



Mini-Circuits

MMIC SURFACE MOUNT

Monolithic Amplifier

GALI-4F+

50Ω DC to 4 GHz

FEATURES

- Frequency Range, DC to 4 GHz
- InGaP HBT Microwave Amplifier
- Miniature SOT-89 Package
- Internally Matched to 50Ω
- Output Power, +15.3 dBm Typ.
- Excellent Package for Heat Dissipation, Exposed Metal Bottom
- Low Thermal Resistance for High Reliability
- Aqueous Washable
- Protected By US Patent 6,943,629



Generic photo used for illustration purposes only

CASE STYLE: DF782

+RoHS Compliant

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

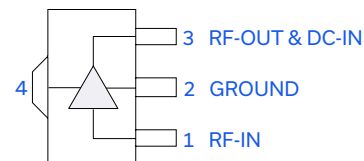
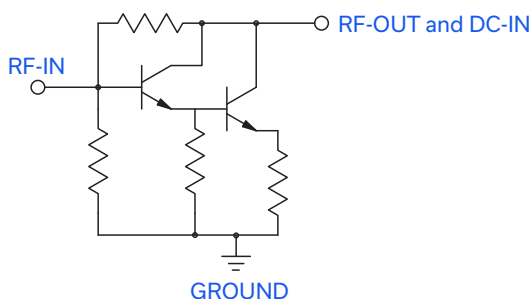
APPLICATIONS

- Cellular
- PCS
- Communication Receivers & Transmitters

PRODUCT OVERVIEW

Gali-4F+ (RoHS compliant) is a wideband amplifier offering high dynamic range. It has repeatable performance from lot to lot, and is enclosed in a SOT-89 package. It uses patented Transient Protected Darlington configuration and is fabricated using InGaP HBT technology. Expected MTTF is 10,000 years at +85°C case temperature. Gali-4F+ is designed to be rugged for ESD and supply switch-on transients.

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.

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50Ω DC to 4 GHz

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

Parameter	Conditions (GHz)	Min.	Typ.	Max.	Units
Frequency Range ¹		DC		4	GHz
Gain	0.1	11	14.3		dB
	1		14.0		
	2		13.4		
	3		13.0		
	4		12.3		
	6		13.2		
Input Return Loss	DC - 3		21		dB
	3 - 4		21		
Output Return Loss	DC - 3		14		dB
	3 - 4		11		
Output Power @ 1 dB Compression	1	+13.8	+15.3		dBm
Output IP3	1		+34		dBm
Noise Figure	1		4.0		dB
Recommended Device Operating Current			50		mA
Device Operating Voltage		+4.0	+4.4	+5.0	V
Device Voltage Variation vs. Temperature at 50 mA			-3.1		mV/°C
Device Voltage Variation vs. Current at +25°C			10.0		mV/mA
Thermal Resistance, Junction-to-Case ²			93		°C/W

1. Guaranteed specification DC-4 GHz. Low frequency cut off determined by external coupling capacitors.

2. Case is defined as ground leads.

ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature ³	-45°C to +85°C
Storage Temperature	-65°C to +150°C
Operating Current	65 mA
Input Power	+20 dBm

3. Based on typical case temperature rise +3°C above ambient.

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





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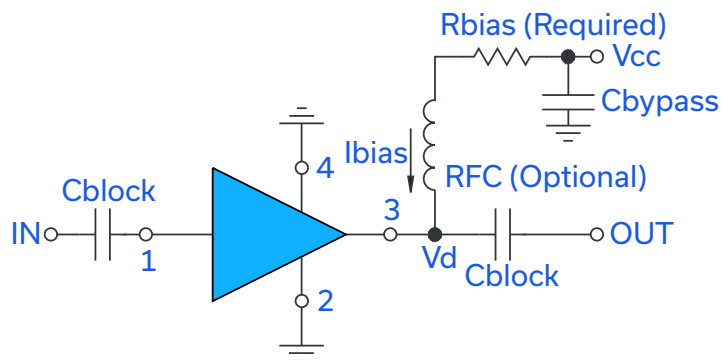
MMIC SURFACE MOUNT

Monolithic Amplifier

GALI-4F+

50Ω DC to 4 GHz

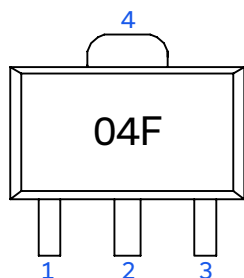
RECOMMENDED APPLICATION CIRCUIT



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

R BIAS	
Vcc	"1%" Res. Values (Ohms) for Optimum Biasing
7	51.1
8	69.8
9	90.9
10	110
11	130
12	150
13	169
14	191
15	210
16	232
17	249
18	274
19	294
20	316

PRODUCT MARKING



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



Monolithic Amplifier

GALI-4F+

50Ω DC to 4 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	DF782 Plastic package, Lead Finish: Matte-tin
Tape & Reel Standard Quantities Available on Reel	F55 7" Reels with 20, 50, 100, 200, 500 or 1K devices
Suggested Layout for PCB Design	PL019
Evaluation Board	TB-409-4F+
Environmental Ratings	ENV08T2

ESD RATING

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

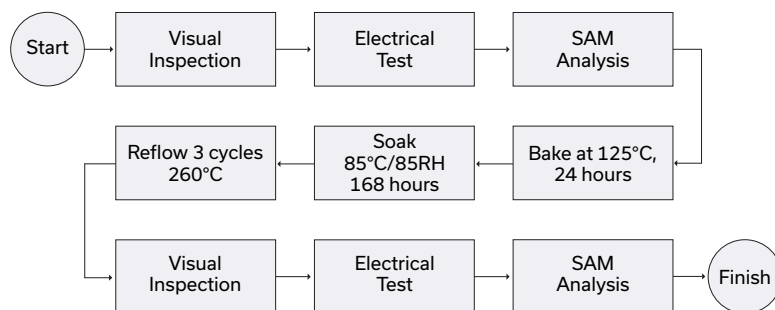
Machine Model (MM): Class M1 (< 100 V) in accordance with ESD STM 5.2 - 1999

MSL RATING

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

No.	Test Required	Condition	Standard	Quantity
1	Visual Inspection	Low Power Microscope Magnification 40x	MIP-IN-0003 (MCT spec)	45 units
2	Electrical Test	Room Temperature	SCD (MCL spec)	45 units
3	SAM Analysis	Less than 10% growth in term of delamination	J-Std-020C (Jedec Standard)	45 units
4	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-020C (Jedec Standard)	45 units

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-Circuits' 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

Typical Performance Data

**NOTE: Use PDF Bookmarks to view DATA at required conditions
or to view GRAPHS.**

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Icc = 50mA, Vd = 4.34V @Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)	(dB)
50	14.48	18.87	30.32	34.22	1.13	0.60	32.67	15.82	3.82
100	14.47	18.94	31.15	34.71	1.13	0.60	32.42	15.96	4.04
200	14.44	18.96	31.18	35.04	1.14	0.59	32.60	15.88	3.86
300	14.39	18.96	30.53	35.43	1.14	0.59	32.32	15.79	4.22
400	14.35	18.97	31.06	35.72	1.14	0.59	31.99	15.98	3.96
500	14.30	18.99	29.73	35.65	1.15	0.58	31.67	15.78	4.07
600	14.24	19.01	30.55	35.61	1.15	0.58	31.45	15.83	3.94
700	14.19	19.03	28.45	35.66	1.16	0.57	31.58	15.86	4.05
800	14.14	19.05	29.41	35.35	1.16	0.57	31.65	15.81	4.00
900	14.09	19.07	27.22	34.51	1.17	0.56	31.62	15.90	4.03
1000	14.03	19.08	28.27	34.32	1.17	0.56	31.34	15.77	3.98
1100	13.99	19.12	26.86	33.62	1.18	0.55	31.03	15.64	4.02
1200	13.93	19.17	26.80	32.92	1.19	0.55	30.74	15.51	4.05
1300	13.87	19.21	26.07	32.16	1.19	0.54	30.36	15.41	4.03
1400	13.81	19.25	25.19	31.15	1.20	0.53	29.97	15.41	4.14
1500	13.74	19.29	24.75	30.22	1.21	0.53	29.86	15.30	4.20
1600	13.68	19.35	23.84	29.27	1.22	0.52	30.14	15.27	4.13
1700	13.63	19.41	24.00	28.25	1.22	0.51	30.29	15.27	4.08
1800	13.57	19.47	22.54	27.33	1.23	0.51	29.80	15.14	4.21
1900	13.50	19.49	22.30	26.24	1.24	0.50	29.35	15.04	4.13
2000	13.44	19.57	21.30	25.21	1.25	0.50	29.14	14.97	3.98
2100	13.36	19.65	20.98	24.40	1.26	0.49	28.85	14.80	4.19
2200	13.31	19.71	20.35	23.46	1.27	0.48	28.54	14.66	4.04
2300	13.22	19.78	19.72	22.64	1.29	0.47	28.17	14.44	4.14
2400	13.15	19.87	19.30	21.90	1.30	0.47	27.81	14.19	4.18
2500	13.08	19.92	18.62	21.16	1.31	0.46	27.31	14.05	4.07
2600	13.00	20.03	18.30	20.70	1.33	0.45	27.06	13.83	4.22
2700	12.96	20.08	17.77	20.00	1.33	0.45	26.61	13.72	4.15
2800	12.86	20.18	17.45	19.61	1.35	0.44	26.55	13.56	4.20
2900	12.82	20.23	17.04	19.07	1.36	0.43	26.33	13.40	4.27
3000	12.75	20.33	16.70	18.70	1.37	0.43	26.09	13.18	4.08
3100	12.67	20.42	16.43	18.32	1.39	0.42	25.79	12.79	4.36
3200	12.60	20.52	16.11	17.92	1.41	0.41	25.53	12.63	4.09
3300	12.53	20.62	15.80	17.67	1.42	0.41	25.27	12.48	4.28
3400	12.49	20.69	15.64	17.39	1.44	0.40	25.07	12.26	4.28
3500	12.40	20.76	15.40	17.30	1.45	0.40	24.75	12.06	4.18
3600	12.38	20.85	15.32	16.98	1.47	0.39	24.47	11.75	4.35
3700	12.28	20.98	15.16	16.89	1.49	0.39	24.22	11.55	4.22
3800	12.25	21.05	15.02	16.71	1.51	0.38	23.95	11.29	4.45
4000	12.13	21.26	14.80	16.50	1.55	0.37	23.54	10.84	4.31

