



ULTRA LOW NOISE, HIGH IP3

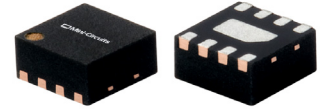
# Monolithic Amplifier

## PMA2-43LN+

50Ω 1.1 to 4.0 GHz

### THE BIG DEAL

- Ultra low noise figure, 0.46 dB typ. at 1.9 GHz
- High IP3, +33 dBm typ. at 1.9 GHz
- High Pout, P1dB +19.9 dBm typ. at 1.9 GHz
- Small size, 2 x 2 x 1mm



Generic photo used for illustration purposes only

CASE STYLE: MC1631-1

### +RoHS Compliant

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

### APPLICATIONS

- Base station infrastructure
- Portable Wireless
- LTE
- GPS
- GSM
- Airborne radar

### PRODUCT OVERVIEW

Mini-Circuits PMA2-43LN+ is an E-PHEMT\* based, ultra-low noise MMIC amplifier with a unique combination of low noise and high IP3, making this amplifier ideal for sensitive, high-dynamic-range receiver applications. This design operates on a single +5V supply, is well matched for 50Ω systems, and comes in a tiny, low profile package, accommodating dense circuit board layouts.

### KEY FEATURES

Feature	Advantages
Ultra-low noise, 0.46 dB at 1.9 GHz	Enables lower system noise figure performance
High IP3 <ul style="list-style-type: none"> <li>• +32.9 dBm at 1.9 GHz</li> <li>• +32.6 dBm at 2.5 GHz</li> </ul>	Combination of 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 of sensitivity & two-tone IM performance at both ends of the dynamic range.
Low operating voltage, +5V	Achieves high IP3 using low voltage.
2 x 2mm 8-lead MCLP package	Tiny footprint saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB.
High max input power <ul style="list-style-type: none"> <li>• +22 dBm (5 minutes)</li> <li>• +14 dBm (continuous)</li> </ul>	Ruggedized design provides high power handling for input powers common at receiver inputs, eliminating the need for an external limiter in most cases.
High reliability	Low signal operating current of 51 mA nominal maintains junction temperatures typically below 103 °C at 85°C ground lead temperature.

\*Enhancement mode Pseudomorphic High Electron Mobility Transistor





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50Ω 1.1 to 4.0 GHz

### ELECTRICAL SPECIFICATIONS<sup>1</sup> AT +25°C AND +5V, UNLESS NOTED OTHERWISE

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		1.1		4.0	GHz
Noise Figure	1.1		0.41	—	dB
	1.5		0.45	—	
	1.9		0.46	0.69	
	2.5		0.66	—	
	4.0		1.08	—	
Gain	1.1	—	23.4	—	dB
	1.5	—	21.6	—	
	1.9	18.0	19.9	22.01	
	2.5	—	17.6	—	
	4.0	—	12.9	—	
Input Return Loss	1.1		13.8		dB
	1.5		19.1		
	1.9		16.6		
	2.5		14.1		
	4.0		11.9		
Output Return Loss	1.1		9.6		dB
	1.5		11.9		
	1.9		12.3		
	2.5		10.6		
	4.0		6.7		
Output Power at 1dB Compression	1.1		+18.6		dBm
	1.5		+19.4		
	1.9		+19.9		
	2.5		+19.7		
	4.0		+17.1		
Output IP3	1.1		+30.3		dBm
	1.5		+32.3		
	1.9		+32.9		
	2.5		+32.6		
	4.0		+32.2		
Device Operating Voltage ( $V_{DD}$ )			+5.0		V
Device Operating Current ( $I_{DD}$ )			51	64	mA
Device Current Variation vs. Temperature <sup>2</sup>			-72		$\mu\text{A}/^\circ\text{C}$
Device Current Variation vs. Voltage			0.018		mA/mV
Thermal Resistance, junction-to-ground lead			61		$^\circ\text{C}/\text{W}$

1. Measured on Mini-Circuits Characterization test board TB-805+. See Characterization Test Circuit (Fig. 1)

2. Current increases at P1dB

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





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50Ω 1.1 to 4.0 GHz

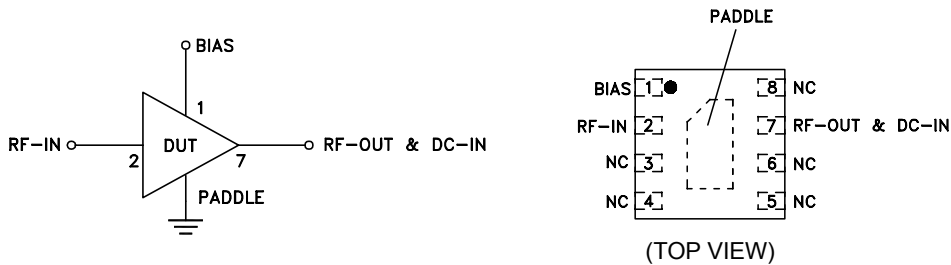
### ABSOLUTE MAXIMUM RATINGS<sup>4</sup>

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	0.7 W
Input Power (CW), Vd=5V <sup>5</sup>	+22 dBm (5minutes max) +14 dBm (continuous)
DC Voltage	+6V

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

5. Measured on Mini-Circuits test board, TB-805+

### SIMPLIFIED SCHEMATIC & PAD DESCRIPTION



Function	Pad Number	Description (See Figure 1)
RF-IN	2	Connects to RF input via C1 and Pad 1 via L1
RF-OUT & DC-IN	7	Connects to RF out via C2 and V <sub>s</sub> via L2 & R2
Ground	Paddle	Connects to ground
Bias	1	Connects to Supply voltage (V <sub>s</sub> ) via R1 & Rb
No Connection	3,4,5,6,8	Not used internally. Connected to ground on test board



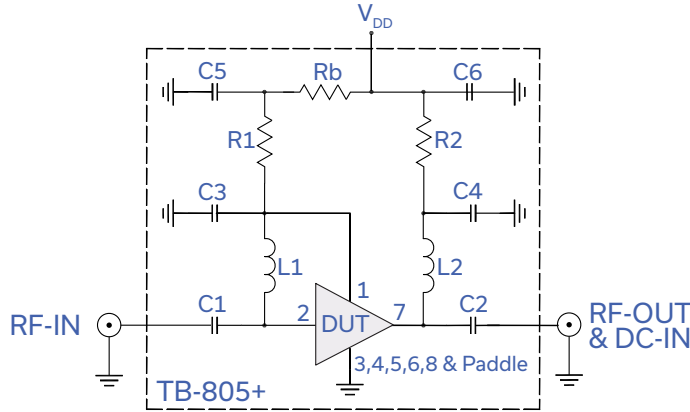
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# Monolithic Amplifier

**PMA2-43LN+**

50Ω 1.1 to 4.0 GHz

## RECOMMENDED APPLICATION AND CHARACTERIZATION TEST CIRCUIT



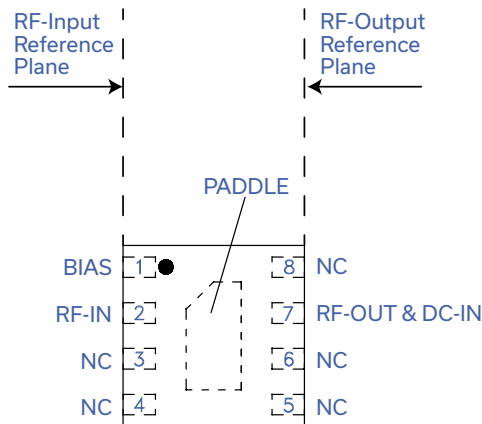
Component	Value	Size
C1, C2	1000pF	0402
C5, C6	4.7μF	0402
C3, C4	100pF	0402
L1	10nH	0402
L2	8.2nH	0402
R1	49.9Ω	0402
R2	0Ω	0603
Rb	5.11kΩ	0402

Fig 1. Application and Characterization Circuit

Note: This block diagram is used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-805+) Gain, Return loss, Output power at 1dB compression (P1 dB), output IP3 (OIP3) and noise figure measured using Agilent's N5242A PNA-X microwave network analyzer.

Conditions:

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



## NOISE PARAMETERS<sup>6,7,8</sup> (AT 50 mA)

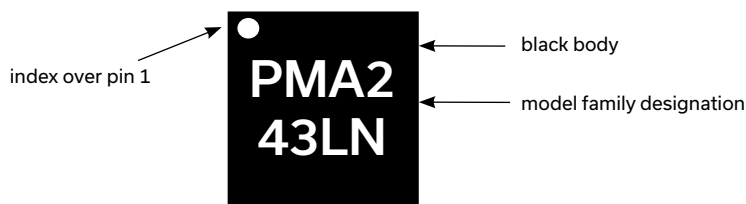
Frequency (MHz)	Fmin (dB)	$\Gamma_{opt}$ Magnitude	$\Gamma_{opt}$ Angle	Rn/50
800	0.26	0.066	79.6	0.039
900	0.22	0.086	98.2	0.032
1000	0.22	0.108	102.9	0.032
1500	0.25	0.214	135.0	0.021
2000	0.27	0.237	-169.4	0.028
2500	0.32	0.317	-162.8	0.022
3000	0.43	0.381	-141.7	0.035

6. DUT soldered on test board (50 ohm input and output)

7. Reference plane is at the end of the RF-IN pad and the output reference plane is at the end of the RF-OUT pad as shown in figure below

8. For data at 40,60,70 & 80 mA, data can be found in S-parameter files and can be downloaded from model dash-board.

## PRODUCT MARKING



Marking may contain other features or characters for internal lot control





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## PMA2-43LN+

50Ω 1.1 to 4.0 GHz

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	MC1631-1 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-400
Evaluation Board	TB-805+
Environmental Ratings	ENV08T1

### ESD RATING

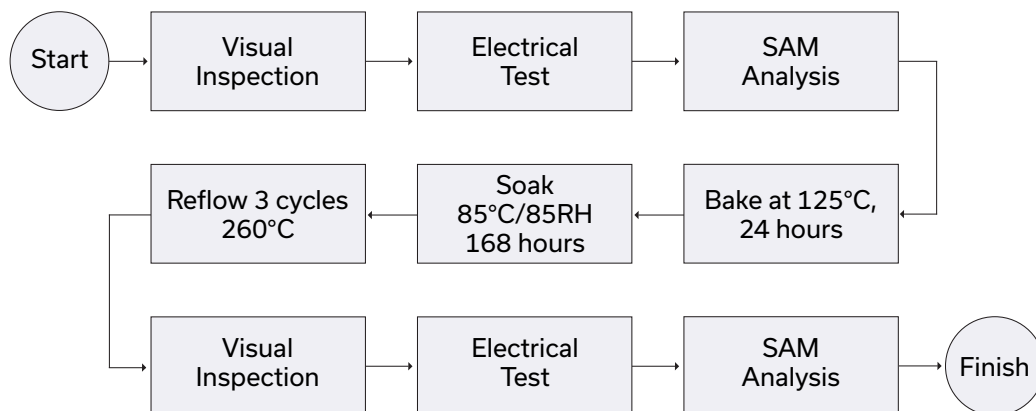
Human Body Model (HBM): Class 1A (250 to <500V) in accordance with ANSI/ESD STM 5.1 - 2001

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](http://www.minicircuits.com/MCLStore/terms.jsp)



## Typical Performance Data

**NOTE: Use PDF Bookmarks to view DATA at required conditions**

**Definitions:**

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5V, Id = 49.39 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)
400.00	12.53	51.90	0.71	1.72	3.03	0.59	19.66	7.66	2.35
500.00	19.09	43.94	1.13	1.88	1.43	0.54	23.54	11.85	1.26
600.00	22.01	39.53	2.10	2.86	1.32	0.61	25.10	13.73	1.02
700.00	23.51	36.80	3.72	4.21	1.33	0.66	26.31	15.03	0.68
800.00	24.09	35.14	5.97	5.82	1.38	0.70	27.65	16.17	0.63
900.00	24.18	34.16	8.53	7.32	1.42	0.73	28.86	17.29	0.51
1000.00	23.94	33.55	11.19	8.61	1.47	0.75	29.87	18.12	0.46
1100.00	23.56	33.18	13.84	9.70	1.53	0.78	30.89	18.60	0.49
1200.00	23.12	32.76	16.18	10.56	1.56	0.80	31.42	18.94	0.45
1300.00	22.65	32.69	17.98	11.24	1.64	0.82	31.84	19.24	0.40
1400.00	22.19	32.42	18.89	11.75	1.67	0.83	32.28	19.32	0.41
1500.00	21.73	32.24	19.02	12.13	1.72	0.85	32.55	19.75	0.39
1600.00	21.29	32.19	18.68	12.35	1.79	0.87	32.53	19.63	0.44
1700.00	20.84	31.87	18.14	12.44	1.80	0.87	32.99	19.60	0.42
1800.00	20.42	31.77	17.55	12.40	1.85	0.88	32.93	19.29	0.44
1900.00	19.99	31.46	16.97	12.23	1.86	0.89	32.78	19.84	0.48
2000.00	19.57	31.37	16.40	11.98	1.91	0.89	32.86	20.15	0.48
2100.00	19.16	31.24	15.96	11.68	1.95	0.90	32.79	20.21	0.49
2200.00	18.76	31.09	15.52	11.34	1.98	0.90	33.14	20.41	0.50
2300.00	18.38	31.03	15.09	10.95	2.02	0.90	33.00	19.94	0.56
2400.00	17.99	30.84	14.74	10.58	2.04	0.90	32.98	19.60	0.63
2500.00	17.61	30.67	14.40	10.18	2.05	0.90	32.78	20.15	0.60
2600.00	17.23	30.54	14.14	9.84	2.08	0.89	32.79	19.86	0.58
2700.00	16.89	30.44	13.83	9.46	2.11	0.89	32.88	19.96	0.64
2800.00	16.54	30.25	13.61	9.12	2.11	0.88	32.90	19.39	0.69
2900.00	16.19	30.12	13.40	8.82	2.13	0.88	32.94	19.40	0.73
3000.00	15.87	29.85	13.20	8.52	2.12	0.87	32.85	19.27	0.69
3100.00	15.53	29.74	13.05	8.27	2.14	0.87	32.76	19.50	0.76
3200.00	15.22	29.56	12.92	8.01	2.14	0.86	32.48	19.44	0.75
3300.00	14.92	29.36	12.80	7.79	2.14	0.86	32.91	18.28	0.83
3400.00	14.63	29.26	12.73	7.57	2.16	0.85	32.98	18.76	0.83
3500.00	14.34	28.98	12.64	7.38	2.14	0.84	32.50	18.57	0.88
3600.00	14.06	28.78	12.59	7.21	2.13	0.84	32.43	18.58	0.94
3700.00	13.78	28.62	12.62	7.07	2.14	0.83	32.72	18.28	1.00
3800.00	13.53	28.27	12.60	6.91	2.10	0.82	32.75	17.92	1.05
3900.00	13.27	28.14	12.64	6.79	2.11	0.82	32.70	17.35	1.12
4000.00	13.02	27.87	12.70	6.68	2.09	0.81	32.90	17.24	1.12
4100.00	12.76	27.64	12.75	6.58	2.09	0.81	32.45	16.89	1.25
4200.00	12.52	27.43	12.84	6.50	2.08	0.80	32.18	16.51	1.25
4300.00	12.28	27.23	12.97	6.44	2.09	0.80	32.38	16.26	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 = 4.75V, Id = 44.98 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)
400.00	12.24	51.89	0.70	1.72	3.08	0.59	19.02	7.20	2.36
500.00	18.84	43.59	1.09	1.88	1.39	0.54	22.75	11.01	1.28
600.00	21.80	39.22	2.02	2.84	1.29	0.61	24.33	12.94	1.03
700.00	23.34	36.58	3.60	4.18	1.32	0.66	25.60	14.43	0.72
800.00	23.96	35.13	5.78	5.79	1.38	0.71	26.94	15.77	0.62
900.00	24.07	33.95	8.30	7.32	1.41	0.73	28.28	16.91	0.53
1000.00	23.85	33.41	10.94	8.63	1.46	0.75	29.12	17.99	0.45
1100.00	23.47	33.03	13.49	9.73	1.52	0.78	30.16	18.55	0.50
1200.00	23.03	32.72	15.73	10.60	1.57	0.80	30.85	18.96	0.43
1300.00	22.56	32.49	17.35	11.28	1.62	0.82	31.35	19.25	0.42
1400.00	22.10	32.28	18.16	11.81	1.66	0.84	31.76	19.41	0.43
1500.00	21.64	32.06	18.24	12.18	1.70	0.85	32.17	19.75	0.41
1600.00	21.19	31.97	17.94	12.41	1.76	0.87	32.14	19.75	0.46
1700.00	20.75	31.76	17.45	12.48	1.80	0.88	32.56	19.75	0.42
1800.00	20.32	31.64	16.90	12.43	1.84	0.89	32.55	19.46	0.45
1900.00	19.89	31.49	16.35	12.26	1.88	0.89	32.74	19.87	0.50
2000.00	19.48	31.30	15.88	12.01	1.91	0.90	32.48	20.18	0.49
2100.00	19.06	31.22	15.45	11.69	1.95	0.90	32.41	20.17	0.50
2200.00	18.67	31.08	15.03	11.35	1.98	0.90	32.60	20.37	0.50
2300.00	18.28	30.84	14.64	10.98	1.99	0.90	32.59	19.96	0.57
2400.00	17.89	30.76	14.34	10.59	2.03	0.90	32.64	19.77	0.62
2500.00	17.51	30.64	14.04	10.21	2.06	0.90	32.24	20.03	0.61
2600.00	17.13	30.45	13.80	9.85	2.07	0.90	32.38	19.77	0.58
2700.00	16.79	30.27	13.52	9.46	2.08	0.89	32.37	19.69	0.65
2800.00	16.44	30.16	13.32	9.15	2.11	0.89	32.41	19.28	0.69
2900.00	16.10	30.01	13.12	8.82	2.12	0.88	32.50	19.20	0.76
3000.00	15.77	29.82	12.94	8.54	2.12	0.88	32.32	19.02	0.70
3100.00	15.44	29.70	12.82	8.27	2.15	0.87	32.14	19.15	0.78
3200.00	15.13	29.55	12.69	8.02	2.15	0.87	31.89	19.01	0.78
3300.00	14.83	29.37	12.58	7.80	2.15	0.86	32.54	18.19	0.83
3400.00	14.54	29.15	12.53	7.58	2.14	0.85	32.44	18.25	0.85
3500.00	14.25	28.88	12.45	7.39	2.13	0.85	31.99	18.12	0.92
3600.00	13.97	28.71	12.43	7.21	2.13	0.84	31.89	18.04	0.96
3700.00	13.69	28.47	12.45	7.09	2.12	0.84	32.11	17.78	1.00
3800.00	13.44	28.30	12.45	6.92	2.12	0.83	32.01	17.72	1.08
3900.00	13.18	28.04	12.49	6.80	2.10	0.82	32.02	16.83	1.07
4000.00	12.93	27.80	12.54	6.70	2.09	0.82	32.19	16.76	1.11
4100.00	12.67	27.58	12.64	6.59	2.09	0.81	31.66	16.27	1.21
4200.00	12.44	27.37	12.72	6.50	2.08	0.81	31.48	15.87	1.29
4300.00	12.19	27.20	12.84	6.46	2.10	0.80	31.59	15.74	1.22

