

Absorptive Digital Control Attenuator 0.2GHz-6GHz



Product Description

RFDAT0106G8B is an absorptive digital control attenuator with a frequency range of 0.2 to 6GHz.

The maximum power input of this attenuation is 25dBm. The insertion loss is 5.5dB with a typical attenuation range of 63.5dB.

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

Features

- Absorptive Digital Control Attenuator
- Wide Band Operation 0.2-6GHz
- Functional Bandwidth : 0.1GHz to 7GHz
- 0.25dB LSB Steps to 63.5dB
- 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) ,Vdd = +5V, VCTL = 0 / +5V

Parameter	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range	0.2		1	1		2.5	2.5		6	GHz
Attenuation Range		63.5	68		63.5	68		63.5	68	dB
Attenuation Flatness: (Referenced to Insertion Loss)		±1.0	±3.0		±1.5	±3.0		±2.0	±3.0	dB
Control Bits					8					Bit
Control Step Size		0.25			0.25			0.25		dB
Insertion Loss		2.0	3.0		3.5	4.5		5.5	6.5	dB
Insertion Loss Temperature Coefficient		0.01			0.01			0.01		dB/ °C
Input VSWR (All Atten. States)		1.3	1.8		1.3	1.5		1.5	1.8	: 1
Output VSWR (All Atten. States)		1.3	1.8		1.3	1.5		1.5	1.8	: 1
Input Linearity 0.1dB Compression Point (P0.1dB)		25			25			25		dBm
Input Third-Order Intercept(IP3) @Two-tone input power = 16 dBm/tone, Δf = 1 MHz		50			50			46		dBm
Switching Speed 50% CTRL* to 10% or 90%					220 Max.					ns
Video Leakage (Peak to Peak)					130 Typ. 150 Max.					mV
Bias Current (+5V)					20 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	+5.5V
RF Input Power	+25dBm

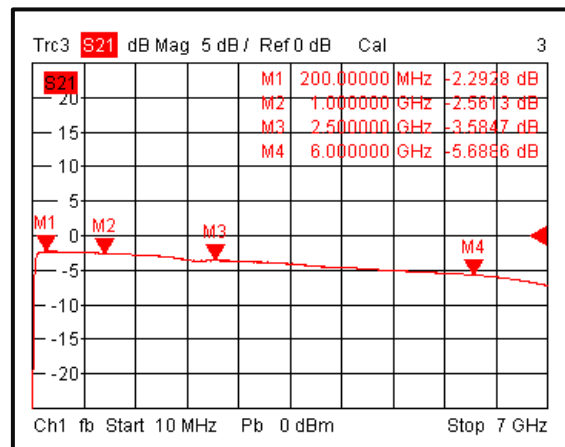
Environmental Specifications and Test Standards

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)

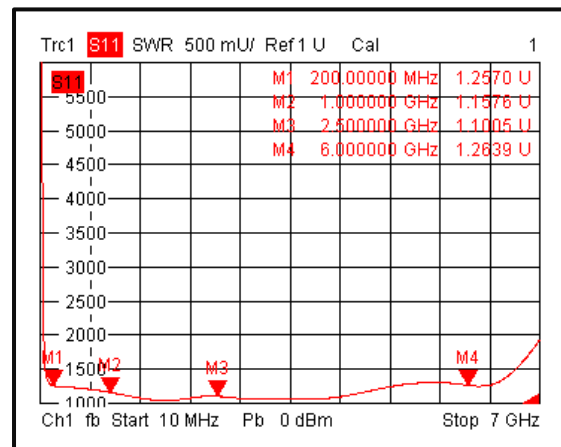
*For vibration testing details please see additional information section.

