

DATA SHEET

SKY13299-321LF: GaAs SPDT 7 W Switch 100 MHz–4 GHz

Features

- Positive voltage control (0/3 to 0/5 V)
- Low insertion loss 0.5 dB typical at 3.5 GHz
- High isolation >35 dB at 3.5 GHz
- High P_{-0.1} dB of 38.5 dBm at 3.3 V
- Low gate lag process for fast settling time applications
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C per JEDEC J-STD-020

Description

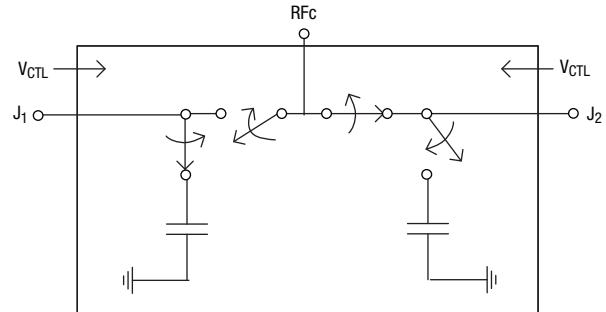
The SKY13299-321LF is a pHEMT GaAs FET IC high power switch packaged in a 12-lead exposed pad plastic package for low-cost commercial applications. This switch is an ideal choice for WiMax and WLAN applications where low loss, high isolation and excellent linearity are key requirements.

NEW

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



Functional Diagram



Electrical Specifications at 25°C

V_{CTL} = 0 V/3 V, T = 25 °C, P_{INPUT} = 0 dBm, Z₀ = 50 Ω, unless otherwise noted

| Parameter | Frequency | Min. | Typ. | Max. | Unit |
|---|-------------|------|------|------|------|
| Insertion loss | 0.1–1.0 GHz | | 0.30 | 0.50 | dB |
| | 1.0–2.0 GHz | | 0.40 | 0.60 | dB |
| | 2.0–3.0 GHz | | 0.45 | 0.65 | dB |
| | 3.0–4.0 GHz | | 0.65 | 0.85 | dB |
| Isolation | 0.1–1.0 GHz | 26 | 29 | | dB |
| | 1.0–2.0 GHz | 26 | 29 | | dB |
| | 2.0–3.0 GHz | 26 | 29 | | dB |
| | 3.0–4.0 GHz | 27 | 30 | | dB |
| Return loss (Insertion loss state) Lower frequency return loss is dependent on DC blocks | 0.1–1.0 GHz | | 20 | | dB |
| | 1.0–2.0 GHz | | 17 | | dB |
| | 2.0–3.0 GHz | | 20 | | dB |
| | 3.0–4.0 GHz | | 17 | | dB |



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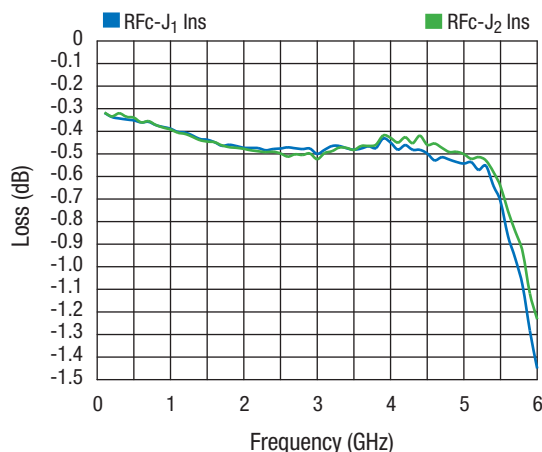
Operating Characteristics at 25°C

$V_{CTL} = 0\text{ V/3 V}$, $T = 25\text{ °C}$, $P_{INPUT} = 0\text{ dBm}$, $Z_0 = 50\text{ }\Omega$, unless otherwise noted

