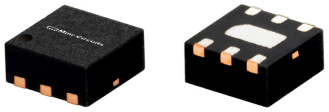
ULTRA LOW NOISE, LOW CURRENT, SHUTDOWN

Monolithic Amplifier PMA2-133LN+

50Ω 10 to 13 GHz

THE BIG DEAL

- Ultra-Low noise figure, 1.3 dB at 11 GHz
- Low current, 13 mA at +3V, 29 mA typ. at +5V
- Excellent ESD protection Class 1C
- Small size, 2 x 2 x 1 mm
- Shutdown feature



Generic photo used for illustration purposes only

CASE STYLE: MC1630-1

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

APPLICATIONS

- Satellite communication
- Military Radar
- VSAT
- Point to Point
- Radio Astronomy

PRODUCT OVERVIEW

Mini-Circuits' PMA2-133LN+ is an E-PHEMT* based, ultra-low noise MMIC amplifier. The model offers a unique combination of low current consumption, low noise and high IP3, making it an ideal for sensitive, high-dynamic-range receiver applications. This design operates at both +3V & +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, 1.3 dB at 11 GHz	Enables lower system noise figure performance.
High IP3, +28.6 dBm typ. at 11 GHz	The combination of low noise and high IP3 makes the PMA2-133LN+ ideal for use in low noise receiver front end (RFE) as it gives the user the advantages of sensitivity and two-tone IM performance at both ends of the dynamic range.
Support Low operating voltage, +3V & +5V	Usable in battery operated systems.
Low current consumption, 13 mA at +3V 29 mA at +5V	Enables prolonged battery life.
Shutdown feature (Ven=0V, V_{DD}= +3/+5V)	Saves DC power consumption when it is not reguired.
Separate pads for V_{DD} and RF-OUT	Built-in RF-choke separates V_{DD} and RF-OUT ports, minimizing external components, cost and saving PCB space.
Excellent ESD protection, Class 1C	Robust ESD performance eliminates the need for external ESD protection circuits, saving PCB space, minimizing noise figure degradation, and reducing cost.
2 x 2mm, 6-lead MCLP package	Tiny footprint saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB.

*Enhancement mode Pseudomorphic High Electron Mobility Transistor

REV. B
ECO-023457
PMA2-133LN+
MCL NY
241107

ELECTRICAL SPECIFICATIONS[1] AT 25°C, +3V & +5V, AND 50 OHMS UNLESS NOTED OTHERWISE

Parameter	Condition (GHz)	+3V Min.	+3V Typ.	+3V Max.	+5V Typ.	Units
Frequency Range		10		13		GHz
Noise Figure	10.0		1.4		1.5	dB
	10.7		1.4		1.3	
	11.0		1.4		1.3	
	12.0		1.5		1.4	
	13.0		1.6		1.5	
Gain	10.0	—	14.1	—	15.3	dB
	10.7	—	14.1	—	15.3	
	11.0	—	14.1	—	15.3	
	12.0	11.1	14.1	15.3	15.6	
	13.0	—	14.0	—	15.8	
Reverse Isolation	11.0		22.7		23.3	dB
Input Return Loss	10.0		13		16	dB
	10.7		14		17	
	11.0		14		17	
	12.0		17		21	
	13.0		27		24	
Output Return Loss	10.0		18		14	dB
	10.7		16		12	
	11.0		16		12	
	12.0		26		18	
	13.0		13		18	
Output Power at 1dB Compression	10.0		+8.4		+13.3	dBm
	10.7		+9.4		+14.4	
	11.0		+8.9		+13.5	
	12.0		+8.5		+13.1	
	13.0		+7.1		+11.5	
Output IP3 Pout=-10 dBm/tone	10.0		+23.4		+27.9	dBm
	10.7		+23.7		+29.3	
	11.0		+23.6		+28.6	
	12.0		+23.8		+28.8	
	13.0		+23.5		+28.9	
Device Operating Voltage (V_{DD})[3]			+3.0		+5.0	V
Device Operating Current (I_{DD})			13	21	29	mA
Device Current Variation vs. Temperature[2]			-10		-53	µA/°C
Device Current Variation vs. Voltage			0.0079		0.0076	mA/mV
Thermal Resistance, junction-to-ground lead			124		118	°C/W

1. Measured on Mini-Circuits Characterization test board TB-991+. See Characterization Test Circuit (Fig. 1)
2. (Current at 85°C - Current at -45°C)/130
3. V_{DD} is connected to Ven.

ABSOLUTE MAXIMUM RATINGS[4]

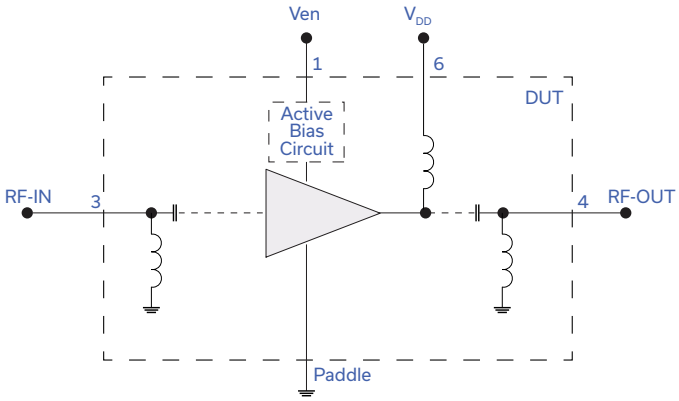
Parameter	Ratings
Operating Temperature (ground lead)	-40°C to +85°C
Storage Temperature	-65°C to +150°C
Total Power Dissipation	0.31 W
Input Power (CW)	+19 dBm (5minutes max) +10 dBm (continuous)
DC Voltage	+7.7 V

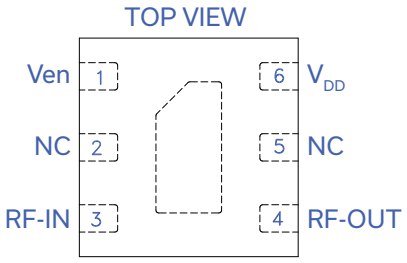
4. Permanent damage may occur if any of these limits are exceeded. Electrical maximum ratings are not intended for continuous normal operation.

Monolithic Amplifier PMA2-133LN+

50Ω 10 to 13 GHz

SIMPLIFIED SCHEMATIC & PAD DESCRIPTION





Function	Pad Number	Description
RF-IN	3	RF Input pad.
RF-OUT	4	RF Output pad.
V_{DD}	6	DC Supply pad, Connect to external DC power supply.
Ven	1	Gain or shutdown model enable voltage pad. Connect to V_{DD} for Gain mode operation. Connect to Ground to shutdown the amplifier.
GND	Paddle	Connections to Ground.
NC	2,5	Pads have no connections internally. Connect pads to Ground externally.

RECOMMENDED APPLICATION AND CHARACTERIZATION TEST CIRCUIT

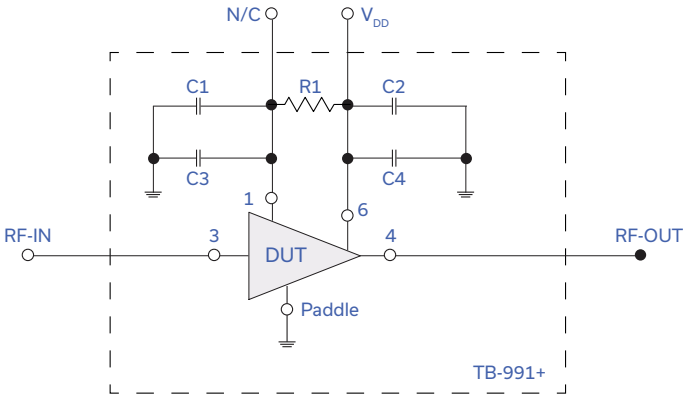


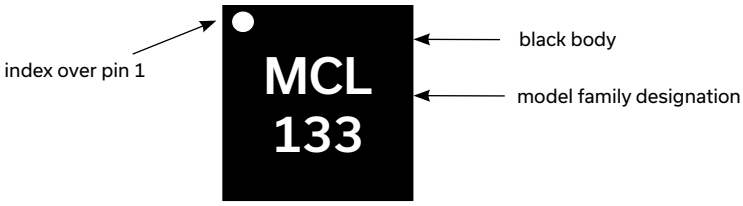
Fig 1. Application and Characterization Circuit
This block diagram is used for DUT characterization in Gain Mode operation. (DUT soldered on Mini-Circuits Characterization test board TB-991+).
Gain, Return loss, Output power at 1dB compression (P1dB), Output IP3 (OIP3) and noise figure measured using Agilent's N5242A PNA-X microwave network analyzer.

Conditions:
1. Gain and Return loss: P_{IN}= -25dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, -10 dBm/tone at output.

FOR GAIN MODE OPERATION:

Component	Size	Value	Manufacturer	P/N
C1, C2	0402	0.1uF	Murata	GRM155R71C104KA88D
C3, C4	0402	100pF	Murata	GRM1555C1H101J01D
R1	0402	0 ohms	KOA	RK73Z1JTTD

PRODUCT MARKING



Marking may contain other features or characters for internal lot control

Wideband Amplifier PMA2-133LN+

50Ω 10 to 13 GHz

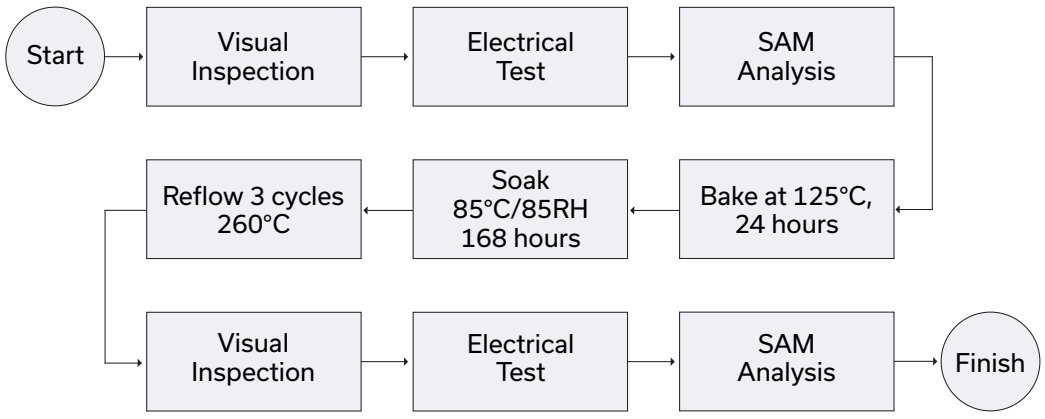
ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASHBOARD. CLICK HERE

Performance Data	Data Table Swept Graphs S-Parameter (S2P Files) Data Set (.zip file)
Case Style	MC1630-1 Plastic package, exposed paddle, lead finish: matte-tin
Tape & Reel **Standard quantities available on reel**	F66 7" reels with 20, 50, 100, 200, 500, 1K, 2K or 3K devices
Suggested Layout for PCB Design	PL-585
Evaluation Board	TB-991+
Environmental Ratings	ENV08T1

ESD RATING

Human Body Model (HBM): Class 1C (Pass 1000V) in accordance with ANSI/ESD STM 5.1 - 2001

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

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 = 3.00V, Id = 11.07mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
9000	12.50	26.26	9.87	8.30	2.08	0.85	22.17	6.49	1.30
9500	13.48	24.45	12.12	13.84	1.78	0.91	23.96	7.60	1.27
9600	13.56	24.26	12.56	14.76	1.75	0.91	24.40	7.77	1.26
9700	13.64	24.08	12.95	15.40	1.72	0.91	24.08	7.90	1.25
9800	13.70	23.89	13.31	15.68	1.69	0.90	24.06	8.39	1.30
9900	13.68	23.80	13.62	15.86	1.68	0.90	24.74	8.44	1.24
10000	13.71	23.66	13.86	15.71	1.65	0.89	24.31	8.03	1.30
10100	13.71	23.58	14.17	15.59	1.64	0.89	24.49	8.30	1.31
10200	13.70	23.52	14.38	15.25	1.64	0.88	24.44	8.53	1.25
10300	13.71	23.42	14.58	15.17	1.62	0.88	24.83	8.56	1.24
10400	13.71	23.37	14.82	15.11	1.61	0.88	24.63	8.75	1.26
10500	13.70	23.32	14.92	15.06	1.61	0.87	24.52	8.67	1.25
10600	13.69	23.28	15.06	15.09	1.60	0.87	24.92	8.46	1.30
10700	13.68	23.26	15.23	15.21	1.61	0.87	24.72	8.45	1.28
10800	13.68	23.27	15.33	15.39	1.61	0.87	24.54	8.62	1.30
10900	13.69	23.21	15.43	15.67	1.60	0.87	25.55	8.11	1.28
11000	13.69	23.19	15.56	16.01	1.60	0.88	25.35	8.03	1.23
11100	13.68	23.19	15.70	16.48	1.61	0.88	25.68	7.93	1.24
11200	13.68	23.20	15.86	17.07	1.61	0.88	25.32	8.20	1.24
11300	13.70	23.24	16.11	17.83	1.62	0.89	25.26	8.06	1.22
11400	13.69	23.23	16.46	18.91	1.63	0.89	25.09	8.03	1.28
11500	13.71	23.23	16.80	20.33	1.63	0.89	24.71	8.11	1.26
11600	13.72	23.26	17.11	22.09	1.64	0.90	24.83	7.61	1.30
11700	13.73	23.29	17.38	24.68	1.64	0.90	24.72	7.79	1.24
11800	13.72	23.30	17.62	27.68	1.65	0.90	23.89	7.75	1.26
11900	13.73	23.38	18.27	32.44	1.66	0.90	24.72	7.40	1.31
12000	13.74	23.46	18.67	33.15	1.67	0.91	24.15	7.62	1.29
12100	13.72	23.51	19.12	28.44	1.68	0.91	23.62	6.78	1.25
12200	13.71	23.62	19.75	24.76	1.70	0.91	23.61	6.86	1.20
12300	13.69	23.69	20.31	21.83	1.71	0.90	23.80	7.14	1.26
12400	13.68	23.81	21.06	19.62	1.73	0.90	23.07	6.54	1.23
12500	13.66	23.96	21.69	17.80	1.74	0.90	22.05	6.99	1.21
12600	13.62	24.09	22.53	16.15	1.76	0.90	22.02	6.93	1.25
12700	13.56	24.21	23.60	14.77	1.78	0.89	21.60	6.27	1.34
12800	13.50	24.40	24.79	13.60	1.81	0.88	20.58	5.94	1.33
12900	13.44	24.59	26.12	12.54	1.83	0.87	21.11	6.10	1.35
13000	13.38	24.81	27.65	11.62	1.86	0.87	20.57	5.81	1.35
13500	12.85	26.12	33.34	8.19	2.06	0.80	17.63	4.26	1.38
14000	12.01	27.93	23.17	5.72	2.35	0.71	15.12	2.87	1.47
14500	10.88	30.17	17.76	4.01	2.78	0.60	13.30	1.42	1.58
15000	9.42	32.42	14.54	2.87	3.29	0.50	12.21	0.23	1.69

