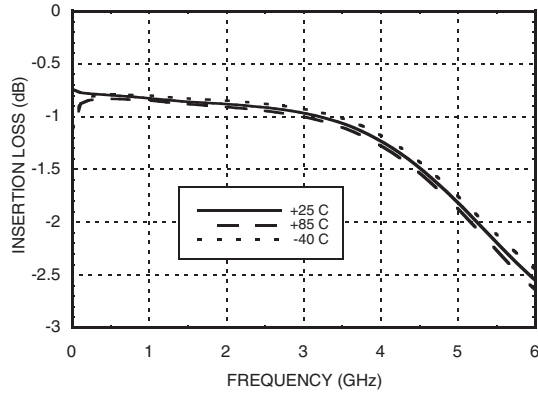
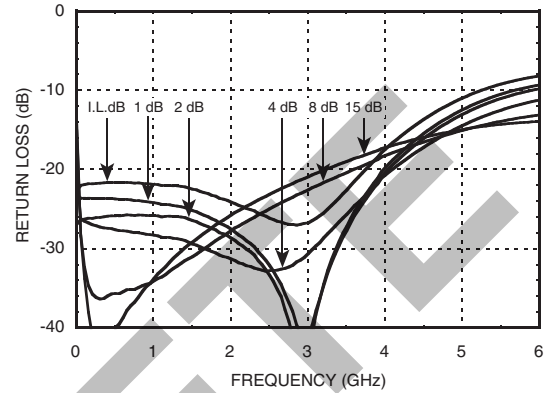


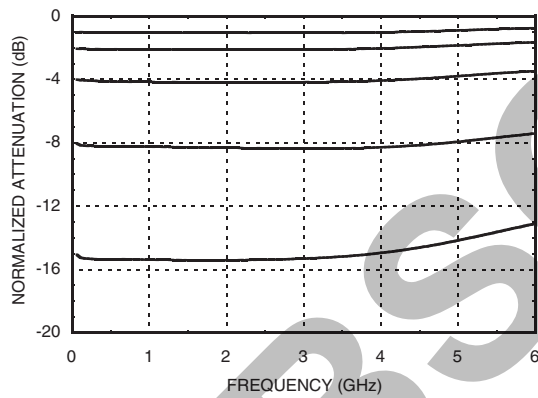
### Insertion Loss



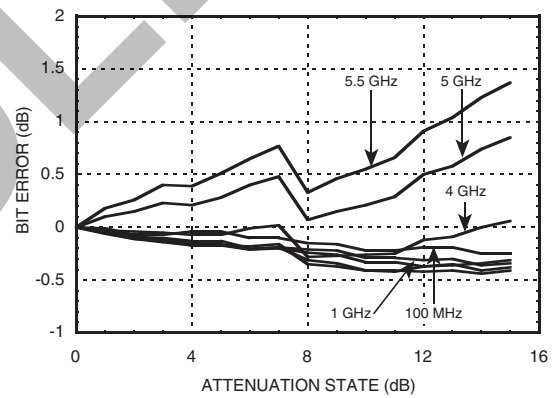
### Return Loss RF1, RF2 (Only Major States are Shown)



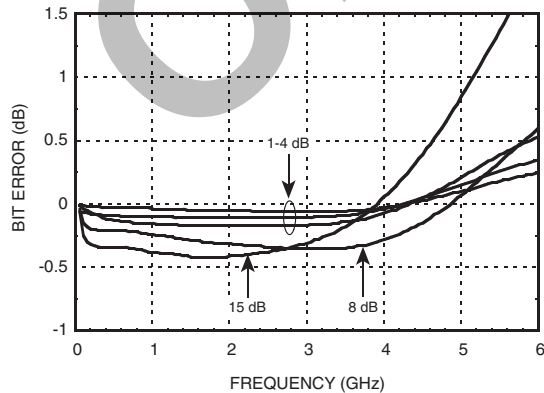
### Normalized Attenuation (Only Major States are Shown)



