

5 Volt-Surface Mount

# Monolithic Amplifier

DC-7 GHz

## Product Features

- Gain, 15 dB typ. at 100 MHz
- High Pout, P1dB 20 dBm typ.
- High IP3, 40 dBm typ. at 100 MHz
- Ruggedized design
- Fixed 5V operation
- Unconditionally stable
- Excellent ESD Protection
- Transient protected, US patent 6,943,629



Generic photo used for illustration purposes only

CASE STYLE: DF782

## GVA-82+

**+RoHS Compliant**

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

**LTE Performance**

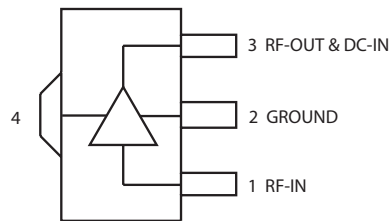
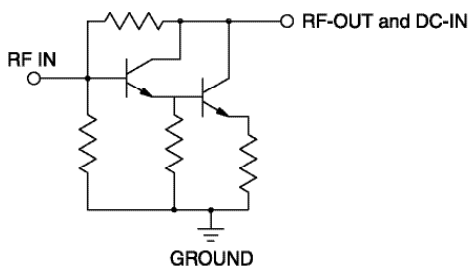
## Typical Applications

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

## General Description

GVA-82+ (RoHS compliant) is a wideband amplifier offering high dynamic range. Lead finish is SnAgNi. 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.

## 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", 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.

### Notes

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**Electrical Specifications<sup>(1)</sup> at 25°C and 5V, unless noted**

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range <sup>(2)</sup>		DC		7	GHz
Gain	0.1	13.7	15.3	16.8	dB
	1.0	—	14.9	—	
	2.0	12.2	13.8	15.2	
	3.0	—	12.5	—	
	4.0	9.8	11.7	13.0	
	6.0	—	10.6	—	
	7.0	—	9.9	—	
Magnitude of Gain Variation versus Temperature <sup>(3)</sup> (values are negative)	0.1	—	0.0002	—	dB/°C
	1.0	—	0.0012	—	
	2.0	—	0.0020	0.005	
	3.0	—	0.0027	—	
	4.0	—	0.0037	—	
	6.0	—	0.0062	—	
	7.0	—	0.0108	—	
Input Return Loss	0.1	—	35.0	—	dB
	1.0	—	24.0	—	
	2.0	14.0	18.5	—	
	3.0	—	15.9	—	
	4.0	—	15.8	—	
	6.0	—	19.7	—	
	7.0	—	14.4	—	
Output Return Loss	0.1	—	17.7	—	dB
	1.0	—	15.7	—	
	2.0	9.0	12.3	—	
	3.0	—	10.8	—	
	4.0	—	10.0	—	
	6.0	—	10.9	—	
	7.0	—	10.5	—	
Reverse Isolation	2.0	—	23.6	—	dB
Output Power @ 1 dB compression	0.1	18.0	20.1	—	dBm
	1.0	18.0	20.1	—	
	2.0	18.0	20.6	—	
	3.0	—	20.6	—	
	4.0	—	20.2	—	
	6.0	—	18.2	—	
	7.0	—	18.2	—	
Output IP3	0.1	—	40.3	—	dBm
	1.0	—	38.0	—	
	2.0	34.0	36.0	—	
	3.0	—	34.3	—	
	4.0	—	32.7	—	
	6.0	—	31.0	—	
	7.0	—	30.9	—	
Noise Figure	0.1	—	6.5	8.0	dB
	1.0	—	6.6	—	
	2.0	—	6.6	8.2	
	3.0	—	6.8	—	
	4.0	—	6.9	—	
	6.0	—	7.5	—	
	7.0	—	8.2	—	
Group Delay	2.0	—	100	—	psec
Device Operating Voltage		4.8	5.0	5.2	V
Device Operating Current		90	106	120	mA
Device Current Variation vs. Temperature			70.5		µA/°C
Device Current Variation vs Voltage			0.038		mA/mV
Thermal Resistance, junction-to-ground lead			68		°C/W

<sup>(1)</sup> Measured on Mini-Circuits test board TB-313. See Characterization Test Circuit (Fig. 1)

<sup>(2)</sup> Guaranteed specification DC-7 GHz. \*Low frequency cut off determined by external coupling capacitors and RF Choke (RFC).

<sup>(3)</sup> (Gain at 85°C, Gain at -45°C)/130

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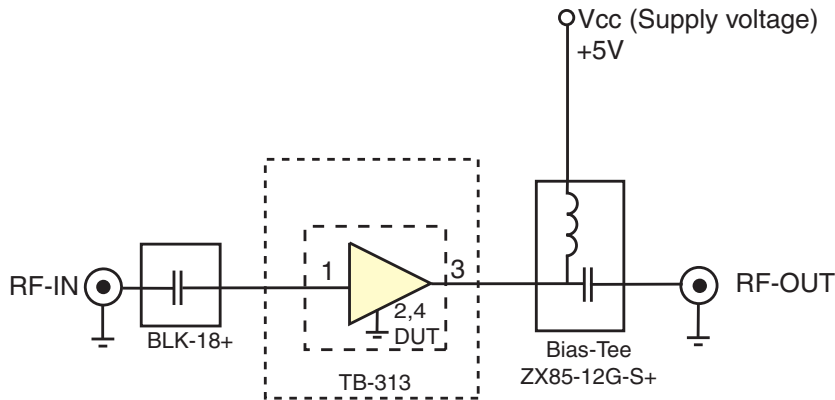


**Absolute Maximum Ratings**

Parameter	Ratings
Operating Temperature (ground lead)	-40°C to 85°C
Storage Temperature	-65°C to 150°C
Operating Current at 5V	160mA
Power Dissipation	0.84W
Input Power	20 dBm
DC Voltage on Pin 3	5.8V

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

**Characterization Test Circuit**

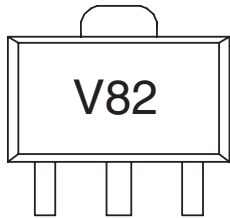


**Fig 1.** Block Diagram of Test Circuit used for characterization. (DUT soldered on Mini-Circuits Test Board TB-313)  
 Gain, Output power at 1dB compression (P1 dB) and output IP3 (OIP3) are measured using R&S Network Analyzer ZVA-24.  
 Noise Figure measured using Agilent’s N5242A PNA-X microwave network analyzer.

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

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**Product Marking**



Marking may contain other features or characters for internal lot control

**Additional Detailed Technical Information**

Additional information is available on our web site. To access this information enter the model number on our web site home page.

**Performance data, graphs, s-parameter (S2P FILES) data set (.zip file)**

**Case Style: DF782 (SOT 89)**

Plastic package, exposed paddle, lead finish: tin-silver over nickel

**Tape & Reel: F55**

7" Reels with 20, 50, 100, 200, 500, 1K devices

**Suggested Layout for PCB Design: PL-255**

**Evaluation Board: TB-410-82+**

**Environmental Ratings: ENV08T1**

**Recommended Application Circuit**

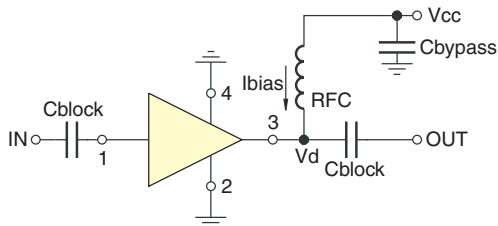


Fig 2. Test Board includes case, connectors, and components soldered to PCB

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**ESD Rating**

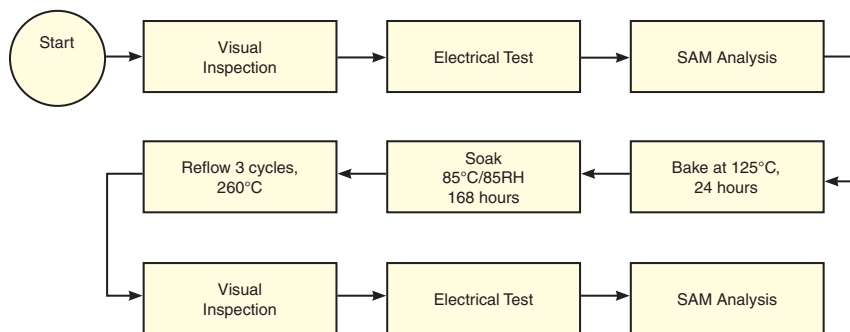
Human Body Model (HBM): Class 1C (1000v to < 2000v) in accordance with ANSI/ESD STM 5.1 - 2001

