DATA SHEET

SKY13309-370LF: PHEMT GaAs IC SP3T Switch 0.1–3.0 GHz

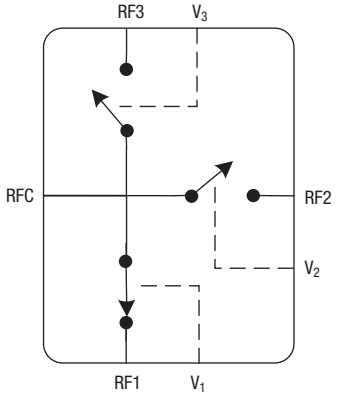
Features

- Positive low voltage control (0/3 V)
- Low insertion loss (0.5 dB at 2.5 GHz)
- High isolation (25 dB at 2.5 GHz)
- Excellent linearity performance ($P_{1\ dB}$ = 29 dBm)
- Miniature ultrathin MLP-8 pin plastic package (2 x 2 x 0.55 mm)
- Advanced PHEMT process
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C per JEDEC J-STD-020

Description

The SKY13309-370LF is a PHEMT GaAs IC SP3T antenna switch operating in the 0.1–3 GHz frequency range. Switching between the antenna and Tx/Rx ports is accomplished with 3 control voltages. The low loss, high isolation, high linearity, small size and low cost features make this switch ideal for all WLAN and Bluetooth® systems operating in the 2.4–2.5 GHz band.

Simplified Block Diagram



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

Electrical Specifications at 25 °C, V_{HIGH} = 2.1–5 V

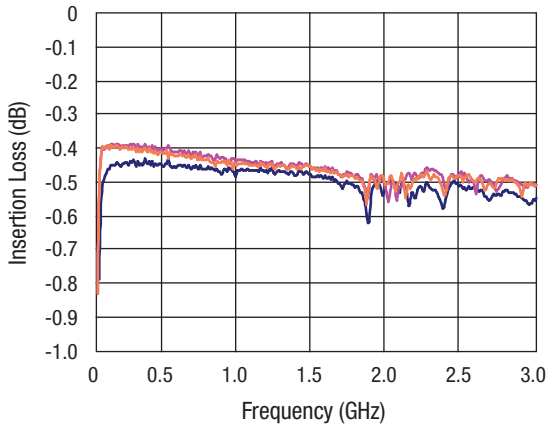
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Insertion loss	RFC–RF1, RF2, RF3	0.1–3.0 GHz 2.4–2.5 GHz		0.6 0.5	0.75 0.65	dB dB
Return loss (Insertion loss state)	RFC–RF1, RF2, RF3	0.1–3.0 GHz 2.4–2.5 GHz		20 20		dB dB
Isolation	RFC–RF1, RF2, RF3	0.1–3.0 GHz 2.4–2.5 GHz	22 22	25 25		dB dB

Operating Characteristics at 25 °C

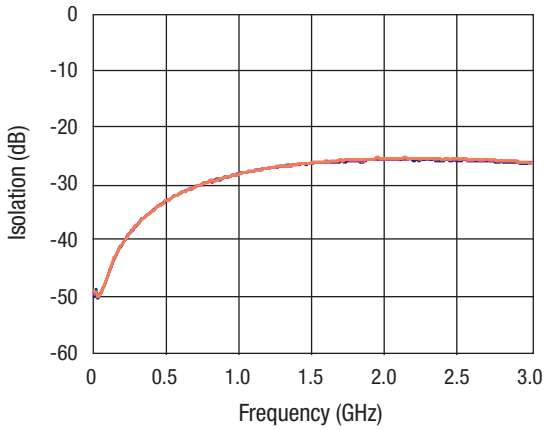
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching characteristics Rise/fall time On, off time	 10/90% or 90/10% RF 50% CTL to 90/10% RF			 30 25		 ns ns
Video feedthru				40		mV
Input power for 1 dB compression	V_{LOW} = 0 V, V_{HIGH} = 3.3 V	2450 MHz		29		dBm
Input third order intermodulation intercept	For two-tone input power 17 dBm V_{LOW} = 0 V, V_{HIGH} = 2.1 V V_{LOW} = 0 V, V_{HIGH} = 3.3 V	 2450 MHz 2450 MHz		 37 45		 dBm dBm
Control voltages	V_{LOW} = 0 to 0.25 V @ 5 µA typ. V_{HIGH} = 2.1 to 5.0 V @ 10 µA typ.			0 3.3		V V

