Fairview Microwave
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FMAT5003
DATA SHEET

0 to 31.5 dB 6 Bit Programmable CMOS Controlled Step Attenuator with a 0.5 dB Step SMA Female to SMA Female Rated to 0.32 Watts Up to 13 GHz

The FMAT5003 is a 6 Bit Programmable 31.5 dB Pin Diode Attenuator with Step Resolution as Low as 0.5 dB over the Operating Frequency Range from 0 GHz to 13 GHz. The RF Input/Output Connectors are SMA Female. The control is thru a six bit CMOS compatible serial control word that is used to select attenuation state and a single -5 VDC bias that allows the operation at frequencies down to DC. The drop-in package is hermetically sealed with field replaceable SMA connectors and has an operating temperature range of -40°C to +85°C. And for added confidence, this rugged package assembly is designed to meet MIL-STD-883 test conditions for Hermeticity and Temperature Cycle.

Features:

- 6 Bit Programmable 31.5 dB Attenuator
- 0 GHz to 6 GHz Frequency Range
- 31.5 dB Attenuation Range
- Step Resolution of 0.5 dB
- Insertion Loss 3.6 dB Typ
- SMA Female Field Replaceable Connectors
- 3 Pin Serial CMOS control

Applications:

- Electronic Warfare
- Electronic Countermeasures
- Microwave Radio
- VSAT
- Radar
- Fiber Optic
- Space Systems
- Test Instrumentation
- Telecom Infrastructure

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		dB
Power Rating			+25.1	dBm
Step Size	0.5			dB
DC Power Supply			-5 ±10%	Volts

Mechanical Specifications

Size

Length	1.035 in [26.29 mm]
Width	0.68 in [17.27 mm]
Height	0.34 in [8.64 mm]
Weight	3.25 lbs [1.47 kg]
Connector 1	SMA Female
Connector 2	SMA Female

Environmental Specifications

Temperature

Operating Range	-50 to +85 deg C
Storage Range	-65 to +150 deg C
Temperature Cycling	MIL-STD-883, Method 101C, Cond B
Hermetic Seal	Gross Leak MIL-STD-883 Method 1014C1/Fine Leak MIL-STD-883, Method 1014A2, 5 x 10-8 atm cc
ESD Sensitivity	ESD Sensitive Material, Transport material in Approved ESD bags. Handle only in ESD Workstation.

Compliance Certifications (see product page for current document)

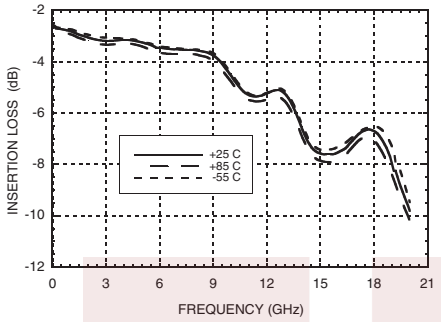
Plotted and Other Data

Notes:

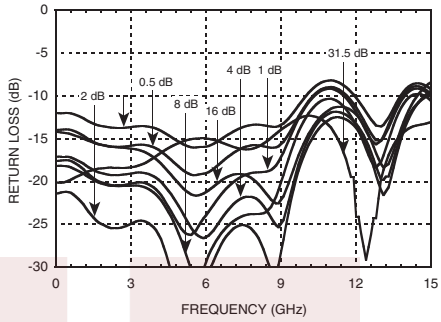
Fairview Microwave
301 Leora Ln., Suite 100
Lewisville, TX 75056
Tel: 1-800-715-4396 / (972) 649-6678
Fax: (972) 649-6689
www.fairviewmicrowave.com
sales@fairviewmicrowave.com

Typical Performance Data

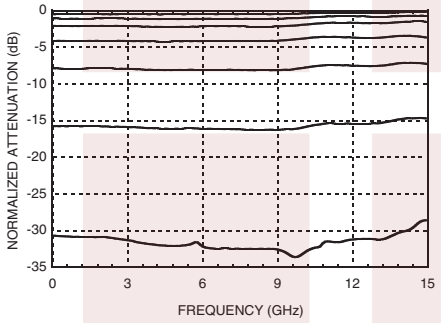
Insertion Loss



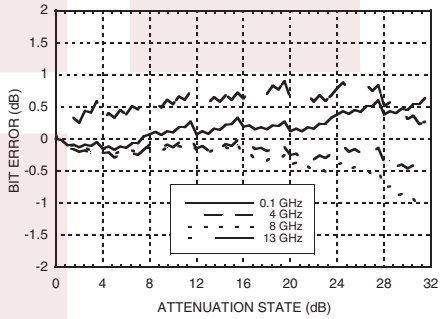
Return Loss RF1, RF2
(Only Major States are Shown)



