5 VOLT-SURFACE MOUNT

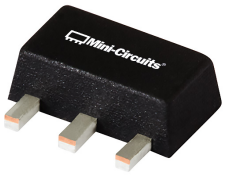
Monolithic Amplifier

GVA-81+

50Ω DC to 6 GHz

THE BIG DEAL

- Gain, 10 dB typ.
- High Pout, P1dB 19.5 dBm typ.
- High IP3, 41 dBm typ. at 1 GHz
- Ruggedized design
- Fixed 5V operation
- Unconditionally stable
- Excellent ESD Protection
- Transient protected, US patent 6,943,629
- Low additive phase noise, typically -171 dBc/Hz @10 KHz



Generic photo used for illustration purposes only

CASE STYLE: DF782

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

LTE Performance

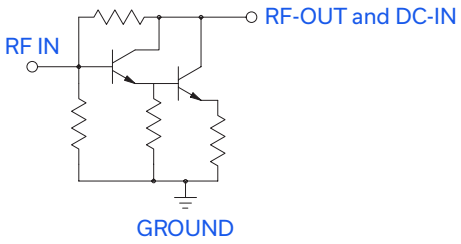
APPLICATIONS

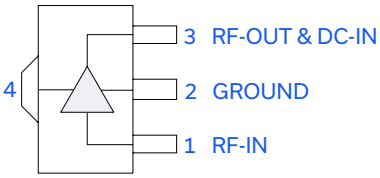
- Base station infrastructure
- Portable Wireless
- CATV & DBS
- MMDS & Wireless LAN
- LTE
- Suitable for low phase noise applications

PRODUCT OVERVIEW

GVA-81+ (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.

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.

A. Suitability for model replacement within a particular system must be determined by and is solely the responsibility of the customer based on, among other things, electrical performance criteria, stimulus conditions, application, compatibility with other components and environmental conditions and stresses.
B. The RFMD SBB4089Z part number is used for identification and comparison purposes only.

REV. C
ECO-010563
GVA-81+
240207

Monolithic Amplifier GVA-81+

ELECTRICAL SPECIFICATIONS[1] AT 25°C AND 5V, UNLESS NOTED

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range[2]		DC		6	GHz
Gain	0.1	9.5	10.5	11.5	dB
	1.0	—	10.5	—	
	2.0	9.0	10.0	11.0	
	3.0	—	9.3	—	
	4.0	8.0	8.7	10.0	
	6.0	—	8.1	—	
InpMagnitude of Gain Variation versus Temperature[3] (values are negative)	0.1	—	0.0005	—	dB/°C
	1.0	—	0.0010	—	
	2.0	—	0.0016	0.005	
	3.0	—	0.0020	—	
	4.0	—	0.0025	—	
	6.0	—	0.0036	—	
Input Return Loss	0.1	—	38.0	—	dB
	1.0	—	27.0	—	
	2.0	17	20.1	—	
	3.0	—	17.4	—	
	4.0	—	16.9	—	
	6.0	—	18.5	—	
Reverse Isolation	2.0		20.8		dB
Output Power at 1dB Compression	0.1	18.0	19.1	—	dBm
	1.0	18.0	19.1	—	
	2.0	18.0	19.7	—	
	3.0	—	20.0	—	
	4.0	—	19.4	—	
	6.0	—	17.7	—	
Output IP3	0.1	—	42.0	—	dBm
	1.0	—	41.3	—	
	2.0	34	36.6	—	
	3.0	—	35.0	—	
	4.0	—	33.2	—	
	6.0	—	31.1	—	
Noise Figure	0.1	—	7.3	7.9	dB
	1.0	—	7.3	—	
	2.0	—	7.4	7.9	
	3.0	—	7.6	—	
	4.0	—	7.7	8.2	
	6.0	—	8.3	—	
Additive Phase Noise 2 GHz, 10 KHz offset			-171		dBc/Hz
Group Delay	2.0		98		psec
Device Operating Voltage		4.8	5.0	5.2	V
Device Operating Current		94	103	112	mA
Device Current Variation vs. Temperature			62		µA/°C
Device Current Variation vs Voltage			0.036		mA/mV
Thermal Resistance, junction-to-ground lead			68		°C/W

(1) Measured on Mini-Circuits test board TB-313. See Characterization Test Circuit (Fig. 1)
(2) Guaranteed specification DC*-7 GHz. *Low frequency cut off determined by external coupling capacitors and RF Choke (RFC).
(3) (Gain at 85°C, Gain at -45°C)/130

Monolithic Amplifier GVA-81+

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	0.855W
Input Power	13dBm
DC Voltage on Pin 3	5.9V

