

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



AS217-000

## Applications

- T/R Switch for Handset Applications

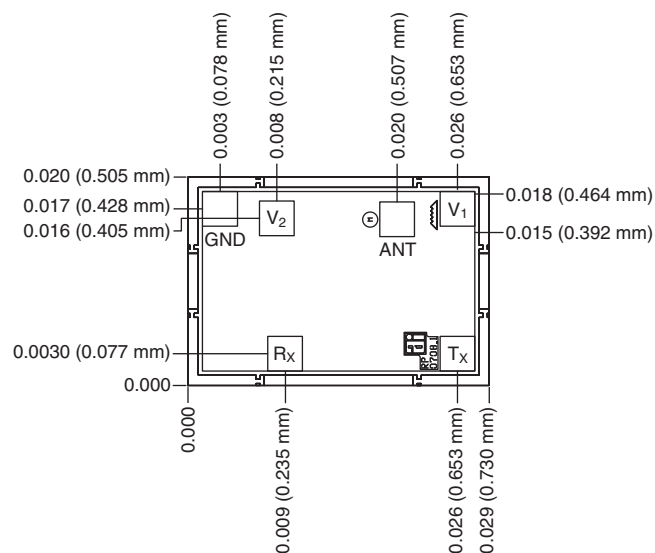
## Features

- +2.7 to +5 V Linear Operation
- Harmonics  $H_2, H_3 > 70$  dBc @  
 $P_{IN} = 34.5$  dBm
- Low  $T_X$  Insertion Loss (0.25 dB @ 0.9 GHz)
- High  $R_X$  Isolation (35 dB @ 0.9 GHz)

## 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  $R_X$  isolation and low  $T_X$  insertion loss. 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.

## Outline Drawing



Dimension in inches (mm). Thickness: 0.008 (0.200 mm)  $\pm$  0.001 (0.025 mm).  
Tolerance:  $\pm$  0.001 (0.025 mm).

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

Parameter <sup>1</sup>	Condition	Frequency	Min.	Typ.	Max.	Unit
Insertion Loss <sup>2</sup>	Ant- $R_X$	0.1–1.0 GHz	0.20	0.30	0.35	dB
		1.0–2.0 GHz	0.25	0.35	0.50	dB
		2.0–2.5 GHz	0.40	0.50	0.65	dB
	Ant- $T_X$	0.1–1.0 GHz	0.10	0.25	0.30	dB
		1.0–2.0 GHz	0.20	0.30	0.45	dB
		2.0–2.5 GHz	0.35	0.40	0.50	dB
Isolation	Ant- $R_X$	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- $T_X$	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 <sup>3</sup>		0.1–2.5 GHz		1.2:1	1.3:1	dB

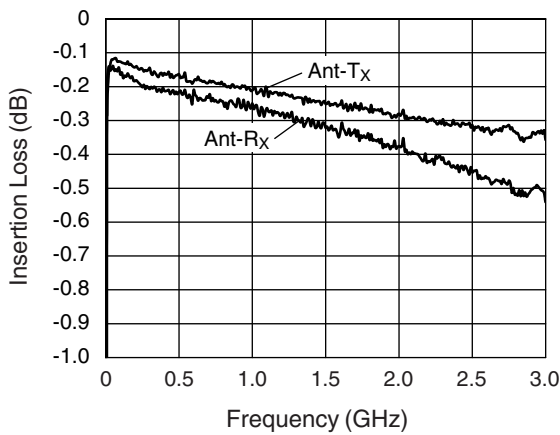
### Operating Characteristics at 25°C (0, +3 V)

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics <sup>4</sup>	Rise, Fall (10/90% or 90/10% RF)			60		ns
	On, Off (50% CTL to 90/10% RF)			100		ns
	Video Feedthru			50		mV
Input Power for -0.1 dB Compression	0/+3 V	0.9 GHz		+35		dBm
Harmonics H <sub>2</sub> , H <sub>3</sub> (Transmit State)	P <sub>IN</sub> = 34.5 dBm	0.9 GHz		+70		dBc
Control Voltages	V <sub>Low</sub> = 0 to 0.2 V @ 20 μA Max. V <sub>High</sub> = +2.7 V @ 100 μA Max. to +5 V @ 200 μA Max.					

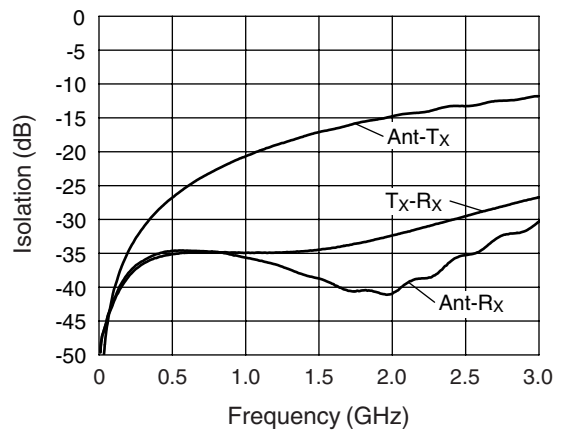
1. All measurements made in a 50 Ω system, unless otherwise specified.  
2. Insertion loss changes by 0.003 dB/°C.

3. Insertion loss state.  
4. Video feedthru measured with 1 ns risetime pulse and 500 MHz bandwidth.

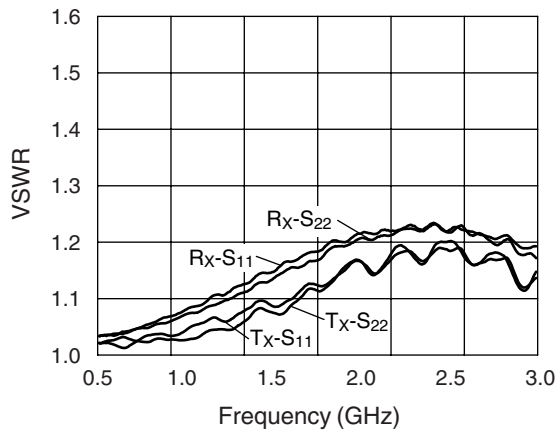
### Typical Performance Data (0, +3 V)



Insertion Loss vs. Frequency



Isolation vs. Frequency



VSWR vs. Frequency

### Absolute Maximum Ratings

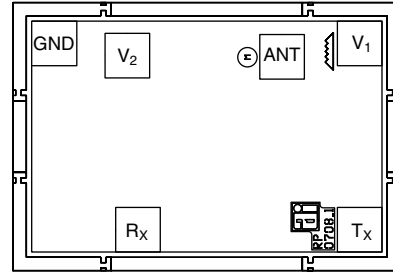
Characteristic	Value
RF Input Power	4 W > 500 MHz 0/+6 V Control
Control Voltage	-0.2 V, +6 V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

**Truth Table**

V <sub>1</sub>	V <sub>2</sub>	Ant-R <sub>x</sub>	Ant-T <sub>x</sub>
V <sub>High</sub>	0	Isolation	Insertion Loss
0	V <sub>High</sub>	Insertion Loss	Isolation

V<sub>High</sub> = +2.7 to +5 V.

**Pin Out**



Note: Bond pad metalization: gold.  
 Bond pad dimensions: 0.003 (0.075 mm) x 0.003 (0.075 mm).  
 Back side metalization: none.  
 See application note, Handling GaAs MMIC Die.