



ULTRA HIGH DYNAMIC RANGE

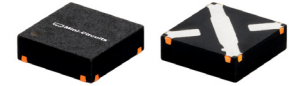
# Monolithic Amplifier

## LHA-1+

50Ω 0.05 to 6 GHz

### THE BIG DEAL

- High IP3, +40 dBm typ. at 2 GHz, +5V
- Gain, 14.1 dB typ. at 2 GHz, +5V
- High Pout, P1dB +22.7 dBm typ. at 2 GHz, +5V
- Low noise figure, 2.1 dB @2 GHz, +5V
- Usable to +4.0V
- No external matching components required



Generic photo used for illustration purposes only

CASE STYLE: FG873

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

### APPLICATIONS

- Base station infrastructure
- Portable Wireless
- CATV & DBS
- MMDS & Wireless LAN
- LTE

### PRODUCT OVERVIEW

LHA-1+ (RoHS compliant) is an advanced wideband amplifier fabricated using E-PHEMT technology and offers extremely high dynamic range over a broad frequency range and with low noise figure. In addition, the LHA-1+, unlike competitive models, is well matched (input and output) over a broad frequency range without the need for external matching components. Lead finish is tin-silver over nickel. It is enclosed in a 3x3 mm MCLP package for low parasitic interface.

### KEY FEATURES

Feature	Advantages
Broad Band: 0.05 to 6.0 GHz	Broadband covering primary wireless communications bands: Cellular, PCS, LTE, WiMAX
Extremely High IP3 versus DC power Consumption +40 dBm typical at 2 GHz	The LHA-1+ matches industry leading IP3 performance relative to device size and power consumption. The combination of the design and E-PHEMT Structure provides enhanced linearity over a broad frequency range as evidence in the IP3 being typically 17 dB above the P 1dB point. This feature makes this amplifier ideal for use in: <ul style="list-style-type: none"> <li>• Driver amplifiers for complex waveform up converter paths</li> <li>• Drivers in linearized transmit systems</li> <li>• Secondary amplifiers in ultra High Dynamic range receivers</li> </ul>
No External Matching Components Required	LHA-1+ provides Input and Output Return Loss of 10-21 dB up to 4 GHz without the need for any external matching components
Low Noise Figure: 2.6dB typ. up to 4 GHz 3.4 dB typ. up to 6 GHz	A unique feature of the LHA-1+ which separates this design from all competitors is the low noise figure performance in combination with the high dynamic range.

REV. C  
 ECO-019357  
 LHA-1+  
 MCL NY  
 240725





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# Monolithic Amplifier

LHA-1+

Mini-Circuits

50Ω 0.05 to 6 GHz

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

Parameter	Condition (GHz)	Vd=+5.0V			Vd=+4.5V	Vd=+4.0V	Units
		Min.	Typ.	Max.	Typ.	Typ.	
Frequency Range		0.05		6	0.05-6	0.05-6	GHz
Gain	0.05	15.4	17.6	19.4	17.4	17.1	dB
	0.8	14.1	16.0	17.3	15.7	15.4	
	2.0	—	14.1	—	13.9	13.5	
	3.0	—	12.5	—	12.2	11.9	
	4.0	9.6	11.1	12.3	10.9	10.6	
	6.0	—	9.2	—	9.0	8.7	
Input Return Loss	0.05	—	11.2	—	11.2	11.1	dB
	0.8	13.0	15.8	—	15.8	15.6	
	2.0	—	11.5	—	11.5	11.3	
	3.0	—	10.4	—	10.4	10.2	
	4.0	—	10.1	—	10.2	10.1	
	6.0	—	9.0	—	9.0	9.0	
Output Return Loss	0.05	—	14.1	—	14.0	13.8	dB
	0.8	13.0	20.8	—	20.1	19.3	
	2.0	—	15.8	—	15.4	14.6	
	3.0	—	13.9	—	13.6	13.1	
	4.0	—	12.8	—	12.7	12.3	
	6.0	—	12.0	—	12.8	11.3	
Reverse Isolation	2.0		19.3		19.1	18.7	dB
Output Power @1 dB Compression	0.05	+20.0	+22.8	—	+21.6	+20.1	dBm
	0.8	+20.0	+22.6	—	+21.5	+20.0	
	2.0	+20.0	+22.7	—	+21.6	+20.1	
	3.0	—	+23.0	—	+21.9	+20.4	
	4.0	—	+22.9	—	+21.9	+20.4	
	6.0	—	+22.5	—	+21.6	+20.1	
Output IP3	0.05	—	+40.3	—	+39.0	+35.2	dBm
	0.8	+37.0	+39.6	—	+39.7	+35.9	
	2.0	—	+39.5	—	+37.3	+33.1	
	3.0	—	+39.6	—	+37.0	+32.7	
	4.0	—	+39.0	—	+36.7	+32.3	
	6.0	—	+38.0	—	+35.8	+31.5	
Noise Figure	0.05		1.8		1.7	1.7	dB
	0.8		2.0		2.0	2.0	
	2.0		2.1		2.0	2.0	
	3.0		2.3		2.2	2.2	
	4.0		2.6		2.4	2.4	
	6.0		3.4		3.2	3.0	
Device Operating Voltage		+4.8	+5.0	+5.2	+4.5	+4.0	V
Device Operating Current		110	146	180	114	87	mA
Device Current Variation vs. Temperature <sup>2</sup>			116		138	138	μA/°C
Device Current Variation vs Voltage		116	0.057	—	0.055	0.055	mA/mV
Thermal Resistance, junction-to-ground lead			59		59	59	°C/W

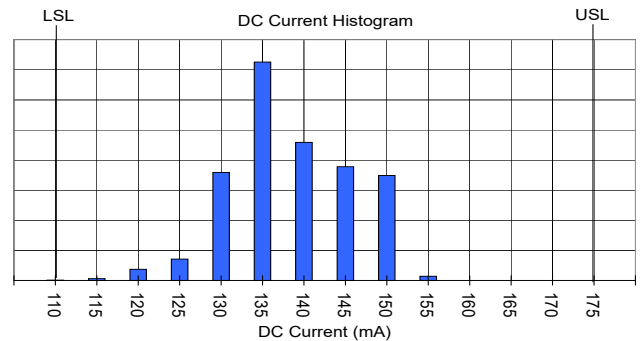
1. Measured on Mini-Circuits Characterization test board TB-784+. See Characterization Test Board (Fig. 1)

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

## ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature (ground lead)	-40°C to 85°C
Storage Temperature	-65°C to 150°C
Operating Current at +5V	210 mA
Power Dissipation	1 W
Input Power (CW)	+24 dBm
DC Voltage on Pin 3	+6 V

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





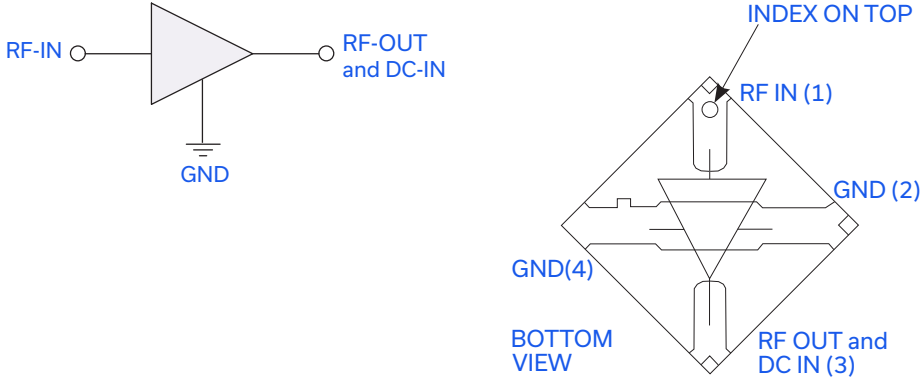
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## SIMPLIFIED SCHEMATIC AND PAD DESCRIPTION



Function	Pad 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", Fig. 2
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.



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## CHARACTERIZATION TEST CIRCUIT

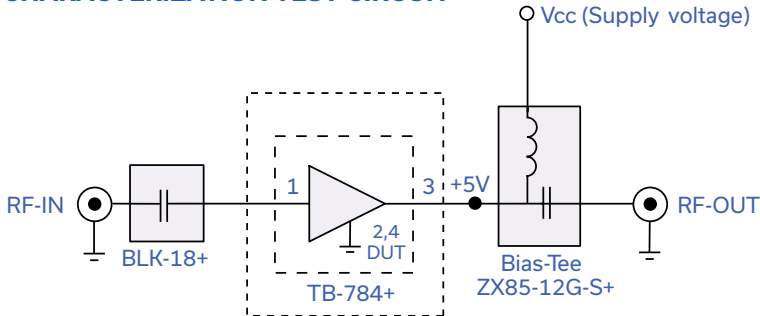
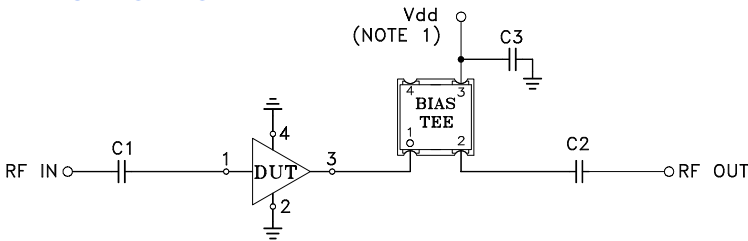


Fig 1. Block Diagram of Test Circuit used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-784+) Gain, Return loss, Output power at 1dB compression (P1 dB), output IP3 (OIP3) and noise figure measured using Agilent's N5242A PNA-X microwave network analyzer.

Conditions:

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

## EVALUATION BOARD



## RECOMMENDED APPLICATION CIRCUIT

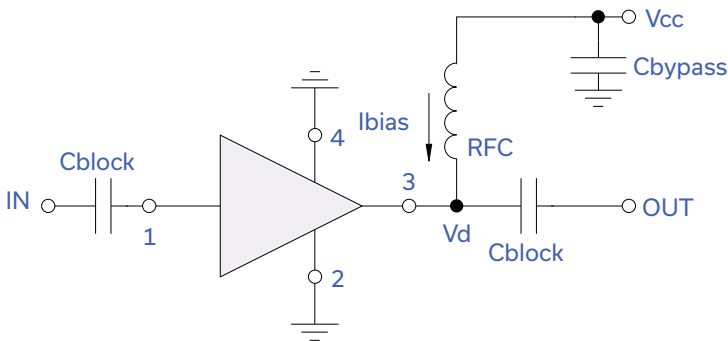
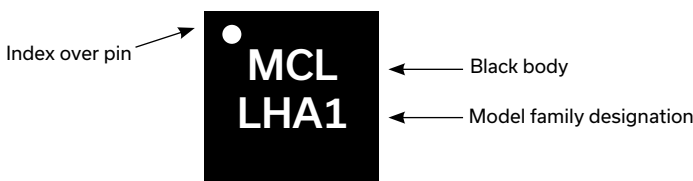


Fig 2. Evaluation Board TB-819+. Includes case, connectors and components soldered to PCB

Component	Value	Size	Part Number	Manufacturer
C1, C2	0.001uF	0402	GRM1555C1H-102JA01D	Murata
C3	1nF	0603	GRM1885C1H-102JA01D	Murata
DUT	-	3x3mm	LHA-1+	Mini-Circuits
Bias Tee	-	3.81x3.81 mm	TCBT-14+	Mini-Circuits

## PRODUCT MARKING



Marking may contain other features or characters for internal lot control





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LHA-1+

50Ω 0.05 to 6 GHz

ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASHBOARD. [CLICK HERE](#)

Performance Data	Data Table Swept Graphs S-Parameter (S2P Files) Data Set (.zip file)
Case Style	FG873 (3x3 mm MCLP) Plastic package, exposed paddle lead finish: tin-silver over nickel
Tape & Reel Standard quantities available on reel	F68 7" reels with 20, 50, 100, 200, 500, 1K, 2K or 3K devices 13" Reels with 2K, 3K, 4K devices
Suggested Layout for PCB Design	PL-443
Evaluation Board	TB-819+
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 (>25V) in accordance with ANSI/ESD STM5.2-1999

