

Absorptive Digital Control Attenuator 1GHz-20GHz



Product Description

RFDAT0120G8A is an absorptive digital control attenuator with a frequency range of 1 to 20GHz.

The max power input is 25dBm. The insertion loss is 9dB with an attenuation range of 127.5dB.

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

Features

- Absorptive Digital Control Attenuator
- Ultra Wide Band Operation 1-20GHz
- 0.5dB LSB Steps to 127.5dB
- 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 ($T_A = +25^\circ\text{C}$), $V_{dd} = +5\text{V}/-5\text{V}$, $V_{CTL} = 0 / +5\text{V}$

Parameter	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range		1~10			10~20		GHz
Attenuation Range		127.5			127.5		dB
Attenuation Flatness: (Referenced to Insertion Loss)		± 3.0			± 5.0		dB
Control Bits			8				Bit
Control Step size		0.5			0.5		dB
Insertion Loss		9.0	10		13.5	15	dB
Insertion Loss Temperature Coefficient		0.01			0.01		dB/ °C
Input VSWR (All Atten. States)		1.9	2.3		1.9	2.3	:1
Output VSWR (All Atten. States)		1.9	2.3		1.9	2.3	:1
Input 0.1 dB Compression Point (P0.1dB)		25			25		dBm
Input IP3		45			43		dBm
Switching Speed			200Typ.				ns
Bias Current (+5V/-5V)			250/130 Max.				mA
Weight			0.08 Max.				lbs.
Impedance			50				Ohms
Input / Output Connectors			SMA-Female (Input) – SMA-Female (Output)				
Interface and Control Connector			MICRO-D15(Female)				
Package			Epoxy Sealed (Standard)				
			Hermetically Sealed (Optional)				

Absolute Maximum Ratings

Parameter	Rating
Biasing Voltage	+5V±10%/-5V±10%
RF Input Power	+27dBm

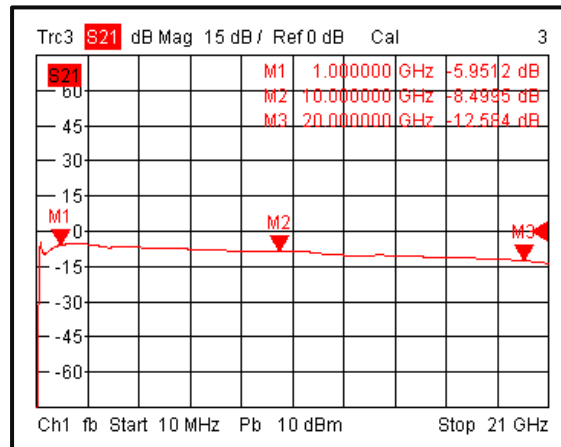
Environmental Specifications and Test Standards

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)

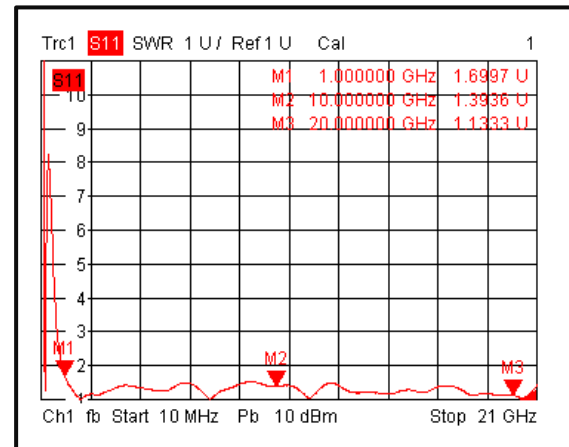
**For vibration testing details please see additional information section.

Typical Performance Plots

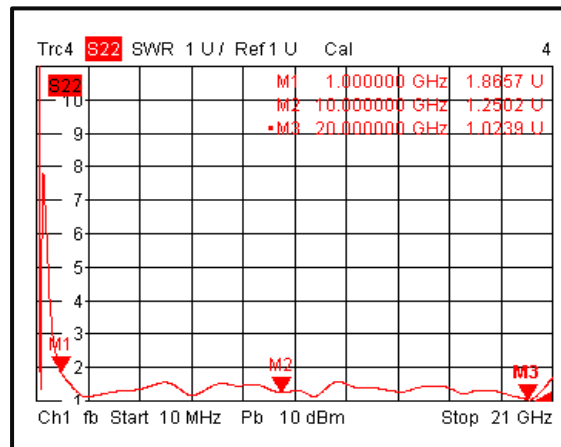
Insertion Loss @+25°C



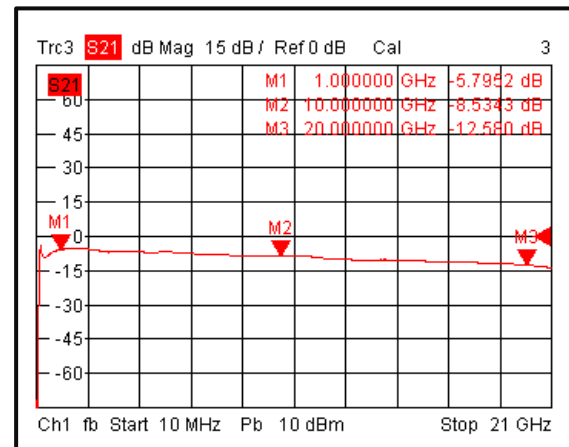
Input VSWR @+25°C



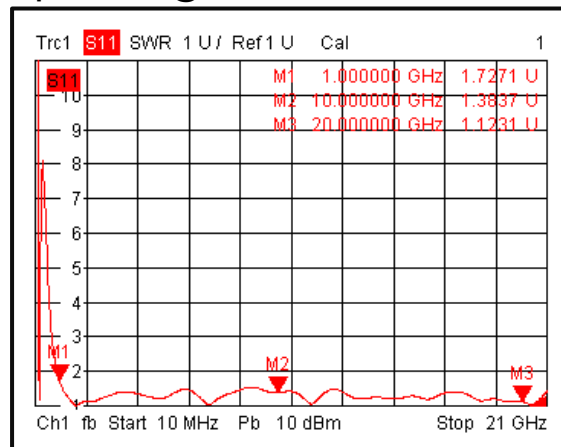
Output VSWR @+25°C



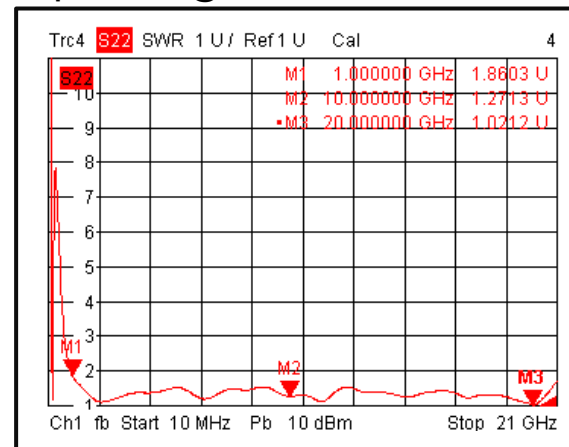
Insertion Loss @-40°C



Input VSWR @-40°C

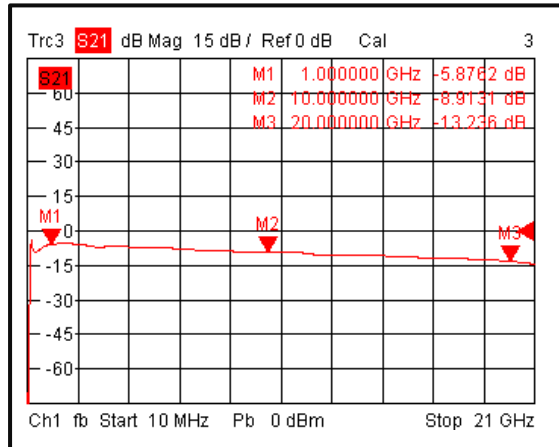


Output VSWR @-40°C

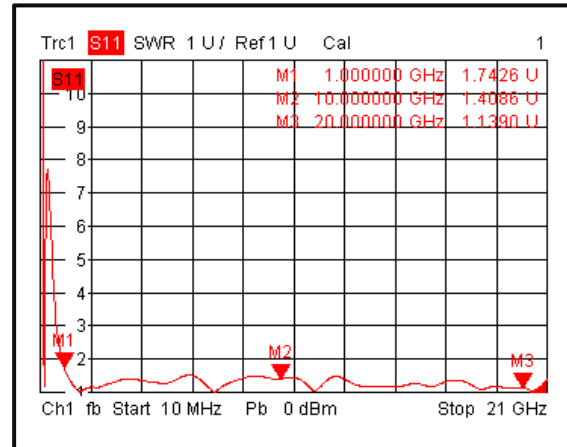


Typical Performance Plots

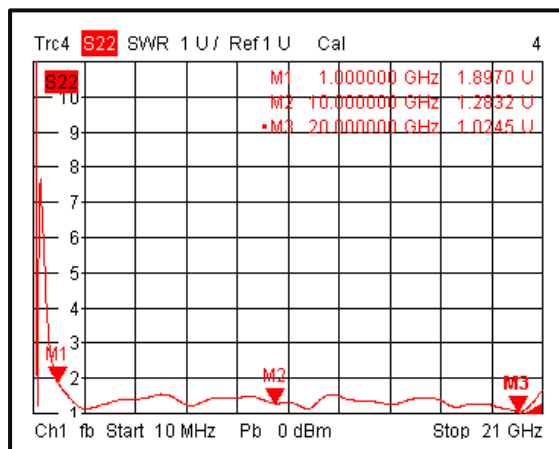
Insertion Loss @+85°C



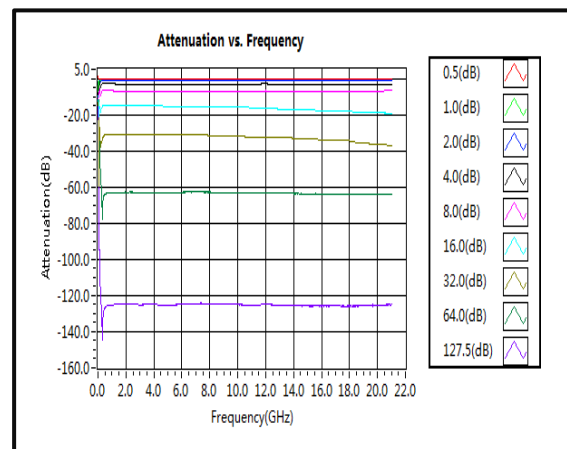
Input VSWR @+85°C



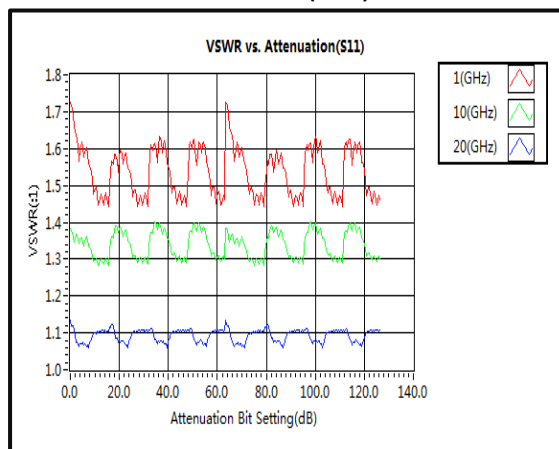
Output VSWR @+85°C



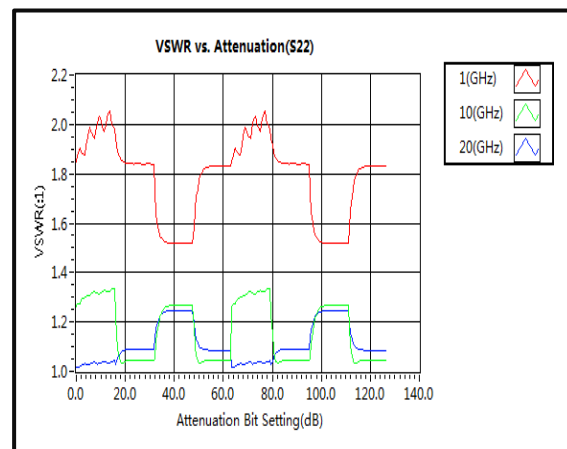
Attenuation vs. Frequency



VSWR vs. Attenuation (S11)

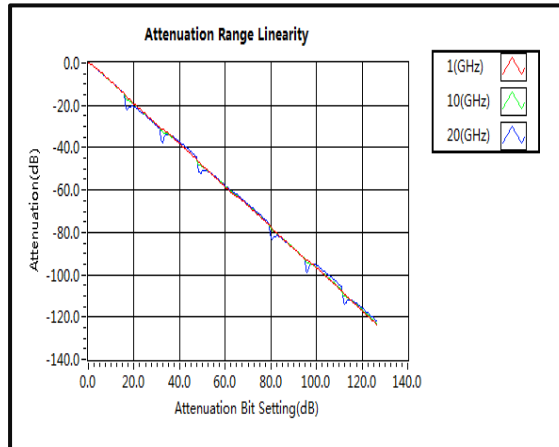


VSWR vs. Attenuation (S22)

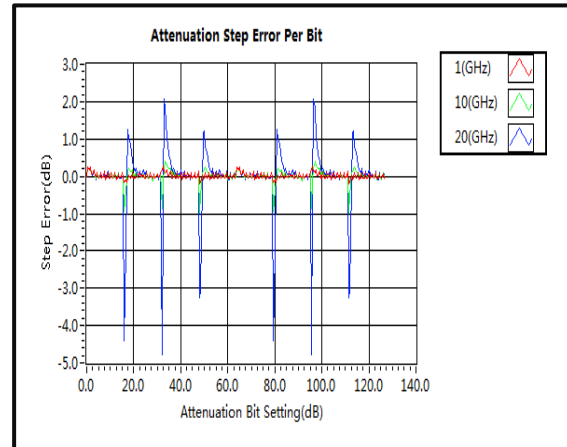


Typical Performance Plots

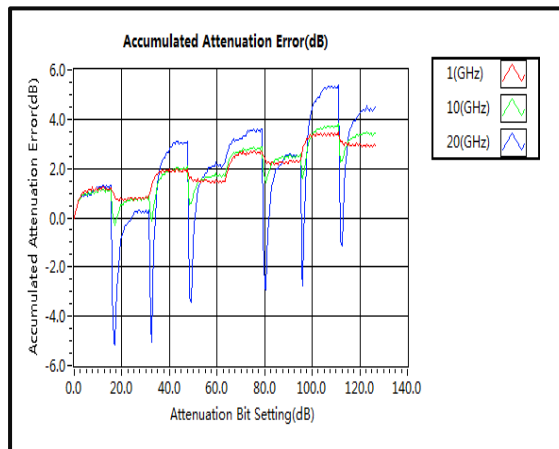
Attenuation Range Linearity



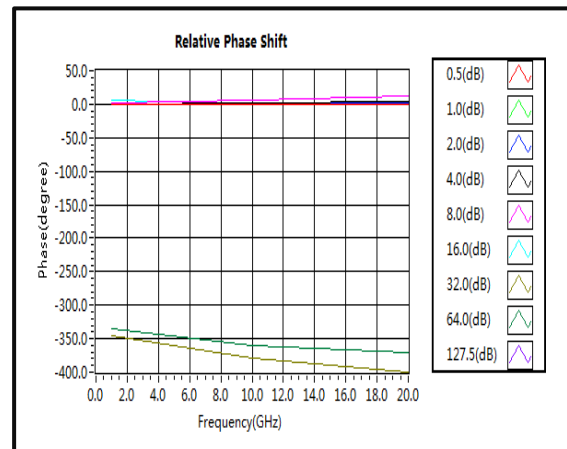
Attenuation Step Error Per Bit (dB)



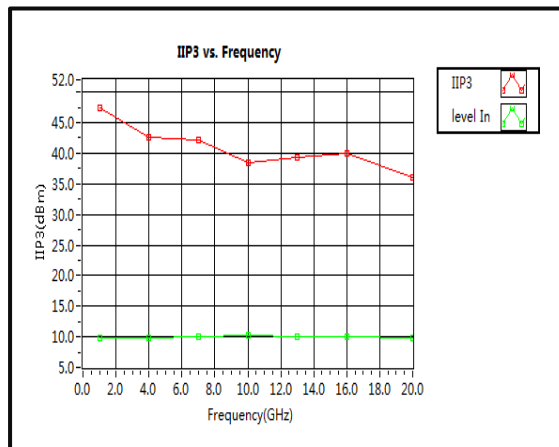
Accumulated Attenuation Error (dB)



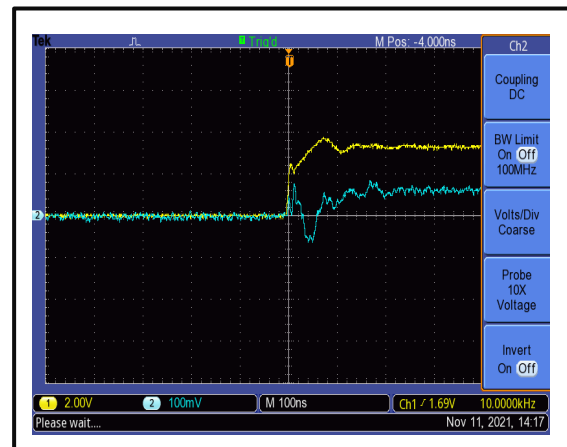
Relative Phase Shift



IIP3

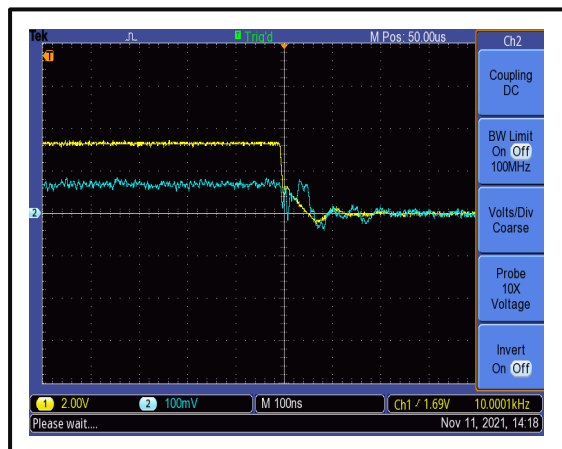


Speed

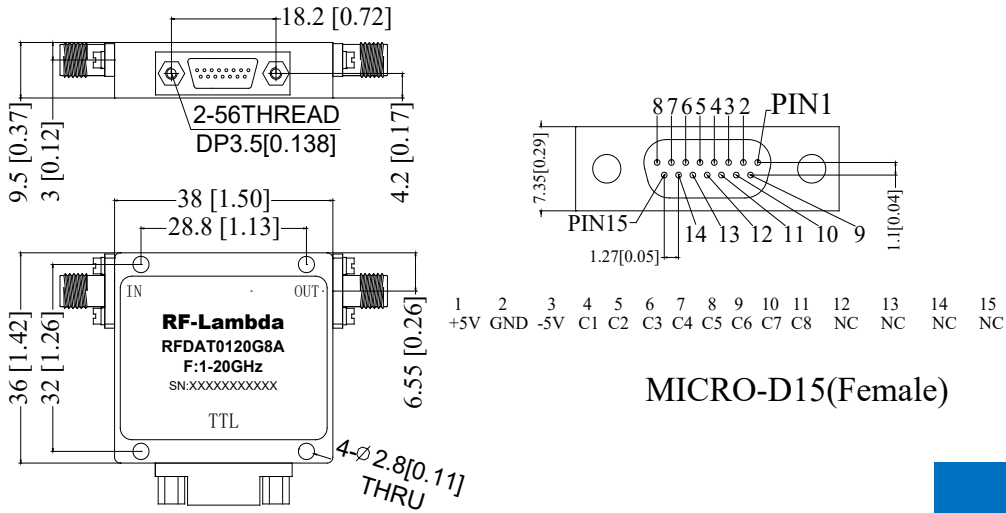


Typical Performance Plots

Speed



Outline Drawing



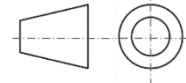
MICRO-D15(Female)

Truth Table

TTL Control Voltage THRESHOLD								Low(0)=0~0.8V High(1)=2.8~5V
Control Input TTL								Attenuation State
C8	C7	C6	C5	C4	C3	C2	C1	Reference IL
1	1	1	1	1	1	1	1	0.5dB
1	1	1	1	1	1	1	0	1dB
1	1	1	1	1	0	1	1	2dB
1	1	1	1	0	1	1	1	4dB
1	1	1	0	1	1	1	1	8dB
1	1	0	1	1	1	1	1	16dB
1	0	1	1	1	1	1	1	32dB
0	1	1	1	1	1	1	1	64dB
0	0	0	0	0	0	0	0	127.5dB

Notes:

1. Package Material: Aluminum
2. Plating: Gold
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
RFDAT0120G8A	Standard	1-20GHz Digital Control Attenuator

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