

**DATA SHEET**

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

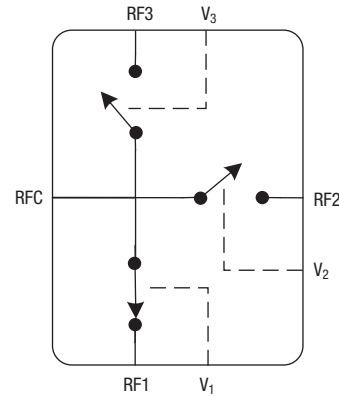
**Features**

- 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 ( $P_{1\text{ dB}} = 29\text{ dBm}$ )
- 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,  $V_{\text{HIGH}} = 2.1\text{--}5\text{ V}$**

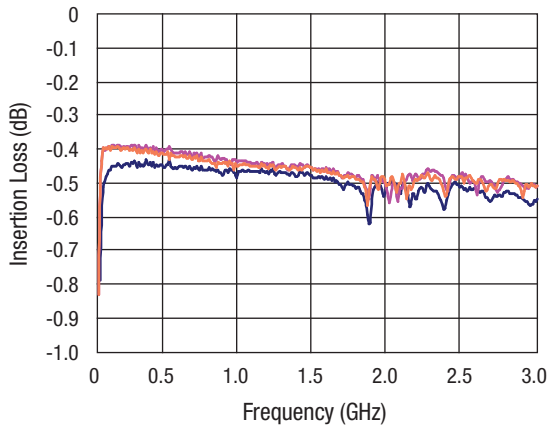
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Insertion loss	RFC–RF1, RF2, RF3	0.1–3.0 GHz		0.6	0.75	dB
		2.4–2.5 GHz		0.5	0.65	dB
Return loss (Insertion loss state)	RFC–RF1, RF2, RF3	0.1–3.0 GHz		20		dB
		2.4–2.5 GHz		20		dB
Isolation	RFC–RF1, RF2, RF3	0.1–3.0 GHz	22	25		dB
		2.4–2.5 GHz	22	25	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

**Operating Characteristics at 25 °C**

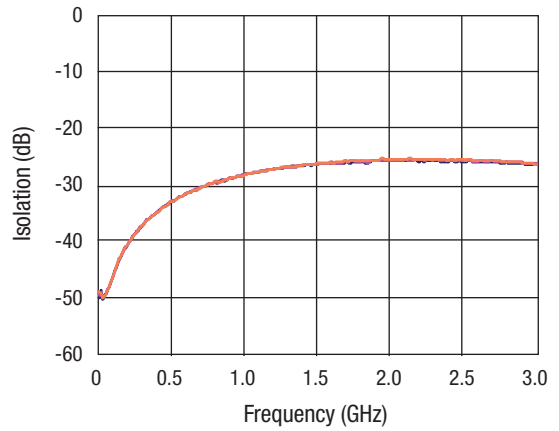
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching characteristics Rise/fall time On, off time	10/90% or 90/10% RF 50% CTL to 90/10% RF			30		ns
				25		ns
Video feedthru				40		mV
Input power for 1 dB compression	$V_{\text{LOW}} = 0\text{ V}$ , $V_{\text{HIGH}} = 3.3\text{ V}$	2450 MHz		29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

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

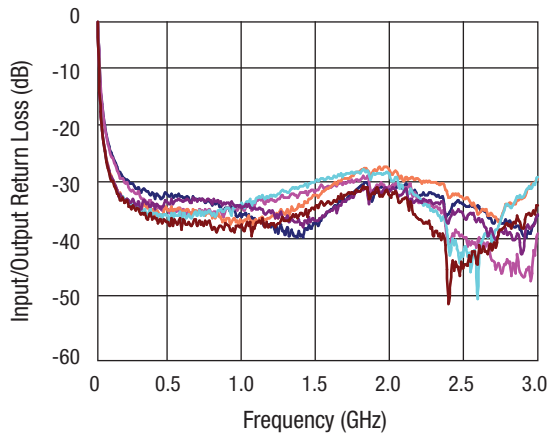
**RFC–RF1 State (Data Shown on 3 Units)**