Typical Performance Data at 25° C (0, 3.3 V)

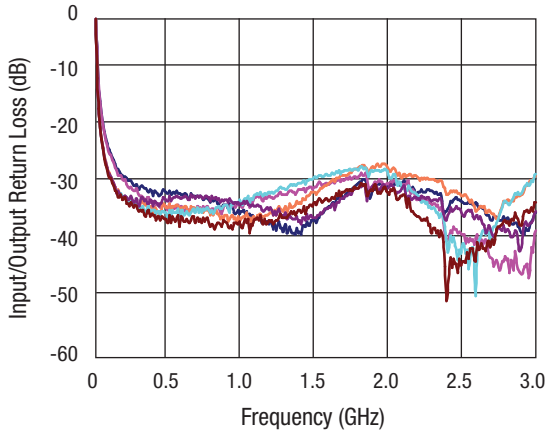
RFC–RF1 State (Data Shown on 3 Units)



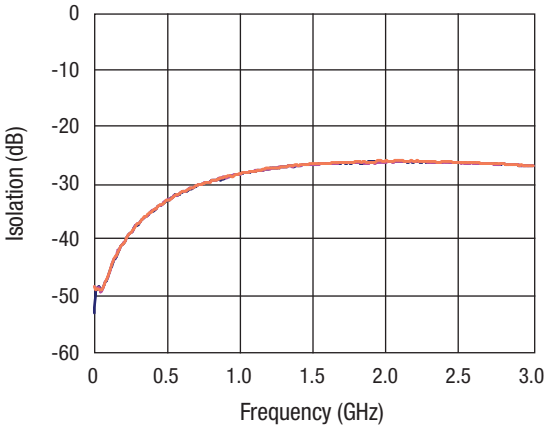
RFC to RF1 Insertion Loss



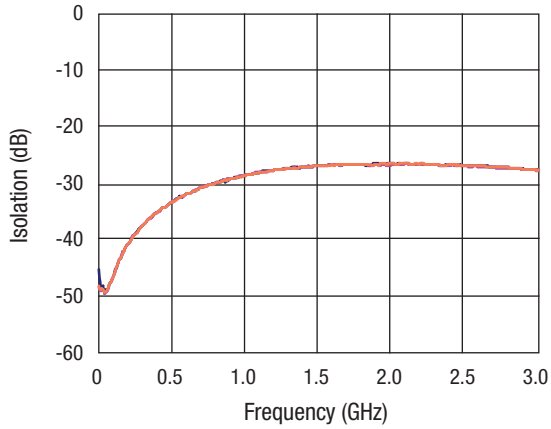
RFC to RF3 Isolation



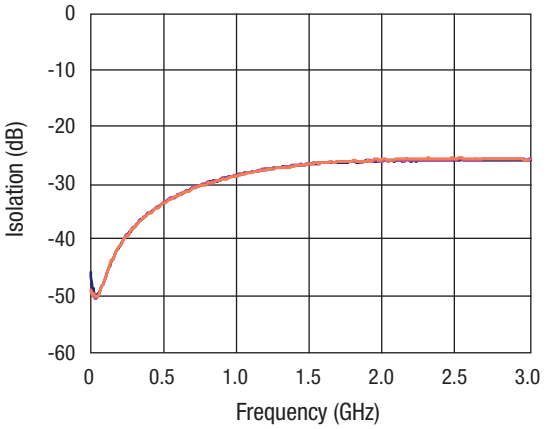
RFC to RF1 Return Loss



RFC to RF2 Isolation



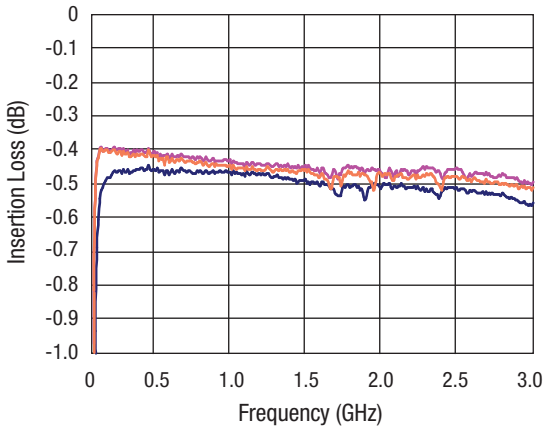
RFC to RF1 Isolation



