RFSW8000

2.5V TO 5.0V, 5MHz TO 6500MHz 10W SPDT SWITCH

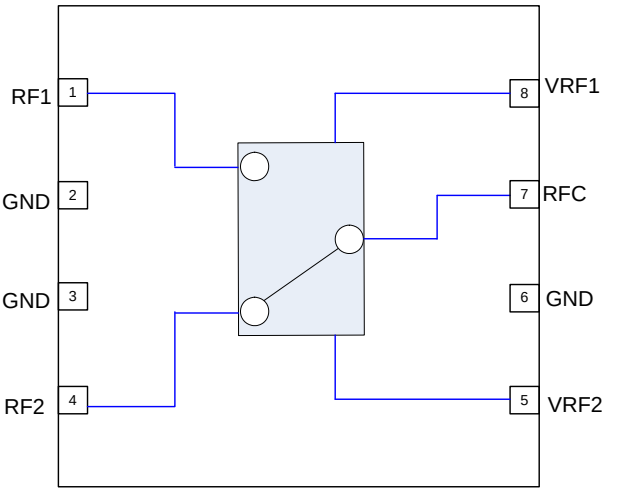
Package: QFN, 2mm x 2mm x 0.55mm

Features

- Single Voltage: 2.5V to 5.0V
- 40dBm P1dB
- 30dB Isolation at 2GHz

Applications

- IEEE 802.11a/n WiFi Systems
- IEEE 802.16 WiMAX Systems
- Customer Premise Equipment (CPE)
- Wireless Access Points, Gateways and Router Applications
- ISM Band Transmitter Applications



Functional Block Diagram

Product Description

The RFSW8000 is a high power single-pole double-throw (SPDT) switch designed for high performance wireless applications. This wideband switch has been designed for use from 5MHz to 6.5GHz, where extremely high linearity, high isolation, low insertion loss, and small package size are required. Switching for the RFSW8000 is controlled via two control voltage inputs.

The RFSW8000 is manufactured in a pHEMT GaAs process and packaged in an 8-pin, 2.0mm x 2.0mm quad-flat no-Lead (QFN) plastic package.

Ordering Information

RFSW8000-410	RFSW8000 eval board (100MHz to 2000MHz) and 5-piece bag
RFSW8000-411	RFSW8000 eval board (2000MHz to 4500MHz) and 5-piece bag
RFSW8000-412	RFSW8000 eval board (4500MHz to 6500MHz) and 5-piece bag
RFSW8000SB	5-Piece bag
RFSW8000SR	100-Piece reel
RFSW8000TR7	2500-Piece reel
RFSW8000SQ	25-Piece bag

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Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage (RF Applied)	-0.5 to +5.0	V
Supply Voltage (No RF Applied)	-0.5 to +5.0	V
DC Supply Current	10	mA
Input RF Power	+40*	dBm
Max Input Power, OFDM Modulated, 3:1 Load VSWR	+36	dBm
Operating Ambient Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C
Moisture Sensitivity	MSL2	

*Note: Maximum input power with a 50Ω load.

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.

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RFMD Green: RoHS compliant per EU Directive 2011/65/EU, 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.		
Typical Conditions					Temp = 25°C, VC = 3.0V unless otherwise noted
Performance - Low Band					Optimized at 700MHz to 950MHz
Frequency	100		2000	MHz	
Insertion Loss		0.4	0.6	dB	
Input P0.1dB	39	40		dBm	At higher $V_{CONTROL}$, P0.1dB will be improved
Input Return Loss	20	25		dB	
Isolation	26	29		dB	
Harmonics (2nd, 3rd)		80		dBc	at P_{OUT} = 30dBm
IIP3		59		dBm	
Performance - Mid Band					Optimized at 2.1GHz to 2.7GHz
Frequency	2000		4500	MHz	
Insertion Loss		0.55	0.65	dB	In optimized frequency band
			0.95	dB	in full frequency band
Input P0.1dB	39	40		dBm	At higher $V_{CONTROL}$, P0.1dB will be improved
Input Return Loss	15	20		dB	
Isolation	26	29		dB	
Harmonics (2nd, 3rd)		80		dBc	at P_{OUT} = 30dBm
IIP3		59		dBm	
Performance - High Band					Optimized at 5.1GHz to 5.9GHz
Frequency	4500		6500	MHz	
Insertion Loss		0.85	1	dB	In optimized frequency band
Input P0.1dB RF1 to RFC	35	36		dBm	At higher $V_{CONTROL}$, P0.1dB will be improved
Input P0.1dB RF2 to RFC	37	38		dBm	At higher $V_{CONTROL}$, P0.1dB will be improved
Input Return Loss	14	20		dB	
Isolation	24	25.5		dB	
Harmonics (2nd, 3rd)		80		dBc	at P_{OUT} = 30dBm
IIP3		55		dBm	
Switching					
Switching Speed High		300	500	nSec	50% CTL to 90/10% RF
Switching Speed Low		100	300	nSec	90/10% RF to 10/90% RF

