



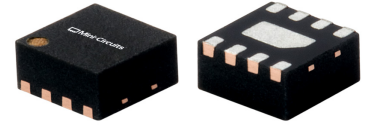
ULTRA LOW NOISE, HIGH IP3

Monolithic Amplifier PMA2-252LN+

50Ω 1.5 to 2.5 GHz

THE BIG DEAL

- Low Noise figure, 0.8 dB at 1.8 GHz
- High IP3, 30 dBm typ. at 1.8 GHz
- Adjustable Current, 25 to 80 mA
- P1dB 17.9 dBm typ. at 1.8 GHz
- Adjustable Gain, ±1.5 dB
- Active Bias
- May be used as a replacement for MGA-632P8^{a,b}



Generic photo used for illustration purposes only

CASE STYLE: MC1631

+RoHS Compliant

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

APPLICATIONS

- Base station infrastructure
- Satellite Communication (Inmarsat)
- LTE
- GPS
- Tactical Air Navigation

PRODUCT OVERVIEW

Mini-Circuits PMA2-252LN+ is a E-PHEMT based Ultra-Low Noise MMIC Amplifier with a unique combinations of low noise and high IP3 making this amplifier ideal for sensitive high dynamic range receiver applications. This design operates on a single 3 to 4V supply.

KEY FEATURES

Feature	Advantages
Ultra Low Noise, 0.8 dB at 1.8 GHz	Excellent noise figure performance. Increases signal to noise ratio.
High IP3, +30 dBm at 1.8 GHz	Combining Low Noise and High IP3 makes this MMIC amplifier ideal for use in Low Noise Receiver Front End (RFE) as it gives the user advantages at both ends of the dynamic range: sensitivity & two-tone IM performance.
Adjustable Current	Provides users ability to set current consumption over a wide range from 25 to 80 mA.
2mm x 2mm 8 lead MCLP Package	Low Inductance, repeatable transitions, excellent thermal contact to PCB
Max Input Power, +27 dBm	Ruggedized design operates up to high input powers often seen at Receiver inputs eliminating the need for an external limiter.
High Reliability	Low, small signal operating current of 57 mA nominal maintains junction temperatures typically below 100°C at 85°C ground lead temperature.

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, compatibility with other components and environmental conditions and stresses.

B. The Avago MGA-632P8 part number is used for identification and comparison purposes only





ULTRA LOW NOISE, HIGH IP3

Monolithic Amplifier PMA2-252LN+

ELECTRICAL SPECIFICATIONS⁽¹⁾ AT 25°C, UNLESS NOTED OTHERWISE

Parameter	Condition (GHz)	Vs=4V			Vs=3V	Units
		Min.	Typ.	Max.	Typ.	
Frequency Range		1.5		2.5		GHz
Noise Figure	1.5		0.7		0.7	dB
	1.8		0.8		0.8	
	2.0		0.8		0.9	
	2.2		0.8		1.1	
	2.5		1.2		1.1	
Gain	1.5	—	19.5	—	18.8	dB
	1.8	—	18.6	—	17.8	
	2.0	15.8	17.6	19.5	16.8	
	2.2	—	16.5	—	15.7	
	2.5	—	15.7	—	14.8	
Input Return Loss	1.5		21.3		17.5	dB
	1.8		19.9		15.4	
	2.0		18.0		14.4	
	2.2		16.3		13.4	
	2.5		14.9		13.0	
Output Return Loss	1.5		10.0		10.8	dB
	1.8		23.3		28.5	
	2.0		18.2		16.9	
	2.2		12.9		11.9	
	2.5		8.3		7.9	
Output Power @1 dB compression ⁽²⁾	1.5		18.5		16.2	dBm
	1.8		17.9		15.9	
	2.0		17.8		15.6	
	2.2		17.4		15.3	
	2.5		16.2		13.9	
Output IP3	1.5		31.1		27.1	dBm
	1.8		30.1		25.5	
	2.0		30.0		25.3	
	2.2		29.3		24.8	
	2.5		27.6		23.2	
Device Operating Voltage		3.8	4.0	4.2	3.0	V
Device Operating Current at typical voltage ⁽²⁾			57	70	41	mA
Device Current variation vs. Temperature at typical voltage ⁽³⁾			-19.0		-3.4	μA/°C
Device Current Variation vs Voltage			0.018		0.017	mA/mV
Thermal Resistance			53		53	°C/W

(1) Measured on Mini-Circuits Characterization test board TB-642+. See Characterization Test Circuit (Fig. 1) R1=825Ω, RBIAS=619Ω

(2) Current increases at P1dB

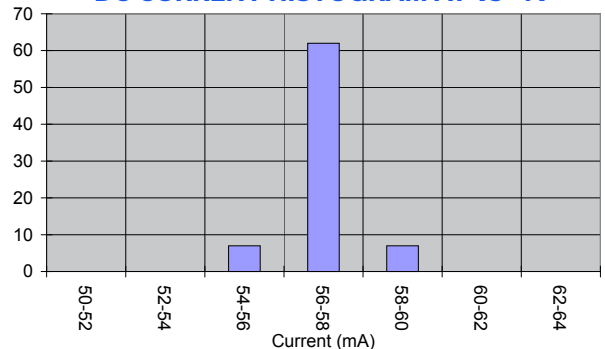
(3) (Current at 85°C - Current at -45°C)/130

MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature (ground lead)	-40°C to 85°C
Storage Temperature	-65°C to 150°C
Junction Temperature	150°C
Total Power Dissipation	0.55W
Input Power (CW), Vs=3V or 4V	+25 dBm (5 minutes max), +20 dBm (continuous)
DC Voltage (Vs)	5.5 V

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

DC CURRENT HISTOGRAM AT Vs=4V

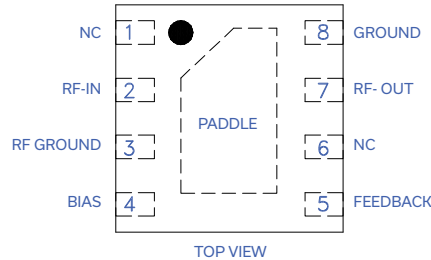
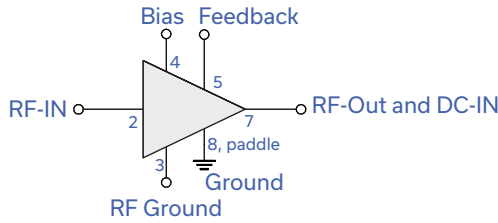




ULTRA LOW NOISE, HIGH IP3

Monolithic Amplifier PMA2-252LN+

SIMPLIFIED SCHEMATIC AND PAD DESCRIPTION



Function	Pad Number	Description (Ref: Figure1)
RF IN	2	Connects to RF input via C1 and Pad 3 via L1
RF-OUT	7	Connects to RF out via C2, Pad 5 via R1 and C3
RF-Ground	3	Connects to ground via C4 and Pad 2 via L1
Bias	4	Connects to Supply voltage (Vs) via Rbias
Feedback	5	Connected to pads via R1 and C3
No Connection	1,6	Not used internally. Pin 1 Connected to ground on test board
Ground	8 & paddle	Connects to ground

RECOMMENDED APPLICATION AND CHARACTERIZATION TEST CIRCUIT

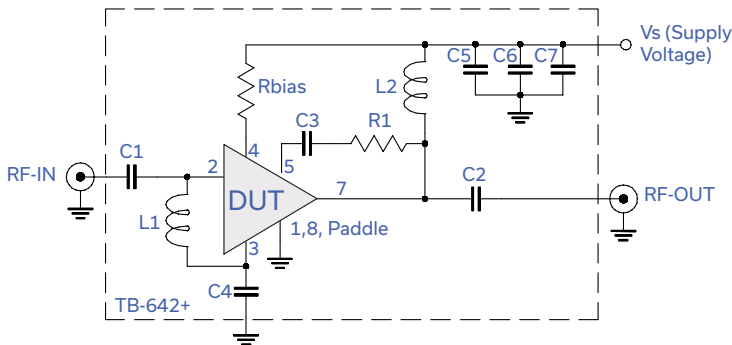
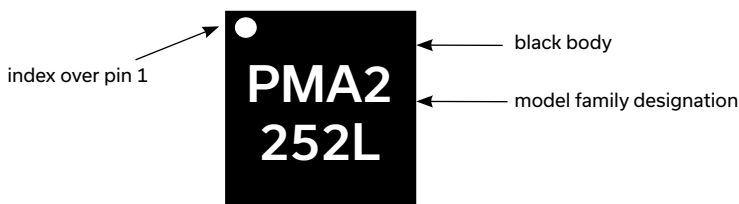


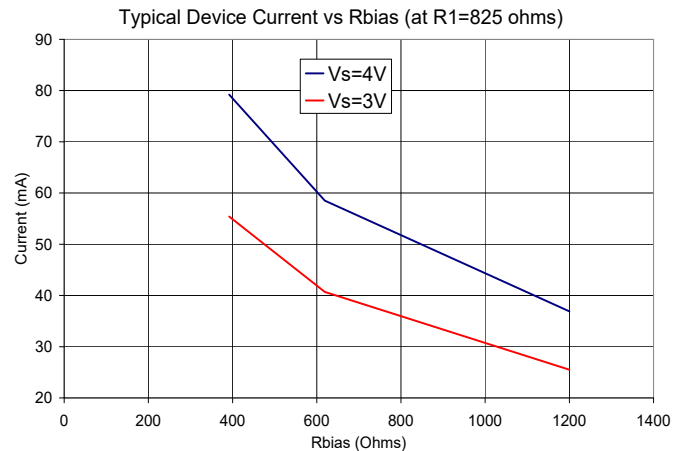
Fig 1. Application and Characterization Circuit
 Note: This block diagram is used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-642+)
 Gain, Return loss, Output power at 1dB compression (P1 dB), output IP3 (OIP3) and noise figure measured using Agilent's N5242A PNA-X microwave network analyzer.

- Conditions:
- Gain and Return loss: Pin= -25dBm
 - Output IP3 (OIP3): Two tones, spaced 1 MHz apart, 0 dBm/ tone at output.

PRODUCT MARKING



Marking may contain other features or characters for internal lot control



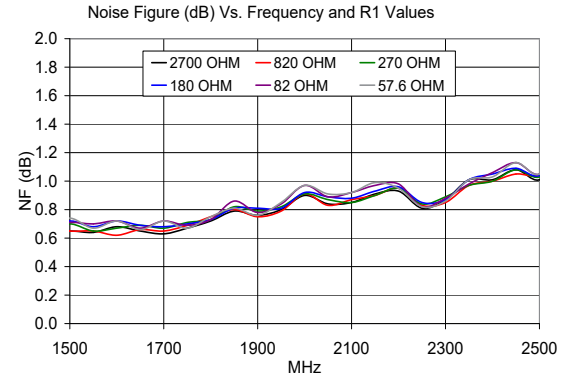
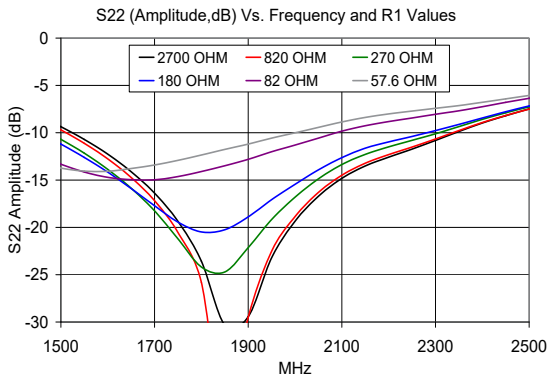
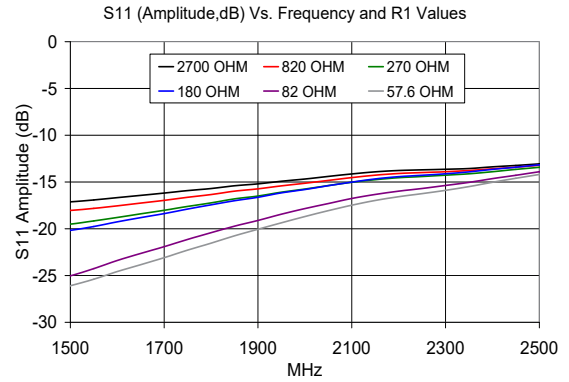
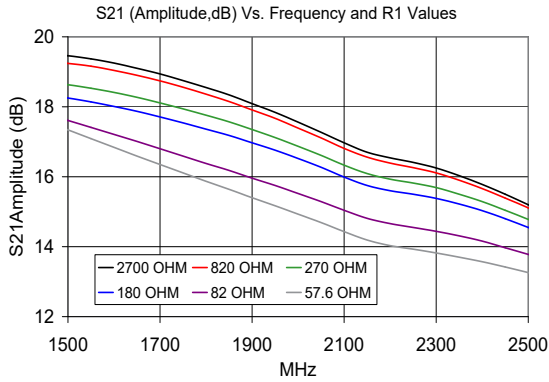


ULTRA LOW NOISE, HIGH IP3

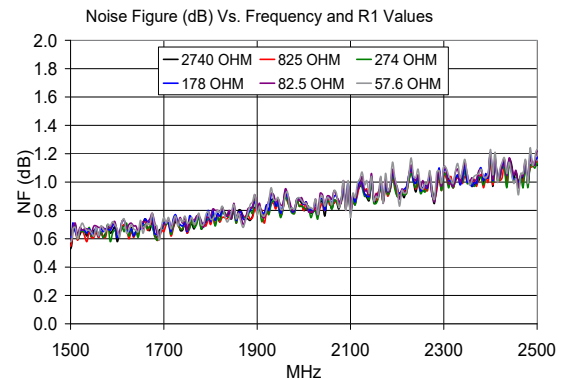
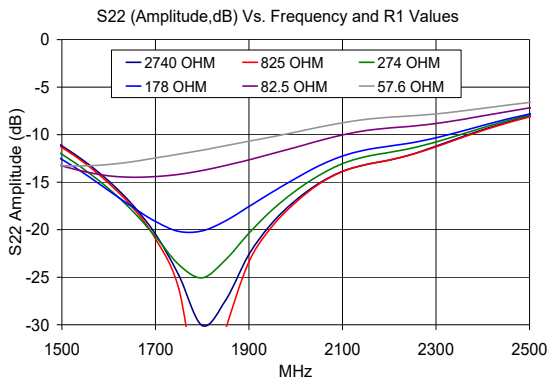
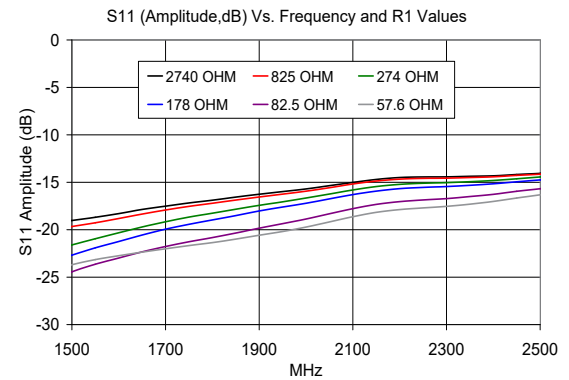
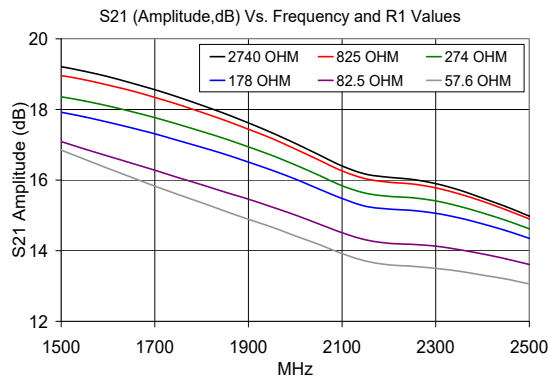
Monolithic Amplifier PMA2-252LN+

