

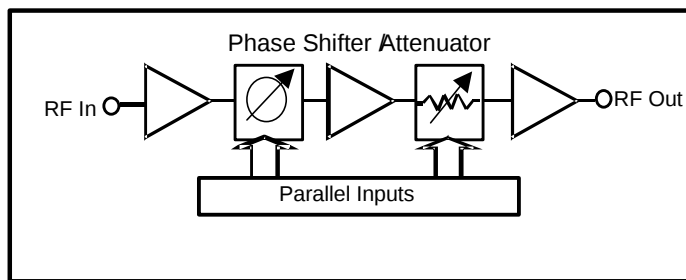


X-Band Parallel Input 5-Bit Attenuator / 6-Bit Phase Shifter / Buffer Amplifier Die

Preliminary Release

FEATURES

- 8 to 11 GHz Operation
- 50 Ω Input and Output Impedance
- Self-Aligned MSAG[®] MESFET Process



Description

The MA03503D is an X-Band Parallel Input 5-Bit Attenuator / 6-Bit Phase Shifter / Buffer Amplifier fabricated using M/A-COM's mature GaAs Self-Aligned MSAG[®] MESFET Process. This product is fully matched to 50 ohms on both the input and the output.

Maximum Ratings (T_A = 25 °C unless otherwise noted)

Rating	Symbol	Value	Unit
DC Drain Supply Voltage	V _D	8	V _{dc}
DC Gate Supply Voltage	V _G	-6	V _{dc}
Digital Supply Voltage	V _{EE}	-6	V _{dc}
RF Input Power	P _{IN}	200	mW
Junction Temperature	T _J	150	°C
Storage Temperature	T _{STG}	-40 to +150	°C

ELECTRICAL CHARACTERISTICS V_D=5.0 V, V_G = -4.0 V, V_{EE} = -4.0 V, T=25 °C, Input and Output Connected to 50 Ω .

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range		8		11	GHz
Maximum Gain	G _p		18		dB
Gain Flatness (Peak-to-Peak over any 250 MHz band)			0.5		dB
Input and Output Return Loss	RL		16		dB
Attenuation Range (5-Bits, 32 Steps 0.75 dB Nominal)			0.75 to 23.25		dB
RMS Attenuation Error (Uncorrected)			0.20		dB
0.75 dB Attenuator		-0.5	-0.8	-1.0	dB
1.5 dB Attenuator		-1.0	-1.5	-2.0	dB
3 dB Attenuator		-2.4	-3.0	-3.6	dB
6 dB Attenuator		-5.0	-6.0	-7.0	dB
12 dB Attenuator		-10.8	-12	-13.2	dB
Phase Shift Range (6-Bits, 64 Steps 5.6 degrees Nominal)			5.6 to 354.4		Deg
RMS Phase Error (uncorrected)			2		Deg
5.6 degree phase bit		-4	-5.3	-7	Deg
11.25 degree phase bit		-8	-11	-13	Deg
22.5 degree phase bit		-19	-22	-24	Deg
45 degree phase bit		-40	-44	-47	Deg
90 degree phase bit		-85	-90	-95	Deg
180 degree phase bit		-170	-180	-190	Deg
Gain Variation (Over all Phase Shifter Settings)			+/- 1.0		dB
Output Third Order Intercept Point	TOI		28		dBm
1-dB Compression Point	P _{1dB}		22.5		dBm

Specifications subject to change without notice.

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- North America: Tel. (800)366-2266, Fax (800)618-8883
- Asia/Pacific: Tel. +81-44-844-8296, Fax +81-44-844-8298
- Europe: Tel. +44 (1344) 869 595, Fax +44 (1344) 300 020

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Characteristic	Symbol	Min	Typ	Max	Unit
Noise Figure	NF		10		dB
Clock Frequency			20		MHz

Characteristic	Symbol	Min	Typ	Max	Unit
DC Power Supplies					
Microwave					
Drain Supply Voltage	V_D		5		V
Gate Supply Voltage	V_G		-4		V
Drain Supply Current	I_D		325		mA
Gate Supply Current	I_G		1		mA
Digital					
Source Supply Voltage	V_{EE}		-4		V
Source Supply Current	I_{EE}		10		mA
Logic Levels at Input					
Input High Voltage	V_{ih}	3			V
Input Low Voltage	V_{il}			0.4	V
Input High Input Current	I_{ih}			0.5	mA
Input Low Input Current	I_{il}			0.1	mA
Timing Delay between enable signal and bit change			25		ns
Reliability (80 °C Baseplate)	MTTF	10^6			Hours