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Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Control Voltage					
Control Voltage High	2.5	3	5	V	
Control Voltage Low			0.2	V	
Control Current		5		µA	
Generic Performance					
ESD					
Human Body Model	250			V	EIA/JESD22-114A RF pins
	500			V	EIA/JESD22-114A DC pins
Charge Device Model	1000			V	JESD22-C101C all pins

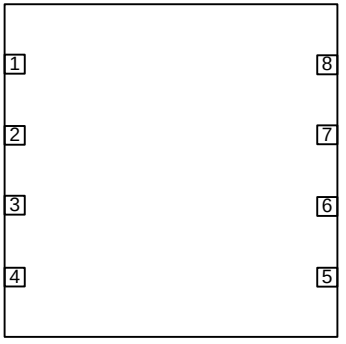
RFSW8000 Control Truth Table

Switch status		Logic control	
RF1 to RFC	**RF2 to RFC**	**VRF1**	**VRF2**
ON	OFF	High	Low
OFF	ON	Low	High

Pin Names and Description

Pin	Function	Description
1	**RF1**	RF port 1, is internally matched to 50Ω.
2	**GND**	Ground connection.
3	**GND**	Ground connection.
4	**RF2**	RF port 2, is internally matched to 50Ω.
5	**VRF2**	Logic control for RF2 port.
6	**GND**	Ground connection.
7	**RFC**	RF common port, is internally matched to 50Ω.
8	**VRF1**	Logic control for RF1 port.
Pkg Base	**GND**	Ground connection. The back side of the package should be connected to the ground plane through as short connection as possible. PCB vias under the device are recommended.

Pin Out



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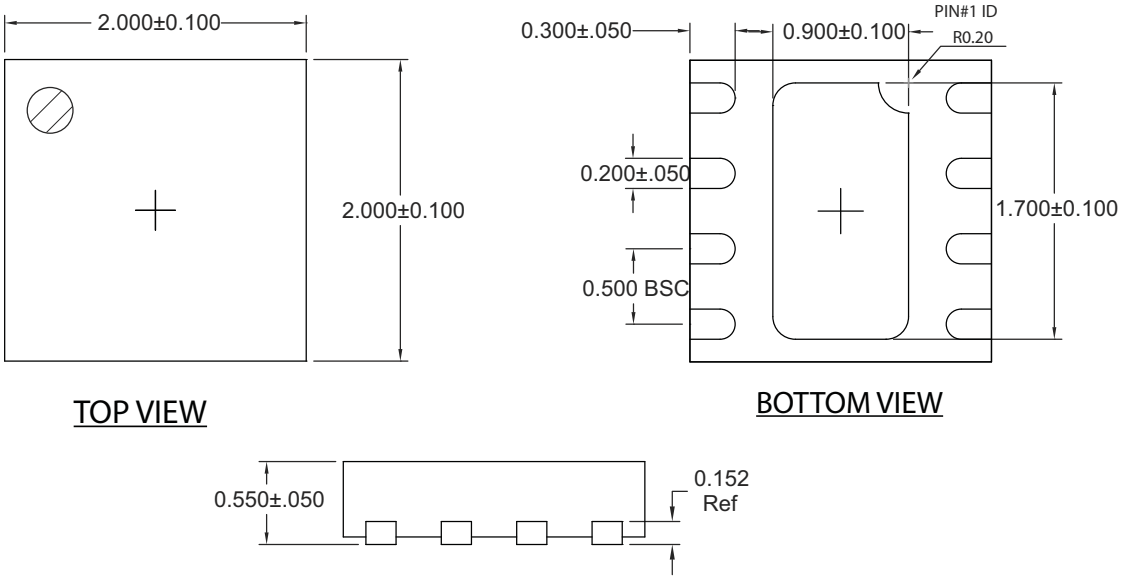
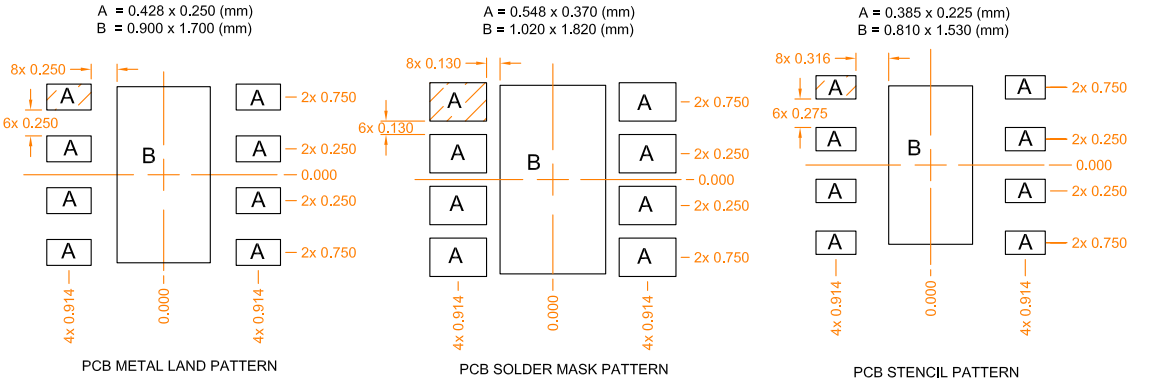
Package Drawing



