

Absorptive Digital Control Attenuator 0-20GHz



Note: Photo is for illustration purposes only.
Please refer to outline drawing.

Features

- Absorptive Digital Control Attenuator
- 1dB LSB Steps to 31dB
- Single Positive Control Line Per Bit

Product Description

RFDAT0018G5A is an absorptive digital control attenuator with a frequency range of 0 to 20GHz.

The maximum power input of this attenuation is 35dBm. The insertion loss is 3.5dB with a typical attenuation range of 31dB.

The working temperature of this product is between - 40°C and + 85°C.

Typical Applications

- Wireless Infrastructure
- Military and Aerospace Applications
- Test Instrumentation
- Radar Systems
- 5G Wireless Communications
- Microwave Radio Systems
- TR Modules
- Research and Development
- Cellular Base Stations

Electrical Specifications ($T_A=+25^{\circ}\text{C}$), $V_{dd} = +5\text{V}$, $\text{TTL} = 0 / +5\text{V}$

Parameter	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range		0.01-0.1			0.1-6			6-20		GHz
Attenuation Range	30	31		30	31		30	31		dB
Attenuation Flatness: (Referenced to Insertion Loss)		± 1.0			± 1.0			± 1.5		dB
Control Bits					5					Bit
Control Step Size		1			1			1		dB
Insertion Loss		2.5	3.5		3.5	4.5		5.0	6.5	dB
Insertion Loss Temperature Coefficient		0.003			0.003			0.003		dB/ $^{\circ}\text{C}$
Input VSWR (All Atten. States)		1.5	2.0		1.5	2.0		1.5	2.0	: 1
Output VSWR (All Atten. States)		1.5	2.0		1.5	2.0		1.5	2.0	: 1
Input 1dB Compression Point (P1dB)		14			20			22		dBm
IP3 Input		28			35			35		dBm
Switching Speed					200Typ.					ns
Bias Current (+5V)					20Typ.					mA
Weight					0.04 Max.					lbs.
Impedance					50					Ohms
Input / Output Connectors	SMA-Female (Input) – SMA-Female (Output)									
Interface and Control Connector	MICRO-D9 (Female)									
Package	Epoxy Sealed (Standard)									
	Hermetically Sealed (Optional)									

Absolute Maximum Ratings

Parameter	Rating
Biasing Voltage	+5V±10%
RF Input Power	+25dBm

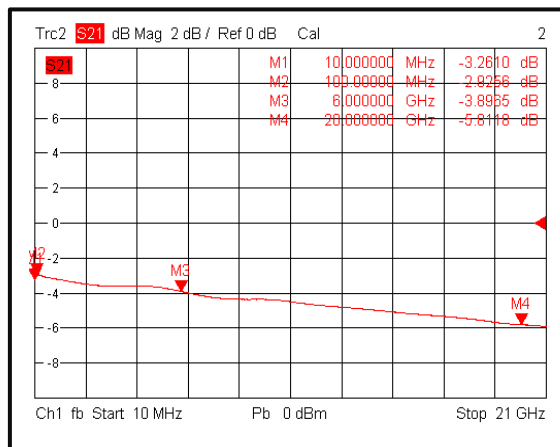
Environmental Specifications and Test Standards

Parameter	Description
Operational Temperature	-40°C to +85°C (Case Temperature)
Storage Temperature	-50°C to +105°C
Thermal Shock	-40°C → +85°C (5 Cycles / 10 hours)
*Random Vibration	MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis
High Temperature Burn In	Temperature +85°C for 72 Hours
Shock	1. Weight >20g, 50g half sine wave for 11ms, Speed variation 3.44m/s 2. Weight <=20g, 100g Half sine wave for 6ms, Speed variation 3.75m/s 3. Total 18 times (6 directions, 3 repetitions per direction).
Altitude	Standard: 30,000 Ft (Epoxy Sealed Controlled Environment) Optional: Hermetically Sealed (60,000 ft. 1.0 PSI min)
Hermetically Sealed (Optional)	MIL-STD-883 (For Hermetically Sealed Units)

