HMC536LP2 / 536LP2E

v02.0409

GaAs MMIC POSITIVE CONTROL T/R SWITCH, DC - 6 GHz

Typical Applications

The HMC536LP2(E) is ideal for:

- Cellular/PCS/3G Infrastructure
- WiMAX, WiBro & Fixed Wireless
- CATV/CMTS
- Test Instrumentation

Features

Input P0.1dB: +33 dBm @ +5V

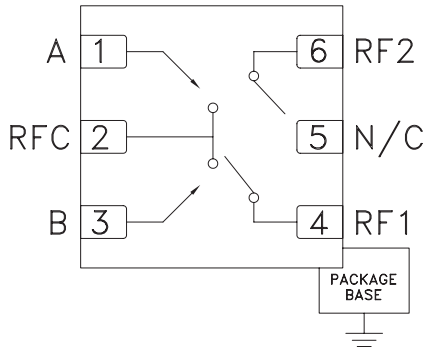
Insertion Loss: 0.6 dB

Positive Control: +3V or +5V

Isolation: 27 dB

2x2 mm Leadless DFN SMT Package, 4 mm^2

Functional Diagram



General Description

The HMC536LP2(E) is a DC to 6 GHz GaAs MMIC T/R switch in leadless 2x2 mm DFN LP2 surface mount packages with an exposed ground paddle. The switch is ideal for cellular, WiMAX, & WiBro access point and subscriber applications featuring low 0.6 dB insertion loss and high +54 dBm input IP3. Power handling is excellent up through 6 GHz with the switch offering a P0.1dB compression point of +29 dBm at +3V and +33 dBm at +5V control. On-chip circuitry allows positive voltage control of 0/+3V or 0/+5V at very low DC currents. The HMC536LP2(E) occupy only 4 mm^2 and are ideal for applications where small size is required.

Electrical Specifications, T_A = +25° C, Vctl = 0/+3 Vdc to +5 Vdc, 50 Ohm System

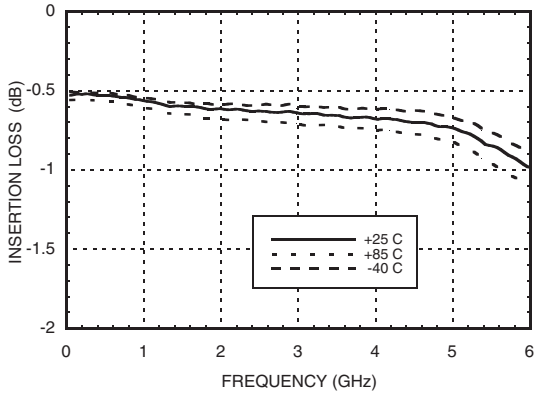
Parameter		Frequency	Min.	Typ.	Max.	Units
Insertion Loss		DC - 3.0 GHz DC - 4.5 GHz DC - 6.0 GHz		0.6 0.7 1.0	0.9 1.0 1.3	dB dB dB
Isolation (RFC to RF1/RF2)		DC - 4.0 GHz 4.0 - 5.0 GHz 5.0 - 6.0 GHz	23 26 24	27 30 29		dB dB dB
Return Loss		DC - 3.0 GHz 3.0 - 4.0 GHz 4.0 - 6.0 GHz		20 20 12		dB dB dB
Input Power for 0.1 dB Compression	(Vctl = 3V) (Vctl = 5V)	0.5 - 6.0 GHz 0.5 - 6.0 GHz	27 31	29 33		dBm dBm
Input Third Order Intercept (Two-Tone Input Power = +7 dBm Each Tone)	(Vctl = 3V, 5V)	0.5 - 1.0 GHz 1.0 - 3.0 GHz 3.0 - 6.0 GHz		54 52 49		dBm dBm dBm
Switching Speed	tRISE, tFALL (10/90% RF) tON, tOFF (50% CTL to 10/90% RF)	DC - 6.0 GHz		33 70		ns ns

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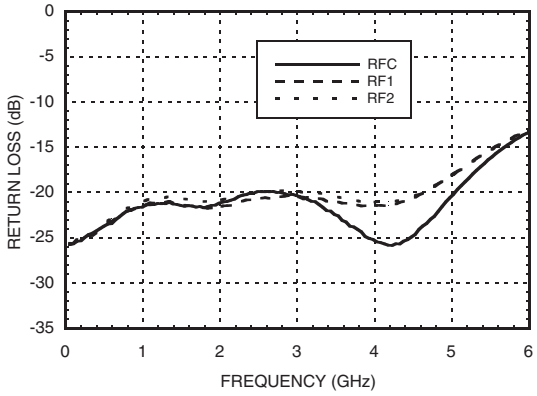
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Application Support: Phone: 1-800-ANALOG-D

