

Typical Applications

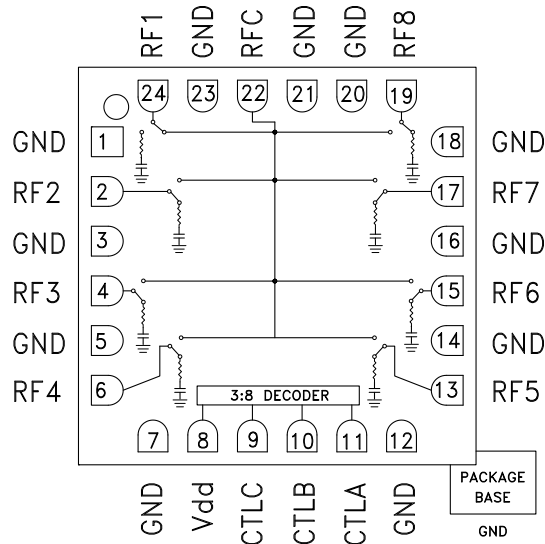
The HMC253ALC4 is ideal for:

- Basestations & Repeaters
- WiMAX/WiBro & Fixed Wireless
- Cellular/3G Infrastructure
- CATV/DBS
- Military & Hi-Rel

Features

- Ceramic, RoHS Compliant 4x4 mm SMT Package
- Non-Reflective Topology
- Low Insertion Loss: 1.6 dB
- Single Positive Supply: $V_{dd} = +5V$
- Integrated 3:8 TTL/CMOS Decoder: 0/+3V

Functional Diagram



General Description

The HMC253ALC4 is a non-reflective SP8T switch in a leadless RoHS compliant 4x4 mm ceramic SMT package featuring wideband operation from DC to 3.5 GHz. The switch offers a single positive bias and true TTL/CMOS compatibility enabling it to operate with 0/+3V control and a +5V supply. A 3:8 decoder is integrated on the switch requiring only 3 control lines and a positive bias to select each path. The HMC253ALC4 SP8T will replace multiple configurations of SP4T and SPDT MMIC switches.

Electrical Specifications,

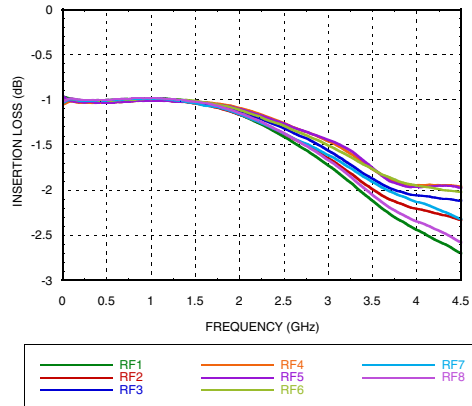
$T_A = +25^\circ C$, For TTL Control and $V_{dd} = +5V$ in a 50 Ohm system

| Parameter | Frequency | Min. | Typ. | Max. | Units |
|---|---------------|---------------|------|------|-------|
| Insertion Loss | DC - 2.0 GHz | | 1.1 | 1.5 | dB |
| | DC - 3.0 GHz | | 1.6 | 2.0 | dB |
| | DC - 3.5 GHz | | 1.9 | 2.4 | dB |
| Isolation | DC - 2.0 GHz | 38 | 43 | | dB |
| | DC - 3.0 GHz | 34 | 39 | | dB |
| | DC - 3.5 GHz | 30 | 35 | | dB |
| Return Loss | "On State" | 0.3 - 3.0 GHz | | 13 | dB |
| | | 0.3 - 3.5 GHz | | 10 | dB |
| Return Loss (RF1-8) | "Off State" | 0.3 - 3.5 GHz | | 10 | dB |
| | | 0.5 - 3.5 GHz | | 14 | dB |
| Input Power for 1 dB Compression | 0.5 - 3.5 GHz | 20 | 24 | | dBm |
| Input Third Order Intercept (Two-Tone Input Power = +10 dBm Each Tone) | 0.5 - 3.5 GHz | 40 | 43 | | dBm |
| Switching Characteristics | 0.3 - 3.5 GHz | | | | |
| tRISE, tFALL (10/90% RF) | | | 30 | | ns |
| tON, tOFF (50% CTL to 10/90% RF) | | | 100 | | ns |

