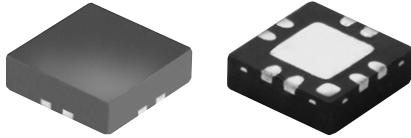


Surface Mount

# Monolithic Amplifiers

## MNA-SERIES

High Directivity, 50Ω, 0.5 to 5.9 GHz



CASE STYLE:DQ849

### 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
- low cost

### Applications

- buffer amplifier
- cellular
- PCN

### Electrical Specifications at T<sub>AMB</sub>=25°C

MODEL NO.	FREQ. (GHz) f <sub>L</sub> - f <sub>U</sub>	DC VOLTS (V)	GAIN, dB Typical						MAXIMUM POWER (dBm) Output (1 dB Comp.) Typ.		DYNAMIC RANGE			VSWR* (:1) Typ.		DIRECTIVITY (dB) (Isolation-Gain) Typ.	DC OPERATING CURRENT @ Pin 3 (mA)		THERMAL RESISTANCE θ <sub>JC</sub> Typ. °C/W	CASE STYLE	CONNECTION	PRICE \$ Qty. (30)	
			over frequency, GHz						f <sub>L</sub>	f <sub>U</sub>	NF (dB) Typ.	IP3 (dBm) Typ.	at1 GHz	at1 GHz	at2 GHz		Typ.	Typ.					Max.
			0.5	1.0	1.5	2.0	2.5	Min. at 2 GHz	f <sub>L</sub>	f <sub>U</sub>	at1 GHz	at1 GHz	at2 GHz	In	Out		Typ.	Typ.					Max.
MNA-2	0.5-2.5	5.0 2.8	10.6 2.8	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	over frequency, GHz						15.6	15.9	at2 GHz	at2 GHz	at5.9 GHz	2.0	1.5	20	73	96	78	DQ849	nt	2.25	
			1.5	2.0	3.5	5.0	5.9				6.9	28.4	28.6	6.9	24.1	23.8	2.0	1.5					

\* VSWR above .75 GHz

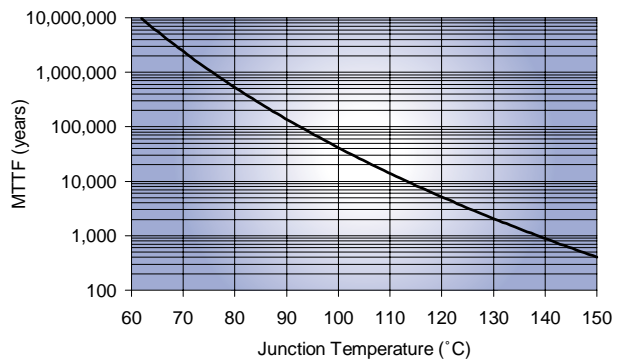
### Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
DC Voltage	7V at pin 7 <sup>†</sup> 10V at pins 2&5
Power	500mW
Input Power (no damage)	10 dBm
<sup>†</sup> Refer to pin configuration for DC	

### Pin Configuration

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

MTTF vs. Junction Temp. (MNA)



designers kit available

KIT No.	No. of Units in 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



Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

Mini-Circuits ISO 9001 & ISO 14001 Certified

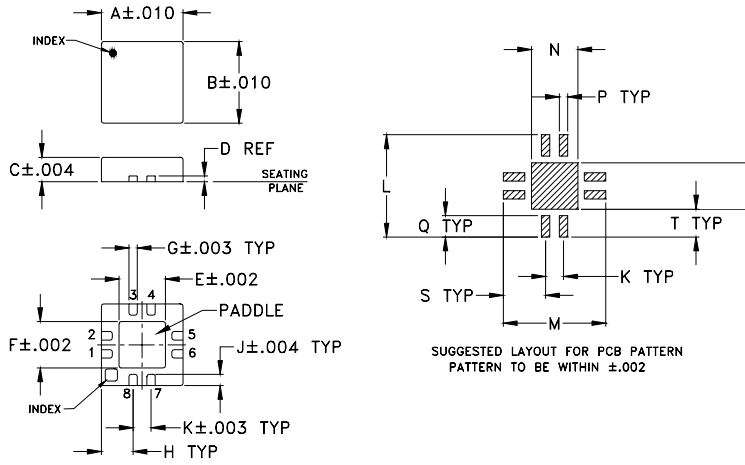
INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

