

**DATA SHEET**

# AS200-313, AS200-313LF: PHEMT GaAs IC 2 W High-Linearity 5–6 GHz T/R Switch

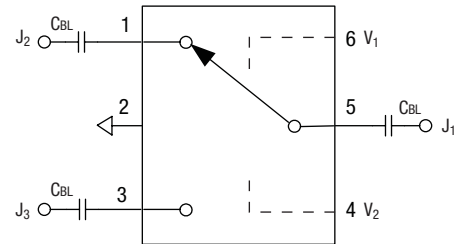
## Applications

- T/R switch in WLAN 802.11a systems

## Features

- Operating frequency 5–6 GHz
- High linearity 50 dBm IIP3
- High power  $P_{-1\text{ dB}} > 33\text{ dBm}$
- Low positive control voltage 3 V
- Low-cost, ultrasmall QFN package
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C per JEDEC J-STD-020

## Simplified Block Diagram



## Description

The AS200-313 is a 5–6 GHz PHEMT GaAs switch. Designed for transmit-receive applications, this device is capable of switching 2 W microwave signals with 3 V control while maintaining high-linearity performance. The switch covers the entire 802.11a frequency ranges of 5.15–5.825 GHz. The low-loss, high-isolation, high-linearity and low-cost features make it ideal for wireless LAN systems in the 802.11a frequency band.

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



## Electrical Specifications at 25 °C (0, 3 V)

| Parameter <sup>(1)</sup>      | Frequency   | Min. | Typ. | Max. | Unit |
|-------------------------------|-------------|------|------|------|------|
| Insertion loss <sup>(2)</sup> | 5.0–6.0 GHz |      | 1.3  | 1.5  | dB   |
|                               | 5.0–5.4 GHz |      | 1.3  | 1.5  | dB   |
|                               | 5.5–6.0 GHz |      | 1.3  | 1.5  | dB   |
| Isolation                     | 5.0–6.0 GHz | 26   | 30   |      | dB   |
|                               | 5.0–5.4 GHz | 26   | 30   |      | dB   |
|                               | 5.5–6.0 GHz | 26   | 30   |      | dB   |
| Return loss <sup>(3)</sup>    | 5.0–5.4 GHz | 10   | 15   |      | dB   |
|                               | 5.5–6.0 GHz | 10   | 15   |      | dB   |

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

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

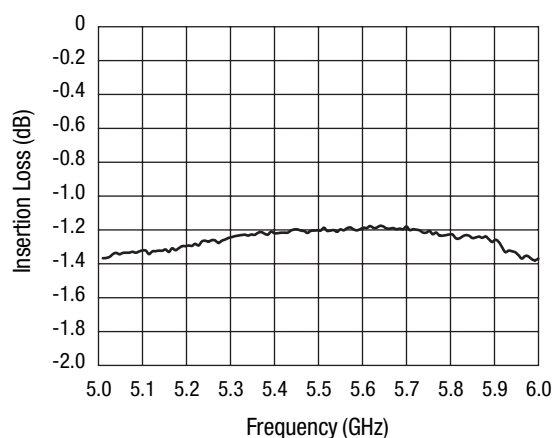
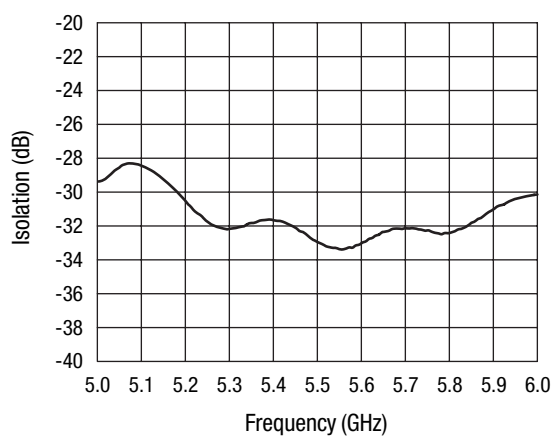
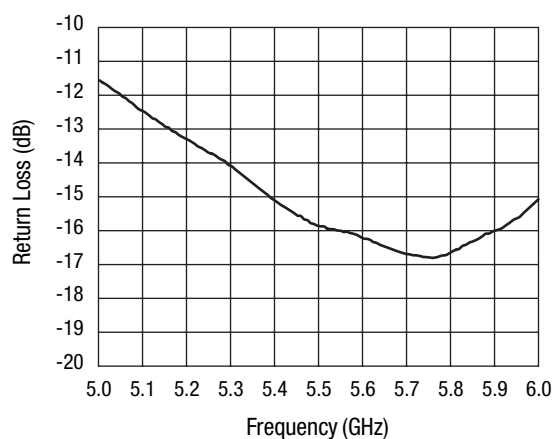
3. Insertion loss state.



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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   |           |      | 20   |      | ns   |
| On, off                             | 50% CTL to 90/10% RF  |           |      | 50   |      | ns   |
| Video feedthru                      | $T_{RISE} = 1$ ns, BW = 500 MHz   |           |      | 50   |      | mV   |
| Input power for -0.1 dB compression | $V_{CTL} = 0/3$ V   | 5.2 GHz   |      | 33   |      | dBm  |
| Harmonics $H_2$ , $H_3$             | $P_{IN} = 30$ dBm   | 5.2 GHz   |      | -65  |      | dBc  |
| Thermal resistance                  |   |           |      | 25   |      | °C/W |
| Control voltages                    | $V_{LOW} = 0$ to $0.2$ V @ $20$ $\mu$ A max.<br>$V_{HIGH} = 2.5$ V @ $100$ $\mu$ A max. to $5$ V @ $200$ $\mu$ A max. |           |      |      |      |      |

**Typical Performance Data (0, 3 V)****Insertion Loss vs. Frequency****Isolation vs. Frequency****Return Loss vs. Frequency**

## Absolute Maximum Ratings

| Characteristic        | Value                               |
|-----------------------|-------------------------------------|
| RF input power        | 6 W max. > 900 MHz<br>0/7 V control |
| Control voltage       | -0.2 V <sub>i</sub> +7 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.

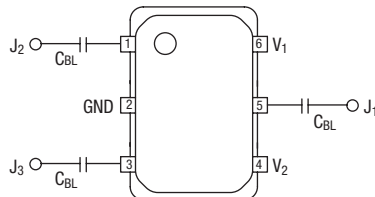
## Recommended Solder Reflow Profiles

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.

## Pin Out (Top View)



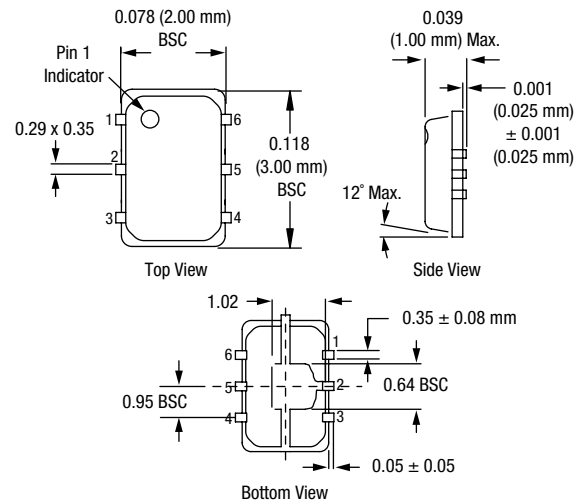
DC blocking capacitors ( $C_{BL}$ ) must be supplied externally.  
 $C_{BL} = 15 \text{ pF}$ .

## 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.  
 $V_{HIGH} = 2.5 \text{ to } 5 \text{ V}$ .

## QFN-6



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