APPLICATION NOTE

REPLACEMENT PART REFERENCE GUIDE, MNA-6+ AN-60-078

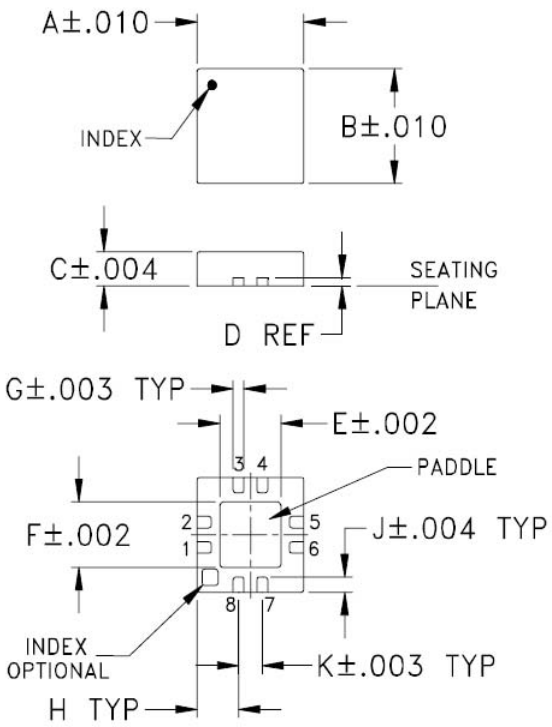
ORIGINAL PART: MNA-6+
REPLACEMENT PART: MNA-6A+

Replacement Part has been judged by Mini-Circuits Engineering as a suitable replacement to Original Part[a]

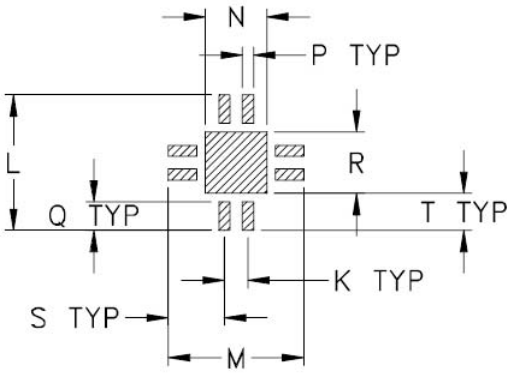
MECHANICAL DIMENSIONS & PCB LAND PATTERN

ORIGINAL PART: MNA-6+	REPLACEMENT PART: MNA-6A+

Case Style DQ849 (No Change)



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

Marking	Marking
MNA6	MN6A

Notes:
a. Suitability for model replacement within a particular system must be determined by and is solely the responsibility of the customer based on, among other things, electrical performance criteria, stimulus conditions, application, compatibility with other components and environmental conditions and stresses.

CONCLUSION:

1) **FORM-FIT-FUNCTIONAL COMPATIBLE[a]**:

Replacement part is Form, Fit compatible. Following is a summary of changes/improvements:

Typical performance comparison: See paragraphs 2 to 5

Min/Max Specifications, Thermal Resistance and Max Tj- see below:

Parameter	Original Part (MNA-6+)	Replacement Part (MNA-6A+)
Gain-Min at 2 GHz (dB)	21.5	22.3
Thermal resistance (°C/W)	78	46
Maximum DC Voltage on pins 2 & 5 (V)	10	1
Power Dissipation (W)	0.5	0.97

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2) **PERFORMANCE COMPARISON[a] (TYPICAL), DC Voltage=5V**:

Parameter	Freq. MHz	MNA-6+ Original Part Data of 2 Units			MNA-6A+ Replacement Part Data of 5 units		
		Min	Average	Max	Min	Average	Max
Gain (dB)	500	18.2	18.3	18.4	22.3	22.4	22.5
	750	20.9	21.1	21.2	24.4	24.5	24.5
	1000	22.0	22.2	22.3	25.0	25.1	25.1
	1500	23.2	23.3	23.5	25.3	25.4	25.4
	2000	23.3	23.6	23.9	24.8	24.9	25.0
	2500	21.4	21.8	22.2	23.2	23.3	23.5
Input Return Loss (dB)	500	7.3	7.5	7.6	6.3	6.4	6.5
	750	12.8	13.0	13.3	10.9	11.0	11.1
	1000	19.7	20.2	20.6	14.2	14.3	14.4
	1500	20.5	20.7	21.0	17.4	17.7	17.9
	2000	25.5	26.1	26.7	17.6	18.2	18.6
	2500	16.0	16.8	17.7	14.9	15.6	16.5
Output Return Loss (dB)	500	8.5	8.6	8.6	10.9	11.1	11.2
	750	17.7	17.7	17.7	17.8	17.9	18.0
	1000	22.8	22.9	23.0	27.2	27.5	28.3
	1500	13.2	13.3	13.4	24.1	24.8	25.2
	2000	10.1	10.2	10.2	19.5	19.7	20.2
	2500	10.3	10.5	10.7	19.4	19.9	20.2
Output Power at 1dB Compression (dBm)	500	18.2	18.3	18.5	20.3	20.3	20.4
	750	18.9	19.1	19.3	20.3	20.3	20.4
	1000	18.4	18.6	18.8	20.2	20.2	20.2
	1500	17.2	17.5	17.7	19.9	19.9	19.9
	2000	16.1	16.3	16.5	19.4	19.5	19.5
	2500	16.3	16.5	16.7	19.2	19.3	19.3
Output IP3 (dBm)	500	30.1	30.3	30.5	33.2	33.4	33.6
	750	30.8	31.0	31.2	33.0	33.1	33.3
	1000	30.1	30.3	30.4	32.4	32.6	32.7
	1500	28.8	29.1	29.3	31.4	31.6	31.7
	2000	27.6	27.8	28.0	30.4	30.5	30.6
	2500	29.6	29.8	30.0	30.0	30.1	30.3
NF (dB)	500	3.4	3.4	3.4	3.0	3.0	3.1
	750	3.1	3.1	3.1	2.7	2.7	2.8
	1000	2.9	2.9	3.0	2.5	2.6	2.6
	1500	2.9	2.9	2.9	2.5	2.6	2.6
	2000	2.9	2.9	3.0	2.6	2.6	2.7
	2500	3.0	3.1	3.1	2.6	2.7	2.7
Directivity (Isolation- Gain) (dB)	500	25.2	25.3	25.4	22.1	22.5	22.8
	750	21.5	21.6	21.8	21.1	21.4	21.5
	1000	19.2	19.2	19.2	18.7	19.0	19.1
	1500	16.5	16.5	16.6	15.1	15.4	15.6
	2000	15.6	15.8	16.0	13.3	13.6	13.8
	2500	16.0	16.3	16.6	13.2	13.4	13.6
DC Current (mA)	DC	73.8	75.5	77.1	97.8	98.6	99.3

Notes:
a. Suitability for model replacement within a particular system must be determined by and is solely the responsibility of the customer based on, among other things, electrical performance criteria, stimulus conditions, application, compatibility with other components and environmental conditions and stresses.

3) **PERFORMANCE COMPARISON[a] (TYPICAL), DC Voltage=2.8V**:

Parameter	Freq. MHz	MNA-6+ Original Part Data of 2 Units			MNA-6A+ Replacement Part Data of 5 units		
		Min	Average	Max	Min	Average	Max
Gain (dB)	500	16.8	16.9	17.1	20.4	20.5	20.6
	750	19.1	19.3	19.4	22.0	22.0	22.1
	1000	19.9	20.0	20.2	22.3	22.4	22.4
	1500	20.5	20.7	20.9	22.3	22.4	22.4
	2000	20.7	20.9	21.2	21.6	21.8	21.9
	2500	19.5	19.9	20.2	20.4	20.6	20.7
Input Return Loss (dB)	500	7.0	7.2	7.3	6.9	6.9	7.0
	750	11.7	12.0	12.2	11.2	11.3	11.4
	1000	16.6	17.0	17.3	13.9	14.0	14.1
	1500	23.3	23.4	23.4	16.3	16.6	16.8
	2000	35.0	37.2	39.4	17.5	17.7	18.1
	2500	16.1	16.8	17.4	15.4	16.2	16.9
Output Return Loss (dB)	500	8.6	8.7	8.8	9.8	10.0	10.1
	750	15.1	15.2	15.2	13.3	13.6	13.8
	1000	14.5	14.7	14.8	14.9	15.2	15.5
	1500	10.4	10.5	10.6	15.3	15.6	15.9
	2000	8.4	8.4	8.5	14.8	15.1	15.4
	2500	8.0	8.1	8.1	15.2	15.7	16.0
Output Power at 1dB Compression (dBm)	500	14.2	14.2	14.2	11.1	11.3	11.5
	750	14.7	14.8	14.8	11.6	11.9	12.1
	1000	14.7	14.8	14.9	11.9	12.2	12.4
	1500	14.2	14.4	14.6	11.8	12.1	12.3
	2000	13.4	13.7	13.9	12.2	12.5	12.7
	2500	13.3	13.5	13.8	12.5	12.8	13.0
Output IP3 (dBm)	500	25.7	25.7	25.7	22.8	23.1	23.4
	750	26.0	26.0	26.0	23.3	23.6	23.7
	1000	25.8	25.8	25.8	23.7	23.9	24.1
	1500	25.3	25.4	25.5	23.5	23.7	23.9
	2000	24.8	24.9	25.0	23.8	24.0	24.2
	2500	24.0	24.1	24.1	24.1	24.3	24.5
NF (dB)	500	3.4	3.4	3.4	3.1	3.1	3.2
	750	3.1	3.1	3.1	2.8	2.8	2.9
	1000	3.0	3.0	3.0	2.6	2.6	2.7
	1500	2.9	2.9	3.0	2.6	2.7	2.7
	2000	2.9	2.9	3.0	2.7	2.7	2.7
	2500	3.1	3.1	3.1	2.7	2.8	2.8
Directivity (Isolation- Gain) (dB)	500	27.0	27.1	27.2	24.9	25.3	25.7
	750	22.4	22.5	22.6	22.0	22.3	22.5
	1000	19.7	19.7	19.8	19.2	19.5	19.6
	1500	16.8	16.8	16.9	15.5	15.8	16.0
	2000	15.2	15.3	15.3	13.6	13.8	14.1
	2500	15.0	15.2	15.4	13.0	13.1	13.3
DC Current (mA)	I(mA)	66.6	68.3	69.9	91.4	92.0	92.7