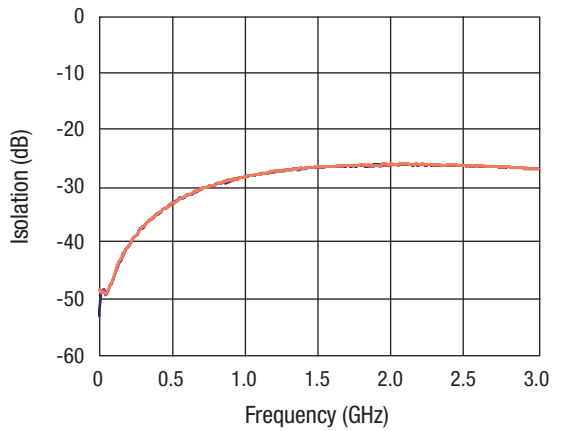
**RFC to RF1 Insertion Loss**



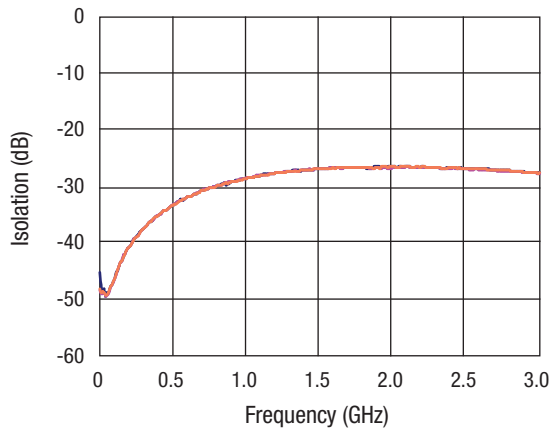
**RFC to RF3 Isolation**



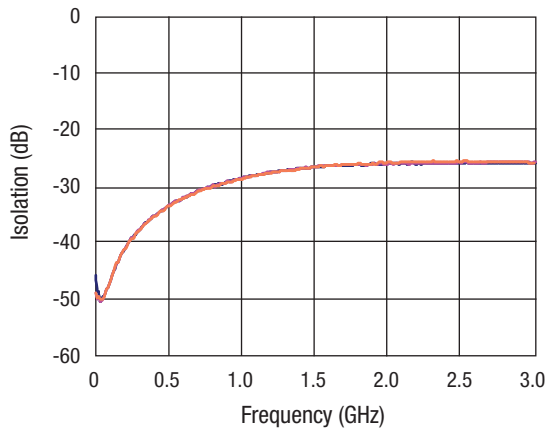
**RFC to RF1 Return Loss**



**RFC to RF2 Isolation**



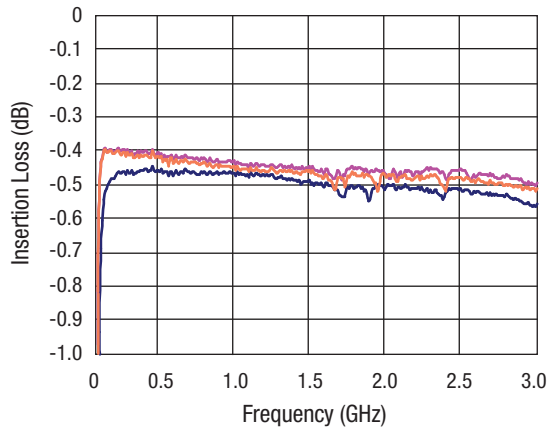
**RF1 to RF2 Isolation**



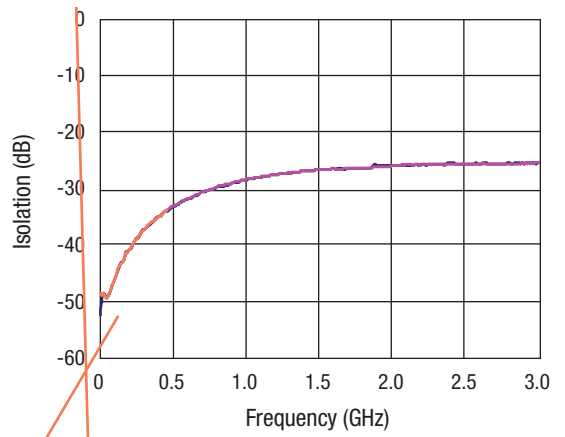