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.25V, Id = 53.90 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)
400.00	12.78	52.14	0.72	1.72	3.09	0.59	20.30	8.65	2.35
500.00	19.31	43.90	1.17	1.89	1.42	0.54	24.23	12.52	1.26
600.00	22.19	39.60	2.17	2.88	1.33	0.61	25.82	14.30	1.05
700.00	23.65	37.01	3.84	4.24	1.35	0.66	26.95	15.45	0.69
800.00	24.20	35.24	6.12	5.85	1.39	0.70	28.12	16.40	0.63
900.00	24.27	34.33	8.72	7.34	1.44	0.73	29.53	17.42	0.60
1000.00	24.02	33.69	11.43	8.61	1.48	0.75	30.08	18.08	0.45
1100.00	23.63	33.26	14.13	9.69	1.53	0.78	30.96	18.45	0.48
1200.00	23.19	33.05	16.58	10.55	1.59	0.80	31.48	18.65	0.42
1300.00	22.72	32.73	18.48	11.22	1.63	0.82	32.04	18.84	0.40
1400.00	22.26	32.59	19.50	11.74	1.69	0.84	32.12	18.94	0.43
1500.00	21.81	32.35	19.73	12.13	1.73	0.85	32.42	19.32	0.41
1600.00	21.36	32.10	19.38	12.34	1.76	0.86	32.26	19.29	0.42
1700.00	20.92	31.99	18.77	12.43	1.81	0.87	32.65	19.16	0.42
1800.00	20.49	31.84	18.15	12.40	1.86	0.88	32.18	18.79	0.45
1900.00	20.07	31.60	17.52	12.22	1.88	0.88	32.37	19.41	0.47
2000.00	19.65	31.51	16.92	12.00	1.93	0.89	32.47	19.75	0.48
2100.00	19.23	31.33	16.39	11.67	1.95	0.89	32.66	19.86	0.46
2200.00	18.84	31.19	15.93	11.34	1.98	0.90	32.87	20.10	0.52
2300.00	18.46	31.01	15.46	10.96	2.01	0.89	32.61	19.69	0.57
2400.00	18.06	30.90	15.09	10.58	2.04	0.89	32.40	19.36	0.60
2500.00	17.68	30.72	14.73	10.19	2.06	0.89	32.59	19.98	0.59
2600.00	17.31	30.57	14.42	9.84	2.08	0.89	32.24	19.71	0.58
2700.00	16.96	30.35	14.10	9.46	2.08	0.88	32.78	19.87	0.64
2800.00	16.61	30.27	13.86	9.13	2.11	0.88	32.57	19.21	0.68
2900.00	16.27	30.14	13.62	8.81	2.13	0.88	32.47	19.21	0.73
3000.00	15.94	29.97	13.42	8.52	2.13	0.87	32.65	19.23	0.67
3100.00	15.61	29.74	13.25	8.26	2.13	0.86	32.56	19.43	0.79
3200.00	15.30	29.66	13.10	8.01	2.15	0.86	32.58	19.59	0.77
3300.00	14.99	29.40	12.95	7.79	2.14	0.85	32.32	18.15	0.84
3400.00	14.70	29.23	12.87	7.57	2.14	0.85	32.55	18.68	0.84
3500.00	14.41	29.08	12.78	7.38	2.15	0.84	32.29	18.61	0.90
3600.00	14.13	28.81	12.73	7.20	2.13	0.83	32.50	18.65	0.96
3700.00	13.85	28.57	12.73	7.08	2.12	0.83	32.57	18.38	1.01
3800.00	13.60	28.40	12.71	6.91	2.12	0.82	32.58	18.18	1.07
3900.00	13.34	28.22	12.74	6.80	2.12	0.82	32.18	17.57	1.09
4000.00	13.08	27.96	12.79	6.68	2.10	0.81	32.36	17.35	1.13
4100.00	12.83	27.74	12.86	6.58	2.10	0.81	32.28	17.74	1.21
4200.00	12.59	27.49	12.93	6.49	2.08	0.80	32.10	17.07	1.30
4300.00	12.34	27.35	13.03	6.45	2.10	0.80	32.26	16.67	1.21



## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5V, Id = 55.39 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)
400.00	13.25	52.83	0.63	1.46	2.62	0.52	20.30	8.83	1.81
500.00	20.03	44.01	1.08	1.76	1.31	0.50	24.77	13.25	0.86
600.00	22.85	39.84	2.13	2.74	1.28	0.57	26.54	15.28	0.69
700.00	24.25	37.23	3.83	4.10	1.31	0.63	27.73	16.76	0.40
800.00	24.73	35.42	6.12	5.71	1.35	0.68	29.09	17.96	0.40
900.00	24.77	34.64	8.65	7.16	1.40	0.71	30.34	19.04	0.30
1000.00	24.51	34.02	11.22	8.31	1.44	0.74	31.43	19.81	0.25
1100.00	24.13	33.39	13.87	9.37	1.47	0.76	32.21	20.07	0.28
1200.00	23.70	33.13	16.34	10.23	1.52	0.78	32.38	20.13	0.24
1300.00	23.24	32.70	18.46	10.92	1.55	0.80	33.42	20.31	0.22
1400.00	22.79	32.45	20.37	11.48	1.59	0.81	34.32	20.40	0.23
1500.00	22.35	32.31	21.56	11.99	1.64	0.83	34.20	20.58	0.21
1600.00	21.92	31.94	21.48	12.34	1.65	0.84	34.70	20.54	0.24
1700.00	21.49	31.82	20.97	12.46	1.70	0.85	35.42	20.56	0.22
1800.00	21.07	31.68	20.43	12.38	1.74	0.86	35.37	20.34	0.25
1900.00	20.65	31.41	19.68	12.30	1.76	0.86	35.53	20.71	0.27
2000.00	20.25	31.31	18.87	12.19	1.80	0.87	35.03	21.01	0.28
2100.00	19.83	31.06	18.14	11.84	1.82	0.87	35.45	21.01	0.26
2200.00	19.44	31.02	17.51	11.45	1.86	0.87	36.14	21.07	0.29
2300.00	19.07	30.83	16.94	11.17	1.88	0.88	36.03	20.72	0.33
2400.00	18.69	30.64	16.40	10.87	1.90	0.88	35.76	20.56	0.39
2500.00	18.30	30.47	15.78	10.41	1.91	0.88	36.26	20.95	0.38
2600.00	17.91	30.32	15.24	9.95	1.93	0.87	35.91	20.73	0.36
2700.00	17.56	30.15	14.72	9.53	1.94	0.87	36.24	20.66	0.39
2800.00	17.22	30.01	14.38	9.19	1.95	0.86	36.30	20.29	0.39
2900.00	16.88	29.92	14.02	8.86	1.97	0.86	36.62	20.25	0.44
3000.00	16.54	29.65	13.71	8.55	1.96	0.85	36.40	20.17	0.38
3100.00	16.21	29.49	13.45	8.27	1.97	0.85	35.94	20.23	0.48
3200.00	15.91	29.35	13.23	8.02	1.97	0.84	36.39	20.14	0.50
3300.00	15.60	29.17	13.02	7.79	1.97	0.84	36.21	19.33	0.53
3400.00	15.30	28.94	12.80	7.53	1.96	0.83	36.64	19.60	0.52
3500.00	15.01	28.78	12.57	7.31	1.95	0.83	36.11	19.57	0.56
3600.00	14.73	28.60	12.44	7.14	1.95	0.82	36.26	19.53	0.58
3700.00	14.45	28.43	12.41	7.00	1.96	0.82	37.01	19.34	0.66
3800.00	14.20	28.14	12.34	6.79	1.92	0.81	36.52	18.97	0.67
3900.00	13.94	27.92	12.37	6.64	1.91	0.80	36.92	18.65	0.69
4000.00	13.71	27.60	12.43	6.56	1.89	0.80	36.62	18.51	0.73
4100.00	13.47	27.45	12.45	6.49	1.90	0.79	36.59	18.65	0.81
4200.00	13.25	27.21	12.48	6.42	1.88	0.79	36.02	18.30	0.85
4300.00	13.01	27.02	12.58	6.34	1.88	0.79	36.88	18.18	0.80