## MSL RATING

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

### 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](http://www.minicircuits.com/terms/viewterm.html)



## 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, Id = 144.55mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
20.0	19.41	23.67	6.88	9.46	0.88	0.70	40.05	21.57	1.89
40.0	18.05	21.75	10.11	12.95	0.95	0.66	43.69	22.71	1.78
60.0	17.39	21.16	12.58	15.44	1.00	0.64	40.41	22.61	1.87
80.0	17.07	20.96	14.38	17.56	1.04	0.63	42.16	22.65	1.85
100.0	16.89	20.85	15.62	19.04	1.06	0.63	40.49	22.50	1.87
200.0	16.60	20.72	18.19	22.80	1.09	0.63	42.15	22.59	1.86
400.0	16.41	20.63	18.34	23.51	1.10	0.64	41.12	22.60	1.86
600.0	16.22	20.55	17.34	22.43	1.10	0.66	40.51	22.67	1.93
800.0	16.00	20.43	16.17	21.15	1.09	0.67	40.31	22.71	1.92
1000.0	15.73	20.28	15.12	19.98	1.09	0.69	40.73	22.90	2.02
1200.0	15.44	20.12	14.25	18.88	1.08	0.71	40.34	22.82	2.04
1400.0	15.12	19.93	13.52	18.00	1.08	0.73	40.69	22.81	2.09
1600.0	14.80	19.73	12.92	17.26	1.07	0.74	39.92	22.66	2.13
1800.0	14.45	19.51	12.41	16.56	1.07	0.76	40.38	22.70	2.14
2000.0	14.11	19.29	11.98	16.00	1.06	0.78	40.48	22.85	2.08
2200.0	13.76	19.06	11.75	15.41	1.06	0.79	40.27	22.67	2.17
2400.0	13.42	18.82	11.53	14.99	1.06	0.80	41.21	22.98	2.27
2600.0	13.09	18.57	11.32	14.56	1.06	0.81	40.90	23.16	2.34
2800.0	12.77	18.31	11.21	14.17	1.05	0.81	40.31	23.00	2.37
3000.0	12.45	18.05	11.12	13.86	1.05	0.82	40.77	23.19	2.34
3200.0	12.15	17.78	11.11	13.56	1.05	0.82	41.83	23.20	2.40
3400.0	11.87	17.50	11.09	13.32	1.04	0.82	41.17	23.40	2.42
3600.0	11.60	17.22	11.09	13.12	1.04	0.82	39.83	23.24	2.48
3800.0	11.35	16.94	11.14	12.87	1.03	0.81	40.30	23.27	2.52
4000.0	11.10	16.65	11.22	12.80	1.03	0.81	40.38	23.13	2.56
4200.0	10.88	16.35	11.28	12.69	1.03	0.80	40.66	23.25	2.70
4400.0	10.66	16.06	11.31	12.64	1.02	0.80	39.79	23.28	2.69
4600.0	10.46	15.75	11.33	12.69	1.02	0.79	39.89	23.10	2.76
4800.0	10.27	15.45	11.35	12.66	1.01	0.78	39.34	22.89	2.73
5000.0	10.09	15.15	11.29	12.74	1.00	0.78	39.46	23.31	2.83
5200.0	9.92	14.86	11.14	12.91	1.00	0.77	39.57	23.03	2.99
5400.0	9.74	14.57	10.90	13.12	0.99	0.77	38.70	22.49	3.05
5600.0	9.57	14.28	10.59	13.18	0.98	0.76	39.56	22.77	3.12
5800.0	9.40	14.01	10.11	13.41	0.97	0.76	39.86	23.03	3.32
6000.0	9.21	13.77	9.64	13.35	0.97	0.76	39.24	22.81	3.41

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 4.75V, Id = 130.48mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
20.0	19.33	23.62	6.90	9.48	0.88	0.70	38.34	21.06	1.83
40.0	17.97	21.68	10.09	12.92	0.95	0.66	42.20	22.16	1.76
60.0	17.30	21.10	12.58	15.38	1.01	0.64	40.52	22.04	1.83
80.0	16.97	20.88	14.38	17.48	1.04	0.64	41.74	22.08	1.78
100.0	16.79	20.78	15.66	18.94	1.06	0.63	41.26	21.94	1.85
200.0	16.49	20.64	18.28	22.56	1.09	0.63	41.71	22.03	1.83
400.0	16.30	20.55	18.47	23.18	1.10	0.64	40.81	22.05	1.84
600.0	16.11	20.46	17.41	22.14	1.10	0.66	41.33	22.13	1.88
800.0	15.89	20.34	16.23	20.85	1.09	0.67	39.99	22.19	1.89
1000.0	15.63	20.19	15.17	19.68	1.09	0.69	41.09	22.35	1.99
1200.0	15.33	20.02	14.29	18.60	1.08	0.71	39.72	22.29	2.02
1400.0	15.02	19.83	13.54	17.76	1.08	0.73	39.95	22.29	2.04
1600.0	14.69	19.63	12.94	17.03	1.07	0.74	38.76	22.15	2.12
1800.0	14.35	19.41	12.42	16.35	1.07	0.76	39.11	22.18	2.13
2000.0	14.01	19.19	12.01	15.80	1.06	0.78	39.10	22.31	2.05
2200.0	13.66	18.95	11.74	15.24	1.06	0.79	39.13	22.16	2.13
2400.0	13.32	18.72	11.53	14.84	1.06	0.80	39.35	22.44	2.19
2600.0	12.99	18.47	11.34	14.41	1.05	0.81	38.93	22.61	2.31
2800.0	12.67	18.21	11.23	14.06	1.05	0.81	39.26	22.46	2.32
3000.0	12.36	17.95	11.16	13.77	1.05	0.81	39.04	22.65	2.27
3200.0	12.06	17.68	11.14	13.48	1.05	0.82	39.46	22.66	2.35
3400.0	11.78	17.40	11.12	13.26	1.04	0.82	39.28	22.85	2.38
3600.0	11.51	17.13	11.13	13.07	1.04	0.81	38.26	22.71	2.49
3800.0	11.26	16.84	11.19	12.86	1.03	0.81	38.47	22.75	2.44
4000.0	11.01	16.56	11.27	12.77	1.03	0.81	38.74	22.62	2.43
4200.0	10.79	16.26	11.32	12.69	1.03	0.80	38.96	22.73	2.67
4400.0	10.57	15.97	11.36	12.66	1.02	0.79	38.23	22.73	2.66
4600.0	10.37	15.67	11.40	12.69	1.02	0.79	38.61	22.58	2.70
4800.0	10.18	15.38	11.40	12.67	1.01	0.78	38.12	22.37	2.65
5000.0	10.00	15.08	11.35	12.76	1.00	0.77	38.39	22.76	2.71
5200.0	9.83	14.79	11.21	12.93	1.00	0.77	38.22	22.52	2.85
5400.0	9.66	14.50	10.95	13.12	0.99	0.77	37.23	22.00	2.95
5600.0	9.48	14.22	10.67	13.16	0.99	0.76	38.18	22.27	3.03
5800.0	9.32	13.96	10.16	13.41	0.98	0.76	38.30	22.51	3.15
6000.0	9.12	13.72	9.70	13.29	0.97	0.76	37.51	22.31	3.26

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.25V, Id = 158.62mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
20.0	19.47	23.70	6.88	9.44	0.88	0.70	44.69	22.01	1.98
40.0	18.11	21.80	10.12	12.96	0.95	0.66	42.13	23.21	1.84
60.0	17.46	21.23	12.67	15.48	1.01	0.64	41.78	23.12	1.89
80.0	17.15	21.03	14.35	17.64	1.04	0.63	41.44	23.15	1.88
100.0	16.98	20.93	15.58	19.15	1.06	0.63	40.31	22.98	1.90
200.0	16.70	20.80	18.04	23.05	1.09	0.63	41.13	23.07	1.92
400.0	16.50	20.71	18.18	23.82	1.10	0.64	40.97	23.11	1.91
600.0	16.32	20.63	17.20	22.71	1.10	0.65	40.91	23.14	1.94
800.0	16.09	20.51	16.06	21.40	1.09	0.67	40.04	23.17	1.97
1000.0	15.83	20.37	15.03	20.20	1.09	0.69	40.54	23.36	2.08
1200.0	15.54	20.20	14.19	19.07	1.08	0.71	40.63	23.28	2.09
1400.0	15.22	20.02	13.44	18.18	1.08	0.73	41.04	23.28	2.13
1600.0	14.89	19.82	12.85	17.42	1.07	0.75	40.10	23.12	2.18
1800.0	14.54	19.60	12.35	16.70	1.07	0.76	41.71	23.15	2.23
2000.0	14.20	19.38	11.93	16.12	1.06	0.78	41.68	23.33	2.15
2200.0	13.85	19.15	11.69	15.51	1.06	0.79	41.27	23.13	2.23
2400.0	13.50	18.91	11.47	15.08	1.06	0.80	42.61	23.46	2.31
2600.0	13.17	18.66	11.25	14.63	1.06	0.81	42.14	23.66	2.41
2800.0	12.85	18.40	11.15	14.22	1.05	0.81	43.37	23.47	2.42
3000.0	12.53	18.13	11.06	13.90	1.05	0.82	42.72	23.68	2.42
3200.0	12.23	17.87	11.04	13.57	1.05	0.82	43.24	23.68	2.45
3400.0	11.95	17.59	11.01	13.33	1.04	0.82	42.92	23.89	2.50
3600.0	11.68	17.31	11.01	13.11	1.04	0.82	41.46	23.70	2.63
3800.0	11.42	17.02	11.06	12.85	1.03	0.81	42.09	23.75	2.61
4000.0	11.17	16.73	11.13	12.77	1.03	0.81	42.14	23.58	2.62
4200.0	10.94	16.43	11.18	12.65	1.02	0.80	42.68	23.72	2.81
4400.0	10.73	16.14	11.21	12.59	1.02	0.80	41.58	23.75	2.77
4600.0	10.53	15.83	11.26	12.65	1.01	0.79	41.72	23.57	2.85
4800.0	10.34	15.53	11.25	12.62	1.01	0.78	40.97	23.33	2.81
5000.0	10.15	15.22	11.21	12.69	1.00	0.78	40.90	23.80	2.97
5200.0	9.98	14.93	11.05	12.87	0.99	0.77	41.35	23.51	3.12
5400.0	9.81	14.63	10.80	13.09	0.99	0.77	40.31	22.94	3.16
5600.0	9.63	14.34	10.50	13.16	0.98	0.77	41.32	23.22	3.25
5800.0	9.47	14.06	10.02	13.43	0.97	0.77	41.61	23.50	3.40
6000.0	9.28	13.81	9.55	13.38	0.96	0.77	40.48	23.26	3.52



## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.00V, Id = 134.92mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
20.0	19.14	23.28	7.43	9.68	0.88	0.69	40.46	21.48	1.83
40.0	17.68	21.22	10.40	12.56	0.93	0.65	43.61	22.57	1.52
60.0	16.88	20.55	12.93	14.58	0.99	0.64	39.70	22.44	1.54
80.0	16.46	20.29	14.89	16.35	1.03	0.63	38.78	22.50	1.51
100.0	16.24	20.16	16.43	17.57	1.05	0.62	37.41	22.40	1.55
200.0	15.87	19.97	20.76	20.51	1.09	0.62	37.10	22.50	1.58
400.0	15.67	19.90	22.02	20.05	1.10	0.62	36.59	22.52	1.54
600.0	15.53	19.84	19.86	20.47	1.11	0.64	36.87	22.64	1.54
800.0	15.36	19.76	18.44	20.42	1.11	0.65	36.31	22.71	1.59
1000.0	15.17	19.65	17.20	20.70	1.10	0.66	37.23	22.85	1.66
1200.0	14.96	19.53	16.28	19.95	1.10	0.68	37.10	22.78	1.69
1400.0	14.72	19.40	15.54	18.95	1.10	0.69	37.13	22.75	1.69
1600.0	14.45	19.25	14.73	18.65	1.10	0.71	37.12	22.62	1.73
1800.0	14.18	19.09	14.01	18.49	1.10	0.72	37.82	22.63	1.74
2000.0	13.91	18.91	13.53	17.99	1.09	0.74	38.36	22.75	1.68
2200.0	13.63	18.71	13.21	17.37	1.09	0.75	37.97	22.62	1.72
2400.0	13.35	18.51	12.93	16.93	1.09	0.76	38.82	22.83	1.82
2600.0	13.06	18.31	12.50	16.52	1.09	0.77	39.49	23.03	1.86
2800.0	12.79	18.09	12.25	16.17	1.08	0.78	39.38	22.90	1.85
3000.0	12.51	17.86	12.00	15.87	1.08	0.79	40.27	23.05	1.82
3200.0	12.25	17.62	12.21	15.04	1.07	0.78	39.65	23.08	1.84
3400.0	12.01	17.37	12.25	14.57	1.07	0.78	41.35	23.33	1.85
3600.0	11.77	17.11	12.18	14.36	1.06	0.78	40.72	23.19	1.92
3800.0	11.54	16.85	12.27	13.77	1.05	0.77	40.86	23.23	1.91
4000.0	11.32	16.58	12.21	13.72	1.05	0.77	40.63	23.06	1.88
4200.0	11.13	16.29	12.34	13.42	1.04	0.76	41.46	23.19	2.06
4400.0	10.95	16.01	12.45	13.30	1.03	0.75	41.69	23.34	2.01
4600.0	10.75	15.73	12.10	13.47	1.02	0.75	41.08	23.19	2.11
4800.0	10.60	15.43	12.14	13.40	1.01	0.74	40.93	23.06	2.00
5000.0	10.45	15.12	11.77	13.85	1.01	0.74	42.63	23.52	2.09
5200.0	10.29	14.83	11.67	13.99	1.00	0.74	42.15	23.23	2.24
5400.0	10.15	14.54	11.47	13.97	0.99	0.73	40.06	22.74	2.31
5600.0	9.99	14.26	10.92	14.46	0.98	0.73	41.57	22.81	2.34
5800.0	9.78	14.07	10.64	13.57	0.97	0.72	42.98	23.06	2.51
6000.0	9.63	13.81	9.80	14.52	0.97	0.73	41.47	22.86	2.56