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 = 2.70V, Id = 9.42mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
9000	12.19	25.97	9.36	8.51	2.08	0.87	20.48	5.43	1.34
9500	13.14	24.21	11.53	14.43	1.79	0.93	21.81	6.56	1.33
9600	13.22	24.03	11.93	15.48	1.77	0.93	22.23	6.72	1.31
9700	13.29	23.85	12.29	16.20	1.73	0.92	21.92	6.87	1.29
9800	13.35	23.67	12.63	16.63	1.70	0.92	22.09	7.33	1.35
9900	13.34	23.59	12.92	16.86	1.70	0.92	22.40	7.38	1.30
10000	13.36	23.45	13.13	16.72	1.67	0.91	22.04	6.99	1.36
10100	13.36	23.38	13.41	16.60	1.66	0.91	22.34	7.27	1.39
10200	13.34	23.34	13.60	16.21	1.66	0.90	22.33	7.49	1.34
10300	13.35	23.24	13.79	16.10	1.65	0.90	22.46	7.52	1.31
10400	13.35	23.19	13.97	16.08	1.64	0.89	22.21	7.69	1.34
10500	13.34	23.14	14.07	16.04	1.63	0.89	22.32	7.62	1.32
10600	13.33	23.11	14.21	16.09	1.63	0.89	22.23	7.44	1.35
10700	13.32	23.09	14.36	16.25	1.63	0.89	22.16	7.42	1.38
10800	13.31	23.11	14.47	16.48	1.64	0.89	22.14	7.57	1.35
10900	13.32	23.06	14.57	16.80	1.64	0.89	22.68	7.09	1.35
11000	13.31	23.04	14.67	17.23	1.64	0.89	22.52	7.01	1.29
11100	13.30	23.03	14.83	17.80	1.64	0.90	22.56	6.91	1.34
11200	13.30	23.05	14.96	18.51	1.65	0.90	22.32	7.17	1.30
11300	13.31	23.10	15.19	19.44	1.66	0.90	22.40	7.03	1.29
11400	13.30	23.09	15.47	20.77	1.66	0.91	22.14	6.99	1.31
11500	13.31	23.10	15.82	22.56	1.67	0.91	21.84	7.04	1.29
11600	13.31	23.14	16.10	24.83	1.68	0.91	21.64	6.57	1.35
11700	13.32	23.17	16.35	28.25	1.68	0.91	21.65	6.73	1.31
11800	13.30	23.19	16.55	31.13	1.69	0.92	20.96	6.68	1.29
11900	13.30	23.29	17.14	31.23	1.71	0.92	21.35	6.35	1.37
12000	13.30	23.36	17.50	27.57	1.72	0.92	20.90	6.54	1.38
12100	13.27	23.42	17.92	24.07	1.73	0.92	20.33	5.74	1.28
12200	13.26	23.54	18.48	21.56	1.75	0.92	20.25	5.79	1.29
12300	13.23	23.62	19.00	19.39	1.76	0.91	20.45	6.05	1.31
12400	13.20	23.75	19.62	17.66	1.78	0.91	19.81	5.47	1.27
12500	13.17	23.90	20.10	16.20	1.80	0.91	19.37	5.86	1.29
12600	13.12	24.03	20.81	14.82	1.81	0.90	19.29	5.79	1.34
12700	13.06	24.17	21.62	13.64	1.83	0.89	18.75	5.15	1.39
12800	12.98	24.36	22.47	12.63	1.86	0.89	17.92	4.81	1.39
12900	12.91	24.56	23.36	11.69	1.89	0.88	18.36	4.92	1.41
13000	12.85	24.77	24.18	10.87	1.92	0.87	17.92	4.62	1.46
13500	12.26	26.08	26.36	7.78	2.13	0.80	15.23	3.02	1.44
14000	11.38	27.83	21.69	5.50	2.42	0.71	12.97	1.58	1.55
14500	10.23	29.96	17.21	3.91	2.83	0.60	11.24	0.11	1.65
15000	8.77	32.00	14.22	2.83	3.31	0.50	10.21	-1.11	1.74

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 = 3.30V, Id = 12.73mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
9000	12.72	26.49	10.29	8.11	2.09	0.84	23.02	7.40	1.28
9500	13.74	24.62	12.62	13.34	1.77	0.90	25.32	8.51	1.21
9600	13.83	24.43	13.10	14.16	1.74	0.90	25.36	8.66	1.19
9700	13.91	24.23	13.49	14.69	1.70	0.89	25.85	8.79	1.17
9800	13.97	24.04	13.88	14.97	1.67	0.89	25.71	9.31	1.24
9900	13.96	23.95	14.27	15.13	1.66	0.89	25.91	9.35	1.19
10000	13.99	23.80	14.52	14.96	1.64	0.88	25.89	8.93	1.29
10100	14.00	23.72	14.86	14.85	1.62	0.87	26.05	9.20	1.29
10200	13.98	23.67	15.08	14.51	1.62	0.87	26.11	9.47	1.23
10300	13.99	23.56	15.31	14.40	1.60	0.86	26.58	9.48	1.19
10400	13.99	23.51	15.55	14.36	1.59	0.86	26.64	9.66	1.24
10500	13.98	23.45	15.66	14.30	1.58	0.86	26.72	9.58	1.22
10600	13.98	23.41	15.83	14.30	1.58	0.86	26.93	9.36	1.25
10700	13.97	23.38	15.98	14.41	1.58	0.86	27.03	9.35	1.23
10800	13.97	23.38	16.09	14.56	1.58	0.86	26.70	9.53	1.22
10900	13.98	23.33	16.22	14.77	1.58	0.86	27.42	9.01	1.22
11000	13.98	23.30	16.33	15.08	1.58	0.86	27.38	8.93	1.17
11100	13.98	23.29	16.49	15.50	1.58	0.86	27.67	8.82	1.20
11200	13.98	23.30	16.67	16.00	1.58	0.87	27.81	9.12	1.18
11300	14.01	23.34	16.86	16.63	1.59	0.87	27.42	8.96	1.18
11400	14.01	23.31	17.23	17.55	1.59	0.87	27.62	8.93	1.22
11500	14.02	23.32	17.61	18.72	1.60	0.88	27.42	9.03	1.19
11600	14.03	23.34	17.94	20.17	1.60	0.88	27.97	8.51	1.24
11700	14.05	23.36	18.17	22.22	1.61	0.89	27.40	8.69	1.21
11800	14.05	23.37	18.41	24.60	1.61	0.89	26.64	8.67	1.18
11900	14.06	23.45	19.12	28.42	1.63	0.89	28.31	8.32	1.26
12000	14.08	23.52	19.59	33.75	1.64	0.90	27.52	8.55	1.26
12100	14.07	23.56	20.07	34.29	1.64	0.90	27.60	7.67	1.16
12200	14.07	23.67	20.75	28.96	1.66	0.90	26.99	7.76	1.13
12300	14.07	23.72	21.29	24.62	1.67	0.90	27.32	8.07	1.25
12400	14.06	23.85	22.10	21.67	1.68	0.90	27.11	7.45	1.19
12500	14.04	23.98	22.86	19.42	1.70	0.89	25.00	7.96	1.16
12600	14.01	24.11	23.80	17.44	1.72	0.89	24.93	7.91	1.22
12700	13.97	24.23	25.03	15.83	1.73	0.89	24.78	7.23	1.29
12800	13.92	24.41	26.37	14.50	1.76	0.88	23.32	6.89	1.29
12900	13.87	24.59	27.94	13.31	1.78	0.87	24.01	7.10	1.28
13000	13.82	24.81	30.07	12.29	1.80	0.86	23.27	6.82	1.33
13500	13.33	26.13	35.82	8.55	1.99	0.81	19.83	5.30	1.31
14000	12.53	27.98	23.29	5.89	2.28	0.71	17.05	3.98	1.41
14500	11.41	30.34	17.92	4.08	2.71	0.60	15.12	2.54	1.50
15000	9.95	32.77	14.58	2.88	3.26	0.50	13.95	1.38	1.56

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 = 3.00V, Id = 12.11mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
9000	13.27	26.62	10.18	6.82	1.91	0.76	22.70	6.75	0.79
9500	14.45	24.51	13.06	11.69	1.63	0.84	24.91	7.99	0.75
9600	14.57	24.28	13.72	12.68	1.60	0.85	25.59	8.22	0.74
9700	14.67	24.07	14.43	13.48	1.57	0.85	25.72	8.48	0.69
9800	14.74	23.85	15.15	13.98	1.54	0.84	25.62	8.79	0.78
9900	14.75	23.73	15.91	14.42	1.53	0.84	26.93	9.03	0.73
10000	14.78	23.59	16.53	14.41	1.50	0.84	26.04	8.48	0.81
10100	14.78	23.47	17.20	14.46	1.49	0.83	27.09	9.00	0.79
10200	14.77	23.44	17.44	13.98	1.48	0.83	26.89	9.19	0.74
10300	14.75	23.35	17.62	13.65	1.47	0.82	27.12	9.08	0.73
10400	14.74	23.29	17.67	13.31	1.46	0.82	27.59	9.34	0.75
10500	14.71	23.26	17.56	13.00	1.45	0.81	27.51	9.30	0.75
10600	14.70	23.20	17.51	12.87	1.45	0.81	28.31	9.13	0.74
10700	14.68	23.18	17.46	12.89	1.45	0.81	28.39	9.33	0.73
10800	14.66	23.18	17.29	12.92	1.45	0.81	27.47	9.36	0.74
10900	14.67	23.14	16.94	12.93	1.44	0.81	29.47	8.82	0.77
11000	14.65	23.13	16.60	12.97	1.44	0.81	29.45	8.64	0.67
11100	14.65	23.11	16.48	13.18	1.44	0.81	28.42	8.39	0.72
11200	14.65	23.11	16.32	13.53	1.45	0.82	28.77	8.79	0.71
11300	14.67	23.15	16.21	14.04	1.45	0.82	27.71	8.46	0.69
11400	14.67	23.11	16.09	14.68	1.46	0.83	28.54	8.60	0.72
11500	14.71	23.11	16.51	15.47	1.46	0.83	29.79	8.77	0.73
11600	14.74	23.09	16.98	16.54	1.46	0.84	28.15	8.13	0.71
11700	14.77	23.10	17.31	17.91	1.47	0.84	29.03	8.31	0.69
11800	14.78	23.10	17.50	19.48	1.47	0.85	31.85	8.67	0.68
11900	14.81	23.16	18.40	21.96	1.48	0.86	30.49	8.03	0.78
12000	14.85	23.19	19.36	25.46	1.48	0.86	34.20	8.38	0.75
12100	14.85	23.23	20.38	31.03	1.49	0.86	32.82	7.68	0.67
12200	14.86	23.31	21.51	37.29	1.50	0.86	32.19	7.56	0.64
12300	14.87	23.36	23.01	29.46	1.51	0.86	29.70	7.55	0.71
12400	14.87	23.48	25.02	24.77	1.52	0.86	29.50	7.13	0.69
12500	14.87	23.58	26.98	21.55	1.53	0.86	30.01	8.05	0.64
12600	14.86	23.69	29.42	18.95	1.54	0.86	30.91	7.66	0.67
12700	14.83	23.82	31.18	16.88	1.56	0.85	27.05	7.04	0.76
12800	14.79	23.98	30.07	15.25	1.57	0.85	25.61	6.91	0.72
12900	14.75	24.15	28.11	13.97	1.59	0.84	26.45	7.01	0.71
13000	14.72	24.34	26.59	12.92	1.61	0.84	25.16	6.82	0.77
13500	14.39	25.52	22.36	9.25	1.74	0.79	21.40	5.48	0.74
14000	13.73	27.30	23.92	6.25	1.95	0.71	18.34	4.34	0.82
14500	12.57	29.88	20.17	3.95	2.26	0.58	15.56	2.66	0.92
15000	11.00	32.82	13.57	2.59	2.69	0.46	14.65	1.52	1.07

