PHEMT GaAs IC High Linearity 3 V Control SPDT 0.1–2.5 GHz Switch Chip

AS193-000

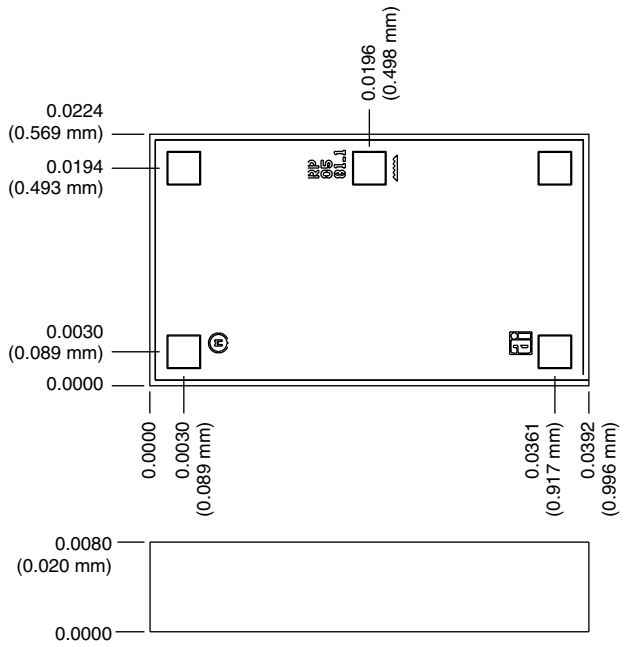
Features

- +2.5 to +5 V Linear Operation
- Harmonics H_2, H_3 > 65 dBc @ P_{IN} = 34.5 dBm
- Low Insertion Loss (0.35 dB @ 0.9 GHz)
- High Isolation (24 dB @ 0.9 GHz)

Description

The AS193-000 is a PHEMT GaAs FET IC high linearity SPDT switch. This switch has been designed for use where extremely high linearity, low control voltage, high isolation and low insertion loss are needed. Some standard implementations include antenna changeover, T/R and diversity switching over 3 W. The AS193-000 switch is ideal for GaAs based antenna switch front-end modules.

Outline Drawing



Dimensions in inches (mm). Tolerance ± 0.001 (0.025 mm).

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

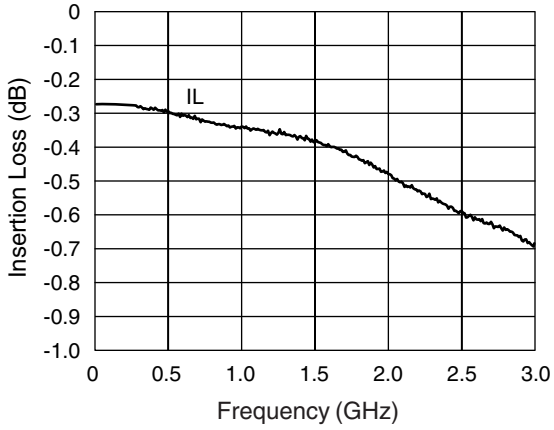
Parameter[1]	Frequency	Min.	Typ.	Max.	Unit
Insertion Loss[2]	0.1–0.5 GHz		0.30	0.4	dB
	0.5–1.0 GHz		0.35	0.5	dB
	1.0–2.0 GHz		0.45	0.6	dB
	2.0–2.5 GHz		0.55	0.7	dB
Isolation	0.1–0.5 GHz	28	30		dB
	0.5–1.0 GHz	22	24		dB
	1.0–2.0 GHz	17	19		dB
	2.0–2.5 GHz	15	17		dB
VSWR[3]	0.1–1.0 GHz		1.2:1		dB
	1.0–2.5 GHz		1.3:1		dB

