

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, 20 dB typ.
- wide bandwidth, 0.5 to 2.5 GHz
- low noise figure, 6.4 dB typ.
- output power, up to +10.2 dBm typ.
- excellent repeatability
- low cost



## VNA-21

CASE STYLE: XX211-1  
PRICE: \$1.80 ea. QTY. (25)

## Typical Applications

- buffer amplifier
- cellular
- PCN

## General Description

VNA-21 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-21 is fabricated using GaAs MESFET technology. Expected MTBF at 85°C case temperature is 90,000 years at 2.8V, 35,000 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.



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



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RF/IF MICROWAVE COMPONENTS

REV. D  
M108520  
VNA-21  
061218  
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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	9.8	9.1			
	f=1.0 GHz	12.5	11.5			
	f=1.5 GHz	13.5	12.3			
	f=2.0 GHz	13.7	12.4			
	f=2.5 GHz	13.1	11.8			
Input Return Loss	f=0.75 to 2.5 GHz		15.5	15.5	dB	
Output Return Loss	f=0.75 to 2.5 GHz		17.5	17.5	dB	
Output Power @ 1 dB compression	f=0.5 to 2.5 GHz		8.5	7.0	dBm	
Output IP3	f=0.5 to 2.5 GHz		20	19	dBm	
Noise Figure	f=0.5 to 2.5 GHz		6.4	6.4	dB	
Directivity (Isolation - Gain)	f=0.5 to 2.5 GHz		18-24	18-25	dB	
DC Current			31	29	45	mA
Thermal Resistance, junction-to-case <sup>1</sup>			105		°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.



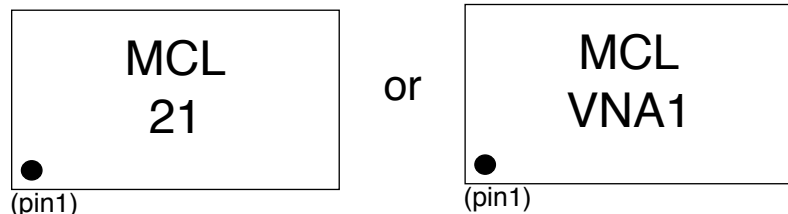
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RF/IF MICROWAVE COMPONENTS

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 data set (.zip file)

Case Style: XX211-1

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

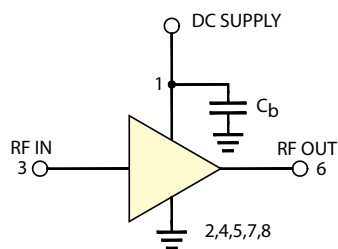
Tape & Reel: F16

Suggested Layout for PCB Design: PL-077

Evaluation Board: TB-01

Environmental Ratings: ENV08T1

Recommended Application Circuit



$C_b = 100\text{pF to } 10\text{ nF}$

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

**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**

