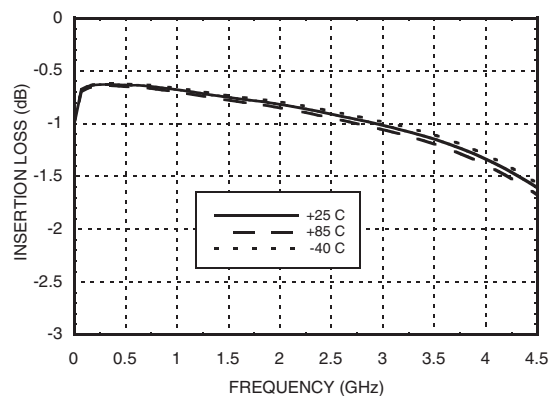
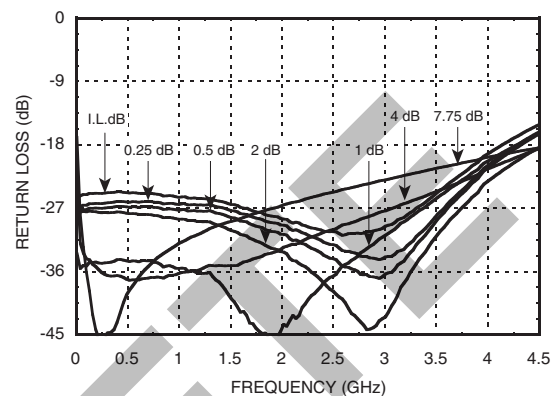


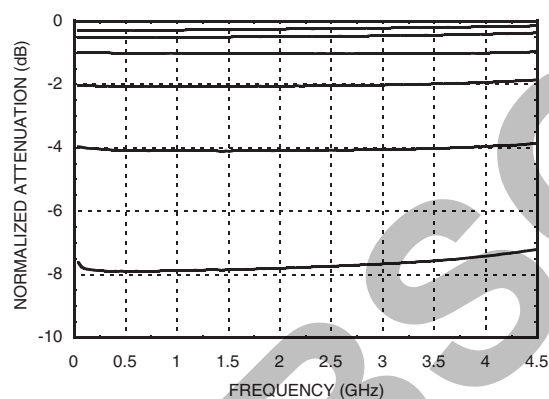
Insertion Loss



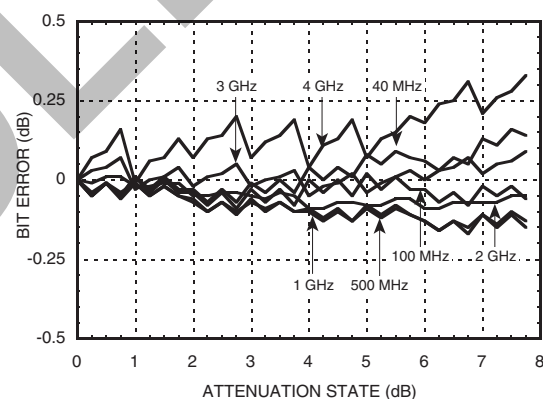
Return Loss RF1, RF2
(Only Major States are Shown)



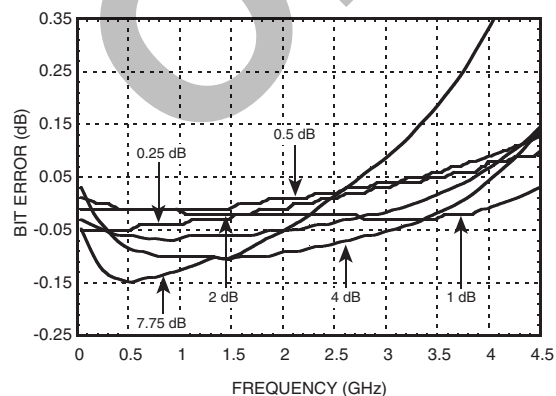
Normalized Attenuation
(Only Major States are Shown)