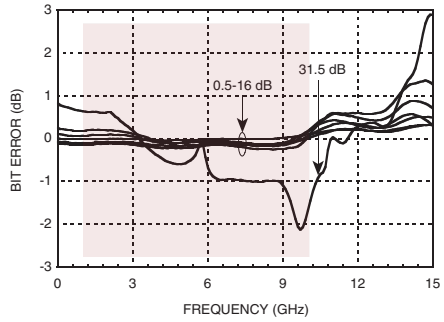
Normalized Attenuation
(Only Major States are Shown)



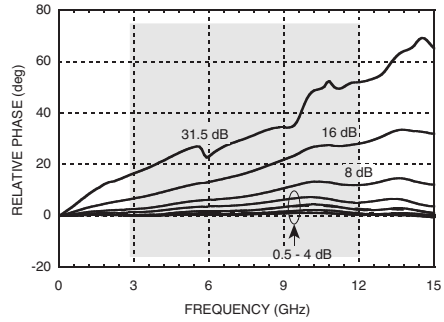
Bit Error vs. Attenuation State



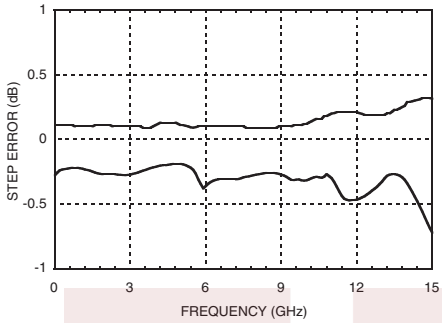
Bit Error vs. Frequency
(Only Major States are Shown)



