WIDEBAND, LOW NOISE, LOW CURRENT

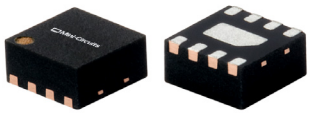
Monolithic Amplifier

PMA2-63LN+

50Ω 0.4 to 6 GHz

THE BIG DEAL

- Ultra wideband, 0.4 to 6 GHz
- Excellent noise figure, 0.5 dB at 2 GHz
- Low Current, 44 mA at 5V
- High Gain, 19.5 dB at 2 GHz
- High IP3, +31.7 dBm at 2 GHz



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

- 5G
- Fixed-Satellite
- Cellular Infrastructure
- Defense

PRODUCT OVERVIEW

The PMA2-63LN+ is a PHEMT based wideband, low noise MMIC amplifier with an unique combination of high gain, high IP3 and low noise figure, making it ideal for sensitive, high-dynamic-range receiver applications. This design operates on a single +5V supply, is well matched for 50 ohm and comes in a tiny, low profile package (2 x 2 mm, 8 lead MCLP), accommodating dense circuit board layouts.

KEY FEATURES

Feature	Advantages
Excellent Noise Figure up to 6 GHz • 0.5 dB typ. at 2 GHz • 0.7 dB typ. at 4 GHz	Enables lower system noise figure performance.
High IP3 • +31.7 dBm at 2 GHz • +31.6 dBm at 4 GHz	Combination of low noise figure 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 and two-tone IM performance at both ends of the dynamic range.
Low operating voltage & current +5V & 44 mA	Low voltage & current consumption is ideal for use in amplifier chain.
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.

REV. B
ECO-011027
PMA2-63LN+
GY/RS/CP
240327

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Monolithic Amplifier PMA2-63LN+

50Ω 0.4 to 6 GHz

ELECTRICAL SPECIFICATIONS[1] AT +25°C, ZO=50Ω UNLESS NOTED OTHERWISE

Parameter	Condition (GHz)	V_{DD}=+5 V & Vladj=Open			Units
		Min.	Typ.	Max.	
Frequency Range		0.4		6	GHz
Gain	0.4	21.1	24.1	25.8	dB
	1.0	19.9	22.7	24.4	
	2.0	17.2	19.5	21.0	
	4.0	13.1	14.7	16.5	
	6.0	—	11.5	—	
Input Return Loss	0.4		7.7		dB
	1.0		9.5		
	2.0		12.0		
	4.0		14.2		
	6.0		12.0		
Output Return Loss	0.4		9.4		dB
	1.0		9.1		
	2.0		7.7		
	4.0		7.1		
	6.0		6.4		
Output Power at 1dB Compression[2]	0.4		+17.2		dBm
	1.0		+17.1		
	2.0		+17.7		
	4.0		+18.4		
	6.0		+17.9		
Output IP3	0.4		+31.3		dBm
	1.0		+30.9		
	2.0		+31.7		
	4.0		+31.6		
	6.0		+32.8		
Noise Figure	0.4		0.5		dB
	1.0		0.5		
	2.0		0.5		
	4.0		0.7		
	6.0		1.0		
Device Operating Voltage (V_{DD})		+4.75	+5.0	+5.25	V
Device Operating Current (I_{DD})		–	44	61	mA
Device Current Variation vs. Temperature[2]			-81		µA/°C
Device Current Variation vs. Voltage			0.014		mA/mV
Thermal Resistance, junction-to-ground lead			65		°C/W

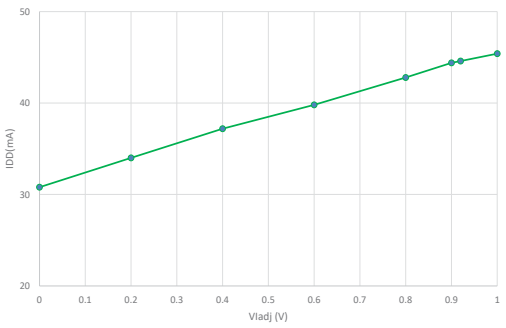
1. Measured on Mini-Circuits Characterization Test Board TB-PMA2-63LNE+. See Characterization Test & Application Circuit (Fig. 2)
2. Device Current Variation vs. Temperature= (Current in mA at 85°C - Current in mA at -45°C)/130°C
3. Device Current Variation vs. Voltage = (Current in mA at 5.25V – Current in mA at 4.75V) / ((5.25V-4.75V)*1000 mA/mV)

ABSOLUTE MAXIMUM RATINGS[5]

Parameter	Ratings
Operating Temperature (ground lead)	-40°C to +85°C
Storage Temperature	-65°C to +150°C
Junction Temperature	137°C
Total Power Dissipation	0.8 W
Input Power (CW), Vd=5V	+22 dBm (5 minutes max.) +13 dBm (continuous)
DC Voltage at Pad 1	+1.2 V
DC Voltage at Pad 6	+7 V

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

VOLTAGE LEVEL AT CURRENT ADJUSTMENT PAD (VLADJ) VS. DEVICE CURRENT (IDD)[4]

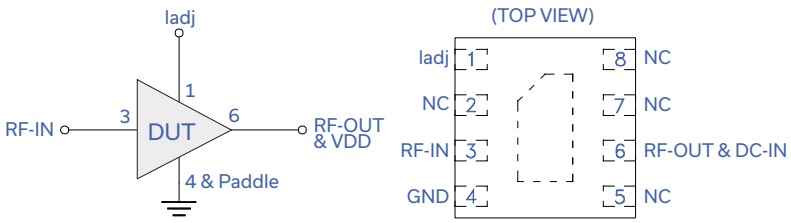


4. When Iadj connection is Open, Vladj=0.92V given a device with IDD=44 mA typ. For RF Performance at different Vladj, please see View Data and Graph.

Monolithic Amplifier PMA2-63LN+

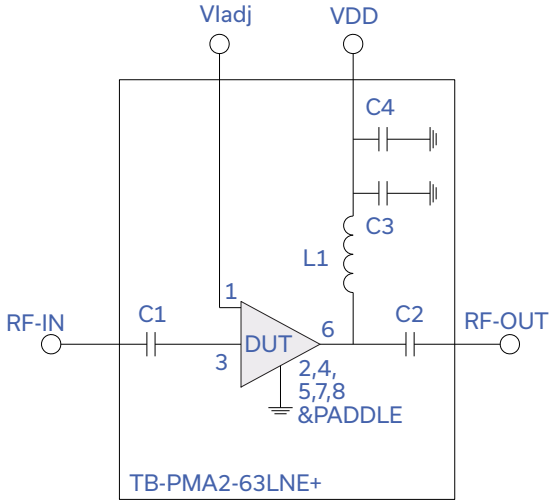
50Ω 0.4 to 6 GHz

SIMPLIFIED SCHEMATIC & PAD DESCRIPTION



Function	Pad Number	Description (See Figure 2)
RF-IN	3	Connects to RF input via C1
RF-OUT & DC-IN	6	Connects to RF out via C2 and connects to V_{DD} via L1
ladj	1	Current Adjustment Pad. Can adjust device current by supplying different voltage levels
No Connection	2,5,7 & 8	Not used internally. Connected to ground on Test Board
Ground	4 & Paddle	Connects to ground on Test board.

CHARACTERIZATION TEST & APPLICATION CIRCUIT

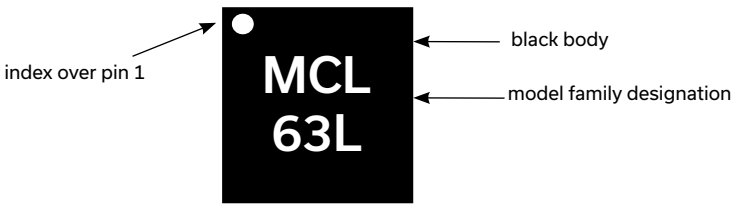


Components	Size	Value	Manufacturer	P/N
C1	0402	150pF	Murata	GRM1555C1H151JA01
C2		150pF		GRM1555C1H151JA01
C3		100pF		GRM1555C1H101JA1D
C4		1uF		GRM155R61E105KA12
L1		56nH	Coilcraft	0402CS-56NXGL

Fig 2. Application and Characterization Circuit
Note: This block diagram is used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-PMA2-63LNE+) 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: Pin= -25dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, 0 dBm/tone at output.