Mini-Circuits

ADJUSTABLE GAIN PERFORMANCE (Vs. R1) AT Vs=4V



ADJUSTABLE GAIN PERFORMANCE (Vs. R1) AT Vs=3V





ULTRA LOW NOISE, HIGH IP3

Monolithic Amplifier PMA2-252LN+

Mini-Circuits

ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS [CLICK HERE](#)

Performance Data	Data Table
	Swept Graphs
	S-Parameter (S2P Files) Data Set (.zip file)
Case Style	MC1631 Plastic package, exposed paddle, lead finish: matte tin
Tape & Reel	F66
Standard quantities available on reel	7" reels with 20, 50, 100, 200, 500,1K,2K or 3K devices
Suggested Layout for PCB Design	PL-360
Evaluation Board	TB-642+
Environmental Ratings	ENV08T1

ESD RATING

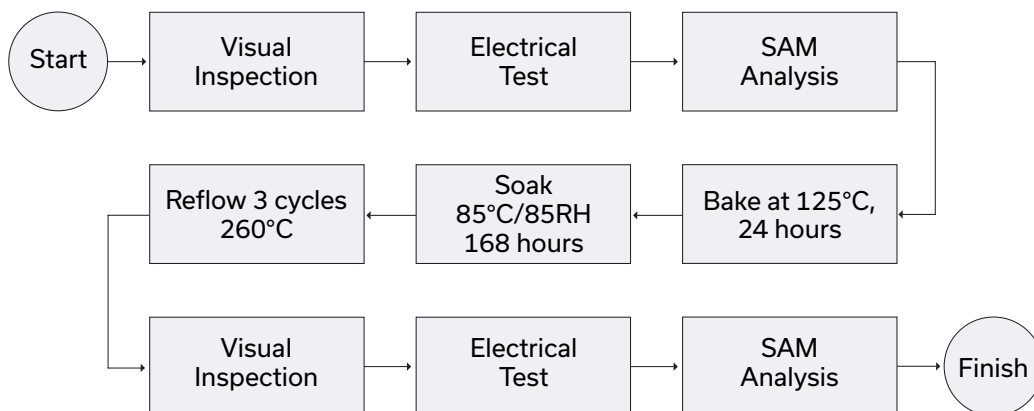
Human Body Model (HBM): Class 1A (250 to <500V) in accordance with ANSI/ESD STM 5.1 - 2001

Machine Model (MM): Class M1 (pass 25V) in accordance with ANSI/ESD STM5.2-1999

MSL RATING

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

MSL TEST FLOW CHART



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



MMIC Amplifier

PMA2-252LN+

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 = 4V, Id = 59.59 mA @ Temperature = +25degC

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)
1500	19.45	38.31	24.80	10.04	4.01	0.89	31.32	18.52	0.61
1525	19.40	38.06	24.60	10.70	3.98	0.90	31.36	18.45	0.55
1550	19.36	38.10	24.33	11.38	4.07	0.91	30.97	18.18	0.61
1575	19.29	38.05	24.14	12.14	4.13	0.93	31.18	18.31	0.57
1600	19.22	37.61	23.81	12.97	4.00	0.94	31.56	18.67	0.59
1625	19.16	37.72	23.32	13.88	4.12	0.95	30.60	18.05	0.62
1650	19.08	37.64	22.82	14.83	4.14	0.96	31.30	18.39	0.56
1675	19.00	37.53	22.44	15.86	4.16	0.96	31.32	18.35	0.68
1700	18.92	37.52	21.99	16.98	4.21	0.97	30.71	18.02	0.62
1725	18.84	37.42	21.62	18.26	4.22	0.98	31.17	18.39	0.64
1750	18.74	37.48	21.26	19.75	4.31	0.98	30.77	17.93	0.65
1800	18.55	37.46	20.54	23.31	4.41	0.99	30.74	17.96	0.71
1850	18.34	37.41	19.86	27.42	4.49	1.00	30.86	18.00	0.75
1900	18.11	37.32	19.37	27.36	4.55	1.00	30.66	17.80	0.76
1925	17.99	37.39	19.09	25.34	4.64	1.00	30.73	17.97	0.87
1950	17.87	37.37	18.81	23.39	4.68	1.00	30.81	17.92	0.80
1975	17.75	37.24	18.52	21.57	4.66	1.00	30.48	17.66	0.79
2000	17.61	37.31	18.30	20.06	4.75	1.00	30.59	17.78	0.74
2025	17.46	37.23	18.07	18.70	4.76	0.99	30.38	17.71	0.89
2050	17.32	37.36	17.75	17.55	4.89	0.99	30.34	17.52	0.90
2075	17.16	37.26	17.49	16.65	4.89	0.99	29.96	17.40	0.89
2100	17.00	37.11	17.27	15.76	4.87	0.99	30.18	17.49	0.82
2125	16.84	37.55	17.00	15.11	5.17	0.98	29.92	17.31	1.00
2175	16.61	37.45	16.54	14.23	5.20	0.98	29.34	16.93	1.05
2200	16.54	37.17	16.33	13.99	5.06	0.98	30.07	17.45	0.82
2225	16.50	37.34	16.25	13.81	5.17	0.98	28.54	16.48	0.86
2250	16.50	37.08	16.12	13.49	5.00	0.97	29.68	17.08	0.84
2275	16.49	37.02	15.97	13.08	4.95	0.97	28.96	16.73	0.95
2300	16.45	36.76	15.88	12.64	4.79	0.97	29.00	16.69	1.06
2325	16.41	36.83	15.80	12.14	4.81	0.96	28.67	16.52	0.96
2350	16.34	36.87	15.67	11.62	4.82	0.95	29.53	16.82	0.89
2375	16.25	36.82	15.62	11.14	4.80	0.95	28.58	16.39	0.83
2450	15.94	37.14	15.32	9.71	4.96	0.92	28.59	16.36	1.07
2475	15.81	37.04	15.29	9.33	4.93	0.91	28.36	16.21	1.04
2500	15.68	37.19	15.19	8.94	5.01	0.90	28.54	16.24	1.24



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 = 3.5V, Id =50.69 mA @ Temperature = +25degC

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)
1500	19.24	36.98	21.62	10.79	3.59	0.90	29.20	17.37	0.58
1525	19.19	36.96	21.27	11.53	3.65	0.91	29.05	17.31	0.55
1550	19.14	37.02	20.92	12.31	3.74	0.93	28.40	17.06	0.58
1575	19.06	36.77	20.68	13.17	3.70	0.94	28.70	17.16	0.54
1600	18.99	36.54	20.43	14.14	3.67	0.95	29.19	17.48	0.63
1625	18.91	36.50	20.07	15.19	3.72	0.96	28.11	16.92	0.59
1650	18.83	36.51	19.68	16.37	3.78	0.97	28.73	17.24	0.57
1675	18.75	36.43	19.40	17.64	3.80	0.97	28.74	17.17	0.70
1700	18.66	36.36	19.08	19.09	3.82	0.98	27.98	16.89	0.63
1725	18.56	36.34	18.83	20.83	3.86	0.99	28.47	17.24	0.80
1750	18.46	36.41	18.59	22.85	3.94	0.99	27.90	16.79	0.66
1800	18.26	36.22	18.10	28.75	3.95	1.00	27.79	16.81	0.72
1850	18.04	36.11	17.66	31.88	3.99	1.00	27.92	16.87	0.76
1900	17.80	36.47	17.32	25.42	4.25	1.00	27.64	16.67	0.77
1925	17.68	36.26	17.12	22.95	4.19	1.00	27.77	16.83	0.86
1950	17.55	36.17	16.93	21.10	4.19	1.00	27.84	16.77	0.82
1975	17.42	36.20	16.74	19.48	4.25	1.00	27.39	16.53	0.81
2000	17.28	36.46	16.59	18.18	4.42	1.00	27.63	16.64	0.75
2025	17.13	36.34	16.41	17.03	4.41	0.99	27.46	16.55	0.89
2050	16.98	36.13	16.20	16.00	4.35	0.99	27.28	16.36	0.93
2075	16.82	36.55	16.01	15.20	4.61	0.99	26.99	16.25	0.92
2100	16.65	36.52	15.85	14.42	4.65	0.98	27.22	16.33	0.81
2125	16.50	36.36	15.61	13.83	4.61	0.98	26.90	16.16	1.03
2175	16.26	36.42	15.25	13.01	4.71	0.98	26.34	15.79	1.07
2200	16.18	36.33	15.11	12.78	4.68	0.97	27.00	16.28	0.83
2225	16.14	36.31	15.05	12.60	4.68	0.97	25.55	15.37	0.87
2250	16.12	36.18	14.98	12.31	4.60	0.97	26.51	15.92	0.84
2275	16.10	36.13	14.89	11.93	4.55	0.96	25.88	15.59	0.94
2300	16.06	36.11	14.84	11.55	4.53	0.96	25.81	15.55	1.09
2325	16.01	35.94	14.80	11.11	4.43	0.95	25.56	15.39	0.99
2350	15.93	36.08	14.70	10.65	4.49	0.94	26.25	15.69	0.86
2375	15.83	36.05	14.70	10.24	4.48	0.94	25.45	15.26	0.86
2450	15.50	36.31	14.52	8.97	4.60	0.91	25.38	15.16	1.15
2475	15.37	36.39	14.48	8.62	4.66	0.90	25.21	15.05	1.05
2500	15.23	36.45	14.41	8.28	4.69	0.89	25.35	15.03	1.25

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 = 4.5V, Id = 68.6 mA @ Temperature = +25degC

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)
1500	19.57	39.28	26.04	9.55	4.35	0.88	30.51	19.20	0.58
1525	19.54	39.31	26.39	10.16	4.46	0.89	30.49	19.13	0.57
1550	19.50	38.97	26.62	10.80	4.37	0.90	30.44	18.84	0.58
1575	19.44	39.20	26.83	11.48	4.57	0.92	30.33	19.00	0.53
1600	19.37	38.87	26.57	12.24	4.49	0.93	30.57	19.36	0.60
1625	19.31	38.76	26.15	13.05	4.51	0.94	30.02	18.73	0.64
1650	19.24	38.69	25.59	13.90	4.55	0.95	30.31	19.11	0.54
1675	19.17	38.73	25.17	14.80	4.64	0.96	30.40	19.11	0.67
1700	19.09	38.66	24.65	15.78	4.68	0.96	30.17	18.74	0.65
1725	19.01	38.57	24.19	16.87	4.70	0.97	30.35	19.18	0.66
1750	18.92	38.30	23.71	18.07	4.63	0.98	30.21	18.71	0.64
1800	18.73	38.40	22.77	20.83	4.80	0.99	30.18	18.74	0.70
1850	18.54	38.43	21.88	23.96	4.94	0.99	30.17	18.83	0.78
1900	18.31	38.17	21.17	25.89	4.92	1.00	30.08	18.68	0.78
1925	18.19	38.25	20.83	25.36	5.02	1.00	30.16	18.86	0.85
1950	18.08	38.17	20.49	24.12	5.03	1.00	30.19	18.80	0.82
1975	17.96	38.10	20.11	22.60	5.05	1.00	30.07	18.55	0.78
2000	17.82	38.29	19.78	21.14	5.22	1.00	30.12	18.71	0.78
2025	17.68	38.30	19.50	19.75	5.29	0.99	30.01	18.60	0.89
2050	17.53	38.31	19.12	18.60	5.36	0.99	29.96	18.48	0.85
2075	17.37	38.17	18.81	17.60	5.35	0.99	29.77	18.33	0.89
2100	17.21	38.25	18.49	16.66	5.46	0.99	30.00	18.43	0.81
2125	17.06	38.00	18.17	15.99	5.37	0.98	29.82	18.28	0.98
2175	16.83	38.18	17.62	15.10	5.58	0.98	29.56	17.88	1.02
2200	16.77	38.04	17.39	14.88	5.52	0.98	29.84	18.39	0.80
2225	16.73	38.16	17.25	14.70	5.61	0.98	29.36	17.42	0.87
2250	16.73	37.67	17.06	14.36	5.28	0.98	29.74	18.07	0.83
2275	16.73	37.60	16.88	13.90	5.21	0.98	29.61	17.68	0.96
2300	16.70	37.65	16.75	13.42	5.22	0.97	29.71	17.65	1.07
2325	16.66	37.47	16.64	12.87	5.11	0.97	29.55	17.49	0.97
2350	16.60	37.61	16.49	12.27	5.18	0.96	29.76	17.83	0.84
2375	16.51	37.48	16.40	11.76	5.11	0.95	29.63	17.35	0.89
2450	16.22	37.74	16.03	10.22	5.25	0.93	29.54	17.34	1.05
2475	16.09	37.67	15.95	9.80	5.23	0.92	29.44	17.21	1.08
2500	15.97	37.66	15.82	9.38	5.23	0.91	29.61	17.23	1.19

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 =61.67 mA @ Temperature = -45degC

