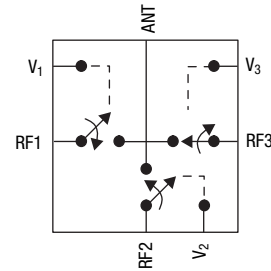


**DATA SHEET**

# **AS227-321LF: PHEMT GaAs IC High-Power SP3T Switch 300 kHz–2 GHz**

**Features**

- Positive low voltage control (0/2.75 V operation)
- Low insertion loss (0.5 dB typ. @ 1 GHz)
- High isolation (26 dB typ. @ 1 GHz)
- Excellent IIP3 (63 dBm @ 2.75 V, 27 dBm/tone)
- Miniature QFN-12 plastic package
- PHEMT process
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C per JEDEC J-STD-020

**Functional Block Diagram**

**Description**

The AS227-321LF is a PHEMT GaAs IC SP3T antenna switch operating in the 900 MHz and 1800 MHz frequency bands. Switching between the antenna and Tx/Rx ports is accomplished with 3 control inputs. When the control inputs are driven with the appropriate voltages, a low insertion loss path is provided from an antenna port to an Rx or Tx port, while the other ports have high attenuation.

**NEW**

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


**Electrical Specifications at 25 °C**

**$V_{CTL} = 0/2.75 \text{ V}$ ,  $Z_0 = 50 \Omega$ , unless otherwise noted**

| Parameter      | Frequency         | Min.            | Typ. | Max. | Unit |
|----------------|-------------------|-----------------|------|------|------|
| Insertion loss | Ant-RF1, RF2, RF3 | 300 kHz–0.5 GHz | 0.45 | 0.6  | dB   |
|                |                   | 300 kHz–1.0 GHz | 0.50 | 0.7  | dB   |
|                |                   | 300 kHz–2.0 GHz | 0.70 | 0.9  | dB   |
| Isolation      | Ant-RF1, RF2, RF3 | 300 kHz–0.5 GHz | 30   | 32   | dB   |
|                |                   | 300 kHz–1.0 GHz | 24   | 26   | dB   |
|                |                   | 300 kHz–2.0 GHz | 18   | 20   | dB   |
| Return loss    | Ant-RF1, RF2, RF3 | 300 kHz–0.5 GHz | 18   |      | dB   |
|                |                   | 300 kHz–1.0 GHz | 18   |      | dB   |
|                |                   | 300 kHz–2.0 GHz | 14   |      | dB   |

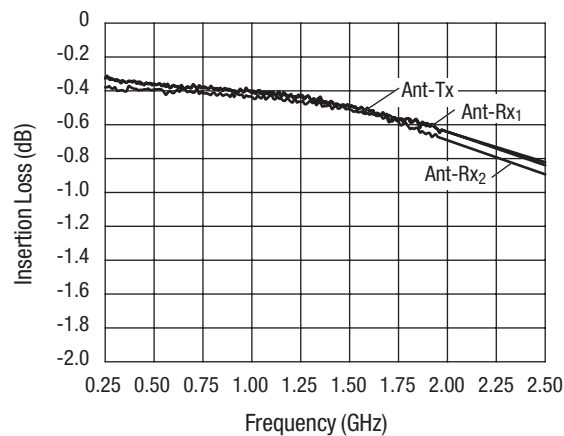
Operating Characteristics at 25 °C

V<sub>CTL</sub> = 0/2.75 V, Z<sub>0</sub> = 50 Ω, unless otherwise noted

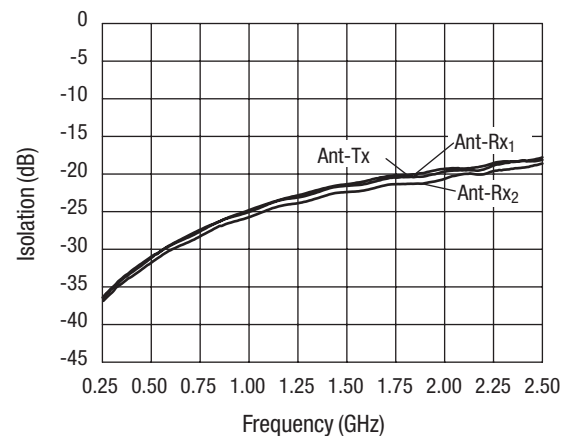
| Parameter                          | Condition   | Frequency   | Min.  | Typ. | Max. | Unit |
|------------------------------------|---|-------------|-------|------|------|------|
| Input Third Order Intercept (IIP3) | P <sub>IN</sub> = 27 dBm, each tone                 | 824/869 MHz |       | 63   |      | dBm  |
| 2nd/3rd harmonic                   | P <sub>IN</sub> = 34.5 dBm                          | 900 MHz     |       | -65  |      | dBc  |
| Gate leakage current               | P <sub>IN</sub> = 34 dBm, V <sub>CTL</sub> = 2.75 V |             |       | 50   |      | μA   |
| Thermal resistance                 |   |             |       | 25   |      | °C/W |
| Control voltages                   | V <sub>LOW</sub>                                    |             | -0.25 | 0    | 0.25 | V    |
|                                    | V <sub>HIGH</sub>                                   |             | 2.60  | 2.75 | 5.00 | V    |

