



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

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

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

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



### Typical Applications

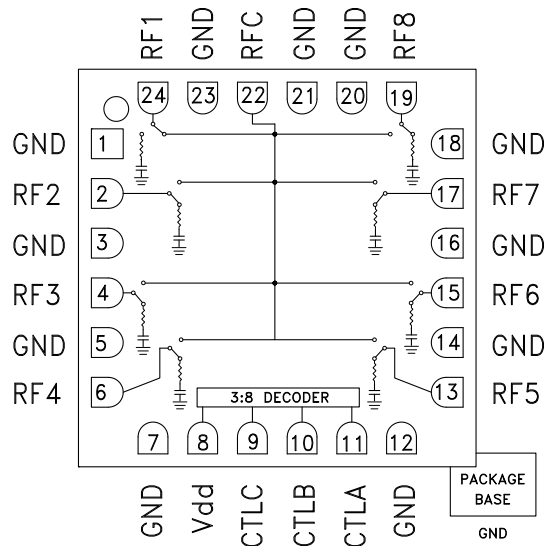
The HMC253ALC4 is ideal for:

- 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<br>(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   |       |
| tON, tOFF (50% CTL to 10/90% RF)  |               |                          | 100  |      | ns    |

# HMC253ALC4\* PRODUCT PAGE QUICK LINKS

Last Content Update: 02/23/2017

---

## COMPARABLE PARTS

View a parametric search of comparable parts.

## EVALUATION KITS

- HMC253ALC4 Evaluation Board

## DOCUMENTATION

### Data Sheet

- HMC253ALC4: GaAs MIMIC SP8T Non-Reflective Switch, DC-3.5 GHz Data Sheet

## TOOLS AND SIMULATIONS

- HMC253ALC4 S-Parameters

## DESIGN RESOURCES

- HMC253ALC4 Material Declaration
- PCN-PDN Information
- Quality And Reliability
- Symbols and Footprints

## DISCUSSIONS

View all HMC253ALC4 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

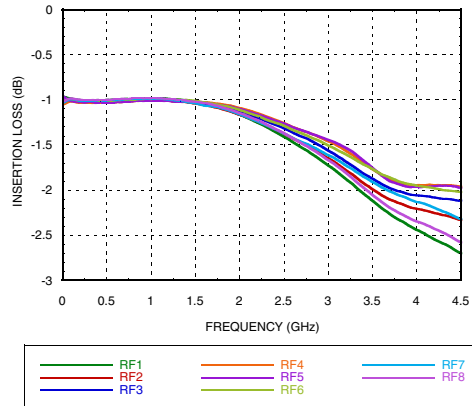
Submit feedback for this data sheet.

