

MONOLITHIC AMPLIFIERS 50Ω

High DIRECTIVITY 0.5 to 5.9 GHz

NEW!



VNA

All specifications at 25°C

MODEL NO.	FREQ. (GHz) $f_L - f_U$	DC VOLTS (V)	GAIN, dB Typical						MAXIMUM POWER (dBm) Output (1 dB Comp.) Typ.	DYNAMIC RANGE		VSWR ² (:1) Typ.		ACTIVE DIRECTIVITY (dB) (Isolation-Gain) Typ.	DC OPERATING CURRENT @ Pin 3 (mA)		THERMAL RESISTANCE ³ θ_{jc} Typ. °C/W	CASE STYLE Note B	CONNECTION	PRICE \$ ea. Qty. (30)	
			over frequency, GHz							NF (dB) Typ.	IP3 (dBm) Typ.	In	Out		Typ.	Typ.					Max.
			0.5	1.0	1.5	2.0	2.5	Min. at 2 GHz													
VNA-21	0.5-2.5	5.0	9.8	12.5	13.5	13.7	13.1	12.6	8.5	6.4	20	1.4	1.3	18-24	31	45	105	XX211	hj	1.80	
	2.8	2.8	9.1	11.5	12.3	12.4	11.8	—	7.0	6.4	19	1.4	1.3	18-25	29	—					
VNA-22	0.5-2.5	5.0	10.3	13.3	13.8	13.3	12.2	11.8	17.0	6.7	29	1.6	1.4	17-27	80	95	102	XX211	hj	2.20	
	2.8	2.8	9.6	12.3	12.6	11.9	10.8	—	14.0	7.0	26	1.6	1.5	17-29	72	80					
VNA-23	0.5-2.5	5.0	15.1	18.6	18.3	16.9	14.6	15.4	10.0	4.7	21	1.5	1.3	15-20	32	45	110	XX211	hj	1.90	
	2.8	2.8	14.6	17.6	17.1	15.9	13.9	—	8.5	4.7	19	1.5	1.5	14-21	29	—					
VNA-25	0.5-2.5	5.0	15.5	18.0	18.6	17.8	16.0	16.0	18.2	5.5	29	1.5	1.6	18-24	85	105	125	XX211	hj	2.50	
	2.8	2.8	14.5	16.7	17.4	17.0	15.5	—	12.0	5.5	24	1.5	1.6	16-25	80	—					
VNA-28	0.5-2.5	5.0	18.1	22.4	22.8	21.6	18.3	19.7	11.0	3.7	22	1.6	1.5	16-20	33	45	125	XX211	hj	1.95	
	2.8	2.8	17.5	21.1	21.0	20.1	17.5	—	9.6	3.7	19.6	1.6	1.6	15-21	30	—					

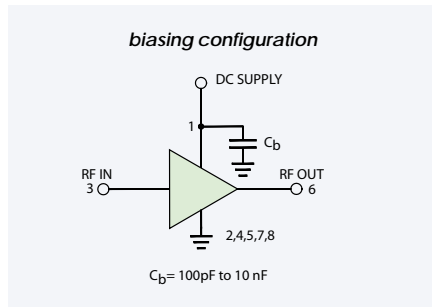
see suggested PCB layout PL-077 for VNA models

features

- from 2.8V to 5V operation
- no external biasing circuit required
- internal DC blocking at RF input and output
- high directivity, 25 dB typ.
- wide bandwidth, 0.5 to 2.5 GHz
- low noise figure, 4.7 dB typ. (VNA-23)
- output power, up to +18.2 dBm typ.
- excellent repeatability

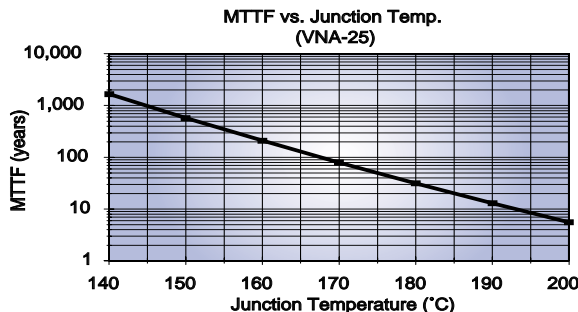
model identification

Model	marking
VNA-21	21 or VNA1
VNA-22	22 or VNA2
VNA-23	23 or VNA3
VNA-25	25
VNA-28	28 or VNA5
MNA-2	MNA2
MNA-3	MNA3
MNA-4	MNA4
MNA-5	MNA5
MNA-6	MNA6
MNA-7	MNA7



absolute maximum ratings

- operating temperature: -40°C to 85°C
- storage temperature: -55°C to 100°C
- dc voltage: 8V, VNA-25 +7V, -1.0V reverse
- power: 400mW, VNA-21,23,28; VNA-22, 800mW; VNA-25, 1000mW
- input power (no damage): 10 dBm



NOTES:

- ◆ Aqueous washable
- A. Environmental specifications and re-flow soldering information available in General Information Section.
- B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".
- C. Prices and Specifications subject to change without notice.
- D. For Quality Control Procedures see Table of Contents, Section 0, "Mini-Circuits Guarantees Quality" article. For Environmental Specifications see Amplifier Selection Guide.
- 2. VSWR for VNA-25 increases below 1.5 GHz. Other VNA models VSWR .75-2.5 GHz. For MNA models, VSWR .75-2.5 GHz, MNA-7, 2.5-5.9 GHz.
- 3. Thermal resistance is from junction to heat slug, or mounting paddle. For units without heat slug/mounting paddle, thermal resistance is from junction to mounting surface of leads.