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

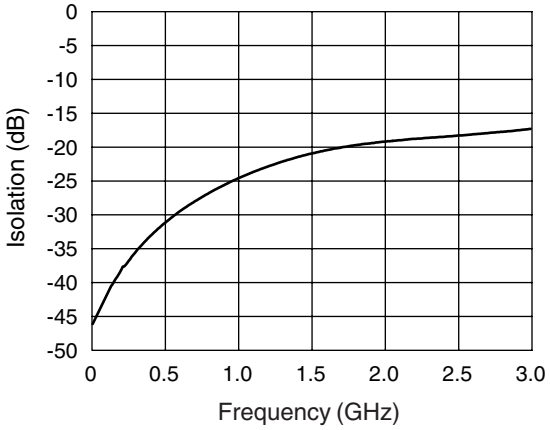
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics[4]	Rise, Fall (10/90% or 90/10% RF)			60		ns
	On, Off (50% CTL to 90/10% RF)			100		ns
	Video Feedthru			50		mV
Input Power for -0.1 dB Compression	0/+3 V	0.9 GHz		+37		dBm
Harmonics H_2, H_3	P_{IN} = 34.5 dBm	0.9 GHz		+65		dBc
Control Voltages	V_{Low} = 0 to 0.2 V @ 20 µA Max. V_{High} = +2.5 V @ 50 µA Max. to +5 V @ 100 µA Max.					

1. All measurements made in a 50 Ω system, unless otherwise specified.
2. Insertion loss changes by 0.003 dB/°C.
3. Insertion loss state.
4. Video feedthru measured with 1 ns risetime pulse and 500 MHz bandwidth.

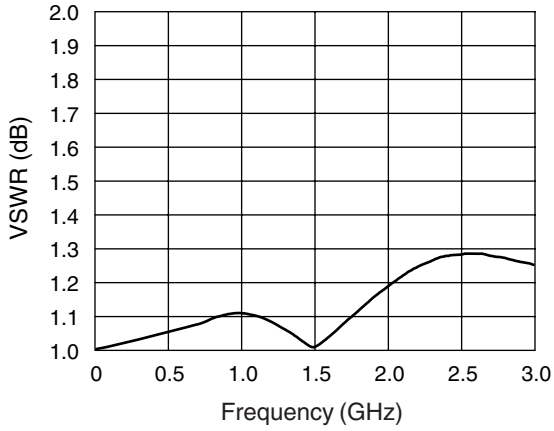
Typical Performance Data



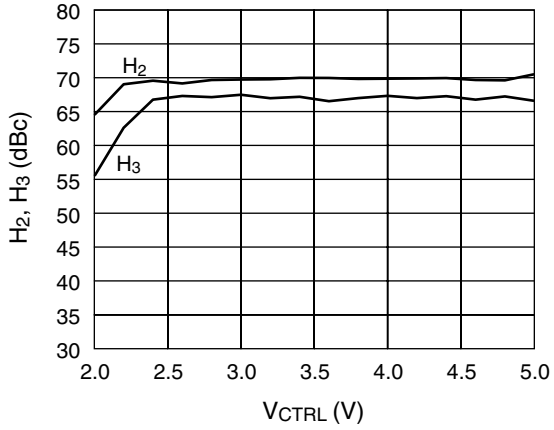
Insertion Loss vs. Frequency



Isolation vs. Frequency



VSWR vs. Frequency



Harmonics vs. Control Voltage
P_{IN} = 34.5 dBm, 900 MHz, GSM Pulsed

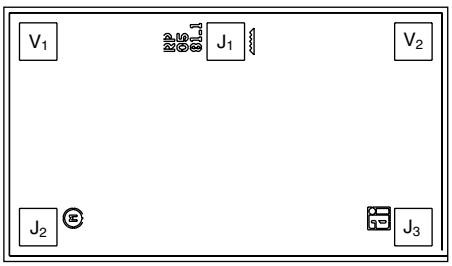
Note: Contact factory for S-parameter data.

Truth Table

V_1	V_2	J_1–J_2	J_1–J_3
0	V_{High}	Isolation	Insertion Loss
V_{High}	0	Insertion Loss	Isolation

V_{High} = +2.5 to +5 V.

Pin Out



Absolute Maximum Ratings

Characteristic	Value
RF Input Power	6 W Max. > 900 MHz, 0/+5 V Control
Control Voltage	-0.2 V, +8 V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C
Θ_{JC}	25°C/W

Notes:
Bond pad metalization: gold.
Back side metalization: none.
See application note, Handling GaAs MMIC Die.