

## MODULAR CONNECTORLESS AMPLIFIERS

### MODAMP™ MONOLITHIC MICROWAVE INTEGRATED CIRCUITS (MMICs)

The MSA series of monolithic silicon amplifiers is a family of silicon bipolar Monolithic Microwave Integrated Circuits (MMICs) using nitride self-alignment, ion-implantation for precise control of doping and nitride passivation for high reliability. They use series

and shunt feedback and exhibit very high uniformity from amplifier to amplifier. Typical applications include narrow and broadband IF and RF amplifiers in commercial, industrial and military mobile, airborne and land based systems.

### MSA SERIES

Typical Specifications at 25° C Case Temperature

PC1

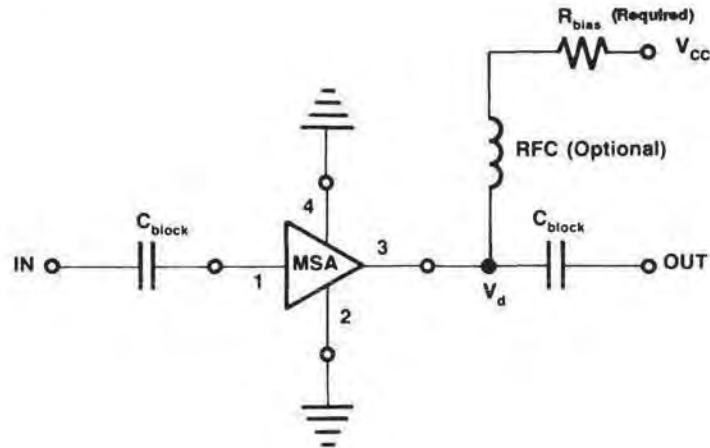
Part Number	Maximum Usable Frequency <sup>1</sup> (GHz)	S <sub>21</sub>   <sup>2</sup> Gain @ 0.1 GHz (dB)	S <sub>21</sub>   <sup>2</sup> Gain @ 1.0 GHz (dB)	Noise Figure @ 1.0 GHz (dB)	P <sub>1dB</sub> @ 1.0 GHz (dBm)	Minimum Power Supply Voltage <sup>3</sup> (V <sub>cc</sub> )	Device Voltage <sup>3</sup> (V <sub>d</sub> )	Device Current <sup>3</sup> (mA)	Case Type
MSA-0104	3.5	18.5	15.0	6.0	1.5	7	5	17	4-pac plastic
MSA-0204	4.0	12.5	11.0	6.5	4.5	7	5	25	4-pac plastic
MSA-0304	3.5	12.5	11.0	6.0	10.0	7	5	35	4-pac plastic
MSA-0404	2.5	8.3	7.7	7.0	11.5	7	5.3	50	4-pac plastic
MSA-0420	4.0	8.5	8.5	6.5	16.0	10	6.3	90	200 mil BeO
MSA-0520	2.5	9.0	8.5	6.5	23.0	15	12	165	200 mil BeO
MSA-1023	2.5	8.5	8.5	7.0	27.0	20	15	325	230 mil flange
MSA-1120 <sup>2</sup>	3.0	12.5	11.0	4.0	15.0	8	5.5	60	200 mil BeO
MSA-0135	4.5	19.0	16.5	6.0	1.5	7	5	17	micro-X
MSA-0235	4.5	12.5	12.0	6.5	4.5	7	5	25	micro-X
MSA-0335	4.5	12.5	12.0	6.0	10.0	7	5	35	micro-X
MSA-0435	3.8	8.5	8.3	6.5	12.5	7	5.3	50	micro-X
MSA-0635	4.0	20.5	16.5	3.0	1.5	5	3.5	16	micro-X
MSA-0735	4.0	13.5	13.0	4.5	5.5	5	4	22	micro-X
MSA-0835	6.5	32.5	23.0	3.0	12.5	10	7.8	36	micro-X
MSA-0170	4.5	19.0	16.5	6.0	1.5	7	5	17	70 mil hermetic
MSA-0270	4.5	12.5	12.0	6.5	4.5	7	5	25	70 mil hermetic
MSA-0370	4.5	12.5	12.0	6.0	10.0	7	5	35	70 mil hermetic
MSA-0470	4.0	8.5	8.3	6.5	12.5	7	5.3	50	70 mil hermetic
MSA-0670	4.0	20.5	17.5	3.0	1.5	5	3.5	16	70 mil hermetic
MSA-0770	4.0	13.5	13.0	4.5	5.5	5	4	22	70 mil hermetic
MSA-0870	6.0	32.5	23.5	3.0	12.5	10	7.8	36	70 mil hermetic
MSA-0910 <sup>2</sup>	6.0	8.0	8.0	6.0	12.0	12	7.7	35	100 mil hermetic
MSA-0185	4.5	18.5	15.5	6.0	1.5	7	5	17	85 mil plastic
MSA-0285	4.5	12.5	12.0	6.5	4.5	7	5	25	85 mil plastic
MSA-0385	4.0	12.5	12.0	6.0	10.0	7	5	35	85 mil plastic
MSA-0485	3.6	8.3	8.0	7.0	12.5	7	5.3	50	85 mil plastic
MSA-0685	4.0	20.0	17.0	3.2	1.5	5	3.5	16	85 mil plastic
MSA-0785	3.8	13.5	12.5	5.0	5.5	5	4	22	85 mil plastic
MSA-0885	6.0	32.5	22.5	3.3	12.5	10	7.8	36	85 mil plastic
MSA-0186	4.5	18.5	15.5	6.0	1.5	7	5	17	surface mount plastic
MSA-0286	4.5	12.5	12.0	6.5	4.5	7	5	25	surface mount plastic
MSA-0386	4.0	12.5	12.0	6.0	10.0	7	5	35	surface mount plastic
MSA-0486	3.6	8.3	8.0	7.0	12.5	7	5.3	50	surface mount plastic
MSA-0686	4.0	20.0	17.0	3.2	1.5	5	3.5	16	surface mount plastic
MSA-0786	3.8	13.5	12.5	5.0	5.5	5	4	22	surface mount plastic
MSA-0886	6.0	32.5	22.5	3.3	12.5	10	7.8	36	surface mount plastic