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 4.75V, Id = 119.69mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
20.0	19.06	23.22	7.40	9.60	0.88	0.69	45.26	20.92	1.71
40.0	17.60	21.16	10.37	12.48	0.93	0.66	42.06	21.94	1.46
60.0	16.79	20.47	12.77	14.52	0.99	0.64	38.97	21.80	1.54
80.0	16.37	20.22	14.79	16.30	1.03	0.63	39.07	21.86	1.46
100.0	16.14	20.08	16.32	17.54	1.05	0.63	38.01	21.76	1.53
200.0	15.77	19.89	20.72	20.59	1.09	0.62	37.69	21.87	1.54
400.0	15.57	19.82	22.01	20.17	1.10	0.63	36.93	21.91	1.53
600.0	15.43	19.76	19.88	20.58	1.11	0.64	37.20	22.00	1.54
800.0	15.26	19.68	18.45	20.49	1.11	0.65	36.35	22.07	1.57
1000.0	15.08	19.58	17.21	20.74	1.11	0.67	37.89	22.21	1.58
1200.0	14.87	19.46	16.29	19.95	1.10	0.68	37.19	22.14	1.70
1400.0	14.62	19.33	15.54	18.93	1.10	0.69	37.61	22.12	1.64
1600.0	14.36	19.19	14.73	18.59	1.10	0.71	37.28	22.00	1.76
1800.0	14.10	19.02	14.01	18.41	1.10	0.73	37.96	22.01	1.72
2000.0	13.82	18.85	13.53	17.90	1.10	0.74	38.42	22.11	1.67
2200.0	13.55	18.66	13.21	17.28	1.09	0.75	37.87	21.99	1.69
2400.0	13.27	18.46	12.91	16.83	1.09	0.76	39.32	22.20	1.77
2600.0	12.98	18.26	12.48	16.42	1.09	0.77	39.76	22.39	1.85
2800.0	12.71	18.04	12.24	16.07	1.08	0.78	39.53	22.28	1.85
3000.0	12.43	17.82	11.99	15.76	1.08	0.79	39.81	22.42	1.77
3200.0	12.18	17.59	12.19	14.95	1.07	0.79	39.92	22.45	1.83
3400.0	11.93	17.33	12.23	14.48	1.07	0.78	41.07	22.66	1.84
3600.0	11.71	17.07	12.15	14.27	1.06	0.78	39.72	22.53	1.86
3800.0	11.47	16.83	12.25	13.69	1.05	0.78	39.82	22.56	1.86
4000.0	11.26	16.55	12.18	13.62	1.05	0.77	39.56	22.45	1.88
4200.0	11.07	16.27	12.30	13.34	1.04	0.76	40.04	22.57	2.00
4400.0	10.89	15.99	12.41	13.24	1.03	0.76	40.09	22.68	2.00
4600.0	10.69	15.71	12.06	13.41	1.02	0.76	39.76	22.54	2.01
4800.0	10.54	15.42	12.11	13.34	1.02	0.75	39.02	22.44	1.95
5000.0	10.39	15.11	11.72	13.79	1.01	0.75	40.56	22.82	2.08
5200.0	10.23	14.83	11.65	13.92	1.00	0.74	40.15	22.58	2.17
5400.0	10.09	14.53	11.46	13.91	0.99	0.73	38.80	22.15	2.22
5600.0	9.93	14.26	10.91	14.41	0.98	0.73	40.38	22.22	2.30
5800.0	9.73	14.06	10.62	13.49	0.97	0.73	40.43	22.45	2.45
6000.0	9.57	13.81	9.78	14.47	0.97	0.74	39.44	22.27	2.49

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.25V, Id = 150.35mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
20.0	19.21	23.33	7.43	9.73	0.88	0.69	42.90	21.99	1.99
40.0	17.75	21.28	10.45	12.62	0.93	0.65	41.80	23.14	1.60
60.0	16.95	20.61	12.91	14.64	0.99	0.64	38.95	23.03	1.61
80.0	16.55	20.36	14.92	16.40	1.03	0.63	38.87	23.09	1.55
100.0	16.32	20.23	16.46	17.60	1.05	0.62	37.39	22.99	1.59
200.0	15.96	20.04	20.78	20.50	1.09	0.62	37.04	23.08	1.59
400.0	15.76	19.97	22.03	20.01	1.10	0.62	36.47	23.10	1.56
600.0	15.62	19.91	19.85	20.43	1.10	0.63	36.51	23.20	1.59
800.0	15.45	19.83	18.42	20.40	1.10	0.65	36.32	23.28	1.61
1000.0	15.26	19.72	17.17	20.70	1.10	0.66	37.11	23.43	1.68
1200.0	15.04	19.60	16.24	19.96	1.10	0.68	36.85	23.35	1.70
1400.0	14.80	19.46	15.50	18.97	1.10	0.69	36.88	23.32	1.69
1600.0	14.53	19.31	14.70	18.68	1.10	0.71	36.97	23.19	1.74
1800.0	14.26	19.14	14.00	18.54	1.10	0.72	37.64	23.19	1.77
2000.0	13.98	18.96	13.50	18.05	1.09	0.74	37.94	23.33	1.70
2200.0	13.70	18.76	13.18	17.43	1.09	0.75	37.89	23.18	1.75
2400.0	13.41	18.56	12.92	16.99	1.09	0.76	38.96	23.40	1.81
2600.0	13.12	18.35	12.47	16.58	1.08	0.77	39.44	23.63	1.90
2800.0	12.85	18.12	12.24	16.24	1.08	0.78	38.95	23.46	1.91
3000.0	12.57	17.89	12.00	15.94	1.07	0.78	39.99	23.62	1.81
3200.0	12.31	17.65	12.20	15.10	1.07	0.78	40.10	23.66	1.88
3400.0	12.07	17.39	12.26	14.63	1.06	0.78	42.13	23.93	1.91
3600.0	11.83	17.13	12.19	14.41	1.06	0.78	41.33	23.77	1.95
3800.0	11.60	16.87	12.29	13.81	1.05	0.77	41.62	23.81	1.93
4000.0	11.38	16.59	12.21	13.75	1.04	0.77	40.94	23.60	1.94
4200.0	11.19	16.30	12.34	13.45	1.04	0.76	42.02	23.75	2.10
4400.0	11.00	16.02	12.45	13.34	1.03	0.75	42.79	23.92	2.09
4600.0	10.80	15.73	12.11	13.51	1.02	0.75	42.46	23.76	2.12
4800.0	10.65	15.43	12.15	13.43	1.01	0.74	41.88	23.62	2.08
5000.0	10.50	15.12	11.77	13.88	1.00	0.74	44.05	24.14	2.16
5200.0	10.34	14.84	11.68	14.02	1.00	0.73	43.42	23.80	2.25
5400.0	10.20	14.54	11.48	14.00	0.99	0.72	41.30	23.28	2.38
5600.0	10.04	14.26	10.92	14.50	0.98	0.72	43.03	23.35	2.41
5800.0	9.83	14.06	10.65	13.57	0.97	0.72	46.05	23.62	2.54
6000.0	9.67	13.81	9.79	14.55	0.97	0.73	43.51	23.40	2.62

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.00V, Id = 150.07mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
20.0	19.46	23.85	6.65	9.30	0.88	0.70	38.60	21.53	2.18
40.0	18.20	22.04	9.90	13.07	0.96	0.66	40.62	22.69	2.03
60.0	17.64	21.51	12.31	15.78	1.02	0.64	41.09	22.60	2.07
80.0	17.38	21.33	13.82	18.09	1.05	0.64	41.90	22.61	2.03
100.0	17.24	21.24	14.88	19.71	1.06	0.64	42.79	22.42	2.06
200.0	16.97	21.14	16.17	22.83	1.09	0.64	46.34	22.52	2.10
400.0	16.78	21.04	16.08	23.31	1.09	0.65	46.32	22.55	2.08
600.0	16.56	20.93	15.30	21.14	1.09	0.67	43.48	22.59	2.11
800.0	16.30	20.78	14.29	19.76	1.08	0.69	41.46	22.62	2.16
1000.0	15.99	20.60	13.40	18.61	1.07	0.71	42.23	22.81	2.22
1200.0	15.66	20.40	12.73	17.48	1.06	0.73	41.22	22.77	2.32
1400.0	15.30	20.17	12.15	16.64	1.06	0.75	41.28	22.77	2.34
1600.0	14.94	19.93	11.73	15.92	1.05	0.77	39.47	22.63	2.39
1800.0	14.57	19.67	11.36	15.31	1.04	0.78	40.36	22.73	2.44
2000.0	14.20	19.41	11.08	14.80	1.04	0.80	39.64	22.85	2.39
2200.0	13.83	19.15	10.92	14.30	1.03	0.81	39.55	22.64	2.47
2400.0	13.47	18.88	10.77	13.96	1.03	0.81	40.18	23.01	2.56
2600.0	13.12	18.61	10.63	13.57	1.03	0.82	39.57	23.10	2.66
2800.0	12.78	18.33	10.56	13.24	1.02	0.83	39.88	22.98	2.70
3000.0	12.44	18.06	10.52	12.98	1.02	0.83	39.44	23.17	2.67
3200.0	12.12	17.78	10.48	12.78	1.02	0.83	39.97	23.16	2.77
3400.0	11.81	17.51	10.48	12.59	1.02	0.83	39.21	23.27	2.78
3600.0	11.52	17.22	10.43	12.50	1.02	0.83	38.67	23.08	2.90
3800.0	11.24	16.94	10.47	12.34	1.01	0.83	39.23	23.11	2.97
4000.0	10.97	16.66	10.57	12.28	1.01	0.83	39.41	23.06	2.95
4200.0	10.72	16.37	10.65	12.13	1.01	0.82	39.25	23.13	3.14
4400.0	10.48	16.08	10.64	12.09	1.01	0.82	38.39	22.99	3.13
4600.0	10.26	15.78	10.69	12.19	1.00	0.81	38.68	22.87	3.25
4800.0	10.05	15.49	10.73	12.22	1.00	0.81	38.14	22.66	3.18
5000.0	9.86	15.18	10.76	12.23	1.00	0.80	38.09	22.97	3.29
5200.0	9.69	14.88	10.66	12.40	0.99	0.80	38.12	22.80	3.47
5400.0	9.48	14.62	10.56	12.63	0.99	0.79	37.66	22.29	3.55
5600.0	9.32	14.31	10.21	12.80	0.98	0.79	38.68	22.71	3.69
5800.0	9.14	14.04	9.82	12.98	0.97	0.79	38.20	22.87	3.79
6000.0	8.97	13.76	9.40	13.14	0.97	0.79	37.42	22.64	3.94