PRODUCT MARKING



Marking may contain other features or characters for internal lot control

Monolithic Amplifier PMA2-63LN+

50Ω 0.4 to 6 GHz

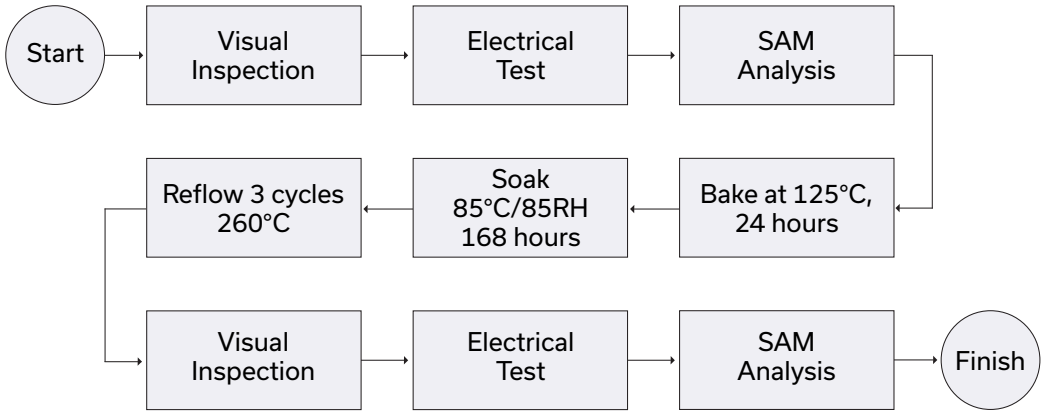
ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS CLICK HERE

Performance Data	Data Table Swept Graphs S-Parameter (S2P Files) Data Set (.zip file)
Case Style	MC1631-1 Plastic package, exposed paddle, lead finish: tin silver over nickel
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-683
Evaluation Board	TB-PMA2-63LNE+
Environmental Ratings	ENV08T1

ESD RATING

Human Body Model (HBM): Class 1A (250 to <500V) 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

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, VIadj=Open, Id = 44mA @ 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)
400	24.05	28.31	8.01	9.74	1.05	0.51	31.53	17.95	0.57
600	23.74	28.21	8.83	10.09	1.07	0.53	31.60	18.03	0.52
800	23.26	28.27	9.41	9.80	1.10	0.56	31.84	18.21	0.58
1000	22.69	28.27	9.92	9.43	1.13	0.59	31.21	17.78	0.54
1200	22.08	28.26	10.42	9.06	1.16	0.61	31.39	18.23	0.55
1400	21.44	28.22	10.90	8.74	1.19	0.64	31.26	18.30	0.61
1600	20.81	28.11	11.40	8.47	1.22	0.66	31.48	18.57	0.57
1800	20.18	28.01	11.90	8.26	1.26	0.68	31.42	18.29	0.62
2000	19.55	27.83	12.48	8.10	1.29	0.69	31.53	18.37	0.55
2200	18.91	27.71	13.11	7.94	1.34	0.71	31.08	18.24	0.56
2400	18.32	27.54	13.40	7.72	1.37	0.71	31.53	18.73	0.59
2600	17.83	27.26	13.51	7.56	1.38	0.72	31.58	18.41	0.62
2800	17.34	27.05	13.64	7.49	1.40	0.73	32.08	18.57	0.69
3000	16.90	26.71	14.01	7.48	1.41	0.73	30.70	18.98	0.65
3200	16.46	26.46	14.17	7.46	1.42	0.74	31.07	18.78	0.59
3400	16.03	26.20	14.31	7.46	1.44	0.75	31.90	19.09	0.58
3600	15.60	25.94	14.37	7.46	1.45	0.76	31.08	18.86	0.59
3800	15.21	25.71	14.37	7.46	1.47	0.77	31.69	19.00	0.70
4000	14.81	25.46	14.31	7.45	1.48	0.77	31.75	19.27	0.74
4200	14.43	25.23	14.19	7.44	1.49	0.78	31.26	19.06	0.72
4400	14.07	24.99	14.02	7.39	1.50	0.78	31.86	19.21	0.74
4600	13.72	24.81	13.80	7.32	1.51	0.79	31.63	18.97	0.75
4800	13.40	24.60	13.52	7.22	1.51	0.79	31.66	18.74	0.82
5000	13.08	24.39	13.24	7.09	1.50	0.79	31.74	18.90	0.82
5200	12.76	24.19	12.97	6.97	1.50	0.79	32.20	18.84	0.85
5400	12.45	24.07	12.71	6.79	1.51	0.79	32.08	18.61	0.95
5600	12.09	23.98	12.21	6.66	1.52	0.80	32.35	18.58	0.98
5800	11.84	23.75	12.12	6.54	1.51	0.79	32.62	18.31	1.01
6000	11.53	23.60	11.91	6.34	1.50	0.79	32.00	18.62	1.00

Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions

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

TEST CONDITIONS: Vd = 5.00V, VIadj=Open, Id = 46mA @ 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)
400	24.01	28.29	8.00	9.71	1.05	0.50	31.39	18.10	0.55
600	23.70	28.25	8.80	10.06	1.07	0.53	32.85	18.29	0.53
800	23.22	28.34	9.37	9.74	1.10	0.57	32.55	18.47	0.56
1000	22.65	28.29	9.88	9.37	1.13	0.59	31.99	18.03	0.57
1200	22.03	28.32	10.38	9.00	1.16	0.62	32.77	18.61	0.63
1400	21.40	28.25	10.84	8.68	1.20	0.64	31.42	18.55	0.59
1600	20.76	28.15	11.34	8.42	1.23	0.66	31.31	18.82	0.58
1800	20.13	28.07	11.85	8.21	1.27	0.68	31.68	18.53	0.56
2000	19.50	27.84	12.44	8.05	1.30	0.69	31.70	18.73	0.54
2200	18.86	27.79	13.05	7.89	1.35	0.71	30.67	18.48	0.58
2400	18.28	27.60	13.35	7.68	1.38	0.71	31.23	18.96	0.62
2600	17.78	27.28	13.52	7.53	1.39	0.72	31.10	18.51	0.64
2800	17.30	27.08	13.67	7.45	1.41	0.73	30.10	18.79	0.70
3000	16.85	26.78	14.07	7.45	1.42	0.74	31.42	19.07	0.66
3200	16.40	26.48	14.26	7.43	1.43	0.74	31.06	18.88	0.55
3400	15.98	26.23	14.43	7.43	1.44	0.75	31.74	19.19	0.61
3600	15.55	25.99	14.53	7.41	1.46	0.76	31.36	19.06	0.64
3800	15.15	25.72	14.53	7.41	1.47	0.76	31.43	19.21	0.67
4000	14.76	25.51	14.50	7.40	1.49	0.77	31.38	19.34	0.70
4200	14.38	25.27	14.38	7.38	1.50	0.78	31.78	19.14	0.71
4400	14.02	25.06	14.20	7.35	1.51	0.78	32.05	19.39	0.77
4600	13.67	24.82	13.94	7.28	1.51	0.79	31.30	19.16	0.80
4800	13.34	24.64	13.64	7.20	1.52	0.79	31.76	18.93	0.82
5000	13.02	24.44	13.30	7.09	1.52	0.79	31.77	19.08	0.89
5200	12.70	24.23	12.99	6.96	1.51	0.80	32.19	19.01	0.86
5400	12.38	24.12	12.67	6.80	1.52	0.79	31.54	18.81	0.91
5600	12.01	24.01	12.17	6.66	1.53	0.80	31.59	18.65	0.98
5800	11.76	23.80	12.02	6.55	1.52	0.80	31.92	18.51	1.00
6000	11.45	23.70	11.76	6.36	1.52	0.79	31.69	18.80	1.00

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, VIadj=Open, Id = 50mA @ 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)
400	24.22	28.44	8.25	9.84	1.05	0.50	31.49	18.35	0.57
600	23.91	28.36	9.10	10.18	1.07	0.53	32.40	18.54	0.54
800	23.42	28.38	9.70	9.86	1.10	0.55	31.96	18.83	0.62
1000	22.84	28.36	10.23	9.47	1.13	0.58	31.84	18.28	0.53
1200	22.22	28.38	10.75	9.08	1.16	0.61	32.65	18.85	0.56
1400	21.58	28.30	11.22	8.74	1.19	0.63	32.06	18.78	0.61
1600	20.94	28.26	11.72	8.47	1.23	0.66	31.56	19.05	0.56
1800	20.30	28.08	12.23	8.25	1.26	0.67	31.28	18.77	0.59
2000	19.67	27.87	12.81	8.09	1.29	0.69	31.76	18.96	0.56
2200	19.02	27.82	13.46	7.92	1.34	0.70	31.83	18.71	0.56
2400	18.43	27.59	13.75	7.70	1.37	0.71	32.16	19.19	0.77
2600	17.93	27.36	13.86	7.55	1.38	0.71	30.50	18.74	0.64
2800	17.44	27.11	13.97	7.47	1.40	0.72	30.05	19.01	0.71
3000	16.99	26.82	14.34	7.46	1.41	0.73	31.36	19.28	0.70
3200	16.55	26.51	14.50	7.45	1.42	0.74	31.06	19.08	0.59
3400	16.12	26.25	14.63	7.45	1.43	0.75	31.32	19.40	0.61
3600	15.69	25.97	14.69	7.45	1.45	0.75	31.23	19.27	0.65
3800	15.30	25.76	14.67	7.44	1.46	0.76	31.51	19.41	0.62
4000	14.90	25.49	14.59	7.44	1.47	0.77	31.56	19.54	0.72
4200	14.52	25.22	14.45	7.42	1.48	0.78	32.12	19.35	0.77
4400	14.16	25.05	14.28	7.38	1.50	0.78	31.34	19.60	0.76
4600	13.81	24.84	14.04	7.31	1.50	0.78	31.08	19.36	0.80
4800	13.49	24.62	13.76	7.22	1.50	0.79	31.04	19.02	0.83
5000	13.17	24.42	13.48	7.09	1.50	0.79	31.17	19.28	0.87
5200	12.85	24.21	13.19	6.97	1.50	0.79	31.54	19.11	0.90
5400	12.54	24.05	12.91	6.79	1.50	0.79	31.94	19.03	0.93
5600	12.18	23.98	12.39	6.66	1.51	0.79	31.49	18.86	0.98
5800	11.93	23.77	12.31	6.55	1.50	0.79	31.60	18.73	1.02
6000	11.62	23.66	12.09	6.35	1.51	0.78	31.47	19.01	1.04

