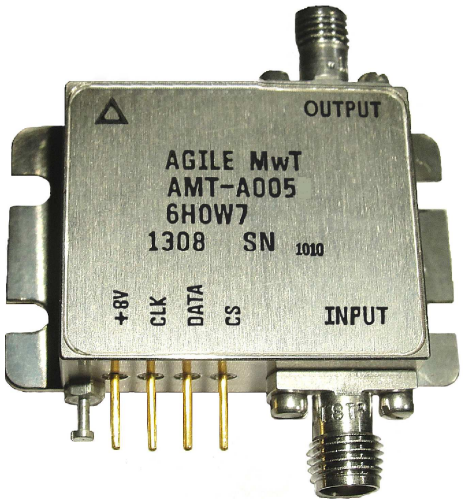
AMT-A0205 0.5 GHz to 2.5 GHz
VGA with 30 dB 5 Bit Attenuator w SPI
Data Sheet

Microwave Technology Inc

Features

- 0.5 GHz to 2.5 GHz Frequency Range
- 5 Bit 30 dB Variable Gain Range
- Typical Gain 42 dB
- Gain Flatness < ± 1.5 dB
- Internally Regulated
- Operates from a Single Supply
- Unconditionally Stable
- State-of-the-Art GaAs Technology



Description

The AMT-A0205 is a Variable gain medium power amplifier with 5-Bit Serial Control 30 dB digital attenuator. The performance is achieved through the use of AMTI's proprietary technology. The VGA is a highly integrated module with fast digital attenuator and medium power amplifier. The RF input output are internally matched to 50 Ohms and DC blocked. The AMT-A0205 is ideal for use where variable amplification is required in a Hi-Rel communications system for Commercial or Military applications

Applications

- Communication systems
- Microwave Radio systems
- Test Equipment

MAXIMUM RATINGS[1]

Parameter	Symbol	Units	MIN	MAX
Operating Temperature – Case	T_{MO}	° C	-30	+85
Storage Temperature - Case	T_{MS}	° C	-55	+150
RF Input power (CW)	Pin	dBm		+30
Die $T_{Junction}$	T_J	° C		+150
Positive Supply Voltage	V_{+SS}	V		+12

Note: Control Pins should not be floating while biased

1.Stresses above those listed under "Absolute Maximum Rating" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

