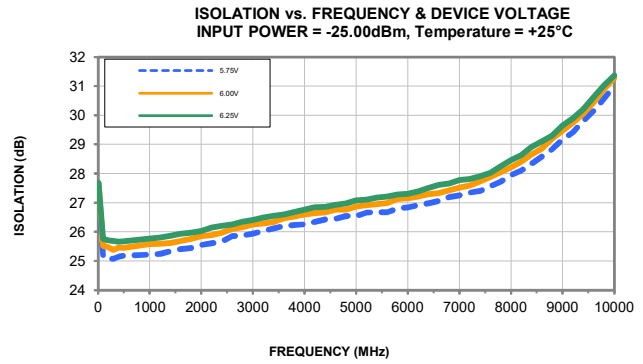
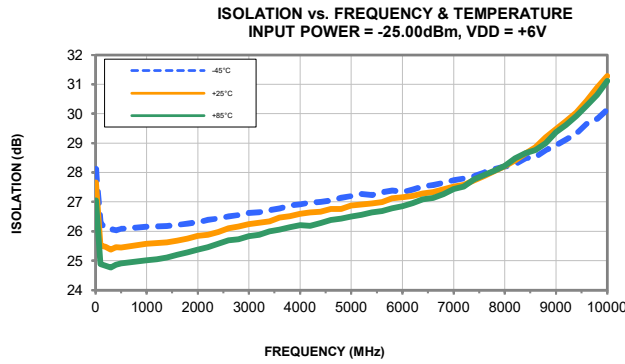
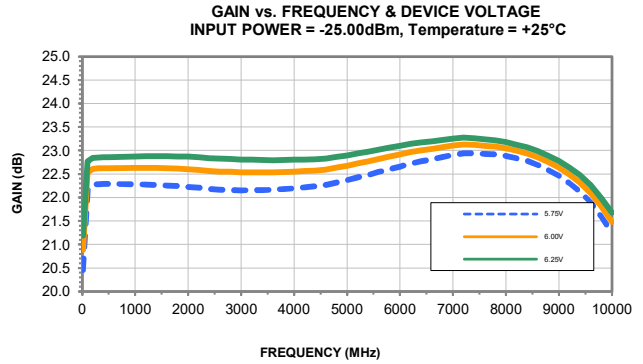
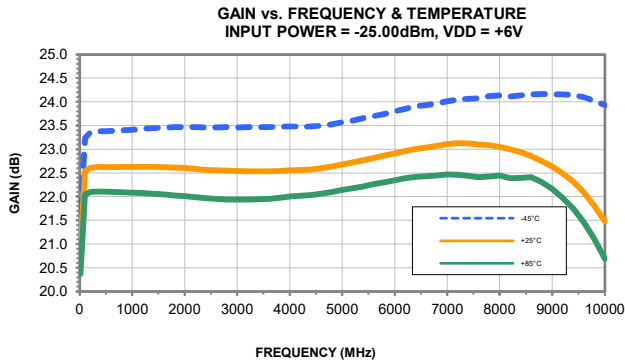
5. T<sub>j</sub> = 85 °C + (VDD)\*(IDD)\*(θJC) = 106 °C. Keeping T<sub>j</sub> below 106°C will ensure MTTF >100 Years.

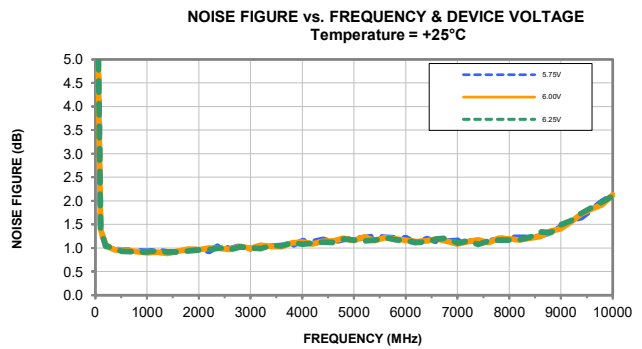
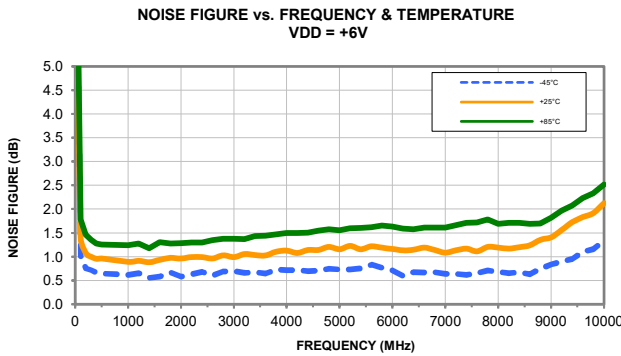
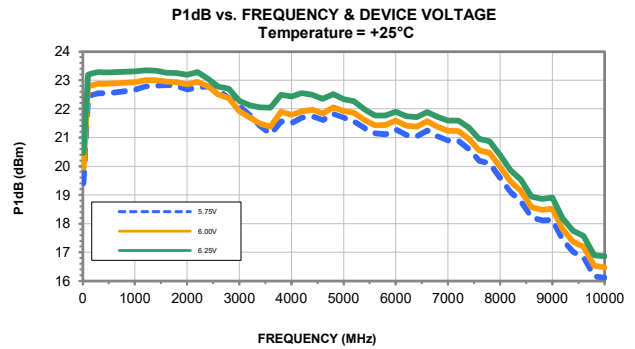
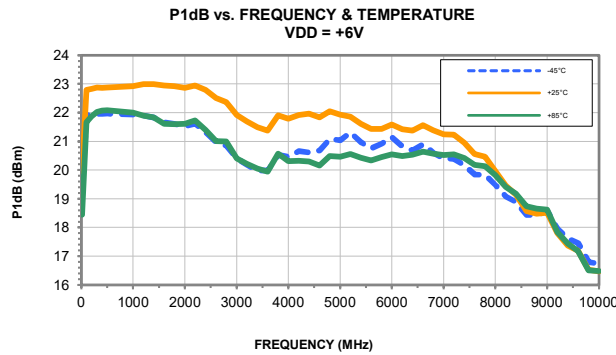
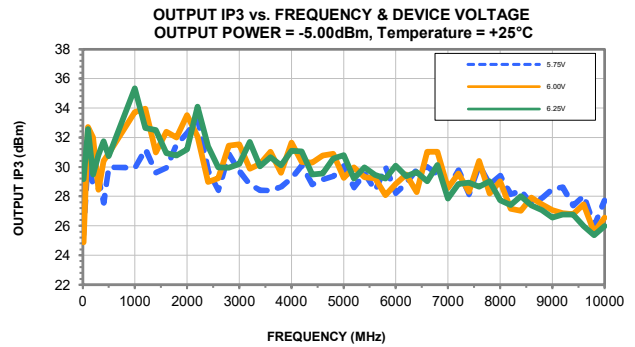
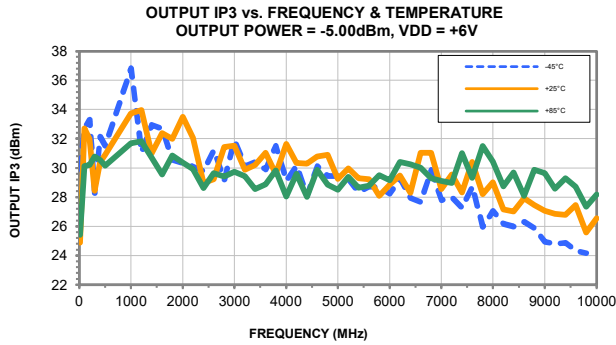


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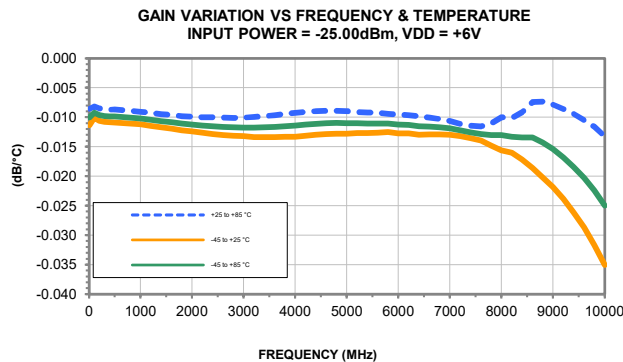
## PMA3-14LN-D+





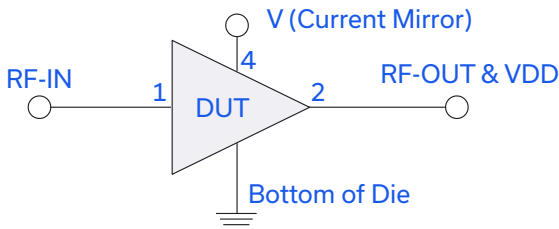
\*Typical Noise Figure 1.8dB at 50MHz

\*Typical Noise Figure 1.8dB at 50MHz



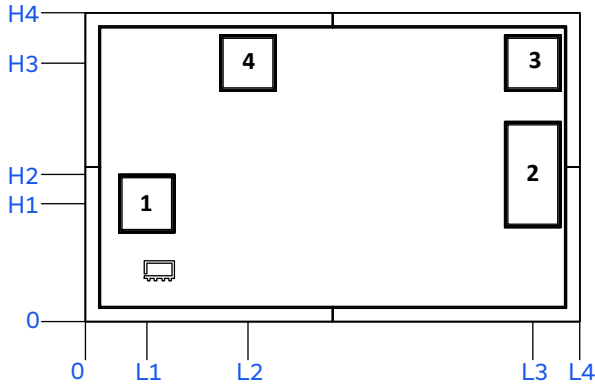


**SIMPLIFIED SCHEMATIC AND PAD DESCRIPTION**



Function	Pad Number	Description
RF-IN	1	RF-Input Pad. Connects to RF-IN port via C1.
RF-OUT & DC-IN	2	RF Output Pad and DC Pad. Connects to VDD via L2 & connects to RF-OUT Port via blocking capacitor C2.
NC	3	Keep the pad floating for normal operation.
V (Current Mirror)	4	Current Mirror Pad. Connects to RF-IN port via L1
Ground	Bottom of Die	Ground pad on the bottom of the die does not require any wire-bond connections.

**BONDING PAD POSITION**



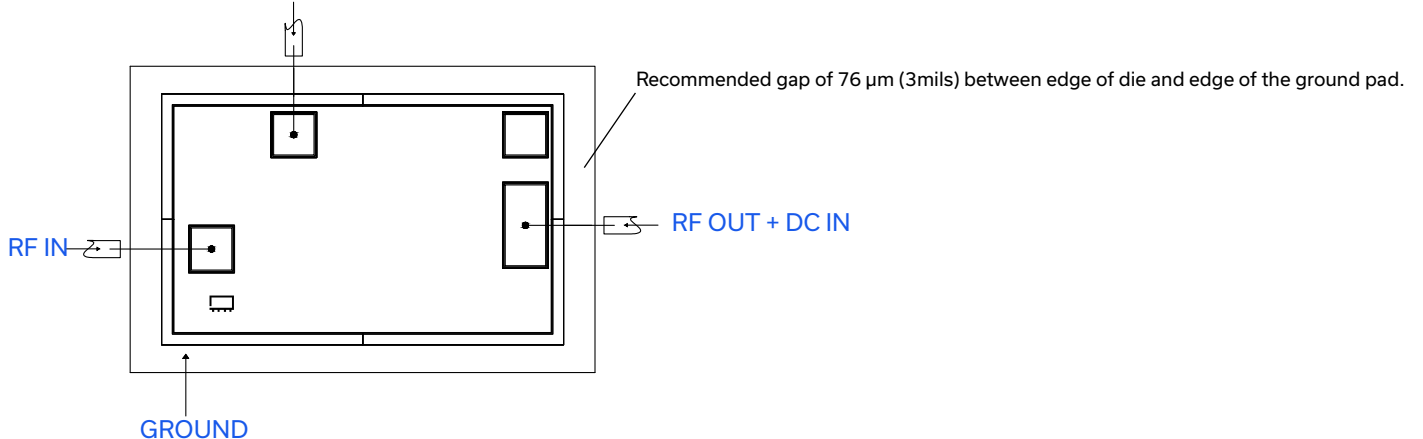
**DIMENSION IN  $\mu\text{m}$ , TYP.**

L1	L2	L3	L4	H1	H2	H3	H4
93	245	675	746	178	222	290	466

Thickness	Die size	Pad size 1	Pad size 2	Pad Size 3 & 4
100	746 x 466	75 x 78	75 x 150	75 x 75

**ASSEMBLY DIAGRAM**

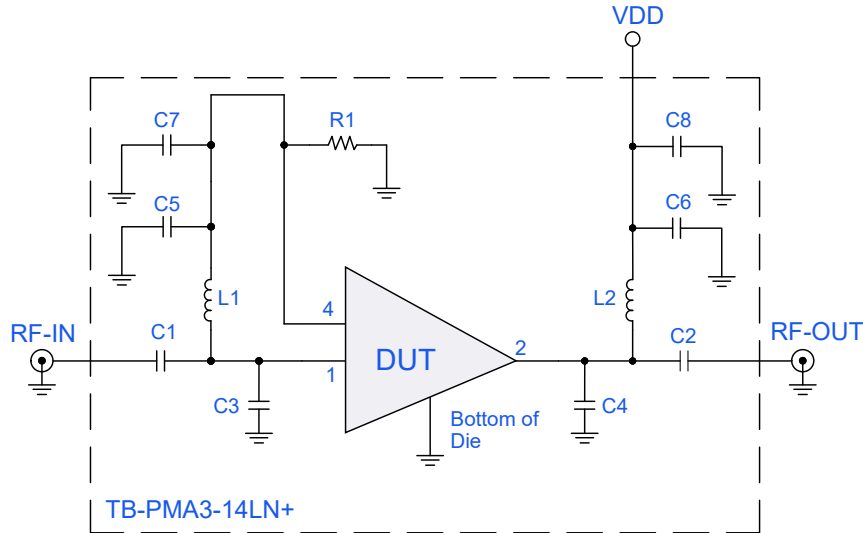
V ( Current Mirror)



1. Recommended bond length for RF-IN: 635  $\mu\text{m}$
2. Recommended bond length for V (Current Mirror): 838  $\mu\text{m}$
3. Recommended bond length for RF OUT + DC IN: 1168  $\mu\text{m}$



## CHARACTERIZATION, APPLICATION CIRCUIT &amp; ASSEMBLY DRAWING



Component	Size	Value	Part Number	Manufacturer
C1 & C2	0402	0.01uF	GRM155R71H103KA88D	Murata
C3	0402	0.2pF	GJM1555C1HR20WB01D	Murata
C4	0402	0.1pF	GJM1555C1HR10WB01D	Murata
C5 & C6	0402	100pF	GRM1555C1H101JA01D	Murata
C7 & C8	0402	0.1uF	GRM155R71H104KE14J	Murata
L1 & L2	0402	900nH	0402DF-901XJRU	Coilcraft
R1	0402	510Ω	RK73H1ETTP5100F	KOA

Fig 1. Application and Characterization Circuit


Note: This block diagram is used for characterization.

(DUT is soldered onto a 3x3 12L MCLP and measured on Mini-Circuits Characterization test board TB-PMA3-14LN+) 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.

## Conditions:

1. VDD=+6V
2. Gain and Return loss: Pin= -25 dBm
3. Output IP3 (OIP3): Two Tones, Spaced 1 MHz apart, -5 dBm/Tone at Output

## 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.
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 wire length and bond wire height should be kept as short as possible unless specified by the Assembly Drawing to minimize performance degradation due to undesirable series inductance.



## 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: VDD = +5.75V, Id = 64mA @ 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)
10	20.46	27.17	9.18	14.25	1.15	0.87	25.43	19.41	8.92
100	22.20	25.13	22.46	21.95	1.05	0.50	30.65	22.45	1.37
200	22.28	25.07	23.42	23.85	1.04	0.48	28.68	22.50	1.06
300	22.29	25.08	23.27	24.74	1.05	0.49	29.17	22.55	1.02
400	22.29	25.15	22.98	25.12	1.05	0.50	27.58	22.54	0.97
500	22.29	25.19	22.58	25.57	1.05	0.50	29.99	22.55	0.96
1000	22.28	25.22	19.66	27.67	1.05	0.52	29.94	22.67	0.94
1200	22.28	25.25	18.42	27.51	1.05	0.52	31.22	22.78	0.96
1400	22.27	25.35	17.29	26.20	1.06	0.54	29.62	22.80	0.91
1600	22.26	25.42	16.20	24.55	1.06	0.55	29.97	22.83	0.94
1800	22.25	25.45	15.30	22.84	1.06	0.55	31.54	22.80	0.96
2000	22.23	25.55	14.44	21.32	1.06	0.57	32.31	22.68	0.97
2200	22.21	25.62	13.69	20.06	1.07	0.58	33.26	22.75	0.93
2400	22.18	25.67	13.06	19.05	1.07	0.58	29.73	22.78	1.07
2600	22.17	25.86	12.58	18.29	1.08	0.60	28.43	22.65	0.98
2800	22.16	25.88	12.19	17.80	1.08	0.61	30.87	22.38	1.05
3000	22.16	25.94	11.94	17.47	1.08	0.62	29.72	22.10	0.99
3200	22.16	26.04	11.74	17.30	1.08	0.63	28.81	21.77	1.06
3400	22.16	26.12	11.63	17.22	1.09	0.64	28.42	21.40	1.04
3600	22.16	26.20	11.60	17.21	1.09	0.64	28.39	21.13	1.06
3800	22.18	26.24	11.60	17.36	1.09	0.65	28.66	21.56	1.05
4000	22.20	26.27	11.70	17.64	1.09	0.65	29.25	21.51	1.16
4200	22.22	26.35	11.87	18.05	1.10	0.66	30.11	21.70	1.14
4400	22.24	26.42	12.10	18.50	1.10	0.67	28.80	21.74	1.19
4600	22.27	26.45	12.36	19.04	1.10	0.67	29.16	21.61	1.14
4800	22.32	26.55	12.67	19.61	1.11	0.68	29.37	21.83	1.19
5000	22.37	26.55	13.02	20.26	1.11	0.68	30.08	21.69	1.21
5200	22.43	26.66	13.44	20.86	1.12	0.69	28.61	21.57	1.22
5400	22.48	26.67	13.87	21.44	1.12	0.68	29.58	21.33	1.27
5600	22.55	26.67	14.42	21.98	1.12	0.68	28.42	21.15	1.23
5800	22.61	26.80	15.06	22.61	1.12	0.69	29.99	21.12	1.22
6000	22.66	26.85	15.80	23.09	1.13	0.69	28.20	21.28	1.22
6200	22.73	26.92	16.75	23.01	1.13	0.69	28.94	21.09	1.10
6400	22.77	26.98	17.74	22.66	1.14	0.69	29.82	21.04	1.20
6600	22.81	27.06	19.02	21.83	1.15	0.69	30.01	21.24	1.14
6800	22.86	27.19	20.71	20.64	1.16	0.70	29.50	21.05	1.15
7000	22.91	27.25	22.82	19.57	1.16	0.70	28.62	20.90	1.17
7200	22.94	27.35	24.91	18.68	1.17	0.70	29.79	20.90	1.14
7400	22.94	27.41	26.72	17.99	1.18	0.70	28.14	20.60	1.16
7600	22.93	27.57	26.69	17.33	1.20	0.71	30.13	20.20	1.15
7800	22.92	27.73	25.02	16.70	1.22	0.72	28.81	20.10	1.19
8000	22.89	27.96	23.01	16.34	1.25	0.74	29.42	19.59	1.23
8200	22.84	28.11	20.99	16.14	1.27	0.75	28.14	19.10	1.23
8400	22.78	28.34	19.42	16.02	1.30	0.77	28.40	18.78	1.23
8600	22.70	28.59	18.18	16.27	1.34	0.79	27.50	18.22	1.25
8800	22.59	28.83	17.09	16.71	1.39	0.82	27.89	18.12	1.33
9000	22.46	29.19	16.24	17.37	1.45	0.84	28.51	18.14	1.45
9200	22.31	29.42	15.50	18.23	1.51	0.87	28.63	17.44	1.59
9400	22.13	29.81	14.75	19.22	1.60	0.89	27.39	17.01	1.65
9600	21.89	30.15	14.06	20.07	1.69	0.92	28.06	16.83	1.83
9800	21.59	30.58	13.41	20.21	1.80	0.94	26.04	16.17	2.00
10000	21.25	31.03	12.70	19.46	1.94	0.96	27.73	16.12	2.14



## 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: VDD = +6V, Id = 73mA @ 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)
10	20.89	27.66	9.92	14.72	1.16	0.87	24.88	19.95	8.89
100	22.53	25.52	26.78	19.12	1.05	0.49	32.71	22.79	1.40
200	22.61	25.47	28.52	20.23	1.05	0.48	32.00	22.83	1.07
300	22.62	25.39	28.32	20.81	1.04	0.47	28.43	22.87	1.00
400	22.62	25.46	27.58	21.06	1.05	0.49	30.39	22.86	0.96
500	22.62	25.45	26.99	21.32	1.05	0.49	30.91	22.87	0.96
1000	22.63	25.58	22.54	23.32	1.05	0.51	33.73	22.92	0.90
1200	22.63	25.59	20.87	24.16	1.05	0.52	33.97	23.00	0.92
1400	22.63	25.62	19.43	24.41	1.06	0.52	30.98	23.00	0.89
1600	22.62	25.68	18.05	24.10	1.06	0.54	32.38	22.95	0.94
1800	22.61	25.75	16.93	23.22	1.06	0.55	31.99	22.92	0.98
2000	22.60	25.84	15.88	22.03	1.06	0.56	33.50	22.86	0.96
2200	22.59	25.88	14.99	20.91	1.06	0.57	32.07	22.94	1.00
2400	22.57	25.97	14.25	19.87	1.07	0.58	28.97	22.79	0.99
2600	22.55	26.10	13.68	19.10	1.07	0.59	29.22	22.50	0.97
2800	22.55	26.16	13.24	18.54	1.07	0.60	31.43	22.36	1.03
3000	22.54	26.25	12.94	18.14	1.08	0.61	31.52	21.92	0.99
3200	22.54	26.29	12.70	17.92	1.08	0.61	29.87	21.69	1.06
3400	22.54	26.34	12.57	17.77	1.08	0.62	30.20	21.49	1.04
3600	22.53	26.47	12.53	17.70	1.09	0.63	31.03	21.37	1.03
3800	22.54	26.52	12.52	17.77	1.09	0.64	29.60	21.90	1.11
4000	22.55	26.60	12.64	17.97	1.09	0.65	31.64	21.79	1.13
4200	22.56	26.64	12.81	18.27	1.10	0.66	30.33	21.91	1.08
4400	22.57	26.66	13.07	18.59	1.10	0.66	30.28	21.97	1.14
4600	22.60	26.76	13.34	19.01	1.11	0.67	30.77	21.83	1.15
4800	22.63	26.76	13.69	19.35	1.11	0.67	30.89	22.05	1.21
5000	22.68	26.87	14.07	19.72	1.11	0.68	29.24	21.93	1.16
5200	22.72	26.91	14.51	20.03	1.11	0.68	29.97	21.86	1.23
5400	22.77	26.95	14.99	20.26	1.12	0.68	29.29	21.62	1.16
5600	22.82	26.99	15.59	20.43	1.12	0.68	29.23	21.43	1.22
5800	22.87	27.12	16.29	20.59	1.13	0.69	28.08	21.43	1.19
6000	22.91	27.15	17.12	20.67	1.13	0.69	28.84	21.59	1.16
6200	22.96	27.21	18.22	20.40	1.14	0.69	29.49	21.42	1.13
6400	23.00	27.29	19.35	20.07	1.14	0.69	28.29	21.37	1.15
6600	23.03	27.33	20.91	19.43	1.15	0.69	31.02	21.56	1.20
6800	23.07	27.42	23.06	18.62	1.16	0.69	31.03	21.38	1.14
7000	23.10	27.52	26.02	17.86	1.17	0.69	28.56	21.24	1.09
7200	23.13	27.58	29.47	17.22	1.17	0.69	29.56	21.23	1.14
7400	23.12	27.73	32.61	16.76	1.19	0.70	28.31	20.95	1.17
7600	23.10	27.88	30.41	16.31	1.21	0.71	30.40	20.55	1.11
7800	23.08	28.05	26.39	15.83	1.23	0.72	28.20	20.47	1.21
8000	23.05	28.21	23.62	15.56	1.25	0.74	29.02	19.97	1.19
8200	23.00	28.41	21.35	15.43	1.28	0.75	27.16	19.46	1.17
8400	22.94	28.65	19.60	15.34	1.32	0.77	27.01	19.14	1.20
8600	22.85	28.86	18.37	15.61	1.35	0.79	27.92	18.58	1.24
8800	22.75	29.19	17.29	16.02	1.41	0.82	27.46	18.48	1.36
9000	22.63	29.47	16.42	16.61	1.47	0.84	27.06	18.51	1.41
9200	22.49	29.74	15.72	17.39	1.53	0.86	26.86	17.80	1.56
9400	22.31	30.04	14.99	18.35	1.60	0.89	26.79	17.37	1.73
9600	22.09	30.44	14.31	19.15	1.70	0.91	27.46	17.19	1.83
9800	21.81	30.88	13.66	19.56	1.82	0.94	25.57	16.53	1.92
10000	21.48	31.29	12.98	19.18	1.95	0.96	26.56	16.48	2.13

