

## Excellent Integrated System Limited

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[Skyworks Solutions Inc.](#)  
[AS176-59LF](#)

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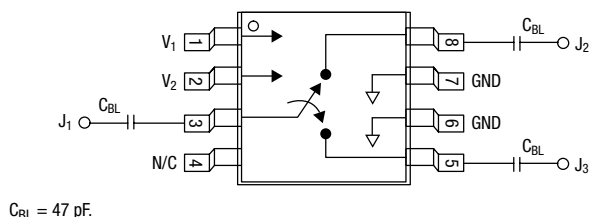
**DATA SHEET**

# AS176-59, AS176-59LF: GaAs IC High-Isolation Positive Control SPDT Switch 300 kHz–3 GHz

**Features**

- Positive voltage control (0/3 to 5 V)
- High isolation (50 dB @ 0.9, 1.9 GHz)
- Low DC power consumption
- Ideal for cellular, GSM, DCS, PCS, 3G and 2.4 GHz ISM applications
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C per JEDEC J-STD-020

**Pin Out**



**Description**

The AS176-59 is a GaAs FET IC SPDT switch packaged in an MSOP-8 plastic package for low-cost, high-isolation commercial applications. It is an 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.

**NEW** Skyworks offers lead (Pb)-free, RoHS (Restriction of Hazardous Substances)-compliant packaging.



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

Parameter <sup>(1)</sup>	Condition	Frequency	Min.	Typ.	Max.	Unit
Insertion loss <sup>(2)</sup>		300 kHz–1.0 GHz		0.7	0.9	dB
		300 kHz–2.0 GHz		0.8	1.0	dB
		300 kHz–2.5 GHz		0.8	1.1	dB
		300 kHz–3.0 GHz		0.9	1.2	dB
Isolation <sup>(3)</sup>	$J_1-J_2/J_1-J_3$ $J_1-J_2/J_1-J_3$	300 kHz–1.0 GHz	45/50	50/55		dB
		300 kHz–2.0 GHz	41/38	45/42		dB
		300 kHz–2.5 GHz	29	34		dB
		300 kHz–3.0 GHz	22	27		dB
Isolation <sup>(4)</sup>	$J_1-J_2/J_1-J_3$	300 kHz–1.0 GHz	45/50	50/55		dB
		300 kHz–2.0 GHz	47	52		dB
		300 kHz–2.5 GHz	36	40		dB
		300 kHz–3.0 GHz	30	35		dB
VSWR <sup>(5)</sup>		300 kHz–2.0 GHz		1.3:1	1.5:1	
		300 kHz–3.0 GHz		1.5:1	1.8:1	

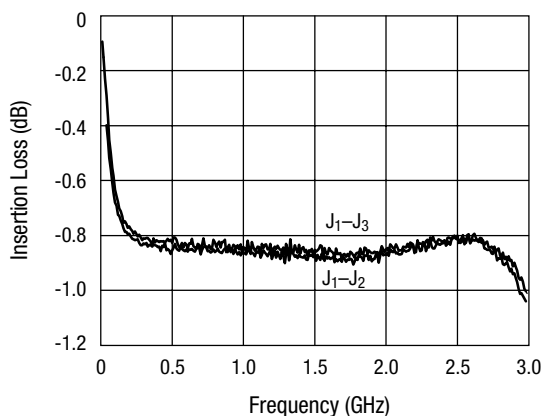
1. All measurements made in a 50 Ω system, unless otherwise specified.  
 2. Insertion loss changes by 0.003 dB/°C.  
 3. Pin 4: N/C.  
 4. Pin 4: GND.  
 5. Insertion loss state.

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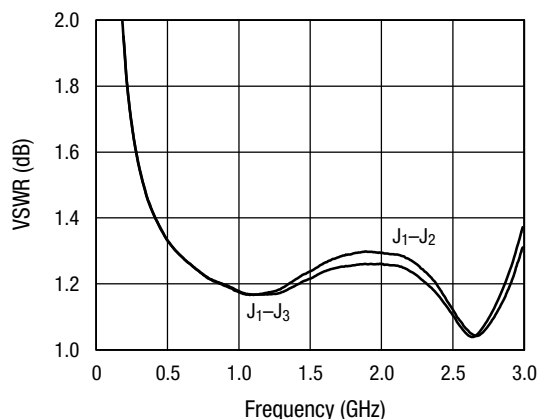
Operating Characteristics at 25 °C (0, 5 V)