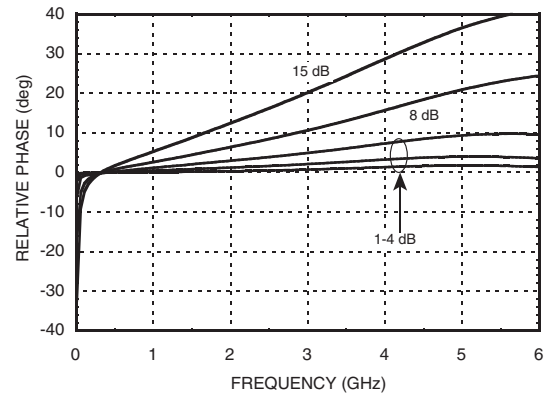
### Bit Error vs. Attenuation State



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



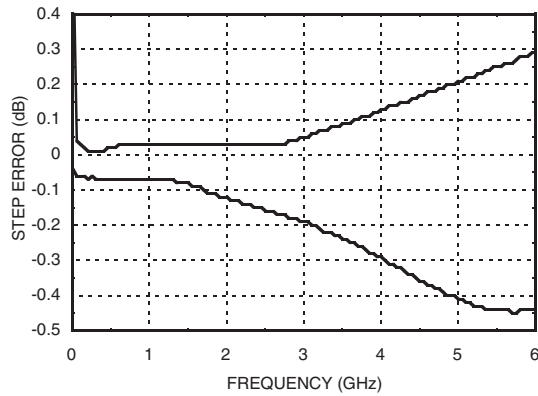
### Relative Phase vs. Frequency (Only Major States are Shown)



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### Worst Case Step Error Between Successive Attenuation States



### Bias Voltage & Current

Vdd = +5.0 Vdc ± 10%	
Vdd (VDC)	Idd (Typ.) (mA)
+4.5	3.0
+5.0	3.2
+5.5	3.4

### Control Voltage

State	Bias Condition
Low	0 to +0.8V @ -5 uA Typ.
High	+2.0 to + 5.0 Vdc @ 40 uA Typ.

Note: Vdd = +5V

### Truth Table

Control Voltage Input				Attenuation State RF1 - RF2
V1 8 dB	V2 4 dB	V3 2 dB	V4 1 dB	
High	High	High	High	Reference I.L.
High	High	High	Low	1 dB
High	High	Low	High	2 dB
High	Low	High	High	4 dB
Low	High	High	High	8 dB
Low	Low	Low	Low	15 dB