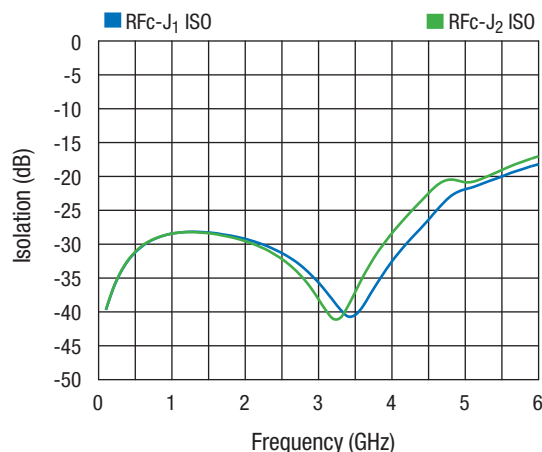
| Parameter | Condition | Frequency | Min. | Typ. | Max. | Unit |
|------------------------------------|--|------------------------|-----------|-----------------------|----------|--|
| Switching characteristics | | | | | | |
| Rise/fall time | 10/90% or 90/10% RF | | | 200 | | ns |
| On/off time | 50% V_{CTL} to 90/10% RF | | | 300 | | ns |
| Settling time | 50% CTL to 0.1 dB final value | | | 2 | | μ s |
| Harmonics H2, H3 | $P_{IN} = 34\text{ dBm CW}$ | $F_0 = 900\text{ MHz}$ | | -80 | | dBc |
| Input power for 0.1 dB compression | | 0.7–4 GHz | | 38.5 | | dBm |
| Control voltages | $V_{CTL\text{ LOW}}$ $V_{CTL\text{ HIGH}}$ | | 0 2.75 | | 0.2 5 | V V |
| Supply currents | $V_{CTL\text{ LOW}}$ $V_{CTL\text{ HIGH}}$ @ 3.3 V and < 30 dBm input $V_{CTL\text{ HIGH}}$ @ 3.3 V and 30–37 dBm input $V_{CTL\text{ HIGH}}$ @ 3.3 V and 37–38 dBm input | | | 5 50 100 200 | | μ A μ A μ A μ A |

Typical Performance Data

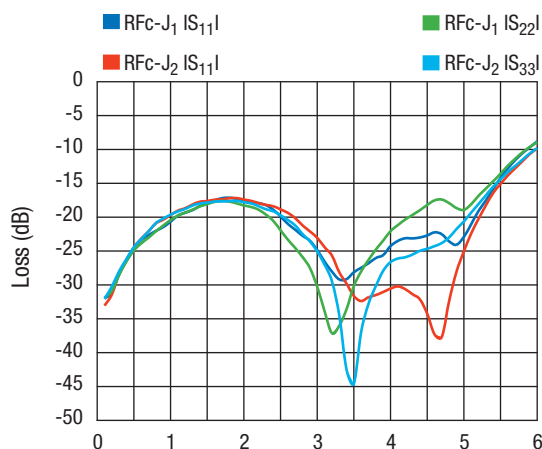
$V_{CTL} = 0\text{ V/3 V}$, $T = 25\text{ °C}$, $P_{INPUT} = 0\text{ dBm}$, $Z_0 = 50\text{ }\Omega$, unless otherwise noted