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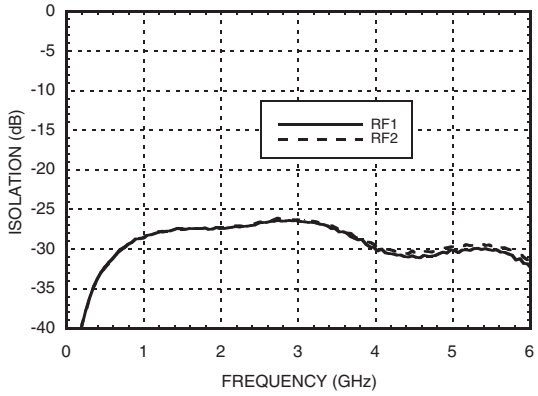
Insertion Loss



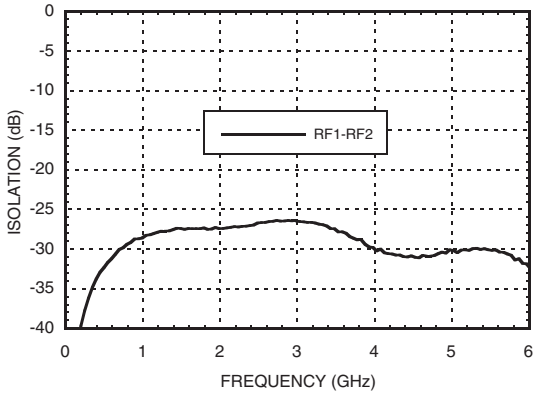
Return Loss



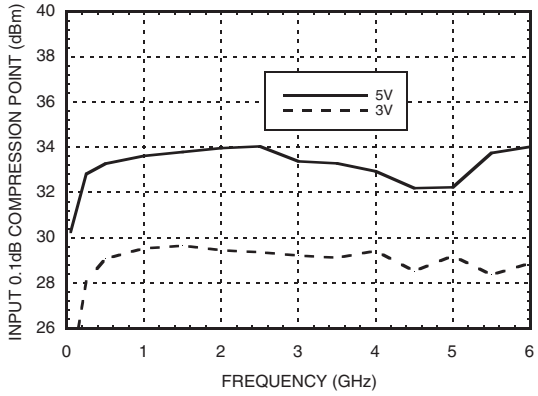
Isolation Between Ports RFC and RF1 / RF2



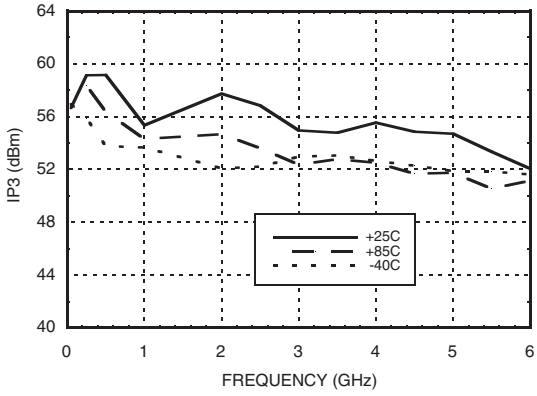
Isolation Between Ports RF1 and RF2



Input 0.1 dB Compression Point



Input Third Order Intercept Point, Vctl = 3v



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Absolute Maximum Ratings

Control Voltage Range	-0.5 to +7.5V
Hot Switch Power Level (Vctl = +3V)	+29 dBm
Channel Temperature	150 °C
Continuous Pdiss (T = 85 °C) (derate 13.3 mW/°C above 85 °C)	0.86 W
Thermal Resistance	75 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
ESD Sensitivity (HBM)	Class 1A

Control Voltages

*Control Input Tolerances are ± 0.2V

State	Bias Condition*
Low	0 Vdc @ 25 µA Typical
High	+3 Vdc to +5 Vdc @ 25 µA Typical