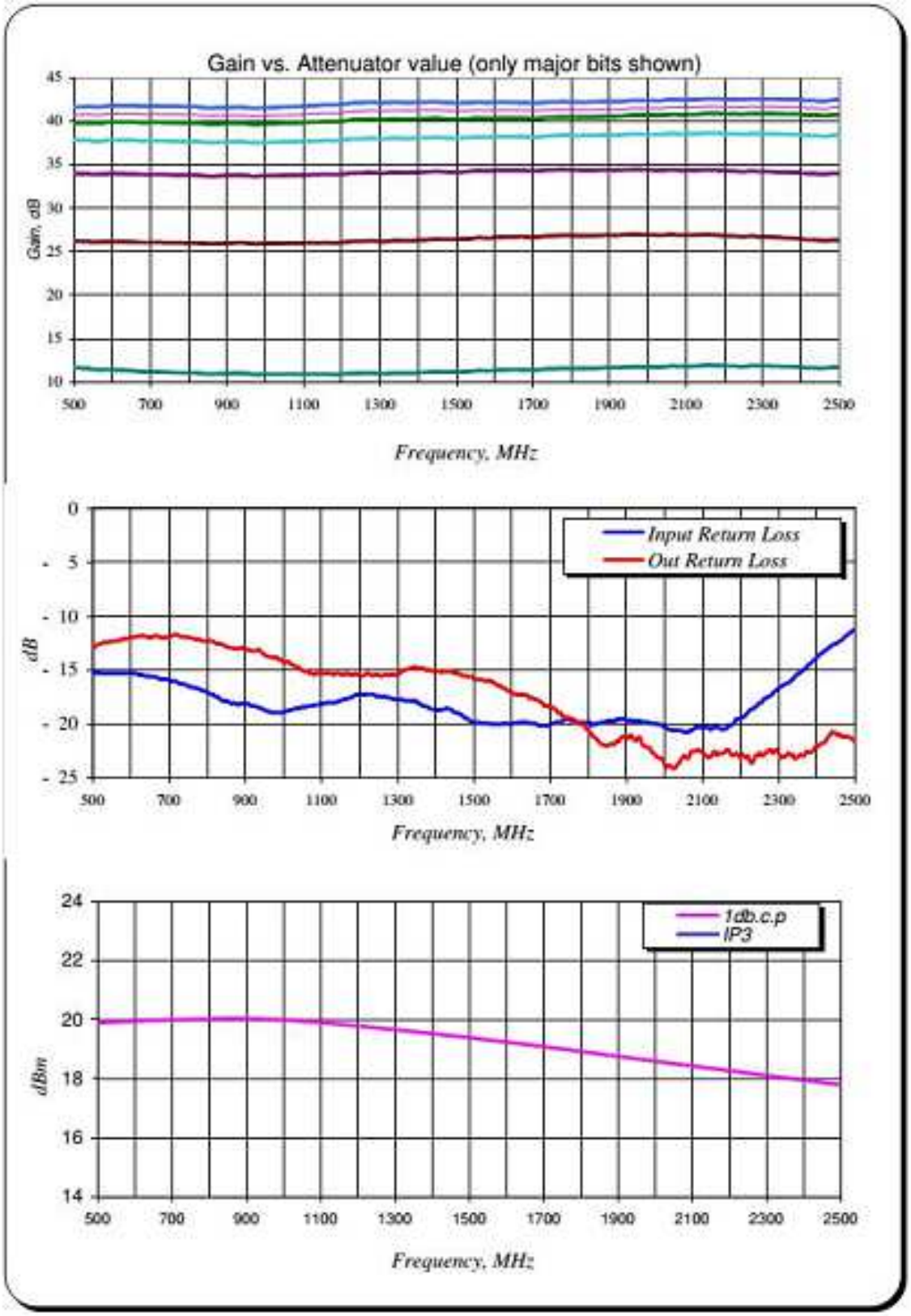
ELECTRICAL SPECIFICATIONS @ 23ºC

Parameter	Conditions	Units	MIN	Typical	MAX
Frequency Range		GHz	0.5		2.5
Gain	Small Signal with 0 Attenuation	dB	38	42	
Gain Flatness	Small Signal with 0 Attenuation	dB		±1	±2
Input Power	CW, without damage	dBm	+15		
Output Power (P1dB)	1 dB compression point @ 1.5 GHz	dBm	10	20	
Control Setup Time	Serial control TTL CMOS Setup Time	nS		90	110
RF Input Impedance	Reference to 50 ohms VSWR			1.8:1	2.0:1
RF Output Impedance	Reference to 50 ohms			1:9:1	2.0:1
Supply Voltage Positive: Supply Current Positive:		V mA		+8 210mA	 350

Notes:
1/ Unconditional Stability

Customized configurations of the above specifications are available

Typical Broadband Performance @ 23C +8V 210 mA



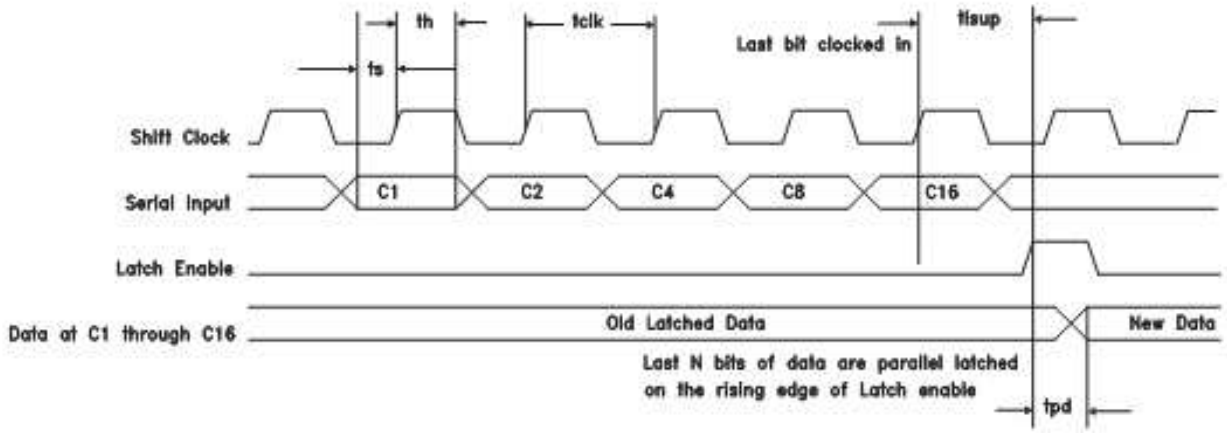
5-BIT Digital Attenuator

The AMT-A0205 contains a 3-wire SPI compatible interface as follows:

Serial Control Interface

Timing Diagram

Serial data is shifted in on the rising edge of the Shift Clock, LSB first, and is latched on the rising edge of Latch Enable.