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching characteristics						
Rise, fall	10/90% or 90/10% RF			60		ns
On, off	50% CTL to 90/10% RF			100		ns
Video feedthru	$T_{RISE} = 1 \text{ ns}$ , BW = 500 MHz			50		mV
Intermodulation intercept point (IP3)	Two-tone input power 5 dBm $V_{CTL} = 3 \text{ V}$ $V_{CTL} = 5 \text{ V}$	0.5–3 GHz 0.5–3 GHz		41 45		dBm dBm
Thermal resistance				25		°C/W
Control voltages	$V_{LOW} = 0 \text{ to } 0.2 \text{ V @ } 20 \mu\text{A max.}$ $V_{HIGH} = 3 \text{ V @ } 100 \mu\text{A max. to } 5 \text{ V @ } 200 \mu\text{A max.}$					

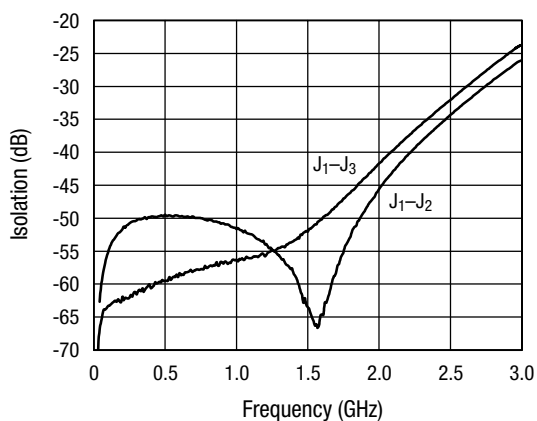
Typical Performance Data (0, 5 V)



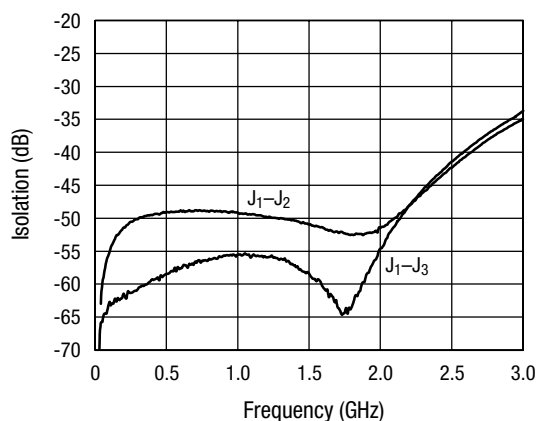
Insertion Loss vs. Frequency



VSWR vs. Frequency



Isolation vs. Frequency  
Pin 4: N/C



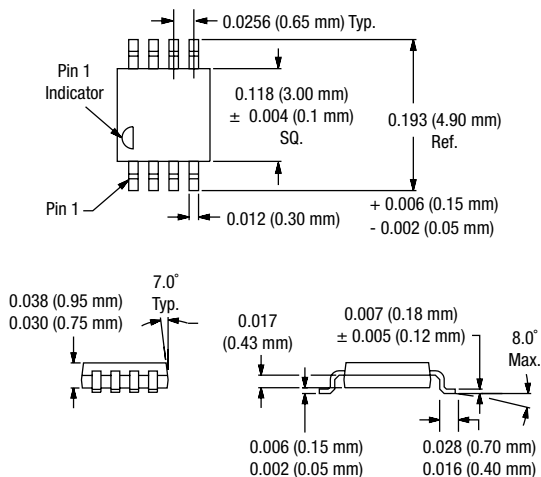
Isolation vs. Frequency  
Pin 4: GND

### 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

All other conditions not recommended.  
 V<sub>HIGH</sub> = 3 V to 5 V.

### MSOP-8



### Absolute Maximum Ratings

Characteristic	Value
RF input power	1 W max. for f > 500 MHz 100 mW for f < 500 MHz V <sub>CTL</sub> = 0/8 V
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

Performance is guaranteed only under the conditions listed in the specifications table and is not guaranteed under the full range(s) described by the Absolute Maximum specifications. Exceeding any of the absolute maximum/minimum specifications may result in permanent damage to the device and will void the warranty.

**CAUTION:** Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions must be employed at all times.

### Recommended Solder Reflow Profiles

Refer to the [“Recommended Solder Reflow Profile”](#) Application Note.

### Tape and Reel Information

Refer to the [“Discrete Devices and IC Switch/Attenuators Tape and Reel Package Orientation”](#) Application Note.

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