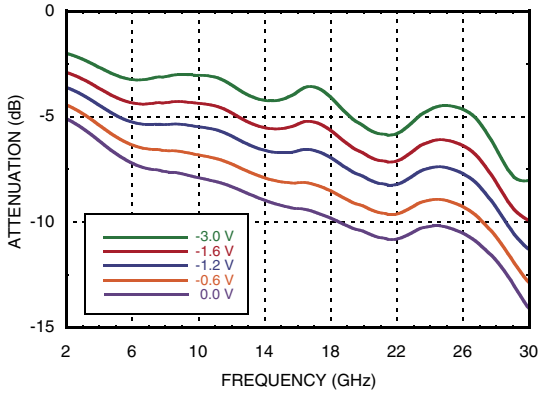
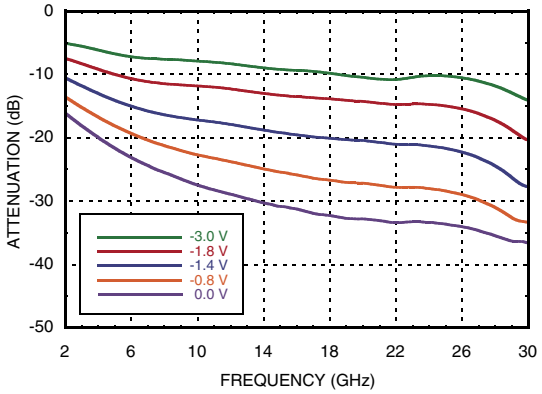
GaAs MMIC VOLTAGE-VARIABLE ATTENUATOR, 5 - 26.5 GHz

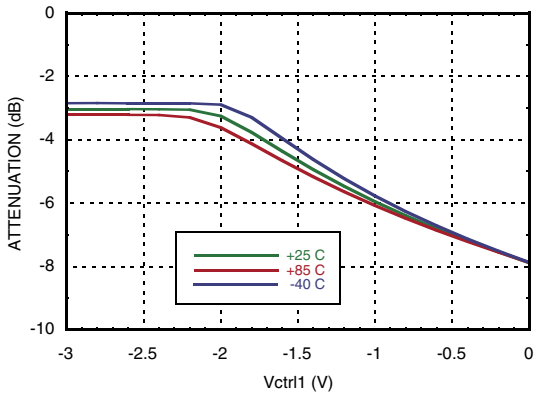
Attenuation vs. Frequency over Vctrl1 = Variable, Vctrl2 = -3V



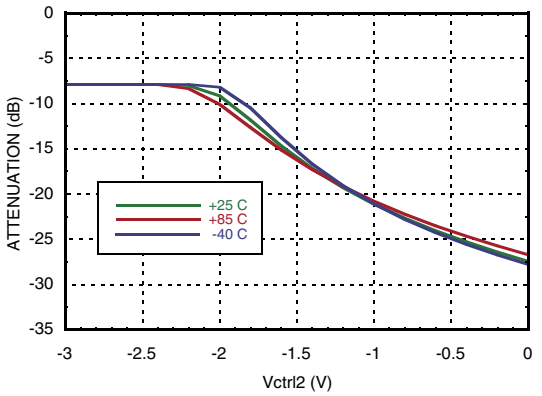
Attenuation vs. Frequency over Vctrl1 = 0V, Vctrl2 = Variable



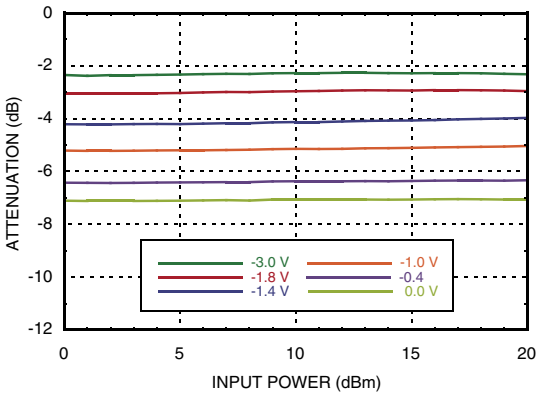
Attenuation vs. Vctrl1 Over Temperature @ 10 GHz, Vctrl2 = -3V



