MMIC SURFACE MOUNT

Monolithic Amplifier

ERA-9SM+

50Ω DC to 8 GHz

FEATURES

- DC to 8 GHz
- Gain, 8.4 dB typ. at 2 GHz
- Good Gain Flatness, ±0.9 dB Typ.
- Output Power, +13.8 dBm Typ. at 2 GHz
- Internally Matched to 50Ω
- Aqueous Washable
- Protected By US Patent 6,943,629

Generic photo used for illustration purposes only

CASE STYLE: WW107

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

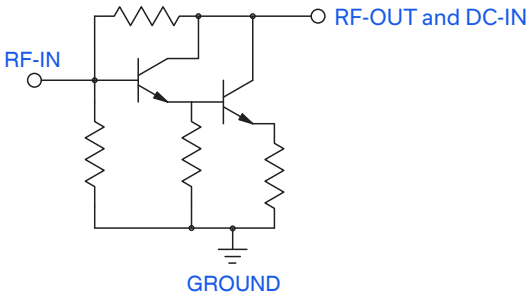
APPLICATIONS

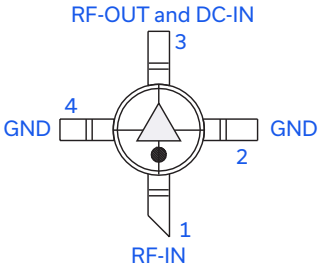
- Cellular
- PCS
- Communication Receivers & Transmitters
- Satellite Communications

PRODUCT OVERVIEW

ERA-9SM+ (RoHS compliant) is a wideband current driven low gain, amplifier offering medium dynamic range. It has repeatable performance from lot to lot. It is enclosed in a 0.085" diameter micro-x package.

SIMPLIFIED SCHEMATIC AND PIN DESCRIPTION





Function	Pin Number	Description
RF-IN	1	RF input pin. This pin requires the use of an external DC blocking capacitor chosen for the frequency of operation.
RF-OUT and DC-IN	3	RF output and bias pin. DC voltage is present on this pin; therefore a DC blocking capacitor is necessary for proper operation. An RF choke is needed to feed DC bias without loss of RF signal due to the bias connection, as shown in "Recommended Application Circuit".
GND	2,4	Connections to ground. Use via holes as shown in "Suggested Layout for PCB Design" to reduce ground path inductance for best performance.

REV. D
ECO-024491
ERA-9SM+
MCL NY
250211

Monolithic Amplifier ERA-9SM+

50Ω DC to 8 GHz

ELECTRICAL SPECIFICATIONS AT +25°C AND 50 mA UNLESS NOTED OTHERWISE

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range[1]		DC		8	GHz
Gain	0.1	7.4	8.6	9.0	dB
	1.0		8.5		
	2.0		8.3		
	4.0		7.8		
	5.0		7.4		
	8.0		6.9		
Input Return Loss	0.1		24.0		dB
	1.0		24.4		
	2.0		25.0		
	4.0		24.0		
	5.0		21.9		
	8.0		18.6		
Output Return Loss	0.1		37.3		dB
	1.0		32.4		
	2.0		23.8		
	4.0		17.8		
	5.0		15.5		
	8.0		11.9		
Output Power @ 1 dB Compression	0.1	+12.8	+14.3		dBm
	1.0		+14.1		
	2.0		+14.1		
	4.0		+12.5		
	5.0		+10.9		
	8.0		+7.9		
Output IP3	0.1		+31.1		dBm
	1.0		+31.3		
	2.0		+30.1		
	4.0		+25.4		
	5.0		+23.4		
	8.0		+19.4		
Noise Figure	0.1		5.1	3	dB
	1.0		5.3		
	2.0		5.3		
	4.0		5.3		
	5.0		5.3	3.8	
	8.0		5.4	4	
Additive Phase Noise	2.0 GHz, 10 kHz Offset		-173		dBc/Hz
Recommended Device Operating Current (I_d)			50		mA
Device Operating Voltage (V_d)		+3.6	+4.0	+4.4	V
Device Voltage Variation vs. Temperature at 50 mA			-2.6		mV/°C
Device Voltage Variation vs. Current at +25°C			17.5		mV/mA
Thermal Resistance, Junction-to-Case[2]			138		°C/W

1. Low frequency cut off determined by external coupling capacitors.
2. Case is defined as ground leads.

ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-45°C to +85°C
Storage Temperature	-65°C to +150°C
Operating Current	74 mA
Input Power	+26 dBm (5 min max.) +15 dBm (continuous)

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

Monolithic Amplifier ERA-9SM+

50Ω DC to 8 GHz

CHARACTERIZATION TEST CIRCUIT

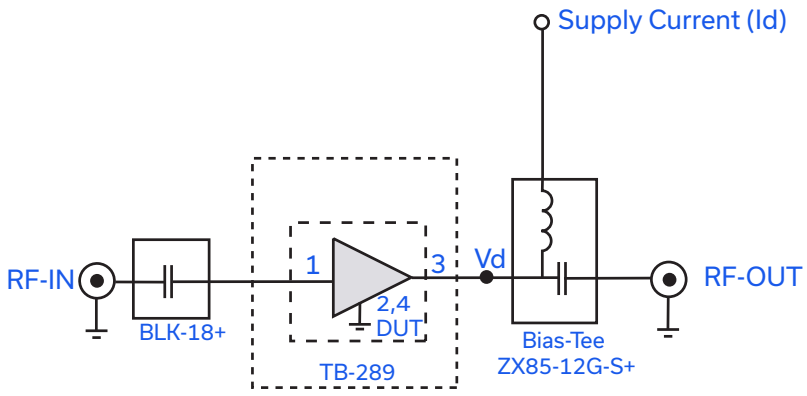
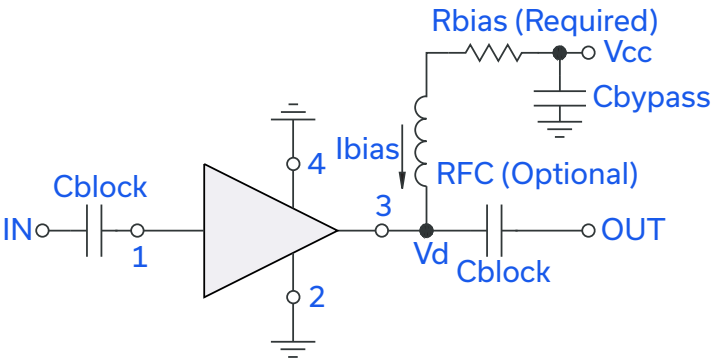


Fig 1. Block Diagram of Test Circuit used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-289) Gain, Return Loss, Output Power at 1 dB Compression (P1dB), Output IP3 (OIP3) and Noise Figure measured using Agilent's N5242A PNA-X microwave network analyzer.

Conditions:
1. Gain and Return loss: P_{IN}= -25 dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, -5 dBm/tone at output.

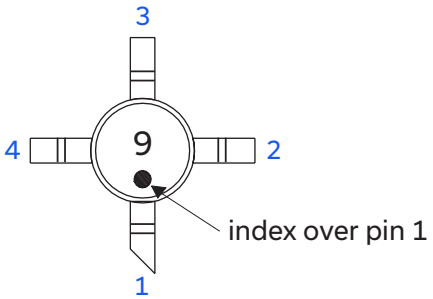
RECOMMENDED APPLICATION CIRCUIT



Test Board includes case, connectors, and components (in bold) soldered to PCB

R BIAS	
Vcc	"1%" Res. Values (Ohms) for Optimum Biasing
7	61.9
8	80.6
9	100
10	121
11	140
12	165
13	182
14	200
15	221
16	237
17	261
18	274
19	301
20	316

PRODUCT MARKING



Markings in addition to model number designation may appear for internal quality control purposes.

