DATA SHEET

# AS217-000: PHEMT GaAs IC High-Linearity 3 V T/R SPDT Switch 0.1–2.5 GHz

## Applications

- T/R switch for handset applications

## Features

- 2.7 to 5 V linear operation
- Harmonics $H_2$, $H_3$ > 70 dBc @ $P_{IN}$ = 34.5 dBm
- Low Tx insertion loss (0.25 dB @ 0.9 GHz)
- High Rx isolation (35 dB @ 0.9 GHz)
- Available lead (Pb)-free, RoHS-compliant, and Green

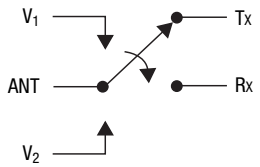
## Description

The AS217-000 is a PHEMT GaAs FET IC high-linearity SPDT switch. This switch has been designed for use where extremely high linearity, low control voltage, high Rx isolation and low Tx insertion loss are needed. It can be controlled with positive, negative or a combination of both voltages. Some standard implementations include antenna changeover, T/R and diversity switching over 3 W. The AS217-000 switch can be used in many analog and digital wireless communication systems including cellular, GSM and DECT applications.

NEW

Skyworks Green products are lead (Pb)-free, RoHS (Restriction of Hazardous Substances)-compliant, conform to the EIA/EICTA/JEITA Joint Industry Guide (JIG) Level A guidelines, and are free from antimony trioxide and brominated flame retardants.

## Pin Out




Bond-pad metallization: gold.
Bond-pad dimensions: 0.003 (0.075 mm) x 0.003 (0.075 mm).
Backside metallization: none.
See application note, Handling GaAs MMIC Die.

## Electrical Specifications at 25 °C (0, 3 V)

### $Z_0$ = 50 Ω, unless otherwise noted

| Parameter(1) | Condition | Frequency | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Insertion loss(2) | Ant-Rx | 0.1–1.0 GHz | | 0.30 | 0.35 | dB |
| | | 1.0–2.0 GHz | | 0.35 | 0.50 | dB |
| | | 2.0–2.5 GHz | | 0.50 | 0.65 | dB |
| | Ant-Tx | 0.1–1.0 GHz | | 0.25 | 0.30 | dB |
| | | 1.0–2.0 GHz | | 0.30 | 0.45 | dB |
| | | 2.0–2.5 GHz | | 0.40 | 0.50 | dB |
| Isolation | Ant-Rx | 0.1–1.0 GHz | 34 | 36 | | dB |
| | | 1.0–2.0 GHz | 25 | 30 | | dB |
| | | 2.0–2.5 GHz | 20 | 24 | | dB |
| | Ant-Tx | 0.1–1.0 GHz | 20 | 27 | | dB |
| | | 1.0–2.0 GHz | 14 | 17 | | dB |
| | | 2.0–2.5 GHz | 10 | 14 | | dB |
| VSWR(3) | | 0.1–2.5 GHz | | 1.2:1 | | dB |

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.

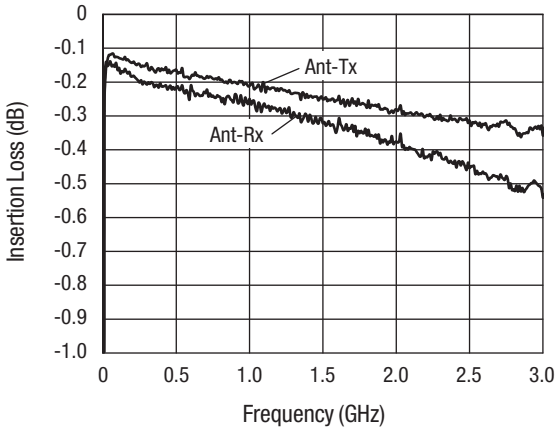
## Operating Characteristics at 25 °C (0, 3 V)