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



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



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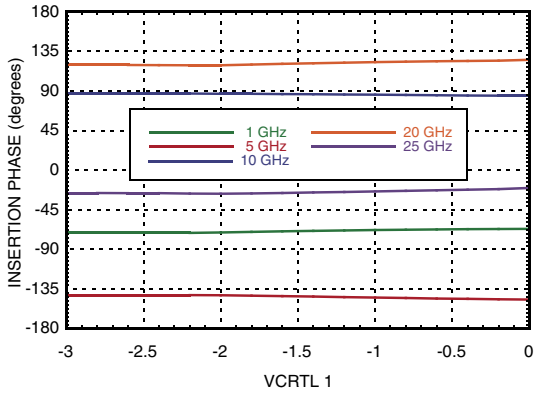
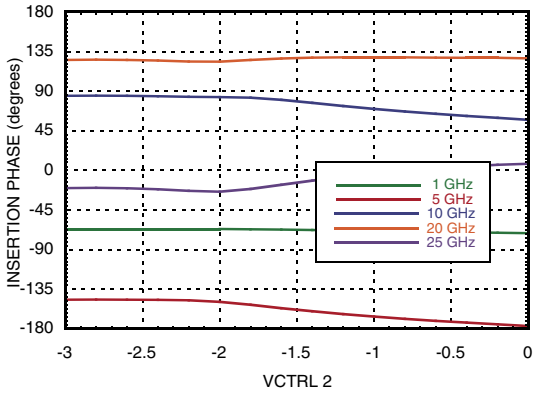
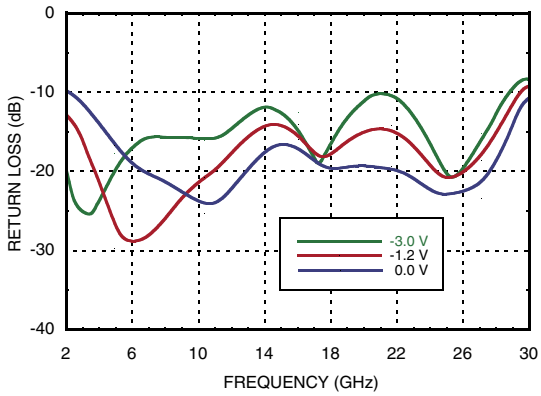
Insertion Phase vs. Vctrl1, Vctrl2 = -3V



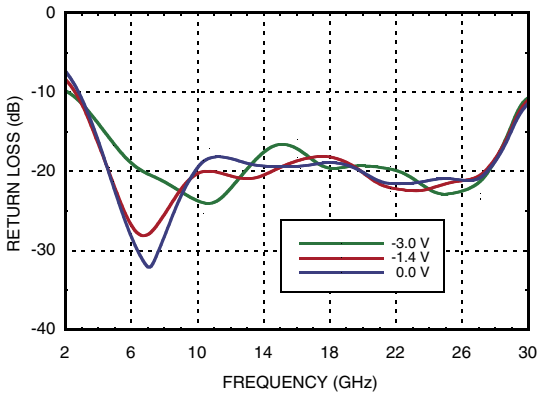
Insertion Phase vs. Vctrl2, Vctrl1 = 0V



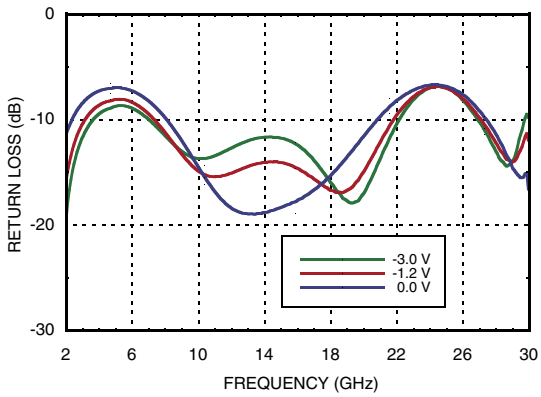
Input Return Loss
Vctrl1 = Variable, Vctrl2 = -3V



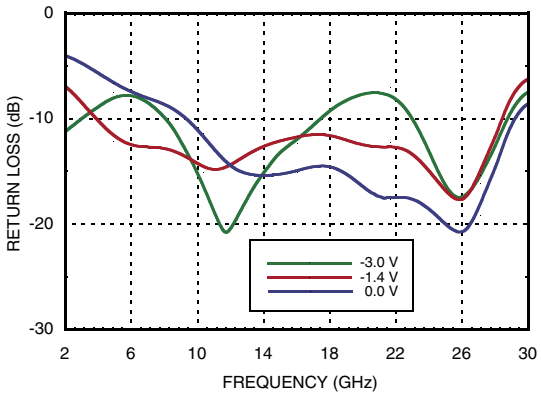
Input Return Loss
Vctrl1 = 0V, Vctrl2 = Variable



Output Return Loss
Vctrl1 = Variable, Vctrl2 = -3V



Output Return Loss
Vctrl1 = 0V, Vctrl2 = Variable



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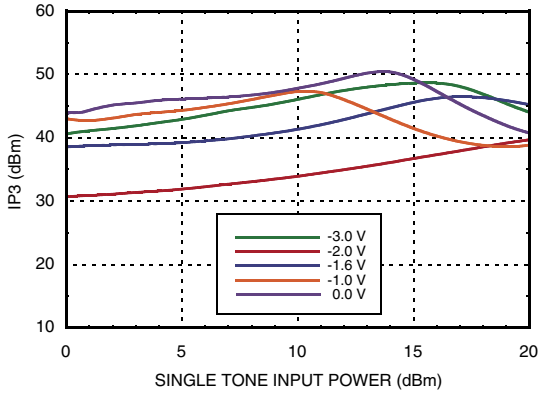
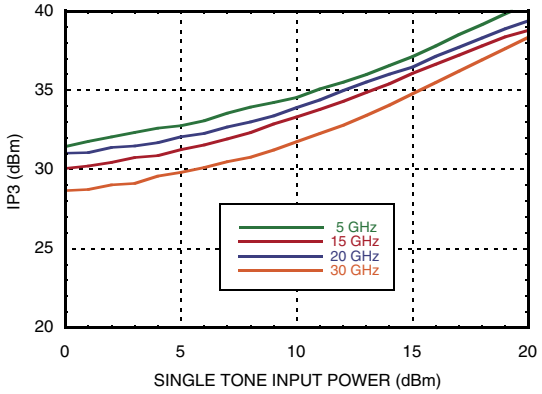
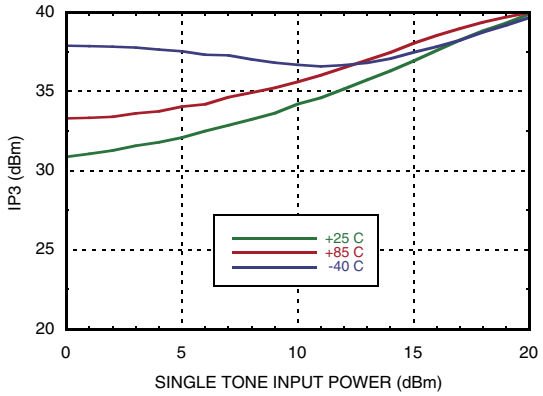
Input IP3 vs Input Power @ 10 GHz Vctrl1 = Variable, Vctrl2 = -3V