---

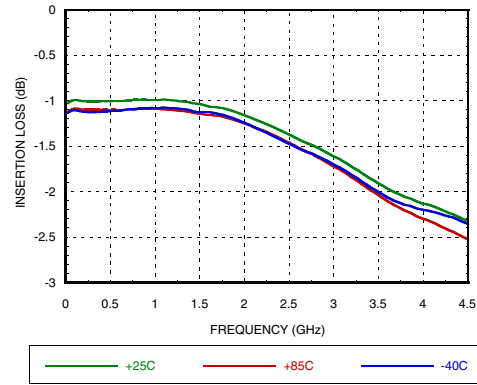


**GaAs MIMIC SP8T NON-REFLECTIVE SWITCH, DC - 3.5 GHz**

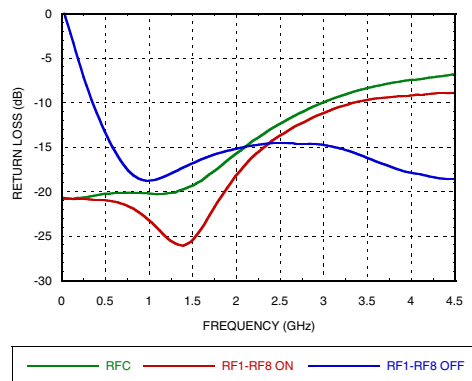
**Insertion Loss**



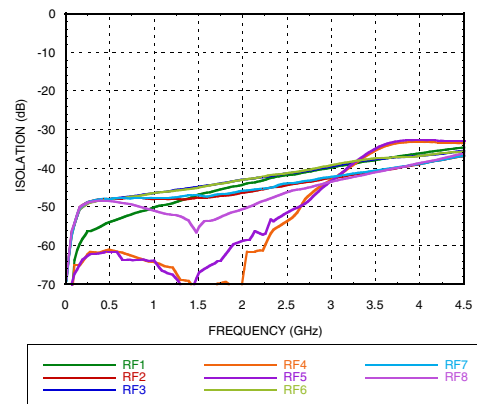
**Insertion Loss vs. Temperature**



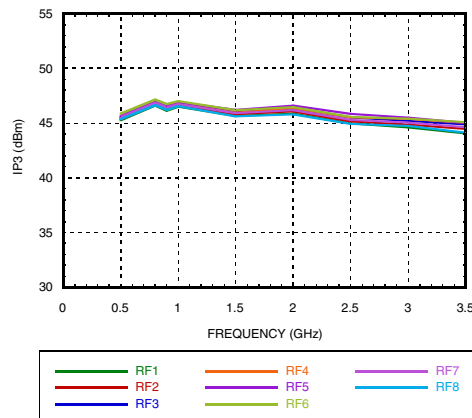
**Return Loss**



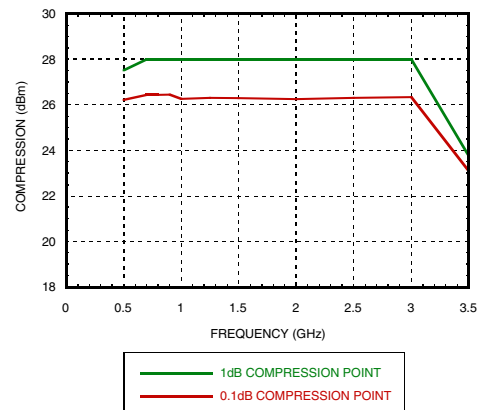
**Isolation**



**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:**

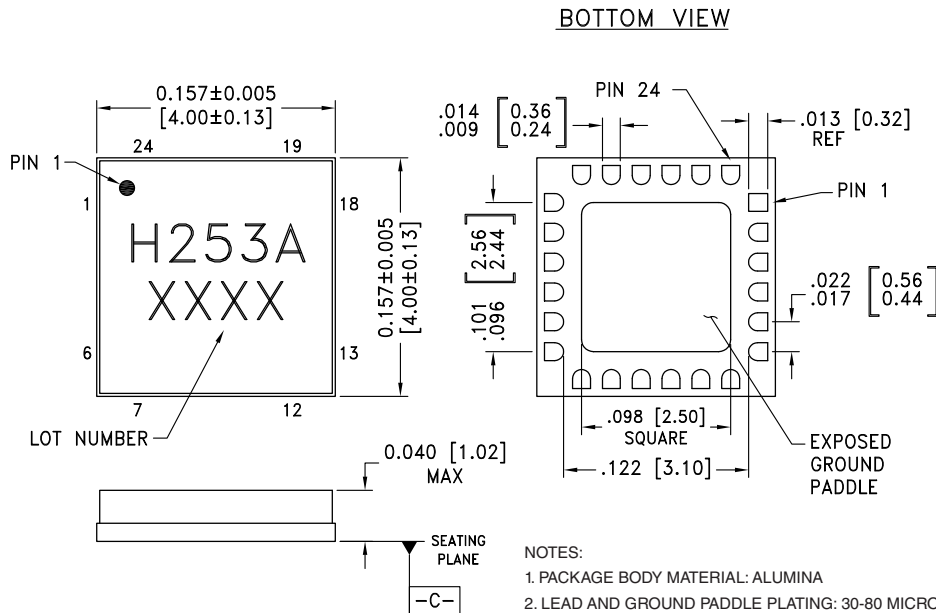
DC Blocking capacitors are required at ports RFC and RF1, 2, 3, 4, 5, 6, 7, 8.


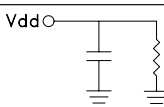
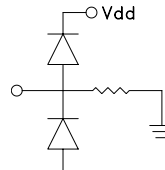
**Truth Table**

| 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<br>(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<br>(Vdd = +5V)                       |   |
| Through Path   | +20 dBm (0.05 - 0.5 GHz)<br>+25 dBm (0.5 - 3.5 GHz)   |
| Terminated Path  | +20 dBm (0.05 - 0.5 GHz)<br>+23.5 dBm (0.5 - 3.5 GHz) |
| ESD Sensitivity (HBM)                                    | Class 1A  |

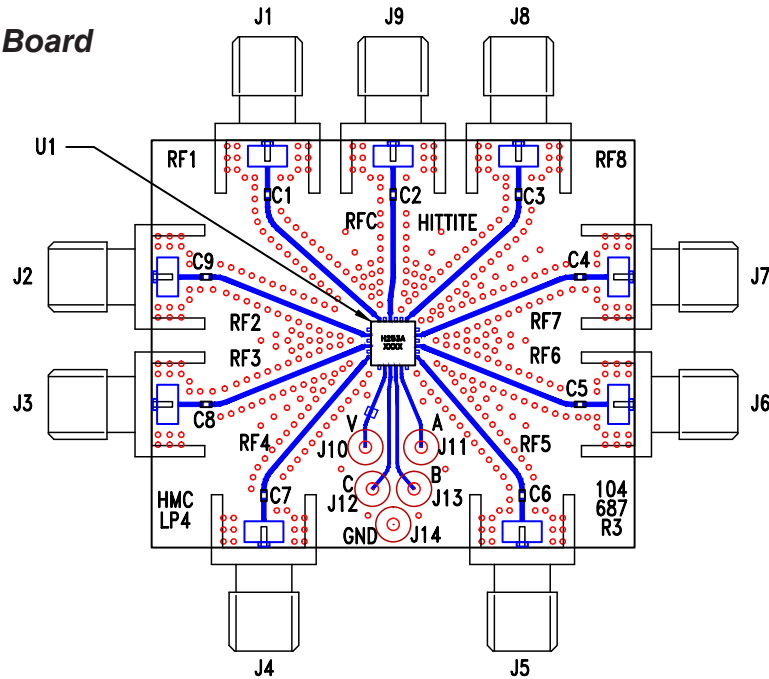
**GaAs MIMIC SP8T NON-REFLECTIVE SWITCH, DC - 3.5 GHz**
**Outline Drawing**

**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.