

Absorptive Digital Control Attenuator 0.01GHz-43.5GHz



Product Description

RFDAT0040G9A is an absorptive digital control attenuator with a frequency range of 0.01 to 43.5GHz.

The maximum power input of this attenuator is 25dBm. The insertion loss is 10dB with a typical attenuation range of 63.875dB.

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

Features

- Absorptive Digital Control Attenuator
- 0.125dB LSB Steps to 63.875dB
- Single Positive Control Line Per Bit

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

Parameter	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range	0.01		1	1		18	18		43.5	GHz
Attenuation Range		63.875			63.875			63.875		dB
Attenuation Flatness: (Referenced to Insertion Loss)		±2.0			±2.0			±2.0		dB
Control Bits					9					Bit
Control Step Size		0.125			0.125			0.125		dB
Insertion Loss		8	10		10	15		15	19.5	dB
Insertion Loss Temperature Coefficient					0.005					dB/ °C
Input VSWR (All Atten. States)		2.5	3.0		2.0	2.5		2.0	2.5	: 1
Output VSWR (All Atten. States)		2.5	3.0		2.0	2.5		2.0	2.5	: 1
Input 0.1 dB Compression Point (P0.1dB)		24			24			24		dBm
IP3 Input		38			38			38		dBm
Switching Speed					150Typ.					ns
Bias Current (+5V)					50Typ.					mA
Weight					0.08Max.					lbs.
Impedance					50					Ohms
Input / Output Connectors					2.92mm-Female					
Interface and Control Connector					MICRO-D15 (Female)					
Package					Epoxy Sealed (Standard)					Hermetically Sealed (Optional)

Absolute Maximum Ratings

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

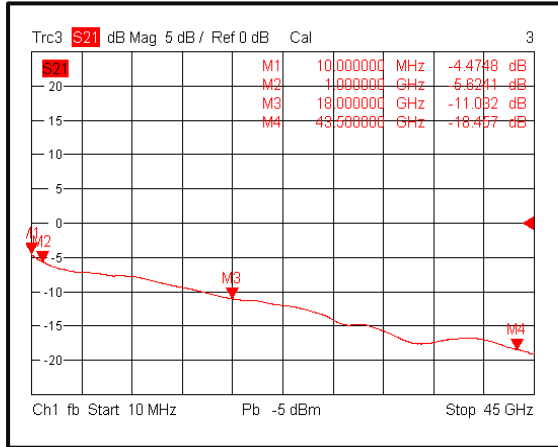
Environmental Specifications and Test Standards

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)

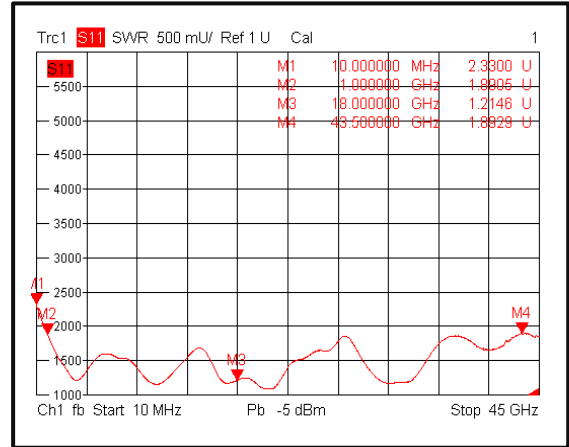
*For vibration testing details please see additional information section.