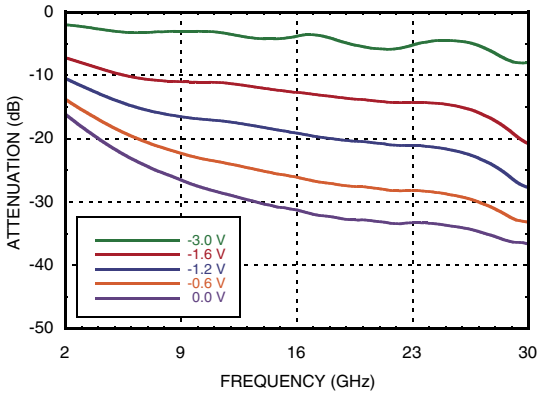
Input IP3 vs. Input Power Over Frequency Vctrl1 = -2.0V, Vctrl2 = -3V (Worst Case IP3)



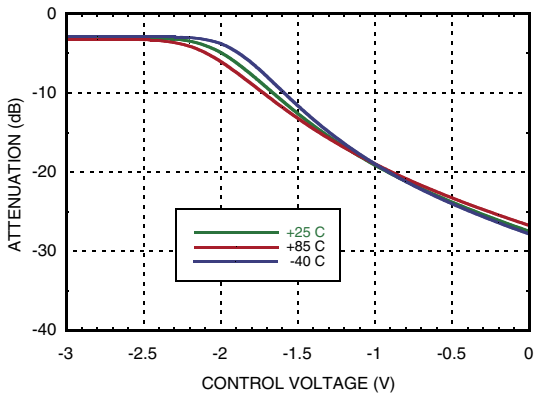
Input IP3 vs. Input Power Over Temperature @ 10 GHz, Vctrl1 = -2.0V, Vctrl2 = -3V



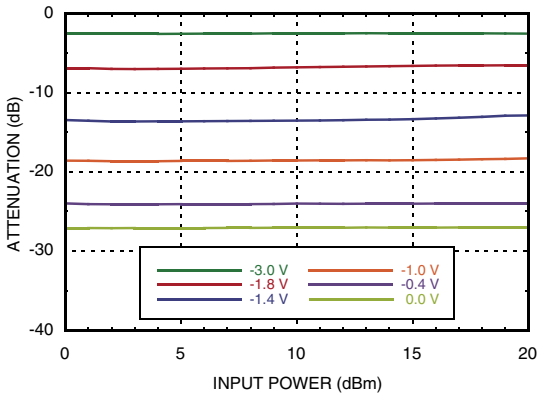
Attenuation vs. Frequency over Vctrl Vctrl1 = Vctrl2