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 4.75V, Id = 51.29 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)
400.00	13.05	51.53	0.62	1.47	2.40	0.52	19.84	8.47	1.84
500.00	19.85	44.12	1.05	1.75	1.32	0.50	24.32	12.81	0.84
600.00	22.70	39.67	2.08	2.74	1.27	0.57	26.10	14.91	0.69
700.00	24.13	37.18	3.75	4.08	1.31	0.64	27.19	16.36	0.40
800.00	24.64	35.54	6.01	5.70	1.36	0.69	28.56	17.67	0.40
900.00	24.70	34.44	8.52	7.15	1.39	0.71	29.95	18.77	0.82
1000.00	24.44	33.87	11.07	8.31	1.44	0.74	30.90	19.53	0.24
1100.00	24.06	33.38	13.72	9.39	1.48	0.76	31.87	19.78	0.30
1200.00	23.63	33.08	16.13	10.26	1.53	0.78	32.04	19.86	0.25
1300.00	23.17	32.67	18.23	10.94	1.55	0.80	33.06	20.06	0.21
1400.00	22.72	32.46	20.04	11.52	1.60	0.82	33.66	20.17	0.23
1500.00	22.28	32.15	21.09	12.03	1.63	0.83	33.77	20.34	0.21
1600.00	21.85	31.96	20.91	12.37	1.67	0.84	34.23	20.34	0.24
1700.00	21.42	31.75	20.42	12.48	1.70	0.85	34.94	20.38	0.26
1800.00	21.00	31.55	19.87	12.42	1.73	0.86	35.06	20.19	0.24
1900.00	20.58	31.38	19.20	12.32	1.76	0.87	35.06	20.52	0.27
2000.00	20.17	31.27	18.43	12.23	1.81	0.87	34.92	20.80	0.28
2100.00	19.76	31.07	17.74	11.86	1.83	0.88	35.42	20.79	0.26
2200.00	19.37	30.88	17.19	11.48	1.85	0.88	35.69	20.88	0.28
2300.00	19.00	30.69	16.66	11.18	1.86	0.88	35.43	20.53	0.34
2400.00	18.62	30.59	16.13	10.89	1.90	0.88	35.55	20.42	0.38
2500.00	18.22	30.40	15.55	10.41	1.91	0.88	35.74	20.66	0.36
2600.00	17.84	30.30	15.03	9.96	1.94	0.88	35.26	20.45	0.34
2700.00	17.49	30.14	14.56	9.54	1.94	0.87	35.84	20.34	0.37
2800.00	17.14	30.02	14.22	9.20	1.96	0.87	35.94	20.03	0.43
2900.00	16.81	29.83	13.89	8.89	1.97	0.86	36.28	19.94	0.42
3000.00	16.47	29.68	13.59	8.56	1.97	0.86	35.77	19.83	0.37
3100.00	16.14	29.39	13.37	8.29	1.96	0.85	35.43	19.85	0.49
3200.00	15.84	29.35	13.16	8.03	1.98	0.85	35.42	19.76	0.50
3300.00	15.53	29.09	12.95	7.80	1.97	0.84	36.42	19.02	0.54
3400.00	15.23	28.99	12.74	7.54	1.98	0.84	36.00	19.23	0.50
3500.00	14.94	28.67	12.53	7.32	1.94	0.83	35.43	19.09	0.53
3600.00	14.66	28.56	12.41	7.14	1.96	0.82	36.52	19.15	0.61
3700.00	14.38	28.36	12.38	7.02	1.96	0.82	36.36	18.92	0.65
3800.00	14.13	28.13	12.33	6.80	1.93	0.81	36.28	18.62	0.70
3900.00	13.88	27.92	12.36	6.66	1.93	0.80	36.64	18.24	0.68
4000.00	13.64	27.60	12.42	6.57	1.90	0.80	37.04	18.01	0.72
4100.00	13.41	27.38	12.45	6.51	1.89	0.80	35.87	18.20	0.78
4200.00	13.18	27.19	12.48	6.43	1.89	0.79	36.20	17.87	0.83
4300.00	12.95	27.01	12.58	6.36	1.89	0.79	36.90	17.69	0.78

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.25V, Id = 60.32 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)
400.00	13.46	51.26	0.64	1.46	2.26	0.51	21.18	9.44	1.79
500.00	20.21	44.18	1.11	1.76	1.33	0.50	25.65	14.01	0.82
600.00	23.00	39.71	2.19	2.76	1.27	0.57	27.41	15.99	0.70
700.00	24.36	37.33	3.92	4.12	1.32	0.63	28.51	17.31	0.40
800.00	24.82	35.58	6.23	5.73	1.36	0.68	29.66	18.35	0.38
900.00	24.85	34.62	8.76	7.15	1.39	0.71	31.03	19.38	0.30
1000.00	24.58	33.94	11.32	8.30	1.43	0.73	32.06	20.00	0.23
1100.00	24.19	33.54	13.98	9.34	1.48	0.76	33.06	20.25	0.29
1200.00	23.76	33.20	16.45	10.20	1.52	0.78	32.99	20.29	0.22
1300.00	23.31	32.78	18.62	10.88	1.55	0.80	33.82	20.44	0.22
1400.00	22.86	32.53	20.66	11.46	1.59	0.81	34.65	20.47	0.24
1500.00	22.42	32.28	22.04	11.95	1.63	0.83	35.03	20.69	0.20
1600.00	21.99	32.14	22.01	12.30	1.67	0.84	34.83	20.62	0.25
1700.00	21.56	31.83	21.53	12.43	1.69	0.85	35.36	20.59	0.20
1800.00	21.15	31.59	20.93	12.35	1.72	0.85	35.79	20.32	0.25
1900.00	20.73	31.49	20.18	12.27	1.76	0.86	36.01	20.73	0.28
2000.00	20.32	31.34	19.35	12.19	1.80	0.87	35.76	21.05	0.25
2100.00	19.91	31.03	18.54	11.81	1.80	0.87	36.22	21.07	0.29
2200.00	19.52	31.03	17.88	11.44	1.85	0.87	36.09	21.16	0.28
2300.00	19.15	30.78	17.27	11.16	1.86	0.87	36.21	20.80	0.33
2400.00	18.77	30.70	16.70	10.85	1.90	0.87	35.91	20.60	0.38
2500.00	18.38	30.50	16.03	10.38	1.91	0.87	36.91	21.07	0.34
2600.00	17.99	30.42	15.46	9.93	1.94	0.87	35.96	20.84	0.33
2700.00	17.64	30.21	14.89	9.51	1.94	0.86	36.52	20.83	0.38
2800.00	17.29	30.06	14.53	9.18	1.95	0.86	36.42	20.41	0.41
2900.00	16.95	29.84	14.15	8.85	1.95	0.86	36.26	20.49	0.43
3000.00	16.62	29.72	13.81	8.54	1.96	0.85	36.21	20.39	0.35
3100.00	16.29	29.55	13.56	8.26	1.97	0.85	36.18	20.54	0.48
3200.00	15.98	29.38	13.32	8.01	1.97	0.84	36.65	20.54	0.50
3300.00	15.68	29.19	13.09	7.78	1.96	0.84	36.45	19.56	0.54
3400.00	15.37	28.98	12.86	7.51	1.95	0.83	36.54	19.88	0.54
3500.00	15.08	28.81	12.62	7.29	1.95	0.82	36.11	19.89	0.56
3600.00	14.80	28.64	12.48	7.12	1.95	0.82	36.55	19.92	0.60
3700.00	14.52	28.45	12.43	6.98	1.95	0.81	36.71	19.72	0.65
3800.00	14.27	28.20	12.36	6.77	1.92	0.81	36.13	19.40	0.67
3900.00	14.01	27.93	12.37	6.63	1.90	0.80	36.69	19.04	0.69
4000.00	13.78	27.70	12.42	6.54	1.90	0.79	36.92	18.90	0.73
4100.00	13.54	27.46	12.45	6.48	1.89	0.79	36.42	19.16	0.83
4200.00	13.31	27.28	12.47	6.40	1.88	0.79	36.75	18.75	0.83
4300.00	13.08	27.08	12.57	6.33	1.88	0.78	36.43	18.44	0.80