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 4.75V, Id = 136.75mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
20.0	19.41	23.83	6.64	9.34	0.88	0.71	38.60	21.07	2.10
40.0	18.14	22.00	9.85	13.08	0.96	0.67	39.90	22.18	1.99
60.0	17.57	21.46	12.17	15.77	1.02	0.65	40.39	22.07	2.02
80.0	17.31	21.28	13.77	18.06	1.05	0.64	42.69	22.09	1.99
100.0	17.16	21.19	14.85	19.67	1.06	0.64	42.94	21.91	2.03
200.0	16.89	21.09	16.20	22.72	1.09	0.65	47.80	22.01	2.02
400.0	16.70	20.98	16.10	23.07	1.09	0.66	44.50	22.03	2.06
600.0	16.48	20.86	15.29	20.88	1.09	0.67	42.33	22.10	2.09
800.0	16.21	20.71	14.28	19.48	1.08	0.69	41.34	22.14	2.08
1000.0	15.90	20.52	13.38	18.32	1.07	0.71	41.39	22.33	2.17
1200.0	15.56	20.30	12.70	17.20	1.06	0.73	40.36	22.28	2.26
1400.0	15.20	20.07	12.14	16.38	1.05	0.75	39.95	22.29	2.29
1600.0	14.84	19.82	11.71	15.67	1.04	0.77	38.83	22.16	2.39
1800.0	14.46	19.56	11.35	15.08	1.04	0.78	38.97	22.25	2.39
2000.0	14.10	19.29	11.06	14.58	1.03	0.80	39.02	22.36	2.35
2200.0	13.73	19.02	10.92	14.09	1.03	0.80	38.30	22.16	2.47
2400.0	13.36	18.75	10.78	13.77	1.03	0.81	38.83	22.51	2.55
2600.0	13.01	18.48	10.63	13.40	1.02	0.82	38.61	22.60	2.64
2800.0	12.67	18.20	10.57	13.09	1.02	0.82	38.59	22.47	2.64
3000.0	12.33	17.93	10.54	12.85	1.02	0.83	38.21	22.67	2.61
3200.0	12.01	17.65	10.50	12.66	1.02	0.83	38.86	22.66	2.72
3400.0	11.70	17.38	10.51	12.49	1.02	0.83	38.40	22.77	2.68
3600.0	11.41	17.09	10.46	12.41	1.01	0.83	37.46	22.60	2.82
3800.0	11.13	16.82	10.50	12.27	1.01	0.83	37.74	22.62	2.91
4000.0	10.86	16.54	10.61	12.22	1.01	0.83	38.01	22.58	2.91
4200.0	10.61	16.25	10.70	12.09	1.01	0.82	38.18	22.64	3.08
4400.0	10.38	15.95	10.71	12.07	1.01	0.82	37.23	22.52	3.05
4600.0	10.16	15.66	10.75	12.17	1.01	0.81	37.41	22.39	3.17
4800.0	9.95	15.37	10.81	12.21	1.00	0.81	37.20	22.18	3.16
5000.0	9.76	15.07	10.83	12.24	1.00	0.80	37.08	22.49	3.21
5200.0	9.58	14.77	10.73	12.40	0.99	0.79	37.25	22.32	3.37
5400.0	9.38	14.52	10.63	12.61	0.99	0.79	36.42	21.84	3.49
5600.0	9.22	14.21	10.28	12.77	0.98	0.79	37.35	22.24	3.56
5800.0	9.04	13.95	9.89	12.90	0.98	0.79	36.99	22.41	3.70
6000.0	8.86	13.68	9.47	13.03	0.97	0.78	36.43	22.18	3.81

## 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 = 5.25V, Id = 163.15mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
20.0	19.50	23.88	6.65	9.26	0.88	0.70	38.58	21.93	2.31
40.0	18.25	22.07	9.92	13.05	0.97	0.66	41.37	23.15	2.12
60.0	17.69	21.56	12.23	15.78	1.02	0.64	40.30	23.06	2.15
80.0	17.44	21.38	13.82	18.09	1.05	0.64	41.81	23.06	2.09
100.0	17.29	21.29	14.85	19.74	1.06	0.64	42.46	22.86	2.10
200.0	17.03	21.19	16.13	22.89	1.09	0.64	45.58	22.95	2.12
400.0	16.84	21.09	16.03	23.47	1.09	0.65	44.17	22.98	2.16
600.0	16.63	20.99	15.27	21.32	1.09	0.67	46.09	23.02	2.16
800.0	16.37	20.85	14.26	19.96	1.08	0.69	42.17	23.04	2.21
1000.0	16.06	20.68	13.38	18.81	1.07	0.71	42.25	23.25	2.29
1200.0	15.73	20.48	12.71	17.67	1.07	0.73	42.60	23.20	2.34
1400.0	15.38	20.26	12.14	16.82	1.06	0.75	42.33	23.21	2.43
1600.0	15.02	20.02	11.70	16.09	1.05	0.77	40.51	23.06	2.46
1800.0	14.65	19.77	11.34	15.46	1.05	0.78	42.04	23.16	2.56
2000.0	14.28	19.52	11.06	14.94	1.04	0.80	40.97	23.29	2.43
2200.0	13.91	19.26	10.89	14.43	1.04	0.81	40.73	23.08	2.53
2400.0	13.55	18.99	10.74	14.07	1.03	0.82	41.99	23.46	2.64
2600.0	13.20	18.72	10.59	13.67	1.03	0.82	40.59	23.56	2.72
2800.0	12.86	18.45	10.52	13.33	1.03	0.83	41.44	23.43	2.75
3000.0	12.52	18.17	10.48	13.05	1.02	0.83	40.61	23.62	2.73
3200.0	12.20	17.90	10.43	12.83	1.02	0.84	41.58	23.61	2.85
3400.0	11.89	17.62	10.43	12.62	1.02	0.84	40.95	23.73	2.92
3600.0	11.60	17.34	10.36	12.52	1.02	0.84	40.11	23.52	2.95
3800.0	11.32	17.06	10.39	12.36	1.01	0.84	40.12	23.54	3.04
4000.0	11.05	16.78	10.48	12.27	1.01	0.83	40.80	23.49	3.10
4200.0	10.80	16.48	10.57	12.12	1.01	0.83	41.19	23.55	3.25
4400.0	10.56	16.18	10.56	12.06	1.00	0.82	39.22	23.43	3.28
4600.0	10.34	15.88	10.60	12.16	1.00	0.82	39.58	23.29	3.35
4800.0	10.13	15.59	10.64	12.17	1.00	0.81	39.27	23.07	3.28
5000.0	9.94	15.28	10.65	12.18	0.99	0.81	39.04	23.39	3.46
5200.0	9.76	14.97	10.55	12.34	0.99	0.80	39.14	23.23	3.58
5400.0	9.55	14.71	10.45	12.58	0.99	0.80	38.67	22.71	3.71
5600.0	9.39	14.39	10.11	12.76	0.97	0.80	39.65	23.14	3.77
5800.0	9.22	14.12	9.73	12.97	0.97	0.80	38.75	23.31	3.92
6000.0	9.04	13.83	9.31	13.17	0.96	0.80	38.54	23.06	4.02

## 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 = 4.00V, Idd = 88.39mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
20.0	18.97	23.45	6.86	9.42	0.89	0.71	36.60	19.16	1.71
40.0	17.61	21.44	9.88	12.73	0.95	0.68	37.28	20.09	1.68
60.0	16.91	20.82	12.46	15.14	1.01	0.65	37.09	19.92	1.74
80.0	16.57	20.59	14.13	17.20	1.04	0.65	37.07	19.95	1.72
100.0	16.38	20.48	15.45	18.62	1.06	0.65	38.85	19.83	1.75
200.0	16.06	20.32	18.10	22.08	1.10	0.65	38.88	19.93	1.76
400.0	15.86	20.23	18.29	22.47	1.10	0.65	39.14	19.99	1.80
600.0	15.68	20.13	17.24	21.24	1.10	0.67	37.24	20.06	1.86
800.0	15.45	20.00	16.06	19.86	1.09	0.68	36.38	20.10	1.85
1000.0	15.19	19.84	15.00	18.65	1.09	0.70	35.73	20.20	1.93
1200.0	14.90	19.66	14.12	17.58	1.08	0.72	34.85	20.17	1.95
1400.0	14.58	19.46	13.38	16.74	1.07	0.73	34.73	20.17	1.96
1600.0	14.25	19.25	12.76	16.04	1.07	0.75	33.93	20.07	2.01
1800.0	13.91	19.03	12.27	15.38	1.06	0.77	33.98	20.13	2.03
2000.0	13.57	18.80	11.84	14.88	1.06	0.78	33.70	20.18	1.98
2200.0	13.22	18.57	11.59	14.36	1.05	0.79	33.07	20.11	2.03
2400.0	12.89	18.33	11.39	14.01	1.05	0.80	33.51	20.31	2.11
2600.0	12.56	18.09	11.21	13.64	1.05	0.81	33.15	20.39	2.19
2800.0	12.25	17.83	11.10	13.36	1.04	0.81	33.25	20.34	2.22
3000.0	11.93	17.57	11.04	13.12	1.04	0.82	33.19	20.48	2.19
3200.0	11.64	17.31	11.03	12.89	1.04	0.82	33.35	20.48	2.22
3400.0	11.37	17.04	11.02	12.73	1.03	0.82	33.18	20.56	2.22
3600.0	11.10	16.77	11.02	12.60	1.03	0.82	32.75	20.50	2.29
3800.0	10.85	16.50	11.11	12.41	1.03	0.81	32.87	20.52	2.35
4000.0	10.61	16.22	11.18	12.40	1.03	0.81	32.79	20.51	2.26
4200.0	10.39	15.93	11.25	12.35	1.02	0.80	32.94	20.53	2.50
4400.0	10.18	15.65	11.30	12.35	1.02	0.80	32.57	20.48	2.46
4600.0	9.99	15.36	11.35	12.43	1.02	0.79	32.65	20.39	2.50
4800.0	9.80	15.07	11.36	12.37	1.01	0.78	32.34	20.29	2.48
5000.0	9.63	14.79	11.30	12.50	1.01	0.78	32.60	20.50	2.52
5200.0	9.46	14.51	11.16	12.63	1.00	0.77	32.62	20.43	2.67
5400.0	9.29	14.23	10.90	12.79	1.00	0.77	31.81	20.10	2.73
5600.0	9.11	13.97	10.62	12.74	0.99	0.76	32.37	20.32	2.80
5800.0	8.95	13.72	10.14	12.88	0.98	0.76	32.69	20.50	2.92
6000.0	8.75	13.49	9.67	12.71	0.98	0.76	32.14	20.39	2.99

## 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 = 4.50V, Idd = 115.55mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
20.0	19.23	23.57	6.92	9.50	0.88	0.71	40.35	20.47	1.79
40.0	17.86	21.60	10.05	12.88	0.95	0.67	41.25	21.52	1.72
60.0	17.18	20.99	12.52	15.31	1.00	0.65	40.38	21.38	1.79
80.0	16.84	20.78	14.35	17.38	1.04	0.64	41.74	21.41	1.75
100.0	16.66	20.67	15.66	18.80	1.06	0.64	41.68	21.28	1.83
200.0	16.35	20.53	18.37	22.29	1.09	0.64	46.07	21.37	1.82
400.0	16.15	20.44	18.57	22.84	1.10	0.65	42.29	21.42	1.83
600.0	15.97	20.35	17.48	21.79	1.10	0.66	41.22	21.49	1.87
800.0	15.74	20.23	16.29	20.50	1.09	0.68	39.31	21.55	1.87
1000.0	15.48	20.07	15.21	19.34	1.09	0.69	39.45	21.70	1.93
1200.0	15.19	19.90	14.32	18.28	1.08	0.71	38.34	21.65	2.00
1400.0	14.88	19.71	13.56	17.45	1.08	0.73	38.45	21.64	2.03
1600.0	14.55	19.51	12.95	16.74	1.07	0.74	37.31	21.52	2.04
1800.0	14.21	19.29	12.45	16.07	1.07	0.76	37.50	21.56	2.09
2000.0	13.87	19.06	12.00	15.54	1.06	0.78	37.44	21.67	2.01
2200.0	13.53	18.83	11.75	15.00	1.06	0.79	36.66	21.54	2.10
2400.0	13.19	18.59	11.54	14.62	1.06	0.80	37.37	21.80	2.18
2600.0	12.86	18.34	11.35	14.21	1.05	0.80	37.17	21.95	2.26
2800.0	12.55	18.08	11.23	13.88	1.05	0.81	37.20	21.82	2.29
3000.0	12.23	17.82	11.16	13.62	1.05	0.81	37.20	21.99	2.23
3200.0	11.94	17.56	11.16	13.34	1.04	0.81	37.30	22.00	2.31
3400.0	11.66	17.29	11.14	13.14	1.04	0.81	37.21	22.17	2.30
3600.0	11.39	17.01	11.15	12.98	1.04	0.81	36.58	22.06	2.40
3800.0	11.14	16.73	11.21	12.77	1.03	0.81	36.81	22.09	2.38
4000.0	10.90	16.44	11.29	12.72	1.03	0.80	36.67	22.00	2.40
4200.0	10.68	16.15	11.35	12.64	1.03	0.80	37.06	22.09	2.60
4400.0	10.46	15.87	11.39	12.61	1.02	0.79	36.45	22.07	2.55
4600.0	10.26	15.57	11.45	12.67	1.02	0.79	36.36	21.93	2.62
4800.0	10.08	15.27	11.46	12.63	1.01	0.78	35.99	21.75	2.54
5000.0	9.90	14.98	11.41	12.72	1.01	0.77	36.62	22.09	2.62
5200.0	9.73	14.69	11.25	12.88	1.00	0.77	36.47	21.89	2.80
5400.0	9.56	14.41	10.99	13.05	0.99	0.76	35.48	21.43	2.86
5600.0	9.38	14.13	10.71	13.07	0.99	0.76	36.28	21.68	2.97
5800.0	9.22	13.87	10.22	13.27	0.98	0.76	36.63	21.92	3.08
6000.0	9.02	13.63	9.74	13.12	0.97	0.76	35.85	21.73	3.16