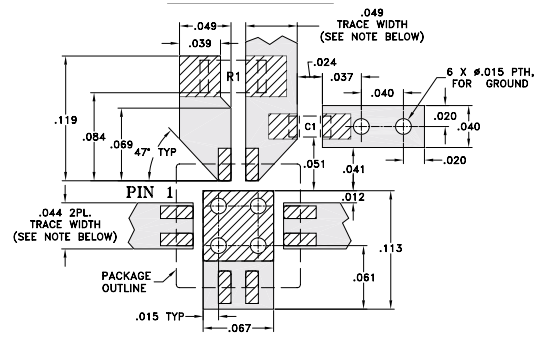
REV. G  
M92482  
ED-9640A/2  
MNA-SERIES  
FL/TD/CP  
11/028  
Page 1 of 1

# MNA-SERIES

## Outline Drawing



## Suggested PCB Layout (PL-078)



RESISTOR R1: 33.2 Ohm, 0603 SIZE  
CAPACITOR C1: 1000 pF ± 10%, X7R, 0402 SIZE

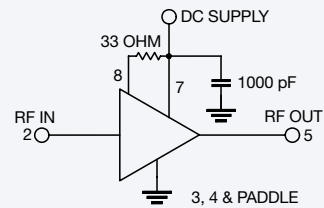
NOTE: TRACE WIDTH IS SHOWN FOR ROGERS RO4350 WITH DIELECTRIC THICKNESS 0.020" ± 