## 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: VDD = +6.25V, Id = 82mA @ 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)
10	21.19	27.68	10.44	14.65	1.14	0.86	29.15	20.47	8.86
100	22.77	25.75	31.56	17.49	1.05	0.48	32.57	23.19	1.39
200	22.84	25.71	34.55	18.33	1.05	0.47	29.47	23.25	1.04
300	22.85	25.68	34.35	18.78	1.04	0.47	30.81	23.28	1.01
400	22.86	25.67	33.07	19.02	1.04	0.47	31.73	23.27	0.99
500	22.86	25.68	32.09	19.15	1.05	0.48	30.72	23.27	0.93
1000	22.87	25.77	25.40	20.85	1.05	0.50	35.34	23.30	0.92
1200	22.88	25.81	23.22	21.68	1.05	0.51	32.63	23.34	0.95
1400	22.88	25.86	21.35	22.22	1.06	0.52	32.51	23.32	0.92
1600	22.88	25.94	19.69	22.43	1.06	0.53	30.94	23.26	0.92
1800	22.87	25.97	18.33	22.16	1.06	0.54	30.77	23.24	0.94
2000	22.87	26.03	17.14	21.55	1.06	0.55	31.18	23.18	0.97
2200	22.85	26.15	16.10	20.74	1.07	0.56	34.08	23.28	0.97
2400	22.84	26.20	15.24	19.89	1.07	0.57	31.38	23.04	1.00
2600	22.82	26.25	14.61	19.16	1.07	0.58	29.96	22.77	0.97
2800	22.82	26.34	14.08	18.63	1.07	0.59	29.95	22.70	1.03
3000	22.81	26.40	13.73	18.20	1.07	0.60	30.20	22.28	1.01
3200	22.81	26.49	13.48	17.98	1.08	0.61	31.69	22.12	0.99
3400	22.80	26.55	13.33	17.78	1.08	0.61	30.03	22.05	1.06
3600	22.79	26.60	13.27	17.66	1.08	0.62	30.66	22.03	1.05
3800	22.80	26.67	13.27	17.68	1.09	0.63	30.11	22.49	1.11
4000	22.80	26.76	13.38	17.79	1.09	0.64	31.10	22.43	1.09
4200	22.81	26.85	13.54	18.00	1.10	0.65	31.04	22.55	1.11
4400	22.81	26.86	13.83	18.20	1.10	0.65	29.49	22.49	1.13
4600	22.83	26.92	14.11	18.47	1.10	0.66	29.56	22.34	1.12
4800	22.86	26.98	14.47	18.69	1.11	0.66	30.55	22.51	1.20
5000	22.89	27.07	14.88	18.89	1.11	0.67	30.80	22.34	1.17
5200	22.94	27.10	15.35	19.01	1.11	0.67	29.21	22.27	1.15
5400	22.97	27.18	15.86	19.08	1.12	0.68	29.97	21.98	1.17
5600	23.02	27.21	16.51	19.10	1.12	0.68	29.46	21.77	1.22
5800	23.06	27.28	17.26	19.12	1.12	0.68	29.21	21.77	1.18
6000	23.10	27.31	18.16	19.10	1.13	0.68	30.09	21.90	1.16
6200	23.14	27.38	19.31	18.79	1.13	0.68	29.37	21.74	1.12
6400	23.17	27.50	20.56	18.54	1.14	0.69	29.64	21.70	1.13
6600	23.19	27.61	22.28	18.03	1.15	0.69	29.02	21.88	1.19
6800	23.22	27.65	24.93	17.40	1.16	0.69	30.14	21.72	1.21
7000	23.26	27.78	28.78	16.77	1.17	0.69	27.84	21.59	1.11
7200	23.27	27.81	34.48	16.29	1.18	0.69	28.84	21.59	1.16
7400	23.26	27.91	40.72	15.94	1.19	0.70	28.92	21.34	1.07
7600	23.24	28.03	31.93	15.58	1.21	0.71	28.65	20.95	1.16
7800	23.22	28.25	26.68	15.21	1.23	0.72	29.03	20.87	1.17
8000	23.18	28.46	23.63	15.00	1.26	0.74	27.72	20.39	1.17
8200	23.12	28.62	21.35	14.94	1.29	0.75	27.41	19.86	1.18
8400	23.07	28.91	19.63	14.85	1.33	0.77	28.00	19.54	1.24
8600	22.99	29.11	18.42	15.10	1.37	0.79	27.38	18.94	1.35
8800	22.89	29.30	17.36	15.49	1.41	0.81	27.06	18.86	1.33
9000	22.78	29.65	16.51	16.06	1.47	0.84	26.56	18.91	1.49
9200	22.64	29.89	15.84	16.76	1.53	0.86	26.75	18.18	1.59
9400	22.47	30.20	15.13	17.61	1.60	0.88	26.77	17.75	1.75
9600	22.26	30.61	14.45	18.36	1.70	0.91	25.97	17.57	1.87
9800	21.99	31.02	13.82	18.81	1.81	0.93	25.38	16.90	1.99
10000	21.68	31.37	13.16	18.63	1.93	0.95	25.97	16.87	2.10

## 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: VDD = +5.75V, Id = 73mA @ 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)
10	21.43	27.97	10.37	14.21	1.13	0.86	27.48	18.56	8.41
100	23.03	26.02	31.19	15.66	1.04	0.47	29.11	21.26	0.93
200	23.14	25.83	34.00	16.68	1.04	0.44	32.57	21.28	0.71
300	23.17	25.90	35.38	17.12	1.04	0.45	33.38	21.29	0.70
400	23.18	25.71	34.52	17.25	1.03	0.43	32.67	21.30	0.69
500	23.17	25.82	34.35	17.39	1.04	0.45	27.90	21.32	0.67
1000	23.20	25.90	28.31	18.87	1.04	0.47	31.67	21.32	0.72
1200	23.21	25.95	25.68	19.83	1.04	0.48	32.24	21.31	0.68
1400	23.22	25.99	23.52	20.82	1.05	0.49	32.21	21.26	0.56
1600	23.23	25.96	21.39	21.67	1.04	0.49	29.78	21.08	0.58
1800	23.24	26.06	19.77	22.21	1.05	0.50	33.22	21.03	0.60
2000	23.24	26.11	18.38	22.02	1.05	0.51	35.44	20.94	0.64
2200	23.23	26.13	17.24	21.39	1.05	0.52	30.29	20.98	0.60
2400	23.22	26.21	16.43	20.56	1.05	0.53	30.60	20.71	0.67
2600	23.22	26.28	15.82	19.80	1.05	0.54	31.11	20.31	0.65
2800	23.23	26.34	15.32	19.25	1.05	0.54	30.14	20.18	0.61
3000	23.23	26.39	14.95	18.68	1.06	0.55	30.50	19.67	0.63
3200	23.24	26.48	14.68	18.41	1.06	0.56	30.60	19.29	0.69
3400	23.24	26.54	14.58	18.16	1.06	0.56	30.34	18.96	0.61
3600	23.25	26.58	14.46	17.96	1.06	0.57	28.39	18.84	0.68
3800	23.25	26.67	14.43	17.85	1.06	0.58	29.35	19.51	0.68
4000	23.27	26.74	14.49	17.82	1.07	0.59	30.75	19.38	0.74
4200	23.27	26.77	14.65	17.98	1.07	0.59	29.50	19.56	0.74
4400	23.28	26.78	14.96	18.08	1.07	0.59	30.51	19.56	0.74
4600	23.30	26.91	15.27	18.24	1.07	0.61	28.36	19.67	0.74
4800	23.34	26.95	15.59	18.28	1.07	0.61	29.10	20.10	0.78
5000	23.39	26.99	15.92	18.37	1.07	0.61	28.24	20.12	0.74
5200	23.43	27.02	16.41	18.31	1.07	0.61	28.37	20.46	0.74
5400	23.49	27.13	16.79	18.27	1.08	0.62	28.47	20.16	0.76
5600	23.54	27.14	17.29	18.16	1.07	0.62	27.89	20.07	0.79
5800	23.59	27.21	17.87	17.97	1.08	0.62	28.58	20.31	0.75
6000	23.65	27.21	18.44	17.66	1.07	0.62	28.50	20.59	0.79
6200	23.72	27.28	19.26	17.13	1.07	0.62	28.50	20.31	0.62
6400	23.77	27.31	19.84	16.79	1.07	0.61	28.52	20.22	0.64
6600	23.81	27.39	20.93	16.25	1.08	0.62	28.77	20.44	0.68
6800	23.85	27.47	22.13	15.51	1.08	0.61	27.62	20.15	0.66
7000	23.90	27.51	23.20	14.76	1.08	0.60	28.66	19.96	0.71
7200	23.95	27.61	23.62	14.10	1.08	0.60	26.90	19.97	0.66
7400	23.97	27.72	23.70	13.57	1.09	0.60	28.00	19.74	0.64
7600	23.99	27.82	23.16	13.03	1.10	0.60	26.92	19.41	0.65
7800	24.04	27.98	21.81	12.46	1.11	0.60	27.76	19.40	0.65
8000	24.06	28.02	20.78	12.14	1.11	0.60	27.44	19.03	0.65
8200	24.05	28.19	20.42	12.13	1.13	0.61	26.78	18.63	0.63
8400	24.07	28.29	19.69	12.01	1.14	0.62	26.52	18.45	0.70
8600	24.09	28.36	19.16	12.13	1.15	0.62	26.06	18.00	0.74
8800	24.11	28.54	18.43	12.21	1.16	0.64	26.50	17.99	0.76
9000	24.10	28.73	17.86	12.39	1.19	0.66	26.44	18.12	0.80
9200	24.10	28.91	17.22	12.61	1.21	0.68	25.95	17.51	0.94
9400	24.09	29.19	16.66	12.84	1.24	0.70	26.09	17.14	0.99
9600	24.05	29.50	16.26	13.17	1.27	0.73	25.45	16.98	1.06
9800	23.98	29.72	15.85	13.62	1.31	0.76	24.21	16.34	1.17
10000	23.89	29.93	15.24	14.19	1.35	0.78	24.86	16.26	1.32

