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RF1127

BROADBAND LOW POWER SPDT SWITCH

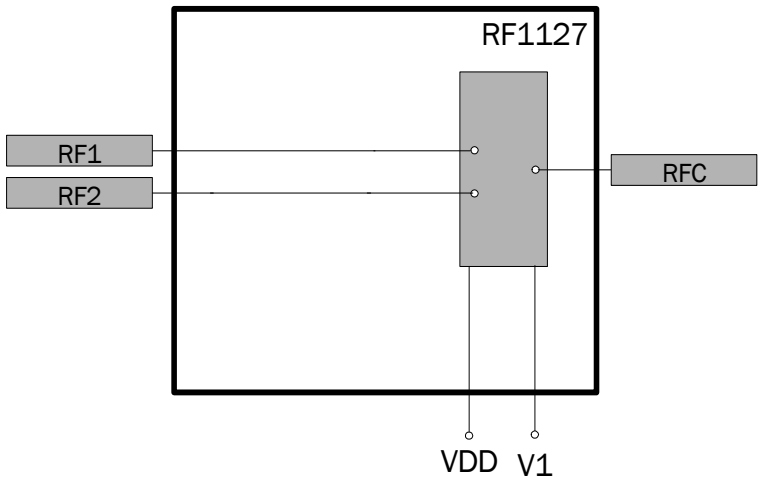
Package Style: QFN, 6-pin, 2mmx1.3mmx0.385mm

Features

- Broadband Performance Low Frequency to 3.5GHz
- 1-Bit Control: Requires Single Control Line to Switch Between Two RF Paths
- Compatible With Low Voltage Logic (1.8V)
- Very Low Insertion Loss:
  - 0.3dB at 1GHz (Typ)
  - 0.4dB at 2GHz (Typ)
- Excellent Linearity:
  - IIP2>100dBm (Typ)
  - IIP3>63dBm (Typ)
- P0.1dB:23dBm (Typ)
- Compact Footprint
- 2.0mmx1.3mmx0.385mm, 6-Pin, QFN

Applications

- Cellular Handset Applications
- Antenna Tuning Applications
- IEEE802.11b/g WLAN Applications



Functional Block Diagram

Product Description

The RF1127 is a single pole double throw (SPDT) switch designed for general purpose switching applications which require very low insertion loss and low power handling capability. The RF1127 features low insertion loss, good isolation, and excellent linearity performance which makes it ideally suited for battery operated applications requiring high performance switching with very low DC power consumption. The RF1127 builds upon RFMD's GaAs pHEMT process and is packaged in a very compact, low profile 2mmx1.3mmx0.385mm, leadless QFN package.

Ordering Information

RF1127	Broadband Low Power SPDT Switch
RF1127PCBA-410	Fully Assembled Evaluation Board

Optimum Technology Matching® Applied

☐ GaAs HBT	☐ SiGe BiCMOS	☑ GaAs pHEMT	☐ GaN HEMT
☐ GaAs MESFET	☐ Si BiCMOS	☐ Si CMOS	☐ RF MEMS
☐ InGaP HBT	☐ SiGe HBT	☐ Si BJT	☐ LDMOS

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Absolute Maximum Ratings

Parameter	Rating	Unit
Voltage (V_{DD}, V1)	6.0	V
Maximum Input Power (450MHz to 3500MHz), RF1, RF2	+28	dBm
Operating Temperature	-30 to +85	°C
Storage Temperature	-65 to +150	°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).