Notes:
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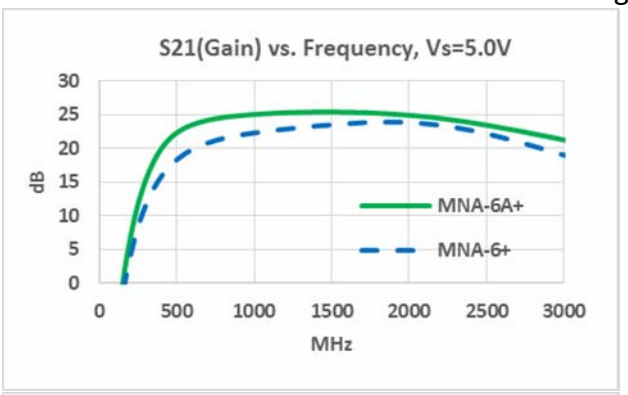
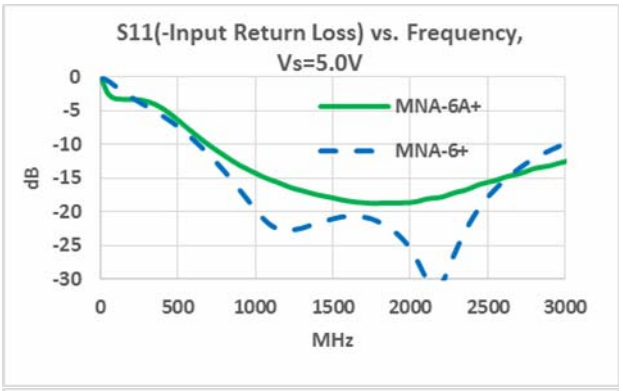
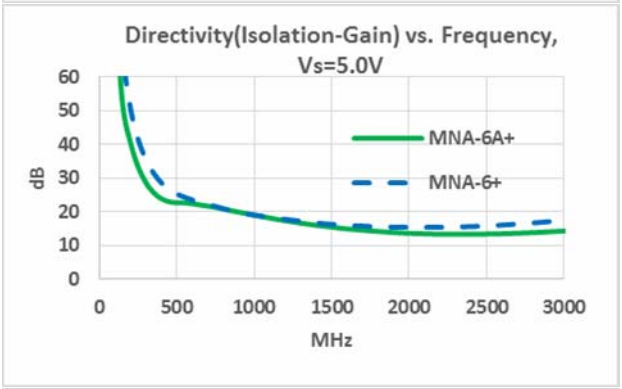
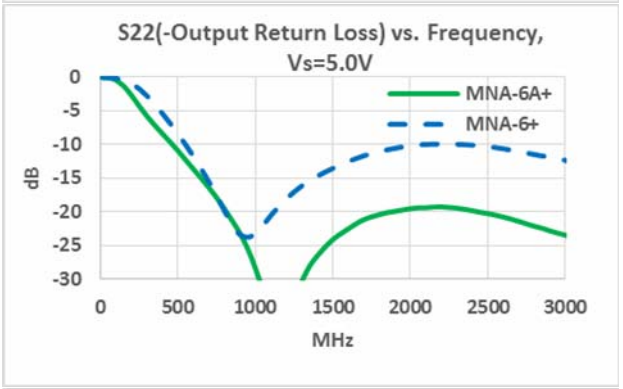
4) PERFORMANCE COMPARISON CURVES[a] (TYPICAL), DC Supply=5V:

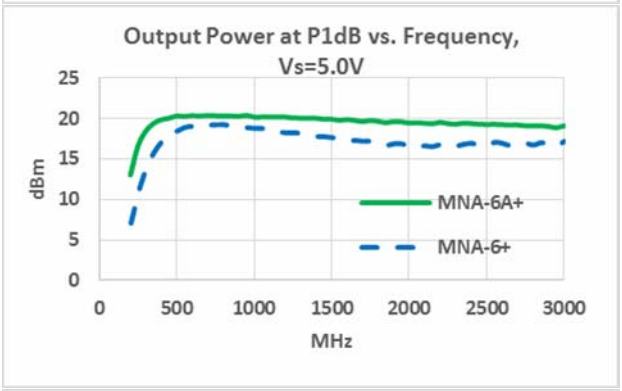
Data of Replacement Part
Data of Original Part