PCB Design Requirements



Shaded are represents Pin 1.

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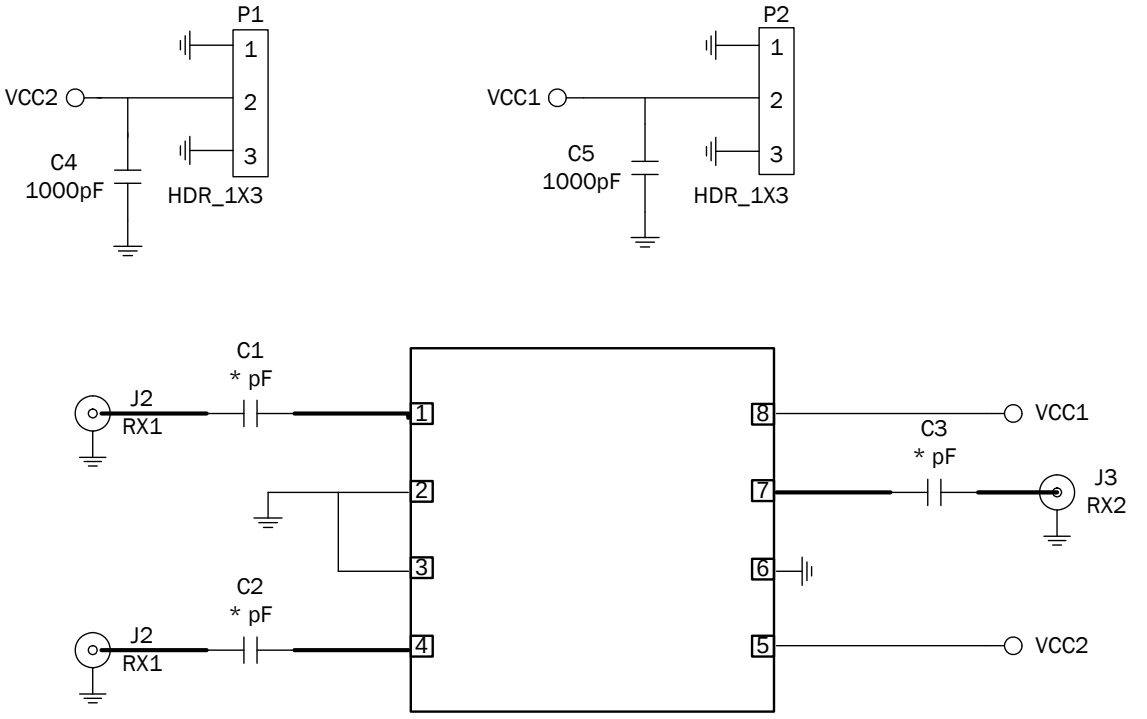
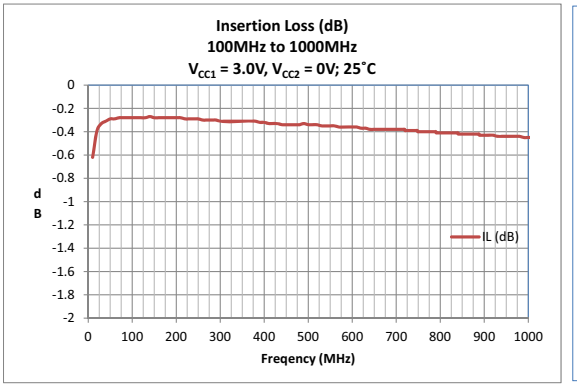
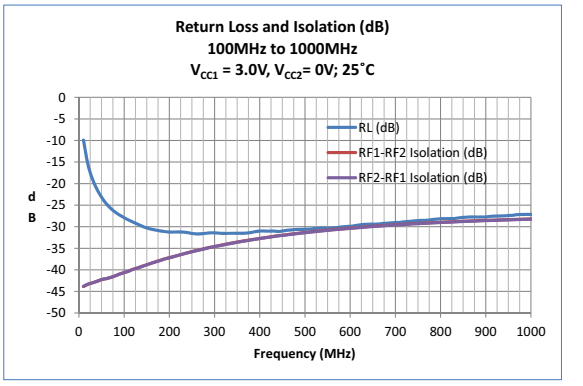
Evaluation Board Layout