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

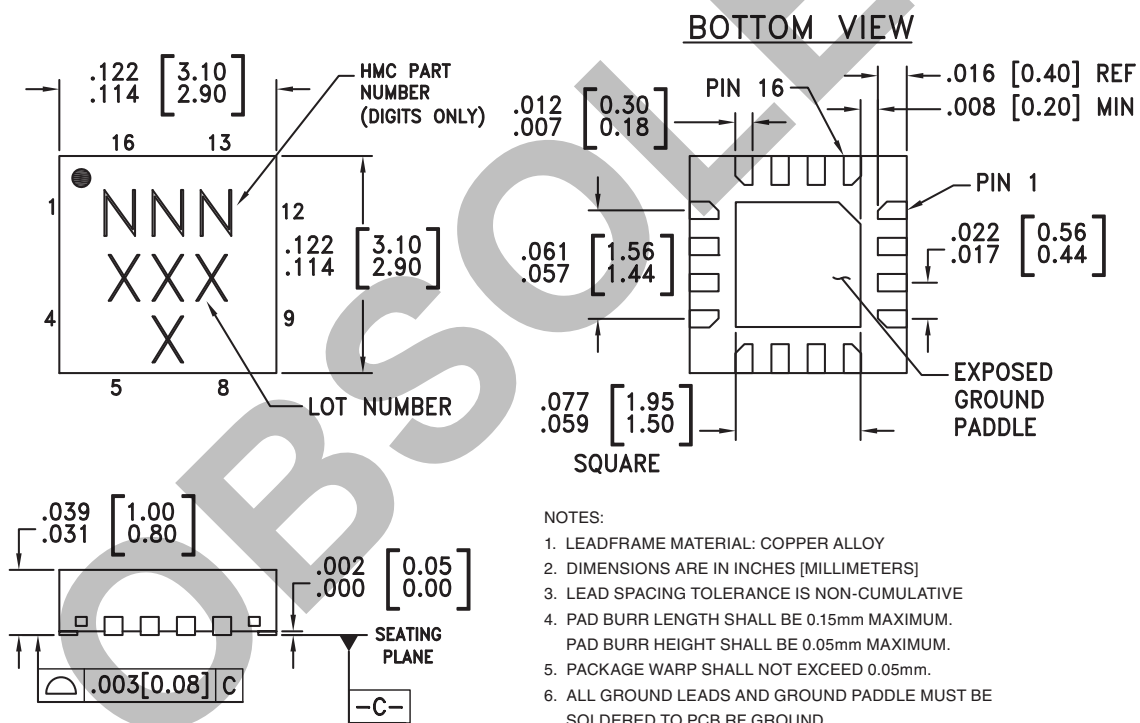
### Absolute Maximum Ratings

RF Input Power (DC - 5.5 GHz)	+29 dBm (T = +85 °C)
Control Voltage Range (V1 to V4)	-1V to Vdd +1V
Bias Voltage (Vdd)	+7.0 Vdc
Channel Temperature	150 °C
Continuous P <sub>diss</sub> (T = 85 °C) (derate 11.7 mW/°C above 85 °C)	0.769 W
Thermal Resistance	85 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C



ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS

### Outline Drawing



### Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking <sup>[3]</sup>
HMC540LP3	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 <sup>[1]</sup>	540 XXXX
HMC540LP3E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 <sup>[2]</sup>	540 XXXX

[1] Max peak reflow temperature of 235 °C

[2] Max peak reflow temperature of 260 °C

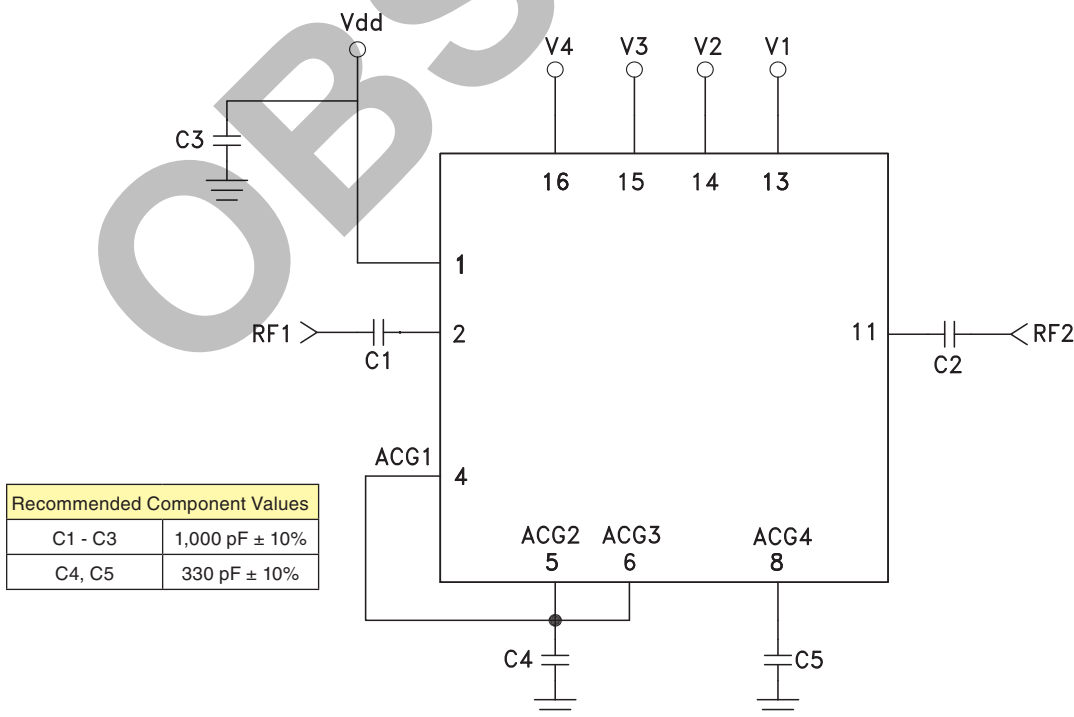
[3] 4-Digit lot number XXXX

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### 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, 7, 9, 10, 12	N/C	These pins should be connected to PCB RF ground to maximize performance.	
4 - 6, 8	ACG1 - ACG4	External capacitor to ground is required. Select value for lowest frequency of operation. Place capacitor as close to pins as possible.	
13 - 16	V1 - V4	See truth table and control voltage table.	
	GND	Package bottom has an exposed metal paddle that must be connected to RF/DC Ground.	