0.0015", COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.

- DENOTES PCB COPPER LAYOUT
- DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

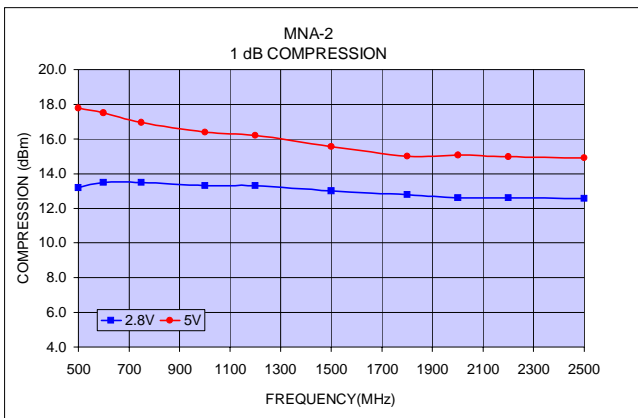
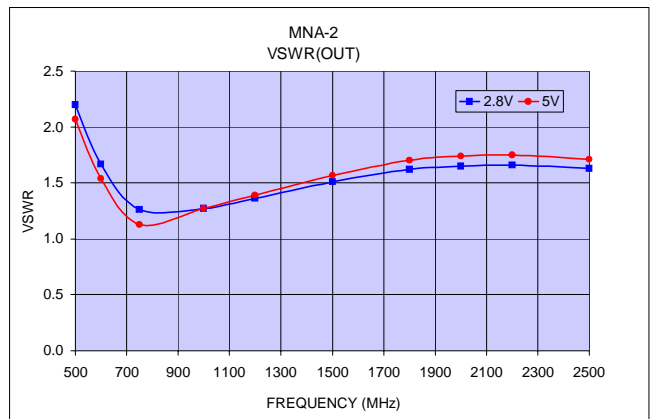
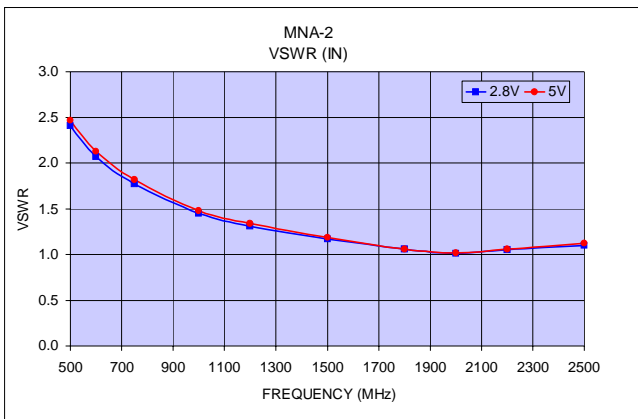
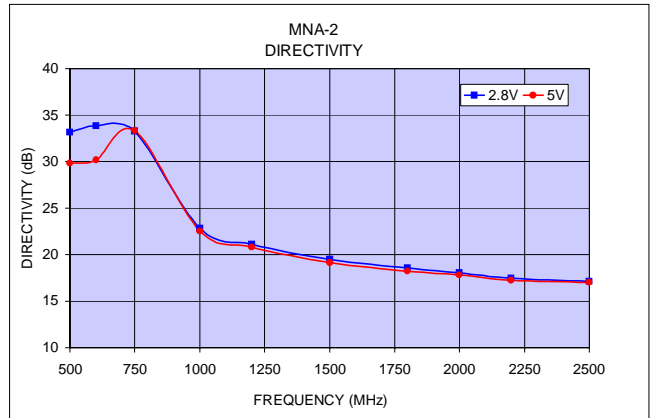
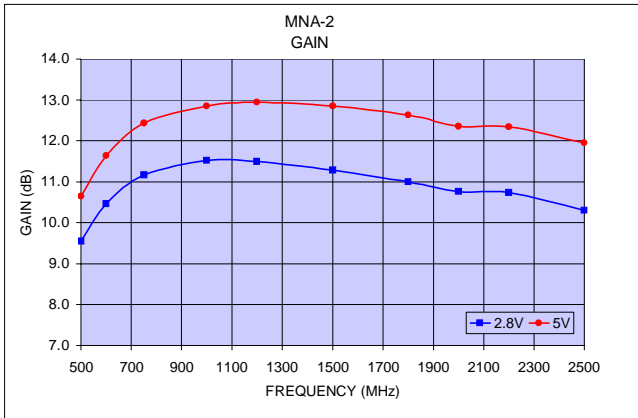
## Outline Dimensions (inch mm)