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
					VDD=2.6V, V1=High=1.8V, V1=Low=0V, Temp=25°C, unless otherwise specified
Operating Frequency	450		3500	MHz	
Insertion Loss					
RFC-RF1, RFC-RF2		0.3	0.4	dB	RF ON, 824MHz to 960MHz
		0.35	0.5	dB	RF ON, 1850MHz to 1990MHz
		0.4	0.65	dB	RF ON, 2170MHz to 2500MHz
		0.50		dB	RF ON, 3500MHz
RF Isolation					
RF1-RF2, RF2-RF1	27	29		dB	RF1-ANT, RF2-ANT, 824MHz to 960MHz
	19	20		dB	RF1-ANT, RF2-ANT, 1850MHz to 1990MHz
	17	19		dB	RF1-ANT, RF2-ANT, 2170MHz to 2500MHz
		18		dB	RF1-ANT, RF2-ANT, 3500MHz
RFC-RF1, RFC-RF2	27	29		dB	RF1-ANT, RF2-ANT, 824MHz to 960MHz
	19	20		dB	RF1-ANT, RF2-ANT, 1850MHz to 1900MHz
	17	19		dB	RF1-ANT, RF2-ANT, 2170MHz to 2500MHz
		18		dB	RF1-ANT, RF2-ANT, 3500MHz
RF Port Return Loss					
VSWR			1.5:1		
880MHz Harmonics					
Second Harmonic	69	92		dBc	Pin=16dBm; F_0=880MHz
Third Harmonic	69	105		dBc	Pin=16dBm; F_0=880MHz
1880MHz Harmonics					
Second Harmonic	70	100		dBc	Pin=16dBm; F_0=1880MHz
Third Harmonic	70	107		dBc	Pin=16dBm; F_0=1880MHz
2500MHz Harmonics					
Second Harmonic	70	89		dBc	Pin=16dBm; F_0=2500MHz
Third Harmonic	70	92		dBc	Pin=16dBm; F_0=2500MHz

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Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
IIP2					
RF1, RF2-ANT Cell		100		dBm	Tone 1: 836.5MHz at 16dBm, Tone 2: 1718MHz at -20dBm Receive Freq: 881.5MHz
RF1, RF2-ANT AWS		99		dBm	Tone 1: 1732.5MHz at 16dBm, Tone 2: 3865MHz at -20dBm Receive Freq: 2132.5MHz
RF1, RF2-ANT PCS		100		dBm	Tone 1: 1880MHz at 16dBm, Tone 2: 3840MHz at -20dBm Receive Freq: 1960MHz
IIP3					
IIP3 RF1, RF2-ANT Cell		65		dBm	Tone 1: 836.5MHz at 16dBm, Tone 2: 791.5MHz at -20dBm Receive Freq: 881.5MHz
IIP3 RF1, RF2-ANT IMT		63		dBm	Tone 1: 1950MHz at 16dBm, Tone 2: 1760MHz at -20dBm Receive Freq: 2140MHz
Input Power at 0.1dB Compression Point					
	19	23		dBm	
Switching Speed					
			600	ns	50% to 90% RFon, 50% to 10% RF off.
DC Supply					
VDD	2.50	2.60	3.30	V	
V1 (H)		1.80	3.60	V	
V1 (L)	0.00		0.40	V	
Supply Current		120	250	uA	Pin=16dBm
Control Current		14	25	uA	Pin=16dBm

Note: Parameters hold at 25°C and VDD=2.5V.

Control Logic

	Control Signal	Signal Paths	
	V1	RF1-RFC	RF2-RFC
Valid States	1	ON	OFF
	0	OFF	ON

0: Logic level low, 0V~0.2V

1: Logic level high, 1.8V~3.6V

Note: In indeterminate states, both signal paths are ON with degraded performance.

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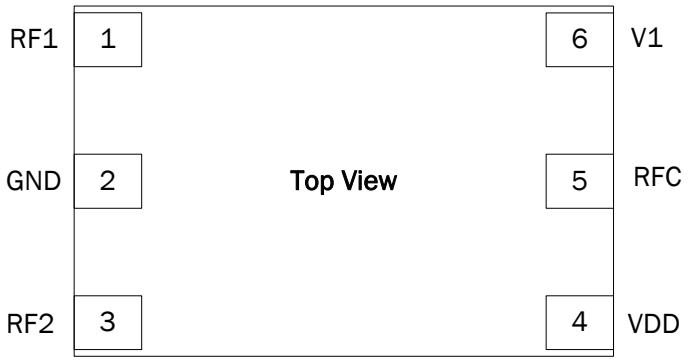
Pin	Function	Description
1	RF1	RF Port 1.
2	GND	Ground.
3	RF2	RF Port 2.
4	VDD	Supply.
5	RFC	Antenna.
6	V1	Control Line.
Pkg Base	GND	Package base ground.

