ULTRA LOW NOISE, HIGH IP3

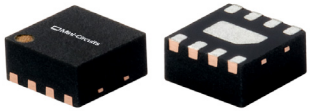
Monolithic Amplifier

PMA2-33LN+

50Ω 0.4 to 3.0 GHz

THE BIG DEAL

- Ultra Low Noise Figure, 0.38 dB typ. at 0.9 GHz
- High Gain IP3, 34 dBm typ. at 0.9 GHz, +39 dBm at 3 GHz
- High Pout, P1dB +17.2 dBm at 0.9 GHz
- Small Size, 2 x 2 x 1mm
- Class 1A HBM ESD Rating (250V)



Generic photo used for illustration purposes only

CASE STYLE: MC1631-1

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

APPLICATIONS

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

PRODUCT OVERVIEW

Mini-Circuits PMA2-33LN+ is an E-PHEMT* based, ultra-low noise MMIC amplifier with a unique combination of low noise and high IP3, making this amplifier ideal for sensitive, high-dynamic range receiver applications. This design operates on a single +3V supply, is well matched for 50Ω systems, and comes in a tiny, low-profile package accommodating dense circuit board layouts.

KEY FEATURES

Feature	Advantages
Ultra Low Noise, 0.38 dB at 0.9 GHz	Enables lower system noise figure performance.
High IP3, • +34 dBm at 0.9 GHz • +39 dBm at 3 GHz	Combination of low noise and high IP3 makes this MMIC amplifier ideal for use in low noise receiver front end (RFE) as it gives the user advantages of sensitivity & two-tone IM performance at both ends of the dynamic range.
Low operating voltage, +3V	Achieves high IP3 using lower voltage compared to other devices of its kind.
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 PCB.
Max input power • +27 dBm (5 minutes) • +14 to +22 dBm (Continuous)	Ruggedized design provides high power handling for input powers common at receiver inputs, eliminating the need for an external limiter in most cases
High reliability	Low signal operating current of 56 mA nominal maintains junction temperatures typically below 93°C at 85°C ground lead temperature.

*Enhancement mode Pseudomorphic High Electron Mobility Transistor

REV. B
ECO-011027
PMA2-33LN+
TH/RS/CP
240327

Monolithic Amplifier PMA2-33LN+

50Ω 0.4 to 3.0 GHz

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

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		0.4		3.0	GHz
Noise Figure	0.4	—	0.78	—	dB
	0.9	—	0.38	0.6	
	1.5	—	0.36	—	
	2.0	—	0.46	—	
	3.0	—	0.78	—	
Gain	0.4		24.4		dB
	0.9		19.1		
	1.5		14.9		
	2.0		12.5		
	3.0		9.1		
Input Return Loss	0.4		9.5		dB
	0.9		10.2		
	1.5		10.0		
	2.0		10.4		
	3.0		12.3		
Output Return Loss	0.4		20.1		dB
	0.9		19.3		
	1.5		17.4		
	2.0		17.3		
	3.0		18.2		
Output Power @1 dB compression[2]	0.4		+17.0		dBm
	0.9		+17.2		
	1.5		+17.0		
	2.0		+17.5		
	3.0		+17.3		
Output IP3	0.4		+30.4		dBm
	0.9		+34.5		
	1.5		+35.6		
	2.0		+37.5		
	3.0		+38.6		
Device Operating Voltage			3.0		V
Device Operating Current at 3V[2]			56	67	mA
Device Current Variation vs. Temperature at 3V[3]			-27		µA/°C
Device Current Variation vs. Voltage at 25°C			0.025		mA/mV
Thermal Resistance, junction-to-ground lead			54		°C/W

1. Measured on Mini-Circuits Characterization test board TB-736+. See Characterization Test Circuit (Fig. 1)
2. Current increases at P1dB
3. (Current at 85°C - Current at -45°C)/130

ABSOLUTE MAXIMUM RATINGS[4]

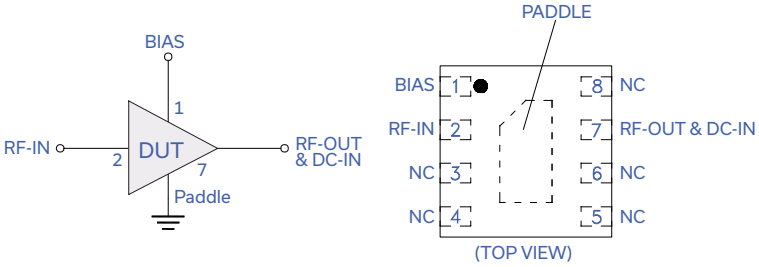
Parameter	Ratings
Operating Temperature (ground lead)	-40°C to +85°C
Storage Temperature	-65°C to +150°C
Junction Temperature	+150°C
Total Power Dissipation	0.5 W
Input Power (CW), Vd=3V[5]	+27dBm (5minutes max) +14 dBm to 1.5 GHz and +22 dBm over 1.5 to 3 GHz (continuos)
DC Voltage	+5.5 V

4. Permanent damage may occur if any of these limits are exceeded.
Electrical maximum ratings are not intended for continuous normal operation.
5. Measured on Mini-Circuits test board, TB-736+

Monolithic Amplifier PMA2-33LN+

50Ω 0.4 to 3.0 GHz

SIMPLIFIED SCHEMATIC & PAD DESCRIPTION



Function	Pad Number	Description (See Figure 1)
RF IN	2	Connects to RF input via C1 and Pad 1 via L1
RF-OUT & DC-IN	7	Connects to RF out via C2 and V_S via L2 & R2
Ground	Paddle	Connects to ground
Bias	1	Connects to Supply voltage (V_{DD}) via R1 & R6
No Connection	3,4,5,6,8	Not used internally. Connected to ground on test board

RECOMMENDED APPLICATION AND CHARACTERIZATION TEST CIRCUIT

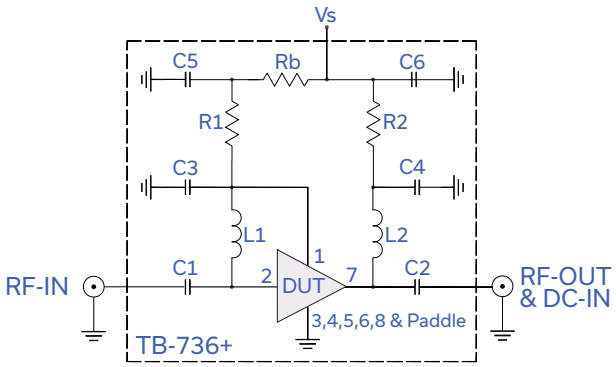
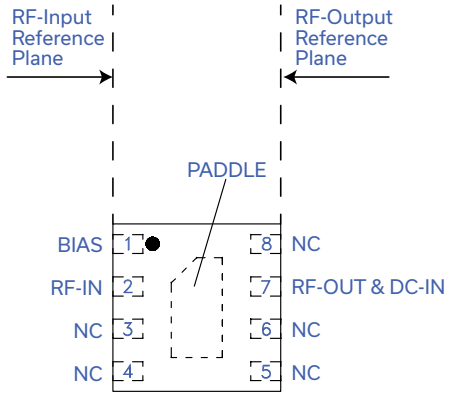


Fig 1. Application and Characterization Circuit
Note: This block diagram is used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-736+)

Gain, Return loss, Output power at 1dB compression (P1 dB) , output IP3 (OIP3) and noise figure measured using Agilent's N5242A PNA-X microwave network analyzer.

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

Component	Value	Size
C1, C2	100pF	0402
C3, C6	4.7µF	0402
C4	33pF	0402
C5	Not Used	—
L1, L2	33nH	0402
R1	0Ω	0402
R2	10Ω	0603
Rb	4.02kΩ	0402

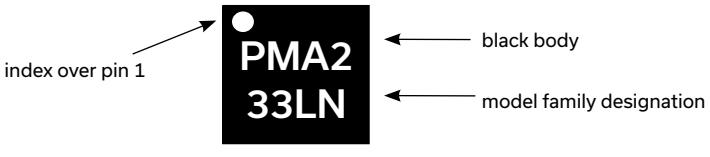


NOISE PARAMETERS

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

1) DUT soldered on test board (50 ohm input and output)
2) reference plane is at the end of the RF-IN pad and the output reference plane is at the end of the RF-OUT pad as shown in figure below

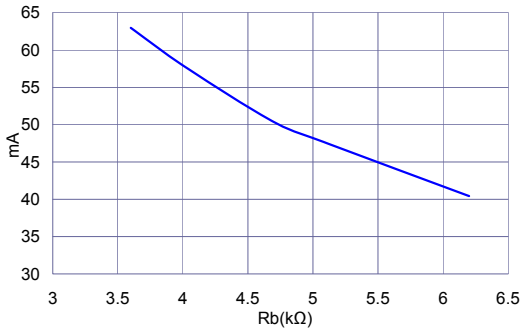
PRODUCT MARKING



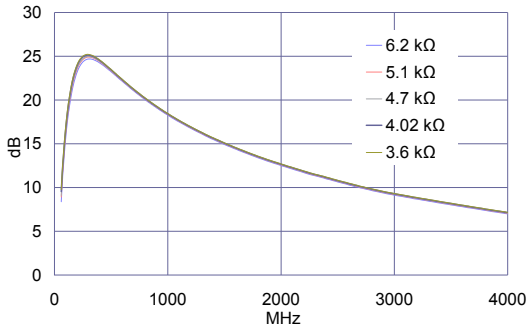
Marking may contain other features or characters for internal lot control

