

Absorptive Digital Control Attenuator 0.001GHz-43.5GHz



Product Description

RFDAT0030G6A is an absorptive digital control attenuator with a frequency range of 0.001 to 43.5GHz.

The power input of this attenuation is 23dBm typical. The insertion loss is 6.5dB with a typical attenuation range of 31.5dB.

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

Features

- Absorptive Digital Control Attenuator
- 0.5dB LSB Steps to 31.5dB
- 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°C), V_{dd} = +5V , V_{CTL} = 0/ +5V

Parameter	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range	0.001		18	18		30	30		43.5	GHz
Attenuation Range	30	31.5		30	31.5		28	29		dB
Attenuation Flatness (Referenced to Insertion Loss)		±0.5			±0.6			±0.6		dB
Control Bits					6					Bit
Control Step Size		0.5			0.5			0.5		dB
Insertion Loss		4.5	6.5		6.5	8.0		9.5	10.0	dB
Insertion Loss Temperature Coefficient		0.03			0.03			0.03		dB/ °C
Input VSWR (All Atten. States)		1.5	2.2		1.5	2.0		1.5	2.0	: 1
Output VSWR (All Atten. States)		1.8	2.2		1.8	2.0		1.8	2.0	: 1
Input 0.1dB Compression Point (P0.1dB)		23			23			23		dBm
IP3 Input		43			41			40		dBm
Switching Speed 50% CTRL* to 90% or 10%					200 Typ.					ns
Bias Current (+5V)					10 Max.					mA
Weight					0.05 Max.					lbs.
Impedance					50					Ohms
Input / Output Connectors					2.92mm-Female (Input) – 2.92mm-Female (Output)					
Interface and Control Connector					MICRO-D9 (Female)					
Package					Epoxy Sealed (Standard)					
					Hermetically Sealed (Optional)					

Absolute Maximum Ratings

Parameter	Rating
Biasing Voltage	+5V $\pm$ 10%
RF Input Power	+27dBm

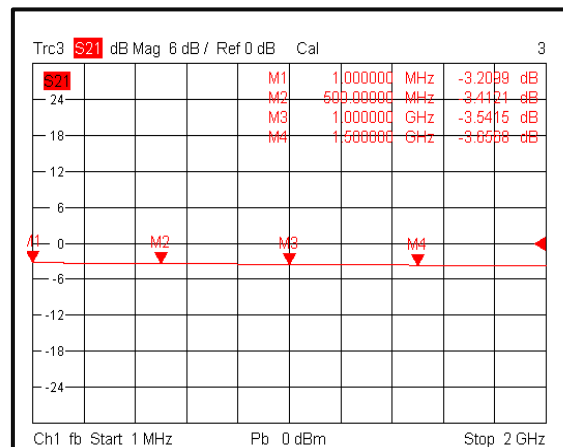
Environmental Specifications and Test Standards

Parameter	Description
Operational Temperature	-40°C to +85°C (Case Temperature)
Storage Temperature	-50°C to +105°C
Thermal Shock	-40°C $\rightarrow$ +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)

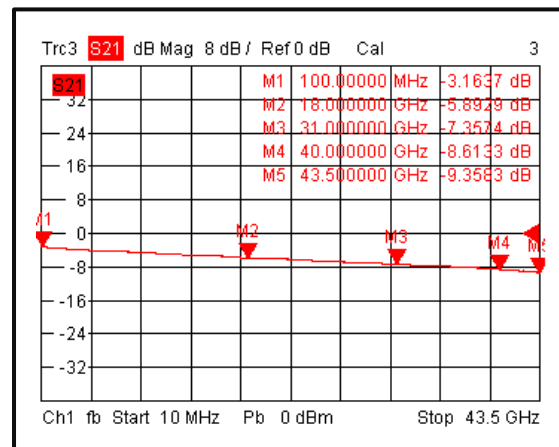
**For vibration testing details please see additional information section.

Typical Performance Plots

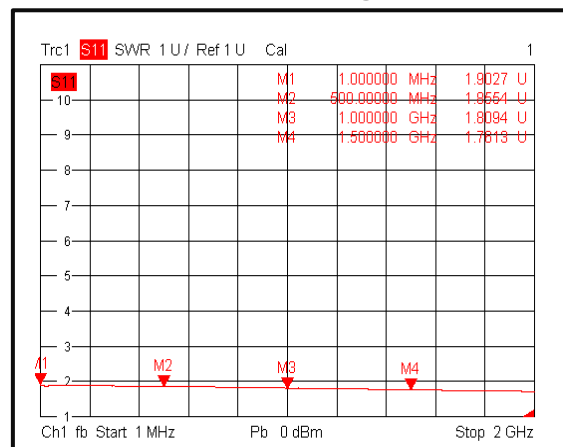
Insertion Loss(1MHz-1.5GHz) @+25°C



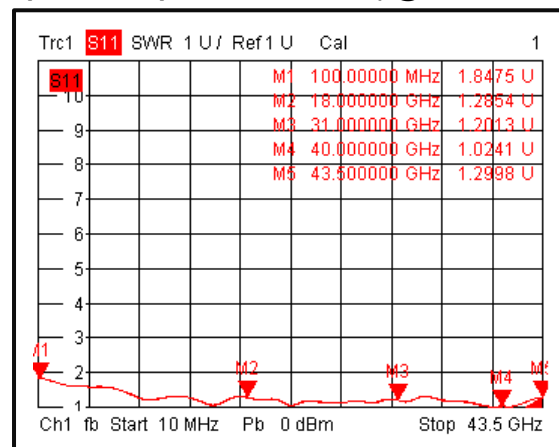
Insertion Loss(100MHz-43.5GHz) @+25°C



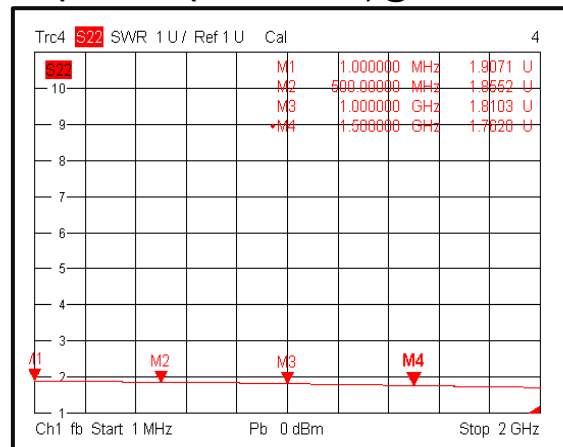
Input VSWR(1MHz-1.5GHz) @+25°C



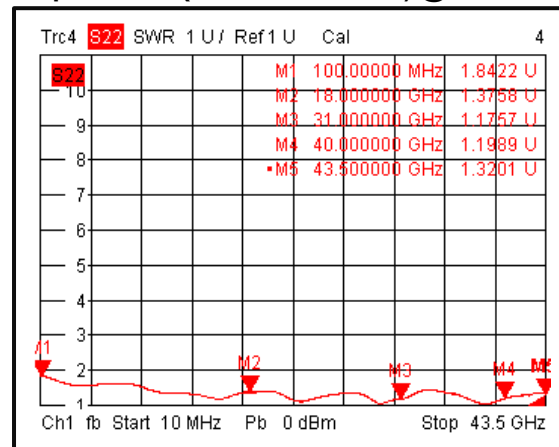
Input VSWR(100MHz-43.5GHz) @+25°C



Output VSWR(1MHz-1.5GHz) @+25°C

