

# PHEMT GaAs IC Transmit/Dual Receive Switch With Diversity Antennas 0.5–2 GHz

AS160-86

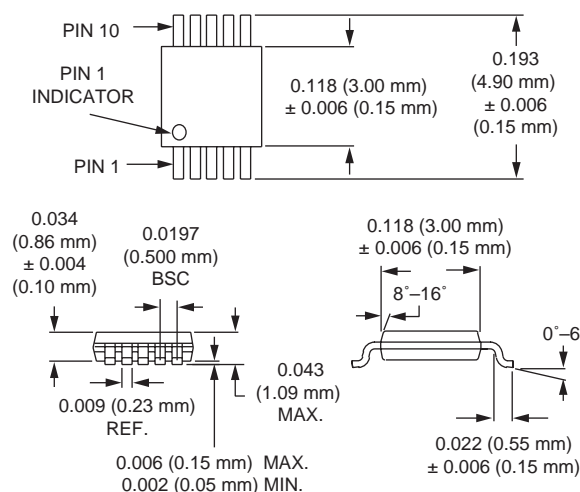
## Features

- Five RF Ports
- Transmit to Either of Two Antennas
- Receive From Either of Two Antennas
- Differential Biasing for High Linearity

## Description

The AS160-86 is a PHEMT GaAs IC transfer and SPDT switch. This switch is ideal for dual band applications where  $T_X/R_X$  diversity is required. The switch has 4 control lines that may be positive, negative or a combination of both (differential biasing). This switch is designed for commercial wireless applications such as GSM, DCS and PCS systems.

## MSOP-10



## Electrical Specifications at 25°C (+2.75, -4.5 V)

Parameter <sup>1</sup>	Condition	Frequency	Min.	Typ.	Max.	Unit
Insertion Loss <sup>2</sup>	$T_X$ -Ant. 1, Ant. 2	0.5–1.0 GHz		0.5	0.6	dB
		1.0–2.0 GHz		0.7	0.9	dB
	$R_{X1}$ , $R_{X2}$ -Ant. 1, Ant. 2	0.5–1.0 GHz		1.1	1.3	dB
		1.0–2.0 GHz		1.5	1.7	dB
Isolation	$R_{X1}$ , $R_{X2}$ -Ant. 1, Ant. 2 ( $T_X$ -Ant. 1, 2 Insertion Loss)	0.5–1.0 GHz		35	30	dB
		1.0–2.0 GHz		25	20	dB
VSWR	Insertion Loss States	0.5–2.0 GHz		1.5:1		

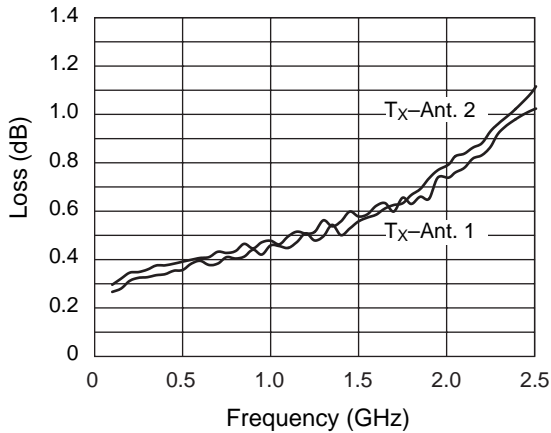
## Operating Characteristics at 25°C (+2.75, -4.5 V)

Parameter <sup>1</sup>	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics	Rise, Fall (10/90% or 90%/10% RF)			50		nS
	On, Off (50% CTL to 90%/10% RF)			100		nS
	Video Feedthru			50		mV
2nd and 3rd Harmonics	34.5 dBm @ ( $V_{High} - V_{Low}$ ) > 7.25	0.9 GHz		65		dBc
	32.0 dBm @ ( $V_{High} - V_{Low}$ ) > 7.25	1.8 GHz		67		dBc
Control Voltages	$V_{Low} = -5 < V_{Low} < -2.75$ V @ 200 $\mu$ A Max. $V_{High} = -.2 < V_{High} < +5$ V @ 200 $\mu$ A Max. Differential = $2.75 < (V_{High} - V_{Low}) < 10$ V @ 200 $\mu$ A Max.					

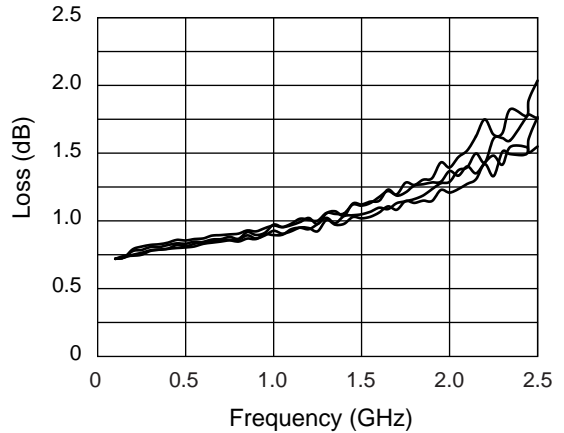
1. All measurements made in a 50  $\Omega$  system, unless otherwise specified.