Machine Model (MM): Class M2 (100V to < 200V) in accordance with ANSI/ESD STM 5.2 - 1999

**MSL Rating**

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

**MSL Test Flow Chart**



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## 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=102.62mA @ Temperature = +25degC

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)
100	15.38	24.28	35.23	17.06	1.54	0.85	39.54	19.87	6.57
300	15.26	24.29	32.63	18.61	1.60	0.86	39.55	19.98	6.53
600	15.20	24.16	28.27	17.29	1.55	0.86	40.16	20.11	6.64
900	15.03	24.03	25.81	15.87	1.53	0.86	39.85	20.11	6.65
1000	14.96	23.93	24.89	15.60	1.53	0.86	39.80	20.24	6.67
1200	14.75	23.82	23.78	13.94	1.52	0.85	37.81	19.96	6.73
1400	14.54	23.78	22.56	13.64	1.53	0.85	37.43	19.80	6.77
1600	14.24	23.72	21.32	11.83	1.52	0.84	37.58	20.32	6.81
1800	14.00	23.67	20.20	11.92	1.55	0.85	35.79	19.83	6.81
2000	13.65	23.65	19.18	10.99	1.56	0.85	35.89	19.68	6.78
2200	13.38	23.60	18.52	10.89	1.60	0.86	36.85	20.15	6.80
2400	13.13	23.57	17.47	11.06	1.62	0.87	35.35	19.77	6.82
2600	12.91	23.38	16.32	10.77	1.60	0.87	35.29	19.97	6.91
2800	12.70	23.35	15.94	11.51	1.65	0.89	35.51	20.24	6.94
3000	12.47	23.29	15.13	11.47	1.65	0.90	33.91	20.15	6.89
3200	12.34	23.17	14.69	12.00	1.67	0.91	34.31	19.85	6.92
3400	12.13	23.16	14.63	12.17	1.72	0.92	34.73	20.56	6.97
3600	11.93	23.07	14.33	11.82	1.72	0.92	34.62	19.97	7.02
3800	11.77	22.98	14.88	11.85	1.74	0.91	33.35	20.26	7.04
4000	11.55	23.11	14.87	11.55	1.78	0.92	32.98	20.25	7.09
4200	11.41	23.06	15.32	11.13	1.79	0.91	32.61	19.90	7.13
4400	11.26	22.96	16.15	10.52	1.81	0.89	33.08	19.99	7.19
4600	11.09	23.04	16.45	10.12	1.82	0.88	32.60	19.52	7.19
4800	10.93	23.07	18.00	9.92	1.87	0.87	32.94	19.84	7.25
5000	10.75	23.11	18.61	9.26	1.89	0.85	32.04	19.19	7.29
5200	10.67	23.04	19.21	9.61	1.92	0.86	32.83	19.51	7.34
5400	10.62	23.02	21.15	9.49	1.93	0.85	32.55	19.31	7.41
5600	10.52	22.92	21.62	9.75	1.95	0.86	32.49	19.01	7.48
5800	10.49	22.88	22.51	10.48	1.98	0.87	32.83	19.03	7.55
6000	10.21	22.78	24.53	11.28	2.06	0.88	32.25	18.76	7.58
6200	10.23	22.63	21.58	11.39	2.04	0.89	32.15	18.27	7.64
6400	10.30	22.56	19.63	13.78	2.06	0.92	32.69	18.67	7.75
6600	10.17	22.55	18.12	12.93	2.05	0.92	31.45	18.31	7.84
6800	10.00	22.50	14.52	13.32	2.07	0.95	31.94	17.84	7.95
7000	9.72	22.47	13.28	14.07	2.13	0.97	31.95	18.21	8.05
7200	9.34	22.57	11.84	9.98	2.08	0.95	30.58	17.28	8.13
7400	8.75	22.77	10.25	10.00	2.23	0.98	30.46	17.11	8.27
7600	8.18	22.79	9.69	9.30	2.29	0.98	29.59	17.07	8.39
7800	7.47	23.01	8.78	6.65	2.25	0.92	28.64	15.95	8.54
8000	6.74	23.25	8.19	6.81	2.48	0.94	27.51	16.12	8.74

## 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=93.26mA @ Temperature = +25degC

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)
100.00	15.28	24.23	33.53	16.91	1.54	0.86	38.13	19.07	6.46
300.00	15.18	24.34	31.68	18.10	1.57	0.87	38.32	19.12	6.45
600.00	15.14	24.05	28.31	16.96	1.54	0.86	38.61	19.24	6.50
900.00	15.01	23.93	25.99	15.53	1.52	0.85	38.12	19.27	6.55
1000.00	14.93	23.87	24.66	15.42	1.53	0.85	38.57	19.36	6.55
1200.00	14.71	23.78	23.76	13.85	1.52	0.85	36.75	19.15	6.61
1400.00	14.48	23.66	22.46	13.37	1.52	0.85	36.55	19.00	6.67
1600.00	14.22	23.64	21.18	11.80	1.51	0.84	36.31	19.46	6.70
1800.00	13.93	23.55	20.06	11.64	1.54	0.85	34.82	19.04	6.69
2000.00	13.59	23.55	18.98	10.99	1.56	0.85	35.08	18.91	6.65
2200.00	13.33	23.51	18.30	10.84	1.59	0.86	35.60	19.26	6.67
2400.00	13.07	23.46	17.33	11.09	1.61	0.87	34.45	19.01	6.70
2600.00	12.84	23.32	16.18	10.65	1.60	0.87	34.47	19.17	6.78
2800.00	12.63	23.26	15.84	11.70	1.64	0.89	34.53	19.38	6.80
3000.00	12.42	23.17	15.04	11.42	1.65	0.90	33.29	19.38	6.76
3200.00	12.27	23.07	14.66	11.90	1.66	0.91	33.61	19.04	6.80
3400.00	12.06	23.03	14.53	12.16	1.70	0.92	34.00	19.74	6.83
3600.00	11.86	22.96	14.23	11.80	1.71	0.92	33.61	19.22	6.86
3800.00	11.70	22.86	14.77	11.90	1.73	0.92	32.85	19.53	6.90
4000.00	11.48	22.99	14.81	11.53	1.77	0.92	32.33	19.55	6.95
4200.00	11.34	22.95	15.25	11.25	1.79	0.91	32.02	19.25	6.99
4400.00	11.16	22.84	16.06	10.48	1.79	0.89	32.47	19.33	7.06
4600.00	11.00	22.91	16.36	10.08	1.81	0.88	31.96	18.91	7.06
4800.00	10.84	22.96	17.98	9.84	1.86	0.87	32.30	19.20	7.09
5000.00	10.66	23.01	18.50	9.27	1.88	0.86	31.43	18.62	7.14
5200.00	10.59	22.92	19.15	9.52	1.90	0.86	32.16	18.89	7.19
5400.00	10.51	22.89	21.09	9.57	1.92	0.85	31.90	18.76	7.26
5600.00	10.42	22.79	21.47	9.80	1.94	0.86	31.73	18.48	7.34
5800.00	10.40	22.75	22.27	10.47	1.97	0.87	32.09	18.44	7.40
6000.00	10.12	22.64	24.59	11.10	2.05	0.88	31.50	18.27	7.44
6200.00	10.13	22.54	21.40	11.52	2.03	0.89	31.58	17.75	7.48
6400.00	10.20	22.46	19.47	13.95	2.05	0.92	32.08	18.12	7.59
6600.00	10.09	22.39	18.04	12.72	2.05	0.92	30.79	17.86	7.71
6800.00	9.90	22.38	14.48	13.15	2.07	0.95	30.97	17.37	7.79
7000.00	9.62	22.36	13.20	14.44	2.12	0.98	31.34	17.75	7.90
7200.00	9.23	22.46	11.77	10.00	2.08	0.95	29.88	16.84	8.00
7400.00	8.63	22.67	10.23	10.03	2.23	0.99	29.71	16.66	8.14
7600.00	8.06	22.70	9.66	9.04	2.28	0.98	29.66	16.64	8.21
7800.00	7.37	22.88	8.72	6.54	2.26	0.91	28.07	15.51	8.40
8000.00	6.63	23.18	8.19	6.74	2.49	0.94	27.79	15.71	8.59