## 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: VDD = +6V, Id = 81mA 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)
10	21.68	28.13	10.89	13.85	1.12	0.85	26.60	19.21	8.37
100	23.24	26.29	31.41	14.54	1.04	0.47	29.94	21.92	0.99
200	23.35	26.09	31.05	15.43	1.03	0.44	32.75	21.95	0.76
300	23.38	26.08	31.58	15.79	1.04	0.44	33.31	21.95	0.72
400	23.38	26.04	31.48	15.89	1.03	0.43	28.26	21.96	0.67
500	23.39	26.09	31.60	16.00	1.04	0.44	32.15	21.97	0.65
1000	23.41	26.16	31.16	17.25	1.04	0.46	31.53	21.94	0.62
1200	23.43	26.17	28.82	18.06	1.04	0.47	36.84	21.91	0.66
1400	23.45	26.18	26.28	18.90	1.04	0.48	31.09	21.84	0.56
1600	23.46	26.22	23.61	19.71	1.04	0.48	32.96	21.67	0.58
1800	23.47	26.27	21.66	20.34	1.05	0.50	32.68	21.61	0.67
2000	23.47	26.32	19.96	20.53	1.05	0.50	30.55	21.54	0.59
2200	23.47	26.39	18.63	20.35	1.05	0.52	30.33	21.62	0.64
2400	23.46	26.44	17.63	19.78	1.05	0.52	30.10	21.31	0.69
2600	23.46	26.52	16.94	19.26	1.05	0.53	29.77	20.98	0.61
2800	23.47	26.56	16.37	18.83	1.05	0.54	31.23	20.86	0.69
3000	23.46	26.63	15.93	18.30	1.06	0.54	29.21	20.42	0.70
3200	23.47	26.65	15.64	18.06	1.06	0.55	31.91	20.18	0.66
3400	23.47	26.72	15.48	17.79	1.06	0.55	30.13	19.99	0.68
3600	23.47	26.78	15.35	17.59	1.06	0.56	30.41	19.99	0.65
3800	23.48	26.88	15.31	17.41	1.06	0.57	29.90	20.53	0.73
4000	23.48	26.92	15.35	17.34	1.06	0.58	31.53	20.46	0.72
4200	23.48	26.98	15.52	17.42	1.07	0.59	29.13	20.66	0.72
4400	23.48	27.00	15.85	17.38	1.07	0.59	30.16	20.62	0.70
4600	23.50	27.05	16.21	17.44	1.07	0.60	28.10	20.69	0.72
4800	23.53	27.15	16.50	17.40	1.07	0.61	30.12	21.09	0.75
5000	23.57	27.20	16.89	17.42	1.07	0.61	29.46	21.04	0.73
5200	23.61	27.27	17.43	17.27	1.07	0.61	29.46	21.31	0.73
5400	23.66	27.24	17.79	17.18	1.07	0.61	29.24	20.98	0.75
5600	23.70	27.33	18.31	17.04	1.07	0.62	28.36	20.76	0.84
5800	23.74	27.40	18.89	16.83	1.07	0.62	28.73	20.93	0.77
6000	23.80	27.35	19.46	16.53	1.07	0.61	28.69	21.15	0.71
6200	23.86	27.43	20.21	16.09	1.07	0.61	28.24	20.83	0.60
6400	23.91	27.53	20.70	15.79	1.07	0.62	29.29	20.69	0.68
6600	23.93	27.58	21.63	15.36	1.08	0.61	27.95	20.90	0.67
6800	23.97	27.66	22.50	14.75	1.08	0.61	27.66	20.60	0.68
7000	24.01	27.75	23.09	14.07	1.08	0.61	29.86	20.41	0.64
7200	24.05	27.80	22.88	13.53	1.09	0.60	27.81	20.39	0.64
7400	24.07	27.88	22.48	13.05	1.09	0.60	28.00	20.17	0.62
7600	24.08	28.01	21.76	12.59	1.10	0.60	27.27	19.85	0.66
7800	24.12	28.13	20.44	12.06	1.11	0.60	28.73	19.83	0.71
8000	24.14	28.22	19.61	11.81	1.11	0.60	25.98	19.48	0.68
8200	24.12	28.28	19.31	11.83	1.13	0.61	27.06	19.08	0.66
8400	24.14	28.50	18.68	11.73	1.14	0.62	26.17	18.89	0.68
8600	24.16	28.53	18.27	11.87	1.15	0.63	25.99	18.44	0.64
8800	24.17	28.76	17.62	11.97	1.17	0.65	26.32	18.44	0.75
9000	24.16	28.94	17.17	12.17	1.19	0.67	25.88	18.58	0.84
9200	24.16	29.12	16.59	12.39	1.22	0.68	24.94	17.96	0.90
9400	24.14	29.33	16.09	12.64	1.24	0.71	24.80	17.61	0.96
9600	24.10	29.66	15.74	12.97	1.28	0.74	24.89	17.46	1.11
9800	24.02	29.83	15.38	13.40	1.31	0.76	24.34	16.80	1.16
10000	23.93	30.14	14.83	14.02	1.36	0.79	24.17	16.74	1.34

## 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: VDD = +6.25V, Id = 89mA @ 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)
10	21.87	27.96	11.20	13.62	1.10	0.83	26.74	19.86	8.39
100	23.40	26.43	29.08	13.82	1.04	0.46	31.35	22.54	0.95
200	23.51	26.32	27.69	14.56	1.04	0.44	30.27	22.55	0.76
300	23.53	26.25	27.89	14.89	1.03	0.43	32.28	22.56	0.68
400	23.55	26.21	27.90	15.00	1.03	0.43	32.74	22.57	0.68
500	23.54	26.25	28.09	15.07	1.04	0.43	32.89	22.60	0.67
1000	23.58	26.30	30.50	16.19	1.04	0.45	35.24	22.56	0.67
1200	23.60	26.33	30.31	16.93	1.04	0.46	30.96	22.52	0.63
1400	23.61	26.36	28.31	17.68	1.04	0.47	35.63	22.44	0.57
1600	23.63	26.40	25.42	18.47	1.04	0.48	32.49	22.27	0.62
1800	23.64	26.43	23.23	19.13	1.05	0.49	30.76	22.24	0.65
2000	23.65	26.45	21.25	19.45	1.05	0.49	33.32	22.20	0.60
2200	23.65	26.54	19.76	19.43	1.05	0.51	30.89	22.27	0.64
2400	23.64	26.58	18.67	19.01	1.05	0.51	31.79	21.93	0.59
2600	23.64	26.64	17.88	18.64	1.05	0.52	29.92	21.60	0.59
2800	23.64	26.72	17.24	18.24	1.05	0.53	35.14	21.54	0.66
3000	23.64	26.76	16.75	17.77	1.05	0.54	31.62	21.16	0.59
3200	23.65	26.77	16.42	17.56	1.05	0.54	30.69	21.00	0.64
3400	23.65	26.86	16.23	17.27	1.06	0.55	30.72	20.88	0.67
3600	23.64	26.88	16.10	17.07	1.06	0.55	30.72	20.93	0.62
3800	23.64	26.97	16.03	16.90	1.06	0.56	29.10	21.41	0.68
4000	23.65	27.05	16.07	16.77	1.06	0.57	30.31	21.39	0.72
4200	23.64	27.12	16.27	16.80	1.07	0.58	29.51	21.61	0.72
4400	23.64	27.21	16.59	16.72	1.07	0.59	29.83	21.59	0.68
4600	23.65	27.19	16.96	16.72	1.07	0.59	29.99	21.61	0.73
4800	23.68	27.29	17.27	16.64	1.07	0.60	29.30	21.94	0.80
5000	23.71	27.33	17.65	16.58	1.07	0.60	29.02	21.86	0.74
5200	23.75	27.38	18.19	16.44	1.07	0.61	28.60	22.06	0.76
5400	23.79	27.40	18.56	16.34	1.07	0.61	29.00	21.68	0.77
5600	23.83	27.43	19.07	16.19	1.07	0.61	29.01	21.40	0.83
5800	23.87	27.51	19.60	15.98	1.07	0.61	28.28	21.54	0.74
6000	23.92	27.56	20.16	15.73	1.07	0.61	27.41	21.68	0.73
6200	23.97	27.63	20.82	15.32	1.07	0.61	28.28	21.36	0.76
6400	24.02	27.67	21.25	15.10	1.07	0.61	27.91	21.19	0.65
6600	24.04	27.70	22.05	14.71	1.07	0.61	28.63	21.36	0.71
6800	24.07	27.79	22.69	14.17	1.08	0.61	27.50	21.05	0.68
7000	24.11	27.89	22.89	13.59	1.08	0.61	28.29	20.84	0.72
7200	24.14	27.96	22.41	13.10	1.09	0.60	27.17	20.81	0.68
7400	24.15	27.99	21.80	12.70	1.09	0.60	28.11	20.59	0.69
7600	24.15	28.13	20.99	12.29	1.10	0.60	27.45	20.26	0.63
7800	24.19	28.31	19.76	11.82	1.11	0.60	26.51	20.25	0.69
8000	24.21	28.34	18.94	11.59	1.12	0.60	26.88	19.89	0.69
8200	24.18	28.40	18.66	11.62	1.13	0.61	25.99	19.49	0.67
8400	24.20	28.61	18.08	11.55	1.15	0.62	26.12	19.30	0.63
8600	24.21	28.67	17.69	11.71	1.16	0.63	25.60	18.84	0.72
8800	24.22	28.82	17.09	11.81	1.17	0.64	26.22	18.85	0.76
9000	24.21	29.10	16.69	12.04	1.20	0.67	25.43	19.00	0.79
9200	24.20	29.32	16.15	12.24	1.22	0.69	24.70	18.39	0.93
9400	24.18	29.57	15.67	12.48	1.25	0.72	24.74	18.04	0.98
9600	24.14	29.79	15.33	12.82	1.29	0.74	24.42	17.88	1.08
9800	24.06	30.08	15.01	13.25	1.33	0.77	23.08	17.24	1.24
10000	23.96	30.27	14.48	13.82	1.37	0.79	23.58	17.17	1.35

