

# GaAs IC Diversity Switch

## DC–2.5 GHz



**ASC02D2-12**  
(Previously ADC02D2-12)\*

### Features

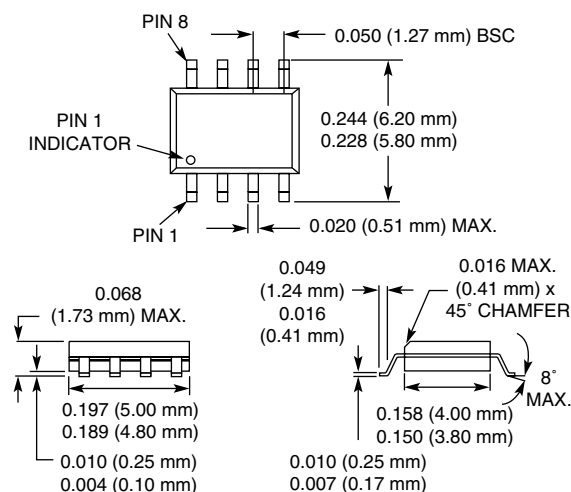
- Low Cost SOIC-8 Plastic Package
- Independent Four Port Switching
- Individual Voltage Control on Each Port

### Description

The ADC02D2 is a 4 port switch with independent DC voltage control on each port mounted in the SOIC-8 package.

In transmit or receive applications, the asymmetric design allows for good isolation between transmit and receive path while maintaining medium power handling in transmit port.

### SOIC-8



### Electrical Specifications at 25°C (0, -5 V)

| Parameter <sup>1</sup>                                                                        | Frequency <sup>2</sup> | Min. | Typ.  | Max.  | Unit |
|-----------------------------------------------------------------------------------------------|------------------------|------|-------|-------|------|
| Insertion Loss <sup>3</sup><br>Receiver<br>(R <sub>X</sub> –J <sub>1</sub> , J <sub>2</sub> ) | DC–0.5 GHz             |      | 1.0   | 1.1   | dB   |
|                                                                                               | DC–1.0 GHz             |      | 1.0   | 1.2   | dB   |
|                                                                                               | DC–2.0 GHz             |      | 1.1   | 1.3   | dB   |
|                                                                                               | DC–2.5 GHz             |      | 1.1   | 1.4   | dB   |
| Insertion Loss<br>Transmit<br>(T <sub>X</sub> –J <sub>1</sub> , J <sub>2</sub> )              | DC–0.5 GHz             |      | 0.8   | 0.9   | dB   |
|                                                                                               | DC–1.0 GHz             |      | 0.8   | 1.0   | dB   |
|                                                                                               | DC–2.0 GHz             |      | 0.9   | 1.1   | dB   |
|                                                                                               | DC–2.5 GHz             |      | 0.9   | 1.2   | dB   |
| Isolation<br>(R <sub>X</sub> –J <sub>1</sub> , J <sub>2</sub> )                               | DC–0.5 GHz             | 34   | 37    |       | dB   |
|                                                                                               | DC–1.0 GHz             | 28   | 30    |       | dB   |
|                                                                                               | DC–2.0 GHz             | 22   | 24    |       | dB   |
|                                                                                               | DC–2.5 GHz             | 20   | 22    |       | dB   |
| Isolation<br>(T <sub>X</sub> –J <sub>1</sub> , J <sub>2</sub> )                               | DC–0.5 GHz             | 32   | 33    |       | dB   |
|                                                                                               | DC–1.0 GHz             | 26   | 27    |       | dB   |
|                                                                                               | DC–2.0 GHz             | 20   | 21    |       | dB   |
|                                                                                               | DC–2.5 GHz             | 18   | 19    |       | dB   |
| VSWR <sup>4</sup>                                                                             | DC–1.0 GHz             |      | 1.5:1 | 1.7:1 |      |
|                                                                                               | DC–2.5 GHz             |      | 1.8:1 | 2.0:1 |      |

### Operating Characteristics at 25°C (0, -5 V)

| Parameter                                                                              | Condition                                                                                             | Frequency    | Min. | Typ. | Max. | Unit |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------|------|------|------|------|
| Switching Characteristics <sup>5</sup>                                                 | Rise, Fall (10/90% or 90/10% RF)                                                                      |              |      | 3    |      | ns   |
|                                                                                        | On, Off (50% CTL to 90/10% RF)                                                                        |              |      | 6    |      | ns   |
|                                                                                        | Video Feedthru                                                                                        |              |      | 30   |      | mV   |
| Input Power for 1 dB Compression<br>(T <sub>X</sub> –J <sub>1</sub> , J <sub>2</sub> ) |                                                                                                       | 0.50–2.0 GHz |      | +27  |      | dBm  |
|                                                                                        |                                                                                                       | 0.050 GHz    |      | +18  |      | dBm  |
| Intermodulation Intercept Point (IP3)                                                  | For Two-tone Input Power +13 dBm                                                                      | 0.50–2.0 GHz |      | +40  |      | dBm  |
|                                                                                        |                                                                                                       | 0.050 GHz    |      | +29  |      | dBm  |
| Control Voltages                                                                       | V <sub>Low</sub> = 0 to -0.2 V @ 20 μA Max.<br>V <sub>High</sub> = -5 V @ 50 μA to -8 V @ 200 μA Max. |              |      |      |      |      |