A	B	C	D	E	F	G	H	J	
.118	.118	.035	.008	.067	.067	.012	.046	.016	
3.00	3.00	0.89	0.20	1.70	1.70	0.30	1.17	0.41	
K	L	M	N	P	Q	R	S	T	wt.
.026	.148	.148	.067	.012	.031	.067	.061	.041	grams
0.66	3.76	3.76	1.70	0.30	0.79	1.70	1.55	1.04	.02

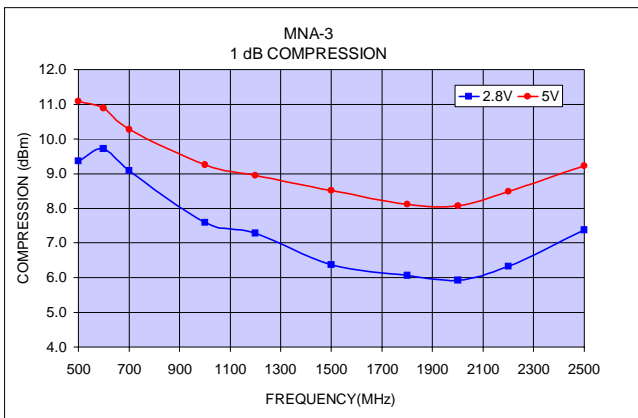
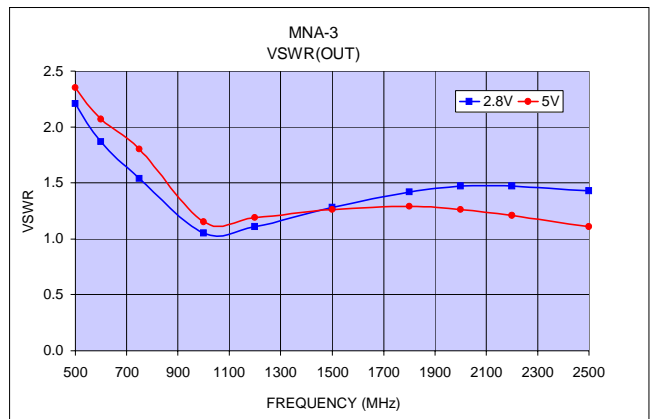
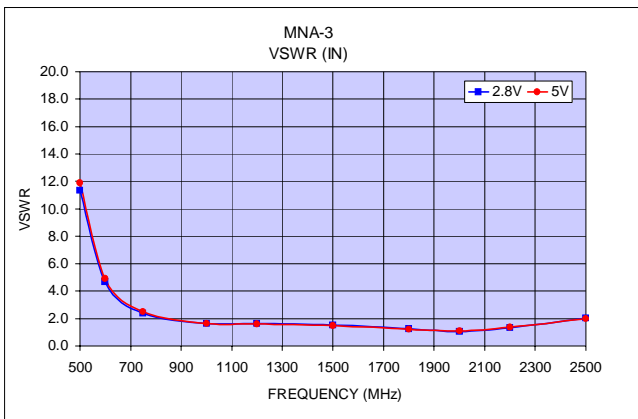
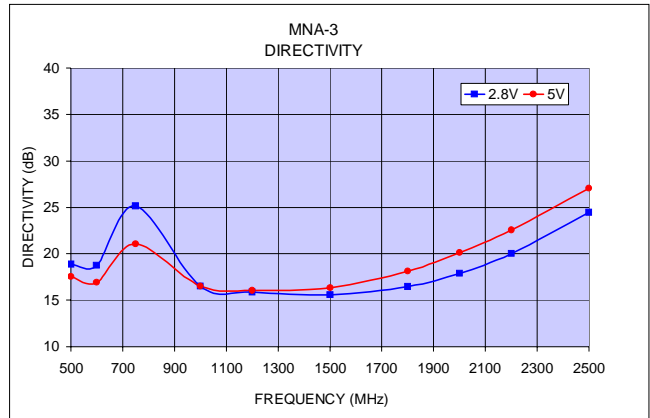
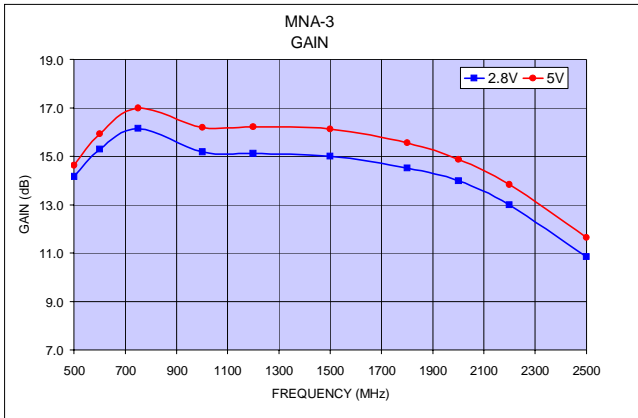
## Biasing configuration