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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: Icc = 40mA, Vd = 4.24V @Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)	(dB)
50	14.32	18.83	27.42	29.76	1.14	0.60	29.22	13.58	3.77
100	14.31	18.81	28.01	29.93	1.14	0.60	28.94	13.79	3.99
200	14.26	18.83	28.15	30.23	1.14	0.59	29.11	13.52	3.84
300	14.22	18.86	27.56	30.38	1.14	0.59	28.94	13.51	4.14
400	14.19	18.86	28.23	30.72	1.15	0.58	28.70	13.75	3.91
500	14.14	18.87	27.20	30.72	1.15	0.58	28.53	13.56	4.01
600	14.08	18.90	28.00	30.74	1.16	0.57	28.38	13.65	3.90
700	14.03	18.92	26.33	30.82	1.16	0.57	28.60	13.78	3.99
800	13.98	18.93	27.12	30.71	1.17	0.57	28.77	13.73	3.96
900	13.93	18.95	25.52	30.23	1.17	0.56	28.82	13.87	3.98
1000	13.88	18.97	26.14	30.11	1.17	0.56	28.60	13.64	3.93
1100	13.82	19.02	25.16	29.68	1.18	0.55	28.36	13.48	3.96
1200	13.77	19.06	24.90	29.27	1.19	0.55	28.12	13.40	4.02
1300	13.71	19.09	24.57	28.90	1.19	0.54	27.85	13.22	3.98
1400	13.66	19.13	23.72	28.19	1.20	0.53	27.52	13.26	4.07
1500	13.59	19.18	23.41	27.56	1.21	0.53	27.47	13.21	4.12
1600	13.53	19.23	22.56	26.86	1.22	0.52	27.72	13.15	4.07
1700	13.48	19.29	22.72	26.08	1.23	0.51	28.04	13.21	4.01
1800	13.41	19.35	21.48	25.39	1.24	0.51	27.69	13.09	4.17
1900	13.35	19.40	21.16	24.51	1.24	0.50	27.36	13.09	4.08
2000	13.28	19.47	20.31	23.63	1.25	0.49	27.26	13.10	3.93
2100	13.20	19.56	19.93	22.97	1.27	0.48	27.03	12.96	4.14
2200	13.15	19.59	19.43	22.18	1.27	0.48	26.81	12.90	3.99
2300	13.07	19.66	18.87	21.47	1.29	0.47	26.59	12.87	4.09
2400	12.99	19.74	18.51	20.86	1.30	0.47	26.32	12.74	4.11
2500	12.93	19.81	17.83	20.19	1.31	0.46	25.87	12.61	4.03
2600	12.83	19.92	17.53	19.78	1.33	0.45	25.66	12.43	4.17
2700	12.80	19.96	17.00	19.15	1.33	0.45	25.25	12.33	4.09
2800	12.70	20.07	16.76	18.82	1.35	0.44	25.24	12.29	4.12
2900	12.67	20.13	16.39	18.34	1.36	0.43	25.05	12.10	4.22
3000	12.58	20.21	16.09	18.01	1.37	0.43	24.86	12.00	4.00
3100	12.52	20.31	15.78	17.66	1.39	0.42	24.59	11.77	4.32
3200	12.45	20.43	15.51	17.31	1.41	0.41	24.36	11.59	4.00
3300	12.37	20.51	15.23	17.08	1.42	0.41	24.11	11.50	4.23
3400	12.34	20.57	15.08	16.81	1.43	0.40	23.92	11.35	4.23
3500	12.24	20.65	14.85	16.74	1.45	0.40	23.60	11.03	4.12
3600	12.22	20.75	14.75	16.44	1.47	0.39	23.32	10.85	4.29
3700	12.13	20.86	14.59	16.36	1.49	0.39	23.05	10.58	4.15
3800	12.10	20.94	14.50	16.23	1.50	0.38	22.80	10.35	4.40
4000	11.97	21.14	14.30	16.02	1.55	0.37	22.41	9.95	4.26

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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: Icc = 60mA, Vd = 4.44V @Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)	(dB)
50	14.59	18.97	32.55	39.55	1.13	0.60	35.22	17.32	3.89
100	14.58	19.01	33.87	39.71	1.13	0.60	34.99	17.39	4.09
200	14.54	19.03	33.80	40.98	1.14	0.60	35.10	17.31	3.93
300	14.49	19.05	32.75	40.95	1.14	0.59	34.69	17.26	4.26
400	14.44	19.04	33.28	41.35	1.14	0.59	34.24	17.39	3.99
500	14.39	19.07	31.72	40.69	1.15	0.58	33.78	17.19	4.13
600	14.35	19.06	32.69	40.74	1.15	0.58	33.45	17.17	3.99
700	14.30	19.11	30.06	40.24	1.16	0.57	33.44	17.19	4.14
800	14.24	19.13	31.22	39.46	1.16	0.57	33.40	17.09	4.06
900	14.20	19.15	28.58	38.53	1.17	0.57	33.26	17.17	4.09
1000	14.13	19.16	29.76	38.21	1.17	0.56	32.93	17.06	4.05
1100	14.09	19.20	28.00	37.19	1.18	0.56	32.55	16.93	4.07
1200	14.02	19.25	28.03	36.05	1.19	0.55	32.25	16.78	4.10
1300	13.96	19.28	27.15	34.89	1.19	0.54	31.80	16.62	4.09
1400	13.90	19.31	26.31	33.37	1.20	0.54	31.37	16.61	4.18
1500	13.84	19.37	25.76	32.40	1.21	0.53	31.20	16.49	4.23
1600	13.79	19.43	24.74	31.13	1.21	0.52	31.47	16.41	4.18
1700	13.73	19.49	24.91	29.77	1.22	0.52	31.48	16.37	4.13
1800	13.66	19.53	23.36	28.80	1.23	0.51	30.93	16.20	4.28
1900	13.61	19.58	23.07	27.56	1.24	0.50	30.46	16.12	4.17
2000	13.53	19.64	22.00	26.36	1.25	0.50	30.21	15.99	4.06
2100	13.46	19.73	21.65	25.44	1.26	0.49	29.88	15.79	4.27
2200	13.40	19.78	21.01	24.35	1.27	0.48	29.52	15.66	4.13
2300	13.32	19.85	20.36	23.41	1.28	0.47	29.09	15.42	4.18
2400	13.25	19.92	19.94	22.65	1.30	0.47	28.76	15.18	4.24
2500	13.18	20.00	19.19	21.85	1.31	0.46	28.26	14.95	4.15
2600	13.10	20.08	18.86	21.34	1.32	0.45	27.97	14.76	4.30
2700	13.06	20.13	18.26	20.56	1.33	0.45	27.50	14.59	4.21
2800	12.95	20.24	17.95	20.14	1.35	0.44	27.44	14.45	4.27
2900	12.92	20.31	17.54	19.56	1.36	0.43	27.17	14.25	4.30
3000	12.84	20.39	17.19	19.18	1.37	0.43	26.96	14.04	4.14
3100	12.77	20.48	16.87	18.76	1.39	0.42	26.62	13.57	4.43
3200	12.71	20.59	16.55	18.33	1.41	0.41	26.36	13.44	4.19
3300	12.64	20.68	16.24	18.04	1.42	0.41	26.12	13.36	4.39
3400	12.60	20.74	16.07	17.77	1.43	0.40	25.90	13.16	4.42
3500	12.51	20.83	15.81	17.68	1.45	0.40	25.60	12.91	4.35
3600	12.48	20.92	15.71	17.33	1.47	0.39	25.32	12.63	4.44
3700	12.39	21.06	15.55	17.21	1.49	0.38	25.07	12.34	4.30
3800	12.36	21.12	15.42	17.03	1.50	0.38	24.82	12.10	4.56
4000	12.25	21.31	15.19	16.81	1.54	0.37	24.40	11.60	4.42