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

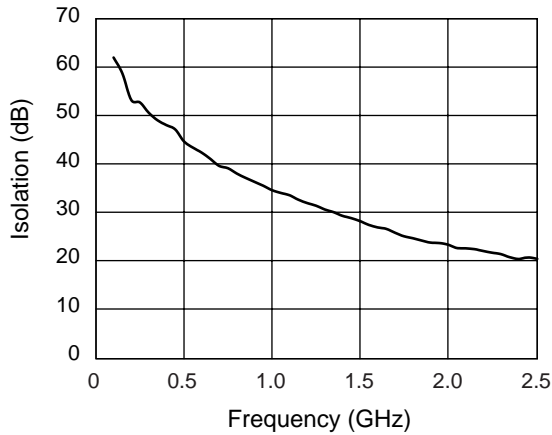
### Typical Performance Data



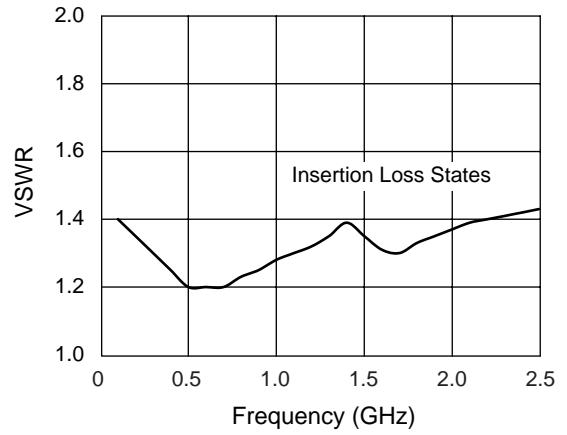
**TX-Ant. 1, TX-Ant. 2  
Insertion Loss vs. Frequency**



**RX1-Ant. 1, 2 RX2-Ant. 1, 2  
Insertion Loss vs. Frequency**



**Ant. 1, 2-RX1, 2  
Isolation vs. Frequency**



**VSWR vs. Frequency**

### Truth Table

V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	T <sub>X</sub> -Ant. 1	T <sub>X</sub> -Ant. 2	R <sub>X1</sub> -Ant. 1	R <sub>X1</sub> -Ant. 2	R <sub>X2</sub> -Ant. 1	R <sub>X2</sub> -Ant. 2
V <sub>Low</sub>	V <sub>High</sub>	V <sub>Low</sub>	V <sub>Low</sub>	Ins. Loss	Isol.	Isol.	Isol.	Isol.	Isol.
V <sub>High</sub>	V <sub>Low</sub>	V <sub>Low</sub>	V <sub>Low</sub>	Isol.	Ins. Loss	Isol.	Isol.	Isol.	Isol.
V <sub>High</sub>	V <sub>Low</sub>	V <sub>High</sub>	V <sub>Low</sub>	Isol.	Ins. Loss	Ins. Loss	Isol.	Isol.	Isol.
V <sub>Low</sub>	V <sub>High</sub>	V <sub>High</sub>	V <sub>Low</sub>	Ins. Loss	Isol.	Isol.	Ins. Loss	Isol.	Isol.
V <sub>High</sub>	V <sub>Low</sub>	V <sub>Low</sub>	V <sub>High</sub>	Isol.	Ins. Loss	Isol.	Isol.	Ins. Loss	Isol.
V <sub>Low</sub>	V <sub>High</sub>	V <sub>Low</sub>	V <sub>High</sub>	Ins. Loss	Isol.	Isol.	Isol.	Isol.	Ins. Loss

V<sub>Low</sub> = -5 < V<sub>Low</sub> < -2.75 V @ 200 μA Max.

V<sub>High</sub> = -2 < V<sub>High</sub> < +5 V @ 200 μA Max.

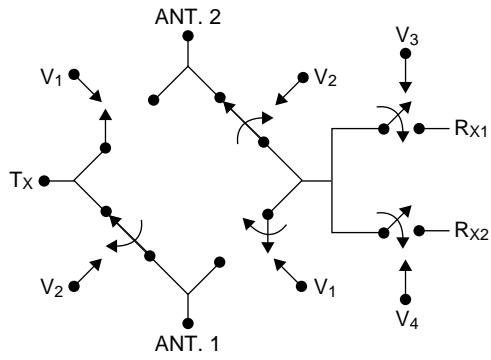
Differential = 2.75 < (V<sub>High</sub> - V<sub>Low</sub>) < 10 V @ 200 μA Max.

### Absolute Maximum Ratings

Characteristic	Value
RF Input Power	3 W Max. > 500 MHz +5 V/-5 V
Control Voltage	+5 V/-5 V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C
θ <sub>JC</sub>	25°C/W

Note: Exceeding these ratings may cause irreversible damage.

### Switch Schematic



### Pin Out