**RF1 to RF3 Isolation**

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

RFC–RF2 State (Data Shown on 3 Units)



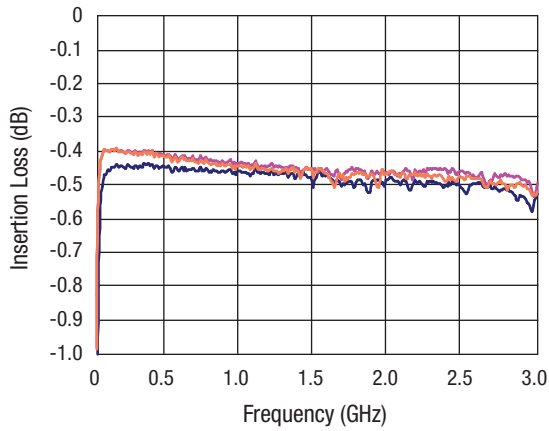
**RFC to RF2 Insertion Loss**



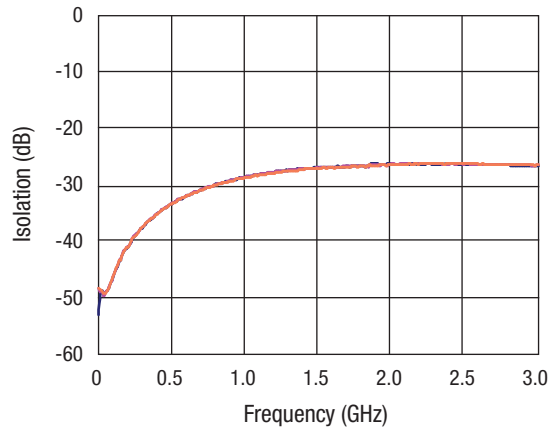
**RFC to RF1 Isolation**

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

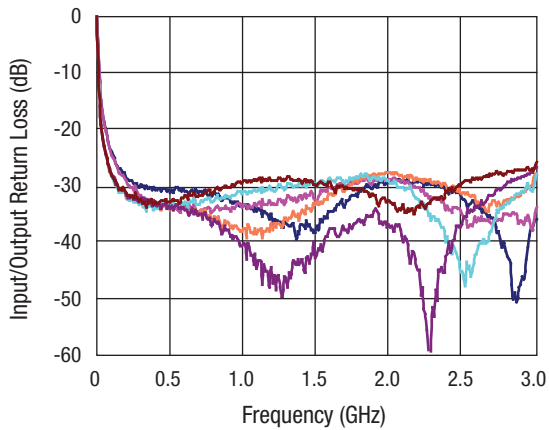
**RFC–RF3 State (Data Shown on 3 Units)**