Monolithic Amplifier ERA-9SM+

50Ω DC to 8 GHz

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

Performance Data & Graphs	Data Table Swept Graphs S-Parameter (S2P Files) Data Set (.zip file)
Case Style	WW107 Plastic micro-x package, lead finish: Matte-tin
Tape & Reel **Standard Quantities Available on Reel**	F4 7" Reels with 20, 50, 100, 200, 500 or 1K devices
Suggested Layout for PCB Design	PL075
Evaluation Board	TB-408-9SM+
Environmental Ratings	ENV08T1

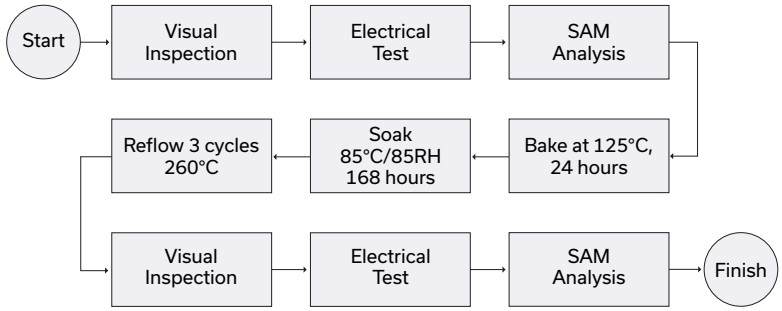
ESD RATING

Human Body Model (HBM): Class 1B (500 V to < 1000 V) in accordance with ANSI/ESD STM 5.1 - 2001
Machine Model (MM): Class M1 (25 V) in accordance with ANSI/ESD STM 5.2 - 1999

MSL RATING

Moisture Sensitivity: MSL1 in accordance with IPC/JEDECJ-STD-020C

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/terms/viewterm.html

MMIC Amplifier ERA-9SM+

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: Id =50mA, Vd = 4.1V, @ Temperature = +25degC

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)
10.0	8.58	15.30	22.68	41.72	1.31	0.79	30.97	13.93	5.24
50.0	8.61	15.15	23.12	37.24	1.29	0.78	33.94	14.44	5.09
100.0	8.60	15.10	23.28	38.13	1.29	0.78	32.96	14.31	5.05
200.0	8.59	15.12	23.10	38.00	1.29	0.78	33.34	14.15	5.00
300.0	8.58	15.12	23.29	38.38	1.29	0.78	32.93	14.21	5.51
400.0	8.57	15.12	23.47	37.93	1.29	0.78	31.73	14.21	5.17
500.0	8.55	15.12	23.61	37.96	1.30	0.78	31.76	14.19	5.52
600.0	8.55	15.12	23.84	37.45	1.30	0.78	32.54	14.23	5.22
700.0	8.53	15.12	24.22	36.18	1.30	0.78	33.15	14.18	5.27
800.0	8.52	15.13	24.46	35.03	1.30	0.79	33.49	14.18	5.28
1000.0	8.50	15.12	24.96	32.47	1.30	0.79	31.54	14.08	5.26
1250.0	8.46	15.14	25.59	29.44	1.30	0.79	32.66	14.08	5.17
1500.0	8.41	15.14	25.99	27.03	1.31	0.79	31.14	14.09	5.16
1750.0	8.36	15.13	26.05	25.44	1.31	0.79	30.53	14.13	5.18
2000.0	8.30	15.17	25.78	24.13	1.32	0.79	30.73	14.06	5.25
2250.0	8.25	15.13	26.14	23.41	1.32	0.79	30.31	13.99	5.22
2500.0	8.19	15.16	25.98	22.75	1.33	0.80	29.18	13.89	5.14
2750.0	8.12	15.17	26.01	22.51	1.34	0.80	28.53	13.77	5.19
3000.0	8.06	15.17	26.35	22.24	1.34	0.80	27.87	13.55	5.23
3250.0	8.00	15.16	26.66	21.99	1.35	0.80	27.37	13.28	5.16
3500.0	7.89	15.20	26.29	21.18	1.36	0.81	26.82	12.95	5.28
3750.0	7.84	15.18	26.84	21.16	1.37	0.81	26.02	12.68	5.16
4000.0	7.75	15.16	27.26	19.97	1.37	0.81	25.54	12.43	5.12
4250.0	7.65	15.21	26.88	19.03	1.39	0.81	25.23	11.86	5.11
4500.0	7.60	15.19	27.45	18.34	1.39	0.81	24.71	11.65	5.22
4750.0	7.42	15.14	25.31	16.75	1.40	0.81	24.40	11.46	5.20
5000.0	7.20	15.34	24.07	16.26	1.44	0.82	23.74	11.05	5.24
5250.0	7.25	15.24	24.84	15.77	1.42	0.81	23.15	10.67	5.24
5500.0	7.17	15.29	24.59	15.28	1.44	0.81	23.25	10.72	5.09
5750.0	7.13	15.18	24.18	14.59	1.42	0.80	22.92	10.30	5.13
6000.0	7.05	15.39	25.70	14.82	1.46	0.82	22.32	9.99	5.15
6250.0	6.99	15.20	24.77	14.22	1.44	0.81	22.13	9.75	5.15
6500.0	6.86	15.22	25.51	14.26	1.46	0.81	21.83	9.57	5.14
6750.0	6.68	15.12	24.75	14.19	1.47	0.81	21.16	9.19	5.18
7000.0	6.88	15.26	30.14	14.70	1.46	0.82	21.22	9.08	5.24
7250.0	6.82	15.19	30.89	14.89	1.46	0.82	21.11	8.92	5.21
7500.0	6.85	15.11	29.99	14.80	1.45	0.82	20.30	8.47	5.20
7750.0	6.92	15.11	29.93	14.54	1.44	0.81	20.15	8.27	5.27
8000.0	6.98	15.07	27.54	14.02	1.42	0.80	20.34	8.03	5.17

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: Id =40mA, Vd = 3.93V, @ Temperature = +25degC

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)
10.0	8.47	15.27	22.05	37.12	1.32	0.80	28.86	12.06	5.15
50.0	8.50	15.06	22.30	32.99	1.29	0.78	28.97	12.20	5.03
100.0	8.48	15.05	22.46	33.71	1.29	0.78	29.25	12.19	5.01
200.0	8.47	15.03	22.28	33.52	1.29	0.78	28.40	11.89	4.93
300.0	8.46	15.03	22.51	34.18	1.30	0.78	29.00	11.94	5.05
400.0	8.45	15.05	22.65	34.62	1.30	0.79	28.84	12.12	5.14
500.0	8.44	15.05	22.81	35.12	1.30	0.79	28.89	12.01	5.11
600.0	8.43	15.04	23.03	35.93	1.30	0.79	29.24	12.11	5.17
700.0	8.42	15.05	23.40	36.04	1.30	0.79	28.89	12.13	5.15
800.0	8.41	15.04	23.62	36.22	1.30	0.79	29.66	12.15	5.10
1000.0	8.39	15.05	24.16	34.91	1.30	0.79	28.06	11.97	5.17
1250.0	8.35	15.05	24.87	31.61	1.31	0.79	29.25	11.98	5.14
1500.0	8.31	15.06	25.53	28.76	1.31	0.79	29.25	12.09	5.09
1750.0	8.26	15.05	25.75	26.86	1.31	0.79	28.63	12.20	5.10
2000.0	8.21	15.09	25.74	25.31	1.32	0.80	28.67	12.11	5.15
2250.0	8.16	15.05	26.14	24.38	1.32	0.79	27.99	12.11	5.13
2500.0	8.11	15.08	26.19	23.63	1.33	0.80	27.80	12.11	5.11
2750.0	8.04	15.09	26.26	23.22	1.34	0.80	27.31	12.18	5.11
3000.0	7.99	15.08	26.60	22.89	1.34	0.80	26.75	12.21	5.04
3250.0	7.92	15.08	26.98	22.54	1.35	0.80	26.22	12.07	5.02
3500.0	7.83	15.11	26.85	21.68	1.36	0.81	25.76	11.84	5.14
3750.0	7.78	15.11	27.51	21.59	1.37	0.81	25.17	11.71	5.09
4000.0	7.69	15.08	28.32	20.35	1.37	0.81	24.59	11.41	4.97
4250.0	7.59	15.10	28.23	19.34	1.38	0.81	24.15	10.93	5.02
4500.0	7.54	15.11	29.11	18.60	1.39	0.81	23.70	10.72	5.07
4750.0	7.37	15.06	26.76	16.98	1.40	0.81	23.48	10.53	5.07
5000.0	7.16	15.26	25.28	16.44	1.44	0.82	22.81	10.11	5.12
5250.0	7.21	15.17	26.16	15.93	1.42	0.81	22.30	9.81	5.05
5500.0	7.13	15.21	25.79	15.42	1.43	0.81	22.37	9.80	4.94
5750.0	7.09	15.10	25.01	14.67	1.42	0.80	21.93	9.37	4.97
6000.0	7.02	15.33	26.63	14.92	1.46	0.82	21.46	9.11	5.04
6250.0	6.96	15.14	25.28	14.28	1.43	0.81	21.24	8.89	5.04
6500.0	6.82	15.16	25.87	14.33	1.45	0.81	20.95	8.66	5.00
6750.0	6.64	15.06	25.00	14.23	1.46	0.82	20.25	8.35	5.06
7000.0	6.85	15.20	29.90	14.75	1.46	0.82	20.29	8.22	4.96
7250.0	6.78	15.14	30.71	14.95	1.46	0.82	20.15	8.02	5.10
7500.0	6.81	15.06	29.36	14.84	1.44	0.82	19.35	7.57	5.04
7750.0	6.89	15.06	28.79	14.54	1.43	0.81	19.23	7.38	5.13
8000.0	6.94	15.02	26.37	14.04	1.41	0.81	19.24	7.14	5.02

