

5 Volt-Surface Mount

# Monolithic Amplifier

DC-6 GHz

## Product Features

- High Gain, 24 dB typ. at 100 MHz
- High IP3, 37 dBm typ. at 100 MHz
- High Pout, P1dB 20.5 dBm typ. at 100 MHz
- Fixed 5V operation
- Unconditionally stable
- Transient protected
- Excellent ESD Protection
- Aqueous washable
- Protected by US patent 6,943,629

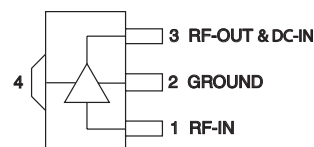
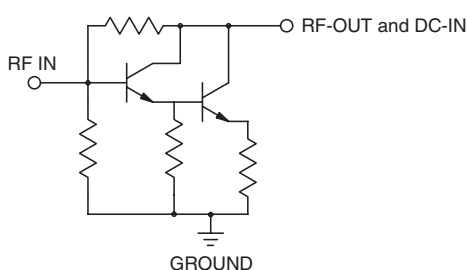
## Typical Applications

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

## General Description

GVA-84+ (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. Expected MTBF is 1200 years at 85°C case temperature. GVA-84+ 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.



**GVA-84+**

CASE STYLE: DF782  
PRICE: \$1.82 ea. QTY. (25)

+ RoHS compliant in accordance  
with EU Directive (2002/95/EC)

The +Suffix has been added in order to identify RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications.

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RF/IF MICROWAVE COMPONENTS

REV. B  
M108520  
GVA-84+  
ED-11756/5E  
070731  
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## Electrical Specifications at 25°C and 5V, unless noted

Parameter		Min.	Typ.	Max.	Units	Cpk
Frequency Range <sup>(1)</sup>		DC		6	GHz	
Gain	f=0.1 GHz f=1 GHz f=2 GHz f=3 GHz f=4 GHz f=6 GHz	22.9 17.4 13.8	24.1 21.7 18.4 16.0 14.6 12.5	25.3 19.9 16.3	dB	≥1.5
Magnitude of Gain Variation versus Temperature (values are negative)	f=0.1 GHz f=1 GHz f=2 GHz f=3 GHz f=4 GHz f=6 GHz		0.0004 0.0021 0.0032 0.0044 0.0058 0.0131	0.006	dB/°C	
Input Return Loss	f=0.1 GHz f=1 GHz f=2 GHz f=3 GHz f=4 GHz f=6 GHz	15	22.9 20.6 18.5 18.1 19.1 17.9		dB	
Output Return Loss	f=0.1 GHz f=1 GHz f=2 GHz f=3 GHz f=4 GHz f=6 GHz	6	23.3 10.7 7.7 7.1 7.0 6.3		dB	
Reverse Isolation	f=2 GHz		26.5		dB	
Output Power @ 1 dB compression	f=0.1 GHz f=1 GHz f=2 GHz f=3 GHz f=4 GHz f=6 GHz	19.4 19.5 19.6	20.4 20.5 20.6 21.0 19.9 17.0		dBm	≥1.5
Saturated Output Power (at 3dB compression)	f=0.1 GHz f=1 GHz f=2 GHz f=3 GHz f=4 GHz f=6 GHz		21.7 22.3 22.3 22.2 21.0 18.9		dBm	
Output IP3	f=0.1 GHz f=1 GHz f=2 GHz f=3 GHz f=4 GHz f=6 GHz	33 32.2 32.9	36.7 35.8 36.6 35.8 34.9 33.0		dBm	≥1.5
Noise Figure	f=0.1 GHz f=1 GHz f=2 GHz f=3 GHz f=4 GHz f=6 GHz		5.5 5.6 5.5 5.5 5.6 6.2	6.5 6.5 6.6	dB	≥1.5
Group Delay	f=2 GHz		94		psec	
Device Operating Voltage		4.8	5.0	5.2	V	
Device Operating Current		85	108	130	mA	
Device Current Variation vs. Temperature at 5V			61.8		μA/°C	
Device Current Variation vs Voltage at 25°C			0.058		mA/mV	
Thermal Resistance, junction-to-case <sup>(2)</sup>			64		°C/W	

<sup>(1)</sup>Guaranteed specification DC-6 GHz. Low frequency cut off determined by external coupling capacitors.<sup>(2)</sup>Case is defined as ground leads.

## Absolute Maximum Ratings

Parameter	Ratings
Operating Temperature <sup>(3)</sup>	-45°C to 85°C
Storage Temperature	-65°C to 150°C
Operating Current	160mA
Power Dissipation	1W
Input Power	13dBm

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

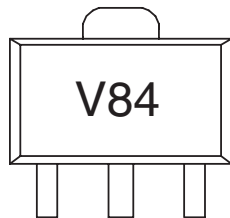
<sup>(3)</sup>Based on typical case temperature rise 10°C above ambient.

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RF/IF MICROWAVE COMPONENTS

## Product Marking



## 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/nickel

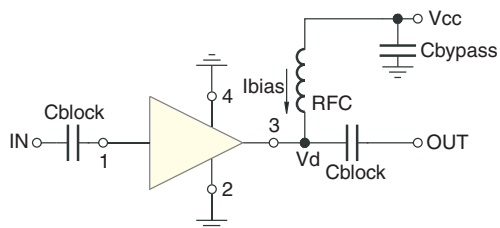
**Tape & Reel: F55**

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

**Evaluation Board: TB-410-84+**

**Environmental Ratings: ENV08T2**

## Recommended Application Circuit



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-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