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5V, Id = 45.81 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)
400.00	11.92	50.84	0.76	1.89	3.22	0.63	19.22	7.51	2.82
500.00	18.35	43.33	1.16	1.98	1.45	0.57	22.57	10.90	1.63
600.00	21.34	39.33	2.06	2.95	1.35	0.64	23.89	12.56	1.27
700.00	22.93	36.50	3.61	4.30	1.35	0.69	24.90	13.67	0.92
800.00	23.60	34.94	5.77	5.92	1.40	0.73	26.03	14.72	0.79
900.00	23.72	33.96	8.22	7.42	1.45	0.75	27.18	15.80	0.83
1000.00	23.49	33.40	10.73	8.73	1.51	0.77	27.67	16.55	0.61
1100.00	23.12	32.98	13.08	9.82	1.56	0.79	28.44	16.90	0.64
1200.00	22.67	32.80	15.01	10.64	1.63	0.81	28.70	17.26	0.59
1300.00	22.20	32.64	16.28	11.27	1.69	0.83	28.90	17.39	0.55
1400.00	21.74	32.45	16.84	11.74	1.74	0.85	28.94	17.66	0.56
1500.00	21.27	32.18	16.88	12.06	1.78	0.86	29.28	18.14	0.56
1600.00	20.82	32.11	16.63	12.24	1.84	0.88	29.18	17.91	0.61
1700.00	20.37	32.00	16.26	12.28	1.89	0.89	29.21	17.95	0.59
1800.00	19.94	31.91	15.87	12.21	1.95	0.90	28.89	17.55	0.61
1900.00	19.51	31.67	15.44	12.07	1.97	0.90	29.09	18.31	0.66
2000.00	19.10	31.50	15.05	11.84	2.00	0.91	29.32	18.69	0.65
2100.00	18.68	31.41	14.71	11.53	2.05	0.91	29.39	18.72	0.70
2200.00	18.29	31.26	14.41	11.22	2.08	0.91	29.63	19.20	0.72
2300.00	17.90	31.14	14.08	10.86	2.12	0.91	29.36	18.64	0.75
2400.00	17.51	31.04	13.83	10.50	2.16	0.91	29.16	18.06	0.80
2500.00	17.12	30.91	13.58	10.12	2.19	0.91	29.32	18.66	0.81
2600.00	16.75	30.79	13.40	9.79	2.22	0.91	29.20	18.57	0.80
2700.00	16.41	30.61	13.17	9.43	2.23	0.90	29.58	18.61	0.86
2800.00	16.06	30.49	13.03	9.12	2.25	0.90	29.22	17.93	0.91
2900.00	15.72	30.33	12.87	8.84	2.27	0.89	29.25	17.71	0.97
3000.00	15.39	30.13	12.75	8.57	2.27	0.89	29.30	17.51	0.91
3100.00	15.06	30.01	12.64	8.32	2.30	0.88	29.47	17.89	1.02
3200.00	14.75	29.81	12.57	8.07	2.30	0.88	29.23	17.72	1.04
3300.00	14.44	29.58	12.50	7.85	2.29	0.87	29.10	16.79	1.09
3400.00	14.15	29.34	12.50	7.65	2.28	0.86	29.22	17.15	1.14
3500.00	13.86	29.20	12.45	7.47	2.29	0.86	29.00	16.74	1.17
3600.00	13.58	28.97	12.46	7.29	2.28	0.85	29.18	16.62	1.26
3700.00	13.30	28.79	12.51	7.16	2.29	0.84	29.28	16.39	1.30
3800.00	13.04	28.52	12.54	7.02	2.27	0.84	29.25	15.88	1.43
3900.00	12.77	28.27	12.63	6.90	2.26	0.83	28.94	15.56	1.43
4000.00	12.52	28.04	12.71	6.78	2.25	0.83	29.07	15.42	1.48
4100.00	12.25	27.89	12.85	6.71	2.27	0.82	28.95	15.55	1.58
4200.00	12.01	27.59	12.93	6.59	2.24	0.82	28.85	15.13	1.61
4300.00	11.75	27.53	13.11	6.56	2.29	0.81	28.93	14.93	1.57

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 4.75V, Id = 41.70mA @ 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)
400.00	11.59	51.19	0.75	1.89	3.40	0.63	18.72	6.88	2.85
500.00	18.06	43.43	1.12	1.96	1.46	0.57	22.04	10.18	1.62
600.00	21.08	38.96	1.97	2.90	1.32	0.64	23.38	11.96	1.28
700.00	22.73	36.36	3.46	4.25	1.34	0.69	24.45	13.29	0.93
800.00	23.45	34.78	5.55	5.85	1.39	0.73	25.71	14.49	0.82
900.00	23.59	33.75	7.94	7.37	1.43	0.74	26.98	15.62	0.67
1000.00	23.39	33.16	10.38	8.69	1.48	0.77	27.65	16.52	0.63
1100.00	23.02	32.83	12.64	9.79	1.55	0.79	28.52	17.01	0.65
1200.00	22.58	32.63	14.45	10.62	1.61	0.81	29.10	17.47	0.58
1300.00	22.11	32.42	15.61	11.24	1.67	0.83	29.43	17.77	0.56
1400.00	21.65	32.30	16.12	11.70	1.73	0.85	29.60	18.04	0.58
1500.00	21.18	32.03	16.14	12.04	1.76	0.87	29.95	18.34	0.56
1600.00	20.73	32.03	15.93	12.19	1.83	0.88	29.93	18.35	0.61
1700.00	20.27	31.96	15.62	12.23	1.90	0.89	30.18	18.39	0.60
1800.00	19.85	31.67	15.22	12.16	1.91	0.90	30.01	17.93	0.62
1900.00	19.42	31.53	14.85	12.01	1.95	0.91	30.04	18.72	0.66
2000.00	19.00	31.49	14.50	11.77	2.01	0.91	30.08	19.05	0.66
2100.00	18.58	31.31	14.21	11.47	2.04	0.92	30.05	19.04	0.70
2200.00	18.19	31.23	13.91	11.16	2.09	0.92	30.28	19.27	0.71
2300.00	17.80	31.12	13.64	10.79	2.12	0.92	30.15	18.70	0.76
2400.00	17.41	30.92	13.40	10.43	2.14	0.92	30.09	18.44	0.81
2500.00	17.03	30.81	13.17	10.06	2.17	0.91	29.84	18.94	0.82
2600.00	16.65	30.70	13.02	9.73	2.21	0.91	29.96	18.62	0.84
2700.00	16.31	30.45	12.83	9.38	2.20	0.91	30.10	18.90	0.87
2800.00	15.96	30.43	12.69	9.06	2.25	0.90	30.04	17.95	0.91
2900.00	15.62	30.28	12.54	8.78	2.27	0.90	29.94	18.34	0.99
3000.00	15.29	30.10	12.43	8.51	2.27	0.89	29.95	17.91	0.89
3100.00	14.96	29.90	12.36	8.26	2.28	0.89	29.91	17.82	1.03
3200.00	14.65	29.77	12.30	8.02	2.30	0.88	29.68	17.67	1.06
3300.00	14.34	29.46	12.25	7.81	2.27	0.87	29.74	16.98	1.11
3400.00	14.05	29.32	12.25	7.61	2.28	0.87	29.77	17.07	1.14
3500.00	13.76	29.09	12.22	7.43	2.27	0.86	29.50	16.87	1.19
3600.00	13.49	28.83	12.26	7.26	2.26	0.85	29.58	16.54	1.27
3700.00	13.20	28.68	12.30	7.13	2.28	0.85	29.62	16.26	1.29
3800.00	12.95	28.47	12.35	6.97	2.27	0.84	29.60	15.74	1.40
3900.00	12.68	28.24	12.45	6.86	2.26	0.83	29.38	15.29	1.42
4000.00	12.42	27.92	12.55	6.75	2.23	0.83	29.50	15.21	1.49
4100.00	12.15	27.78	12.69	6.67	2.26	0.82	29.19	15.11	1.57
4200.00	11.91	27.51	12.77	6.56	2.24	0.82	28.92	14.77	1.61
4300.00	11.65	27.40	12.92	6.52	2.27	0.81	29.00	14.44	1.63