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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: Icc = 50mA, Vd = 4.56V @Temperature = -45degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)	(dB)
50	14.62	18.98	29.97	34.96	1.13	0.61	33.39	15.98	3.19
100	14.61	19.02	29.02	32.35	1.13	0.60	33.10	16.05	3.37
200	14.58	18.99	28.48	31.55	1.13	0.60	33.24	15.89	3.29
300	14.54	19.01	31.28	37.67	1.14	0.60	33.08	15.90	3.52
400	14.50	18.99	33.29	43.35	1.14	0.60	32.85	16.14	3.31
500	14.45	19.01	30.87	38.99	1.14	0.59	32.56	15.91	3.38
600	14.42	19.04	31.91	39.84	1.14	0.59	32.33	15.97	3.29
700	14.37	19.04	29.72	40.45	1.15	0.58	32.50	16.06	3.38
800	14.31	19.08	30.60	37.41	1.15	0.58	32.58	16.05	3.34
900	14.27	19.08	27.38	35.60	1.16	0.57	32.59	16.15	3.35
1000	14.21	19.09	28.03	35.23	1.16	0.57	32.34	15.96	3.32
1100	14.18	19.13	27.14	35.00	1.17	0.57	32.07	15.80	3.32
1200	14.12	19.17	27.46	34.92	1.17	0.56	31.83	15.73	3.35
1300	14.07	19.20	26.83	35.13	1.18	0.55	31.49	15.61	3.34
1400	14.00	19.24	26.25	34.24	1.18	0.55	31.12	15.63	3.42
1500	13.95	19.27	25.84	33.42	1.19	0.54	31.02	15.57	3.48
1600	13.90	19.33	24.77	32.48	1.20	0.54	31.29	15.54	3.42
1700	13.84	19.38	25.02	30.85	1.21	0.53	31.50	15.58	3.38
1800	13.79	19.43	23.44	29.40	1.21	0.52	31.05	15.46	3.50
1900	13.73	19.46	23.19	28.29	1.22	0.52	30.66	15.39	3.38
2000	13.67	19.53	22.11	27.48	1.23	0.51	30.50	15.37	3.27
2100	13.60	19.59	21.78	26.60	1.24	0.50	30.23	15.21	3.44
2200	13.55	19.65	21.08	25.18	1.25	0.50	29.97	15.18	3.30
2300	13.47	19.71	20.42	24.15	1.26	0.49	29.61	15.03	3.39
2400	13.40	19.77	20.02	23.45	1.27	0.48	29.25	14.87	3.40
2500	13.34	19.86	19.19	22.38	1.28	0.48	28.83	14.77	3.34
2600	13.26	19.94	18.72	21.76	1.29	0.47	28.53	14.55	3.46
2700	13.22	20.00	18.04	20.74	1.30	0.46	28.41	14.39	3.40
2800	13.13	20.06	17.74	20.23	1.31	0.46	28.19	14.26	3.44
2900	13.10	20.14	17.30	19.41	1.32	0.45	27.72	14.16	3.50
3000	13.03	20.23	16.91	19.00	1.33	0.45	27.57	14.02	3.32
3100	12.96	20.31	16.73	18.76	1.35	0.44	27.32	13.60	3.58
3200	12.89	20.41	16.63	18.43	1.37	0.43	27.05	13.42	3.31
3300	12.83	20.48	16.37	18.19	1.38	0.43	26.78	13.33	3.54
3400	12.80	20.53	16.31	18.01	1.39	0.42	26.61	13.22	3.50
3500	12.74	20.60	15.99	17.89	1.40	0.42	26.26	12.93	3.42
3600	12.71	20.71	15.97	17.40	1.41	0.41	26.03	12.64	3.53
3700	12.60	20.73	16.03	17.57	1.43	0.41	25.80	12.46	3.45
3800	12.59	20.85	15.78	17.15	1.44	0.40	25.47	12.22	3.66
4000	12.47	21.06	15.76	17.08	1.49	0.39	25.05	11.72	3.52

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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: Icc = 40mA, Vd = 4.45V @Temperature = -45degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)	(dB)
50	14.48	18.92	27.83	30.66	1.13	0.60	29.77	13.59	3.15
100	14.47	18.89	27.03	29.12	1.13	0.60	29.49	13.73	3.33
200	14.44	18.89	26.57	28.54	1.13	0.60	29.60	13.49	3.25
300	14.40	18.90	28.66	32.39	1.14	0.60	29.54	13.50	3.51
400	14.37	18.91	30.27	35.02	1.14	0.59	29.41	13.76	3.28
500	14.33	18.93	28.47	33.40	1.14	0.59	29.26	13.55	3.34
600	14.28	18.93	29.43	33.84	1.15	0.59	29.10	13.64	3.26
700	14.23	18.95	27.83	34.61	1.15	0.58	29.32	13.77	3.32
800	14.19	18.97	28.43	33.00	1.15	0.58	29.52	13.77	3.29
900	14.14	18.99	25.87	31.53	1.16	0.57	29.58	13.92	3.29
1000	14.08	19.00	26.41	31.25	1.16	0.57	29.40	13.63	3.27
1100	14.05	19.03	25.68	31.08	1.17	0.56	29.15	13.51	3.27
1200	13.99	19.07	25.82	31.18	1.17	0.56	28.97	13.39	3.32
1300	13.94	19.12	25.44	31.17	1.18	0.55	28.73	13.28	3.28
1400	13.88	19.13	24.85	30.81	1.19	0.55	28.44	13.38	3.38
1500	13.83	19.18	24.62	30.36	1.19	0.54	28.39	13.26	3.42
1600	13.78	19.24	23.57	29.57	1.20	0.53	28.63	13.29	3.35
1700	13.73	19.28	23.86	28.49	1.21	0.53	28.96	13.37	3.30
1800	13.67	19.34	22.46	27.35	1.21	0.52	28.68	13.25	3.44
1900	13.60	19.37	22.22	26.45	1.22	0.52	28.44	13.27	3.35
2000	13.54	19.45	21.24	25.78	1.23	0.51	28.37	13.23	3.23
2100	13.47	19.50	20.89	25.09	1.24	0.50	28.19	13.18	3.38
2200	13.43	19.55	20.22	23.84	1.25	0.50	28.03	13.22	3.26
2300	13.35	19.62	19.62	22.99	1.26	0.49	27.84	13.18	3.33
2400	13.27	19.69	19.28	22.36	1.27	0.48	27.60	13.15	3.35
2500	13.21	19.77	18.51	21.45	1.28	0.47	27.26	13.05	3.30
2600	13.13	19.85	18.06	20.87	1.29	0.47	27.03	12.95	3.39
2700	13.10	19.90	17.41	19.96	1.30	0.46	26.97	12.84	3.35
2800	13.01	19.97	17.10	19.49	1.31	0.46	26.66	12.77	3.39
2900	12.97	20.06	16.69	18.75	1.32	0.45	26.41	12.73	3.45
3000	12.90	20.15	16.35	18.38	1.34	0.45	26.29	12.75	3.25
3100	12.84	20.23	16.16	18.14	1.35	0.44	26.04	12.40	3.54
3200	12.77	20.33	16.05	17.86	1.37	0.43	25.86	12.36	3.26
3300	12.71	20.40	15.84	17.65	1.38	0.43	25.60	12.34	3.48
3400	12.68	20.45	15.79	17.51	1.39	0.42	25.43	12.21	3.45
3500	12.61	20.51	15.50	17.37	1.40	0.42	25.10	12.00	3.36
3600	12.60	20.61	15.46	16.92	1.41	0.41	24.87	11.74	3.46
3700	12.48	20.65	15.51	17.07	1.43	0.41	24.61	11.54	3.40
3800	12.47	20.78	15.27	16.68	1.45	0.40	24.30	11.23	3.58
4000	12.34	20.96	15.25	16.65	1.48	0.39	23.93	10.89	3.44