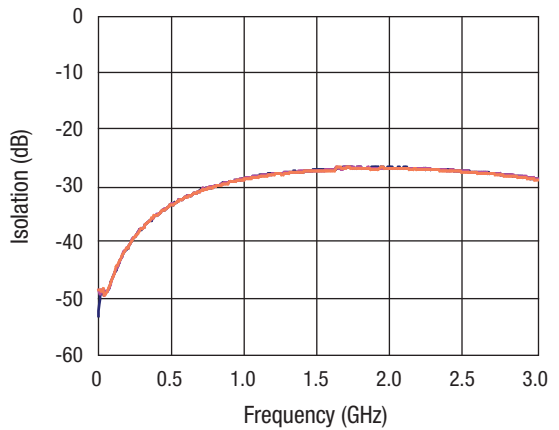
**RFC to RF3 Insertion Loss**



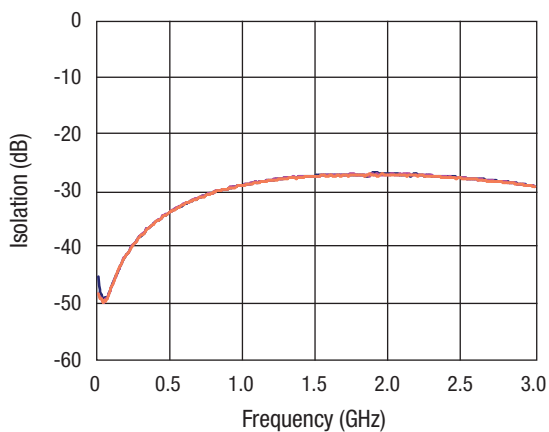
**RFC to RF1 Isolation**



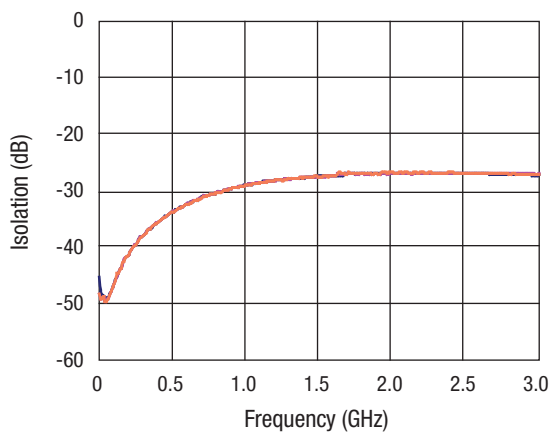
**RFC to RF3 Return Loss**



**RFC to RF2 Isolation**



**RF3 to RF1 Isolation**



**RF3 to RF2 Isolation**

### Truth Table

Low Insertion Loss Path	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>
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

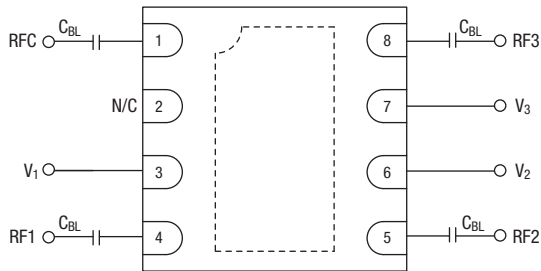
### Recommended Solder Reflow Profiles

Refer to the [“Recommended Solder Reflow Profile”](#) Application Note.

### Tape and Reel Information

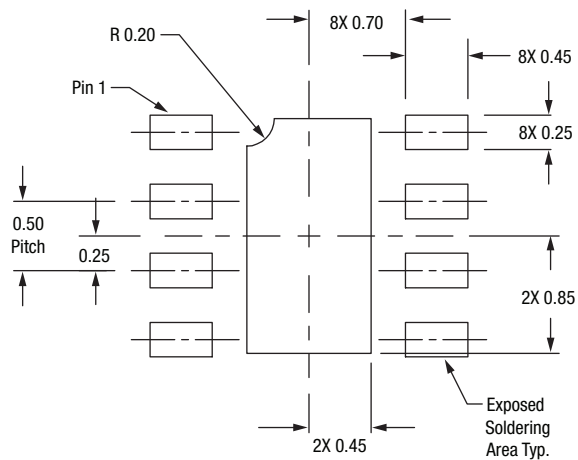
Refer to the [“Discrete Devices and IC Switch/Attenuators Tape and Reel Package Orientation”](#) Application Note.

### Pin Out (Top View)



C<sub>BL</sub> = 47 pF for operation > 500 MHz.  
 C<sub>BL</sub> = 220 pF for operation down to 50 MHz.  
 Higher values recommended for lower frequency operation.  
 Exposed paddle must be grounded.

