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 over frequency, GHz 0.5	1.0	1.5	2.0	2.5	Min. at 2 GHz	MAXIMUM POWER (dBm) Output (1 dB Comp.) Typ.	DYNAMIC RANGE NF (dB) Typ.	IP3 (dBm) Typ.	VSWR[2] (:1) Typ. In	Out	DIRECTIVITY (dB) (Isolation-Gain) Typ.	DC OPERATING CURRENT @ Pin 3 (mA) Typ.	Max.	THERMAL RESISTANCE[3] θjc Typ. °C/W	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (30)
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	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	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	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	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	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

- 3V & 5V operation
- no external biasing circuit required
- 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

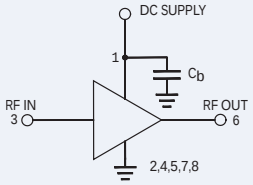
absolute maximum ratings

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

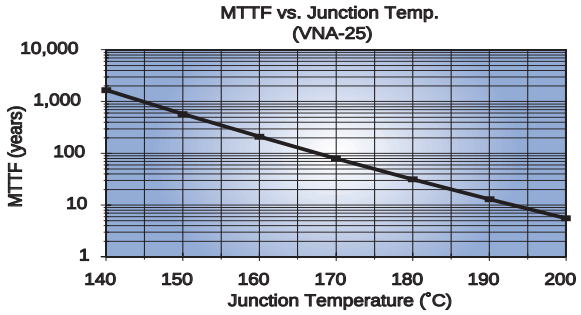
model identification

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

biasing configuration



C_b= 100pF to 10 nF



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.

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NEW!

MNA

All specifications at 25°C

◆ MODEL NO.	FREQ. (GHz) f_L - f_U	DC VOLTS (V)	GAIN, dB Typical over frequency, GHz 0.5	1.0	1.5	2.0	2.5	Min. at 2 GHz	MAXIMUM POWER (dBm) Output (1 dB Comp.) Typ. f_L	f_U	DYNAMIC RANGE NF (dB) Typ. at 1 GHz	IP3 (dBm) Typ. at 1 GHz	at 2 GHz	VSWR[2] (:1) Typ. In	Out	DIRECTIVITY (dB) (Isolation-Gain) Typ.	DC OPERATING CURRENT @ Pin 3 (mA) Typ.	Max.	THERMAL RESIS-TANCE[3] θjc Typ. °C/W	CASE STYLE Note B	CONNECTION	PRICE $ Qty. (30)
MNA-2	0.5-2.5	5.0	10.6	12.8	12.8	12.3	11.9	10.3	17.7	14.9	5.4	26.5	28.0	1.5	1.6	20	76	95	78	DQ849	nt	1.90
		2.8	9.6	11.5	11.2	10.7	10.2	—	12.9	12.4	5.4	23.2	24.2	1.5	1.6	20	60	—				
MNA-3	0.5-2.5	5.0	14.6	16.2	16.1	15.0	11.8	13.0	11.4	9.5	4.9	19.6	21.3	1.9	1.5	17	30	40	78	DQ849	nt	1.60
		2.8	14.2	15.2	15.0	14.0	11.0	—	9.7	8.0	4.8	18.0	19.9	1.9	1.5	17	28	—				
MNA-4	0.5-2.5	5.0	15.6	16.6	16.4	15.8	13.3	14.0	19.0	17.0	4.8	28.4	29.0	1.5	1.7	20	75	90	78	DQ849	nt	1.90
		2.8	14.3	14.6	14.5	14.1	11.7	—	13.4	13.7	4.8	23.9	24.9	1.5	1.7	20	67	—				
MNA-5	0.5-2.5	5.0	18.5	22.8	21.9	20.6	18.0	17.0	12.2	8.0	3.5	19.4	21.0	1.6	1.9	17	28	40	78	DQ849	nt	1.60
		2.8	18.0	21.4	20.5	19.4	17.4	—	10.1	6.5	3.5	18.0	20.0	1.6	1.9	17	26	—				
MNA-6	0.5-2.5	5.0	19.4	23.5	23.6	23.0	20.2	21.5	18.0	15.8	2.9	27.1	28.0	1.5	1.6	17	72	95	78	DQ849	nt	2.25
		2.8	18.6	21.5	21.2	21.0	19.0	—	14.1	13.2	2.9	23.4	25.0	1.5	1.9	17	65	—				
			over frequency, GHz 1.5	2.0	3.5	5.0	5.9				at 2 GHz	at 2 GHz	at 5.9 GHz									
MNA-7	1.5-5.9	5.0	15.9	17.2	17.4	17.2	10.8	15.0	15.6	15.9	6.9	28.4	28.6	2.0	1.5	20	73	96	78	DQ849	nt	2.25
		2.8	13.7	15.4	15.8	16.7	9.8	—	12.7	13.1	6.9	24.1	23.8	2.0	1.5	24	65	—				

see suggested PCB layout PL-078 for MNA models

features

- 3V & 5V operation
- micro-miniature size .120"x.120"
- no external biasing circuit required
- 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

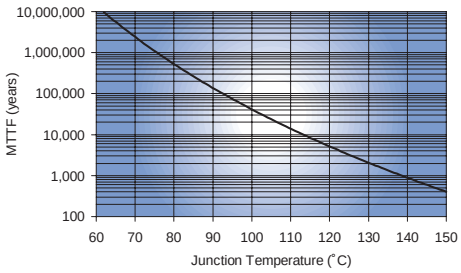
applications

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

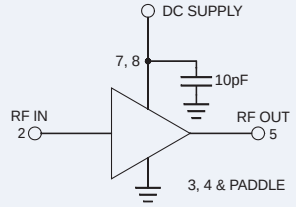
absolute maximum ratings

operating temperature: -40°C to 85°C
storage temperature: -55°C to 100°C
dc voltage:7V at pins 7&8; 10V at pins 2&5
power: 500mW
input power (no damage): 10 dBm

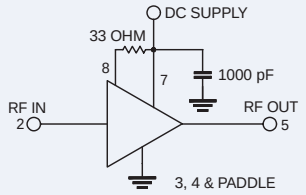
MTTF vs. Junction Temp. (MNA)



(Scheme I) biasing configuration



(Scheme II) alternative biasing configuration*



*TO ENSURE UNCONDITIONAL STABILITY FOR VARIOUS CUSTOMER CONFIGURATIONS

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	*1*	*Scheme I* 7,8 connected together externally *Scheme II* Alt. biasing config. 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

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