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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: Icc = 60mA, Vd = 4.63V @Temperature = -45degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)	(dB)
50	14.71	19.04	32.06	39.02	1.13	0.61	35.98	17.42	3.24
100	14.70	19.06	30.64	35.52	1.13	0.61	35.75	17.49	3.43
200	14.66	19.04	30.13	34.24	1.13	0.60	35.89	17.44	3.33
300	14.62	19.07	33.40	45.06	1.13	0.60	35.58	17.40	3.60
400	14.58	19.07	35.59	52.10	1.14	0.60	35.24	17.58	3.36
500	14.54	19.07	32.73	43.76	1.14	0.59	34.78	17.38	3.43
600	14.50	19.09	33.80	45.27	1.14	0.59	34.47	17.41	3.33
700	14.45	19.09	31.20	43.02	1.15	0.59	34.49	17.44	3.42
800	14.40	19.13	32.17	40.25	1.15	0.58	34.51	17.36	3.39
900	14.35	19.14	28.41	39.10	1.15	0.58	34.38	17.45	3.43
1000	14.30	19.15	29.26	39.31	1.16	0.57	34.10	17.38	3.35
1100	14.27	19.18	28.15	38.66	1.16	0.57	33.78	17.25	3.37
1200	14.20	19.23	28.63	38.69	1.17	0.56	33.50	17.13	3.39
1300	14.14	19.26	27.70	38.51	1.18	0.55	33.09	17.01	3.37
1400	14.09	19.29	27.17	36.96	1.18	0.55	32.71	17.01	3.45
1500	14.04	19.32	26.67	35.83	1.19	0.54	32.56	16.92	3.52
1600	13.98	19.39	25.53	34.70	1.20	0.54	32.82	16.85	3.48
1700	13.93	19.43	25.80	32.68	1.20	0.53	32.85	16.87	3.40
1800	13.86	19.48	24.11	30.82	1.21	0.52	32.35	16.73	3.55
1900	13.81	19.52	23.90	29.72	1.22	0.52	31.91	16.68	3.43
2000	13.75	19.59	22.76	28.76	1.23	0.51	31.72	16.60	3.33
2100	13.68	19.66	22.42	27.79	1.24	0.50	31.40	16.47	3.50
2200	13.63	19.70	21.65	26.11	1.25	0.50	31.07	16.28	3.37
2300	13.55	19.77	20.96	25.01	1.26	0.49	30.68	16.11	3.42
2400	13.48	19.84	20.56	24.17	1.27	0.48	30.24	15.88	3.46
2500	13.43	19.90	19.69	23.07	1.28	0.48	29.79	15.66	3.39
2600	13.35	20.00	19.24	22.41	1.29	0.47	29.48	15.45	3.51
2700	13.30	20.05	18.50	21.33	1.30	0.46	29.31	15.27	3.46
2800	13.21	20.11	18.19	20.73	1.31	0.46	29.14	15.14	3.50
2900	13.18	20.19	17.70	19.84	1.32	0.45	28.61	14.97	3.55
3000	13.12	20.27	17.31	19.41	1.33	0.45	28.44	14.80	3.38
3100	13.04	20.36	17.15	19.20	1.35	0.44	28.14	14.40	3.64
3200	12.97	20.47	17.02	18.81	1.37	0.43	27.90	14.17	3.38
3300	12.92	20.52	16.76	18.55	1.38	0.43	27.60	14.08	3.58
3400	12.89	20.59	16.69	18.36	1.39	0.42	27.46	13.92	3.55
3500	12.83	20.67	16.39	18.24	1.40	0.42	27.13	13.67	3.47
3600	12.80	20.76	16.36	17.71	1.41	0.41	26.87	13.44	3.60
3700	12.68	20.78	16.41	17.90	1.43	0.41	26.64	13.10	3.52
3800	12.67	20.90	16.13	17.43	1.44	0.40	26.33	12.90	3.72
4000	12.55	21.11	16.12	17.37	1.48	0.39	25.91	12.38	3.60

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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: Icc = 50mA, Vd = 4.16V @Temperature = +85degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)	(dB)
50	14.38	18.82	30.13	33.23	1.13	0.60	32.12	15.71	4.37
100	14.37	18.83	32.81	36.07	1.13	0.60	31.91	15.80	4.58
200	14.33	18.88	35.31	41.41	1.14	0.59	32.15	15.74	4.43
300	14.27	18.90	31.79	37.06	1.14	0.59	31.79	15.68	4.76
400	14.22	18.91	30.60	34.07	1.15	0.58	31.40	15.84	4.51
500	14.17	18.92	29.25	33.65	1.15	0.58	31.05	15.61	4.65
600	14.12	18.94	29.82	33.40	1.16	0.57	30.78	15.63	4.49
700	14.07	18.96	27.32	32.27	1.16	0.57	30.88	15.67	4.62
800	14.00	18.99	27.69	31.11	1.17	0.56	30.93	15.58	4.56
900	13.95	19.03	25.83	30.32	1.17	0.56	30.83	15.68	4.63
1000	13.89	19.03	26.58	30.28	1.18	0.55	30.55	15.52	4.55
1100	13.85	19.08	25.39	29.55	1.18	0.55	30.20	15.36	4.59
1200	13.78	19.13	25.06	29.02	1.19	0.54	29.89	15.26	4.64
1300	13.72	19.17	24.58	28.58	1.20	0.53	29.49	15.14	4.62
1400	13.65	19.21	23.76	28.07	1.21	0.53	29.09	15.11	4.72
1500	13.59	19.26	23.38	27.48	1.22	0.52	28.97	15.01	4.77
1600	13.53	19.32	22.61	26.96	1.22	0.52	29.26	14.93	4.72
1700	13.47	19.38	22.87	26.40	1.23	0.51	29.34	14.90	4.68
1800	13.41	19.43	21.68	25.82	1.24	0.50	28.78	14.72	4.81
1900	13.35	19.48	21.50	24.99	1.25	0.50	28.32	14.66	4.75
2000	13.28	19.57	20.66	24.11	1.26	0.49	28.08	14.48	4.59
2100	13.19	19.63	20.42	23.56	1.28	0.48	27.71	14.32	4.82
2200	13.14	19.70	19.91	22.69	1.29	0.47	27.38	14.17	4.63
2300	13.04	19.77	19.38	21.99	1.30	0.46	26.99	13.91	4.75
2400	12.97	19.84	18.99	21.34	1.31	0.46	26.60	13.65	4.81
2500	12.91	19.91	18.32	20.64	1.32	0.45	26.11	13.51	4.69
2600	12.82	20.02	18.02	20.22	1.34	0.44	25.83	13.28	4.87
2700	12.77	20.08	17.45	19.48	1.35	0.44	25.67	13.05	4.76
2800	12.66	20.18	17.18	19.17	1.37	0.43	25.20	12.89	4.83
2900	12.62	20.26	16.69	18.56	1.38	0.42	25.09	12.70	4.92
3000	12.56	20.36	16.29	18.12	1.39	0.42	24.87	12.54	4.70
3100	12.47	20.44	15.97	17.81	1.41	0.41	24.59	12.16	5.00
3200	12.38	20.57	15.65	17.44	1.43	0.40	24.32	11.89	4.72
3300	12.30	20.66	15.22	17.07	1.45	0.40	24.05	11.81	4.94
3400	12.26	20.73	14.96	16.77	1.46	0.39	23.85	11.55	4.95
3500	12.18	20.81	14.57	16.58	1.48	0.39	23.52	11.24	4.81
3600	12.14	20.91	14.40	16.23	1.49	0.38	23.24	11.04	5.05
3700	12.00	21.01	14.29	16.27	1.52	0.38	23.01	10.80	4.84
3800	11.98	21.11	14.05	15.96	1.54	0.37	22.73	10.59	5.16
4000	11.84	21.35	13.88	15.77	1.59	0.36	22.29	10.15	4.97

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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: Icc = 40mA, Vd = 4.05V @Temperature = +85degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)	(dB)
50	14.20	18.82	27.00	28.73	1.14	0.59	28.81	13.72	4.34
100	14.19	18.70	28.81	30.44	1.14	0.60	28.57	13.92	4.53
200	14.13	18.74	30.63	32.88	1.14	0.59	28.79	13.76	4.39
300	14.09	18.75	28.47	31.18	1.15	0.59	28.54	13.68	4.68
400	14.03	18.79	27.58	29.39	1.15	0.58	28.28	13.89	4.47
500	13.99	18.80	26.55	29.04	1.16	0.58	28.06	13.69	4.58
600	13.94	18.82	27.08	29.08	1.16	0.57	27.89	13.76	4.43
700	13.88	18.83	25.25	28.49	1.16	0.57	28.08	13.84	4.58
800	13.83	18.87	25.42	27.56	1.17	0.56	28.21	13.75	4.53
900	13.77	18.91	23.95	27.11	1.18	0.56	28.25	13.94	4.59
1000	13.72	18.91	24.62	27.16	1.18	0.55	28.01	13.63	4.53
1100	13.66	18.96	23.74	26.72	1.19	0.55	27.73	13.48	4.56
1200	13.60	18.99	23.44	26.31	1.19	0.54	27.49	13.44	4.59
1300	13.53	19.04	23.02	25.92	1.20	0.53	27.22	13.29	4.59
1400	13.48	19.08	22.27	25.52	1.21	0.53	26.83	13.33	4.68
1500	13.42	19.13	21.99	25.19	1.22	0.52	26.80	13.20	4.73
1600	13.34	19.19	21.31	24.79	1.23	0.51	27.08	13.16	4.68
1700	13.30	19.26	21.53	24.33	1.24	0.51	27.34	13.22	4.63
1800	13.23	19.31	20.50	23.94	1.25	0.50	26.92	13.05	4.75
1900	13.17	19.36	20.37	23.36	1.25	0.49	26.55	12.98	4.69
2000	13.10	19.42	19.63	22.66	1.26	0.49	26.40	12.94	4.55
2100	13.02	19.50	19.44	22.17	1.28	0.48	26.12	12.78	4.78
2200	12.95	19.57	18.91	21.40	1.29	0.47	25.87	12.72	4.60
2300	12.87	19.65	18.41	20.79	1.30	0.46	25.58	12.58	4.72
2400	12.80	19.72	18.07	20.24	1.31	0.46	25.27	12.38	4.81
2500	12.73	19.80	17.50	19.67	1.32	0.45	24.83	12.27	4.64
2600	12.64	19.90	17.24	19.31	1.34	0.44	24.58	12.03	4.81
2700	12.60	19.97	16.72	18.62	1.35	0.44	24.42	11.92	4.72
2800	12.48	20.04	16.43	18.35	1.37	0.43	24.01	11.84	4.74
2900	12.46	20.14	15.98	17.78	1.38	0.42	23.93	11.71	4.86
3000	12.38	20.22	15.61	17.43	1.39	0.42	23.76	11.53	4.64
3100	12.28	20.33	15.32	17.12	1.41	0.41	23.47	11.10	4.95
3200	12.20	20.46	15.01	16.78	1.44	0.40	23.24	10.99	4.67
3300	12.13	20.52	14.60	16.43	1.45	0.40	22.97	10.93	4.88
3400	12.09	20.60	14.37	16.19	1.46	0.40	22.77	10.65	4.88
3500	11.99	20.69	14.03	16.04	1.48	0.39	22.44	10.40	4.78
3600	11.95	20.79	13.88	15.71	1.49	0.39	22.17	10.17	4.97
3700	11.81	20.89	13.78	15.72	1.53	0.38	21.94	9.95	4.78
3800	11.80	20.98	13.54	15.45	1.54	0.37	21.65	9.66	5.09
4000	11.64	21.21	13.41	15.32	1.59	0.36	21.25	9.30	4.92