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

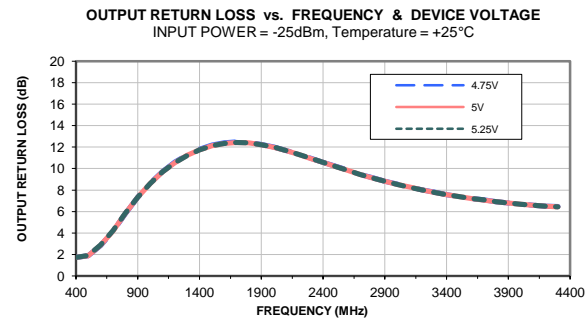
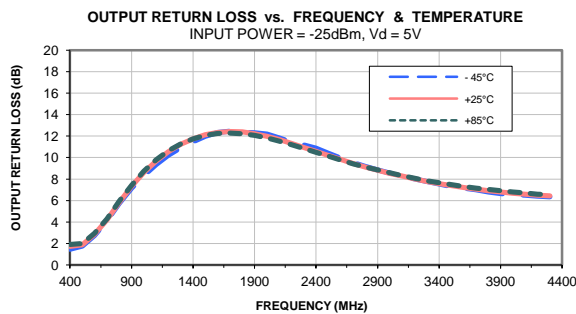
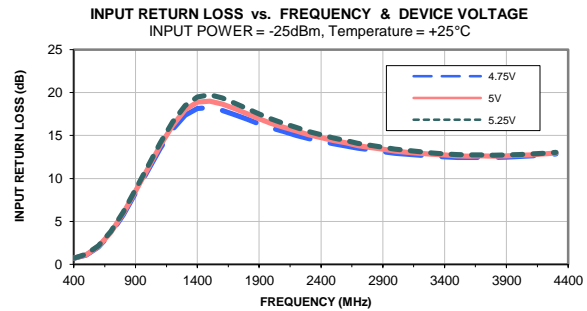
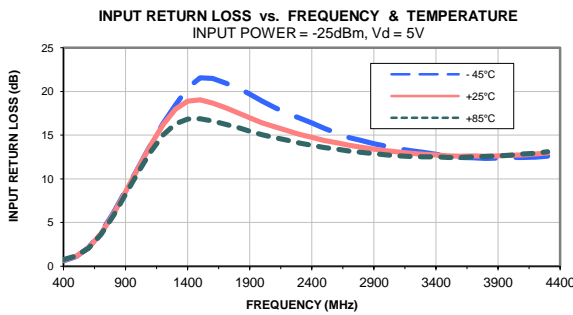
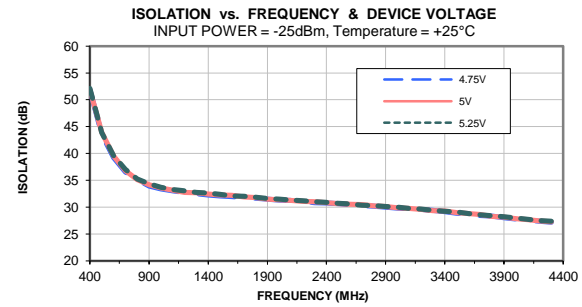
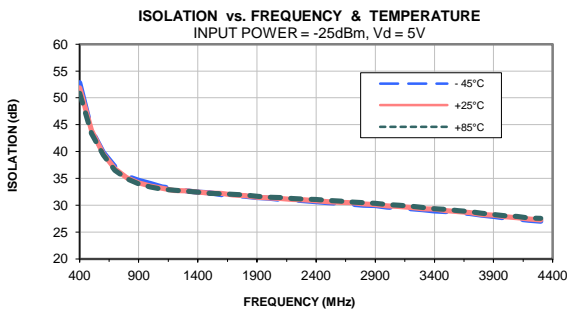
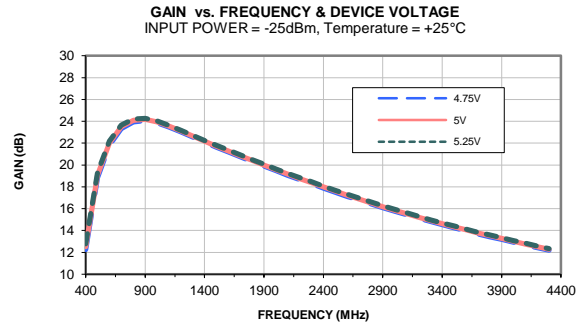
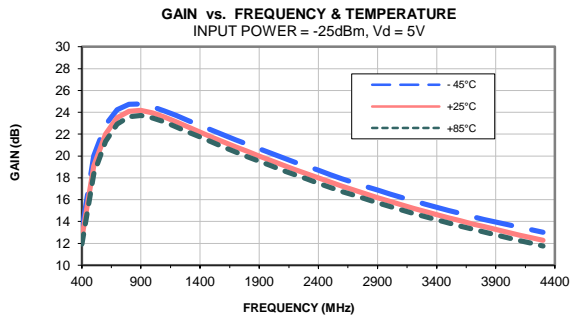
Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

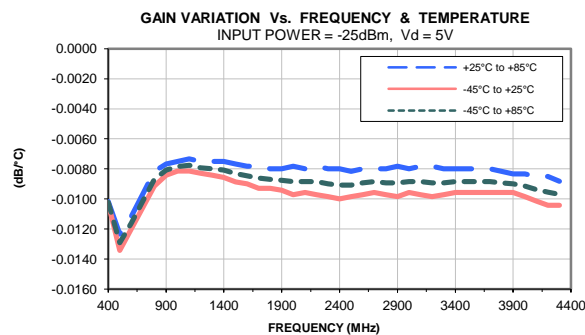
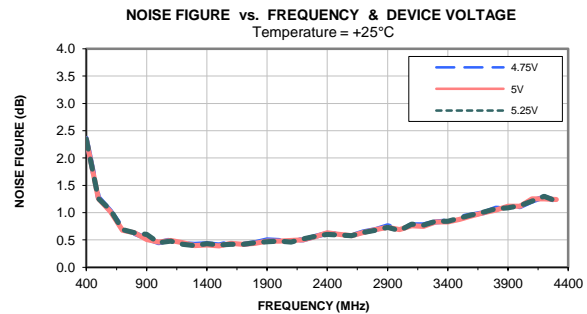
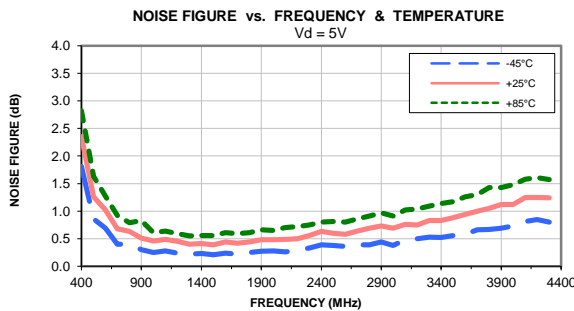
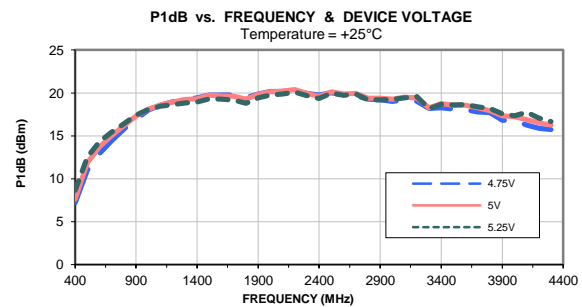
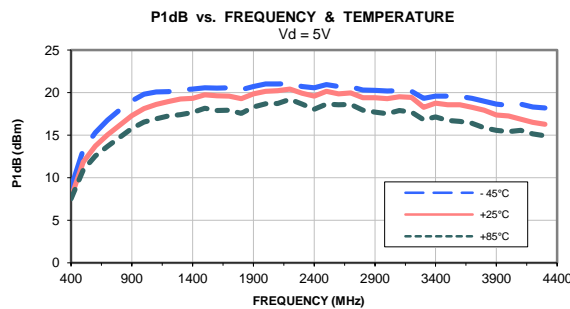
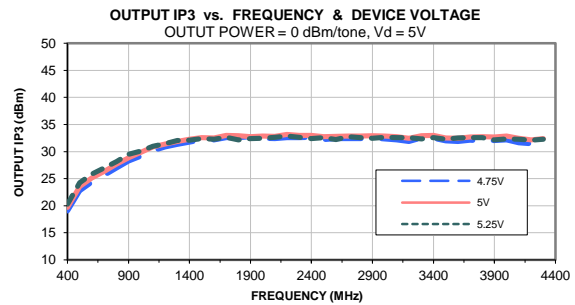
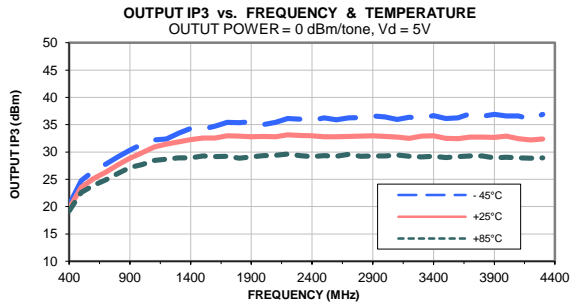
TEST CONDITIONS: Vd = 5.25V, Id = 50.03 mA @ Temperature = +85degC