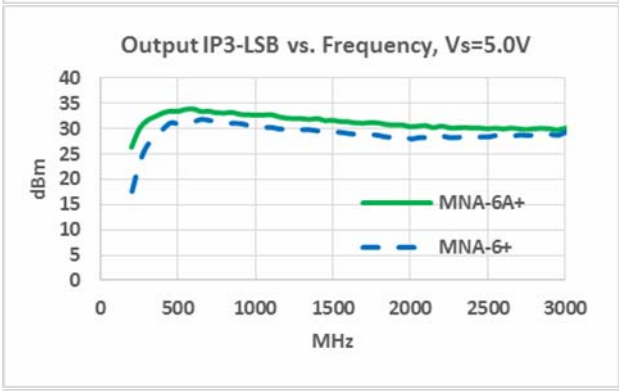


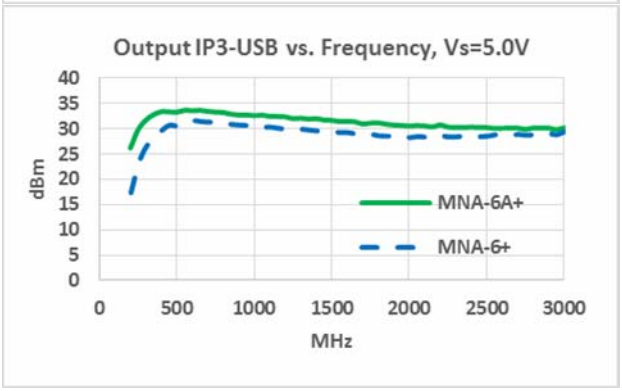


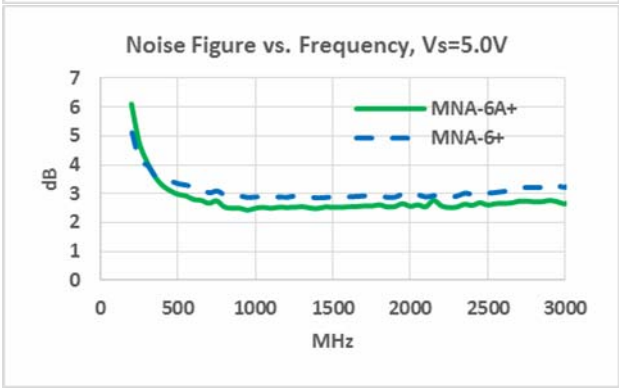












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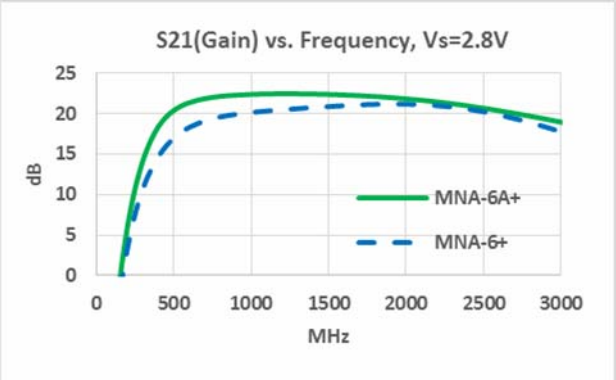
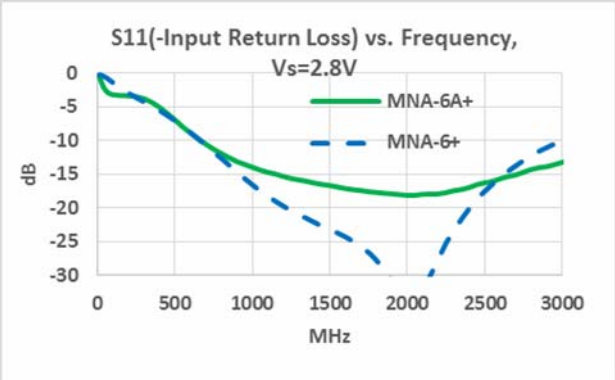
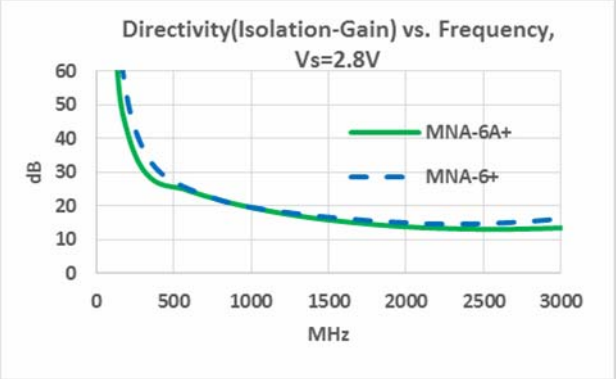
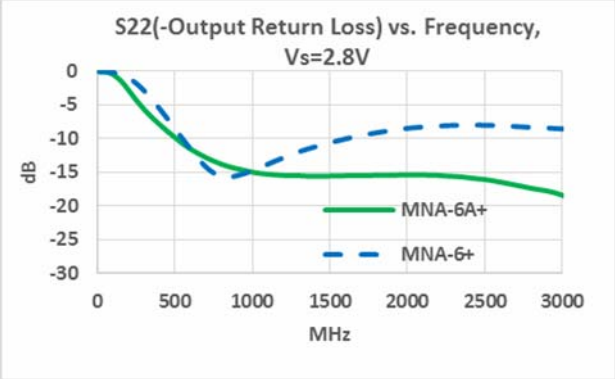
5) PERFORMANCE COMPARISON CURVES[a] (TYPICAL),DC Supply=2.8V:

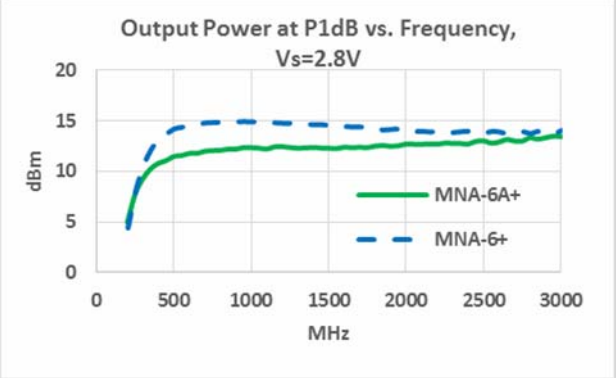
Data of Replacement Part
Data of Original Part

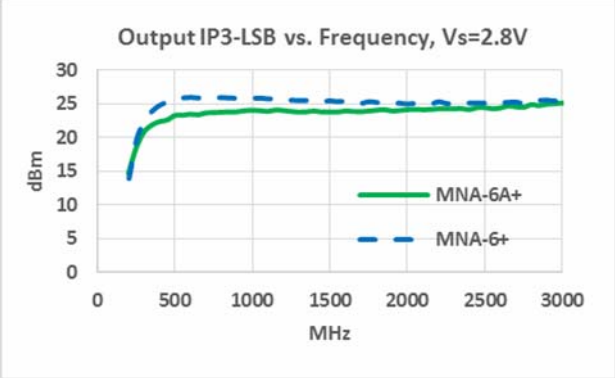


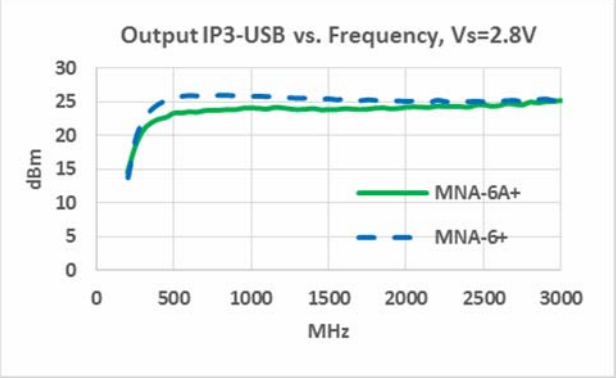


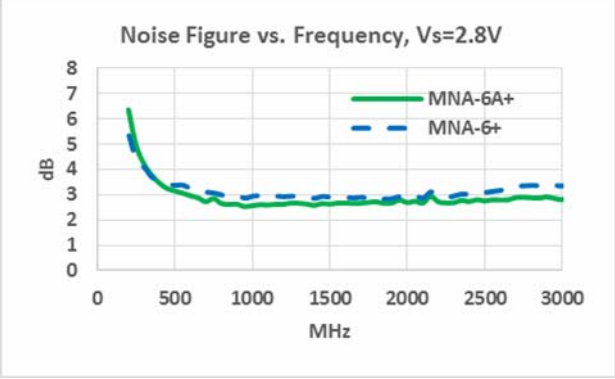












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