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 = 2.70V, Id = 10.27mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
9000	12.98	26.37	9.59	7.02	1.92	0.78	21.30	5.67	0.83
9500	14.13	24.32	12.30	12.20	1.64	0.86	23.04	6.91	0.78
9600	14.24	24.12	12.88	13.28	1.62	0.87	23.81	7.13	0.77
9700	14.34	23.90	13.54	14.21	1.59	0.87	23.38	7.39	0.74
9800	14.41	23.70	14.16	14.75	1.56	0.86	23.80	7.68	0.79
9900	14.41	23.58	14.83	15.24	1.55	0.86	24.05	7.92	0.77
10000	14.45	23.44	15.37	15.24	1.53	0.85	23.78	7.40	0.84
10100	14.44	23.33	15.94	15.27	1.52	0.85	24.32	7.92	0.85
10200	14.43	23.30	16.18	14.74	1.51	0.84	24.27	8.09	0.77
10300	14.41	23.22	16.30	14.37	1.50	0.84	24.20	7.98	0.76
10400	14.40	23.16	16.32	14.01	1.49	0.83	24.04	8.24	0.79
10500	14.37	23.14	16.27	13.66	1.49	0.83	24.30	8.21	0.78
10600	14.36	23.08	16.23	13.54	1.48	0.83	23.87	8.06	0.82
10700	14.34	23.06	16.21	13.59	1.48	0.83	24.21	8.25	0.78
10800	14.33	23.07	16.08	13.63	1.48	0.83	24.36	8.26	0.77
10900	14.33	23.04	15.78	13.68	1.48	0.83	24.56	7.74	0.77
11000	14.30	23.03	15.51	13.75	1.48	0.83	24.63	7.58	0.74
11100	14.30	23.02	15.44	14.01	1.48	0.83	25.34	7.34	0.78
11200	14.31	23.03	15.30	14.43	1.49	0.84	24.96	7.70	0.72
11300	14.32	23.06	15.23	15.04	1.49	0.85	25.28	7.39	0.75
11400	14.32	23.05	15.17	15.78	1.50	0.85	25.07	7.51	0.74
11500	14.34	23.04	15.53	16.72	1.50	0.86	24.64	7.67	0.74
11600	14.37	23.04	15.95	18.02	1.50	0.86	24.95	7.06	0.81
11700	14.39	23.05	16.28	19.67	1.51	0.87	24.96	7.22	0.76
11800	14.39	23.06	16.50	21.63	1.51	0.87	24.29	7.58	0.72
11900	14.42	23.13	17.30	24.90	1.52	0.88	24.81	6.95	0.80
12000	14.44	23.18	18.16	29.47	1.53	0.88	24.44	7.28	0.81
12100	14.44	23.22	19.06	32.47	1.54	0.88	23.40	6.62	0.69
12200	14.44	23.32	20.09	28.68	1.55	0.88	24.07	6.50	0.70
12300	14.44	23.37	21.34	24.19	1.56	0.88	24.34	6.46	0.75
12400	14.43	23.49	23.06	21.41	1.57	0.88	23.20	6.06	0.72
12500	14.43	23.61	24.74	19.14	1.59	0.87	22.80	6.93	0.67
12600	14.40	23.73	27.07	17.09	1.60	0.87	22.55	6.54	0.72
12700	14.36	23.85	30.61	15.40	1.61	0.86	21.59	5.95	0.81
12800	14.31	24.02	35.82	14.06	1.63	0.86	20.83	5.82	0.79
12900	14.27	24.20	39.23	12.95	1.65	0.85	21.44	5.88	0.80
13000	14.23	24.39	36.45	12.02	1.67	0.84	20.89	5.67	0.85
13500	13.85	25.60	28.22	8.70	1.81	0.79	18.04	4.29	0.78
14000	13.12	27.37	30.98	5.93	2.03	0.70	15.63	3.09	0.85
14500	11.89	29.86	20.13	3.78	2.33	0.57	13.15	1.38	0.95
15000	10.31	32.53	13.39	2.54	2.73	0.46	12.40	0.19	1.10

Typical Performance Data

Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 3.30V, Id = 13.97mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
9000	13.42	26.76	10.56	6.70	1.91	0.75	22.00	7.70	0.76
9500	14.62	24.62	13.56	11.37	1.62	0.83	24.05	8.97	0.73
9600	14.73	24.38	14.23	12.31	1.59	0.84	24.28	9.18	0.70
9700	14.84	24.16	14.98	13.09	1.56	0.84	24.99	9.45	0.68
9800	14.92	23.96	15.79	13.52	1.52	0.83	24.60	9.76	0.75
9900	14.92	23.83	16.59	13.95	1.51	0.83	25.47	9.99	0.71
10000	14.96	23.68	17.26	13.92	1.49	0.83	24.96	9.44	0.76
10100	14.96	23.55	18.00	13.98	1.48	0.82	25.79	9.96	0.78
10200	14.94	23.53	18.28	13.52	1.47	0.82	25.96	10.15	0.74
10300	14.93	23.43	18.44	13.20	1.45	0.81	25.74	10.03	0.69
10400	14.92	23.38	18.50	12.86	1.44	0.81	26.12	10.29	0.74
10500	14.89	23.34	18.38	12.56	1.44	0.80	26.51	10.24	0.72
10600	14.88	23.28	18.31	12.41	1.43	0.80	27.04	10.07	0.73
10700	14.86	23.25	18.26	12.43	1.43	0.80	27.61	10.29	0.72
10800	14.85	23.25	18.06	12.46	1.43	0.80	26.58	10.31	0.72
10900	14.85	23.21	17.65	12.44	1.42	0.80	26.85	9.77	0.72
11000	14.83	23.19	17.27	12.47	1.42	0.80	26.17	9.59	0.69
11100	14.83	23.17	17.12	12.67	1.42	0.80	25.72	9.34	0.72
11200	14.84	23.17	16.92	12.98	1.43	0.81	25.94	9.74	0.71
11300	14.87	23.19	16.77	13.45	1.43	0.81	25.49	9.42	0.65
11400	14.87	23.16	16.66	14.03	1.43	0.82	25.84	9.54	0.68
11500	14.90	23.15	17.06	14.73	1.44	0.82	26.45	9.72	0.69
11600	14.94	23.13	17.54	15.72	1.44	0.83	25.31	9.08	0.69
11700	14.98	23.14	17.88	16.95	1.44	0.83	25.70	9.26	0.70
11800	14.99	23.13	18.05	18.34	1.45	0.84	27.47	9.63	0.66
11900	15.03	23.17	19.00	20.50	1.45	0.84	25.67	8.97	0.76
12000	15.07	23.21	19.98	23.42	1.46	0.85	26.56	9.33	0.72
12100	15.08	23.24	21.08	27.93	1.46	0.85	26.64	8.61	0.62
12200	15.09	23.32	22.20	37.40	1.48	0.85	25.80	8.49	0.62
12300	15.11	23.36	23.72	35.60	1.48	0.85	25.25	8.48	0.70
12400	15.11	23.47	25.52	27.64	1.49	0.86	25.55	8.05	0.67
12500	15.12	23.57	27.16	23.47	1.50	0.85	28.84	8.99	0.61
12600	15.12	23.67	28.54	20.34	1.51	0.85	27.28	8.58	0.69
12700	15.09	23.78	28.26	17.95	1.52	0.85	26.73	7.97	0.74
12800	15.05	23.95	26.51	16.10	1.54	0.84	28.31	7.83	0.74
12900	15.03	24.12	24.90	14.70	1.56	0.84	27.15	7.94	0.72
13000	15.00	24.30	23.65	13.56	1.57	0.83	26.75	7.75	0.77
13500	14.70	25.47	20.24	9.65	1.70	0.80	25.19	6.43	0.71
14000	14.09	27.24	21.19	6.48	1.90	0.71	21.39	5.34	0.80
14500	12.95	29.89	19.47	4.05	2.22	0.58	17.96	3.67	0.86
15000	11.38	33.01	13.48	2.64	2.69	0.46	16.93	2.55	1.01

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 = 3.00V, Id = 9.22mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
9000	11.82	25.97	9.57	9.75	2.22	0.92	19.43	5.84	1.79
9500	12.68	24.39	11.54	16.26	1.92	0.96	20.65	6.76	1.73
9600	12.75	24.22	11.85	16.95	1.88	0.95	20.54	6.84	1.76
9700	12.81	24.07	12.14	17.29	1.85	0.95	20.65	6.86	1.70
9800	12.86	23.91	12.33	17.20	1.82	0.94	20.54	7.33	1.77
9900	12.85	23.84	12.52	17.05	1.81	0.94	20.46	7.24	1.76
10000	12.87	23.72	12.66	16.67	1.79	0.93	20.83	7.12	1.81
10100	12.87	23.67	12.86	16.42	1.78	0.93	20.57	7.15	1.82
10200	12.86	23.60	13.01	16.24	1.77	0.92	20.65	7.32	1.76
10300	12.87	23.54	13.12	16.23	1.76	0.92	20.84	7.45	1.77
10400	12.88	23.49	13.33	16.39	1.76	0.92	20.56	7.49	1.79
10500	12.88	23.45	13.50	16.55	1.75	0.92	20.58	7.41	1.77
10600	12.87	23.42	13.68	16.81	1.75	0.92	20.80	7.26	1.79
10700	12.86	23.41	13.91	17.17	1.76	0.92	20.38	7.08	1.79
10800	12.87	23.42	14.16	17.70	1.76	0.92	20.29	7.25	1.78
10900	12.89	23.39	14.47	18.41	1.76	0.92	20.52	6.97	1.79
11000	12.88	23.38	14.78	19.22	1.77	0.92	20.60	6.95	1.73
11100	12.88	23.38	15.08	20.15	1.77	0.92	20.62	6.94	1.79
11200	12.89	23.43	15.47	21.36	1.78	0.93	20.24	6.93	1.77
11300	12.89	23.47	15.95	22.73	1.80	0.93	20.17	6.96	1.75
11400	12.89	23.46	16.55	25.08	1.80	0.93	19.80	6.77	1.79
11500	12.90	23.51	17.10	28.11	1.81	0.93	19.56	6.66	1.80
11600	12.90	23.56	17.63	32.56	1.82	0.93	19.53	6.45	1.82
11700	12.90	23.61	18.16	34.76	1.83	0.93	19.38	6.47	1.79
11800	12.88	23.65	18.67	30.95	1.84	0.93	18.69	6.12	1.76
11900	12.87	23.76	19.41	26.49	1.87	0.93	18.90	6.07	1.85
12000	12.87	23.86	19.76	23.62	1.88	0.93	18.52	6.00	1.82
12100	12.84	23.95	20.10	21.19	1.90	0.93	17.98	5.39	1.75
12200	12.80	24.06	20.65	19.27	1.92	0.93	17.86	5.49	1.71
12300	12.77	24.18	21.04	17.59	1.94	0.92	18.06	5.76	1.79
12400	12.73	24.34	21.32	16.14	1.96	0.92	17.49	5.23	1.75
12500	12.68	24.51	21.39	14.86	1.99	0.92	16.87	5.06	1.77
12600	12.61	24.70	21.59	13.69	2.02	0.91	16.94	5.05	1.84
12700	12.52	24.86	21.79	12.62	2.05	0.90	16.59	4.59	1.88
12800	12.43	25.08	21.91	11.71	2.09	0.89	15.92	4.18	1.86
12900	12.34	25.32	21.92	10.87	2.12	0.88	15.91	4.14	1.90
13000	12.24	25.57	21.91	10.13	2.16	0.87	15.49	3.78	1.94
13500	11.49	27.12	20.34	7.16	2.46	0.80	13.20	2.10	1.98
14000	10.45	29.02	16.59	5.11	2.88	0.71	11.03	0.48	2.11
14500	9.26	31.06	13.85	3.81	3.42	0.61	9.73	-0.86	2.23
15000	7.93	32.62	12.91	2.94	3.95	0.52	8.46	-1.92	2.30

Typical Performance Data

Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 2.70V, Id = 7.90mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
9000	11.47	25.65	9.16	10.03	2.22	0.94	17.95	4.81	1.88
9500	12.29	24.12	11.08	17.14	1.93	0.97	19.00	5.69	1.83
9600	12.36	23.97	11.36	17.98	1.90	0.97	18.97	5.78	1.84
9700	12.41	23.82	11.60	18.40	1.87	0.96	19.00	5.80	1.79
9800	12.46	23.67	11.79	18.32	1.84	0.96	18.97	6.23	1.87
9900	12.45	23.62	11.97	18.15	1.83	0.95	18.90	6.15	1.84
10000	12.47	23.50	12.09	17.72	1.81	0.95	19.16	6.05	1.91
10100	12.46	23.45	12.28	17.46	1.81	0.94	18.94	6.07	1.93
10200	12.46	23.40	12.40	17.27	1.80	0.94	18.97	6.23	1.87
10300	12.46	23.34	12.51	17.29	1.79	0.94	19.21	6.35	1.83
10400	12.47	23.30	12.70	17.48	1.79	0.94	19.04	6.38	1.89
10500	12.47	23.26	12.85	17.70	1.78	0.94	18.94	6.31	1.88
10600	12.46	23.23	13.02	18.02	1.79	0.94	19.04	6.17	1.92
10700	12.45	23.23	13.24	18.49	1.79	0.94	18.71	6.00	1.87
10800	12.45	23.25	13.46	19.16	1.80	0.94	18.55	6.13	1.88
10900	12.46	23.22	13.77	20.07	1.80	0.94	18.72	5.88	1.88
11000	12.46	23.22	14.05	21.09	1.81	0.94	18.75	5.86	1.83
11100	12.45	23.23	14.33	22.33	1.81	0.94	18.82	5.84	1.91
11200	12.45	23.28	14.68	23.92	1.83	0.94	18.41	5.82	1.87
11300	12.45	23.34	15.11	25.81	1.84	0.94	18.42	5.83	1.86
11400	12.45	23.33	15.62	29.28	1.85	0.94	18.01	5.64	1.84
11500	12.45	23.38	16.11	33.56	1.86	0.94	17.75	5.52	1.88
11600	12.44	23.44	16.56	34.59	1.87	0.94	17.70	5.32	1.90
11700	12.44	23.50	17.04	29.45	1.88	0.94	17.47	5.34	1.89
11800	12.41	23.55	17.50	25.95	1.90	0.94	16.97	4.98	1.85
11900	12.39	23.66	18.13	23.00	1.92	0.94	16.98	4.91	1.93
12000	12.38	23.77	18.45	20.88	1.94	0.94	16.67	4.82	1.92
12100	12.34	23.86	18.74	19.03	1.95	0.94	16.09	4.23	1.85
12200	12.30	23.99	19.20	17.50	1.98	0.93	15.99	4.31	1.85
12300	12.26	24.11	19.55	16.09	2.00	0.93	16.24	4.53	1.90
12400	12.20	24.28	19.80	14.86	2.03	0.92	15.61	4.03	1.88
12500	12.14	24.46	19.83	13.74	2.06	0.92	15.05	3.82	1.88
12600	12.06	24.66	19.93	12.71	2.09	0.91	15.17	3.79	1.92
12700	11.96	24.83	20.05	11.77	2.12	0.90	14.75	3.33	1.98
12800	11.85	25.06	20.09	10.95	2.16	0.89	14.08	2.92	1.99
12900	11.75	25.30	19.99	10.20	2.21	0.88	14.10	2.86	1.96
13000	11.64	25.55	19.85	9.52	2.25	0.87	13.70	2.50	2.04
13500	10.82	27.10	18.10	6.82	2.56	0.80	11.46	0.78	2.10
14000	9.74	28.94	15.36	4.93	2.99	0.70	9.33	-0.84	2.24
14500	8.55	30.83	13.23	3.72	3.51	0.61	8.05	-2.16	2.39
15000	7.24	32.23	12.57	2.91	4.02	0.52	6.80	-3.25	2.48

