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Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

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Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





# HMC812\* PRODUCT PAGE QUICK LINKS

Last Content Update: 02/23/2017

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## COMPARABLE PARTS

View a parametric search of comparable parts.

## EVALUATION KITS

- HMC812LC4 Evaluation Board

## DOCUMENTATION

### Data Sheet

- HMC812 Data Sheet

## TOOLS AND SIMULATIONS

- HMC812 S-Parameter

## REFERENCE MATERIALS

### Quality Documentation

- Package/Assembly Qualification Test Report: LC4, LC4B (QTR: 2014-00380 REV: 01)

## DESIGN RESOURCES

- HMC812 Material Declaration
- PCN-PDN Information
- Quality And Reliability
- Symbols and Footprints

## DISCUSSIONS

View all HMC812 EngineerZone Discussions.

## SAMPLE AND BUY

Visit the product page to see pricing options.

## TECHNICAL SUPPORT

Submit a technical question or find your regional support number.

## DOCUMENT FEEDBACK

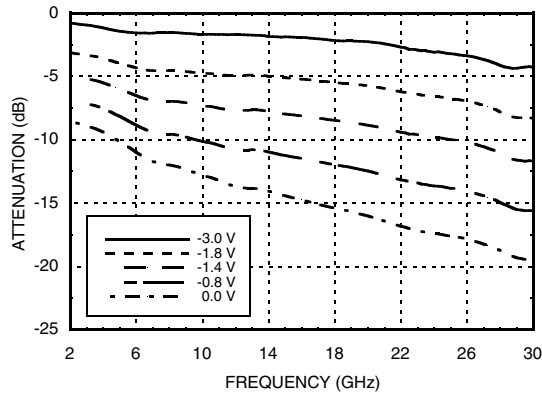
Submit feedback for this data sheet.

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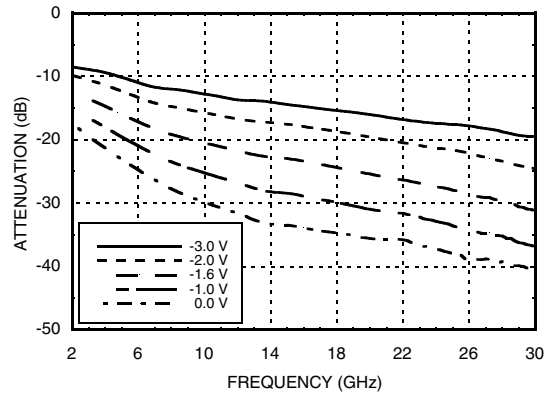


**GaAs MMIC VOLTAGE-VARIABLE  
ATTENUATOR, 5 - 30 GHz**

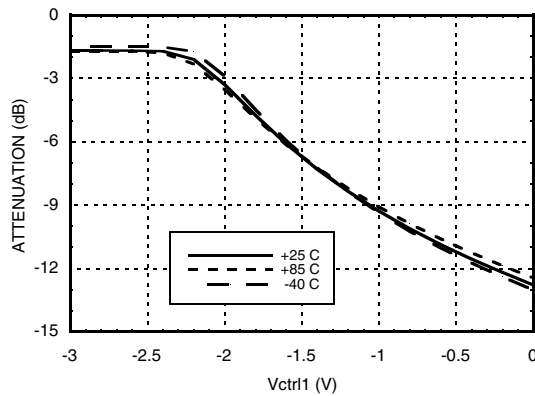
**Attenuation vs. Frequency over Vctrl1**  
Vctrl1 = Variable, Vctrl2 = -3V