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, VIadj=Open, Id = 51mA @ 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)
400	24.96	28.76	9.18	10.25	1.04	0.47	31.88	17.93	0.40
600	24.66	28.62	10.26	10.66	1.06	0.49	32.37	18.11	0.37
800	24.18	28.56	10.95	10.30	1.08	0.51	31.89	18.28	0.40
1000	23.63	28.57	11.57	9.90	1.11	0.54	31.67	18.06	0.39
1200	23.03	28.43	12.19	9.49	1.13	0.57	32.82	18.36	0.41
1400	22.40	28.34	12.71	9.11	1.15	0.59	32.37	18.48	0.41
1600	21.78	28.21	13.31	8.79	1.18	0.61	33.72	18.71	0.40
1800	21.16	28.07	13.90	8.54	1.21	0.63	32.25	18.64	0.39
2000	20.54	27.80	14.58	8.37	1.23	0.64	33.66	18.82	0.34
2200	19.90	27.64	15.38	8.20	1.26	0.66	33.30	18.71	0.33
2400	19.28	27.47	15.81	7.94	1.30	0.67	33.36	19.03	0.62
2600	18.80	27.21	15.88	7.73	1.31	0.67	33.12	18.76	0.41
2800	18.32	26.94	16.10	7.64	1.32	0.68	31.77	18.79	0.46
3000	17.88	26.60	16.75	7.64	1.32	0.69	33.78	19.27	0.44
3200	17.45	26.29	17.11	7.64	1.33	0.69	32.83	19.19	0.33
3400	17.03	26.01	17.42	7.67	1.34	0.70	33.85	19.27	0.34
3600	16.62	25.74	17.65	7.69	1.35	0.71	32.75	19.19	0.34
3800	16.23	25.46	17.77	7.71	1.36	0.72	33.09	19.16	0.41
4000	15.83	25.21	17.77	7.72	1.38	0.73	33.37	19.63	0.44
4200	15.45	25.01	17.63	7.70	1.39	0.74	33.09	19.12	0.46
4400	15.08	24.79	17.44	7.65	1.40	0.74	34.18	19.31	0.45
4600	14.74	24.55	17.16	7.55	1.40	0.74	33.47	19.15	0.48
4800	14.43	24.32	16.78	7.42	1.40	0.74	32.84	18.87	0.54
5000	14.12	24.09	16.36	7.28	1.40	0.74	33.44	19.11	0.55
5200	13.82	23.90	15.94	7.14	1.39	0.74	33.01	19.11	0.58
5400	13.52	23.71	15.54	6.96	1.39	0.74	34.47	18.54	0.58
5600	13.16	23.67	14.80	6.82	1.41	0.74	33.27	18.66	0.66
5800	12.93	23.42	14.74	6.73	1.40	0.74	33.17	18.27	0.65
6000	12.63	23.29	14.38	6.54	1.40	0.74	33.01	18.72	0.70

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, VIadj=Open, Id = 54mA @ 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)
400	24.99	28.79	9.24	10.27	1.04	0.47	31.88	18.35	0.41
600	24.69	28.64	10.33	10.67	1.06	0.49	32.37	18.53	0.35
800	24.20	28.61	10.99	10.28	1.08	0.51	32.36	18.69	0.42
1000	23.64	28.59	11.62	9.87	1.11	0.54	32.21	18.46	0.35
1200	23.03	28.47	12.23	9.46	1.13	0.57	33.81	18.76	0.40
1400	22.40	28.38	12.73	9.06	1.16	0.59	32.71	18.88	0.40
1600	21.77	28.25	13.35	8.77	1.18	0.61	33.63	19.10	0.37
1800	21.14	28.06	13.94	8.52	1.21	0.63	33.11	19.15	0.37
2000	20.52	27.90	14.59	8.32	1.24	0.65	33.66	19.08	0.36
2200	19.88	27.66	15.45	8.16	1.27	0.66	33.81	19.10	0.31
2400	19.26	27.52	15.86	7.91	1.30	0.67	33.36	19.29	0.38
2600	18.78	27.20	15.94	7.71	1.31	0.67	33.12	19.15	0.44
2800	18.31	26.96	16.25	7.63	1.32	0.68	31.77	19.18	0.47
3000	17.86	26.56	16.94	7.64	1.32	0.69	34.68	19.66	0.41
3200	17.43	26.31	17.34	7.63	1.33	0.69	32.83	19.69	0.34
3400	17.01	26.03	17.71	7.67	1.35	0.70	34.13	19.65	0.37
3600	16.59	25.72	17.92	7.69	1.35	0.71	32.75	19.58	0.39
3800	16.20	25.50	18.04	7.71	1.37	0.72	33.09	19.55	0.40
4000	15.80	25.24	18.06	7.72	1.38	0.73	33.37	20.02	0.46
4200	15.42	25.00	17.93	7.70	1.39	0.74	33.09	19.51	0.48
4400	15.05	24.76	17.75	7.65	1.40	0.74	34.64	19.69	0.49
4600	14.71	24.52	17.44	7.55	1.40	0.74	33.47	19.54	0.48
4800	14.39	24.32	17.00	7.43	1.40	0.74	33.97	19.38	0.56
5000	14.09	24.09	16.51	7.28	1.40	0.74	34.86	19.50	0.56
5200	13.78	23.89	16.06	7.15	1.40	0.74	33.01	19.50	0.52
5400	13.48	23.76	15.62	6.98	1.40	0.74	34.62	19.05	0.54
5600	13.11	23.66	14.83	6.83	1.41	0.75	34.01	19.05	0.62
5800	12.88	23.41	14.69	6.75	1.40	0.75	33.17	18.79	0.63
6000	12.58	23.31	14.30	6.58	1.41	0.74	33.01	19.10	0.64

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, VIadj=Open, Id = 58mA @ 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)
400	25.02	28.78	9.33	10.31	1.04	0.46	33.38	18.77	0.38
600	24.71	28.70	10.38	10.70	1.06	0.49	32.96	18.94	0.36
800	24.23	28.63	11.09	10.33	1.08	0.51	34.63	19.23	0.39
1000	23.66	28.55	11.72	9.91	1.10	0.54	33.73	18.85	0.35
1200	23.05	28.50	12.33	9.48	1.13	0.57	33.71	19.28	0.41
1400	22.42	28.43	12.89	9.11	1.16	0.59	33.86	19.38	0.41
1600	21.79	28.21	13.48	8.79	1.18	0.61	34.44	19.49	0.38
1800	21.17	28.07	14.08	8.56	1.21	0.63	34.77	19.53	0.37
2000	20.54	27.90	14.77	8.37	1.24	0.65	33.84	19.58	0.33
2200	19.90	27.71	15.59	8.20	1.27	0.66	33.32	19.47	0.31
2400	19.27	27.53	15.99	7.94	1.30	0.67	34.75	19.79	0.35
2600	18.79	27.17	16.02	7.74	1.30	0.67	34.96	19.65	0.39
2800	18.32	26.92	16.20	7.66	1.32	0.68	35.66	19.67	0.45
3000	17.88	26.60	16.80	7.68	1.32	0.69	34.99	20.03	0.43
3200	17.44	26.28	17.11	7.67	1.33	0.70	34.89	20.06	0.32
3400	17.02	26.00	17.42	7.69	1.34	0.70	34.91	20.03	0.33
3600	16.60	25.75	17.58	7.71	1.36	0.71	35.37	20.08	0.35
3800	16.21	25.48	17.64	7.73	1.37	0.72	34.41	20.06	0.37
4000	15.81	25.27	17.60	7.73	1.38	0.73	36.25	20.39	0.44
4200	15.43	24.99	17.48	7.74	1.39	0.74	34.09	20.01	0.43
4400	15.06	24.80	17.29	7.69	1.41	0.74	35.80	20.18	0.45
4600	14.73	24.54	16.95	7.61	1.41	0.74	36.85	20.04	0.51
4800	14.41	24.34	16.59	7.49	1.41	0.75	34.12	19.75	0.51
5000	14.11	24.10	16.16	7.34	1.40	0.74	35.57	19.99	0.55
5200	13.80	23.91	15.80	7.20	1.40	0.74	34.85	19.99	0.56
5400	13.50	23.73	15.43	7.01	1.40	0.74	34.94	19.43	0.57
5600	13.14	23.66	14.73	6.85	1.41	0.75	35.31	19.55	0.59
5800	12.90	23.43	14.71	6.75	1.40	0.74	35.56	19.17	0.67
6000	12.61	23.29	14.35	6.55	1.40	0.74	34.76	19.60	0.64

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, VIadj=Open, Id = 41mA @ 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)
400	23.43	28.04	7.43	9.37	1.05	0.53	28.86	16.34	0.73
600	23.13	28.00	8.13	9.71	1.08	0.56	30.67	16.55	0.70
800	22.66	27.98	8.64	9.44	1.10	0.58	30.11	16.73	0.73
1000	22.10	28.06	9.09	9.11	1.14	0.61	29.69	16.28	0.68
1200	21.50	28.09	9.55	8.77	1.17	0.64	30.55	16.74	0.78
1400	20.87	28.04	10.00	8.49	1.21	0.66	30.00	16.68	0.79
1600	20.25	27.96	10.48	8.24	1.24	0.68	30.94	16.98	0.74
1800	19.63	27.93	10.96	8.04	1.29	0.70	30.62	16.68	0.76
2000	19.00	27.80	11.51	7.90	1.33	0.71	31.32	16.88	0.73
2200	18.38	27.65	12.04	7.75	1.37	0.72	30.48	16.62	0.74
2400	17.81	27.50	12.33	7.57	1.41	0.73	31.24	17.15	0.78
2600	17.31	27.25	12.51	7.44	1.42	0.73	31.48	16.66	0.80
2800	16.81	27.10	12.66	7.37	1.45	0.75	32.26	16.87	0.92
3000	16.37	26.79	13.00	7.36	1.46	0.75	31.81	17.21	0.87
3200	15.93	26.55	13.17	7.34	1.48	0.76	31.27	16.91	0.80
3400	15.50	26.28	13.32	7.34	1.50	0.77	32.24	17.36	0.81
3600	15.08	26.05	13.40	7.34	1.51	0.77	31.71	17.09	0.85
3800	14.69	25.84	13.42	7.36	1.53	0.78	31.82	17.23	0.88
4000	14.30	25.57	13.37	7.37	1.54	0.79	32.42	17.51	0.94
4200	13.92	25.40	13.24	7.39	1.57	0.80	32.59	17.22	0.97
4400	13.56	25.18	13.08	7.39	1.58	0.81	33.48	17.47	1.00
4600	13.22	24.97	12.84	7.36	1.59	0.81	34.29	17.21	1.01
4800	12.88	24.78	12.55	7.31	1.59	0.82	33.57	16.86	1.08
5000	12.55	24.55	12.26	7.21	1.59	0.82	34.07	17.10	1.13
5200	12.22	24.42	11.97	7.09	1.60	0.82	36.47	16.89	1.17
5400	11.89	24.26	11.71	6.92	1.60	0.82	35.60	16.84	1.18
5600	11.52	24.20	11.25	6.77	1.62	0.83	35.33	16.61	1.33
5800	11.26	24.02	11.15	6.62	1.61	0.82	35.33	16.53	1.33
6000	10.94	23.89	10.96	6.39	1.61	0.82	36.85	16.63	1.29