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 = 3.30V, Id = 10.48mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
9000	12.08	26.24	9.94	9.50	2.23	0.90	20.55	6.76	1.74
9500	12.98	24.60	11.99	15.51	1.91	0.94	22.04	7.65	1.68
9600	13.06	24.43	12.30	16.09	1.87	0.94	21.92	7.74	1.68
9700	13.12	24.27	12.61	16.35	1.84	0.93	22.04	7.77	1.63
9800	13.17	24.10	12.81	16.25	1.80	0.93	21.98	8.25	1.69
9900	13.16	24.03	13.03	16.10	1.79	0.92	21.95	8.16	1.72
10000	13.19	23.91	13.18	15.74	1.77	0.92	22.29	8.04	1.77
10100	13.19	23.84	13.40	15.52	1.76	0.91	22.02	8.05	1.76
10200	13.19	23.78	13.56	15.35	1.75	0.91	22.06	8.25	1.73
10300	13.19	23.71	13.67	15.31	1.74	0.91	22.34	8.37	1.67
10400	13.20	23.66	13.89	15.43	1.73	0.90	22.22	8.43	1.72
10500	13.21	23.61	14.08	15.57	1.73	0.90	21.97	8.33	1.73
10600	13.21	23.57	14.25	15.77	1.72	0.90	22.40	8.20	1.71
10700	13.20	23.56	14.52	16.06	1.73	0.90	21.94	8.01	1.72
10800	13.21	23.57	14.80	16.52	1.73	0.90	21.72	8.17	1.75
10900	13.23	23.53	15.15	17.11	1.73	0.90	22.15	7.88	1.75
11000	13.23	23.51	15.49	17.78	1.73	0.91	22.22	7.87	1.68
11100	13.23	23.51	15.81	18.53	1.74	0.91	22.27	7.87	1.72
11200	13.24	23.55	16.24	19.48	1.75	0.91	21.75	7.88	1.71
11300	13.25	23.59	16.78	20.52	1.76	0.91	21.77	7.90	1.70
11400	13.26	23.58	17.43	22.20	1.76	0.91	21.42	7.71	1.74
11500	13.27	23.62	18.04	24.35	1.77	0.92	21.16	7.62	1.72
11600	13.27	23.66	18.62	27.22	1.78	0.92	21.26	7.40	1.75
11700	13.28	23.71	19.20	31.07	1.79	0.92	20.97	7.44	1.71
11800	13.27	23.75	19.81	33.88	1.80	0.92	20.38	7.09	1.67
11900	13.27	23.85	20.70	30.76	1.82	0.92	20.54	7.04	1.78
12000	13.27	23.94	21.12	26.93	1.83	0.92	20.10	6.98	1.76
12100	13.25	24.01	21.48	23.74	1.85	0.92	19.71	6.36	1.68
12200	13.22	24.13	21.98	21.35	1.87	0.92	19.53	6.47	1.65
12300	13.20	24.24	22.42	19.29	1.88	0.92	19.71	6.79	1.73
12400	13.17	24.39	22.68	17.56	1.91	0.92	19.15	6.24	1.71
12500	13.13	24.56	22.82	16.06	1.93	0.91	18.44	6.08	1.69
12600	13.07	24.74	23.04	14.72	1.96	0.91	18.49	6.11	1.75
12700	13.00	24.89	23.35	13.50	1.99	0.90	18.19	5.63	1.81
12800	12.92	25.11	23.58	12.48	2.02	0.89	17.50	5.24	1.81
12900	12.84	25.34	23.83	11.56	2.06	0.88	17.45	5.21	1.86
13000	12.75	25.59	23.99	10.73	2.10	0.87	17.04	4.87	1.86
13500	12.05	27.14	22.62	7.47	2.38	0.80	14.70	3.20	1.92
14000	11.04	29.11	17.59	5.26	2.79	0.71	12.49	1.58	2.01
14500	9.86	31.27	14.17	3.87	3.33	0.61	11.21	0.25	2.12
15000	8.52	32.98	13.05	2.96	3.89	0.52	9.93	-0.78	2.20

Typical Performance Data

Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.00V, Id = 29.30mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
9000	12.79	27.65	12.04	6.27	2.19	0.74	27.69	10.74	1.20
9500	14.13	25.41	13.75	10.03	1.78	0.83	28.72	12.06	1.15
10000	14.60	24.19	15.97	13.54	1.60	0.85	29.49	12.53	1.22
10100	14.62	24.05	16.29	13.85	1.58	0.85	29.87	12.83	1.21
10200	14.65	23.95	16.56	14.04	1.56	0.85	30.47	13.20	1.17
10300	14.67	23.81	16.95	14.13	1.54	0.84	29.58	13.13	1.19
10400	14.66	23.73	17.24	14.13	1.53	0.84	30.05	13.46	1.18
10500	14.68	23.66	17.46	14.04	1.52	0.84	30.07	13.62	1.28
10600	14.68	23.58	17.78	13.97	1.51	0.83	30.03	13.33	1.25
10700	14.69	23.51	18.13	13.95	1.50	0.83	30.75	13.74	1.21
10800	14.68	23.46	18.37	13.93	1.50	0.83	31.27	13.81	1.20
10900	14.69	23.41	18.55	13.91	1.49	0.83	30.57	13.16	1.20
11000	14.68	23.39	18.96	14.00	1.49	0.83	30.99	13.20	1.22
11100	14.69	23.37	19.14	14.11	1.49	0.83	30.85	12.88	1.21
11200	14.70	23.34	19.42	14.33	1.49	0.83	30.41	13.31	1.28
11300	14.71	23.32	19.60	14.58	1.48	0.83	30.52	12.85	1.21
11400	14.73	23.32	19.88	14.93	1.48	0.83	30.15	12.85	1.22
11500	14.73	23.30	20.20	15.32	1.49	0.83	30.31	13.36	1.28
11600	14.76	23.30	20.76	15.91	1.49	0.84	29.88	12.51	1.22
11700	14.78	23.30	21.45	16.50	1.49	0.84	29.98	13.07	1.17
11800	14.81	23.32	22.04	17.07	1.49	0.84	29.94	13.47	1.21
11900	14.83	23.31	22.43	17.70	1.49	0.84	29.65	12.66	1.29
12000	14.86	23.32	22.83	18.58	1.49	0.85	29.86	13.16	1.25
12100	14.89	23.36	23.39	20.00	1.50	0.85	29.97	11.99	1.23
12200	14.93	23.39	24.39	22.03	1.50	0.85	30.00	11.89	1.26
12300	14.97	23.44	25.46	24.83	1.51	0.86	29.97	12.00	1.26
12400	15.00	23.49	25.88	28.75	1.51	0.86	30.36	11.27	1.20
12500	15.01	23.54	25.92	35.69	1.52	0.86	30.78	12.46	1.32
12600	15.03	23.61	25.94	40.12	1.53	0.86	29.97	11.81	1.25
12700	15.05	23.71	25.52	29.29	1.54	0.86	30.08	11.26	1.32
12800	15.05	23.81	24.85	24.22	1.55	0.86	29.93	11.34	1.28
12900	15.05	23.94	24.22	20.87	1.56	0.86	30.61	11.59	1.33
13000	15.05	24.08	23.22	18.51	1.57	0.86	30.61	11.52	1.35
13500	14.83	25.11	18.61	11.28	1.68	0.83	30.53	9.81	1.34
14000	14.30	26.81	15.37	7.52	1.88	0.76	27.88	9.11	1.41
14500	13.41	29.22	13.31	5.12	2.23	0.66	25.19	8.19	1.40
15000	12.26	32.31	12.01	3.59	2.84	0.56	24.41	7.64	1.55

Typical Performance Data

Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 4.75V, Id = 27.63mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
9000	12.75	27.59	11.91	6.30	2.19	0.74	25.38	10.31	1.20
9500	14.09	25.35	13.62	10.09	1.78	0.83	26.27	11.63	1.10
10000	14.56	24.13	15.83	13.67	1.60	0.85	27.52	12.12	1.23
10100	14.57	24.00	16.15	14.06	1.58	0.85	27.82	12.41	1.20
10200	14.59	23.90	16.41	14.24	1.57	0.85	28.26	12.79	1.19
10300	14.61	23.78	16.79	14.33	1.55	0.85	27.46	12.70	1.17
10400	14.61	23.69	17.10	14.34	1.54	0.84	27.93	13.04	1.18
10500	14.61	23.62	17.29	14.23	1.53	0.84	28.47	13.20	1.21
10600	14.62	23.54	17.61	14.18	1.52	0.84	28.05	12.91	1.24
10700	14.63	23.47	17.92	14.17	1.51	0.83	28.93	13.33	1.14
10800	14.63	23.42	18.23	14.18	1.50	0.83	29.41	13.39	1.15
10900	14.63	23.37	18.41	14.16	1.49	0.83	28.36	12.75	1.22
11000	14.63	23.35	18.81	14.26	1.49	0.83	28.25	12.78	1.22
11100	14.63	23.32	18.98	14.39	1.49	0.83	27.90	12.48	1.19
11200	14.64	23.30	19.23	14.61	1.49	0.83	28.54	12.89	1.29
11300	14.65	23.28	19.38	14.87	1.49	0.83	27.78	12.43	1.20
11400	14.66	23.27	19.65	15.24	1.49	0.83	28.24	12.45	1.23
11500	14.66	23.25	20.04	15.64	1.49	0.84	28.32	12.94	1.23
11600	14.69	23.26	20.56	16.26	1.49	0.84	27.10	12.11	1.21
11700	14.72	23.26	21.20	16.87	1.49	0.84	27.72	12.66	1.20
11800	14.74	23.28	21.88	17.46	1.50	0.84	28.58	13.06	1.21
11900	14.76	23.27	22.23	18.17	1.50	0.85	27.81	12.28	1.27
12000	14.78	23.28	22.63	19.07	1.50	0.85	28.42	12.77	1.19
12100	14.82	23.33	23.32	20.56	1.50	0.85	27.73	11.64	1.21
12200	14.86	23.36	24.18	22.75	1.51	0.86	27.70	11.56	1.23
12300	14.89	23.41	25.35	25.90	1.51	0.86	27.53	11.66	1.24
12400	14.91	23.46	25.81	30.65	1.52	0.86	27.64	10.99	1.21
12500	14.93	23.51	26.01	41.31	1.53	0.86	28.08	12.10	1.23
12600	14.95	23.59	26.11	36.24	1.53	0.87	27.39	11.48	1.25
12700	14.96	23.69	25.74	27.76	1.54	0.87	27.48	10.98	1.28
12800	14.96	23.79	25.28	23.38	1.56	0.87	27.67	11.06	1.24
12900	14.96	23.92	24.71	20.27	1.57	0.86	27.80	11.30	1.26
13000	14.95	24.07	23.72	18.06	1.58	0.86	28.66	11.23	1.32
13500	14.71	25.10	18.96	11.10	1.69	0.82	29.28	9.56	1.30
14000	14.17	26.79	15.60	7.45	1.89	0.76	32.40	8.85	1.39
14500	13.28	29.18	13.51	5.09	2.24	0.66	29.51	7.90	1.41
15000	12.13	32.21	12.15	3.58	2.85	0.56	26.67	7.31	1.54

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 = 31.00mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
9000	12.82	27.72	12.17	6.23	2.20	0.73	32.14	11.14	1.22
9500	14.18	25.43	13.87	9.95	1.77	0.83	32.14	12.46	1.14
10000	14.67	24.22	16.11	13.40	1.59	0.85	32.76	12.93	1.22
10100	14.68	24.09	16.45	13.70	1.58	0.85	32.95	13.21	1.22
10200	14.71	23.98	16.74	13.84	1.56	0.85	32.47	13.60	1.21
10300	14.73	23.85	17.13	13.92	1.54	0.84	31.89	13.53	1.19
10400	14.73	23.78	17.43	13.88	1.53	0.84	32.24	13.86	1.21
10500	14.73	23.68	17.63	13.77	1.52	0.83	32.21	14.02	1.26
10600	14.74	23.61	18.00	13.73	1.51	0.83	31.46	13.72	1.19
10700	14.75	23.55	18.31	13.69	1.50	0.83	31.78	14.12	1.22
10800	14.75	23.51	18.63	13.68	1.49	0.83	31.95	14.21	1.20
10900	14.76	23.45	18.80	13.67	1.48	0.82	32.39	13.55	1.23
11000	14.75	23.44	19.26	13.74	1.48	0.82	32.46	13.58	1.19
11100	14.76	23.40	19.44	13.87	1.48	0.82	31.90	13.27	1.19
11200	14.76	23.37	19.71	14.07	1.48	0.82	32.33	13.70	1.24
11300	14.78	23.34	19.84	14.32	1.48	0.83	31.85	13.25	1.21
11400	14.79	23.34	20.10	14.67	1.48	0.83	31.89	13.22	1.25
11500	14.80	23.31	20.49	15.04	1.48	0.83	31.54	13.75	1.25
11600	14.83	23.33	21.05	15.59	1.48	0.83	31.09	12.90	1.24
11700	14.86	23.33	21.74	16.09	1.48	0.83	31.28	13.44	1.21
11800	14.88	23.34	22.39	16.64	1.48	0.84	31.87	13.83	1.26
11900	14.90	23.34	22.71	17.26	1.48	0.84	30.53	13.01	1.26
12000	14.93	23.34	23.10	18.09	1.48	0.84	30.45	13.51	1.23
12100	14.97	23.38	23.72	19.34	1.49	0.85	30.29	12.26	1.23
12200	15.01	23.41	24.52	21.24	1.49	0.85	30.03	12.15	1.22
12300	15.05	23.47	25.56	23.68	1.50	0.85	30.51	12.32	1.24
12400	15.08	23.51	25.93	27.01	1.50	0.86	30.17	11.52	1.21
12500	15.10	23.55	25.88	32.17	1.51	0.86	30.73	12.78	1.24
12600	15.13	23.63	25.78	40.00	1.51	0.86	30.08	12.10	1.26
12700	15.15	23.73	25.13	30.84	1.52	0.86	29.27	11.51	1.29
12800	15.15	23.82	24.48	25.23	1.53	0.86	29.45	11.60	1.24
12900	15.16	23.95	23.80	21.48	1.55	0.86	29.66	11.85	1.31
13000	15.15	24.09	22.78	18.95	1.56	0.86	28.71	11.75	1.36
13500	14.95	25.12	18.30	11.40	1.66	0.82	26.41	10.00	1.30
14000	14.43	26.82	15.11	7.57	1.86	0.76	24.74	9.32	1.42
14500	13.55	29.26	13.12	5.12	2.21	0.66	23.23	8.42	1.40
15000	12.39	32.41	11.86	3.57	2.82	0.56	22.95	7.93	1.58

