SKYWORKS®

DATA SHEET

AS196-307, AS196-307LF: GaAs IC High Isolation SPDT Non-Reflective Switch with Driver DC–6.0 GHz

Features

- Positive voltage control (0/+3 to 0/+5 V)
- High isolation (55 dB @ 0.9 GHz and 1.9 GHz)
- LPCC 4 x 4 mm package
- Integrated silicon CMOS driver
- Non-reflective
- Available lead (Pb)-free MSL-2 @ 250 °C per JEDEC J-STD-020

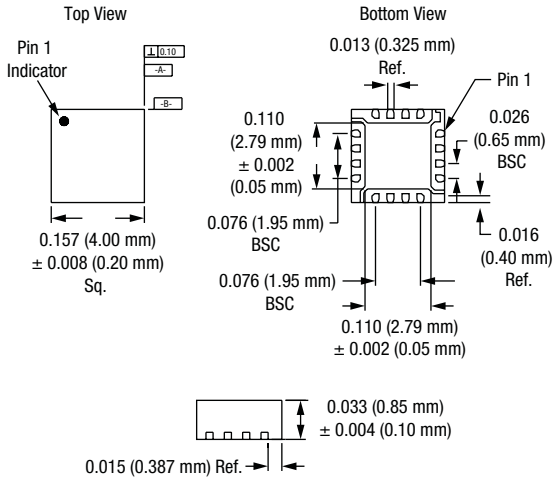
Description

The AS196-307 is a GaAs FET IC SPDT non-reflective switch packaged in a 16 lead leadless 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 and 5.8 GHz ISM and wireless local loop.

NEW

Skyworks offers lead (Pb)-free "environmentally friendly" packaging that is RoHS compliant (European Parliament for the Restriction of Hazardous Substances).

LPCC 4 x 4 (-307)



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

Parameter[1]	Frequency	Min.	Typ.	Max.	Unit
Insertion loss	DC–2.0 GHz		0.9	1.15	dB
	DC–3.0 GHz		1.0	1.25	dB
	DC–4.0 GHz		1.2	1.4	dB
	DC–6.0 GHz		1.6	2.0	dB
Isolation[2]	DC–2.0 GHz	50	55		dB
	DC–3.0 GHz	43	50		dB
	DC–4.0 GHz	35	40		dB
	DC–6.0 GHz	25	30		dB
VSWR (on state)	DC–2.0 GHz		1.3:1	1.5:1	
	DC–6.0 GHz		1.3:1	1.6:1	
VSWR (off state)	0.5–6.0 GHz		1.35:1	1.7:1	

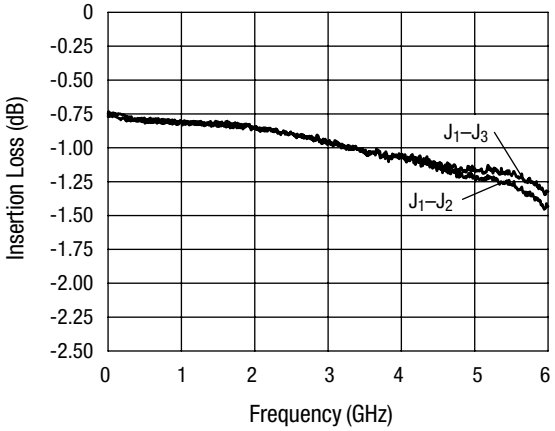
1. All measurements made in a 50 Ω system, unless otherwise specified.
2. Backside of exposed pad must be connected to RF ground to obtain specified isolation.