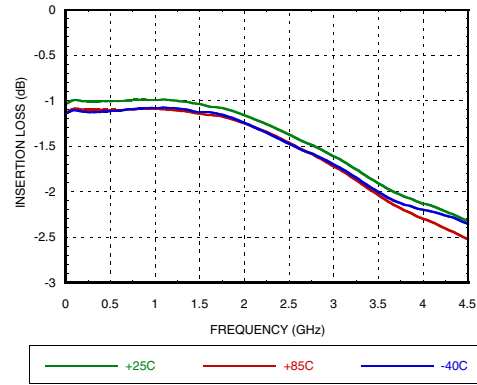


GaAs MIMIC SP8T NON-REFLECTIVE SWITCH, DC - 3.5 GHz

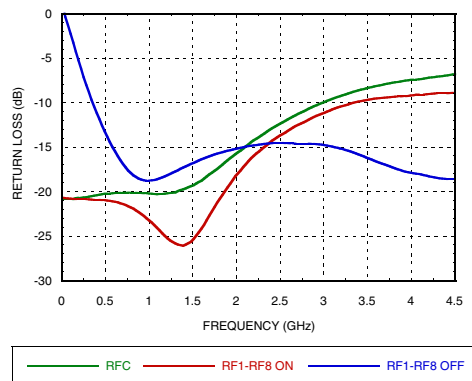
Insertion Loss



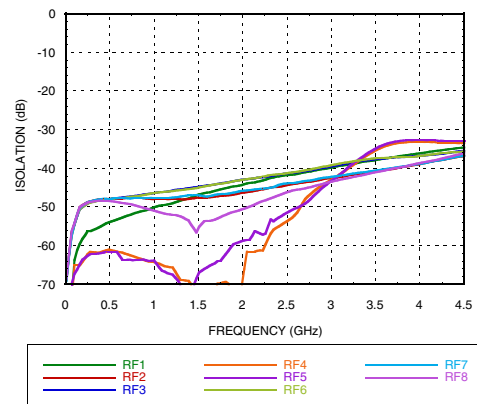
Insertion Loss vs. Temperature



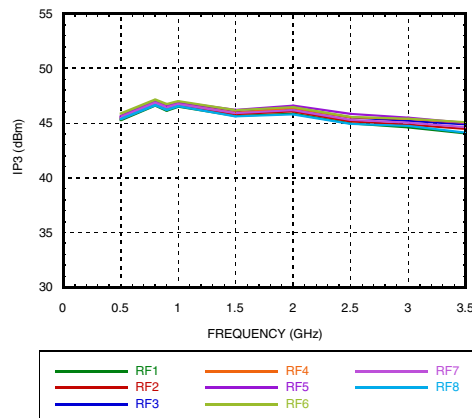
Return Loss



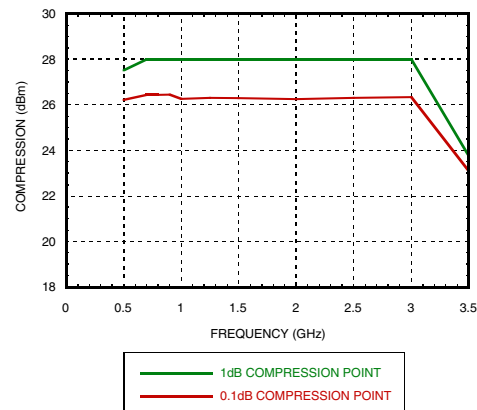
Isolation



Input IP3



Input Compression




GaAs MIMIC SP8T NON-REFLECTIVE SWITCH, DC - 3.5 GHz
Bias Voltage & Current

| Vdd Range = +5 Vdc ± 10% | | |
|--------------------------|-----------------|-----------------|
| Vdd (Vdc) | Idd (Typ.) (mA) | Idd (Max.) (mA) |
| +5 | 4.5 | 7.5 |

TTL/CMOS Control Voltages

| State | Bias Condition |
|-------|-----------------------------|
| Low | 0 to +0.8 Vdc @ <1 μA Typ. |
| High | +2.0 to +5 Vdc @ 60 μA Typ. |

NOTE:

DC Blocking capacitors are required at ports RFC and RF1, 2, 3, 4, 5, 6, 7, 8.