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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: Icc = 60mA, Vd = 4.26V @Temperature = +85degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)	(dB)
50	14.49	18.97	32.95	37.78	1.14	0.60	34.56	17.00	4.41
100	14.49	18.95	36.74	43.89	1.13	0.60	34.39	17.07	4.64
200	14.44	18.95	40.17	56.16	1.14	0.59	34.57	17.03	4.48
300	14.38	18.99	34.82	44.33	1.14	0.59	34.07	16.96	4.79
400	14.33	18.99	33.12	38.76	1.15	0.58	33.60	17.07	4.56
500	14.28	19.00	31.36	37.72	1.15	0.58	33.05	16.84	4.70
600	14.23	19.03	32.04	37.47	1.16	0.58	32.67	16.79	4.53
700	14.17	19.06	28.95	35.69	1.16	0.57	32.66	16.81	4.70
800	14.12	19.07	29.36	33.94	1.17	0.57	32.57	16.66	4.61
900	14.05	19.10	27.17	33.07	1.17	0.56	32.38	16.75	4.68
1000	14.00	19.12	28.09	33.01	1.18	0.56	32.01	16.61	4.61
1100	13.96	19.16	26.61	32.19	1.18	0.55	31.64	16.45	4.65
1200	13.89	19.21	26.34	31.28	1.19	0.54	31.30	16.33	4.69
1300	13.83	19.25	25.68	30.69	1.20	0.54	30.83	16.10	4.69
1400	13.76	19.29	24.83	29.94	1.21	0.53	30.39	16.12	4.77
1500	13.70	19.33	24.37	29.32	1.21	0.52	30.23	15.96	4.85
1600	13.64	19.40	23.53	28.66	1.22	0.52	30.48	15.85	4.78
1700	13.59	19.46	23.82	27.88	1.23	0.51	30.42	15.75	4.72
1800	13.51	19.53	22.51	27.22	1.24	0.50	29.79	15.58	4.88
1900	13.45	19.56	22.34	26.30	1.25	0.50	29.28	15.48	4.80
2000	13.39	19.64	21.41	25.25	1.26	0.49	29.03	15.34	4.64
2100	13.30	19.70	21.20	24.58	1.27	0.48	28.65	15.11	4.87
2200	13.24	19.77	20.63	23.58	1.28	0.47	28.27	14.92	4.71
2300	13.15	19.85	20.04	22.79	1.30	0.47	27.83	14.71	4.81
2400	13.09	19.92	19.63	22.09	1.31	0.46	27.43	14.40	4.90
2500	13.02	20.00	18.94	21.35	1.32	0.45	26.94	14.24	4.73
2600	12.93	20.09	18.63	20.90	1.34	0.44	26.65	13.98	4.93
2700	12.88	20.16	18.01	20.05	1.35	0.44	26.46	13.84	4.82
2800	12.77	20.23	17.72	19.73	1.37	0.43	26.03	13.69	4.88
2900	12.74	20.35	17.21	19.06	1.38	0.42	25.88	13.51	4.96
3000	12.66	20.42	16.78	18.61	1.39	0.42	25.66	13.25	4.77
3100	12.57	20.50	16.44	18.27	1.41	0.41	25.36	12.76	5.05
3200	12.49	20.66	16.09	17.85	1.43	0.40	25.09	12.63	4.82
3300	12.43	20.73	15.64	17.46	1.45	0.40	24.82	12.51	4.99
3400	12.38	20.81	15.38	17.16	1.46	0.39	24.65	12.32	5.02
3500	12.29	20.88	14.97	16.96	1.48	0.39	24.30	11.99	4.88
3600	12.26	20.99	14.80	16.59	1.49	0.38	24.02	11.71	5.13
3700	12.12	21.10	14.69	16.60	1.52	0.38	23.79	11.51	4.93
3800	12.11	21.19	14.43	16.27	1.53	0.37	23.50	11.28	5.23
4000	11.96	21.42	14.24	16.09	1.59	0.36	23.07	10.80	5.07

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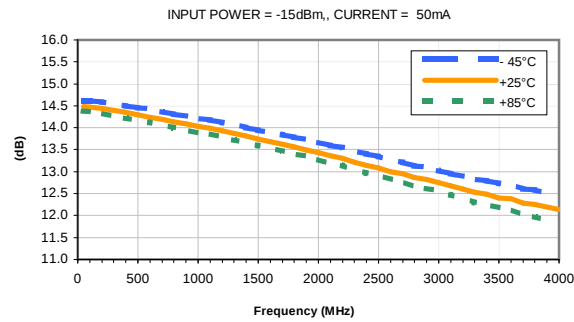


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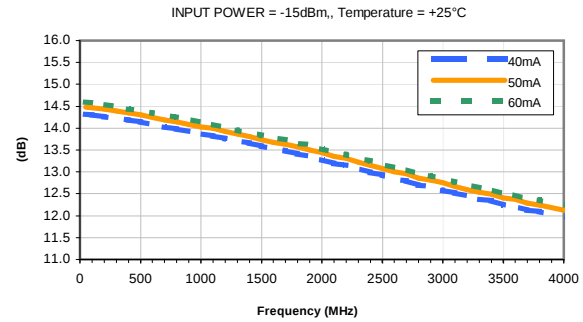