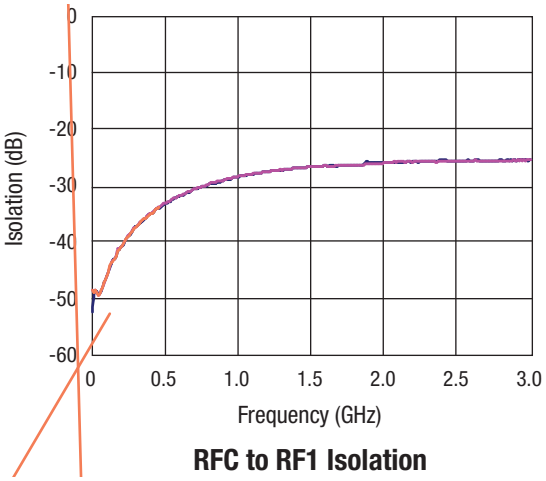
RFC to RF3 Isolation

Typical Performance Data at 25° C (0, 3.3 V)

RFC–RF2 State (Data Shown on 3 Units)



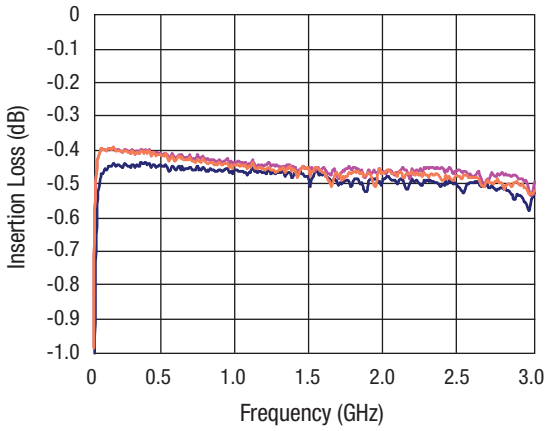
RFC to RF2 Insertion Loss



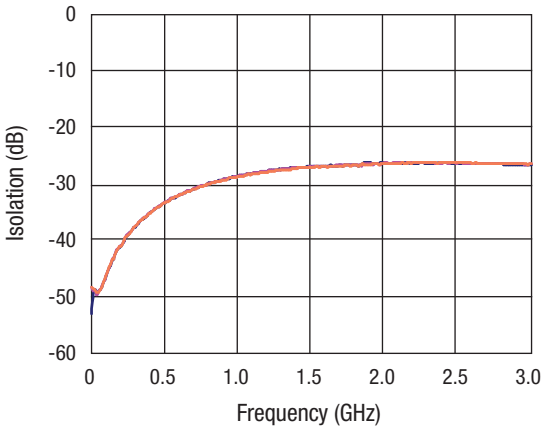
RFC to RF1 Isolation

Typical Performance Data at 25° C (0, 3.3 V)

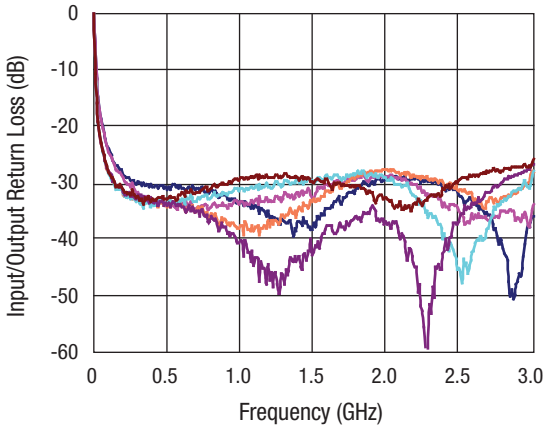
RFC–RF3 State (Data Shown on 3 Units)