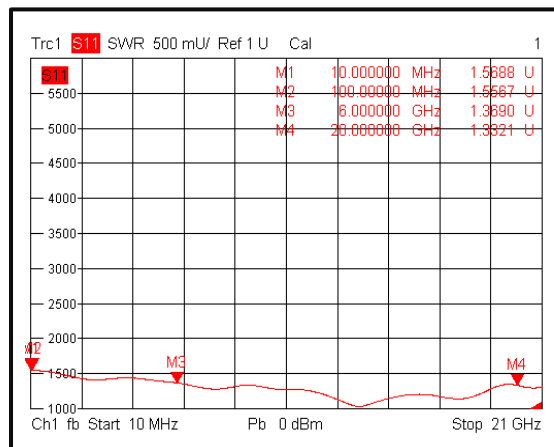
*For vibration testing details please see additional information section.

Typical Performance Plots

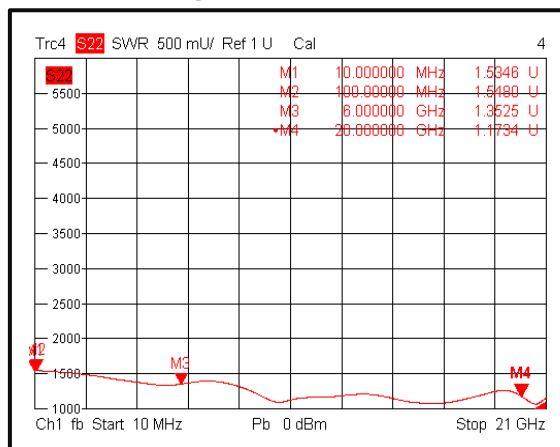
Insertion Loss @+25°C



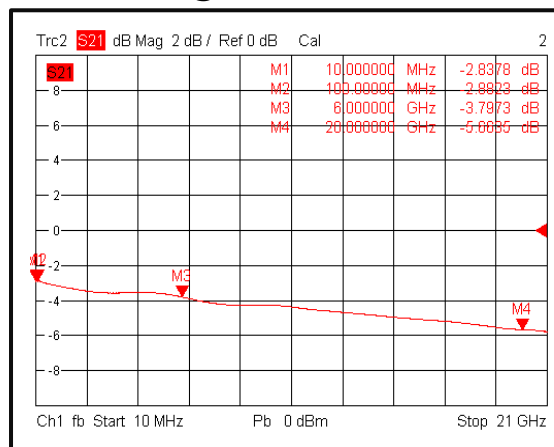
Input VSWR @+25°C



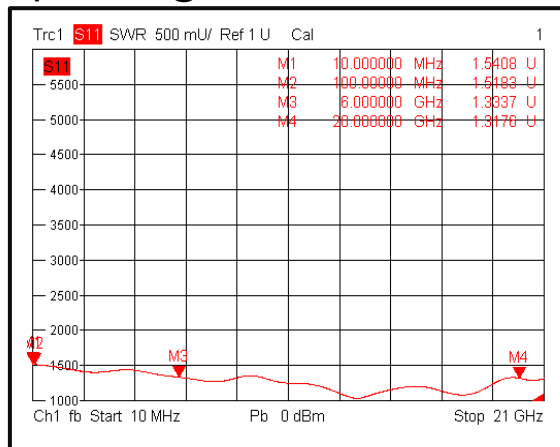