## 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: VDD = +5.75V, Id = 60mA @ 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)
10	19.99	26.69	8.62	13.26	1.14	0.86	24.80	18.03	9.37
100	21.73	24.58	18.36	26.72	1.04	0.50	28.73	21.34	1.81
200	21.78	24.52	18.81	31.01	1.04	0.49	31.82	21.54	1.45
300	21.79	24.55	18.67	33.59	1.04	0.49	30.85	21.71	1.39
400	21.79	24.62	18.33	35.38	1.05	0.50	31.77	21.74	1.27
500	21.79	24.59	18.07	35.87	1.05	0.50	31.64	21.76	1.30
1000	21.76	24.71	16.10	28.03	1.05	0.53	30.00	21.72	1.26
1200	21.74	24.78	15.27	25.06	1.05	0.54	30.33	21.65	1.28
1400	21.72	24.87	14.50	22.77	1.06	0.55	29.20	21.61	1.19
1600	21.70	24.97	13.76	20.87	1.06	0.56	29.33	21.41	1.29
1800	21.67	25.03	13.13	19.39	1.07	0.57	28.69	21.38	1.29
2000	21.66	25.13	12.55	18.14	1.07	0.58	28.65	21.37	1.35
2200	21.63	25.24	12.01	17.11	1.07	0.59	30.66	21.49	1.38
2400	21.61	25.34	11.57	16.34	1.08	0.60	30.46	21.27	1.26
2600	21.59	25.42	11.24	15.75	1.08	0.61	27.92	20.95	1.36
2800	21.58	25.50	10.99	15.37	1.08	0.62	28.39	20.86	1.36
3000	21.58	25.60	10.83	15.15	1.09	0.63	27.60	20.26	1.37
3200	21.59	25.69	10.72	15.06	1.09	0.64	28.49	19.94	1.43
3400	21.60	25.75	10.72	15.09	1.09	0.64	28.19	19.60	1.44
3600	21.61	25.82	10.77	15.22	1.10	0.65	28.26	19.35	1.43
3800	21.64	25.89	10.85	15.50	1.10	0.66	28.74	20.00	1.52
4000	21.67	25.92	11.00	15.90	1.10	0.66	27.78	19.71	1.51
4200	21.69	25.99	11.18	16.43	1.11	0.67	29.01	19.71	1.59
4400	21.72	26.06	11.40	17.00	1.11	0.68	27.37	19.69	1.51
4600	21.75	26.16	11.56	17.65	1.12	0.69	26.92	19.62	1.55
4800	21.80	26.22	11.73	18.28	1.12	0.70	28.39	20.00	1.59
5000	21.84	26.27	11.89	19.01	1.13	0.71	28.56	20.01	1.58
5200	21.89	26.32	12.06	19.76	1.13	0.71	28.64	20.13	1.59
5400	21.94	26.37	12.24	20.50	1.13	0.72	28.05	20.04	1.68
5600	21.99	26.48	12.48	21.32	1.14	0.73	27.39	20.00	1.64
5800	22.04	26.49	12.78	22.43	1.14	0.73	27.54	20.12	1.65
6000	22.09	26.63	13.15	23.68	1.15	0.74	28.53	20.25	1.63
6200	22.15	26.67	13.67	25.08	1.16	0.74	29.09	20.18	1.59
6400	22.19	26.79	14.17	26.49	1.17	0.75	28.72	20.22	1.59
6600	22.21	26.91	14.82	27.60	1.18	0.75	29.06	20.34	1.63
6800	22.25	26.97	15.60	27.32	1.19	0.76	29.16	20.26	1.62
7000	22.28	27.16	16.51	26.58	1.22	0.77	28.93	20.19	1.65
7200	22.28	27.30	17.24	25.52	1.24	0.78	29.47	20.21	1.66
7400	22.26	27.46	17.88	24.77	1.26	0.79	29.89	20.06	1.74
7600	22.24	27.62	18.16	24.30	1.29	0.80	28.67	19.83	1.69
7800	22.25	27.85	18.17	23.86	1.32	0.81	29.16	19.77	1.74
8000	22.28	27.94	17.98	23.60	1.34	0.82	29.36	19.41	1.68
8200	22.23	28.11	17.68	22.96	1.38	0.83	29.85	18.97	1.67
8400	22.22	28.39	16.77	23.18	1.42	0.85	29.22	18.70	1.72
8600	22.24	28.51	15.71	23.57	1.44	0.86	29.14	18.24	1.68
8800	22.15	28.69	14.90	23.54	1.48	0.88	28.81	18.16	1.75
9000	21.99	28.99	14.29	23.72	1.54	0.90	29.60	18.11	1.88
9200	21.79	29.28	13.64	23.59	1.61	0.92	28.55	17.35	1.93
9400	21.56	29.59	12.84	22.77	1.68	0.94	30.81	16.95	2.05
9600	21.26	29.96	12.06	20.99	1.77	0.96	28.40	16.69	2.21
9800	20.89	30.39	11.26	18.65	1.88	0.98	27.82	16.03	2.35
10000	20.45	30.97	10.41	16.47	2.03	1.00	27.88	16.00	2.57

