

# GaAs IC High Isolation Positive Control SPDT Switch DC–3.0 GHz



AS176-59

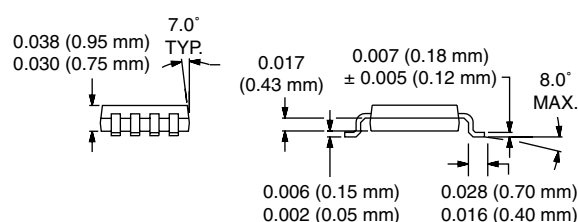
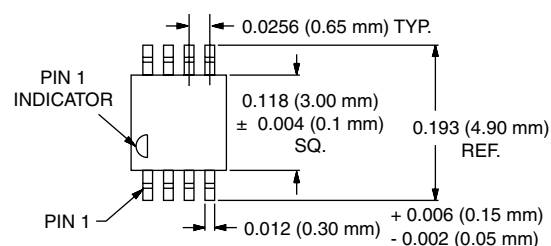
## Features

- Positive Voltage Control (0/+3 to +5 V)
- High Isolation (50 dB @ 0.9, 1.9 GHz)<sup>5</sup>
- Low DC Power Consumption
- Ideal for Cellular, GSM, DCS, PCS, 3G and 2.4 GHz ISM Applications

## Description

The AS176-59 is a GaAs FET IC SPDT switch packaged in a MSOP-8 plastic package for low cost, high isolation commercial applications. Ideal building block for base station dual band applications where synthesizer isolation is critical. Use in conjunction with the AS165-59 SPST switch to meet GSM synthesizer isolation requirements.

## MSOP-8



## Electrical Specifications at 25°C (0, +3 V), (0, +5 V)

Parameter <sup>1</sup>	Condition	Frequency <sup>2</sup>	Min.	Typ.	Max.	Unit
Insertion Loss <sup>3</sup>		DC–1.0 GHz		0.7	0.9	dB
		DC–2.0 GHz		0.8	1.0	dB
		DC–2.5 GHz		0.8	1.1	dB
		DC–3.0 GHz		0.9	1.2	dB
Isolation <sup>4</sup>	J <sub>1</sub> –J <sub>2</sub> /J <sub>1</sub> –J <sub>3</sub> J <sub>1</sub> –J <sub>2</sub> /J <sub>1</sub> –J <sub>3</sub>	DC–1.0 GHz	45/50	50/55		dB
		DC–2.0 GHz	41/38	45/42		dB
		DC–2.5 GHz	29	34		dB
		DC–3.0 GHz	22	27		dB
Isolation <sup>5</sup>	J <sub>1</sub> –J <sub>2</sub> /J <sub>1</sub> –J <sub>3</sub>	DC–1.0 GHz	45/50	50/55		dB
		DC–2.0 GHz	47	52		dB
		DC–2.5 GHz	36	40		dB
		DC–3.0 GHz	30	35		dB
VSWR <sup>6</sup>		DC–2.0 GHz		1.3:1	1.5:1	
		DC–3.0 GHz		1.5:1	1.8:1	

## Operating Characteristics at 25°C (0, +5 V)

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics <sup>7</sup>	Rise, Fall (10/90% or 90/10% RF)			60		ns
	On, Off (50% CTL to 90/10% RF)			100		ns
	Video Feedthru				50	
Intermodulation Intercept Point (IP3)	Two-tone Input Power +5 dBm +3 V +5 V	0.5–3.0 GHz		+41		dBm
		0.5–3.0 GHz		+45		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. V <sub>S</sub> = V <sub>High</sub> ± 0.2 V					

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

2. DC = 300 kHz.

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

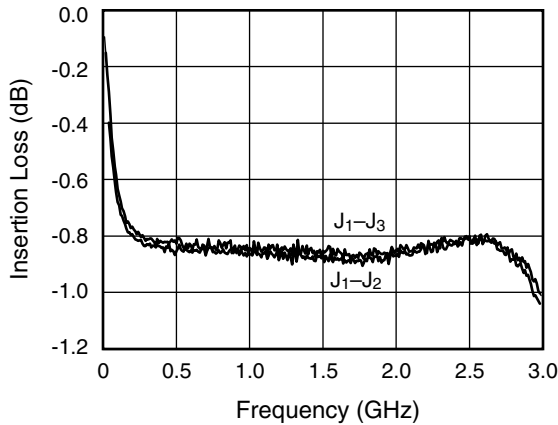
4. Pin 4: N/C.