Output VSWR @+25°C



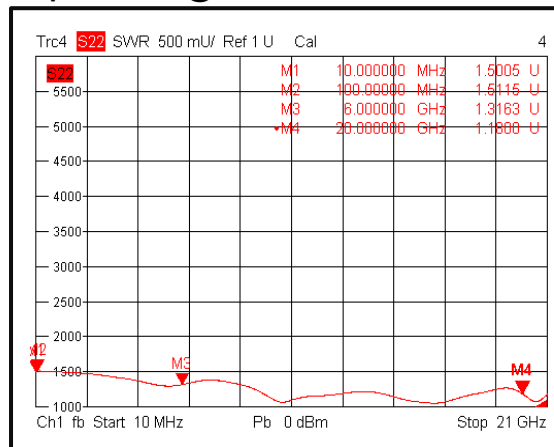
Insertion Loss @-40°C



Input VSWR @-40°C

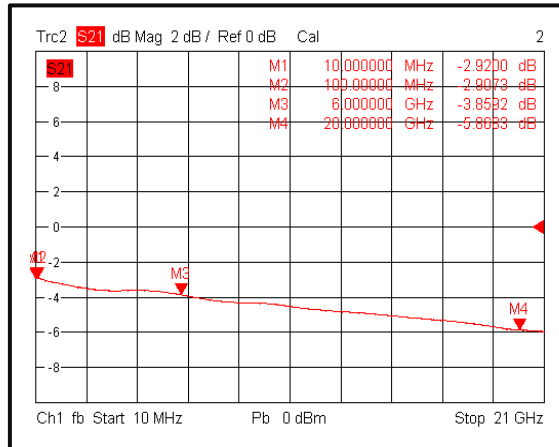


Output VSWR @-40°C

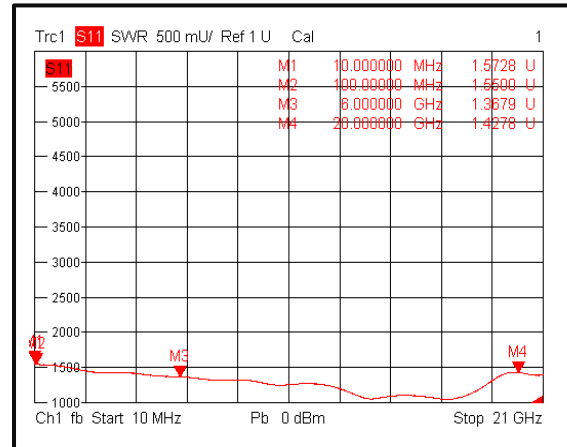


Typical Performance Plots

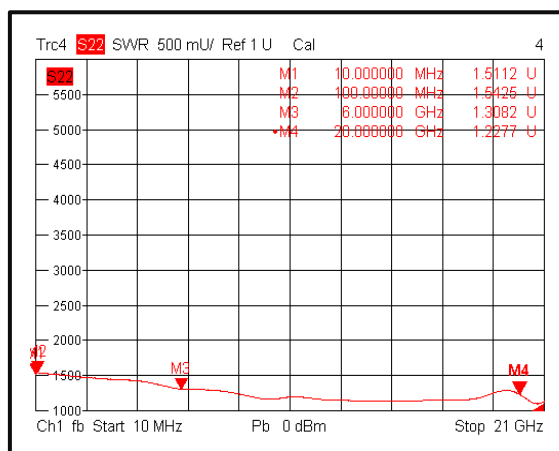
Insertion Loss @+85°C