## 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: VDD = +6V, Id = 67mA @ 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)
10	20.38	27.05	9.21	13.86	1.15	0.86	25.43	18.44	9.33
100	22.04	24.88	20.60	23.55	1.04	0.49	30.13	21.67	1.78
200	22.10	24.83	21.22	25.66	1.04	0.48	30.19	21.87	1.46
300	22.10	24.77	21.02	26.86	1.04	0.48	30.77	22.02	1.35
400	22.10	24.86	20.61	27.75	1.04	0.49	30.56	22.07	1.27
500	22.10	24.91	20.21	28.57	1.05	0.50	30.16	22.09	1.26
1000	22.08	25.02	17.72	31.05	1.05	0.52	31.69	22.00	1.24
1200	22.07	25.05	16.71	28.45	1.05	0.53	31.84	21.89	1.27
1400	22.06	25.10	15.80	25.62	1.06	0.54	30.72	21.83	1.18
1600	22.05	25.20	14.92	23.21	1.06	0.55	29.54	21.61	1.30
1800	22.02	25.28	14.22	21.29	1.06	0.56	30.85	21.60	1.28
2000	22.01	25.38	13.53	19.74	1.07	0.57	30.35	21.61	1.29
2200	21.99	25.46	12.92	18.48	1.07	0.58	29.92	21.73	1.30
2400	21.97	25.58	12.42	17.53	1.08	0.59	28.62	21.40	1.29
2600	21.95	25.69	12.05	16.80	1.08	0.60	29.63	21.01	1.35
2800	21.94	25.72	11.76	16.32	1.08	0.61	29.41	20.99	1.37
3000	21.93	25.84	11.58	16.01	1.09	0.62	29.73	20.40	1.37
3200	21.94	25.88	11.47	15.86	1.09	0.62	29.44	20.21	1.37
3400	21.95	26.00	11.46	15.82	1.09	0.64	28.54	20.05	1.43
3600	21.96	26.05	11.50	15.90	1.10	0.64	28.87	19.94	1.44
3800	21.98	26.13	11.58	16.11	1.10	0.65	29.82	20.57	1.47
4000	22.00	26.21	11.74	16.45	1.10	0.66	28.03	20.31	1.50
4200	22.02	26.19	11.95	16.92	1.10	0.66	29.58	20.32	1.50
4400	22.04	26.28	12.17	17.40	1.11	0.68	28.02	20.30	1.51
4600	22.06	26.38	12.34	18.00	1.12	0.69	29.87	20.15	1.54
4800	22.10	26.43	12.52	18.57	1.12	0.69	28.85	20.49	1.57
5000	22.14	26.50	12.68	19.17	1.12	0.70	28.50	20.47	1.55
5200	22.18	26.56	12.86	19.82	1.13	0.71	29.38	20.56	1.59
5400	22.22	26.64	13.05	20.41	1.13	0.71	28.65	20.43	1.60
5600	22.26	26.68	13.31	21.05	1.14	0.72	28.78	20.34	1.62
5800	22.30	26.78	13.64	21.84	1.15	0.72	29.51	20.45	1.65
6000	22.34	26.85	14.06	22.72	1.15	0.73	29.16	20.54	1.64
6200	22.39	26.96	14.61	23.37	1.16	0.74	30.40	20.49	1.59
6400	22.41	27.09	15.17	24.04	1.18	0.74	30.25	20.53	1.57
6600	22.43	27.14	15.89	24.21	1.19	0.75	30.02	20.64	1.61
6800	22.45	27.26	16.79	23.74	1.20	0.75	29.30	20.58	1.61
7000	22.47	27.44	17.78	23.22	1.23	0.76	29.11	20.52	1.61
7200	22.46	27.52	18.62	22.63	1.24	0.77	28.97	20.54	1.66
7400	22.44	27.77	19.33	22.23	1.28	0.79	31.01	20.41	1.71
7600	22.41	27.92	19.58	22.04	1.31	0.80	29.32	20.18	1.71
7800	22.42	28.06	19.49	21.86	1.33	0.81	31.51	20.14	1.78
8000	22.45	28.22	19.14	21.70	1.36	0.82	30.43	19.83	1.69
8200	22.39	28.48	18.66	21.33	1.41	0.84	28.74	19.41	1.71
8400	22.39	28.66	17.49	21.63	1.44	0.85	29.69	19.18	1.71
8600	22.41	28.76	16.25	22.03	1.45	0.86	28.08	18.74	1.69
8800	22.31	29.00	15.34	22.02	1.50	0.88	29.87	18.66	1.70
9000	22.16	29.38	14.64	22.24	1.57	0.90	29.64	18.62	1.82
9200	21.97	29.61	13.95	22.34	1.64	0.92	28.58	17.84	1.97
9400	21.75	29.92	13.13	22.01	1.71	0.94	29.29	17.44	2.07
9600	21.46	30.28	12.32	20.72	1.80	0.96	28.72	17.18	2.23
9800	21.11	30.63	11.52	18.73	1.90	0.98	27.34	16.51	2.33
10000	20.69	31.12	10.67	16.68	2.03	0.99	28.18	16.49	2.52

## Typical Performance Data

**Definitions:**

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

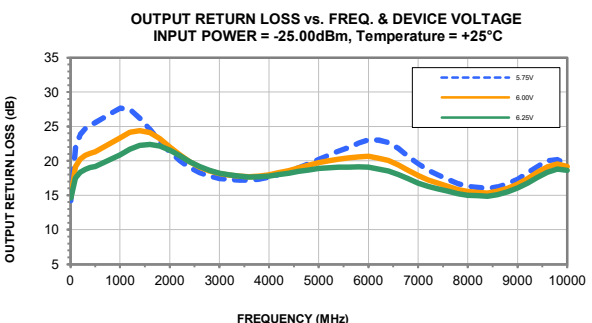
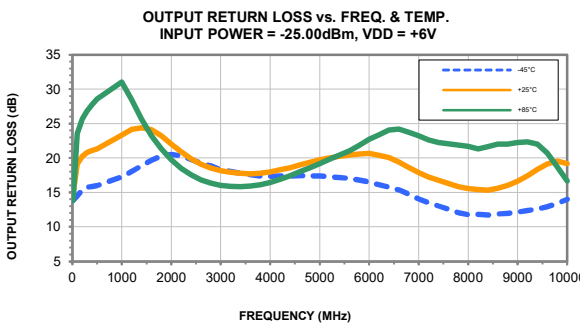
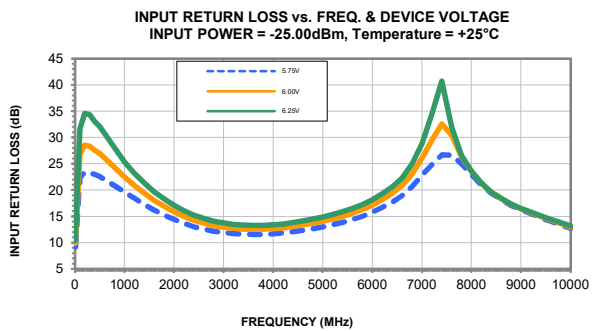
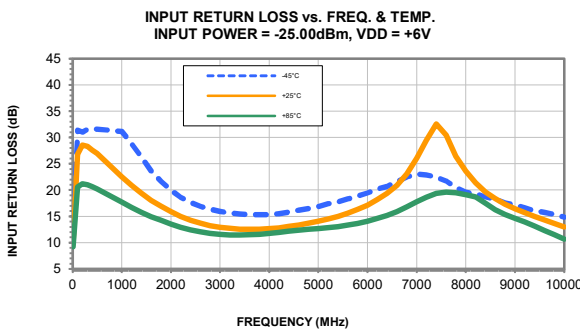
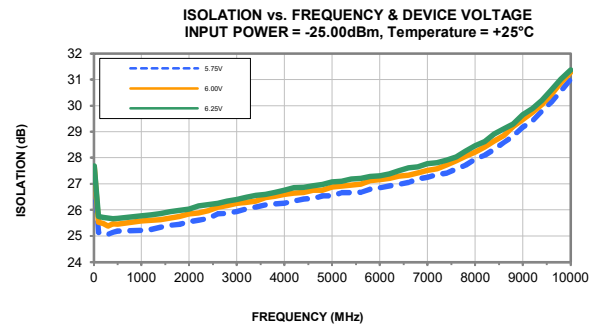
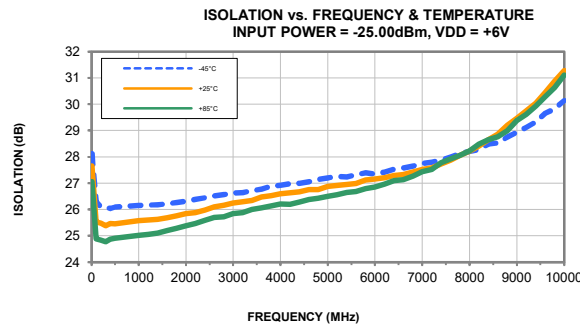
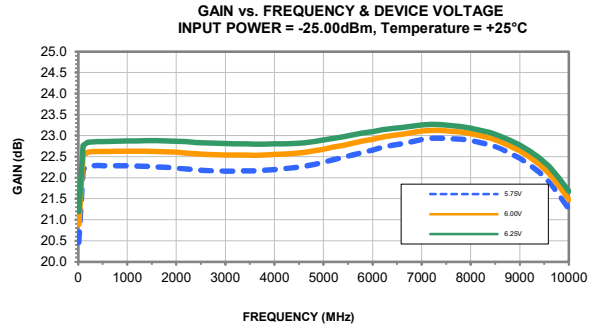
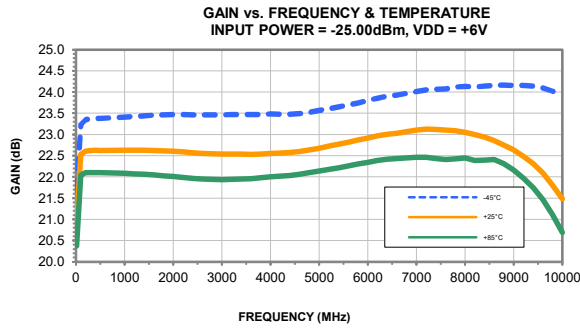
Output Return Loss = -S22 (dB)