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

2. DC = 300 kHz.

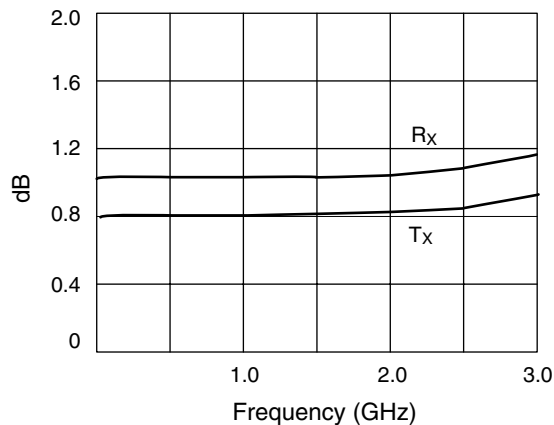
3. Insertion loss changes by 0.003 dB/°C.

4. Insertion loss state.

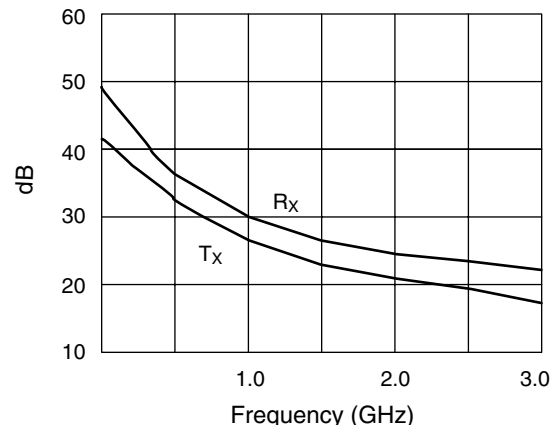
5. Video feedthru measured with 1 ns risetime pulse and 500 MHz bandwidth.

\*Due to conflict with another company's product numbering system, Alpha's attenuator product "ADC02D2-12" is being changed to "ASC02D2-12".

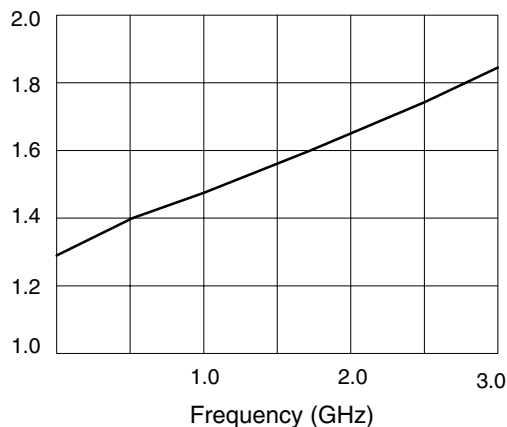
Typical Performance Data (0, -5 V)



Insertion Loss vs. Frequency



Isolation vs. Frequency



VSWR vs. Frequency (Worst Case)

Truth Table

| V <sub>1</sub> | V <sub>2</sub> | V <sub>3</sub> | V <sub>4</sub> | “On Paths”                                                      |
|----------------|----------------|----------------|----------------|-----------------------------------------------------------------|
| 0              | -5             | -5             | -5             | T <sub>X</sub> –J <sub>2</sub>                                  |
| -5             | 0              | -5             | -5             | T <sub>X</sub> –J <sub>1</sub>                                  |
| -5             | -5             | 0              | -5             | R <sub>X</sub> –J <sub>1</sub>                                  |
| -5             | -5             | -5             | 0              | R <sub>X</sub> –J <sub>2</sub>                                  |
| 0              | -5             | 0              | -5             | T <sub>X</sub> –J <sub>2</sub> , R <sub>X</sub> –J <sub>1</sub> |
| -5             | 0              | -5             | 0              | T <sub>X</sub> –J <sub>1</sub> , R <sub>X</sub> –J <sub>2</sub> |

Absolute Maximum Ratings

| Characteristic        | Value                                         |
|-----------------------|-----------------------------------------------|
| RF Input Power        | 2 W > 500 MHz 0/-8 V<br>0.5 W @ 50 MHz 0/-8 V |
| Control Voltage       | +0.2 V, -10 V                                 |
| Operating Temperature | -40°C to +85°C                                |
| Storage Temperature   | -65°C to +150°C                               |
| Θ <sub>JC</sub>       | 25°C/W                                        |

Note: Exceeding these parameters may cause irreversible damage.

Pin Out

