



COAXIAL

Low Noise Amplifier ZX60-P105LN+

Mini-Circuits

50Ω 40 to 2600 MHz SMA Female

THE BIG DEAL

- Flat Gain, ±0.25 dB Typ.
- Low Noise Figure, 1.9 dB Typ. at 2 GHz
- High Dynamic Range
- Gain, 15 dB Typ. at 2 GHz
- High IP3, +39 dBm Typ. at 0.9 GHz
- Unconditionally Stable
- Protected by US Patent 6,790,049



Generic photo used for illustration purposes only

Model No.	ZX60-P105LN+
Case Style	GC957
Connectors	SMA female

+RoHS Compliant

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

APPLICATIONS

- Base Station Infrastructure
- Portable Wireless
- CATV & DBS
- MMDS & Wireless LAN
- LTE

PRODUCT OVERVIEW

The ZX60-P105LN+ (RoHS compliant) uses Mini-Circuits' E-pHEMT technology and offers ultra low Gain Flatness over a broad frequency range and high dynamic range. Housed in a rugged, cost effective unibody chassis. The ZX60-P105LN+ is unconditionally stable and has good input and output return loss over a broad frequency range without the need for external matching components.

KEY FEATURES

Feature	Advantages
Ultra-Low Noise Figure, 1.9 dB at 2 GHz	Outstanding world class noise figure performance.
High IP3 vs. DC Power Consumption +37 dBm Typical at 1 GHz	Combining Low Noise and High IP3 makes this model ideal for use in Low Noise Receiver Front End (RFE).
Max. Input Power, +23 dBm (5 Minutes Max., +17 dBm Continuous)	Ruggedized design operates to high input powers often seen at receiver inputs.
Very Small Size, 0.75x0.75"	The unique unibody size and construction enable the ZX60-P105LN+ to be used in extremely compact connectorized applications.

REV. C
ECO-016035
ZX60-P105LN+
MCL NY
260226





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Low Noise Amplifier **ZX60-P105LN+**

Mini-Circuits

50Ω 40 to 2600 MHz SMA Female

ELECTRICAL SPECIFICATIONS AT +25 °C AND +5.0 V, UNLESS NOTED OTHERWISE

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		40		2600	MHz
Noise Figure	40		2.3		dB
	500		2.0		
	900		1.9		
	2000		1.9	2.7	
	2600		2.0		
Gain	40		14.4		dB
	500		14.5		
	900		14.4		
	2000	13.8	15.5	16.8	
	2600		15.1		
Gain Flatness	1000-2000		±0.25		dB
Output Power at 1 dB Compression	40		+19.5		dBm
	500		+21.0		
	900		+21.0		
	2000		+18.9		
	2600		+19.4		
Output IP3	40		+34.6		dBm
	500		+38.7		
	900		+37.4		
	2000		+33.6		
	2600		+33.2		
Input VSWR	40		2.2		dB
	500		1.2		
	900		1.2		
	2000		1.3		
	2600		1.8		
Output VSWR	40		1.1		dB
	500		1.2		
	900		1.1		
	2000		2.4		
	2600		2.2		
Active Directivity (Isolation - Gain)	40		6.3		dB
	500		4.5		
	900		5.1		
	2000		8.1		
	2600		13.5		
DC Supply Voltage		+4.8	+5.0	+5.2	V
Supply Current			63	77	mA





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Low Noise Amplifier ZX60-P105LN+

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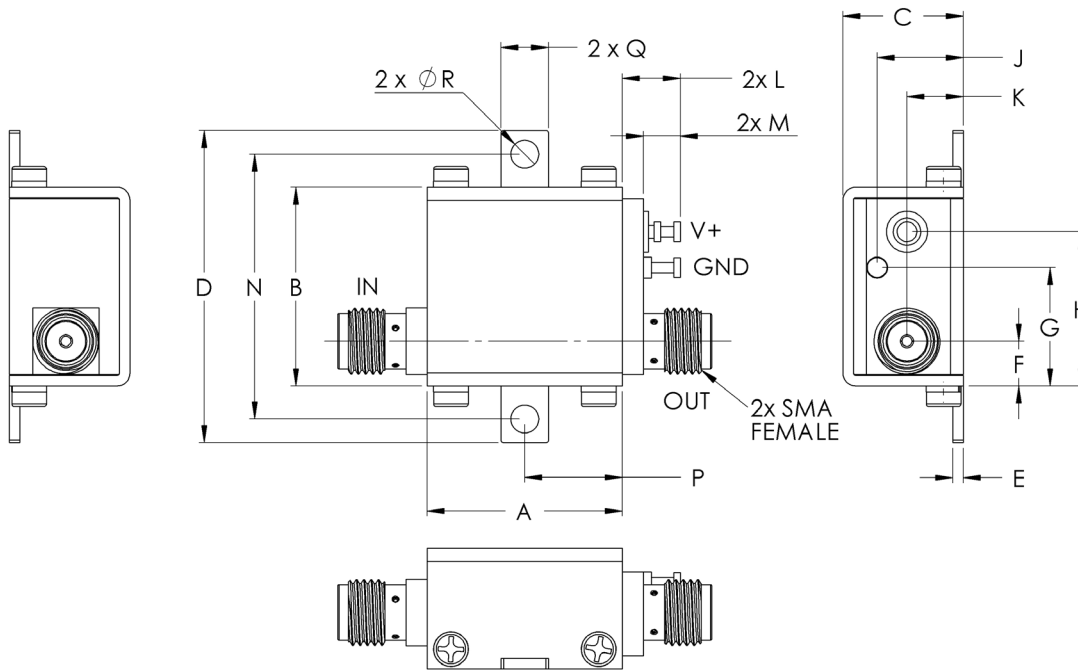
50Ω 40 to 2600 MHz SMA Female

ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-40 °C to +85 °C case
Storage Temperature	-55 °C to +100 °C
DC Voltage	+5.5 V
Input RF Power (No Damage)	+23 dBm (5 minutes max.), +17 dBm (continuous)
Power Consumption	0.47 W

Permanent damage may occur if any of these limits are exceeded.

OUTLINE DRAWING



! NOTE: When soldering the DC connections, caution must be used to avoid overheating the DC terminal. See Application Note. [AN-40-010](#).