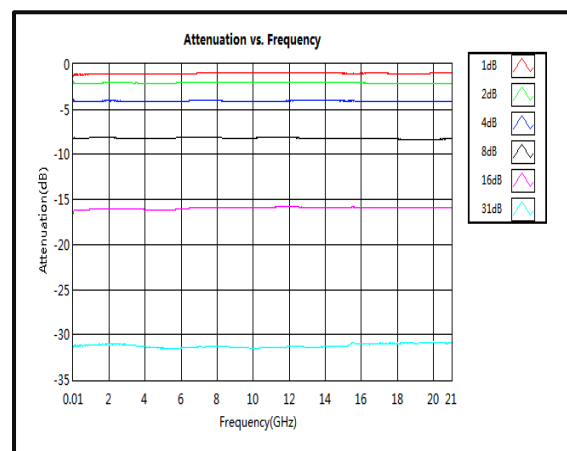
Input VSWR @+85°C



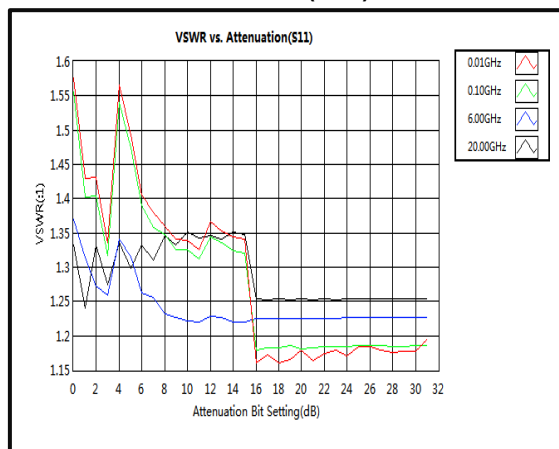
Output VSWR @+85°C



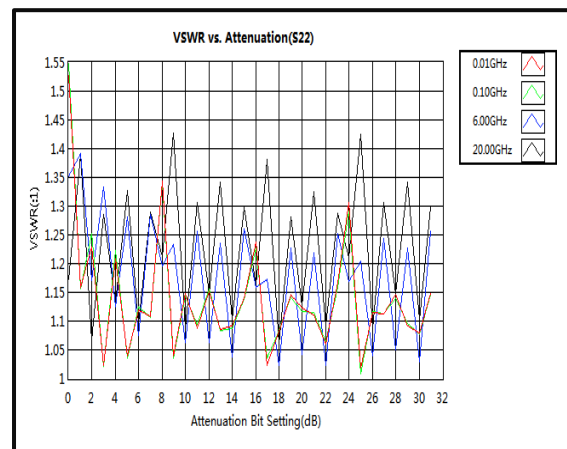
Attenuation vs. Frequency



VSWR vs. Attenuation (S11)

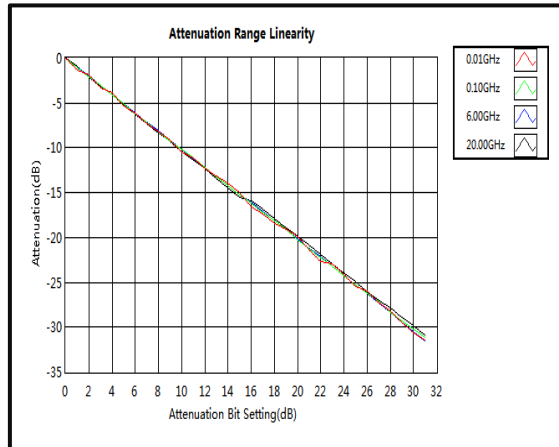


VSWR vs. Attenuation (S22)