Notes 1: Frequency at which |S<sub>21</sub>|<sup>2</sup> gain equals 6 dB.

2. Recent product addition.

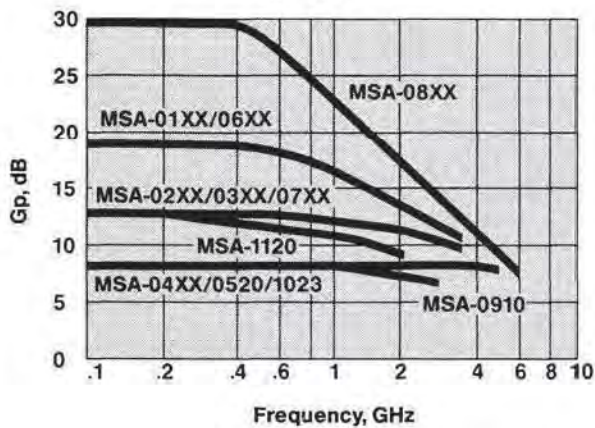
3. Refer to biasing configuration on next page.

## TYPICAL BIASING CONFIGURATION

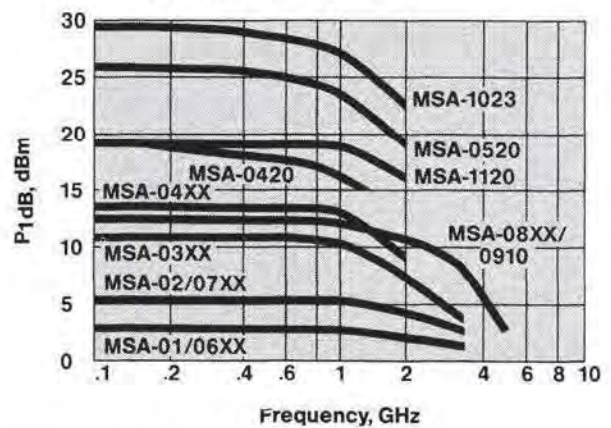


## TYPICAL PERFORMANCE: Si MMIC AMPLIFIERS

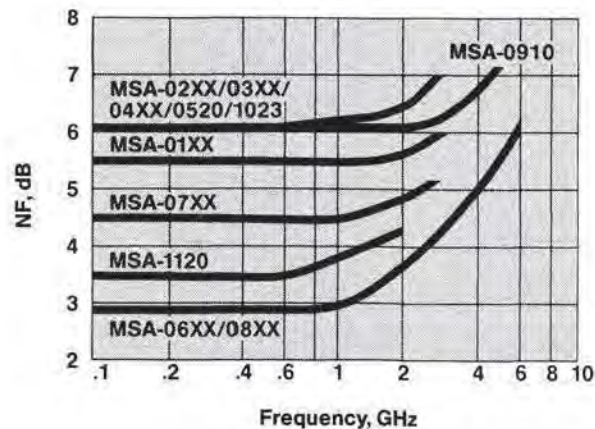
TYPICAL POWER GAIN vs. FREQUENCY  
 $T_A = 25^\circ\text{C}$