OUTLINE DIMENSIONS (Inches mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	wt
.74	.75	.46	1.18	.04	.17	.45	.59	.33	.21	.22	.14	1.00	.37	.18	.106	grams
18.80	19.1	11.68	30.0	1.02	4.32	11.4	14.99	8.38	5.33	5.59	3.56	25.40	9.40	4.57	2.69	23.0





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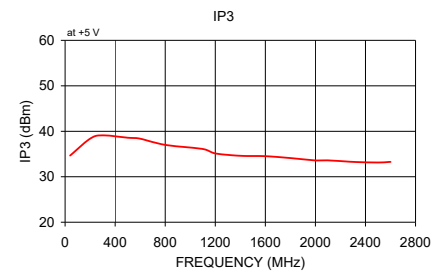
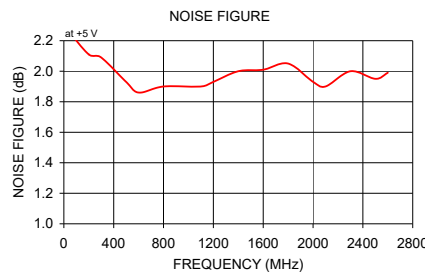
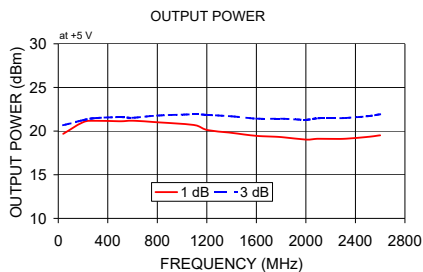
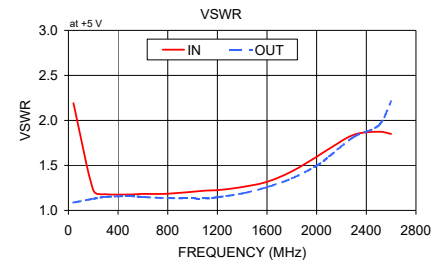
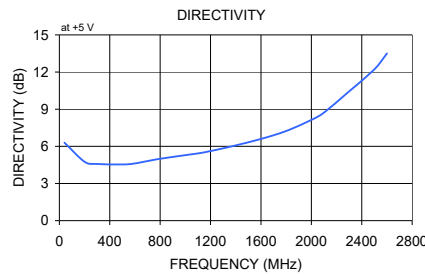
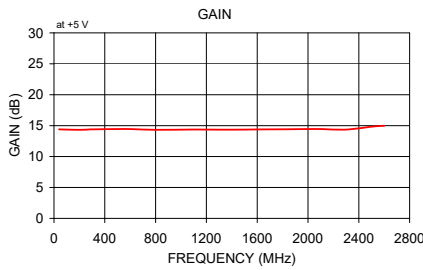
Low Noise Amplifier ZX60-P105LN+

Mini-Circuits

50Ω 40 to 2600 MHz SMA Female

TYPICAL PERFORMANCE DATA/CURVES

Frequency (MHz)	Gain (dB)	Directivity (dB)	VSWR (:1)		Power Out at 1 dB Compr. (dBm)	Noise Figure (dB)	OUTPUT IP3 (dBm)
			+5 V				
			IN	OUT			
40	14.40	6.30	2.19	1.09	19.7	2.3	34.7
200	14.32	4.76	1.23	1.13	21.0	2.1	38.4
300	14.39	4.58	1.18	1.15	21.2	2.1	39.1
500	14.45	4.54	1.18	1.16	21.1	1.9	38.6
600	14.45	4.62	1.18	1.15	21.2	1.9	38.4
800	14.32	5.00	1.18	1.14	21.0	1.9	37.0
1100	14.37	5.43	1.22	1.13	20.7	1.9	36.1
1200	14.36	5.62	1.22	1.15	20.1	1.9	35.1
1400	14.35	6.08	1.26	1.19	19.8	2.0	34.6
1600	14.38	6.60	1.32	1.26	19.5	2.0	34.5
1800	14.41	7.24	1.43	1.36	19.3	2.1	34.1
2000	14.44	8.14	1.60	1.50	19.0	1.9	33.6
2100	14.45	8.73	1.68	1.60	19.1	1.9	33.6
2300	14.36	10.44	1.84	1.82	19.1	2.0	33.3
2500	14.83	12.22	1.87	1.95	19.3	2.0	33.1
2600	14.98	13.50	1.85	2.21	19.5	2.0	33.3



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



Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.00V, Id = 64.67mA @ 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)
40.0	14.45	20.75	8.51	26.88	1.13	0.90	34.92	19.19	2.10
50.0	14.41	20.18	9.91	27.65	1.13	0.83	35.50	19.55	2.29
60.0	14.35	19.90	11.20	26.65	1.14	0.79	35.71	20.08	2.33
70.0	14.32	19.73	12.29	26.16	1.14	0.77	34.81	20.46	2.49
80.0	14.29	19.59	13.27	25.76	1.15	0.75	36.91	20.55	2.38
90.0	14.28	19.50	14.18	25.41	1.15	0.73	41.68	20.76	2.38
100.0	14.28	19.42	14.96	25.30	1.15	0.72	37.29	20.86	2.34
150.0	14.28	19.22	17.87	24.25	1.15	0.69	36.75	20.93	2.33
200.0	14.32	19.13	19.92	23.39	1.15	0.67	37.15	20.93	2.24
250.0	14.36	19.06	21.14	22.87	1.14	0.66	39.48	21.02	2.22
300.0	14.40	19.02	22.05	22.51	1.14	0.65	43.51	20.95	2.15
350.0	14.43	19.01	22.68	22.20	1.13	0.65	41.98	21.14	2.16
400.0	14.44	19.01	22.82	21.82	1.13	0.65	38.81	21.14	2.33
450.0	14.43	19.02	22.78	21.69	1.13	0.65	37.80	21.14	2.04
500.0	14.44	19.06	22.76	21.64	1.14	0.65	38.40	21.18	2.05
600.0	14.42	19.13	22.87	21.94	1.14	0.66	40.05	21.08	2.02
700.0	14.39	19.25	23.08	22.24	1.15	0.67	37.37	20.92	2.07
800.0	14.28	19.44	23.58	23.31	1.17	0.69	36.12	20.82	2.13
900.0	14.32	19.51	22.15	24.45	1.18	0.70	36.70	20.91	2.05
1000.0	14.32	19.65	21.68	24.37	1.19	0.71	35.35	20.04	2.03
1100.0	14.30	19.82	21.18	24.31	1.20	0.72	36.14	20.53	2.06
1200.0	14.28	20.01	20.19	23.81	1.21	0.74	34.36	19.76	2.07
1250.0	14.26	20.12	19.67	23.54	1.22	0.74	34.23	19.47	2.12
1300.0	14.26	20.23	19.09	22.46	1.23	0.75	34.30	19.27	2.11
1450.0	14.22	20.60	17.43	20.14	1.26	0.78	34.51	19.05	2.14
1600.0	14.18	21.03	15.92	18.01	1.28	0.80	32.88	18.30	2.09
1700.0	14.16	21.35	14.96	16.95	1.30	0.82	34.28	18.14	2.07
1800.0	14.13	21.73	13.89	15.74	1.32	0.85	34.10	17.75	2.09
1900.0	14.08	22.21	12.92	14.17	1.34	0.87	34.25	17.83	2.39
2000.0	14.03	22.75	12.16	12.80	1.37	0.89	33.54	17.54	2.10
2100.0	13.98	23.37	11.45	11.69	1.40	0.92	33.84	17.76	2.07
2200.0	13.94	24.16	10.74	10.71	1.44	0.94	33.73	18.18	2.12
2300.0	13.79	25.15	10.21	9.62	1.54	0.95	33.90	18.46	1.98
2400.0	13.56	26.44	9.59	9.05	1.73	0.97	33.49	18.57	2.10
2500.0	13.92	27.59	9.49	8.03	1.78	0.95	33.99	18.98	2.19
2600.0	14.18	29.38	9.68	7.09	2.01	0.91	34.57	19.43	2.11
2700.0	14.32	31.78	9.88	6.33	2.49	0.87	34.29	19.74	2.16
2800.0	14.39	35.83	10.45	5.62	3.80	0.81	34.48	19.94	2.13
2900.0	14.43	39.77	11.25	5.12	5.94	0.74	35.32	20.34	2.02
3000.0	14.39	36.45	12.37	4.99	4.24	0.70	35.50	21.07	2.06