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)
1500	19.93	38.63	23.21	9.44	3.87	0.87	31.93	18.94	0.42
1525	19.89	38.69	23.96	10.04	3.98	0.89	32.11	18.89	0.38
1550	19.86	38.59	24.72	10.66	4.01	0.90	31.80	18.62	0.38
1575	19.80	38.44	25.43	11.34	4.02	0.91	32.03	18.73	0.39
1600	19.74	38.10	25.81	12.06	3.95	0.92	32.41	19.08	0.41
1625	19.68	38.16	26.19	12.84	4.04	0.93	31.59	18.47	0.45
1650	19.61	38.18	26.24	13.65	4.12	0.94	32.20	18.84	0.35
1675	19.53	38.12	26.31	14.52	4.16	0.95	32.12	18.80	0.46
1700	19.46	38.07	26.15	15.45	4.19	0.96	31.59	18.45	0.40
1725	19.38	38.01	25.90	16.51	4.23	0.96	32.08	18.82	0.43
1750	19.29	37.90	25.50	17.65	4.24	0.97	31.83	18.36	0.43
1800	19.12	37.62	24.62	20.48	4.22	0.98	31.87	18.38	0.48
1850	18.92	37.85	23.75	23.76	4.44	0.99	31.93	18.43	0.52
1900	18.70	37.53	23.12	26.10	4.39	0.99	31.82	18.25	0.52
1925	18.59	37.75	22.74	25.72	4.56	0.99	31.73	18.42	0.57
1950	18.47	37.74	22.44	24.50	4.61	0.99	31.88	18.34	0.54
1975	18.35	37.68	22.02	22.88	4.62	0.99	31.55	18.12	0.51
2000	18.21	37.62	21.69	21.37	4.65	0.99	31.78	18.25	0.46
2025	18.08	37.82	21.26	19.90	4.81	0.99	31.61	18.12	0.61
2050	17.93	37.86	20.83	18.67	4.89	0.99	31.45	17.99	0.59
2075	17.76	38.04	20.50	17.60	5.06	0.98	31.09	17.88	0.60
2100	17.59	37.83	20.02	16.57	5.01	0.98	31.30	17.94	0.50
2125	17.43	38.03	19.60	15.80	5.19	0.98	31.08	17.79	0.71
2175	17.17	37.58	18.89	14.78	5.03	0.97	30.56	17.40	0.72
2200	17.09	37.74	18.58	14.56	5.16	0.97	31.14	17.85	0.52
2225	17.05	37.51	18.44	14.43	5.03	0.97	29.68	16.89	0.55
2250	17.06	37.45	18.27	14.16	4.98	0.97	30.84	17.55	0.50
2275	17.07	37.31	18.05	13.76	4.87	0.97	30.09	17.12	0.63
2300	17.06	37.13	17.93	13.31	4.75	0.96	30.19	17.12	0.75
2325	17.02	37.12	17.81	12.76	4.73	0.96	29.80	16.95	0.67
2350	16.97	37.22	17.65	12.19	4.77	0.95	30.85	17.29	0.55
2375	16.88	37.23	17.55	11.66	4.78	0.95	29.68	16.81	0.55
2450	16.58	37.35	17.10	10.10	4.83	0.92	29.73	16.82	0.70
2475	16.46	37.40	16.95	9.66	4.87	0.91	29.49	16.65	0.71
2500	16.33	37.54	16.80	9.26	4.95	0.90	29.73	16.71	0.85

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 3.5V, Id =51.58 mA @ Temperature = -45degC

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)
1500	19.65	37.75	24.03	9.97	3.68	0.88	30.14	17.56	0.43
1525	19.60	37.70	24.16	10.63	3.74	0.90	30.05	17.52	0.35
1550	19.56	37.56	24.20	11.31	3.74	0.91	29.27	17.28	0.40
1575	19.49	37.34	24.23	12.07	3.72	0.92	29.89	17.40	0.32
1600	19.42	37.19	24.14	12.87	3.73	0.93	30.25	17.71	0.41
1625	19.35	37.08	23.75	13.75	3.75	0.94	29.10	17.18	0.41
1650	19.28	37.09	23.27	14.66	3.81	0.95	29.91	17.51	0.37
1675	19.20	37.08	22.93	15.67	3.87	0.96	29.81	17.46	0.46
1700	19.12	36.86	22.44	16.76	3.82	0.97	28.95	17.15	0.41
1725	19.04	36.98	22.03	18.04	3.93	0.97	29.61	17.49	0.49
1750	18.94	36.96	21.67	19.46	3.98	0.98	28.92	17.08	0.42
1800	18.75	36.91	20.93	23.13	4.06	0.99	28.76	17.09	0.47
1850	18.55	36.67	20.31	27.48	4.04	0.99	29.04	17.16	0.51
1900	18.32	36.74	19.83	27.45	4.17	0.99	28.72	16.99	0.54
1925	18.20	36.73	19.62	25.37	4.22	1.00	28.85	17.16	0.61
1950	18.08	36.66	19.35	23.34	4.23	0.99	28.90	17.07	0.57
1975	17.96	36.79	19.10	21.52	4.33	0.99	28.49	16.86	0.53
2000	17.82	36.86	18.86	19.99	4.42	0.99	28.81	16.99	0.50
2025	17.68	36.80	18.58	18.57	4.44	0.99	28.46	16.87	0.60
2050	17.52	36.82	18.28	17.41	4.50	0.99	28.36	16.74	0.61
2075	17.36	37.13	18.00	16.45	4.72	0.99	28.06	16.61	0.61
2100	17.18	36.88	17.73	15.48	4.64	0.98	28.27	16.66	0.52
2125	17.02	36.91	17.40	14.77	4.71	0.98	27.91	16.52	0.72
2175	16.75	36.95	16.88	13.80	4.83	0.97	27.32	16.16	0.75
2200	16.67	36.89	16.64	13.56	4.82	0.97	27.91	16.58	0.52
2225	16.63	36.76	16.52	13.40	4.76	0.97	26.39	15.71	0.54
2250	16.63	36.55	16.40	13.16	4.63	0.97	27.39	16.27	0.52
2275	16.63	36.61	16.28	12.80	4.64	0.97	26.65	15.92	0.65
2300	16.61	36.41	16.21	12.40	4.51	0.96	26.59	15.91	0.78
2325	16.56	36.42	16.14	11.90	4.50	0.96	26.34	15.75	0.67
2350	16.50	36.44	16.06	11.39	4.50	0.95	27.15	16.05	0.54
2375	16.41	36.38	16.02	10.92	4.47	0.94	26.19	15.64	0.52
2450	16.10	36.61	15.71	9.50	4.58	0.91	26.18	15.57	0.73
2475	15.97	36.59	15.63	9.09	4.57	0.90	25.95	15.43	0.71
2500	15.84	37.03	15.54	8.73	4.81	0.89	26.21	15.46	0.87

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 = 4.5V, Id = 72.08 mA @ Temperature = -45degC

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)
1500	20.00	39.98	21.73	8.92	4.38	0.86	32.29	19.67	0.42
1525	19.97	39.81	22.44	9.48	4.39	0.88	32.31	19.63	0.38
1550	19.94	39.67	23.22	10.05	4.41	0.89	32.03	19.33	0.41
1575	19.89	39.43	23.98	10.67	4.38	0.90	32.30	19.47	0.40
1600	19.83	39.18	24.45	11.31	4.35	0.92	32.71	19.82	0.44
1625	19.77	39.36	25.12	12.02	4.52	0.93	31.70	19.20	0.43
1650	19.71	38.98	25.63	12.73	4.41	0.94	32.33	19.55	0.36
1675	19.64	39.08	26.14	13.49	4.53	0.94	32.19	19.53	0.46
1700	19.58	39.06	26.35	14.31	4.59	0.95	31.75	19.17	0.44
1725	19.50	38.87	26.53	15.21	4.56	0.96	32.14	19.56	0.44
1750	19.41	38.91	26.43	16.17	4.65	0.97	31.93	19.09	0.42
1800	19.24	38.90	25.91	18.43	4.78	0.98	31.97	19.10	0.48
1850	19.06	38.90	25.24	21.03	4.91	0.98	32.03	19.19	0.54
1900	18.85	38.69	24.55	23.54	4.92	0.99	31.84	18.99	0.52
1925	18.74	38.63	24.18	24.21	4.95	0.99	31.76	19.16	0.60
1950	18.63	38.61	23.85	24.15	5.00	0.99	31.95	19.08	0.58
1975	18.51	38.37	23.41	23.47	4.92	0.99	31.68	18.82	0.54
2000	18.37	38.90	23.05	22.37	5.30	0.99	31.84	18.96	0.51
2025	18.24	38.61	22.55	21.06	5.19	0.99	31.71	18.86	0.63
2050	18.09	38.77	22.05	19.84	5.35	0.99	31.55	18.72	0.58
2075	17.93	38.94	21.67	18.80	5.54	0.99	31.32	18.58	0.61
2100	17.76	38.64	21.18	17.70	5.43	0.98	31.42	18.67	0.54
2125	17.60	38.84	20.69	16.90	5.63	0.98	31.29	18.50	0.69
2175	17.34	38.70	19.87	15.87	5.67	0.98	30.97	18.11	0.73
2200	17.27	38.59	19.59	15.65	5.63	0.98	31.41	18.60	0.54
2225	17.24	38.18	19.38	15.54	5.38	0.98	30.34	17.63	0.60
2250	17.25	38.21	19.16	15.27	5.38	0.98	31.08	18.26	0.55
2275	17.27	37.86	18.89	14.81	5.14	0.97	30.76	17.88	0.66
2300	17.26	37.81	18.74	14.31	5.09	0.97	30.82	17.86	0.76
2325	17.23	37.88	18.54	13.68	5.11	0.97	30.61	17.65	0.68
2350	17.18	37.76	18.34	13.03	5.02	0.96	31.15	18.04	0.60
2375	17.10	37.90	18.21	12.45	5.11	0.95	30.50	17.55	0.55
2450	16.82	38.00	17.67	10.71	5.16	0.93	30.51	17.54	0.85
2475	16.70	37.71	17.48	10.23	5.00	0.92	30.30	17.38	0.71
2500	16.58	37.99	17.34	9.79	5.17	0.91	30.41	17.42	0.88

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 4V, Id = 58.6 mA @ Temperature = +85degC

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)
1500	19.03	39.03	22.64	9.82	4.53	0.89	30.55	18.22	0.76
1525	18.99	39.06	22.25	10.45	4.63	0.90	30.65	18.21	0.72
1550	18.94	38.87	21.89	11.10	4.61	0.91	30.65	17.96	0.76
1575	18.88	38.63	21.62	11.81	4.58	0.93	30.39	18.02	0.74
1600	18.81	38.52	21.34	12.59	4.60	0.94	30.71	18.41	0.78
1625	18.74	38.73	20.87	13.42	4.79	0.95	30.22	17.81	0.83
1650	18.67	38.49	20.45	14.28	4.74	0.96	30.44	18.14	0.72
1675	18.59	38.23	20.11	15.19	4.67	0.97	30.50	18.11	0.84
1700	18.51	38.44	19.71	16.17	4.85	0.97	30.40	17.81	0.79
1725	18.42	38.17	19.42	17.29	4.77	0.98	30.46	18.17	0.83
1750	18.33	38.27	19.14	18.46	4.90	0.99	30.46	17.73	0.82
1800	18.13	38.09	18.59	21.23	4.92	1.00	30.47	17.77	0.89
1850	17.93	38.17	18.01	24.15	5.09	1.00	30.34	17.81	0.94
1900	17.71	38.09	17.57	25.70	5.17	1.01	30.22	17.61	0.93
1925	17.59	38.00	17.35	25.15	5.17	1.01	30.23	17.78	1.05
1950	17.47	37.93	17.14	23.96	5.19	1.01	30.28	17.76	1.03
1975	17.34	37.91	16.89	22.54	5.24	1.01	30.18	17.47	1.03
2000	17.21	37.97	16.69	21.22	5.34	1.01	30.08	17.59	0.96
2025	17.07	38.23	16.49	19.90	5.56	1.01	30.07	17.51	1.10
2050	16.93	37.98	16.24	18.79	5.46	1.01	29.97	17.36	1.09
2075	16.77	38.28	16.01	17.88	5.73	1.00	29.86	17.19	1.10
2100	16.62	38.17	15.86	17.02	5.72	1.00	29.95	17.31	1.01
2125	16.48	37.94	15.61	16.35	5.64	1.00	29.81	17.15	1.20
2175	16.27	37.80	15.24	15.46	5.64	1.00	29.50	16.75	1.22
2200	16.21	37.86	15.09	15.21	5.70	1.00	29.89	17.30	1.06
2225	16.17	37.66	14.98	14.97	5.58	1.00	29.38	16.29	1.07
2250	16.16	37.64	14.86	14.59	5.55	0.99	29.80	16.95	1.07
2275	16.15	37.50	14.73	14.11	5.44	0.99	29.65	16.55	1.21
2300	16.12	37.49	14.64	13.60	5.42	0.99	29.69	16.54	1.29
2325	16.07	37.36	14.54	13.03	5.32	0.98	29.52	16.33	1.23
2350	16.01	37.40	14.45	12.45	5.34	0.98	29.83	16.68	1.13
2375	15.92	37.23	14.36	11.91	5.24	0.97	29.56	16.21	1.12
2450	15.63	37.51	14.12	10.38	5.41	0.95	29.33	16.18	1.33
2475	15.49	37.67	14.10	9.95	5.53	0.94	29.28	16.04	1.31
2500	15.37	37.54	13.99	9.54	5.46	0.93	29.25	16.02	1.50

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 = 3.5V, Id = 50.16 mA @ Temperature = +85degC

