

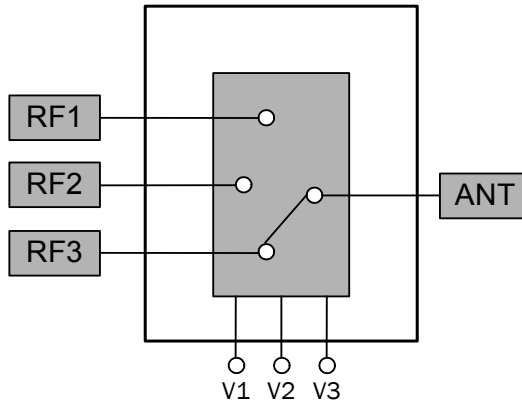


### Features

- Broadband Performance  
Low Frequency - 2.5GHz
- Very Low Insertion Loss  
0.30dB Typ at 0.90GHz  
0.45dB Typ at 1.90GHz
- High Isolation:  
31dB Typ at 1.90GHz
- PO.1dB > 35 dBm
- Compact Footprint  
(2.0mmx2.0mmx0.55mm,  
12-pin QFN)

### Applications

- CDMA Handset Applications
- Antenna Tuning Applications
- IEEE802.11b/g WLAN Applications
- Multi-mode GSM/W-CDMA Applications
- GSM/GPRS/EDGE Switch Applications



Functional Block Diagram

### Product Description

The RF1131 is a single-pole triple-throw (SP3T) switch designed for CDMA Handset Applications and general purpose switching applications which require very low insertion loss and high power handling capability. The RF1131 is ideally suited for battery operated applications requiring high performance switching with very low DC power consumption. The RF1131 features extremely low insertion loss, and high isolation. It is fabricated with 0.5µm GaAs pHEMT process, and is packaged in a very compact 2mmx2mm, 12-pin, leadless QFN package.

### Ordering Information

RF1131                      Broadband High Power SP3T Switch  
 RF1131PCBA-410      Fully Assembled Evaluation Board

### Optimum Technology Matching® Applied

- |                                      |                                      |  |                                   |
|--------------------------------------|--------------------------------------|--|-----------------------------------|
| <input type="checkbox"/> GaAs HBT    | <input type="checkbox"/> SiGe BiCMOS | <input checked="" type="checkbox"/> GaAs pHEMT | <input type="checkbox"/> GaN HEMT |
| <input type="checkbox"/> GaAs MESFET | <input type="checkbox"/> Si BiCMOS   | <input type="checkbox"/> Si CMOS               |                                   |
| <input type="checkbox"/> InGaP HBT   | <input type="checkbox"/> SiGe HBT    | <input type="checkbox"/> Si BJT                |                                   |

## Absolute Maximum Ratings

Parameter	Rating	Unit
Voltage	6.0	V
Maximum Input Power (0.6GHz to 2.5GHz), RF1, RF2, RF3	+36	dBm
Operating Temperature	-30 to +85	°C
Storage Temperature	-65 to +100	°C



**Caution!** ESD sensitive device.

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied.

RoHS status based on EUDirective2002/95/EC (at time of this document revision).

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Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
					$V_{CONTROL} = 0/2.6V$ , Nominal Test Conditions Unless Otherwise Specified: $Z_0 = 50\Omega$ . Temp = 25 °C. Need external DC blocking capacitors on all RF ports.
Operating Frequency	0.6		2.5	GHz	
<b>Insertion Loss</b>					
Cellular		0.30	0.45	dB	ANT to RfX ON, 824 MHz to 894 MHz
GPS		0.41	0.51	dB	ANT to RfX ON, 1574 MHz to 1577 MHz
PCS		0.45	0.70	dB	ANT to RfX ON, 1850 MHz to 1990 MHz
<b>RF&gt;ANT Isolation</b>					
Cellular	30	32		dB	RfXOFF to RfX ON, 824 MHz to 894 MHz
GPS	29	31		dB	RfXOFF to RfX ON, 1574 MHz to 1577 MHz
PCS	28	31		dB	RfXOFF to RfX ON, 1850 MHz to 1990 MHz
<b>Second Harmonics</b>					
Cellular		-84	-78	dBc	+26dBm input, $V_{CONTROL} = 2.4V$
PCS		-87	-78	dBc	+26dBm input, $V_{CONTROL} = 2.4V$
<b>Third Harmonics</b>					
Cellular		-81	-77	dBc	+26dBm input, $V_{CONTROL} = 2.4V$
PCS		-79	-75	dBc	+26dBm input, $V_{CONTROL} = 2.4V$
<b>IIP3</b>					
IIP3 - Cellular	61	62		dBm	Two tones: +23 dBm, 837 MHz and 838 MHz
		66		dBm	Two tones: +23 dBm, 837 MHz and 838 MHz, $V_{CONTROL} = 3V$
IIP3 - PCS	58	59		dBm	Two tones: +23 dBm, 1880 MHz and 1881 MHz
		65		dBm	Two tones: +23 dBm, 1880 MHz and 1881 MHz, $V_{CONTROL} = 3V$