Typical Performance Plots

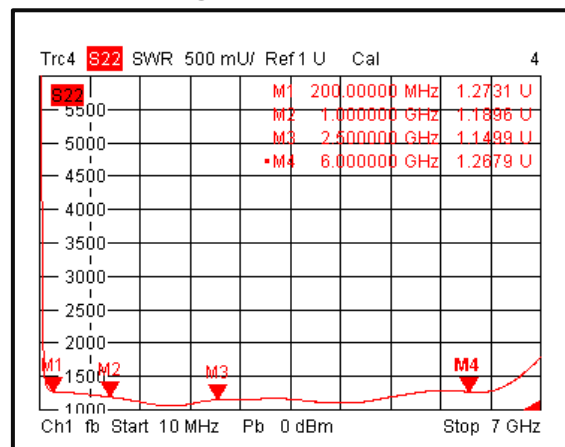
Insertion Loss @+25°C



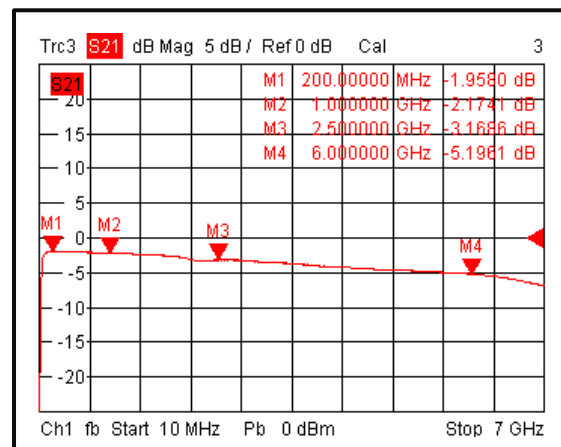
Input VSWR @+25°C



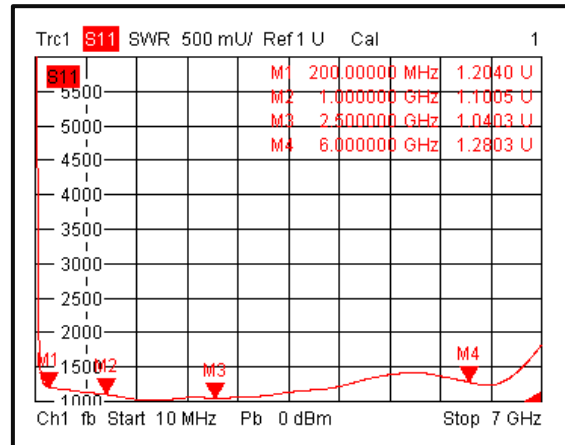
Output VSWR @+25°C



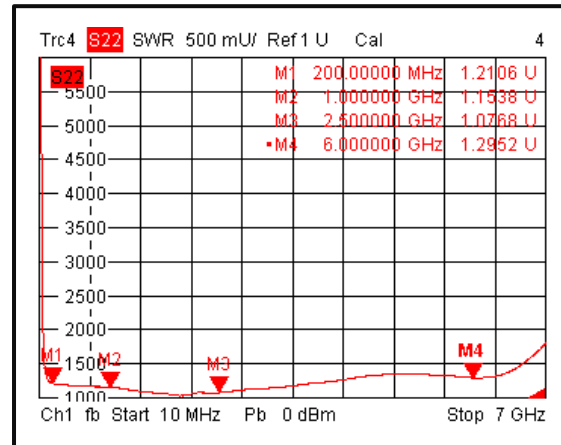
Insertion Loss @-40°C



Input VSWR @-40°C

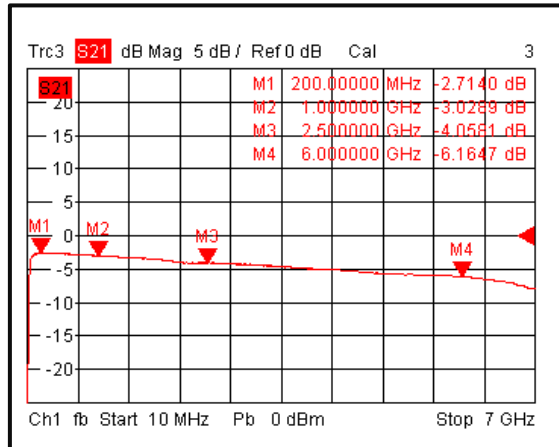


Output VSWR @-40°C