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

CHARACTERIZATION TEST CIRCUIT

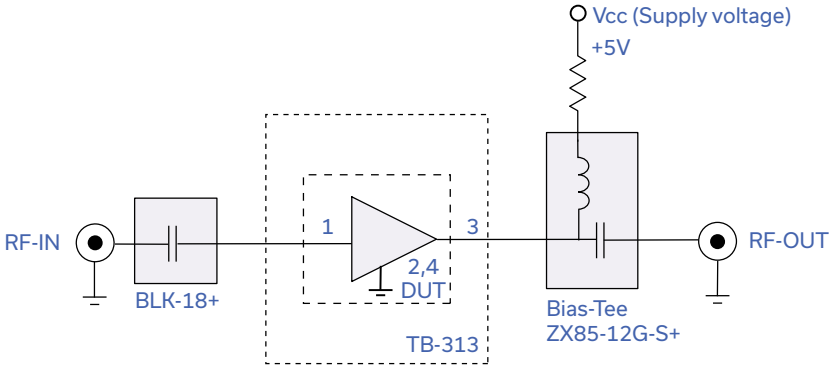


Fig 1. Block Diagram of Test Circuit used for characterization. (DUT soldered on Mini-Circuits Test Board TB-313)
Gain, Output power at 1dB compression (P1 dB) and output IP3 (OIP3) are measured using R&S Network Analyzer ZVA-24. Noise Figure measured using Agilent's N5242A PNA-X microwave network analyzer.

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

RECOMMENDED APPLICATION CIRCUIT

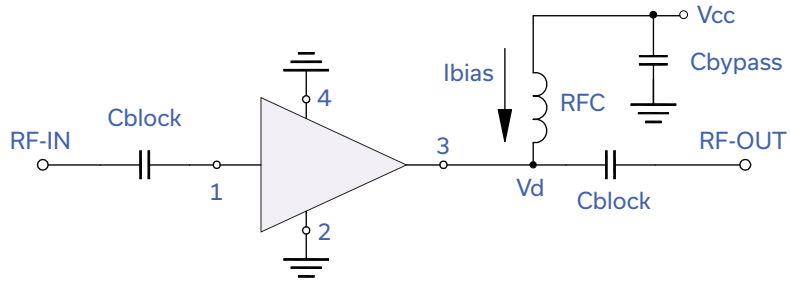
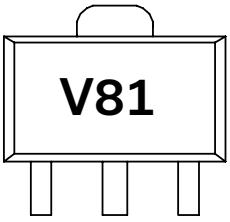


Fig 2. Test Board includes case, connectors, and components soldered to PCB

PRODUCT MARKING



Marking may contain other features or characters for internal lot control

Monolithic Amplifier GVA-81+

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

Performance Data	Data Table Swept Graphs S-Parameter (S2P Files) Data Set (.zip file)
Case Style	DF782 (SOT 89) Plastic package, exposed paddle 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	PL-255
Evaluation Board	TB-410-81+
Environmental Ratings	ENV08T1

ESD RATING

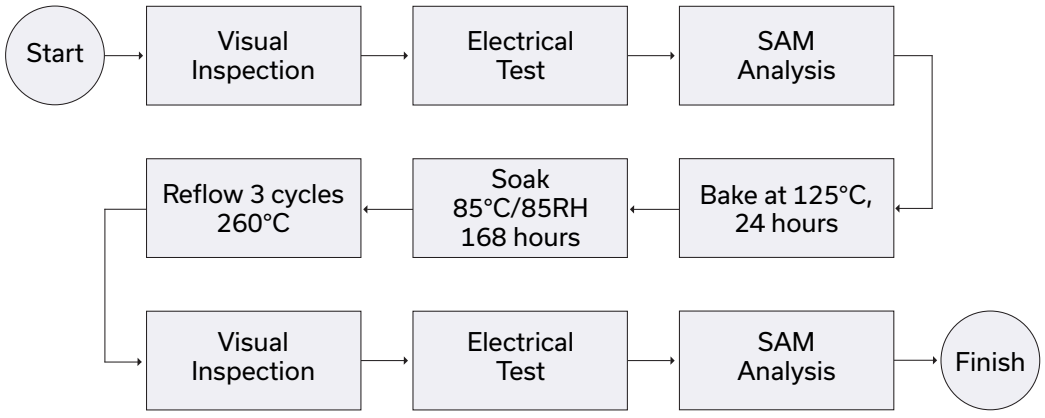
Human Body Model (HBM): Class 1C (1000v to < 2000v) in accordance with ANSI/ESD STM 5.1 - 2001