### $Z_0$ = 50 Ω, unless otherwise noted

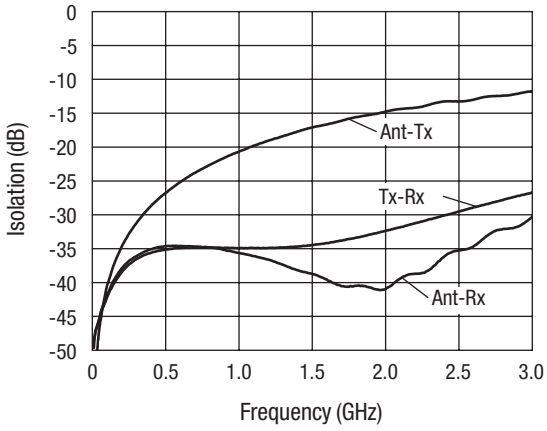
| Parameter | Condition | Frequency | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Switching characteristics | | | | | | |
| Rise, fall | 10/90% or 90/10% RF | | | 60 | | ns |
| On, off | 50% CTL to 90/10% RF | | | 100 | | ns |
| Video feedthru | $T_{RISE}$ = 1 ns, BW = 500 MHz | | | 50 | | mV |
| Input power for -0.1 dB compression | $V_{CTL}$ = 0/3 V | 0.9 GHz | | 35 | | dBm |
| Harmonics $H_2$, $H_3$ (transmit state) | $P_{IN}$ = 34.5 dBm | 0.9 GHz | | -70 | | dBc |
| Control voltage | $V_{LOW}$ = 0 to 0.2 V @ 20 µA max.<br>$V_{HIGH}$ = 2.7 V @ 100 µA max. to 5 V @ 200 µA max. | | | | | |

## Typical Performance Data (0, 3 V)

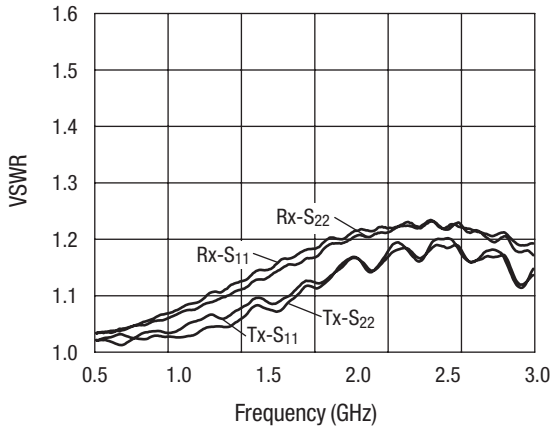
**$Z_0$ = 50 Ω, unless otherwise noted**




**Insertion Loss vs. Frequency**




**Isolation vs. Frequency**




**VSWR vs. Frequency**

## Absolute Maximum Ratings

| Characteristic | Value |
|---|---|
| RF input power | 4 W > 500 MHz<br>0/6 V control |
| Control voltage | -0.2 V, +6 V |
| Operating temperature | -40 °C to +85 °C |
| Storage temperature | -65 °C to +150 °C |

Performance is guaranteed only under the conditions listed in the specifications table and is not guaranteed under the full range(s) described by the Absolute Maximum specifications. Exceeding any of the absolute maximum/minimum specifications may result in permanent damage to the device and will void the warranty.

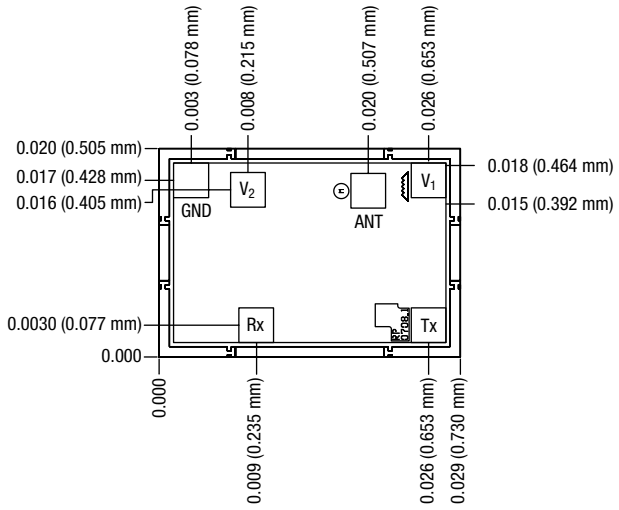
***CAUTION:*** *Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions must be employed at all times.*

## Truth Table

| $V_1$ | $V_2$ | Ant–Rx | Ant–Tx |
|---|---|---|---|
| $V_{HIGH}$ | 0 | Isolation | Insertion loss |
| 0 | $V_{HIGH}$ | Insertion loss | Isolation |

All other conditions not recommended.
$V_{HIGH}$ = 2.7 to 5 V.

## Outline Drawing




Dimension in inches (mm). Thickness: 0.008 (0.200 mm) ± 0.001 (0.025 mm).
Tolerance: ± 0.001 (0.025 mm).
Bond-pad metallization: gold.
Bond-pad dimensions: 0.003 (0.075 mm) x 0.003 (0.075 mm).
Backside metallization: none.
See application note, Handling GaAs MMIC Die.

## Ordering Information

| Model Name | Operating Temperature Range | Ordering Part Number | Package Description |
|---|---|---|---|
| AS217-000 GaAs SPDT switch | -40 °C to +85 °C | AS217-000 | Wafer on plastic-ring film frame |