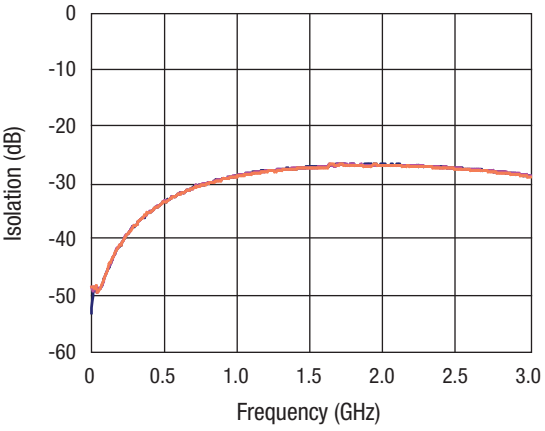
RFC to RF3 Insertion Loss



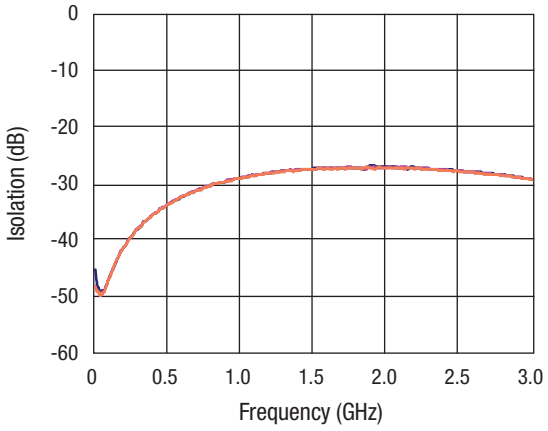
RFC to RF1 Isolation



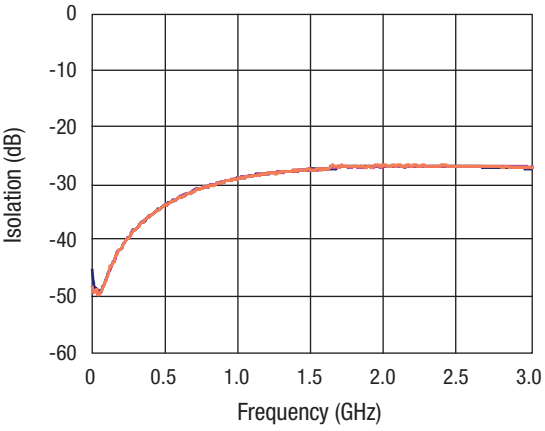
RFC to RF3 Return Loss



RFC to RF2 Isolation



RF3 to RF1 Isolation



RF3 to RF2 Isolation

Truth Table

Low Insertion Loss Path	V_1	V_2	V_3
RFC–RF1	High	Low	Low
RFC–RF2	Low	High	Low
RFC–RF3	Low	Low	High

High = 2.1 to 5 V.
Low = 0 to 0.25 V.
All other states not recommended. If a non-recommended state occurs, no damage to the switch will occur but it will be placed into an undefined state

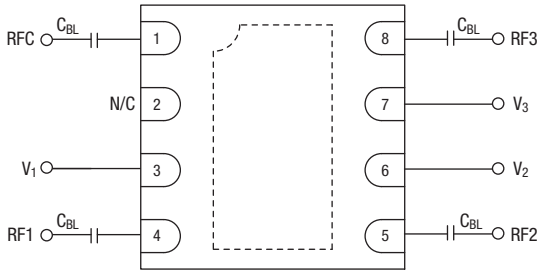
Recommended Solder Reflow Profiles

Refer to the *"Recommended Solder Reflow Profile"* Application Note.