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, VIadj=Open, Id = 44mA @ 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)
400	23.52	28.10	7.55	9.42	1.05	0.53	29.75	16.58	0.73
600	23.21	28.01	8.24	9.75	1.07	0.55	30.61	16.78	0.68
800	22.74	28.04	8.76	9.47	1.10	0.58	30.60	16.96	0.76
1000	22.17	28.14	9.22	9.11	1.14	0.61	30.45	16.39	0.73
1200	21.56	28.14	9.68	8.77	1.17	0.63	31.86	16.97	0.72
1400	20.94	28.11	10.14	8.47	1.21	0.66	30.69	16.91	0.78
1600	20.31	28.04	10.62	8.23	1.25	0.68	31.22	17.20	0.75
1800	19.68	27.96	11.10	8.04	1.29	0.69	31.29	16.90	0.80
2000	19.06	27.86	11.66	7.88	1.33	0.71	31.20	17.10	0.78
2200	18.43	27.77	12.18	7.72	1.38	0.72	30.85	16.84	0.76
2400	17.86	27.57	12.47	7.55	1.41	0.73	32.47	17.25	0.73
2600	17.35	27.37	12.65	7.42	1.43	0.73	31.56	16.87	0.82
2800	16.86	27.16	12.79	7.35	1.45	0.74	30.32	17.19	0.92
3000	16.41	26.83	13.13	7.34	1.46	0.75	32.84	17.41	0.89
3200	15.97	26.61	13.29	7.31	1.48	0.76	31.85	17.10	0.81
3400	15.55	26.35	13.44	7.32	1.50	0.76	32.43	17.56	0.83
3600	15.13	26.10	13.52	7.33	1.52	0.77	32.12	17.28	0.90
3800	14.73	25.83	13.53	7.34	1.53	0.78	32.61	17.43	0.94
4000	14.34	25.66	13.49	7.35	1.55	0.79	34.28	17.58	0.94
4200	13.97	25.43	13.36	7.37	1.57	0.80	33.09	17.42	0.99
4400	13.60	25.22	13.17	7.37	1.58	0.80	32.96	17.66	1.06
4600	13.26	25.04	12.94	7.35	1.59	0.81	33.06	17.41	1.09
4800	12.92	24.83	12.64	7.29	1.60	0.82	34.54	17.05	1.15
5000	12.59	24.60	12.34	7.20	1.59	0.82	33.94	17.18	1.18
5200	12.26	24.47	12.06	7.09	1.60	0.82	36.03	17.09	1.19
5400	11.93	24.33	11.77	6.91	1.61	0.82	35.32	17.05	1.21
5600	11.57	24.27	11.33	6.77	1.62	0.83	34.10	16.81	1.33
5800	11.30	24.06	11.21	6.62	1.61	0.82	36.08	16.74	1.32
6000	10.99	23.92	11.02	6.38	1.61	0.81	36.97	16.83	1.33

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, VIadj=Open, Id = 46mA @ 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)
400	23.59	28.12	7.63	9.45	1.05	0.52	29.80	16.68	0.71
600	23.28	28.11	8.34	9.77	1.08	0.55	30.73	16.88	0.71
800	22.80	28.04	8.87	9.47	1.10	0.57	30.87	17.17	0.75
1000	22.23	28.17	9.32	9.12	1.14	0.61	30.55	16.60	0.72
1200	21.62	28.15	9.79	8.76	1.17	0.63	31.55	17.18	0.86
1400	20.99	28.10	10.24	8.46	1.20	0.65	31.07	17.00	0.78
1600	20.36	28.07	10.72	8.20	1.24	0.67	31.40	17.40	0.74
1800	19.73	28.01	11.21	8.00	1.29	0.69	31.40	17.10	0.79
2000	19.10	27.89	11.77	7.85	1.33	0.71	32.40	17.19	0.80
2200	18.47	27.74	12.28	7.69	1.37	0.72	32.32	16.92	0.78
2400	17.90	27.65	12.58	7.51	1.41	0.73	31.98	17.44	0.79
2600	17.40	27.39	12.75	7.37	1.43	0.73	31.52	17.06	0.87
2800	16.90	27.18	12.89	7.31	1.45	0.74	30.46	17.27	0.96
3000	16.46	26.82	13.22	7.29	1.45	0.75	32.36	17.48	0.91
3200	16.02	26.67	13.39	7.28	1.49	0.76	31.55	17.28	0.83
3400	15.59	26.37	13.53	7.29	1.49	0.76	32.26	17.63	0.80
3600	15.16	26.16	13.60	7.29	1.52	0.77	32.34	17.35	0.89
3800	14.77	25.91	13.61	7.30	1.53	0.78	33.78	17.62	0.97
4000	14.38	25.69	13.56	7.31	1.55	0.79	33.39	17.65	0.98
4200	14.00	25.47	13.42	7.33	1.56	0.79	33.33	17.48	0.99
4400	13.64	25.28	13.23	7.33	1.58	0.80	33.14	17.72	1.05
4600	13.30	25.05	12.99	7.30	1.59	0.81	33.25	17.59	1.10
4800	12.96	24.84	12.70	7.24	1.59	0.81	34.53	17.24	1.17
5000	12.63	24.67	12.39	7.15	1.59	0.82	33.77	17.36	1.19
5200	12.30	24.47	12.11	7.04	1.59	0.82	34.57	17.27	1.25
5400	11.98	24.33	11.83	6.86	1.60	0.82	35.33	17.24	1.26
5600	11.61	24.28	11.37	6.72	1.62	0.82	34.03	16.88	1.34
5800	11.35	24.09	11.26	6.58	1.61	0.82	34.37	16.82	1.35
6000	11.03	23.97	11.07	6.35	1.61	0.81	35.77	17.02	1.37

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, Vladj = Ground, Id = 32mA @ 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)
400	23.37	27.92	7.22	9.11	1.05	0.51	27.64	16.08	0.58
600	23.10	27.89	7.93	9.45	1.07	0.54	27.66	16.04	0.48
800	22.65	27.91	8.46	9.22	1.09	0.57	28.33	16.37	0.55
1000	22.11	27.99	8.94	8.92	1.13	0.60	27.57	16.00	0.50
1200	21.52	28.03	9.41	8.59	1.16	0.62	28.50	16.44	0.62
1400	20.91	28.00	9.86	8.31	1.20	0.65	28.40	16.58	0.52
1600	20.30	27.94	10.33	8.07	1.23	0.67	28.99	16.88	0.55
1800	19.68	27.89	10.78	7.88	1.27	0.69	28.98	16.90	0.55
2000	19.07	27.73	11.31	7.73	1.31	0.70	29.72	17.00	0.55
2200	18.43	27.66	11.85	7.57	1.36	0.71	29.37	16.90	0.55
2400	17.85	27.59	12.12	7.38	1.40	0.72	30.18	17.61	0.59
2600	17.36	27.27	12.24	7.23	1.40	0.72	29.33	17.30	0.61
2800	16.90	27.08	12.41	7.16	1.42	0.73	29.52	17.64	0.64
3000	16.45	26.81	12.57	7.13	1.44	0.74	30.65	18.25	0.67
3200	16.01	26.62	12.72	7.12	1.46	0.75	30.19	18.19	0.59
3400	15.58	26.39	12.79	7.12	1.48	0.76	31.10	18.53	0.62
3600	15.16	26.09	12.83	7.12	1.49	0.77	30.58	18.45	0.62
3800	14.77	25.93	12.80	7.13	1.51	0.78	31.01	18.44	0.71
4000	14.38	25.72	12.78	7.14	1.53	0.78	31.34	18.89	0.71
4200	14.00	25.47	12.69	7.13	1.54	0.79	30.82	18.55	0.74
4400	13.64	25.29	12.56	7.08	1.55	0.80	31.80	18.87	0.76
4600	13.30	25.10	12.36	7.04	1.56	0.80	31.23	18.61	0.79
4800	12.98	24.85	12.18	6.94	1.56	0.80	30.74	18.36	0.85
5000	12.67	24.71	11.96	6.82	1.56	0.80	31.34	18.69	0.83
5200	12.36	24.48	11.74	6.70	1.55	0.80	30.39	18.62	0.84
5400	12.05	24.34	11.59	6.55	1.56	0.80	31.69	18.28	0.95
5600	11.74	24.15	11.40	6.39	1.55	0.80	30.57	18.46	0.87
5800	11.44	24.02	11.22	6.24	1.55	0.80	30.10	18.09	0.99
6000	11.12	23.91	11.06	6.03	1.55	0.79	30.24	18.45	1.03