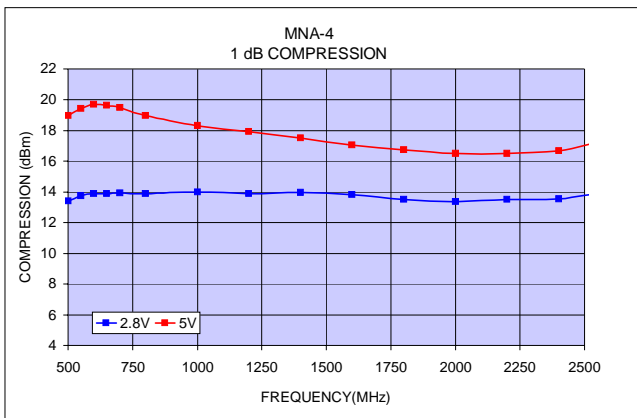
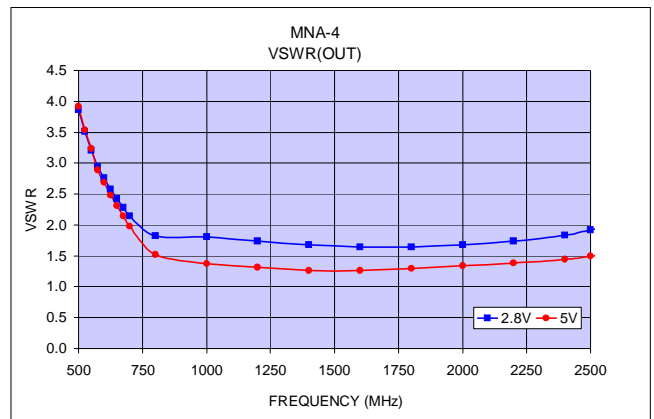
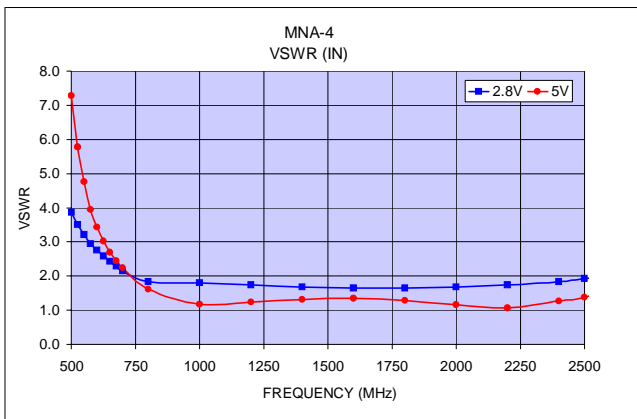
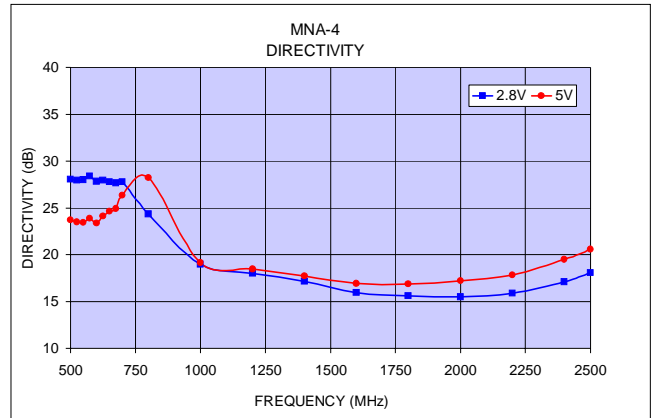
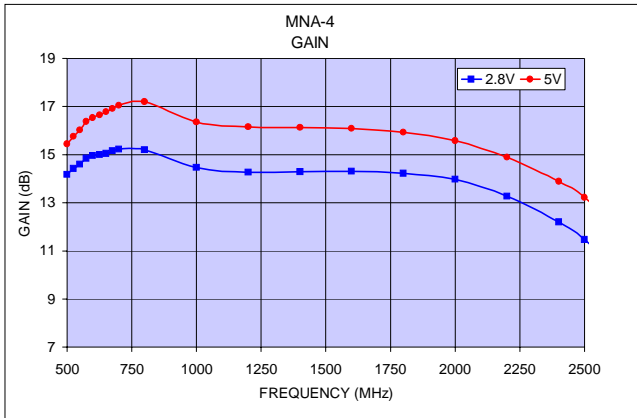
# MNA-2 Performance Curves