## 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=112.14mA @ Temperature = +25degC

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)
100.00	15.42	24.29	37.39	17.18	1.56	0.85	40.72	20.63	6.71
300.00	15.30	24.45	32.27	19.23	1.58	0.87	41.74	20.75	6.68
600.00	15.21	24.21	28.76	17.44	1.55	0.86	41.36	20.89	6.73
900.00	15.05	24.05	26.26	15.80	1.54	0.86	40.94	20.87	6.76
1000.00	14.99	23.96	24.86	15.76	1.54	0.86	40.53	21.02	6.78
1200.00	14.80	23.89	23.87	14.12	1.53	0.85	38.22	20.69	6.84
1400.00	14.59	23.82	22.77	13.68	1.54	0.85	38.10	20.51	6.89
1600.00	14.31	23.79	21.43	11.94	1.53	0.84	38.42	21.10	6.94
1800.00	14.03	23.72	20.35	11.87	1.55	0.85	36.46	20.53	6.91
2000.00	13.69	23.75	19.22	11.00	1.58	0.85	37.13	20.37	6.89
2200.00	13.42	23.69	18.55	11.17	1.61	0.86	37.88	20.96	6.91
2400.00	13.18	23.65	17.57	11.11	1.63	0.87	36.11	20.43	6.94
2600.00	12.95	23.51	16.41	10.78	1.61	0.88	36.12	20.70	7.02
2800.00	12.75	23.44	16.01	11.70	1.67	0.89	36.00	21.02	7.05
3000.00	12.55	23.40	15.22	11.42	1.67	0.90	34.30	20.82	7.00
3200.00	12.40	23.27	14.77	12.07	1.68	0.91	34.78	20.57	7.05
3400.00	12.19	23.22	14.67	12.43	1.72	0.92	35.34	21.25	7.09
3600.00	12.00	23.17	14.40	12.23	1.73	0.92	35.17	20.61	7.12
3800.00	11.83	23.07	14.90	11.98	1.75	0.92	33.93	20.89	7.15
4000.00	11.62	23.21	14.91	11.50	1.78	0.91	33.27	20.86	7.19
4200.00	11.48	23.15	15.40	11.35	1.81	0.91	33.16	20.48	7.24
4400.00	11.32	23.07	16.22	10.60	1.80	0.89	33.50	20.56	7.30
4600.00	11.16	23.10	16.55	10.16	1.84	0.88	33.04	20.06	7.32
4800.00	10.99	23.16	18.08	9.94	1.87	0.87	33.48	20.39	7.37
5000.00	10.83	23.27	18.63	9.38	1.90	0.86	32.48	19.71	7.41
5200.00	10.75	23.15	19.26	9.66	1.92	0.86	33.40	20.05	7.47
5400.00	10.69	23.11	21.17	9.71	1.93	0.86	33.00	19.79	7.54
5600.00	10.60	23.04	21.74	9.75	1.96	0.86	33.02	19.49	7.62
5800.00	10.57	22.96	22.65	10.43	1.99	0.87	33.45	19.53	7.70
6000.00	10.30	22.87	24.73	11.39	2.06	0.88	32.69	19.18	7.72
6200.00	10.31	22.77	21.80	11.56	2.04	0.89	32.79	18.73	7.79
6400.00	10.38	22.66	19.74	13.70	2.07	0.92	33.29	19.12	7.90
6600.00	10.27	22.65	18.24	12.68	2.06	0.92	32.01	18.70	8.00
6800.00	10.10	22.55	14.63	13.58	2.07	0.95	32.29	18.24	8.09
7000.00	9.84	22.53	13.38	14.24	2.13	0.97	32.56	18.60	8.19
7200.00	9.44	22.65	11.88	10.05	2.09	0.95	30.98	17.67	8.31
7400.00	8.84	22.87	10.25	10.10	2.23	0.99	31.00	17.51	8.45
7600.00	8.27	22.88	9.72	9.22	2.28	0.98	31.13	17.45	8.55
7800.00	7.58	23.03	8.80	6.83	2.24	0.92	29.32	16.32	8.71
8000.00	6.81	23.31	8.19	6.92	2.45	0.95	30.42	16.52	8.93



## 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=97.44mA @ Temperature = -45degC

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)
100.00	15.37	24.12	31.95	16.50	1.54	0.85	39.18	19.55	5.79
300.00	15.26	24.24	31.81	18.29	1.56	0.86	39.67	19.55	5.75
600.00	15.23	24.02	29.34	16.78	1.53	0.85	39.73	19.67	5.80
900.00	15.11	23.87	26.68	15.68	1.51	0.85	39.95	19.74	5.83
1000.00	15.02	23.81	24.98	15.67	1.51	0.85	39.90	19.82	5.85
1200.00	14.83	23.65	24.55	13.97	1.50	0.84	37.99	19.66	5.90
1400.00	14.63	23.60	22.68	13.74	1.50	0.85	37.59	19.51	5.93
1600.00	14.33	23.56	21.66	11.87	1.49	0.84	37.50	19.94	5.96
1800.00	14.08	23.47	20.66	11.96	1.51	0.85	36.18	19.60	5.94
2000.00	13.77	23.47	19.19	11.03	1.53	0.85	36.30	19.43	5.91
2200.00	13.52	23.42	18.86	11.11	1.55	0.85	37.18	19.78	5.91
2400.00	13.26	23.37	17.50	11.00	1.57	0.86	35.88	19.57	5.93
2600.00	13.05	23.19	16.65	10.64	1.55	0.86	35.65	19.74	6.00
2800.00	12.84	23.15	16.10	11.72	1.59	0.89	36.03	19.92	6.03
3000.00	12.67	23.04	15.38	11.39	1.59	0.89	34.46	19.98	5.97
3200.00	12.51	22.94	14.96	11.74	1.61	0.90	34.93	19.61	6.00
3400.00	12.32	22.90	14.87	12.14	1.64	0.91	35.63	20.36	6.02
3600.00	12.14	22.83	14.66	11.91	1.65	0.91	35.18	19.89	6.04
3800.00	12.00	22.71	15.04	11.97	1.66	0.91	34.07	20.20	6.06
4000.00	11.78	22.82	15.51	11.34	1.71	0.90	33.63	20.28	6.13
4200.00	11.66	22.79	15.47	11.15	1.71	0.90	33.27	19.99	6.13
4400.00	11.49	22.69	16.88	10.48	1.72	0.88	33.49	20.10	6.18
4600.00	11.34	22.75	16.96	10.08	1.73	0.87	33.23	19.70	6.18
4800.00	11.19	22.77	18.22	9.75	1.78	0.86	33.71	20.00	6.23
5000.00	11.04	22.85	19.69	9.11	1.79	0.84	32.85	19.50	6.28
5200.00	10.93	22.77	19.15	9.41	1.80	0.85	33.43	19.70	6.32
5400.00	10.91	22.71	22.25	9.41	1.80	0.84	33.16	19.66	6.39
5600.00	10.82	22.65	21.95	9.39	1.82	0.84	32.96	19.36	6.45
5800.00	10.80	22.55	22.56	10.25	1.85	0.86	33.60	19.32	6.51
6000.00	10.56	22.48	26.72	10.88	1.91	0.86	33.09	19.23	6.52
6200.00	10.62	22.35	22.86	10.89	1.88	0.87	32.78	18.62	6.55
6400.00	10.73	22.24	20.77	12.93	1.89	0.90	33.76	19.05	6.65
6600.00	10.67	22.19	19.25	12.24	1.86	0.90	32.28	18.90	6.72
6800.00	10.55	22.11	15.09	12.78	1.88	0.93	32.44	18.31	6.80
7000.00	10.37	22.07	13.88	13.35	1.91	0.95	32.65	18.74	6.90
7200.00	10.06	22.15	12.02	10.01	1.86	0.93	31.48	18.01	6.98
7400.00	9.56	22.31	10.44	9.41	1.95	0.96	31.01	17.53	7.09
7600.00	9.01	22.28	9.63	8.78	1.98	0.97	31.02	17.74	7.15
7800.00	8.39	22.48	8.64	6.30	1.91	0.90	29.71	16.60	7.31
8000.00	7.66	22.81	8.09	6.35	2.09	0.92	30.19	16.63	7.54