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: Id =60mA, Vd = 4.29V, @ Temperature = +25degC

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)
10.0	8.67	14.85	23.78	37.72	1.26	0.76	28.75	14.45	5.28
50.0	8.69	15.15	23.74	40.99	1.29	0.78	37.19	15.67	5.18
100.0	8.67	15.17	23.80	43.33	1.29	0.78	36.27	15.46	5.15
200.0	8.66	15.15	23.67	41.48	1.29	0.78	35.19	15.42	5.09
300.0	8.65	15.16	23.90	40.40	1.29	0.78	33.55	15.48	5.24
400.0	8.64	15.16	24.05	39.68	1.29	0.78	34.96	15.37	5.27
500.0	8.63	15.15	24.17	38.40	1.29	0.78	33.61	15.36	5.26
600.0	8.62	15.15	24.42	36.66	1.29	0.78	33.99	15.35	5.30
700.0	8.61	15.16	24.77	34.87	1.29	0.78	35.20	15.26	5.28
800.0	8.59	15.17	25.01	33.39	1.30	0.78	35.25	15.23	5.26
1000.0	8.56	15.17	25.38	31.00	1.30	0.79	33.20	15.21	5.29
1250.0	8.53	15.17	25.99	28.19	1.30	0.79	31.92	15.19	5.25
1500.0	8.48	15.18	26.31	26.16	1.31	0.79	32.85	15.11	5.25
1750.0	8.42	15.18	26.13	24.64	1.31	0.79	32.01	15.06	5.24
2000.0	8.36	15.20	25.75	23.50	1.32	0.79	32.35	14.96	5.28
2250.0	8.31	15.17	25.94	22.85	1.32	0.79	30.79	14.84	5.31
2500.0	8.25	15.20	25.83	22.27	1.33	0.79	29.74	14.70	5.27
2750.0	8.17	15.22	25.76	22.07	1.34	0.80	29.45	14.46	5.25
3000.0	8.11	15.19	26.12	21.86	1.34	0.80	28.63	14.22	5.20
3250.0	8.04	15.20	26.29	21.64	1.35	0.80	28.08	13.93	5.20
3500.0	7.94	15.23	25.92	20.90	1.36	0.81	27.35	13.66	5.30
3750.0	7.88	15.23	26.39	20.83	1.37	0.81	26.84	13.36	5.29
4000.0	7.79	15.19	26.58	19.75	1.37	0.81	26.12	13.14	5.22
4250.0	7.68	15.22	26.04	18.83	1.38	0.81	25.70	12.63	5.18
4500.0	7.63	15.22	26.39	18.15	1.39	0.81	25.31	12.46	5.24
4750.0	7.45	15.16	24.42	16.63	1.40	0.81	25.12	12.28	5.28
5000.0	7.23	15.36	23.28	16.10	1.44	0.82	24.51	11.91	5.31
5250.0	7.28	15.28	23.97	15.67	1.43	0.81	23.83	11.48	5.23
5500.0	7.20	15.33	23.72	15.19	1.44	0.81	24.05	11.58	5.12
5750.0	7.16	15.21	23.51	14.52	1.42	0.80	23.61	11.11	5.20
6000.0	7.08	15.42	24.77	14.76	1.46	0.82	23.10	10.83	5.27
6250.0	7.03	15.25	24.27	14.21	1.44	0.81	22.89	10.59	5.26
6500.0	6.88	15.24	24.91	14.23	1.46	0.81	22.55	10.41	5.27
6750.0	6.71	15.14	24.35	14.15	1.46	0.81	21.88	10.03	5.34
7000.0	6.91	15.29	29.53	14.71	1.46	0.82	22.01	9.96	5.24
7250.0	6.85	15.23	29.97	14.92	1.46	0.82	21.76	9.79	5.33
7500.0	6.88	15.12	29.84	14.85	1.45	0.81	21.11	9.32	5.31
7750.0	6.96	15.12	30.04	14.58	1.43	0.81	20.92	9.13	5.41
8000.0	7.02	15.07	28.39	14.11	1.42	0.80	20.99	8.88	5.36

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: Id =50mA, Vd = 4.29V, @ Temperature = -45degC

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)
10.0	8.68	14.93	23.09	35.92	1.27	0.77	30.16	14.03	4.48
50.0	8.69	15.18	22.64	35.59	1.29	0.78	36.25	14.56	4.37
100.0	8.67	15.16	22.06	33.68	1.29	0.78	33.39	14.44	4.32
200.0	8.67	15.13	21.80	32.62	1.28	0.78	34.68	14.23	4.30
300.0	8.66	15.11	23.07	36.78	1.28	0.78	32.55	14.33	4.44
400.0	8.66	15.12	23.69	39.39	1.29	0.78	33.05	14.40	4.50
500.0	8.65	15.13	23.84	38.40	1.29	0.78	32.95	14.37	4.50
600.0	8.65	15.11	24.29	37.04	1.28	0.78	33.75	14.41	4.52
700.0	8.64	15.11	24.36	35.71	1.29	0.78	33.43	14.40	4.50
800.0	8.63	15.11	24.06	35.21	1.29	0.78	33.99	14.39	4.46
1000.0	8.61	15.09	24.10	32.66	1.29	0.78	32.39	14.27	4.46
1250.0	8.58	15.09	25.11	28.55	1.29	0.78	33.85	14.29	4.46
1500.0	8.54	15.09	25.73	25.96	1.29	0.78	32.98	14.35	4.45
1750.0	8.50	15.08	25.73	24.39	1.29	0.78	32.51	14.42	4.46
2000.0	8.45	15.09	25.61	23.14	1.30	0.78	33.92	14.38	4.47
2250.0	8.39	15.06	25.64	22.09	1.30	0.78	31.07	14.35	4.47
2500.0	8.34	15.07	25.57	21.55	1.31	0.78	30.00	14.30	4.37
2750.0	8.28	15.07	25.88	22.33	1.31	0.79	29.99	14.26	4.45
3000.0	8.23	15.04	26.05	22.61	1.31	0.79	28.85	14.17	4.40
3250.0	8.16	15.03	25.98	22.00	1.32	0.79	28.45	13.95	4.32
3500.0	8.07	15.06	25.66	21.13	1.33	0.79	28.40	13.68	4.40
3750.0	8.02	15.04	26.12	21.34	1.33	0.80	27.48	13.42	4.39
4000.0	7.93	15.01	26.08	20.21	1.34	0.80	26.82	13.15	4.32
4250.0	7.83	15.02	25.39	18.94	1.35	0.80	26.55	12.65	4.33
4500.0	7.78	15.01	25.60	18.22	1.35	0.80	25.81	12.41	4.40
4750.0	7.57	15.00	23.12	16.47	1.36	0.79	25.45	12.18	4.39
5000.0	7.39	15.20	22.02	15.90	1.40	0.81	25.18	11.90	4.47
5250.0	7.46	15.03	22.35	15.09	1.37	0.79	24.47	11.50	4.39
5500.0	7.37	15.06	22.54	14.69	1.38	0.79	24.23	11.39	4.23
5750.0	7.27	15.05	22.44	14.12	1.39	0.79	24.13	11.08	4.32
6000.0	7.23	15.22	23.26	14.41	1.42	0.80	23.78	10.74	4.37
6250.0	7.11	14.96	22.41	13.61	1.39	0.79	23.47	10.48	4.31
6500.0	7.02	14.88	23.18	13.53	1.39	0.78	23.00	10.32	4.34
6750.0	6.91	14.82	23.03	13.79	1.40	0.79	22.59	10.11	4.26
7000.0	7.02	14.97	26.24	14.32	1.41	0.80	22.45	9.96	4.33
7250.0	7.04	14.94	27.66	14.68	1.41	0.80	22.36	9.84	4.29
7500.0	7.05	14.94	27.23	15.10	1.41	0.80	21.70	9.41	4.35
7750.0	7.17	14.88	29.37	14.94	1.39	0.79	21.78	9.28	4.40
8000.0	7.22	14.84	29.21	14.31	1.37	0.79	21.80	9.08	4.33

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: Id =40mA, Vd = 4.11V, @ Temperature = -45degC