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 = 5.00V, VIadj = 0.2V, Id = 35mA @ 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)
400	23.60	28.06	7.49	9.33	1.05	0.51	28.20	16.69	0.55
600	23.32	28.00	8.23	9.67	1.07	0.54	28.91	16.77	0.51
800	22.86	28.04	8.77	9.41	1.10	0.56	29.55	17.10	0.54
1000	22.30	28.07	9.27	9.08	1.13	0.59	28.87	16.70	0.50
1200	21.71	28.10	9.75	8.74	1.16	0.62	29.88	17.16	0.61
1400	21.09	28.11	10.21	8.45	1.20	0.65	29.44	17.27	0.57
1600	20.47	28.00	10.69	8.19	1.23	0.66	30.14	17.57	0.58
1800	19.85	27.92	11.15	7.99	1.27	0.68	30.16	17.43	0.60
2000	19.23	27.85	11.69	7.83	1.31	0.70	30.04	17.53	0.57
2200	18.59	27.75	12.24	7.66	1.36	0.71	30.45	17.41	0.55
2400	18.00	27.61	12.50	7.47	1.40	0.72	30.72	18.10	0.58
2600	17.51	27.32	12.62	7.32	1.40	0.72	30.64	17.78	0.59
2800	17.04	27.06	12.79	7.25	1.41	0.73	30.99	18.11	0.70
3000	16.59	26.84	12.95	7.21	1.43	0.74	31.24	18.55	0.64
3200	16.14	26.57	13.09	7.21	1.45	0.75	31.68	18.35	0.54
3400	15.72	26.38	13.15	7.21	1.47	0.76	32.64	18.82	0.59
3600	15.30	26.10	13.20	7.22	1.48	0.77	31.73	18.59	0.61
3800	14.90	25.87	13.16	7.23	1.50	0.77	32.25	18.59	0.71
4000	14.51	25.64	13.13	7.23	1.51	0.78	32.86	19.15	0.73
4200	14.13	25.43	13.02	7.22	1.53	0.79	32.69	18.82	0.71
4400	13.77	25.22	12.88	7.18	1.54	0.79	34.55	19.00	0.78
4600	13.43	25.01	12.67	7.13	1.54	0.80	33.79	18.87	0.80
4800	13.11	24.79	12.49	7.04	1.54	0.80	33.36	18.63	0.79
5000	12.79	24.59	12.25	6.92	1.54	0.80	33.55	18.93	0.87
5200	12.49	24.41	12.03	6.80	1.54	0.80	33.75	18.75	0.89
5400	12.18	24.26	11.86	6.64	1.54	0.80	36.12	18.54	0.93
5600	11.87	24.08	11.67	6.49	1.54	0.80	34.11	18.58	0.98
5800	11.57	23.95	11.48	6.34	1.54	0.79	34.03	18.23	1.02
6000	11.25	23.83	11.32	6.13	1.54	0.79	34.47	18.56	0.96

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, VIadj = 0.4V, Id = 39mA @ 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)
400	23.80	28.15	7.71	9.49	1.05	0.51	29.75	17.23	0.57
600	23.50	28.12	8.49	9.85	1.07	0.54	30.02	17.44	0.50
800	23.03	28.15	9.05	9.57	1.10	0.56	30.78	17.62	0.55
1000	22.47	28.14	9.56	9.22	1.13	0.59	29.64	17.21	0.52
1200	21.87	28.22	10.05	8.86	1.16	0.62	30.15	17.68	0.59
1400	21.24	28.15	10.52	8.55	1.20	0.64	30.30	17.77	0.54
1600	20.61	28.06	11.00	8.28	1.23	0.66	30.49	18.06	0.61
1800	19.98	27.97	11.47	8.07	1.26	0.68	30.57	17.91	0.56
2000	19.36	27.87	12.02	7.92	1.31	0.70	31.45	18.01	0.54
2200	18.72	27.75	12.59	7.75	1.35	0.71	30.49	17.88	0.52
2400	18.12	27.61	12.85	7.54	1.39	0.72	31.24	18.54	0.55
2600	17.63	27.32	12.96	7.39	1.39	0.72	31.14	18.09	0.57
2800	17.16	27.09	13.13	7.31	1.41	0.73	31.33	18.41	0.63
3000	16.70	26.83	13.29	7.28	1.43	0.74	31.85	18.70	0.64
3200	16.26	26.54	13.43	7.28	1.44	0.75	32.49	18.63	0.57
3400	15.83	26.31	13.48	7.28	1.46	0.76	32.60	18.95	0.59
3600	15.41	26.10	13.53	7.29	1.48	0.76	32.53	18.72	0.64
3800	15.01	25.82	13.47	7.30	1.48	0.77	33.61	18.86	0.71
4000	14.62	25.59	13.45	7.31	1.50	0.78	33.16	19.27	0.68
4200	14.24	25.37	13.32	7.30	1.51	0.79	32.26	18.95	0.72
4400	13.88	25.19	13.18	7.25	1.53	0.79	33.23	19.24	0.77
4600	13.54	24.96	12.95	7.21	1.53	0.80	34.06	18.99	0.81
4800	13.22	24.70	12.76	7.12	1.53	0.80	34.59	18.75	0.84
5000	12.90	24.49	12.51	7.00	1.52	0.80	34.26	19.05	0.85
5200	12.60	24.34	12.29	6.88	1.53	0.80	35.01	18.87	0.91
5400	12.29	24.17	12.12	6.73	1.52	0.80	37.47	18.66	0.85
5600	11.98	24.02	11.92	6.57	1.53	0.80	34.78	18.69	0.91
5800	11.68	23.86	11.73	6.42	1.53	0.79	37.42	18.35	0.99
6000	11.36	23.76	11.55	6.21	1.53	0.79	35.91	18.67	1.00

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, VIadj = 0.6V, Id = 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)
400	23.95	28.25	7.91	9.64	1.05	0.50	30.18	17.72	0.62
600	23.65	28.18	8.72	9.99	1.07	0.53	31.44	17.80	0.49
800	23.18	28.23	9.29	9.69	1.10	0.56	31.06	18.10	0.52
1000	22.61	28.18	9.81	9.33	1.12	0.58	30.77	17.68	0.49
1200	22.00	28.24	10.32	8.96	1.16	0.62	31.27	18.15	0.56
1400	21.36	28.22	10.79	8.64	1.20	0.64	31.21	18.10	0.57
1600	20.73	28.10	11.29	8.37	1.23	0.66	31.63	18.39	0.54
1800	20.10	28.02	11.76	8.15	1.26	0.68	30.62	18.22	0.59
2000	19.47	27.85	12.31	7.99	1.30	0.69	31.87	18.32	0.51
2200	18.83	27.81	12.90	7.81	1.35	0.71	31.45	18.19	0.54
2400	18.23	27.58	13.16	7.60	1.38	0.71	32.77	18.70	0.56
2600	17.74	27.33	13.26	7.46	1.39	0.72	31.18	18.37	0.60
2800	17.27	27.09	13.44	7.38	1.41	0.73	30.77	18.68	0.67
3000	16.81	26.83	13.59	7.35	1.42	0.74	32.01	18.95	0.63
3200	16.36	26.53	13.73	7.35	1.43	0.74	31.47	18.75	0.54
3400	15.93	26.23	13.79	7.35	1.44	0.75	32.54	19.07	0.62
3600	15.51	26.04	13.83	7.35	1.46	0.76	31.90	18.97	0.66
3800	15.11	25.78	13.77	7.36	1.47	0.77	33.06	18.98	0.67
4000	14.72	25.56	13.73	7.37	1.49	0.78	32.82	19.38	0.76
4200	14.34	25.33	13.60	7.37	1.50	0.78	32.89	19.06	0.69
4400	13.98	25.12	13.46	7.33	1.52	0.79	32.30	19.34	0.77
4600	13.64	24.87	13.23	7.28	1.52	0.79	32.97	19.10	0.80
4800	13.32	24.66	13.03	7.19	1.52	0.80	33.03	18.86	0.83
5000	13.00	24.49	12.77	7.07	1.52	0.80	32.75	19.14	0.86
5200	12.70	24.27	12.54	6.95	1.51	0.80	34.63	18.97	0.90
5400	12.39	24.12	12.35	6.80	1.52	0.80	33.67	18.77	0.89
5600	12.08	23.92	12.14	6.64	1.51	0.79	34.44	18.67	0.86
5800	11.78	23.80	11.94	6.49	1.52	0.79	36.42	18.46	1.02
6000	11.46	23.67	11.76	6.28	1.52	0.78	33.84	18.77	0.98

Typical Performance Data

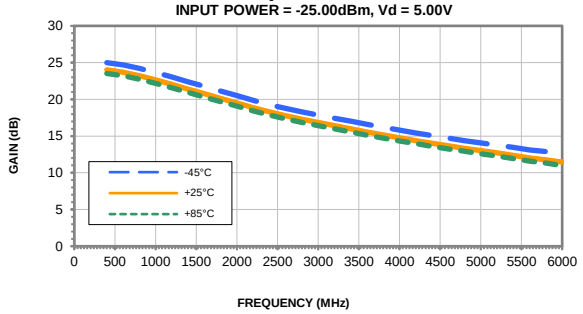
Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.00V, VIadj = 0.8V, Id = 45mA @ Temperature = +25°C

