

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

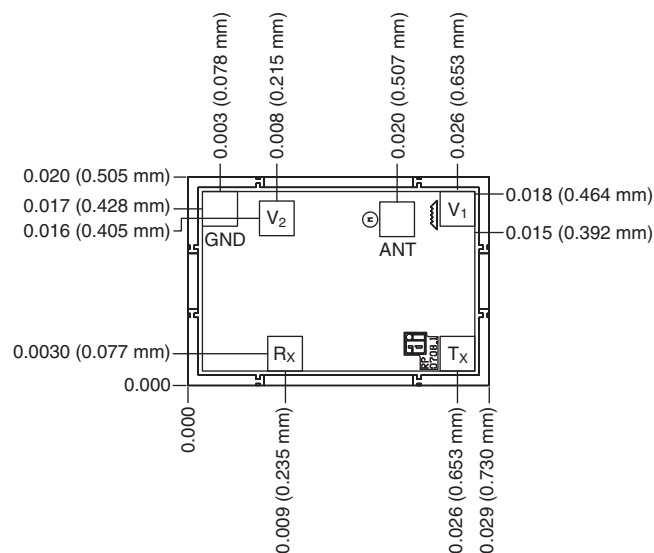
Features

- +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 ¹	Condition	Frequency	Min.	Typ.	Max.	Unit
Insertion Loss ²	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 ³		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 ⁴	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 ₂ , H ₃ (Transmit State)	P _{IN} = 34.5 dBm	0.9 GHz		+70		dBc
Control Voltages	V _{Low} = 0 to 0.2 V @ 20 μ A Max. V _{High} = +2.7 V @ 100 μ A Max. to +5 V @ 200 μ A Max.					

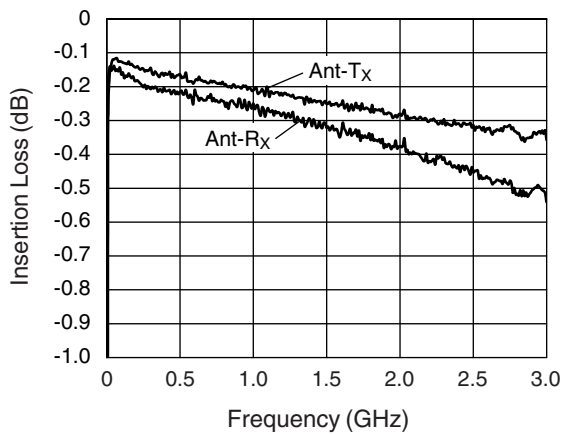
1. All measurements made in a 50 Ω system, unless otherwise specified.

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

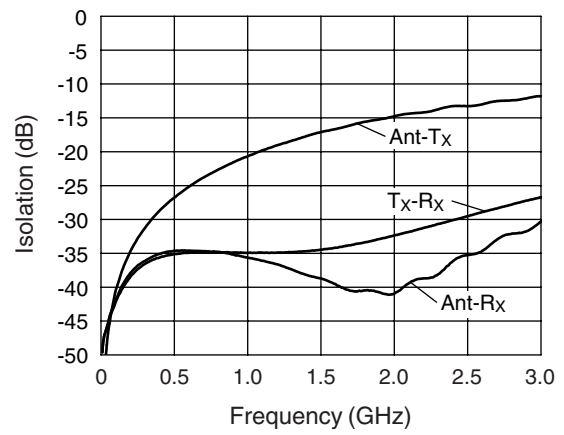
3. Insertion loss state.

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

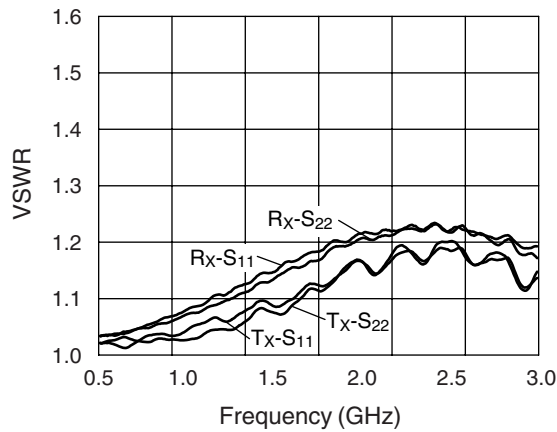
Typical Performance Data (0, +3 V)



Insertion Loss vs. Frequency



Isolation vs. Frequency



VSWR vs. Frequency

Absolute Maximum Ratings

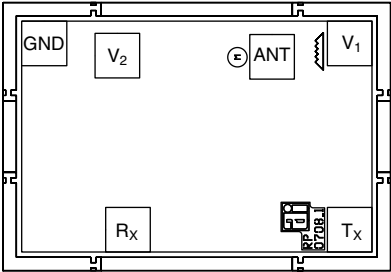
Characteristic	Value
RF Input Power	4 W > 500 MHz 0/+6 V Control
Control Voltage	-0.2 V, +6 V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

Truth Table

V ₁	V ₂	Ant–R _x	Ant–T _x
V _{High}	0	Isolation	Insertion Loss
0	V _{High}	Insertion Loss	Isolation

V_{High} = +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.