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## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



DATA SHEET

# AS195-306LF: PHEMT GaAs IC High-Power SP5T Switch 0.1 to 2 GHz

## Applications

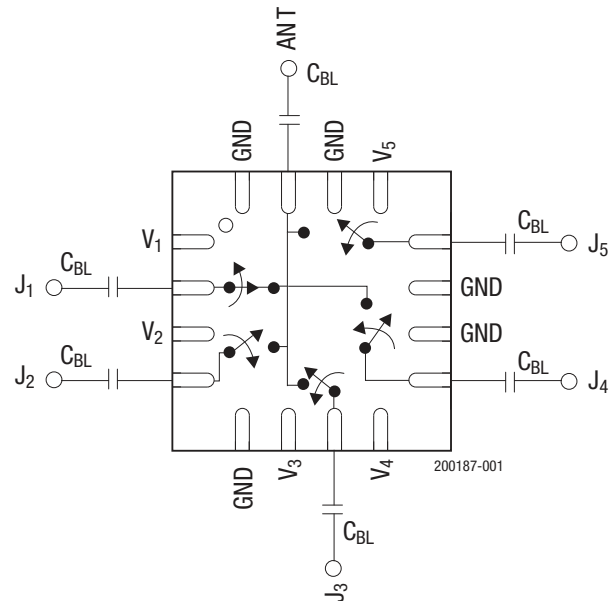
- 2G/3G cellular infrastructure

## Features

- Five symmetric RF paths
- Positive voltage control
- High IP3
- Excellent harmonic performance
- Handles GSM power levels
- Available in a small, low-profile QFN-16 (4 x 4 mm) package (MSL1 @ 260 °C per JEDEC J-STD-020)



Skyworks Green™ products are compliant with all applicable legislation and are halogen-free. For additional information, refer to *Skyworks Definition of Green™*, document number SQ04-0074.



**Figure 1. Functional Block Diagram and Pinout of the AS195-306LF**

## Description

The AS195-306 is a reflective SP5T switch. It is an ideal switch for higher power applications. It can be used for GSM dual-band handset applications where low loss, low current and small size are critical parameters.

Figure 1 shows the block diagram and pinout for the AS195-306LF.

### Electrical and Mechanical Specifications

The absolute maximum ratings of the AS195-306LF are shown in Table 2. Recommended operating conditions of the AS195-306LF are provided in Table 3. The electrical specifications are provided in Table 4. Table 5 shows the electrical specifications for nominal operating conditions.

Figures 2, 3, and 4 show the typical performance characteristics for the AS195-306.

**Table 2. AS195-306LF Absolute Maximum Ratings**

Parameter	Minimum	Typical	Maximum	Units
RF input power			+36 dBm, f > 500 MHz, +27 dBm < 500 MHz, 0/8 V control 100 mW, f ≤ 500 MHz	
Control voltage	-0.2		8	V
Operating temperature	-40		+85	°C
Storage temperature	-65		+150	°C

**ESD HANDLING:** 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 when handling or transporting. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD handling precautions should be used at all times.

**Table 3. AS195-306LF Recommended Operating Conditions**

Parameter	Condition	Minimum	Typical	Maximum	Units
Switching characteristics:					
Rise, fall	10/90%, RF		50		ns
On, off	50% CTL to 90/10% RF		100		ns
Video feedthru	T <sub>RISE</sub> = 1 ns, BW = 500 MHz		50		mV
IP3	+13 dBm/tone		55		dBm
2 <sup>nd</sup> and 3 <sup>rd</sup> harmonics	+ 34 dBm input 900 MHz		-65		dBc
Thermal resistance			25		°C/W
Control voltages	V <sub>LOW</sub>		0		V
	V <sub>HIGH</sub>		3		V
Control current	I <sub>DD</sub> @ V <sub>HIGH</sub> = 3 V			200	µA

**Table 4. AS195-306LF Electrical Specifications**

( $T_A = +25^\circ\text{C}$ ,  $V_{\text{Low}} = 0\text{ V}$ ,  $V_{\text{High}} = 3\text{ V}$ ,  $Z_0 = 50\ \Omega$ , Unless Otherwise Specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Insertion loss	Ant to J1, J2, J3, J4, J5	0.1 to 0.5 GHz		0.5	0.7	dB
		0.5 to 1.0 GHz		0.6	0.8	dB
		1.0 to 2.0 GHz		1.0	1.1	dB
Isolation	Ant to J1, J2, J3, J4, J5	0.1 to 0.5 GHz	30	35		dB
		0.5 to 1.0 GHz	25	27		dB
		1.0 to 2.0 GHz	21	23		dB
VSWR		0.1 to 1.0 GHz		1.4:1		
		1.0 to 2.0 GHz		1.6:1		

**Table 5. AS196-306LF Truth Table<sup>1</sup>**

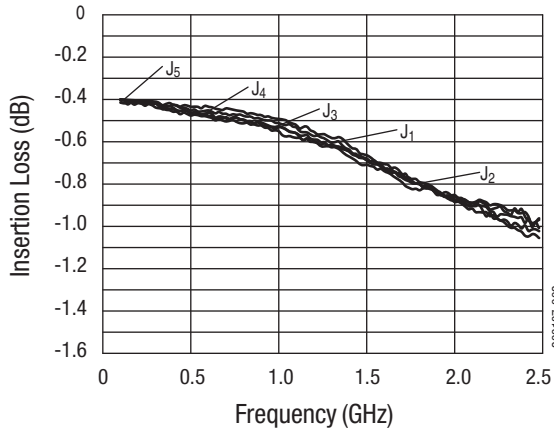
V1	V2	V3	V4	V5	ANT-J1	ANT-J2	ANT-J3	ANT-J4	ANT-J5
V <sub>HIGH</sub>	0	0	0	0	Insertion loss	Isolation	Isolation	Isolation	Isolation
0	V <sub>HIGH</sub>	0	0	0	Isolation	Insertion loss	Isolation	Isolation	Isolation
0	0	V <sub>HIGH</sub>	0	0	Isolation	Isolation	Insertion loss	Isolation	Isolation
0	0	0	V <sub>HIGH</sub>	0	Isolation	Isolation	Isolation	Insertion loss	Isolation
0	0	0		V <sub>HIGH</sub>	Isolation	Isolation	Isolation	Isolation	Insertion loss

<sup>1</sup> All other conditions not recommended.

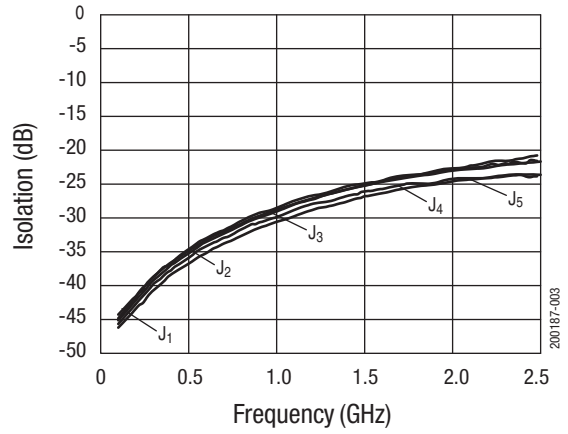
"0" = 0 to 0.2 V.

"V<sub>HIGH</sub>" = 2.7 to 5 V.

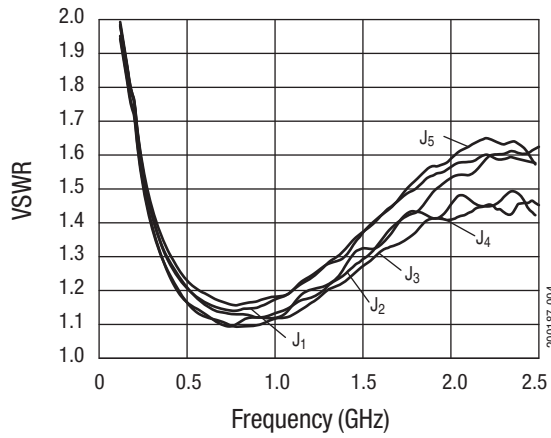
**Typical Performance Characteristics**  
 ( $Z_0 = 50 \Omega$ , Unless Otherwise Specified)



**Figure 2. Typical Loss (All Paths) vs Frequency**



**Figure 3. Typical Isolation (All Paths) vs Frequency**



**Figure 4. VSWR vs Frequency**



### Package Dimensions

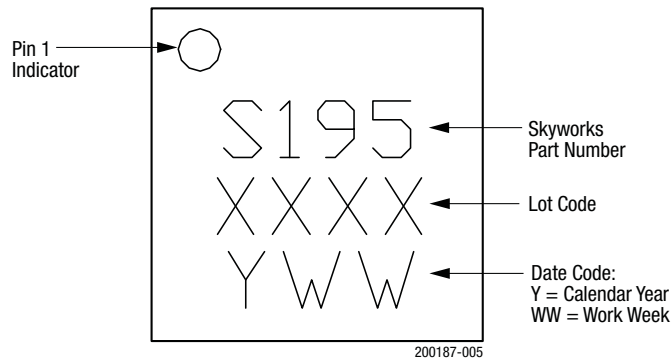
The typical part marking for the AS195-306LF is shown in Figure 5. Package dimensions are shown in Figure 6.

