

### Typical Applications

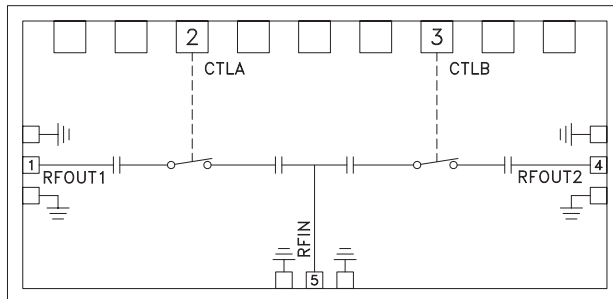
This HMC-SDD112 is ideal for:

- FCC E-Band Communication Systems
- Short-Haul / High Capacity Radios
- Automotive Radar
- Test & Measurement Equipment
- SATCOM
- Sensors

### Features

- Low Insertion Loss: 2 dB
- High Isolation: 30 dB
- DC Blocked RF I/Os
- Integrated DC Bias Circuitry
- Die Size: 2.01 x 0.975 x 0.1 mm

### Functional Diagram



### General Description

The HMC-SDD112 is a monolithic, GaAs PIN diode based Single Pole Double Throw (SPDT) MMIC Switch which exhibits low insertion loss and high isolation. This all-shunt MMIC SPDT features on-chip DC blocks and DC bias voltage decoupling circuitry. All bond pads and the die backside are Ti/Au metallized and the PIN diode devices are fully passivated for reliable operation. The HMC-SDD112 GaAs PIN SPDT is compatible with conventional die attach methods, as well as thermocompression and thermosonic wirebonding, making it ideal for MCM and hybrid microcircuit applications. All data shown herein is measured with the chip in a 50 Ohm environment and contacted with RF probes.

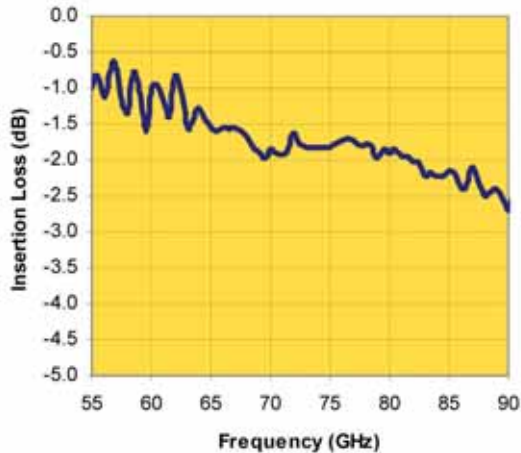
### Electrical Specifications\*, $T_A = +25\text{ }^\circ\text{C}$ , with -5/+5V Control, 50 Ohm System

| Parameter                | Min.    | Typ. | Max. | Units |
|--------------------------|---------|------|------|-------|
| Frequency Range          | 55 - 86 |      |      | GHz   |
| Insertion Loss           |         | 2    | 3    | dB    |
| Isolation                | 25      | 30   |      | dB    |
| Return Loss ON State     |         | 12   |      | dB    |
| Current (+5 V) ON State  |         | 22   |      | mA    |
| Current (-5 V) OFF State |         | -63  |      | nA    |

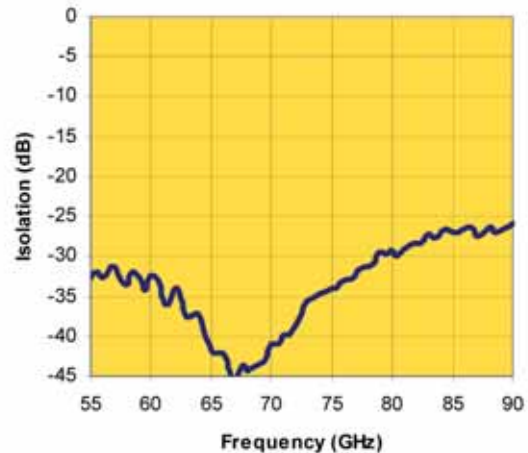
\* Unless otherwise indicated, all measurements are from probed die

**GaAs PIN MMIC SPDT SWITCH  
55 - 86 GHz**

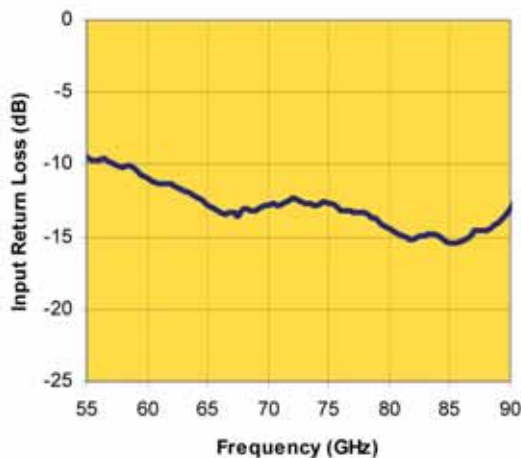
**“On” Insertion Loss vs. Freq. CTLA= -5V,  
CTLB= 5V for RFOUT1 to be ON**



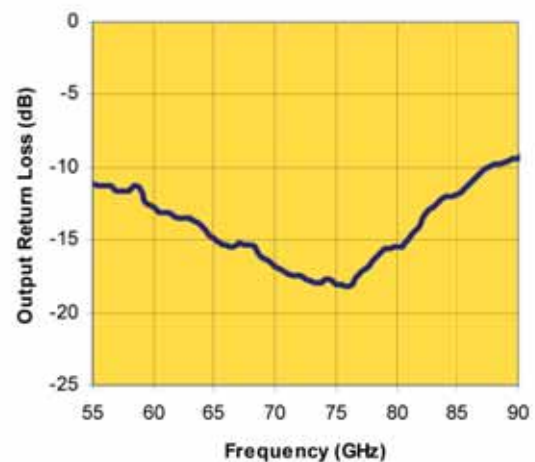
**“Off” Isolation vs. Freq. CTLA= +5V,  
CTLB= -5V for RFOUT1 to be OFF**