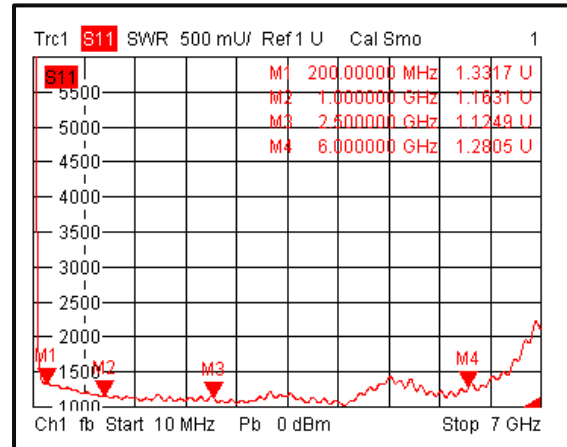


Typical Performance Plots

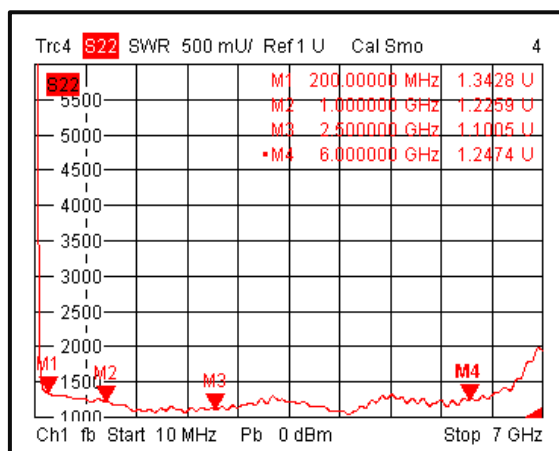
Insertion Loss @+85°C



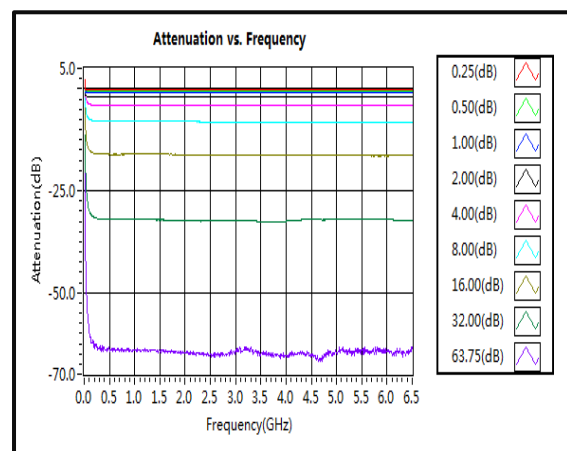
Input VSWR @+85°C



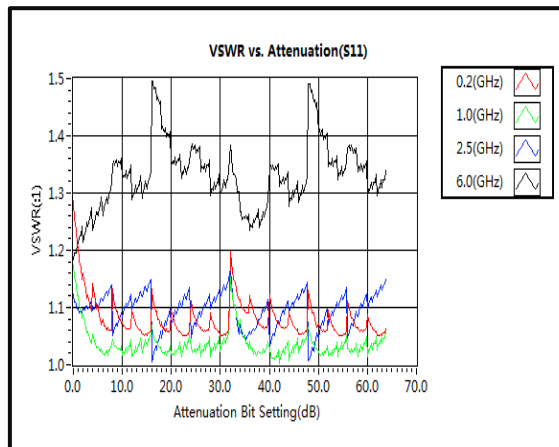
Output VSWR @+85°C



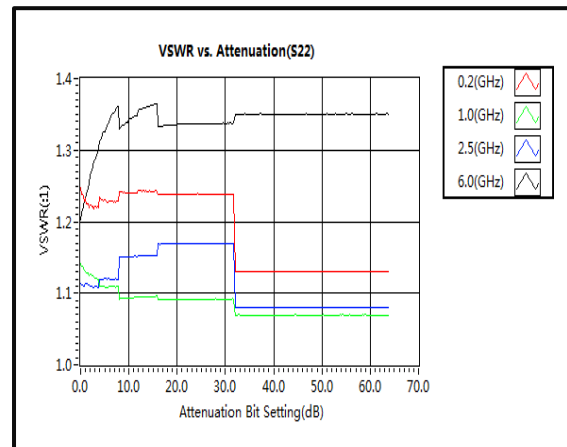
Attenuation vs. Frequency



VSWR vs. Attenuation (S11)

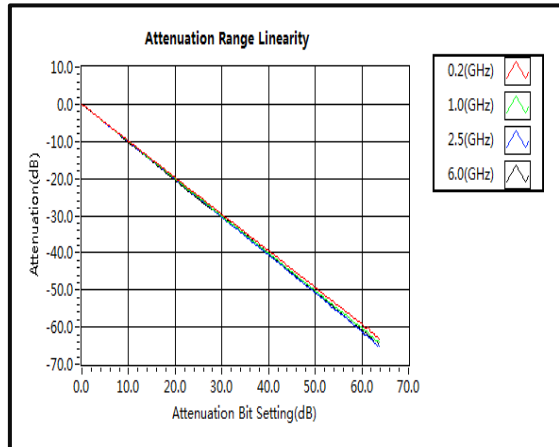


VSWR vs. Attenuation (S22)

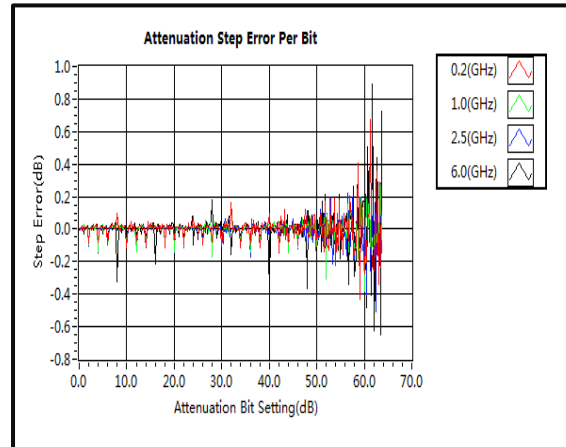


Typical Performance Plots

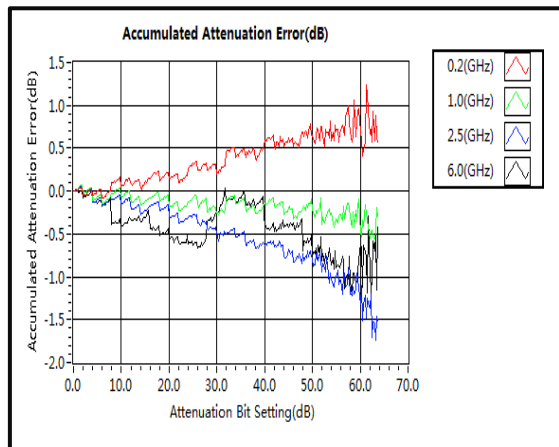
Attenuation Range Linearity



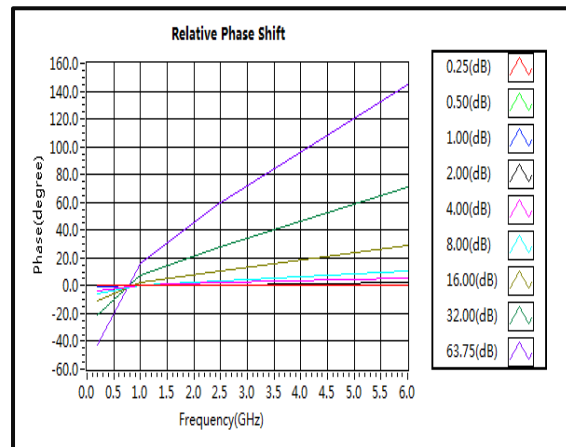
Attenuation Step Error Per Bit (dB)