# MMIC Amplifier

# GVA-82+

## 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=88.4 mA @ Temperature = -45degC

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)
100.00	15.30	24.13	30.60	16.33	1.54	0.85	37.92	18.67	5.68
300.00	15.20	24.14	30.15	17.69	1.54	0.86	37.98	18.62	5.66
600.00	15.17	23.95	28.60	16.54	1.52	0.85	38.32	18.73	5.70
900.00	15.02	23.79	26.62	15.66	1.50	0.85	38.06	18.83	5.75
1000.00	14.98	23.72	25.04	15.44	1.51	0.85	38.20	18.87	5.74
1200.00	14.77	23.62	24.18	13.87	1.49	0.84	36.42	18.77	5.80
1400.00	14.57	23.51	22.65	13.65	1.50	0.85	36.25	18.64	5.83
1600.00	14.29	23.46	21.59	11.89	1.49	0.84	36.07	19.00	5.86
1800.00	14.03	23.35	20.43	11.84	1.51	0.84	34.83	18.74	5.85
2000.00	13.69	23.35	19.06	11.05	1.51	0.85	35.27	18.59	5.83
2200.00	13.46	23.29	18.55	10.82	1.53	0.85	35.71	18.77	5.83
2400.00	13.21	23.23	17.44	10.85	1.56	0.86	34.46	18.73	5.84
2600.00	12.98	23.10	16.42	10.55	1.54	0.86	34.58	18.84	5.90
2800.00	12.77	23.02	16.01	11.45	1.58	0.88	34.84	18.95	5.92
3000.00	12.57	22.95	15.19	11.28	1.58	0.89	33.52	19.14	5.86
3200.00	12.43	22.84	14.81	11.72	1.60	0.90	34.13	18.71	5.89
3400.00	12.24	22.76	14.80	12.14	1.63	0.91	34.30	19.44	5.92
3600.00	12.06	22.72	14.48	11.69	1.63	0.91	33.97	19.04	5.92
3800.00	11.90	22.58	15.01	11.71	1.65	0.90	33.33	19.35	5.94
4000.00	11.70	22.70	15.26	11.21	1.69	0.90	32.87	19.45	6.00
4200.00	11.56	22.66	15.46	11.01	1.69	0.90	32.51	19.23	6.03
4400.00	11.41	22.59	16.68	10.39	1.70	0.88	32.69	19.32	6.07
4600.00	11.25	22.62	16.85	9.84	1.72	0.87	32.16	19.00	6.08
4800.00	11.10	22.65	18.25	9.73	1.76	0.86	32.72	19.25	6.14
5000.00	10.91	22.70	19.40	9.10	1.77	0.84	31.94	18.87	6.18
5200.00	10.86	22.66	19.27	9.47	1.79	0.85	32.48	18.97	6.21
5400.00	10.81	22.59	21.80	9.34	1.80	0.84	32.47	18.99	6.26
5600.00	10.72	22.52	22.00	9.62	1.81	0.84	32.12	18.75	6.34
5800.00	10.70	22.42	22.47	10.26	1.84	0.86	32.70	18.62	6.38
6000.00	10.47	22.37	26.03	10.67	1.91	0.86	32.24	18.60	6.41
6200.00	10.49	22.24	22.99	10.54	1.88	0.86	31.77	18.05	6.44
6400.00	10.65	22.15	20.49	13.01	1.88	0.90	32.64	18.33	6.53
6600.00	10.59	22.07	18.95	11.89	1.87	0.89	31.50	18.39	6.59
6800.00	10.43	22.01	15.03	12.54	1.88	0.93	31.50	17.78	6.67
7000.00	10.27	21.96	13.69	13.21	1.92	0.95	31.72	18.18	6.78
7200.00	9.94	22.04	12.02	9.85	1.85	0.93	30.70	17.52	6.84
7400.00	9.42	22.19	10.32	9.24	1.94	0.96	30.05	17.02	6.94
7600.00	8.92	22.22	9.58	8.67	1.98	0.97	30.33	17.26	7.03
7800.00	8.29	22.40	8.66	6.11	1.92	0.89	28.88	16.09	7.20
8000.00	7.55	22.71	8.06	6.22	2.08	0.92	29.30	16.15	7.40



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IF/RF MICROWAVE COMPONENTS

## 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=106.6mA @ Temperature = -45degC

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)
100.00	15.39	24.16	33.06	16.62	1.54	0.85	40.75	20.31	5.90
300.00	15.42	24.29	30.76	18.26	1.57	0.86	41.37	20.38	5.87
600.00	15.22	24.07	29.26	17.05	1.53	0.85	41.60	20.52	5.92
900.00	15.14	23.92	26.93	15.68	1.51	0.85	41.31	20.56	5.93
1000.00	15.06	23.85	25.20	15.89	1.51	0.85	41.85	20.67	5.93
1200.00	14.89	23.76	24.62	14.10	1.50	0.84	39.06	20.45	5.99
1400.00	14.68	23.69	22.86	13.90	1.51	0.85	38.54	20.27	6.03
1600.00	14.38	23.63	21.66	12.05	1.50	0.84	39.19	20.78	6.05
1800.00	14.14	23.56	20.78	12.07	1.53	0.85	37.16	20.37	6.04
2000.00	13.79	23.54	19.20	11.22	1.54	0.85	36.94	20.17	6.02
2200.00	13.57	23.51	19.09	10.93	1.55	0.85	38.15	20.63	6.03
2400.00	13.32	23.43	17.52	11.12	1.58	0.86	36.54	20.31	6.03
2600.00	13.09	23.28	16.81	10.79	1.55	0.87	36.77	20.51	6.11
2800.00	12.90	23.23	16.16	11.64	1.60	0.89	37.29	20.74	6.11
3000.00	12.72	23.14	15.38	11.54	1.60	0.89	35.21	20.73	6.07
3200.00	12.57	23.02	15.15	11.88	1.61	0.90	35.27	20.39	6.10
3400.00	12.38	22.97	14.88	12.32	1.65	0.91	36.64	21.14	6.15
3600.00	12.21	22.90	14.87	11.90	1.66	0.91	35.86	20.62	6.17
3800.00	12.03	22.78	15.09	12.02	1.67	0.91	34.76	20.91	6.17
4000.00	11.84	22.92	15.54	11.65	1.70	0.90	34.04	20.98	6.21
4200.00	11.72	22.87	15.65	11.22	1.72	0.90	33.76	20.64	6.24
4400.00	11.56	22.78	16.81	10.48	1.72	0.88	34.32	20.76	6.29
4600.00	11.41	22.86	17.19	10.03	1.75	0.87	33.75	20.28	6.29
4800.00	11.25	22.88	18.14	9.82	1.78	0.86	34.33	20.64	6.34
5000.00	11.10	22.95	19.89	9.13	1.78	0.84	33.30	20.05	6.40
5200.00	11.01	22.88	19.33	9.40	1.80	0.85	34.19	20.33	6.44
5400.00	10.99	22.81	22.15	9.50	1.82	0.84	33.80	20.22	6.52
5600.00	10.90	22.76	22.52	9.49	1.83	0.84	33.75	19.88	6.59
5800.00	10.87	22.69	22.70	10.24	1.85	0.86	34.23	19.92	6.62
6000.00	10.65	22.56	27.00	10.83	1.91	0.86	33.68	19.78	6.66
6200.00	10.69	22.48	23.37	10.97	1.89	0.87	33.63	19.14	6.69
6400.00	10.83	22.34	20.70	12.85	1.90	0.90	34.45	19.63	6.76
6600.00	10.77	22.28	19.40	12.13	1.88	0.89	32.83	19.34	6.83
6800.00	10.63	22.22	15.19	12.92	1.88	0.93	33.18	18.76	6.94
7000.00	10.46	22.16	13.79	13.70	1.92	0.95	33.34	19.20	7.03
7200.00	10.17	22.24	12.17	10.10	1.86	0.93	32.09	18.46	7.10
7400.00	9.64	22.36	10.42	9.54	1.96	0.96	31.60	17.97	7.23
7600.00	9.17	22.37	9.67	8.78	1.98	0.97	31.82	18.18	7.30
7800.00	8.55	22.59	8.72	6.42	1.91	0.91	30.40	17.02	7.46
8000.00	7.79	22.87	8.09	6.39	2.08	0.93	30.84	17.04	7.65