### Land Pattern



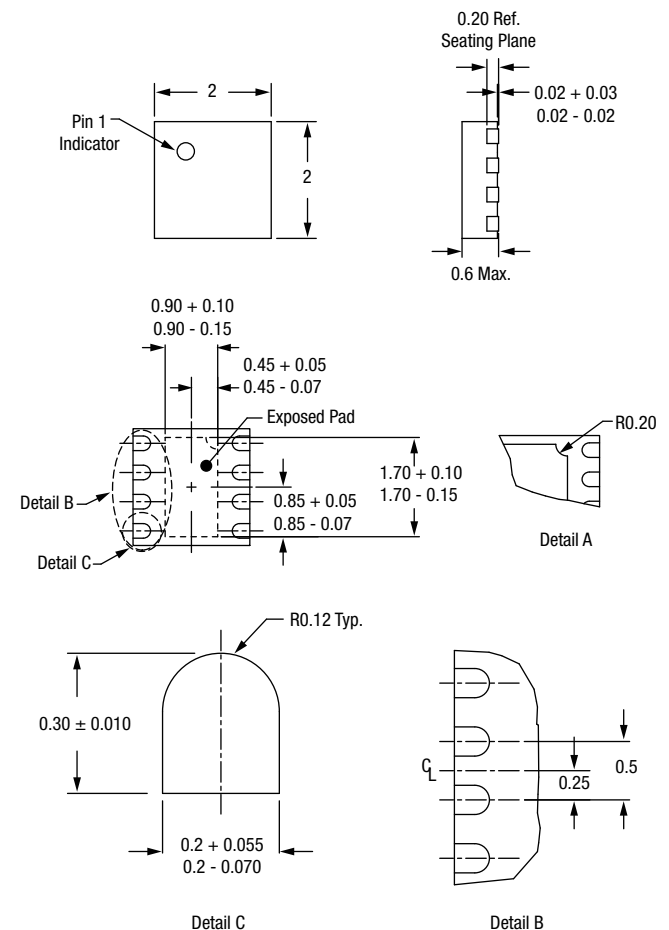
### Absolute Maximum Ratings

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

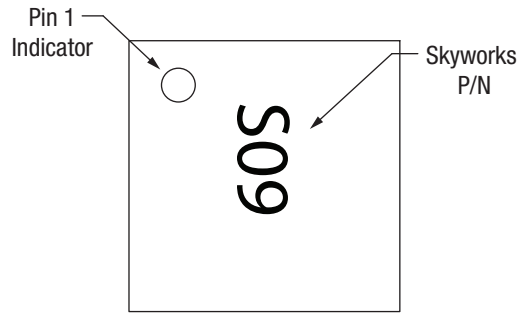
Performance is guaranteed only under the conditions listed in the specifications table and is not guaranteed under the full range(s) described by the Absolute Maximum specifications. Exceeding any of the absolute maximum/minimum specifications may result in permanent damage to the device and will void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

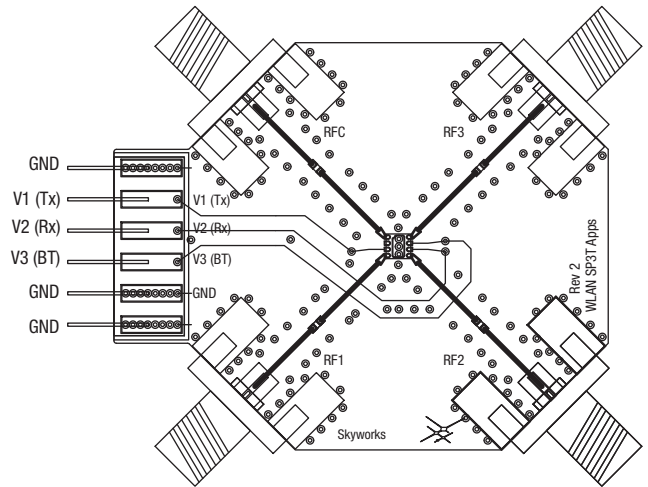
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### Part Marking



### Evaluation Board



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