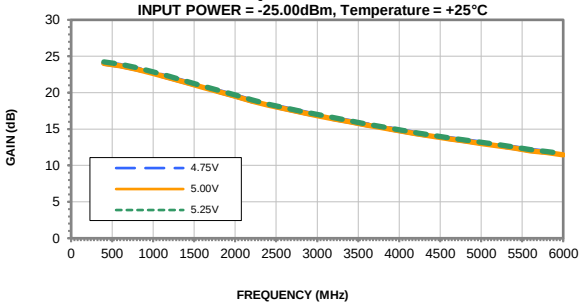
FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
400	24.09	28.39	8.10	9.76	1.05	0.51	30.32	17.92	0.58
600	23.78	28.25	8.92	10.11	1.07	0.53	31.93	18.12	0.51
800	23.30	28.29	9.51	9.81	1.10	0.56	31.96	18.42	0.53
1000	22.73	28.30	10.04	9.43	1.13	0.59	31.31	17.87	0.52
1200	22.11	28.30	10.56	9.04	1.16	0.61	32.33	18.46	0.62
1400	21.48	28.29	11.03	8.72	1.20	0.64	31.75	18.40	0.55
1600	20.84	28.15	11.53	8.44	1.23	0.66	30.95	18.79	0.56
1800	20.21	28.09	12.01	8.21	1.26	0.68	31.55	18.51	0.55
2000	19.58	27.93	12.59	8.05	1.30	0.69	31.45	18.60	0.54
2200	18.93	27.80	13.18	7.87	1.34	0.70	31.30	18.46	0.58
2400	18.33	27.59	13.44	7.66	1.37	0.71	31.32	18.96	0.55
2600	17.83	27.38	13.55	7.50	1.39	0.72	31.78	18.51	0.61
2800	17.37	27.05	13.73	7.43	1.39	0.72	31.10	18.81	0.69
3000	16.90	26.79	13.89	7.40	1.41	0.73	31.06	19.07	0.66
3200	16.46	26.52	14.04	7.40	1.42	0.74	32.08	18.99	0.54
3400	16.02	26.25	14.08	7.40	1.44	0.75	31.86	19.30	0.59
3600	15.60	26.00	14.12	7.41	1.45	0.76	31.33	19.07	0.61
3800	15.20	25.79	14.05	7.42	1.47	0.77	31.56	19.21	0.70
4000	14.81	25.51	14.02	7.43	1.48	0.77	31.63	19.48	0.69
4200	14.43	25.30	13.90	7.42	1.50	0.78	32.22	19.17	0.72
4400	14.07	25.05	13.73	7.38	1.50	0.79	32.22	19.43	0.77
4600	13.73	24.82	13.48	7.34	1.51	0.79	31.96	19.20	0.82
4800	13.41	24.60	13.28	7.25	1.51	0.79	32.28	18.97	0.81
5000	13.09	24.41	13.02	7.13	1.51	0.79	31.67	19.23	0.86
5200	12.79	24.26	12.77	7.02	1.51	0.80	32.44	19.06	0.84
5400	12.48	24.06	12.58	6.86	1.51	0.79	32.12	18.86	0.94
5600	12.17	23.92	12.37	6.71	1.51	0.79	32.35	18.88	0.89
5800	11.87	23.77	12.15	6.55	1.51	0.79	33.73	18.56	1.02
6000	11.55	23.64	11.97	6.34	1.51	0.78	32.04	18.85	1.00

Typical Performance Curves

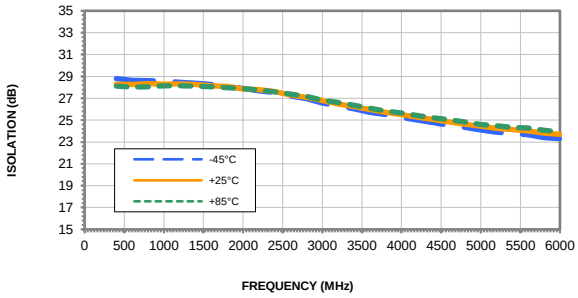
GAIN vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25.00dBm, Vd = 5.00V



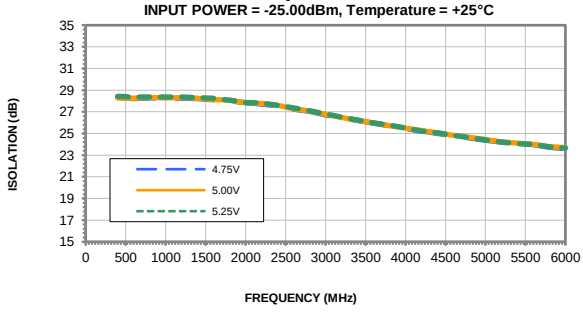
GAIN vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25.00dBm, Temperature = +25°C



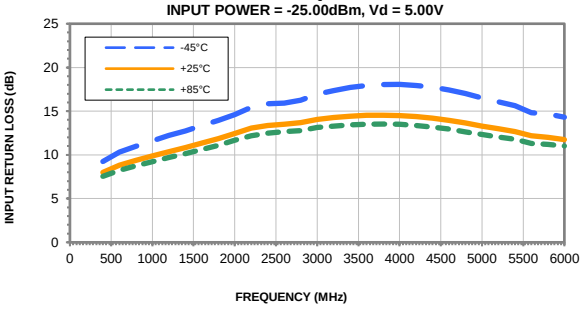
ISOLATION vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25.00dBm, Vd = 5.00V



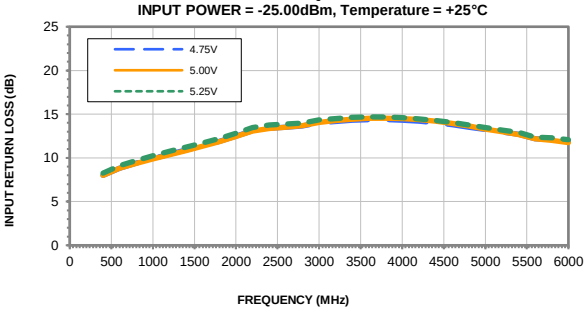
ISOLATION vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25.00dBm, Temperature = +25°C



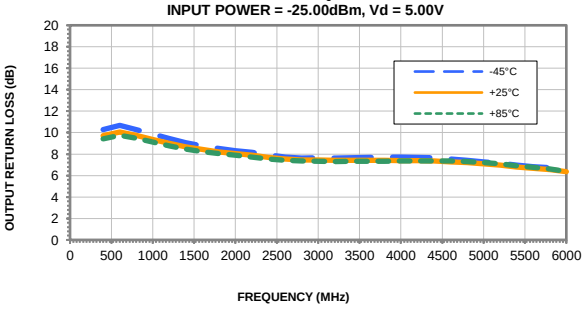
INPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25.00dBm, Vd = 5.00V



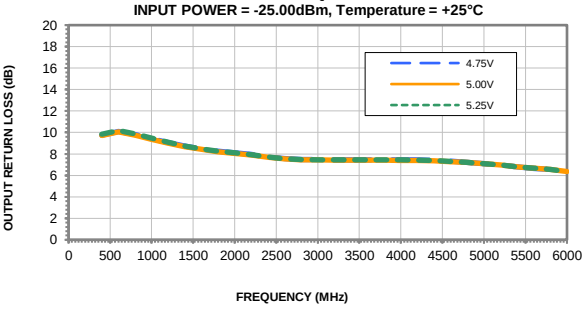
INPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25.00dBm, Temperature = +25°C



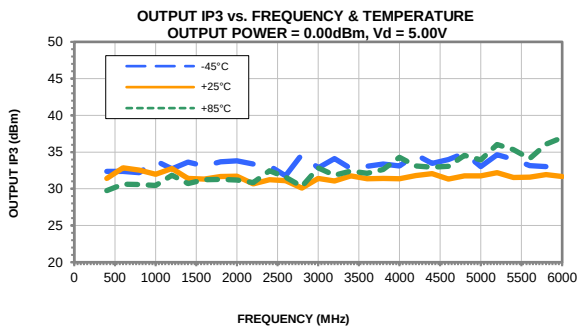
OUTPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25.00dBm, Vd = 5.00V

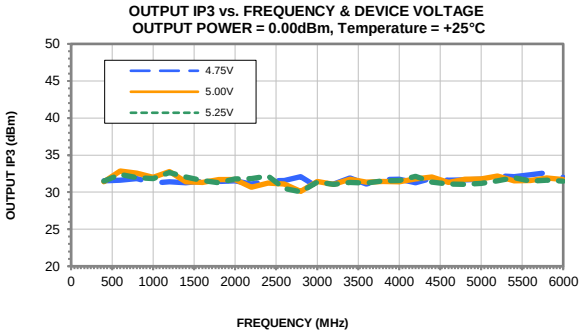


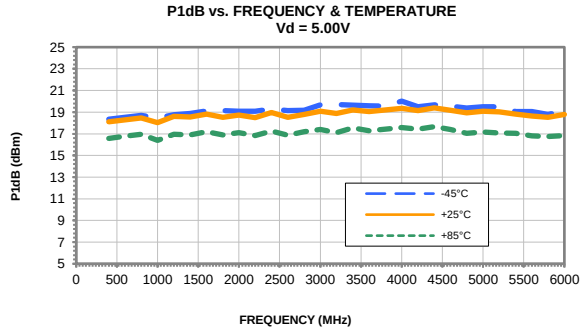
OUTPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25.00dBm, Temperature = +25°C