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>Cross-Modulation</b>					
Cellular		-95	-92	dBm	PTx1=23dBm @ 836MHz, PTx2=23dBm @ 837 MHz; P <sub>INT</sub> =-23dBm @ 881.5MHz, , V <sub>CONTROL</sub> =2.4V
		-103		dBm	PTx1=23dBm @ 836MHz, PTx2=23dBm @ 837 MHz; P <sub>INT</sub> =-23dBm @ 881.5MHz, V <sub>CONTROL</sub> =3V
PCS		-89	-86	dBm	PTx1=23dBm @ 1879.5MHz, PTx2=23dBm @ 1880.5MHz; P <sub>INT</sub> =-23dBm @ 1960MHz, , V <sub>CONTROL</sub> =2.4V
		-97		dBm	PTx1=23dBm @ 1879.5MHz, PTx2=23dBm @ 1880.5MHz; P <sub>INT</sub> =-23dBm @ 1960MHz, V <sub>CONTROL</sub> =3V
<b>RF Port Return Loss</b>					
RF>ANT		-24	-15	dB	0.5GHz to 2.0GHz
<b>Input Power at 0.1dB Compression Point</b>					
Cellular		>+35		dBm	
PCS		>+35		dBm	
<b>Switching Speed</b>					
T <sub>RISE</sub> , T <sub>FALL</sub>		0.80	4	us	10% to 90% RF, 90% to 10% RF
T <sub>ON</sub> , T <sub>OFF</sub>		0.80	4	μs	50% control to 90% RF, 50% control to 90% RF
<b>DC Controls</b>					
V <sub>High</sub> (V1, V2, V3)	2.4	2.6	3.6	V	
V <sub>Low</sub> (V1, V2, V3)	0		0.4	V	
Control Current			54	μA	
Leakage Current		10		μA	

**Switch Control Settings**

V1	V2	V3	ANT-RF1	ANT-RF2	ANT-RF3
1	0	0	ON	OFF	OFF
0	1	0	OFF	ON	OFF
0	0	1	OFF	OFF	ON

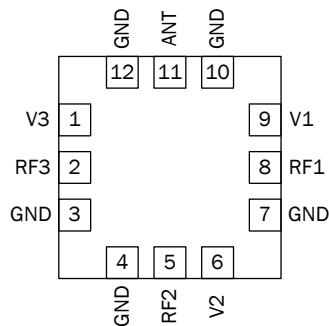
0: Logic level low, 0V to 0.4V

1: Logic level high, 2.4V to 3.6V

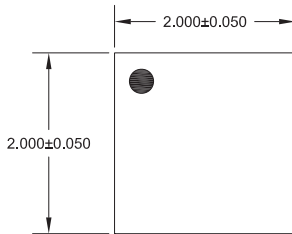
Note: Indeterminate states would lead to degraded performance.

Pin	Function	Description
1	V3	Control Signal 3
2	RF3	RF Port 3
3	GND	Ground
4	GND	Ground
5	RF2	RF Port 2
6	V2	Control Signal 2
7	GND	Ground
8	RF1	RF Port 1
9	V1	Control Signal 1.
10	GND	Ground
11	ANT	Antenna Connection
12	GND	Ground
<b>Pkg Base</b>	<b>NC</b>	Should be left floating for best performance. RF performance specifications in this data sheet are quoted with package base left floating.

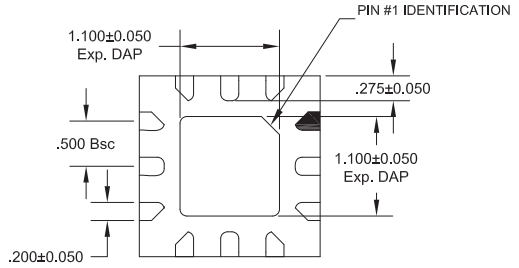
### Pin Out



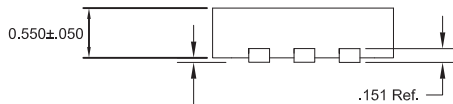
**Package Drawing**



TOP VIEW



BOTTOM VIEW

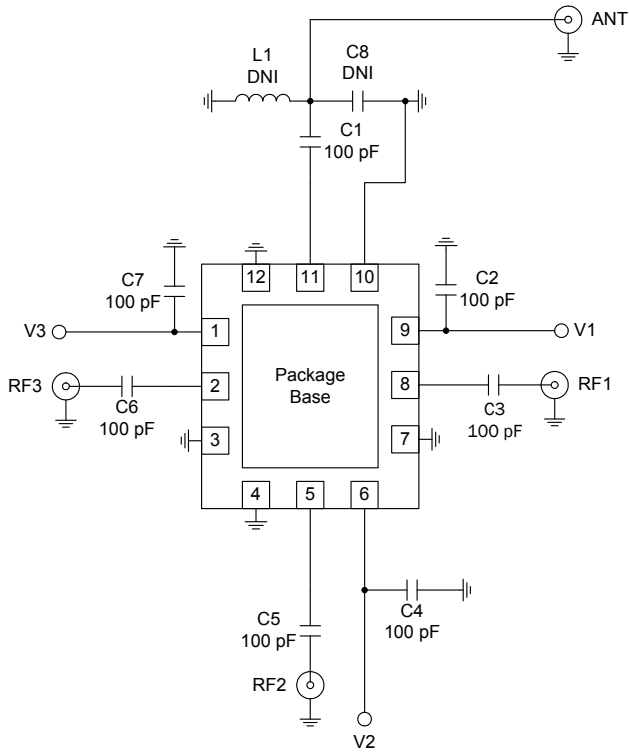


SIDE VIEW

Notes:

- 1) Pin 1 Shaded Area

## Evaluation Board Schematic



Note: Package Base needs to be left floating for best isolation performance.

Typical Performance

