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RF1201

BROADBAND 10W SPDT SWITCH

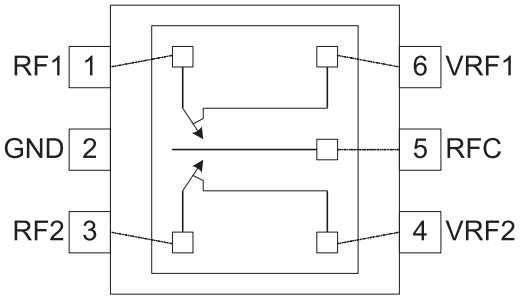
Package: QFN, 6-Pin, 2mm x 2mm x 0.85mm

Features

- Low Frequency - 2.5GHz Operation
- Low Insertion Loss: 0.3dB at 1GHz
- High Isolation: 26dB at 1GHz
- Low Control Voltage: 2.6V to 5.0V
- Operation at 1.8V Control for Low Power Applications
- Excellent Harmonic Performance: -80dBc at 1GHz
- High P0.1dB: 40dBm
- GaAs pHEMT Process

Applications

- Cellular Handset Applications
- Antenna Tuning Applications
- Multi-Mode GSM, WCDMA Applications
- IEEE802.11b/g WLAN Applications
- GSM/GPRS/EDGE Switch Applications
- Cellular Infrastructure Applications



Functional Block Diagram

Product Description

The RF1201 is a single-pole double-throw (SPDT) switch designed for switching applications which require very high power handling capability along with exceptional linearity. The RF1201 is ideally suited for battery operated applications requiring high performance switching with very low DC power consumption. The part builds upon RFMD's 0.5umGaAs pHEMT process, and is packaged in a very compact 2mmx2mmx0.85mm, 6-Pin, leadless QFN package.

Ordering Information

RF1201	Broadband 10W SPDT Switch
RF1201PCBA-410	Fully Assembled Evaluation Board

Optimum Technology Matching® Applied

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

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Absolute Maximum Ratings

Parameter	Rating	Unit
V_{RF1}, V_{RF2}	7.0	V
Maximum Input Power		
0.88GHz (25°C, 50Ω)	+42	dBm
1.88GHz (25°C, 50Ω)	+41	dBm
Operating Temperature	-30 to +85	°C
Storage Temperature	-35 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.

RFMD Green: RoHS compliant per EU Directive 2002/95/EC, halogen free per IEC 61249-2-21, < 1000ppm each of antimony trioxide in polymeric materials and red phosphorus as a flame retardant, and <2% antimony in solder.

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
					Temp=25°C, $V_{CONTROL}$=2.65V
Insertion Loss					
RF1-ANT, RF2-ANT		0.3	0.4	dB	RF ON, 0.88GHz
RF1-ANT, RF2-ANT		0.4	0.5	dB	RF ON, 1.88GHz
RF1-ANT, RF2-ANT		0.5	0.6	dB	RF ON, 2.10GHz
RF1-ANT, RF2-ANT		0.55	0.65	dB	RF ON, 2.45GHz
RF>ANT Isolation					
RF1-ANT, RF2-ANT	25	26		dB	RF ON, 0.88GHz
RF1-ANT, RF2-ANT	21	22		dB	RF ON, 1.88GHz
RF1-ANT, RF2-ANT	19	20		dB	RF ON, 2.10GHz
RF1-ANT, RF2-ANT	17	18		dB	RF ON, 2.45GHz
0.8GHz to 1GHz Harmonics					
Second Harmonic		-80		dBc	P_{IN}=34.5dBm, 0.88GHz, $2f_0$
Third Harmonic		-75		dBc	P_{IN}=34.5dBm, 0.88GHz, $3f_0$
1.7GHz to 2.0GHz Harmonics					
Second Harmonic		-80		dBc	P_{IN}=31.5dBm, 1.9GHz, $2f_0$
Third Harmonic		-80		dBc	P_{IN}=31.5dBm, 1.9GHz, $3f_0$
2.45GHz Harmonics					
Second Harmonic		-90		dBc	P_{IN}=31.5dBm, 1.9GHz, $2f_0$
Third Harmonic		-90		dBc	P_{IN}=31.5dBm, 1.9GHz, $3f_0$
IIP2					
RF1-ANT, RF2-ANT (Cell)		114		dBm	Tone 1: 824MHz @ 26dBm, Tone 2: 1693MHz @ -20dBm, Receive Freq: 869MHz
RF1-ANT, RF2-ANT (AWS)		115		dBm	Tone 1: 1710MHz @ 26dBm, Tone 2: 3820MHz @ -20dBm, Receive Freq: 2110MHz
RF1-ANT, RF2-ANT (PCS)		117		dBm	Tone 1: 1850MHz @ 26dBm, Tone 2: 3780MHz @ -20dBm, Receive Freq: 1930MHz
Triple Beat Ratio (TBR)					
RF1-ANT, RF2-ANT (Cell)		88		dBc	VSWR=2:1, Temp=15°C, 25°C, 60°C; Jammer Freq=881.5MHz
RF1-ANT, RF2-ANT (PCS)		88		dBc	VSWR=2:1, Temp=15°C, 25°C, 60°C; Jammer Freq=1960MHz