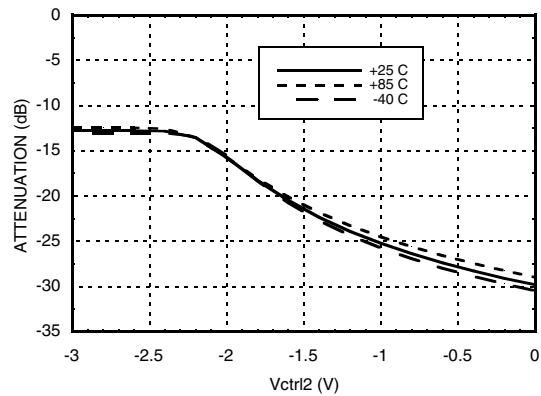
**Attenuation vs. Frequency over Vctrl1**  
Vctrl1 = 0V, Vctrl2 = Variable



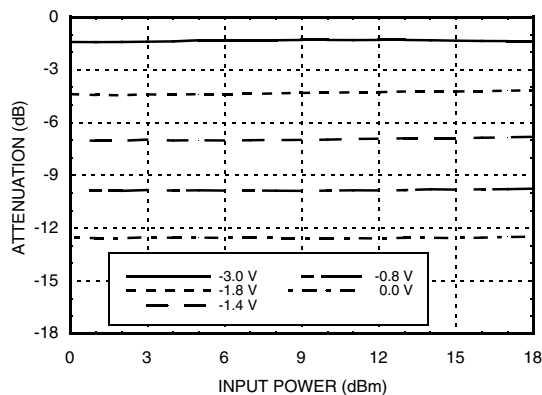
**Attenuation vs. Vctrl1**  
Over Temperature @ 10 GHz, Vctrl2 = -3V



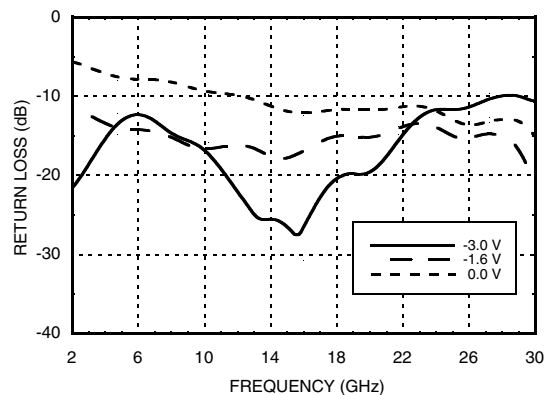
**Attenuation vs. Vctrl2**  
Over Temperature @ 10 GHz, Vctrl1 = 0V