Pin Out



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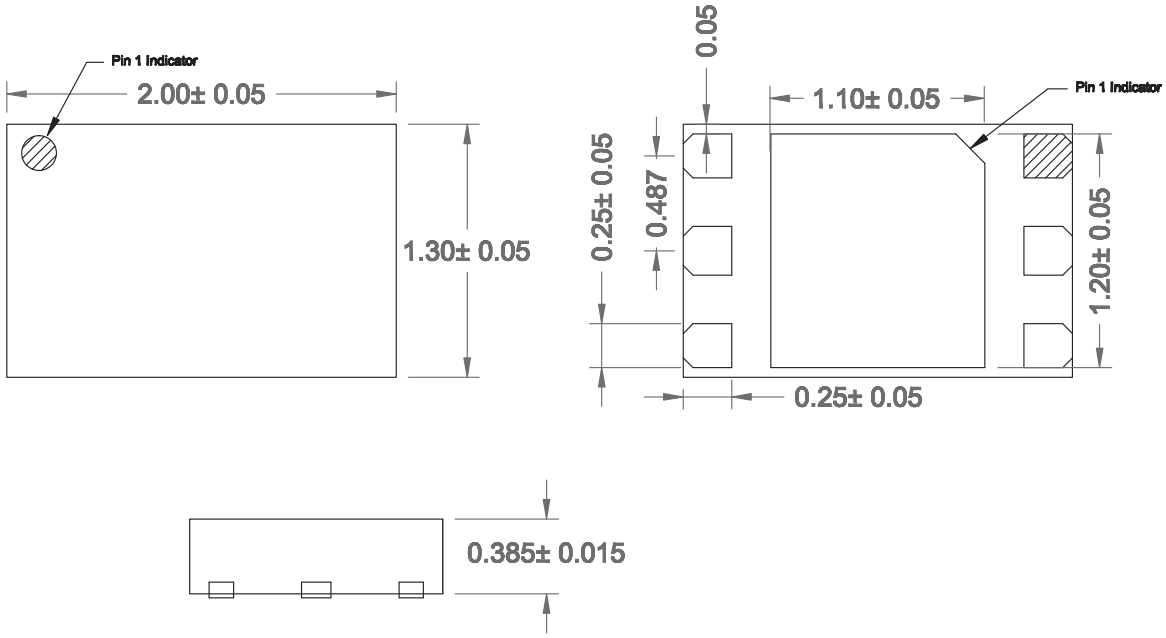
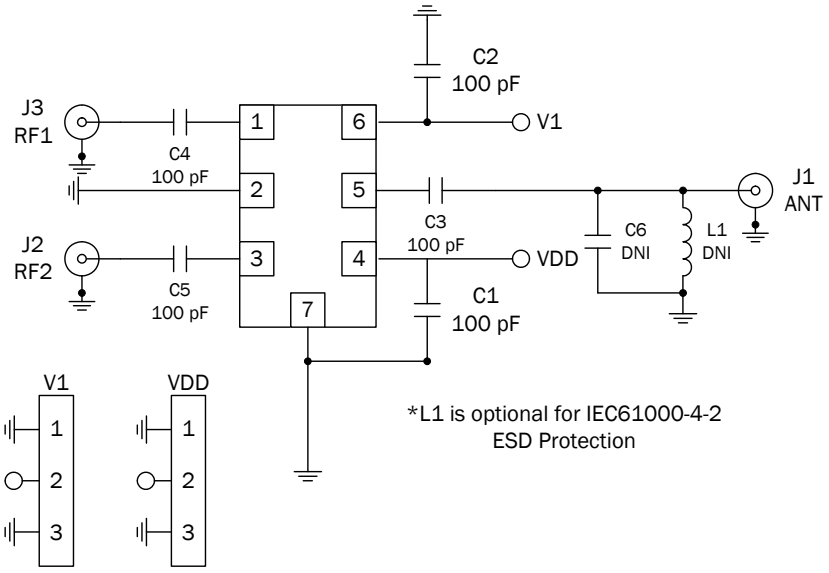
Package Drawing