Tape and Reel Information

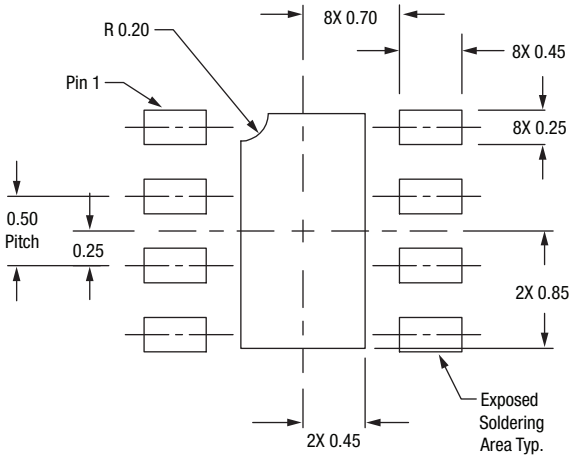
Refer to the *"Discrete Devices and IC Switch/Attenuators Tape and Reel Package Orientation"* Application Note.

Pin Out (Top View)



C_{BL} = 47 pF for operation > 500 MHz.
C_{BL} = 220 pF for operation down to 50 MHz.
Higher values recommended for lower frequency operation.
Exposed paddle must be grounded.

Land Pattern



Absolute Maximum Ratings

Characteristic	Value
Max input power @ 0/3V	30 dBm
Max input power @ 0/5V	32 dBm
Operating voltage	+8.0 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.*

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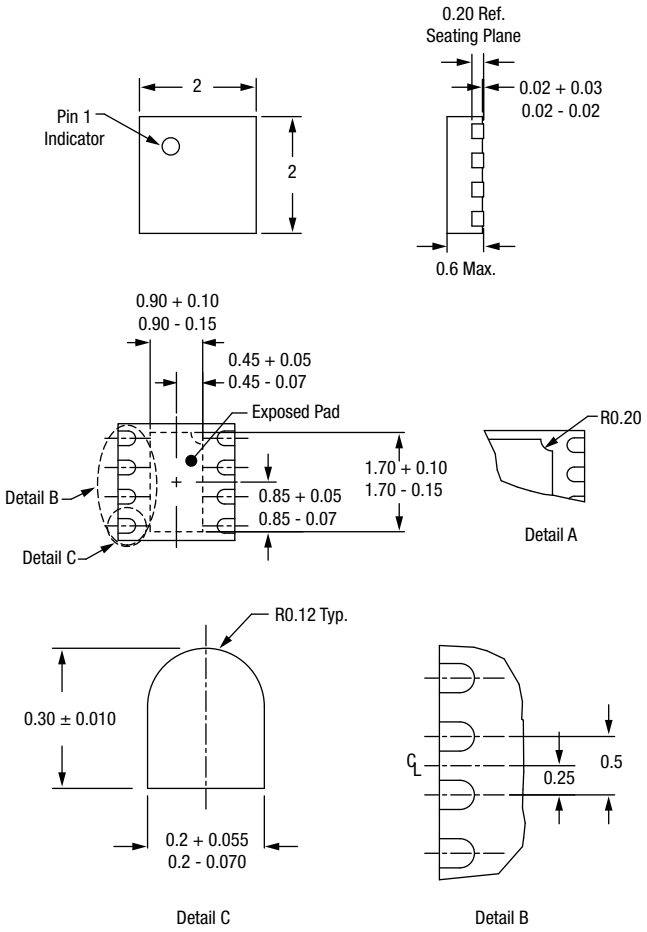
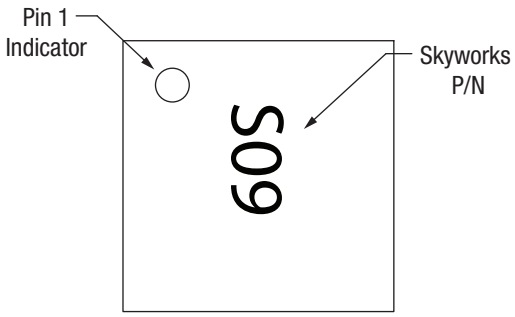


Part Marking



Evaluation Board