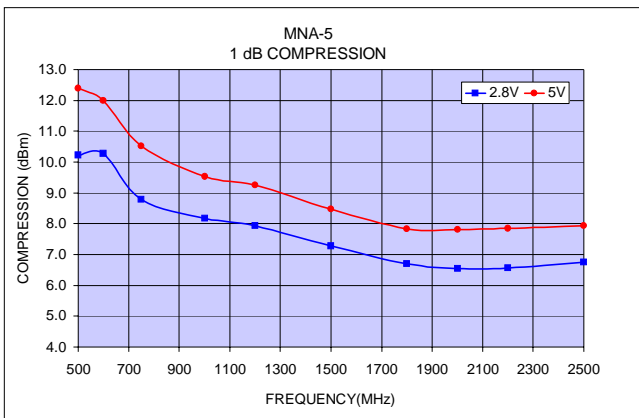
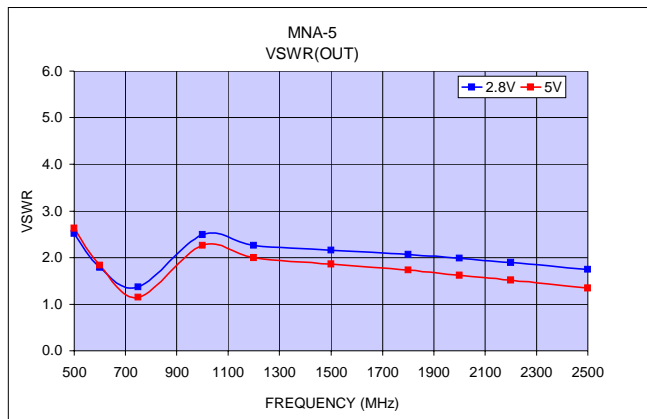
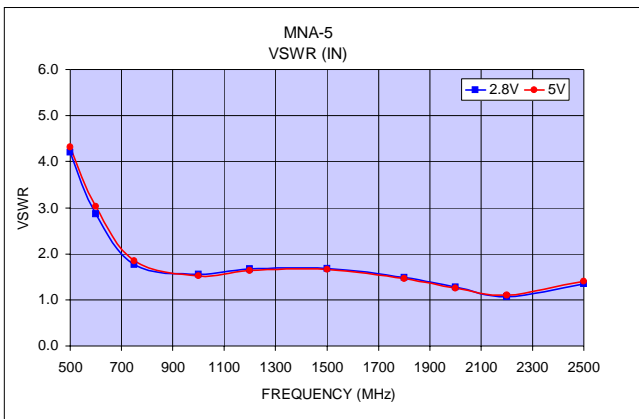
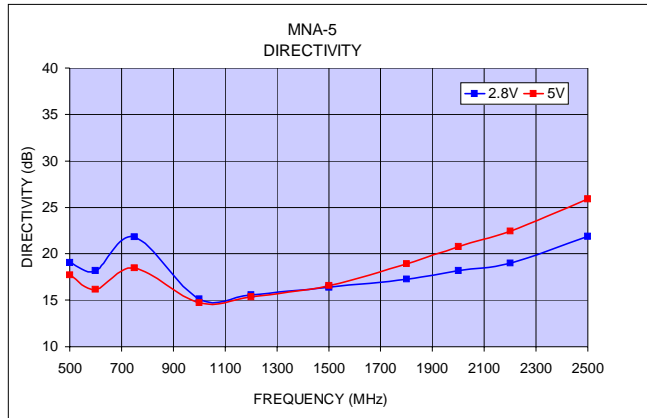
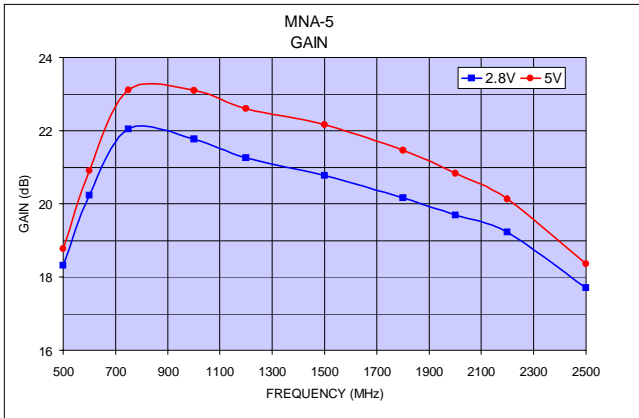
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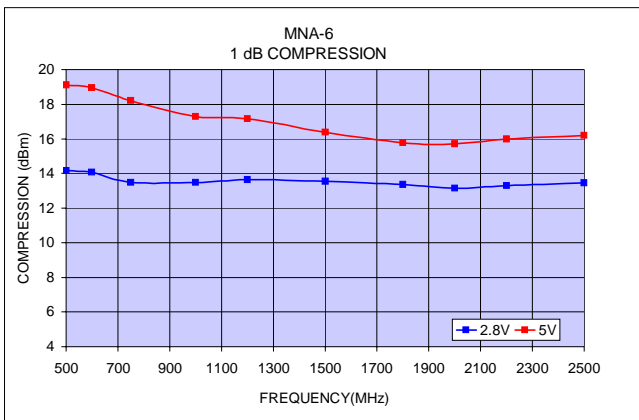