ELECTRICAL PERFORMANCE VS. RB

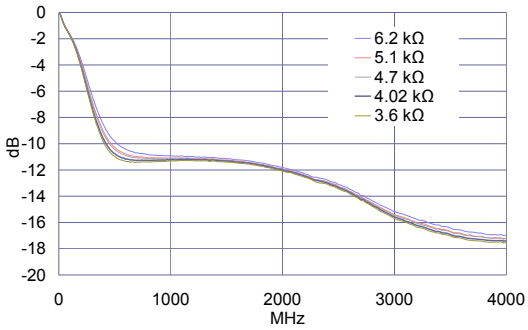
Rb vs. DC Current



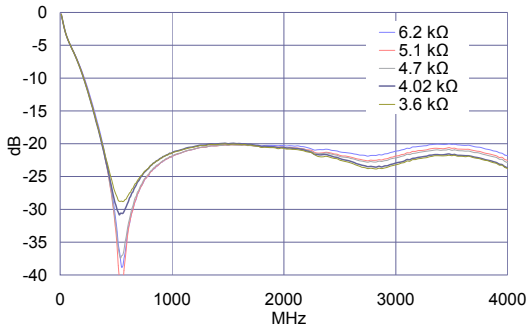
Gain vs. Frequency & Rb



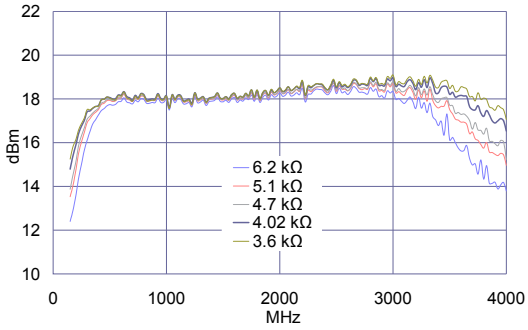
S11 (-Input Return Loss) vs. Frequency & Rb



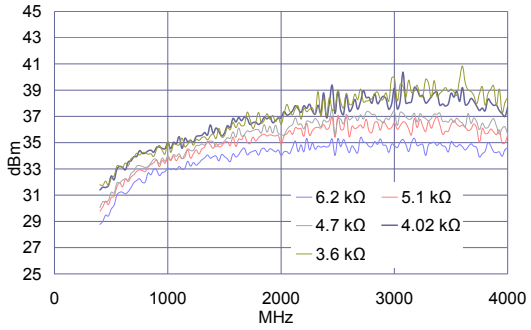
S22 (-Output Return Loss) vs. Frequency & Rb



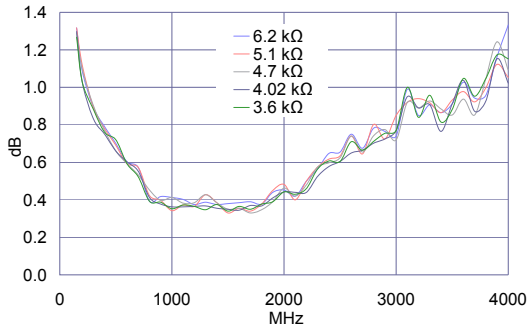
P1dB vs. Frequency & Rb



OIP3 vs. Frequency & Rb



NF vs. Frequency & Rb



Monolithic Amplifier PMA2-33LN+

50Ω 0.4 to 3.0 GHz

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

Performance Data	Data Table Swept Graphs S-Parameter (S2P Files) Data Set (.zip file)
Case Style	MC1631-1 Plastic package, exposed paddle, lead finish: tin silver 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-400
Evaluation Board	TB-736+
Environmental Ratings	ENV08T1

ESD RATING

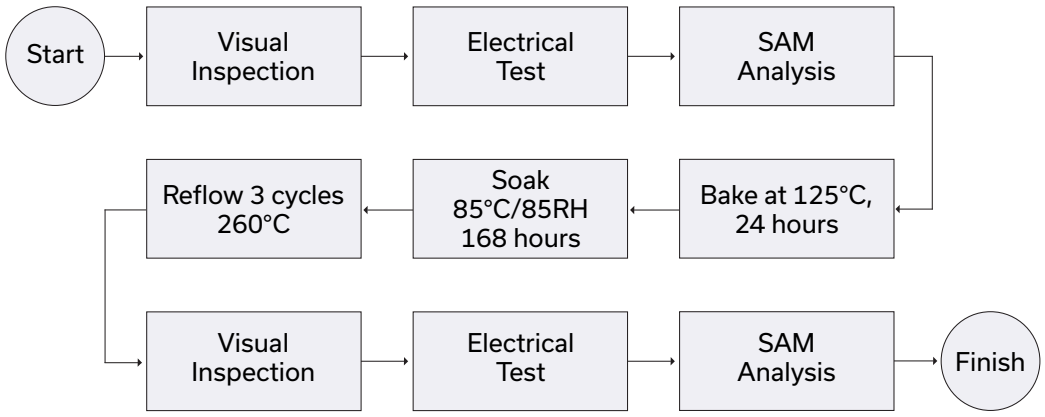
Human Body Model (HBM): Class 1A (250 to <500V) in accordance with ANSI/ESD STM 5.1 - 2001

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

MSL RATING

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

MSL TEST FLOW CHART



NOTES

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

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 = 56.23mA @ 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)
400.0	24.53	28.53	9.65	21.72	1.04	0.67	31.06	17.52	0.72
450.0	23.99	27.65	10.18	24.83	1.03	0.64	31.72	17.49	0.68
500.0	23.42	26.89	10.47	27.06	1.02	0.62	32.18	17.63	0.68
550.0	22.84	26.23	10.61	27.21	1.02	0.61	32.52	17.53	0.64
600.0	22.26	25.62	10.66	26.47	1.02	0.61	32.94	17.70	0.60
650.0	21.70	25.06	10.69	25.32	1.02	0.61	33.18	17.68	0.57
700.0	21.15	24.53	10.71	24.49	1.02	0.61	33.47	17.80	0.54
750.0	20.63	24.05	10.74	23.62	1.02	0.61	34.66	17.98	0.50
800.0	20.13	23.58	10.77	23.13	1.02	0.62	34.37	17.90	0.46
850.0	19.66	23.14	10.80	22.82	1.02	0.62	34.32	17.90	0.42
900.0	19.21	22.73	10.85	22.59	1.02	0.62	34.58	17.88	0.39
950.0	18.78	22.33	10.89	22.47	1.03	0.63	35.01	17.85	0.38
1000.0	18.37	21.95	10.93	22.34	1.03	0.63	34.82	17.77	0.39
1050.0	17.98	21.58	11.01	22.26	1.03	0.63	34.64	17.79	0.39
1100.0	17.59	21.23	11.03	22.17	1.03	0.63	35.27	17.90	0.38
1150.0	17.23	20.89	11.10	22.07	1.03	0.63	36.23	17.67	0.36
1200.0	16.88	20.57	11.16	22.07	1.03	0.64	35.30	17.89	0.37
1300.0	16.23	19.95	11.40	22.32	1.04	0.64	35.75	17.90	0.38
1400.0	15.63	19.36	11.67	22.65	1.04	0.64	36.08	17.97	0.38
1500.0	15.06	18.82	11.91	22.95	1.04	0.64	36.25	17.84	0.37
1600.0	14.54	18.31	12.11	23.15	1.04	0.64	36.79	18.29	0.36
1700.0	14.04	17.83	12.39	23.16	1.04	0.64	37.09	18.45	0.37
1800.0	13.57	17.37	12.83	23.10	1.05	0.64	36.90	18.23	0.39
1900.0	13.13	16.94	13.23	22.96	1.05	0.64	36.53	18.55	0.41
2000.0	12.71	16.53	13.55	22.89	1.05	0.64	37.72	18.33	0.43
2100.0	12.31	16.15	13.99	22.73	1.05	0.64	36.29	18.51	0.46
2200.0	11.92	15.78	14.40	22.32	1.05	0.64	38.59	18.60	0.44
2300.0	11.54	15.46	15.01	21.63	1.06	0.64	37.37	18.49	0.48
2400.0	11.15	15.17	15.74	21.41	1.07	0.64	40.66	18.78	0.53
2500.0	10.84	14.82	15.98	20.67	1.07	0.64	37.38	18.78	0.51
2600.0	10.49	14.54	16.61	20.21	1.07	0.64	39.93	18.80	0.57
2700.0	10.16	14.26	17.25	19.72	1.08	0.64	39.05	19.06	0.60
2800.0	9.87	13.99	17.96	19.07	1.08	0.63	39.66	19.04	0.59
2900.0	9.59	13.72	18.52	18.42	1.08	0.63	40.06	19.16	0.63
3000.0	9.33	13.44	18.80	17.92	1.08	0.62	38.80	18.89	0.68
3100.0	9.10	13.16	18.97	17.53	1.08	0.61	40.06	18.76	0.58
3200.0	8.87	12.89	19.28	17.28	1.08	0.61	38.64	19.18	0.67
3300.0	8.64	12.64	19.46	17.18	1.08	0.60	38.33	18.57	0.72
3400.0	8.43	12.39	19.72	17.31	1.08	0.60	38.81	18.81	0.90
3500.0	8.22	12.16	19.65	17.62	1.07	0.60	38.36	18.33	0.81