## 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 = 4.00V, Idd = 77.60mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
20.0	18.64	23.01	7.23	9.28	0.89	0.69	35.76	18.64	1.50
40.0	17.21	20.89	10.14	12.18	0.93	0.66	34.98	19.50	1.34
60.0	16.40	20.19	12.61	14.34	0.99	0.65	35.00	19.32	1.45
80.0	15.98	19.91	14.50	16.24	1.03	0.64	35.01	19.38	1.40
100.0	15.75	19.77	15.99	17.60	1.06	0.64	36.07	19.31	1.48
200.0	15.37	19.56	20.31	21.40	1.10	0.63	37.02	19.44	1.49
400.0	15.17	19.49	21.81	21.20	1.11	0.64	40.72	19.50	1.47
600.0	15.03	19.44	19.75	21.53	1.11	0.65	37.70	19.55	1.51
800.0	14.87	19.36	18.31	21.10	1.11	0.66	38.07	19.60	1.53
1000.0	14.69	19.26	17.05	21.04	1.11	0.68	35.53	19.65	1.57
1200.0	14.49	19.15	16.14	20.00	1.11	0.69	35.87	19.62	1.60
1400.0	14.25	19.03	15.43	18.76	1.10	0.70	35.99	19.61	1.61
1600.0	13.99	18.91	14.58	18.21	1.10	0.72	35.17	19.53	1.69
1800.0	13.73	18.75	13.87	17.87	1.10	0.74	35.51	19.60	1.70
2000.0	13.47	18.59	13.38	17.27	1.09	0.75	34.62	19.60	1.60
2200.0	13.19	18.41	13.05	16.61	1.09	0.76	34.35	19.55	1.66
2400.0	12.92	18.24	12.74	16.11	1.09	0.77	34.56	19.71	1.72
2600.0	12.64	18.05	12.29	15.67	1.08	0.78	33.98	19.77	1.77
2800.0	12.37	17.85	12.03	15.32	1.08	0.79	34.47	19.78	1.74
3000.0	12.10	17.64	11.75	15.01	1.07	0.80	33.99	19.87	1.76
3200.0	11.85	17.43	11.92	14.23	1.07	0.80	34.40	19.90	1.78
3400.0	11.61	17.19	11.94	13.79	1.06	0.80	33.80	19.94	1.77
3600.0	11.39	16.95	11.86	13.61	1.06	0.80	33.59	19.89	1.86
3800.0	11.16	16.71	11.94	13.07	1.05	0.79	33.66	19.89	1.79
4000.0	10.96	16.45	11.86	13.03	1.04	0.79	34.05	19.96	1.81
4200.0	10.77	16.18	11.92	12.79	1.04	0.78	34.27	20.02	1.97
4400.0	10.59	15.91	12.05	12.71	1.03	0.77	33.49	19.95	1.86
4600.0	10.41	15.64	11.71	12.88	1.02	0.78	33.82	19.89	1.94
4800.0	10.26	15.35	11.76	12.83	1.01	0.77	33.47	19.85	1.90
5000.0	10.12	15.05	11.41	13.28	1.01	0.77	33.56	20.07	1.94
5200.0	9.97	14.78	11.33	13.42	1.00	0.76	33.79	20.02	2.10
5400.0	9.83	14.49	11.17	13.40	0.99	0.75	33.21	19.77	2.12
5600.0	9.67	14.22	10.65	13.87	0.98	0.75	33.92	19.92	2.19
5800.0	9.47	14.03	10.37	13.02	0.97	0.75	33.97	20.08	2.29
6000.0	9.32	13.78	9.58	13.89	0.97	0.76	33.53	20.00	2.35

## 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 = 4.50V, Idd = 103.82mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
20.0	18.95	23.17	7.36	9.50	0.89	0.69	39.57	20.24	1.60
40.0	17.49	21.08	10.29	12.39	0.93	0.66	40.62	21.20	1.39
60.0	16.68	20.39	12.76	14.46	0.99	0.64	38.35	21.03	1.50
80.0	16.27	20.13	14.72	16.28	1.03	0.63	39.72	21.09	1.46
100.0	16.03	19.99	16.24	17.56	1.05	0.63	38.49	21.00	1.50
200.0	15.66	19.80	20.61	20.82	1.09	0.62	39.09	21.11	1.51
400.0	15.46	19.72	21.97	20.45	1.11	0.63	37.77	21.17	1.53
600.0	15.32	19.67	19.85	20.85	1.11	0.64	38.22	21.25	1.54
800.0	15.15	19.59	18.42	20.68	1.11	0.65	37.29	21.31	1.58
1000.0	14.97	19.48	17.17	20.85	1.11	0.67	38.92	21.43	1.61
1200.0	14.76	19.37	16.25	19.99	1.10	0.68	37.87	21.36	1.66
1400.0	14.52	19.24	15.51	18.91	1.10	0.69	38.27	21.35	1.66
1600.0	14.26	19.10	14.69	18.52	1.10	0.71	37.49	21.24	1.71
1800.0	14.00	18.94	13.97	18.29	1.10	0.73	38.25	21.27	1.70
2000.0	13.73	18.77	13.49	17.75	1.09	0.74	38.05	21.34	1.62
2200.0	13.45	18.58	13.17	17.12	1.09	0.75	37.49	21.25	1.68
2400.0	13.17	18.39	12.88	16.65	1.09	0.76	38.57	21.43	1.74
2600.0	12.89	18.20	12.44	16.23	1.09	0.78	38.40	21.59	1.85
2800.0	12.62	17.98	12.20	15.88	1.08	0.78	38.35	21.53	1.81
3000.0	12.34	17.76	11.92	15.58	1.08	0.79	38.21	21.65	1.74
3200.0	12.09	17.54	12.11	14.77	1.07	0.79	38.34	21.68	1.77
3400.0	11.85	17.29	12.15	14.32	1.07	0.79	38.33	21.84	1.77
3600.0	11.62	17.03	12.07	14.11	1.06	0.79	37.39	21.73	1.80
3800.0	11.39	16.79	12.16	13.54	1.05	0.78	37.68	21.77	1.86
4000.0	11.18	16.52	12.10	13.48	1.05	0.78	37.56	21.71	1.85
4200.0	10.99	16.24	12.20	13.22	1.04	0.77	38.03	21.81	1.99
4400.0	10.81	15.96	12.32	13.12	1.03	0.76	37.26	21.85	2.00
4600.0	10.62	15.69	11.98	13.29	1.02	0.76	37.49	21.73	1.99
4800.0	10.47	15.39	12.00	13.22	1.02	0.75	37.08	21.65	1.96
5000.0	10.31	15.09	11.66	13.68	1.01	0.75	37.41	21.96	2.02
5200.0	10.17	14.81	11.57	13.82	1.00	0.74	37.44	21.79	2.16
5400.0	10.02	14.51	11.39	13.80	0.99	0.73	36.40	21.41	2.23
5600.0	9.86	14.24	10.84	14.30	0.98	0.74	37.09	21.50	2.23
5800.0	9.65	14.05	10.57	13.39	0.97	0.73	37.65	21.69	2.41
6000.0	9.51	13.80	9.70	14.35	0.97	0.74	36.85	21.53	2.44

## 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 = 4.00V, Idd = 95.86mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
20.0	19.09	23.73	6.52	9.39	0.89	0.73	35.96	19.25	1.91
40.0	17.82	21.82	9.61	13.01	0.96	0.68	38.38	20.25	1.86
60.0	17.24	21.27	11.95	15.64	1.02	0.66	37.62	20.10	1.92
80.0	16.96	21.07	13.49	17.86	1.05	0.66	38.00	20.12	1.92
100.0	16.81	20.97	14.59	19.38	1.07	0.65	39.61	19.97	1.97
200.0	16.52	20.85	15.93	22.13	1.09	0.66	39.33	20.06	1.94
400.0	16.32	20.72	15.84	21.98	1.09	0.67	39.42	20.12	2.01
600.0	16.09	20.58	15.01	19.76	1.09	0.68	38.06	20.19	2.01
800.0	15.81	20.40	13.97	18.32	1.07	0.70	37.11	20.23	2.05
1000.0	15.49	20.17	13.10	17.12	1.06	0.72	36.80	20.38	2.12
1200.0	15.14	19.93	12.44	16.04	1.05	0.74	35.60	20.35	2.19
1400.0	14.77	19.67	11.88	15.26	1.04	0.76	35.81	20.36	2.24
1600.0	14.40	19.40	11.46	14.60	1.03	0.77	34.83	20.25	2.29
1800.0	14.02	19.12	11.12	14.06	1.02	0.79	35.05	20.35	2.33
2000.0	13.64	18.84	10.86	13.60	1.01	0.80	34.66	20.42	2.26
2200.0	13.26	18.56	10.70	13.17	1.01	0.81	34.07	20.30	2.32
2400.0	12.89	18.29	10.59	12.88	1.01	0.81	34.63	20.54	2.42
2600.0	12.54	18.01	10.46	12.56	1.00	0.82	34.10	20.61	2.50
2800.0	12.20	17.73	10.42	12.31	1.00	0.82	34.36	20.53	2.50
3000.0	11.86	17.46	10.40	12.13	1.00	0.83	34.13	20.70	2.48
3200.0	11.53	17.19	10.39	11.98	1.00	0.83	34.51	20.69	2.58
3400.0	11.23	16.91	10.40	11.86	1.00	0.83	33.97	20.75	2.61
3600.0	10.95	16.63	10.37	11.82	1.00	0.83	33.60	20.67	2.65
3800.0	10.67	16.36	10.43	11.72	1.00	0.83	33.64	20.67	2.68
4000.0	10.40	16.09	10.56	11.73	1.00	0.82	33.83	20.65	2.68
4200.0	10.16	15.80	10.65	11.63	1.00	0.82	33.86	20.66	2.89
4400.0	9.93	15.52	10.69	11.67	1.00	0.81	33.19	20.55	2.83
4600.0	9.71	15.23	10.73	11.76	1.00	0.81	33.35	20.47	2.95
4800.0	9.51	14.96	10.78	11.83	1.00	0.80	33.09	20.34	2.91
5000.0	9.31	14.67	10.83	11.89	1.00	0.79	32.94	20.54	3.05
5200.0	9.14	14.38	10.71	12.03	0.99	0.79	33.08	20.47	3.14
5400.0	8.94	14.13	10.59	12.16	1.00	0.78	32.58	20.12	3.23
5600.0	8.78	13.84	10.25	12.26	0.99	0.78	33.16	20.43	3.30
5800.0	8.59	13.61	9.86	12.26	0.98	0.78	33.02	20.55	3.42
6000.0	8.41	13.34	9.43	12.26	0.98	0.77	32.46	20.41	3.45

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

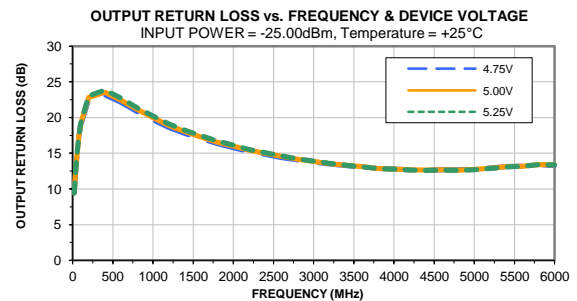
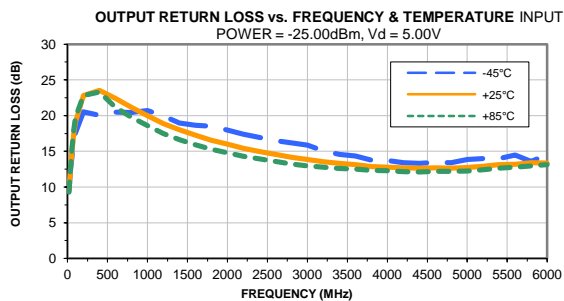
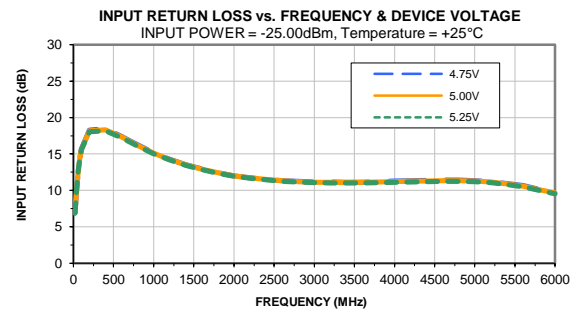
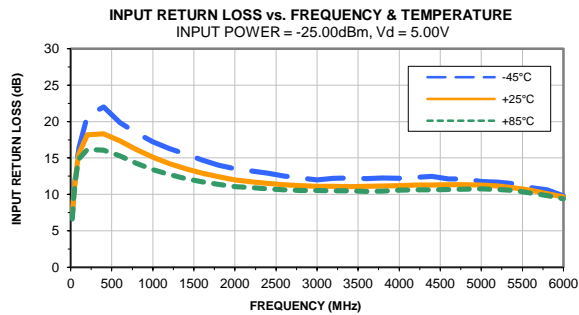
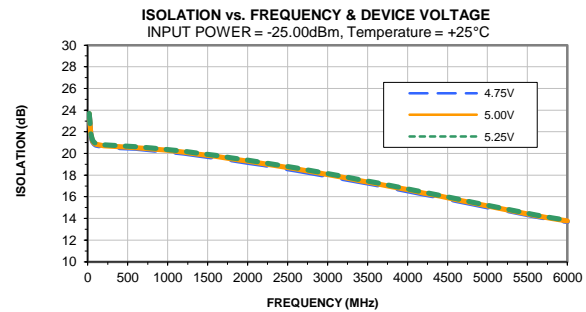
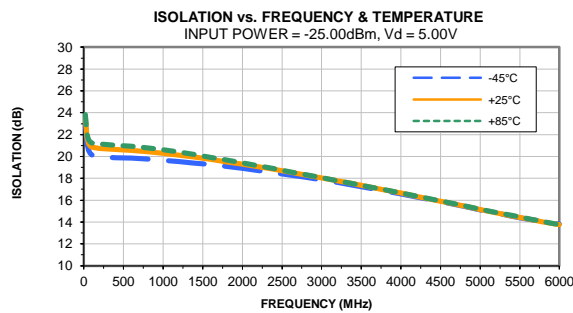
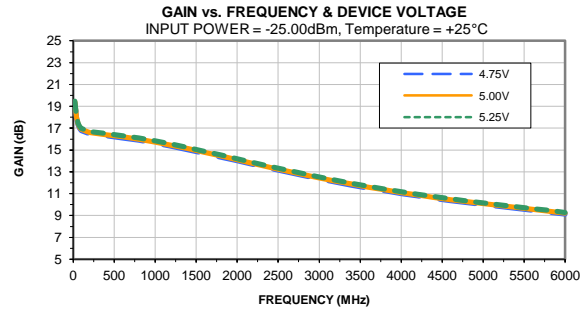
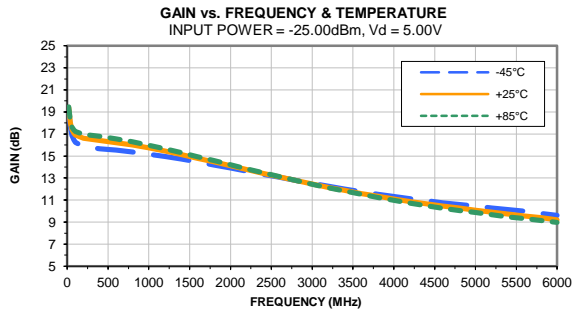
Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