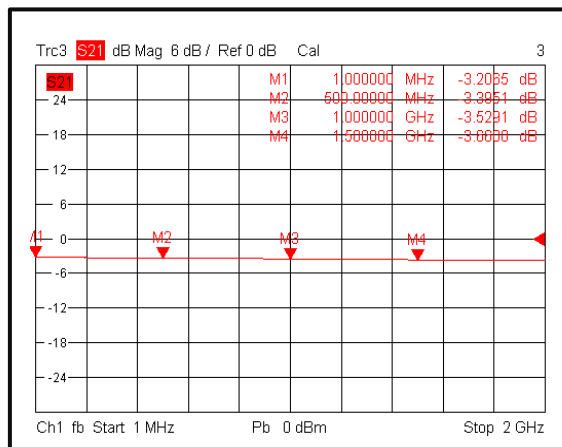


Output VSWR(100MHz-43.5GHz) @+25°C

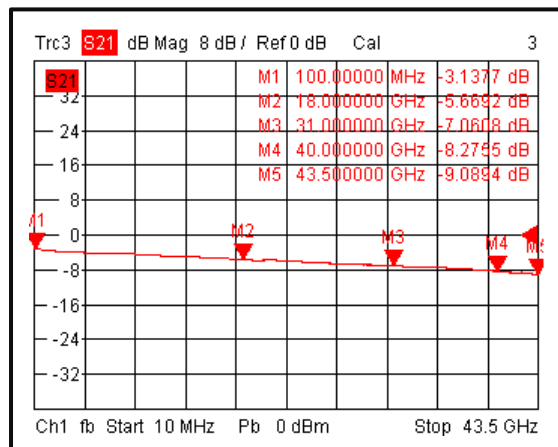


Typical Performance Plots

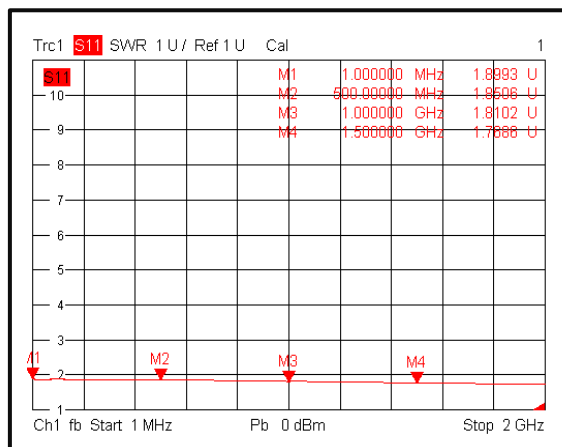
Insertion Loss(1MHz-1.5GHz) @-40°C



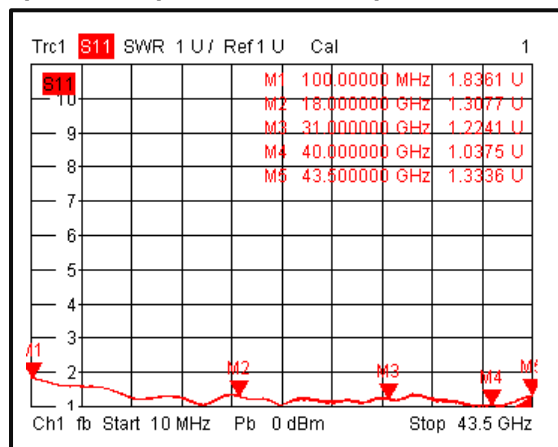
Insertion Loss(100MHz-43.5GHz) @-40°C



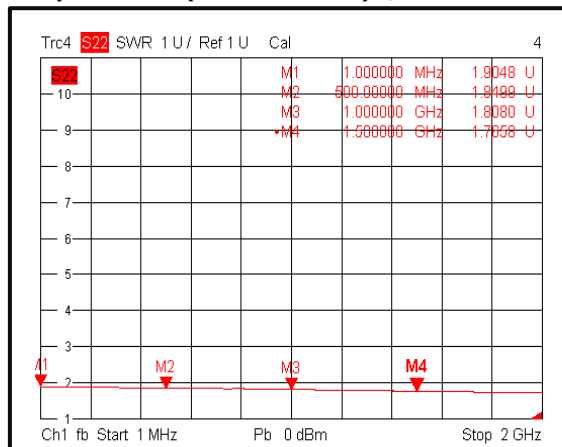