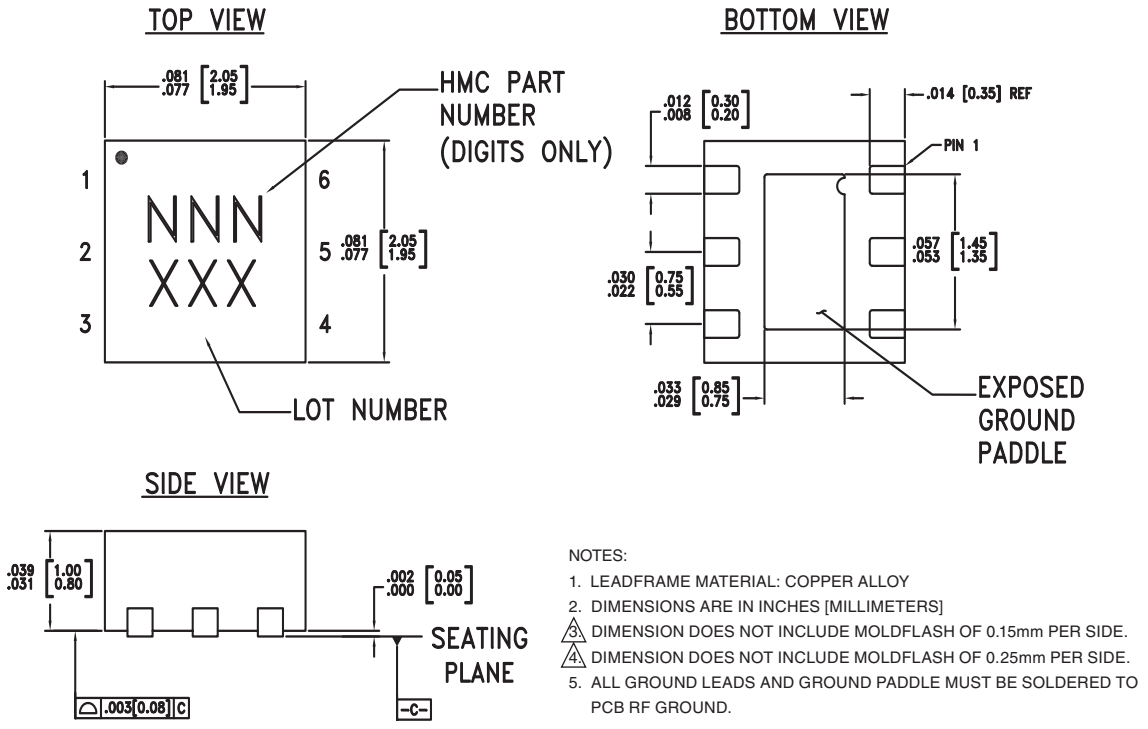
Truth Table

Control Input		Signal Path State
A	B	RFC to:
Low	High	RF1
High	Low	RF2

DC blocks are required at ports RFC, RF1, RF2.

Choose value for lowest frequency of operation.

Outline Drawing



NOTES:

1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS]
3. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
4. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
5. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.

Package Information

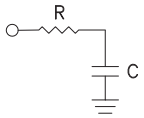
Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [3]
HMC536LP2	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 [1]	536 XXX
HMC536LP2E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 [2]	536 XXX

[1] Max peak reflow temperature of 235 °C
[2] Max peak reflow temperature of 260 °C
[3] 3-Digit lot number XXX

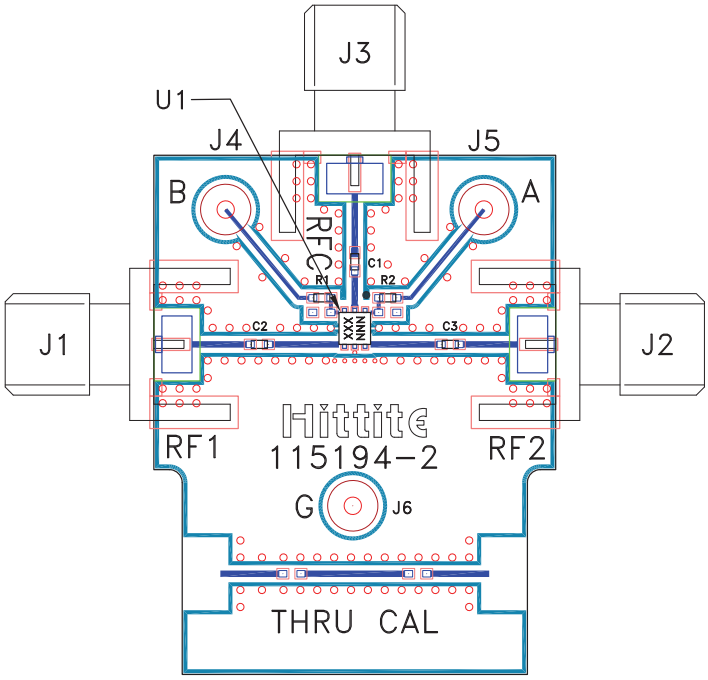
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Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1	A	See truth and control voltage tables.	
3	B	See truth and control voltage tables.	
2, 4, 6	RFC, RF1, RF2	These pins are DC coupled and matched to 50 Ohms. Blocking capacitors are required.	
5	N/C	This pin should be connected to RF ground to achieve best isolation.	
	GND	Package bottom has exposed metal paddle that must be connected to RF/DC ground.	

Evaluation PCB



List of Materials for Evaluation PCB 115195 [1]

Item	Description
J1 - J3	PCB Mount SMA RF Connector
J4 - J6	DC Pin
C1 - C3	100 pF Capacitor, 0402 Pkg.
R1 - R2	1K Ohm Resistor, 0402 Pkg.
U1	HMC536LP2(E) SPDT Switch
PCB [2]	115194 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 be generated with proper RF circuit design techniques. Signal lines at the RF port should have 50 ohm impedance and the package ground leads and exposed paddle should be connected directly to the ground plane similar to that shown above. The evaluation circuit board shown above is available from Hittite Microwave Corporation upon request.

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