

High Directivity

# Monolithic Amplifier

0.5-2.5 GHz

## Product Features

- 3V & 5V operation
- no external biasing circuit required
- internal DC blocking at RF input and output
- high directivity, 18 dB typ.
- wide bandwidth, 0.5 to 2.5 GHz
- low noise figure, 4.7 dB typ.
- output power, up to +10 dBm typ.
- low cost



**VNA-23**

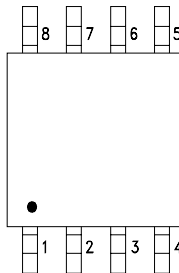
CASE STYLE: XX211  
PRICE: Contact Sales Dept.

## Typical Applications

- buffer amplifier
- cellular
- PCN

## General Description

VNA-23 is a wideband amplifier offering high dynamic range. It has repeatable performance from lot to lot. It is enclosed in an 8-lead SOIC package. VNA-23 is fabricated using GaAs MESFET technology. Expected MTBF at 85°C case temperature is 80,000 years at 2.8V, 30,000 at 5V.



## Pin description

Function	Pin Number	Description
RF IN	3	RF input pin.
RF OUT	6	RF output pin.
DC	1	Bias pin
GND	2,4,5,7,8	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](http://www.minicircuits.com/MCLStore/terms.jsp)



### Electrical Specifications at 25°C

Parameter	Min.	Typ.		Max.	Units	
Frequency Range	0.5			2.5	GHz	
at DC Volts	5.0	5.0	2.8	5.0	V	
Gain					dB	
	f=0.5 GHz	—	15.1	14.6		
	f=1.0 GHz	—	18.6	17.6		
	f=1.5 GHz	—	18.3	17.1		
	f=2.0 GHz	15.4	16.9	15.9		
	f=2.5 GHz	—	14.6	13.9		
Input Return Loss	f=0.75 to 2.5 GHz		14	14	dB	
Output Return Loss	f=0.75 to 2.5 GHz		17.5	14	dB	
Output Power @ 1 dB compression	f=0.5 to 2.5 GHz		10	8.5	dBm	
Output IP3	f=0.5 to 2.5 GHz		21	19	dBm	
Noise Figure	f=0.5 to 2.5 GHz		4.7	4.7	dB	
Directivity (Isolation-Gain)	f=0.5 to 2.5 GHz		15-20	14-21	dB	
DC Current			32	29	45	mA
Thermal Resistance, junction-to-case <sup>1</sup>			110		°C/W	

### Absolute Maximum Ratings

Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 150°C
DC Voltage	8V
Power Dissipation	400mW
Input Power	10dBm

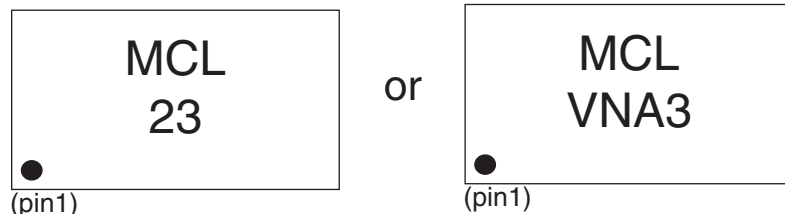
Note: Permanent damage may occur if any of these limits are exceeded.  
 These ratings are not intended for continuous normal operation.  
<sup>1</sup>Case is defined as ground leads.

#### 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](http://www.minicircuits.com/MCLStore/terms.jsp)



### 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: XX211

Plastic model, 8 lead SOIC, lead finish: tin lead

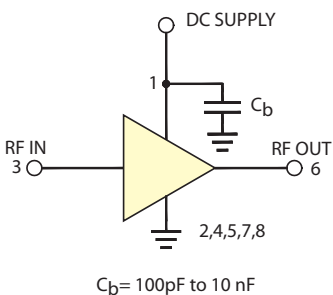
### Tape & Reel: F16

### Suggested Layout for PCB Design: PL-077

### Evaluation Board: TB-01

### Environmental Ratings: ENV08T1

### Recommended Application Circuit



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

#### 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](http://www.minicircuits.com/MCLStore/terms.jsp)

### ESD Rating

Human Body Model (HBM): Class 1A (250 v to < 500 v) in accordance with ANSI/ESD STM 5.1 - 2001

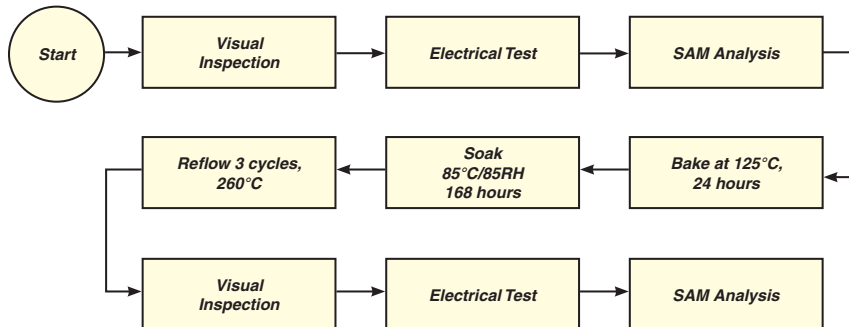
Charged Device Model (CDM): Class III (500 to 1000 v) in accordance with JESD22-C101A

### 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)	10 units
2	Electrical Test	Room Temperature	SCD (MCL spec)	10 units
3	SAM Analysis	Less than 10% growth in term of delamination	J-Std-020C (Jedec Standard)	10 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)	10 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-Circuits' 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](http://www.minicircuits.com/MCLStore/terms.jsp)