Input VSWR(1MHz-1.5GHz) @-40°C



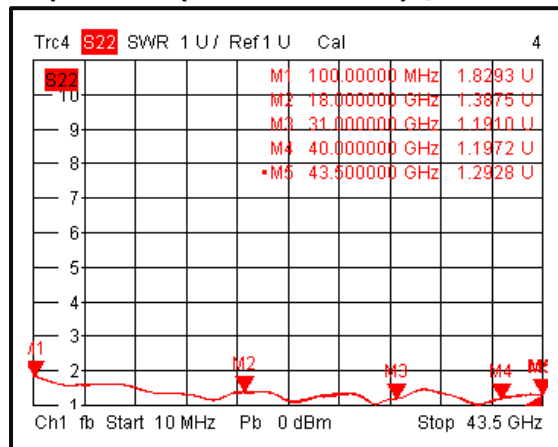
Input VSWR(100MHz-43.5GHz) @-40°C



Output VSWR(1MHz-1.5GHz) @-40°C

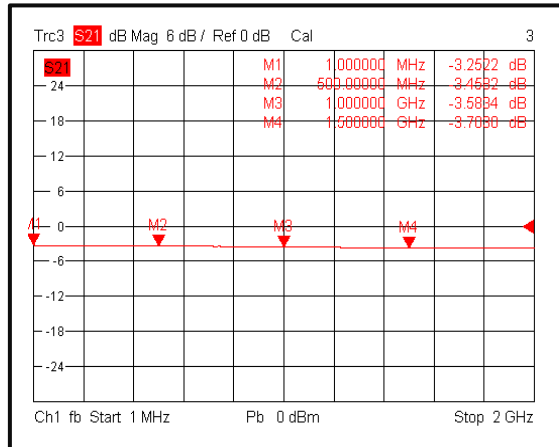


Output VSWR(100MHz-43.5GHz) @-40°C

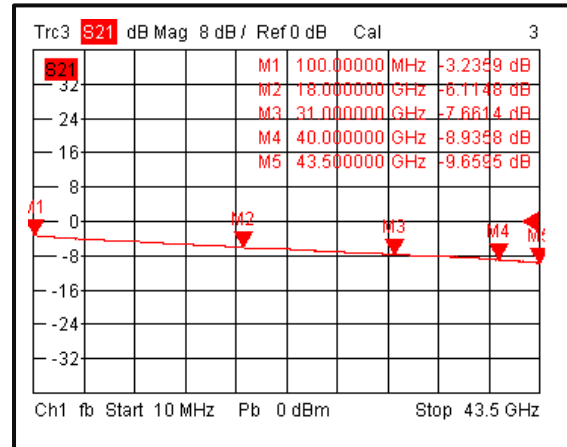


Typical Performance Plots

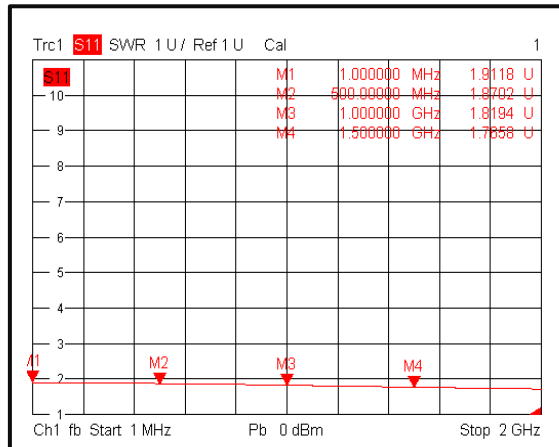
Insertion Loss(1MHz-1.5GHz) @+85°C