## 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=106.57mA @ Temperature = +85degC

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)
100.00	15.34	24.18	37.88	17.37	1.55	0.85	39.29	20.11	7.20
300.00	15.26	24.23	31.30	19.01	1.59	0.86	39.61	20.25	7.21
600.00	15.12	24.14	28.84	17.18	1.55	0.86	39.65	20.37	7.30
900.00	14.95	24.04	25.47	15.52	1.54	0.86	38.85	20.32	7.34
1000.00	14.90	23.96	24.43	15.34	1.54	0.86	39.35	20.48	7.36
1200.00	14.67	23.89	23.48	13.78	1.53	0.85	37.13	20.11	7.41
1400.00	14.45	23.82	22.42	13.29	1.55	0.85	36.94	19.95	7.48
1600.00	14.17	23.76	21.11	11.74	1.54	0.85	36.76	20.53	7.52
1800.00	13.86	23.72	19.99	11.70	1.57	0.85	35.35	19.90	7.51
2000.00	13.52	23.70	18.92	10.71	1.59	0.85	35.49	19.80	7.50
2200.00	13.25	23.70	18.13	10.91	1.63	0.86	36.01	20.35	7.53
2400.00	13.00	23.65	17.17	10.85	1.65	0.87	34.72	19.81	7.57
2600.00	12.75	23.52	16.09	10.61	1.64	0.88	34.66	20.08	7.66
2800.00	12.55	23.47	15.61	11.47	1.69	0.90	34.64	20.37	7.69
3000.00	12.32	23.39	14.82	11.46	1.70	0.91	33.21	20.15	7.64
3200.00	12.17	23.32	14.34	12.09	1.72	0.92	33.58	19.92	7.71
3400.00	11.93	23.31	14.26	12.36	1.76	0.93	33.94	20.55	7.77
3600.00	11.72	23.25	13.97	12.15	1.78	0.93	33.42	19.87	7.80
3800.00	11.55	23.14	14.39	12.10	1.81	0.93	32.64	20.14	7.85
4000.00	11.32	23.29	14.39	11.48	1.85	0.92	31.93	20.04	7.90
4200.00	11.16	23.23	14.78	11.25	1.87	0.92	32.01	19.69	7.95
4400.00	10.97	23.13	15.37	10.67	1.87	0.90	32.02	19.72	8.00
4600.00	10.82	23.22	15.63	10.38	1.92	0.90	31.58	19.29	8.03
4800.00	10.65	23.25	16.94	10.23	1.96	0.89	31.74	19.48	8.10
5000.00	10.45	23.33	17.36	9.66	2.00	0.88	31.10	18.84	8.14
5200.00	10.37	23.25	18.01	9.80	2.02	0.88	31.57	19.12	8.19
5400.00	10.29	23.19	19.69	9.92	2.04	0.87	31.24	18.80	8.28
5600.00	10.16	23.13	19.83	10.23	2.07	0.88	31.18	18.56	8.36
5800.00	10.12	23.02	20.59	11.30	2.12	0.89	31.40	18.48	8.45
6000.00	9.79	22.97	21.78	12.05	2.21	0.90	30.71	18.10	8.48
6200.00	9.77	22.87	19.43	12.78	2.20	0.92	30.82	17.78	8.54
6400.00	9.78	22.79	18.23	15.60	2.25	0.95	30.87	17.99	8.67
6600.00	9.58	22.76	16.92	14.24	2.25	0.95	29.95	17.62	8.80
6800.00	9.31	22.80	13.83	14.93	2.32	0.98	29.84	17.22	8.90
7000.00	8.94	22.77	12.81	15.31	2.38	1.00	30.32	17.48	9.03
7200.00	8.51	22.98	11.43	10.69	2.41	0.97	28.58	16.48	9.17
7400.00	7.81	23.10	10.04	10.63	2.57	1.01	28.57	16.52	9.32
7600.00	7.24	23.18	9.70	9.49	2.66	0.99	27.96	16.27	9.43
7800.00	6.46	23.31	8.80	7.27	2.69	0.94	26.83	15.24	9.60
8000.00	5.67	23.49	8.25	7.23	2.90	0.96	25.94	15.42	9.79

## 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=96.97mA @ Temperature = +85degC

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)
100.00	15.28	24.16	35.08	17.17	1.55	0.85	37.92	19.32	7.07
300.00	15.19	24.21	31.61	18.92	1.59	0.86	38.19	19.45	7.05
600.00	15.11	24.06	28.53	17.05	1.56	0.86	38.66	19.56	7.16
900.00	14.94	24.00	25.57	15.48	1.53	0.86	37.97	19.53	7.17
1000.00	14.85	23.89	24.45	15.14	1.54	0.86	38.36	19.66	7.19
1200.00	14.64	23.81	23.26	13.49	1.53	0.85	36.37	19.35	7.26
1400.00	14.38	23.76	22.14	13.34	1.54	0.86	36.36	19.20	7.31
1600.00	14.12	23.70	20.94	11.42	1.54	0.84	35.82	19.72	7.35
1800.00	13.81	23.64	19.86	11.76	1.56	0.86	34.53	19.18	7.36
2000.00	13.46	23.65	18.76	10.70	1.58	0.85	34.76	19.08	7.33
2200.00	13.21	23.59	17.99	10.99	1.61	0.86	35.23	19.52	7.36
2400.00	12.95	23.55	17.00	10.89	1.63	0.87	33.96	19.11	7.38
2600.00	12.70	23.40	16.03	10.55	1.63	0.88	34.04	19.33	7.47
2800.00	12.49	23.37	15.55	11.40	1.68	0.90	33.96	19.58	7.51
3000.00	12.27	23.31	14.78	11.48	1.68	0.91	32.73	19.45	7.46
3200.00	12.11	23.17	14.30	11.85	1.70	0.92	32.96	19.18	7.50
3400.00	11.89	23.17	14.15	12.17	1.74	0.93	33.55	19.85	7.56
3600.00	11.68	23.12	13.95	11.93	1.76	0.93	33.01	19.21	7.61
3800.00	11.48	23.02	14.35	11.94	1.79	0.93	32.26	19.49	7.65
4000.00	11.24	23.16	14.36	11.50	1.83	0.92	31.59	19.44	7.71
4200.00	11.12	23.13	14.72	11.05	1.86	0.92	31.59	19.11	7.76
4400.00	10.91	23.02	15.37	10.65	1.86	0.90	31.61	19.15	7.79
4600.00	10.76	23.09	15.66	10.22	1.90	0.90	31.42	18.73	7.83
4800.00	10.57	23.13	17.01	10.13	1.94	0.89	31.44	18.96	7.90
5000.00	10.39	23.19	17.35	9.60	1.99	0.87	30.71	18.34	7.95
5200.00	10.30	23.10	18.13	9.84	2.00	0.88	31.27	18.62	8.00
5400.00	10.22	23.09	19.81	9.85	2.03	0.87	30.88	18.36	8.07
5600.00	10.10	23.00	19.92	10.35	2.06	0.88	30.82	18.12	8.16
5800.00	10.04	22.90	20.67	10.85	2.09	0.89	31.08	18.05	8.23
6000.00	9.76	22.87	21.88	12.06	2.21	0.90	30.41	17.71	8.28
6200.00	9.69	22.76	19.54	12.67	2.19	0.92	30.51	17.35	8.36
6400.00	9.71	22.71	18.34	15.07	2.22	0.94	30.63	17.58	8.47
6600.00	9.55	22.67	16.98	14.08	2.25	0.94	29.60	17.25	8.57
6800.00	9.24	22.69	13.88	14.60	2.29	0.98	29.67	16.84	8.67
7000.00	8.92	22.71	12.84	15.09	2.37	0.99	30.02	17.11	8.79
7200.00	8.42	22.86	11.49	10.47	2.37	0.97	28.00	16.12	8.93
7400.00	7.77	23.01	10.10	10.59	2.56	1.00	28.40	16.15	9.07
7600.00	7.18	23.15	9.74	9.45	2.64	0.99	27.63	15.93	9.19
7800.00	6.40	23.29	8.82	7.12	2.65	0.94	26.48	14.88	9.33
8000.00	5.65	23.49	8.22	7.38	2.88	0.97	26.57	15.14	9.54

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

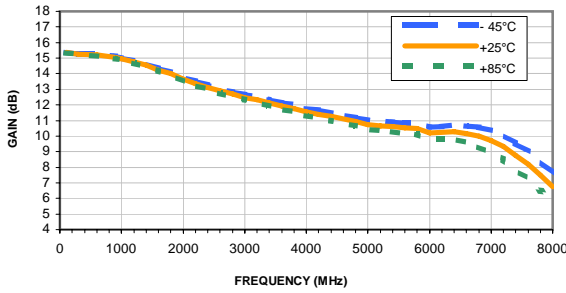
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.25V, Id=116.3mA @ Temperature = +85degC

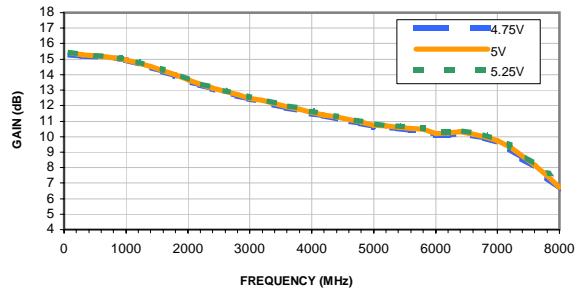
FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
100.00	15.35	24.22	40.33	17.45	1.55	0.85	40.83	20.84	7.37
300.00	15.22	24.39	33.57	19.14	1.59	0.87	41.38	20.99	7.35
600.00	15.17	24.21	28.53	17.40	1.57	0.86	40.81	21.11	7.45
900.00	14.99	24.13	25.77	15.62	1.55	0.86	39.96	21.03	7.48
1000.00	14.92	24.03	24.53	15.48	1.56	0.86	39.92	21.22	7.51
1200.00	14.70	23.94	23.54	13.79	1.54	0.85	37.75	20.78	7.57
1400.00	14.46	23.89	22.50	13.62	1.56	0.86	37.66	20.62	7.63
1600.00	14.21	23.84	21.15	11.77	1.55	0.85	37.41	21.26	7.68
1800.00	13.90	23.81	20.06	11.58	1.57	0.85	35.98	20.53	7.68
2000.00	13.55	23.85	18.97	10.85	1.60	0.86	36.05	20.45	7.63
2200.00	13.28	23.82	18.24	10.99	1.64	0.87	36.73	21.11	7.66
2400.00	13.01	23.76	17.32	10.86	1.67	0.87	35.16	20.42	7.72
2600.00	12.79	23.60	16.20	10.74	1.65	0.88	34.99	20.76	7.81
2800.00	12.58	23.57	15.72	11.50	1.71	0.90	34.80	21.09	7.83
3000.00	12.35	23.54	14.90	11.42	1.72	0.91	33.46	20.75	7.82
3200.00	12.20	23.39	14.42	12.04	1.73	0.92	33.87	20.58	7.87
3400.00	11.98	23.40	14.26	12.19	1.77	0.93	34.41	21.15	7.92
3600.00	11.77	23.36	14.03	11.85	1.79	0.93	33.72	20.44	7.96
3800.00	11.61	23.26	14.48	11.97	1.82	0.93	32.57	20.68	8.01
4000.00	11.34	23.40	14.42	11.72	1.87	0.93	32.23	20.56	8.08
4200.00	11.21	23.36	14.73	11.29	1.89	0.92	32.14	20.20	8.12
4400.00	11.01	23.23	15.41	10.69	1.89	0.91	32.43	20.20	8.19
4600.00	10.87	23.34	15.68	10.43	1.92	0.90	31.90	19.77	8.21
4800.00	10.71	23.35	16.99	10.21	1.97	0.89	31.96	19.93	8.26
5000.00	10.50	23.44	17.31	9.63	2.02	0.88	31.23	19.28	8.33
5200.00	10.43	23.36	18.11	9.94	2.03	0.88	31.77	19.54	8.38
5400.00	10.34	23.30	19.61	9.97	2.06	0.87	31.38	19.17	8.49
5600.00	10.23	23.23	19.85	10.47	2.09	0.88	31.27	18.94	8.58
5800.00	10.16	23.13	20.55	11.38	2.14	0.90	31.52	18.84	8.64
6000.00	9.84	23.09	21.75	12.36	2.22	0.91	30.78	18.40	8.69
6200.00	9.85	22.98	19.43	12.92	2.22	0.92	30.75	18.15	8.76
6400.00	9.81	22.88	18.33	15.44	2.26	0.95	30.79	18.32	8.89
6600.00	9.64	22.90	16.87	14.54	2.27	0.95	30.00	17.94	8.98
6800.00	9.36	22.89	13.88	14.76	2.33	0.98	30.01	17.54	9.12
7000.00	9.02	22.90	12.80	15.86	2.40	1.00	30.30	17.78	9.24
7200.00	8.53	23.03	11.43	10.67	2.40	0.97	28.83	16.79	9.39
7400.00	7.86	23.18	10.11	10.82	2.59	1.01	28.93	16.86	9.52
7600.00	7.25	23.30	9.69	9.83	2.69	1.00	28.07	16.59	9.62
7800.00	6.48	23.45	8.83	7.25	2.69	0.94	27.11	15.56	9.81
8000.00	5.71	23.58	8.27	7.55	2.93	0.97	27.02	15.71	10.04

## Typical Performance Curves

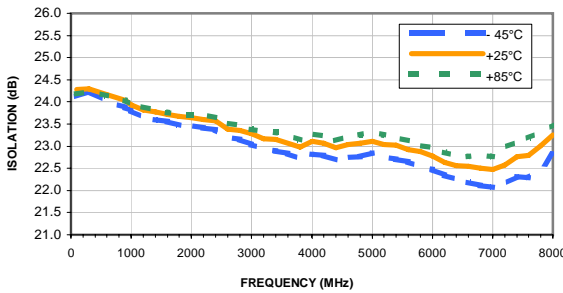
**GAIN vs. FREQUENCY & TEMPERATURE**  
INPUT POWER = -25dBm, Vd = 5.00V



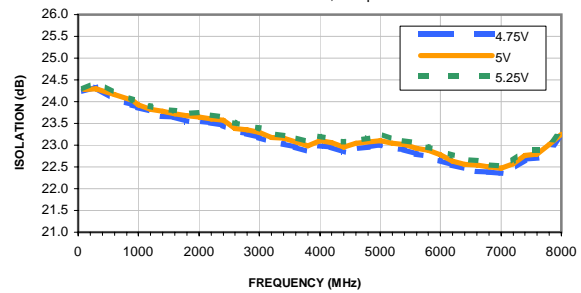
**GAIN vs. FREQUENCY & DEVICE VOLTAGE**  
INPUT POWER = -25dBm, Temperature = +25°C