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 = 48.88mA @ 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)
400.0	24.40	28.32	9.22	22.63	1.03	0.68	29.98	16.62	0.72
450.0	23.87	27.45	9.75	26.67	1.02	0.65	30.99	16.61	0.69
500.0	23.31	26.72	10.08	29.63	1.01	0.63	31.26	16.76	0.67
550.0	22.73	26.07	10.25	28.99	1.01	0.62	31.66	16.68	0.65
600.0	22.15	25.48	10.34	27.25	1.01	0.62	31.91	16.84	0.63
650.0	21.59	24.93	10.38	25.56	1.01	0.62	32.18	16.85	0.57
700.0	21.04	24.42	10.42	24.46	1.01	0.62	32.63	16.96	0.54
750.0	20.52	23.95	10.46	23.43	1.01	0.62	33.23	17.16	0.49
800.0	20.02	23.50	10.53	22.85	1.02	0.63	33.23	17.10	0.48
850.0	19.55	23.07	10.57	22.47	1.02	0.63	33.30	17.10	0.42
900.0	19.10	22.65	10.61	22.19	1.02	0.63	33.66	17.10	0.41
950.0	18.67	22.27	10.67	22.04	1.02	0.64	33.86	17.10	0.37
1000.0	18.26	21.89	10.71	21.88	1.02	0.64	33.87	17.03	0.38
1050.0	17.87	21.53	10.79	21.79	1.03	0.64	33.55	17.05	0.39
1100.0	17.48	21.18	10.81	21.70	1.03	0.64	34.00	17.15	0.37
1150.0	17.12	20.85	10.88	21.58	1.03	0.65	33.85	16.94	0.38
1200.0	16.77	20.53	10.96	21.58	1.03	0.65	34.43	17.16	0.37
1300.0	16.12	19.91	11.19	21.77	1.03	0.65	34.33	17.17	0.38
1400.0	15.52	19.33	11.45	22.07	1.04	0.65	34.77	17.25	0.37
1500.0	14.96	18.79	11.68	22.33	1.04	0.65	34.52	17.14	0.35
1600.0	14.43	18.28	11.88	22.53	1.04	0.65	35.05	17.55	0.37
1700.0	13.94	17.81	12.16	22.57	1.04	0.65	34.62	17.71	0.36
1800.0	13.47	17.35	12.60	22.55	1.05	0.65	35.66	17.50	0.39
1900.0	13.03	16.92	12.97	22.46	1.05	0.65	34.97	17.80	0.42
2000.0	12.61	16.51	13.30	22.45	1.05	0.65	35.51	17.63	0.40
2100.0	12.20	16.13	13.71	22.35	1.05	0.65	35.27	17.79	0.44
2200.0	11.82	15.77	14.08	22.03	1.06	0.65	36.69	17.86	0.42
2300.0	11.44	15.44	14.70	21.42	1.06	0.65	36.39	17.74	0.47
2400.0	11.05	15.16	15.40	21.29	1.07	0.65	38.15	18.01	0.53
2500.0	10.74	14.80	15.63	20.64	1.07	0.65	35.35	18.07	0.53
2600.0	10.40	14.52	16.24	20.23	1.07	0.65	37.43	18.07	0.57
2700.0	10.07	14.25	16.87	19.76	1.08	0.64	38.43	18.30	0.62
2800.0	9.77	13.97	17.55	19.15	1.08	0.64	38.08	18.29	0.62
2900.0	9.50	13.70	18.10	18.53	1.08	0.64	37.91	18.38	0.64
3000.0	9.24	13.42	18.36	18.03	1.08	0.63	38.28	18.11	0.66
3100.0	9.01	13.14	18.59	17.64	1.08	0.62	37.57	17.97	0.58
3200.0	8.79	12.87	18.88	17.41	1.08	0.62	36.20	18.34	0.65
3300.0	8.56	12.62	19.08	17.33	1.08	0.61	36.75	17.77	0.71
3400.0	8.34	12.37	19.37	17.46	1.08	0.61	36.95	17.92	0.86
3500.0	8.14	12.14	19.29	17.75	1.08	0.61	36.92	17.38	0.81

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 = 63.90mA @ 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)
400.0	24.63	28.69	10.04	20.97	1.05	0.66	31.24	18.32	0.72
450.0	24.08	27.80	10.54	23.57	1.04	0.63	31.95	18.30	0.67
500.0	23.52	27.03	10.80	25.50	1.03	0.62	32.15	18.41	0.68
550.0	22.93	26.35	10.91	25.98	1.03	0.61	32.45	18.29	0.63
600.0	22.35	25.73	10.94	25.77	1.03	0.60	33.01	18.43	0.59
650.0	21.78	25.15	10.95	25.01	1.02	0.60	33.74	18.39	0.58
700.0	21.24	24.62	10.92	24.43	1.02	0.61	33.98	18.49	0.54
750.0	20.72	24.12	10.93	23.72	1.02	0.61	34.47	18.67	0.50
800.0	20.22	23.65	10.98	23.33	1.03	0.61	34.33	18.57	0.45
850.0	19.75	23.21	10.99	23.08	1.03	0.61	34.38	18.55	0.41
900.0	19.30	22.78	11.02	22.89	1.03	0.61	34.58	18.53	0.39
950.0	18.87	22.38	11.08	22.80	1.03	0.62	35.52	18.50	0.37
1000.0	18.46	21.99	11.11	22.69	1.03	0.62	34.99	18.40	0.38
1050.0	18.06	21.63	11.19	22.62	1.03	0.62	35.65	18.40	0.39
1100.0	17.68	21.27	11.20	22.56	1.03	0.62	35.64	18.52	0.37
1150.0	17.32	20.93	11.26	22.47	1.03	0.63	35.83	18.28	0.34
1200.0	16.97	20.60	11.34	22.50	1.03	0.63	35.50	18.51	0.38
1300.0	16.32	19.97	11.57	22.77	1.04	0.63	36.07	18.51	0.38
1400.0	15.71	19.39	11.85	23.14	1.04	0.63	36.71	18.58	0.36
1500.0	15.15	18.84	12.07	23.46	1.04	0.63	37.32	18.44	0.37
1600.0	14.62	18.33	12.29	23.67	1.04	0.63	37.88	18.92	0.36
1700.0	14.13	17.85	12.58	23.67	1.04	0.63	37.32	19.08	0.37
1800.0	13.66	17.38	13.03	23.57	1.04	0.63	37.39	18.84	0.37
1900.0	13.21	16.95	13.44	23.37	1.05	0.63	37.82	19.16	0.39
2000.0	12.79	16.54	13.78	23.23	1.05	0.63	37.77	18.94	0.42
2100.0	12.39	16.16	14.21	22.98	1.05	0.63	37.67	19.13	0.44
2200.0	12.00	15.79	14.62	22.51	1.05	0.63	39.53	19.22	0.43
2300.0	11.62	15.47	15.27	21.76	1.06	0.63	38.54	19.11	0.47
2400.0	11.23	15.18	16.01	21.48	1.07	0.63	42.79	19.43	0.53
2500.0	10.91	14.83	16.26	20.68	1.06	0.63	36.65	19.42	0.54
2600.0	10.57	14.55	16.91	20.16	1.07	0.63	39.56	19.40	0.57
2700.0	10.24	14.28	17.57	19.63	1.07	0.63	40.57	19.69	0.62
2800.0	9.94	14.00	18.27	18.99	1.08	0.62	41.08	19.67	0.64
2900.0	9.66	13.73	18.81	18.36	1.08	0.62	40.33	19.78	0.61
3000.0	9.40	13.45	19.11	17.82	1.08	0.61	38.63	19.53	0.68
3100.0	9.17	13.18	19.28	17.39	1.08	0.61	40.16	19.41	0.57
3200.0	8.95	12.91	19.58	17.16	1.07	0.60	39.33	19.85	0.62
3300.0	8.72	12.66	19.74	17.08	1.07	0.60	38.69	19.24	0.69
3400.0	8.50	12.41	20.04	17.19	1.07	0.59	40.91	19.50	0.84
3500.0	8.29	12.18	19.92	17.45	1.07	0.59	40.43	19.02	0.84