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



NOTES

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

MMIC Amplifier GVA-81+

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: I = 100mA, Vd = 5V @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)
20	10.57	20.80	21.06	15.98	1.73	0.32	38.23	17.89	7.24
100	10.47	20.47	26.74	27.48	1.73	0.32	40.29	18.64	7.53
220	10.49	20.46	26.73	28.32	1.73	0.32	39.74	18.76	7.61
300	10.48	20.48	26.73	29.31	1.73	0.31	39.75	18.90	7.66
420	10.39	20.55	26.60	29.23	1.76	0.31	39.27	18.93	7.70
620	10.38	20.51	25.33	27.28	1.75	0.31	38.60	18.90	7.74
820	10.29	20.57	24.68	25.85	1.77	0.30	38.13	18.87	7.76
1000	10.24	20.59	23.81	24.39	1.78	0.30	37.75	18.59	7.78
1220	10.14	20.62	22.92	22.84	1.80	0.29	37.42	18.57	7.80
1420	10.04	20.67	22.40	21.86	1.82	0.29	37.20	18.56	7.80
1500	9.99	20.70	22.18	21.41	1.83	0.29	37.09	17.45	7.79
1620	9.93	20.70	21.75	20.74	1.84	0.28	37.08	18.67	7.79
1820	9.83	20.78	21.33	20.01	1.87	0.28	36.59	19.05	7.79
2000	9.72	20.82	20.89	19.20	1.89	0.27	36.32	18.60	7.82
2020	9.71	20.81	20.85	19.10	1.89	0.27	36.24	19.26	7.82
2220	9.60	20.87	20.51	18.40	1.91	0.26	36.02	19.31	7.84
2420	9.49	20.95	20.45	17.83	1.94	0.26	35.71	19.12	7.85
2620	9.36	20.98	20.35	17.39	1.97	0.25	35.45	19.33	7.88
2820	9.25	21.04	20.15	16.95	2.00	0.24	35.25	19.09	7.91
3000	9.17	21.06	20.39	16.55	2.02	0.24	35.01	19.02	7.90
3020	9.14	21.11	20.41	16.52	2.03	0.24	34.92	19.13	7.89
3420	8.96	21.17	21.16	16.00	2.08	0.23	34.24	18.90	7.88
3820	8.76	21.27	22.19	15.97	2.15	0.22	33.98	18.87	7.93
4000	8.67	21.35	22.87	15.99	2.19	0.22	33.82	18.77	7.96
4020	8.68	21.34	23.06	15.97	2.19	0.22	33.81	18.80	7.96
4220	8.59	21.36	23.28	15.99	2.22	0.22	33.60	18.41	8.00
4420	8.49	21.40	22.71	15.79	2.25	0.22	33.17	18.47	8.05
4620	8.39	21.45	21.37	15.65	2.28	0.22	32.96	18.41	8.12
4820	8.27	21.51	19.37	15.18	2.31	0.22	32.52	18.29	8.20
5000	8.14	21.57	17.60	14.62	2.34	0.22	32.35	18.12	8.28
5220	7.95	21.68	15.44	13.61	2.37	0.22	31.97	17.92	8.38
5620	7.53	21.90	12.28	11.74	2.42	0.23	31.45	17.40	8.50
5820	7.26	22.01	11.07	10.98	2.45	0.23	31.20	17.21	8.63
6000	7.01	22.18	10.03	10.30	2.48	0.24	30.83	16.84	8.73
6220	6.65	22.29	9.04	9.64	2.50	0.24	30.57	16.35	8.85
6420	6.30	22.49	8.14	9.13	2.53	0.25	30.36	15.99	8.96
6620	5.92	22.63	7.48	8.71	2.57	0.25	29.90	15.96	9.08
6820	5.48	22.86	6.91	8.42	2.64	0.25	29.90	15.67	9.31
7000	5.12	23.02	6.48	8.16	2.69	0.25	29.40	15.67	9.46

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: I = 97mA, Vd = 5V @Temperature = -40degC