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Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
RF Port Return Loss					
RF>ANT		15		dB	0.5GHz to 2.5GHz
Input Power at 0.1dB Compression Point					
		41		dBm	0.88GHz
		40		dBm	1.88GHz
Switching Speed					
			5	μs	
Supply and Control Signal Characteristics					
Control Voltage					
V_{HIGH}		2.65	5.00	V	
V_{LOW}			0.2	V	
Control Current			20	μA	

Note: Parameters hold at 25°C and $V_{CONTROL}$=2.65V.

Switch Control Settings

	Control Signals		Signal Paths	
	VRF1	VRF2	RF1-RFC	RF2-RFC
Valid States	1	0	ON	OFF
	0	1	OFF	ON
Invalid States	0	0	Indeterminate State*	
	1	1	Indeterminate State*	

0: Logic level low, 0V~0.2V

1: Logic level high, 2.6V~5.0V

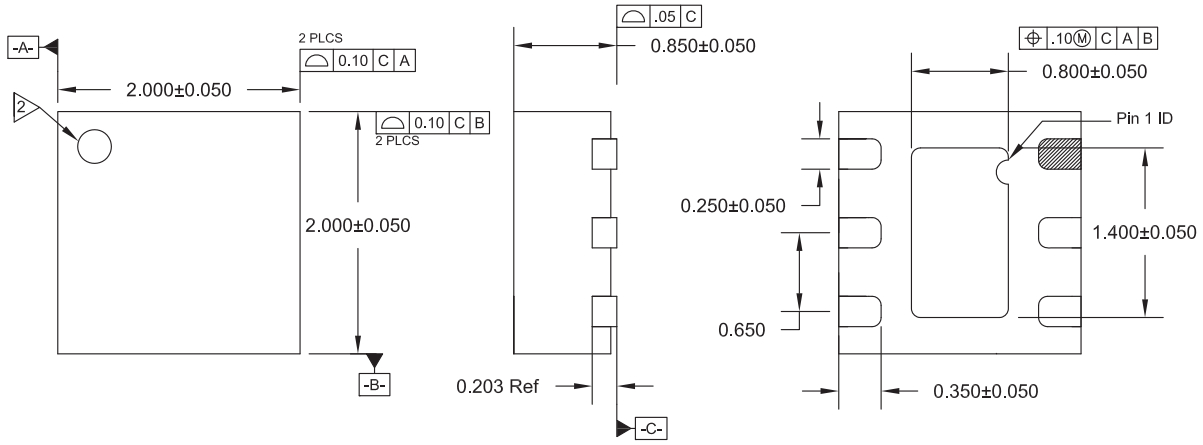
Note: In indeterminate states, both signal paths are ON with degraded performance.

