DATA SHEET

AS221-306, AS221-306LF: PHEMT GaAs IC High-Power SP4T Switch 0.1–2.5 GHz

Features

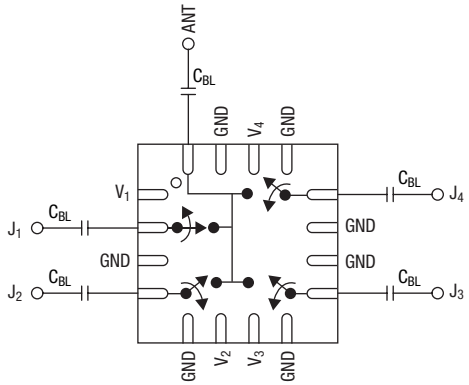
- Four symmetric RF paths
- Positive voltage control @ 2.6 V
- High IP3
- Excellent harmonic performance
- Handles GSM power Levels
- Available in QFN-16 (4 x 4 mm) package
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C per JEDEC J-STD-020

Description

The AS221-306 is a reflective SP4T 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.

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

Pin Out



DC blocking capacitors (C_{BL}) must be supplied externally.
C_{BL} = 47 pF for operating frequency >500 MHz.

Electrical Specifications at 25 °C (0, 2.6 V)

Z_0 = 50 Ω, unless otherwise noted

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Insertion loss	Ant-J_1, J_2, J_3, J_4	0.1–0.5 GHz		0.6	0.7	dB
		0.5–1.0 GHz		0.7	0.8	dB
		1.0–2.0 GHz		0.9	1.1	dB
		2.0–2.5 GHz		1.1	1.2	dB
Isolation	Ant-J_1, J_2, J_3, J_4	0.1–0.5 GHz	30	34		dB
		0.5–1.0 GHz	25	29		dB
		1.0–2.0 GHz	19	23		dB
		2.0–2.5 GHz	18	22		dB
VSWR		0.1–1.0 GHz		1.2:1		
		1.0–2.5 GHz		1.3:1		

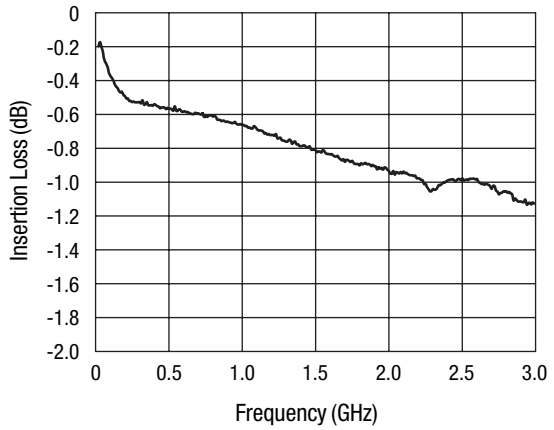
Operating Characteristics at 25 °C (0, 2.6 V)

Z_0 = 50 Ω, unless otherwise noted

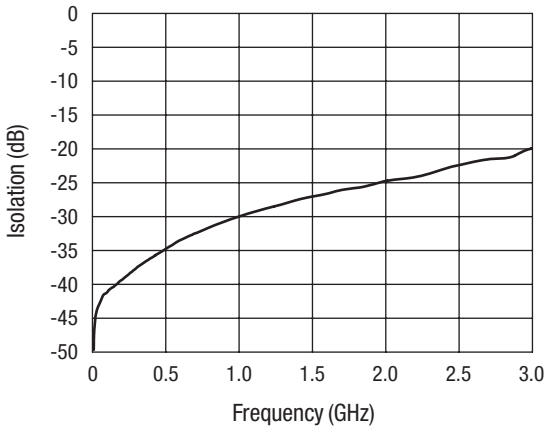
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching characteristics						
Rise, fall	10/90% or 90/10% RF			50		ns
On, off	50% CTL to 90/10% RF			100		ns
Video feedthru	T_{RISE} = 1 ns, BW = 500 MHz			50		mV
IP3	13 dBm/tone			55		dBm
2nd and 3rd harmonics	34 dBm input 900 MHz			-65		dBc
Thermal resistance				25		°C/W
Control voltages	V_{LOW} = 0 V_{HIGH} = 2.6 V @ 200 µA					

Typical Performance Data

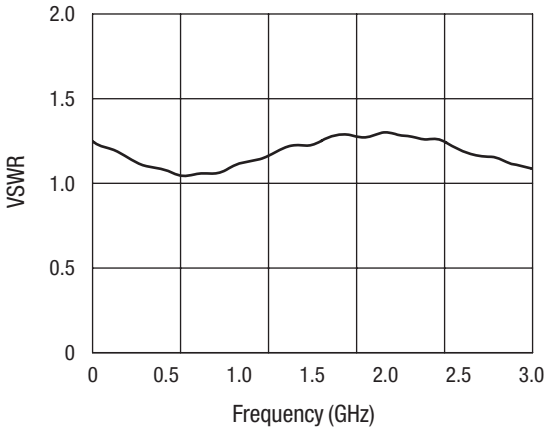
Z_0 = 50 Ω, unless otherwise noted



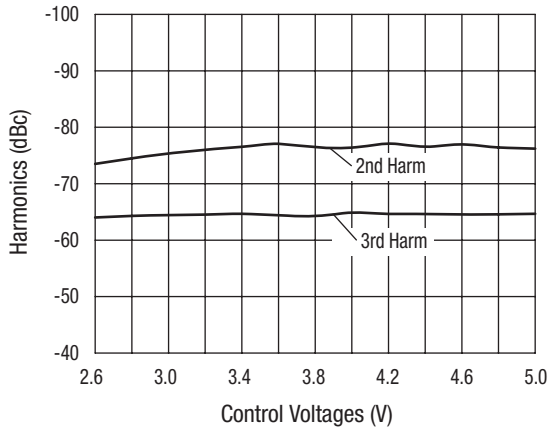
Typical Insertion Loss vs. Frequency



Typical Isolation vs. Frequency



Typical VSWR vs. Frequency



Typical Harmonics vs. Control Voltages

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.

Truth Table

V_1	V_2	V_3	V_4	Ant-J_1	Ant-J_2	Ant-J_3	Ant-J_4
V_{HIGH}	V_{Low}	V_{LOW}	V_{LOW}	Ins. Loss	Isolation	Isolation	Isolation
V_{LOW}	V_{HIGH}	V_{LOW}	V_{LOW}	Isolation	Ins. loss	Isolation	Isolation
V_{LOW}	V_{LOW}	V_{HIGH}	V_{LOW}	Isolation	Isolation	Ins. loss	Isolation
V_{LOW}	V_{LOW}	V_{LOW}	V_{HIGH}	Isolation	Isolation	Isolation	Ins. loss

All other conditions not recommended.
V_{LOW} = 0.
V_{HIGH} = 2.6 V.

QFN-16 (4 x 4 mm)