

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

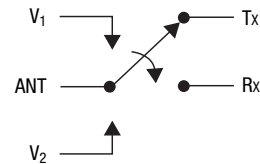
The AS217-000 is a PHEMT GaAs FET IC high-linearity SPDT switch. This switch has been designed for use where extremely high linearity, low control voltage, high Rx isolation and low Tx insertion loss are needed. It can be controlled with positive, negative or a combination of both voltages. Some standard 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)

Z₀ = 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.

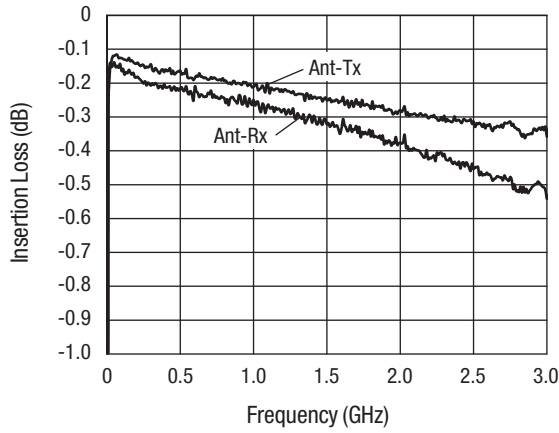
Operating Characteristics at 25 °C (0, 3 V)

Z₀ = 50 Ω, unless otherwise noted

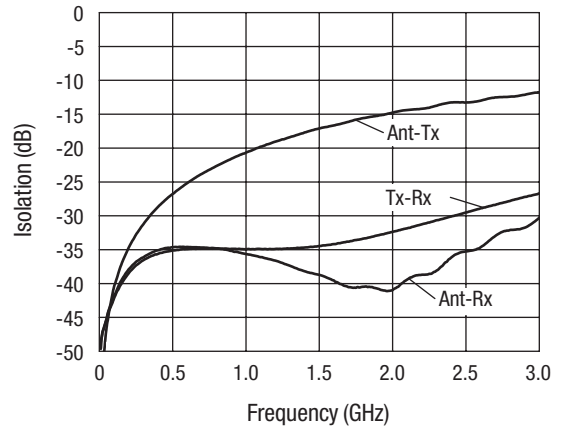
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching characteristics						
Rise, fall	10/90% or 90/10% RF			60		ns
On, off	50% CTL to 90/10% RF			100		ns
Video feedthru	T _{RISE} = 1 ns, BW = 500 MHz			50		mV
Input power for -0.1 dB compression	V _{CTL} = 0/3 V	0.9 GHz		35		dBm
Harmonics H ₂ , 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. V _{HIGH} = 2.7 V @ 100 μA max. to 5 V @ 200 μA max.					

Typical Performance Data (0, 3 V)

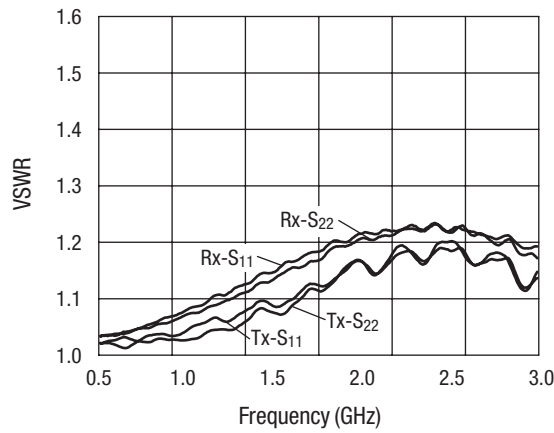
$Z_0 = 50 \Omega$, unless otherwise noted



Insertion Loss vs. Frequency



Isolation vs. Frequency



VSWR vs. Frequency

Absolute Maximum Ratings

Characteristic	Value
RF input power	4 W > 500 MHz 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.

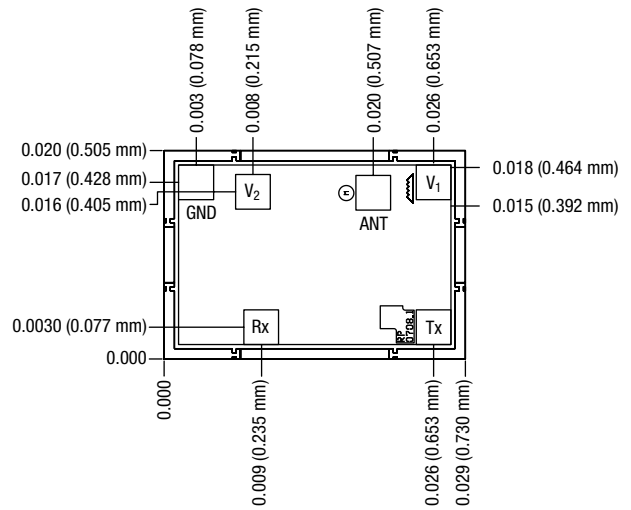
CAUTION: Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without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

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