

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**

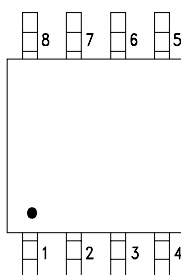
CASE STYLE: XX211  
PRICE: \$1.90 ea. QTY. (25)

## 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)



[www.minicircuits.com](http://www.minicircuits.com) P.O. Box 35166, Brooklyn, NY 11235-0003 (718) 934-4500 [sales@minicircuits.com](mailto:sales@minicircuits.com)

REV. C  
M108520  
VNA-23  
131015  
Page 1 of 1

## 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	15.4	f=0.5 GHz	15.1	14.6	dB
		f=1.0 GHz	18.6	17.6	
		f=1.5 GHz	18.3	17.1	
		f=2.0 GHz	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
<b>Operating Temperature</b>	<b>-40°C to 85°C</b>
<b>Storage Temperature</b>	<b>-55°C to 150°C</b>
<b>DC Voltage</b>	<b>8V</b>
<b>Power Dissipation</b>	<b>400mW</b>
<b>Input Power</b>	<b>10dBm</b>

Note: Permanent damage may occur if any of these limits are exceeded.

These ratings are not intended for continuous normal operation.

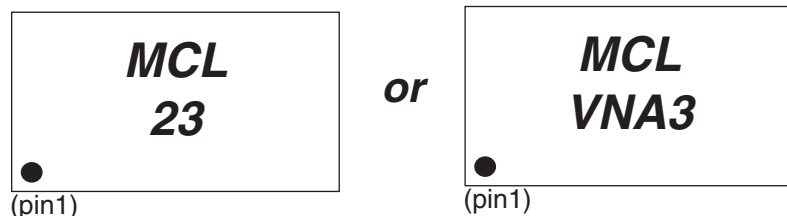
<sup>1</sup>Case is defined as ground leads.

## 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

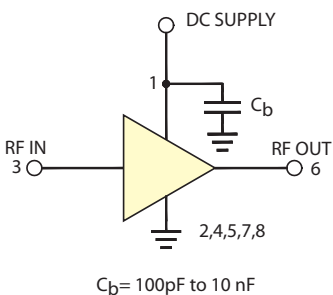
## Tape &amp; Reel: F16

## 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-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)



**ESD Rating**

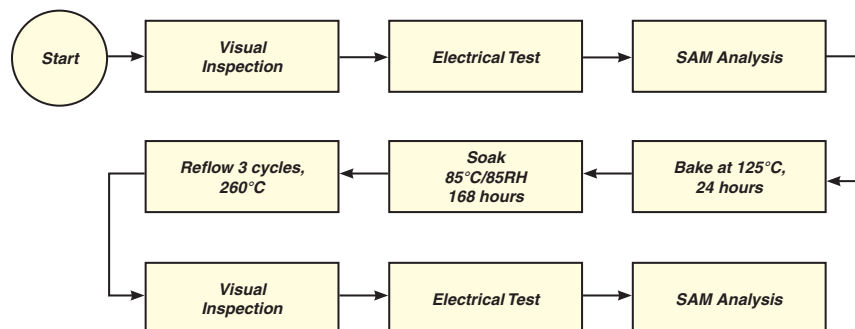
Human Body Model (HBM): Class 1A (250 v to < 500 v) in accordance with ANSI/ESD STM 5.1 - 2001

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-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)