Typical Performance Curves

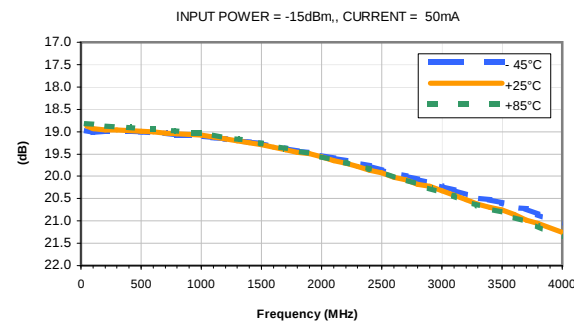
GAIN vs. TEMPERATURE



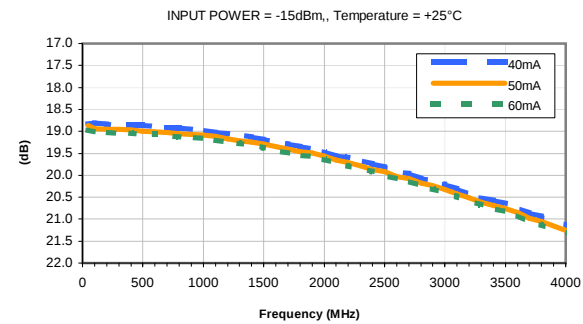
GAIN vs. CURRENT



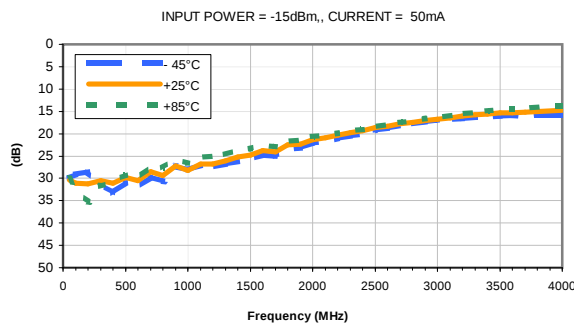
ISOLATION vs. TEMPERATURE



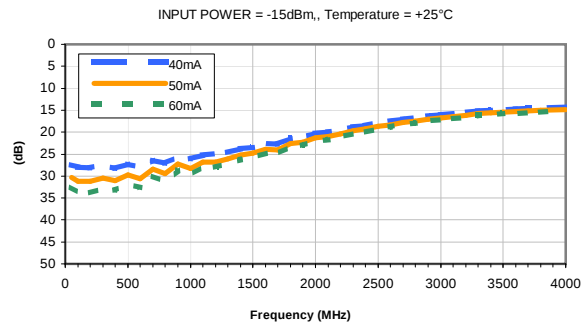
ISOLATION vs. CURRENT



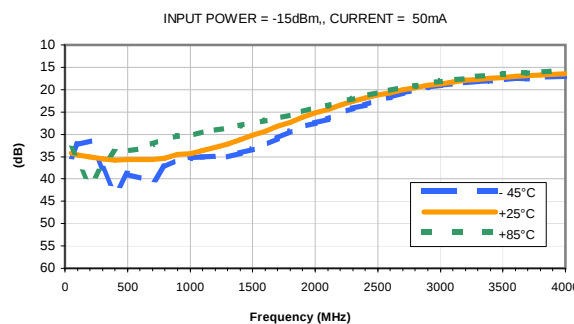
INPUT RETURN LOSS vs. TEMPERATURE



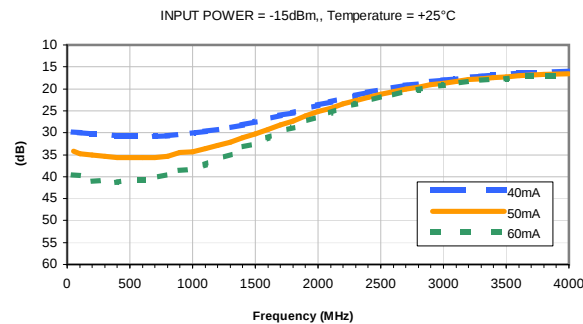
INPUT RETURN LOSS vs. CURRENT



OUTPUT RETURN LOSS vs. TEMPERATURE



OUTPUT RETURN LOSS vs. CURRENT



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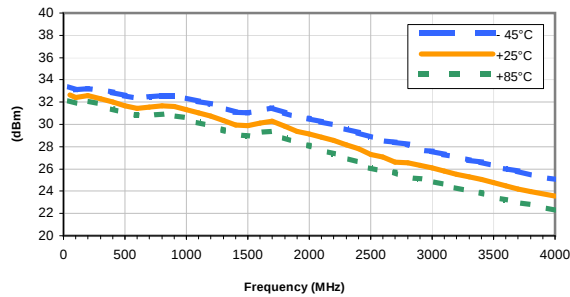
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Typical Performance Curves

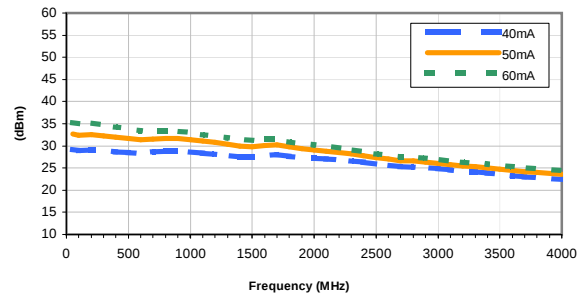
OUTPUT IP3 vs. TEMPERATURE

INPUT POWER = -15dBm, CURRENT = 50mA



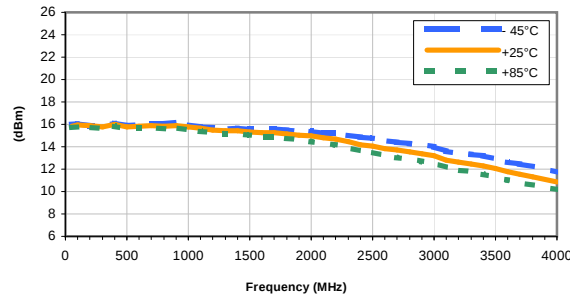
OUTPUT IP3 vs. CURRENT

INPUT POWER = -15dBm, Temperature = +25°C



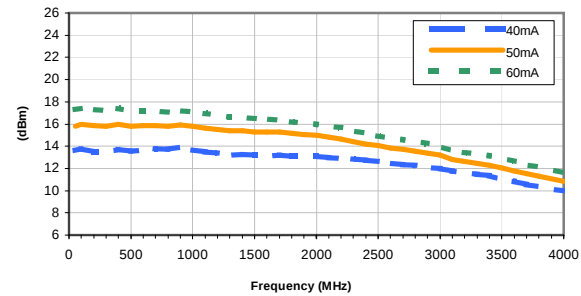
OUTPUT POWER at 1dB Compression vs. TEMPERATURE

CURRENT = 50mA



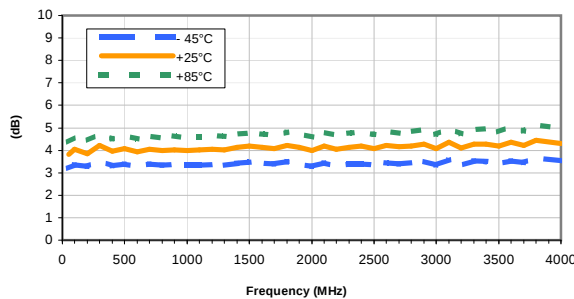
OUTPUT POWER at 1dB Compression vs. CURRENT