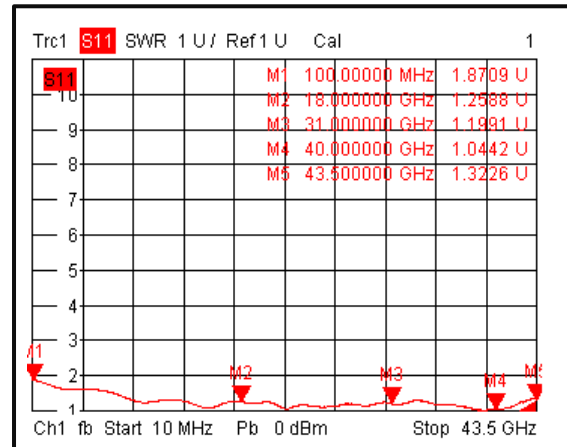
Insertion Loss(100MHz-43.5GHz) @+85°C



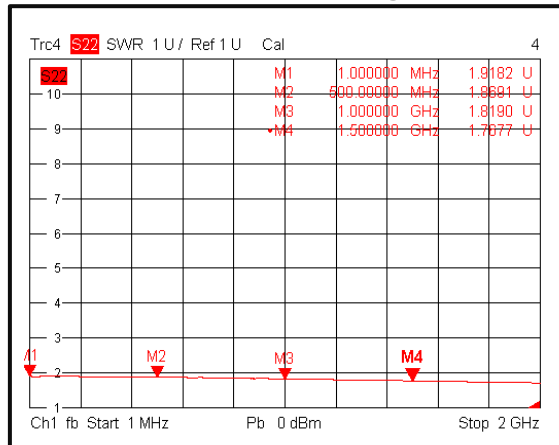
Input VSWR(1MHz-1.5GHz) @+85°C



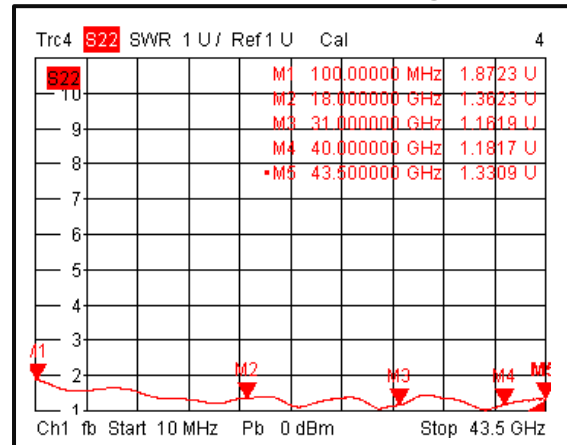
Input VSWR(100MHz-43.5GHz) @+85°C



Output VSWR(1MHz-1.5GHz) @+85°C

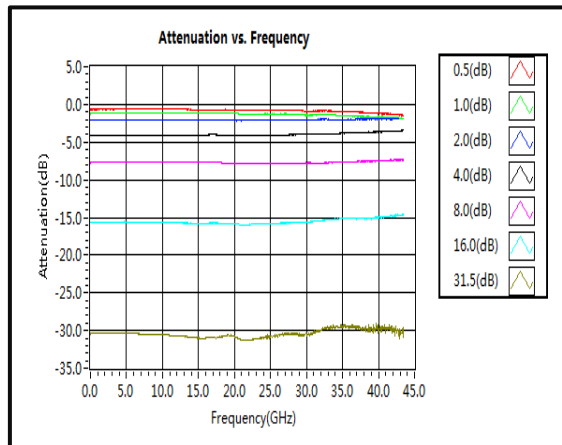


Output VSWR(100MHz-43.5GHz) @+85°C

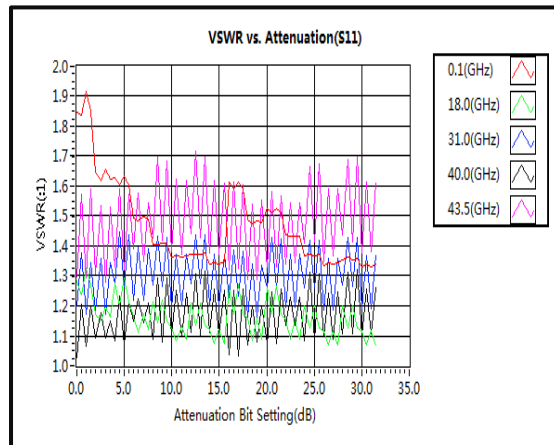