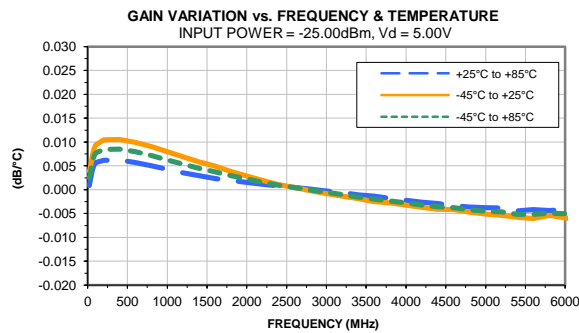
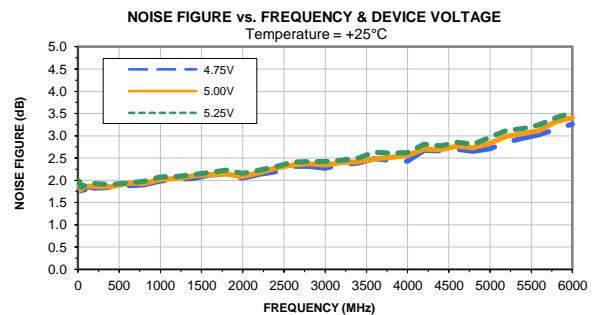
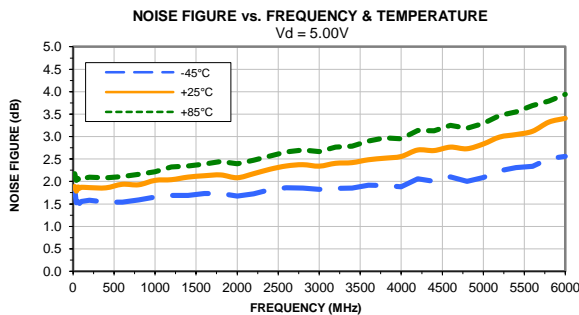
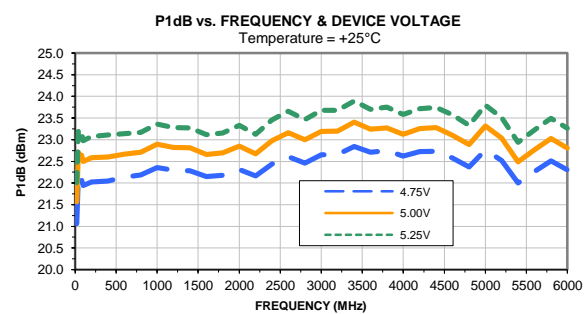
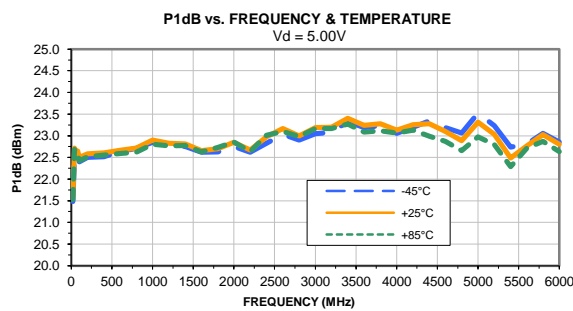
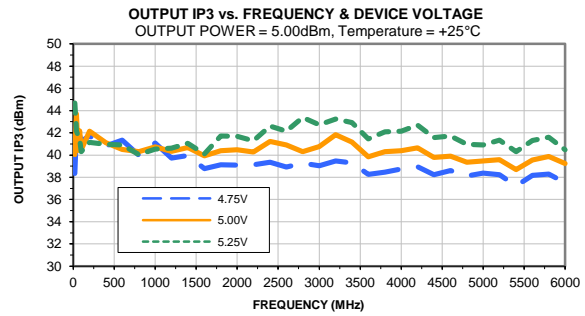
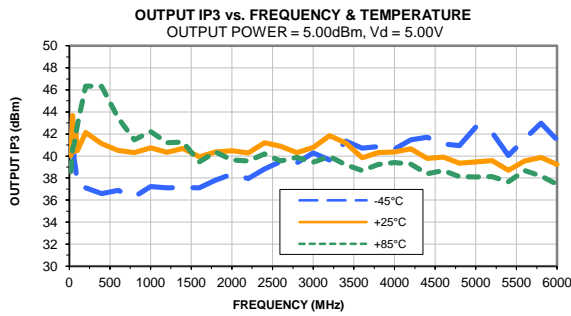
TEST CONDITIONS: Vd = 4.50V, Idd = 122.40mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
20.0	19.32	23.80	6.59	9.38	0.88	0.72	38.75	20.50	2.01
40.0	18.05	21.95	9.79	13.08	0.96	0.67	39.73	21.57	1.93
60.0	17.48	21.40	12.21	15.75	1.02	0.65	39.67	21.45	1.99
80.0	17.21	21.22	13.72	18.02	1.05	0.65	41.11	21.46	1.95
100.0	17.06	21.13	14.83	19.60	1.07	0.64	43.32	21.30	2.00
200.0	16.78	21.02	16.17	22.54	1.09	0.65	46.64	21.40	2.01
400.0	16.58	20.90	16.08	22.73	1.09	0.66	44.25	21.41	2.01
600.0	16.36	20.78	15.26	20.52	1.09	0.67	41.65	21.50	2.04
800.0	16.09	20.61	14.22	19.10	1.08	0.69	40.34	21.55	2.11
1000.0	15.78	20.41	13.33	17.94	1.07	0.72	39.82	21.73	2.16
1200.0	15.44	20.19	12.65	16.83	1.06	0.74	38.64	21.69	2.24
1400.0	15.08	19.94	12.08	16.02	1.05	0.75	38.86	21.70	2.27
1600.0	14.71	19.69	11.66	15.33	1.04	0.77	37.49	21.57	2.36
1800.0	14.33	19.42	11.30	14.76	1.03	0.78	37.63	21.66	2.33
2000.0	13.96	19.15	11.03	14.28	1.03	0.80	37.49	21.77	2.31
2200.0	13.59	18.88	10.87	13.81	1.02	0.80	36.83	21.59	2.37
2400.0	13.22	18.60	10.74	13.50	1.02	0.81	37.48	21.90	2.53
2600.0	12.87	18.33	10.62	13.15	1.02	0.82	37.02	21.99	2.55
2800.0	12.53	18.05	10.55	12.86	1.01	0.82	37.31	21.88	2.59
3000.0	12.19	17.77	10.53	12.64	1.01	0.83	36.78	22.06	2.57
3200.0	11.87	17.50	10.49	12.46	1.01	0.83	37.51	22.05	2.65
3400.0	11.56	17.22	10.51	12.31	1.01	0.83	37.01	22.15	2.68
3600.0	11.27	16.94	10.46	12.25	1.01	0.83	36.34	22.03	2.77
3800.0	10.99	16.66	10.52	12.13	1.01	0.83	36.34	22.04	2.81
4000.0	10.72	16.39	10.65	12.10	1.01	0.82	36.59	21.99	2.81
4200.0	10.48	16.10	10.74	11.98	1.01	0.82	36.79	22.04	2.98
4400.0	10.25	15.81	10.75	11.98	1.01	0.81	35.96	21.91	2.99
4600.0	10.02	15.52	10.80	12.08	1.01	0.81	36.15	21.81	3.08
4800.0	9.82	15.23	10.86	12.13	1.00	0.80	35.82	21.62	3.04
5000.0	9.63	14.93	10.88	12.16	1.00	0.79	35.74	21.90	3.12
5200.0	9.45	14.64	10.77	12.32	0.99	0.79	35.82	21.75	3.31
5400.0	9.24	14.39	10.68	12.51	1.00	0.79	35.12	21.31	3.38
5600.0	9.08	14.08	10.31	12.65	0.99	0.78	35.92	21.68	3.46
5800.0	8.90	13.83	9.92	12.72	0.98	0.78	35.88	21.83	3.58
6000.0	8.72	13.57	9.49	12.81	0.98	0.78	35.23	21.62	3.65

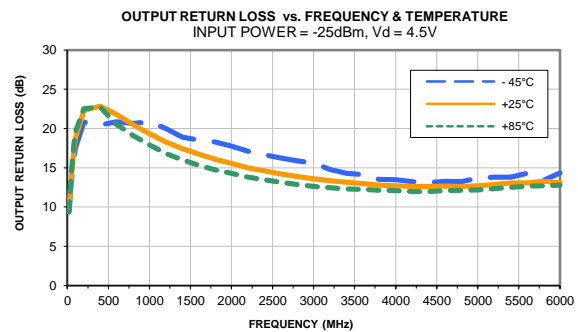
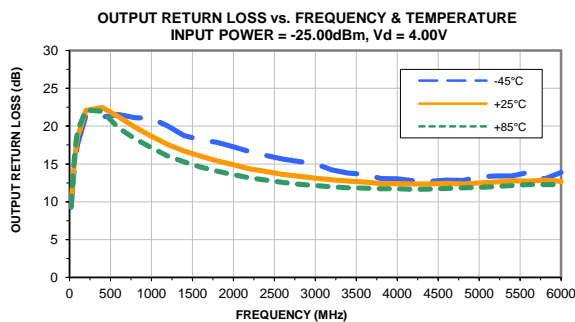
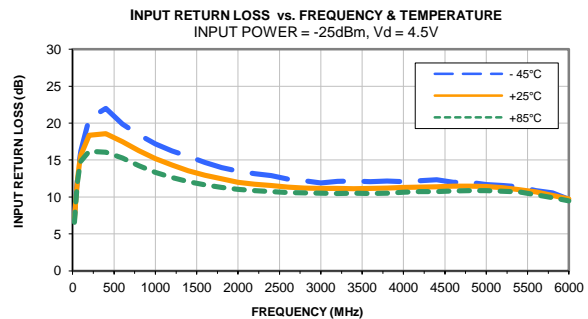
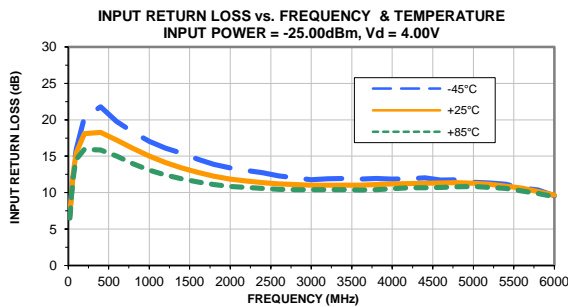
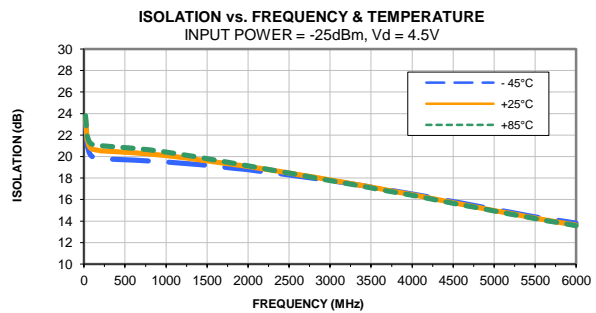
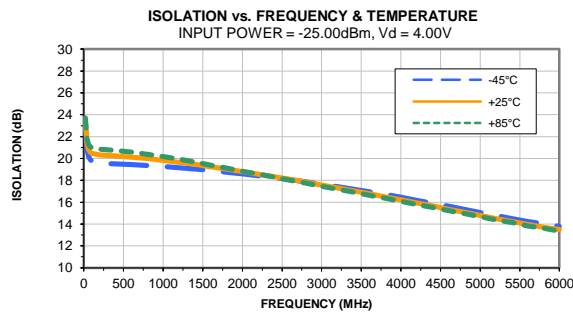
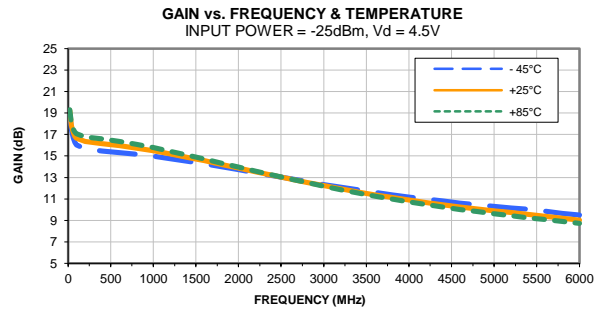
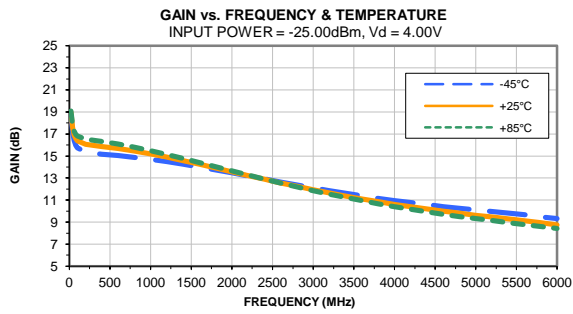
## Typical Performance Curves