Temperature = +25°C



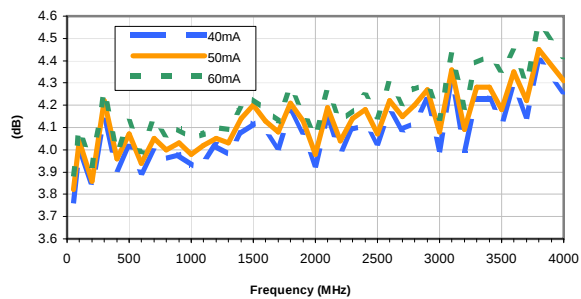
Noise Figure vs. TEMPERATURE

CURRENT = 50mA



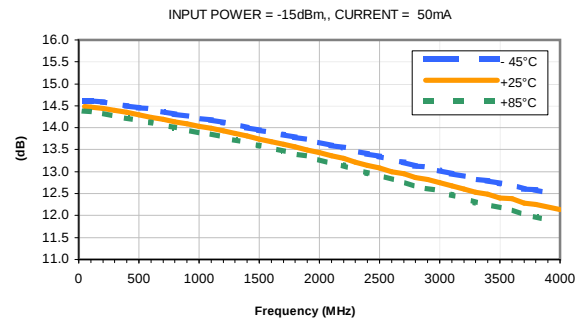
Noise Figure vs. CURRENT

Temperature = +25°C

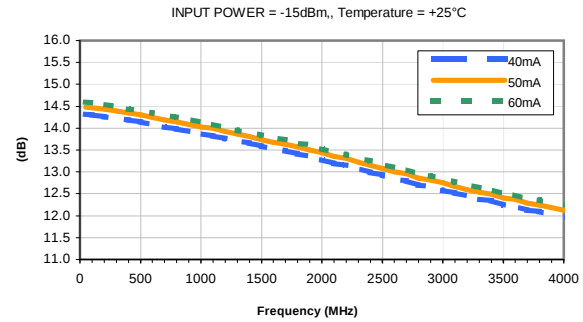


Typical Performance Curves

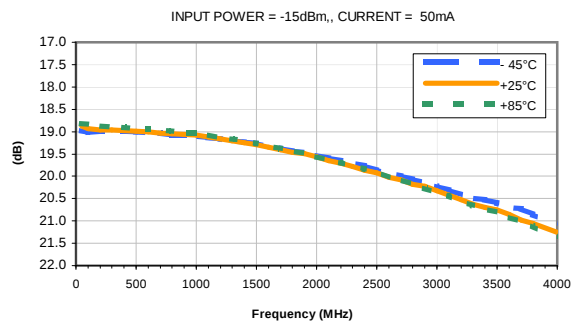
GAIN vs. TEMPERATURE



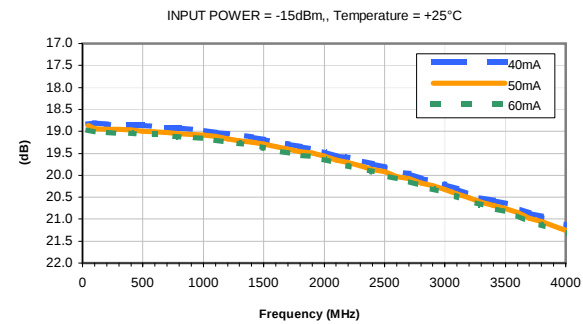
GAIN vs. CURRENT



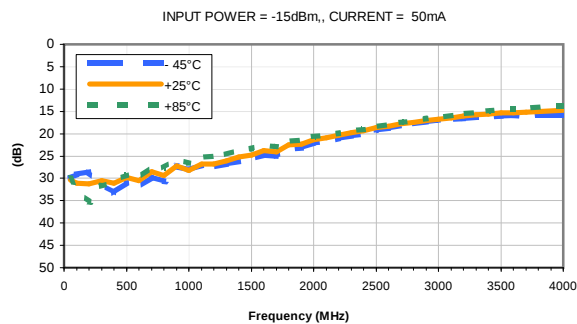
ISOLATION vs. TEMPERATURE



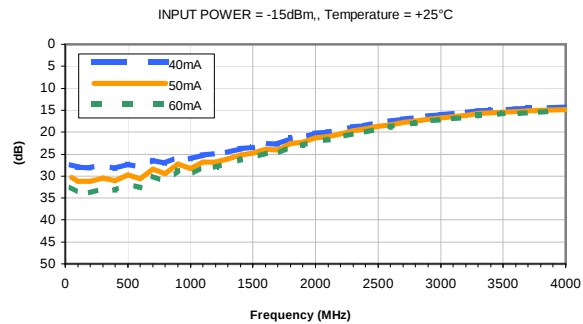
ISOLATION vs. CURRENT



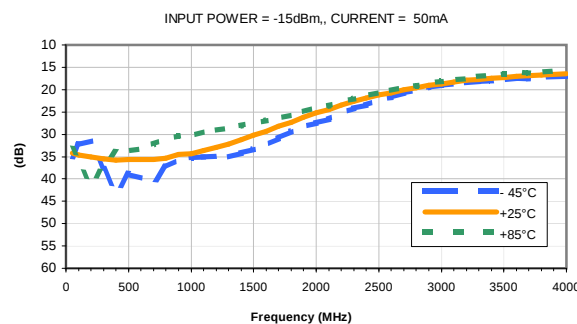
INPUT RETURN LOSS vs. TEMPERATURE



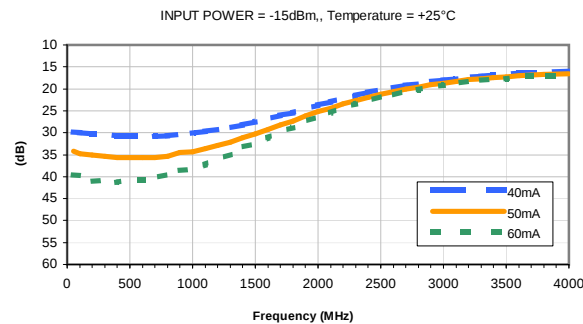
INPUT RETURN LOSS vs. CURRENT



OUTPUT RETURN LOSS vs. TEMPERATURE



OUTPUT RETURN LOSS vs. CURRENT



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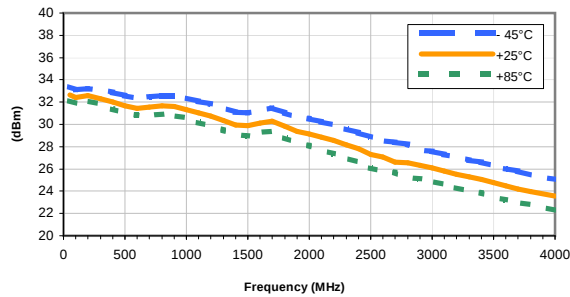
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Typical Performance Curves

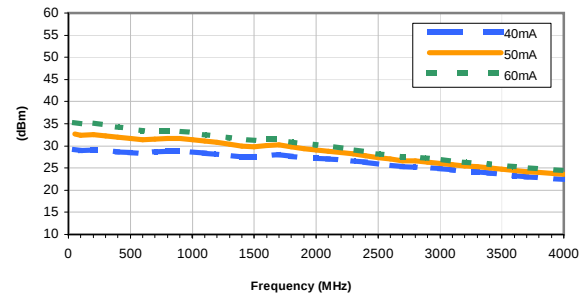
OUTPUT IP3 vs. TEMPERATURE

INPUT POWER = -15dBm, CURRENT = 50mA



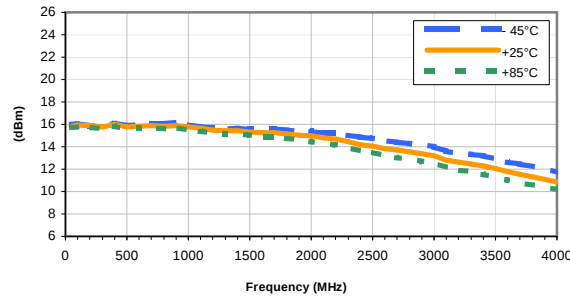
OUTPUT IP3 vs. CURRENT

INPUT POWER = -15dBm, Temperature = +25°C



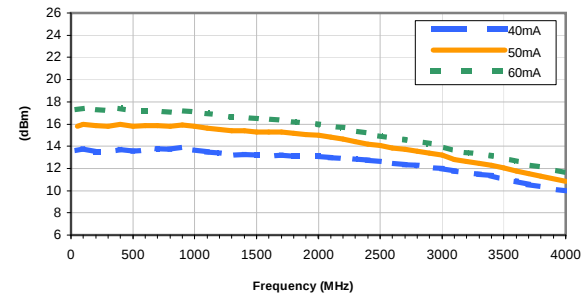
OUTPUT POWER at 1dB Compression vs. TEMPERATURE

CURRENT = 50mA



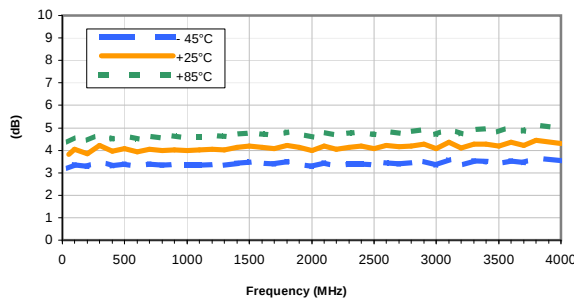
OUTPUT POWER at 1dB Compression vs. CURRENT

Temperature = +25°C



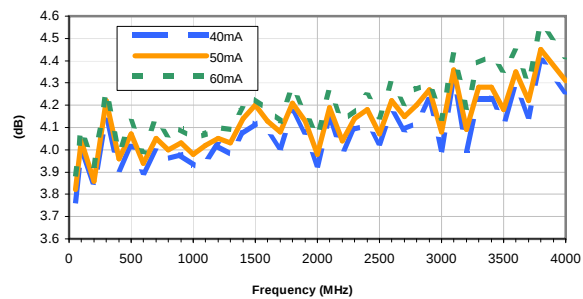
Noise Figure vs. TEMPERATURE

CURRENT = 50mA

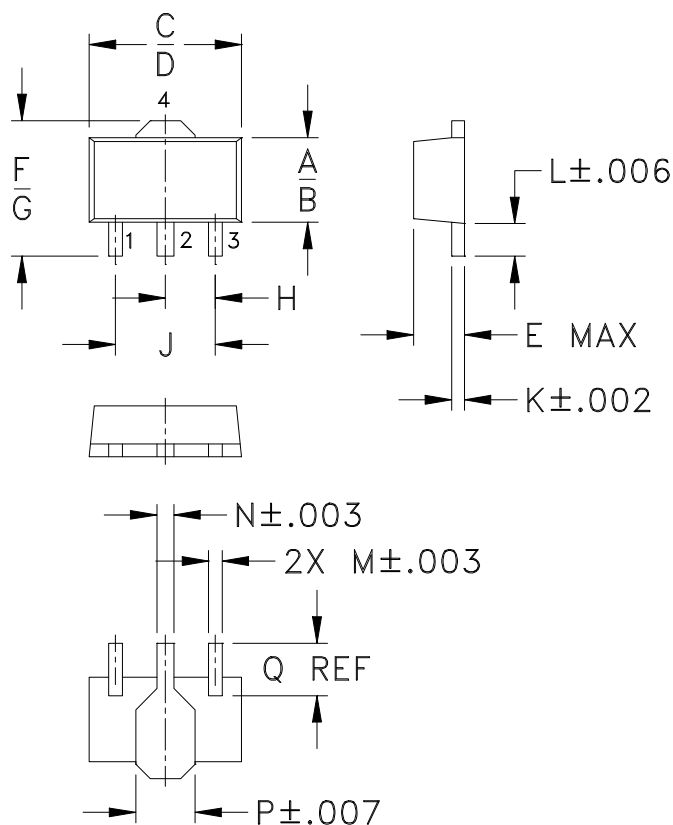


Noise Figure vs. CURRENT

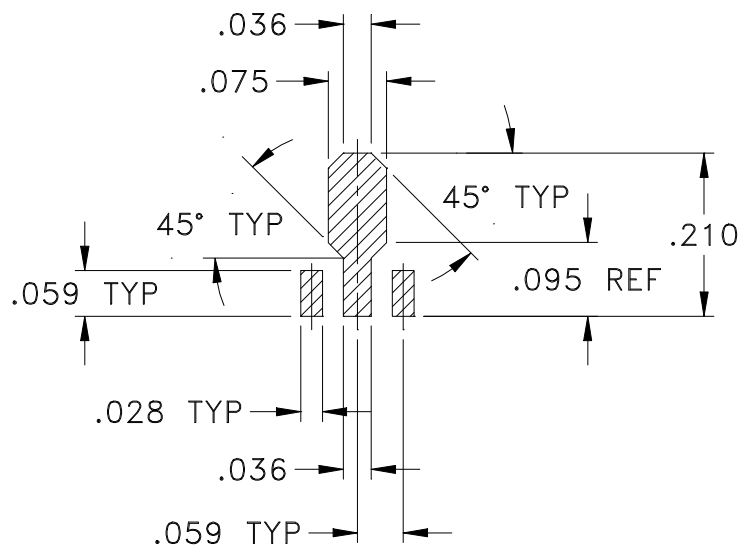
Temperature = +25°C



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
DF782	.102 (2.59)	.090 (2.29)	.181 (4.60)	.173 (4.39)	.063 (1.60)	.167 (4.24)	.155 (3.94)	.059 (1.50)	.118 (3.00)	.015 (0.38)	.041 (1.04)	.016 (0.41)