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



Attenuation vs. Input Power over Vctrl Vctrl1 = Vctrl2



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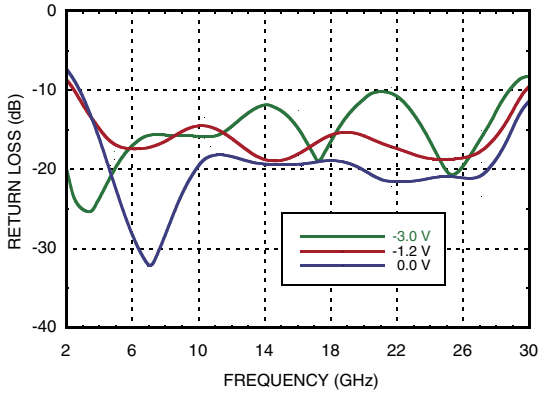
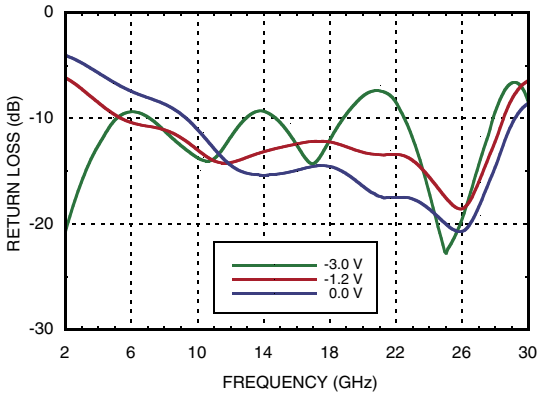
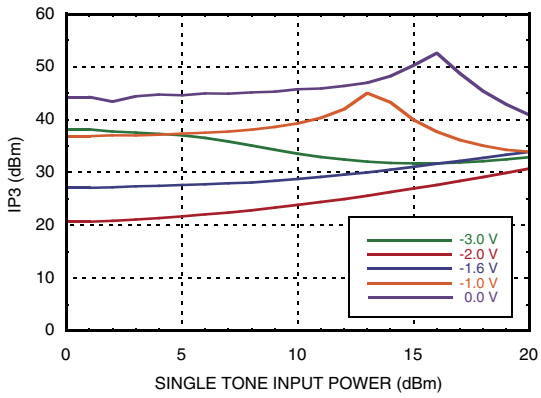
Input Return Loss, Vctrl1 = Vctrl2



Output Return Loss, Vctrl1 = Vctrl2



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



Absolute Maximum Ratings

RF Input Power	+30 dBm
Control Voltage Range	+1 to -5V
Channel Temperature	150 °C
Continuous Pdiss (T = 85 °C)	1W
Thermal Resistance (Channel to ground paddle)	66 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
ESD Sensitivity (HBM)	Class 1A

Control Voltages

Vctrl1	-3 to 0V @ 10 µA
Vctrl2	-3 to 0V @ 10 µA

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

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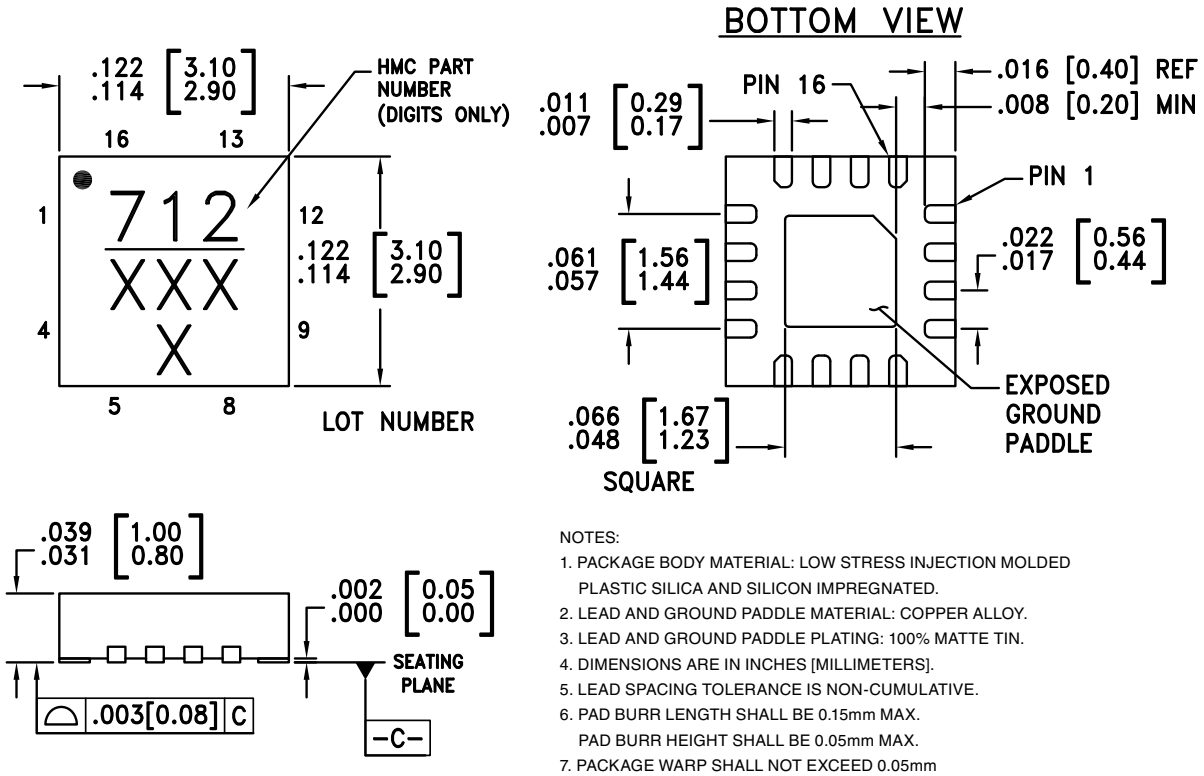
Outline Drawing