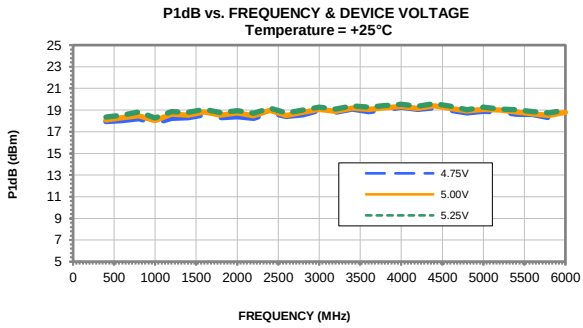


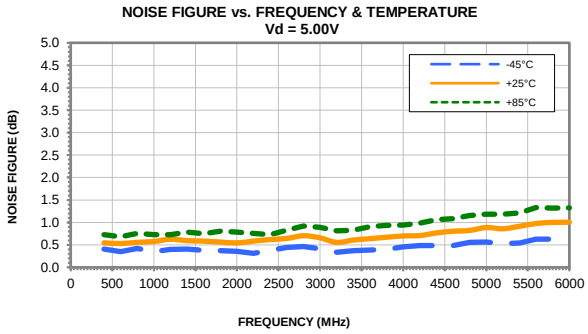
Typical Performance Curves

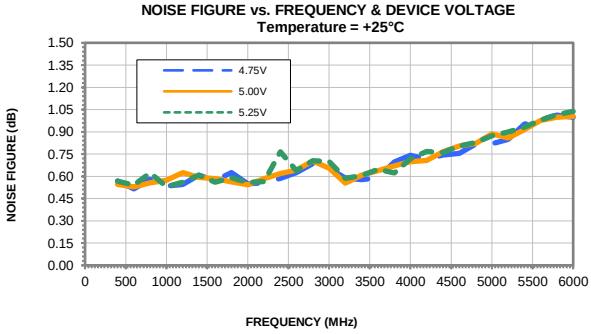


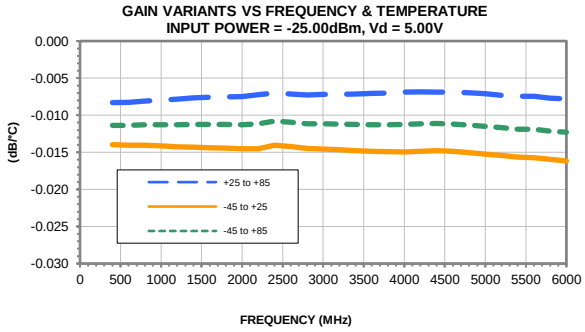






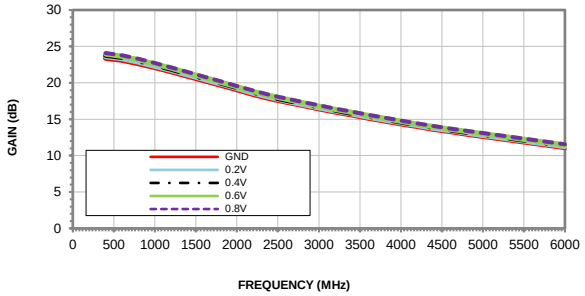




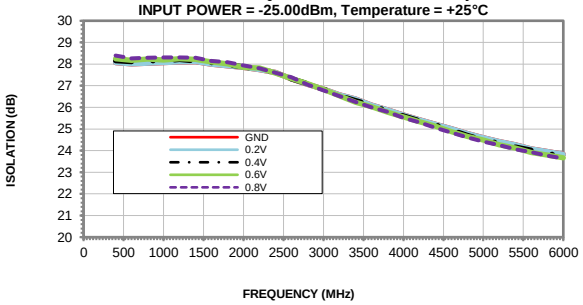


Typical Performance Curves

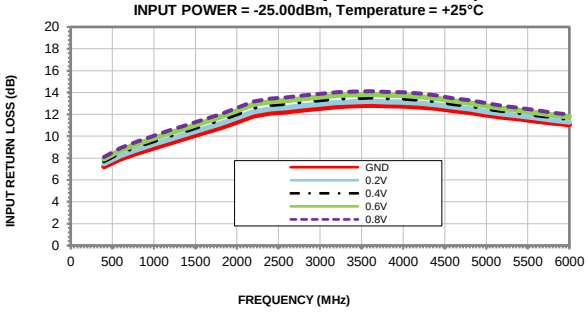
GAIN vs. FREQUENCY & VOLTAGE at Vladj PIN
INPUT POWER = -25.00dBm, Temperature = +25°C



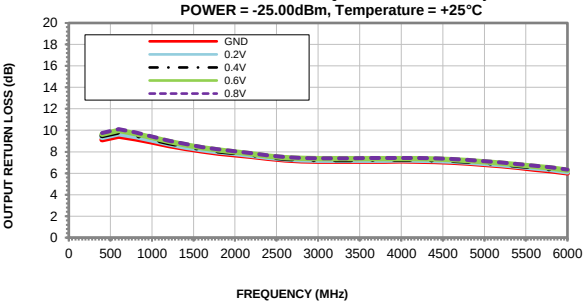
ISOLATION vs. FREQUENCY & VOLTAGE at Vladj PIN
INPUT POWER = -25.00dBm, Temperature = +25°C



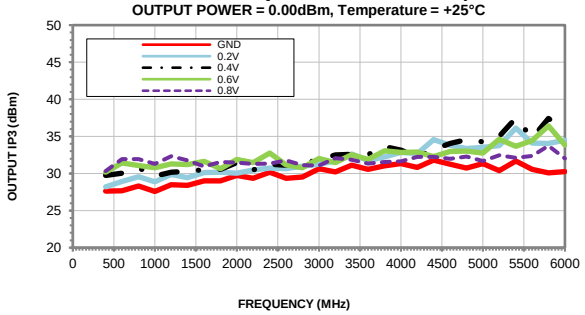
INPUT RETURN LOSS vs. FREQ. & VOLTAGE at Vladj PIN
INPUT POWER = -25.00dBm, Temperature = +25°C



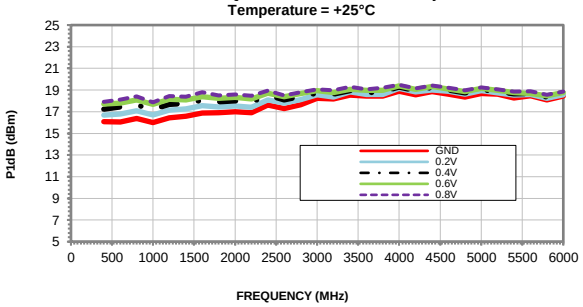
OUTPUT RETURN LOSS vs. FREQ. & VOLTAGE at Vladj PIN INPUT
POWER = -25.00dBm, Temperature = +25°C



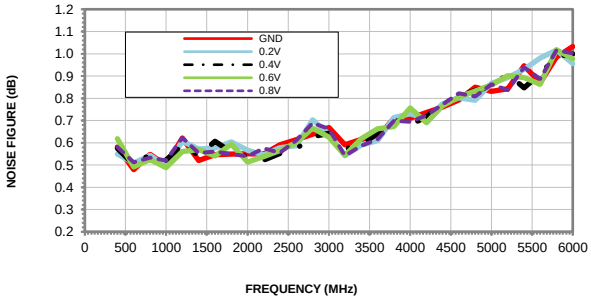
OUTPUT IP3 vs. FREQUENCY & VOLTAGE at Vladj PIN
OUTPUT POWER = 0.00dBm, Temperature = +25°C



P1dB vs. FREQUENCY & VOLTAGE at Vladj PIN
Temperature = +25°C



NOISE FIGURE vs. FREQUENCY & VOLTAGE at Vladj PIN
Temperature = +25°C

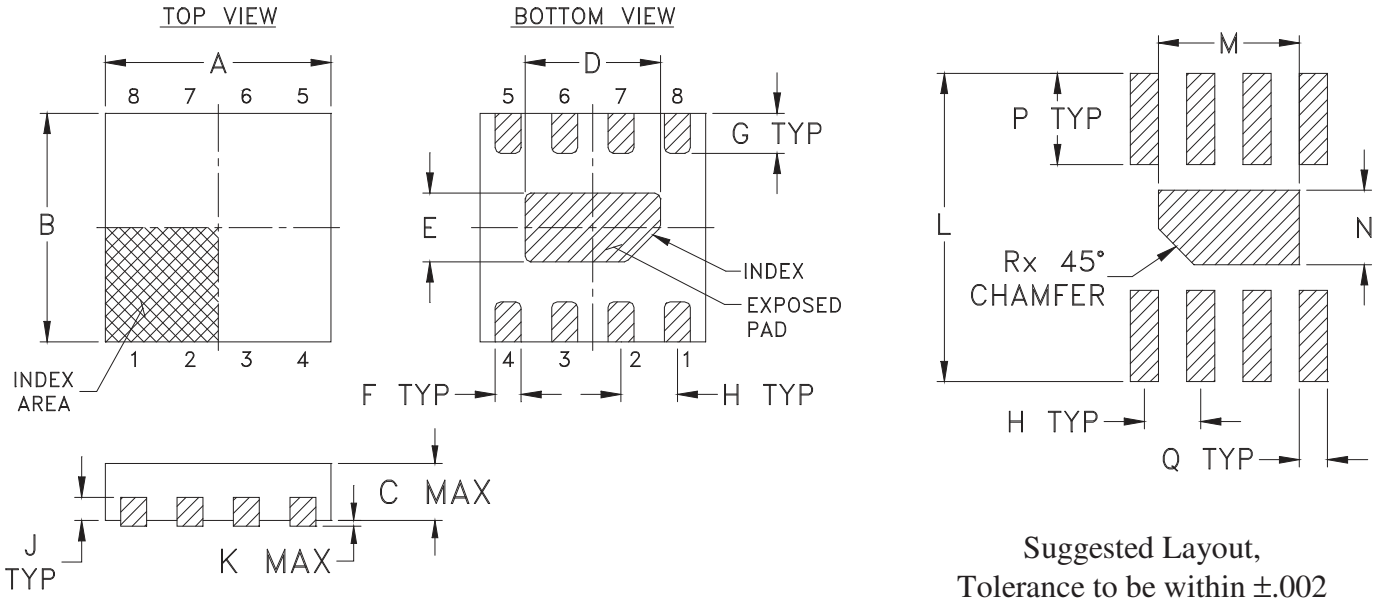


Case Style MC

MC1631-1

Outline Dimensions

PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.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)