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 = 58.68mA @ 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)
400.0	24.88	28.91	10.39	19.37	1.06	0.64	32.33	17.24	0.60
450.0	24.32	27.98	10.96	21.23	1.05	0.61	33.39	17.21	0.58
500.0	23.74	27.18	11.20	22.57	1.04	0.59	33.78	17.32	0.57
550.0	23.15	26.47	11.28	23.11	1.03	0.58	33.40	17.22	0.51
600.0	22.57	25.83	11.28	23.38	1.03	0.58	34.16	17.41	0.50
650.0	22.00	25.23	11.25	23.24	1.03	0.57	34.45	17.42	0.45
700.0	21.46	24.68	11.25	23.13	1.03	0.57	35.08	17.55	0.41
750.0	20.94	24.16	11.23	22.76	1.02	0.57	35.58	17.79	0.37
800.0	20.44	23.66	11.27	22.51	1.03	0.57	35.50	17.72	0.36
850.0	19.97	23.21	11.26	22.30	1.03	0.58	35.25	17.71	0.30
900.0	19.52	22.77	11.24	22.09	1.03	0.58	35.91	17.73	0.31
950.0	19.08	22.36	11.27	21.98	1.03	0.58	36.07	17.72	0.26
1000.0	18.67	21.96	11.27	21.91	1.03	0.58	36.14	17.68	0.27
1050.0	18.28	21.59	11.34	21.97	1.03	0.58	36.05	17.70	0.28
1100.0	17.90	21.22	11.35	22.04	1.03	0.58	36.65	17.82	0.26
1150.0	17.54	20.87	11.43	22.10	1.03	0.59	36.79	17.59	0.27
1200.0	17.19	20.53	11.53	22.20	1.03	0.59	36.57	17.83	0.25
1300.0	16.54	19.89	11.73	22.48	1.03	0.59	36.75	17.85	0.24
1400.0	15.94	19.30	11.92	22.92	1.03	0.59	37.21	17.94	0.25
1500.0	15.38	18.74	12.14	23.56	1.03	0.59	37.74	17.81	0.26
1600.0	14.85	18.22	12.37	24.09	1.03	0.59	38.55	18.24	0.25
1700.0	14.36	17.73	12.68	24.20	1.03	0.59	37.78	18.43	0.28
1800.0	13.89	17.26	13.07	24.32	1.03	0.59	37.78	18.21	0.27
1900.0	13.45	16.83	13.39	24.55	1.04	0.59	39.23	18.51	0.27
2000.0	13.03	16.41	13.74	24.62	1.04	0.59	38.44	18.31	0.27
2100.0	12.64	16.02	14.26	24.12	1.04	0.59	37.97	18.50	0.29
2200.0	12.25	15.64	14.75	23.41	1.04	0.58	40.40	18.61	0.30
2300.0	11.88	15.31	15.36	22.88	1.04	0.58	40.96	18.50	0.32
2400.0	11.49	15.02	15.97	23.05	1.05	0.59	42.77	18.76	0.37
2500.0	11.18	14.67	16.15	22.18	1.05	0.59	37.87	18.77	0.35
2600.0	10.83	14.38	17.00	21.31	1.05	0.59	41.95	18.77	0.40
2700.0	10.49	14.12	17.89	20.64	1.06	0.59	41.12	19.04	0.43
2800.0	10.17	13.86	18.61	20.09	1.06	0.59	40.16	19.05	0.45
2900.0	9.89	13.60	19.08	19.40	1.06	0.59	41.70	19.16	0.45
3000.0	9.63	13.32	19.36	18.51	1.06	0.58	42.00	18.93	0.48
3100.0	9.41	13.03	19.64	17.73	1.06	0.57	41.81	18.82	0.39
3200.0	9.20	12.74	19.99	17.43	1.06	0.56	40.36	19.23	0.46
3300.0	8.98	12.49	20.05	17.34	1.05	0.55	40.03	18.67	0.51
3400.0	8.75	12.24	20.22	17.14	1.05	0.55	45.96	18.97	0.64
3500.0	8.55	12.00	20.09	16.92	1.05	0.54	42.05	18.50	0.58

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 = 2.70V, Id = 50.25mA @ 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)
400.0	24.77	28.74	9.94	20.24	1.05	0.65	31.30	16.45	0.57
450.0	24.22	27.83	10.51	22.48	1.04	0.62	31.94	16.43	0.57
500.0	23.65	27.04	10.80	24.00	1.03	0.60	33.13	16.56	0.58
550.0	23.06	26.35	10.92	24.40	1.03	0.59	33.21	16.46	0.53
600.0	22.48	25.72	10.95	24.40	1.02	0.58	33.39	16.65	0.50
650.0	21.91	25.14	10.95	23.95	1.02	0.58	34.21	16.67	0.46
700.0	21.37	24.59	10.97	23.61	1.02	0.58	34.40	16.80	0.42
750.0	20.85	24.08	10.98	23.05	1.02	0.58	35.39	17.04	0.38
800.0	20.35	23.61	11.02	22.67	1.02	0.58	34.74	16.98	0.36
850.0	19.88	23.15	11.03	22.35	1.02	0.59	34.69	16.97	0.32
900.0	19.43	22.73	11.02	22.07	1.02	0.59	35.18	16.99	0.29
950.0	18.99	22.32	11.05	21.92	1.02	0.59	35.31	16.98	0.28
1000.0	18.58	21.93	11.06	21.81	1.02	0.59	35.48	16.94	0.26
1050.0	18.19	21.56	11.13	21.81	1.03	0.60	35.86	16.97	0.27
1100.0	17.81	21.19	11.15	21.85	1.03	0.60	36.03	17.07	0.28
1150.0	17.45	20.85	11.24	21.87	1.03	0.60	36.18	16.85	0.25
1200.0	17.10	20.51	11.33	21.94	1.03	0.60	35.79	17.10	0.23
1300.0	16.45	19.88	11.54	22.17	1.03	0.60	36.20	17.14	0.27
1400.0	15.85	19.29	11.72	22.56	1.03	0.60	36.25	17.21	0.26
1500.0	15.28	18.74	11.92	23.11	1.03	0.60	36.68	17.08	0.26
1600.0	14.76	18.21	12.16	23.56	1.03	0.60	37.61	17.49	0.25
1700.0	14.28	17.73	12.47	23.66	1.03	0.60	36.91	17.68	0.26
1800.0	13.80	17.26	12.85	23.78	1.03	0.60	37.82	17.49	0.25
1900.0	13.36	16.83	13.16	23.98	1.04	0.60	37.95	17.75	0.28
2000.0	12.95	16.41	13.48	24.02	1.04	0.60	38.17	17.61	0.28
2100.0	12.55	16.02	14.00	23.59	1.04	0.60	38.11	17.77	0.30
2200.0	12.17	15.65	14.48	23.02	1.04	0.60	39.89	17.87	0.31
2300.0	11.79	15.31	15.08	22.57	1.04	0.60	37.81	17.74	0.34
2400.0	11.40	15.03	15.63	22.77	1.05	0.60	41.86	17.99	0.39
2500.0	11.09	14.67	15.85	21.97	1.05	0.60	37.59	18.03	0.38
2600.0	10.74	14.38	16.65	21.17	1.05	0.60	39.81	18.04	0.38
2700.0	10.41	14.12	17.53	20.57	1.06	0.60	40.58	18.28	0.43
2800.0	10.09	13.86	18.20	20.08	1.07	0.60	40.70	18.30	0.44
2900.0	9.81	13.60	18.66	19.41	1.07	0.60	39.82	18.41	0.46
3000.0	9.55	13.31	18.96	18.51	1.06	0.59	40.64	18.15	0.47
3100.0	9.33	13.02	19.25	17.74	1.06	0.58	39.69	18.04	0.41
3200.0	9.12	12.74	19.57	17.48	1.06	0.57	38.72	18.43	0.50
3300.0	8.90	12.48	19.66	17.40	1.06	0.57	39.42	17.89	0.52
3400.0	8.68	12.23	19.82	17.18	1.06	0.56	39.70	18.12	0.63
3500.0	8.48	12.00	19.79	16.95	1.05	0.55	39.08	17.68	0.60

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 = 67.32mA @ 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)
400.0	24.96	29.04	10.79	18.77	1.07	0.64	32.64	18.07	0.55
450.0	24.40	28.10	11.31	20.44	1.05	0.61	33.11	18.03	0.57
500.0	23.82	27.28	11.53	21.69	1.04	0.59	34.06	18.14	0.56
550.0	23.23	26.56	11.58	22.30	1.04	0.57	33.67	18.03	0.53
600.0	22.64	25.90	11.54	22.69	1.03	0.57	34.33	18.22	0.48
650.0	22.08	25.29	11.48	22.71	1.03	0.57	35.19	18.23	0.46
700.0	21.53	24.73	11.44	22.73	1.03	0.57	35.16	18.35	0.41
750.0	21.02	24.21	11.43	22.51	1.03	0.56	35.46	18.58	0.39
800.0	20.52	23.71	11.46	22.38	1.03	0.57	35.14	18.50	0.34
850.0	20.05	23.25	11.43	22.25	1.03	0.57	35.61	18.48	0.31
900.0	19.59	22.80	11.42	22.10	1.03	0.57	35.68	18.49	0.29
950.0	19.16	22.39	11.43	22.03	1.03	0.57	35.86	18.48	0.30
1000.0	18.75	21.99	11.43	21.99	1.03	0.57	35.88	18.41	0.26
1050.0	18.35	21.61	11.48	22.06	1.03	0.57	36.47	18.43	0.27
1100.0	17.98	21.24	11.50	22.15	1.03	0.58	36.71	18.55	0.27
1150.0	17.62	20.89	11.57	22.23	1.03	0.58	36.26	18.32	0.24
1200.0	17.27	20.55	11.67	22.37	1.03	0.58	36.28	18.53	0.24
1300.0	16.62	19.90	11.88	22.73	1.03	0.58	37.01	18.54	0.26
1400.0	16.02	19.31	12.08	23.22	1.03	0.58	37.34	18.63	0.25
1500.0	15.45	18.75	12.27	23.89	1.03	0.58	37.34	18.48	0.25
1600.0	14.93	18.22	12.54	24.45	1.03	0.58	38.69	18.94	0.26
1700.0	14.44	17.73	12.85	24.63	1.03	0.58	39.34	19.13	0.25
1800.0	13.97	17.26	13.25	24.79	1.03	0.58	37.83	18.87	0.26
1900.0	13.52	16.83	13.57	25.02	1.03	0.58	37.91	19.20	0.27
2000.0	13.11	16.41	13.91	25.02	1.03	0.58	37.76	18.96	0.31
2100.0	12.71	16.02	14.46	24.45	1.04	0.58	38.00	19.16	0.31
2200.0	12.32	15.65	14.97	23.72	1.04	0.58	39.65	19.27	0.32
2300.0	11.95	15.31	15.60	23.15	1.04	0.58	40.13	19.20	0.33
2400.0	11.56	15.02	16.20	23.25	1.05	0.58	40.56	19.44	0.36
2500.0	11.24	14.67	16.40	22.26	1.05	0.58	38.31	19.44	0.39
2600.0	10.90	14.39	17.30	21.33	1.05	0.58	41.55	19.44	0.40
2700.0	10.56	14.12	18.20	20.64	1.06	0.58	42.10	19.73	0.43
2800.0	10.24	13.86	18.94	20.10	1.06	0.58	41.09	19.73	0.44
2900.0	9.95	13.60	19.42	19.38	1.06	0.58	41.12	19.83	0.47
3000.0	9.70	13.32	19.68	18.44	1.06	0.57	40.83	19.60	0.48
3100.0	9.47	13.03	19.94	17.66	1.06	0.56	41.04	19.49	0.41
3200.0	9.26	12.75	20.27	17.40	1.05	0.55	43.75	19.94	0.47
3300.0	9.04	12.49	20.30	17.32	1.05	0.55	40.73	19.37	0.54
3400.0	8.82	12.24	20.43	17.07	1.05	0.54	43.56	19.71	0.65
3500.0	8.61	12.01	20.32	16.82	1.05	0.54	41.67	19.21	0.60