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 = 4.80V, Id = 62.01mA @ 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)
40.0	14.43	20.76	8.53	27.07	1.14	0.90	34.96	18.87	2.08
50.0	14.41	20.18	9.88	27.98	1.13	0.83	34.71	19.13	2.33
60.0	14.34	19.91	11.14	27.18	1.14	0.79	35.75	19.74	2.30
70.0	14.31	19.74	12.30	26.71	1.15	0.77	35.20	20.10	2.48
80.0	14.29	19.61	13.32	26.33	1.15	0.75	36.46	20.17	2.38
90.0	14.28	19.51	14.21	25.98	1.15	0.73	38.92	20.37	2.39
100.0	14.28	19.43	15.00	25.86	1.15	0.72	36.92	20.51	2.32
150.0	14.29	19.24	17.86	24.79	1.15	0.69	36.83	20.60	2.34
200.0	14.33	19.14	20.02	23.87	1.15	0.67	36.82	20.57	2.26
250.0	14.36	19.07	21.23	23.32	1.14	0.66	39.38	20.68	2.21
300.0	14.40	19.03	22.09	22.97	1.14	0.65	40.57	20.58	2.23
350.0	14.43	19.02	22.78	22.63	1.14	0.65	42.46	20.81	2.11
400.0	14.44	19.02	22.88	22.23	1.13	0.65	39.02	20.78	2.30
450.0	14.44	19.04	22.76	22.09	1.14	0.65	37.45	20.80	2.06
500.0	14.43	19.06	22.68	22.03	1.14	0.65	37.71	20.82	2.04
600.0	14.42	19.14	22.66	22.36	1.14	0.66	38.29	20.72	2.01
700.0	14.38	19.26	22.76	22.69	1.15	0.67	36.82	20.55	2.07
800.0	14.28	19.45	23.03	23.79	1.18	0.69	35.54	20.43	2.15
900.0	14.32	19.53	21.67	24.97	1.18	0.70	35.98	20.50	2.06
1000.0	14.30	19.66	21.21	24.89	1.19	0.71	34.66	19.72	2.05
1100.0	14.28	19.83	20.75	24.79	1.20	0.72	35.83	20.18	2.07
1200.0	14.25	20.02	19.83	24.12	1.22	0.74	33.84	19.38	2.12
1250.0	14.24	20.13	19.39	23.86	1.23	0.75	33.75	19.16	2.10
1300.0	14.23	20.25	18.85	22.68	1.23	0.75	33.73	18.93	2.12
1450.0	14.19	20.61	17.33	20.26	1.26	0.78	33.97	18.70	2.14
1600.0	14.14	21.04	15.90	18.14	1.29	0.80	32.35	17.94	2.14
1700.0	14.12	21.37	14.96	17.08	1.31	0.83	33.70	17.78	2.04
1800.0	14.08	21.74	13.95	15.88	1.33	0.85	33.59	17.37	2.11
1900.0	14.04	22.22	12.97	14.30	1.35	0.87	33.63	17.47	2.04
2000.0	13.98	22.75	12.22	12.93	1.38	0.90	33.09	17.18	2.10
2100.0	13.94	23.39	11.53	11.80	1.41	0.92	33.32	17.40	2.09
2200.0	13.89	24.18	10.82	10.84	1.46	0.94	33.20	17.83	2.13
2300.0	13.74	25.19	10.27	9.76	1.56	0.95	33.56	18.14	1.98
2400.0	13.52	26.48	9.67	9.17	1.76	0.97	33.11	18.24	2.14
2500.0	13.88	27.64	9.58	8.13	1.82	0.95	33.59	18.67	2.22
2600.0	14.14	29.46	9.76	7.20	2.06	0.91	34.20	19.07	2.10
2700.0	14.27	31.90	9.98	6.45	2.56	0.87	33.85	19.43	2.18
2800.0	14.35	36.16	10.55	5.73	4.02	0.81	34.07	19.65	2.11
2900.0	14.38	40.32	11.38	5.20	6.43	0.75	34.99	20.02	2.03
3000.0	14.35	36.55	12.48	5.08	4.36	0.70	35.21	20.76	2.07

Amplifier

ZX60-P105LN+

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 = 5.20V, Id = 67.82mA @ 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)
40.0	14.48	20.80	8.54	26.99	1.14	0.90	36.09	19.48	2.11
50.0	14.46	20.28	9.76	27.94	1.13	0.84	35.62	19.79	2.31
60.0	14.39	19.98	11.19	27.09	1.14	0.80	37.02	20.35	2.31
70.0	14.36	19.77	12.33	26.63	1.15	0.77	36.01	20.73	2.42
80.0	14.35	19.64	13.32	26.28	1.15	0.75	37.12	20.85	2.35
90.0	14.34	19.53	14.22	25.93	1.15	0.73	40.24	21.02	2.38
100.0	14.34	19.46	15.01	25.83	1.15	0.72	38.62	21.14	2.33
150.0	14.35	19.28	17.86	24.77	1.15	0.69	38.04	21.21	2.33
200.0	14.38	19.17	20.02	23.86	1.15	0.67	38.65	21.20	2.27
250.0	14.42	19.11	21.23	23.31	1.14	0.66	40.82	21.30	2.20
300.0	14.45	19.07	22.11	22.96	1.14	0.65	43.90	21.20	2.15
350.0	14.49	19.05	22.71	22.60	1.13	0.65	43.38	21.42	2.12
400.0	14.50	19.05	22.87	22.18	1.13	0.65	40.19	21.41	2.20
450.0	14.49	19.07	22.79	22.01	1.13	0.65	39.45	21.41	2.00
500.0	14.50	19.10	22.73	21.91	1.14	0.65	39.59	21.46	2.07
600.0	14.48	19.17	22.78	22.18	1.14	0.66	40.42	21.35	2.04
700.0	14.44	19.29	22.87	22.42	1.15	0.67	38.13	21.16	2.06
800.0	14.34	19.49	23.24	23.29	1.17	0.69	37.06	21.07	2.11
900.0	14.38	19.56	21.82	24.20	1.18	0.70	37.33	21.16	2.07
1000.0	14.37	19.70	21.39	24.01	1.19	0.71	35.96	20.33	2.05
1100.0	14.35	19.87	20.89	23.78	1.20	0.72	37.09	20.78	2.07
1200.0	14.32	20.06	19.95	23.08	1.21	0.74	35.02	20.01	2.11
1250.0	14.30	20.17	19.48	22.81	1.22	0.74	34.76	19.76	2.14
1300.0	14.29	20.28	18.97	21.74	1.23	0.75	34.84	19.55	2.11
1450.0	14.25	20.65	17.38	19.50	1.26	0.77	35.06	19.36	2.17
1600.0	14.20	21.08	15.94	17.49	1.28	0.80	33.40	18.61	2.18
1700.0	14.18	21.39	15.01	16.47	1.30	0.82	34.83	18.47	2.04
1800.0	14.15	21.76	13.94	15.34	1.32	0.85	34.61	18.06	2.12
1900.0	14.09	22.24	13.00	13.83	1.34	0.87	34.74	18.15	2.08
2000.0	14.03	22.77	12.23	12.49	1.36	0.89	33.94	17.87	2.10
2100.0	13.98	23.38	11.53	11.38	1.39	0.91	34.26	18.07	2.09
2200.0	13.93	24.16	10.80	10.45	1.44	0.93	34.23	18.47	2.15
2300.0	13.78	25.13	10.24	9.40	1.52	0.95	34.31	18.77	1.98
2400.0	13.55	26.39	9.61	8.84	1.70	0.96	33.88	18.87	2.11
2500.0	13.92	27.47	9.50	7.78	1.73	0.94	34.37	19.28	2.23
2600.0	14.17	29.13	9.68	6.85	1.92	0.90	34.91	19.71	2.13
2700.0	14.29	31.32	9.88	6.10	2.32	0.86	34.69	20.04	2.18
2800.0	14.37	34.82	10.41	5.39	3.32	0.79	34.76	20.19	2.16
2900.0	14.40	37.93	11.21	4.86	4.69	0.72	35.45	20.59	2.06
3000.0	14.38	35.84	12.27	4.73	3.85	0.68	35.53	21.34	2.07