### Package and Handling Information

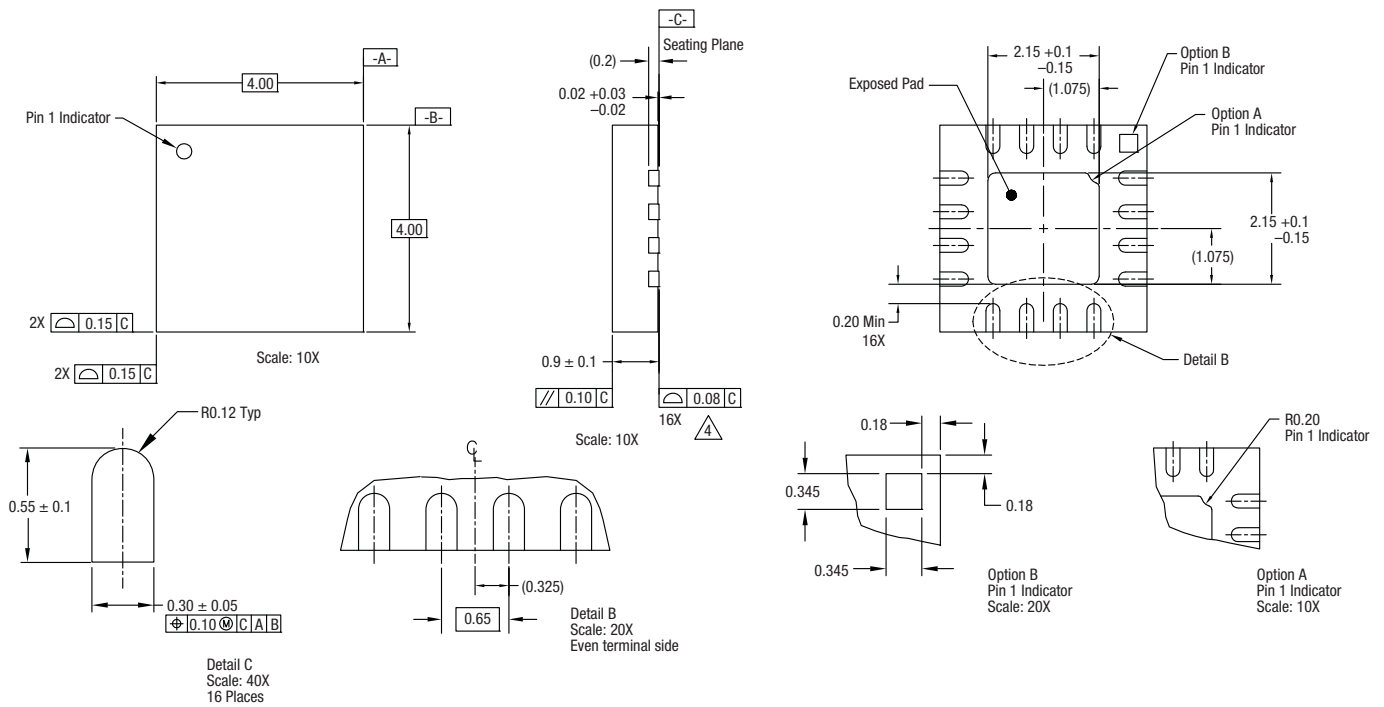
Instructions on the shipping container label regarding exposure to moisture after the container seal is broken must be followed. Otherwise, problems related to moisture absorption may occur when the part is subjected to high temperature during solder assembly.

The AS195-306LF is rated to Moisture Sensitivity Level 3 (MSL3) at 260 °C. It can be used for lead or lead-free soldering. For additional information, refer to the Skyworks Application Note, *Solder Reflow Information*, document number 200164.

Care must be taken when attaching this product, whether it is done manually or in a production solder reflow environment. Production quantities of this product are shipped in a standard tape and reel format. For more information, refer to the *Discrete Devices and IC Switch/Attenuators Tape and Reel Package Orientation* application note.



**Figure 5. Typical Part Marking**



Notes:

1. All measurements are in millimeters.
2. Dimensions and tolerances according to ASME Y14.5M-1994.
3. Coplanarity applies to the exposed heat sink slug as well as the terminals.
4. Plating requirement per source control drawing (SCD) 2504.
5. Package may have Option A or Option B pin 1 indicator.

200187-006

Figure 6. AS195-306LF Package Dimensions

**Ordering Information**

Model Name	Manufacturing Part Number
AS195-306LF: PHEMT GaAs IC High-Power SP5T Switch 0.1 to 2 GHz	AS195-306LF

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