Evaluation Board Schematic



Application Guidelines

The decoupling capacitors are optional and, if necessary, may be used for noise reduction. Decoupling capacitors on the control pins protect the control circuitry from possible RF leakage. For applications less than 300MHz the DC-blocking capacitors on ports RF1, RF2, and ANT need to be 10nF instead of 100pF for best performance.

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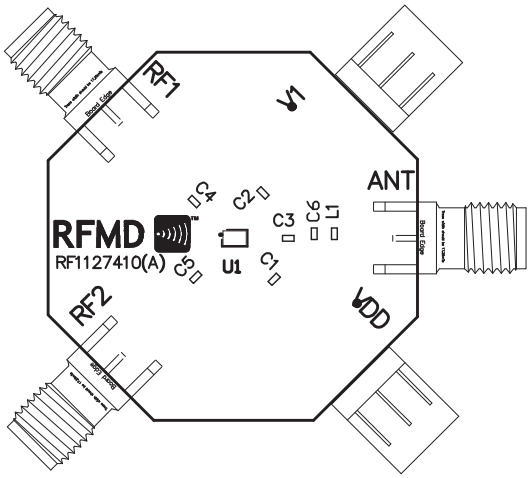
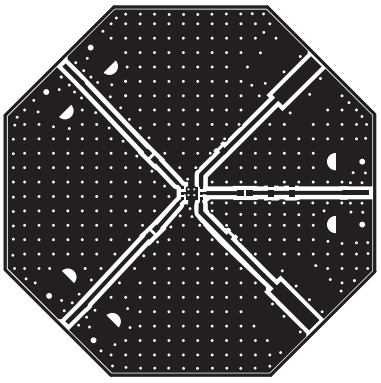
Evaluation Board Layout

Board Thickness 0.0658", Board Material FR-4



Assembly Layer



Top Layer

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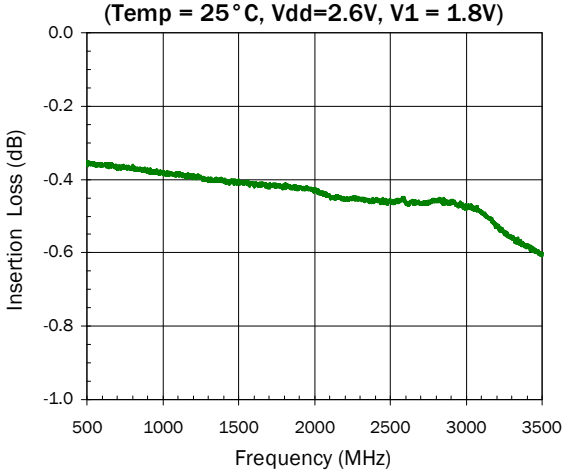
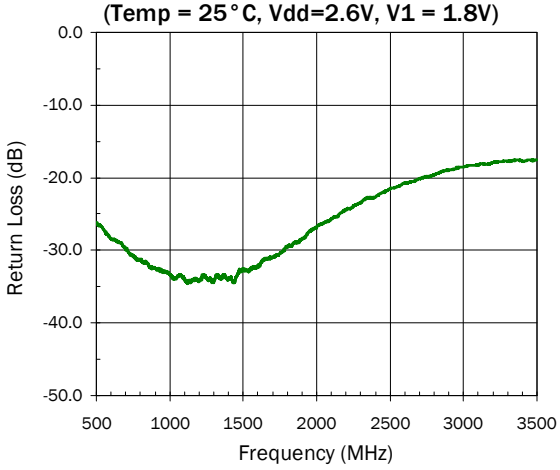
Typical Performance Data on Evaluation Board

Fixture losses have been de-embedded (Temp=25°C, VDD=2.6V, V1=1.8V).