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 = 55.73mA @ 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)
400.0	24.17	28.19	9.13	23.61	1.03	0.69	29.32	17.38	0.89
450.0	23.66	27.35	9.61	29.07	1.02	0.67	30.03	17.35	0.86
500.0	23.11	26.62	9.91	35.84	1.01	0.65	30.64	17.44	0.80
550.0	22.54	25.99	10.09	33.70	1.01	0.64	30.76	17.28	0.78
600.0	21.97	25.42	10.19	29.49	1.01	0.64	31.17	17.41	0.72
650.0	21.41	24.89	10.24	26.74	1.01	0.64	31.74	17.35	0.69
700.0	20.87	24.40	10.27	25.14	1.01	0.65	32.05	17.44	0.63
750.0	20.35	23.93	10.30	23.86	1.01	0.65	32.78	17.61	0.57
800.0	19.85	23.50	10.38	23.20	1.02	0.66	32.60	17.52	0.58
850.0	19.38	23.08	10.44	22.82	1.02	0.66	32.75	17.52	0.52
900.0	18.93	22.68	10.50	22.59	1.02	0.66	33.11	17.49	0.50
950.0	18.50	22.30	10.60	22.51	1.02	0.67	33.51	17.48	0.50
1000.0	18.09	21.93	10.67	22.40	1.03	0.67	33.69	17.39	0.47
1050.0	17.70	21.57	10.76	22.31	1.03	0.67	33.56	17.40	0.49
1100.0	17.32	21.23	10.79	22.18	1.03	0.67	34.15	17.53	0.48
1150.0	16.96	20.91	10.85	22.00	1.03	0.68	34.61	17.30	0.47
1200.0	16.61	20.59	10.93	21.88	1.04	0.68	34.06	17.52	0.46
1300.0	15.95	19.99	11.17	21.88	1.04	0.68	34.31	17.53	0.48
1400.0	15.35	19.42	11.49	21.98	1.04	0.68	35.14	17.60	0.49
1500.0	14.79	18.88	11.74	22.12	1.05	0.68	34.99	17.49	0.48
1600.0	14.26	18.39	11.93	22.24	1.05	0.68	35.81	17.96	0.50
1700.0	13.76	17.92	12.17	22.16	1.05	0.69	35.72	18.11	0.53
1800.0	13.28	17.47	12.63	21.83	1.06	0.68	35.84	17.88	0.52
1900.0	12.84	17.04	13.08	21.40	1.06	0.68	35.85	18.20	0.52
2000.0	12.42	16.64	13.47	21.20	1.06	0.68	36.81	17.98	0.55
2100.0	12.01	16.27	13.84	21.11	1.07	0.68	35.76	18.17	0.57
2200.0	11.63	15.91	14.23	20.80	1.07	0.68	37.97	18.23	0.60
2300.0	11.25	15.59	14.87	20.14	1.08	0.68	36.76	18.11	0.64
2400.0	10.86	15.30	15.55	19.83	1.08	0.68	39.74	18.44	0.69
2500.0	10.54	14.95	15.79	19.30	1.08	0.67	36.13	18.44	0.69
2600.0	10.20	14.67	16.27	19.04	1.09	0.67	39.64	18.43	0.75
2700.0	9.88	14.39	16.81	18.68	1.09	0.67	38.56	18.68	0.78
2800.0	9.59	14.11	17.56	18.17	1.10	0.67	39.82	18.65	0.81
2900.0	9.32	13.84	18.20	17.77	1.10	0.66	38.74	18.74	0.83
3000.0	9.05	13.57	18.49	17.57	1.10	0.66	39.19	18.46	0.89
3100.0	8.81	13.30	18.59	17.46	1.10	0.65	38.22	18.31	0.81
3200.0	8.58	13.04	18.83	17.44	1.10	0.65	37.56	18.70	0.85
3300.0	8.35	12.79	19.02	17.57	1.10	0.65	37.67	18.09	0.97
3400.0	8.12	12.55	19.29	17.88	1.10	0.65	39.04	18.28	1.13
3500.0	7.91	12.33	19.22	18.32	1.10	0.65	38.30	17.76	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 = 2.70V, Id = 48.67mA @ 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)
400.0	24.03	27.96	8.69	24.14	1.02	0.70	28.67	16.45	0.87
450.0	23.52	27.13	9.19	30.93	1.00	0.67	29.30	16.43	0.82
500.0	22.98	26.43	9.52	45.98	1.00	0.66	29.51	16.57	0.81
550.0	22.41	25.81	9.73	34.29	1.00	0.65	29.76	16.45	0.76
600.0	21.85	25.25	9.86	28.90	1.00	0.65	30.11	16.59	0.72
650.0	21.28	24.74	9.92	26.12	1.00	0.65	30.78	16.56	0.69
700.0	20.74	24.26	9.99	24.49	1.00	0.66	31.10	16.64	0.65
750.0	20.22	23.81	10.03	23.23	1.01	0.66	31.57	16.82	0.61
800.0	19.72	23.39	10.13	22.55	1.01	0.66	31.77	16.76	0.56
850.0	19.25	22.98	10.19	22.16	1.01	0.67	31.65	16.75	0.53
900.0	18.80	22.58	10.26	21.92	1.02	0.67	32.04	16.74	0.50
950.0	18.37	22.21	10.37	21.83	1.02	0.68	32.31	16.73	0.51
1000.0	17.96	21.84	10.44	21.73	1.02	0.68	32.42	16.66	0.49
1050.0	17.57	21.50	10.53	21.64	1.03	0.68	32.28	16.68	0.50
1100.0	17.19	21.16	10.56	21.51	1.03	0.68	32.81	16.78	0.49
1150.0	16.83	20.84	10.63	21.35	1.03	0.69	32.91	16.57	0.49
1200.0	16.48	20.53	10.70	21.24	1.03	0.69	32.80	16.78	0.47
1300.0	15.82	19.94	10.95	21.23	1.04	0.69	33.08	16.79	0.50
1400.0	15.23	19.37	11.25	21.35	1.04	0.69	33.76	16.88	0.49
1500.0	14.66	18.84	11.51	21.51	1.05	0.69	33.69	16.76	0.51
1600.0	14.13	18.35	11.69	21.65	1.05	0.69	34.21	17.20	0.48
1700.0	13.64	17.89	11.92	21.62	1.05	0.70	33.88	17.35	0.50
1800.0	13.16	17.44	12.37	21.38	1.06	0.69	34.08	17.14	0.51
1900.0	12.72	17.01	12.83	21.05	1.06	0.69	34.40	17.43	0.53
2000.0	12.31	16.61	13.18	20.94	1.06	0.69	34.76	17.25	0.57
2100.0	11.90	16.24	13.56	20.92	1.07	0.69	34.66	17.41	0.57
2200.0	11.51	15.88	13.92	20.67	1.07	0.69	35.47	17.48	0.59
2300.0	11.13	15.56	14.54	20.08	1.08	0.69	35.84	17.36	0.63
2400.0	10.75	15.27	15.22	19.84	1.09	0.69	37.63	17.67	0.68
2500.0	10.43	14.93	15.45	19.36	1.09	0.68	34.91	17.69	0.68
2600.0	10.09	14.64	15.91	19.15	1.09	0.68	37.23	17.69	0.72
2700.0	9.78	14.36	16.43	18.83	1.10	0.68	37.90	17.93	0.79
2800.0	9.49	14.08	17.14	18.33	1.10	0.67	37.73	17.89	0.79
2900.0	9.21	13.81	17.79	17.93	1.10	0.67	37.48	17.95	0.85
3000.0	8.95	13.54	18.06	17.75	1.10	0.67	37.44	17.68	0.88
3100.0	8.71	13.27	18.19	17.66	1.10	0.66	38.09	17.56	0.83
3200.0	8.48	13.01	18.41	17.64	1.10	0.66	36.40	17.91	0.88
3300.0	8.25	12.76	18.59	17.77	1.10	0.66	35.88	17.32	1.00
3400.0	8.02	12.52	18.90	18.10	1.10	0.65	37.18	17.48	1.08
3500.0	7.81	12.30	18.78	18.57	1.10	0.66	37.03	16.97	1.11

Typical Performance Data

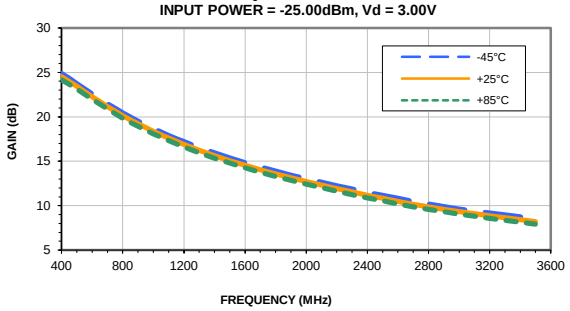
Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 3.30V, Id= 62.82mA @ Temperature = +85°C

