

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

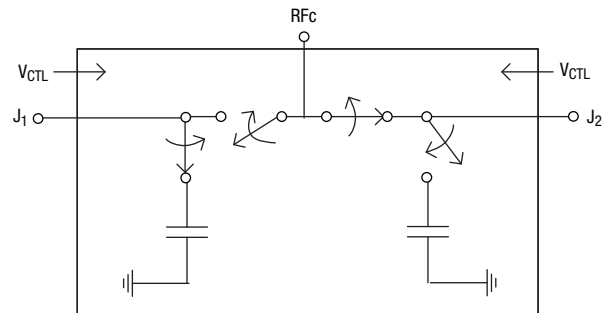
The SKY13299-321LF is a pHEMT GaAs FET IC high power switch packaged in a 12-lead exposed pad plastic package for low-cost commercial applications. This switch is an ideal choice for WiMax and WLAN applications where low loss, high isolation and excellent linearity are key requirements.

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, $Z_0 = 50$ 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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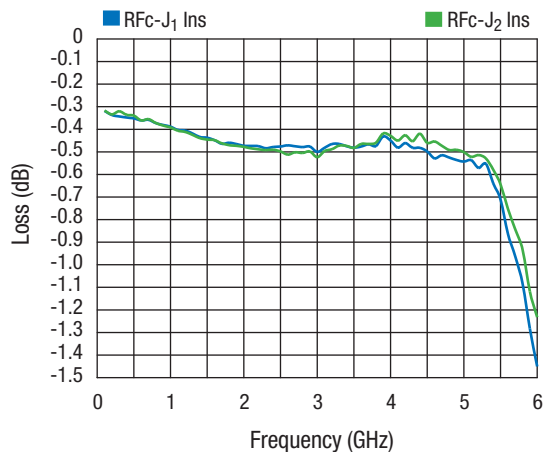
Operating Characteristics at 25°C

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

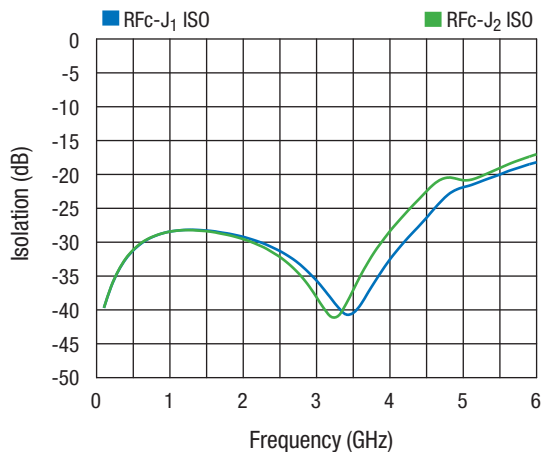
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching characteristics						
Rise/fall time	10/90% or 90/10% RF			200		ns
On/off time	50% V_{CTL} to 90/10% RF			300		ns
Settling time	50% CTL to 0.1 dB final value			2		μ s
Harmonics H2, H3	$P_{IN} = 34\text{ dBm CW}$	$F_0 = 900\text{ MHz}$		-80		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

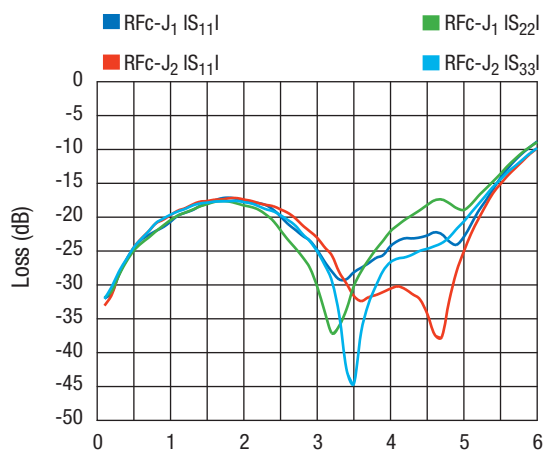
$V_{CTL} = 0\text{ V}/3\text{ V}$, $T = 25\text{ °C}$, $P_{INPUT} = 0\text{ dBm}$, $Z_0 = 50\text{ }\Omega$, unless otherwise noted