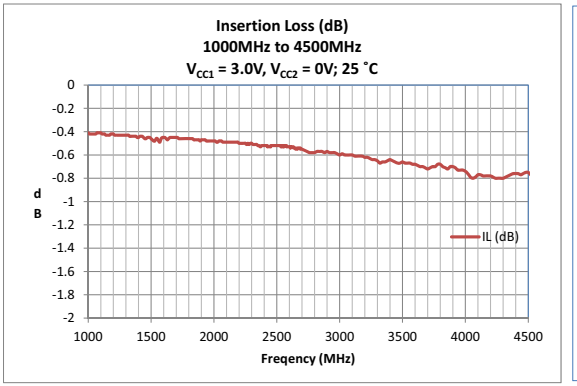
RFSW8000 DC Block Values				
Tune Band	**Freqency Range**	**C1**	**C2**	**C3**
RFSW8000-410	100MHz to 2000MHz	1.0nF	1.0nF	1.0nF
RFSW8000-411	2000MHz to 4500MHz	33pF	33pF	33pF
RFSW8000-412	4500MHz to 6500MHz	2.0pF	2.0pF	2.0pF

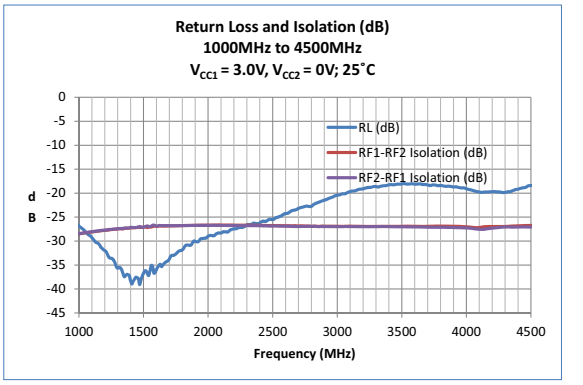
Performance Plots: 100MHz to 1000MHz



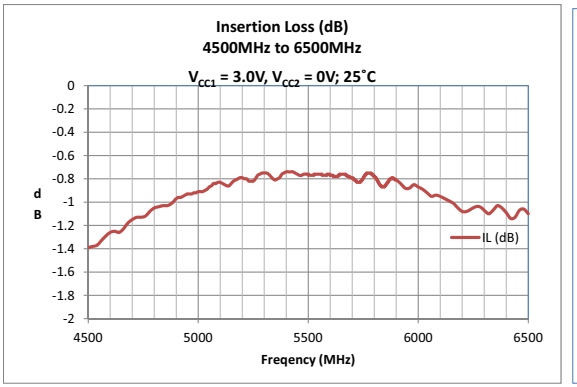


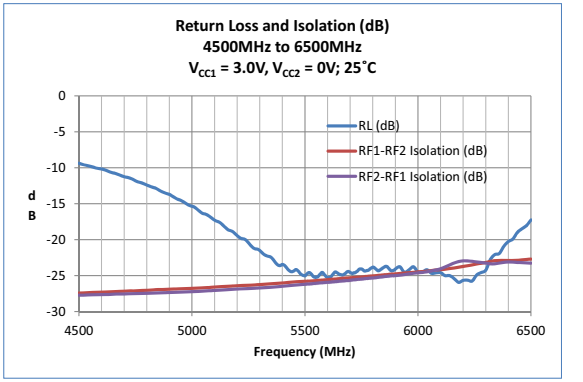
Performance Plots: 1000MHz to 4500MHz





Performance Plots: 4500MHz to 6500MHz





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