

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



AS205-322

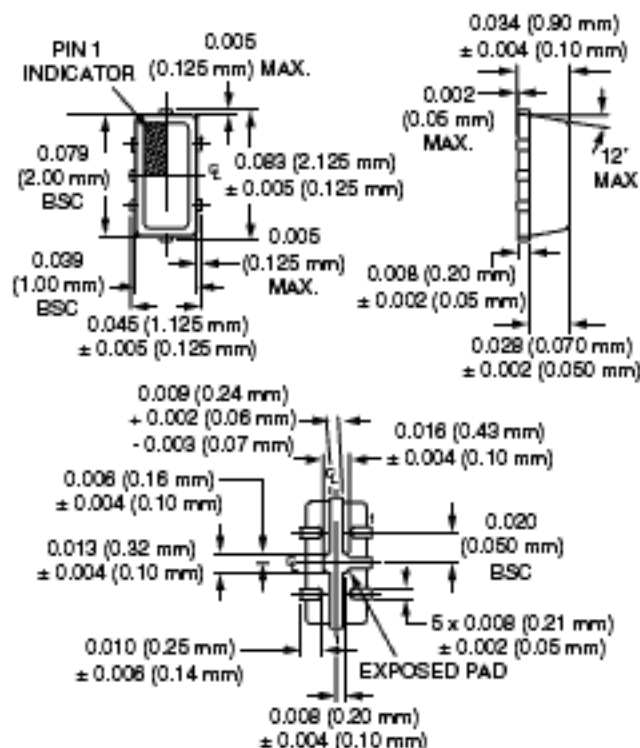
Features

- High Linearity (50 dBm IP3 @ 0.9 GHz) @ 3 V
- Low Insertion Loss (0.35 dB @ 0.9 GHz)
- +3 V Operation
- Ultra Miniature MLP 2 x 1 mm 5 Lead Package
- PHEMT Process

Description

The AS205-322 is a PHEMT GaAs FET IC high linearity SPDT switch in a MLP 2 x 1 mm 5 lead 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 AS205-322 switch can be used in many analog and digital wireless communication systems including cellular, GSM and DECT applications.

MLP 2 x 1 mm 5 Lead



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 | 20 | 23 | | dB |
| | DC–1.0 GHz | 15 | 18 | | dB |
| | DC–2.0 GHz | 10 | 13 | | dB |
| VSWR ⁴ | DC–1.0 GHz | | 1.3:1 | 1.5:1 | dB |
| | DC–2.0 GHz | | 1.3:1 | 1.5:1 | 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 | | 0.9 GHz | | +33 | | dBm |
| Intermodulation Intercept Point (IP3) | For Two-tone Input Power +17 dBm | 0.9 GHz | | +50 | | dBm |
| Control Voltages | $V_{Low} = 0 \text{ to } 0.2 \text{ V @ } 20 \mu\text{A Max.}$ $V_{High} = +3 \text{ V @ } 100 \mu\text{A Max. to } +5 \text{ V @ } 200 \mu\text{A Max.}$ | | | | | |

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

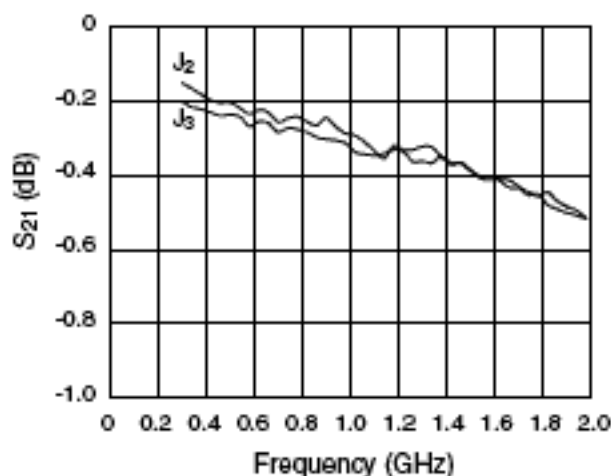
2. DC = 300 kHz.

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

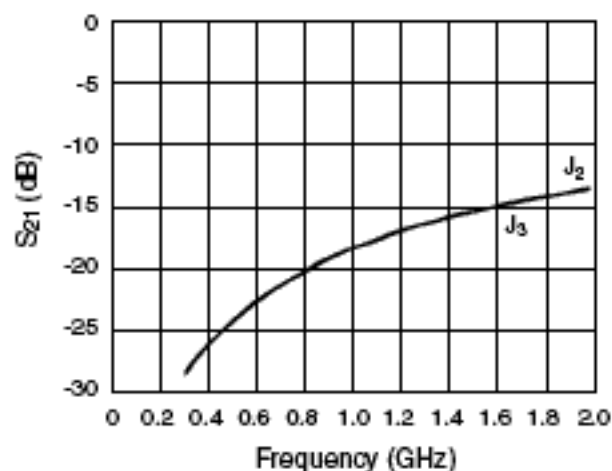
4. Insertion loss state.

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

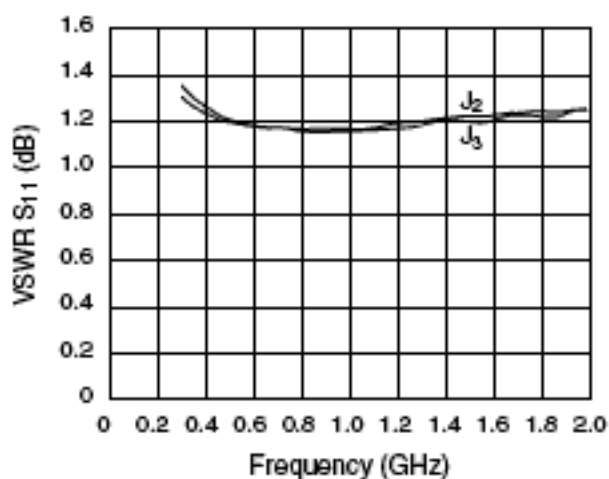
Typical Performance Data (0, +3 V)



Insertion Loss vs. Frequency



Isolation vs. Frequency



VSWR vs. Frequency

Truth Table

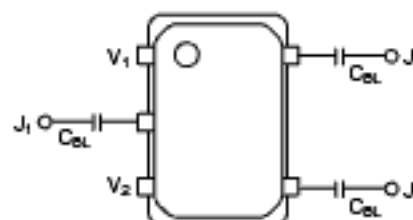
| V ₁ | V ₂ | J ₁ -J ₂ | J ₁ -J ₃ |
|-------------------|-------------------|--------------------------------|--------------------------------|
| 0 | V _{High} | Isolation | Insertion Loss |
| V _{High} | 0 | Insertion Loss | Isolation |

V_{High} = +3 to +5 V.

Absolute Maximum Ratings

| Characteristic | Value |
|-----------------------|--------------------------------------|
| RF Input Power | 6 W Max. > 900 MHz 0/+7 V Control |
| Control Voltage | -0.2 V, +7 V |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -65°C to +150°C |
| θ _{JC} | 25°C/W |

Pin Out



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