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)
10.0	8.80	16.52	26.59	22.07	1.41	0.83	28.46	12.07	4.46
50.0	8.56	15.14	21.99	32.88	1.30	0.78	30.15	12.17	4.29
100.0	8.55	15.07	21.44	31.23	1.29	0.78	29.62	11.96	4.28
200.0	8.54	15.05	21.20	30.55	1.29	0.78	29.38	11.69	4.25
300.0	8.54	15.05	22.37	34.54	1.29	0.78	29.57	11.79	4.32
400.0	8.53	15.04	23.01	36.81	1.29	0.78	30.59	12.00	4.42
500.0	8.53	15.03	23.04	36.48	1.29	0.78	29.23	11.90	4.38
600.0	8.53	15.03	23.58	36.74	1.29	0.78	29.97	12.01	4.46
700.0	8.52	15.02	23.66	36.36	1.29	0.78	30.31	12.03	4.42
800.0	8.51	15.02	23.39	35.99	1.29	0.78	30.48	12.06	4.37
1000.0	8.49	15.02	23.56	34.05	1.29	0.78	28.96	11.84	4.45
1250.0	8.46	15.02	24.59	30.11	1.29	0.78	30.09	11.91	4.39
1500.0	8.43	15.02	25.26	27.30	1.29	0.78	29.66	12.05	4.39
1750.0	8.39	15.00	25.47	25.41	1.30	0.78	29.47	12.17	4.34
2000.0	8.34	15.01	25.57	24.01	1.30	0.78	29.26	12.09	4.40
2250.0	8.29	15.00	25.74	22.80	1.30	0.78	29.39	12.15	4.37
2500.0	8.24	15.01	25.77	22.19	1.31	0.79	28.51	12.18	4.34
2750.0	8.18	14.99	26.04	22.96	1.32	0.79	28.32	12.24	4.39
3000.0	8.13	14.98	26.31	23.31	1.32	0.79	28.24	12.45	4.35
3250.0	8.07	14.95	26.49	22.61	1.32	0.79	27.44	12.42	4.25
3500.0	7.98	14.98	26.33	21.65	1.33	0.80	27.17	12.26	4.37
3750.0	7.93	14.97	26.81	21.78	1.34	0.80	26.58	12.26	4.34
4000.0	7.84	14.94	26.91	20.58	1.34	0.80	25.99	12.05	4.23
4250.0	7.75	14.97	26.27	19.24	1.35	0.80	25.40	11.63	4.22
4500.0	7.70	14.95	26.81	18.46	1.35	0.80	25.11	11.38	4.28
4750.0	7.50	14.94	24.16	16.75	1.37	0.80	24.76	11.21	4.29
5000.0	7.33	15.13	22.85	16.24	1.40	0.81	24.41	10.92	4.35
5250.0	7.39	14.98	23.12	15.29	1.38	0.79	23.71	10.59	4.26
5500.0	7.30	14.99	23.37	14.90	1.38	0.79	23.48	10.50	4.17
5750.0	7.20	14.98	23.02	14.32	1.39	0.79	23.21	10.20	4.20
6000.0	7.17	15.15	24.14	14.59	1.42	0.80	22.75	9.86	4.24
6250.0	7.07	14.92	23.34	13.78	1.39	0.79	22.53	9.61	4.30
6500.0	6.96	14.83	23.77	13.52	1.39	0.79	22.16	9.45	4.26
6750.0	6.82	14.78	23.36	13.86	1.41	0.79	21.74	9.21	4.24
7000.0	6.95	14.96	27.48	14.41	1.42	0.80	21.60	9.12	4.27
7250.0	6.96	14.85	28.90	14.47	1.40	0.80	21.39	8.94	4.32
7500.0	7.04	14.87	30.30	14.91	1.40	0.80	20.81	8.60	4.29
7750.0	7.10	14.81	30.90	14.66	1.38	0.79	20.79	8.41	4.33
8000.0	7.16	14.82	29.79	14.24	1.37	0.79	20.80	8.17	4.28

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: Id =60mA, Vd = 4.46V, @ Temperature = -45degC

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)
10.0	8.75	15.35	23.97	51.03	1.30	0.79	30.72	14.64	4.54
50.0	8.75	15.19	22.82	38.43	1.28	0.78	37.24	15.94	4.45
100.0	8.74	15.19	22.46	35.78	1.28	0.78	39.38	15.76	4.41
200.0	8.73	15.17	22.18	34.32	1.28	0.78	33.37	15.69	4.40
300.0	8.72	15.16	23.60	37.79	1.28	0.78	38.54	15.77	4.49
400.0	8.72	15.16	24.19	39.29	1.28	0.78	35.42	15.70	4.55
500.0	8.71	15.14	24.31	37.50	1.28	0.78	34.50	15.70	4.55
600.0	8.71	15.14	24.80	35.59	1.28	0.78	34.14	15.70	4.58
700.0	8.70	15.15	24.86	34.62	1.28	0.78	35.76	15.65	4.59
800.0	8.69	15.16	24.54	33.89	1.28	0.78	35.97	15.63	4.50
1000.0	8.67	15.13	24.47	31.56	1.28	0.78	34.62	15.58	4.57
1250.0	8.64	15.13	25.37	27.61	1.29	0.78	33.81	15.58	4.54
1500.0	8.59	15.12	25.90	25.23	1.29	0.78	32.43	15.55	4.52
1750.0	8.55	15.12	25.72	23.77	1.29	0.78	32.83	15.56	4.48
2000.0	8.49	15.12	25.48	22.58	1.30	0.78	33.67	15.48	4.50
2250.0	8.44	15.08	25.42	21.65	1.30	0.78	31.88	15.37	4.51
2500.0	8.39	15.10	25.33	21.19	1.30	0.78	31.45	15.29	4.49
2750.0	8.32	15.11	25.66	21.96	1.31	0.79	31.07	15.13	4.54
3000.0	8.27	15.07	25.88	22.21	1.31	0.79	30.00	14.93	4.45
3250.0	8.20	15.07	25.71	21.69	1.32	0.79	29.65	14.65	4.43
3500.0	8.11	15.10	25.29	20.85	1.33	0.79	28.55	14.38	4.55
3750.0	8.05	15.08	25.77	21.05	1.34	0.80	27.80	14.03	4.50
4000.0	7.96	15.06	25.57	19.99	1.34	0.80	27.52	13.85	4.43
4250.0	7.86	15.07	24.73	18.75	1.35	0.80	27.04	13.40	4.45
4500.0	7.80	15.06	24.83	18.06	1.35	0.80	26.68	13.12	4.43
4750.0	7.60	15.04	22.48	16.31	1.36	0.80	26.19	12.93	4.51
5000.0	7.41	15.24	21.46	15.80	1.40	0.81	25.92	12.71	4.63
5250.0	7.48	15.09	21.81	15.04	1.38	0.79	25.18	12.23	4.40
5500.0	7.39	15.10	21.99	14.63	1.39	0.79	25.02	12.14	4.39
5750.0	7.29	15.09	21.82	14.09	1.39	0.79	25.08	11.83	4.38
6000.0	7.24	15.25	22.61	14.38	1.42	0.80	24.45	11.52	4.50
6250.0	7.13	15.01	21.93	13.68	1.40	0.79	24.06	11.26	4.40
6500.0	7.04	14.92	22.65	13.53	1.40	0.79	23.76	11.08	4.37
6750.0	6.94	14.86	22.76	13.82	1.40	0.79	23.24	10.84	4.44
7000.0	7.04	14.98	25.40	14.34	1.41	0.80	23.26	10.76	4.49
7250.0	7.06	14.98	26.42	14.76	1.41	0.80	23.04	10.61	4.45
7500.0	7.04	14.90	25.71	15.02	1.40	0.80	22.56	10.21	4.48
7750.0	7.17	14.89	27.48	14.95	1.39	0.79	22.46	10.09	4.52
8000.0	7.21	14.86	27.97	14.36	1.38	0.79	22.53	9.88	4.48