Typical Performance Data

Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.00V, Id = 33.12mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
9000	13.27	27.77	12.79	5.21	1.97	0.65	29.36	11.02	0.83
9500	14.74	25.33	15.33	8.46	1.62	0.76	29.11	12.29	0.76
10000	15.32	23.95	17.47	12.88	1.47	0.81	29.47	13.09	0.85
10100	15.34	23.83	17.80	13.35	1.45	0.81	30.10	13.62	0.83
10200	15.36	23.70	18.09	13.69	1.44	0.81	30.45	13.81	0.82
10300	15.36	23.59	18.41	13.83	1.43	0.81	29.15	13.49	0.79
10400	15.34	23.52	18.48	13.66	1.42	0.81	29.66	13.96	0.83
10500	15.31	23.46	18.38	13.12	1.41	0.80	30.02	14.08	0.86
10600	15.30	23.40	18.40	12.64	1.39	0.79	29.93	14.04	0.84
10700	15.28	23.34	18.46	12.17	1.39	0.78	30.20	14.69	0.79
10800	15.25	23.32	18.35	11.77	1.38	0.78	31.00	14.35	0.83
10900	15.24	23.27	18.06	11.47	1.37	0.77	30.65	14.11	0.82
11000	15.23	23.26	18.02	11.42	1.37	0.77	30.09	13.98	0.81
11100	15.23	23.22	17.84	11.43	1.37	0.77	29.90	13.51	0.81
11200	15.24	23.18	17.94	11.53	1.37	0.77	29.99	13.94	0.88
11300	15.27	23.13	17.98	11.68	1.36	0.76	29.31	13.00	0.84
11400	15.29	23.11	18.07	11.91	1.36	0.77	29.20	13.42	0.85
11500	15.31	23.06	18.29	12.29	1.36	0.77	29.40	13.57	0.86
11600	15.37	23.03	18.61	12.93	1.36	0.77	28.44	12.42	0.85
11700	15.43	23.00	19.13	13.58	1.35	0.78	28.47	13.29	0.82
11800	15.47	22.96	19.74	14.36	1.35	0.78	29.03	13.85	0.85
11900	15.54	22.92	20.36	15.39	1.35	0.79	28.55	12.82	0.89
12000	15.59	22.89	21.16	16.70	1.35	0.79	29.09	13.74	0.86
12100	15.66	22.90	22.17	18.42	1.35	0.80	29.27	12.97	0.83
12200	15.71	22.90	23.19	20.72	1.35	0.80	28.53	12.36	0.84
12300	15.75	22.94	24.03	23.66	1.35	0.81	28.16	11.61	0.83
12400	15.79	22.98	24.01	27.68	1.35	0.81	28.21	11.38	0.80
12500	15.81	23.01	23.41	32.85	1.36	0.81	28.57	12.43	0.82
12600	15.83	23.09	22.44	33.36	1.36	0.82	27.86	11.08	0.85
12700	15.85	23.17	21.25	28.11	1.37	0.82	28.01	11.13	0.86
12800	15.87	23.25	20.50	24.15	1.37	0.82	28.15	11.05	0.83
12900	15.88	23.35	19.92	21.42	1.38	0.82	27.67	10.90	0.85
13000	15.90	23.46	19.45	19.52	1.38	0.82	27.67	11.21	0.92
13500	15.89	24.23	16.51	13.18	1.44	0.80	27.69	10.23	0.89
14000	15.59	25.66	14.25	8.12	1.53	0.73	26.93	9.45	0.96
14500	14.81	27.94	12.57	4.91	1.69	0.61	26.75	8.76	0.96
15000	13.65	31.17	10.65	3.10	2.02	0.49	26.92	7.94	1.13

Typical Performance Data

Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 4.75V, Id = 31.16mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
9000	13.26	27.72	12.69	5.24	1.97	0.66	26.24	10.59	0.83
9500	14.72	25.28	15.24	8.52	1.62	0.76	26.39	11.87	0.77
10000	15.29	23.91	17.42	13.01	1.47	0.81	27.39	12.68	0.85
10100	15.31	23.79	17.72	13.50	1.45	0.82	27.93	13.20	0.82
10200	15.33	23.66	18.02	13.86	1.44	0.82	28.15	13.38	0.79
10300	15.32	23.56	18.30	14.00	1.43	0.81	27.43	13.06	0.76
10400	15.30	23.49	18.37	13.85	1.42	0.81	27.56	13.53	0.82
10500	15.28	23.43	18.28	13.31	1.41	0.80	27.92	13.65	0.84
10600	15.26	23.36	18.32	12.82	1.40	0.80	27.99	13.61	0.82
10700	15.24	23.31	18.36	12.33	1.39	0.79	28.78	14.25	0.80
10800	15.22	23.28	18.24	11.94	1.38	0.78	28.81	13.91	0.83
10900	15.20	23.24	17.99	11.62	1.38	0.77	28.17	13.69	0.83
11000	15.19	23.22	17.94	11.57	1.37	0.77	28.18	13.57	0.80
11100	15.20	23.18	17.75	11.60	1.37	0.77	27.72	13.10	0.83
11200	15.21	23.15	17.85	11.70	1.37	0.77	27.52	13.51	0.86
11300	15.23	23.10	17.91	11.86	1.36	0.77	27.00	12.63	0.83
11400	15.25	23.07	17.99	12.09	1.36	0.77	27.27	13.02	0.83
11500	15.27	23.03	18.19	12.48	1.36	0.77	26.80	13.15	0.87
11600	15.33	23.00	18.50	13.12	1.36	0.78	26.28	12.12	0.85
11700	15.38	22.97	19.04	13.79	1.36	0.78	26.49	12.90	0.83
11800	15.43	22.94	19.70	14.62	1.36	0.79	26.97	13.43	0.81
11900	15.49	22.90	20.29	15.65	1.35	0.79	26.47	12.51	0.89
12000	15.54	22.87	21.11	17.01	1.35	0.80	27.06	13.34	0.83
12100	15.60	22.88	22.16	18.84	1.35	0.80	27.12	12.69	0.79
12200	15.65	22.88	23.20	21.26	1.35	0.81	26.80	12.13	0.89
12300	15.69	22.92	24.08	24.44	1.36	0.81	26.09	11.44	0.84
12400	15.73	22.96	24.14	29.19	1.36	0.81	26.22	11.21	0.79
12500	15.75	23.00	23.52	36.35	1.36	0.82	26.50	12.19	0.83
12600	15.77	23.07	22.61	33.62	1.37	0.82	25.51	10.92	0.83
12700	15.79	23.15	21.44	27.42	1.37	0.82	25.89	10.95	0.86
12800	15.80	23.23	20.63	23.62	1.38	0.82	25.72	10.88	0.84
12900	15.81	23.34	20.07	21.01	1.38	0.82	25.50	10.74	0.82
13000	15.82	23.45	19.62	19.19	1.39	0.82	25.69	11.04	0.89
13500	15.81	24.24	16.66	12.95	1.44	0.80	25.34	10.10	0.85
14000	15.49	25.66	14.38	8.01	1.54	0.73	25.04	9.30	0.98
14500	14.70	27.95	12.68	4.88	1.71	0.61	26.15	8.57	0.93
15000	13.54	31.13	10.75	3.09	2.02	0.48	27.73	7.72	1.10

Typical Performance Data

Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.25V, Id = 35.61mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
9000	13.30	27.83	12.93	5.17	1.98	0.65	31.03	11.42	0.86
9500	14.78	25.38	15.49	8.38	1.62	0.75	31.27	12.68	0.78
10000	15.36	23.99	17.65	12.70	1.46	0.81	31.27	13.46	0.86
10100	15.39	23.86	17.96	13.16	1.45	0.81	31.56	14.00	0.83
10200	15.41	23.74	18.21	13.47	1.43	0.81	32.06	14.21	0.85
10300	15.41	23.63	18.50	13.59	1.42	0.81	31.78	13.85	0.83
10400	15.39	23.56	18.61	13.42	1.41	0.81	31.63	14.35	0.85
10500	15.36	23.50	18.53	12.90	1.40	0.80	32.02	14.48	0.88
10600	15.35	23.43	18.57	12.43	1.39	0.79	31.51	14.43	0.86
10700	15.33	23.38	18.64	11.95	1.38	0.78	32.77	15.10	0.82
10800	15.30	23.35	18.54	11.57	1.37	0.77	32.14	14.75	0.85
10900	15.29	23.31	18.25	11.26	1.37	0.77	31.40	14.51	0.87
11000	15.27	23.30	18.21	11.20	1.37	0.76	31.34	14.36	0.83
11100	15.29	23.25	18.01	11.23	1.36	0.76	31.70	13.85	0.85
11200	15.29	23.22	18.06	11.32	1.36	0.76	30.70	14.31	0.90
11300	15.32	23.17	18.15	11.46	1.35	0.76	30.05	13.35	0.83
11400	15.34	23.14	18.23	11.69	1.35	0.76	30.12	13.73	0.90
11500	15.37	23.09	18.38	12.05	1.35	0.77	30.95	13.92	0.89
11600	15.43	23.06	18.72	12.66	1.35	0.77	29.86	12.58	0.88
11700	15.48	23.03	19.23	13.27	1.35	0.78	30.16	13.62	0.82
11800	15.54	22.99	19.85	14.05	1.35	0.78	30.19	14.21	0.86
11900	15.60	22.95	20.46	15.02	1.34	0.78	30.04	13.11	0.88
12000	15.66	22.92	21.27	16.27	1.34	0.79	29.98	14.06	0.86
12100	15.73	22.92	22.24	17.92	1.34	0.80	29.54	13.15	0.83
12200	15.78	22.92	23.22	20.02	1.34	0.80	29.68	12.50	0.86
12300	15.83	22.96	23.98	22.57	1.34	0.81	29.00	11.74	0.87
12400	15.86	22.99	23.84	25.92	1.35	0.81	28.94	11.49	0.82
12500	15.89	23.03	23.18	29.96	1.35	0.81	29.46	12.60	0.86
12600	15.92	23.10	22.23	32.39	1.35	0.82	28.46	11.20	0.87
12700	15.94	23.17	21.08	28.64	1.36	0.82	28.20	11.24	0.89
12800	15.96	23.25	20.27	24.73	1.36	0.82	28.29	11.17	0.87
12900	15.97	23.35	19.75	21.97	1.37	0.82	28.18	11.03	0.91
13000	15.99	23.47	19.26	19.99	1.38	0.82	27.50	11.35	0.93
13500	16.01	24.23	16.35	13.41	1.42	0.80	26.55	10.33	0.89
14000	15.73	25.64	14.04	8.23	1.51	0.73	25.26	9.56	1.00
14500	14.97	27.94	12.37	4.96	1.68	0.61	24.02	8.88	0.96
15000	13.81	31.19	10.53	3.09	1.99	0.48	23.81	8.09	1.12

Typical Performance Data

Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.00V, Id = 24.16mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
9000	12.32	27.57	11.53	7.22	2.38	0.80	27.55	10.35	1.56
9500	13.61	25.42	12.87	11.91	1.91	0.89	28.89	11.63	1.48
10000	14.03	24.32	14.74	14.86	1.71	0.89	28.77	11.97	1.59
10100	14.05	24.21	15.05	14.85	1.69	0.88	28.92	12.06	1.56
10200	14.09	24.11	15.29	14.61	1.67	0.88	28.86	12.42	1.58
10300	14.11	23.99	15.64	14.50	1.65	0.87	28.88	12.62	1.55
10400	14.10	23.92	15.98	14.31	1.64	0.87	28.39	12.71	1.59
10500	14.12	23.83	16.36	14.22	1.62	0.86	28.60	12.85	1.60
10600	14.13	23.77	16.76	14.22	1.61	0.86	28.37	12.53	1.63
10700	14.15	23.70	17.14	14.36	1.60	0.86	28.40	12.53	1.58
10800	14.16	23.66	17.63	14.63	1.60	0.86	28.68	12.82	1.57
10900	14.16	23.61	18.05	14.89	1.60	0.86	28.59	12.22	1.58
11000	14.18	23.60	18.69	15.25	1.60	0.86	28.82	12.27	1.56
11100	14.19	23.56	19.17	15.65	1.60	0.86	28.81	12.14	1.57
11200	14.20	23.55	19.73	16.10	1.60	0.86	28.47	12.30	1.62
11300	14.21	23.53	20.25	16.66	1.60	0.86	28.32	12.26	1.54
11400	14.23	23.53	20.78	17.34	1.60	0.87	27.90	11.98	1.58
11500	14.23	23.52	21.34	18.03	1.60	0.87	28.28	12.41	1.62
11600	14.25	23.55	21.94	18.83	1.61	0.87	28.88	11.96	1.62
11700	14.26	23.57	22.76	19.70	1.61	0.88	28.33	12.09	1.56
11800	14.27	23.61	23.43	20.48	1.62	0.88	27.76	12.13	1.60
11900	14.28	23.64	23.70	21.34	1.62	0.88	28.15	11.73	1.63
12000	14.29	23.68	23.96	22.40	1.63	0.88	27.44	11.78	1.57
12100	14.31	23.72	24.30	24.19	1.64	0.89	27.20	10.92	1.59
12200	14.34	23.80	25.13	26.69	1.65	0.89	27.45	11.04	1.66
12300	14.36	23.88	25.93	30.60	1.66	0.89	27.66	11.40	1.61
12400	14.37	23.96	26.35	34.09	1.67	0.89	26.95	10.79	1.64
12500	14.37	24.03	26.90	31.30	1.68	0.89	26.82	11.36	1.66
12600	14.38	24.15	28.00	26.72	1.70	0.89	26.97	11.35	1.63
12700	14.38	24.26	29.06	23.13	1.71	0.89	26.50	10.77	1.68
12800	14.35	24.39	29.99	20.35	1.73	0.89	26.16	10.81	1.66
12900	14.33	24.58	30.46	17.94	1.76	0.89	25.52	10.94	1.72
13000	14.28	24.76	29.48	16.05	1.78	0.88	24.99	10.58	1.73
13500	13.86	26.07	21.17	9.87	1.96	0.83	23.11	8.94	1.73
14000	13.11	28.01	15.98	6.87	2.30	0.76	21.34	8.03	1.86
14500	12.16	30.49	13.53	5.07	2.87	0.68	20.10	6.98	1.89
15000	11.09	33.17	12.74	3.94	3.72	0.61	19.34	6.27	2.01

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 = 22.88mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
9000	12.28	27.50	11.41	7.25	2.37	0.80	25.98	9.93	1.58
9500	13.56	25.37	12.74	12.01	1.91	0.89	27.77	11.22	1.52
10000	13.97	24.28	14.60	15.09	1.71	0.89	29.11	11.57	1.58
10100	13.99	24.17	14.93	15.07	1.70	0.89	28.66	11.67	1.58
10200	14.02	24.07	15.15	14.85	1.67	0.88	28.62	12.04	1.60
10300	14.04	23.94	15.49	14.74	1.65	0.88	28.32	12.22	1.54
10400	14.04	23.88	15.81	14.53	1.64	0.87	28.48	12.32	1.58
10500	14.06	23.79	16.21	14.47	1.63	0.87	28.47	12.46	1.61
10600	14.07	23.72	16.61	14.47	1.62	0.86	28.34	12.14	1.60
10700	14.08	23.66	17.00	14.61	1.61	0.86	28.01	12.13	1.55
10800	14.09	23.62	17.46	14.90	1.61	0.86	28.40	12.44	1.55
10900	14.10	23.57	17.90	15.20	1.60	0.86	28.59	11.83	1.60
11000	14.11	23.56	18.49	15.57	1.61	0.86	29.16	11.89	1.58
11100	14.12	23.52	18.97	16.00	1.60	0.86	28.99	11.75	1.56
11200	14.13	23.51	19.53	16.49	1.60	0.87	28.64	11.93	1.62
11300	14.14	23.49	20.03	17.08	1.60	0.87	29.39	11.88	1.59
11400	14.15	23.49	20.54	17.77	1.61	0.87	28.96	11.60	1.59
11500	14.16	23.49	21.12	18.51	1.61	0.87	28.46	12.03	1.61
11600	14.17	23.52	21.73	19.37	1.62	0.88	29.57	11.57	1.61
11700	14.17	23.54	22.55	20.28	1.62	0.88	28.76	11.72	1.56
11800	14.19	23.58	23.20	21.16	1.63	0.88	28.24	11.77	1.61
11900	14.20	23.61	23.50	22.13	1.63	0.88	28.38	11.36	1.63
12000	14.21	23.65	23.75	23.26	1.64	0.89	27.68	11.41	1.63
12100	14.23	23.70	24.06	25.27	1.65	0.89	28.37	10.56	1.55
12200	14.25	23.78	24.85	28.30	1.66	0.89	28.39	10.67	1.65
12300	14.26	23.86	25.68	33.10	1.67	0.89	29.00	11.03	1.62
12400	14.27	23.94	26.12	35.29	1.68	0.89	28.49	10.42	1.65
12500	14.28	24.01	26.76	30.29	1.69	0.90	27.89	10.99	1.65
12600	14.28	24.13	27.92	25.83	1.71	0.90	28.03	10.97	1.63
12700	14.27	24.25	29.19	22.45	1.72	0.90	27.23	10.41	1.68
12800	14.24	24.38	30.64	19.81	1.75	0.89	27.33	10.45	1.66
12900	14.22	24.57	31.63	17.54	1.77	0.89	26.60	10.56	1.72
13000	14.17	24.75	30.85	15.74	1.80	0.88	25.85	10.21	1.72
13500	13.72	26.07	21.57	9.75	1.98	0.83	23.86	8.58	1.74
14000	12.97	27.99	16.15	6.82	2.33	0.76	21.79	7.66	1.84
14500	12.02	30.42	13.64	5.05	2.88	0.68	20.23	6.62	1.91
15000	10.96	33.05	12.85	3.93	3.72	0.61	19.37	5.89	2.03

Typical Performance Data

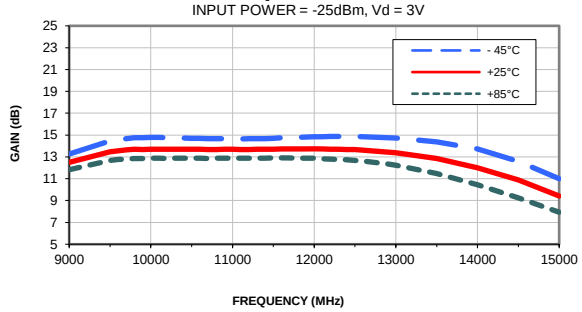
Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.25V, Id = 25.34mA @ Temperature = +85°C

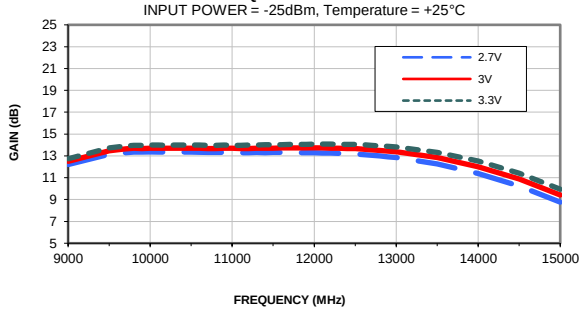
FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
9000	12.36	27.63	11.62	7.18	2.38	0.80	28.15	10.74	1.56
9500	13.67	25.47	12.93	11.84	1.91	0.89	28.48	12.02	1.48
10000	14.09	24.35	14.84	14.69	1.70	0.89	28.62	12.35	1.61
10100	14.11	24.24	15.18	14.64	1.69	0.88	28.38	12.42	1.60
10200	14.14	24.14	15.41	14.41	1.66	0.88	28.79	12.79	1.58
10300	14.17	24.01	15.78	14.29	1.64	0.87	28.76	13.00	1.55
10400	14.17	23.95	16.12	14.09	1.63	0.86	28.47	13.08	1.60
10500	14.19	23.86	16.53	14.02	1.62	0.86	28.39	13.22	1.63
10600	14.20	23.79	16.94	14.01	1.61	0.86	28.30	12.90	1.57
10700	14.21	23.73	17.34	14.13	1.60	0.85	27.87	12.87	1.55
10800	14.22	23.69	17.83	14.40	1.60	0.85	28.05	13.18	1.59
10900	14.23	23.64	18.27	14.67	1.59	0.85	27.79	12.58	1.60
11000	14.24	23.62	18.95	15.01	1.59	0.86	28.12	12.63	1.61
11100	14.26	23.59	19.43	15.40	1.59	0.86	27.89	12.50	1.57
11200	14.27	23.57	20.00	15.84	1.59	0.86	27.44	12.66	1.63
11300	14.28	23.56	20.54	16.37	1.59	0.86	27.80	12.65	1.61
11400	14.30	23.55	21.05	17.00	1.59	0.86	27.22	12.34	1.57
11500	14.30	23.55	21.62	17.64	1.59	0.87	27.48	12.76	1.63
11600	14.32	23.57	22.26	18.40	1.60	0.87	27.58	12.33	1.62
11700	14.33	23.60	23.08	19.18	1.60	0.87	27.48	12.44	1.55
11800	14.34	23.64	23.76	19.93	1.61	0.88	27.39	12.47	1.61
11900	14.36	23.66	24.01	20.74	1.61	0.88	27.05	12.07	1.65
12000	14.37	23.70	24.22	21.68	1.62	0.88	26.59	12.10	1.59
12100	14.39	23.75	24.47	23.25	1.63	0.88	25.83	11.25	1.61
12200	14.42	23.82	25.26	25.49	1.64	0.89	25.86	11.36	1.67
12300	14.44	23.90	26.00	28.77	1.65	0.89	26.48	11.75	1.64
12400	14.45	23.97	26.40	32.29	1.66	0.89	25.68	11.12	1.60
12500	14.46	24.05	26.82	31.69	1.67	0.89	26.03	11.70	1.63
12600	14.47	24.16	27.78	27.49	1.68	0.89	25.81	11.68	1.64
12700	14.47	24.28	28.65	23.78	1.70	0.89	25.25	11.10	1.68
12800	14.45	24.40	29.44	20.83	1.72	0.89	25.24	11.15	1.66
12900	14.43	24.59	29.67	18.29	1.74	0.89	25.07	11.28	1.68
13000	14.39	24.76	28.72	16.32	1.77	0.88	24.29	10.92	1.74
13500	13.97	26.09	20.86	9.93	1.95	0.83	22.31	9.26	1.73
14000	13.23	28.04	15.79	6.87	2.28	0.76	20.99	8.35	1.89
14500	12.28	30.54	13.35	5.05	2.84	0.68	19.73	7.32	1.86
15000	11.21	33.30	12.58	3.91	3.70	0.61	19.24	6.61	2.03

Typical Performance Curves

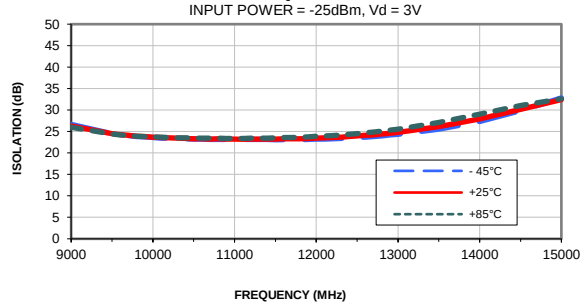
GAIN vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 3V



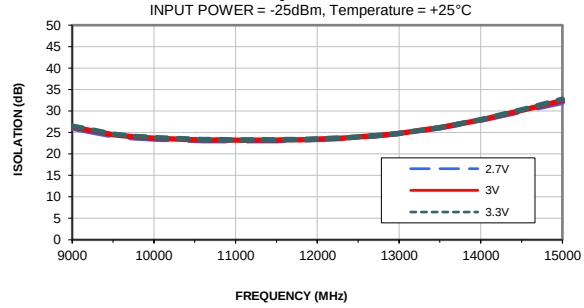
GAIN vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C



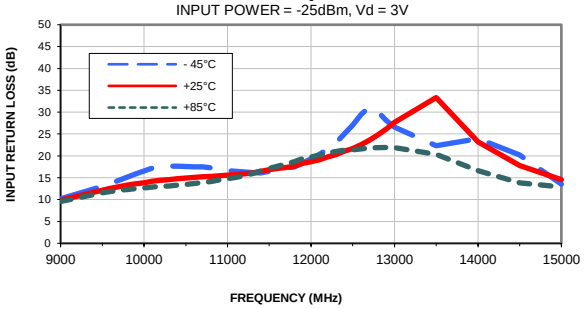
ISOLATION vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 3V



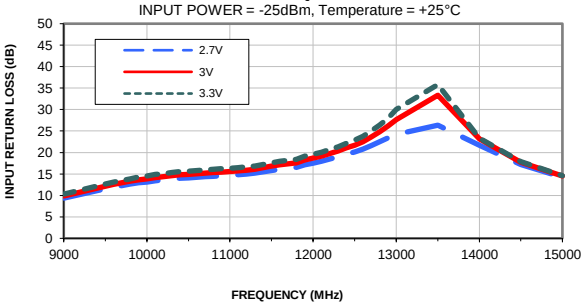
ISOLATION vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C



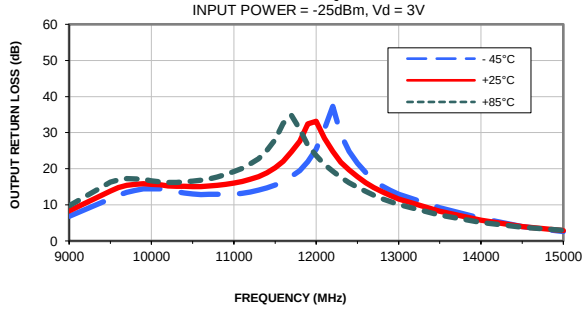
INPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 3V



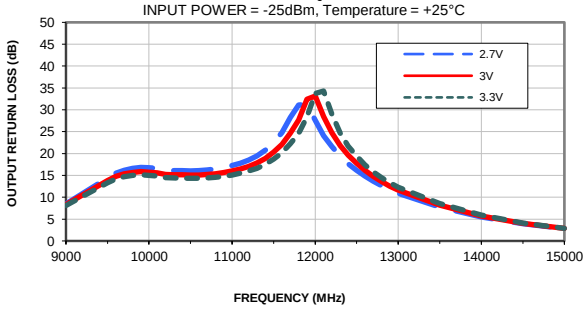
INPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C



OUTPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 3V

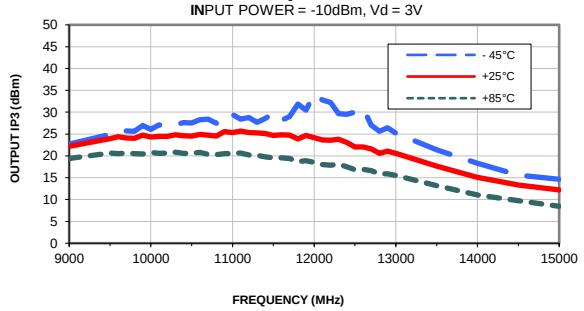


OUTPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C

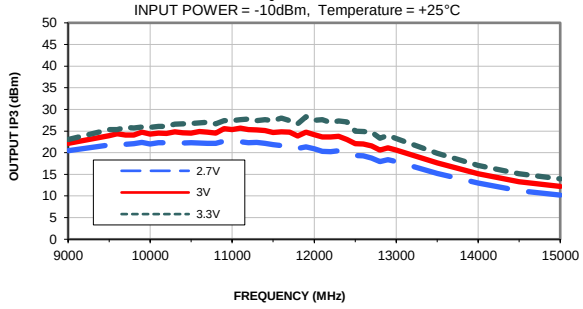


Typical Performance Curves

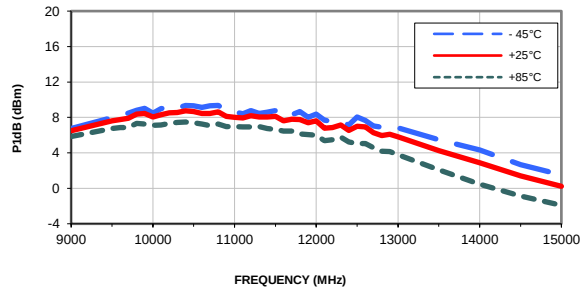
OUTPUT IP3 vs. FREQUENCY & TEMPERATURE
INPUT POWER = -10dBm, Vd = 3V