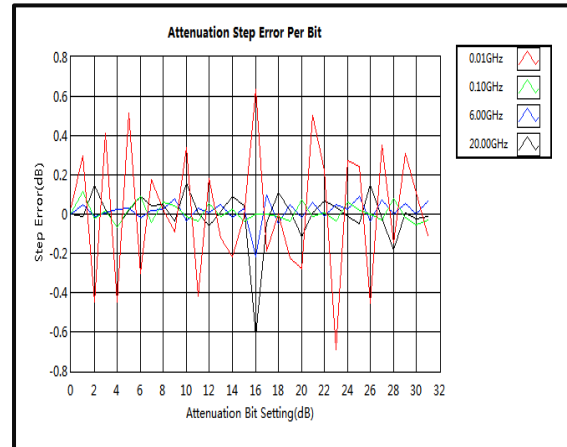


Typical Performance Plots

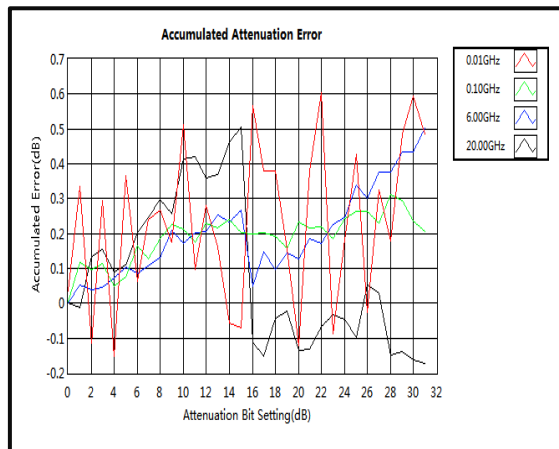
Attenuation Range Linearity



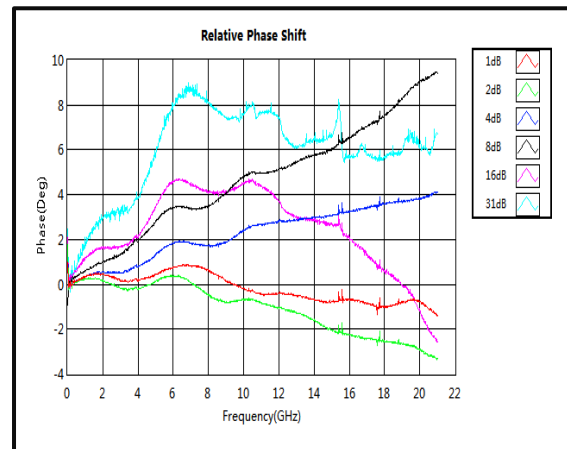
Attenuation Step Error Per Bit (dB)



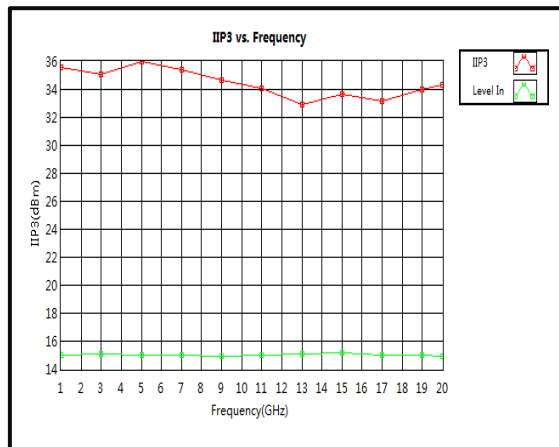
Accumulated Attenuation Error (dB)