**Attenuation vs. Pin @ 10 GHz**  
Vctrl1 = Variable, Vctrl2 = -3V



**Input Return Loss**  
Vctrl1 = Variable, Vctrl2 = -3V

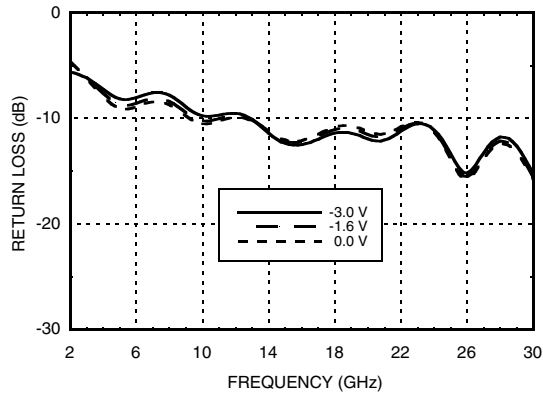




**GaAs MMIC VOLTAGE-VARIABLE ATTENUATOR, 5 - 30 GHz**

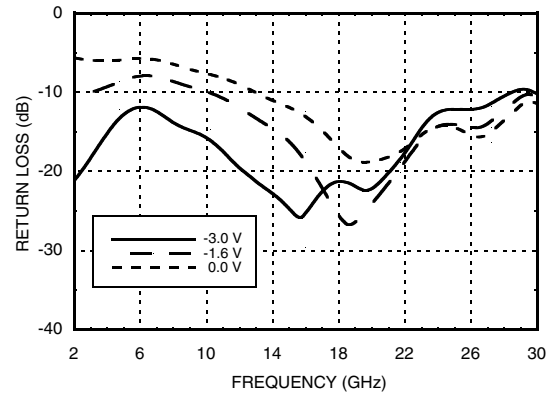
**Input Return Loss**

**Vctrl1 = 0V, Vctrl2 = Variable**



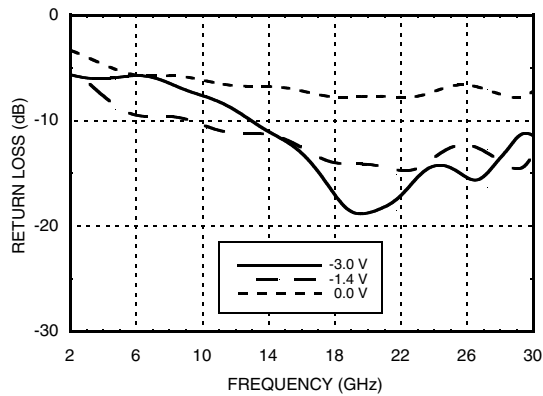
**Output Return Loss**

**Vctrl1 = Variable, Vctrl2 = -3V**



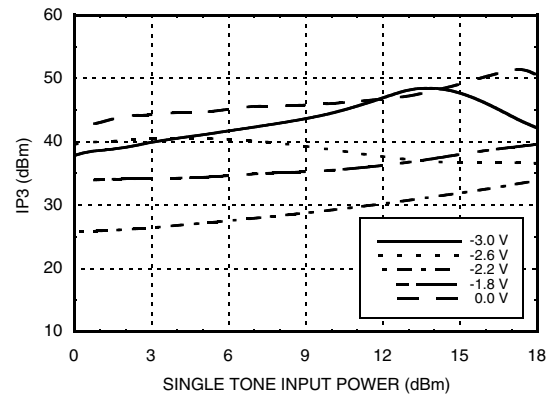
**Output Return Loss**

**Vctrl1 = 0V, Vctrl2 = Variable**

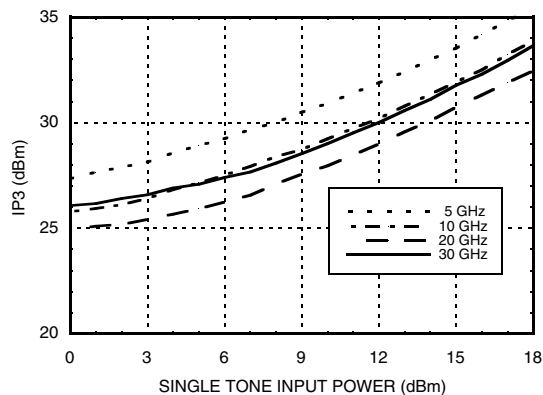


**Input IP3 vs Input Power @ 10 GHz**

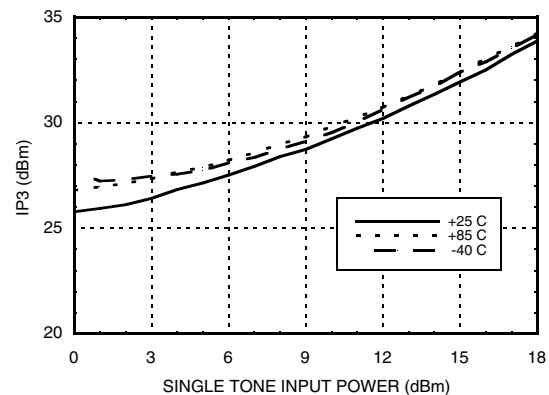