Truth Table

Serial Data Input					Attenuation Setting RF1 - RF2
C1	C2	C4	C8	C16	
High	High	High	High	High	Reference I.L.
Low	High	High	High	High	1 dB
High	Low	High	High	High	2 dB
High	High	Low	High	High	4 dB
High	High	High	Low	High	8 dB
High	High	High	High	Low	16 dB
Low	Low	Low	Low	Low	31 dB Max. Atten.
Any combination of the above states will provide an attenuation approximately equal to the sum of the bits selected.					

Timing

Parameter	Symbol	Vcc = +5V		Vcc = +3V		Units
		Min.	Max.	Min.	Max.	
Serial Input Setup Time	ts	20	-	100	-	ns
Hold time from Serial Input to Shift Clock	th	0	-	5	-	ns
Setup time from Shift Clock to Latch Enable	tlsup	40	-	100	-	ns
Propagation delay, Latch Enable to C1 through C16	tpd	-	30	-	70	ns
Setup time from Reset to Shift Clock	-	20	-	50	-	ns
Clock Frequency (1/tclk)	fclk	-	30	-	10	MHz

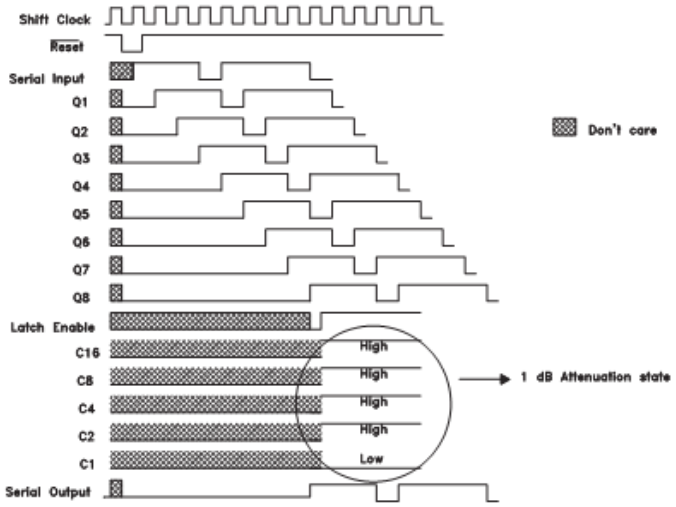
Serial Input Truth Table

Latch Enable	Shift Clock	$\overline{\text{Reset}}$	Function
X	X	L	Shift register cleared
X	↑	H	Shift register clocked
↑	X	H	Contents of shift register transferred to Digital Attenuator

