DATA SHEET

AS197-306LF: PHEMT GaAs IC High-Power SP2T and SP3T Switch 0.1–2.5 GHz

Features

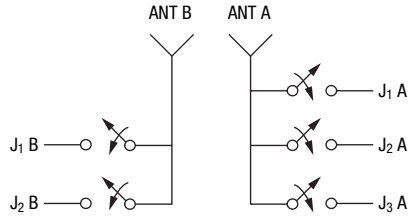
- Multiband, multimode operation
- Positive voltage control
- Four-line logic decoder
- Excellent harmonic performance
- Handles GSM power levels
- Available in QFN-16 (4 x 4 mm) package
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C per JEDEC J-STD-020

Description

The AS197-306 is a reflective SP2T and SP3T switch. It includes a four-line decoder to minimize the number of control lines. There are two separate output ports that can be diplexed for low and high band paths. Typical application is to use the SP2T for GSM Tx/Rx and the SP3T for WCDMA and DCS band Tx/Rx.

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

Functional Schematic



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

Z_0 = 50 Ω, unless otherwise noted

Parameter		Frequency	Min.	Typ.	Max.	Unit
Insertion loss	SP2T	0.1–0.5 GHz		0.7	0.9	dB
		0.5–1.0 GHz		0.7	0.9	dB
		1.0–2.5 GHz		0.7	0.9	dB
	SP3T	0.1–0.5 GHz		0.7	0.9	dB
		0.5–1.0 GHz		0.7	0.9	dB
		1.0–2.5 GHz		0.8	1.0	dB
Isolation	SP2T	0.1–0.5 GHz	28	32		dB
		0.5–1.0 GHz	22	26		dB
		1.0–2.5 GHz	16	20		dB
	SP3T	0.1–0.5 GHz	24	28		dB
		0.5–1.0 GHz	18	22		dB
		1.0–2.5 GHz	12	16		dB
VSWR		0.1–1.0 GHz		1.2:1		
		1.0–2.0 GHz		1.2:1		

Operating Characteristics at 25 °C (0, 3 V)

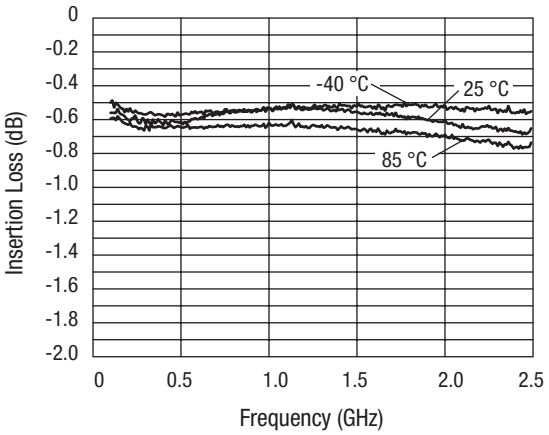
Z_0 = 50 Ω, unless otherwise noted

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching characteristics Rise, fall On, off Video feedthru	 10/90% or 90/10% RF 50% CTL to 90/10% RF			 50 100 50		 ns ns mV
IP3	13 dBm/tone			55		dBm
SP2T 2nd harmonic	34 dBm 900 MHz 3 V 25 °C			-65		dBc
SP2T 3rd harmonic	34 dBm 900 MHz 3 V 25 °C			-60		dBc
SP3T 2nd harmonic	32 dBm 1800 MHz 3 V 25 °C			-65		dBc
SP3T 3rd harmonic	32 dBm 1800 MHz 3 V 25 °C			-60		dBc
V_P	V_P = 2.7 to 5 V @ 10 µA typ.					
Control voltages	V_{LOW} = 0 V to 0.7 V V_{HIGH} = 2.3 V to V_P					

Typical Performance Data @ 3 V

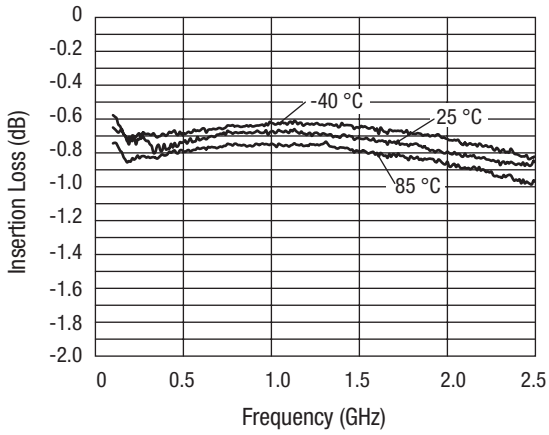
Z_0 = 50 Ω, unless otherwise noted

SP2T

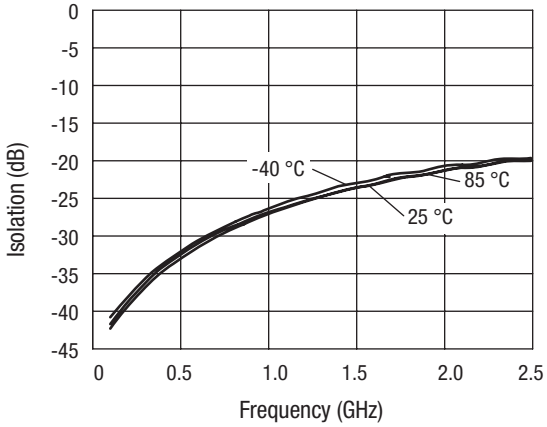


SP2T Insertion Loss vs. Frequency

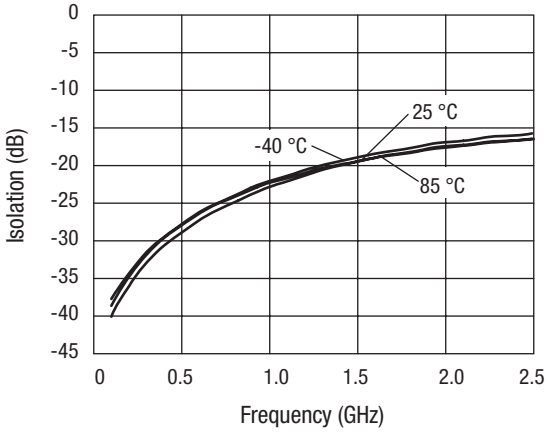
SP3T



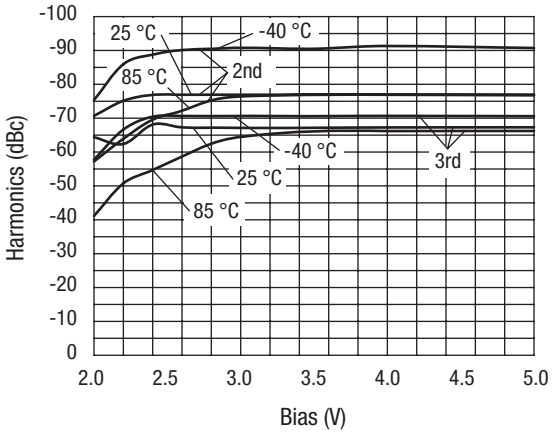
SP3T Insertion Loss vs. Frequency



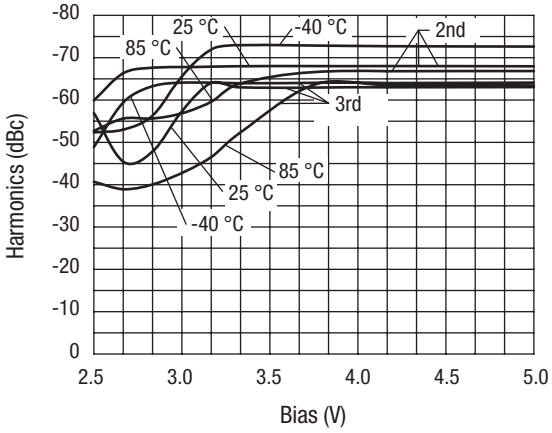
SP2T Isolation vs. Frequency



SP3T Isolation vs. Frequency



SP2T 900 MHz 34 dBm



SP3T 1800 MHz 32 dBm

Truth Table

V_1	V_2	V_3	V_4	On Path (Other Paths in Isolation)
0	0	0	0	All in isolation
0	0	0	1	All in isolation
0	0	1	0	All in isolation
0	0	1	1	All in isolation
0	1	0	0	J_1 A–Ant A and J_2 B–Ant B
1	0	0	0	J_1 A–Ant A and J_2 B–Ant B
1	1	0	0	J_1 A–Ant A and J_2 B–Ant B
0	1	0	1	J_1 B–Ant B
1	0	0	1	J_1 B–Ant B
1	1	0	1	J_1 B–Ant B
0	1	1	0	J_2 A–Ant A
1	0	1	0	J_2 A–Ant A
1	1	1	0	J_2 A–Ant A
0	1	1	1	J_3 A–Ant A
1	0	1	1	J_3 A–Ant A
1	1	1	1	J_3 A–Ant A

"0" = 0 to 0.7 V.
"1" = 2.3 to V_P.
V_P = 2.7 to 5 V.
V_P voltage must be applied prior to V_{CTL} voltage.

Absolute Maximum Ratings

Characteristic	Value
RF input power	4 W > 0.5 GHz 0/6 V control
Control voltage	6 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.*

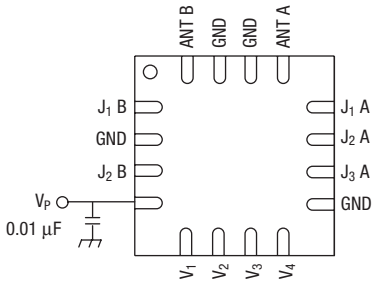
Recommended Solder Reflow Profiles

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.

Pin Out



DC blocking caps must be supplied externally. C_{BL} = 47 pF for operating >500 MHz.
Exposed pad on bottom of package should be grounded.

QFN-16 (4 x 4 mm)