Pin	Function	Description	Interface Schematic
1	RF1	First RF connection.	
2	GND	Ground.	
3	RF2	Second RF connection.	
4	VRF2	Second RF control.	
5	RFC	Common RF connection.	
6	VRF1	First RF control.	
Pkg Base	GND		

Package Drawing
QFN, 6-pin, 2x2

NOTES:

1. SHADED PIN IS LEAD 1.
2. PIN 1 IDENTIFIER MUST EXIST ON TOP SURFACE OF PACKAGE BY IDENTIFICATION MARK OR FEATURE ON THE PACKAGE BODY. EXACT SHAPE AND SIZE IS OPTIONAL.



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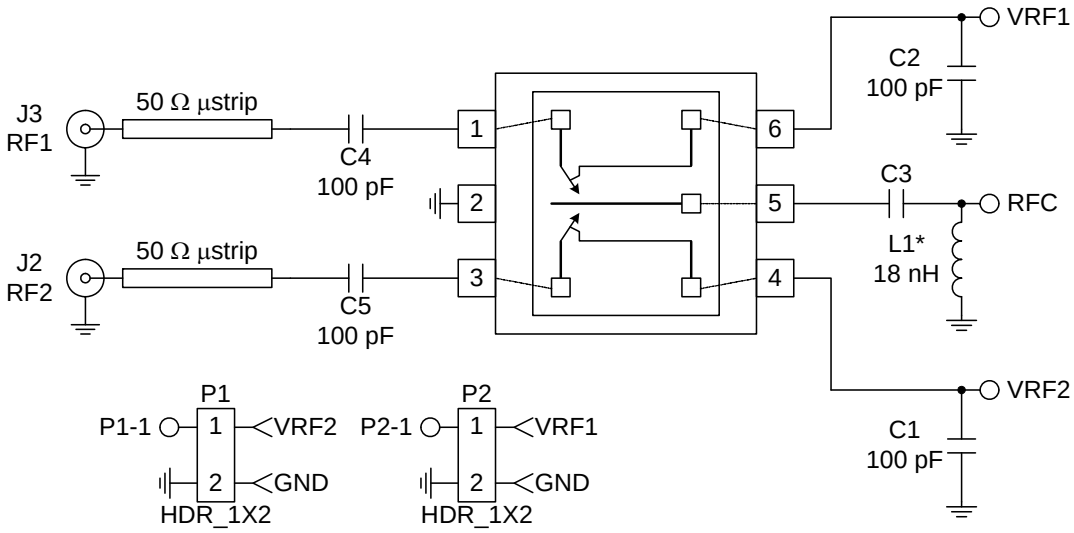
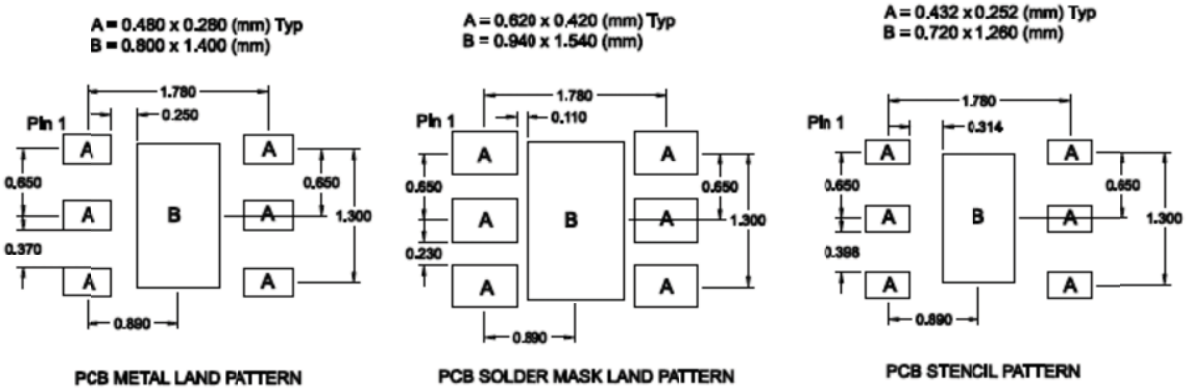
Evaluation Board Schematic



*L1 is optional for
IEC61000-4-2 ESD protection.

