5 Volt-Surface Mount

Monolithic Amplifier DC-6 GHz

Product Features

- 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

GVA-81+

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

LTE Performance

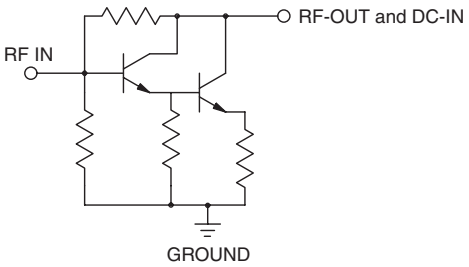
Typical Applications

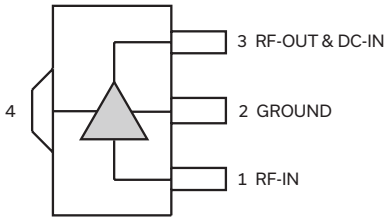
- Base station infrastructure
- Portable Wireless
- CATV & DBS
- MMDS & Wireless LAN
- LTE
- Suitable for low phase noise applications

General Description

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.

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

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	—	
Magnitude 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	—	
Output Return Loss	0.1	—	21.4	—	dB
	1.0	—	20.6	—	
	2.0	14	17.4	—	
	3.0	—	14.5	—	
	4.0	—	13.1	—	
	6.0	—	14.8	—	
Reverse Isolation	2.0		20.8		dB
Output Power @1 dB 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			-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

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

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

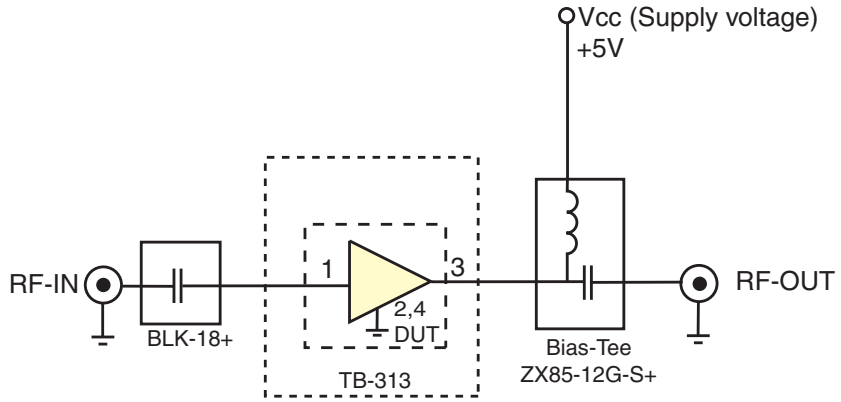
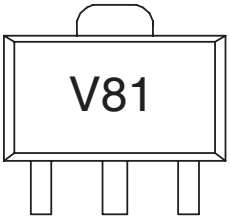


Fig 1. Block Diagram of Test Circuit used for characterization. (DUT soldered on Mini-Circuits Test Board TB-313)

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.

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: Matte-Tin

Tape & Reel: F55
7" Reels with 20, 50, 100, 200, 500, 1K devices

Suggested Layout for PCB Design: PL-255

Evaluation Board: TB-410-81+

Environmental Ratings: ENV08T1

Recommended Application Circuit

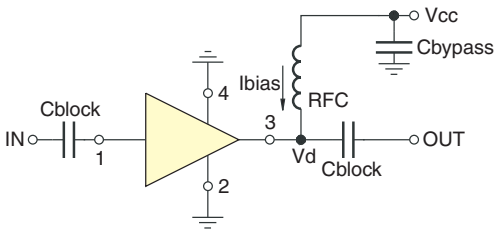


Fig 2. Test Board includes case, connectors, and components soldered to PCB

ESD Rating

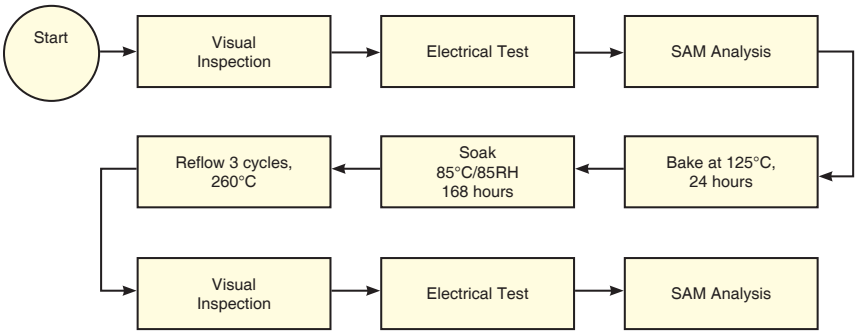
Human Body Model (HBM): Class 1C (1000v to < 2000v) in accordance with ANSI/ESD STM 5.1 - 2001

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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