

Analog Devices Welcomes Hittite Microwave Corporation

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Typical Applications

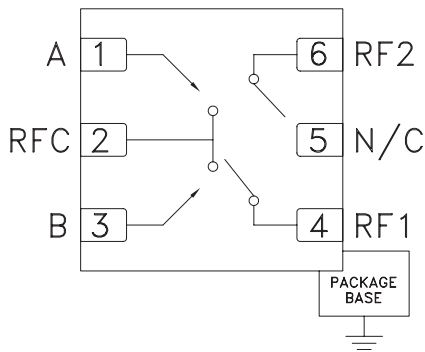
The HMC536LP2(E) is ideal for:

- 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 mm²

Functional Diagram



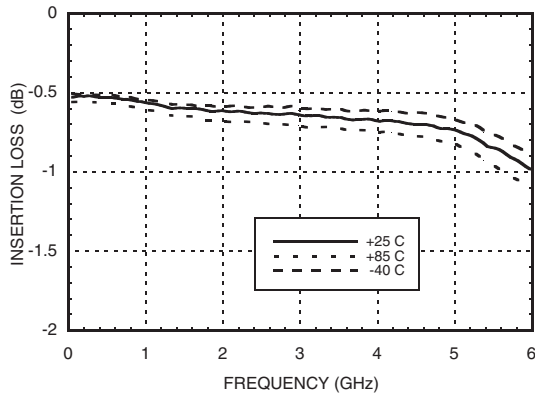
General Description

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 mm² and are ideal for applications where small size is required.

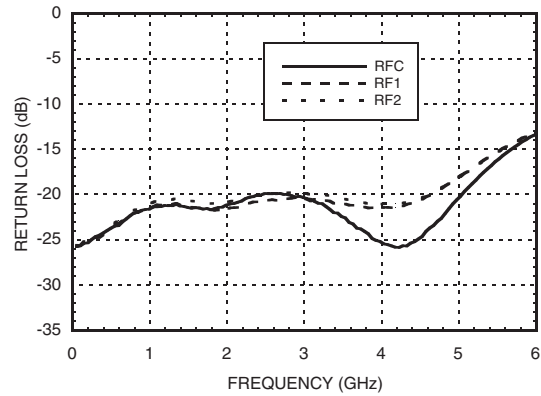
Electrical Specifications, $T_A = +25^\circ C$, $V_{ctl} = 0/+3 Vdc$ to $+5 Vdc$, 50 Ohm System

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

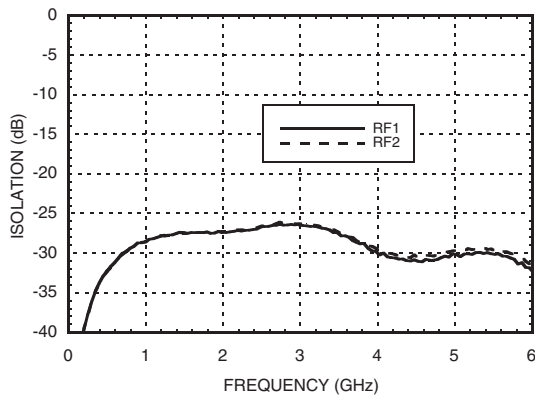
Insertion Loss



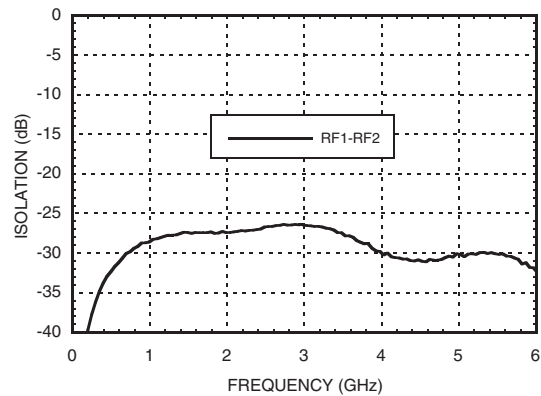
Return Loss



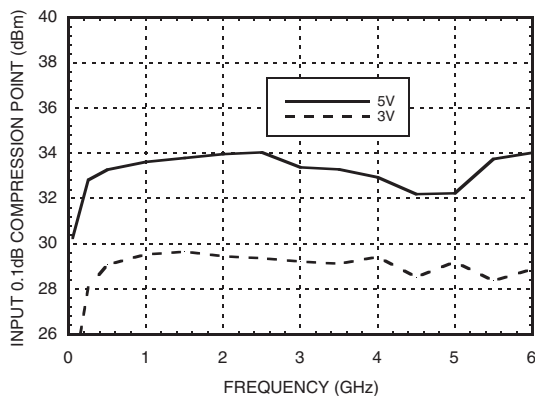
Isolation Between Ports RFC and RF1 / RF2