**Vctrl1 = Variable, Vctrl2 = -3V**



**Input IP3 vs. Input Power Over Frequency**  
**Vctrl1 = -2.2V, Vctrl2 = -3V (Worst Case IP3)**



**Input IP3 vs. Input Power Over Temperature**  
**@ 10 GHz, Vctrl1 = -2.2V, Vctrl2 = -3V**



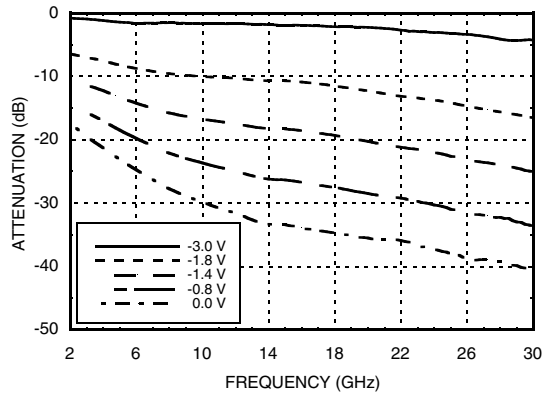
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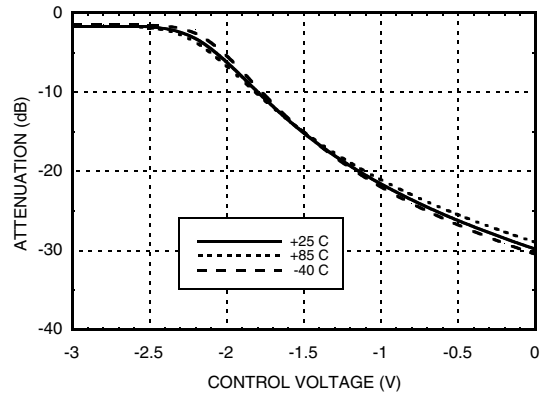


**GaAs MMIC VOLTAGE-VARIABLE ATTENUATOR, 5 - 30 GHz**

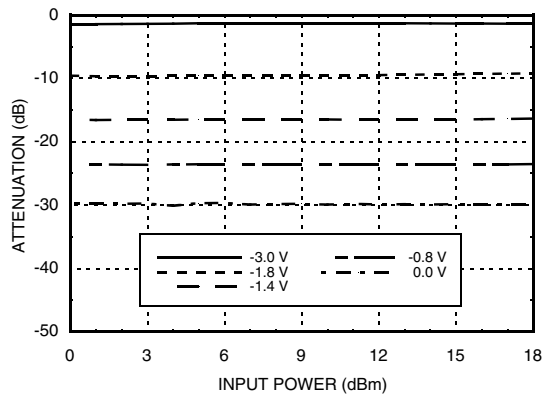
**Attenuation vs. Frequency over Vctrl**  
Vctrl1 = Vctrl2



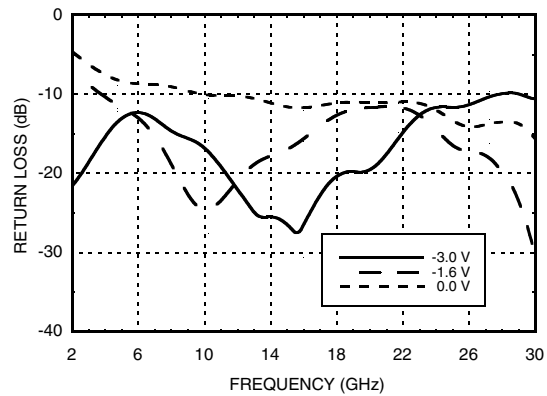
**Attenuation vs. Vctrl over Temperature**  
@ 10 GHz, Vctrl1 = Vctrl2



