

PHEMT GaAs IC High Power SP2T and SP3T Switch 0.1–2.5 GHz



AS197-306

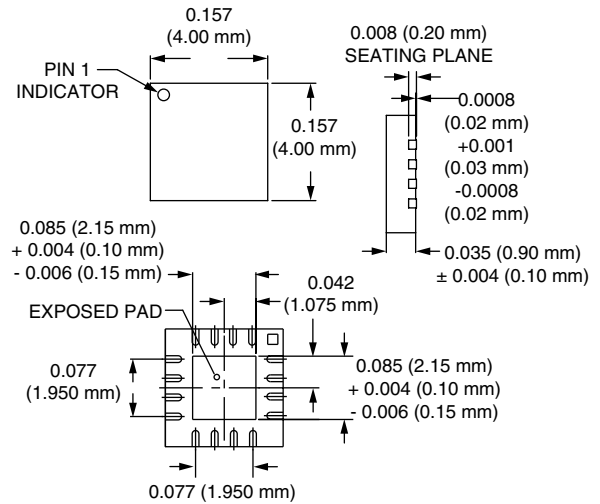
Features

- Multi-band, Multi-mode Operation
- Positive Voltage Control
- 4 Line Logic Decoder
- Excellent Harmonic Performance
- Handles GSM Power Levels
- Available in QFN-16 (4 x 4 mm) Package

Description

The AS197-306 is a reflective SP2T and SP3T switch. It includes a 4 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 T_X/R_X and the SP3T for WCDMA and DCS band T_X/R_X.

QFN-16 (4 x 4 mm)



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

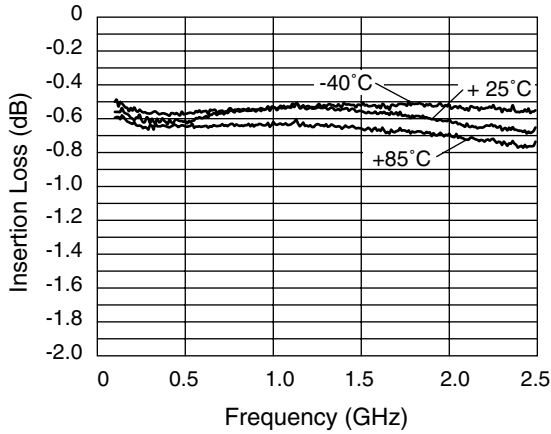
Parameter		Frequency	Min.	Typ.	Max.	Unit
Insertion Loss	SP2T	0.1–0.5 GHz		0.7	0.9	dB
		0.5–1.0 GHz		0.7	0.9	dB
		1.0–2.5 GHz		0.7	0.9	dB
	SP3T	0.1–0.5 GHz		0.7	0.9	dB
		0.5–1.0 GHz		0.7	0.9	dB
		1.0–2.5 GHz		0.8	1.0	dB
Isolation	SP2T	0.1–0.5 GHz	28	32		dB
		0.5–1.0 GHz	22	26		dB
		1.0–2.5 GHz	16	20		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)

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics	Rise, Fall (10/90% or 90/10% RF) On, Off (50% CTL to 90/10% RF) Video Feedthru			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					

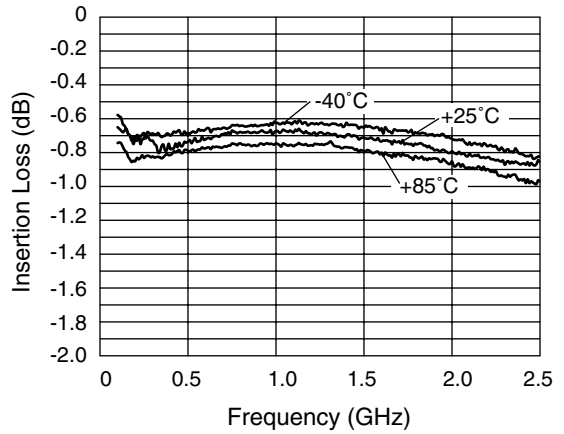
Typical Performance Data @ 3 V

SP2T

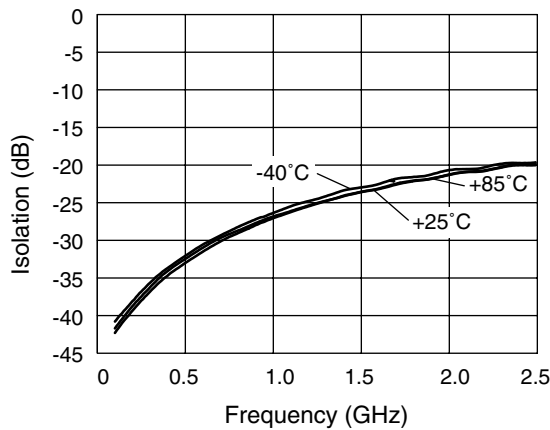


SP2T Insertion Loss vs. Frequency

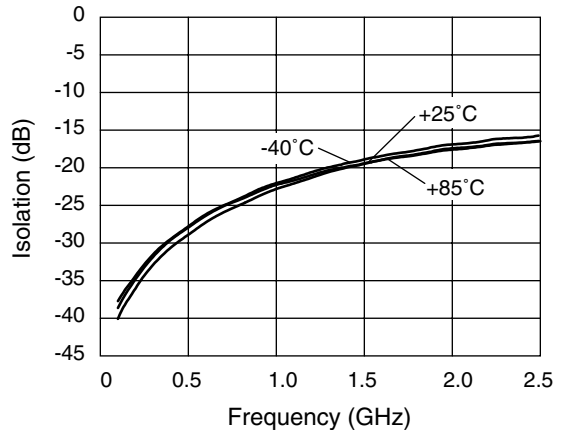
SP3T



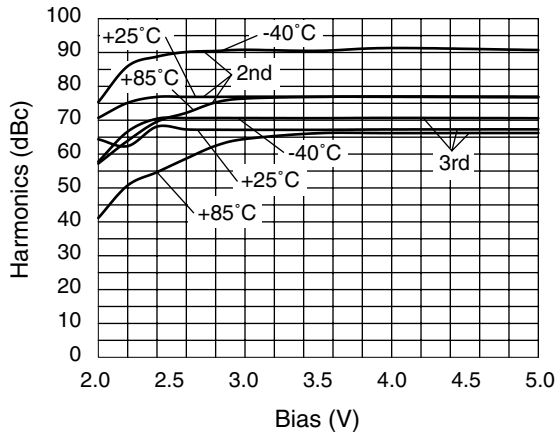
SP3T Insertion Loss vs. Frequency



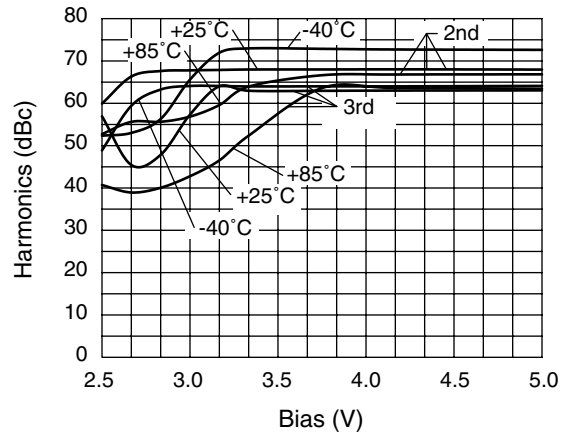
SP2T Isolation vs. Frequency



SP3T Isolation vs. Frequency



SP2T 900 MHz 34 dBm



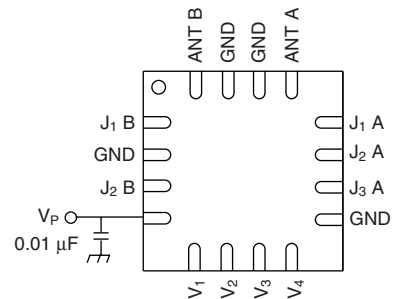
SP3T 1800 MHz 32 dBm

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

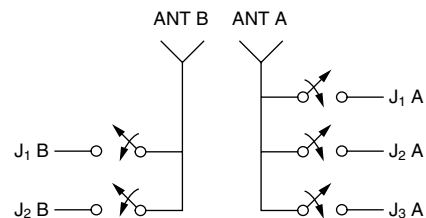
“0” = 0 to 0.7 V.
 “1” = 2.3 to V_P.
 V_P = 2.7 to 5 V.
 V_P voltage must be applied prior to V_{CTL} voltage.

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.

Functional Schematic



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