Surface Mount

NEW!



MNA

All specifications at 25°C

MODEL NO.	FREQ. (GHz) $f_L - f_U$	DC VOLTS (V)	GAIN, dB Typical							MAXIMUM POWER (dBm)		DYNAMIC RANGE			VSWR ² (:1) Typ.		ACTIVE DIRECTIVITY (dB) (Isolation-Gain)		DC OPERATING CURRENT @ Pin 3 (mA)		THERMAL RESISTANCE ³ θ_{jc} Typ. °C/W	CASE STYLE Note B	CONNECTION	PRICE \$ ea.
			over frequency, GHz							Output (1 dB Comp.) Typ.	IP3 (dBm) Typ.	NF (dB) Typ.	at 1 GHz	at 2 GHz	at 1 GHz	at 2 GHz	at 5.9 GHz	Typ.	Typ.	Max.				
			0.5	1.0	1.5	2.0	2.5	Min. at 2 GHz	f_L															
MNA-2	0.5-2.5	5.0 2.8	10.6 9.6	12.8 11.5	12.8 11.2	12.3 10.7	11.9 10.2	10.3 —	17.7 12.9	14.9 12.4	5.4 5.4	26.5 23.2	28.0 24.2	1.5 1.5	1.6 1.6	20 20	76 60	95 —	78	DQ849	nt	1.90		
MNA-3	0.5-2.5	5.0 2.8	14.6 14.2	16.2 15.2	16.1 15.0	15.0 14.0	11.8 11.0	13.0 —	11.4 9.7	9.5 8.0	4.9 4.8	19.6 18.0	21.3 19.9	1.9 1.9	1.5 1.5	17 17	30 28	40 —	78	DQ849	nt	1.60		
MNA-4	0.5-2.5	5.0 2.8	15.6 14.3	16.6 14.6	16.4 14.5	15.8 14.1	13.3 11.7	14.0 —	19.0 13.4	17.0 13.7	4.8 4.8	28.4 23.9	29.0 24.9	1.5 1.5	1.7 1.7	20 20	75 67	90 —	78	DQ849	nt	1.90		
MNA-5	0.5-2.5	5.0 2.8	18.5 18.0	22.8 21.4	21.9 20.5	20.6 19.4	18.0 17.4	17.0 —	12.2 10.1	8.0 6.5	3.5 3.5	19.4 18.0	21.0 20.0	1.6 1.6	1.9 1.9	17 17	28 26	40 —	78	DQ849	nt	1.60		
MNA-6	0.5-2.5	5.0 2.8	19.4 18.6	23.5 21.5	23.6 21.2	23.0 21.0	20.2 19.0	21.5 —	18.0 14.1	15.8 13.2	2.9 2.9	27.1 23.4	28.0 25.0	1.5 1.5	1.6 1.9	17 17	81 65	95 —	78	DQ849	nt	2.25		
MNA-7	1.5-5.9	5.0 2.8	15.9 13.7	17.2 15.4	17.4 15.8	17.2 16.7	10.8 9.8	15.0 —	15.6 12.7	15.9 13.1	6.9 6.9	28.4 24.1	28.6 23.8	2.0 2.0	1.5 1.5	20 24	73 65	96 —	78	DQ849	nt	2.25		

see suggested PCB layout PL-078 for MNA models

features

- from 2.8v to 5V operation
- micro-miniature size .120"x.120"
- no external biasing circuit required
- internal DC blocking at RF input and output
- high directivity, 20 dB typ.
- wide bandwidth, 0.5 to 5.9 GHz
- low noise figure, 2.9 dB typ. (MNA-6)
- output power, up to +19 dBm typ.
- excellent repeatability

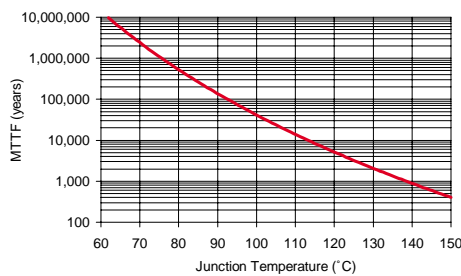
applications

- buffer amplifier
- cellular
- communication satellite
- line of sight links
- defense

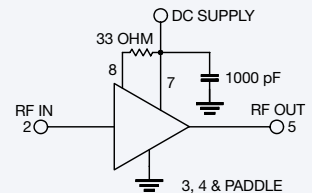
absolute maximum ratings

- operating temperature: -40°C to 85°C
- storage temperature: -55°C to 100°C
- dc voltage: 7V at pin 7; 10V at pins 2&5
- power: 500mW
- input power (no damage): 10 dBm

MTTF vs. Junction Temp. (MNA)



Biasing configuration



designers kit available

KIT No.	No. of Units/KIT	Description	Price \$ per KIT
K1-MNA	40	10 of each: MNA-2, -3, -5, -6	69.95
K2-MNA	60	10 of each: MNA-2, -3, -4, -5, -6, -7	99.95

pin connections

PORT	hj	nt
RF IN	3	2
RF OUT	6	5
DC	7	7 with 1000 pF bypass to ground; connect pin 8 via 33 ohms to pin 7 externally.
GND EXT. OPTIONAL	2,4,5,7,8	3,4 and paddle in center of bottom 1,6 No internal connection; recommended use: per PCB Layout
DEMO BOARD	TB-01	TB-186