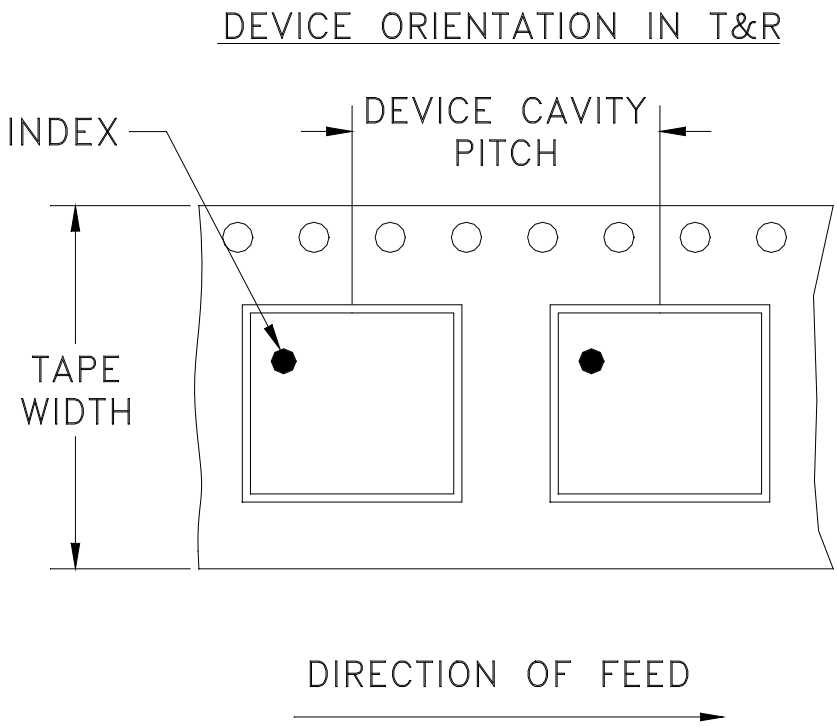
CASE #.	Q	R	WT, GRAM
MC1631-1	.010 (.25)	.012 (.30)	.006

Dimensions are in inches (mm). Tolerances: 2 Pl. ± .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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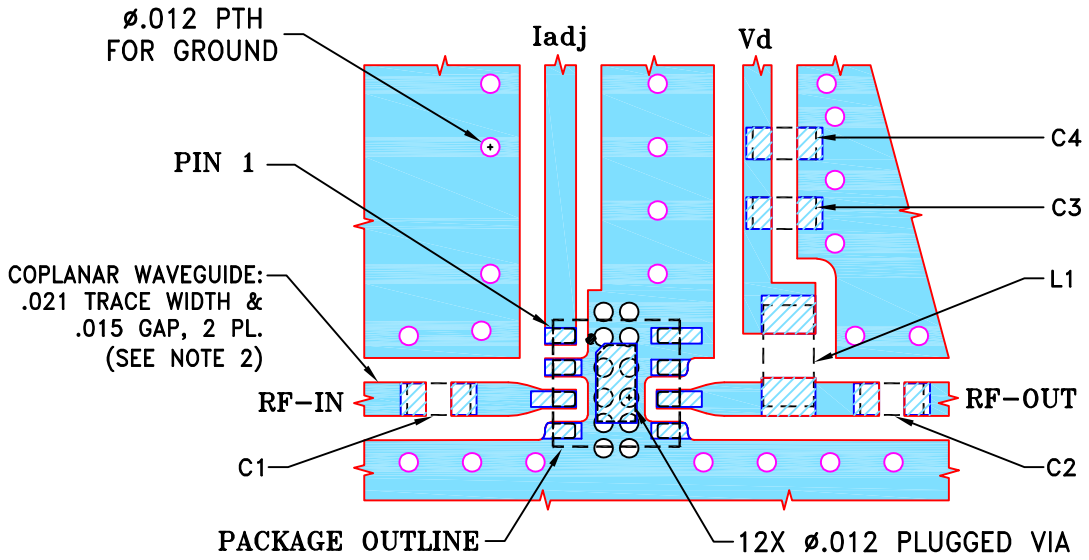
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-003661	NEW RELEASE	08/12/20	ITG	IL
A	ECO-007069	UPDATED TEST BOARD	03/25/21	ITG	GH

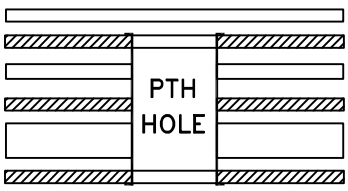
SUGGESTED MOUNTING CONFIGURATION FOR MC1631-1 CASE STYLE



TOP VIEW

COMPONENT	SIZE
C1...C4	0402
L1	0603

STACK-UP DIAGRAM



-TOP SOLDER MASK
-COPPER LAYER 1, 0.5 OZ.
-CORE, 0.010", ROGERS RO4350B
-COPPER LAYER 2, 0.5 OZ.
-CORE, 0.067", FR4
-COPPER LAYER 3, 0.5 OZ.

1. TOTAL FINISHED THICKNESS 0.085" ± 5%.
2. PTH HOLES PRESENT FROM COPPER LAYER 1 TO 3.

NOTES:

1. PCB IS MULTILAYER PCB, SEE STACK-UP DIAGRAM.
2. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .010±.001"; COPPER: 1/2 OZ. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
3. CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE. FOR COMPONENT VALUES REFER TO TB-PMA2-63LNE+.
4. UNIT LAND PATTERN WAS OPTIMIZED FOR BETTER PERFORMANCE.
5. COPPER LAYERS L2 & L3 OF THE PCB ARE CONTINUOUS GROUND PLANES.

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	ITG	08/11/20
TOLERANCES ON:	CHECKED	GF	08/12/20
2 PL DECIMALS ±	APPROVED	IL	08/12/20
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

Mini-Circuits®
13 Neptune Avenue
Brooklyn NY 11235

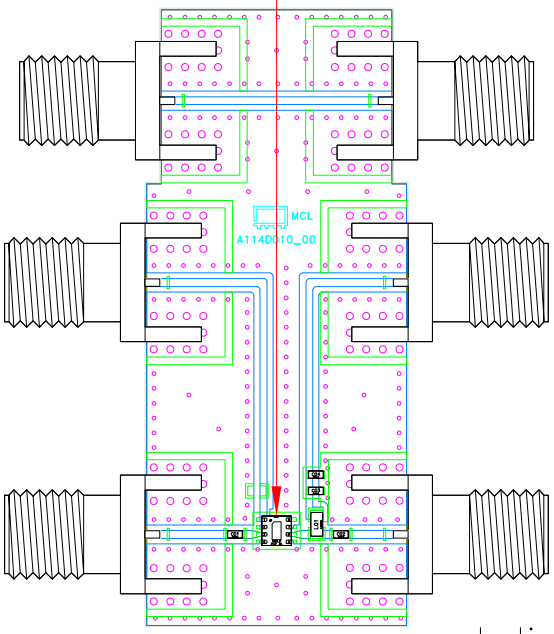
PL, MC1631-1, TB-PMA2-63LNE+

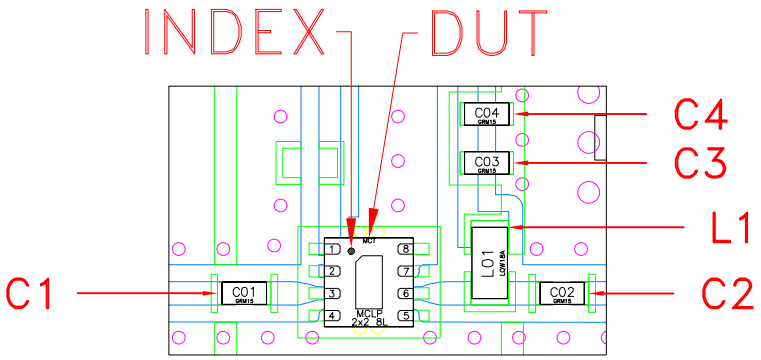
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-683	A

FILE:	SCALE:	SHEET:
98PL683	8:1	1 OF 1

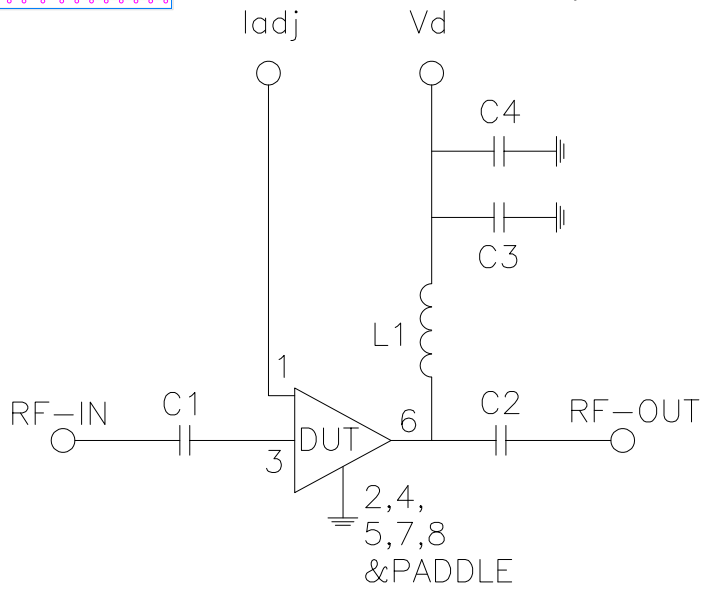
Evaluation Board and Circuit

SEE DETAIL "A"





DETAIL "A"
LOCATION OF INTERCONNECTOR AND UNITS COMPONENTS
(SCALE 3:1)



SCHEMATIC DIAGRAM

Components	Size	Value	Manufacturer	Part Numbers
C1,C2	0402	150pF	Murata	GRM1555C1H151JA01J
C3	0402	100pF	Murata	GRM1555C1H101JA01D
C4	0402	1uF	Murata	GRM155R61E105KA12D
L1	0402	56nH	Coilcraft	0402CS–56NXGLW

Notes:

1. 50 Ohm SMA Female Connectors.
2. PCB Material: Roger RO4350B or equivalent, Dielectric constant=3.5, Thickness=0.010 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