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)
20	10.42	20.65	22.52	17.66	1.75	0.32	39.20	17.84	7.12
100	10.52	20.49	27.99	26.53	1.73	0.32	39.77	18.74	6.89
220	10.54	20.45	29.48	25.81	1.72	0.32	40.28	18.69	6.86
300	10.52	20.48	28.25	27.47	1.73	0.32	40.24	18.76	6.88
420	10.45	20.52	27.00	30.31	1.74	0.31	39.87	18.81	6.91
620	10.45	20.49	25.04	27.41	1.74	0.31	39.12	18.79	6.94
820	10.36	20.53	25.16	25.18	1.75	0.31	38.64	18.79	6.96
1000	10.32	20.54	24.21	24.12	1.76	0.30	38.29	18.67	6.99
1220	10.23	20.56	23.49	22.89	1.77	0.30	37.97	18.63	6.99
1420	10.14	20.58	22.36	22.58	1.79	0.29	37.75	18.69	6.98
1500	10.09	20.61	22.05	22.18	1.80	0.29	37.75	17.63	6.97
1620	10.03	20.63	21.51	21.47	1.81	0.29	37.92	18.90	6.98
1820	9.92	20.68	21.25	20.61	1.83	0.28	37.22	19.09	6.98
2000	9.84	20.67	21.24	20.02	1.84	0.28	36.95	18.76	6.98
2020	9.82	20.69	21.26	19.79	1.85	0.28	36.93	19.16	6.98
2220	9.70	20.77	21.25	18.73	1.88	0.27	36.75	19.22	7.00
2420	9.58	20.79	20.75	17.86	1.90	0.26	36.38	19.11	7.01
2620	9.46	20.89	20.64	16.90	1.93	0.26	36.16	19.27	7.04
2820	9.35	20.90	20.55	16.50	1.95	0.25	36.06	19.10	7.05
3000	9.26	20.95	20.86	16.22	1.97	0.25	35.85	19.05	6.99
3020	9.25	20.96	20.87	16.33	1.98	0.25	35.81	19.24	6.98
3420	9.07	21.03	21.37	16.12	2.03	0.24	35.11	18.98	6.93
3820	8.90	21.12	21.62	16.89	2.10	0.23	34.90	19.05	6.96
4000	8.83	21.14	22.47	16.64	2.12	0.23	34.72	19.01	6.99
4020	8.81	21.16	22.68	16.72	2.13	0.23	34.71	18.99	6.99
4220	8.74	21.19	23.73	16.58	2.15	0.23	34.55	18.64	7.05
4420	8.65	21.22	23.42	16.07	2.18	0.23	34.13	18.66	7.12
4620	8.55	21.26	22.03	15.85	2.20	0.23	33.97	18.60	7.20
4820	8.43	21.33	19.67	15.19	2.24	0.23	33.45	18.47	7.23
5000	8.29	21.42	17.75	14.16	2.26	0.23	33.29	18.29	7.29
5020	8.28	21.41	17.58	14.10	2.26	0.23	33.10	18.26	7.31
5220	8.10	21.51	14.90	13.24	2.29	0.24	32.84	18.24	7.40
5620	7.71	21.70	11.87	11.85	2.32	0.24	32.38	17.72	7.56
5820	7.50	21.84	11.43	10.97	2.36	0.24	32.04	17.66	7.65
6000	7.25	21.95	10.49	10.13	2.38	0.25	31.71	17.22	7.78
6020	7.22	22.01	10.38	10.02	2.39	0.25	31.55	17.20	7.78
6220	6.99	22.03	9.22	9.60	2.36	0.26	31.36	16.72	7.89
6420	6.71	22.16	8.62	9.30	2.40	0.25	31.14	16.55	7.94
6620	6.42	22.27	8.05	8.62	2.40	0.26	30.60	16.58	8.09
6820	6.05	22.47	7.17	8.07	2.41	0.27	30.45	15.95	8.29
7000	5.67	22.67	6.53	7.73	2.44	0.28	30.15	15.94	8.43

Typical Performance Data

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

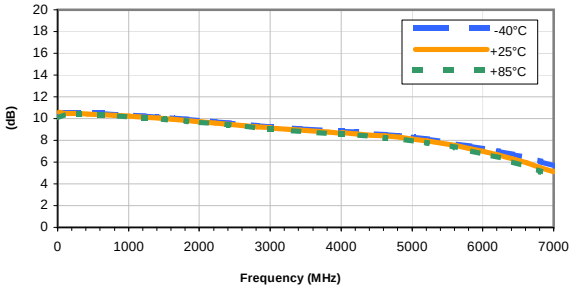
TEST CONDITIONS: I = 102mA, Vd = 5V @Temperature = +85degC

