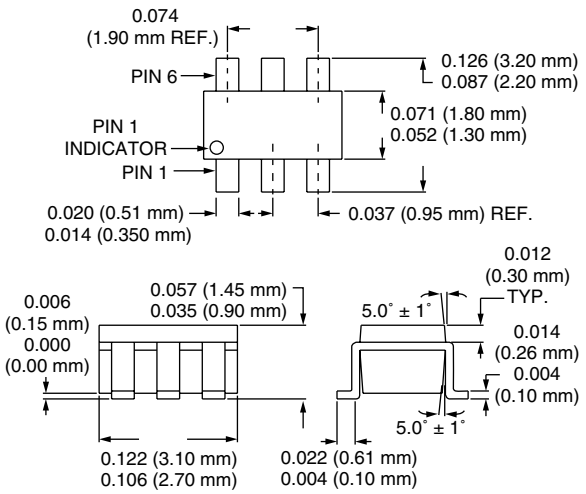
PHEMT GaAs IC High Linearity Positive Control SPDT Switch DC–2 GHz

AS173-73

Features

- High Linearity (50 dBm IP3 @ 0.9 GHz) @ 3 V
- Low Insertion Loss (0.35 dB @ 0.9 GHz)
- Isolation (21 dB @ 0.9 GHz)
- +3 V Operation
- Ultra Miniature SOT-6 Package
- PHEMT Process

SOT-6



Description

The AS173-73 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 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 2 W. The AS173-73 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)

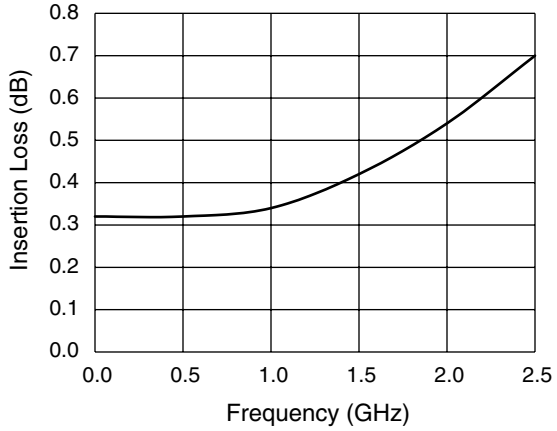
Parameter[1]	Frequency[2]	Min.	Typ.	Max.	Unit
Insertion Loss[3]	DC–0.5 GHz		0.35	0.40	dB
	DC–1.0 GHz		0.35	0.50	dB
	DC–2.0 GHz		0.55	0.70	dB
Isolation	DC–0.5 GHz	23	26		dB
	DC–1.0 GHz	18	20		dB
	DC–2.0 GHz	11	14		dB
VSWR[4]	DC–1.0 GHz		1.2:1	1.4:1	dB
	DC–2.0 GHz		1.3:1	1.8:1	dB

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

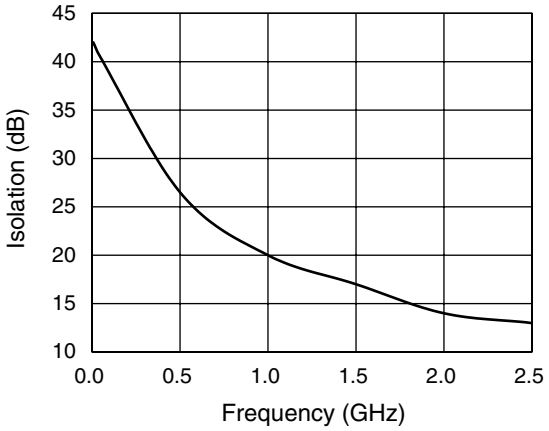
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics[5]	Rise, Fall (10/90% or 90/10% RF)			60		ns
	On, Off (50% CTL to 90/10% RF)			100		ns
	Video Feedthru			50		mV
Input Power for 1 dB Compression	0/+3 V	0.9 GHz		+34		dBm
	0/+5 V	0.9 GHz		+38		dBm
Intermodulation Intercept Point (IP3)	For Two-tone Input Power +17 dBm					
	0/+3 V	0.9 GHz		+50		dBm
	0/+5 V	0.9 GHz		+57		dBm
Control Voltages	V_{Low} = 0 to 0.2 V @ 20 µA Max.					
	V_{High} = +3 V @ 100 µA Max. to +5 V @ 200 µA Max.					
	$V_S = V_{High} \pm 0.2$ V					

1. All measurements made in a 50 Ω 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.

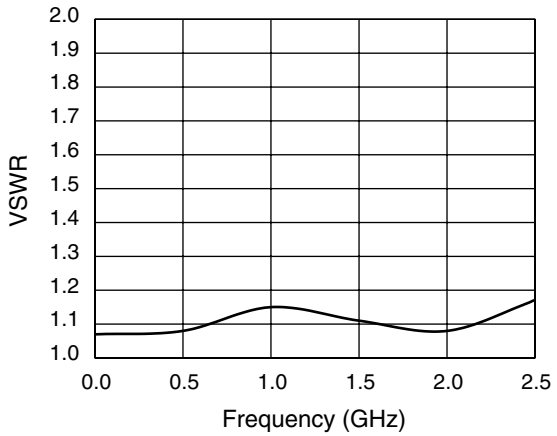
Typical Performance Data (0, +3 V)



Insertion Loss vs. Frequency



Isolation vs. Frequency



VSWR vs. Frequency

Absolute Maximum Ratings

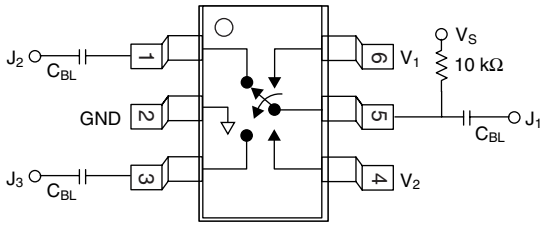
Characteristic	Value
RF Input Power	10 W Max. > 900 MHz 0/+7 V Control
Control Voltage	-0.2 V, +8 V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C
Θ_{JC}	25°C/W

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} = +3 to +5 V (V_S = V_{High} ± 0.2 V).

Pin Out



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