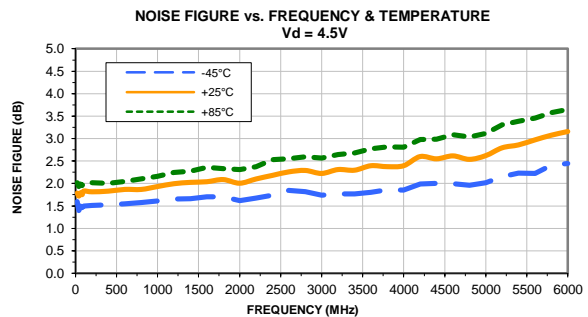
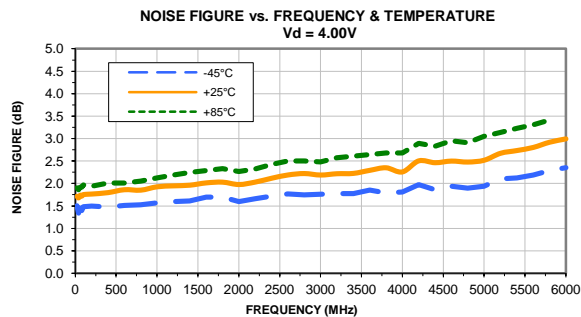
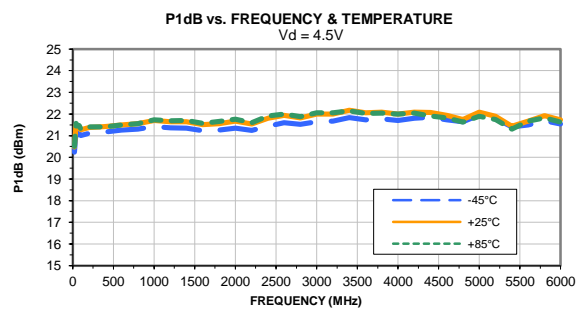
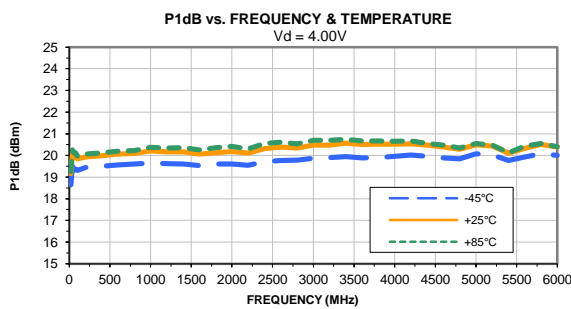
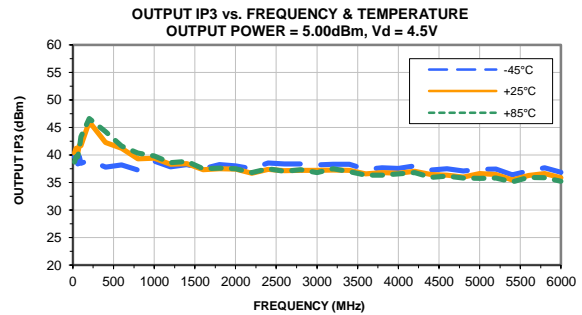
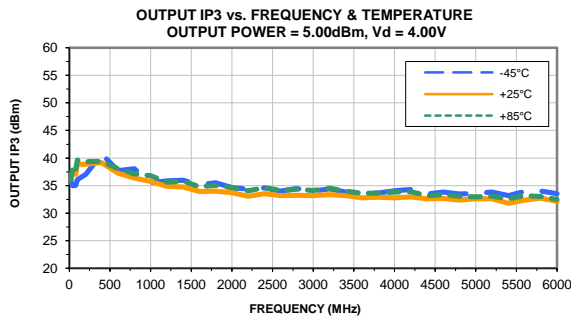
## Typical Performance Curves



## Typical Performance Curves

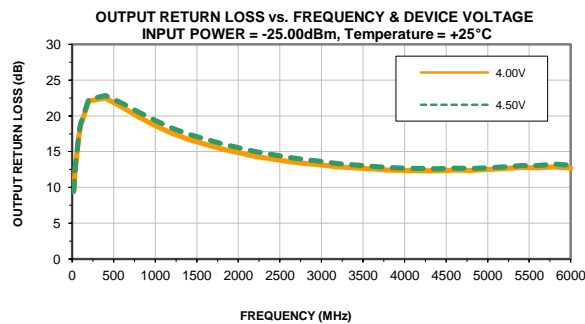
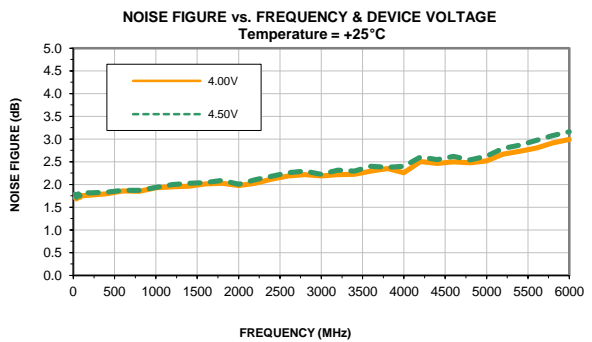
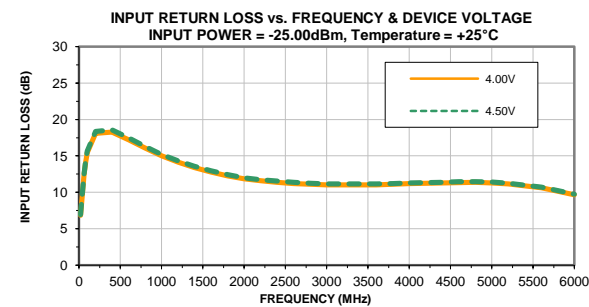
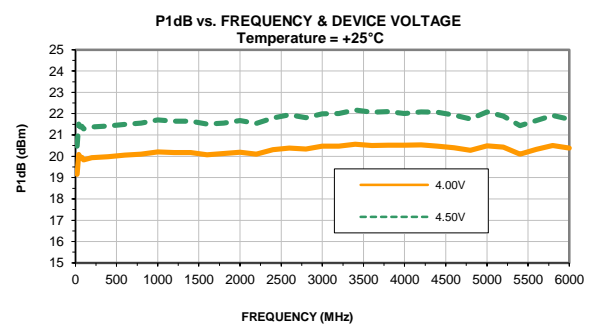
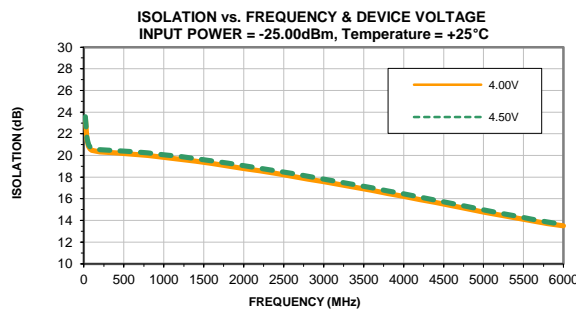
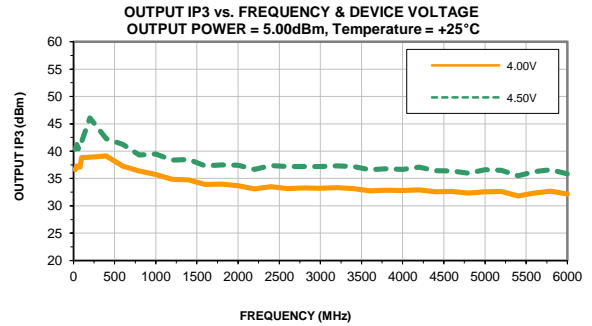
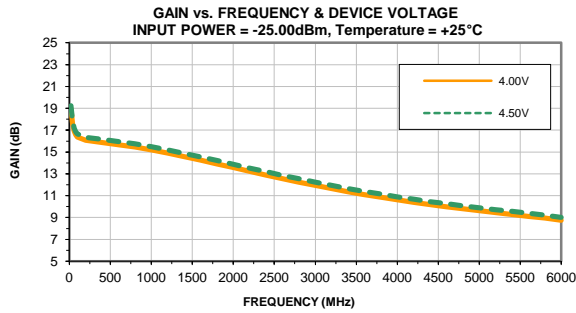


## Typical Performance Curves

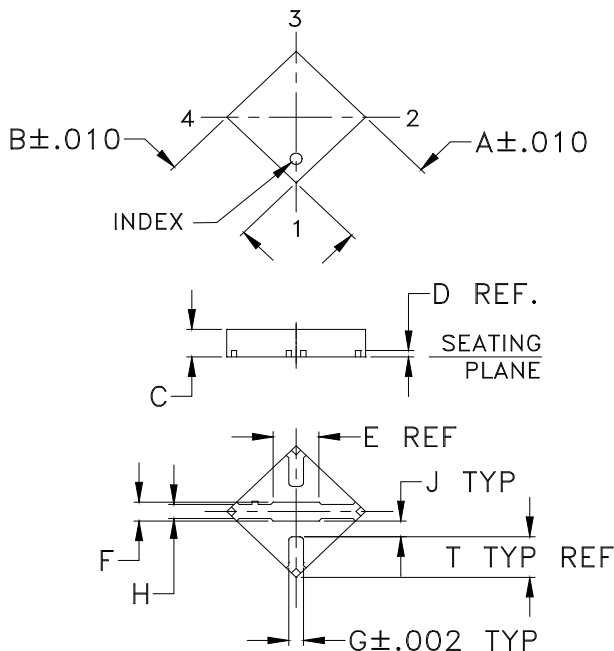




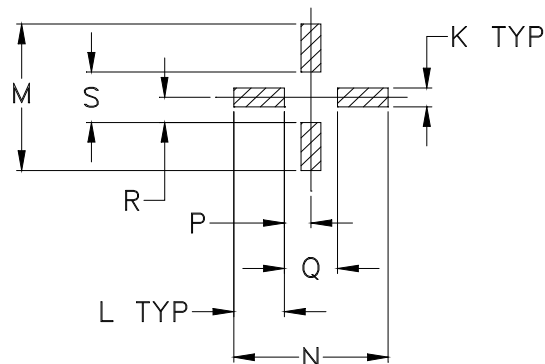
## Typical Performance Curves



### Outline Dimensions



### PCB Land Pattern



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

CASE #	A	B	C	D	E	F	G	H	J	K	L	M	N	P
FG873	.118 (3.00)	.118 (3.00)	.035 (0.89)	.008 (0.20)	.07 (1.78)	.024 (0.60)	.017 (0.43)	.018 (0.46)	.021 (0.52)	.024 (0.61)	.061 (1.55)	.186 (4.72)	.186 (4.72)	.032 (0.81)

CASE #	Q	R	S	T	WT. GRAM
FG873	.064 (1.63)	.032 (0.81)	.064 (1.63)	.050 (1.27)	.02

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm .01$ ; 3Pl.  $\pm .004$

#### Notes:

- Case material: Plastic.
- Termination finish:

For RoHS Case Styles: Tin-Silver alloy plate over Nickel barrier or Matte-Tin per Data Sheet.  
All models, (+) suffix.