Typical Performance Plots

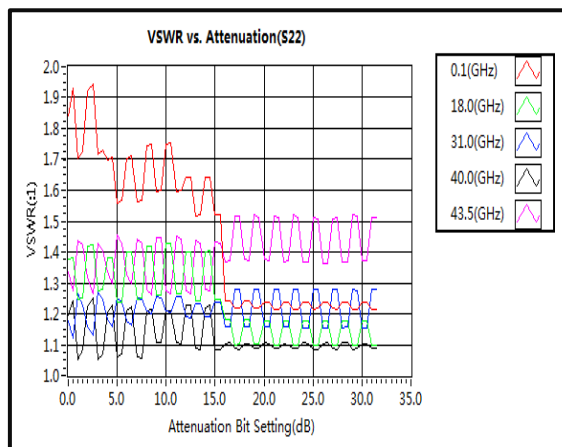
Attenuation vs. Frequency



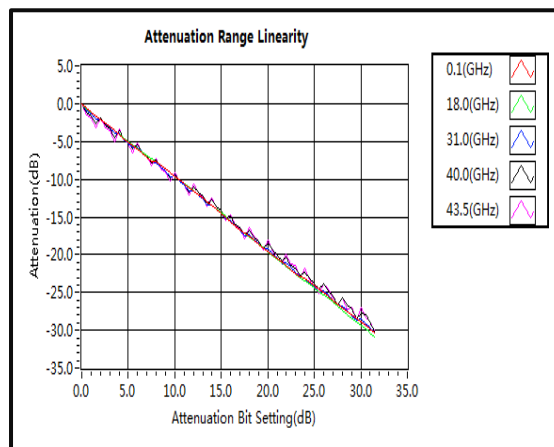
VSWR vs. Attenuation (S11)



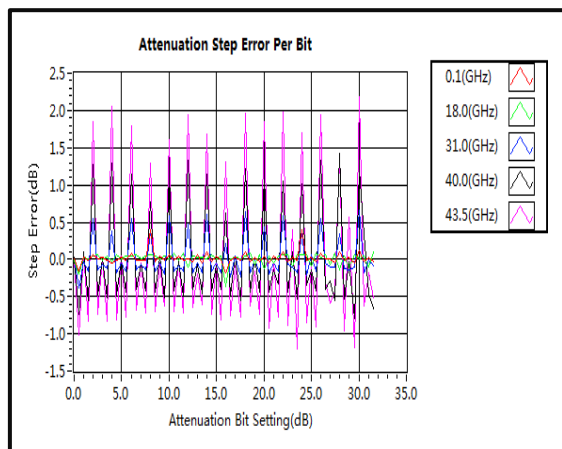
VSWR vs. Attenuation (S22)



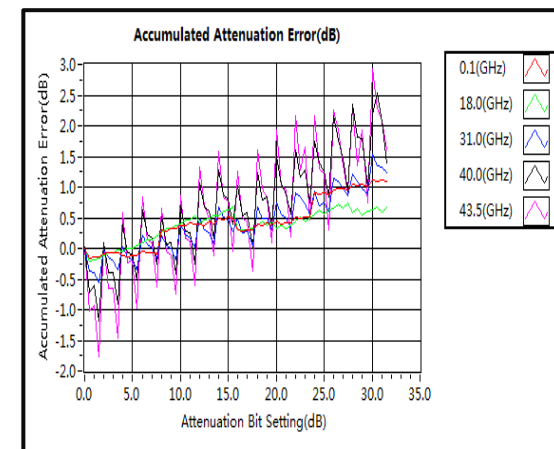
Attenuation Range Linearity



Attenuation Step Error Per Bit (dB)