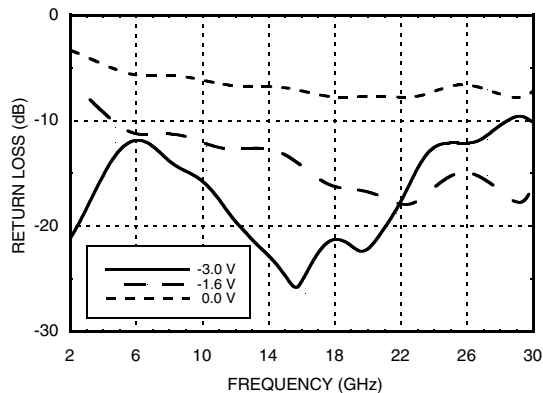
**Attenuation vs. Input Power over Vctrl**  
Vctrl1 = Vctrl2



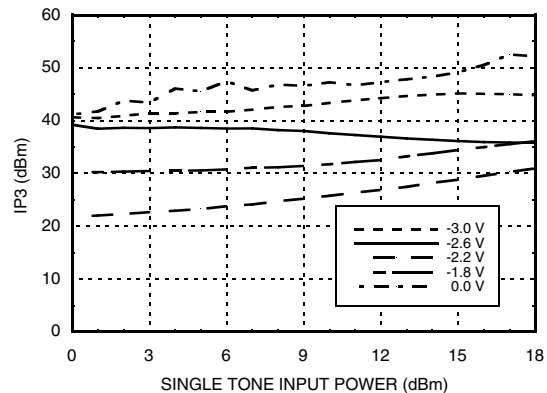
**Input Return Loss, Vctrl1 = Vctrl2**



**Output Return Loss, Vctrl1 = Vctrl2**



**Input IP3 vs. Input Power Over Vctrl @ 10 GHz, Vctrl1 = Vctrl2**



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## GaAs MMIC VOLTAGE-VARIABLE ATTENUATOR, 5 - 30 GHz

### Absolute Maximum Ratings

RF Input Power	+30 dBm
Control Voltage Range	+1 to -5V
Channel Temperature	150 °C
Continuous P <sub>diss</sub> (T = 85 °C) (derate 16.4 mW/°C above 85 °C)	1.07 W
Thermal Resistance (Channel to ground paddle)	61 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