TEST CONDITIONS: VDD = +6.25V, Id = 75mA @ Temperature = +85°C

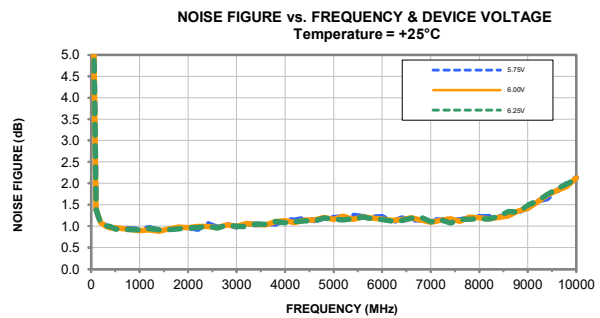
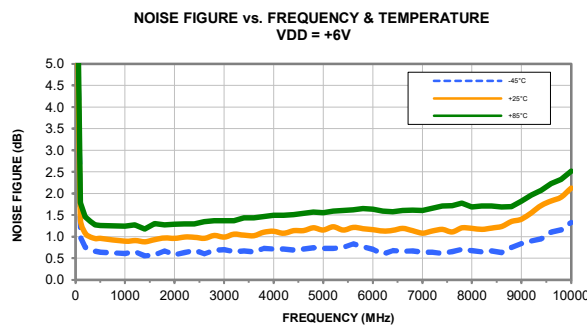
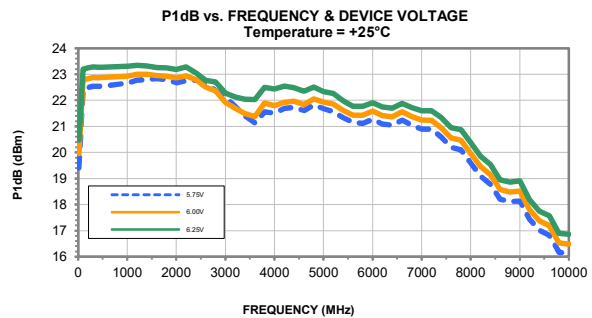
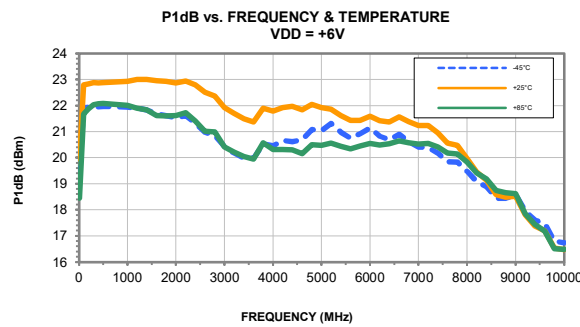
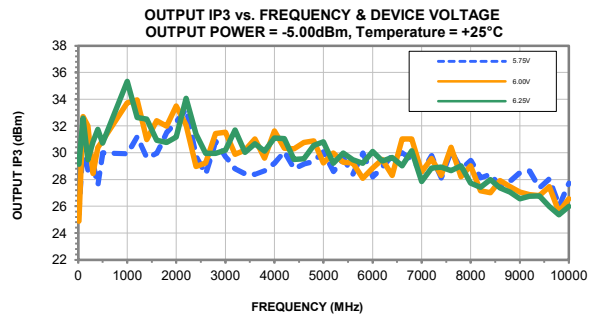
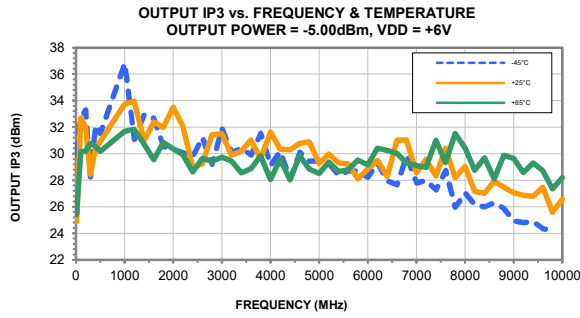
FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
10	20.68	26.96	9.63	14.19	1.12	0.84	25.28	18.79	9.29
100	22.29	25.10	23.01	21.20	1.04	0.48	29.55	21.98	1.84
200	22.35	25.12	23.80	22.47	1.04	0.48	30.16	22.18	1.48
300	22.35	25.06	23.49	23.19	1.04	0.48	30.79	22.32	1.30
400	22.35	25.13	22.95	23.80	1.04	0.49	29.96	22.37	1.27
500	22.35	25.08	22.44	24.34	1.04	0.49	30.28	22.39	1.30
1000	22.34	25.25	19.28	28.13	1.05	0.52	30.66	22.28	1.27
1200	22.33	25.28	18.07	28.36	1.05	0.53	31.06	22.16	1.26
1400	22.32	25.35	17.03	26.72	1.06	0.54	33.02	22.10	1.18
1600	22.31	25.43	16.02	24.54	1.06	0.55	31.62	21.86	1.29
1800	22.29	25.53	15.18	22.54	1.06	0.56	31.24	21.86	1.28
2000	22.28	25.58	14.42	20.86	1.07	0.57	31.03	21.89	1.23
2200	22.26	25.67	13.75	19.44	1.07	0.58	32.01	22.01	1.27
2400	22.25	25.75	13.18	18.33	1.07	0.59	30.07	21.66	1.29
2600	22.23	25.87	12.77	17.53	1.08	0.60	29.83	21.28	1.30
2800	22.22	25.92	12.44	16.96	1.08	0.60	31.20	21.29	1.40
3000	22.21	25.99	12.23	16.55	1.08	0.61	32.76	20.76	1.34
3200	22.22	26.09	12.11	16.34	1.09	0.62	29.31	20.65	1.37
3400	22.22	26.15	12.08	16.23	1.09	0.63	30.23	20.62	1.39
3600	22.22	26.22	12.13	16.24	1.09	0.64	28.89	20.60	1.42
3800	22.24	26.27	12.21	16.37	1.09	0.64	29.57	21.13	1.45
4000	22.26	26.36	12.39	16.63	1.10	0.65	29.45	20.92	1.49
4200	22.27	26.46	12.59	17.01	1.11	0.66	29.37	20.92	1.53
4400	22.28	26.47	12.83	17.41	1.11	0.67	28.08	20.86	1.47
4600	22.31	26.51	13.02	17.87	1.11	0.68	29.08	20.69	1.53
4800	22.34	26.61	13.20	18.37	1.12	0.69	29.90	20.96	1.52
5000	22.37	26.69	13.36	18.83	1.12	0.69	30.19	20.90	1.59
5200	22.40	26.74	13.53	19.34	1.13	0.70	30.06	20.96	1.54
5400	22.43	26.80	13.74	19.76	1.13	0.70	30.65	20.79	1.57
5600	22.47	26.91	14.01	20.24	1.14	0.71	28.92	20.65	1.65
5800	22.51	27.00	14.36	20.75	1.15	0.72	30.82	20.75	1.68
6000	22.54	27.09	14.78	21.34	1.16	0.73	28.84	20.80	1.61
6200	22.58	27.14	15.39	21.67	1.16	0.73	29.36	20.76	1.54
6400	22.59	27.25	16.00	21.93	1.18	0.74	29.95	20.81	1.56
6600	22.60	27.41	16.79	21.98	1.20	0.75	30.19	20.91	1.57
6800	22.61	27.49	17.80	21.61	1.21	0.75	28.92	20.86	1.61
7000	22.63	27.65	18.91	21.20	1.23	0.76	29.54	20.82	1.65
7200	22.61	27.78	19.85	20.80	1.25	0.77	28.27	20.84	1.67
7400	22.58	27.98	20.66	20.63	1.29	0.78	29.64	20.74	1.63
7600	22.55	28.16	20.89	20.54	1.32	0.80	28.69	20.50	1.73
7800	22.57	28.36	20.66	20.47	1.35	0.81	29.31	20.47	1.75
8000	22.59	28.45	20.16	20.36	1.37	0.82	28.60	20.21	1.75
8200	22.52	28.74	19.47	20.12	1.42	0.83	28.13	19.84	1.69
8400	22.54	28.89	18.06	20.55	1.45	0.85	28.41	19.64	1.76
8600	22.56	29.01	16.67	20.86	1.47	0.86	28.34	19.23	1.65
8800	22.46	29.26	15.66	20.89	1.52	0.88	28.53	19.14	1.74
9000	22.31	29.57	14.89	21.13	1.58	0.90	28.52	19.12	1.80
9200	22.13	29.84	14.18	21.30	1.65	0.91	26.87	18.36	1.96
9400	21.92	30.07	13.34	21.17	1.71	0.93	27.33	17.95	2.10
9600	21.64	30.46	12.51	20.27	1.80	0.95	27.04	17.70	2.21
9800	21.30	30.82	11.71	18.56	1.90	0.97	27.46	17.00	2.38
10000	20.89	31.21	10.84	16.70	2.01	0.99	26.75	17.01	2.47



## Typical Performance Curves

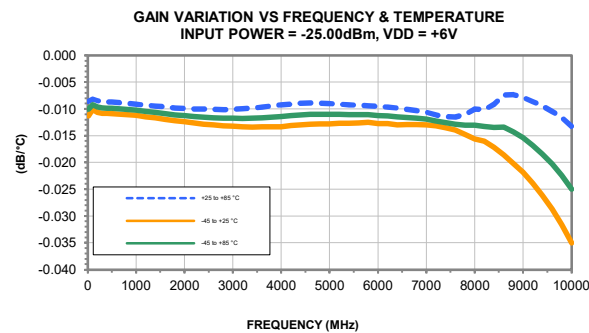


## Typical Performance Curves



\*Typical Noise Figure 1.8dB at 50MHz

\*Typical Noise Figure 1.8dB at 50MHz





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

<b>Specification</b>	<b>Test/Inspection Condition</b>	<b>Reference/Spec</b>
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)	