Surface Mount

Monolithic Amplifier DC-6 GHz

Product Features

- High gain, 25.6 dB typ. at 100 MHz
- High IP3, 38 dBm typ.
- High Pout, P1dB 21.9 dBm typ.
- Internally Matched to 50 Ohms
- Transient Protected
- Excellent ESD Protection
- Unconditionally stable
- Aqueous washable
- Protected by US Patent 6,943,629

Generic photo used for illustration purposes only

Gali 84+

CASE STYLE: DF782

+RoHS Compliant

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

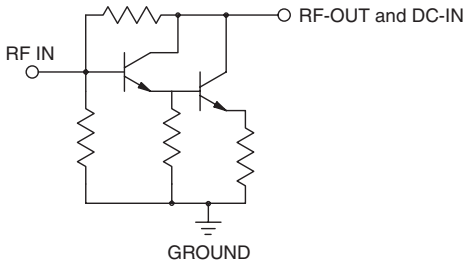
Typical Applications

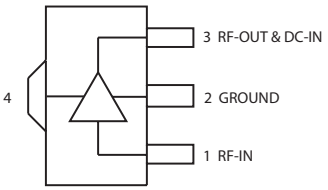
- Base station infrastructure
- Portable Wireless
- CATV & DBS
- MMDS & Wireless LAN

General Description

Gali 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 MTTF is 1200 years at 85°C case temperature. Gali 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.

Electrical Specifications at 25°C and 100mA, unless noted

Parameter		Min.	Typ.	Max.	Units	Cpk
Frequency Range*		DC		6	GHz	
Gain	f=0.1 GHz	24.3	25.6	26.9	dB	≥1.5
	f=1 GHz	—	22.7	—		
	f=2 GHz	18.2	19.2	20.2		
	f=3 GHz	—	16.7	—		
	f=4 GHz	14.3	15.0	15.8		
	f=6 GHz	—	11.8	—		
Magnitude of Gain Variation versus Temperature (values are negative)	f=0.1 GHz	—	0.0025	—	dB/°C	
	f=1 GHz	—	0.0036	—		
	f=2 GHz	—	0.0045	0.0090		
	f=3 GHz	—	0.0057	—		
	f=4 GHz	—	0.0074	—		
	f=6 GHz	—	0.0148	—		
Input Return Loss	f=0.1 GHz	—	25.8	—	dB	
	f=1 GHz	—	21.2	—		
	f=2 GHz	14.0	18.0	—		
	f=3 GHz	—	15.6	—		
	f=4 GHz	—	14.7	—		
	f=6 GHz	—	16.7	—		
Output Return Loss	f=0.1 GHz	—	16.3	—	dB	
	f=1 GHz	—	11.0	—		
	f=2 GHz	6.0	8.9	—		
	f=3 GHz	—	9.0	—		
	f=4 GHz	—	9.7	—		
	f=6 GHz	—	8.4	—		
Reverse Isolation	f=2 GHz	22	26.5	—	dB	
Output Power @1 dB compression	f=0.1 GHz	20.8	21.9	—	dBm	≥1.5
	f=1 GHz	20.4	21.5	—		
	f=2 GHz	20.1	21.2	—		
	f=3 GHz	—	20.9	—		
	f=4 GHz	—	19.2	—		
	f=6 GHz	—	15.5	—		
Saturated Output Power (at 3dB compression)	f=0.1 GHz		23.0		dBm	
	f=1 GHz		22.6			
	f=2 GHz		22.1			
	f=3 GHz		21.7			
	f=4 GHz		20.3			
	f=6 GHz		17.1			
Output IP3	f=0.1 GHz	33.8	37.6	—	dBm	≥1.5
	f=1 GHz	34.0	37.8	—		
	f=2 GHz	34.2	38.0	—		
	f=3 GHz	—	37.4	—		
	f=4 GHz	—	34.7	—		
	f=6 GHz	—	32.7	—		
Noise Figure	f=0.1 GHz		4.2		dBm	≥1.5
	f=1 GHz		4.4			
	f=2 GHz		4.4			
	f=3 GHz		4.4			
	f=4 GHz		4.6			
	f=6 GHz		5.3			
Group Delay	f=2 GHz		94		psec	
Recommended Device Operating Current			100		mA	
Device Operating Voltage		5.4	5.8	6.2	V	≥1.5
Device Voltage Variation vs. Temperature at 100mA			-3.6		mV/°C	
Device Voltage Variation vs Current at 25°C			3.3		mV/mA	
Thermal Resistance, junction-to-case[1]			64		°C/W	

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

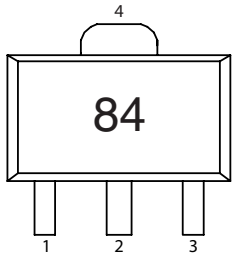
Absolute Maximum Ratings

Parameter	Ratings
Operating Temperature*	-45°C to 85°C
Storage Temperature	-65°C to 150°C
Operating Current	160mA
Power Dissipation	1W
Input Power	13 dBm

Note: Permanent damage may occur if any of these limits are exceeded.
These ratings are not intended for continuous normal operation.
[1]Case is defined as ground leads.
*Based on typical case temperature rise 9°C above ambient.

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

Product Marking



Markings in addition to model number designation may appear for internal quality control purposes.

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: Matte-Tin

Tape & Reel: F55

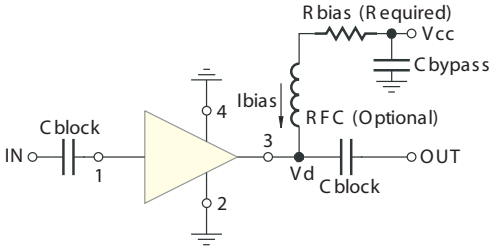
7" reels with 20, 50, 100, 200, 500, 1K devices.

Suggested Layout for PCB Design: PL-019

Evaluation Board: TB-409-84+

Environmental Ratings: ENV08T2

Recommended Application Circuit



Test Board includes case, connectors, and components (in bold) soldered to PCB

R BIAS	
Vcc	**"1%" Res. Values (ohms) for Optimum Biasing**
8	22.1
9	32.4
10	42.2
11	52.3
12	61.9
13	71.5
14	82.5
15	93.1
16	102
17	113
18	121
19	133
20	140

ESD Rating

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

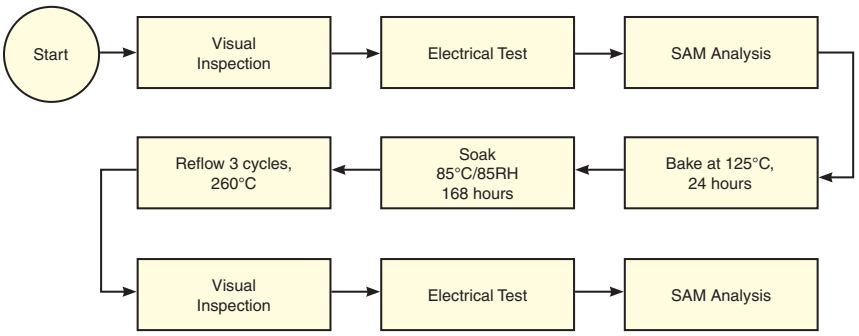
Machine Model (MM): Class M2 (< 100v) in accordance with ANSI/ESD STM 5.2 - 1999

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



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

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Mini-Circuits:

GALI-84+