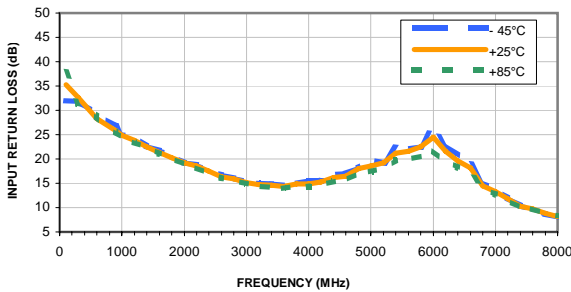
**ISOLATION vs. FREQUENCY & TEMPERATURE**  
INPUT POWER = -25dBm, Vd = 5.00V



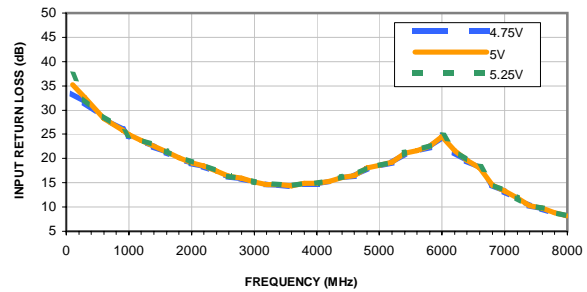
**ISOLATION vs. FREQUENCY & DEVICE VOLTAGE**  
INPUT POWER = -25dBm, Temperature = +25°C



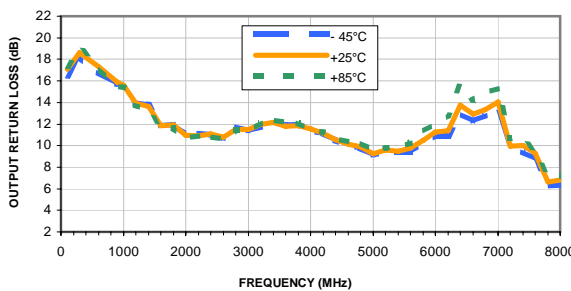
**INPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE**  
INPUT POWER = -25dBm, Vd = 5.00V



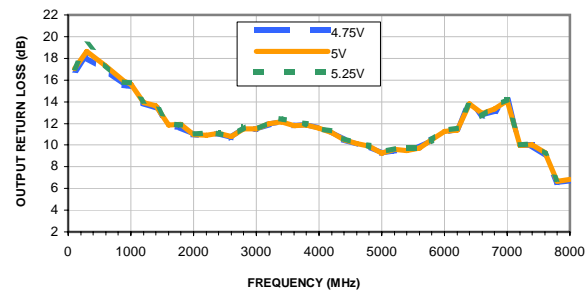
**INPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE**  
INPUT POWER = -25dBm, Temperature = +25°C



**OUTPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE**  
INPUT POWER = -25dBm, Vd = 5.00V



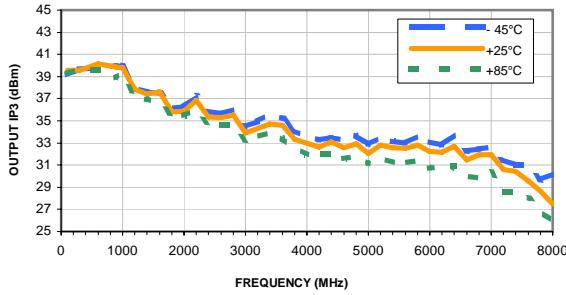
**OUTPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE**  
INPUT POWER = -25dBm, Temperature = +25°C



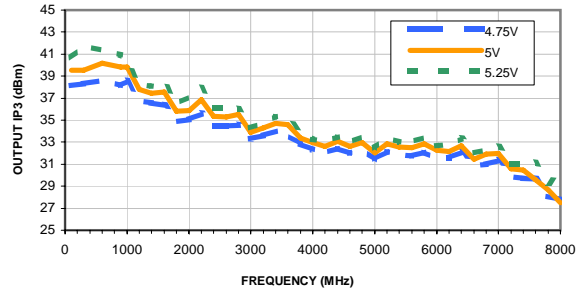


## Typical Performance Curves

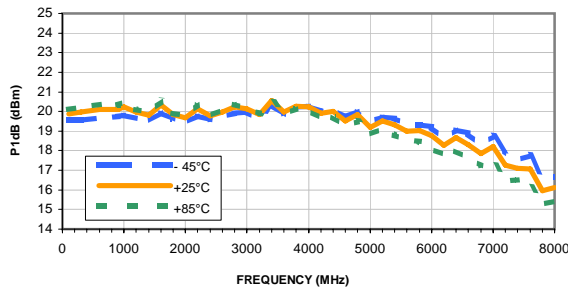
**OUTPUT IP3 vs. FREQUENCY & TEMPERATURE**  
OUTPUT POWER = 0 dBm/1tone, Vd = 5.00V



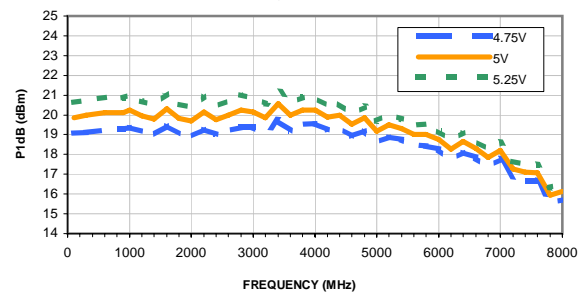
**OUTPUT IP3 vs. FREQUENCY & DEVICE VOLTAGE**  
OUTPUT POWER = 0 dBm/1tone, Temperature = +25°C



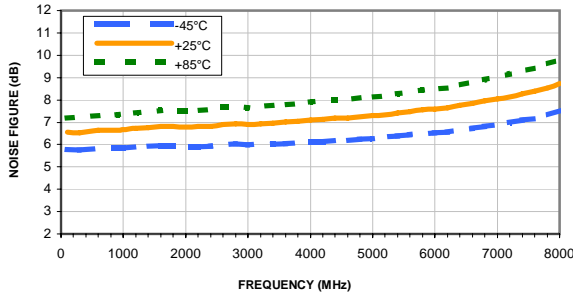
**P1dB vs. FREQUENCY & TEMPERATURE**  
Vd = 5.00V



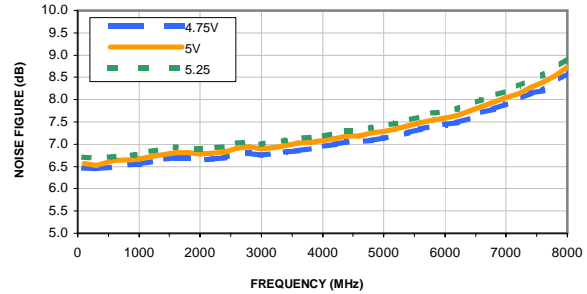
**P1dB vs. FREQUENCY & DEVICE VOLTAGE**  
Temperature = +25°C



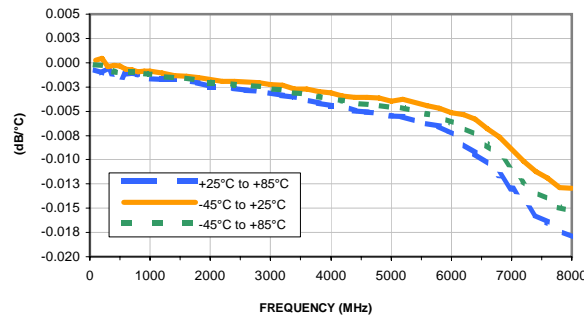
**NOISE FIGURE vs. FREQUENCY & TEMPERATURE**  
Vd = 5.00V



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



**GAIN VARIATION vs. FREQUENCY & TEMPERATURE**  
INPUT POWER = -25dBm, Vd = 5.00V





### 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.



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Mini-Circuits ISO 9001 & ISO 14001 Certified