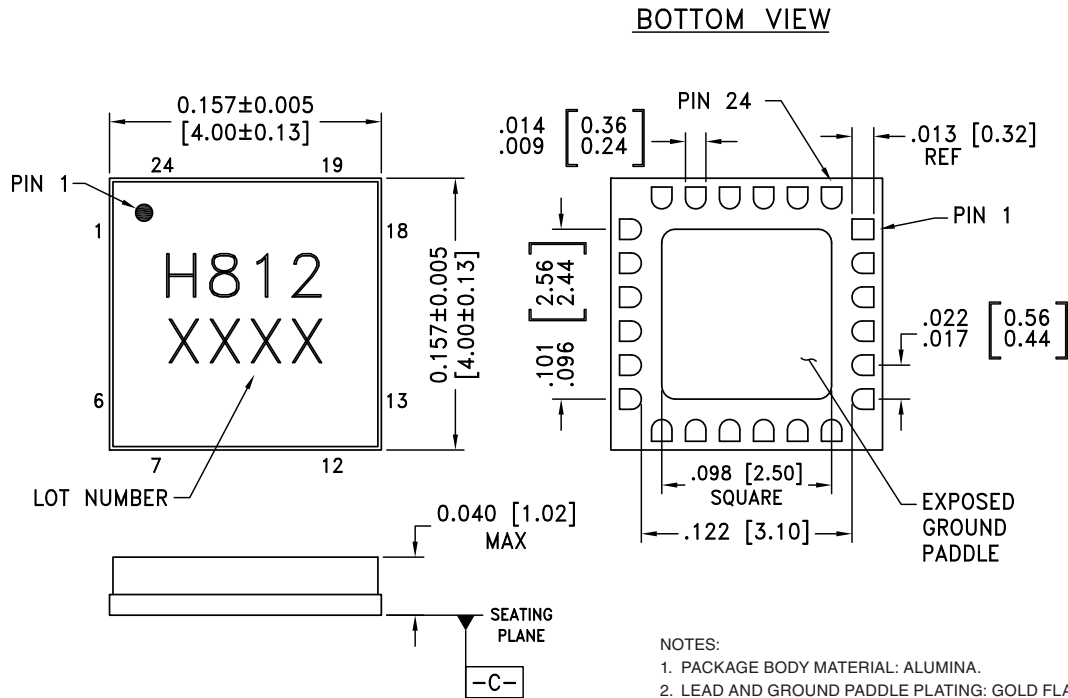
### Control Voltages

V <sub>ctrl1</sub>	-3 to 0V @ 10 μA
V <sub>ctrl2</sub>	-3 to 0V @ 10 μA



ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS

### Outline Drawing



NOTES:

1. PACKAGE BODY MATERIAL: ALUMINA.
2. LEAD AND GROUND PADDLE PLATING: GOLD FLASH OVER NICKEL.
3. DIMENSIONS ARE IN INCHES (MILLIMETERS).
4. LEAD SPACING TOLERANCE IS NON-CUMULATIVE.
5. PACKAGE WARP SHALL NOT EXCEED 0.05MM DATUM  $\square-C-$
6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.


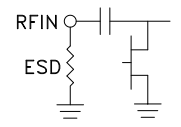
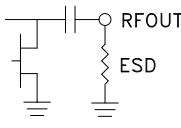
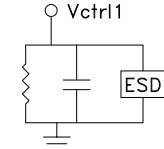
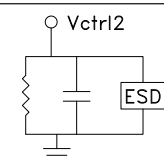
### Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking <sup>[2]</sup>
HMC812LC4	Alumina, White	Gold over Nickel	MSL3 <sup>[1]</sup>	H812 XXXX

[1] Max peak reflow temperature of 260 °C

[2] 4-Digit lot number XXXX


**GaAs MMIC VOLTAGE-VARIABLE  
ATTENUATOR, 5 - 30 GHz**
**Pin Descriptions**

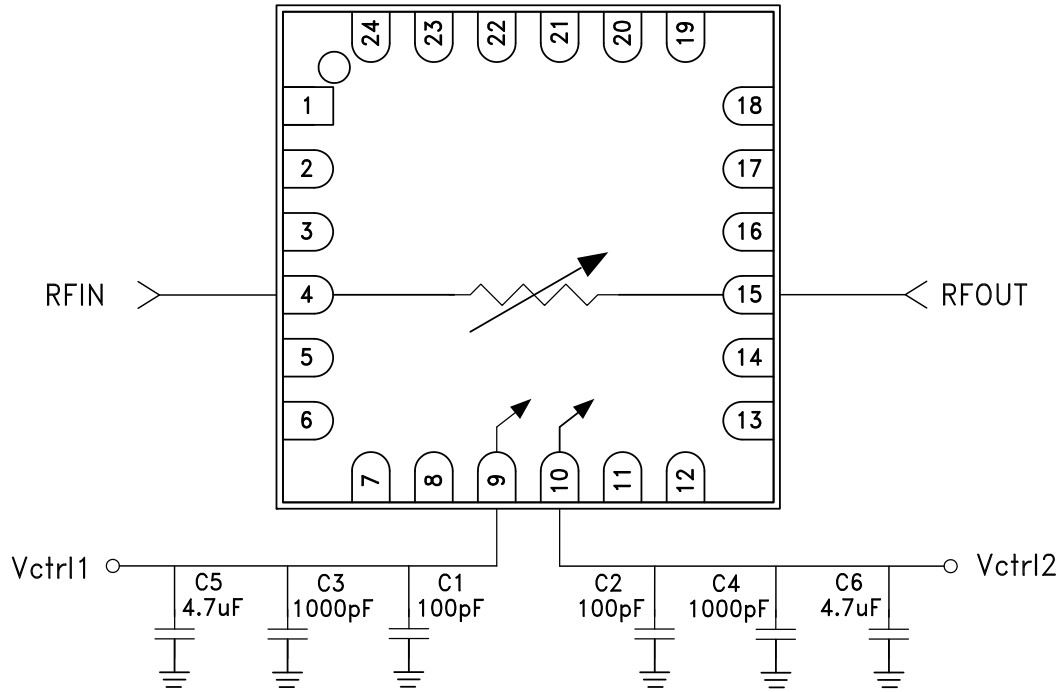
Pin Number	Function	Description	Interface Schematic
1, 2, 6 - 8, 11 - 13, 17 - 24	N/C	These pins are not connected internally, however these pins must be connected to RF/DC ground externally.	
3, 5, 14, 16	GND	These pins and the exposed ground paddle must be connected to RF/DC ground.	
4	RFIN	This pad is DC coupled and matched to 50 Ohms. A blocking capacitor is required if RF line potential is not equal to 0V.	
15	RFOUT		
9	Vctrl1	Control Voltage 1	
10	Vctrl2	Control Voltage 2	