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)
1500	18.81	37.88	19.69	10.26	4.11	0.90	29.17	17.20	0.77
1525	18.76	37.87	19.34	10.93	4.18	0.91	29.13	17.16	0.71
1550	18.71	37.62	19.05	11.63	4.13	0.92	28.51	16.96	0.77
1575	18.64	37.56	18.80	12.41	4.18	0.94	28.74	16.99	0.73
1600	18.57	37.35	18.60	13.24	4.16	0.95	29.25	17.35	0.76
1625	18.49	37.34	18.26	14.15	4.22	0.96	28.13	16.77	0.83
1650	18.42	37.33	17.95	15.14	4.28	0.97	28.82	17.07	0.73
1675	18.33	37.46	17.71	16.14	4.41	0.98	28.84	17.00	0.84
1700	18.25	37.15	17.43	17.29	4.31	0.98	28.08	16.74	0.80
1725	18.16	37.29	17.20	18.58	4.44	0.99	28.60	17.08	0.82
1750	18.06	37.09	17.01	19.97	4.40	1.00	28.07	16.64	0.84
1800	17.86	37.07	16.58	23.43	4.50	1.00	27.97	16.72	0.91
1850	17.65	37.03	16.16	26.96	4.58	1.01	28.11	16.73	0.94
1900	17.42	37.12	15.85	26.88	4.74	1.01	27.78	16.52	0.96
1925	17.30	37.07	15.69	25.22	4.77	1.02	27.95	16.67	1.05
1950	17.17	37.04	15.51	23.39	4.80	1.02	27.99	16.62	1.00
1975	17.05	37.03	15.33	21.70	4.85	1.02	27.61	16.36	1.01
2000	16.91	37.07	15.19	20.31	4.93	1.01	27.78	16.47	0.99
2025	16.77	37.21	15.04	19.00	5.06	1.01	27.59	16.39	1.09
2050	16.62	37.16	14.84	17.89	5.08	1.01	27.42	16.21	1.07
2075	16.47	37.36	14.67	17.02	5.27	1.01	27.14	16.07	1.11
2100	16.32	37.18	14.54	16.18	5.22	1.01	27.36	16.16	1.03
2125	16.17	37.20	14.38	15.53	5.29	1.00	27.06	15.98	1.25
2175	15.96	37.11	14.06	14.66	5.31	1.00	26.51	15.63	1.26
2200	15.89	37.10	13.94	14.42	5.33	1.00	27.22	16.13	1.03
2225	15.85	37.14	13.86	14.18	5.36	1.00	25.77	15.17	1.11
2250	15.84	36.93	13.79	13.84	5.22	1.00	26.74	15.73	1.07
2275	15.82	36.79	13.68	13.38	5.11	0.99	26.11	15.41	1.20
2300	15.79	36.77	13.63	12.90	5.09	0.99	26.02	15.37	1.32
2325	15.73	36.67	13.58	12.39	5.02	0.98	25.74	15.19	1.24
2350	15.66	36.60	13.50	11.86	4.97	0.98	26.45	15.48	1.15
2375	15.57	36.65	13.45	11.38	5.01	0.97	25.63	15.05	1.09
2450	15.26	36.91	13.28	9.92	5.15	0.94	25.56	14.96	1.35
2475	15.13	37.07	13.28	9.54	5.27	0.93	25.44	14.84	1.32
2500	15.01	37.08	13.20	9.14	5.28	0.93	25.51	14.80	1.50

MMIC Amplifier

PMA2-252LN+

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 = 4.5V, Id = 67.05 mA @ Temperature = +85degC

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)
1500	19.16	40.21	25.31	9.45	5.05	0.88	29.62	18.81	0.76
1525	19.12	40.09	24.98	10.05	5.08	0.88	29.67	18.77	0.73
1550	19.08	39.79	24.66	10.66	5.01	0.88	29.56	18.51	0.75
1575	19.02	39.82	24.38	11.33	5.12	0.89	29.50	18.59	0.71
1600	18.95	39.49	23.98	12.04	5.03	0.89	29.69	18.98	0.80
1625	18.89	39.35	23.42	12.81	5.03	0.89	29.27	18.36	0.78
1650	18.81	39.47	22.84	13.60	5.19	0.89	29.53	18.72	0.73
1675	18.74	39.16	22.44	14.43	5.09	0.90	29.61	18.72	0.87
1700	18.67	39.26	21.94	15.33	5.22	0.90	29.31	18.42	0.79
1725	18.58	39.09	21.55	16.30	5.19	0.90	29.50	18.82	0.83
1750	18.49	39.02	21.15	17.31	5.23	0.91	29.37	18.33	0.86
1800	18.30	39.00	20.41	19.65	5.36	0.91	29.23	18.42	0.89
1850	18.10	39.03	19.68	22.10	5.51	0.92	29.22	18.52	0.96
1900	17.88	38.85	19.09	23.98	5.54	0.92	29.25	18.32	0.96
1925	17.77	39.01	18.82	24.14	5.71	0.92	29.31	18.56	1.05
1950	17.65	38.92	18.53	23.71	5.72	0.93	29.26	18.53	1.02
1975	17.53	38.93	18.22	22.73	5.79	0.93	29.17	18.24	1.02
2000	17.40	39.08	17.98	21.69	5.96	0.93	29.21	18.41	0.98
2025	17.26	38.77	17.75	20.50	5.83	0.93	29.13	18.31	1.08
2050	17.12	38.91	17.44	19.45	5.99	0.93	29.11	18.18	1.06
2075	16.96	38.97	17.17	18.58	6.11	0.94	29.00	18.05	1.09
2100	16.82	38.94	16.97	17.69	6.17	0.94	29.11	18.16	1.03
2125	16.68	38.82	16.69	17.03	6.16	0.94	28.96	17.99	1.19
2175	16.47	38.54	16.23	16.16	6.07	0.95	28.71	17.61	1.26
2200	16.41	38.61	16.04	15.89	6.14	0.95	28.98	18.17	1.04
2225	16.37	38.36	15.93	15.66	5.98	0.95	28.56	17.13	1.11
2250	16.37	38.07	15.76	15.26	5.76	0.95	28.89	17.82	1.08
2275	16.36	37.93	15.59	14.73	5.64	0.95	28.69	17.40	1.21
2300	16.34	37.98	15.47	14.18	5.66	0.95	28.76	17.39	1.29
2325	16.29	37.93	15.37	13.57	5.62	0.96	28.63	17.20	1.20
2350	16.23	37.83	15.23	12.94	5.54	0.96	28.82	17.60	1.16
2375	16.15	38.05	15.14	12.38	5.69	0.96	28.63	17.09	1.15
2450	15.86	37.89	14.80	10.73	5.59	0.96	28.57	17.10	1.33
2475	15.73	37.85	14.75	10.30	5.58	0.97	28.55	16.96	1.33
2500	15.61	37.87	14.64	9.85	5.60	0.97	28.75	16.96	1.50



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 = 3V, Id = 40.82 mA @ Temperature = +25degC

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)
1500	18.80	36.26	17.82	10.78	3.47	0.90	27.06	16.30	0.60
1525	18.75	36.32	17.52	11.51	3.54	0.92	26.98	16.31	0.65
1550	18.69	36.16	17.28	12.31	3.51	0.93	26.47	16.19	0.64
1575	18.62	36.10	17.03	13.15	3.57	0.95	26.61	16.15	0.70
1600	18.54	35.88	16.83	14.06	3.55	0.96	26.94	16.49	0.66
1625	18.46	35.81	16.65	15.11	3.58	0.97	26.00	16.08	0.69
1650	18.38	35.71	16.42	16.23	3.61	0.97	26.48	16.32	0.74
1675	18.29	35.78	16.25	17.47	3.70	0.98	26.32	16.27	0.69
1700	18.20	35.70	16.06	18.92	3.70	0.99	25.85	16.03	0.74
1725	18.11	35.67	15.87	20.58	3.65	1.00	26.32	16.35	0.71
1750	18.01	35.54	15.72	22.62	3.72	1.00	25.73	15.90	0.72
1800	17.80	35.50	15.39	28.53	3.86	1.01	25.60	15.98	0.76
1850	17.58	35.38	15.11	34.15	3.94	1.02	25.67	15.92	0.78
1900	17.34	35.50	14.90	26.47	3.94	1.02	25.38	15.76	0.86
1925	17.22	35.58	14.74	23.77	4.07	1.02	25.47	15.80	0.80
1950	17.09	35.57	14.62	21.63	4.07	1.02	25.61	15.90	0.86
1975	16.96	35.58	14.49	20.03	4.19	1.02	25.18	15.62	0.90
2000	16.82	35.69	14.38	18.57	4.16	1.01	25.29	15.66	0.92
2025	16.66	35.77	14.30	17.37	4.27	1.01	25.16	15.69	0.89
2050	16.51	35.80	14.16	16.33	4.32	1.01	25.07	15.58	0.90
2075	16.35	35.74	14.01	15.43	4.39	1.00	24.78	15.33	0.93
2100	16.19	35.82	13.87	14.69	4.55	1.00	24.95	15.41	0.95
2125	16.04	35.95	13.75	14.04	4.48	1.00	24.73	15.26	0.98
2175	15.79	35.85	13.47	13.23	4.59	0.99	24.12	14.85	0.95
2200	15.73	35.87	13.37	12.97	4.57	0.99	24.77	15.25	1.05
2225	15.69	35.80	13.30	12.78	4.58	0.99	23.59	14.48	0.98
2250	15.67	35.74	13.28	12.52	4.48	0.99	24.27	14.86	0.95
2275	15.65	35.69	13.25	12.18	4.46	0.98	23.82	14.63	1.08
2300	15.62	35.59	13.21	11.77	4.43	0.98	23.80	14.56	1.01
2325	15.55	35.60	13.21	11.34	4.40	0.97	23.41	14.30	0.98
2350	15.48	35.62	13.20	10.88	4.43	0.96	24.09	14.67	1.03
2375	15.39	35.79	13.16	10.42	4.38	0.96	23.37	14.28	1.10
2450	15.07	35.79	13.07	9.14	4.56	0.93	23.37	14.15	1.09
2475	14.93	35.95	13.07	8.80	4.66	0.92	23.07	13.95	1.18
2500	14.81	36.12	13.03	8.44	4.68	0.91	23.19	13.93	1.08

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 2.7V, Id =35.73 mA @ Temperature = +25degC

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)
1500	18.50	35.76	15.76	11.21	3.38	0.92	26.26	15.20	0.66
1525	18.45	35.68	15.51	11.99	3.41	0.93	26.20	15.20	0.68
1550	18.38	35.59	15.32	12.85	3.44	0.95	25.73	15.10	0.64
1575	18.31	35.46	15.13	13.76	3.44	0.96	25.84	15.09	0.72
1600	18.23	35.40	14.99	14.75	3.47	0.97	26.17	15.40	0.67
1625	18.14	35.20	14.84	15.93	3.45	0.98	25.30	15.02	0.70
1650	18.06	35.30	14.65	17.13	3.54	0.99	25.71	15.29	0.68
1675	17.96	35.24	14.51	18.56	3.56	1.00	25.60	15.24	0.75
1700	17.87	35.15	14.36	20.24	3.57	1.00	25.17	14.99	0.76
1725	17.77	35.12	14.22	22.27	3.60	1.01	25.56	15.30	0.72
1750	17.67	35.10	14.12	24.83	3.64	1.02	25.04	14.92	0.74
1800	17.46	34.99	13.89	33.78	3.68	1.02	24.90	14.96	0.80
1850	17.23	35.06	13.66	32.04	3.78	1.03	24.93	14.91	0.82
1900	16.98	34.97	13.50	24.25	3.83	1.03	24.65	14.74	0.86
1925	16.86	34.96	13.39	22.01	3.86	1.03	24.67	14.82	0.84
1950	16.73	35.09	13.30	20.21	3.95	1.03	24.85	14.90	0.88
1975	16.60	35.14	13.18	18.77	4.01	1.03	24.46	14.61	0.91
2000	16.45	35.17	13.13	17.46	4.07	1.02	24.50	14.65	0.93
2025	16.29	35.38	13.05	16.40	4.21	1.02	24.38	14.68	0.94
2050	16.14	35.22	12.93	15.44	4.17	1.02	24.29	14.56	0.94
2075	15.98	35.37	12.82	14.61	4.28	1.01	23.97	14.31	1.00
2100	15.81	35.27	12.73	13.93	4.28	1.01	24.15	14.38	1.00
2125	15.66	35.31	12.61	13.34	4.34	1.00	23.93	14.24	0.97
2175	15.41	35.48	12.41	12.56	4.49	1.00	23.35	13.84	0.97
2200	15.35	35.39	12.31	12.31	4.45	1.00	24.00	14.22	1.07
2225	15.30	35.36	12.26	12.10	4.44	0.99	22.82	13.47	1.00
2250	15.28	35.40	12.27	11.86	4.46	0.99	23.50	13.82	0.99
2275	15.25	35.29	12.25	11.54	4.39	0.99	23.05	13.61	1.08
2300	15.21	35.07	12.22	11.15	4.26	0.98	23.04	13.55	1.01
2325	15.14	35.04	12.25	10.74	4.24	0.97	22.66	13.30	1.00
2350	15.07	35.31	12.23	10.32	4.37	0.97	23.28	13.61	1.07
2375	14.98	35.10	12.23	9.89	4.26	0.96	22.59	13.28	1.07
2450	14.64	35.52	12.16	8.70	4.45	0.93	22.54	13.07	1.12
2475	14.50	35.71	12.18	8.37	4.57	0.91	22.25	12.89	1.13
2500	14.37	35.63	12.15	8.03	4.52	0.90	22.38	12.86	1.18

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 = 3.3V, Id = 46.05 mA @ Temperature = +25degC