5. Pin 4: GND.

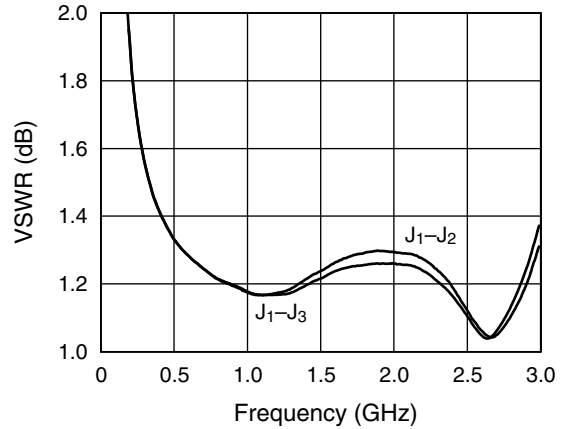
6. Insertion loss state.

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

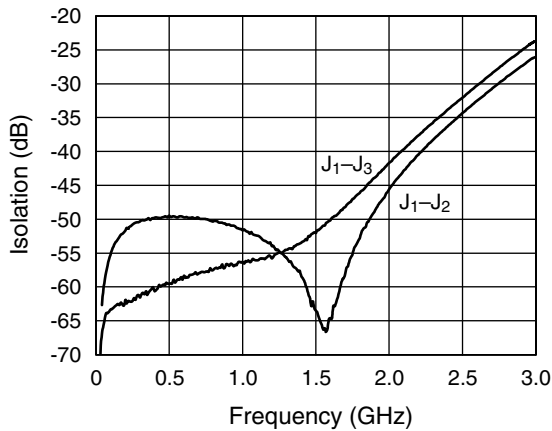
**Typical Performance Data (0, +5 V)**



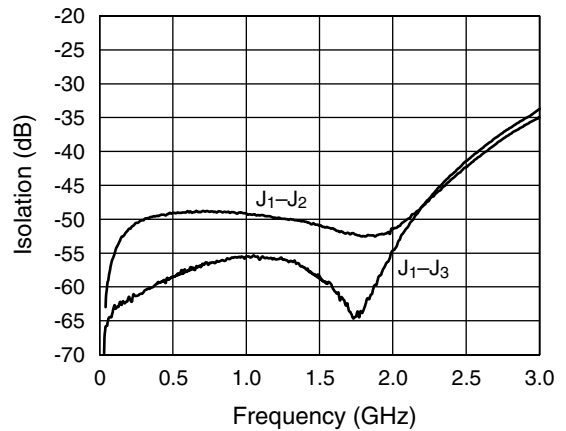
**Insertion Loss vs. Frequency**



**VSWR vs. Frequency**



**Isolation vs. Frequency  
Pin 4: N/C**



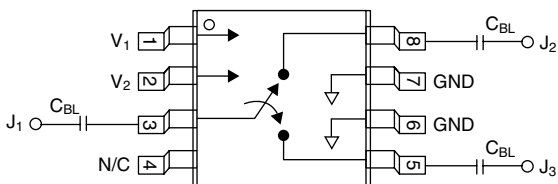
**Isolation vs. Frequency  
Pin 4: GND**

**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.

**Pin Out**



C<sub>BL</sub> = 47 pF.

**Absolute Maximum Ratings**

Characteristic	Value
RF Input Power	1 W Max. > 500 MHz 0/+8 V Control
Supply Voltage	+8 V
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