Amplifier

ZX60-P105LN+

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.00V, Id = 57.56mA @ Temperature = -40°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)
40.0	14.22	20.14	7.96	25.13	1.08	0.90	34.71	18.14	1.85
50.0	14.07	19.61	9.21	23.63	1.09	0.84	34.66	18.55	1.96
60.0	13.94	19.28	10.55	22.33	1.11	0.79	36.19	19.30	1.99
70.0	13.84	19.09	11.52	21.72	1.12	0.76	34.75	19.76	2.12
80.0	13.77	18.95	12.41	21.21	1.13	0.74	35.63	19.82	2.01
90.0	13.73	18.86	13.24	20.84	1.13	0.73	38.21	20.14	2.10
100.0	13.71	18.79	13.93	20.73	1.14	0.72	38.95	20.33	1.99
150.0	13.66	18.61	16.31	20.06	1.14	0.69	37.77	20.56	2.01
200.0	13.66	18.50	18.02	19.41	1.14	0.67	38.30	20.37	1.91
250.0	13.69	18.44	18.87	18.83	1.14	0.65	38.68	20.66	1.90
300.0	13.73	18.41	19.61	18.45	1.14	0.64	41.10	20.43	1.94
350.0	13.76	18.39	20.26	18.21	1.13	0.64	38.57	20.81	1.85
400.0	13.79	18.38	20.88	18.07	1.13	0.63	37.63	20.86	2.12
450.0	13.79	18.40	21.37	18.05	1.13	0.63	37.66	20.78	1.73
500.0	13.82	18.42	21.95	17.89	1.13	0.63	40.63	20.91	1.75
600.0	13.85	18.48	22.93	17.75	1.14	0.63	40.05	20.71	1.75
700.0	13.87	18.58	24.77	17.91	1.14	0.64	36.54	20.45	1.79
800.0	13.80	18.78	29.23	18.35	1.16	0.66	35.41	20.35	1.83
900.0	13.91	18.83	32.48	18.99	1.15	0.66	36.31	20.53	1.73
1000.0	13.98	18.94	32.81	19.03	1.16	0.67	35.26	19.32	1.71
1100.0	14.03	19.10	28.82	19.13	1.16	0.68	35.42	20.09	1.74
1200.0	14.07	19.27	24.58	19.01	1.17	0.69	33.57	19.05	1.74
1250.0	14.10	19.36	22.81	19.12	1.17	0.70	33.43	18.68	1.76
1300.0	14.12	19.47	21.27	18.61	1.17	0.71	33.69	18.41	1.74
1450.0	14.17	19.83	17.65	17.28	1.17	0.74	33.60	18.25	1.75
1600.0	14.20	20.28	15.33	15.87	1.18	0.77	32.08	17.42	1.74
1700.0	14.29	20.57	13.87	14.84	1.17	0.80	33.67	17.34	1.64
1800.0	14.34	20.95	12.61	13.83	1.17	0.82	33.14	16.98	1.65
1900.0	14.35	21.40	11.65	12.50	1.17	0.85	33.34	17.03	1.75
2000.0	14.35	21.95	10.91	11.15	1.17	0.87	32.65	16.65	1.63
2100.0	14.36	22.55	10.19	10.10	1.16	0.90	32.95	16.86	1.60
2200.0	14.39	23.29	9.56	9.26	1.17	0.92	32.95	17.32	1.64
2300.0	14.35	24.18	9.18	8.16	1.19	0.93	33.11	17.72	1.48
2400.0	14.12	25.43	8.82	7.16	1.27	0.92	32.83	17.86	1.51
2500.0	14.29	26.55	8.07	7.21	1.36	0.96	33.21	18.27	1.79
2600.0	14.77	27.76	8.81	5.86	1.36	0.87	33.97	18.83	1.65
2700.0	14.88	29.55	8.98	5.26	1.56	0.83	33.76	19.20	1.66
2800.0	14.99	32.36	9.48	4.53	2.02	0.75	34.05	19.57	1.63
2900.0	15.06	34.98	10.28	3.94	2.64	0.66	34.79	20.19	1.53
3000.0	15.08	35.53	11.34	3.76	2.94	0.60	35.00	21.26	1.55

