

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



AS176-59

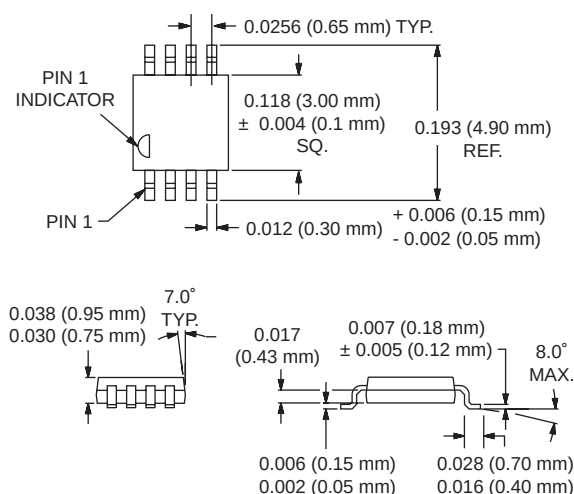
Features

- Positive Voltage Control (0/+3 to +5 V)
- High Isolation (50 dB @ 0.9, 1.9 GHz)⁵
- 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 ¹	Condition	Frequency ²	Min.	Typ.	Max.	Unit
Insertion Loss ³		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 ⁴	J ₁ –J ₂ /J ₁ –J ₃ J ₁ –J ₂ /J ₁ –J ₃	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 ⁵	J ₁ –J ₂ /J ₁ –J ₃	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 ⁶		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 ⁷	Rise, Fall (10/90% or 90/10% RF)			60		ns
	On, Off (50% CTL to 90/10% RF)			100		ns
	Video Feedthru			50		mV
Intermodulation Intercept Point (IP3)	Two-tone Input Power +5 dBm					
	+3 V +5 V	0.5–3.0 GHz 0.5–3.0 GHz		+41 +45		dBm dBm
Control Voltages	V _{Low} = 0 to 0.2 V @ 20 µA Max. V _{High} = +3 V @ 100 µA Max. to +5 V @ 200 µA Max. V _S = V _{High} ± 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.

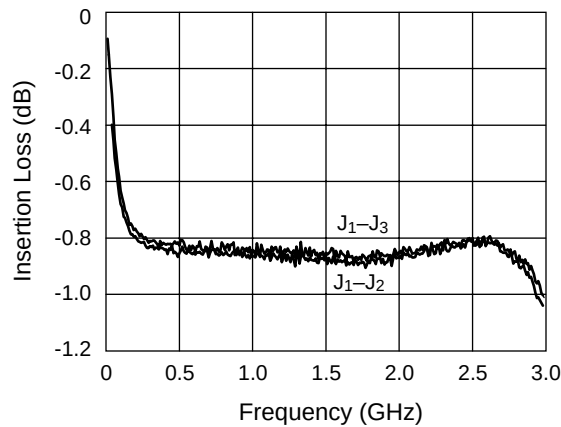
4. Pin 4: N/C.

5. Pin 4: GND.

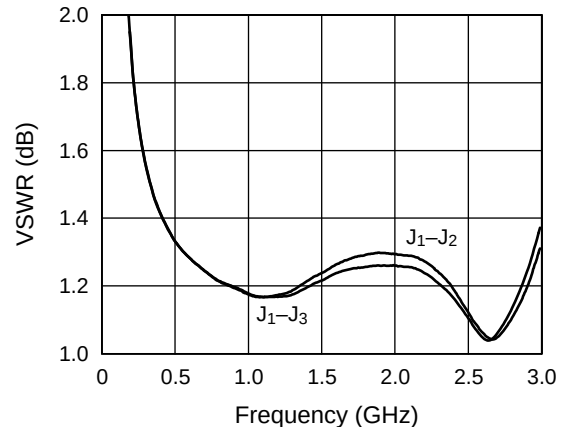
6. Insertion loss state.

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

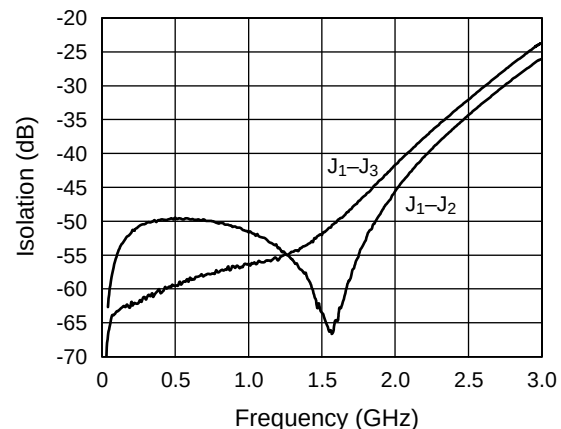
Typical Performance Data (0, +5 V)



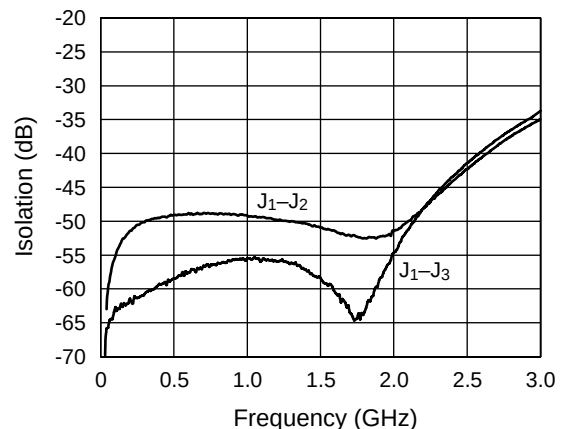
Insertion Loss vs. Frequency



VSWR vs. Frequency



Isolation vs. Frequency
Pin 4: N/C



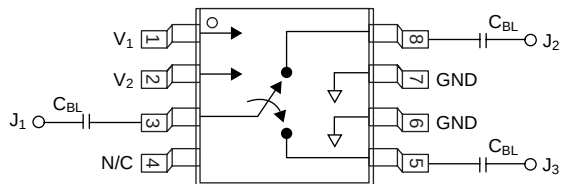
Isolation vs. Frequency
Pin 4: GND

Truth Table

V ₁	V ₂	J ₁ –J ₂	J ₁ –J ₃
0	V _{High}	Isolation	Insertion Loss
V _{High}	0	Insertion Loss	Isolation

V_{High} = +3 V to +5 V.

Pin Out



C_{BL} = 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 _{JC}	25°C/W