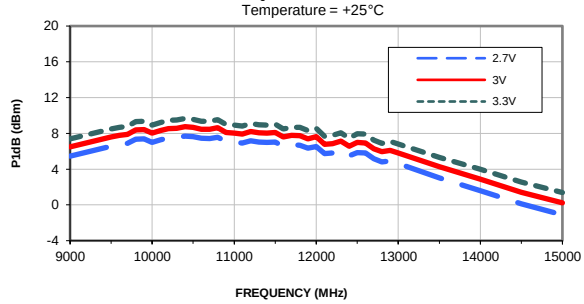
OUTPUT IP3 vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -10dBm, Temperature = +25°C



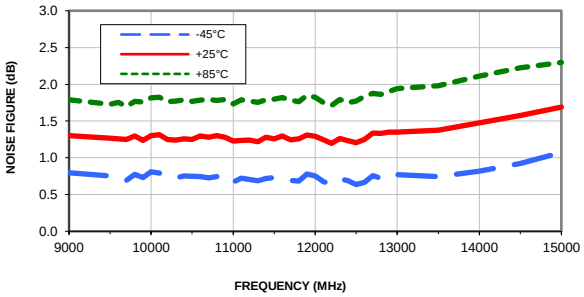
P1dB vs. FREQUENCY & TEMPERATURE
Vd = 3V



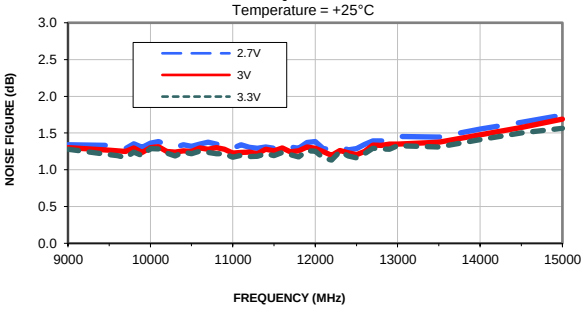
P1dB vs. FREQUENCY & DEVICE VOLTAGE
Temperature = +25°C



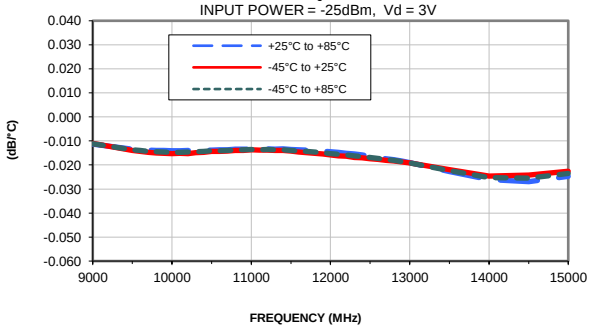
NOISE FIGURE vs. FREQUENCY & TEMPERATURE
Vd = 3V



NOISE FIGURE vs. FREQUENCY & DEVICE VOLTAGE
Temperature = +25°C

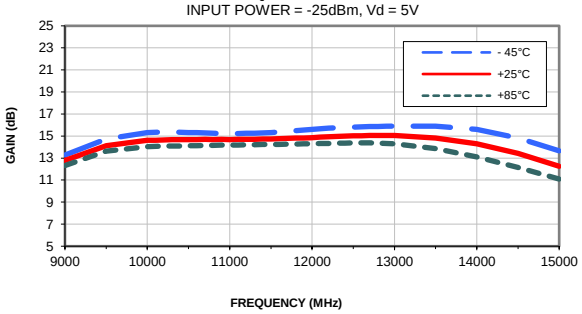


GAIN VARIATION vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 3V

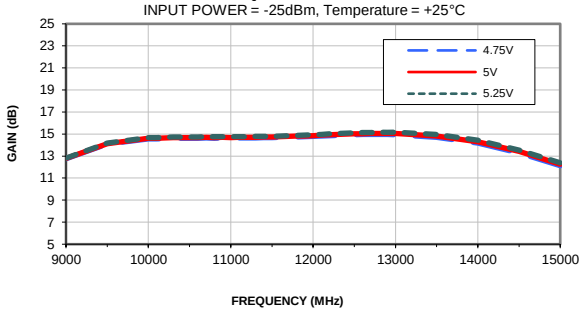


Typical Performance Curves

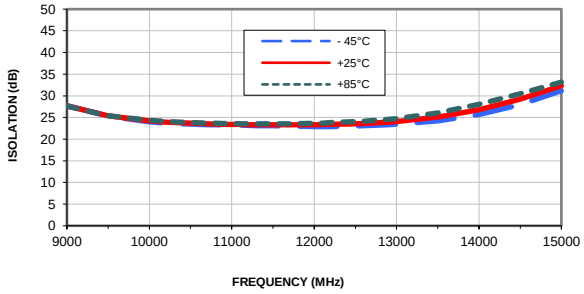
GAIN vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 5V



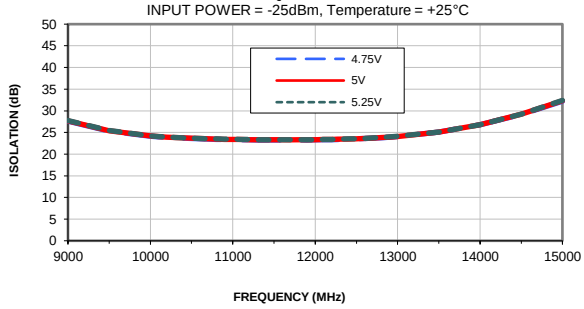
GAIN vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C



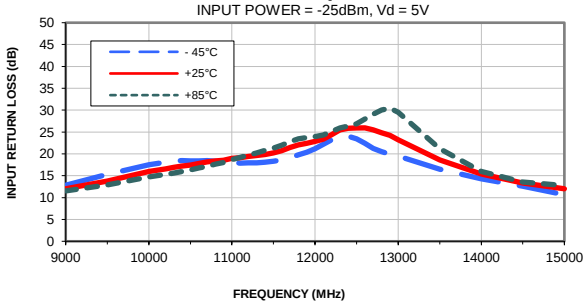
ISOLATION vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 5V



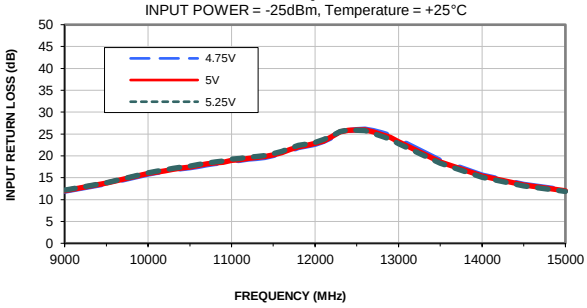
ISOLATION vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C



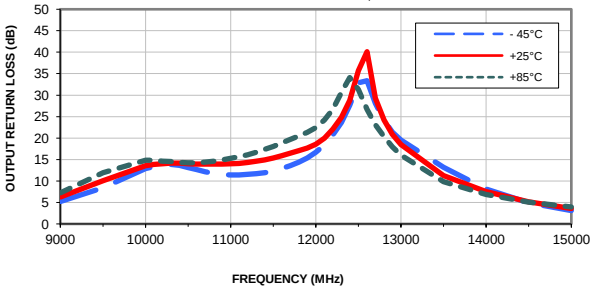
INPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 5V



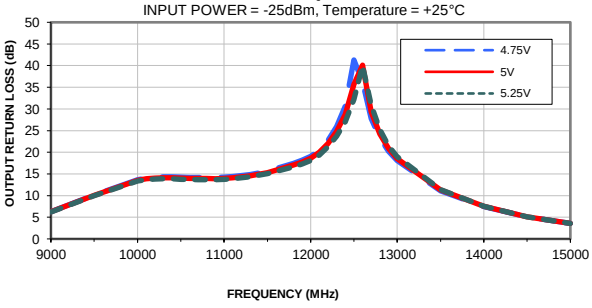
INPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C



OUTPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 5V

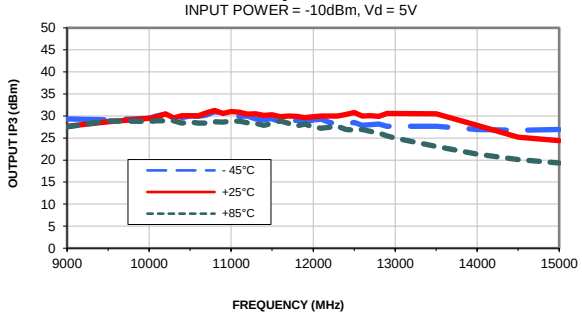


OUTPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C

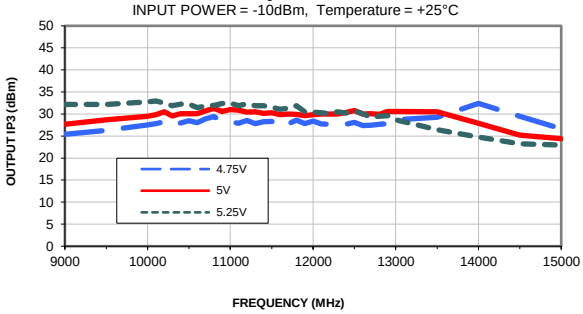


Typical Performance Curves

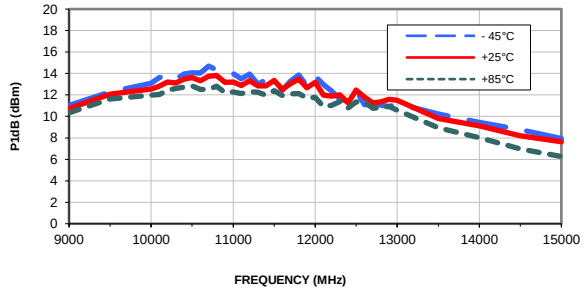
OUTPUT IP3 vs. FREQUENCY & TEMPERATURE
INPUT POWER = -10dBm, Vd = 5V



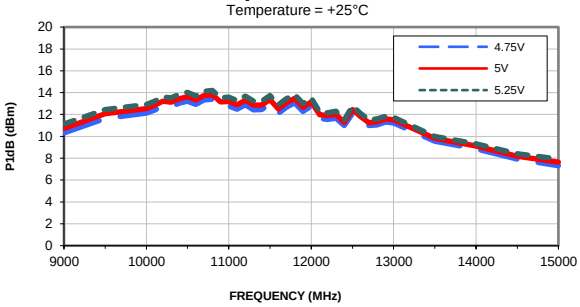
OUTPUT IP3 vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -10dBm, Temperature = +25°C



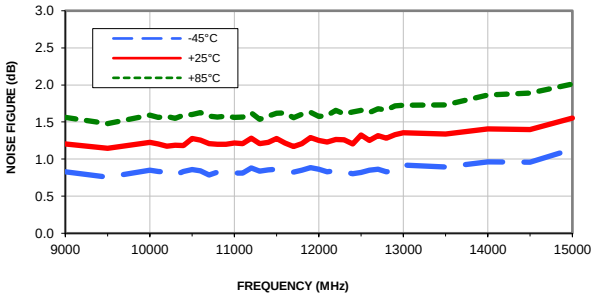
P1dB vs. FREQUENCY & TEMPERATURE
Vd = 5V



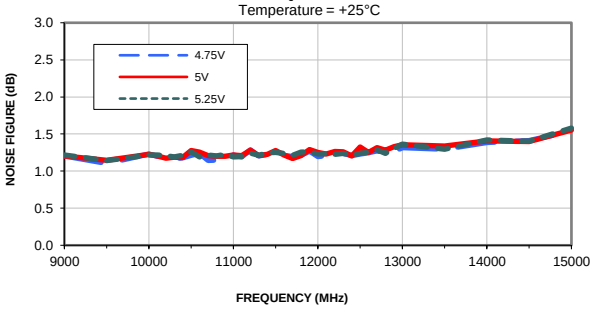
P1dB vs. FREQUENCY & DEVICE VOLTAGE
Temperature = +25°C



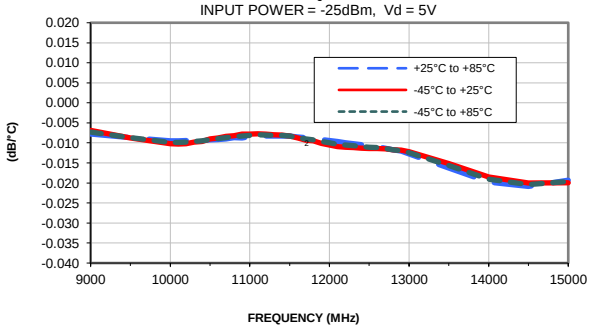
NOISE FIGURE vs. FREQUENCY & TEMPERATURE
Vd = 5V



