

PHEMT GaAs IC High Linearity 3 V Control SPDT Switch 0.1–2 GHz



AS190-73

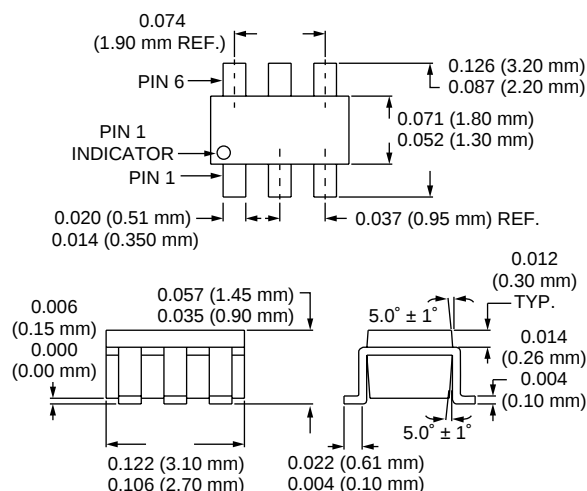
Features

- +2.5 to +5 V Linear Operation
 $P_{-0.1\text{ dB}} \geq 37\text{ dBm}$
- Harmonics $H_2, H_3 > 65\text{ dBc @}$
 $P_{\text{IN}} = 34.5\text{ dBm}$
- Low Insertion Loss (0.5 dB @ 0.9 GHz)
- Ultra Miniature SOT-6 Package
- PHEMT Process

Description

The AS190-73 is a PHEMT GaAs FET IC high linearity SPDT switch in a SOT-6 plastic package. This switch has been designed for use where extremely high linearity, low control voltage, low insertion loss and ultra miniature package size are required. It can be controlled with positive, negative or a combination of both voltages. Some standard implementations include antenna changeover, T/R and diversity switching over 3 W. The AS190-73 switch can be used in many analog and digital wireless communication systems including cellular, GSM and DECT applications.

SOT-6



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

Parameter ¹	Frequency	Min.	Typ.	Max.	Unit
Insertion Loss ²	0.1–0.5 GHz		0.25	0.40	dB
	0.5–1.0 GHz		0.35	0.50	dB
	1.0–2.0 GHz		0.75	0.90	dB
Isolation	0.1–0.5 GHz	22	24		dB
	0.5–1.0 GHz	15	17		dB
	1.0–2.0 GHz	10	12		dB
VSWR ³	0.1–1.0 GHz		1.2:1		dB
	1.0–2.0 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	$P_{\text{IN}} = 34.5\text{ dBm}$	0.9 GHz		+70		dBc
Control Voltages	$V_{\text{Low}} = 0\text{ to }0.2\text{ V @ }20\text{ }\mu\text{A Max.}$ $V_{\text{High}} = +2.5\text{ V @ }100\text{ }\mu\text{A Max. to }+5\text{ V @ }200\text{ }\mu\text{A Max.}$					

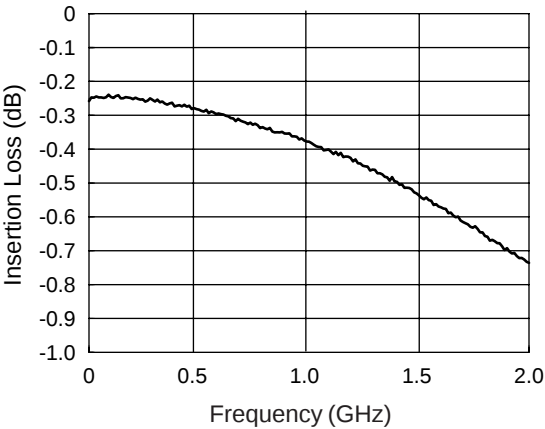
1. All measurements made in a 50 Ω system, unless otherwise specified.

2. Insertion loss changes by 0.003 dB/°C.

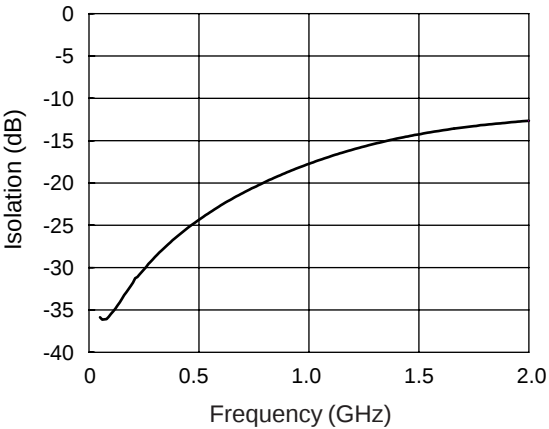
3. Insertion loss state.

4. Video feedthru measured with 1 ns risetime pulse and 500 MHz bandwidth.

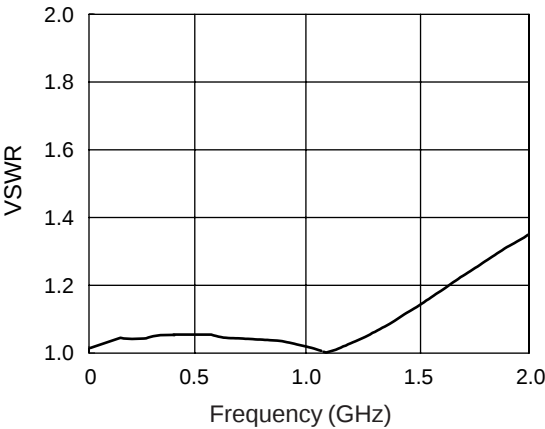
Typical Performance Data



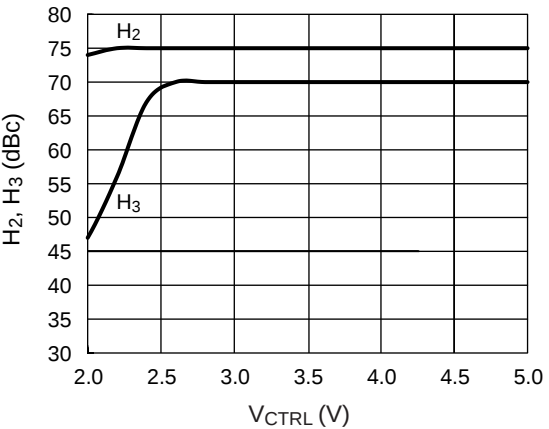
Insertion Loss vs. Frequency



Isolation vs. Frequency



VSWR vs. Frequency



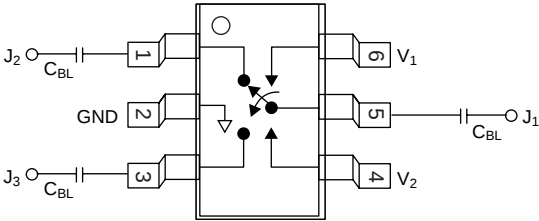
Harmonics vs. Control Voltage
34.5 dBm 900 MHz GSM Pulse

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



DC blocking capacitors (C_{BL}) must be supplied externally.
C_{BL} = 100 pF for operating frequency >500 MHz.