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)
20	10.04	20.90	22.37	15.91	1.85	0.30	37.55	17.81	8.52
100	10.40	20.46	25.45	27.42	1.74	0.31	39.81	18.85	8.31
220	10.43	20.45	24.27	32.02	1.73	0.31	39.26	18.80	8.31
300	10.41	20.47	24.68	33.08	1.74	0.31	39.26	18.92	8.35
420	10.33	20.52	26.03	29.77	1.76	0.31	38.82	18.96	8.39
620	10.32	20.49	24.71	26.66	1.76	0.31	38.10	18.95	8.42
820	10.22	20.57	24.40	25.06	1.78	0.30	37.60	18.90	8.45
1000	10.17	20.58	23.63	24.09	1.79	0.30	37.20	18.57	8.47
1220	10.07	20.64	22.82	22.73	1.81	0.29	36.78	18.56	8.48
1420	9.98	20.67	22.57	21.72	1.83	0.29	36.53	18.53	8.48
1500	9.93	20.70	22.26	21.15	1.84	0.28	36.42	17.44	8.49
1620	9.87	20.72	21.96	20.58	1.85	0.28	36.41	18.47	8.49
1820	9.76	20.77	21.43	19.79	1.88	0.27	35.78	18.84	8.51
2000	9.67	20.82	20.82	19.16	1.90	0.27	35.44	18.63	8.52
2020	9.65	20.86	20.81	19.03	1.91	0.27	35.35	19.20	8.52
2220	9.53	20.90	20.42	18.33	1.93	0.26	35.13	19.25	8.55
2420	9.41	20.93	20.18	17.57	1.95	0.25	34.77	19.06	8.57
2620	9.29	21.01	19.82	17.15	1.98	0.25	34.47	19.23	8.60
2820	9.18	21.04	19.42	16.88	2.01	0.24	34.30	18.98	8.63
3000	9.08	21.15	19.46	16.45	2.05	0.23	34.02	18.92	8.59
3020	9.07	21.13	19.44	16.58	2.05	0.23	33.97	19.07	8.59
3420	8.85	21.28	19.97	15.71	2.12	0.22	33.29	18.71	8.55
3820	8.66	21.35	21.40	15.79	2.18	0.22	33.00	18.70	8.61
4000	8.57	21.39	22.16	15.50	2.21	0.22	32.82	18.54	8.66
4020	8.56	21.40	22.39	15.55	2.22	0.22	32.80	18.56	8.66
4220	8.46	21.43	22.15	15.56	2.25	0.21	32.66	18.13	8.72
4420	8.37	21.48	21.90	15.32	2.28	0.21	32.24	18.21	8.77
4620	8.26	21.51	20.60	15.37	2.31	0.21	31.97	18.05	8.84
4820	8.11	21.58	18.57	14.83	2.35	0.21	31.60	18.01	8.90
5000	7.96	21.65	16.73	14.36	2.38	0.21	31.45	17.84	8.97
5020	7.95	21.66	16.57	14.28	2.39	0.21	31.34	17.58	8.98
5220	7.77	21.73	15.02	13.58	2.42	0.21	31.08	17.51	9.06
5620	7.35	21.90	12.33	12.09	2.47	0.22	30.59	17.05	9.25
5820	7.06	22.05	10.81	11.01	2.49	0.22	30.45	16.81	9.40
6000	6.77	22.19	9.74	10.31	2.52	0.23	30.02	16.38	9.53
6020	6.73	22.22	9.60	10.11	2.52	0.23	30.01	16.45	9.54
6220	6.40	22.36	8.83	9.48	2.55	0.24	29.78	16.09	9.68
6420	6.01	22.55	7.95	8.98	2.59	0.24	29.59	15.62	9.81
6620	5.57	22.76	7.15	8.31	2.61	0.25	29.18	15.38	10.01
6820	5.11	22.94	6.48	7.98	2.65	0.25	29.12	15.30	10.21
7000	4.71	23.06	6.23	7.93	2.74	0.25	28.84	15.04	10.34

Typical Performance Curves

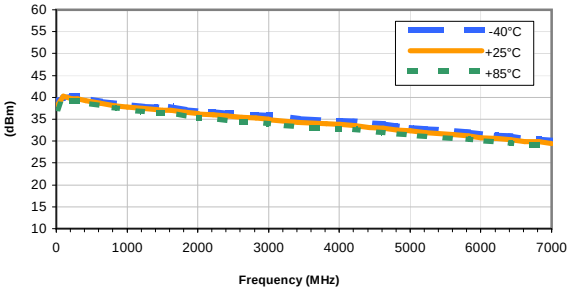
GAIN vs. FREQUENCY & TEMPERATURE

INPUT POWER = -25, VOLTAGE = 5V



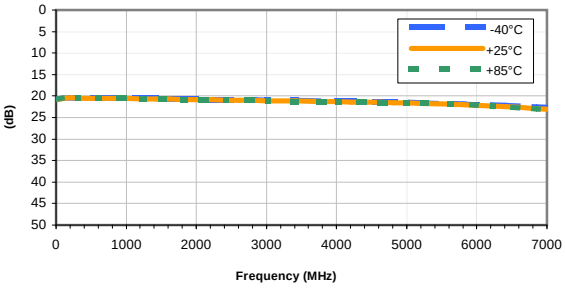
OUTPUT IP3 vs. FREQUENCY & TEMPERATURE

INPUT POWER = -25, VOLTAGE = 5V



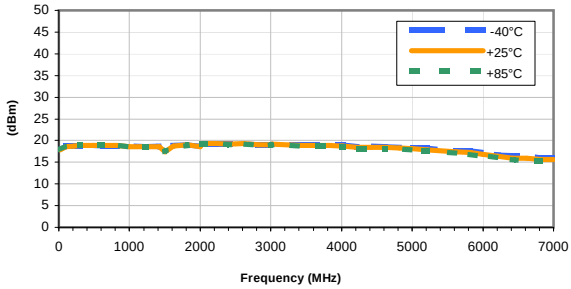
ISOLATION vs. FREQUENCY & TEMPERATUREE

INPUT POWER = -25, VOLTAGE = 5V



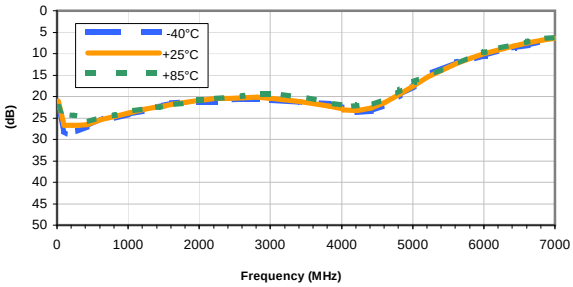
OUTPUT POWER at 1dB COMPRESSION vs. FREQUENCY & TEMPERATUREE

VOLTAGE = 5V



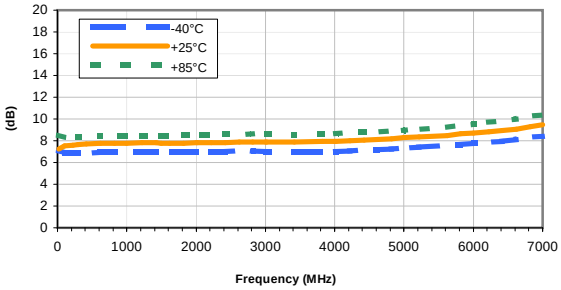
INPUT RETURN LOSS vs. FREQUENCY & TEMPERATUR

INPUT POWER = -25, VOLTAGE = 5V



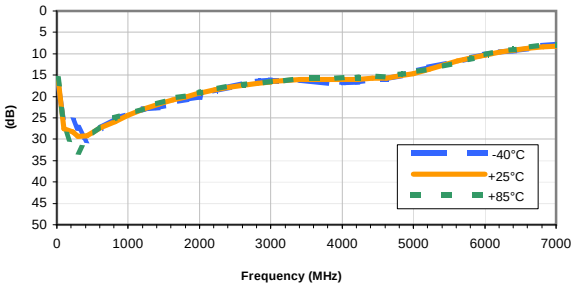
NOISE FIGURE vs. FREQUENCY & TEMPERATURE

VOLTAGE = 5V



OUTPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE

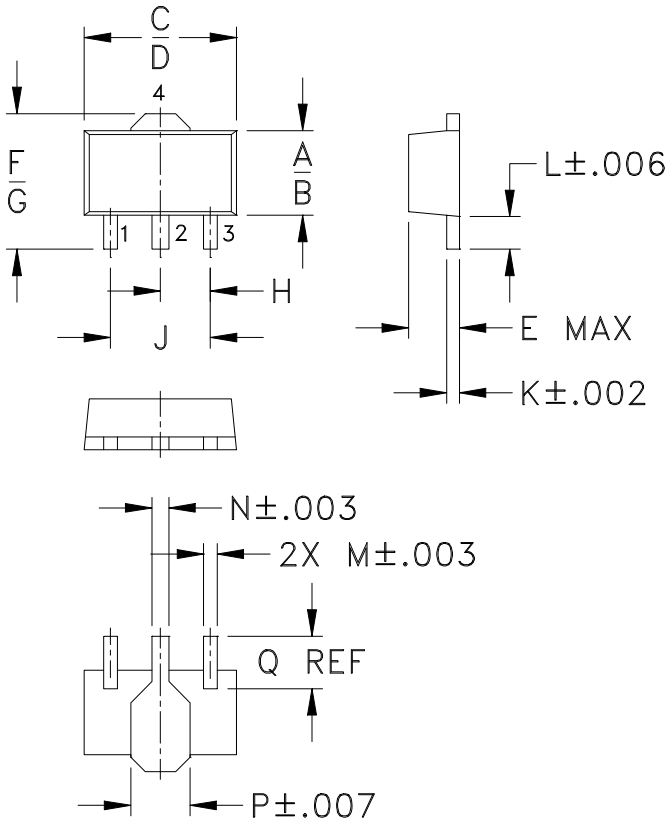
INPUT POWER = -25, VOLTAGE = 5V



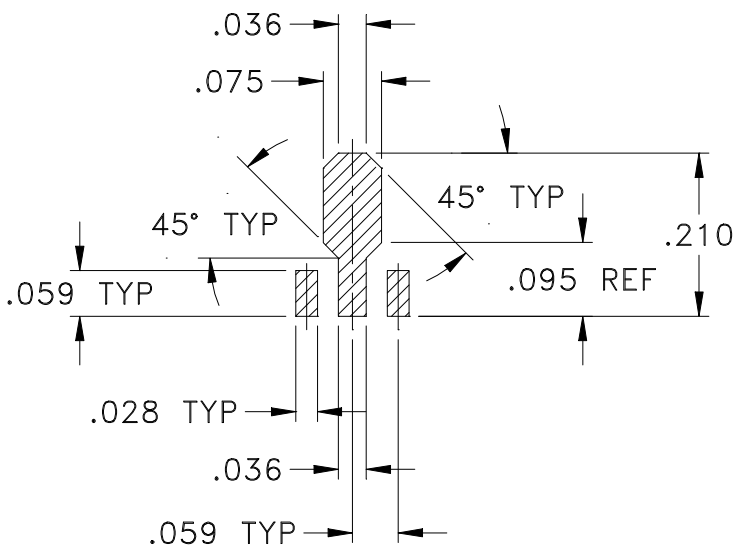
Case Style DF

DF782

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE #	A	B	C	D	E	F	G	H	J	K	L	M
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. ± .01; 3Pl. ± .005

Notes:

1. Case material: Plastic.
2. 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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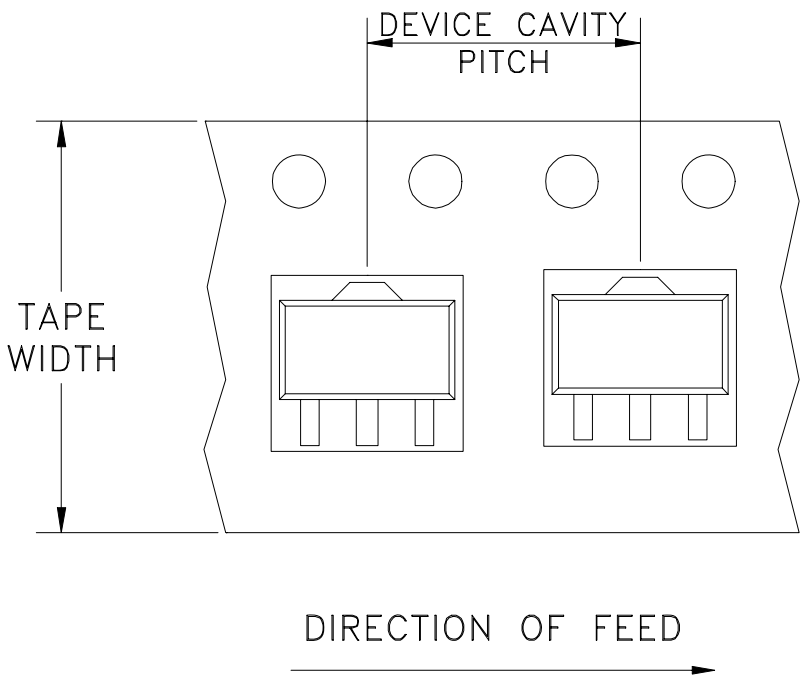
Tape & Reel Packaging TR-F55

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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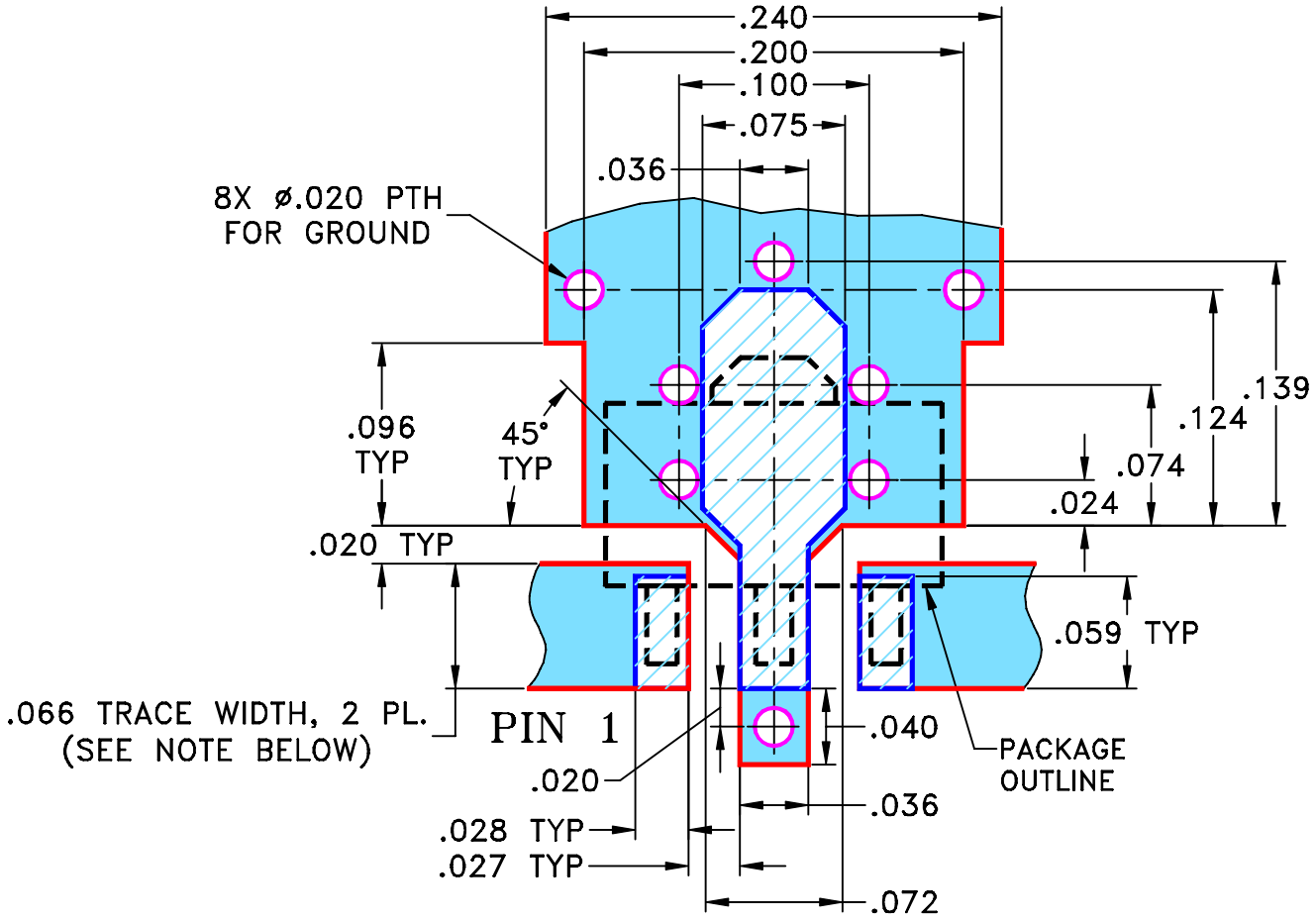
THIRD ANGLE PROJECTION

