# Absorptive Digital Control Attenuator 0.1GHz-18GHz


## Product Description

RFDAT0018G8A is an absorptive digital control attenuator with a frequency range of 0.1 to 18GHz.

The max power input is 22dBm. The insertion loss is 13dB with an attenuation range of 127.5dB.

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

## Features

- Absorptive Digital Control Attenuator
- Ultra Wide Band Operation 0.1-18GHz
- 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 ($T_A$=+25ºC) ,Vdd = +5V/-5V, VCTL = 0 / +5V

| Parameter | Min | Typ | Max | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|---|
| Frequency Range | | 0.1~6 | | | 6~18 | | GHz |
| Attenuation Range | 115 | 127.5 | | 115 | 127.5 | | dB |
| Insertion Loss | | 7 | 10 | | 13 | 16.5 | dB |
| Insertion Loss Temperature Coefficient | | 0.01 | | | 0.01 | | dB/ °C |
| Attenuation Flatness: (Referenced to Insertion Loss) | | ±2.0 | ±7.5 | | ±4.0 | ±7.5 | dB |
| Control Bits | | | 8 | | | | Bit |
| Control Step size | | 0.5 | | | 0.5 | | dB |
| Input VSWR( All Atten. States) | | 1.9 | 2.5 | | 1.9 | 2.2 | : 1 |
| Output VSWR ( All Atten. States) | | 1.9 | 2.5 | | 1.9 | 2.2 | : 1 |
| Input 0.1 dB Compression Point (P0.1dB) | | 22 | | | 22 | | dBm |
| IP3 Input | | 35 | | | 35 | | dBm |
| Switching Speed | | | 200 Max. | | | | ns |
| Bias Current (+5V / - 5V) | | | 140/140 Max. | | | | mA |
| Weight | | | 0.07 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) | | | | |



RF-LAMBDA USA LLC: www.rflambda.com
Sales: sales@rflambda.com Technical: support@rflambda.com

## Absolute Maximum Ratings

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

## Environmental Specifications and Test Standards

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

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


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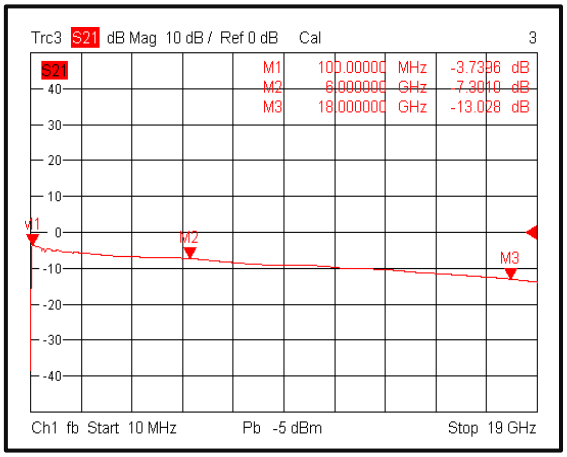
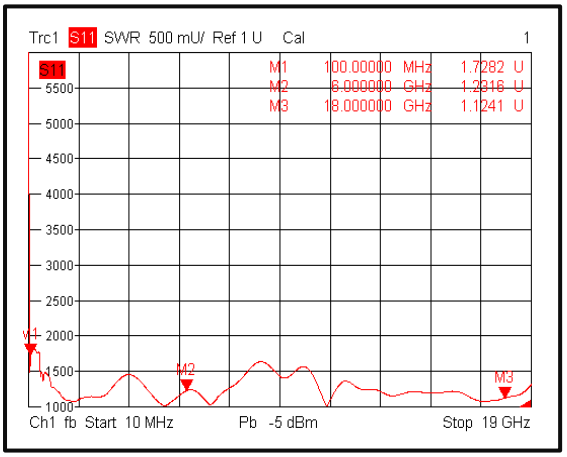
## Typical Performance Plots

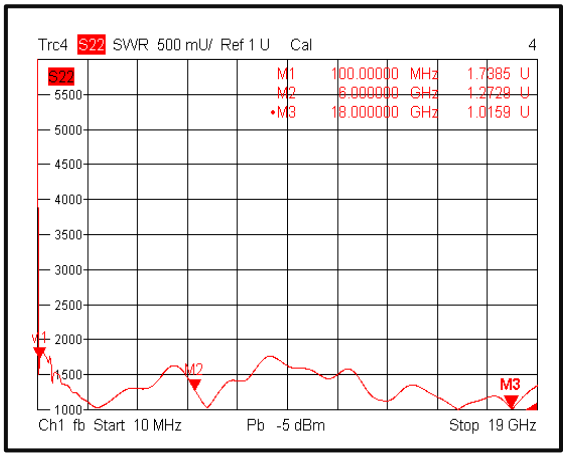
### Insertion Loss @+25ºC



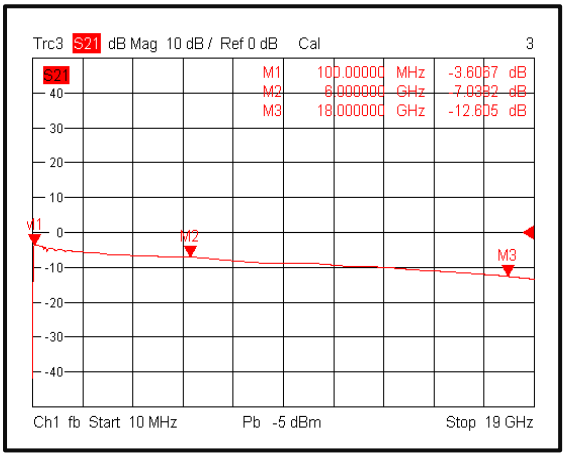

### Input VSWR @+25ºC



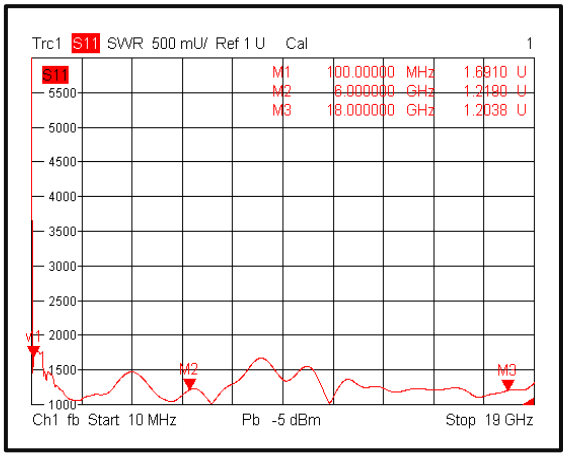

### Output VSWR @+25ºC



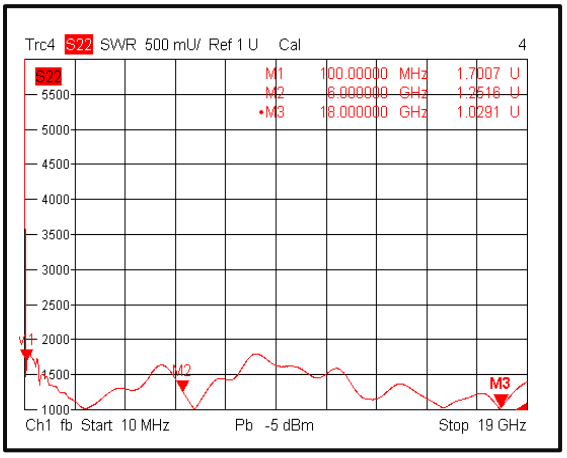

### Insertion Loss @-40ºC




### Input VSWR @-40ºC

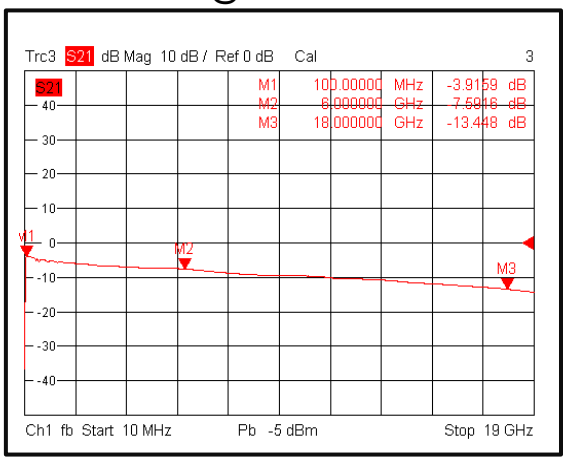



### Output VSWR @-40ºC

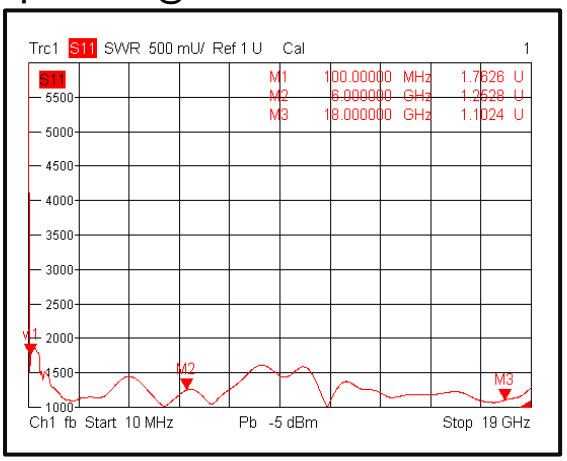


## Typical Performance Plots

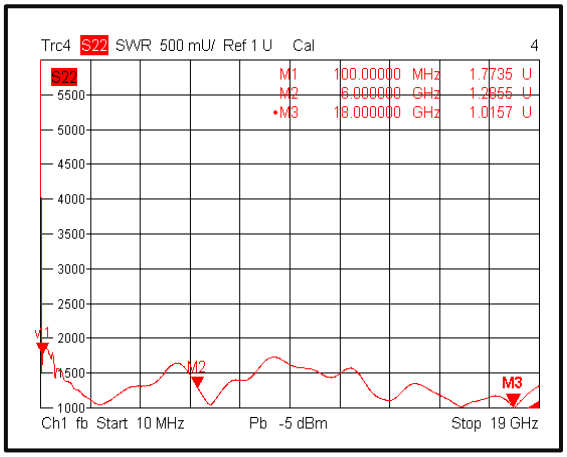
### Insertion Loss @+85ºC



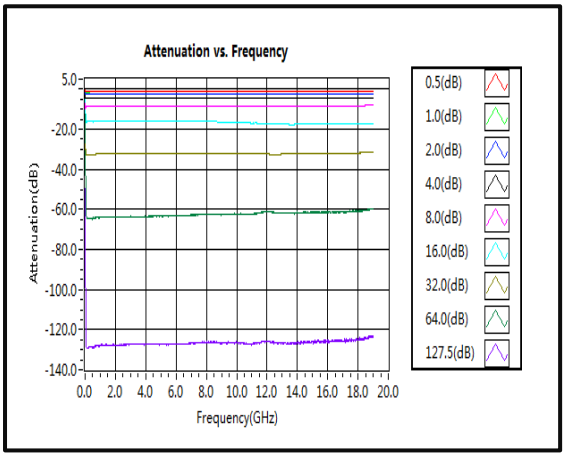

### Input VSWR @+85ºC



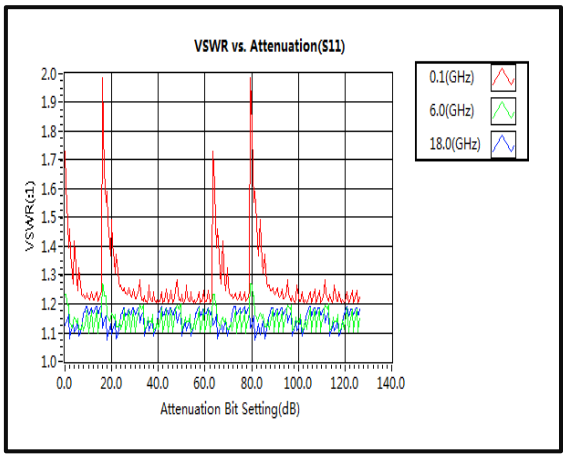

### Output VSWR @+85ºC



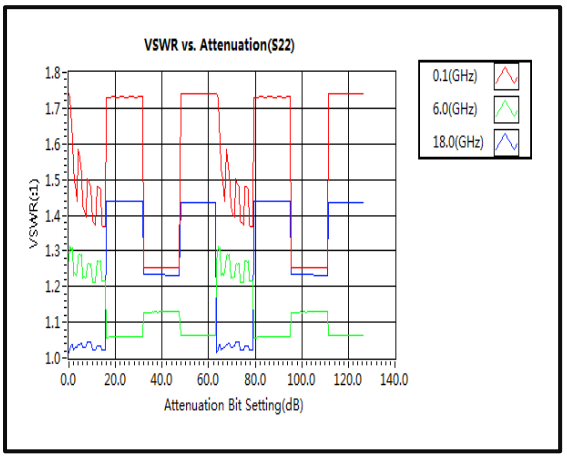

### Attenuation vs. Frequency




### VSWR vs. Attenuation (S11)

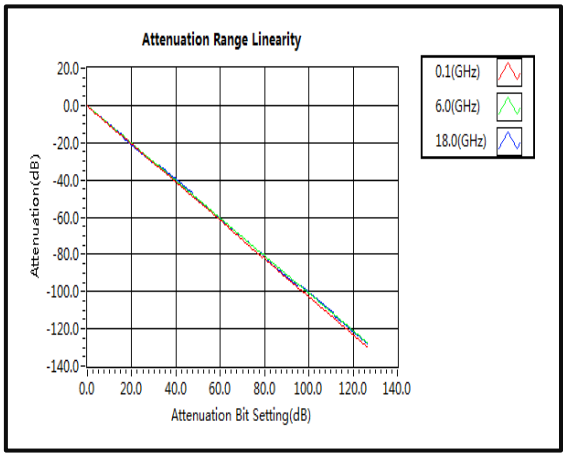



### VSWR vs. Attenuation (S22)

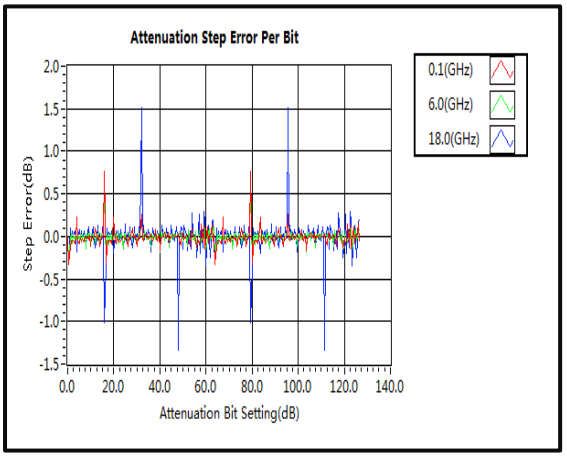


## Typical Performance Plots

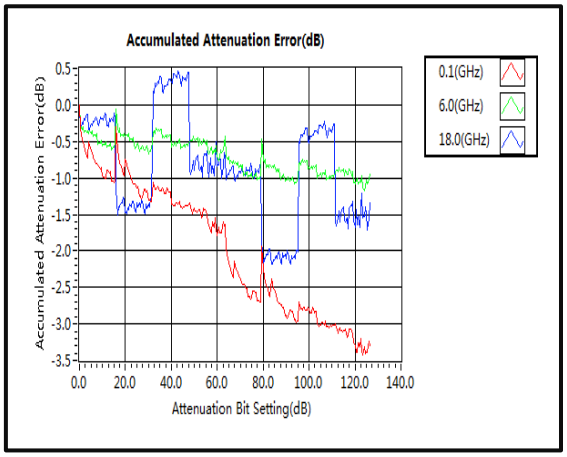
### Attenuation Range Linearity



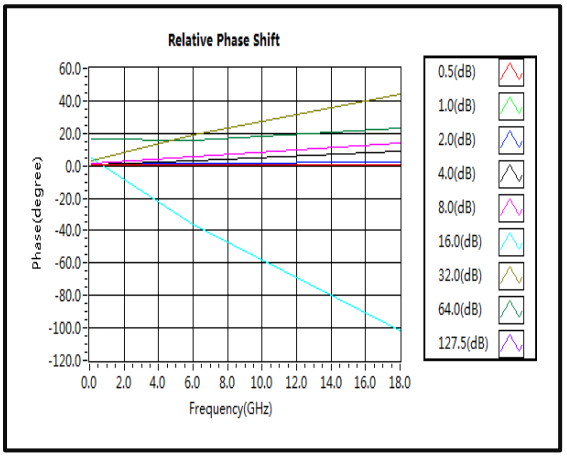

### Attenuation Step Error Per Bit (dB)



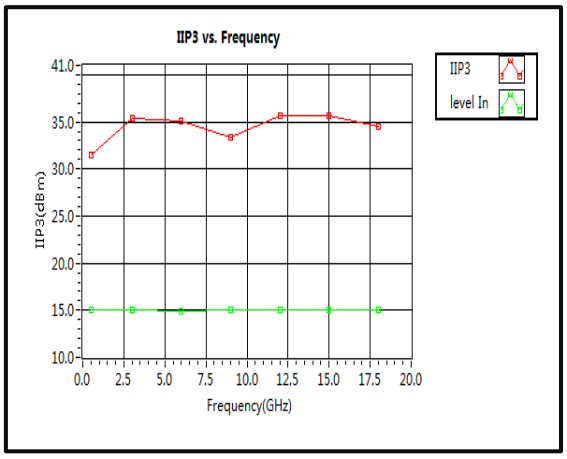

### Accumulated Attenuation Error (dB)



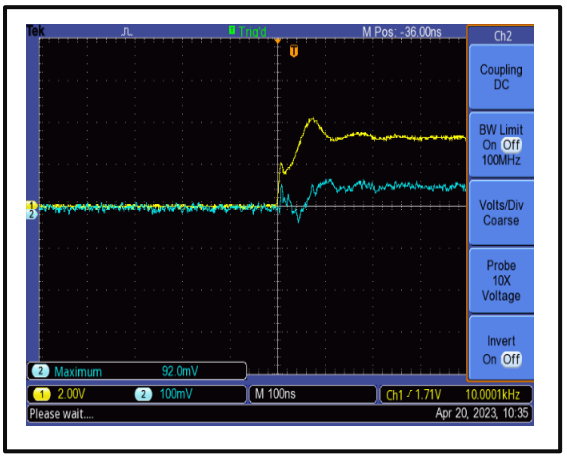

### Relative Phase Shift




### IIP3

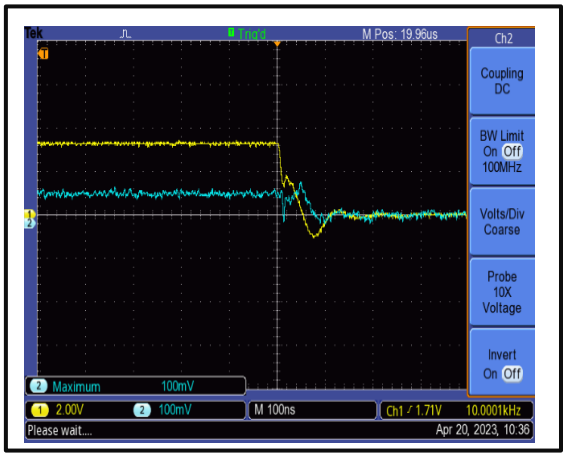



### Speed

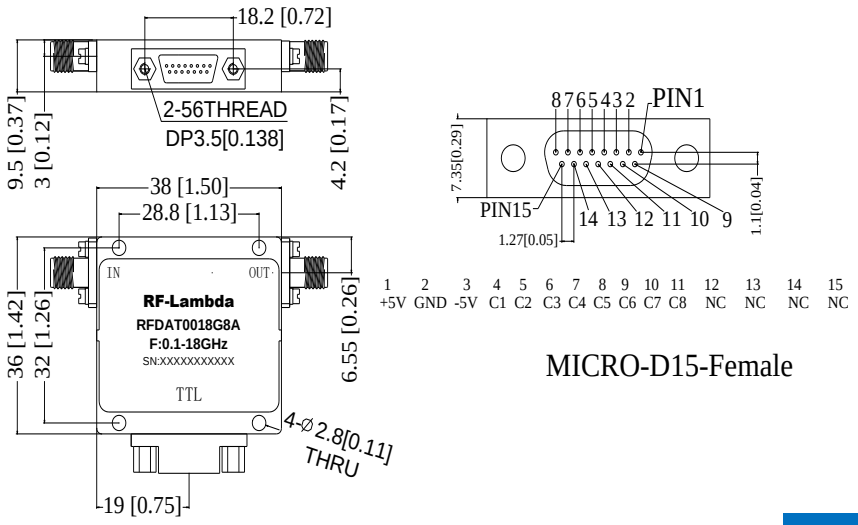


## Typical Performance Plots

### Speed



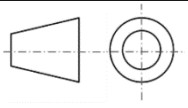
## Outline Drawing




MICRO-D15-Female

### Truth Table

| TTL Control Voltage THRESHOLD | | | | | | | | Low(0)=0~0.8V<br>High(1)=2.8~5V |
|---|---|---|---|---|---|---|---|---|
| Control Input TTL | | | | | | | | Attenuation State |
| C8 | C7 | C6 | C5 | C4 | C3 | C2 | C1 | |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | Reference IL |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0.5dB |
| 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 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. 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 |
|---|---|---|
| RFDAT0018G8A | Standard | 0.1GHz-18GHz Digital Control Attenuator |

## Important Notice





RF-LAMBDA USA LLC: www.rflambda.com
Sales: sales@rflambda.com Technical: support@rflambda.com