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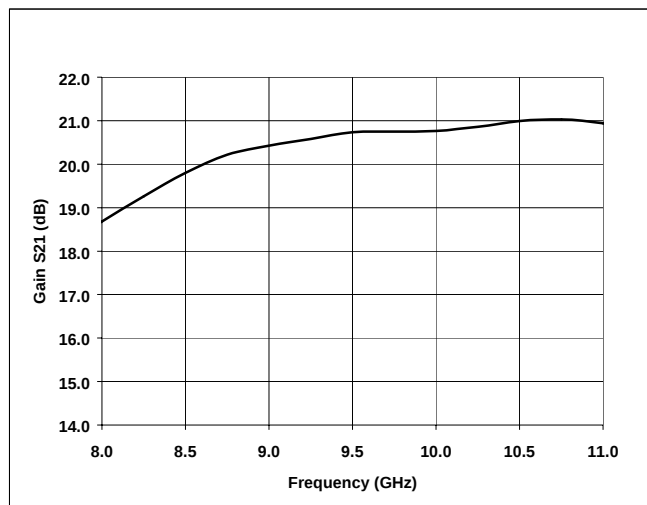


Figure 1. Gain vs. Frequency

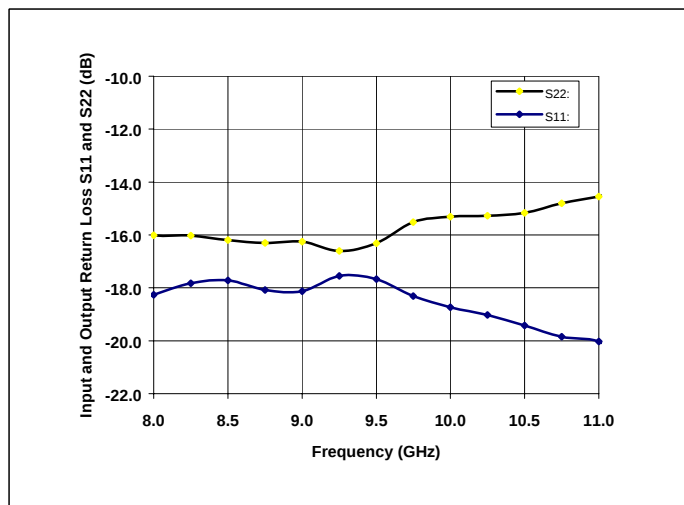
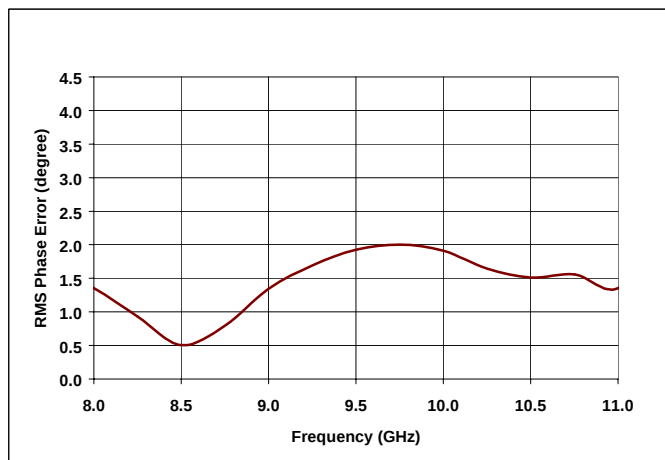
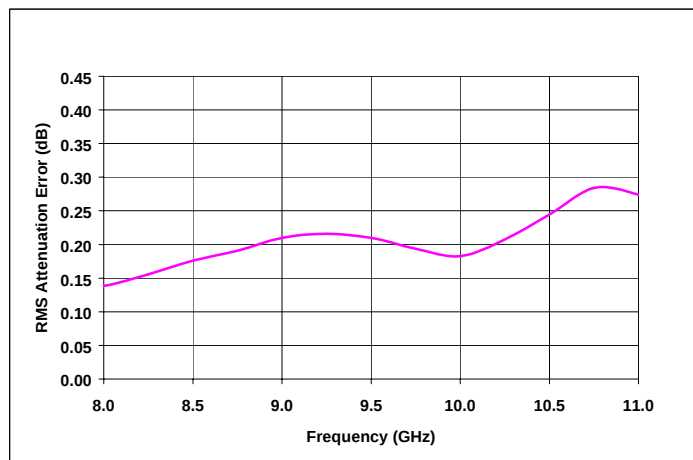