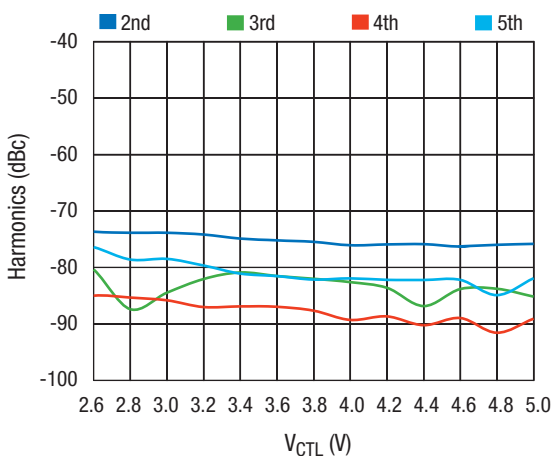
Typical Insertion Loss



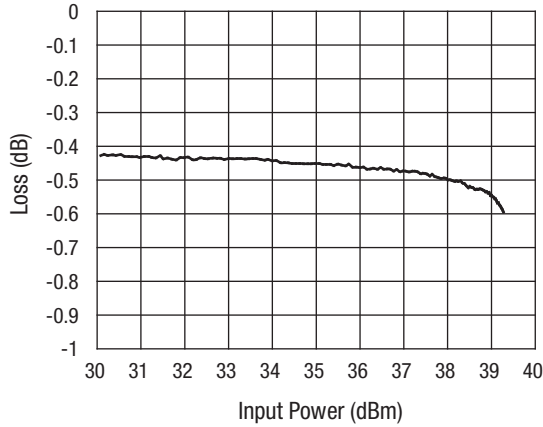
Typical Isolation



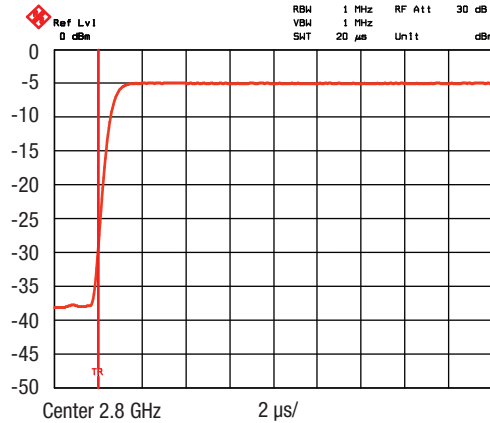
Typical Return Loss



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



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

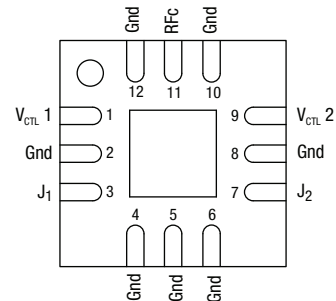
Truth Table

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.

Pin Out (Top View)

X-ray of pads on bottom of package



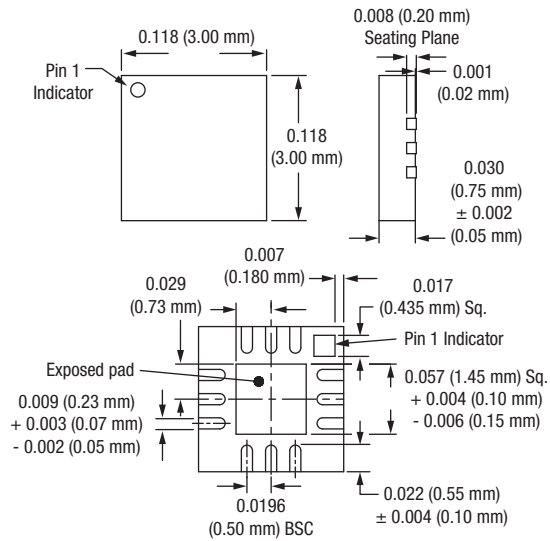
Absolute Maximum Ratings

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

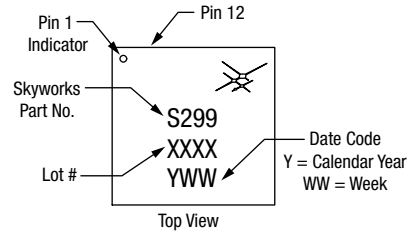
Performance is guaranteed only under the conditions listed in the specifications table and is not guaranteed under the full range(s) described by the Absolute Maximum specifications. Exceeding any of the absolute maximum/minimum specifications may result in permanent damage to the device and will void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

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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