Operating Characteristics (0, +5 V) -40 °C to +85 °C

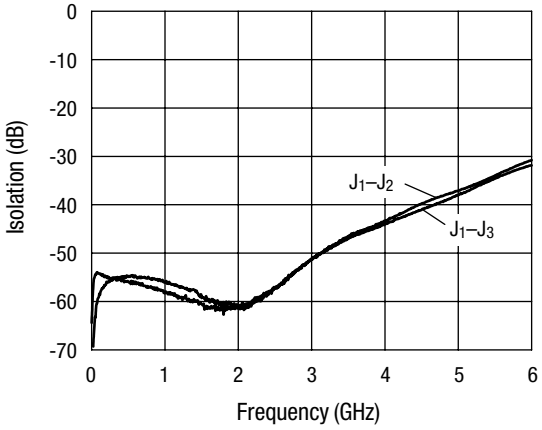
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching characteristics[1]	Rise, fall (10/90% or 90/10% RF) On, off (50% CTL to 90/10% RF) Video feedthru			30 50 25		ns ns mV
Input power for 1 dB compression	0/+3 V 0/+5 V	0.9–6.0 GHz 0.9–6.0 GHz	17 24	21 27		dBm dBm
Intermodulation intercept point (IP3)	For two-tone input power +8 dBm 0/+3 V 0/+5 V	 0.9–6.0 GHz 0.9–6.0 GHz	 30 38	 38 46		 dBm dBm
Control voltage[2]	Low (“0”) High (“1”)		0 V_{CC}–0.6		0.5 V_{CC}	V V
Control current	V_{CTL} = “0” or “1”. VCC = 2.6 to 5 V			5		µA
Supply voltage	V_{CC}		2.6	3	5	V
Supply current	V_{CC} = +3 V V_{CC} = +5 V			10 20	50 100	µA µA

1. Video feedthru measured for 3 ns risetime pulse.
2. V_{CC} must be powered on by a minimum of 10 ns prior to V_{CTL}.

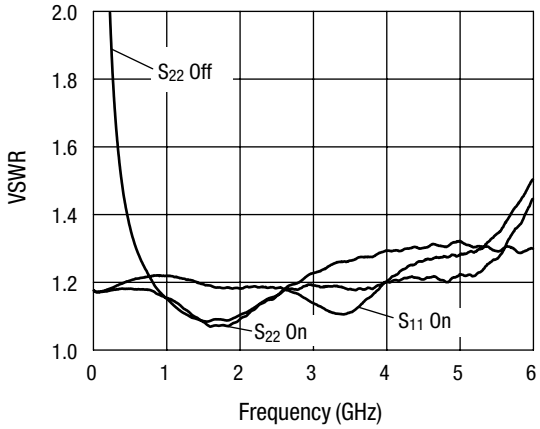
Typical Performance Data (0, +5 V)



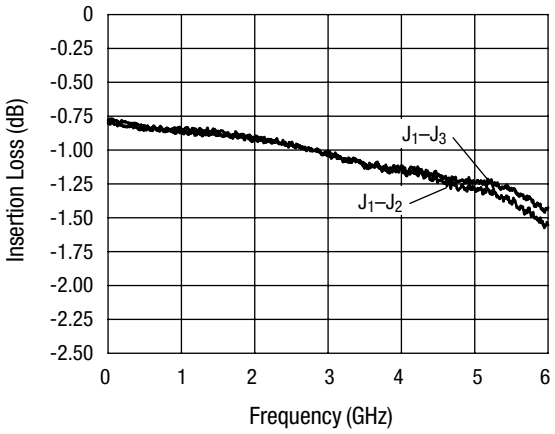
Insertion Loss, 25 ˚C
V_{CC} = +5 V, V_{CTL} = 0/+5 V



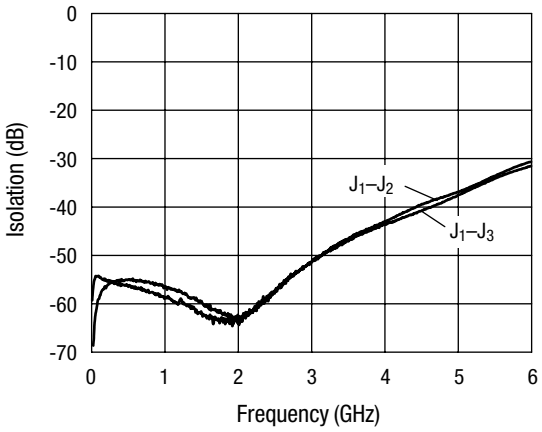
Isolation, 25 ˚C
V_{CC} = +5 V, V_{CTL} = 0/+5 V



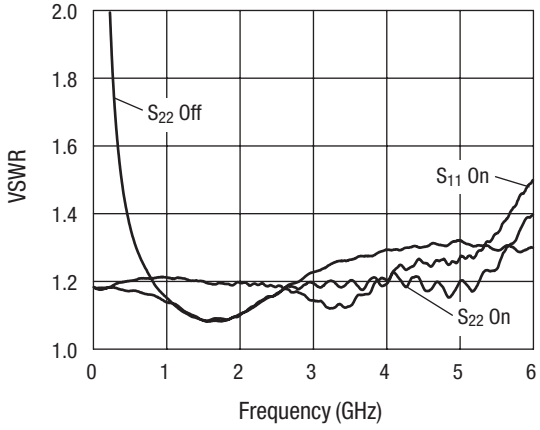
VSWR, 25 ˚C
V_{CC} = +5 V, V_{CTL} = 0/+5 V



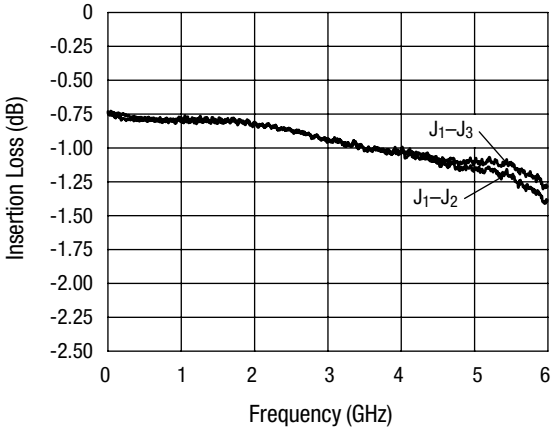
Insertion Loss, 85 ˚C
V_{CC} = +5 V, V_{CTL} = 0/+5 V



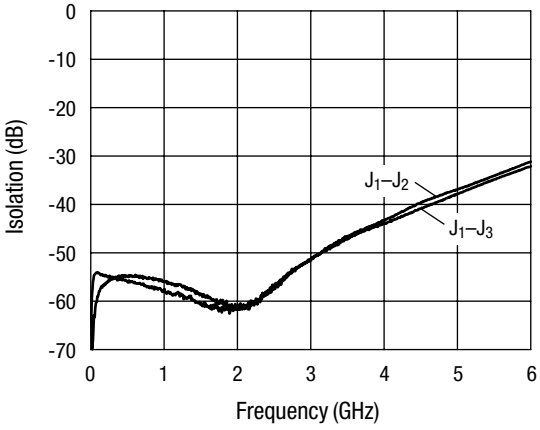
Isolation, 85 ˚C
V_{CC} = +5 V, V_{CTL} = 0/+5 V



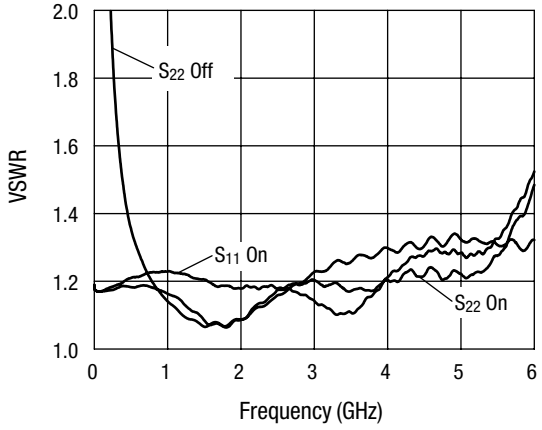
VSWR, 85 ˚C
V_{CC} = +5 V, V_{CTL} = 0/+5 V