For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



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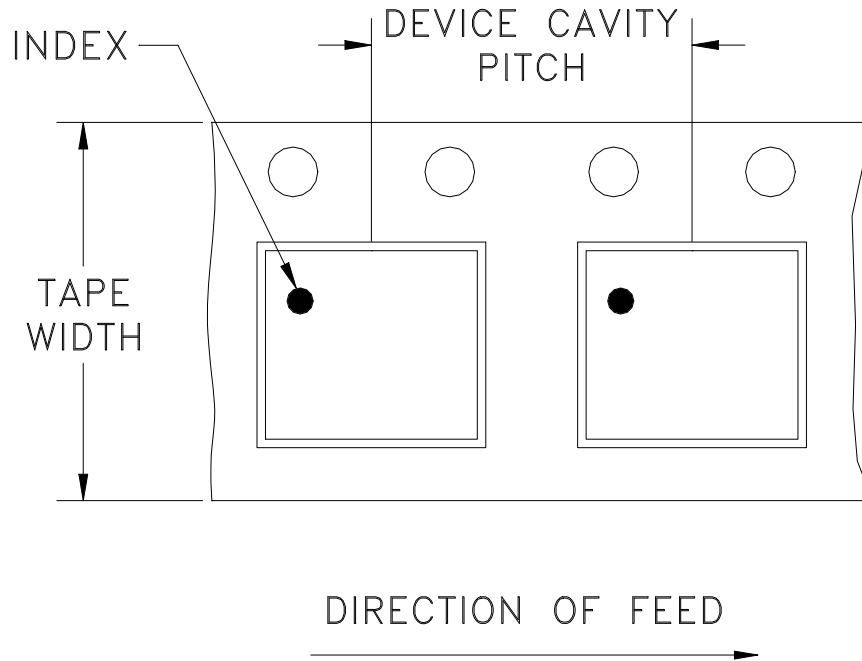


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RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F68

## DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
12	8	7	Small quantity standard	20
				50
				100
				200
				500
		7	Standard	1000
		13	Standard	2000
				3000
				4000

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: [www.minicircuits.com/pages/pdfs/tape.pdf](http://www.minicircuits.com/pages/pdfs/tape.pdf)



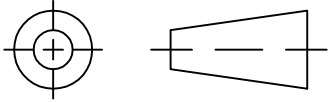
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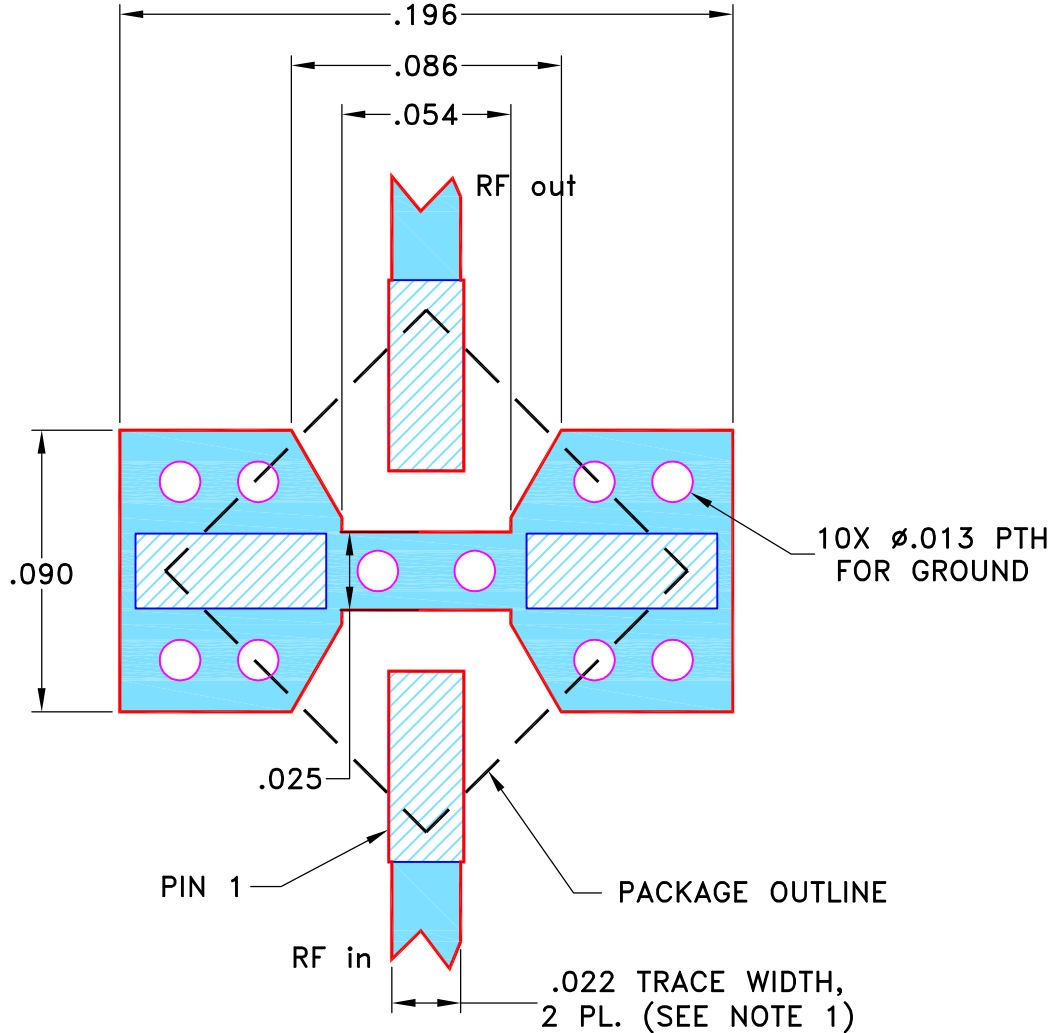
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M148938	NEW RELEASE	11/17/14	ITG	MM

SUGGESTED MOUNTING CONFIGURATION  
FOR FG873 CASE STYLE, "04AM05" PIN CODE



**NOTES:**

- TRACE WIDTH PARAMETERS ARE SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS  $.010 \pm .001$ ". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- 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 TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005 ANGLES ± FRACTIONS ±	DRAWN	ITG	11/07/14
	CHECKED	GF	11/10/14
	APPROVED	MM	11/17/14

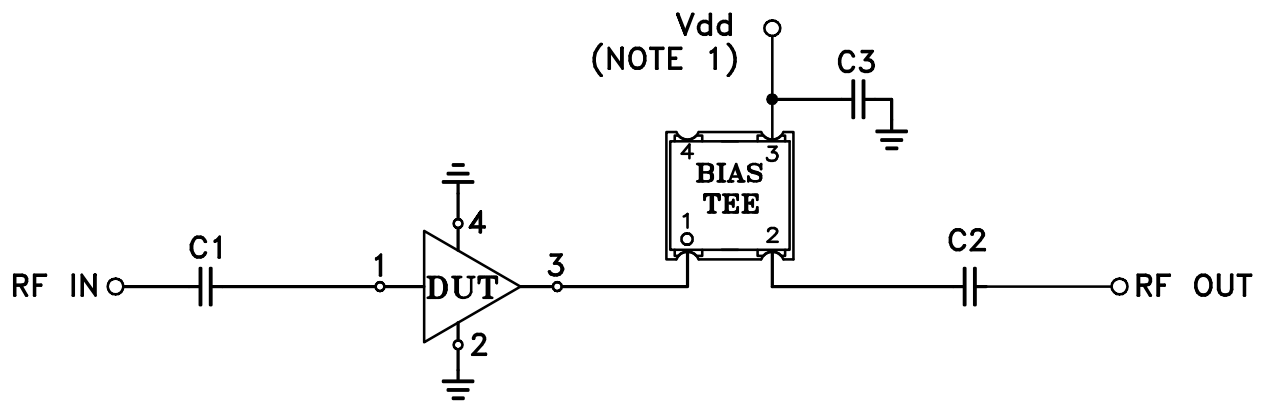
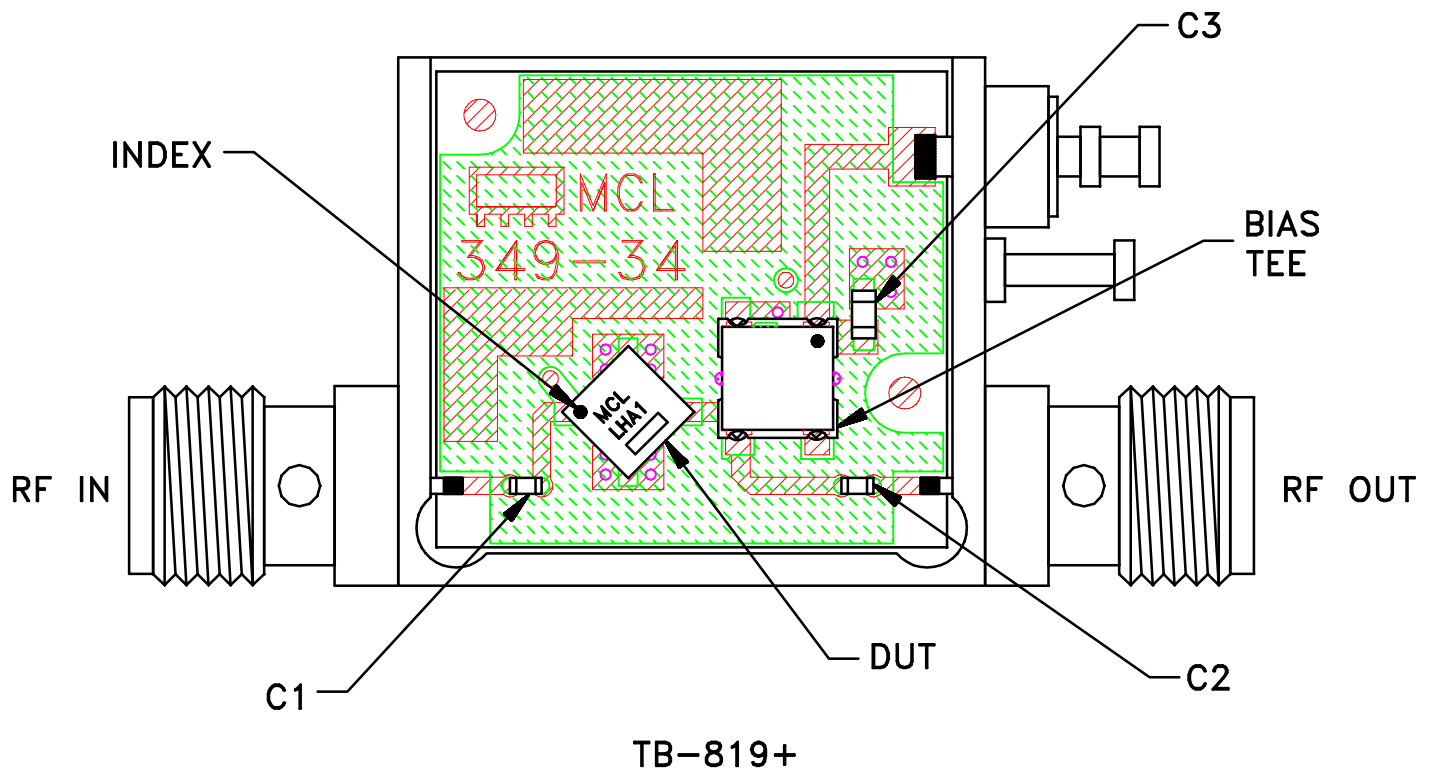
**Mini-Circuits<sup>®</sup>** 13 Neptune Avenue  
Brooklyn NY 11235

PL, 04AM05, FG873, TB-819+

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SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-443	OR
FILE:	98PL443	SCALE: 16:1	SHEET: 1 OF 1

# Evaluation Board and Circuit



COMPONENT	VALUE	SIZE
DUT	LHA-1+	3X3 MM
C1,C2	0.001 uF	0402
C3	1 nF	0603
BIAS TEE	Mini-Circuits TCBT-14+	-

## Schematic Diagram

### NOTES:

1. Vs voltage:  $+5 \pm 0.2V$ .
2. SMA Female connectors.
3. PCB material: Rogers R04350 or equivalent, dielectric constant=3.5, dielectric thickness=.010 inch.

**Mini-Circuits®**

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



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