# 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](http://www.minicircuits.com/pages/pdfs/tape.pdf)



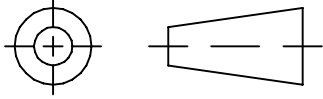
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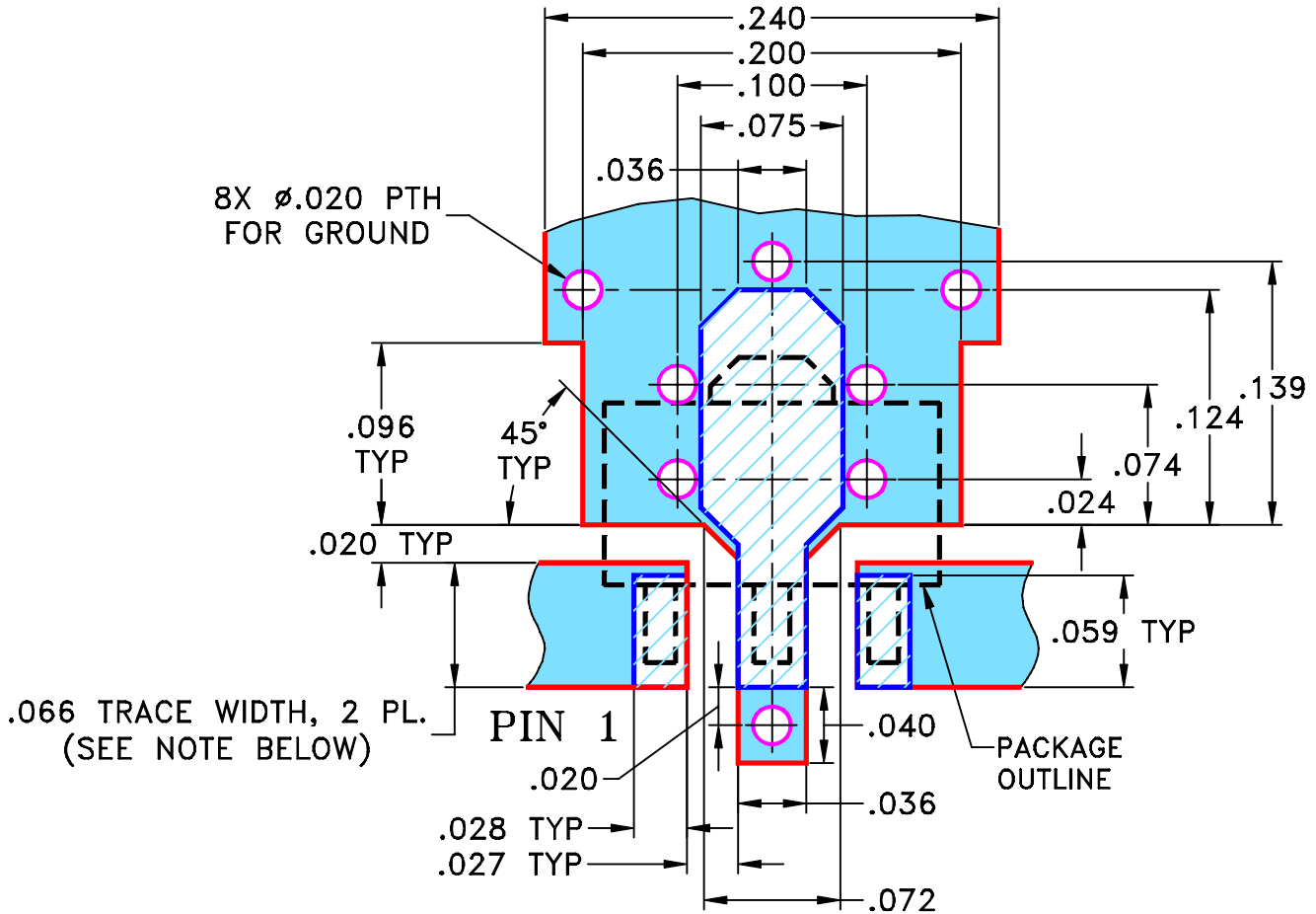
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M108433	NEW RELEASE	11/14/06	PW	IG
A	M124803	"04AM03" WAS "mz", MODIFIED TB IN TITLE	10/23/09	MMG	DJ

SUGGESTED MOUNTING CONFIGURATION  
FOR DF782 CASE STYLE, "04AM03" PIN CONNECTION



- NOTES:** 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.  
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



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 PW	11/14/06
TOLERANCES ON:	CHECKED IL	11/14/06
2 PL DECIMALS ±	APPROVED IG	11/14/06
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		



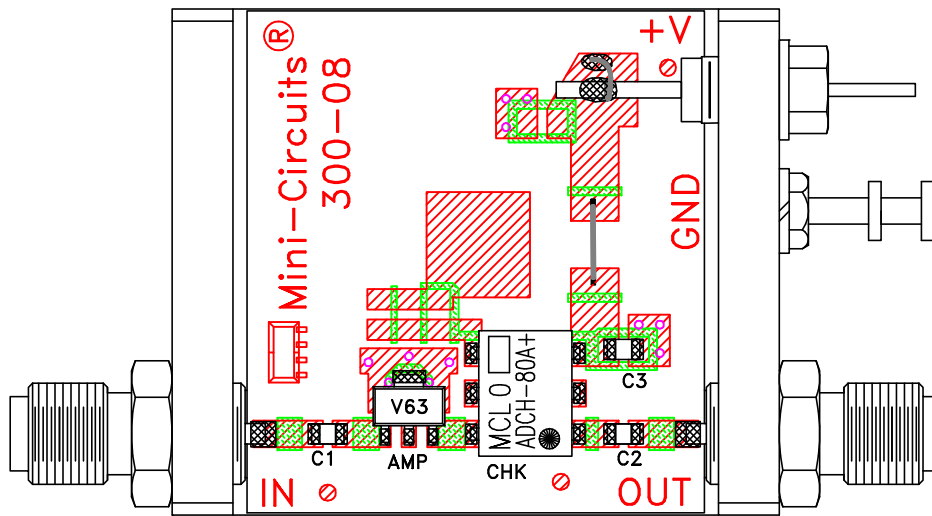
**Mini-Circuits®** 13 Neptune Avenue  
Brooklyn NY 11235

PL, 04AM03, DF782, GVA, TB-410-XX+

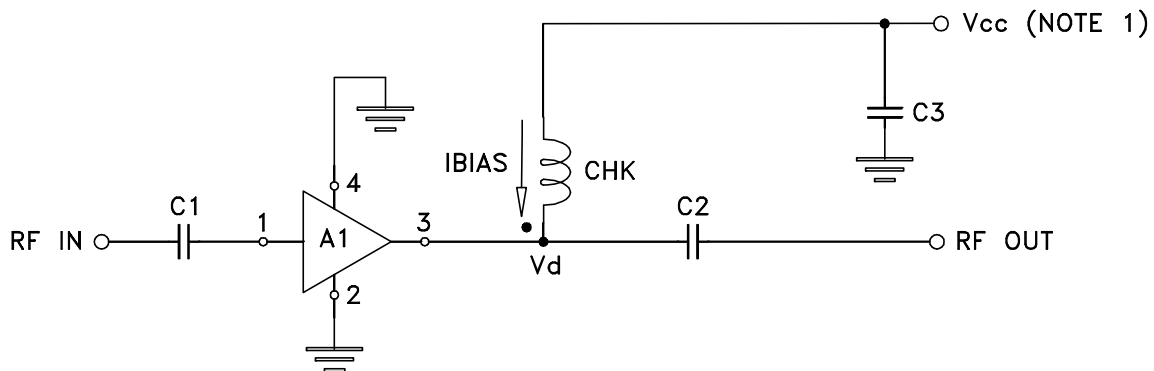
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SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-255	A
FILE:	98PL255	SCALE: 10:1	SHEET: 1 OF 1

# Evaluation Board and Circuit




TB-410-82+



COMPONENT	VALUE
A1	GVA-82+
C1 (NOTE 4)	2400 pF
C2 (NOTE 4)	2400 pF
C3 (bypass)	0.1 uF
CHK	Mini-Circuits ADCH-80A+

Schematic Diagram

- NOTE:**
1. Vcc voltage:  $+5 \pm 0.2V$ .
  2. SMA Female connectors.
  3. PCB material: Rogers R04350 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.

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



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

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