Typical Performance Data

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

TEST CONDITIONS: Id =50mA, Vd = 3.95V, @ Temperature = +85degC

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)
10.0	8.53	15.02	22.94	35.86	1.29	0.78	28.81	13.64	5.72
50.0	8.55	15.13	23.48	37.79	1.30	0.78	33.71	14.27	5.62
100.0	8.53	15.08	23.92	40.81	1.29	0.78	32.39	14.16	5.60
200.0	8.52	15.08	24.59	47.94	1.30	0.78	32.39	14.05	5.54
300.0	8.51	15.06	24.60	46.58	1.29	0.78	31.66	14.11	5.74
400.0	8.50	15.08	24.27	41.89	1.30	0.78	31.11	14.05	5.74
500.0	8.48	15.09	23.92	39.81	1.30	0.79	31.83	14.02	5.72
600.0	8.47	15.09	24.04	40.03	1.30	0.79	32.97	14.03	5.78
700.0	8.46	15.09	24.16	39.59	1.30	0.79	31.79	13.97	5.78
800.0	8.45	15.10	24.21	38.40	1.30	0.79	32.43	13.95	5.68
1000.0	8.42	15.10	24.47	35.61	1.31	0.79	30.75	13.87	5.72
1250.0	8.38	15.10	24.80	32.08	1.31	0.79	30.55	13.86	5.75
1500.0	8.33	15.11	25.38	29.13	1.31	0.79	29.83	13.85	5.75
1750.0	8.28	15.13	25.70	26.79	1.32	0.80	30.21	13.85	5.72
2000.0	8.22	15.16	25.78	24.79	1.33	0.80	30.23	13.76	5.75
2250.0	8.17	15.13	26.25	23.71	1.33	0.80	28.89	13.66	5.78
2500.0	8.11	15.15	26.31	22.81	1.34	0.80	27.96	13.50	5.75
2750.0	8.03	15.20	26.18	22.39	1.35	0.80	28.04	13.29	5.73
3000.0	7.98	15.17	26.41	22.24	1.35	0.81	27.61	13.03	5.69
3250.0	7.91	15.17	26.78	21.98	1.36	0.81	26.38	12.72	5.66
3500.0	7.81	15.23	26.74	21.15	1.38	0.81	25.82	12.40	5.73
3750.0	7.76	15.22	27.63	21.12	1.38	0.81	25.12	12.11	5.70
4000.0	7.66	15.21	28.21	19.98	1.39	0.81	24.83	11.83	5.69
4250.0	7.57	15.23	28.48	18.98	1.40	0.82	24.24	11.27	5.57
4500.0	7.50	15.22	29.06	18.06	1.40	0.81	23.72	11.11	5.69
4750.0	7.38	15.15	27.29	16.55	1.40	0.81	23.57	10.95	5.67
5000.0	7.14	15.32	24.96	15.84	1.45	0.82	22.78	10.45	5.72
5250.0	7.14	15.39	26.04	15.60	1.45	0.82	22.29	10.13	5.70
5500.0	7.03	15.36	24.85	14.89	1.46	0.82	22.44	10.12	5.64
5750.0	7.09	15.26	24.88	14.44	1.43	0.81	22.01	9.67	5.60
6000.0	6.83	15.46	25.11	14.50	1.49	0.82	21.38	9.36	5.73
6250.0	6.89	15.33	24.95	14.35	1.46	0.82	21.20	9.19	5.69
6500.0	6.65	15.09	23.23	13.75	1.46	0.81	21.02	8.97	5.72
6750.0	6.61	15.10	24.03	14.16	1.46	0.82	20.29	8.62	5.65
7000.0	6.67	15.19	26.50	14.72	1.47	0.83	20.34	8.44	5.69
7250.0	6.81	15.24	25.79	15.17	1.46	0.83	20.29	8.28	5.64
7500.0	6.79	15.21	27.81	15.25	1.46	0.83	19.21	7.74	5.73
7750.0	6.69	14.99	26.20	14.43	1.44	0.82	19.09	7.56	5.86
8000.0	6.80	15.05	25.24	14.07	1.43	0.81	18.92	7.21	5.78

Typical Performance Data

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

TEST CONDITIONS: Id =40mA, Vd = 3.78V, @ Temperature = +85degC

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)
10.0	8.42	15.06	22.55	33.19	1.30	0.79	28.22	11.70	5.62
50.0	8.41	14.96	22.41	32.12	1.29	0.78	30.39	12.38	5.57
100.0	8.40	14.98	22.92	34.75	1.30	0.78	28.98	12.24	5.56
200.0	8.39	15.00	23.40	39.04	1.30	0.79	28.19	12.02	5.48
300.0	8.38	14.99	23.56	39.27	1.30	0.79	28.19	12.05	5.65
400.0	8.37	15.00	23.33	36.40	1.30	0.79	28.97	12.17	5.66
500.0	8.35	15.00	22.98	35.49	1.30	0.79	28.43	12.07	5.70
600.0	8.34	14.99	23.03	36.78	1.30	0.79	28.34	12.16	5.72
700.0	8.33	15.01	23.22	37.83	1.31	0.79	29.52	12.14	5.71
800.0	8.32	15.02	23.33	38.79	1.31	0.79	28.95	12.14	5.64
1000.0	8.30	15.01	23.62	38.18	1.31	0.79	27.68	11.98	5.68
1250.0	8.26	15.03	24.11	35.46	1.31	0.79	28.42	11.97	5.68
1500.0	8.22	15.03	24.85	31.50	1.32	0.80	28.51	12.06	5.67
1750.0	8.17	15.04	25.32	28.57	1.32	0.80	28.41	12.17	5.64
2000.0	8.12	15.09	25.60	26.07	1.33	0.80	28.10	12.09	5.72
2250.0	8.07	15.07	26.15	24.83	1.34	0.80	27.25	12.08	5.72
2500.0	8.01	15.08	26.46	23.73	1.34	0.80	27.16	12.01	5.65
2750.0	7.94	15.13	26.33	23.19	1.35	0.81	26.39	12.02	5.66
3000.0	7.88	15.09	26.51	22.99	1.36	0.81	26.11	11.90	5.67
3250.0	7.83	15.10	26.92	22.62	1.36	0.81	25.26	11.69	5.53
3500.0	7.73	15.11	27.23	21.68	1.37	0.81	24.81	11.38	5.69
3750.0	7.69	15.12	28.11	21.59	1.38	0.81	24.05	11.18	5.56
4000.0	7.59	15.13	29.12	20.42	1.39	0.82	23.72	10.87	5.57
4250.0	7.50	15.14	29.87	19.36	1.40	0.82	23.12	10.38	5.51
4500.0	7.44	15.13	31.17	18.29	1.40	0.81	22.66	10.15	5.54
4750.0	7.32	15.06	29.08	16.74	1.40	0.81	22.42	9.97	5.60
5000.0	7.08	15.25	26.29	16.09	1.45	0.82	21.69	9.50	5.62
5250.0	7.07	15.30	27.14	15.72	1.45	0.82	21.21	9.20	5.62
5500.0	6.96	15.28	25.75	14.96	1.46	0.82	21.38	9.22	5.54
5750.0	7.02	15.22	25.48	14.58	1.44	0.81	20.90	8.73	5.51
6000.0	6.81	15.37	25.72	14.63	1.48	0.82	20.39	8.48	5.61
6250.0	6.81	15.24	24.68	14.36	1.46	0.82	20.36	8.23	5.59
6500.0	6.61	15.03	23.14	13.84	1.45	0.82	19.99	8.07	5.57
6750.0	6.57	15.06	23.76	14.26	1.46	0.82	19.29	7.69	5.53
7000.0	6.60	15.10	25.41	14.72	1.47	0.83	19.31	7.54	5.60
7250.0	6.72	15.19	25.38	15.27	1.47	0.83	19.18	7.31	5.53
7500.0	6.67	15.13	26.05	15.10	1.47	0.83	18.25	6.83	5.60
7750.0	6.62	14.94	24.45	14.33	1.44	0.82	18.11	6.66	5.69
8000.0	6.71	14.96	23.88	14.05	1.43	0.82	17.96	6.30	5.68

Typical Performance Data

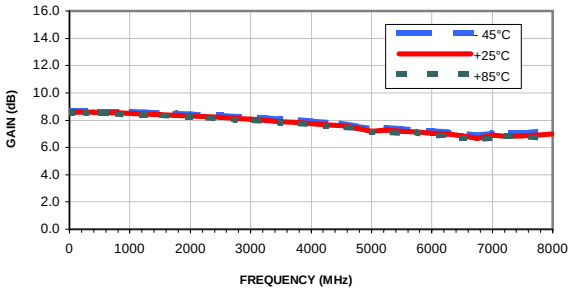
Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Id =60mA, Vd = 4.12V, @ Temperature = +85degC