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 = 4.80V, Id = 55.36mA @ Temperature = -40°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)
40.0	14.19	20.12	7.96	25.27	1.08	0.90	34.10	17.91	1.82
50.0	14.07	19.54	9.21	23.78	1.08	0.84	34.17	18.24	1.99
60.0	13.90	19.27	10.44	22.42	1.11	0.80	35.26	19.01	1.99
70.0	13.81	19.06	11.51	21.79	1.12	0.77	34.02	19.49	2.12
80.0	13.74	18.92	12.41	21.27	1.13	0.74	35.26	19.52	2.01
90.0	13.69	18.83	13.24	20.90	1.13	0.73	38.10	19.88	2.11
100.0	13.67	18.76	13.94	20.79	1.14	0.72	37.48	20.04	2.00
150.0	13.63	18.57	16.33	20.12	1.14	0.69	37.07	20.28	2.03
200.0	13.62	18.47	18.04	19.45	1.14	0.67	37.40	20.15	2.00
250.0	13.66	18.41	18.93	18.88	1.14	0.65	38.65	20.36	1.92
300.0	13.69	18.39	19.64	18.50	1.14	0.65	41.33	20.24	1.87
350.0	13.73	18.36	20.34	18.25	1.14	0.64	39.92	20.55	1.88
400.0	13.75	18.36	20.92	18.11	1.13	0.64	37.55	20.57	2.10
450.0	13.76	18.36	21.43	18.09	1.13	0.63	37.24	20.52	1.81
500.0	13.79	18.40	21.96	17.93	1.13	0.63	39.16	20.60	1.77
600.0	13.81	18.46	23.01	17.78	1.14	0.64	40.18	20.49	1.77
700.0	13.84	18.55	24.88	17.94	1.14	0.64	36.54	20.18	1.75
800.0	13.77	18.76	29.38	18.38	1.16	0.66	35.16	20.23	1.81
900.0	13.88	18.80	32.47	19.00	1.16	0.66	35.77	20.24	1.76
1000.0	13.96	18.91	32.58	19.06	1.16	0.67	34.63	19.12	1.71
1100.0	14.00	19.07	28.52	19.16	1.16	0.68	35.05	19.78	1.74
1200.0	14.04	19.24	24.43	19.03	1.17	0.69	33.00	18.79	1.76
1250.0	14.07	19.34	22.68	19.14	1.17	0.70	32.92	18.45	1.79
1300.0	14.09	19.44	21.17	18.62	1.17	0.71	33.10	18.18	1.76
1450.0	14.14	19.81	17.60	17.27	1.17	0.74	33.16	17.98	1.76
1600.0	14.17	20.26	15.29	15.87	1.18	0.77	31.52	17.18	1.73
1700.0	14.26	20.54	13.85	14.82	1.17	0.80	33.06	17.11	1.62
1800.0	14.30	20.92	12.58	13.81	1.17	0.82	32.68	16.74	1.65
1900.0	14.33	21.38	11.64	12.50	1.17	0.85	32.92	16.81	1.59
2000.0	14.32	21.92	10.91	11.14	1.17	0.87	32.07	16.42	1.61
2100.0	14.35	22.53	10.19	10.09	1.16	0.90	32.38	16.63	1.58
2200.0	14.37	23.27	9.57	9.26	1.17	0.92	32.39	17.08	1.65
2300.0	14.34	24.16	9.20	8.16	1.19	0.93	32.72	17.44	1.42
2400.0	14.11	25.42	8.84	7.15	1.27	0.92	32.30	17.63	1.54
2500.0	14.27	26.55	8.10	7.23	1.36	0.96	32.66	18.04	1.81
2600.0	14.75	27.76	8.84	5.86	1.37	0.87	33.40	18.58	1.67
2700.0	14.87	29.56	9.02	5.26	1.57	0.83	33.06	18.94	1.67
2800.0	14.97	32.35	9.54	4.53	2.02	0.75	33.43	19.29	1.64
2900.0	15.06	35.02	10.33	3.95	2.66	0.66	34.27	19.94	1.52
3000.0	15.07	35.50	11.40	3.76	2.94	0.60	34.53	20.90	1.52

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: Vd = 5.20V, Id = 60.61mA @ Temperature = -40°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)
40.0	14.25	20.15	7.96	24.89	1.08	0.90	35.31	18.65	1.84
50.0	14.11	19.62	9.33	23.40	1.09	0.83	35.04	18.94	1.98
60.0	13.96	19.28	10.52	22.12	1.10	0.79	36.66	19.73	2.01
70.0	13.86	19.09	11.51	21.50	1.12	0.76	35.10	20.19	2.12
80.0	13.79	18.95	12.40	21.00	1.12	0.74	36.14	20.24	2.03
90.0	13.75	18.86	13.22	20.66	1.13	0.73	38.53	20.58	2.13
100.0	13.72	18.80	13.91	20.53	1.14	0.72	40.26	20.79	2.01
150.0	13.67	18.62	16.30	19.86	1.14	0.68	38.76	21.00	2.04
200.0	13.68	18.51	17.90	19.22	1.14	0.66	39.05	20.88	2.05
250.0	13.71	18.45	18.80	18.66	1.14	0.65	39.01	21.08	1.97
300.0	13.73	18.42	19.52	18.30	1.14	0.64	40.26	20.94	1.98
350.0	13.78	18.41	20.13	18.04	1.13	0.64	37.88	21.28	1.90
400.0	13.80	18.40	20.68	17.90	1.13	0.63	37.21	21.35	2.06
450.0	13.81	18.41	21.24	17.88	1.13	0.63	37.83	21.23	1.80
500.0	13.85	18.43	21.71	17.73	1.13	0.63	41.41	21.33	1.75
600.0	13.87	18.50	22.80	17.58	1.14	0.63	40.35	21.22	1.78
700.0	13.89	18.59	24.65	17.73	1.14	0.64	36.95	20.92	1.74
800.0	13.82	18.79	29.04	18.16	1.16	0.66	36.06	20.83	1.85
900.0	13.94	18.84	33.01	18.76	1.15	0.66	36.74	20.96	1.73
1000.0	14.01	18.94	33.96	18.82	1.15	0.67	35.91	19.76	1.72
1100.0	14.05	19.10	29.35	18.91	1.16	0.68	35.88	20.51	1.74
1200.0	14.10	19.28	24.85	18.77	1.16	0.69	33.93	19.46	1.77
1250.0	14.13	19.37	22.89	18.90	1.16	0.70	33.92	19.08	1.77
1300.0	14.16	19.48	21.35	18.39	1.17	0.71	34.20	18.82	1.76
1450.0	14.20	19.84	17.68	17.08	1.17	0.74	34.16	18.64	1.79
1600.0	14.24	20.28	15.32	15.71	1.18	0.77	32.70	17.80	1.78
1700.0	14.32	20.58	13.87	14.69	1.17	0.79	34.35	17.74	1.66
1800.0	14.37	20.94	12.56	13.69	1.16	0.82	33.73	17.38	1.66
1900.0	14.38	21.40	11.62	12.39	1.16	0.85	33.88	17.45	1.60
2000.0	14.37	21.94	10.89	11.03	1.16	0.87	33.08	17.05	1.66
2100.0	14.39	22.54	10.15	9.98	1.15	0.90	33.50	17.25	1.57
2200.0	14.43	23.27	9.51	9.15	1.16	0.92	33.41	17.69	1.66
2300.0	14.40	24.15	9.13	8.06	1.17	0.92	33.65	18.05	1.46
2400.0	14.16	25.40	8.76	7.07	1.25	0.92	33.42	18.26	1.54
2500.0	14.32	26.50	8.02	7.13	1.33	0.96	33.74	18.65	1.80
2600.0	14.79	27.68	8.76	5.76	1.33	0.87	34.53	19.21	1.70
2700.0	14.92	29.42	8.89	5.17	1.51	0.82	34.26	19.56	1.67
2800.0	15.02	32.15	9.41	4.44	1.93	0.74	34.64	19.93	1.66
2900.0	15.10	34.59	10.19	3.85	2.47	0.65	35.52	20.55	1.55
3000.0	15.11	35.21	11.22	3.67	2.78	0.59	35.73	21.60	1.55