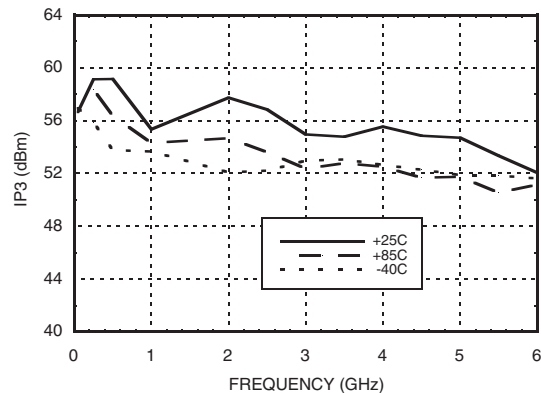
Isolation Between Ports RF1 and RF2



Input 0.1 dB Compression Point



Input Third Order Intercept Point, $V_{ctl} = 3v$



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

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 |

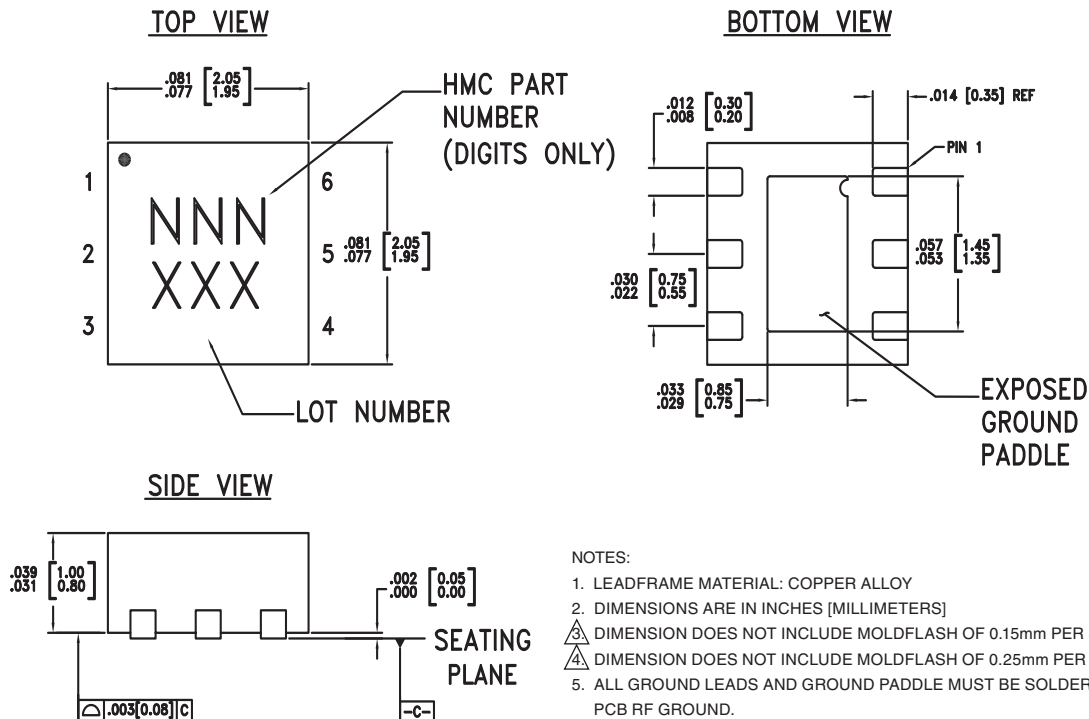
Truth Table

| 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



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 |

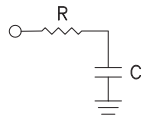

[1] Max peak reflow temperature of 235 °C

[2] Max peak reflow temperature of 260 °C

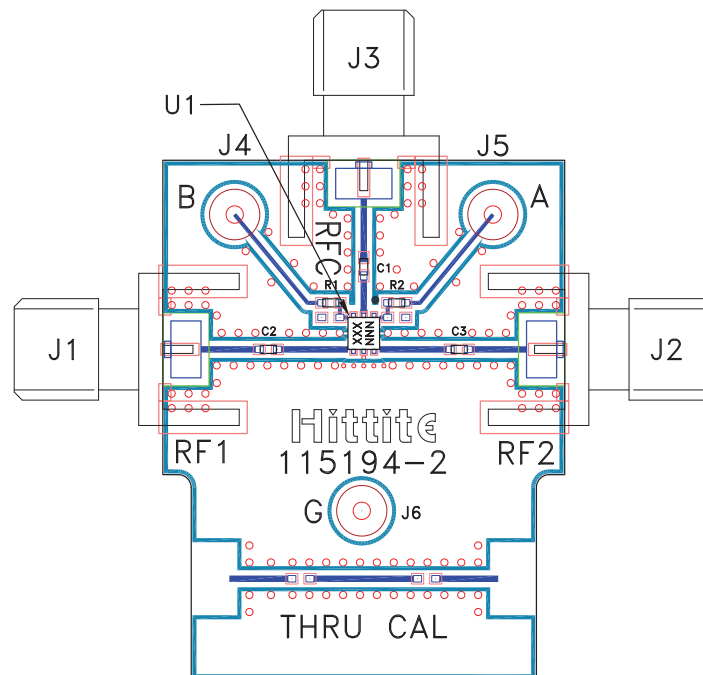
[3] 3-Digit lot number XXX

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

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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