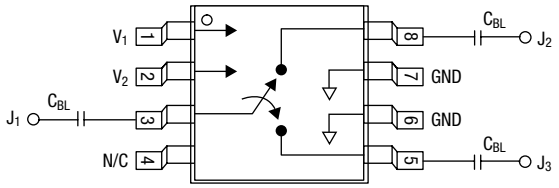
DATA SHEET

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



C_{BL} = 47 pF.

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)

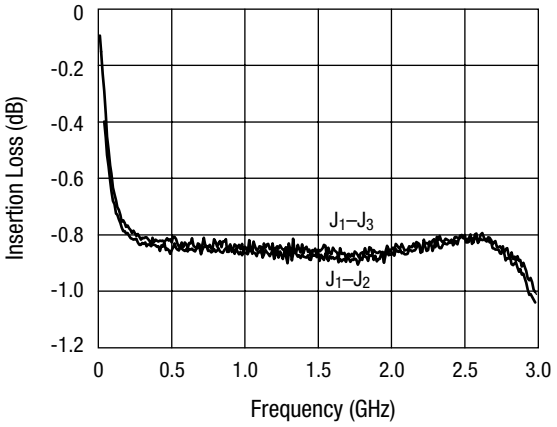
Parameter[1]	Condition	Frequency	Min.	Typ.	Max.	Unit
Insertion loss[2]		300 kHz–1.0 GHz		0.7	0.9	dB
		300 kHz–2.0 GHz		0.8	1.0	dB
		300 kHz–2.5 GHz		0.8	1.1	dB
		300 kHz–3.0 GHz		0.9	1.2	dB
Isolation[3]	J_1–J_2/J_1–J_3	300 kHz–1.0 GHz	45/50	50/55		dB
	J_1–J_2/J_1–J_3	300 kHz–2.0 GHz	41/38	45/42		dB
		300 kHz–2.5 GHz	29	34		dB
		300 kHz–3.0 GHz	22	27		dB
Isolation[4]	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[5]		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.

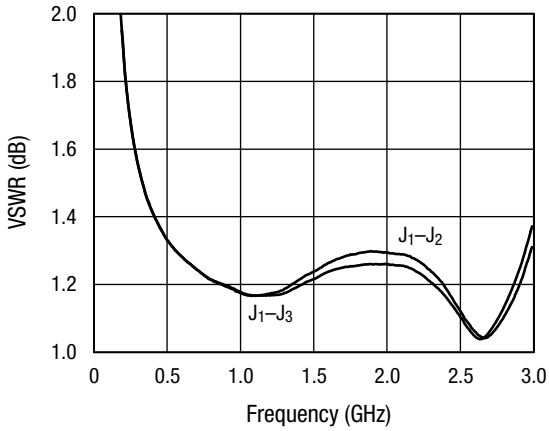
Operating Characteristics at 25 °C (0, 5 V)

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 ns, BW = 500 MHz			50		mV
Intermodulation intercept point (IP3)	Two-tone input power 5 dBm					
	V_{CTL} = 3 V	0.5–3 GHz		41		dBm
	V_{CTL} = 5 V	0.5–3 GHz		45		dBm
Thermal resistance				25		°C/W
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.					

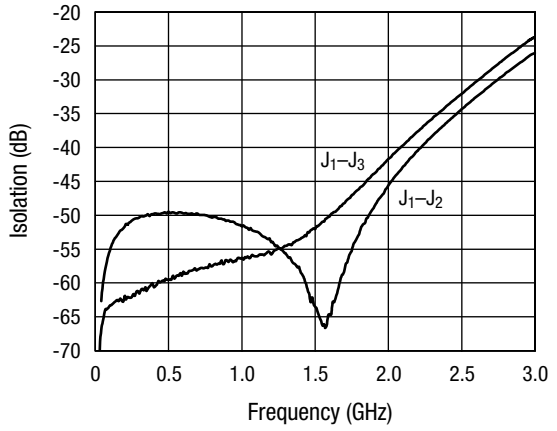
Typical Performance Data (0, 5 V)



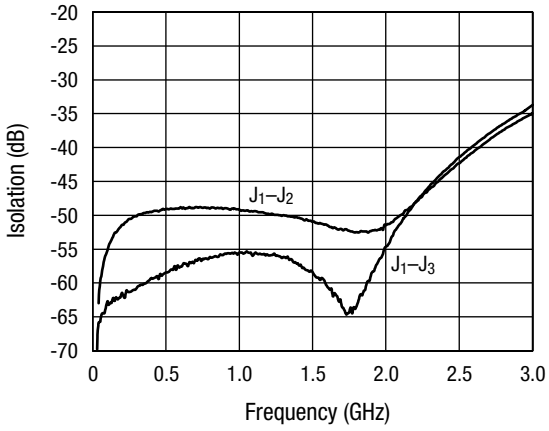
Insertion Loss vs. Frequency



VSWR vs. Frequency



Isolation vs. Frequency
Pin 4: N/C



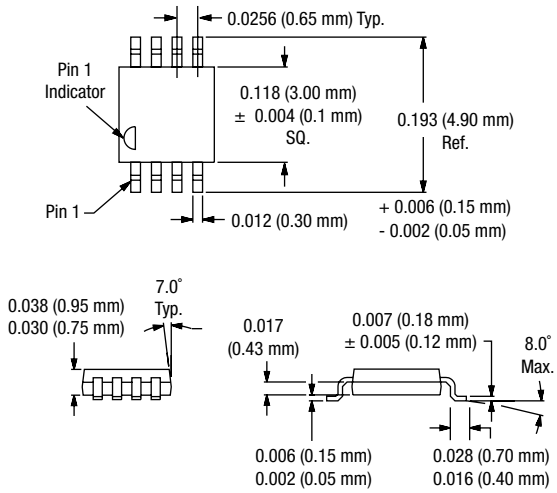
Isolation vs. Frequency
Pin 4: GND

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

All other conditions not recommended.
V_{HIGH} = 3 V to 5 V.

MSOP-8



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.

Absolute Maximum Ratings

Characteristic	Value
RF input power	1 W max. for f > 500 MHz 100 mW for f < 500 MHz V_{CTL} = 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.*