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)
400.00	12.20	51.15	0.77	1.91	3.29	0.64	19.71	7.90	2.78
500.00	18.59	43.95	1.19	2.02	1.53	0.58	23.05	11.39	1.63
600.00	21.53	39.45	2.14	3.01	1.38	0.65	24.16	12.90	1.28
700.00	23.07	36.73	3.74	4.40	1.38	0.70	24.92	13.87	0.92
800.00	23.70	35.10	5.95	6.03	1.43	0.73	25.78	14.78	0.81
900.00	23.79	34.10	8.46	7.53	1.47	0.75	26.79	15.79	0.74
1000.00	23.55	33.60	11.02	8.83	1.53	0.78	26.83	16.23	0.61
1100.00	23.17	33.30	13.45	9.92	1.60	0.80	27.43	16.58	0.65
1200.00	22.72	33.00	15.48	10.75	1.65	0.82	27.54	16.79	0.58
1300.00	22.25	32.86	16.85	11.39	1.72	0.84	27.64	17.15	0.57
1400.00	21.79	32.61	17.47	11.87	1.77	0.85	27.53	16.93	0.56
1500.00	21.33	32.35	17.50	12.21	1.80	0.87	27.87	17.45	0.56
1600.00	20.87	32.20	17.25	12.39	1.86	0.88	27.69	17.34	0.64
1700.00	20.42	32.09	16.86	12.47	1.91	0.89	27.57	17.29	0.59
1800.00	19.99	31.92	16.41	12.42	1.95	0.90	27.28	16.79	0.60
1900.00	19.57	31.91	15.97	12.24	2.02	0.90	27.62	17.50	0.65
2000.00	19.15	31.62	15.52	12.03	2.03	0.91	27.90	18.10	0.65
2100.00	18.73	31.58	15.18	11.72	2.09	0.91	27.96	17.90	0.69
2200.00	18.34	31.39	14.81	11.40	2.12	0.91	28.36	18.38	0.70
2300.00	17.95	31.34	14.48	11.03	2.17	0.91	27.78	17.83	0.74
2400.00	17.56	31.08	14.20	10.66	2.17	0.91	27.68	17.50	0.81
2500.00	17.18	31.05	13.93	10.27	2.22	0.91	27.96	18.15	0.81
2600.00	16.81	30.90	13.73	9.93	2.25	0.91	27.82	17.81	0.81
2700.00	16.46	30.72	13.48	9.56	2.26	0.90	28.28	18.16	0.86
2800.00	16.12	30.52	13.32	9.26	2.27	0.90	27.93	17.10	0.89
2900.00	15.78	30.37	13.14	8.96	2.29	0.89	27.89	17.58	0.94
3000.00	15.44	30.22	12.99	8.69	2.30	0.89	27.76	17.37	0.90
3100.00	15.11	30.05	12.88	8.43	2.32	0.88	28.25	17.83	1.02
3200.00	14.80	29.90	12.80	8.17	2.33	0.88	27.90	17.67	1.03
3300.00	14.50	29.68	12.70	7.97	2.32	0.87	27.53	16.52	1.09
3400.00	14.21	29.52	12.68	7.75	2.33	0.86	27.91	16.70	1.13
3500.00	13.92	29.32	12.63	7.56	2.33	0.86	27.64	16.61	1.19
3600.00	13.64	29.07	12.63	7.40	2.32	0.85	27.97	16.67	1.22
3700.00	13.35	28.78	12.67	7.26	2.30	0.85	28.01	16.43	1.30
3800.00	13.10	28.63	12.69	7.10	2.30	0.84	27.97	15.89	1.41
3900.00	12.83	28.34	12.78	6.99	2.28	0.83	27.51	15.72	1.38
4000.00	12.57	28.11	12.86	6.86	2.27	0.83	27.73	15.49	1.47
4100.00	12.30	27.98	12.98	6.78	2.30	0.82	27.83	15.82	1.55
4200.00	12.06	27.69	13.06	6.67	2.27	0.82	27.77	15.33	1.62
4300.00	11.80	27.65	13.22	6.62	2.33	0.81	27.68	15.05	1.59

## Typical Performance Curves



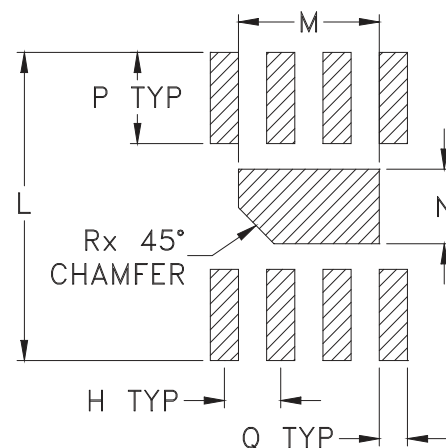
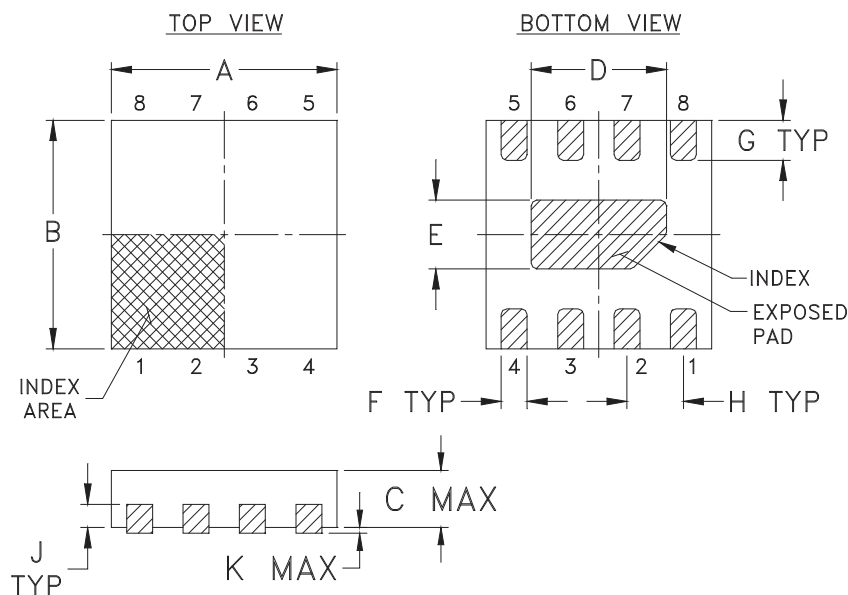
## Typical Performance Curves





### Outline Dimensions

### PCB Land Pattern



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

SE #.	A	B	C	D	E	F	G	H	J	K	L	M	N	P
MC1631-1	.079 (2.00)	.079 (2.00)	.039 (1.00)	.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
MC1631-1	.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: Tin-Silver over Nickel plated or Matte-Tin Plated (See Data sheet).  
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



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F66



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
8	4	7	Small quantity standard	20
				50
				100
				200
				500
		7	Standard	1000, 2000, 3000

Note: Please consult individual model 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](http://www.minicircuits.com/pages/pdfs/tape.pdf)