Typical Performance Plots

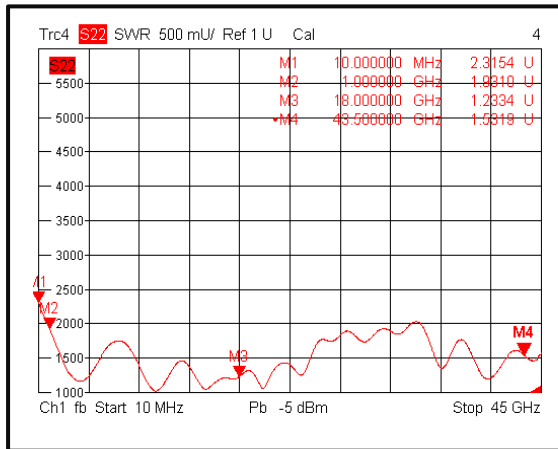
Insertion Loss @+25°C



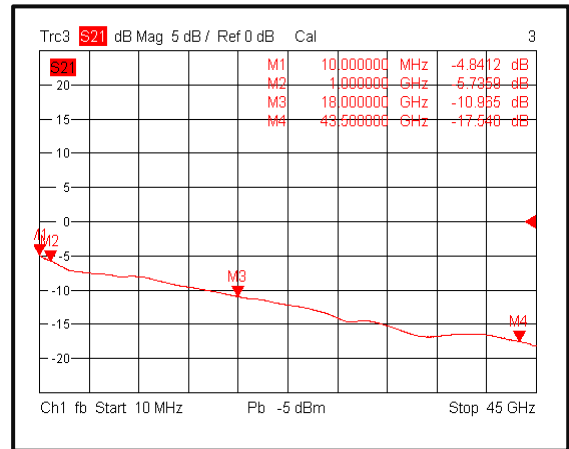
Input VSWR @+25°C



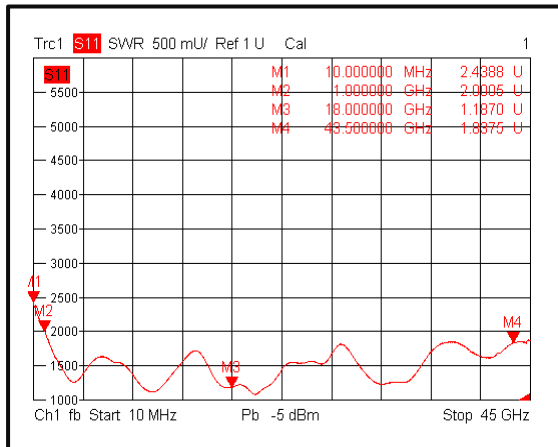
Output VSWR @+25°C



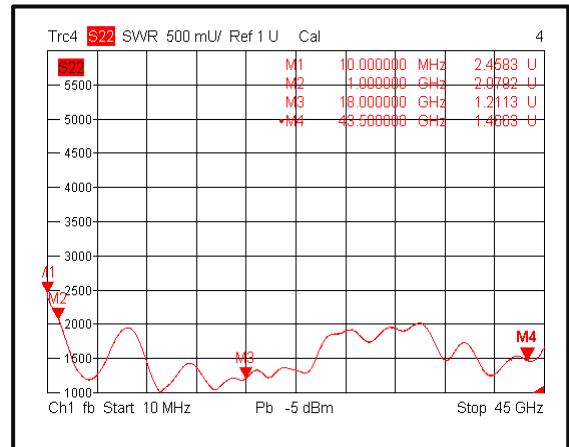
Insertion Loss @-40°C



Input VSWR @-40°C

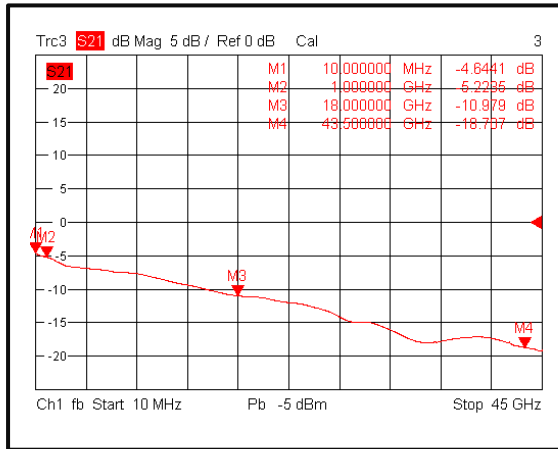


Output VSWR @-40°C

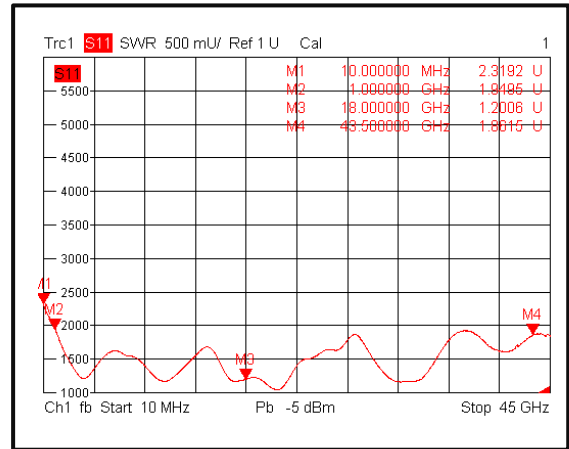


Typical Performance Plots

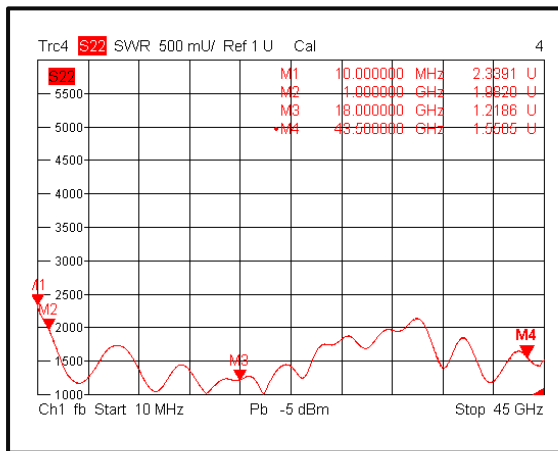
Insertion Loss @+85°C



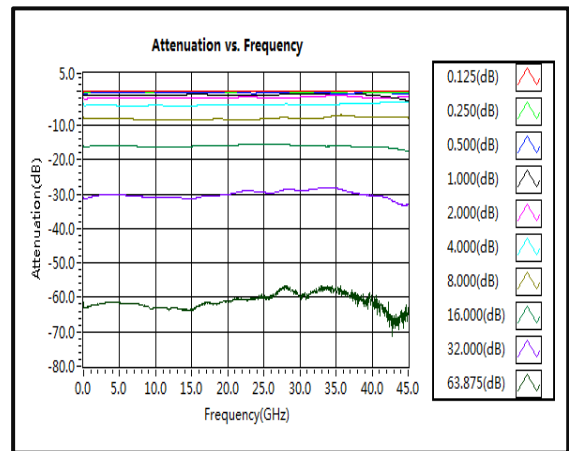
Input VSWR @+85°C



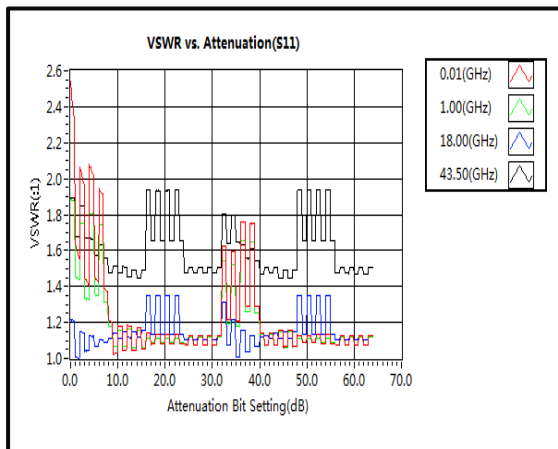
Output VSWR @+85°C



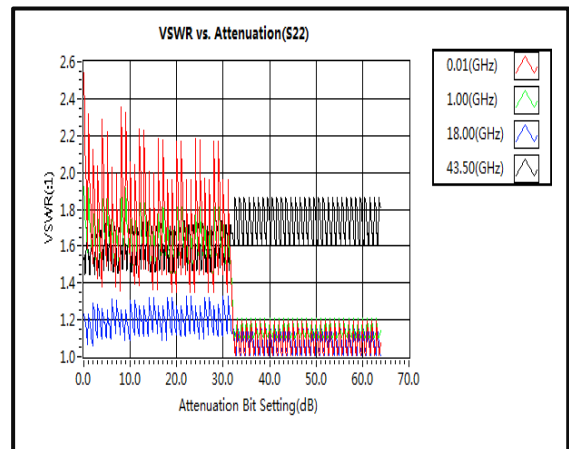
Attenuation vs. Frequency



VSWR vs. Attenuation (S11)

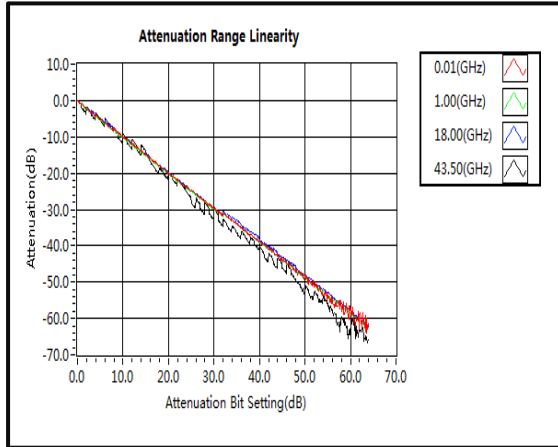


VSWR vs. Attenuation (S22)

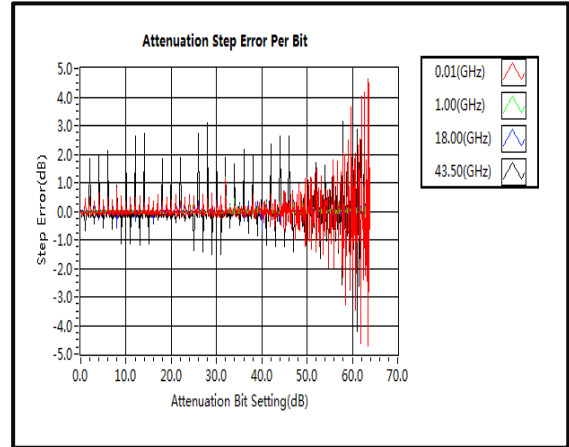


Typical Performance Plots

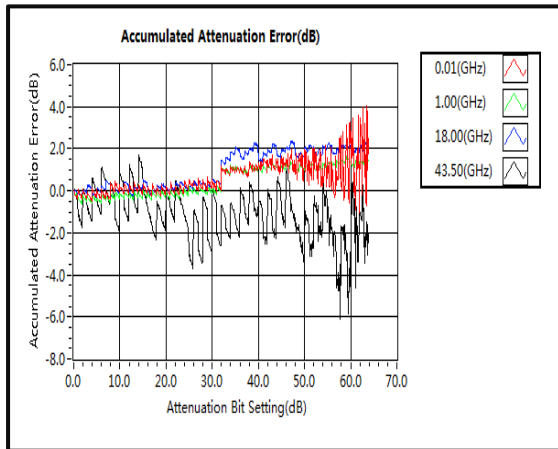
Attenuation Range Linearity



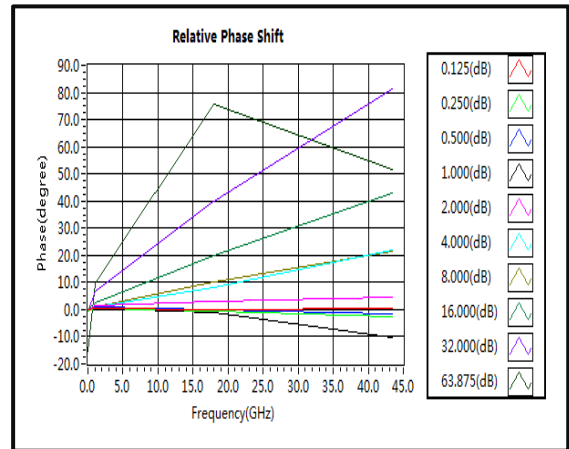
Attenuation Step Error Per Bit (dB)



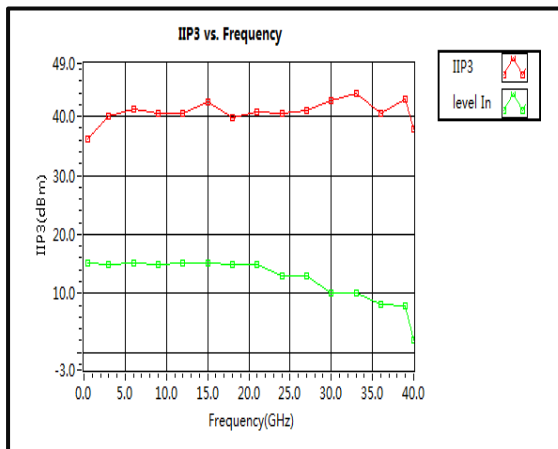
Accumulated Attenuation Error (dB)



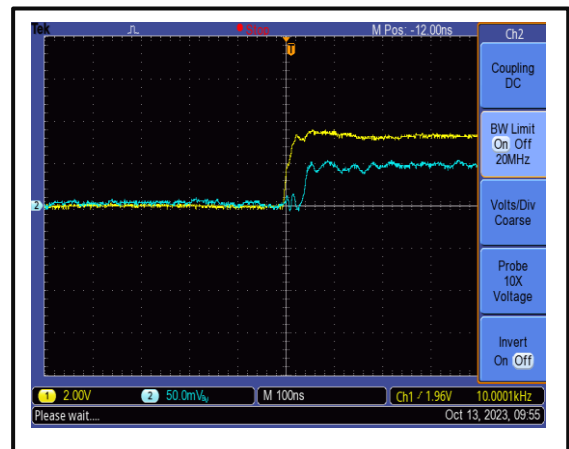
Relative Phase Shift



IIP3

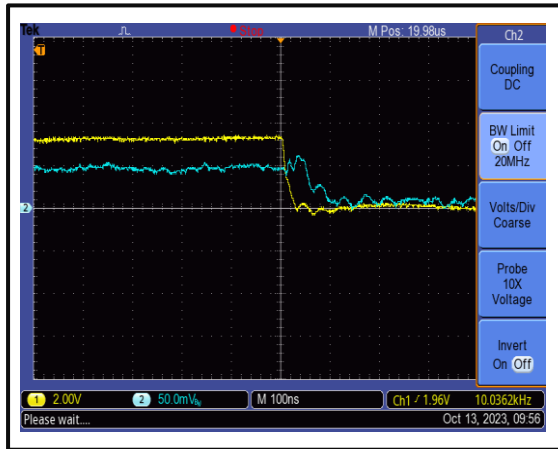


Speed

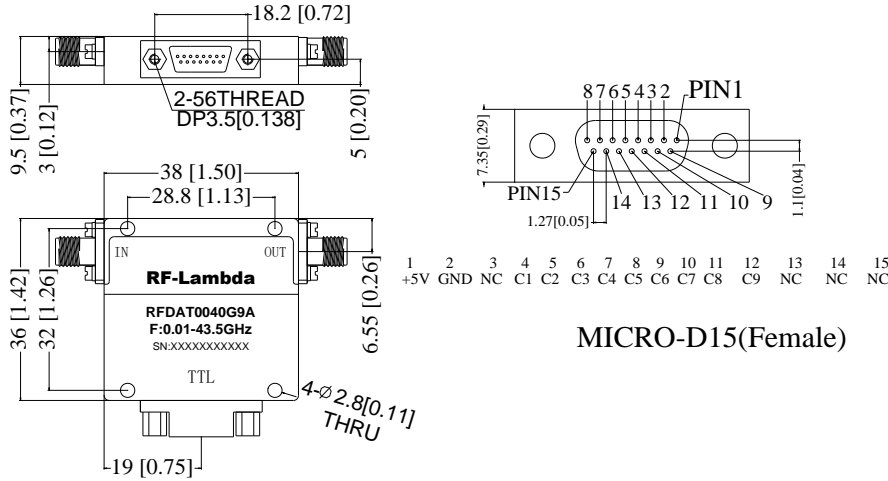


Typical Performance Plots

Speed



Outline Drawing

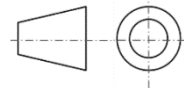


Truth Table

TTL Control Voltage THRESHOLD		Low(0)=0~0.8V High(1)=2.8~5V
Control Input TTL		Attenuation State
C9	C8 C7 C6 C5 C4 C3 C2 C1	Reference IL
1	1 1 1 1 1 1 1 1	0.125dB
1	1 1 1 1 1 1 1 0	0.25dB
1	1 1 1 1 1 1 0 1	0.5dB
1	1 1 1 1 1 0 1 1	1dB
1	1 1 1 1 0 1 1 1	2dB
1	1 1 1 0 1 1 1 1	4dB
1	1 1 0 1 1 1 1 1	8dB
1	0 1 1 1 1 1 1 1	16dB
0	1 1 1 1 1 1 1 1	32dB
0	0 0 0 0 0 0 0 0	63.875dB

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
RFDAT0040G9A	Standard	0.01GHz-43.5GHz Digital Control Attenuator

Important Notice

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