Figure 2. Input and Output Return Loss



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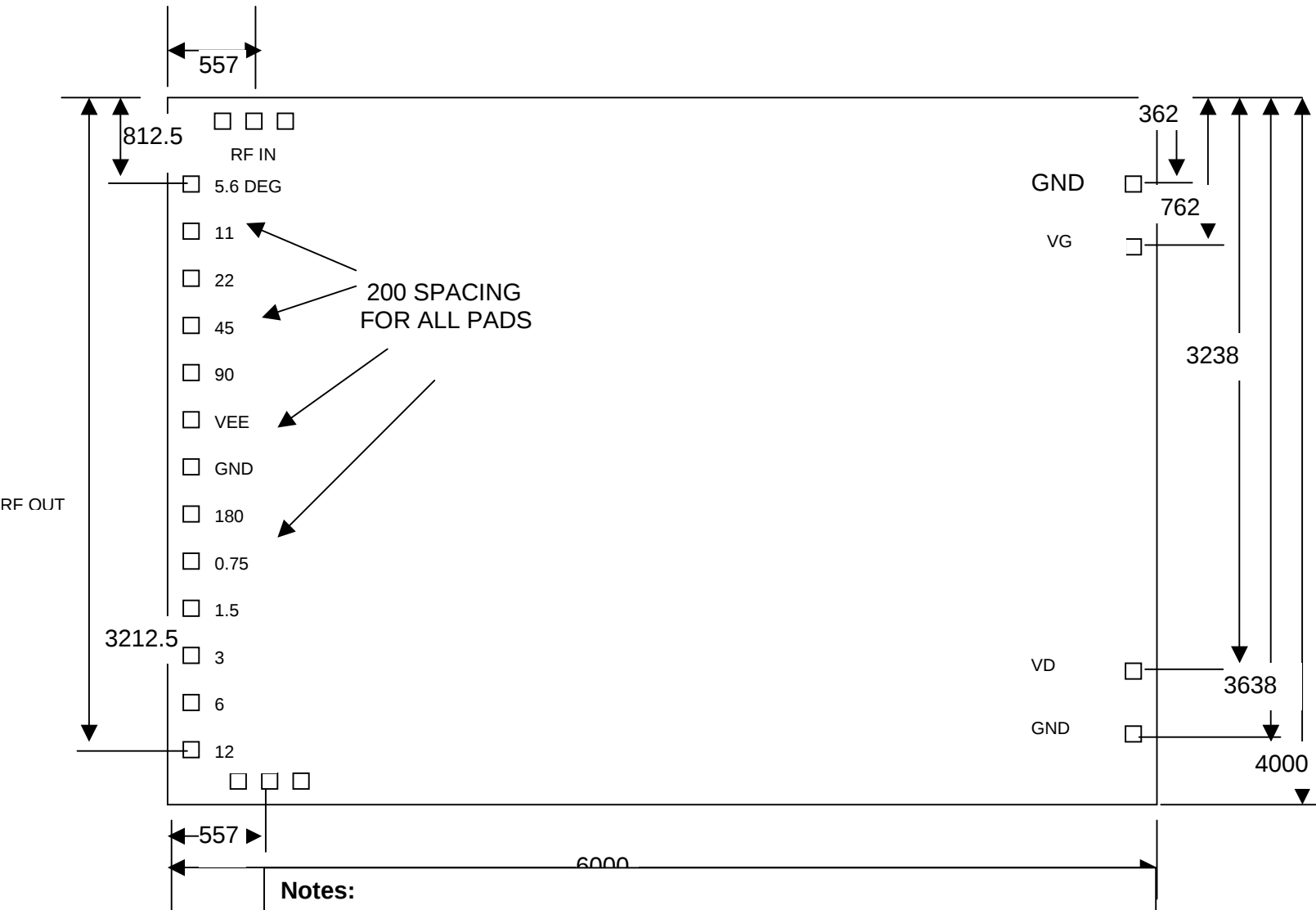
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MECHANICAL INFORMATION

**Notes:**

Dimensions in microns

Pad dimensions

All pads

150umX150um

Ground-RF-Ground Spacing

225um



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