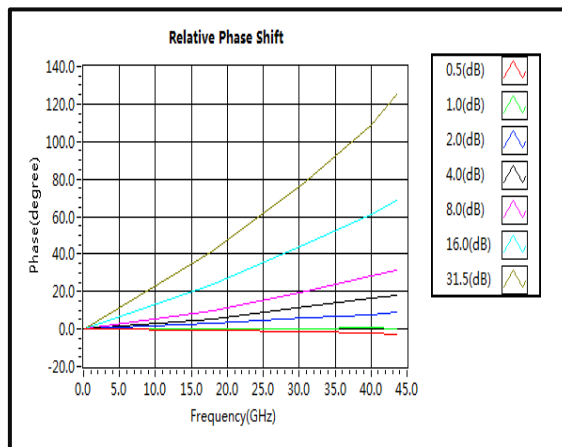


Accumulated Attenuation Error (dB)

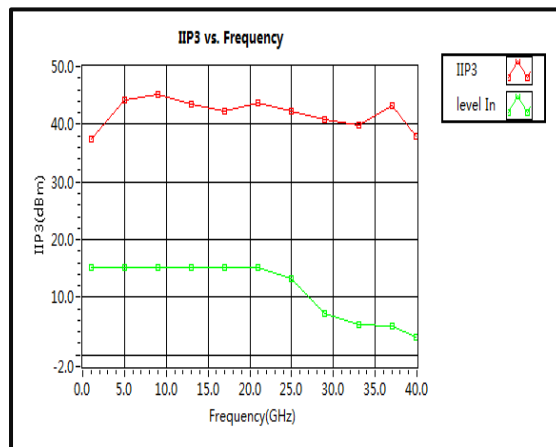


Typical Performance Plots

Relative Phase Shift



IIP3



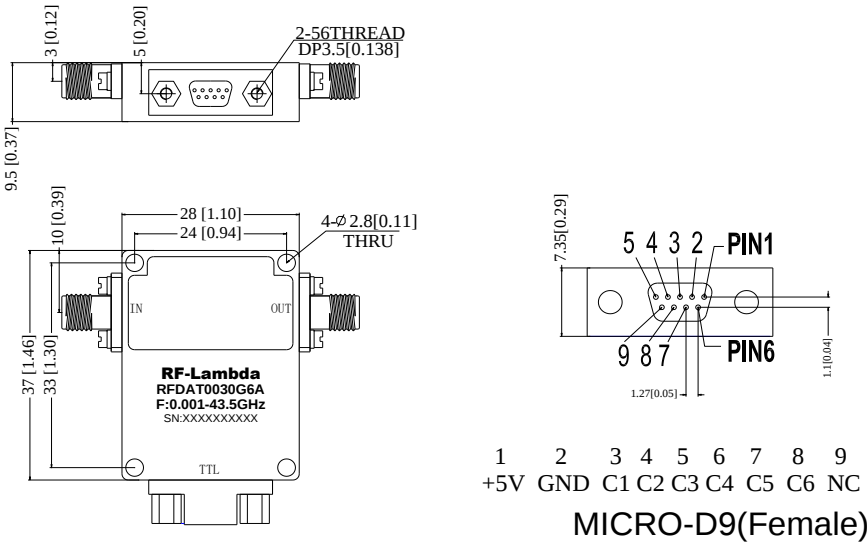
Speed



Speed



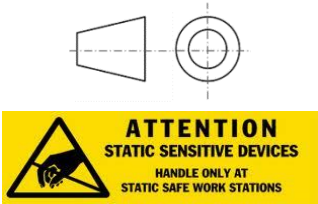
Outline Drawing



Truth Table

TTL Control Voltage THRESHOLD						Low(0)=0~0.8V High(1)=2.8~5V
Control Input TTL						Attenuation State
C6	C5	C4	C3	C2	C1	
1	1	1	1	1	1	Reference IL
1	1	1	1	1	0	0.5dB
1	1	1	1	0	1	1dB
1	1	1	0	1	1	2dB
1	1	0	1	1	1	4dB
1	0	1	1	1	1	8dB
0	1	1	1	1	1	16dB
0	0	0	0	0	0	31.5dB

- 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
RFDAT0030G6A	connectors 2.92mm-Female	0.001GHz-43.5GHz Digital Control Attenuator

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