Insertion Loss, -40 ˚C
V_{CC} = +5 V, V = 0/+5 V



Isolation, -40 ˚C
V_{CC} = +5 V, V_{CTL} = 0/+5 V



VSWR, -40 ˚C
V_{CC} = +5 V, V_{CTL} = 0/+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: 500 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_{JC}	25 °C/W

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, Electrostatic Discharge (ESD) 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.*

IP3 vs. Voltage and Temperature

Control Voltage (V)	Temperature (°C)	IP3 @ +5 dBm Each T one (dBm)
3	-40	45.5
3	25	45.0
3	85	34.0
5	-40	45.5
5	25	45.5
5	85	40.5

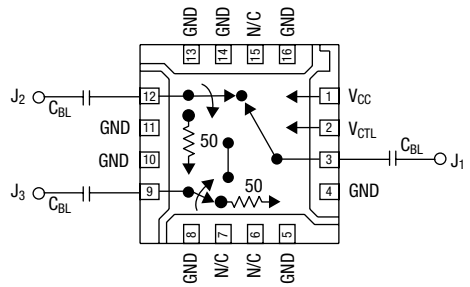
Two tone input power: +5 dBm each tone.
Tone frequencies: 900 and 901 MHz.

Truth Table

V_{CTL}	J_1–J_2	J_1–J_3
0	Insertion loss	Isolation
1	Isolation	Insertion loss

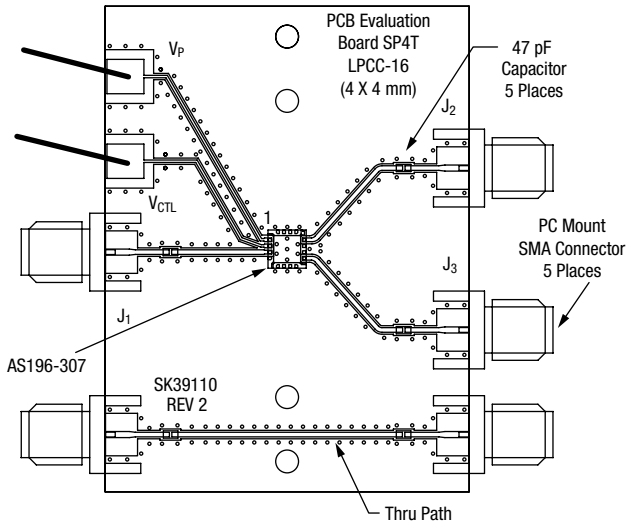
"0" = 0–0.5 V.
"1" = 3.5–5 V.
V_{CC} = 5 V.

Pin Out (Bottom View)



C_{BL} = 47 pF for operation > 500 MHz.

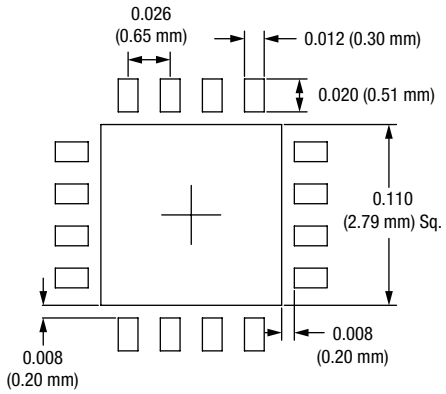
Evaluation PCB



PCB# SK39110. Material: FR4.
The circuit board used in the final application should employ RF circuit design techniques. RF signal lines should have 50 Ω impedance. The package bottom ground plane should be connected directly to PCB ground plane. A sufficient number of via holes should be used to connect the top and bottom ground planes. The evaluation circuit board shown is available upon request.

Surface Mount Land Pattern

4 x 4 mm LPCC-16 Lead



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