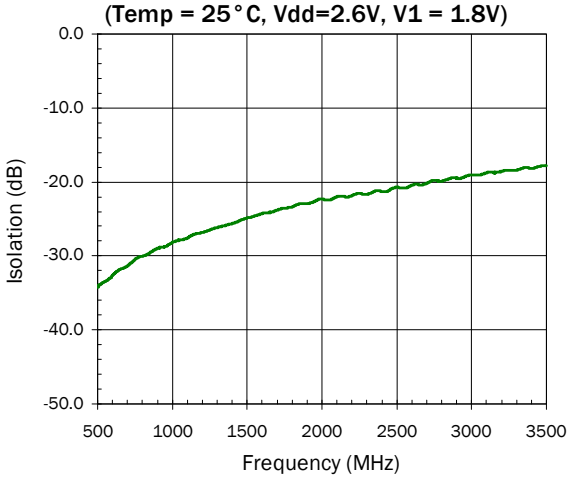
Insertion Loss
(Temp = 25°C, Vdd=2.6V, V1 = 1.8V)



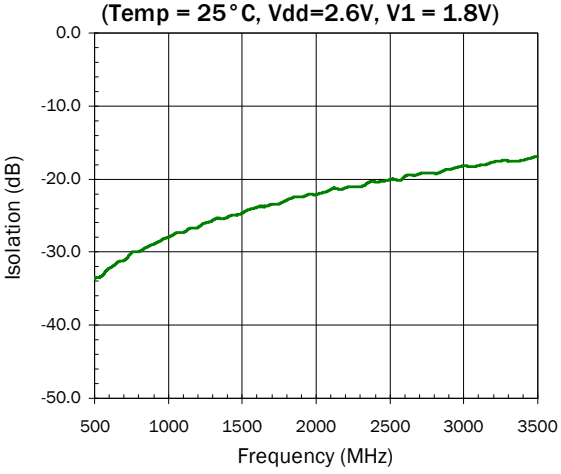
Return Loss
(Temp = 25°C, Vdd=2.6V, V1 = 1.8V)



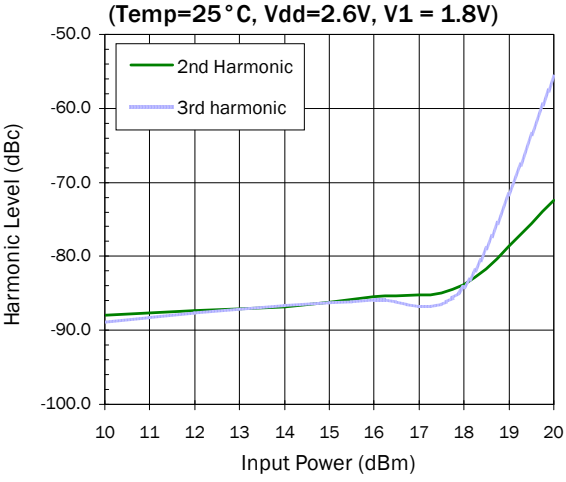
Port to Port Isolation
(Temp = 25°C, Vdd=2.6V, V1 = 1.8V)



Antenna to Port Isolation
(Temp = 25°C, Vdd=2.6V, V1 = 1.8V)



Harmonics
(Temp=25°C, Vdd=2.6V, V1 = 1.8V)



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