TYPICAL OUTPUT POWER @ 1 dB GAIN COMPRESSION  
 vs. FREQUENCY,  $T_A = 25^\circ\text{C}$

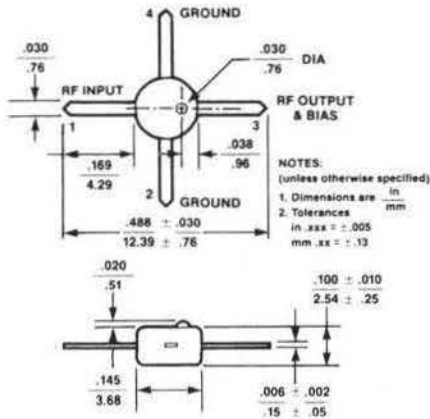


TYPICAL NOISE FIGURE vs. FREQUENCY  
 $T_A = 25^\circ\text{C}$

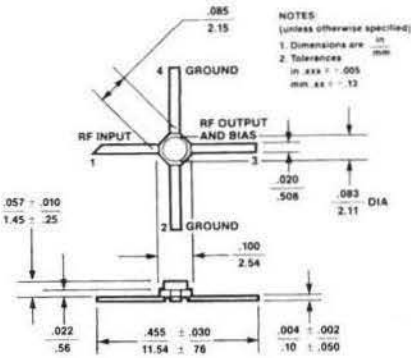


# CASE DRAWINGS

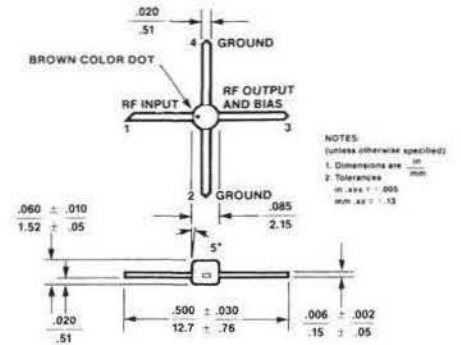
## AVANTEK 04 PLASTIC PACKAGE



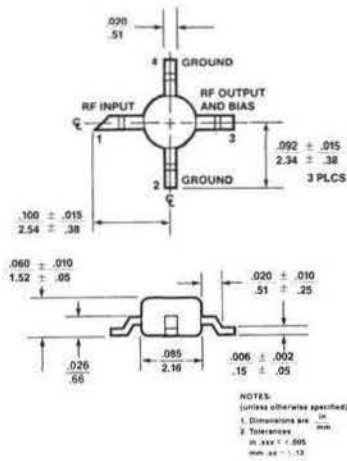
## AVANTEK micro-X PACKAGE



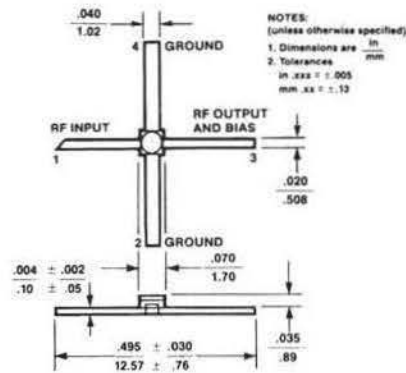
## AVANTEK 85 PLASTIC PACKAGE



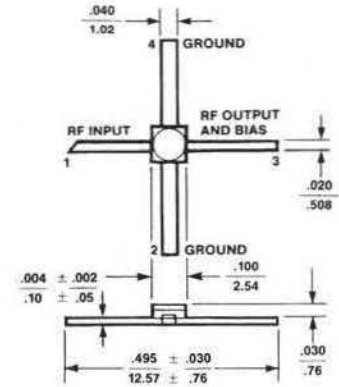
## AVANTEK SURFACE MOUNT



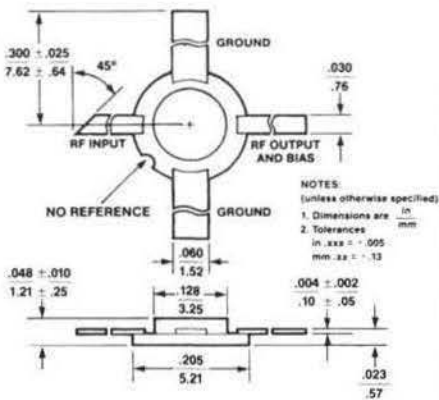
## AVANTEK 70 mil PACKAGE



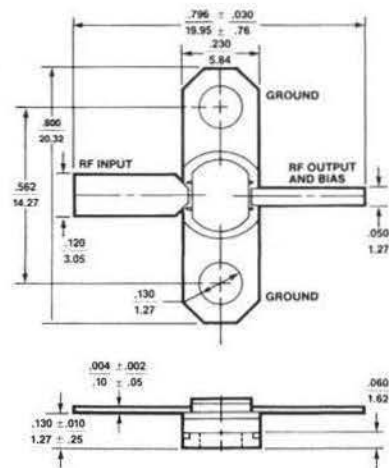
## AVANTEK 100 mil STRIPLINE



## AVANTEK 200 mil BeO PACKAGE



## AVANTEK 230 mil BeO FLANGE PACKAGE



## NOTES: