

# GaAs IC High Isolation Positive Control SPDT Non-Reflective Switch DC–4.0 GHz



AS186-302

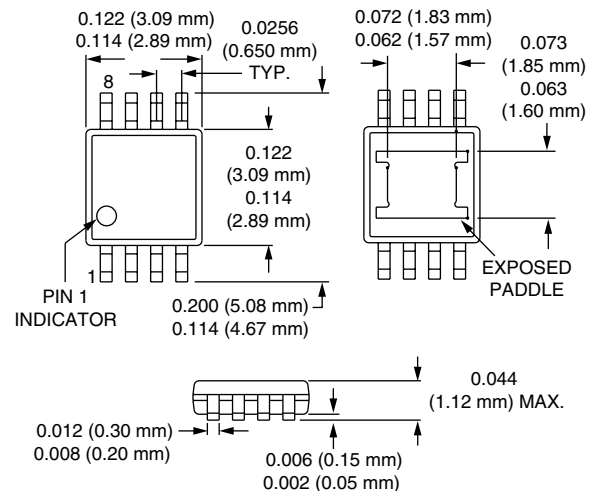
## Features

- Positive Voltage Control (0/+3 to 0/+5 V)
- High Isolation (55 dB @ 0.9 GHz and 1.9 GHz)
- Miniature MSOP-8 Exposed Pad Package
- Three Switch Solution for Base Station Synthesizer Switch
- Non-Reflective
- Operation to 6 GHz

## Description

The AS186-302 is a GaAs FET IC SPDT non-reflective switch packaged in a MSOP-8 exposed pad plastic package for low cost, high isolation commercial applications. Ideal building block for base station applications where synthesizer isolation is critical. Typical applications include GSM, PCS, WCDMA, 2.4 GHz ISM and 3.5 GHz wireless local loop.

## MSOP-8 Exposed Pad

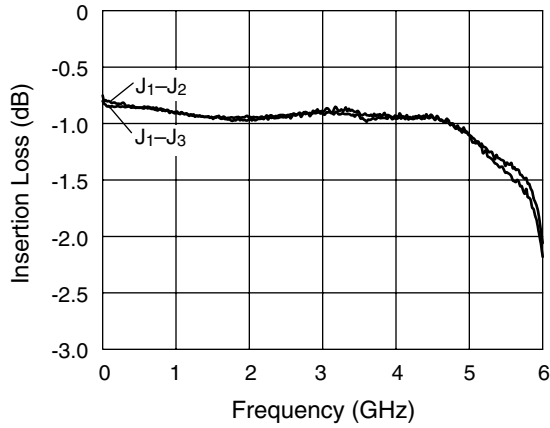


## Electrical Specifications (0, +5 V), -40 to +85°C

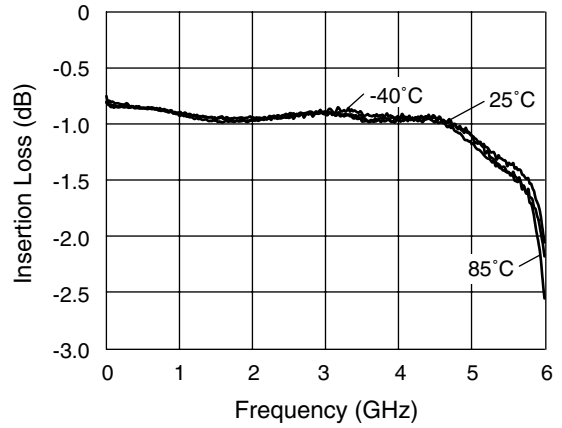
Parameter <sup>1</sup>	Condition	Frequency	Min.	Typ.	Max.	Unit	
Insertion Loss		DC–2.0 GHz		0.8	1.05	dB	
		DC–3.0 GHz		0.9	1.15	dB	
		DC–4.0 GHz		1.0	1.25	dB	
Isolation <sup>2</sup>		DC–2.0 GHz	50	55		dB	
		DC–3.0 GHz	45	50		dB	
		DC–4.0 GHz	35	40		dB	
VSWR (On State)		DC–2.0 GHz		1.3:1	1.5:1		
		DC–4.0 GHz		1.3:1	1.6:1		
VSWR (Off State)		0.5–4.0 GHz		1.35:1	1.7:1		
Switching Characteristics <sup>3</sup>	Rise, Fall (10/90% or 90/10% RF) On, Off (50% CTL to 90/10% RF) Video Feedthru			30		ns	
				50		ns	
				25		mV	
Input Power for 1 dB Compression	0/+3 V	0.9–4.0 GHz	17	21		dBm	
	0/+5 V	0.9–4.0 GHz	24	27		dBm	
Intermodulation Intercept Point (IIP3)	For Two-tone Input Power +8 dBm	0/+3 V	0.9–4.0 GHz	27	38		dBm
		0/+5 V	0.9–4.0 GHz	42	46		dBm
Control Voltages	V <sub>Low</sub> = 0 to 0.2 V @ 20 µA Max. V <sub>High</sub> = +3 V @ 100 µA Max. to +5 V @ 200 µA Max.						

1. All measurements made in a 50 Ω system, unless otherwise specified.
2. Backside of exposed pad must be connected to RF ground to obtain specified isolation.
3. Video feedthru measured with 3 ns risetime pulse.

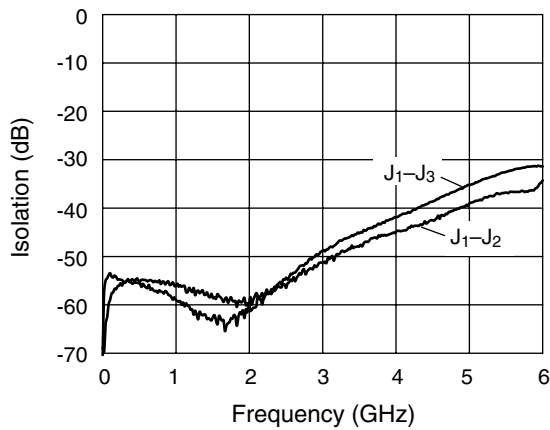
**Typical Performance Data (0, +5 V)**



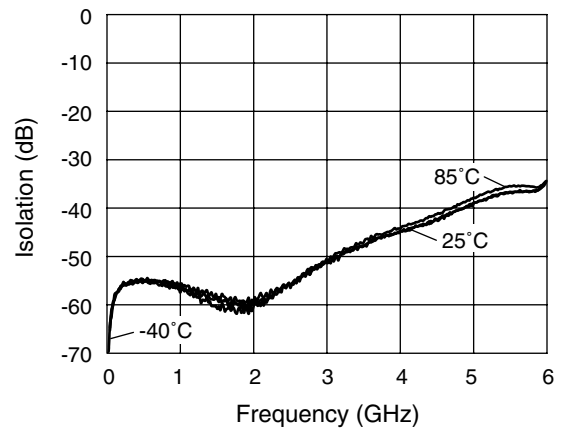
**Insertion Loss vs. Frequency**



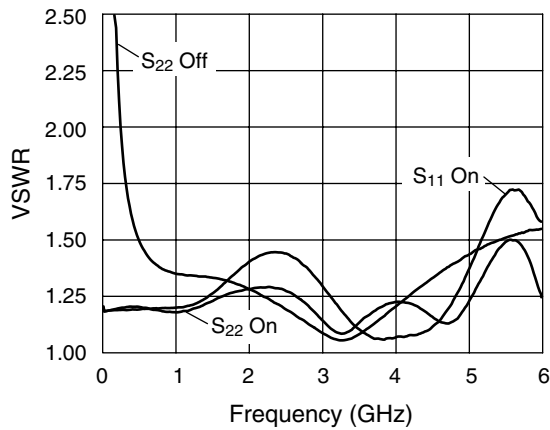
**Insertion Loss vs. Frequency  
-40, 25, 85°C**