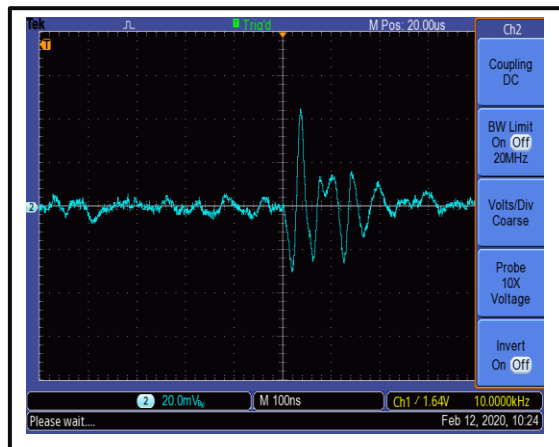
Accumulated Attenuation Error (dB)



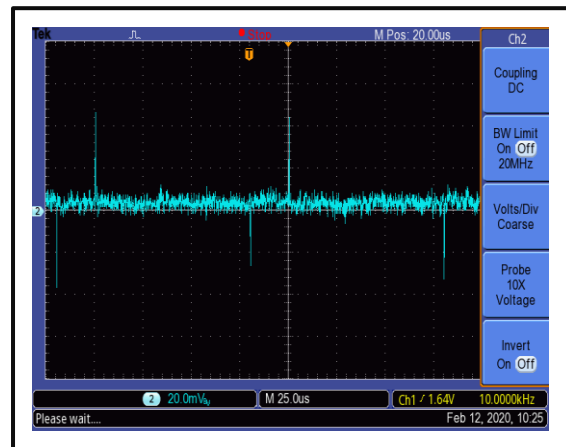
Relative Phase Shift



Video Leakage (Peak to Peak) @+25°C



Video Leakage (Peak to Peak) @+25°C

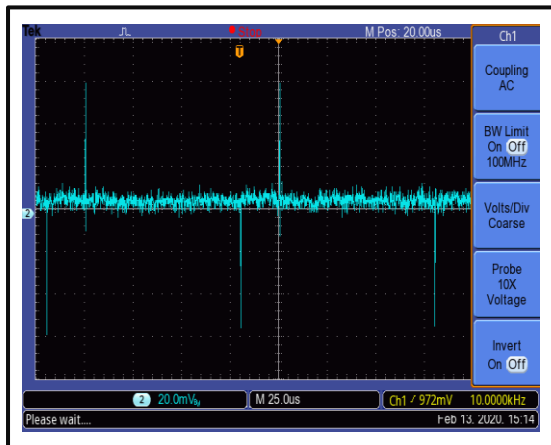


Typical Performance Plots

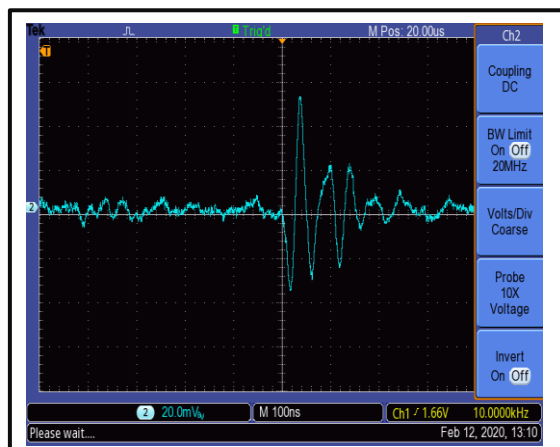
Video Leakage (Peak to Peak) @-40°C



Video Leakage (Peak to Peak) @-40°C



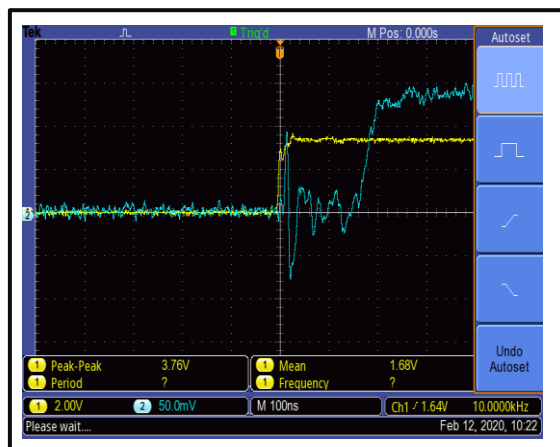
Video Leakage (Peak to Peak) @+85°C



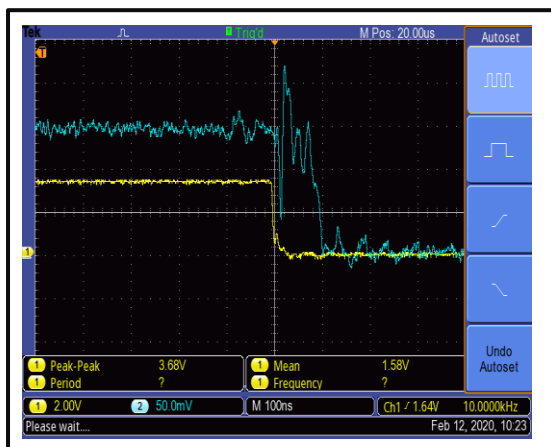
Video Leakage (Peak to Peak) @+85°C