CASE #	N	P	Q	WT. GRAM
DF782	.019 (0.48)	.065 (1.65)	.062 (1.57)	.2

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

Notes:

- Case material: Plastic.
- Termination finish:
For RoHS Case Styles: Tin-Silver alloy plate over Nickel barrier or Matte-Tin.
All models, (+) suffix. See model Data sheet.
For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



INTERNET <http://www.minicircuits.com>

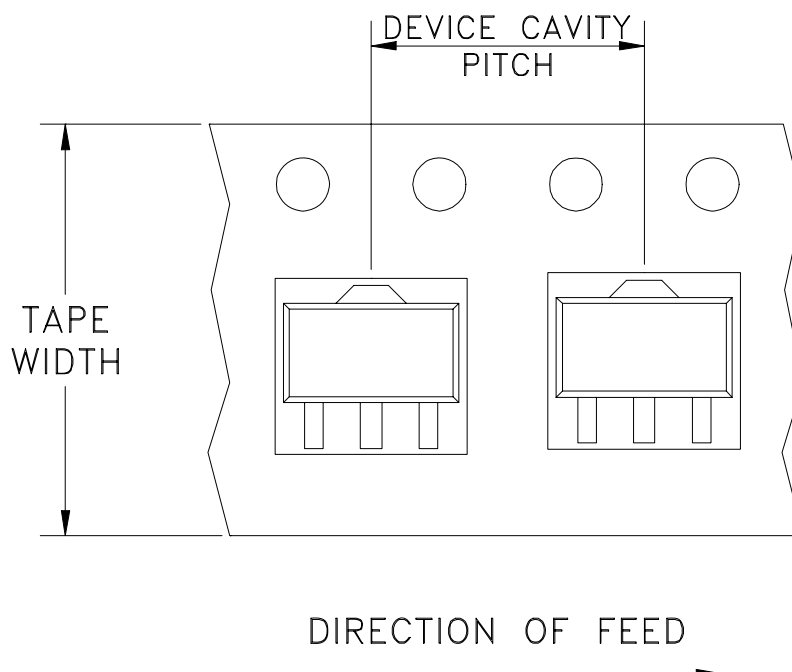
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Tape & Reel Packaging TR-F55

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
12	8	7	Small quantity standard (see note)	20
				50
				100
				200
				500
			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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REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
A	M76190	CHANGED DISCRIPTION	04/01	GF	CT
B	M82575	UPDATED DRAWING	08/05/02	AV	LC
C	M102713	ADDED NOTE 2 & "...WITH SMOBC"	01/17/06	MMG	IL
D	M108434	UPDATED DRAWING PER TB-409+	11/14/06	PW	IG

Technical drawing of a microelectronic package showing top and side views with dimensions and labels.

Top View Dimensions:

- Overall width: .240
- Distance from center to side edge: .200
- Distance from center to side edge (inner): .100
- Distance from center to side edge (inner): .075
- Distance from center to side edge (inner): .036
- Overall height: .139
- Distance from center to bottom edge: .124
- Distance from center to bottom edge (inner): .074
- Distance from center to bottom edge (inner): .024
- Distance from center to bottom edge (inner): .020 TYP
- Distance from center to bottom edge (inner): .096 TYP
- Distance from center to bottom edge (inner): .059 TYP
- Distance from center to bottom edge (inner): .040
- Distance from center to bottom edge (inner): .036
- Distance from center to bottom edge (inner): .072

Labels:

- 8X ϕ .020 PTH FOR GROUND
- 45° TYP
- PIN 1
- PACKAGE OUTLINE
- WIDTH, 2 PL. (SEE NOTE BELOW)

FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

 DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE _____

DIMENSIONS ARE IN INCHES

DRAWN

AV

01/15/01

TOLERANCES ON:

TABLE 1

01 / 22 / 01

2 PL DECIMALS ±

CHECKED

01/23/01

3 PL DECIMAL ANGLES ±

APPROVED

01/23/01

FRACTIONS $\pm$

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11

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Brooklyn NY 11235

PL, mz, DF782, GALI, TB-409-XXX+

SIZE

CODE	IDENT
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DRAWING NO:

98-PL-019

REV:

D

FILE: 98PL019

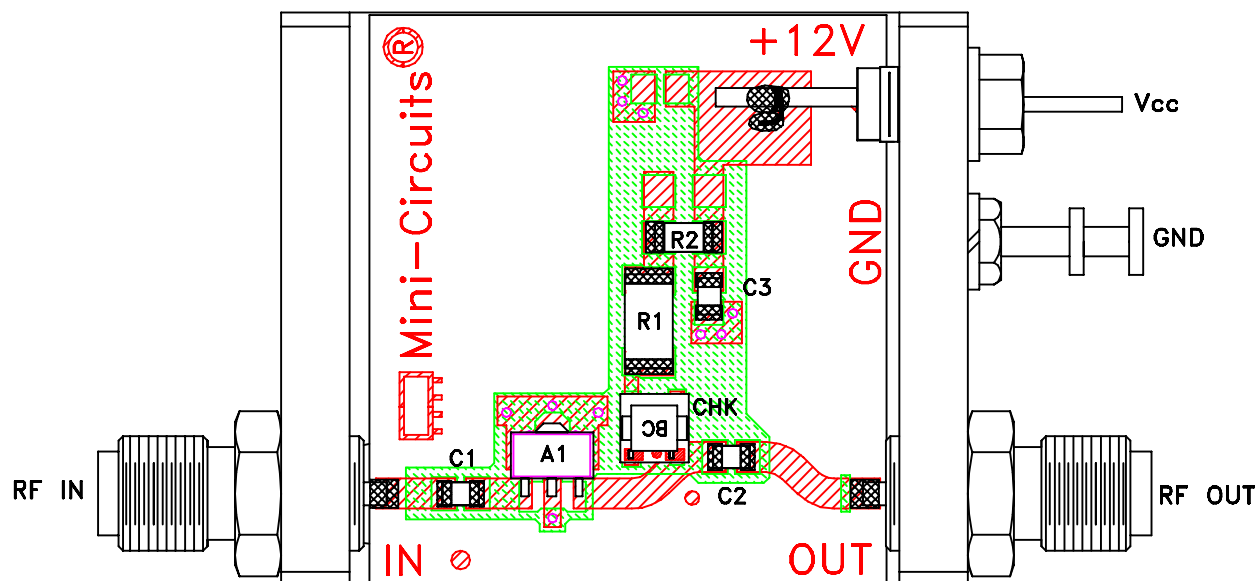
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SHEET:

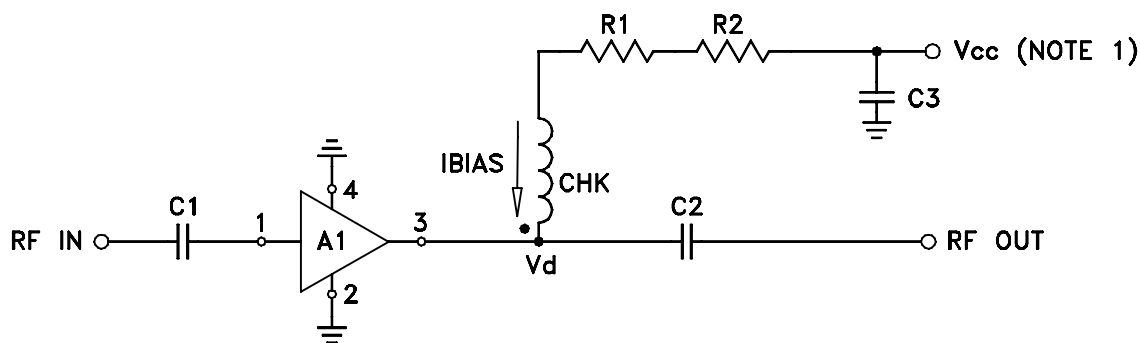
1 OF 1

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

Evaluation Board and Circuit



TB-409-4F+



COMPONENT	VALUE
A1	Gali-4F(+)
C1 (NOTE 4)	2400 pF
C2 (NOTE 4)	2400 pF
C3 (bypass)	0.1 uF
R1	143 Ohms, 0.75W
R2	8.25 Ohms, 0.25W
CHK	Mini-Circuits TCCH-80+

Schematic Diagram

NOTE:

1. Vcc voltage: $+12 \pm 0.2V$.
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.

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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	-45° to 85°C or -40° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-65° to 150° C Ambient Environment	Individual Model Data Sheet
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Mechanical Shock	1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only	MIL-STD-883, Method 2002, Condition B, except Y1 direction only
Vibration (Variable Frequency)	50g peak	MIL-STD-883, Method 2007, Condition B
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102, Condition C
HAST	130°C, 85% RH, 96 hours	JESD22-A110
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Solder Reflow Heat	Sn-Pb Eutetic Process: 240°C peak Pb-Free Process: 260°C peak	J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1
Moisture Sensitivity: Level 1	Bake at 125°C for 24 hours Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 260°C peak	J-STD-020
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether +	MIL-STD-202, Method 215



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

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