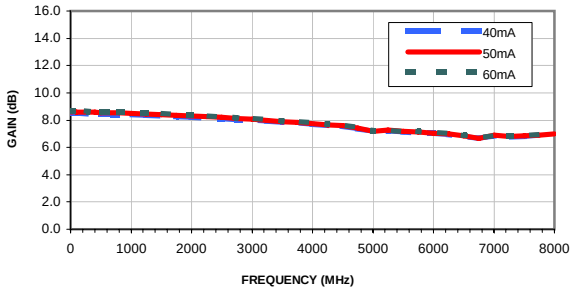
FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
10.0	8.59	15.08	23.19	39.67	1.29	0.78	30.02	13.74	5.74
50.0	8.63	15.15	23.88	42.96	1.29	0.78	33.78	15.35	5.70
100.0	8.62	15.12	24.70	44.81	1.29	0.78	34.10	15.06	5.66
200.0	8.60	15.13	25.33	43.57	1.29	0.78	33.60	15.10	5.63
300.0	8.59	15.12	25.31	43.74	1.29	0.78	32.67	15.15	5.80
400.0	8.58	15.15	24.93	42.57	1.30	0.78	33.82	14.97	5.80
500.0	8.56	15.13	24.62	39.66	1.30	0.78	37.32	15.00	5.82
600.0	8.55	15.12	24.64	38.86	1.30	0.78	33.86	14.95	5.85
700.0	8.54	15.14	24.82	37.54	1.30	0.78	33.51	14.85	5.81
800.0	8.52	15.14	24.83	36.26	1.30	0.79	32.85	14.80	5.79
1000.0	8.50	15.15	24.99	33.49	1.30	0.79	33.33	14.79	5.83
1250.0	8.46	15.16	25.31	30.43	1.31	0.79	31.55	14.79	5.83
1500.0	8.41	15.17	25.77	27.80	1.31	0.79	31.82	14.64	5.82
1750.0	8.35	15.15	25.88	25.82	1.32	0.79	31.37	14.53	5.78
2000.0	8.29	15.22	25.69	24.03	1.33	0.80	30.43	14.44	5.84
2250.0	8.23	15.17	26.08	23.07	1.33	0.80	29.74	14.30	5.88
2500.0	8.17	15.23	26.12	22.30	1.34	0.80	29.17	14.12	5.80
2750.0	8.09	15.23	26.01	21.90	1.35	0.80	28.58	13.86	5.78
3000.0	8.03	15.22	26.26	21.85	1.35	0.80	28.36	13.60	5.78
3250.0	7.97	15.23	26.52	21.59	1.36	0.81	27.10	13.32	5.69
3500.0	7.86	15.26	26.37	20.89	1.37	0.81	26.68	13.02	5.86
3750.0	7.81	15.28	27.14	20.84	1.38	0.81	25.81	12.76	5.76
4000.0	7.72	15.27	27.55	19.74	1.39	0.81	25.49	12.51	5.78
4250.0	7.62	15.28	27.49	18.79	1.40	0.82	24.93	12.03	5.73
4500.0	7.55	15.27	27.91	17.94	1.40	0.81	24.48	11.86	5.86
4750.0	7.43	15.20	26.13	16.44	1.40	0.81	24.32	11.70	5.76
5000.0	7.18	15.36	24.05	15.69	1.45	0.82	23.63	11.22	5.81
5250.0	7.19	15.41	25.13	15.54	1.45	0.82	23.05	10.90	5.77
5500.0	7.08	15.41	24.28	14.90	1.46	0.82	23.26	10.91	5.71
5750.0	7.13	15.31	24.22	14.40	1.44	0.81	22.79	10.45	5.70
6000.0	6.88	15.54	24.95	14.57	1.50	0.82	22.16	10.17	5.86
6250.0	6.96	15.38	24.84	14.35	1.46	0.82	22.05	9.97	5.81
6500.0	6.69	15.14	23.09	13.75	1.46	0.81	21.78	9.75	5.81
6750.0	6.64	15.14	24.13	14.14	1.47	0.82	21.14	9.39	5.83
7000.0	6.70	15.23	27.30	14.72	1.48	0.83	21.13	9.28	5.89
7250.0	6.80	15.21	25.96	14.94	1.46	0.83	21.00	9.06	5.81
7500.0	6.83	15.24	29.10	15.30	1.46	0.83	20.04	8.52	5.85
7750.0	6.73	14.99	28.10	14.48	1.44	0.81	19.85	8.32	6.02
8000.0	6.86	15.08	26.28	14.14	1.43	0.81	19.82	8.07	5.96

Typical Performance Curves

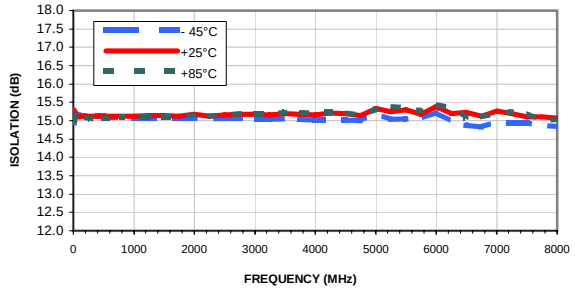
GAIN vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, CURRENT = 50 mA



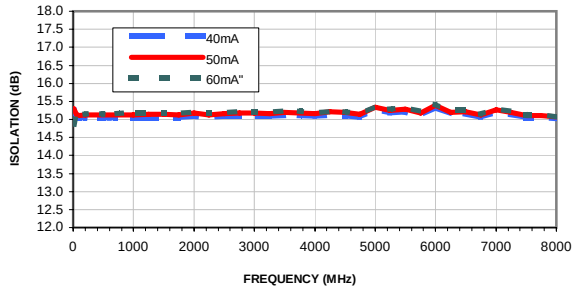
GAIN vs. FREQUENCY & CURRENT
INPUT POWER = -25dBm, Temperature = +25°C



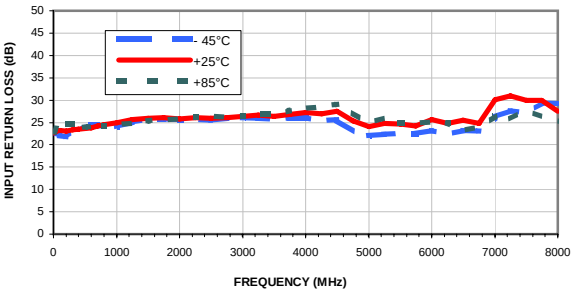
ISOLATION vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, CURRENT = 50 mA



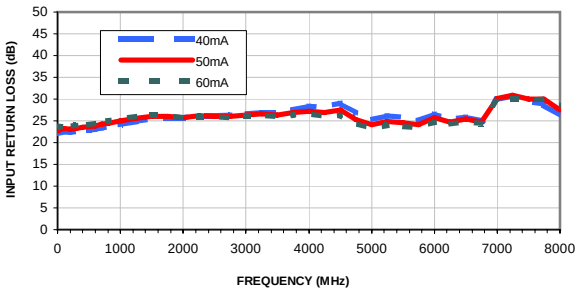
ISOLATION vs. FREQUENCY & CURRENT
INPUT POWER = -25dBm, Temperature = +25°C



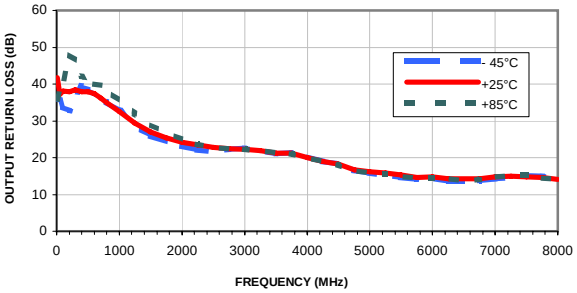
INPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, CURRENT = 50 mA



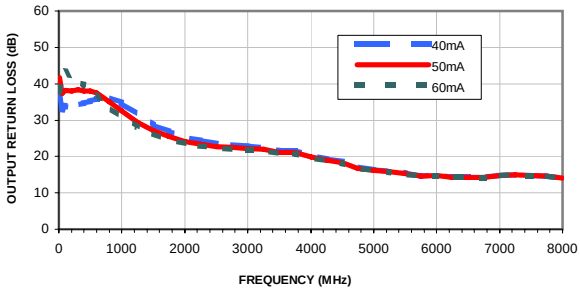
INPUT RETURN LOSS vs. FREQUENCY & CURRENT
INPUT POWER = -25dBm, Temperature = +25°C



OUTPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, CURRENT = 50 mA

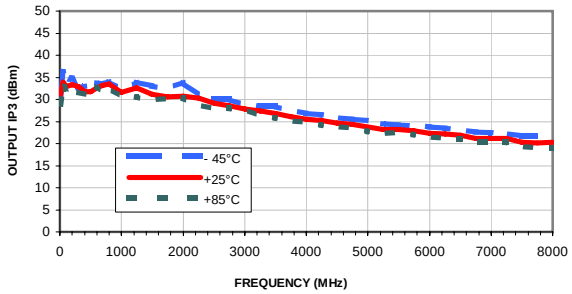


OUTPUT RETURN LOSS vs. FREQUENCY & CURRENT
INPUT POWER = -25dBm, Temperature = +25°C