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)
1500	19.04	37.00	20.02	10.44	3.65	0.90	28.03	17.26	0.62
1525	18.99	36.78	19.66	11.14	3.63	0.91	27.98	17.25	0.65
1550	18.93	36.73	19.36	11.89	3.68	0.92	27.38	17.14	0.61
1575	18.87	36.67	19.08	12.69	3.71	0.94	27.58	17.06	0.64
1600	18.79	36.67	18.83	13.53	3.78	0.95	27.90	17.41	0.61
1625	18.72	36.37	18.58	14.52	3.71	0.96	26.95	16.97	0.69
1650	18.64	36.35	18.28	15.55	3.76	0.97	27.45	17.24	0.71
1675	18.55	36.37	18.02	16.68	3.82	0.97	27.30	17.16	0.69
1700	18.47	36.25	17.76	17.98	3.82	0.98	26.82	16.89	0.70
1725	18.38	36.23	17.55	19.44	3.87	0.99	27.32	17.26	0.67
1750	18.28	36.19	17.36	21.13	3.90	0.99	26.65	16.77	0.72
1800	18.08	36.03	16.92	25.76	3.92	1.00	26.53	16.85	0.76
1850	17.87	36.24	16.55	31.51	4.11	1.01	26.63	16.79	0.76
1900	17.63	36.18	16.27	27.88	4.18	1.01	26.37	16.62	0.83
1925	17.51	36.12	16.09	25.15	4.19	1.01	26.40	16.68	0.81
1950	17.39	36.08	15.93	22.79	4.22	1.01	26.58	16.75	0.85
1975	17.26	36.09	15.76	21.04	4.26	1.01	26.17	16.47	0.89
2000	17.12	36.42	15.63	19.46	4.47	1.01	26.30	16.51	0.88
2025	16.96	36.22	15.50	18.17	4.43	1.00	26.13	16.57	0.88
2050	16.81	36.36	15.33	17.03	4.55	1.00	26.09	16.44	0.90
2075	16.65	36.34	15.15	16.06	4.59	1.00	25.72	16.19	0.92
2100	16.50	36.19	14.97	15.28	4.56	1.00	25.93	16.29	0.97
2125	16.35	36.35	14.82	14.62	4.69	0.99	25.72	16.13	0.94
2175	16.10	36.36	14.49	13.76	4.77	0.99	25.05	15.70	0.96
2200	16.04	36.21	14.34	13.51	4.71	0.99	25.78	16.17	1.02
2225	16.00	36.25	14.26	13.31	4.73	0.99	24.47	15.34	0.99
2250	15.98	36.11	14.22	13.05	4.65	0.98	25.20	15.75	0.96
2275	15.97	35.92	14.18	12.70	4.54	0.98	24.73	15.49	1.06
2300	15.94	35.87	14.10	12.27	4.49	0.98	24.73	15.44	1.00
2325	15.88	35.91	14.10	11.80	4.51	0.97	24.31	15.18	0.98
2350	15.82	36.07	14.05	11.33	4.58	0.96	25.04	15.58	1.00
2375	15.73	36.03	14.01	10.85	4.56	0.96	24.29	15.20	1.03
2450	15.41	36.19	13.86	9.51	4.64	0.93	24.30	15.05	1.10
2475	15.28	36.33	13.85	9.14	4.73	0.92	23.98	14.88	1.07
2500	15.16	36.42	13.79	8.75	4.77	0.91	24.14	14.89	1.04

MMIC Amplifier

PMA2-252LN+

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 = 3V, Id =41.95 mA @ Temperature = -45degC

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)
1500	19.32	36.16	20.58	10.20	3.21	0.88	26.51	15.98	0.42
1525	19.28	35.96	20.23	10.84	3.20	0.90	26.45	16.00	0.47
1550	19.22	36.09	19.97	11.53	3.30	0.91	25.94	15.89	0.42
1575	19.15	35.80	19.69	12.29	3.26	0.92	26.22	15.87	0.46
1600	19.09	35.71	19.42	13.08	3.28	0.93	26.42	16.18	0.39
1625	19.01	35.58	19.23	13.99	3.29	0.94	25.60	15.82	0.46
1650	18.94	35.47	18.90	14.95	3.30	0.95	26.05	16.07	0.47
1675	18.85	35.49	18.69	16.01	3.35	0.96	25.87	16.03	0.47
1700	18.77	35.52	18.46	17.21	3.41	0.97	25.45	15.76	0.49
1725	18.69	35.40	18.23	18.57	3.41	0.98	25.88	16.11	0.58
1750	18.59	35.45	18.04	20.14	3.48	0.98	25.32	15.72	0.48
1800	18.40	35.28	17.64	24.36	3.50	0.99	25.20	15.77	0.51
1850	18.19	35.25	17.27	31.39	3.57	1.00	25.28	15.76	0.54
1900	17.96	35.32	17.00	31.22	3.68	1.00	25.06	15.59	0.61
1925	17.84	35.28	16.84	27.32	3.70	1.00	25.06	15.68	0.55
1950	17.73	35.29	16.69	24.37	3.74	1.00	25.20	15.73	0.62
1975	17.60	35.33	16.52	22.16	3.79	1.00	24.85	15.52	0.63
2000	17.46	35.53	16.38	20.30	3.92	1.00	24.99	15.55	0.62
2025	17.31	35.51	16.26	18.82	3.96	1.00	24.81	15.59	0.64
2050	17.16	35.51	16.09	17.56	4.00	1.00	24.77	15.48	0.61
2075	17.00	35.60	15.92	16.49	4.09	0.99	24.49	15.25	0.65
2100	16.83	35.46	15.73	15.54	4.07	0.99	24.65	15.32	0.67
2125	16.67	35.58	15.55	14.80	4.18	0.99	24.47	15.17	0.65
2175	16.40	35.70	15.18	13.81	4.31	0.98	23.88	14.81	0.63
2200	16.32	35.75	15.00	13.55	4.35	0.98	24.44	15.12	0.75
2225	16.29	35.51	14.92	13.36	4.24	0.98	23.33	14.41	0.68
2250	16.28	35.60	14.86	13.16	4.28	0.98	23.95	14.80	0.64
2275	16.28	35.28	14.82	12.87	4.11	0.97	23.50	14.59	0.73
2300	16.26	35.35	14.77	12.46	4.12	0.97	23.51	14.51	0.68
2325	16.21	35.38	14.76	12.03	4.13	0.97	23.18	14.25	0.67
2350	16.16	35.24	14.69	11.52	4.05	0.96	23.81	14.65	0.67
2375	16.08	35.47	14.65	11.05	4.15	0.95	23.12	14.28	0.71
2450	15.77	35.57	14.45	9.66	4.19	0.93	23.11	14.15	0.76
2475	15.63	35.82	14.47	9.28	4.33	0.92	22.77	13.93	0.76
2500	15.50	35.96	14.39	8.88	4.40	0.91	23.01	13.96	0.75

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 2.7V, Id =36.04 mA @ Temperature = -45degC

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)
1500	18.80	35.85	16.79	10.40	3.27	0.90	25.31	14.61	0.39
1525	18.75	35.62	16.51	11.06	3.25	0.91	25.28	14.64	0.43
1550	18.69	35.50	16.29	11.79	3.26	0.93	24.88	14.59	0.42
1575	18.62	35.53	16.07	12.57	3.33	0.94	25.15	14.56	0.43
1600	18.55	35.40	15.88	13.39	3.33	0.95	25.31	14.82	0.38
1625	18.47	35.30	15.75	14.35	3.35	0.96	24.61	14.54	0.44
1650	18.39	35.09	15.52	15.37	3.32	0.97	25.01	14.76	0.49
1675	18.31	35.14	15.39	16.50	3.39	0.98	24.87	14.71	0.44
1700	18.22	35.00	15.21	17.81	3.38	0.99	24.52	14.47	0.49
1725	18.13	35.05	15.06	19.26	3.44	0.99	24.88	14.79	0.42
1750	18.03	35.15	14.93	20.97	3.52	1.00	24.45	14.45	0.48
1800	17.83	35.00	14.64	25.77	3.55	1.01	24.31	14.48	0.48
1850	17.62	35.07	14.41	33.54	3.66	1.02	24.38	14.45	0.51
1900	17.38	34.93	14.24	28.88	3.68	1.02	24.18	14.34	0.57
1925	17.27	34.91	14.12	25.49	3.71	1.02	24.16	14.34	0.56
1950	17.15	35.03	14.04	22.96	3.79	1.02	24.31	14.40	0.56
1975	17.02	34.94	13.91	21.06	3.79	1.02	24.00	14.15	0.62
2000	16.88	35.12	13.83	19.35	3.91	1.02	24.09	14.17	0.63
2025	16.72	35.17	13.76	18.01	3.98	1.02	23.94	14.23	0.61
2050	16.57	35.11	13.65	16.86	3.99	1.01	23.85	14.08	0.61
2075	16.41	35.18	13.53	15.85	4.07	1.01	23.59	13.85	0.64
2100	16.24	35.32	13.40	14.98	4.18	1.01	23.75	13.94	0.69
2125	16.08	35.30	13.27	14.28	4.21	1.00	23.54	13.75	0.67
2175	15.80	35.41	13.00	13.33	4.34	1.00	23.03	13.39	0.64
2200	15.73	35.35	12.90	13.07	4.33	1.00	23.54	13.75	0.72
2225	15.69	35.43	12.81	12.88	4.37	1.00	22.51	13.06	0.69
2250	15.68	35.18	12.77	12.68	4.24	0.99	23.11	13.37	0.66
2275	15.67	35.15	12.76	12.38	4.21	0.99	22.71	13.19	0.72
2300	15.66	35.07	12.73	11.99	4.15	0.99	22.73	13.10	0.68
2325	15.60	35.14	12.72	11.55	4.17	0.98	22.37	12.85	0.66
2350	15.54	35.22	12.68	11.08	4.20	0.97	22.99	13.15	0.72
2375	15.46	35.16	12.68	10.61	4.16	0.96	22.31	12.83	0.68
2450	15.14	35.41	12.58	9.27	4.27	0.94	22.31	12.59	0.76
2475	15.00	35.69	12.60	8.91	4.43	0.93	21.97	12.44	0.69
2500	14.88	35.82	12.53	8.50	4.48	0.91	22.19	12.35	0.75

MMIC Amplifier

PMA2-252LN+

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 = 3.3V, Id = 46.43 mA @ Temperature = -45degC

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)
1500	19.53	36.77	22.78	10.03	3.35	0.88	27.81	16.97	0.42
1525	19.48	36.68	22.54	10.65	3.38	0.89	27.75	16.99	0.45
1550	19.43	36.65	22.29	11.34	3.43	0.91	27.17	16.85	0.43
1575	19.37	36.57	22.04	12.07	3.46	0.92	27.48	16.83	0.46
1600	19.30	36.46	21.74	12.84	3.48	0.93	27.68	17.14	0.38
1625	19.23	36.34	21.52	13.72	3.50	0.94	26.81	16.75	0.48
1650	19.16	36.09	21.11	14.68	3.45	0.95	27.27	17.04	0.49
1675	19.08	36.06	20.87	15.69	3.49	0.96	27.12	16.99	0.46
1700	19.00	36.10	20.55	16.86	3.56	0.97	26.62	16.69	0.49
1725	18.92	35.94	20.27	18.15	3.54	0.97	27.11	17.04	0.44
1750	18.82	36.00	20.01	19.59	3.61	0.98	26.51	16.61	0.45
1800	18.63	35.87	19.47	23.45	3.66	0.99	26.35	16.64	0.49
1850	18.42	35.92	19.03	29.21	3.77	0.99	26.44	16.65	0.51
1900	18.19	35.91	18.62	30.46	3.85	1.00	26.22	16.51	0.59
1925	18.08	35.91	18.41	27.39	3.89	1.00	26.26	16.57	0.53
1950	17.96	35.88	18.20	24.58	3.92	1.00	26.42	16.64	0.58
1975	17.84	36.06	18.00	22.43	4.04	1.00	26.03	16.39	0.61
2000	17.70	36.02	17.80	20.54	4.06	1.00	26.19	16.45	0.59
2025	17.55	35.96	17.62	19.08	4.09	0.99	26.01	16.47	0.63
2050	17.40	36.05	17.39	17.76	4.17	0.99	25.95	16.37	0.64
2075	17.23	36.12	17.19	16.69	4.26	0.99	25.65	16.14	0.65
2100	17.07	36.12	16.95	15.75	4.31	0.99	25.82	16.21	0.65
2125	16.91	36.22	16.73	15.00	4.41	0.98	25.63	16.06	0.62
2175	16.63	36.13	16.25	14.00	4.45	0.98	24.98	15.67	0.63
2200	16.56	36.23	16.09	13.73	4.52	0.98	25.62	16.03	0.73
2225	16.53	36.14	15.95	13.55	4.48	0.98	24.35	15.29	0.66
2250	16.52	35.79	15.88	13.35	4.30	0.97	25.03	15.69	0.61
2275	16.52	35.81	15.83	13.06	4.29	0.97	24.56	15.46	0.72
2300	16.50	35.91	15.73	12.65	4.32	0.97	24.54	15.40	0.63
2325	16.45	35.88	15.70	12.19	4.30	0.96	24.17	15.17	0.64
2350	16.40	35.77	15.59	11.69	4.23	0.96	24.88	15.55	0.68
2375	16.32	35.95	15.54	11.19	4.31	0.95	24.12	15.19	0.73
2450	16.01	36.06	15.27	9.77	4.36	0.92	24.13	15.07	0.84
2475	15.87	36.17	15.28	9.39	4.44	0.91	23.79	14.83	0.72
2500	15.75	36.51	15.14	8.99	4.61	0.90	24.01	14.90	0.69



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 = 3V, Id = 40.58 mA @ Temperature = +85degC

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)
1500	18.41	36.75	16.38	10.74	3.79	0.91	26.97	16.17	0.77
1525	18.35	36.69	16.15	11.46	3.83	0.93	26.91	16.19	0.81
1550	18.29	36.67	15.96	12.26	3.89	0.94	26.41	16.08	0.79
1575	18.22	36.43	15.78	13.09	3.85	0.95	26.47	15.99	0.81
1600	18.14	36.38	15.59	13.98	3.90	0.97	26.87	16.36	0.78
1625	18.06	36.28	15.45	14.96	3.91	0.98	25.90	15.94	0.79
1650	17.98	36.26	15.24	16.05	3.96	0.98	26.36	16.21	0.89
1675	17.89	36.31	15.10	17.20	4.04	0.99	26.27	16.14	0.87
1700	17.80	36.19	14.93	18.56	4.04	1.00	25.78	15.89	0.90
1725	17.71	36.22	14.76	20.03	4.10	1.01	26.23	16.21	0.84
1750	17.61	36.15	14.63	21.72	4.12	1.01	25.65	15.79	0.89
1800	17.40	36.07	14.36	25.93	4.18	1.02	25.56	15.85	0.96
1850	17.18	36.23	14.09	29.20	4.36	1.03	25.58	15.78	0.95
1900	16.94	36.15	13.88	25.99	4.41	1.03	25.31	15.60	1.04
1925	16.82	36.26	13.75	23.93	4.51	1.03	25.34	15.65	1.03
1950	16.70	36.35	13.65	22.12	4.60	1.03	25.56	15.77	1.06
1975	16.57	36.24	13.52	20.56	4.59	1.03	25.10	15.46	1.09
2000	16.43	36.21	13.41	19.13	4.63	1.03	25.19	15.48	1.13
2025	16.28	36.17	13.30	18.02	4.66	1.03	25.10	15.52	1.15
2050	16.13	36.28	13.18	16.98	4.77	1.02	24.97	15.39	1.15
2075	15.98	36.45	13.06	16.10	4.91	1.02	24.65	15.14	1.15
2100	15.83	36.50	12.91	15.38	4.99	1.02	24.84	15.23	1.16
2125	15.69	36.38	12.81	14.77	4.97	1.02	24.64	15.08	1.18
2175	15.46	36.36	12.55	13.98	5.04	1.01	23.97	14.67	1.20
2200	15.40	36.32	12.46	13.69	5.02	1.01	24.73	15.12	1.26
2225	15.36	36.40	12.39	13.45	5.07	1.01	23.48	14.30	1.23
2250	15.34	36.28	12.34	13.14	4.99	1.01	24.16	14.68	1.21
2275	15.31	36.07	12.31	12.77	4.86	1.00	23.70	14.45	1.35
2300	15.28	36.09	12.26	12.31	4.86	1.00	23.70	14.40	1.21
2325	15.21	36.02	12.24	11.83	4.81	0.99	23.30	14.11	1.24
2350	15.14	35.98	12.20	11.35	4.78	0.98	23.96	14.47	1.29
2375	15.05	36.03	12.17	10.87	4.81	0.98	23.22	14.09	1.31
2450	14.73	36.20	12.06	9.53	4.90	0.95	23.21	13.94	1.36
2475	14.58	36.59	12.10	9.23	5.17	0.94	22.95	13.76	1.37
2500	14.48	36.34	11.98	8.73	4.98	0.93	23.02	13.72	1.39

