

Surface Mount

Monolithic Amplifier

DC-6 GHz

Product Features

- DC to 6 GHz
- Fixed 5V operation
- High Gain, 24 dB typ. at 100 MHz
- High IP3, 37 dBm typ.
- High Pout, P1dB 20.5dBm typ
- 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.



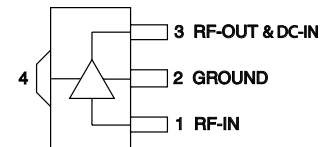
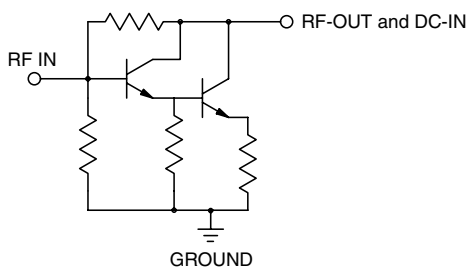
GVA-84+

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.

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.

Mini-Circuits®
ISO 9001 ISO 14001 CERTIFIED

ALL NEW
minicircuits.com

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

REV. B
M108520
GVA-84+
ED-11756/5E
070731
Page 1 of 4

Electrical Specifications at 25°C and 5V, unless noted

Parameter	Min.	Typ.	Max.	Units	Cpk
Frequency Range*	DC		6	GHz	
Gain					≥1.5
	f=0.1 GHz	22.9	24.1	25.3	
	f=1 GHz		21.7		
	f=2 GHz	17.4	18.4	19.9	dB
	f=3 GHz		16.0		
	f=4 GHz	13.8	14.6	16.3	
	f=6 GHz		12.5		
Magnitude of Gain Variation versus Temperature (values are negative)					
	f=0.1 GHz		0.0004		
	f=1 GHz		0.0021	0.006	dB/°C
	f=2 GHz		0.0032		
	f=3 GHz		0.0044		
	f=4 GHz		0.0058		
	f=6 GHz		0.0131		
Input Return Loss					
	f=0.1 GHz		22.9		
	f=1 GHz		20.6		
	f=2 GHz	15	18.5		dB
	f=3 GHz		18.1		
	f=4 GHz		19.1		
	f=6 GHz		17.9		
Output Return Loss					
	f=0.1 GHz		23.3		
	f=1 GHz		10.7		
	f=2 GHz	6	7.7		dB
	f=3 GHz		7.1		
	f=4 GHz		7.0		
	f=6 GHz		6.3		
Reverse Isolation			26.5		dB
Output Power @ 1 dB compression					≥1.5
	f=0.1 GHz	19.4	20.4		
	f=1 GHz	19.5	20.5		
	f=2 GHz	19.6	20.6		dBm
	f=3 GHz		21.0		
	f=4 GHz		19.9		
	f=6 GHz		17.0		
Saturated Output Power (at 3dB compression)					
	f=0.1 GHz		21.7		
	f=1 GHz		22.3		
	f=2 GHz		22.3		dBm
	f=3 GHz		22.2		
	f=4 GHz		21.0		
	f=6 GHz		18.9		
Output IP3					≥1.5
	f=0.1 GHz	33	36.7		
	f=1 GHz	32.2	35.8		
	f=2 GHz	32.9	36.6		dBm
	f=3 GHz		35.8		
	f=4 GHz		34.9		
	f=6 GHz		33.0		
Noise Figure					≥1.5
	f=0.1 GHz		5.5	6.5	
	f=1 GHz		5.6		
	f=2 GHz		5.5	6.5	dB
	f=3 GHz		5.5		
	f=4 GHz		5.6	6.6	
	f=6 GHz		6.2		
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 ¹			64		°C/W

*Guaranteed specification DC-6 GHz. Low frequency cut off determined by external coupling capacitors.

Absolute Maximum Ratings

Parameter	Ratings
Operating Temperature*	-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.
¹Case is defined as ground leads.
 *Based on typical case temperature rise 10°C above ambient.



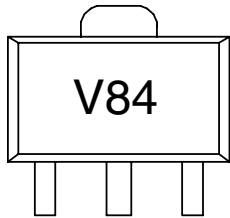
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

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 data set (.zip file)

Case Style: DF782

Plastic package, exposed paddle, lead finish: tin/silver/nickel

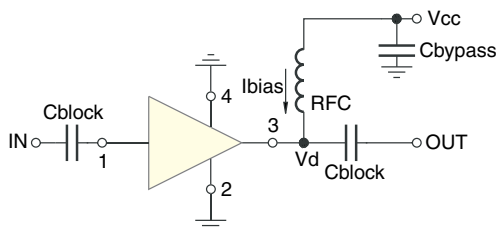
Tape & Reel: F55

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 (in bold) soldered to PCB



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

ESD Rating

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

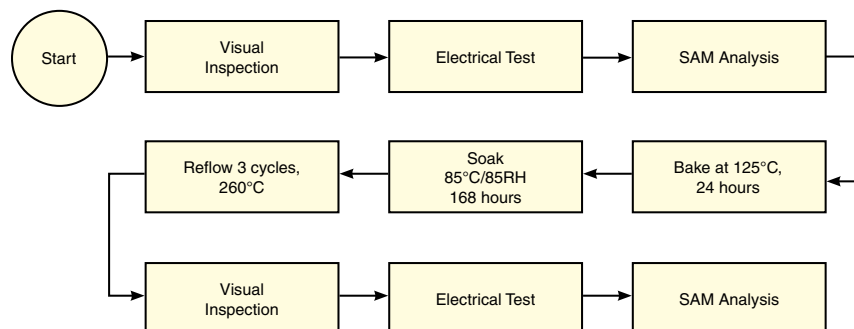
Machine Model (MM): Class M2 (100V to < 200V) in accordance with ANSI/ESD STM 5.2 - 1999

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



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS