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

**AS193-73**

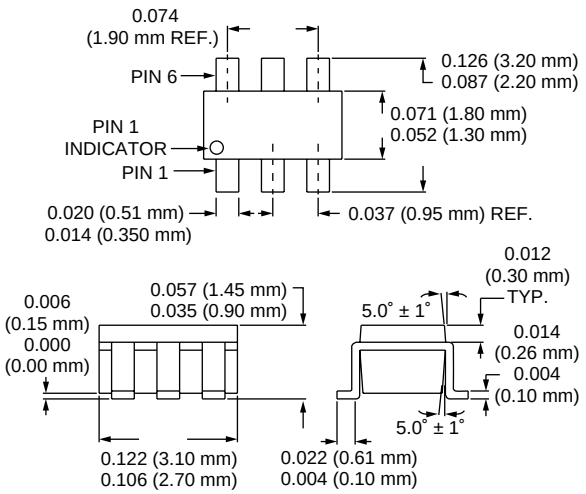
## Features

- +2.5 to +5 V Linear Operation
- Harmonics $H_2$, $H_3$ > 65 dBc @ $P_{IN}$ = 34.5 dBm
- Low Insertion Loss (0.35 dB @ 0.9 GHz)
- High Isolation (24 dB @ 0.9 GHz)
- Ultra Miniature SOT-6 Package
- PHEMT Process

## Description

The AS193-73 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 AS193-73 switch can be used in many analog and digital wireless communication systems including cellular, GSM and UMTS applications.

## SOT-6




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

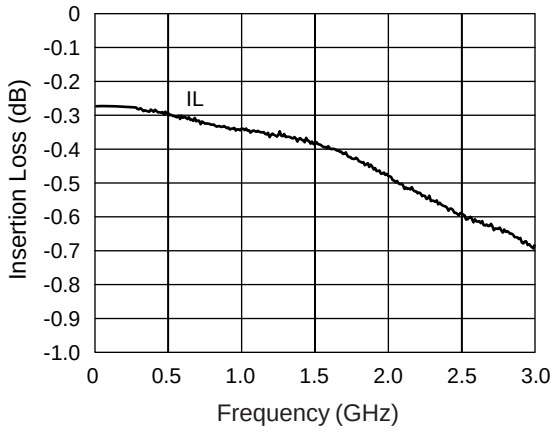
| Parameter[1] | Frequency | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Insertion Loss[2] | 0.1–0.5 GHz | | 0.30 | 0.4 | dB |
| | 0.5–1.0 GHz | | 0.35 | 0.5 | dB |
| | 1.0–2.0 GHz | | 0.45 | 0.6 | dB |
| | 2.0–2.5 GHz | | 0.55 | 0.7 | dB |
| Isolation | 0.1–0.5 GHz | 28 | 30 | | dB |
| | 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)

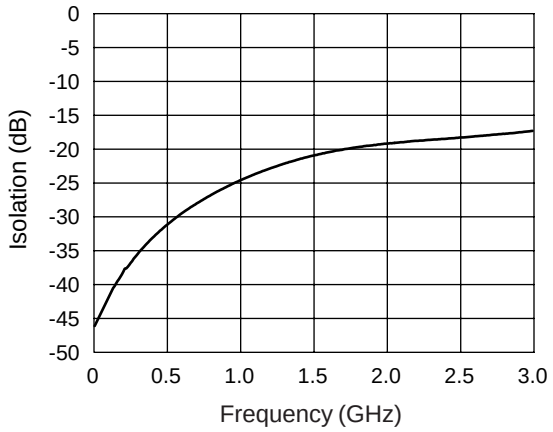
| Parameter | Condition | Frequency | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Switching Characteristics[4] | Rise, Fall (10/90% or 90/10% RF) | | | 60 | | ns |
| | On, Off (50% CTL to 90/10% RF) | | | 100 | | ns |
| | Video Feedthru | | | 50 | | mV |
| Input Power for -0.1 dB Compression | 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.<br>$V_{High}$ = +2.5 V @ 100 µA Max. to +5 V @ 200 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.

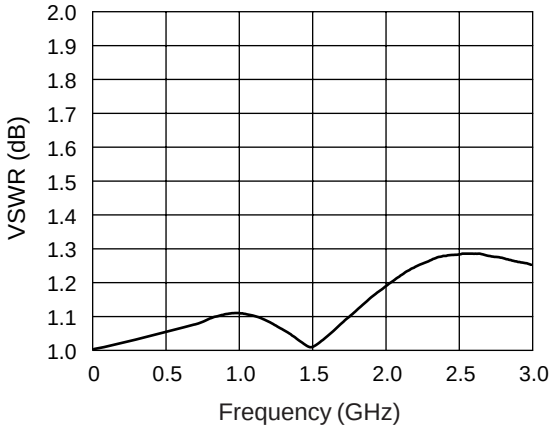
## Typical Performance Data



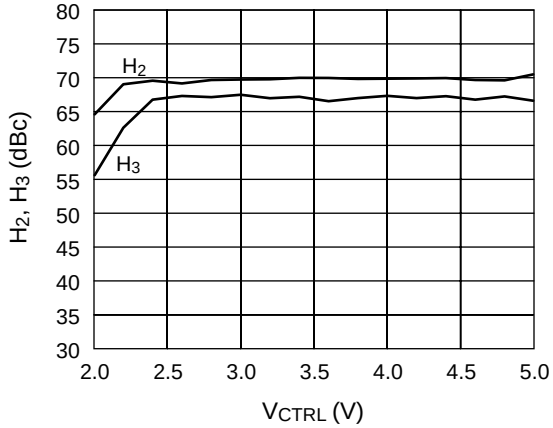

**Insertion Loss vs. Frequency**




**Isolation vs. Frequency**




**VSWR vs. Frequency**




**AS193-73 Harmonics vs. Control Voltage**
**$P_{IN}$ = 34.5 dBm, 900 MHz, GSM Pulsed**

## Truth Table

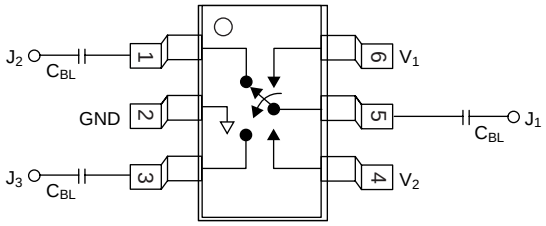
| $V_1$ | $V_2$ | $J_1$–$J_2$ | $J_1$–$J_3$ |
|---|---|---|---|
| 0 | $V_{High}$ | Isolation | Insertion Loss |
| $V_{High}$ | 0 | Insertion Loss | Isolation |

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

## 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 |
| $\Theta_{JC}$ | 25°C/W |

## Pin Out




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