

# GaAs SPDT IC 4 W T/R Switch DC–4 GHz



AH004R2-93

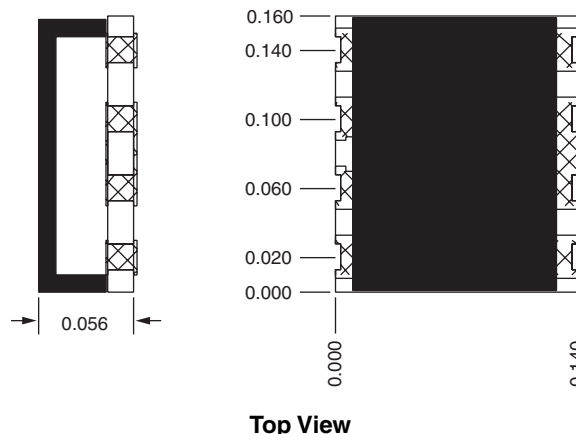
## Features

- Low DC Power Consumption
- Low Insertion Loss
- High Linearity (56 dBm IP3)
- T/R Switch
- Small Low Cost “Chip on Board” Package

## Description

The AH004R2-93 is an IC FET SPDT switch in a low cost “chip on board” package. It features extremely high linearity, low insertion loss, with very low DC power consumption. Some standard implementations include antenna changeover, T/R and diversity switching over 2 W. This switch can be used in many analog and digital wireless communication systems.

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## Electrical Specifications at 25°C

| Parameter <sup>1</sup>      | Frequency <sup>5</sup> | Min. | Typ.  | Max.  | Unit |
|-----------------------------|------------------------|------|-------|-------|------|
| Insertion Loss <sup>2</sup> | DC–0.5 GHz             |      | 0.4   | .5    | dB   |
|                             | DC–1.0 GHz             |      | 0.5   | .6    | dB   |
|                             | DC–2.0 GHz             |      | 0.6   | .8    | dB   |
|                             | DC–4.0 GHz             |      | 1.0   | 1.2   | dB   |
| Isolation                   | DC–0.5 GHz             | 35   | 38    |       | dB   |
|                             | DC–1.0 GHz             | 30   | 33    |       | dB   |
|                             | DC–2.0 GHz             | 20   | 25    |       | dB   |
|                             | DC–4.0 GHz             | 15   | 18    |       | dB   |
| VSWR <sup>3</sup>           | DC–0.5 GHz             |      | 1.3:1 | 1.4:1 |      |
|                             | DC–1.0 GHz             |      | 1.5:1 | 1.6:1 |      |
|                             | DC–2.0 GHz             |      | 1.6:1 | 1.8:1 |      |
|                             | DC–4.0 GHz             |      | 1.8:1 | 2.0:1 |      |

## Operating Characteristics at 25°C

| Parameter                             | Condition                                                                                               | Frequency | Min. | Typ. | Max. | Unit |
|---------------------------------------|---------------------------------------------------------------------------------------------------------|-----------|------|------|------|------|
| Switching Characteristics             | Rise, Fall (10/90% or 90/10% RF)                                                                        |           |      | 6    |      | ns   |
|                                       | On, Off (50% CTL to 90/10% RF)                                                                          |           |      | 12   |      | ns   |
|                                       | Video Feedthru <sup>4</sup>                                                                             |           |      | 30   |      | mV   |
| Input Power for 1 dB Compression      | @ -5 V                                                                                                  | 0.9 GHz   |      | 27   |      | dBm  |
|                                       | @ -10 V                                                                                                 | 0.9 GHz   |      | 35   |      | dBm  |
| Intermodulation Intercept Point (IP3) | For Two-tone Input Power 13 dBm,<br>V <sub>High</sub> = -10 V                                           | 0.9 GHz   |      | 56   |      | dBm  |
| Control Voltages                      | V <sub>Low</sub> = 0 to -0.2 V @ 20 µA Max.<br>V <sub>High</sub> = -5 V @ 100 µA to -10 V @ 400 µA Max. |           |      |      |      |      |