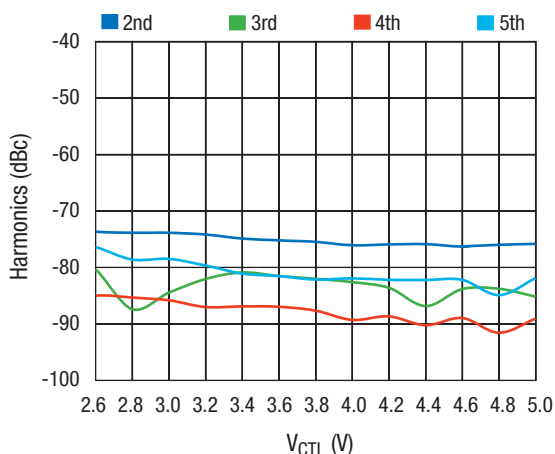
Typical Insertion Loss



Typical Isolation

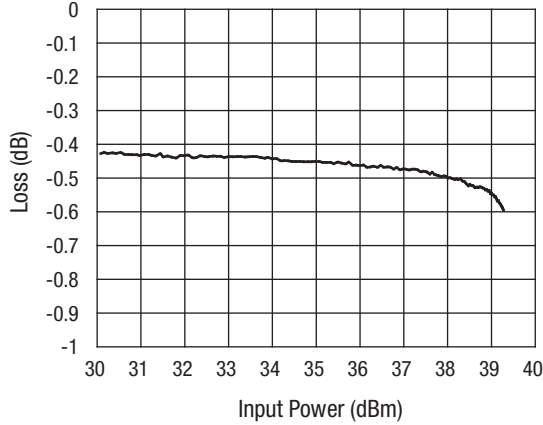


Typical Return Loss

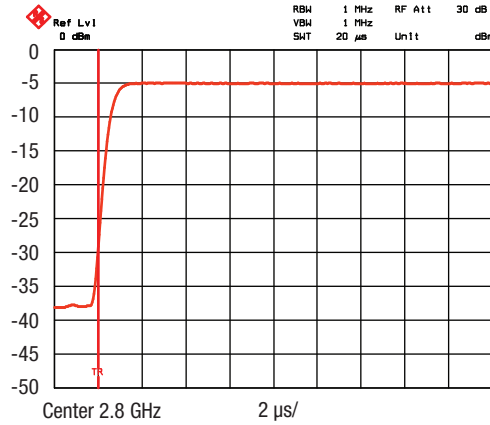


Typical Harmonics
Frequency = 900 MHz, $P_{IN} = 34\text{ dBm CW}$

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Typical Loss vs. Input Power
2500 MHz $V_{CTL} = 3.3\text{ V}$



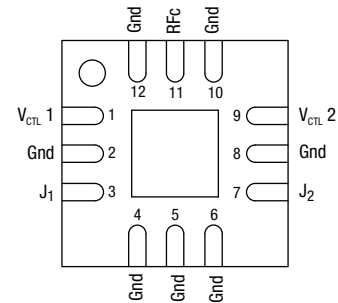
Typical Settling Time

Pin Descriptions

| Pin # | Pin Name | Description |
|--------|------------|-----------------------------------|
| 1 | V_{CTL1} | DC control voltage |
| 2 | Gnd | Ground |
| 3 | J_1 | RF port must be DC blocked |
| 4 | Gnd | Ground |
| 5 | Gnd | Ground |
| 6 | Gnd | Ground |
| 7 | J_2 | RF port must be DC blocked |
| 8 | Gnd | Ground |
| 9 | V_{CTL2} | DC control voltage |
| 10 | Gnd | Ground |
| 11 | RFc | RF common port must be DC blocked |
| 12 | Gnd | Ground |
| Paddle | Paddle | Exposed paddle must be grounded |

Pin Out (Top View)

X-ray of pads on bottom of package



Truth Table

| V_{CTL1} | V_{CTL2} | RFc to J_1 | RFc to J_2 |
|------------|------------|----------------|----------------|
| 1 | 0 | Insertion loss | Isolation |
| 0 | 1 | Isolation | Insertion loss |
| 1 | 1 | undefined | undefined |
| 0 | 0 | undefined | undefined |

0 = 0 to 0.2 V.
1 = 2.75 to 5 V.

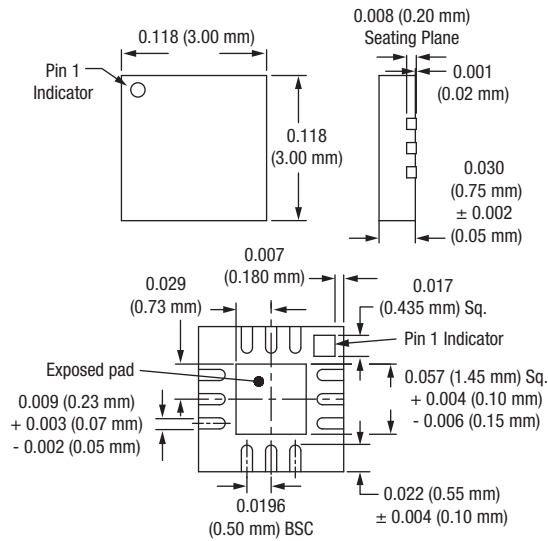
Absolute Maximum Ratings

| Characteristic | Value |
|-------------------------|-------------------------------------|
| V_{CTL} voltage range | $2.75 \leq V_{CTL} \leq 7\text{ V}$ |
| RF input power @ 3.3V | 39.5 dBm, $f > 700\text{ MHz}$ |
| Operating temperature | -40 °C to +85 °C |
| Storage temperature | -65 °C to +150 °C |

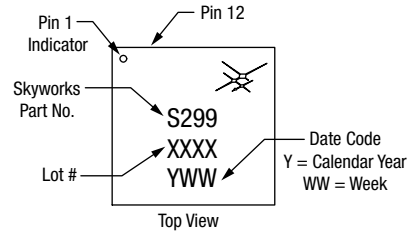
Performance is guaranteed only under the conditions listed in the specifications table and is not guaranteed under the full range(s) described by the Absolute Maximum specifications. Exceeding any of the absolute maximum/minimum specifications may result in permanent damage to the device and will void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

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QFN-12



Part Marking



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.

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