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 2.7V, Id = 35.35 mA @ Temperature = +85degC

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)
1500	18.10	35.99	14.54	11.30	3.61	0.93	26.12	15.02	0.79
1525	18.04	35.86	14.35	12.07	3.62	0.95	26.07	15.04	0.82
1550	17.97	35.98	14.20	12.96	3.73	0.96	25.60	14.95	0.82
1575	17.90	35.92	14.07	13.87	3.76	0.97	25.66	14.88	0.87
1600	17.82	35.81	13.92	14.90	3.78	0.98	26.06	15.24	0.82
1625	17.73	35.60	13.81	16.01	3.74	0.99	25.11	14.86	0.91
1650	17.64	35.64	13.64	17.25	3.81	1.00	25.57	15.09	0.89
1675	17.55	35.59	13.53	18.62	3.84	1.01	25.44	15.03	0.91
1700	17.45	35.78	13.41	20.24	3.97	1.02	25.02	14.81	0.93
1725	17.36	35.44	13.29	22.15	3.87	1.02	25.44	15.13	0.89
1750	17.25	35.57	13.18	24.39	3.98	1.03	24.86	14.72	0.95
1800	17.04	35.54	12.96	30.11	4.05	1.04	24.77	14.79	0.96
1850	16.81	35.52	12.77	29.39	4.13	1.04	24.81	14.71	0.98
1900	16.56	35.47	12.60	23.96	4.19	1.04	24.48	14.55	1.09
1925	16.44	35.47	12.51	21.98	4.23	1.04	24.51	14.59	1.06
1950	16.31	35.58	12.42	20.35	4.33	1.04	24.69	14.69	1.10
1975	16.18	35.34	12.31	18.99	4.25	1.04	24.26	14.41	1.14
2000	16.03	35.66	12.24	17.74	4.45	1.04	24.31	14.44	1.17
2025	15.88	35.55	12.17	16.73	4.45	1.03	24.20	14.47	1.15
2050	15.73	35.73	12.06	15.79	4.58	1.03	24.09	14.34	1.15
2075	15.57	35.83	11.97	15.02	4.68	1.03	23.78	14.10	1.17
2100	15.42	35.79	11.85	14.36	4.70	1.03	23.94	14.17	1.22
2125	15.28	35.82	11.76	13.81	4.76	1.02	23.74	14.02	1.22
2175	15.05	35.90	11.55	13.04	4.87	1.02	23.11	13.61	1.21
2200	14.98	35.83	11.48	12.78	4.85	1.02	23.81	14.03	1.35
2225	14.94	35.86	11.43	12.54	4.86	1.01	22.65	13.25	1.27
2250	14.91	35.64	11.39	12.23	4.74	1.01	23.32	13.62	1.23
2275	14.88	35.56	11.38	11.88	4.68	1.01	22.87	13.37	1.38
2300	14.83	35.67	11.34	11.48	4.72	1.00	22.84	13.34	1.31
2325	14.76	35.46	11.34	11.04	4.61	0.99	22.45	13.03	1.26
2350	14.69	35.74	11.32	10.61	4.75	0.99	23.04	13.36	1.32
2375	14.60	35.57	11.29	10.15	4.65	0.98	22.35	13.01	1.34
2450	14.25	35.80	11.23	8.92	4.77	0.95	22.29	12.79	1.42
2475	14.09	36.17	11.28	8.65	5.02	0.94	22.05	12.63	1.44
2500	13.99	36.08	11.18	8.19	4.92	0.92	22.10	12.60	1.45

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

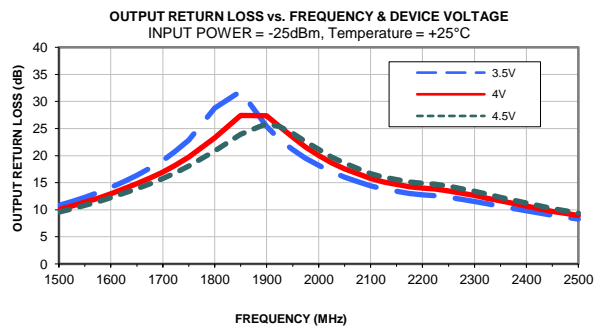
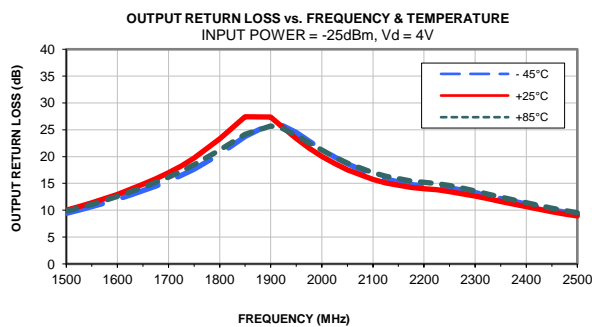
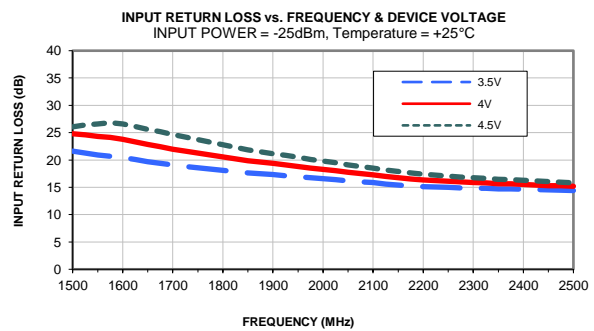
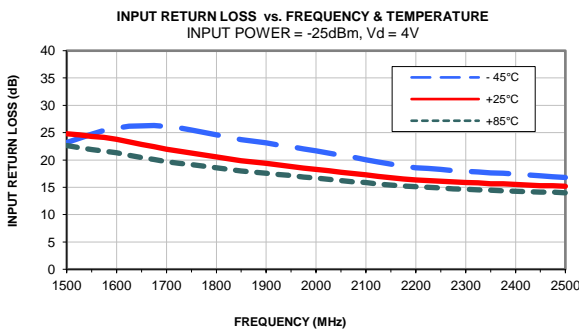
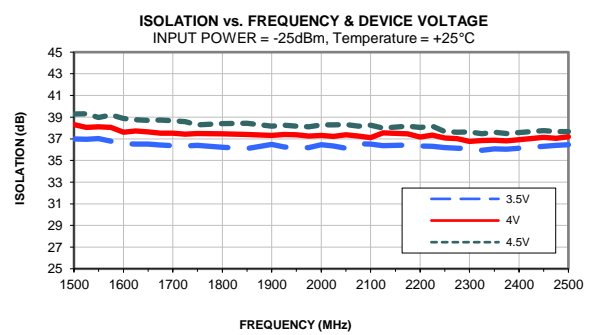
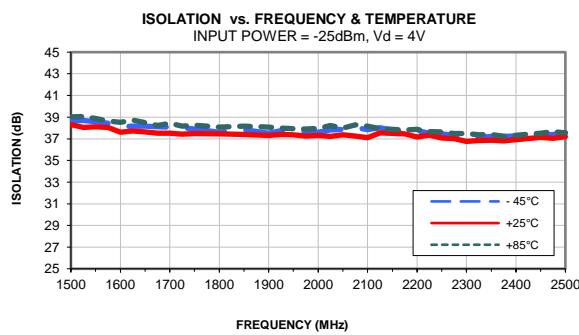
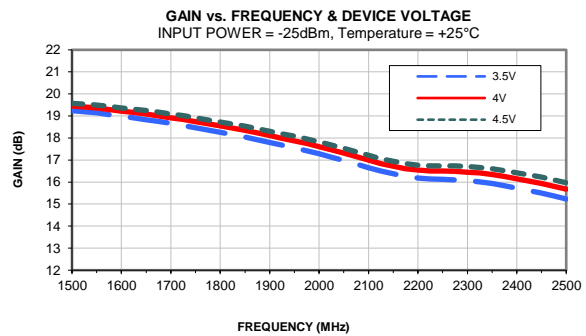
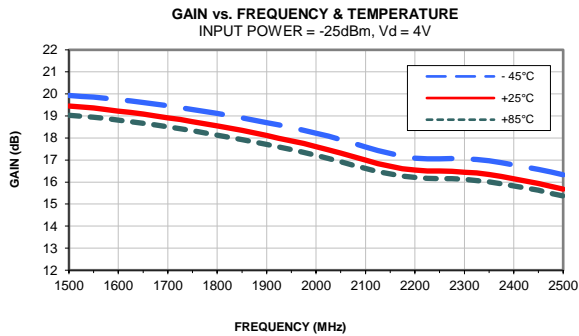
Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

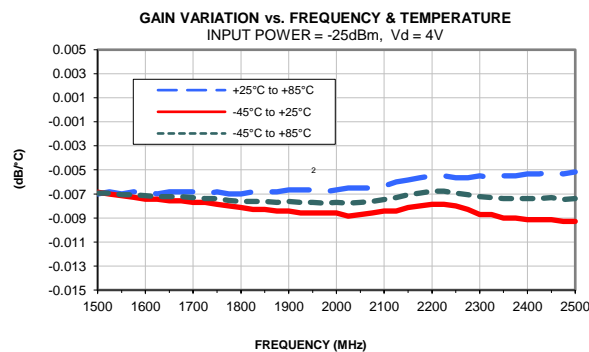
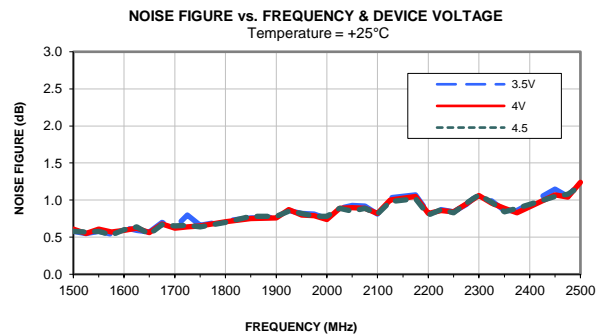
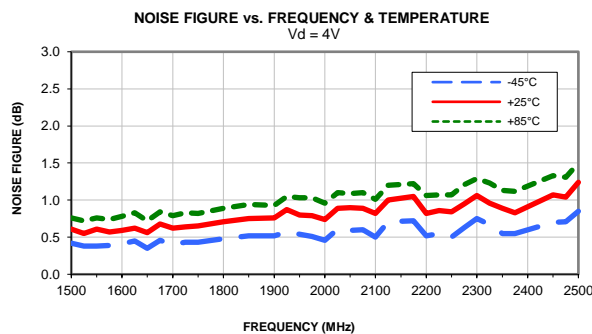
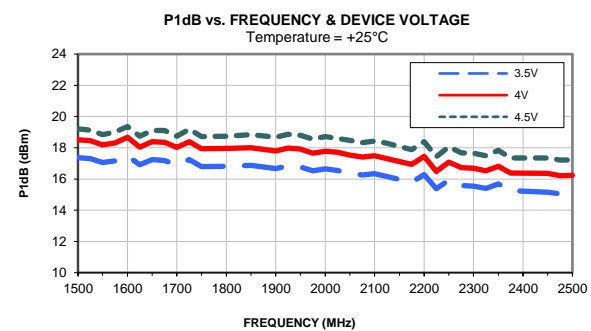
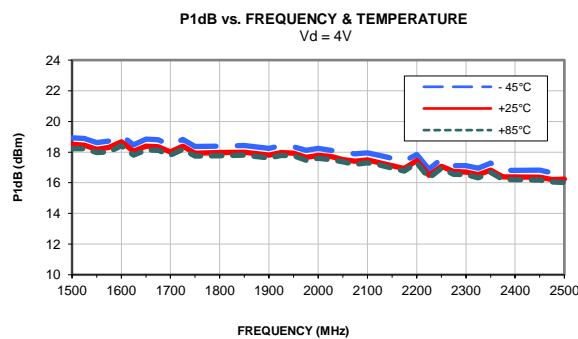
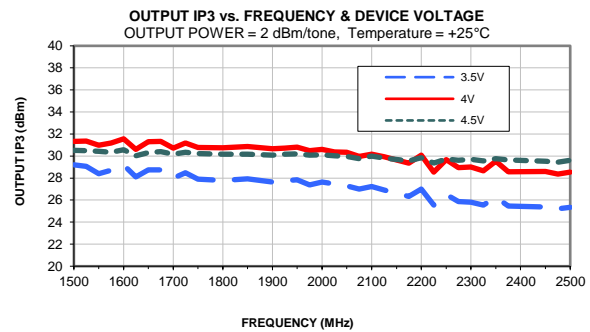
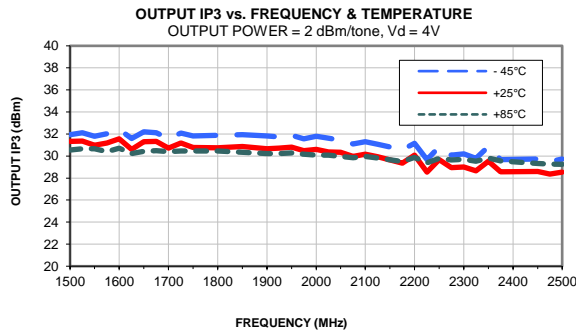
TEST CONDITIONS: Vd = 3.3V, Id = 45.53 mA @ Temperature = +85degC