**“On” Input Return Loss vs. Freq. CTLA= -5V,  
CTLB= 5V for RFOUT1 to be ON**



**“On” Output Return Loss vs. Freq.  
CTLA= -5V, CTLB= 5V for RFOUT1 to be ON**



Note 1: Measured Performance Characteristics (Typical Performance at 25°C) Test data is taken with probes on RFIN and RFOUT1 with RFOUT2 left open.

### Absolute Maximum Ratings

|                         |                 |
|-------------------------|-----------------|
| Bias Voltage Range      | -5.5 to 5.5 Vdc |
| Storage Temperature     | -65 to +150 °C  |
| Operating Temperature   | -55 to +85 °C   |
| Bias Current (ON State) | 30 mA           |



**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**

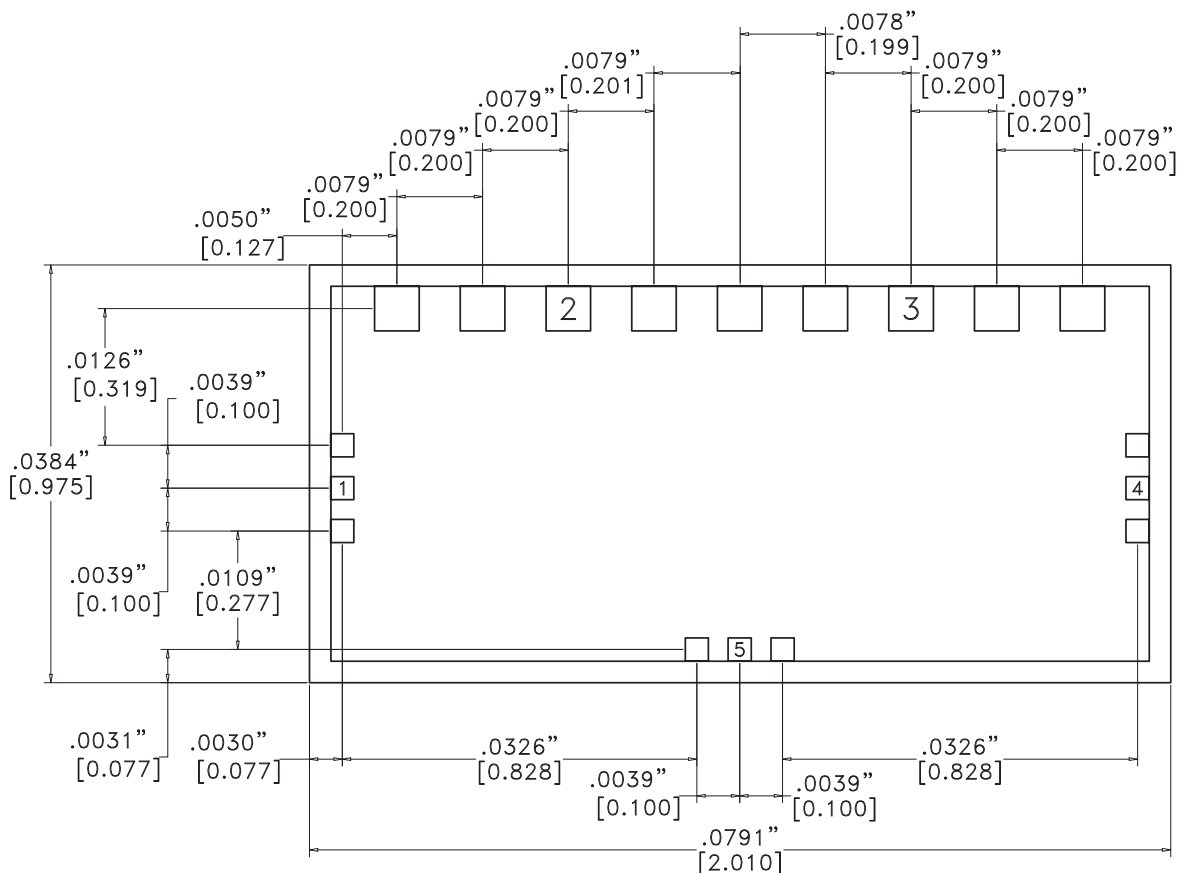
### Control Voltages

| State | Bias Condition       |
|-------|----------------------|
| Low   | -5 V @ 63 nA typical |
| High  | +5 V @ 22 mA typical |

### Truth Table

| Control Input |            | Signal Path State |                |
|---------------|------------|-------------------|----------------|
| CTLA          | CTLB       | RFIN to RFOUT1    | RFIN to RFOUT2 |
| Low (-5V)     | High (+5V) | On                | Off            |
| High (+5V)    | Low (-5V)  | Off               | On             |

### Outline Drawing



**NOTES:**

1. ALL DIMENSIONS ARE IN INCHES [MM].
2. TYPICAL BOND PAD IS .004" SQUARE.
3. BACKSIDE METALLIZATION: GOLD.
4. BACKSIDE METAL IS GROUND.
5. BOND PAD METALLIZATION: GOLD.
6. CONNECTION NOT REQUIRED FOR UNLABELED BOND PADS.
7. OVERALL DIE SIZE ±.002"