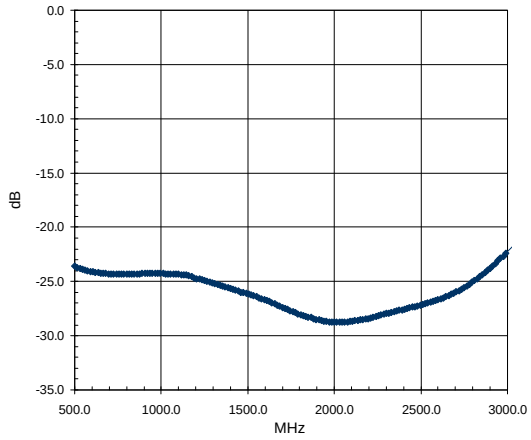
PCB Design Requirements



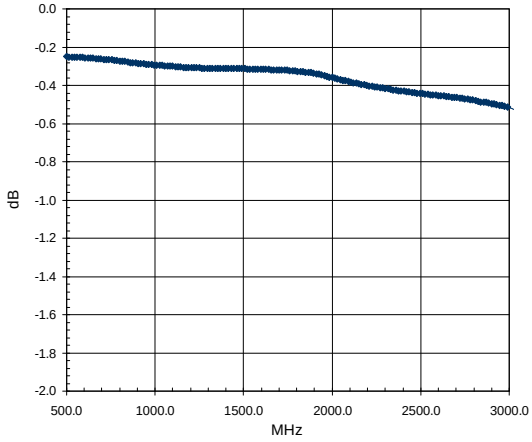
Typical Performance

Temp = 25 °C, $V_{CONTROL}$ = 2.65 V

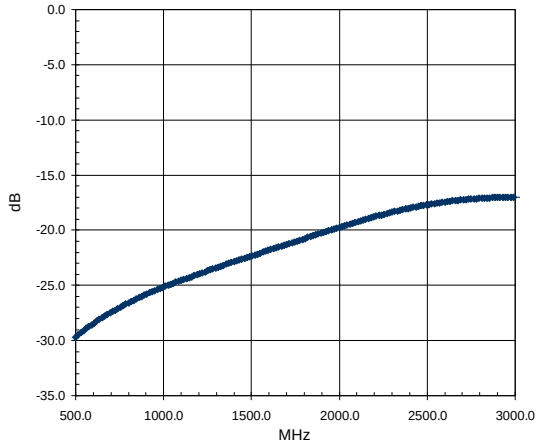
Return Loss



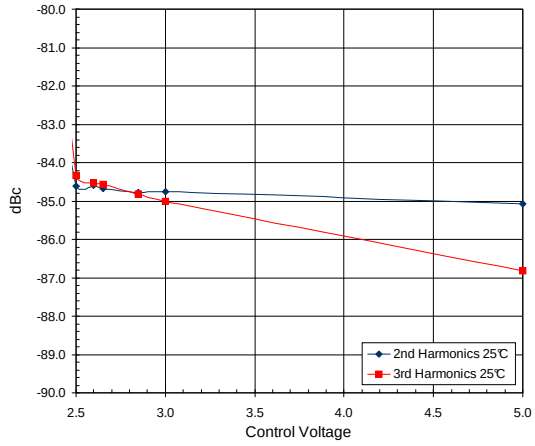
Insertion Loss



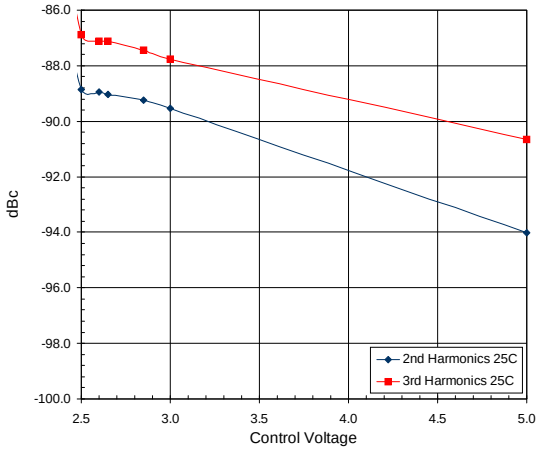
Isolation



900MHz Harmonics versus Control Voltage



1900MHz Harmonics versus Control Voltage



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