NOISE FIGURE vs. FREQUENCY & DEVICE VOLTAGE
Temperature = +25°C



GAIN VARIATION vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 5V

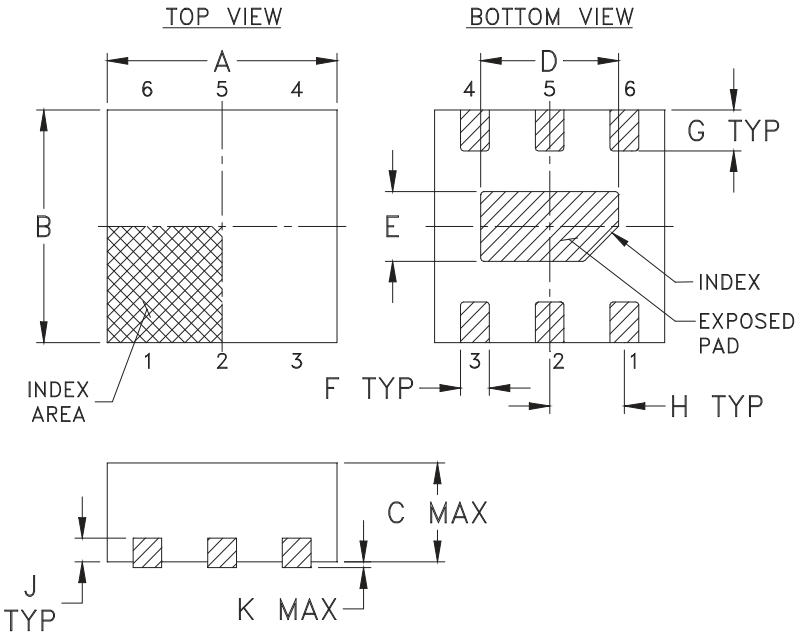


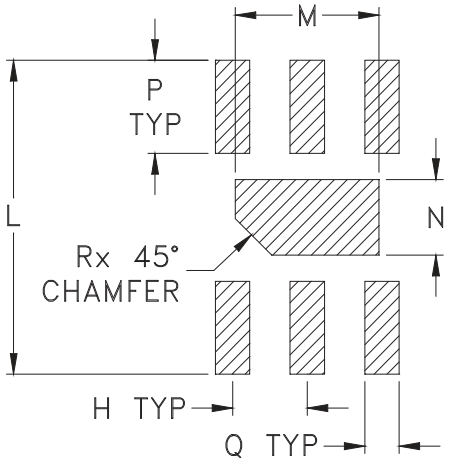
Case Style MC

MC1630-1

Outline Dimensions

PCB Land Pattern





Suggested Layout,
Tolerance to be within ±.002

CASE #.	A	B	C	D	E	F	G	H	J	K	L	M	N	P
MC1630-1	.079 (2.00)	.079 (2.00)	.039 (1.00)	.047 (1.20)	.024 (.60)	.010 (.25)	.014 (.35)	.026 (.65)	.008 (.20)	.002 (.05)	.106 (2.70)	.049 (1.25)	.026 (.65)	.031 (.80)

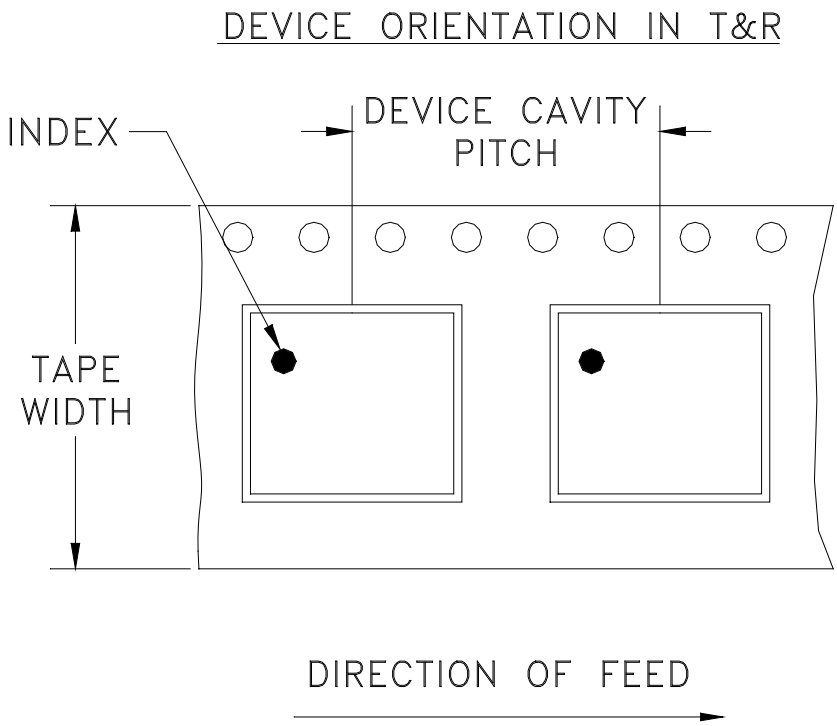
CASE #.	Q	R	WT, GRAM
MC1630-1	.012 (.30)	.012 (.30)	.006

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

Notes:

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

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

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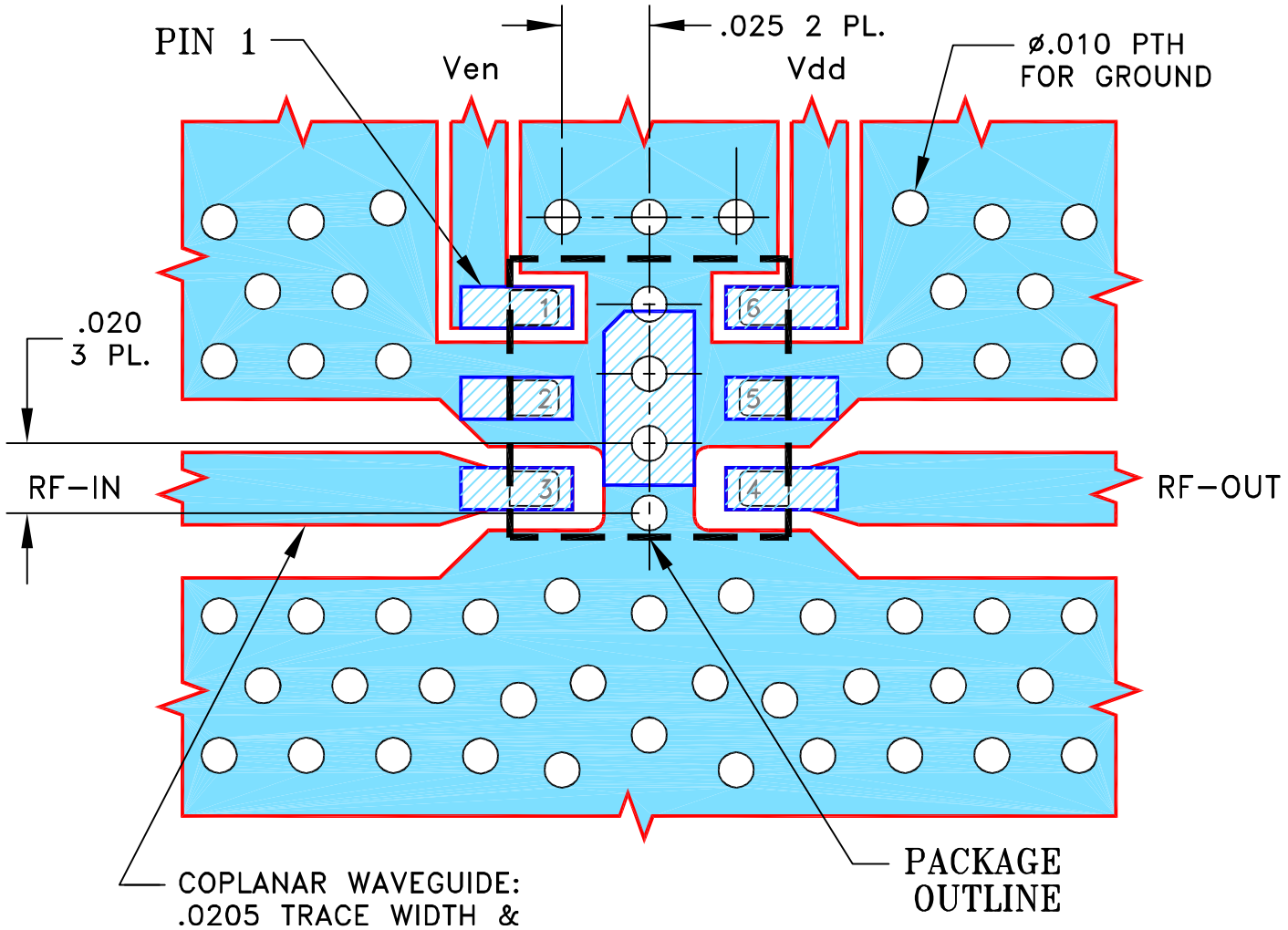
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010
Mini-Circuits ISO 9001 & ISO 14001 Certified

THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M167712	NEW RELEASE	05/11/18	CA	GH

SUGGESTED MOUNTING CONFIGURATION FOR MC1630-1 CASE STYLE, "06AM05" PIN CODE



NOTES:

1. TRACE WIDTH AND GAP PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .010"±.001". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS LINE 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	CA	05/04/18
TOLERANCES ON:	CHECKED	IL	05/09/18
2 PL DECIMALS ±	APPROVED	GH	05/11/18
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

ASHEETA1.DWG REV:A DATE:01/12/95

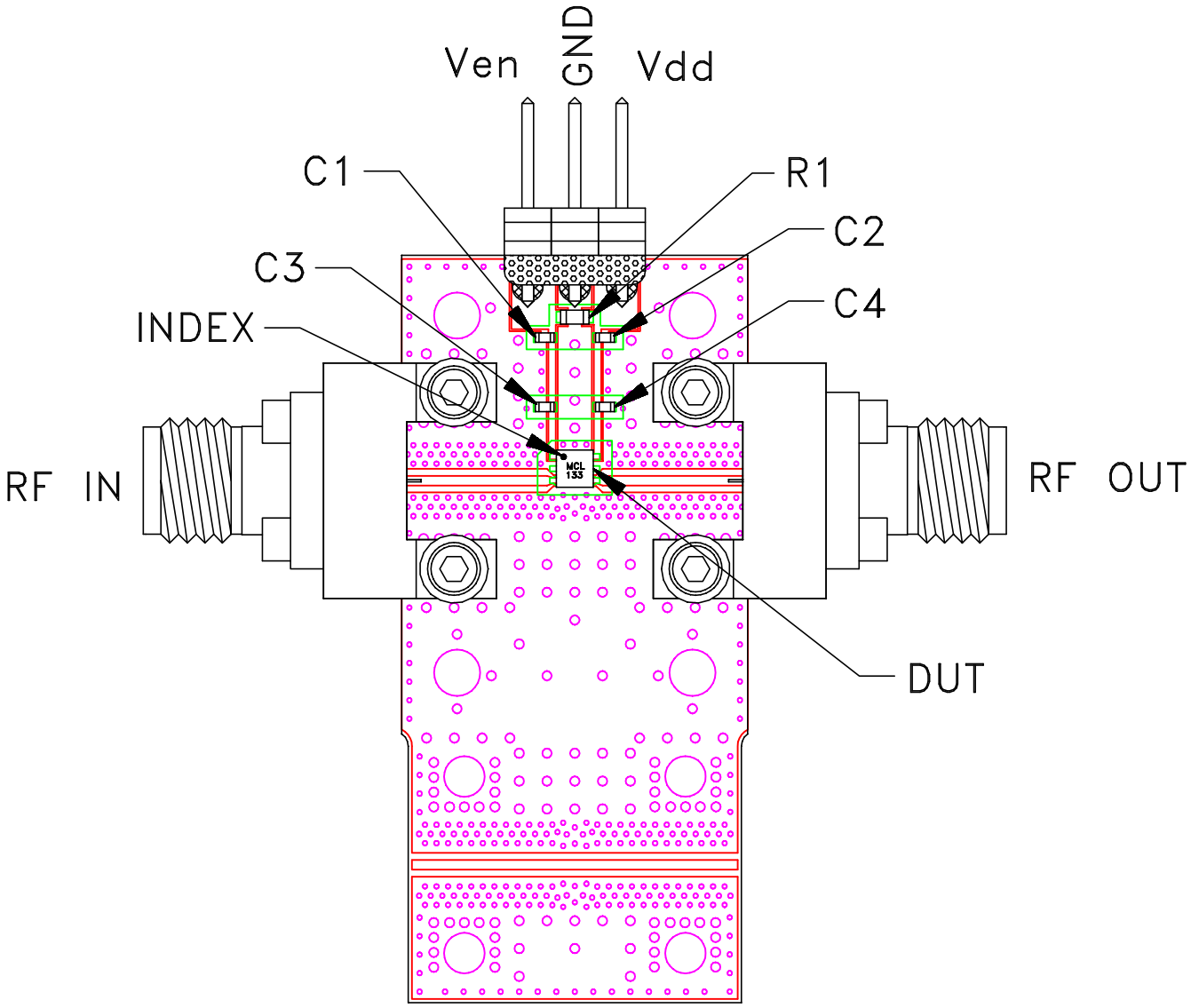
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 06AM05, MC1630-1, TB-991+

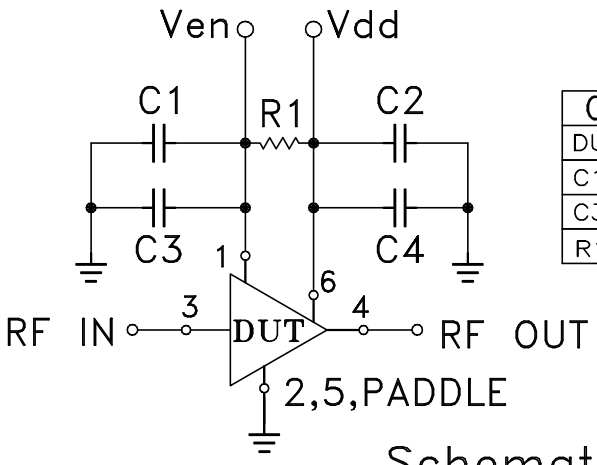
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-585	OR

FILE:	SCALE:	SHEET:
98PL585	20:1	1 OF 1

Evaluation Board and Circuit



TB-991+



Schematic Diagram

COMPONENT	VALUE	SIZE
DUT	PMA2-133LN+	2X2 MM
C1,C2	0.1 uF	0402
C3,C4	100 pF	
R1	0 Ohm	0603

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.010 inch.

Mini-Circuits®

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Environmental Specifications ENV08T1

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.

Specification	Test/Inspection Condition	Reference/Spec
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