Typical Performance Data

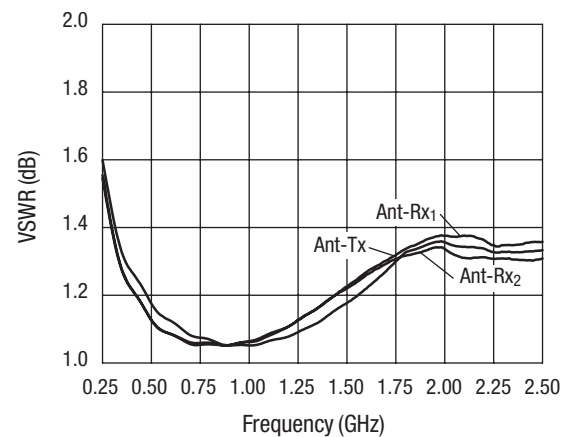
T<sub>A</sub> = 25 °C, V<sub>CTL</sub> = 0/2.75 V, Z<sub>0</sub> = 50 Ω, unless otherwise noted



Insertion Loss vs. Frequency

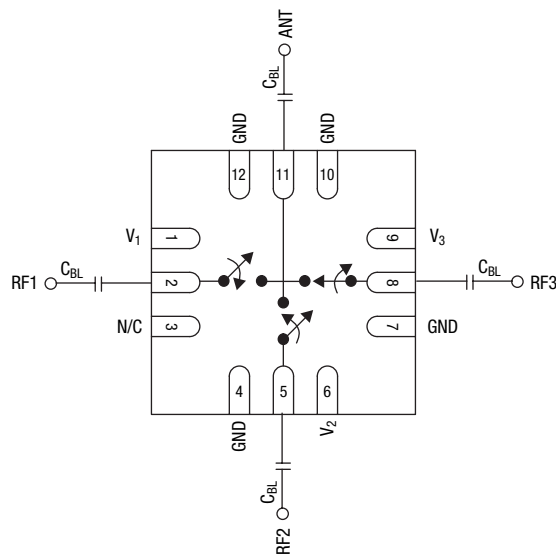


Isolation vs. Frequency



VSWR vs. Frequency

Pin Out (Top View)



DC blocks required.  $C_{BL} = 47 \text{ pF}$  for operation  $>500 \text{ MHz}$ .

Absolute Maximum Ratings

| Characteristic        | Value                          |
|-----------------------|--------------------------------|
| RF input power        | 4 W > 0.5 GHz<br>0/6 V control |
| Control voltage       | 6 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.

Truth Table

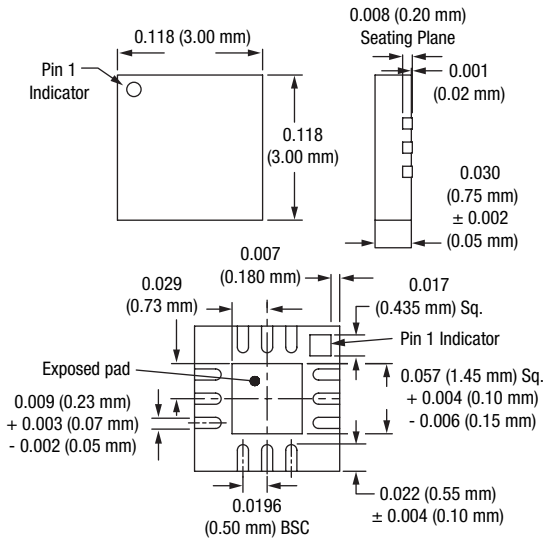
| $V_1$      | $V_2$      | $V_3$      | Ant-RF1   | Ant-RF2   | Ant-RF3   |
|------------|------------|------------|-----------|-----------|-----------|
| $V_{HIGH}$ | $V_{LOW}$  | $V_{LOW}$  | Ins. loss | Isolation | Isolation |
| $V_{LOW}$  | $V_{HIGH}$ | $V_{LOW}$  | Isolation | Ins. loss | Isolation |
| $V_{LOW}$  | $V_{LOW}$  | $V_{HIGH}$ | Isolation | Isolation | Ins. loss |

All other conditions not recommended.

$V_{LOW} = 0-0.2 \text{ V}$ .

$V_{HIGH} = 2.75-5 \text{ V}$ .

QFN-12



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