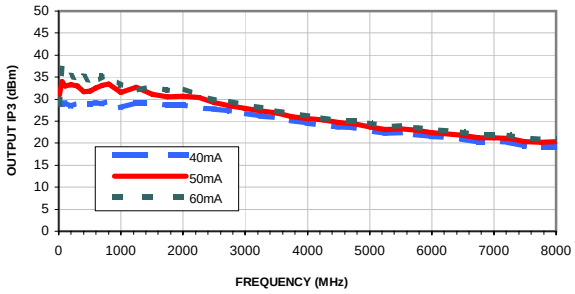


Typical Performance Curves

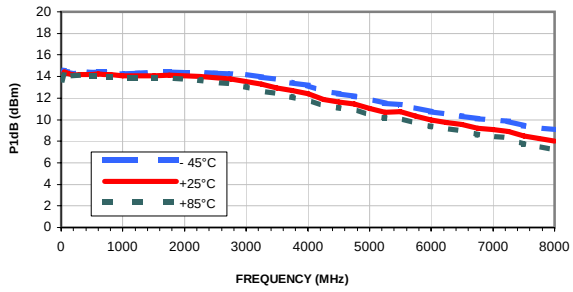
OUTPUT IP3 vs. FREQUENCY & TEMPERATURE
OUTPUT POWER = -5dBm/tone, CURRENT = 50 mA



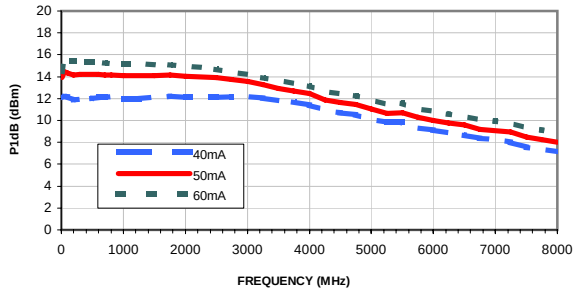
OUTPUT IP3 vs. FREQUENCY & CURRENT
OUTPUT POWER = -5 dBm/tone, Temperature = +25°C



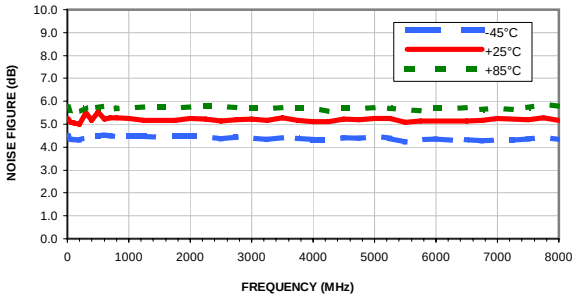
P1dB vs. FREQUENCY & TEMPERATURE
CURRENT = 50 mA



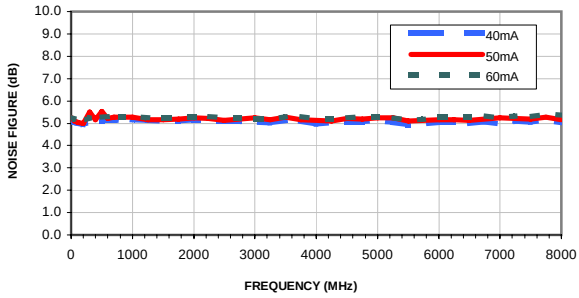
P1dB vs. FREQUENCY & CURRENT
Temperature = +25°C



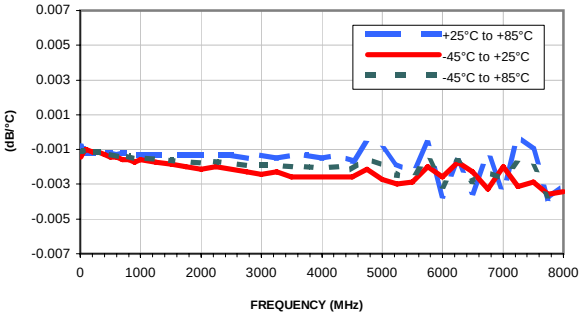
NOISE FIGUR vs. FREQUENCY & TEMPERATURE
CURRENT = 50 mA



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



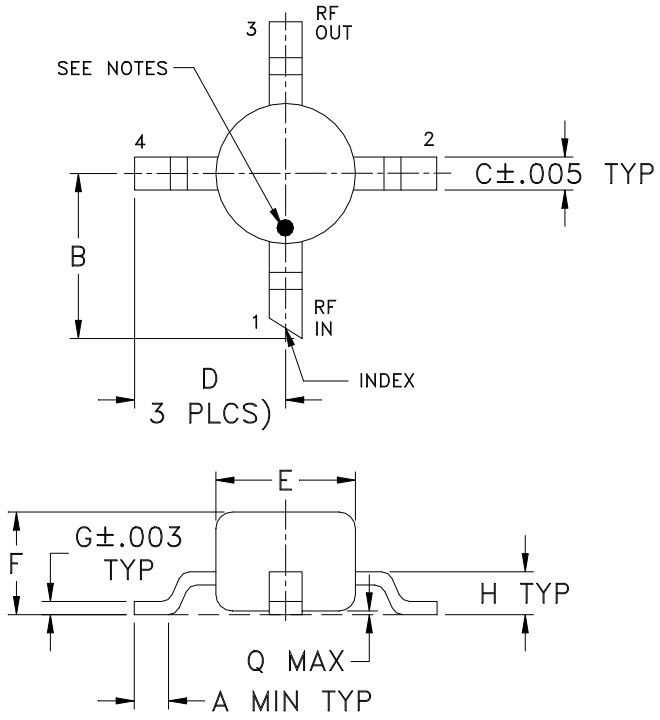
GAIN VARIATION vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, CURRENT = 50 mA



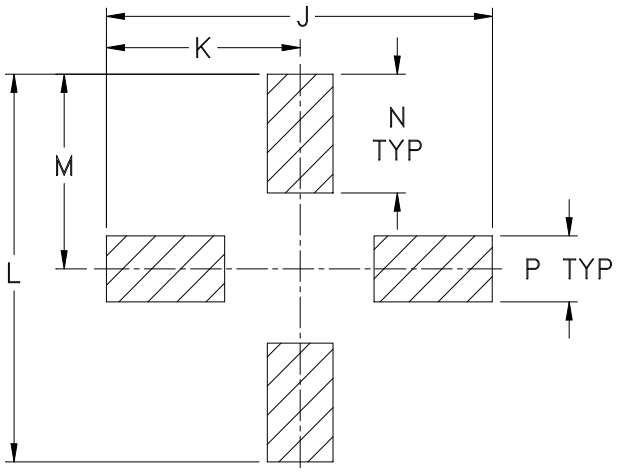
Case Style WW

WW107

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	WT. GRAMS
WW107	.012 (0.30)	.10 (2.54)	.020 (0.51)	.092 (2.34)	.085 (2.16)	.060 (1.52)	.007 (0.18)	.026 (0.66)	.235 (5.97)	.118 (3.00)	.235 (5.97)	.118 (3.00)	.072 (1.83)	.040 (1.02)	.020 (0.51)	.015

Dimensions are in inches (mm). Tolerances: 2 Pl. ± .03; 3 Pl. ± .015

Notes:

1. Case material: Plastic.
2. Termination finish:
   For RoHS Case Styles: Matte tin Plate.
   For RoHS-5 Case Styles: Tin-Lead plate.
3. RF input termination (1) identified by one or both of the following at factory option:
   (a) diagonally cut termination, which may be 45° (ref) in either direction;
   (b) orientation mark on the case. Model dash number is identified by color dot or alphanumeric code on case. See specification data sheet.

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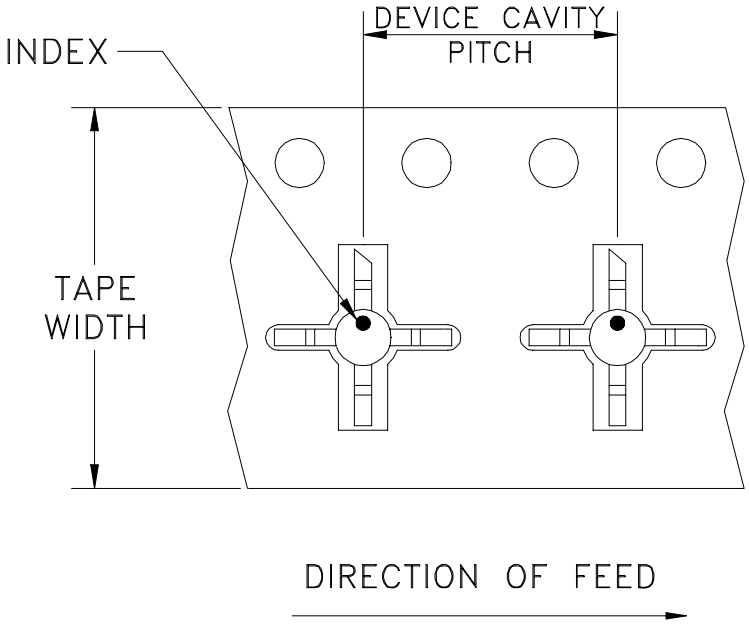
Tape & Reel Packaging TR-F4