NOTES:

1. PACKAGE BODY MATERIAL: LOW STRESS INJECTION MOLDED PLASTIC SILICA AND SILICON IMPREGNATED.
2. LEAD AND GROUND PADDLE MATERIAL: COPPER ALLOY.
3. LEAD AND GROUND PADDLE PLATING: 100% MATTE TIN.
4. DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. LEAD SPACING TOLERANCE IS NON-CUMULATIVE.
6. PAD BURR LENGTH SHALL BE 0.15mm MAX. PAD BURR HEIGHT SHALL BE 0.05mm MAX.
7. PACKAGE WARP SHALL NOT EXCEED 0.05mm
8. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.
9. REFER TO HITTITE APPLICATION NOTE FOR SUGGESTED PCB LAND PATTERN.

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [1]
HMC712LP3CE	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 [2]	H712 XXXX

[1] 4-Digit lot number XXXX

[2] Max peak reflow temperature of 260 °C

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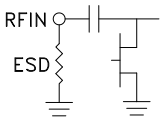
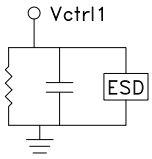
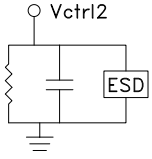
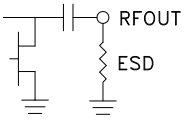
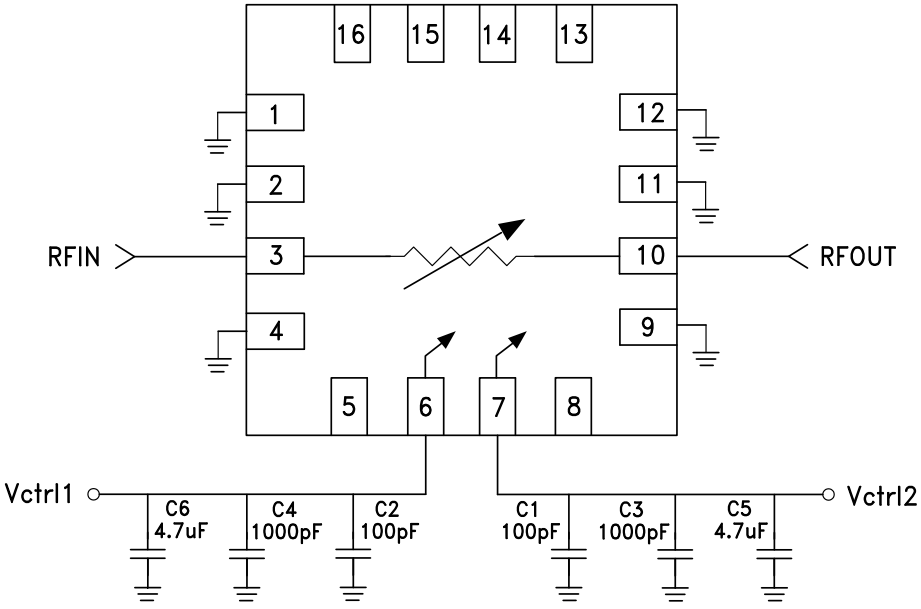
Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1, 2, 4, 9, 11, 12 Ground Paddle	GND	Ground paddle must be connected to RF/DC ground.	
3	RFIN	This pin is DC coupled and matched to 50 Ohms. A blocking capacitor is required if RF line potential is not equal to 0V.	
5, 8, 13 - 16	N/C	These pins should be connected to PCB RF ground to maximize performance.	
6	Vctrl1	Control Voltage 1	
7	Vctrl2	Control Voltage 2	
10	RFOUT	This pin is DC coupled and matched to 50 Ohms. A blocking capacitor is required if RF line potential is not equal to 0V.	

Application Circuit



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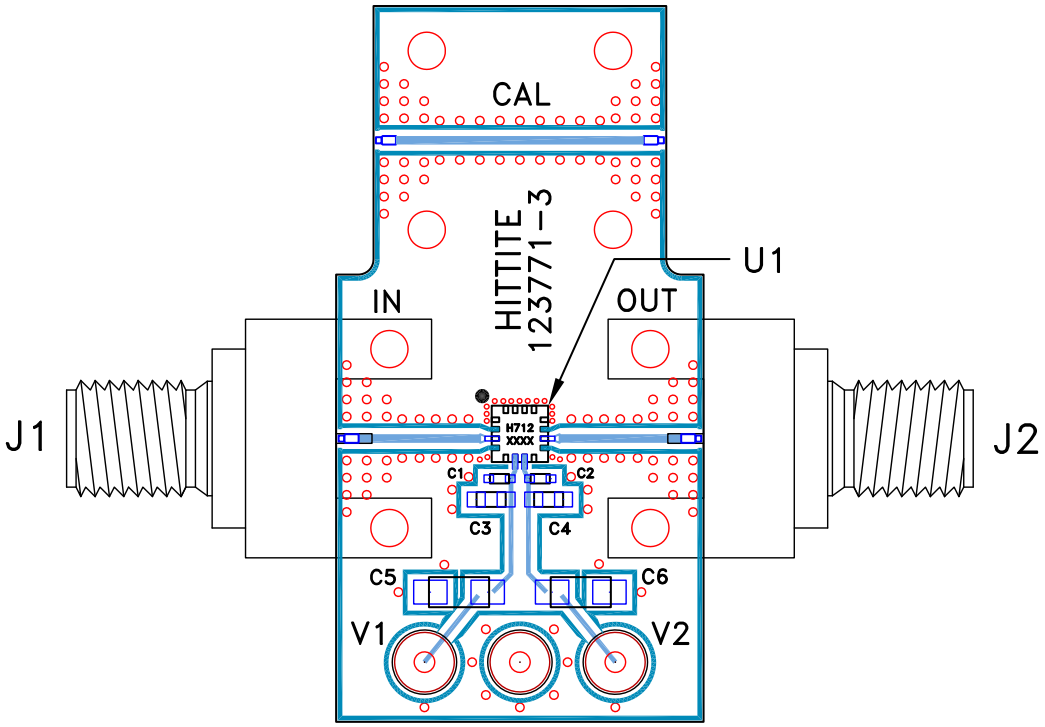
Evaluation PCB



List of Materials for Evaluation PCB 123773 [1]

Item	Description
J1, J2	PCB Mount SMA RF Connector
C1, C2	100 pF Capacitor, 0402 Pkg.
C3, C4	1000 pF Capacitor, 0603 Pkg.
C5, C6	4.7 µF Capacitor, Tantalum
V1, V2	DC Pin
U1	HMC712LP3CE Voltage Variable Attenuator
PCB [2]	123771 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.

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