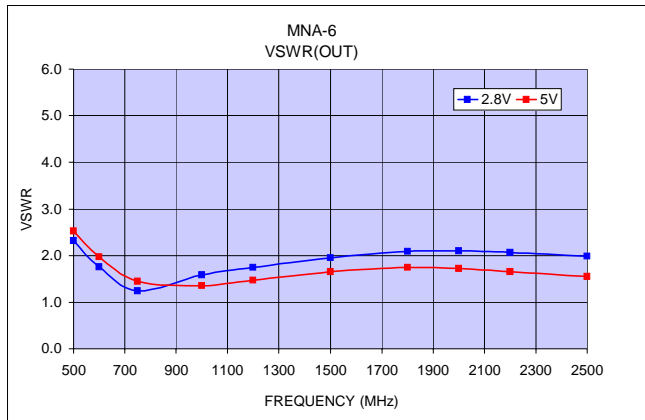
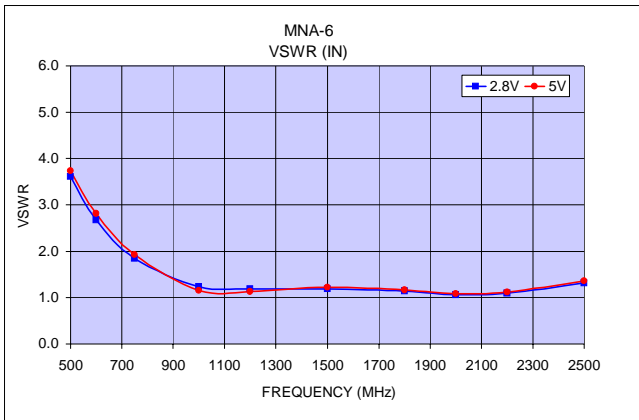
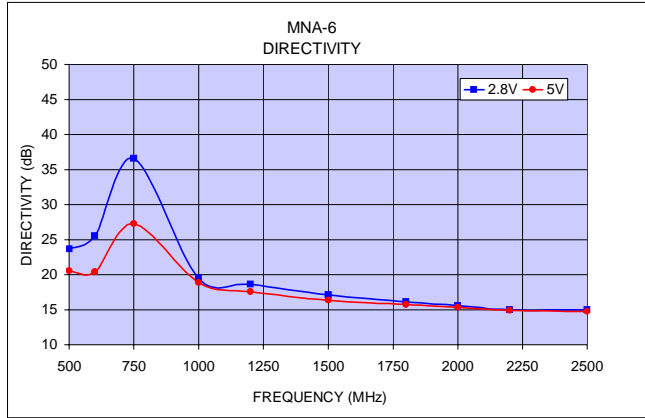
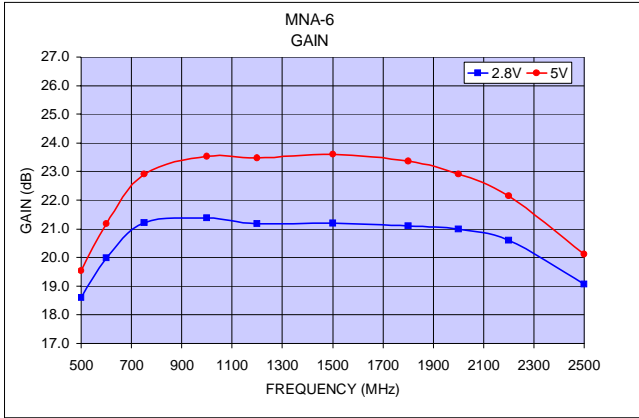
# MNA-4 Performance Curves



# MNA-5 Performance Curves



# MNA-6 Performance Curves



# MNA-7 Performance Curves