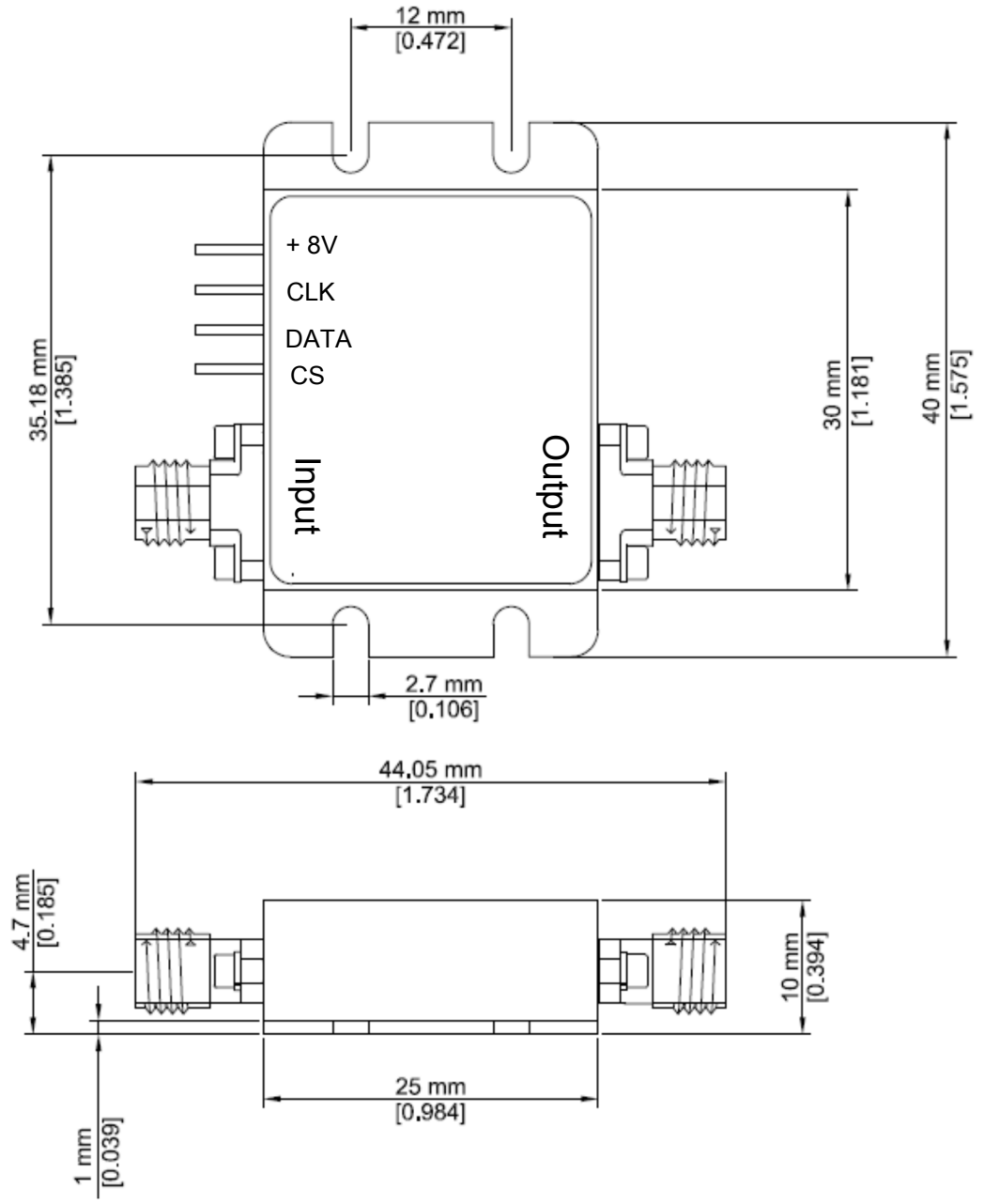
5-BIT Digital Attenuator

ATTENUATION (dB)	HEX code	Decimal
0	FF	255
1	F7	247
2	EF	239
3	E7	231
4	DF	223
5	D7	215
6	CF	207
7	C7	199
8	BF	191
9	B7	183
10	AF	175
11	A7	167
12	9F	159
13	97	151
14	8F	143
15	87	135
16	7F	127
17	77	119
18	6F	111
19	67	103
20	5F	95
21	57	87
22	4F	79
23	47	71
24	3F	63
25	37	55
26	2F	47
27	27	39
28	1F	31
29	17	23
30	F	15
31	7	7

Programming Example to Select 1 dB Attenuation State



Package Outline: M010 SMA Connectorized mm (inches)



Model Number	Description	Hermeticity	Package
AMT-A0205	SMA Female	Non-Hermetic	Outline: M010

Contact us for custom configurations and special requirements.

Our highly experienced team of engineers can quickly identify and implement innovative solutions using latest technology to improve performance and reduce cost.

- Add additional functionality: Input limiter, Temperature compensation, Amplitude/Phase matching, Amplitude/Phase Tracking, Automatic Gain control, Gain sloping, Bypass path, Specific supply voltage, Regulation, Power detector, Health status, and others

- Integrated: Filters, Switches, Limiter, Digital attenuator, Phase shifter, Microcontroller, Multiple amplifiers, Switch matrix, Comb generators and others

- Mechanical: Custom packages - Surface Mount, Connectorized, Waveguide, Carrier, Drop-in, Hermetic and others

Agile Microwave Technology Inc is the logical choice for all your commercial or military RF/Microwave components/module requirements.

Contact Information:

701 Cascade Pointe Lane
Cary, NC 27513

ISO 9001:2015
Certified Company

Agile
Microwave Technology Inc

Phone: (984) 228-8001 **info@agilemwt.com** **www.agilemwt.com**