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 ±			

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

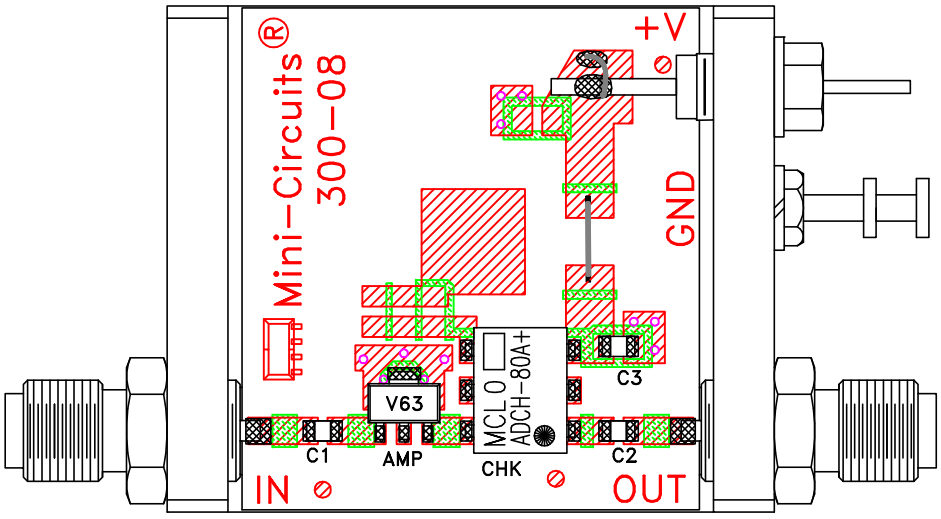
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

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

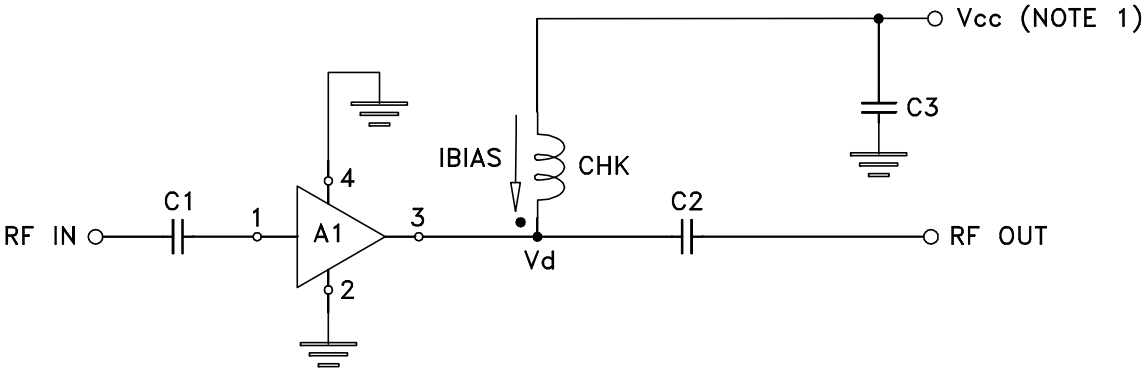
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-255	A

FILE:	SCALE:	SHEET:
98PL255	10:1	1 OF 1

Evaluation Board and Circuit



TB-410-81+



COMPONENT	VALUE
A1	GVA-81+
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±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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Environmental Specifications ENV08T1

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

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

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

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