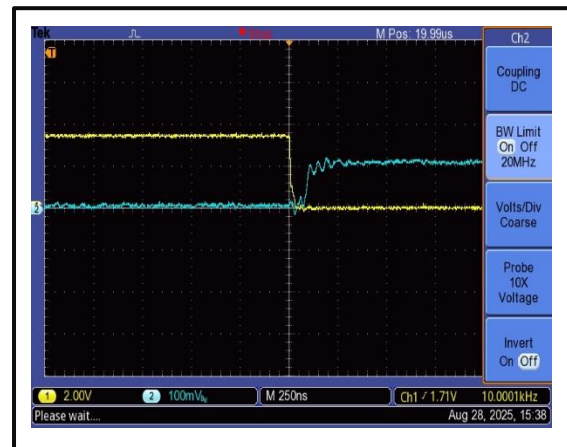
Relative Phase Shift



IIP3

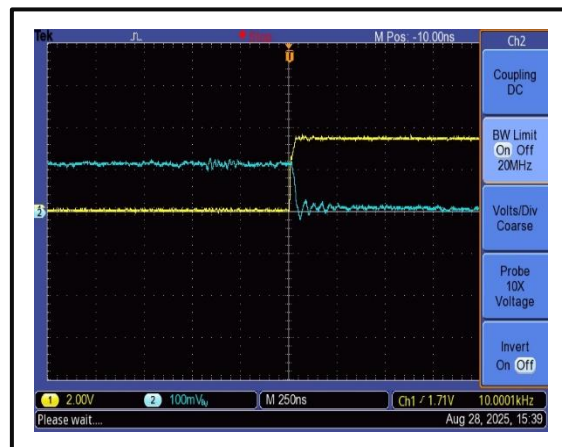


Speed

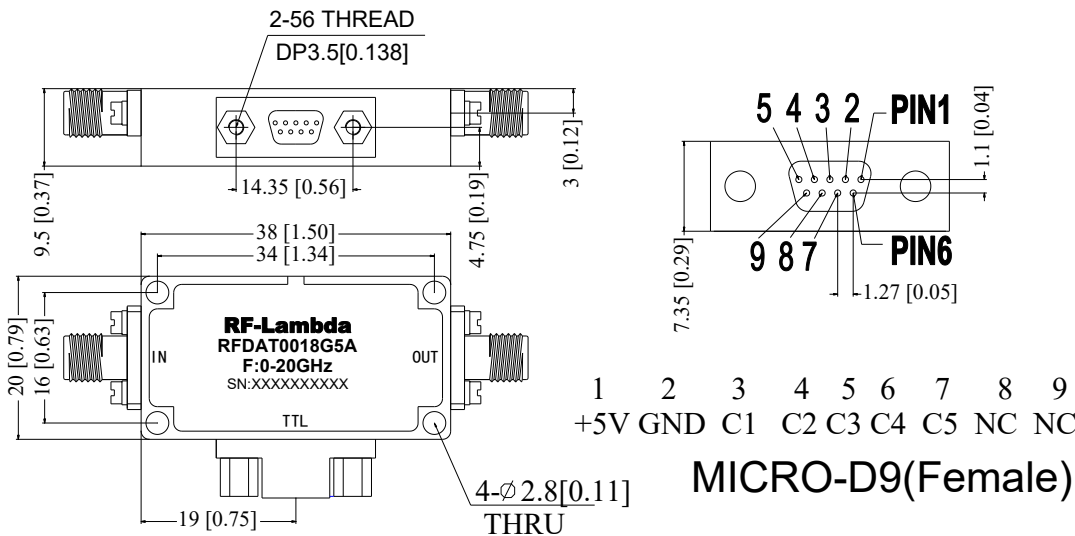


Typical Performance Plots

Speed



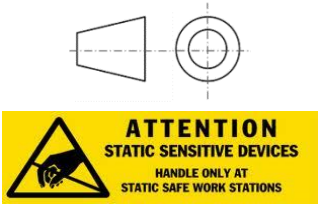
Outline Drawing



Truth Table

TTL Control Voltage	Low(0)=0~0.8V
THRESHOLD	High(1)=2.8~5V
Control Input TTL	Attenuation State
C5 C4 C3 C2 C1	
0 0 0 0 0	Reference IL
0 0 0 0 1	1dB
0 0 0 1 0	2dB
0 0 1 0 0	4dB
0 1 0 0 0	8dB
1 0 0 0 0	16dB
1 1 1 1 1	31dB

- Notes:
1. Package Material: Aluminum
 2. Finish: Gold Plated
 3. All dimensions are in millimeters [inches].
 4. Housing Tolerances ±0.1 [0.004] unless otherwise specified.
 5. Standard torque wrench must be used to secure RF connectors.



Additional Information

Documentation	Webpage
ESD Policy	https://rflambda.com/pdf/rflambda_esd_control.pdf
Connector Torque Specifications	https://www.rflambda.com/pdf/Torque_Specifications.pdf
Random Vibration Test Standard	https://www.rflambda.com/pdf/rflambda_random_vibration_MIL-STD-202G.pdf

Ordering Information

Part Number	Modification	Description
RFDAT0018G5A	Standard	0-20GHz Digital Control Attenuator

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