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.00V, Id = 68.95mA @ 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)
40.0	14.55	21.22	8.73	26.51	1.18	0.90	35.98	18.84	2.25
50.0	14.60	20.66	10.20	28.96	1.17	0.84	35.12	19.12	2.53
60.0	14.60	20.42	11.45	30.00	1.17	0.80	36.52	19.63	2.58
70.0	14.61	20.20	12.57	31.08	1.17	0.77	35.67	19.98	2.57
80.0	14.61	20.05	13.60	32.37	1.17	0.75	37.11	20.07	2.60
90.0	14.63	19.96	14.55	32.68	1.16	0.74	39.07	20.28	2.66
100.0	14.65	19.88	15.33	33.28	1.16	0.73	37.35	20.42	2.61
150.0	14.70	19.67	18.30	33.57	1.16	0.70	37.06	20.55	2.58
200.0	14.75	19.56	20.24	31.66	1.15	0.68	37.48	20.51	2.45
250.0	14.80	19.50	20.96	31.21	1.14	0.67	39.90	20.60	2.41
300.0	14.83	19.46	21.27	31.60	1.14	0.66	40.96	20.48	2.41
350.0	14.86	19.44	21.31	30.71	1.13	0.66	41.64	20.70	2.37
400.0	14.85	19.43	20.95	29.32	1.13	0.66	39.88	20.71	2.24
450.0	14.83	19.45	20.70	28.61	1.14	0.66	38.19	20.66	2.24
500.0	14.82	19.49	20.21	28.14	1.14	0.67	37.92	20.72	2.32
600.0	14.78	19.57	19.47	29.69	1.15	0.68	38.47	20.57	2.29
700.0	14.69	19.70	19.07	29.44	1.16	0.69	37.73	20.35	2.30
800.0	14.57	19.89	18.63	28.42	1.18	0.71	36.44	20.23	2.30
900.0	14.55	19.99	17.57	27.16	1.19	0.72	36.65	20.27	2.32
1000.0	14.49	20.13	17.30	25.84	1.20	0.74	35.23	19.60	2.34
1100.0	14.43	20.31	17.21	24.61	1.22	0.75	36.42	19.94	2.37
1200.0	14.34	20.51	16.79	22.72	1.25	0.76	34.91	19.33	2.39
1250.0	14.30	20.62	16.67	22.32	1.26	0.77	34.61	19.12	2.40
1300.0	14.28	20.74	16.52	21.02	1.27	0.78	34.47	18.98	2.43
1450.0	14.16	21.09	16.19	18.88	1.31	0.80	34.77	18.74	2.46
1600.0	14.05	21.52	15.66	17.14	1.35	0.82	33.17	18.06	2.43
1700.0	13.99	21.83	15.50	16.55	1.38	0.83	34.40	17.89	2.50
1800.0	13.91	22.18	14.76	15.93	1.42	0.86	34.43	17.51	2.45
1900.0	13.81	22.65	13.80	14.38	1.45	0.88	34.56	17.56	2.46
2000.0	13.70	23.18	13.25	12.97	1.50	0.89	33.88	17.35	2.45
2100.0	13.62	23.76	12.64	12.07	1.54	0.91	33.98	17.58	2.49
2200.0	13.53	24.52	11.77	11.32	1.62	0.94	33.81	17.93	2.57
2300.0	13.32	25.55	11.04	10.26	1.76	0.95	33.90	18.17	2.46
2400.0	13.20	26.76	10.47	9.64	1.95	0.96	33.47	18.28	2.59
2500.0	13.53	27.84	10.51	8.31	2.00	0.93	33.80	18.62	2.58
2600.0	13.68	29.65	10.44	7.43	2.29	0.91	34.04	18.96	2.55
2700.0	13.80	32.20	10.67	6.84	2.94	0.88	33.89	19.24	2.59
2800.0	13.86	36.37	11.35	6.09	4.60	0.82	33.87	19.34	2.58
2900.0	13.84	39.01	12.13	5.39	6.10	0.75	34.25	19.69	2.50
3000.0	13.82	35.19	13.13	5.37	4.11	0.72	34.41	20.37	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: Vd = 4.80V, Id = 66.00mA @ 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)
40.0	14.52	21.22	8.76	26.43	1.18	0.90	35.49	18.59	2.24
50.0	14.58	20.69	9.99	28.90	1.17	0.84	34.79	18.86	2.54
60.0	14.57	20.42	11.40	30.02	1.17	0.80	36.02	19.38	2.60
70.0	14.58	20.19	12.57	31.15	1.17	0.77	34.98	19.72	2.59
80.0	14.60	20.05	13.58	32.49	1.17	0.75	36.77	19.82	2.62
90.0	14.61	19.95	14.54	32.92	1.16	0.74	38.38	20.02	2.66
100.0	14.63	19.88	15.33	33.64	1.16	0.73	36.58	20.15	2.61
150.0	14.69	19.67	18.22	34.07	1.16	0.70	36.60	20.27	2.54
200.0	14.73	19.56	20.19	32.03	1.15	0.68	36.99	20.24	2.43
250.0	14.77	19.49	20.87	31.55	1.14	0.67	38.65	20.33	2.46
300.0	14.80	19.46	21.13	31.93	1.14	0.67	39.59	20.20	2.34
350.0	14.83	19.44	21.18	31.05	1.14	0.66	41.23	20.42	2.35
400.0	14.84	19.43	20.83	29.68	1.13	0.66	39.04	20.41	2.27
450.0	14.83	19.45	20.56	29.02	1.14	0.66	37.63	20.39	2.25
500.0	14.80	19.49	20.09	28.56	1.14	0.67	37.04	20.42	2.30
600.0	14.75	19.56	19.35	30.37	1.15	0.68	37.78	20.30	2.26
700.0	14.68	19.70	18.89	30.26	1.16	0.70	37.19	20.08	2.34
800.0	14.56	19.87	18.45	29.21	1.18	0.72	35.96	19.98	2.28
900.0	14.53	19.99	17.42	27.82	1.19	0.73	36.24	20.01	2.30
1000.0	14.47	20.13	17.12	26.39	1.21	0.74	34.67	19.35	2.29
1100.0	14.40	20.30	17.07	25.09	1.22	0.75	36.01	19.66	2.34
1200.0	14.31	20.50	16.69	23.07	1.25	0.77	34.36	19.09	2.40
1250.0	14.28	20.62	16.55	22.63	1.26	0.77	34.11	18.86	2.40
1300.0	14.25	20.72	16.42	21.34	1.27	0.78	33.96	18.72	2.41
1450.0	14.12	21.08	16.12	19.15	1.31	0.80	34.29	18.48	2.48
1600.0	14.02	21.50	15.59	17.38	1.35	0.82	32.71	17.80	2.46
1700.0	13.95	21.81	15.47	16.82	1.39	0.84	33.97	17.63	2.37
1800.0	13.88	22.17	14.71	16.22	1.42	0.86	34.13	17.25	2.46
1900.0	13.77	22.64	13.81	14.64	1.46	0.88	34.14	17.30	2.47
2000.0	13.66	23.17	13.24	13.20	1.51	0.90	33.52	17.09	2.48
2100.0	13.60	23.76	12.65	12.31	1.56	0.92	33.60	17.32	2.44
2200.0	13.50	24.52	11.78	11.56	1.64	0.94	33.53	17.65	2.53
2300.0	13.29	25.57	11.06	10.47	1.78	0.96	33.55	17.91	2.47
2400.0	13.17	26.80	10.51	9.85	1.98	0.97	33.16	18.04	2.55
2500.0	13.51	27.92	10.53	8.51	2.05	0.94	33.47	18.37	2.56
2600.0	13.66	29.79	10.46	7.63	2.36	0.92	33.84	18.72	2.50
2700.0	13.78	32.51	10.72	7.04	3.10	0.89	33.68	19.00	2.58
2800.0	13.84	37.12	11.42	6.28	5.10	0.83	33.61	19.12	2.58
2900.0	13.82	40.25	12.22	5.57	7.18	0.76	34.17	19.46	2.46
3000.0	13.80	35.38	13.22	5.57	4.29	0.73	34.17	20.14	2.46

