

## 0 to 31.5 dB 6 Bit Programmable TTL Controlled Step Attenuator with a 0.5 dB Step SMA Female to SMA Female Rated to 0.16 Watts Up to 13 GHz

The FMAM4000 is a 6-Bit Digital Attenuator that has 31.5 dB of total attenuation with bit values of 0.5 (LSB), 1, 2, 4, 8, and 16 dB across a wide frequency range from DC to 13 GHz. The design is based on GaAs IC technology that offers exceptional performance characteristics that include 5.5 dB typical insertion loss at 13 GHz, +38 dB input IP3, and fast switching speed of 45 nsec. The design also features excellent Attenuation Accuracy with +/- 0.3 dB typical bit error and single control lines per bit that are CMOS compatible. The drop-in package is hermetically sealed and supports Field Replaceable SMA connectors. And for added confidence, this rugged package assembly is designed to meet MIL-STD-883 test conditions for Hermeticity and Temperature Cycle.

### Electrical Specifications (Values at 25°C, sea level)

Description	Min	Typ	Max	Unit
Frequency Range	DC		13	GHz
Mean Attenuation Range	0		31.5	dB
Insertion Loss		5.5	6	dB
Input VSWR		1.67:1		
Output VSWR		1.67:1		
Power Rating			+22	dBm
Accuracy of Attenuation			±0.6	dB
Step Size	0.5			dB
Switching Time			45	ns
DC Power Supply			-5 ±10%	Volts

### Mechanical Specifications

<b>Size</b>	
Length	1.035 in [26.29 mm]
Width	0.68 in [17.27 mm]
Height	0.36 in [9.14 mm]
Weight	2.25 lbs [1.02 kg]
Connector 1	SMA Female
Connector 2	SMA Female

### Environmental Specifications

<b>Temperature</b>	
Operating Range	-55 to +85 deg C

### Compliance Certifications (see [product page](#) for current document)

### Plotted and Other Data

Notes:



### Features:

- 0.5 dB LSB steps to 31.5 dB Attenuation
- Single Control Line Per Bit
- +/-0.3 dB typical Bit Error
- 45 nsec Switching Speed
- CMOS Compatible Control Circuit
- Hermetically Sealed Module
- Field Replaceable SMA Connectors
- -55°C to +85°C Operating Temperature
- Designed to meet MIL-STD-883 Conditions

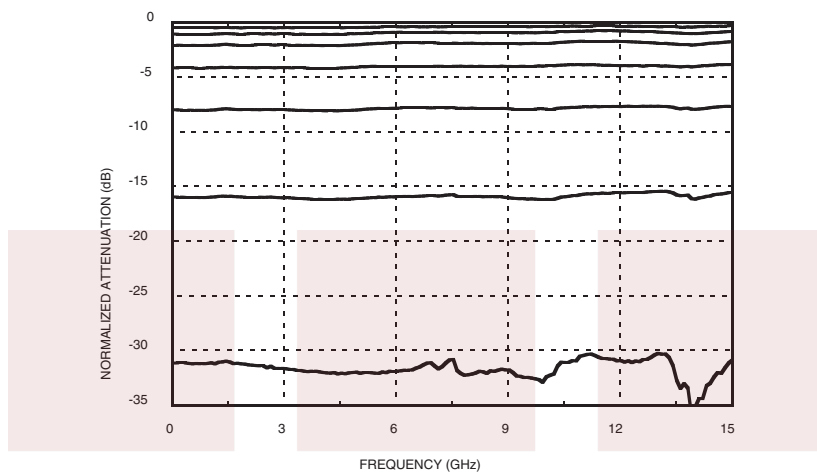
### Applications:

- Military Radio
- Radar
- Electronic Counter Measures
- Space Systems
- Test Instrumentation
- Telecom Infrastructure