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)
1500	18.63	37.39	18.16	10.39	3.97	0.90	27.98	17.11	0.75
1525	18.59	37.56	17.86	11.07	4.11	0.92	27.92	17.11	0.82
1550	18.52	37.30	17.65	11.82	4.07	0.93	27.38	17.01	0.80
1575	18.46	37.27	17.43	12.59	4.13	0.94	27.51	16.88	0.82
1600	18.39	37.18	17.19	13.42	4.15	0.95	27.93	17.30	0.76
1625	18.31	36.94	17.01	14.33	4.11	0.96	26.87	16.85	0.84
1650	18.23	36.96	16.74	15.30	4.18	0.97	27.42	17.10	0.87
1675	18.15	36.87	16.56	16.35	4.20	0.98	27.27	17.03	0.89
1700	18.06	36.71	16.34	17.54	4.18	0.99	26.77	16.78	0.89
1725	17.97	36.78	16.17	18.84	4.26	1.00	27.27	17.09	0.96
1750	17.87	36.74	15.99	20.28	4.30	1.00	26.66	16.64	0.88
1800	17.67	36.84	15.62	23.74	4.46	1.01	26.55	16.71	0.92
1850	17.46	36.76	15.31	27.21	4.52	1.02	26.62	16.65	0.94
1900	17.22	36.77	15.05	26.59	4.63	1.02	26.35	16.45	1.01
1925	17.11	36.62	14.89	24.90	4.60	1.02	26.41	16.49	1.02
1950	16.98	36.65	14.75	23.09	4.67	1.02	26.61	16.63	1.05
1975	16.86	36.78	14.59	21.58	4.78	1.02	26.14	16.31	1.09
2000	16.72	36.71	14.45	20.06	4.80	1.02	26.22	16.34	1.14
2025	16.57	36.72	14.33	18.89	4.87	1.02	26.11	16.40	1.11
2050	16.42	36.92	14.19	17.77	5.04	1.02	26.04	16.29	1.13
2075	16.27	36.91	14.03	16.86	5.08	1.01	25.71	16.01	1.15
2100	16.12	36.80	13.87	16.08	5.07	1.01	25.90	16.14	1.16
2125	15.98	36.97	13.72	15.46	5.23	1.01	25.69	15.98	1.18
2175	15.77	36.87	13.43	14.64	5.25	1.01	24.96	15.54	1.13
2200	15.71	36.67	13.32	14.34	5.14	1.01	25.81	16.03	1.28
2225	15.67	36.85	13.22	14.10	5.25	1.01	24.43	15.17	1.21
2250	15.65	36.71	13.16	13.77	5.15	1.00	25.20	15.60	1.17
2275	15.63	36.61	13.11	13.38	5.09	1.00	24.69	15.34	1.31
2300	15.60	36.53	13.03	12.89	5.02	1.00	24.69	15.27	1.24
2325	15.53	36.51	13.00	12.39	5.01	0.99	24.27	15.00	1.25
2350	15.47	36.58	12.94	11.87	5.03	0.98	24.99	15.42	1.27
2375	15.39	36.67	12.90	11.34	5.08	0.98	24.23	14.98	1.28
2450	15.07	36.79	12.75	9.94	5.16	0.95	24.23	14.87	1.36
2475	14.92	36.89	12.81	9.60	5.27	0.94	23.93	14.71	1.38
2500	14.83	36.83	12.64	9.10	5.19	0.93	24.02	14.66	1.38

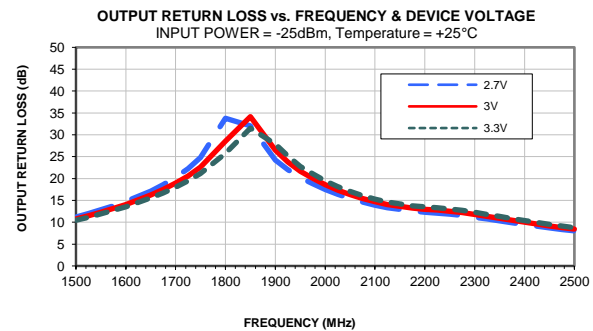
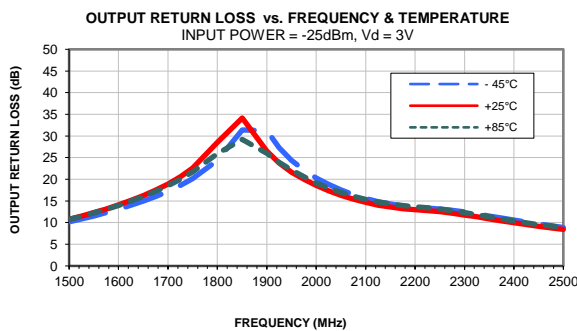
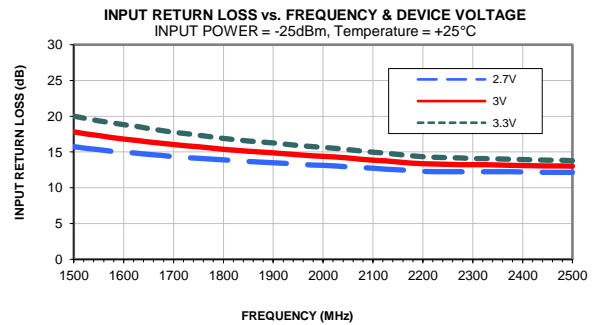
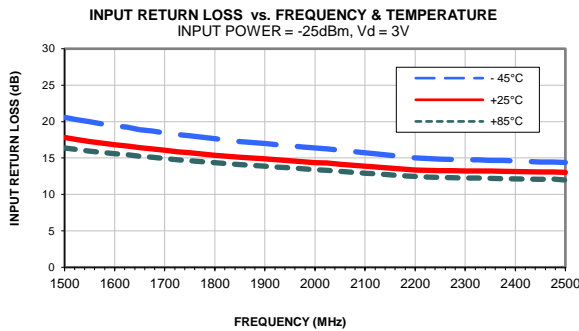
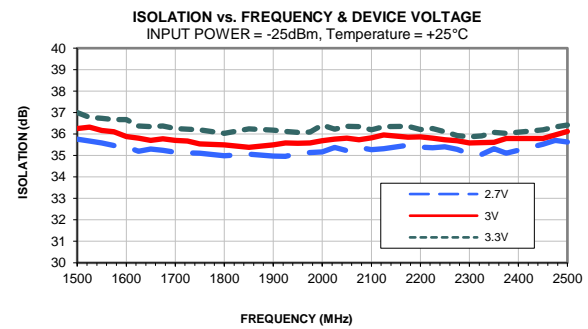
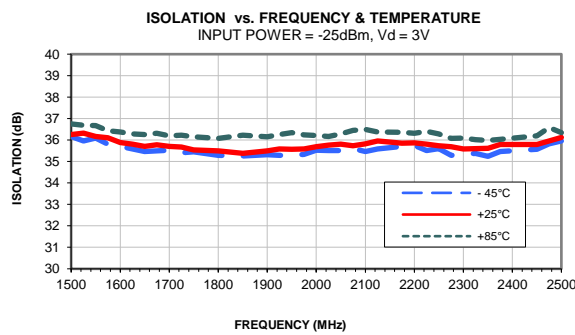
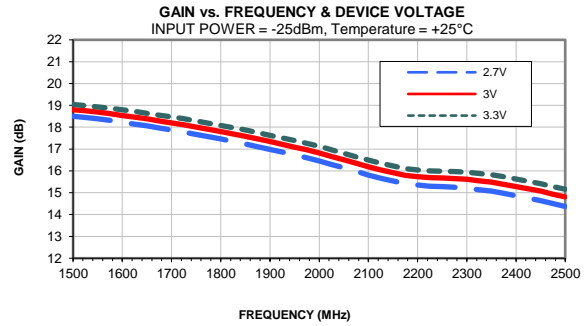
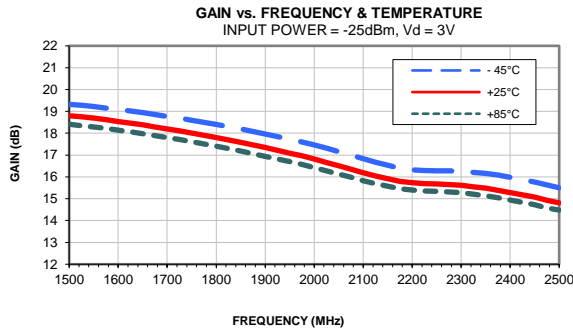
Typical Performance Curves



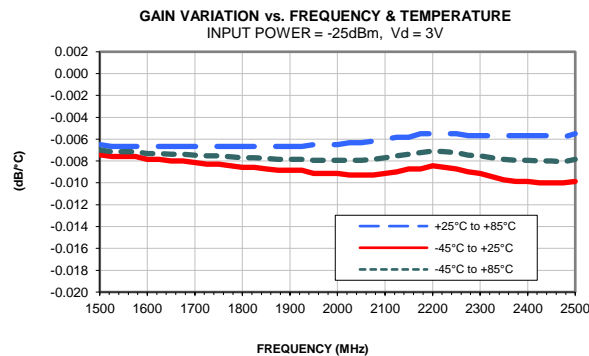
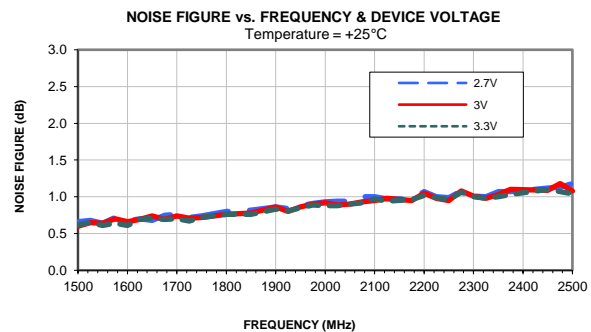
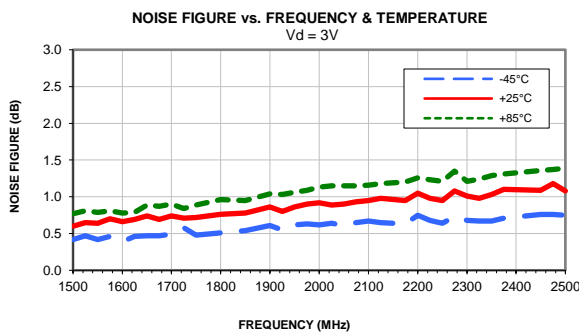
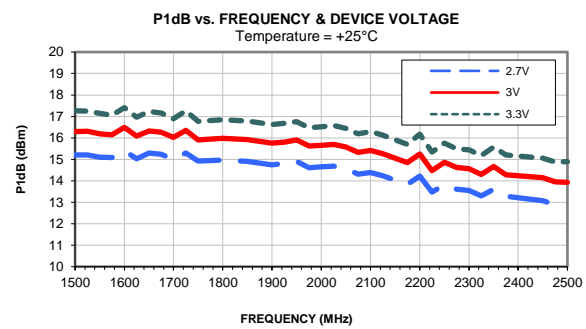
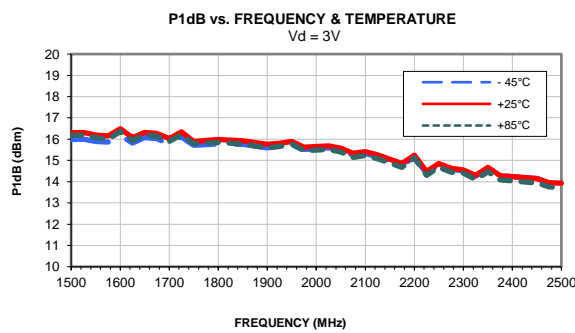
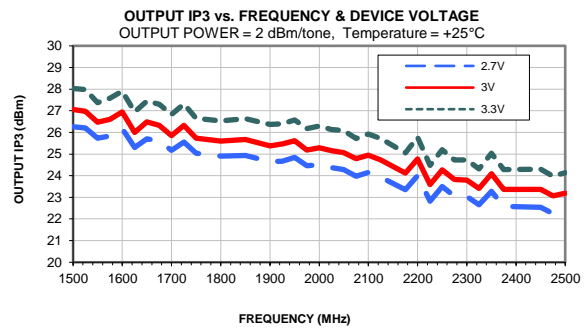
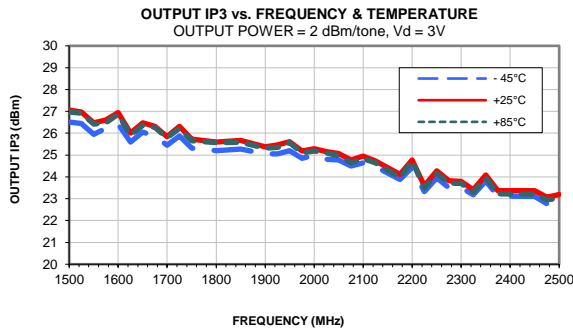
Typical Performance Curves



Typical Performance Curves

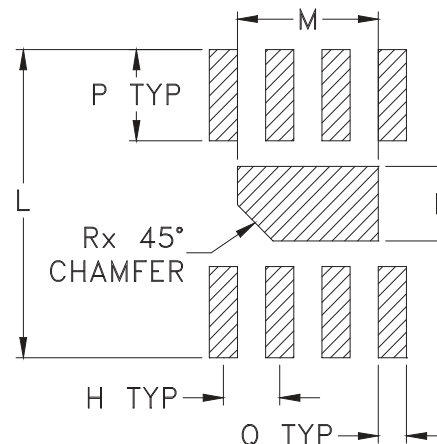
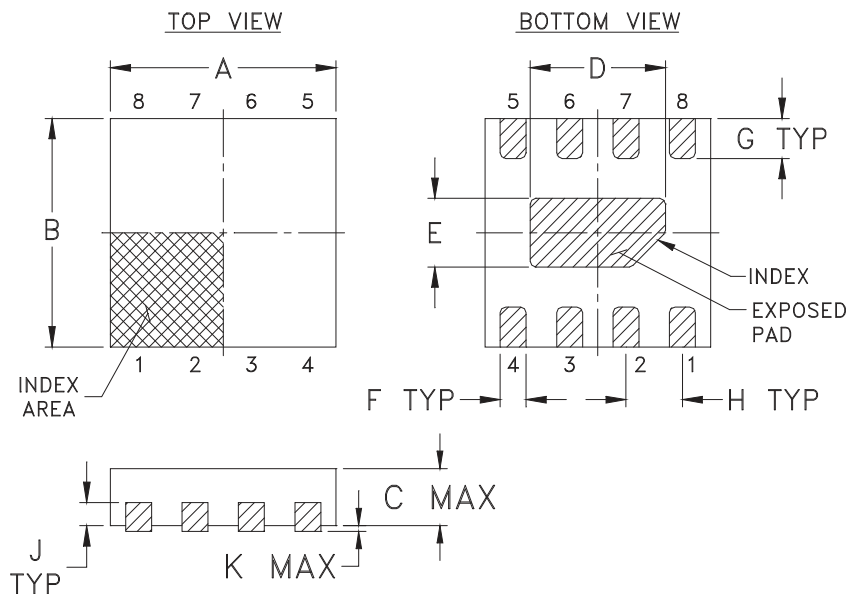


Typical Performance Curves



Outline Dimensions

PCB Land Pattern



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

CASE #.	A	B	C	D	E	F	G	H	J	K	L	M	N	P
MC1631	.079 (2.00)	.079 (2.00)	.022 (.55)	.047 (1.20)	.024 (.60)	.009 (.23)	.014 (.35)	.020 (.50)	.008 (.20)	.002 (.05)	.106 (2.70)	.049 (1.25)	.026 (.65)	.031 (.80)

CASE #.	Q	R	WT, GRAM
MC1631	.010 (.25)	.012 (.30)	.006

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .01$; 3 Pl. $\pm .005$

Notes:

- Case material: Plastic.
- Termination finish:
For RoHS Case Styles: Matte-Tin plate. All models, (+) suffix.
- Lead #1 identifier shall be located in the cross-hatched area shown.
Identifier may be either a molded or marked feature.



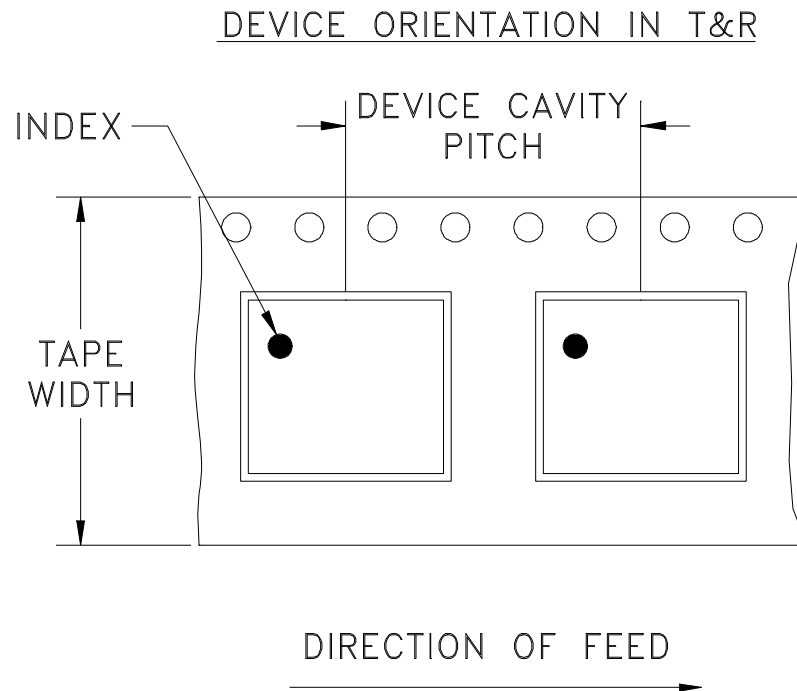
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F108



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
12	4	7	Small quantity standards	20
				50
				100
				200
				500
				1000
		7	Standard	2000
				3000

Note: Please Consult individual data sheet to determine device per reel availability

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

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

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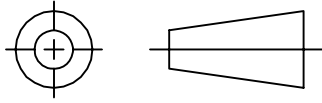
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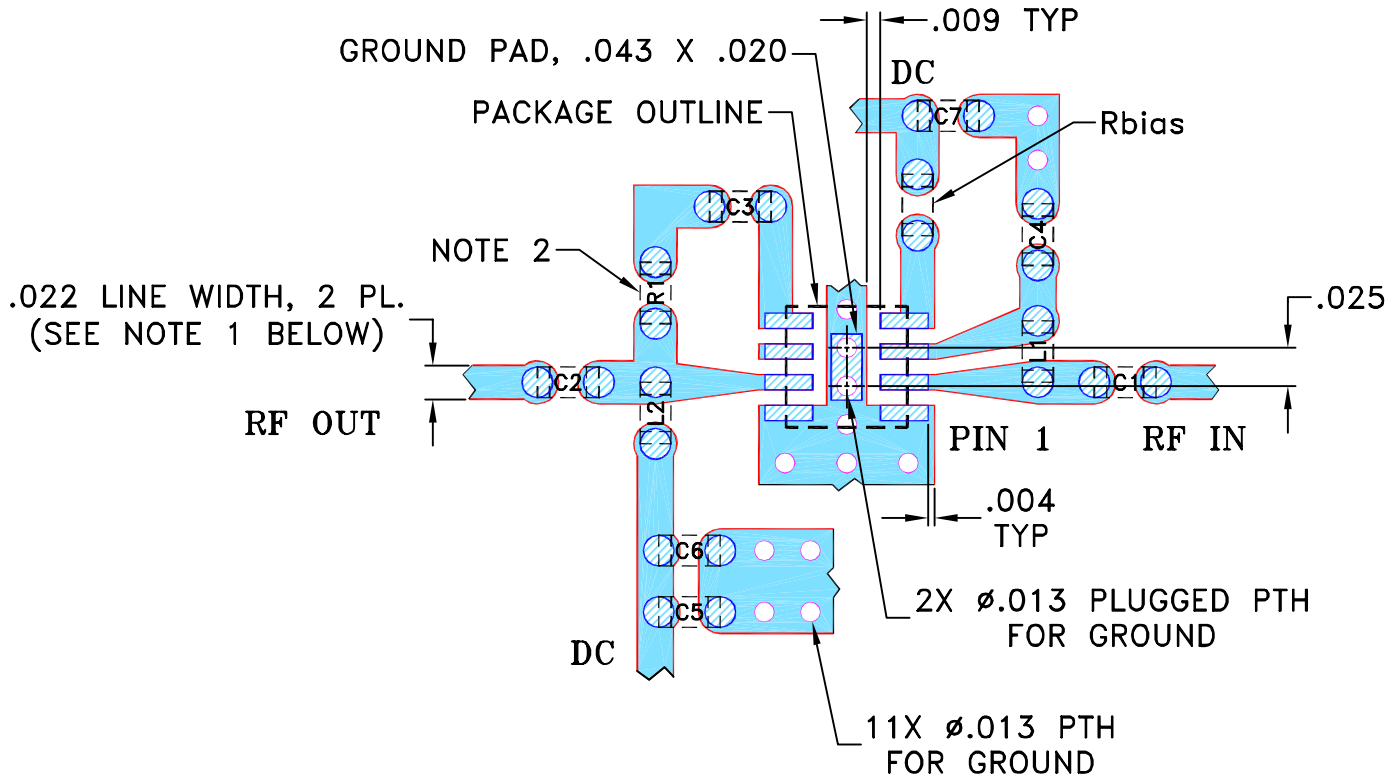
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M135045	NEW RELEASE	12/30/11	AV	DJ

SUGGESTED MOUNTING CONFIGURATION FOR MC1631 CASE STYLE, "08AM07" PIN CODE



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .010" ± .001"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
 2. 0402 SIZE CHIP FOOT PRINTS SHOWN FOR REFERENCE, FOR COMPONENT VALUE REFER TO TB-642+.
 3. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



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



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED	INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN AV	12/28/11
TOLERANCES ON:	CHECKED IL	12/30/11
2 PL DECIMALS ±	APPROVED DJ	12/30/11
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		

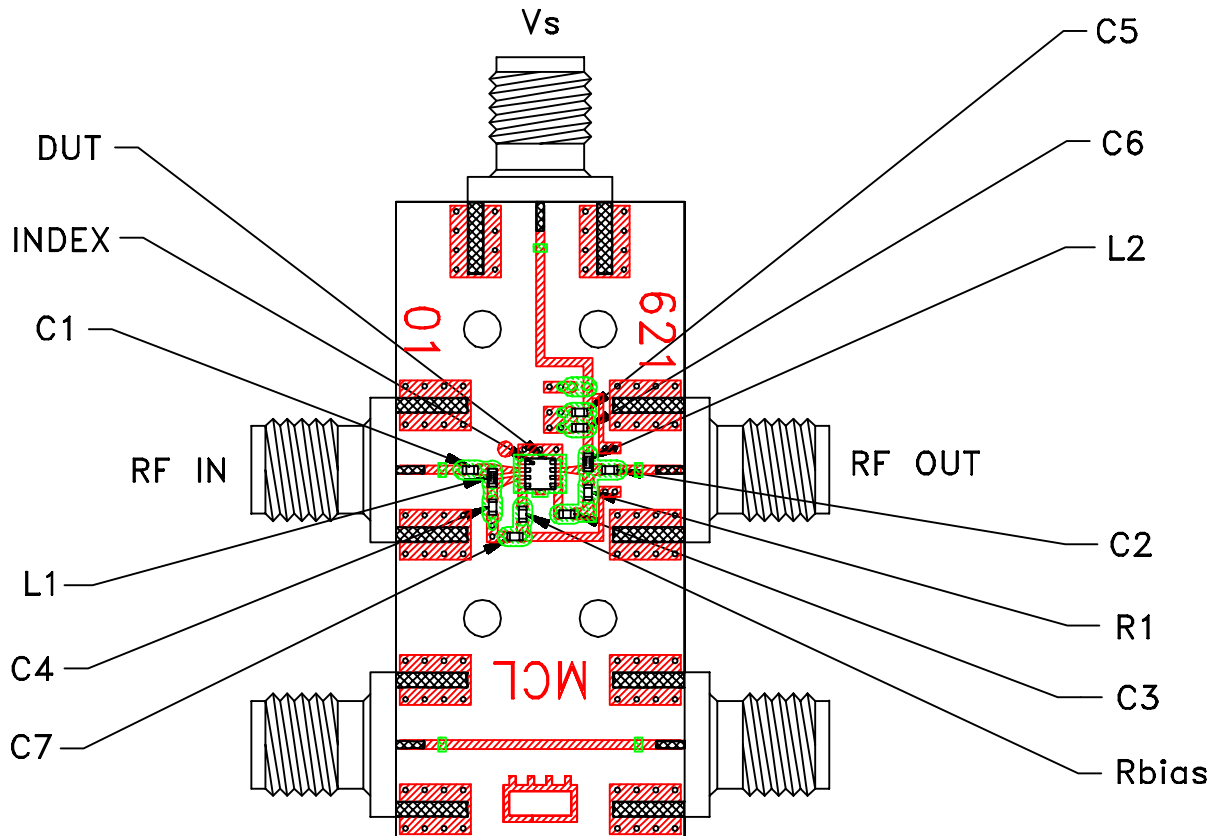
 **Mini-Circuits®** 13 Neptune Avenue
Brooklyn NY 11235

PL, 08AM07, MC1631, TB-642+

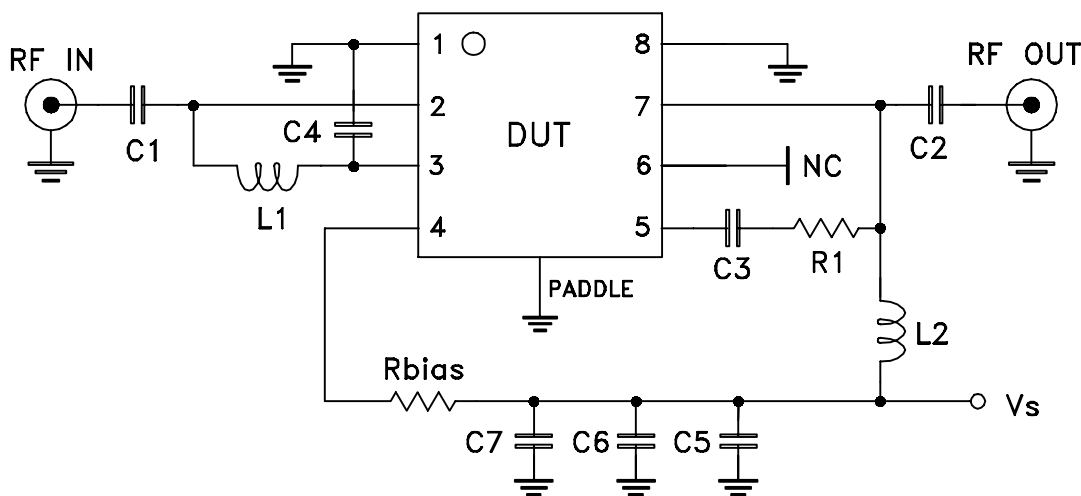
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SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-360	OR
FILE:	98PL360	SCALE: 8:1	SHEET: 1 OF 1

Evaluation Board and Circuit



TB-642+



Schematic Diagram

ITEM	DESCRIPTION
C1	CAP, 27pF
C2	CAP, 2.7pF
C3	CAP, 1.2pF
C4	CAP, 220pF
C5	CAP, 7pF
C6, C7	CAP, 0.1uF
R1	RES, 825 Ohm
Rbias	RES, 619 Ohm
L1	IND, 6.8nH
L2	IND, 2.2nH
DUT	PMA2-252LN+

NOTES:

1. SMA Female connectors.
2. PCB material: Rogers R04350 or equivalent, dielectric constant=3.5, dielectric thickness=.010 inch.

 Mini-Circuits®

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

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85°C or -45° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C or -65° to 150° Ambient Environment	Individual Model Data Sheet
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Mechanical Shock	1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only	MIL-STD-883, Method 2002, Condition B, except Y1 direction only
Vibration (Variable Frequency)	50g peak	MIL-STD-883, Method 2007, Condition B
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102, Condition C
HAST	130°C, 85% RH, 96 hours	JESD22-A110
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Solder Reflow Heat	Sn-Pb Eutetic Process: 240°C peak Pb-Free Process: 260°C peak	J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1
Moisture Sensitivity: Level 1	Bake at 125°C for 24 hours Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 260°C peak	J-STD-020
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether +	MIL-STD-202, Method 215



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
	monoethanolamine at 63°C to 70°C	