Speed@+25°C

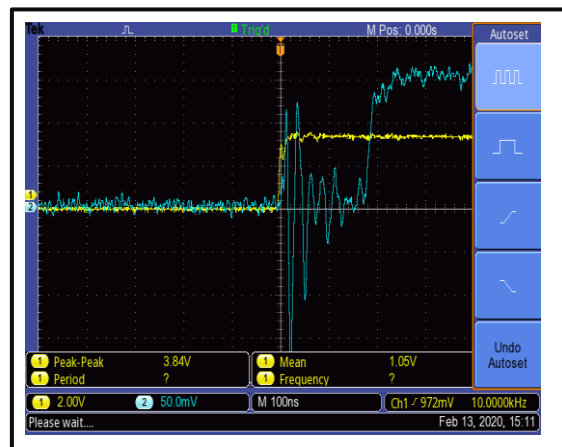


Speed@+25°C



Typical Performance Plots

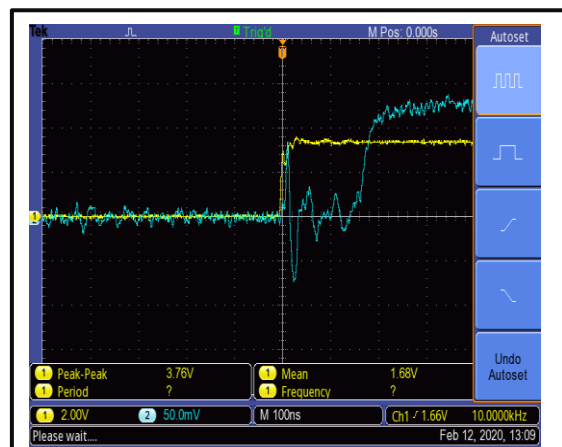
Speed @-40°C



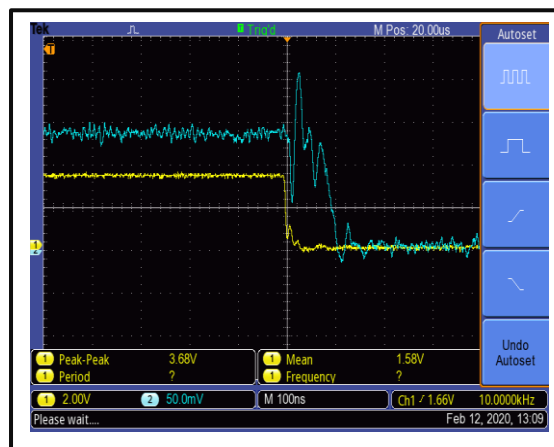
Speed @-40°C



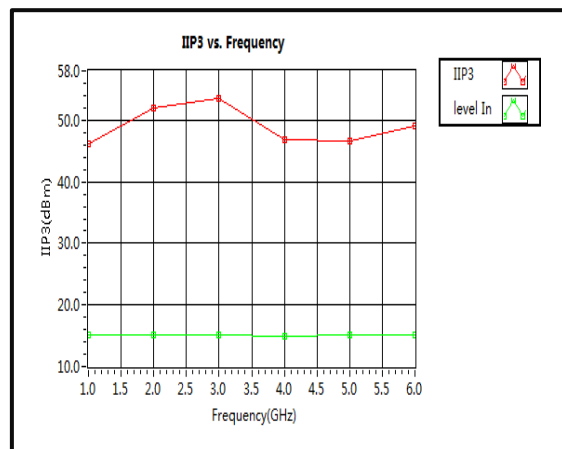
Speed @+85°C



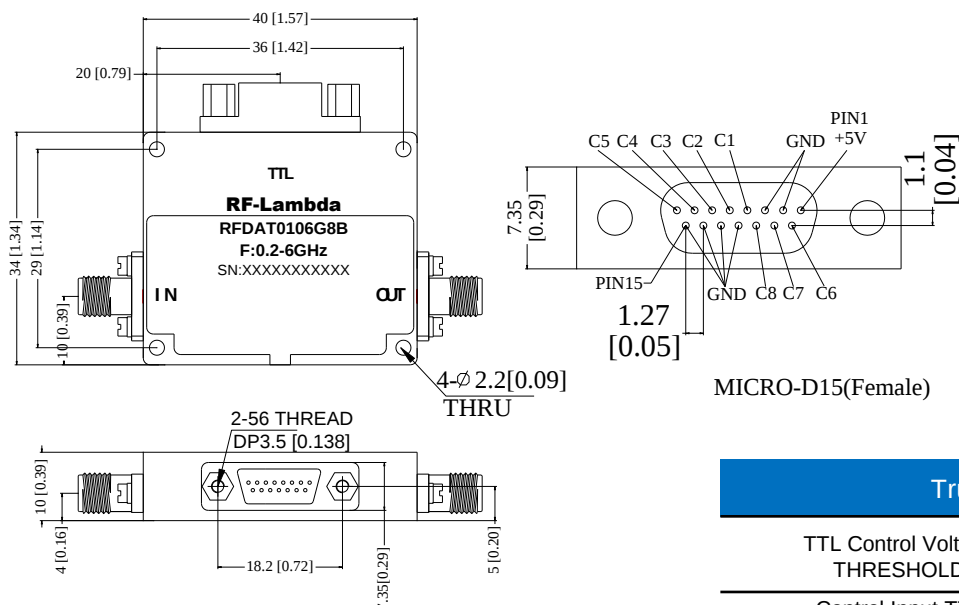
Speed @+85°C



IIP3



Outline Drawing



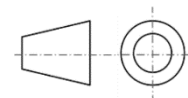
MICRO-D15(Female)

Truth Table

TTL Control Voltage THRESHOLD								Low(0)=0-0.8V
Control Input TTL								High(1)=4-5V
C	C7	C6	C5	C4	C3	C2	C1	Attenuation State
1	1	1	1	1	1	1	1	Reference IL
1	1	1	1	1	1	1	0	0.25dB
1	1	1	1	1	1	0	1	0.5dB
1	1	1	1	1	0	1	1	1dB
1	1	1	1	0	1	1	1	2dB
1	1	1	0	1	1	1	1	4dB
1	1	0	1	1	1	1	1	8dB
1	0	1	1	1	1	1	1	16dB
0	1	1	1	1	1	1	1	31.75dB
0	0	0	0	0	0	0	0	63.5dB

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.
6. Note: A lower TTL High Voltage (+3.3V) can be used, but Vcc must also be +3.3V instead of +5V



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
RFDAT0106G8B	Standard	0.2GHz-6GHz Digital Control Attenuator

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