

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



AS191-73

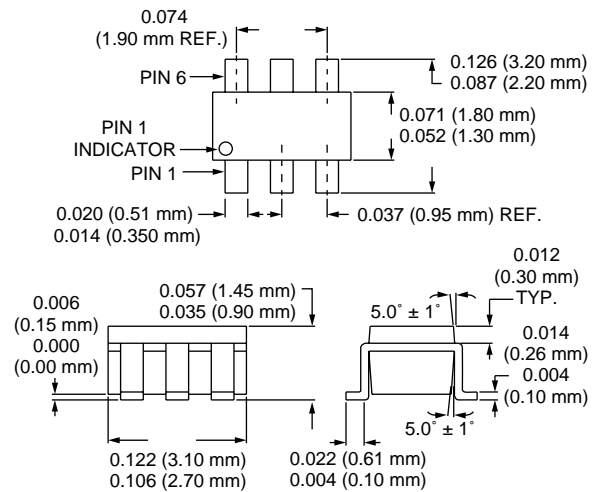
## Features

- +2.5 to +5 V Linear Operation
- Harmonics  $H_2, H_3 > 65$  dBc @  $P_{IN} = 34.5$  dBm
- Low Insertion Loss (0.5 dB @ 0.9 GHz)
- High Isolation (27 dB @ 0.9 GHz)
- Ultra Miniature SOT-6 Package
- PHEMT Process

## Description

The AS191-73 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, high isolation, 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

## SOT-6



AS191-73 switch can be used in many analog and digital wireless communication systems including cellular, GSM and DECT applications.

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

Parameter <sup>1</sup>	Frequency	Min.	Typ.	Max.	Unit
Insertion Loss <sup>2</sup>	0.1–0.5 GHz		0.45	0.60	dB
	0.5–1.0 GHz		0.50	0.60	dB
	1.0–2.0 GHz		0.55	0.70	dB
Isolation	0.1–0.5 GHz	31	33		dB
	0.5–1.0 GHz	25	27		dB
	1.0–2.0 GHz	19	21		dB
VSWR <sup>3</sup>	0.1–1.0 GHz		1.2:1		dB
	1.0–2.0 GHz		1.3:1		dB

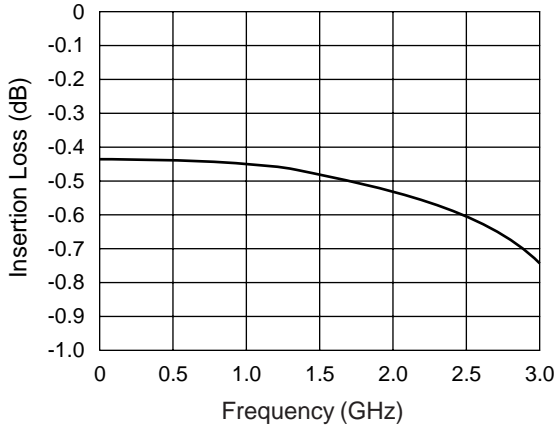
## Operating Characteristics at 25°C (0, +3 V)

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics <sup>4</sup>	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		+35		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 $\mu$ A Max. $V_{High} = +2.5$ V @ 100 $\mu$ A Max. to +5 V @ 200 $\mu$ A Max.					

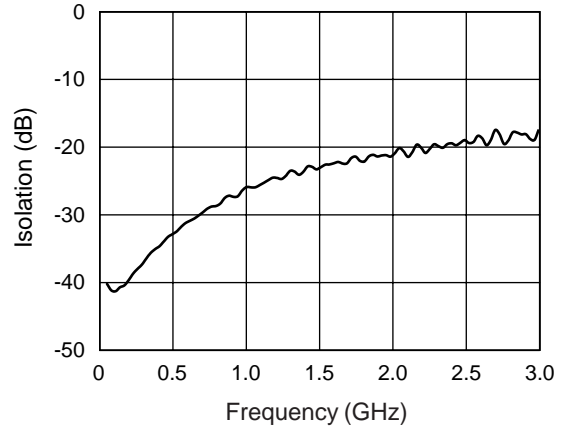
1. All measurements made in a 50  $\Omega$  system, unless otherwise specified.  
2. Insertion loss changes by 0.003 dB/°C.

3. Insertion loss state.  
4. Video feedthru measured with 1 ns risetime pulse and 500 MHz bandwidth.

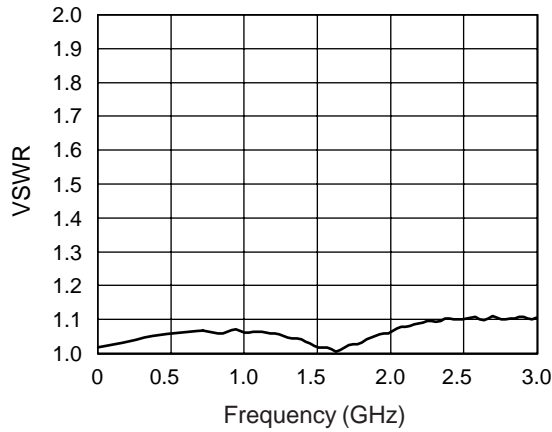
### Typical Performance Data



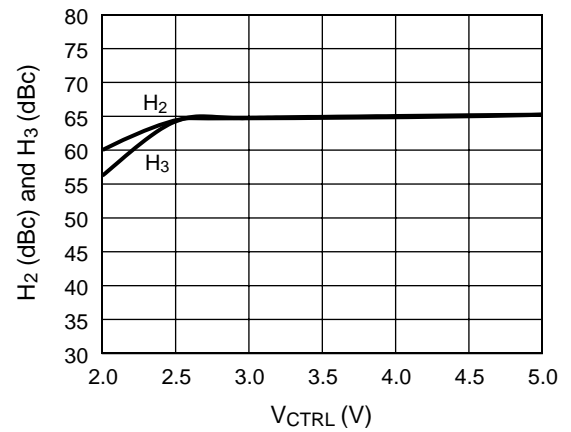
**Insertion Loss vs. Frequency**



**Isolation vs. Frequency**

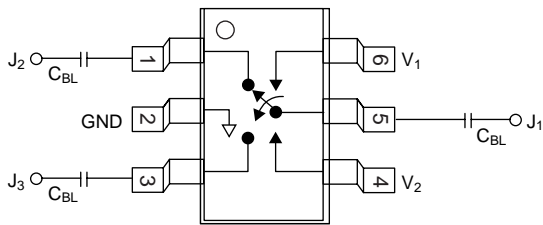


**VSWR vs. Frequency**



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

### Pin Out



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

### Absolute Maximum Ratings

Characteristic	Value
RF Input Power	6 W Max. $> 900 \text{ MHz}$ , 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
$\theta_{JC}$	25°C/W

### 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

$V_{High} = +2.5 \text{ to } +5 \text{ V}$ .