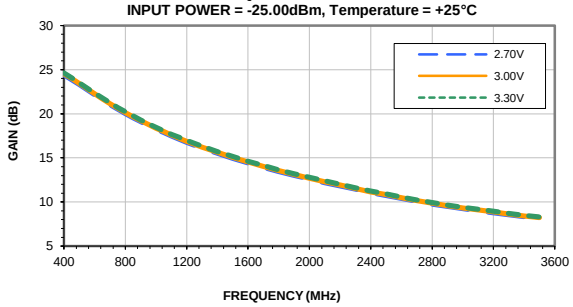
FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
400.0	24.28	28.37	9.50	22.94	1.04	0.69	30.22	18.19	0.85
450.0	23.76	27.52	9.96	27.41	1.03	0.66	30.91	18.12	0.87
500.0	23.21	26.78	10.24	32.15	1.02	0.65	31.33	18.16	0.83
550.0	22.63	26.14	10.39	32.44	1.02	0.64	31.29	17.98	0.75
600.0	22.06	25.55	10.47	29.80	1.02	0.64	32.00	18.08	0.72
650.0	21.50	25.01	10.49	27.30	1.02	0.64	32.20	17.99	0.69
700.0	20.96	24.51	10.50	25.77	1.02	0.64	32.86	18.08	0.65
750.0	20.44	24.04	10.53	24.49	1.02	0.65	33.93	18.24	0.61
800.0	19.94	23.59	10.58	23.82	1.02	0.65	33.65	18.15	0.55
850.0	19.47	23.17	10.65	23.46	1.02	0.65	33.60	18.16	0.53
900.0	19.02	22.76	10.71	23.25	1.03	0.66	33.99	18.11	0.52
950.0	18.59	22.37	10.81	23.19	1.03	0.66	34.60	18.11	0.50
1000.0	18.18	22.00	10.89	23.09	1.03	0.66	34.48	18.00	0.48
1050.0	17.79	21.64	10.96	22.99	1.03	0.66	34.56	18.02	0.48
1100.0	17.41	21.29	10.98	22.84	1.03	0.67	34.67	18.15	0.47
1150.0	17.05	20.96	11.05	22.63	1.04	0.67	34.92	17.91	0.49
1200.0	16.70	20.64	11.11	22.49	1.04	0.67	34.93	18.15	0.49
1300.0	16.04	20.04	11.36	22.47	1.04	0.67	35.46	18.15	0.50
1400.0	15.44	19.47	11.68	22.55	1.04	0.67	35.94	18.23	0.48
1500.0	14.88	18.93	11.95	22.65	1.05	0.68	36.09	18.11	0.49
1600.0	14.34	18.43	12.13	22.72	1.05	0.68	36.63	18.60	0.50
1700.0	13.84	17.96	12.36	22.58	1.05	0.68	36.38	18.75	0.50
1800.0	13.37	17.51	12.84	22.16	1.06	0.68	37.01	18.51	0.52
1900.0	12.93	17.08	13.32	21.62	1.06	0.67	36.90	18.83	0.54
2000.0	12.51	16.68	13.71	21.35	1.06	0.67	37.38	18.62	0.57
2100.0	12.10	16.30	14.09	21.20	1.07	0.67	37.33	18.79	0.59
2200.0	11.71	15.94	14.47	20.83	1.07	0.67	39.02	18.86	0.57
2300.0	11.33	15.62	15.13	20.12	1.07	0.67	37.74	18.74	0.64
2400.0	10.94	15.33	15.83	19.74	1.08	0.67	42.51	19.09	0.68
2500.0	10.62	14.99	16.09	19.17	1.08	0.67	36.78	19.09	0.69
2600.0	10.28	14.70	16.55	18.89	1.09	0.67	39.41	19.06	0.72
2700.0	9.96	14.42	17.10	18.50	1.09	0.66	40.25	19.32	0.78
2800.0	9.67	14.14	17.87	17.99	1.10	0.66	40.29	19.28	0.82
2900.0	9.39	13.87	18.55	17.57	1.10	0.65	39.37	19.35	0.85
3000.0	9.12	13.60	18.85	17.38	1.10	0.65	40.29	19.07	0.85
3100.0	8.88	13.34	18.95	17.26	1.10	0.65	39.51	18.97	0.78
3200.0	8.65	13.07	19.11	17.22	1.10	0.64	39.14	19.41	0.87
3300.0	8.42	12.83	19.29	17.33	1.10	0.64	38.21	18.76	0.93
3400.0	8.19	12.59	19.61	17.63	1.10	0.64	39.22	18.96	1.09
3500.0	7.98	12.36	19.49	18.07	1.10	0.64	38.92	18.48	1.10

Typical Performance Curves

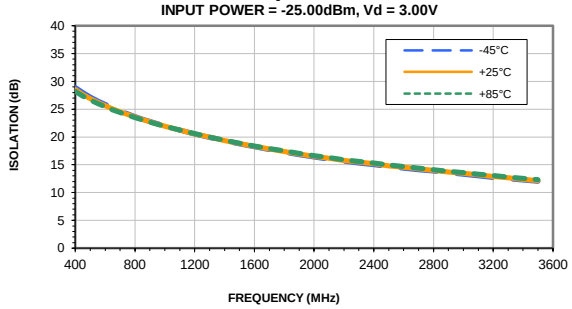
GAIN vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25.00dBm, Vd = 3.00V



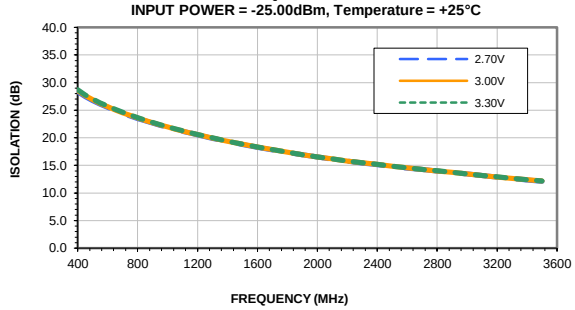
GAIN vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25.00dBm, Temperature = +25°C



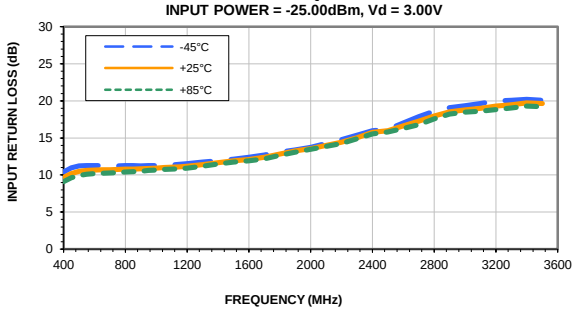
ISOLATION vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25.00dBm, Vd = 3.00V



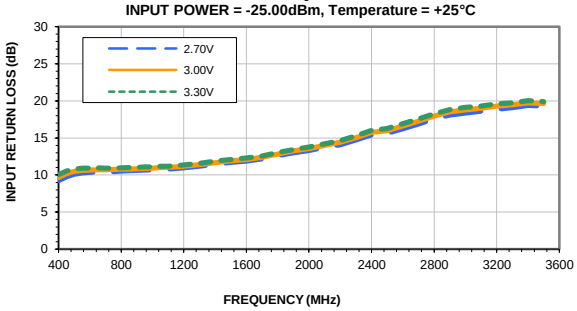
ISOLATION vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25.00dBm, Temperature = +25°C



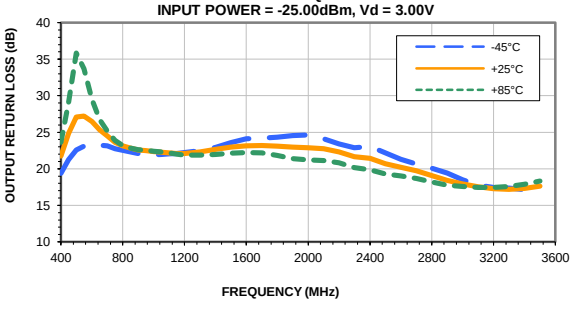
INPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25.00dBm, Vd = 3.00V



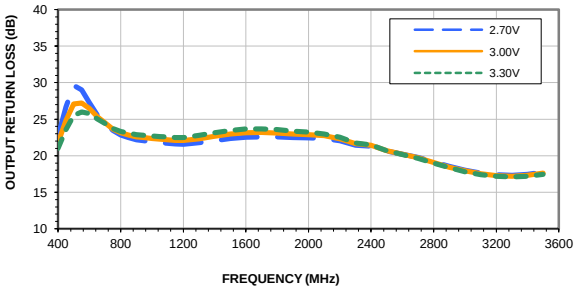
INPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25.00dBm, Temperature = +25°C



OUTPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25.00dBm, Vd = 3.00V

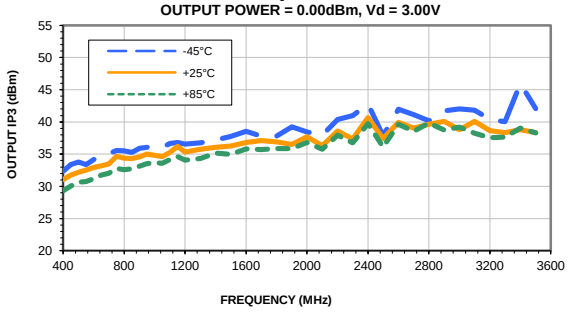


OUTPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25.00dBm, Temperature = +25°C

