

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

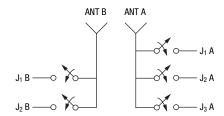
Description

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.



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

Functional Schematic



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

$Z_0 = 50 \Omega$, unless otherwise noted

Parameter		Frequency	Min.	Тур.	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)

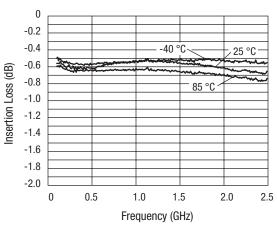
 $Z_0 = 50 \Omega$, unless otherwise noted

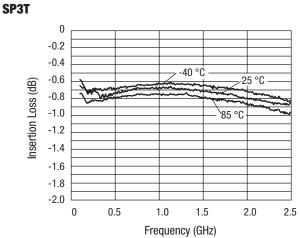
Parameter	Condition	Frequency	Min.	Тур.	Max.	Unit
Switching characteristics						
Rise, fall	10/90% or 90/10% RF			50		ns
On, off	50% CTL to 90/10% RF			100		ns
Video feedthru				50		mV
IP3	13 dBm/tone			55		dBm
SP2T 2nd harmonic	34 dBm 900 MHz 3 V 25 °C			-65		dBc
SP2T 3rd harmonic	34 dBm 900 MHz 3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

Typical Performance Data @ 3 V

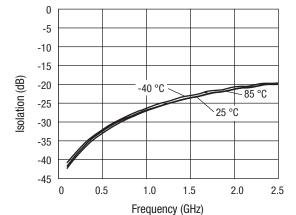
$Z_0 = 50 \Omega$, unless otherwise noted





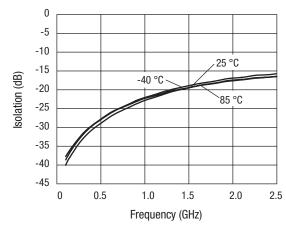


SP2T Insertion Loss vs. Frequency

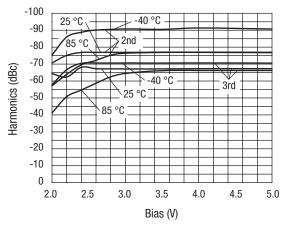


SP2T Isolation vs. Frequency

SP3T Insertion Loss vs. Frequency



SP3T Isolation vs. Frequency

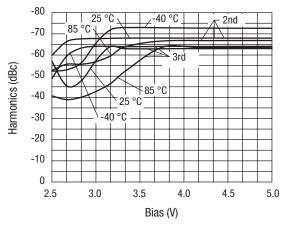


SP2T 900 MHz 34 dBm

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

[&]quot;0" = 0 to 0.7 V. "1" = 2.3 to V_P .



SP3T 1800 MHz 32 dBm

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 "<u>Recommended Solder Reflow Profile</u>" Application Note.

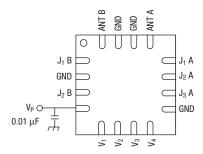
Tape and Reel Information

Refer to the "<u>Discrete Devices and IC Switch/Attenuators</u> <u>Tape and Reel Package Orientation</u>" Application Note.

 $V_{\rm P} = 2.7 \text{ to } 5 \text{ V}.$

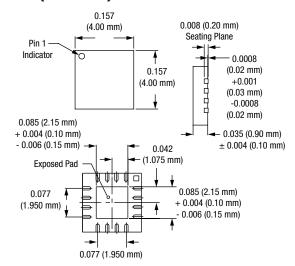
 $[\]dot{V_P}$ voltage must be applied prior to V_{CTL} voltage.

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)



Copyright © 2002, 2003, 2004, 2005, 2006, 2007, Skyworks Solutions, Inc. All Rights Reserved.

Information in this document is provided in connection with Skyworks Solutions, Inc. ("Skyworks") products or services. These materials, including the information contained herein, are provided by Skyworks as a service to its customers and may be used for informational purposes only by the customer. Skyworks assumes no responsibility for errors or omissions in these materials or the information contained herein. Skyworks may change its documentation, products, services, specifications or product descriptions at any time, without notice. Skyworks makes no commitment to update the materials or information and shall have no responsibility whatsoever for conflicts, incompatibilities, or other difficulties arising from any future changes.

No license, whether express, implied, by estoppel or otherwise, is granted to any intellectual property rights by this document. Skyworks assumes no liability for any materials, products or information provided hereunder, including the sale, distribution, reproduction or use of Skyworks products, information or materials, except as may be provided in Skyworks Terms and Conditions of Sale.

THE MATERIALS, PRODUCTS AND INFORMATION ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, WHETHER EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE, INCLUDING FITNESS FOR A PARTICULAR PURPOSE OR USE, MERCHANTABILITY, PERFORMANCE, QUALITY OR NON-INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHT; ALL SUCH WARRANTIES ARE HEREBY EXPRESSLY DISCLAIMED. SKYWORKS DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. SKYWORKS SHALL NOT BE LIABLE FOR ANY DAMAGES, INCLUDING BUT NOT LIMITED TO ANY SPECIAL, INDIRECT, INCIDENTAL, STATUTORY, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS THAT MAY RESULT FROM THE USE OF THE MATERIALS OR INFORMATION, WHETHER OR NOT THE RECIPIENT OF MATERIALS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Skyworks products are not intended for use in medical, lifesaving or life-sustaining applications, or other equipment in which the failure of the Skyworks products could lead to personal injury, death, physical or environmental damage. Skyworks customers using or selling Skyworks products for use in such applications do so at their own risk and agree to fully indemnify Skyworks for any damages resulting from such improper use or sale.

Customers are responsible for their products and applications using Skyworks products, which may deviate from published specifications as a result of design defects, errors, or operation of products outside of published parameters or design specifications. Customers should include design and operating safeguards to minimize these and other risks. Skyworks assumes no liability for applications assistance, customer product design, or damage to any equipment resulting from the use of Skyworks products outside of stated published specifications or parameters.

Skyworks, the Skyworks symbol, and "Breakthrough Simplicity" are trademarks or registered trademarks of Skyworks Solutions, Inc., in the United States and other countries. Third-party brands and names are for identification purposes only, and are the property of their respective owners. Additional information, including relevant terms and conditions, posted at www.skyworksinc.com, are incorporated by reference.