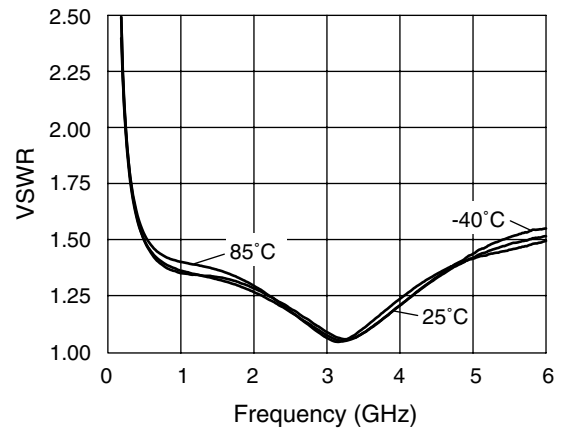
**Isolation vs. Frequency**



**Isolation vs. Frequency  
-40, 25, 85°C**

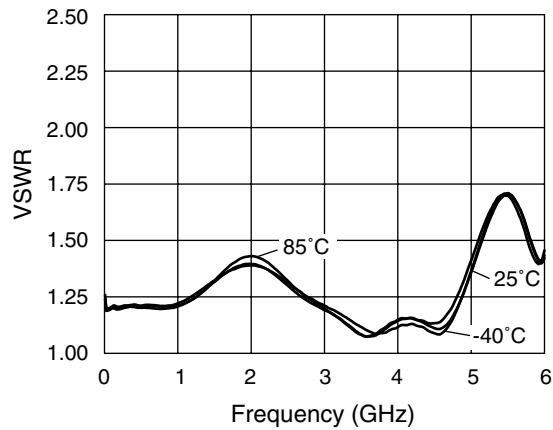


**VSWR vs Frequency**



**VSWR vs Frequency  
-40, 25, 85°C (S22 Off)**

## Typical Performance Data (0, +5 V)



VSWR vs Frequency  
-40, 25, 85°C (S<sub>11</sub> On)

## IP3 vs. Voltage and Temperature

Control Voltage (V)	Temperature (°C)	IP3 @ +8 dBm Each Tone (dBm)
3	-40	44.0
3	25	38.0
3	85	29.5
5	-40	47.5
5	25	46.5
5	85	45.5

Tone frequencies: 900 and 901 MHz.

## Truth Table

V <sub>1</sub>	V <sub>2</sub>	J <sub>1</sub> -J <sub>2</sub>	J <sub>1</sub> -J <sub>3</sub>
0	V <sub>High</sub>	Isolation	Insertion Loss
V <sub>High</sub>	0	Insertion Loss	Isolation

V<sub>High</sub> = +3 V to +5 V.

## Compression Point vs. Voltage and Temperature

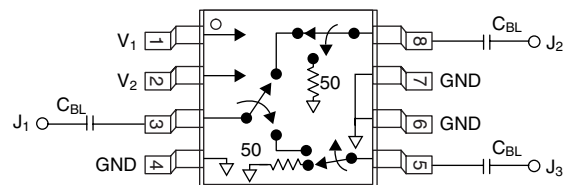
Control Voltage (V)	Temperature (°C)	Input Power @ 1 dB Compression (dBm)	Input power @ 0.1 dB Compression (dBm)
3	-40	20.5	16.5
3	25	20.0	15.3
3	85	19.0	14.0
5	-40	28.5	23.0
5	25	28.0	23.0
5	85	27.5	23.0

Frequency: 900 MHz.

## Absolute Maximum Ratings

Characteristic	Value
RF Input Power	1 W Max. > 500 MHz 0/+8 V Control
Control Voltage	-0.2 V, +8 V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C
Θ <sub>JC</sub>	25°C/W

## Pin Out



C<sub>BL</sub> = 47 pF for operation > 500 MHz.