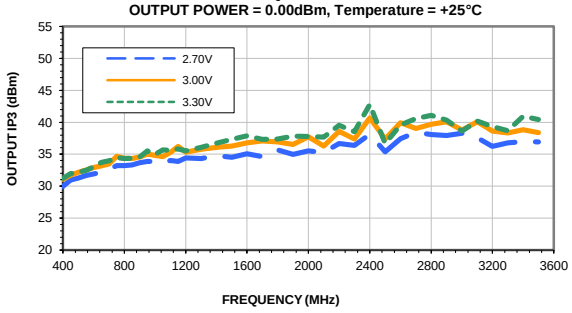


Typical Performance Curves

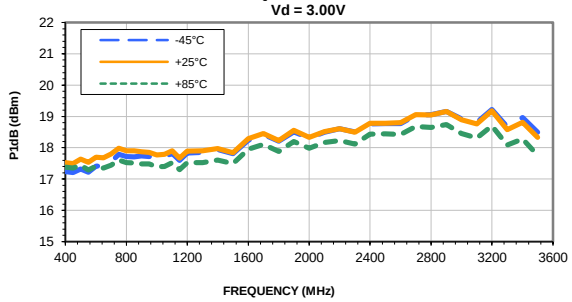
OUTPUT IP3 vs. FREQUENCY & TEMPERATURE
OUTPUT POWER = 0.00dBm, Vd = 3.00V



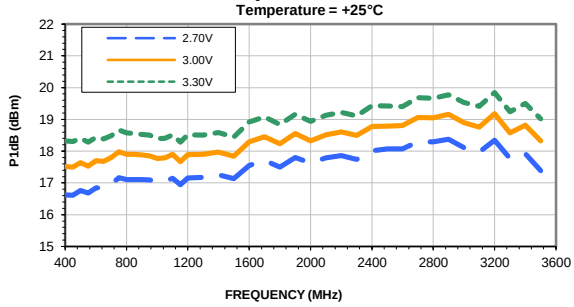
OUTPUT IP3 vs. FREQUENCY & DEVICE VOLTAGE
OUTPUT POWER = 0.00dBm, Temperature = +25°C



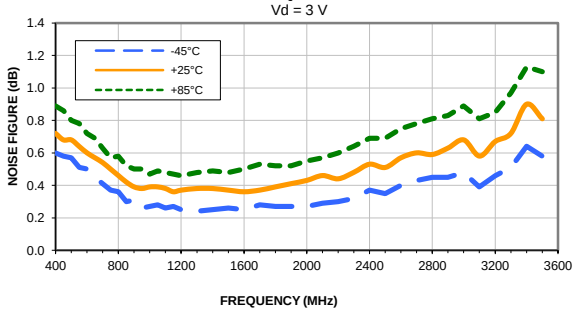
P1dB vs. FREQUENCY & TEMPERATURE
Vd = 3.00V



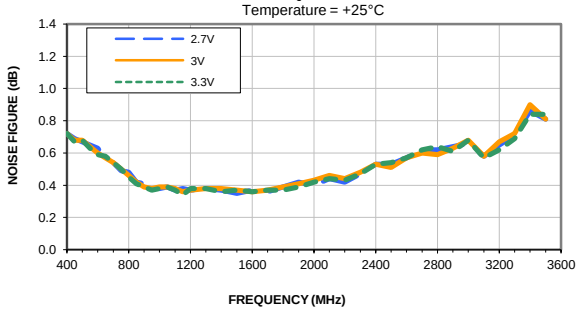
P1dB vs. FREQUENCY & DEVICE VOLTAGE
Temperature = +25°C



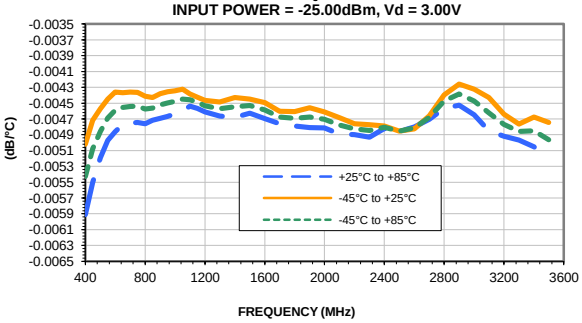
NOISE FIGURE vs. FREQUENCY & TEMPERATURE
Vd = 3 V



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



GAIN VARIATION vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25.00dBm, Vd = 3.00V

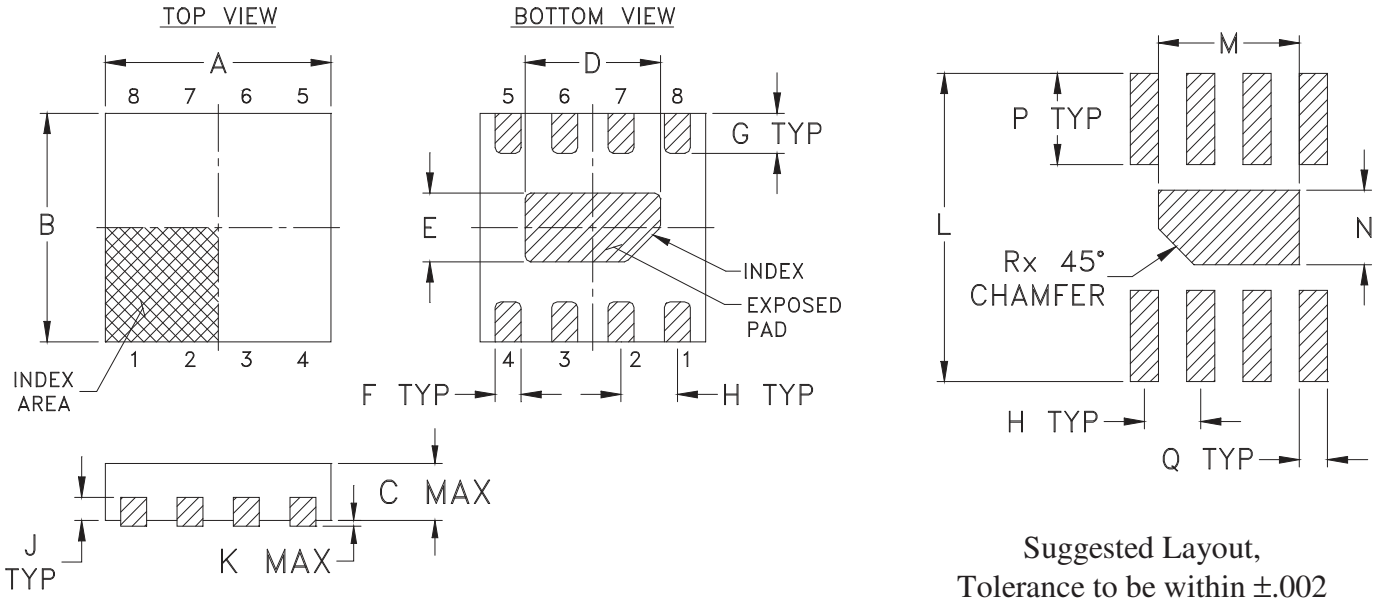


Case Style MC

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)

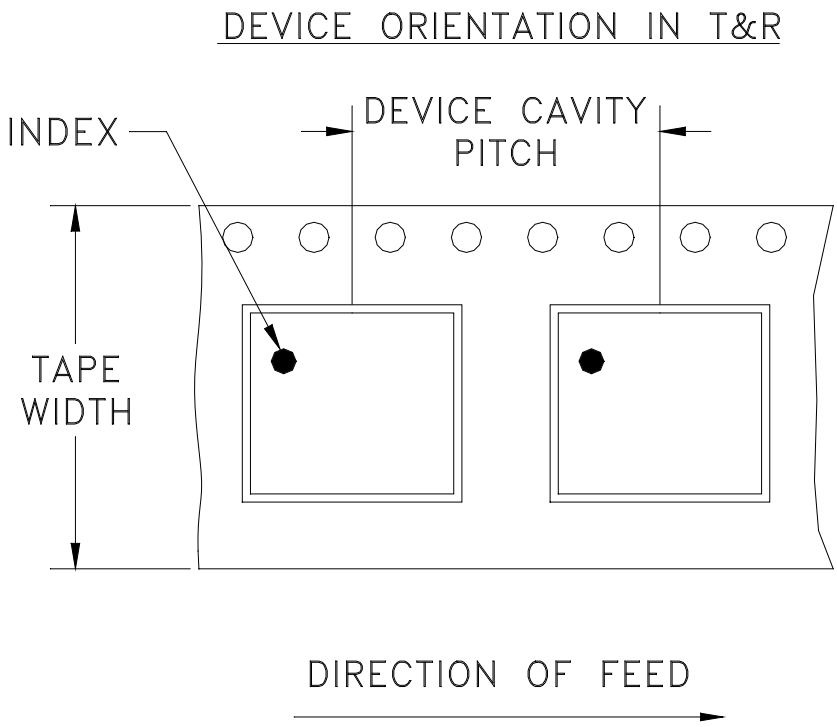
CASE #.	Q	R	WT, GRAM
MC1631-1	.010 (.25)	.012 (.30)	.006

