

GaAs IC 2 Watt High Linearity SPDT Switch DC–2 GHz



AS128-73

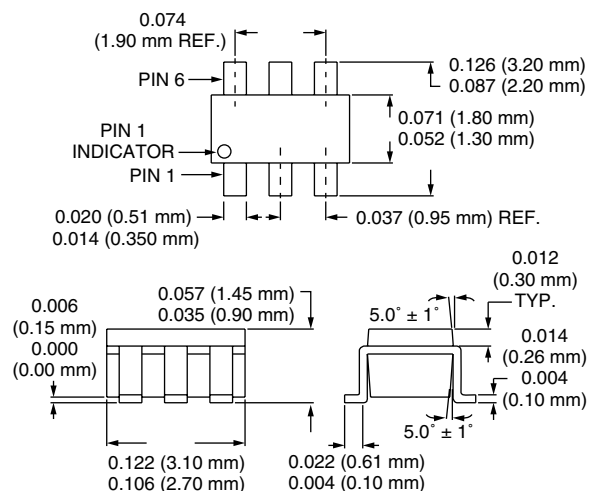
Features

- High Linearity (48 dBm IP3 @ 0.9 GHz)
- Low Insertion Loss (0.35 dB @ 0.9 GHz)
- Antenna Changeover and T/R Cellular Switch
- Ultra Miniature SOT-6 Lead Package

Description

The AS128-73 is a FET IC high power SPDT switch in a SOT-6 plastic package. This switch is 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 AS128-73 switch can be used in many analog and digital wireless communication systems including cellular applications.

SOT-6



Electrical Specifications at 25°C (0, -5 V)

| Parameter ¹ | Frequency ² | Min. | Typ. | Max. | Unit |
|-----------------------------|------------------------|------|-------|-------|------|
| Insertion Loss ³ | 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 ⁴ | DC–1.0 GHz | | 1.4:1 | 1.5:1 | |
| | DC–2.0 GHz | | 1.8:1 | 2.0:1 | |

Operating Characteristics at 25°C (0, -5 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 | | 0.9 GHz | | +33 | | dBm |
| Intermodulation Intercept Point (IP3) | For Two-tone Input Power +10 dBm | 0.9 GHz | | +48 | | dBm |
| Control Voltages | $V_{Low} = -10.0\text{ V} \leq V_{Low} \leq 0\text{ V}$, 500 μA , Max. $V_{High} = 0\text{ V} \leq V_{High} \leq +10.0\text{ V}$, 500 μA , Max. Differential = $5.0\text{ V} \leq (V_{High} - V_{Low}) < 10.0\text{ V}$ | | | | | |

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

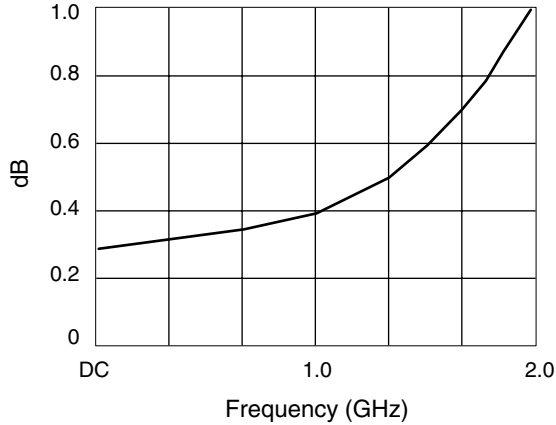
2. DC = 300 kHz.

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

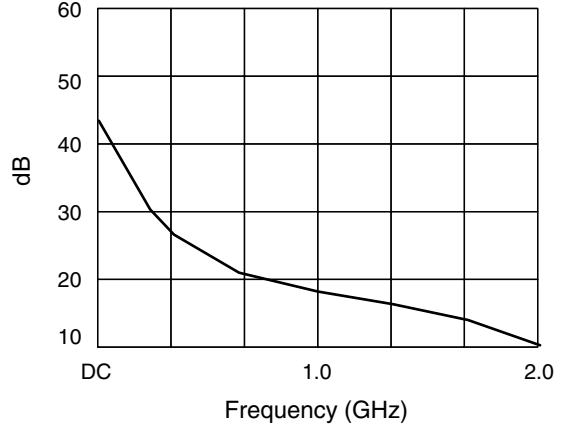
4. Insertion loss state.

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

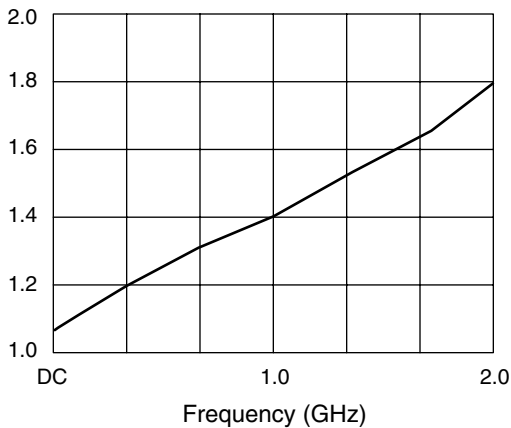
Typical Performance Data (0, -5 V)



Insertion Loss vs. Frequency



Isolation vs. Frequency

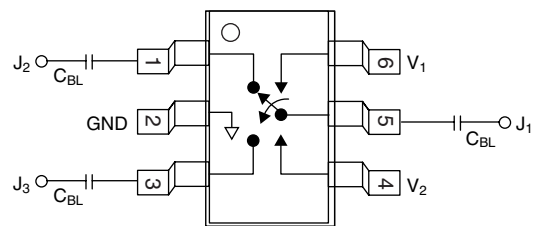


VSWR vs. Frequency

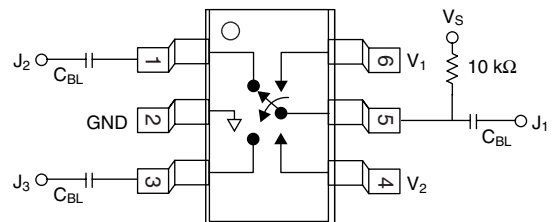
Absolute Maximum Ratings

| Characteristic | Value |
|-----------------------|---------------------------------------|
| RF Input Power | 6 W Max. > 900 MHz, 0/-5 V Control |
| Control Voltage | +0.2 V, -10 V |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -65°C to +150°C |
| θ_{JC} | 25°C/W |

Pin Out



Negative and Differential Voltages



Positive Operation

DC block components must be supplied externally.
 $C_{BL} = 100 \text{ pF}$ for operation >500 MHz.

Truth Table

Negative or Differential Voltage Operation¹

| V_1 | V_2 | J_1-J_2 | J_1-J_3 |
|------------|------------|----------------|----------------|
| V_{Low} | V_{High} | Isolation | Insertion Loss |
| V_{High} | V_{Low} | Insertion Loss | Isolation |

1. Where supply voltage is limited and for improved high power linearity a larger differential voltage can be obtained by using a positive voltage for V_{High} along with a negative voltage for V_{Low} . Refer to application notes for further information.

Positive Voltage Operation

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

$V_{High} = +5 \text{ to } +10 \text{ V}$ ($V_S = V_{High} \pm 0.2 \text{ V}$).