

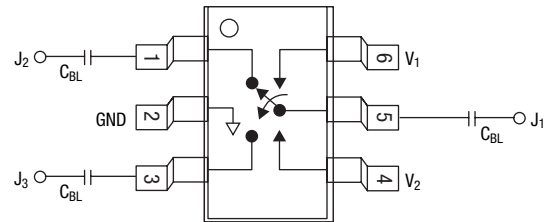
DATA SHEET

AS193-73, AS193-73LF: PHEMT GaAs IC High-Linearity 3 V Control SPDT Switch 0.1–2.5 GHz

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)
- Ultraminiature SOT-6 package
- PHEMT process
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C per JEDEC J-STD-020

Pin Out




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

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

NEW Skyworks offers lead (Pb)-free, RoHS (Restriction of Hazardous Substances)-compliant packaging.



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 |

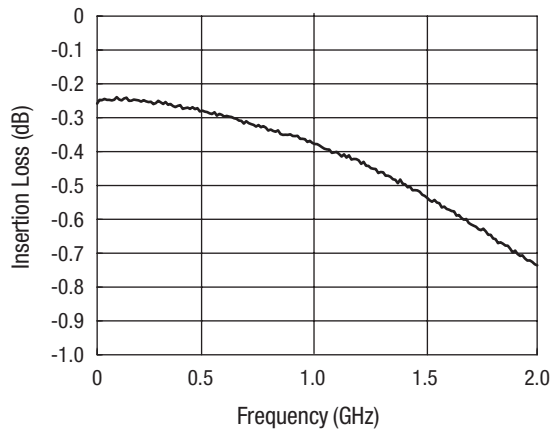
1. All measurements made in a 50 Ω system, unless otherwise specified.
 2. Insertion loss changes by 0.003 dB/°C.
 3. Insertion loss state.

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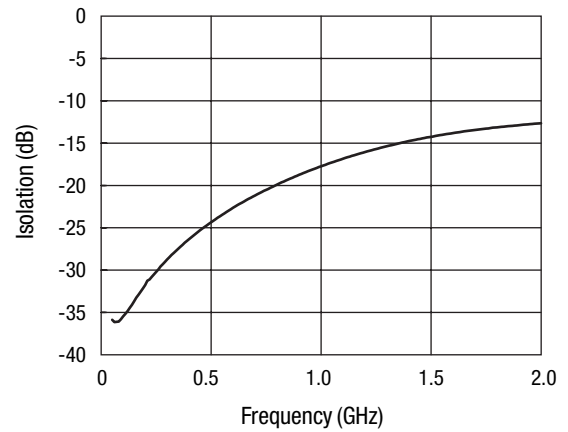
Operating Characteristics at 25 °C (0, 3 V)

| Parameter | Condition | Frequency | Min. | Typ. | Max. | Unit |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------|------|------|------|
| Switching characteristics | | | | | | |
| Rise, fall | 10/90% or 90/10% RF | | | 60 | | ns |
| On, off | 50% CTL to 90/10% RF | | | 100 | | ns |
| Video feedthru | $T_{RISE} = 1 \text{ ns}$, BW = 500 MHz | | | 50 | | mV |
| Input power for -0.1 dB compression | $V_{CTL} = 0/3 \text{ V}$ | 0.9 GHz | | 37 | | dBm |
| Harmonics H_2, H_3 | $P_{IN} = 34.5 \text{ dBm}$ | 0.9 GHz | | -65 | | dBc |
| Thermal resistance | | | | 25 | | °C/W |
| Control voltages | $V_{LOW} = 0 \text{ to } 0.2 \text{ V @ } 20 \mu\text{A max.}$ $V_{HIGH} = 2.5 \text{ V @ } 100 \mu\text{A max. to } 5 \text{ V @ } 200 \mu\text{A max.}$ | | | | | |

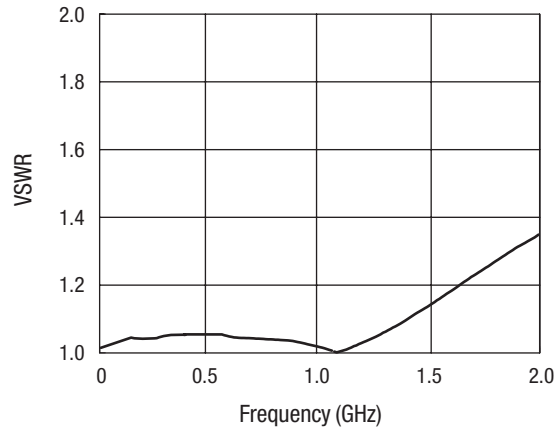
Typical Performance Data



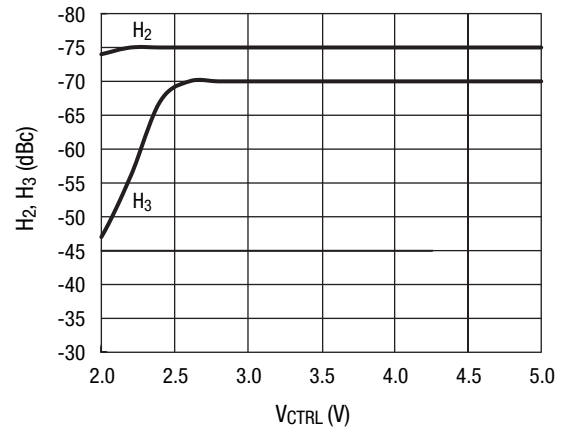
Insertion Loss vs. Frequency



Isolation vs. Frequency



VSWR vs. Frequency



Harmonics vs. Control Voltage
34.5 dBm 900 MHz GSM Pulse

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 |

Performance is guaranteed only under the conditions listed in the specifications table and is not guaranteed under the full range(s) described by the Absolute Maximum specifications. Exceeding any of the absolute maximum/minimum specifications may result in permanent damage to the device and will void the warranty.

CAUTION: Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions must be employed at all times.

Recommended Solder Reflow Profiles

Refer to the [“Recommended Solder Reflow Profile”](#) Application Note.

Tape and Reel Information

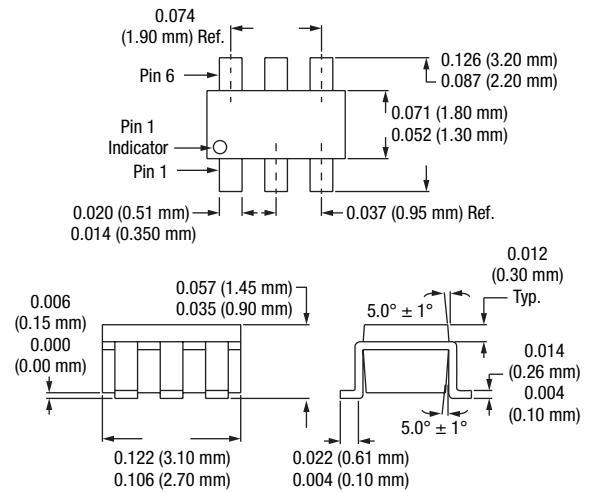
Refer to the [“Discrete Devices and IC Switch/Attenuators Tape and Reel Package Orientation”](#) Application Note.

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 |

All other conditions not recommended.
V_{HIGH} = 2.5 to 5 V.

SOT-6



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