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

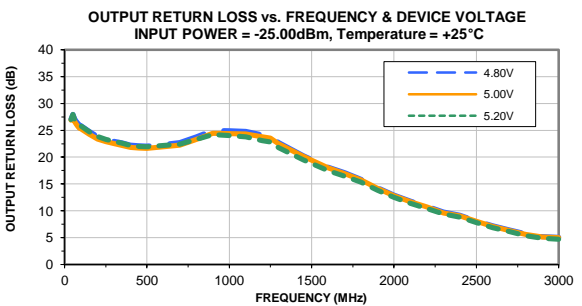
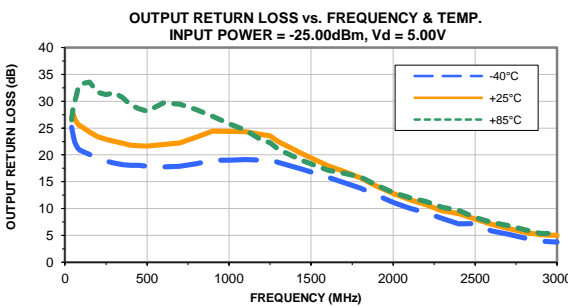
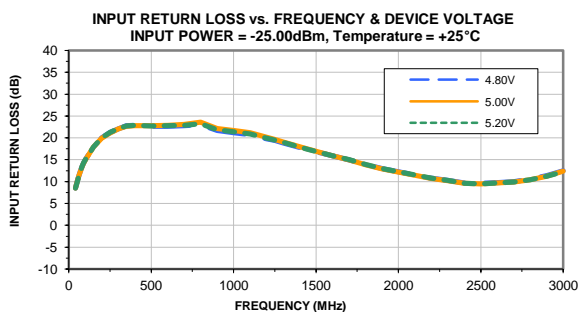
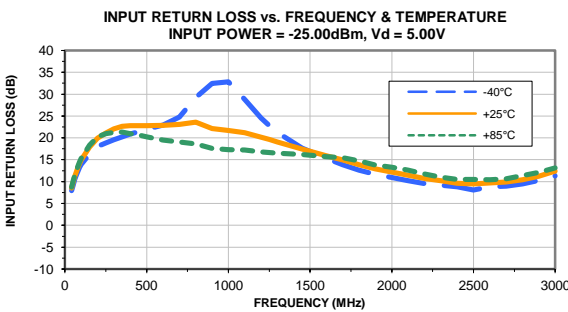
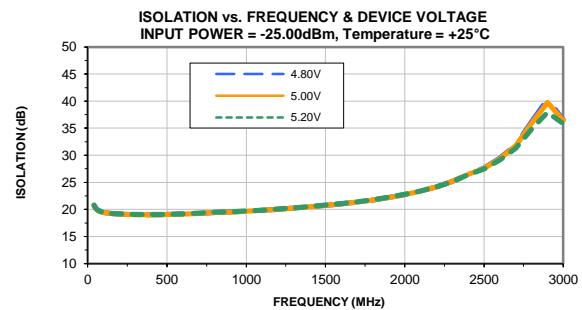
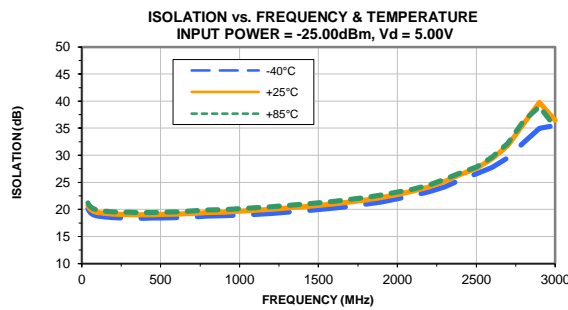
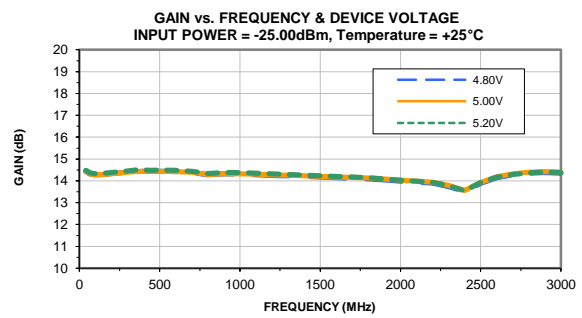
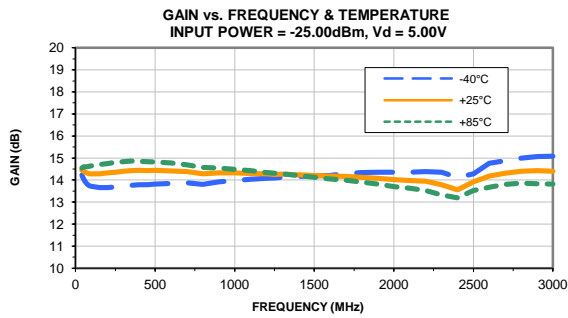
Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