1. All measurements made in a 50 Ω system, unless otherwise specified.

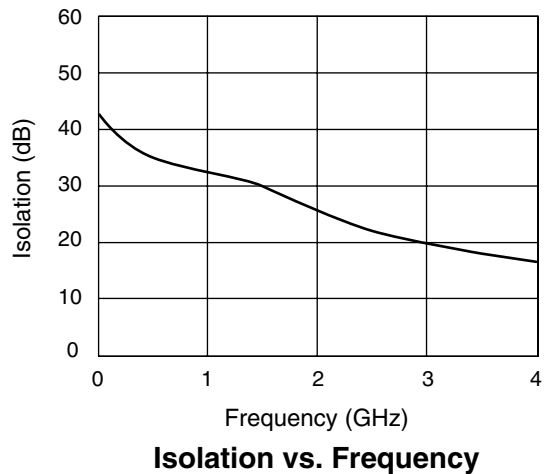
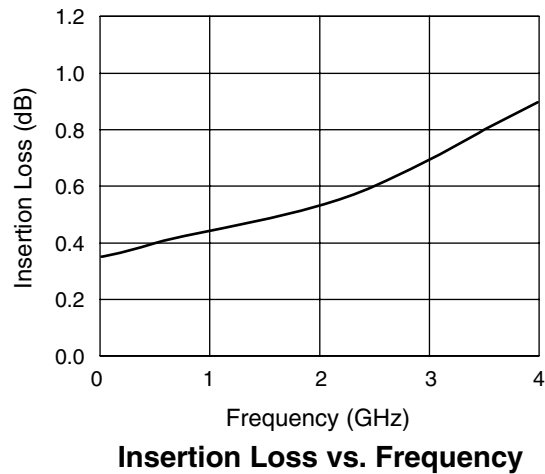
2. Insertion loss changes by 0.003 dB/°C.

3. Insertion loss state.

4. Video feedthru measured with 1 ns risetime pulse and 500 MHz bandwidth.

5. DC = 300 kHz.

Typical Performance Data



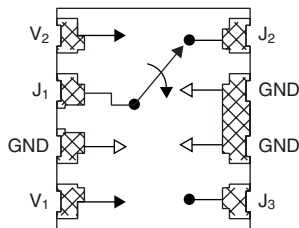
Truth Table

| V <sub>1</sub> | V <sub>2</sub> | J <sub>1</sub> –J <sub>2</sub> | J <sub>1</sub> –J <sub>3</sub> |
|----------------|----------------|--------------------------------|--------------------------------|
| 0              | -5             | Insertion Loss                 | Isolation                      |
| -5             | 0              | Isolation                      | Insertion Loss                 |

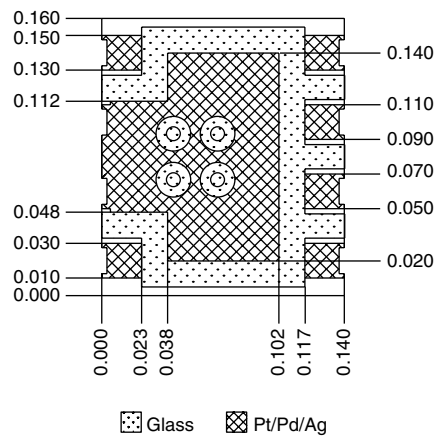
Absolute Maximum Ratings

| Characteristic                           | Value                                 |
|------------------------------------------|---------------------------------------|
| RF Input Power (RF In)                   | 6 W Max. > 900 MHz<br>0/-10 V Control |
| Control Voltage (V <sub>C</sub> )        | -0.2 V, -12 V                         |
| Operating Temperature (T <sub>OP</sub> ) | -40°C to +90°C                        |
| Storage Temperature (T <sub>ST</sub> )   | -65°C to +150°C                       |
| Thermal Resistance (Θ <sub>JC</sub> )    | 35°C/W                                |

Pin Out



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Bottom View

The “chip on board” package is a ceramic leadless chip carrier with a ceramic lid, which allows for automatic pick and place. The external terminals and backside ground plane are Pt/Pd/Ag, which is highly leach resistant and very tolerant to variations in solder conditions. The glass fingers between contacts prevent the possibility of shorted terminals. The recommended solder attachment is a SN6337 (Pb/SN).