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



Worst Case Step Error
Between Successive Attenuation States

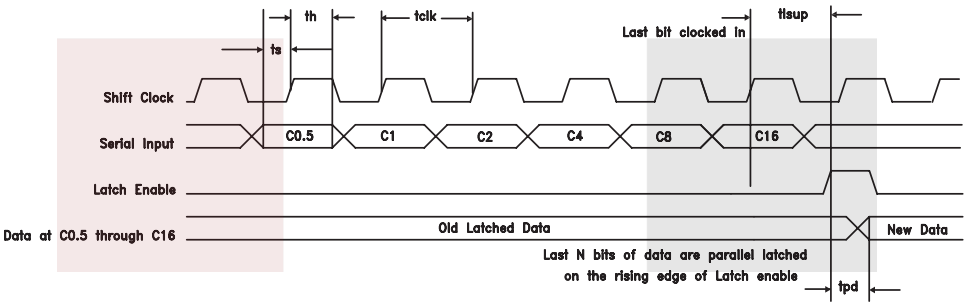


Timing

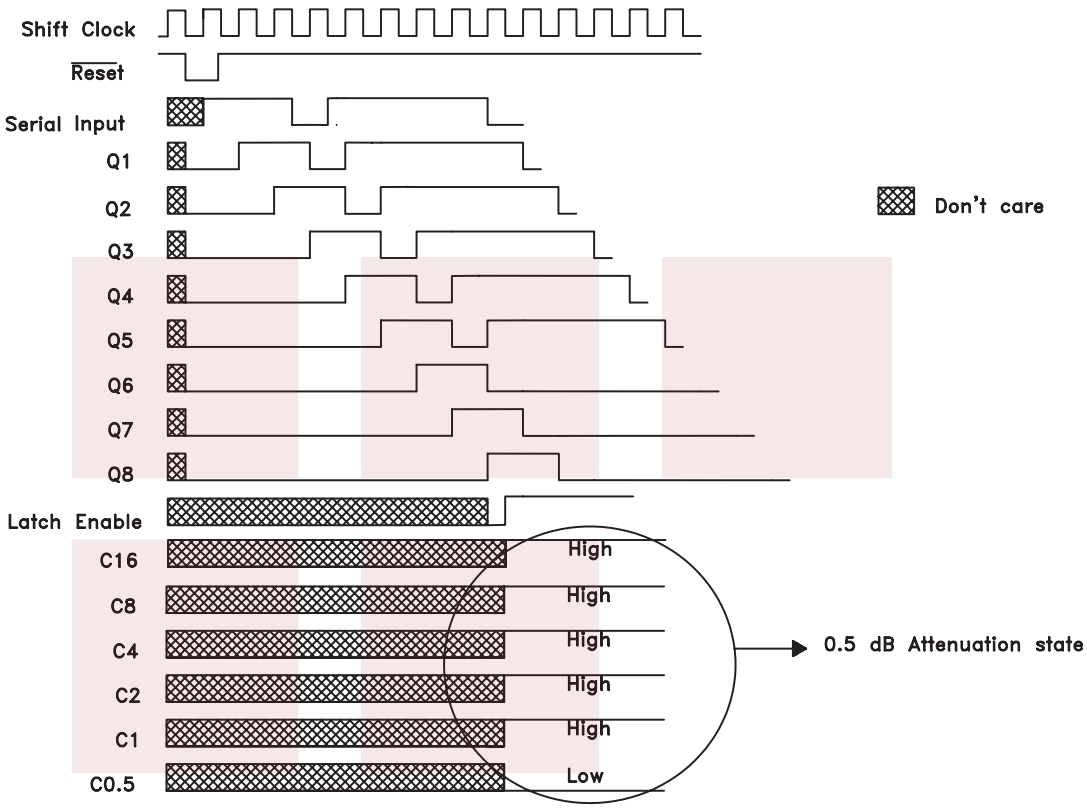
Description	Symbol	Min.	Typ.	Units
Serial Input Setup Time	ts	20	-	ns
Hold Time from Serial Input to Shift Clock	th	0	-	ns
Setup Time from Shift Clock to Latch Enable	tlsup	40	-	ns
Propagation Delay, Latch Enable to C0.5 to C8	tpd	-	30	ns
Setup Time from Reset to Shift Clock	-	20	-	ns
Clock Frequency (1/tclk)	fclk	-	30	MHz

Timing Diagram

Serial data is shifted in on the rising edge of the Shift Clock, LSB first, and is latched on the rising edge of Latch Enable.



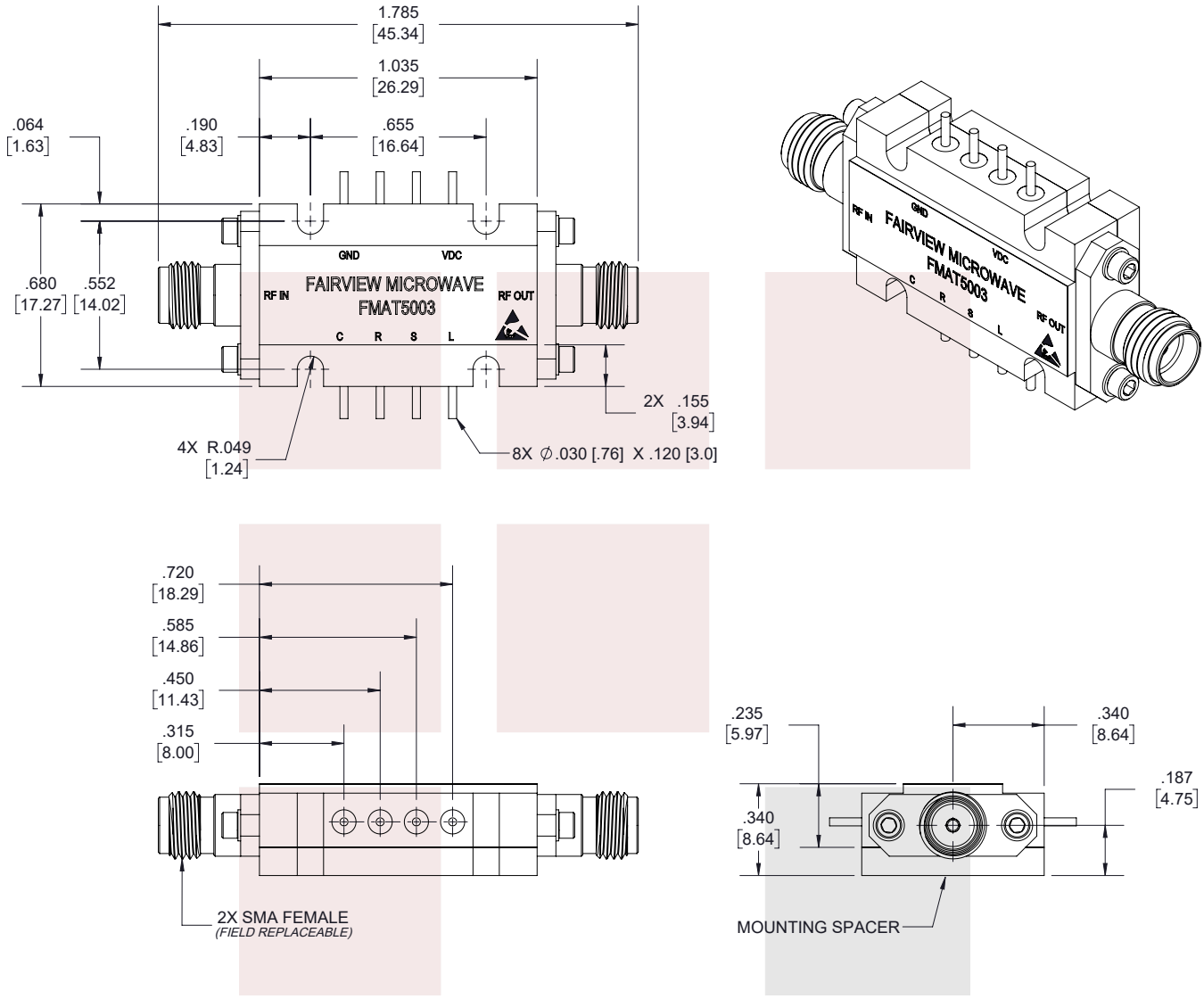
Programming Example to Select 0.5 dB Attenuation State