**GaAs MMIC VOLTAGE-VARIABLE  
ATTENUATOR, 5 - 30 GHz**

**Application Circuit**



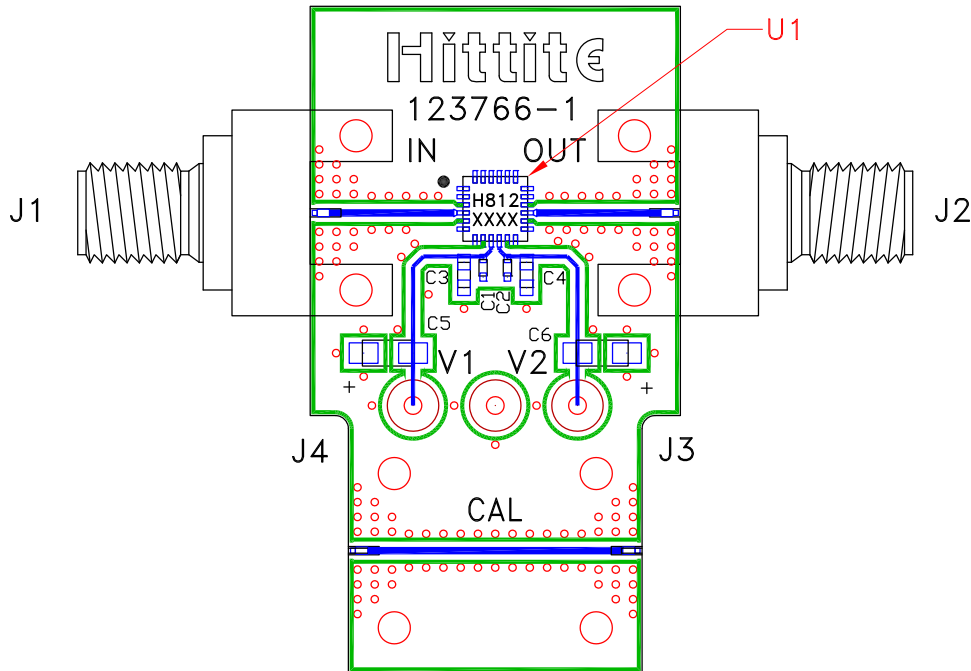
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**GaAs MMIC VOLTAGE-VARIABLE  
ATTENUATOR, 5 - 30 GHz**

**Evaluation PCB**



**List of Materials for Evaluation PCB 123768 [1]**

Item	Description
J1, J2	2.9 mm PC Mount RF Connector
J3, J4	DC Pin
C1, C2	100 pF Capacitor, 0402 Pkg.
C3, C4	1000 pF Capacitor, 0402 Pkg.
C5, C6	4.7 μF Capacitor, CASE A
U1	HMC812LC4 Analog VVA
PCB [2]	123766 Evaluation PCB

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Arlon 25FR or 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.