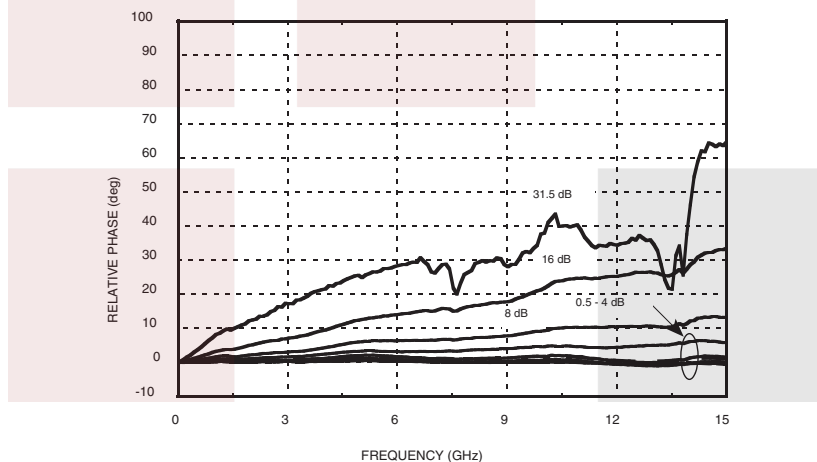
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## Typical Performance Data

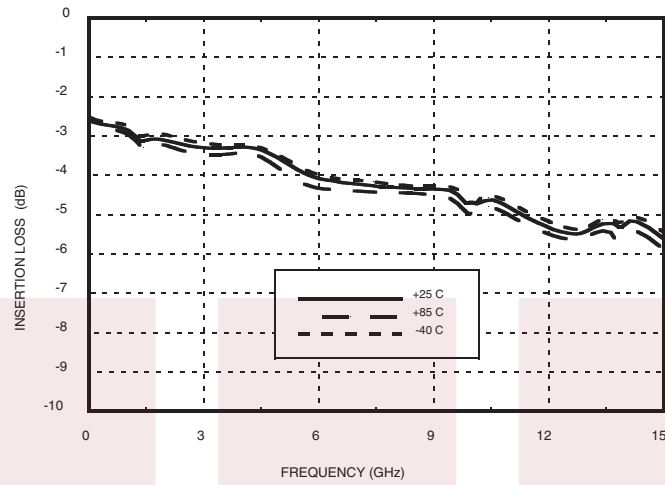
**Normalized Attenuation** (Only Major States are Shown)



**Relative Phase vs. Frequency** (Only Major States are Shown)

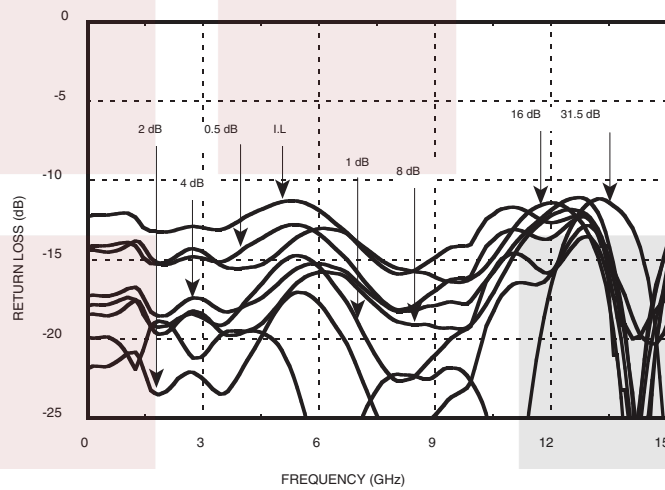


**Insertion Loss**

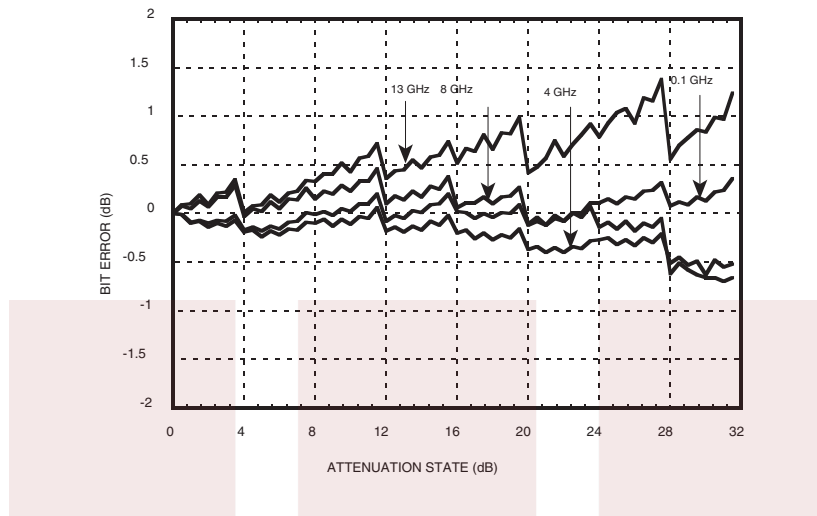


**Return Loss RF1, RF2**

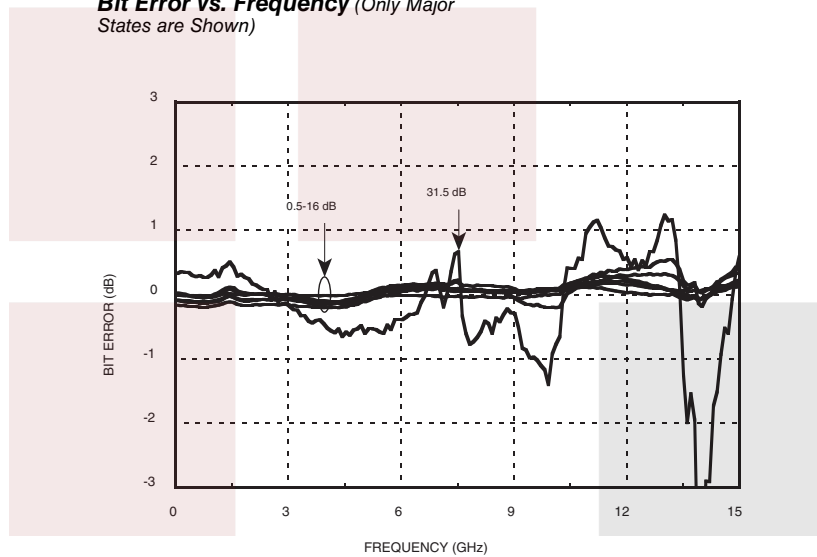
(Only Major States are Shown)



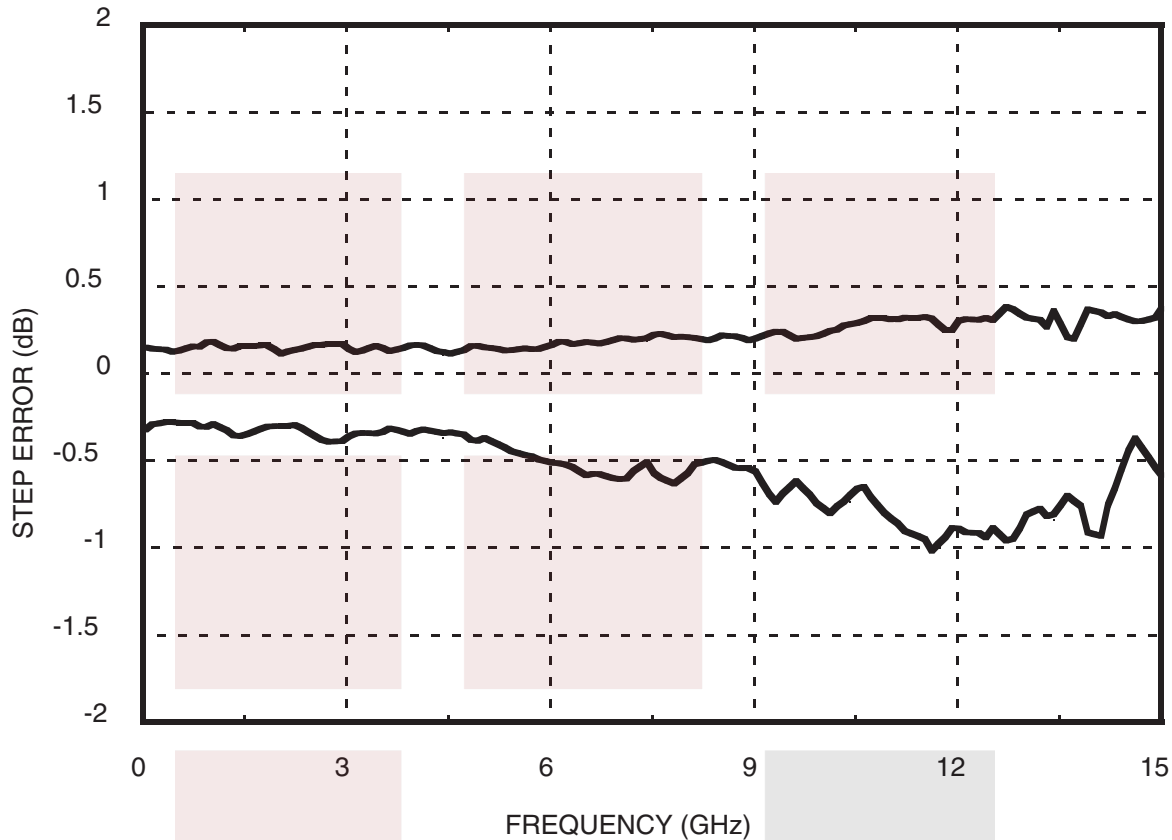
**Bit Error vs. Attenuation State**



**Bit Error vs. Frequency (Only Major States are Shown)**



## ***Worst Case Step Error Between Successive Attenuation States***

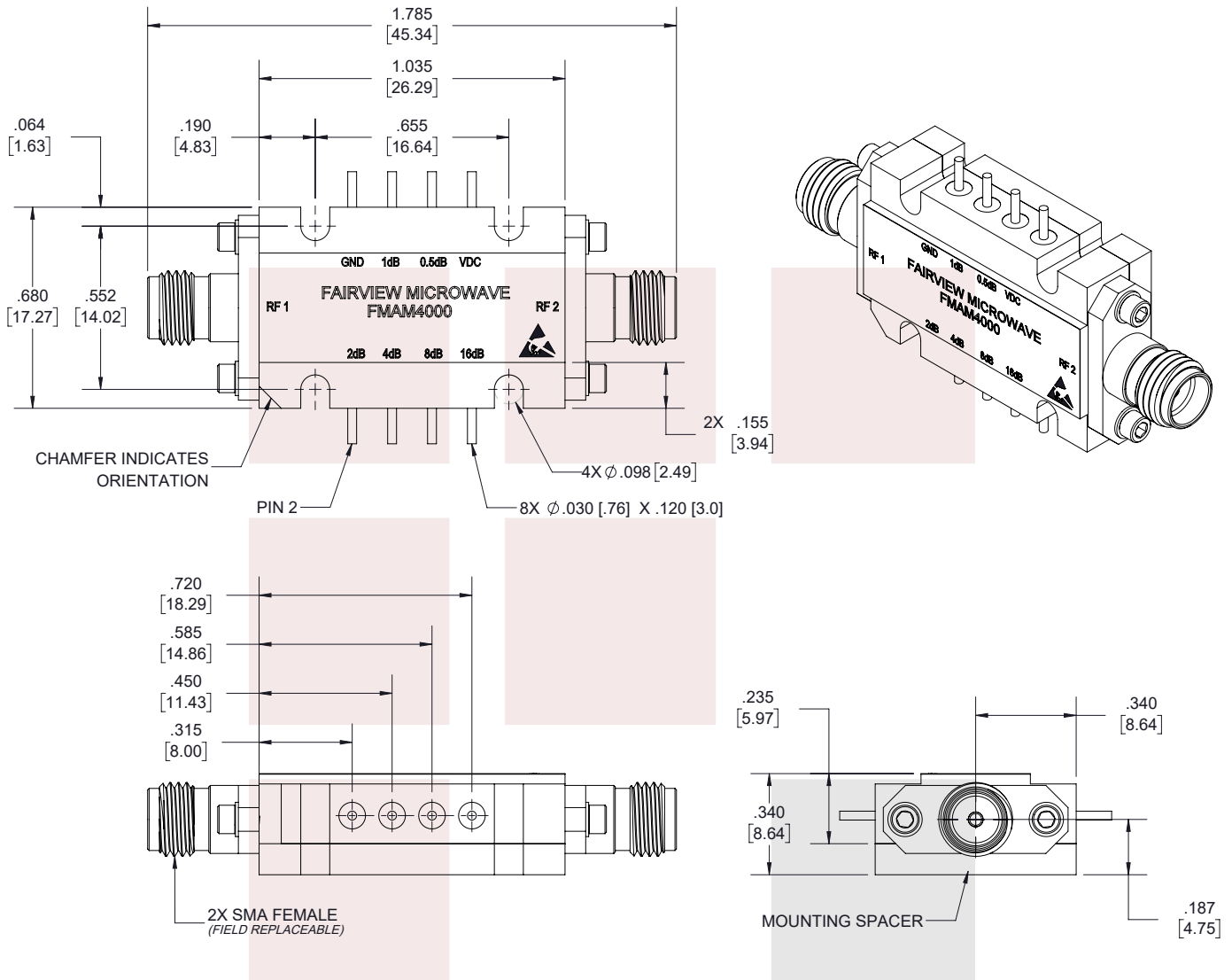


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For additional information on this product, please click the following link: [0 to 31.5 dB 6 Bit Programmable TTL Controlled Step Attenuator with a 0.5 dB Step SMA Female to SMA Female Rated to 0.16 Watts Up to 13 GHz FMAM4000](https://www.fairviewmicrowave.com/31.5-db-ttl-controlled-step-attenuator-sma-female-fmam4000-p.aspx)

URL: <https://www.fairviewmicrowave.com/31.5-db-ttl-controlled-step-attenuator-sma-female-fmam4000-p.aspx>

The information contained in this document is accurate to the best of our knowledge and representative of the part described herein. It may be necessary to make modifications to the part and/or the documentation of the part, in order to implement improvements. Fairview Microwave reserves the right to make such changes as required. Unless otherwise stated, all specifications are nominal. Fairview Microwave does not make any representation or warranty regarding the suitability of the part described herein for any particular purpose, and Fairview Microwave does not assume any liability arising out of the use of any part or documentation.



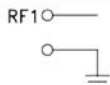
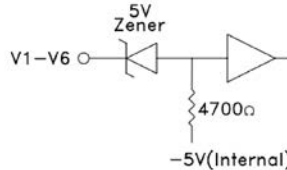
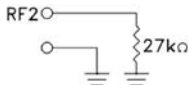

**STANDARD TOLERANCES**

.X  $\pm 0.2$   
.XX  $\pm 0.01$   
.XXX  $\pm 0.005$

\*STANDARD TOLERANCES APPLY ONLY TO DIMENSIONS IN INCHES

<p><b>Fairview Microwave</b> an INFINITE brand</p>		<p>NOTES: 1. UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE NOMINAL. 2. ALL SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE AT ANY TIME. 3. DIMENSIONS ARE IN INCHES [mm].</p>					
TITLE		DWG NO <b>FMAM4000</b>			CAGE CODE <b>3FKR5</b>		
0 to 31.5 dB 6 Bit Programmable TTL Controlled Step Attenuator with a 0.5 dB Step SMA Female to SMA Female Rated to 0.16 Watts Up to 13 GHz		CAD FILE	06/26/19	SHEET	1 OF 2	SCALE	N/A
						SIZE	A
							7361

### Pin Description

Pin Number	Function	Description	Interface Schematic
1	RF1	This pin is DC coupled and matched to 50 Ohms. Blocking capacitors are required if RF line potential is not equal to 0 Vdc.	
5, 4, 3, 2, 9, 8	V1 - V6	See truth table and control voltage table.	
6	RF2	This pin is DC coupled and matched to 50 Ohms. Blocking capacitors are required if RF line potential is not equal to 0 Vdc.	
7	Vdc	Supply voltage: -5 Vdc ±10%.	
10	GND	Power Supply Ground	

### Truth Table

Control Voltage Input						Attenuation State
V1	V2	V3	V4	V5	V6	RF1 - RF2
16 dB	8 dB	4 dB	2 dB	1 dB	0.5 dB	
Low	Low	Low	Low	Low	Low	Reference I.L.
Low	Low	Low	Low	Low	High	0.5 dB
Low	Low	Low	Low	High	Low	1 dB
Low	Low	Low	High	Low	Low	2 dB
Low	Low	High	Low	Low	Low	4 dB
Low	High	Low	Low	Low	Low	8 dB
High	Low	Low	Low	Low	Low	16 dB
High	High	High	High	High	High	31.5 dB

Any combination of the above states will provide an attenuation approximately equal to the sum of the bits selected.

#### STANDARD TOLERANCES

.X ±0.2  
.XX ±0.01  
.XXX ±0.005

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2 OF 2

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