Truth Table

| Control Input | | | Signal Path State |
|---------------|------|------|-------------------|
| A | B | C | RFCOM to: |
| Low | Low | Low | RF1 |
| High | Low | Low | RF2 |
| Low | High | Low | RF3 |
| High | High | Low | RF4 |
| Low | Low | High | RF5 |
| High | Low | High | RF6 |
| Low | High | High | RF7 |
| High | High | High | RF8 |



ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Absolute Maximum Ratings

| | |
|--|---|
| Bias Voltage Range (Port Vdd) | +7.0 Vdc |
| Control Voltage Range (A, B, C) | -0.5V to Vdd +1Vdc |
| Channel Temperature | 150 °C |
| Thermal Resistance (channel to package ground paddle) | |
| Through Path | 183 °C/W |
| Termination Path | 274 °C/W |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -40 to +85 °C |
| Maximum Input Power (Vdd = +5V) | |
| Through Path | +20 dBm (0.05 - 0.5 GHz) +25 dBm (0.5 - 3.5 GHz) |
| Terminated Path | +20 dBm (0.05 - 0.5 GHz) +23.5 dBm (0.5 - 3.5 GHz) |
| ESD Sensitivity (HBM) | Class 1A |

GaAs MIMIC SP8T NON-REFLECTIVE SWITCH, DC - 3.5 GHz
Outline Drawing

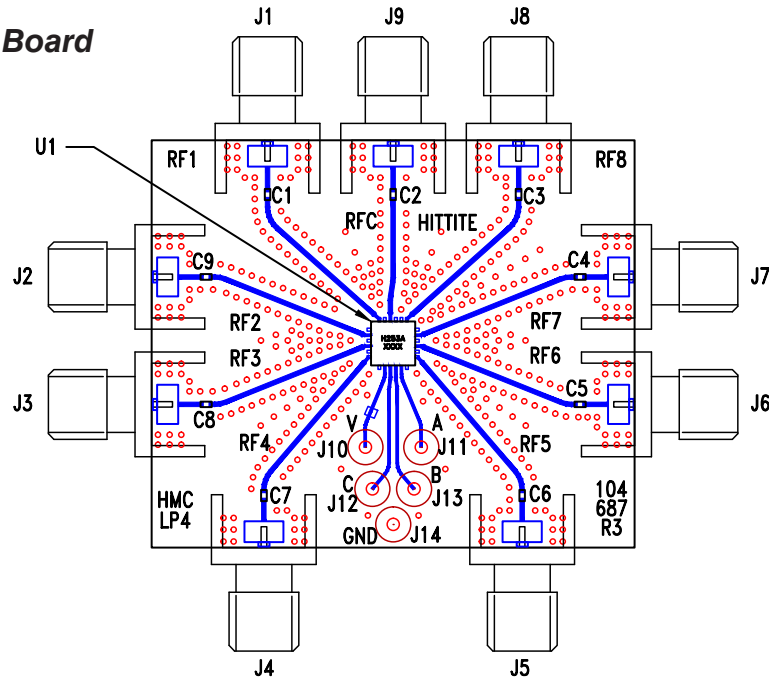
Pin Descriptions

| Pin Number | Function | Description | Interface Schematic |
|--|-----------------|---|---|
| 1, 3, 5, 7, 12, 14, 16, 18, 20, 21, 23 | GND | Package bottom has exposed metal paddle that must also be connected to RF ground. |  |
| 2, 4, 6, 13, 15, 17, 19, 22, 24 | RF1 - RF8 & RFC | This pin is DC coupled and matched to 50 Ohms. Blocking capacitors are required. | |
| 8 | Vdd | Supply Voltage +5 Vdc ±10% |  |
| 9 | CTL C | See truth table and control voltage table. |  |
| 10 | CTL B | | |
| 11 | CTL A | | |



GaAs MIMIC SP8T NON-REFLECTIVE SWITCH, DC - 3.5 GHz

Evaluation Circuit Board



List of Materials for Evaluation PCB EV1HMC253ALC4 [1]

| Item | Description |
|-----------|-----------------------------|
| J1 - J9 | PCB Mount SMA Connector |
| J10 - J14 | DC Pin |
| C1 - C9 | 100 pF Capacitor, 0402 Pkg. |
| U1 | HMC253ALC4 SP8T Switch |
| PCB [2] | 104687 Eval Board |

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350

The circuit board used in the application should be generated with proper RF circuit design techniques. Signal lines at the RF ports should have 50 ohm impedance while the package ground leads should be connected directly to the ground plane similar to that shown above. A sufficient number of via holes should be used to connect the top and bottom ground planes. The evaluation circuit board shown above is available from Hittite Microwave Corporation upon request.



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- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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