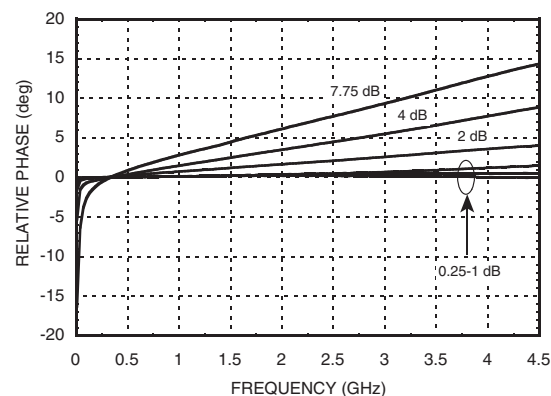
Bit Error vs. Attenuation State



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



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





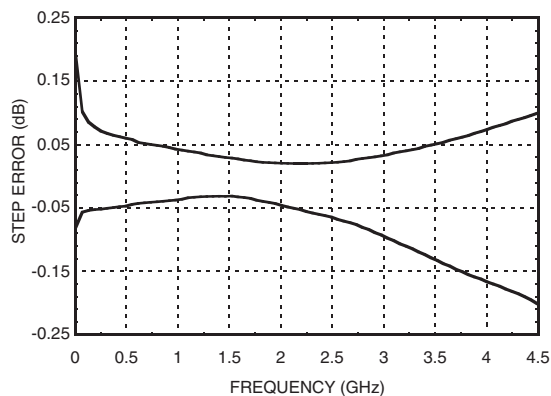
v00.0605



HMC539LP3 / 539LP3E

**0.25 dB LSB GaAs MMIC 5-BIT DIGITAL
POSITIVE CONTROL ATTENUATOR, DC - 4 GHz**

Worst Case Step Error Between Successive Attenuation States



Bias Voltage & Current

Vdd = +5.0 Vdc \pm 10%	
Vdd (VDC)	Idd (Typ.) (mA)
+4.5	3.3
+5.0	3.5
+5.5	3.7

Control Voltage

State	Bias Condition
Low	0 to +0.8V @ -5 μ A Typ.
High	+2.0 to + 5.0 Vdc @ 30 μ A Typ.
Note: Vdd = +5V	

Truth Table

Control Voltage Input					Attenuation State RF1 - RF2
V1 4 dB	V2 2 dB	V3 1 dB	V4 0.5 dB	V5 0.25 dB	
High	High	High	High	High	Reference I.L.
High	High	High	High	Low	0.25 dB
High	High	High	Low	High	0.5 dB
High	High	Low	High	High	1 dB
High	Low	High	High	High	2 dB
Low	High	High	High	High	4 dB
Low	Low	Low	Low	Low	7.75 dB


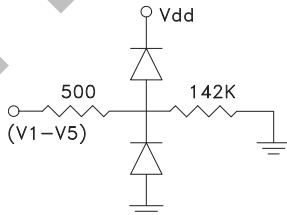

Any combination of the above states will provide an attenuation approximately equal to the sum of the bits selected.



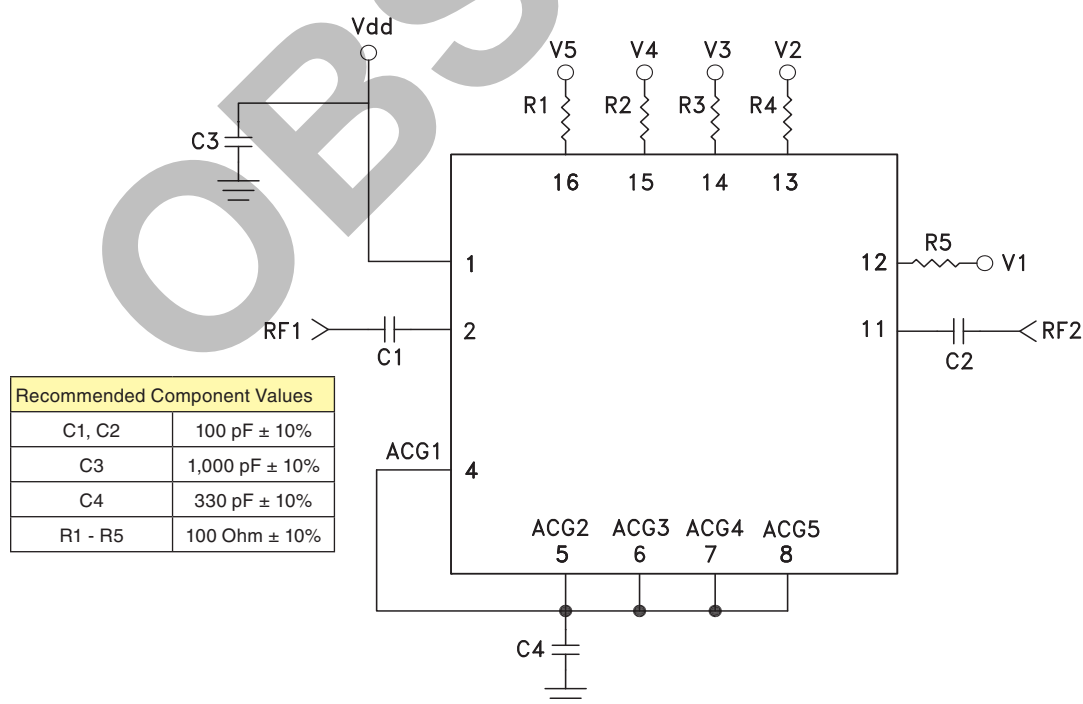
HMC539LP3 / 539LP3E

0.25 dB LSB GaAs MMIC 5-BIT DIGITAL POSITIVE CONTROL ATTENUATOR, DC - 4 GHz

Pin Descriptions

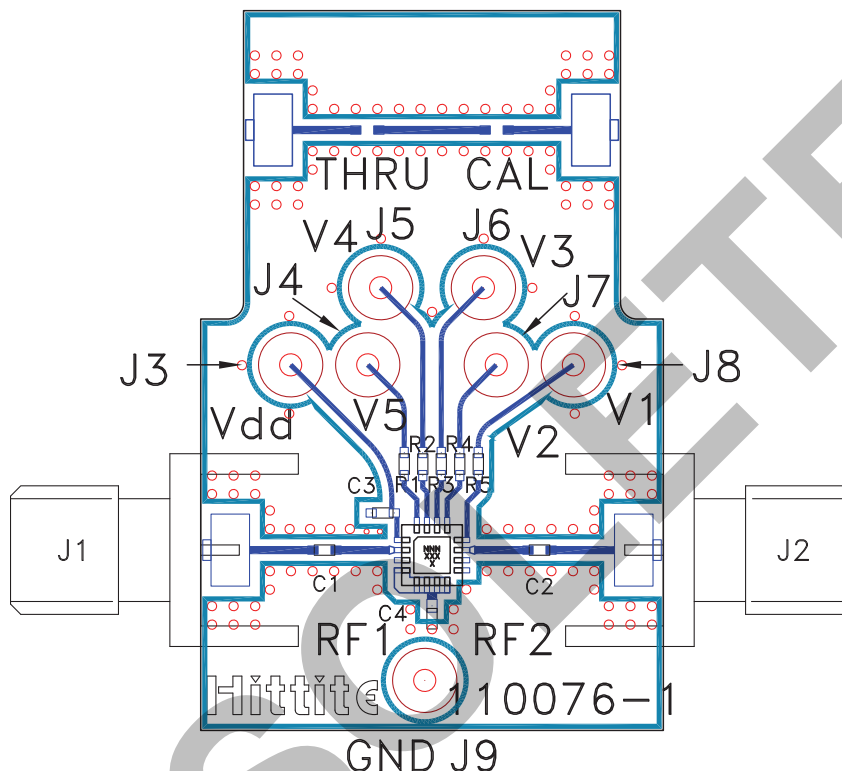
Pin Number	Function	Description	Interface Schematic
1	Vdd	Supply Voltage.	
2, 11	RF1, RF2	This pin is DC coupled and matched to 50 Ohm. Blocking capacitors are required. Select value based on lowest frequency of operation.	
3, 9, 10	N/C	These pins should be connected to PCB RF ground to maximize performance.	
4 - 8	ACG1 - ACG5	External capacitor to ground is required. Select value for lowest frequency of operation. Place capacitor as close to pins as possible.	
12 - 16	V1 - V5	See truth table and control voltage table.	
	GND	Package bottom has an exposed metal paddle that must be connected to RF Ground.	

Application Circuit



For price, delivery, and to place orders, please contact Hittite Microwave Corporation:
 20 Alpha Road, Chelmsford, MA 01824 Phone: 978-250-3343 Fax: 978-250-3373
 Order On-line at www.hittite.com

Evaluation PCB



List of Materials for Evaluation PCB 110078 [1]

Item	Description
J1 - J2	PCB Mount SMA Connector
J3 - J9	DC Pin
C1, C2	100 pF Capacitor, 0402 Pkg.
C3	1000 pF Capacitor, 0402 Pkg.
C4	330 pF Capacitor, 0402 Pkg.
R1 - R5	100 Ohm Resistor 0402
U1	HMC539LP3 / HMC539LP3E Digital Attenuator
PCB [2]	110076 Evaluation PCB

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350

The circuit board used in the final application should use RF circuit design techniques. Signal lines should have 50 ohm impedance while the package ground leads and exposed paddle should be connected directly to the ground plane similar to that shown. A sufficient number of via holes should be used to connect the top and bottom ground planes. The evaluation circuit board shown is available from Hittite upon request.