0 to 31.5 dB 6 Bit Programmable CMOS Controlled Step Attenuator with a 0.5 dB Step SMA Female to SMA Female Rated to 0.32 Watts Up to 13 GHz from Fairview Microwave is in-stock and available to ship same-day. All of our RF/microwave products are available off-the-shelf from our ISO 9001:2008 certified facilities in Allen, Texas. Fairview Microwave is RF on-demand.

For additional information on this product, please click the following link: 0 to 31.5 dB 6 Bit Programmable CMOS Controlled Step Attenuator with a 0.5 dB Step SMA Female to SMA Female Rated to 0.32 Watts Up to 13 GHz FMAT5003

URL: https://www.fairviewmicrowave.com/31.5-db-cmos-controlled-step-attenuator-sma-female-fmat5003-p.aspx



STANDARD TOLERANCES	
.X	±0.2
.XX	±0.01
.XXX	±0.005

*STANDARD TOLERANCES APPLY ONLY TO DIMENSIONS IN INCHES

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NOTES:
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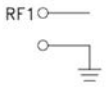
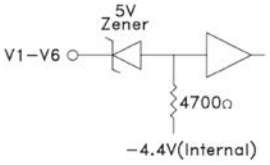
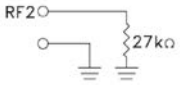
DWG NO	CAGE CODE
FMAT5003	3FKR5

CAD FILE	06/26/19	SHEET	1 OF 2	SCALE	N/A	SIZE	A	7361

301 Leora Ln., Suite 100, Lewisville, TX 75056 | Tel: 1-800-715-4396 / (972) 649-6678 / Fax: (972) 649-6689

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.	
2	C	Shift Clock	
3	R	Reset	
4	S	Serial Input	
5	L	Latch Enable	
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%. (Internal diode for reverse bias protection)	
8	GND	Power Supply Ground	

Serial Input Truth Table

Latch Enable	Shift Clock	$\overline{\text{Reset}}$	Function
X	X	L	Shift register cleared
X	↑	H	Shift register clocked
↑	X	H	Contents of shift register transferred to Digital Attenuator

Truth Table

Serial Control Input						Attenuation Settings RF1 - RF2
C0.5	C1	C2	C4	C8	C16	
H	H	H	H	H	H	Reference I.L.
L	H	H	H	H	H	0.5 dB
H	L	H	H	H	H	1 dB
H	H	L	H	H	H	2 dB
H	H	H	L	H	H	4 dB
H	H	H	H	L	H	8 dB
H	H	H	H	H	L	16 dB
L	L	L	L	L	L	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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