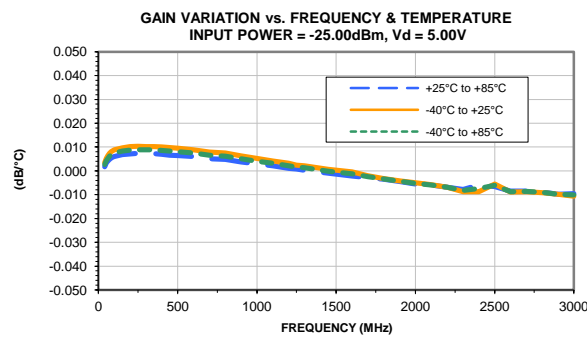
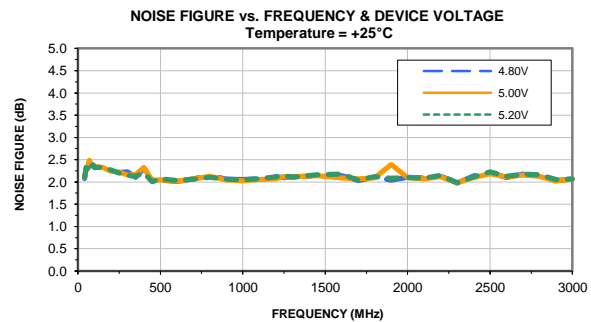
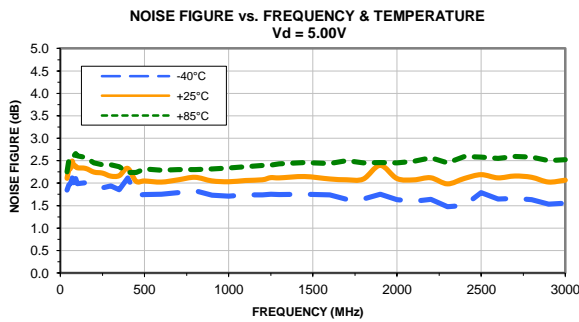
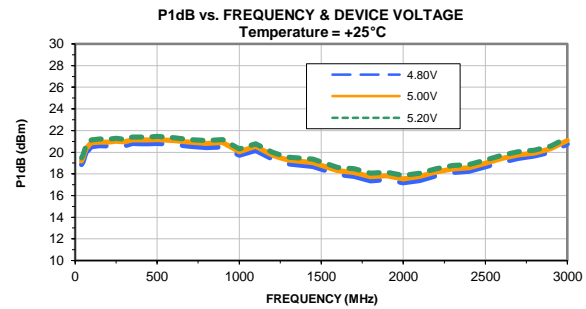
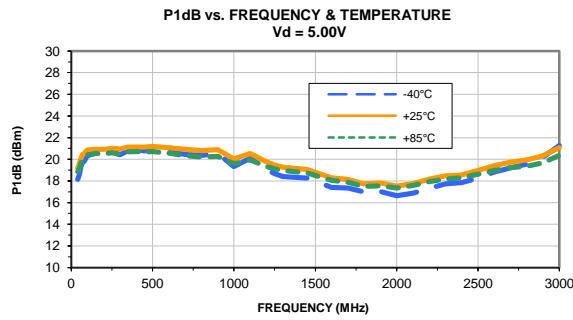
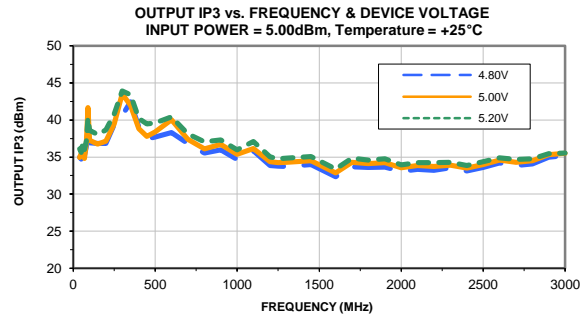
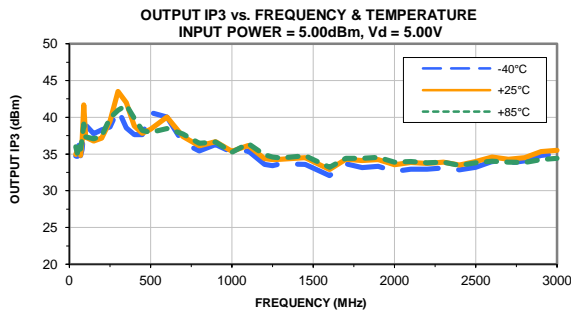
TEST CONDITIONS: Vd = 5.20V, Id = 72.10mA @ Temperature = +85°C

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)
40.0	14.57	21.25	8.76	26.35	1.18	0.90	36.71	18.99	2.27
50.0	14.61	20.73	10.22	28.68	1.17	0.84	35.61	19.28	2.55
60.0	14.62	20.45	11.44	29.93	1.17	0.80	37.28	19.79	2.60
70.0	14.63	20.22	12.57	30.97	1.17	0.77	36.06	20.15	2.66
80.0	14.64	20.08	13.59	32.32	1.17	0.75	37.30	20.24	2.64
90.0	14.66	19.98	14.57	32.81	1.16	0.74	39.70	20.46	2.68
100.0	14.68	19.91	15.35	33.55	1.16	0.73	37.89	20.60	2.61
150.0	14.75	19.70	18.26	34.33	1.15	0.69	37.92	20.74	2.58
200.0	14.78	19.59	20.22	32.34	1.15	0.68	37.90	20.71	2.41
250.0	14.82	19.53	20.95	31.87	1.14	0.67	39.04	20.80	2.45
300.0	14.86	19.49	21.25	32.25	1.14	0.66	41.24	20.64	2.44
350.0	14.90	19.47	21.24	31.22	1.13	0.66	42.42	20.90	2.38
400.0	14.89	19.46	20.87	29.66	1.13	0.66	40.49	20.93	2.17
450.0	14.88	19.48	20.64	28.91	1.14	0.66	38.78	20.85	2.23
500.0	14.86	19.52	20.17	28.30	1.14	0.67	38.63	20.91	2.32
600.0	14.82	19.60	19.40	29.68	1.15	0.68	38.93	20.77	2.26
700.0	14.73	19.74	18.98	29.07	1.16	0.69	38.21	20.54	2.36
800.0	14.61	19.92	18.52	27.77	1.18	0.71	36.86	20.42	2.32
900.0	14.58	20.02	17.46	26.46	1.19	0.72	37.21	20.46	2.33
1000.0	14.53	20.17	17.19	25.19	1.20	0.74	35.66	19.77	2.35
1100.0	14.46	20.35	17.15	24.02	1.22	0.75	36.99	20.07	2.37
1200.0	14.37	20.54	16.72	22.21	1.25	0.76	35.23	19.49	2.42
1250.0	14.33	20.66	16.62	21.84	1.26	0.77	35.01	19.28	2.44
1300.0	14.30	20.77	16.48	20.60	1.27	0.78	34.93	19.14	2.45
1450.0	14.19	21.14	16.16	18.53	1.31	0.79	35.22	18.91	2.49
1600.0	14.07	21.55	15.66	16.84	1.35	0.82	33.60	18.23	2.48
1700.0	14.00	21.86	15.52	16.26	1.38	0.83	34.81	18.07	2.40
1800.0	13.92	22.22	14.78	15.67	1.42	0.86	34.98	17.70	2.50
1900.0	13.82	22.67	13.82	14.16	1.45	0.87	34.99	17.72	2.44
2000.0	13.70	23.21	13.28	12.75	1.50	0.89	34.15	17.51	2.50
2100.0	13.63	23.77	12.67	11.87	1.54	0.91	34.26	17.75	2.46
2200.0	13.53	24.52	11.79	11.14	1.61	0.94	34.19	18.08	2.55
2300.0	13.31	25.55	11.05	10.09	1.75	0.95	34.21	18.33	2.50
2400.0	13.20	26.73	10.47	9.50	1.93	0.96	33.79	18.43	2.58
2500.0	13.53	27.77	10.50	8.15	1.97	0.93	34.02	18.76	2.58
2600.0	13.68	29.50	10.42	7.25	2.23	0.90	34.26	19.12	2.60
2700.0	13.79	31.91	10.65	6.68	2.82	0.87	34.09	19.39	2.63
2800.0	13.85	35.65	11.31	5.94	4.19	0.81	34.09	19.48	2.63
2900.0	13.83	37.89	12.07	5.22	5.29	0.74	34.40	19.82	2.52
3000.0	13.81	34.91	13.07	5.20	3.92	0.70	34.56	20.52	2.53

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 Case Temperature	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Stabilization Bake	(non-operating) 125°C, 24 hours	- - -
Burn-in at Elevated Temp.	(DC on) 160 hours at 85° C	MIL-STD-202, Method 108
Thermal Shock	-55° to 100°C, 5 cycles	MIL-STD-202, Method 107, Condition A, except 100°C