

# GaAs IC High Linearity Positive Control SPDT Switch DC–2 GHz



AS139-73

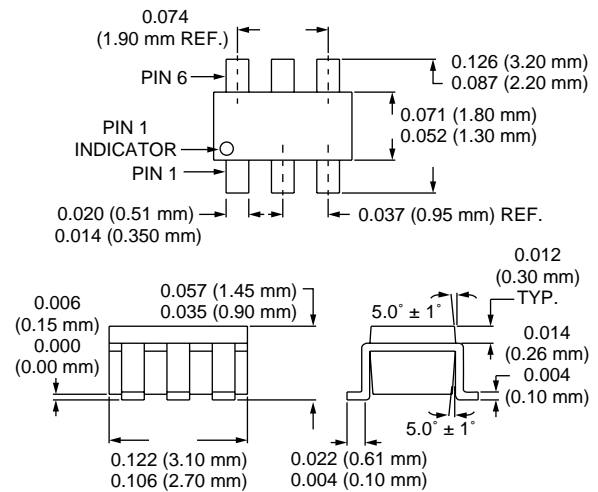
## Features

- High Linearity (55 dBm IP3 @ 0.9 GHz)
- Low Insertion Loss (0.35 dB @ 0.9 GHz)
- Low DC Power Consumption
- +3 V to +5 V Operation
- Ultra Miniature SOT-6 Package

## Description

The AS139-73 is a 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 insertion loss and ultraminiature 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 2 W. The AS139-73 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, +5 V)

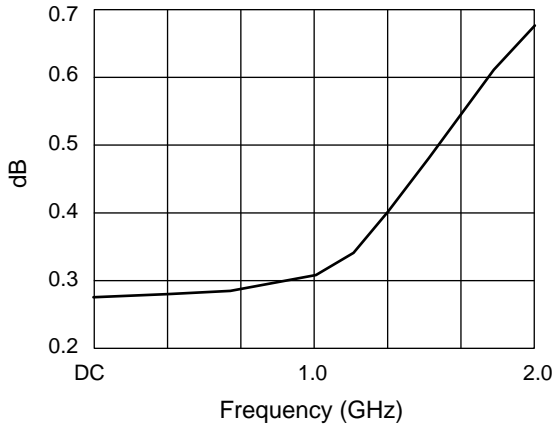
Parameter <sup>1</sup>	Frequency <sup>2</sup>	Min.	Typ.	Max.	Unit
Insertion Loss <sup>3</sup>	DC–0.5 GHz		0.3	0.4	dB
	DC–1.0 GHz		0.4	0.6	dB
	DC–2.0 GHz		1.0	1.2	dB
Isolation	DC–0.5 GHz	20	23		dB
	DC–1.0 GHz	15	17		dB
	DC–2.0 GHz	8	10		dB
VSWR <sup>4</sup>	DC–1.0 GHz		1.3:1	1.4:1	dB
	DC–2.0 GHz		1.3:1	1.8:1	dB

## Operating Characteristics at 25°C (0, +5 V)

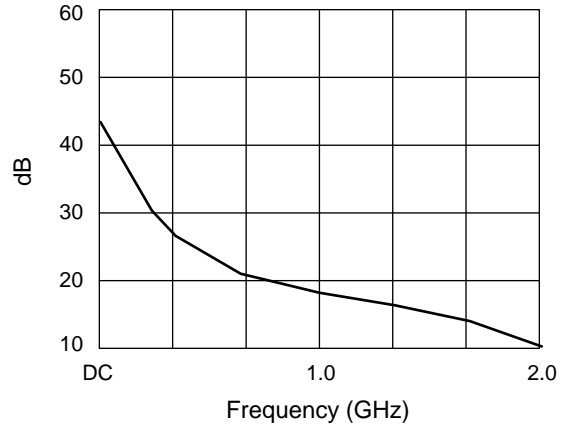
Parameter <sup>1</sup>	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics <sup>5</sup>	Rise, Fall (10/90% or 90/10% RF)			60		ns
	On, Off (50% CTL to 90/10% RF)			100		ns
	Video Feedthru			50		mV
Input Power for 1 dB Compression		0.9 GHz		+38		dBm
Intermodulation Intercept Point (IP3)	For Two-tone Input Power +10 dBm	0.9 GHz		+55		dBm
Control Voltages	$V_{Low} = 0 \text{ to } 0.2 \text{ V @ } 20 \mu\text{A Max.}$ $V_{High} = +3 \text{ V @ } 100 \mu\text{A Max. to } +5 \text{ V @ } 200 \mu\text{A Max.}$ $V_S = V_{High} \pm 0.2 \text{ V}$					

1. All measurements made in a 50  $\Omega$  system, unless otherwise specified.
2. DC = 300 kHz.
3. Insertion loss changes by 0.003 dB/°C.
4. Insertion loss state.
5. Video feedthru measured with 1 ns risetime pulse and 500 MHz bandwidth.

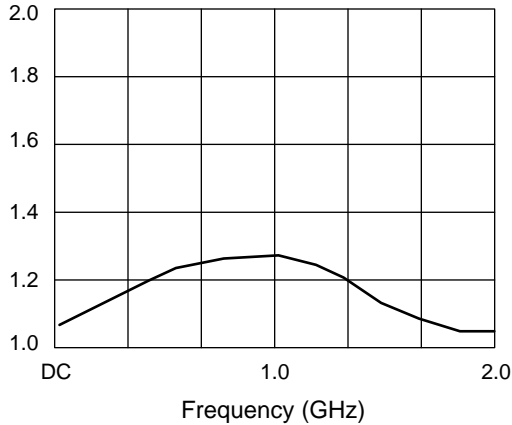
Typical Performance Data (0, +5 V)



Insertion Loss vs. Frequency



Isolation vs. Frequency



VSWR vs. Frequency

Truth Table

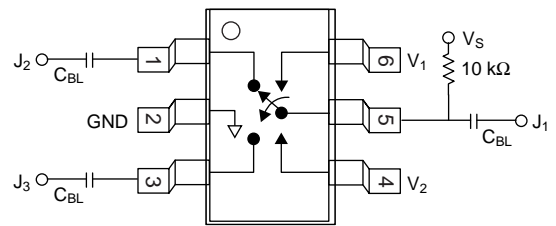
V <sub>1</sub>	V <sub>2</sub>	J <sub>1</sub> -J <sub>2</sub>	J <sub>1</sub> -J <sub>3</sub>
0	V <sub>High</sub>	Isolation	Insertion Loss
V <sub>High</sub>	0	Insertion Loss	Isolation

V<sub>High</sub> = +3 to +5 V (V<sub>S</sub> = V<sub>High</sub> ± 0.2 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
Θ <sub>JC</sub>	25°C/W

Pin Out



DC blocking capacitors (C<sub>BL</sub>) must be supplied externally.  
C<sub>BL</sub> = 100 pF for operating frequency >500 MHz.