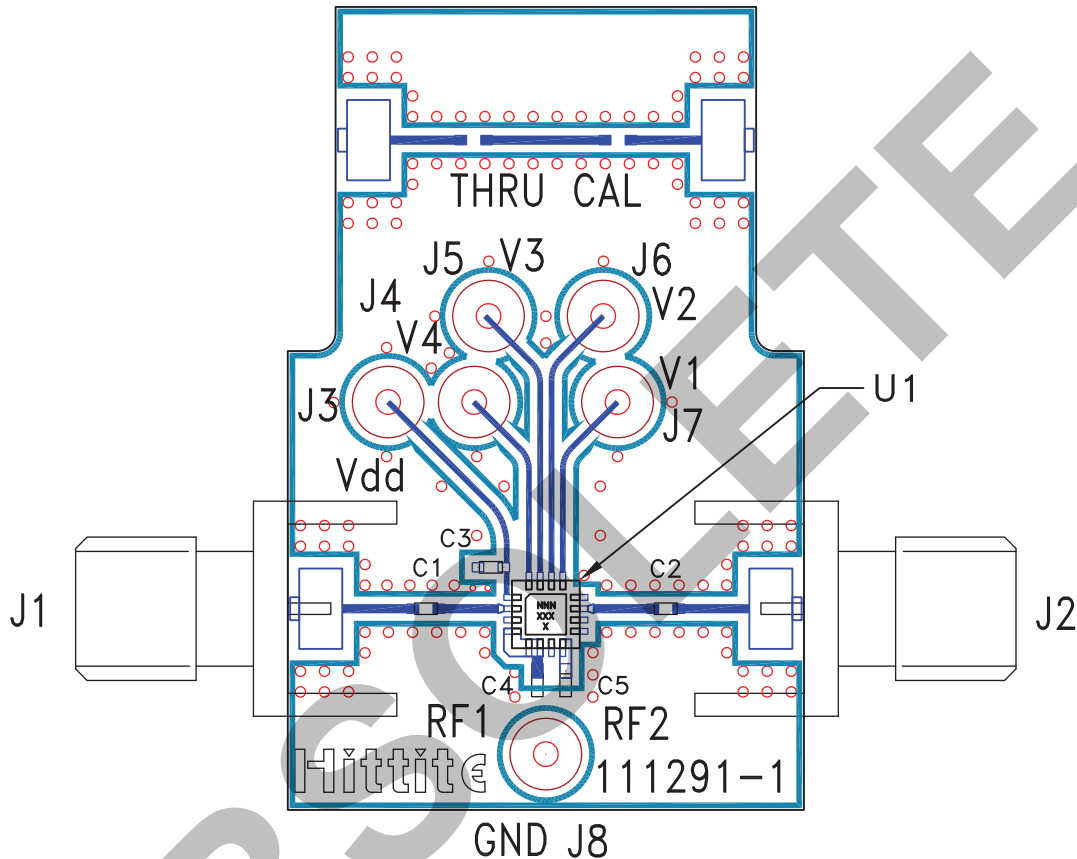
### Application Circuit



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**Evaluation PCB**



**List of Materials for Evaluation PCB 111315 [1]**

Item	Description
J1 - J2	PCB Mount SMA Connector
J3 - J8	DC Pin
C1 - C3	1000 pF Capacitor, 0402 Pkg.
C4, C5	330 pF Capacitor, 0402 Pkg.
U1	HMC540LP3 / HMC540LP3E Digital Attenuator
PCB [2]	111291 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.