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
12	8	7	Small quantity standards (see note)	20
				50
				100
				200
				500
		7	Standard	1000

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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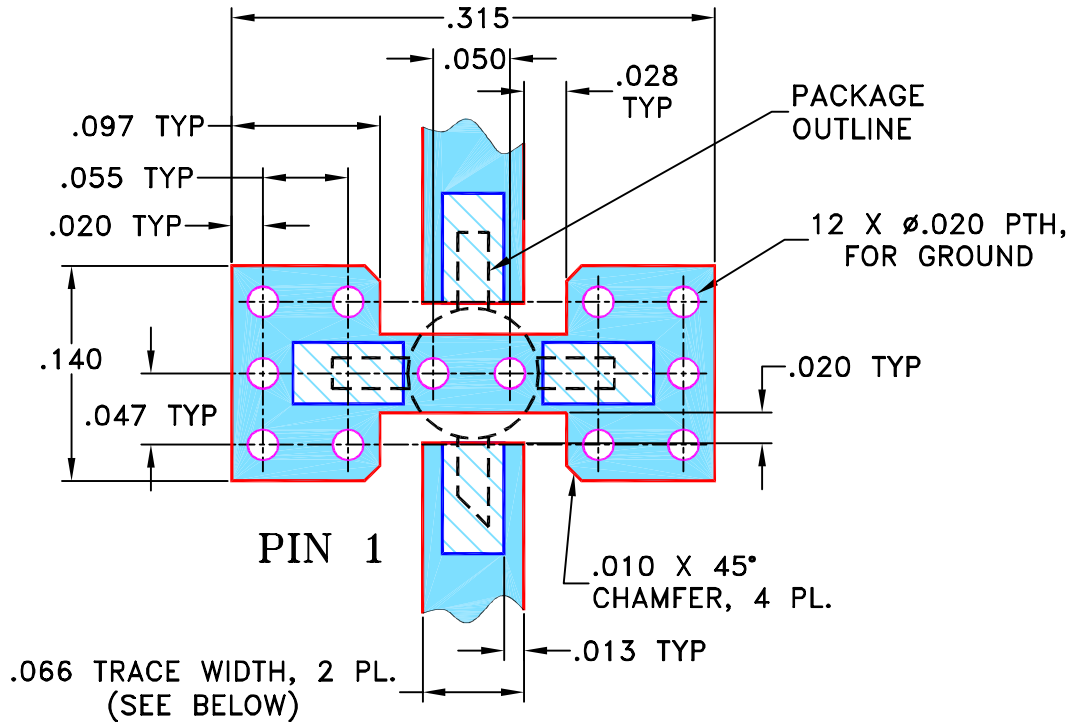
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
A	M100215	ADDED "PACKAGE OUTLINE" & UPDATED NOTES	08/12/05	MMG	MM
B	M100944	REMOVED AF190 & UPDATED NOTES	09/23/05	GT	MM
C	M102713	ADDED "...WITH SMOBC"	01/14/06	GF	IL
D	M108434	UPDATED DRAWING PER TB-408+	11/14/06	PW	IG

SUGGESTED MOUNTING CONFIGURATION FOR WW107 CASE STYLE, "cb" PIN CONNECTION



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002"; 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.
3. IF PCB DESIGN RULES ALLOW, PLACE GROUND VIAS UNDER THE LAND PATTERN FOR BETTER RF PERFORMANCE. OTHERWISE PLACE GROUND VIAS AS CLOSE TO LAND PATTERN AS POSSIBLE.

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	GF	07/18/02
TOLERANCES ON:	CHECKED	LC	08/01/02
2 PL DECIMALS ±	APPROVED	DJ	08/05/02
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

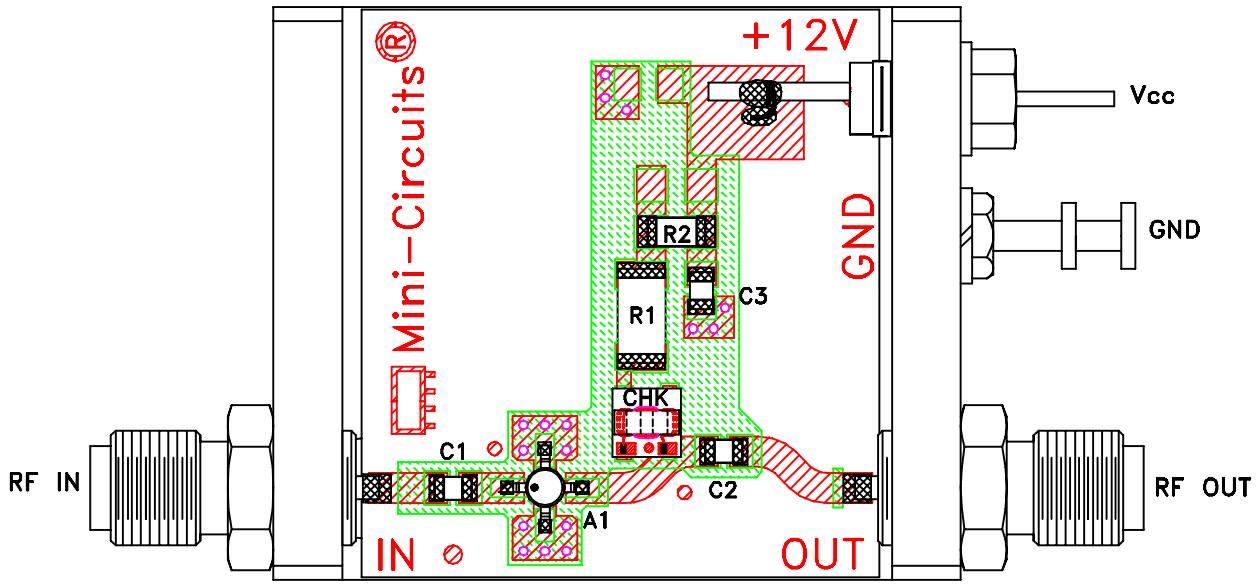
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, cb, WW107, ERA, TB-408-XX+

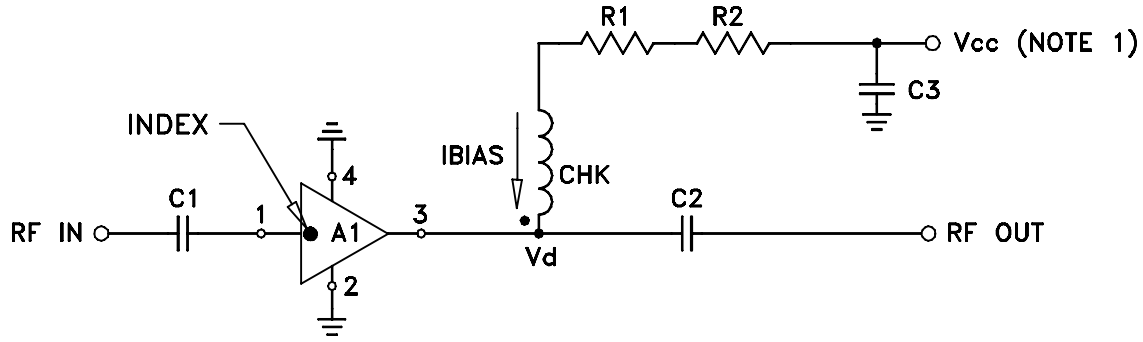
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-075	D

FILE:	SCALE:	SHEET:
98PL075	8:1	1 OF 1

Evaluation Board and Circuit



TB-408-9SM+



COMPONENT	VALUE
A1	ERA-9SM(+)
C1 (NOTE 4)	2400 pF
C2 (NOTE 4)	2400 pF
C3 (bypass)	0.1 uF
R1	165 Ohms, 0.75W
R2	0 Ohm, 0.25W
CHK	Mini-Circuits TCCH-80+

Schematic Diagram

NOTE:

1. Vcc voltage: +12±0.2V.
2. SMA Female connectors.
3. PCB material: Rogers RO4350 or equivalent, dielectric constant=3.5, dielectric thickness=.030 inch.
4. Capacitors, C1 & C2 should be free of resonance up to the highest frequency specified.
5. Insertion loss of Input/Output line :

Frequency, GHz	1.0	2.0	4.0	8.0
Loss,dB*	0.5	0.8	1.2	1.6

* Add PCB loss to measured Gain to get DUT Gain.

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Mini-Circuits

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

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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

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