**Mini-Circuits®**

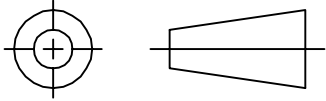
INTERNET <http://www.minicircuits.com>

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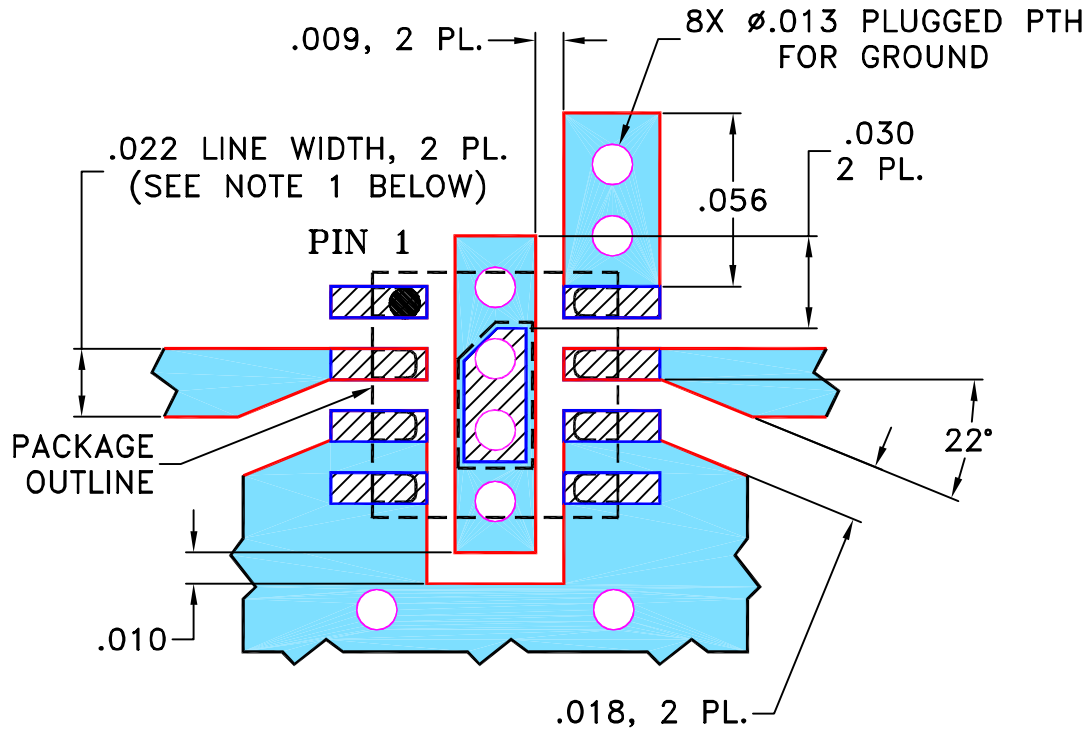
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M143800	NEW RELEASE	11/11/13	AV	RS

SUGGESTED MOUNTING CONFIGURATION FOR MC1631-1 CASE STYLE, "08AM11" 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. 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	10/21/13
TOLERANCES ON:	CHECKED IL	11/07/13
2 PL DECIMALS ±	APPROVED RS	11/11/13
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		



Mini-Circuits®

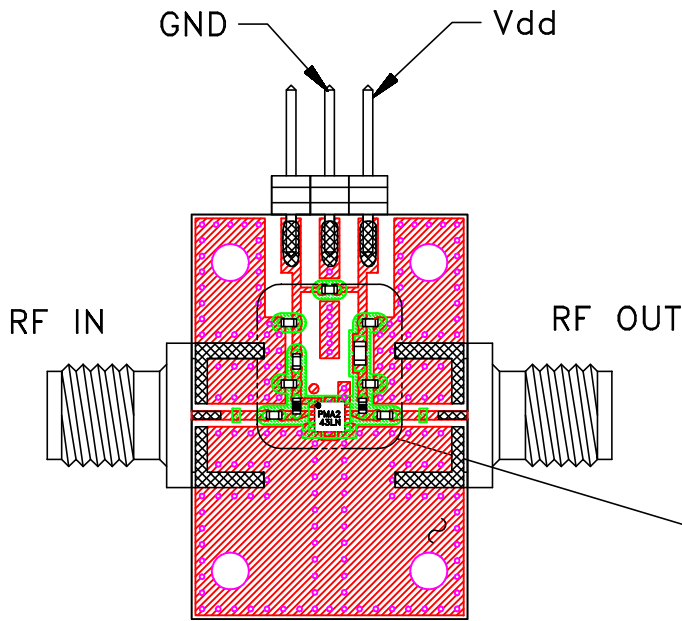
13 Neptune Avenue  
Brooklyn NY 11235

PL, 08AM11, MC1631-1, TB-736+

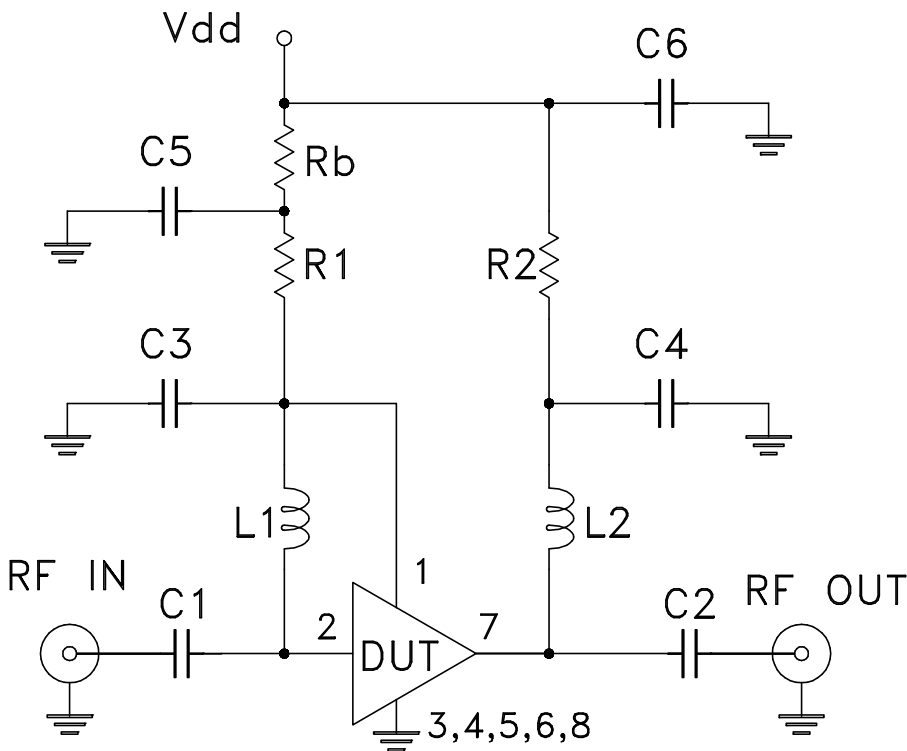
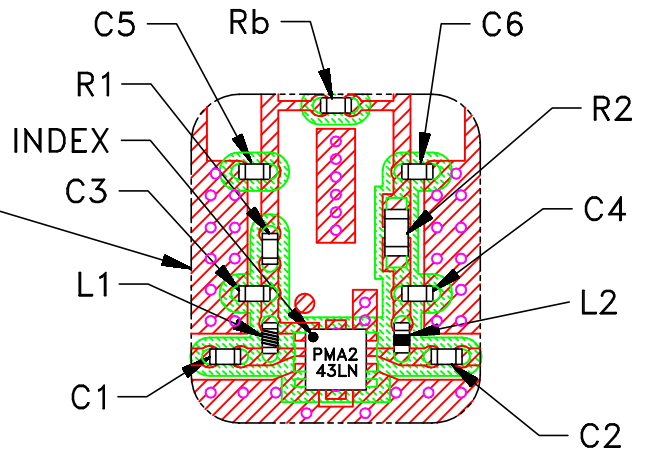
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SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-400	OR
FILE:	98PL400	SCALE: 16:1	SHEET: 1 OF 1

# Evaluation Board and Circuit



TB-805+

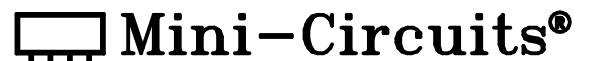


Schematic Diagram

ITEM	DESCRIPTION	SIZE
C1,C2	CAP, 1000 pF	0402
C5,C6	CAP, 4.7 uF	0402
C3,C4	CAP, 100 pF	0402
L1	IND, 10 nH	0402
L2	IND, 8.2 nH	0402
R1	RES, 49.9 Ohm	0402
R2	RES, 0 Ohm	0603
Rb	RES,5.11kOhm	0402
DUT	PMA2-43LN+	-

**NOTES:**

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



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

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85° C or -45° to 85° C or -55° to 105° C or -40° to 105° C or -40° to 95° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C or -65° to 150° Ambient Environment	Individual Model Data Sheet
HTOL	1000 hours at 125°C	MIL-STD-883, Method 1005, Condition B
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Mechanical Shock	1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only	MIL-STD-883, Method 2002, Condition B, except Y1 direction only
Vibration (Variable Frequency)	50g peak	MIL-STD-883, Method 2007, Condition B
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102, Condition C
HAST	130°C, 85% RH, 96 hours	JESD22-A110
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Solder Reflow Heat	Sn-Pb Eutetic Process: 240°C peak Pb-Free Process: 260°C peak	J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1
Moisture Sensitivity: Level 1	Bake at 125°C for 24 hours Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 260°C peak	J-STD-020

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

<b>Specification</b>	<b>Test/Inspection Condition</b>	<b>Reference/Spec</b>
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215