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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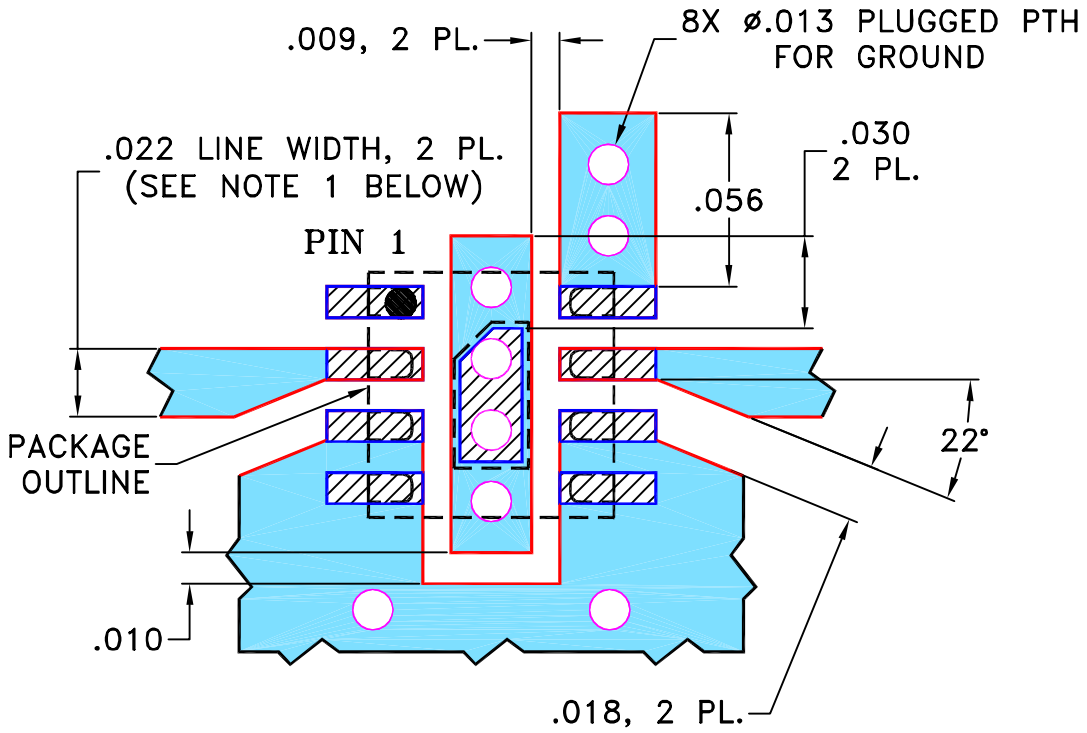
THIRD ANGLE PROJECTION

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

SUGGESTED MOUNTING CONFIGURATION FOR MC1631-1 CASE STYLE, "08AM11" PIN CODE



NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .010" ± .001"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	AV	10/21/13
TOLERANCES ON:	CHECKED	IL	11/07/13
2 PL DECIMALS ±	APPROVED	RS	11/11/13
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

Mini-Circuits®

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

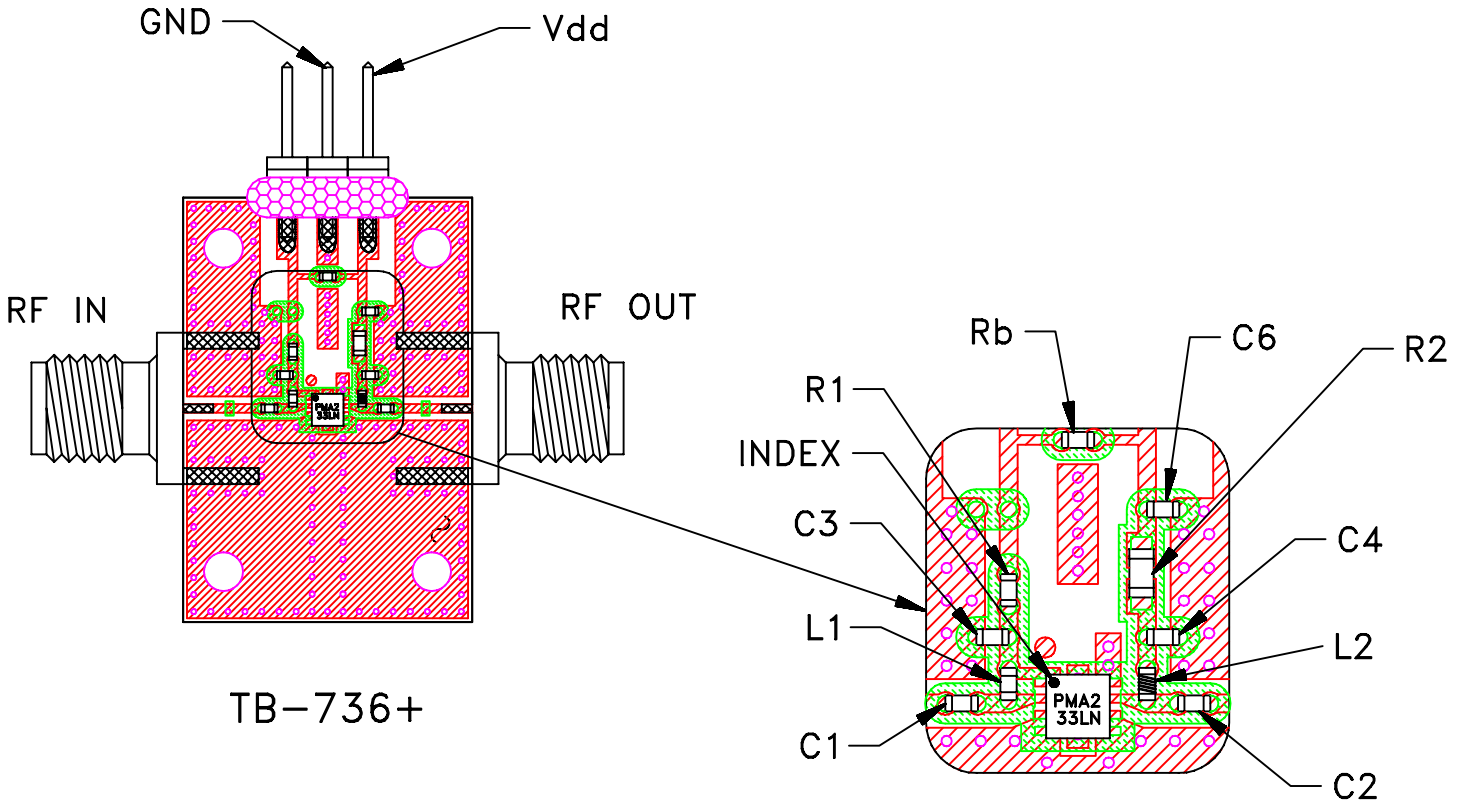
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

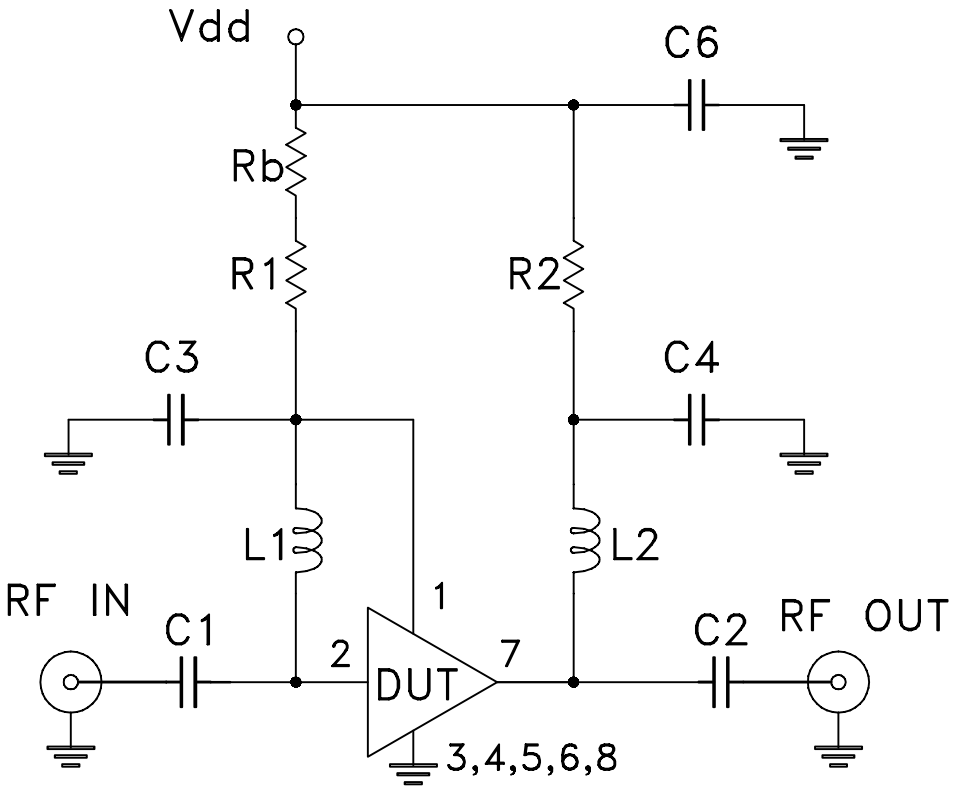
PL, 08AM11, MC1631-1, TB-736+

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-400	OR

FILE:	SCALE:	SHEET:
98PL400	16:1	1 OF 1

Evaluation Board and Circuit





Schematic Diagram

ITEM	DESCRIPTION	SIZE
C1,C2	CAP, 100 pF	0402
C3,C6	CAP, 4.7 uF	0402
C4	CAP, 33 pF	0402
L1	IND, 33 nH	0402
L2	IND, 33 nH	0402
R1	RES, 0 Ohm	0402
R2	RES,10 Ohm	0603
Rb	RES,4.02 kOhm	0402
DUT	PMA2-33LN+	-

NOTES:

1. SMA Female connectors.
2. PCB material: Rogers RO4350 or equivalent, dielectric constant=3.5, dielectric thickness=.010 inch.

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

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

Specification	Test/Inspection Condition	Reference/Spec
	monoethanolamine at 63°C to 70°C	