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Product Overview

The RF1126 is a single-pole double-throw (SPDT) switch designed for general purpose switching applications which require very low insertion loss and medium power handling capability. The RF1126 is ideally suited for battery operated applications requiring high performance switching with very low DC power consumption. The RF1126 features low insertion loss, high linearity, and very good harmonic characteristics, and is operable from 1.8 V to 3.6 V control voltage. It is fabricated with 0.5 μ m GaAs pHEMT process, and is packaged in a very compact 2 mm x 1.3 mm, 6-pin, leadless QFN package.

Functional Block Diagram





Package Style: QFN, 6-pin, 2 mm x 1.3 mm x 0.35 mm

Key Features

- Broadband performance low frequency to 5.8 GHz
- Very Low Insertion Loss
- 0.26 dB Typ at 1 GHz
- 0.32dB Typ at 2 GHz
- Excellent harmonics < -75 dBc at 2 GHz
- High IIP3: Cell Band Typ. 62 dBm
- 1.8 V capable for low power Applications
- P0.1 dB > 23 dBm Typ @ 2 GHz

Applications

- Cellular Handset Applications
- Antenna Tuning Applications
- IEEE802.11b/g WLAN Applications
- Multi-mode GSM, W-CDMA Applications
- WLAN Applications

Ordering Information

Part Number	Description
RF1126	Broadband Medium Power SPDT Switch
RF1126PCBA-410	Fully Assembled Evaluation Board

Absolute Maximum Ratings

Parameter	Rating	Unit
Voltage	6.0	V
Maximum input power (0.6 GHz to 2.5 GHz), RF1, RF2	+28	dBm
Operating temperature	-30 to +85	O°
Storage temperature	-65 to +100	O°

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.

Parameter Min. Typ. Max. Unit Condition Overall - Voomed_high = 3 V Min. Typ. Max. Varen, Varen = High = 3 V, Varen = Varen = Low = 0 V, Temp = 25 °C Operating Frequency 33 5800 MHz Insertion Loss 0 L 0.21 0.24 dB RF ON, 50 MHz to 450 MHz RFC - RF1, RFC - RF2 0.26 0.31 dB RF ON, 824 MHz to 960 MHz 0.20 0.36 0.45 dB RF ON, 824 MHz to 960 MHz 0.20 0.36 B RF ON, 824 MHz to 960 MHz RFC - RF1, RFC - RF2 0.36 0.45 dB RF ON, 150 MHz to 1990 MHz 150 Isolation 1 0.70 dB RF ON, 58 GHz 150 160 170 170 180 170 MHz to 2500 MHz 170 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>							
Parameter Min. Typ. Max. Unit Control Overall – Voorted_high = 3 V Image: Control of the second sec	Peremeter	Specification			11		
Overall - V _{control_Light} = 3 V Image is a state of the	Parameter	Min.	Тур.	Max.	Unit	Condition	
Operating Frequency 33 5800 MHz Insertion Loss - - - - RFC - RF1, RFC - RF2 0.21 0.24 dB RF ON, 824 MHz to 450 MHz RFC - RF1, RFC - RF2 0.32 0.40 dB RF ON, 824 MHz to 1990 MHz 0.36 0.45 dB RF ON, 824 MHz to 1990 MHz - 0.36 0.45 dB RF ON, 824 MHz to 1990 MHz - 0.36 0.45 dB RF ON, 824 MHz to 1990 MHz - Isolation - - - - - 31 33 dB RF ON, 450 MHz - - 18 20 dB RF ON, 450 MHz - - 19 18 20 dB RF ON, 520 MHz - - Return Loss 19 26 dB BF ON, 53 GHz - - Second Harmonic 75 dBc Pnn = +15 dBm, 1980 MHz - - - - - -	$Overall - V_{control_high} = 3 V$					V_{RF1} , V_{RF2} = High = 3 V, V_{RF1} = V_{RF2} = Low = 0 V, Temp = 25 °C	
	Operating Frequency	33		5800	MHz		
$ \begin{array}{ c c c c c } \hline 0.21 & 0.24 & dB & RF ON, 50 MHz to 450 MHz \\ \hline 0.26 & 0.31 & dB & RF ON, 824 MHz to 960 MHz \\ \hline 0.32 & 0.40 & dB & RF ON, 824 MHz to 960 MHz \\ \hline 0.32 & 0.40 & dB & RF ON, 2170 MHz to 2500 MHz \\ \hline 0.36 & 0.45 & dB & RF ON, 2170 MHz to 2500 MHz \\ \hline 0.36 & 0.45 & dB & RF ON, 2170 MHz to 2500 MHz \\ \hline 0.36 & 0.45 & dB & RF ON, 5.8 GHz \\ \hline \hline 100 & & & & & & & & & & & & & & & & & &$	Insertion Loss						
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$ \begin{array}{c c c c c c c c c } \hline 25 & 27 & dB & RF ON, 824 MHz to 960 MHz \\ \hline 18 & 20 & dB & RF ON, 1850 MHz to 1990 MHz \\ \hline 18 & 20 & dB & RF ON, 1850 MHz to 1990 MHz \\ \hline 19 & 19 & dB & RF ON, 2170 MHz to 2500 MHz \\ \hline 11 & dB & RF ON, 5.8 GHz \\ \hline 11 & dB & RF ON, 5.8 GHz \\ \hline 11 & dB & RF ON, 5.8 GHz \\ \hline 11 & dB & RF ON, 5.8 GHz \\ \hline 11 & dB & RF ON, 5.8 GHz \\ \hline 11 & dB & RF ON, 5.8 GHz \\ \hline 11 & dB & RF ON, 5.8 GHz \\ \hline 11 & dB & RF ON, 5.8 GHz \\ \hline 11 & dB & RF ON, 5.8 GHz \\ \hline 11 & dB & RF ON, 5.8 GHz \\ \hline 11 & dB & RF ON, 5.8 GHz \\ \hline 11 & dB & RF ON, 5.8 GHz \\ \hline 11 & dB & RF ON, 5.8 GHz \\ \hline 11 & dB & RF ON, 5.8 GHz \\ \hline 11 & dB & GB & P_{IN} = +15 dBm, 1980 MHz \\ \hline 11 & 10 & dB & P_{IN} = +15 dBm, 1980 MHz \\ \hline 11 & 10 & dB & P_{IN} = +15 dBm, 1980 MHz \\ \hline 11 & 10 & dB & P_{IN} = +15 dBm, 2500 MHz \\ \hline 11 & 10 & dB & P_{IN} = +15 dBm, 2500 MHz \\ \hline 11 & 10 & dB & P_{IN} = +15 dBm, 2500 MHz \\ \hline 11 & 10 & dB & P_{IN} = +15 dBm, 2500 MHz \\ \hline 11 & 10 & dB & P_{IN} = +15 dBm, 2500 MHz \\ \hline 11 & 10 & dB & P_{IN} = +15 dBm, 1980 MHz \\ \hline 11 & 10 & dB & P_{IN} = +15 dBm, 1980 MHz \\ \hline 11 & 10 & dB & P_{IN} = +15 dBm, 1980 MHz \\ \hline 11 & 10 & dB & P_{IN} = +15 dBm, 1980 MHz \\ \hline 11 & 10 & dB & 10 & dBm & Tone 1: 1836.5 MHz @ 16 dBm, Tone 2: 1791.5 MHz @ -20 dBm Rx Freq: 881.5 MHz \\ \hline 11 & 10 & dB & P_{IN} = -21 dBm & Tone 1: 1950 MHz @ 16 dBm, Tone 2: 1760 MHz @ -20 dBm Rx Freq: 2140 MHz \\ \hline 11 & 10 & dB & P_{IN} = -21 dBm & 500 MHz to 3000 MHz \\ \hline 11 & 10 & dB & MB & 500 MHz to 3000 MHz \\ \hline 11 & 10 & 400 & ns & 50\% control to 10\% / 90\% \\ \hline 11 & 10 & 400 & ns & 50\% control to 10\% / 90\% \\ \hline 11 & 10 & 400 & ns & 50\% control to 10\% / 90\% \\ \hline 11 & 10 & 400 & ns & 50\% control to 10\% / 90\% \\ \hline 11 & 10 & 10\% P_{ID} & P_{ID} &$		31	33		dB	RF ON, 450 MHz	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		25	27		dB	RF ON, 824 MHz to 960 MHz	
$ \begin{array}{c c c c c c c c c } 16 & -19 & dB & RF ON, 2170 \ MHz to 2500 \ MHz \\ \hline 11 & dB & RF ON, 5.8 \ GHz \\ \hline Return \ Loss & 19 & 26 & dB & 500 \ MHz to 3000 \ MHz \\ \hline Second \ Harmonic & 75 & dBc & P_{IN} = +15 \ dBm, 1980 \ MHz \\ \hline 69 & dBc & P_{IN} = +15 \ dBm, 2500 \ MHz \\ \hline 69 & dBc & P_{IN} = +15 \ dBm, 2500 \ MHz \\ \hline 70 & dBc & P_{IN} = +15 \ dBm, 1980 \ MHz \\ \hline 70 & dBc & P_{IN} = +15 \ dBm, 2500 \ MHz \\ \hline 1P3 & 70 & dBc & P_{IN} = +15 \ dBm, 2500 \ MHz \\ \hline RF1 - RFC, \ RF2 - RFC \ (Cell) & 61 & 62 & dBm \\ \hline RF1 - RFC, \ RF2 - RFC \ (Cell) & 61 & 62 & dBm \\ \hline RF1 - RFC, \ RF2 - RFC \ (Cell) & 61 & 62 & dBm \\ \hline Tone \ 1: \ 836.5 \ MHz \ @ 16 \ dBm, \ Tone \ 2: \ 791.5 \ MHz \ @ 20 \ dBm \ Rx \ Freq: \ 881.5 \ MHz \\ \hline Tone \ 1: \ 1950 \ MHz \ @ 16 \ dBm, \ Tone \ 2: \ 791.5 \ MHz \ @ 16 \ dBm, \ Tone \ 2: \ 791.5 \ MHz \ @ 20 \ dBm \ Rx \ Freq: \ 881.5 \ MHz \\ \hline Tone \ 1: \ 1950 \ MHz \ @ 16 \ dBm, \ Tone \ 2: \ 791.5 \ MHz \ @ 20 \ dBm \ Rx \ Freq: \ 881.5 \ MHz \\ \hline Tone \ 1: \ 1950 \ MHz \ @ 16 \ dBm, \ Tone \ 2: \ 791.5 \ MHz \ @ 20 \ dBm \ Rx \ Freq: \ 881.5 \ MHz \\ \hline Tone \ 1: \ 1950 \ MHz \ @ 16 \ dBm, \ Tone \ 2: \ 1950 \ MHz \ @ 16 \ dBm, \ Tone \ 2: \ 1950 \ MHz \ @ 16 \ dBm, \ Tone \ 2: \ 1950 \ MHz \ @ 20 \ dBm \ Rx \ Freq: \ 2:140 \ MHz \\ \hline Tiple \ Beat \ Ratio \ Cell/AWS/PCS \ 61 \ dBc \ VSWR \ = \ 2:1 \ dBm \ 500 \ MHz \ 500 \ MHz \ Subsetee \ S$	RFC – RF1, RFC – RF2	18	20		dB	RF ON, 1850 MHz to 1990 MHz	
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Inite Harmonic 70 dBc $P_{IN} = +15 \text{ dBm}, 2500 \text{ MHz}$ IIP3 61 62 63 64 65 66 70	Third Harmonia		90		dBc	P _{IN} = +15 dBm, 1980 MHz	
IIP3 Image: Constraint of the i			70		dBc	P _{IN} = +15 dBm, 2500 MHz	
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Triple Beat Ratio Image: Marcine Stress Image: MarcineStress Image: Marcine Stres I	RF1 – RFC, RF2 – RFC (IMT)	59	60		dBm	Tone 1: 1950 MHz @ 16 dBm, Tone 2: 1760 MHz @ -20 dBm Rx Freq: 2140 MHz	
Cell/AWS/PCS 61 dBc VSWR = 2:1 0.1 dB Compression (P0.1 dB) 21 23 dBm 500 MHz to 3000 MHz Switching Speed 160 400 ns 50% control to 10%/90%	Triple Beat Ratio						
0.1 dB Compression (P0.1 dB) 21 23 dBm 500 MHz to 3000 MHz Switching Speed 160 400 ns 50% control to 10%/90%	Cell/AWS/PCS		61		dBc	VSWR = 2:1	
Switching Speed 160 400 ns 50% control to 10%/90%	0.1 dB Compression (P0.1 dB)	21	23		dBm	500 MHz to 3000 MHz	
	Switching Speed		160	400	ns	50% control to 10%/90%	
Control Current 0.4 1.0 μA P _{IN} = 15 dBm	Control Current		0.4	1.0	μA	P _{IN} = 15 dBm	

Devemotor	Specification			Unit	Condition	
Parameter	Min.	Тур.	Max.	Unit	Condition	
Overall - Vcontrol_high = 1.8 V					V _{RF1} , V _{RF2} = High = 1.8 V, V _{RF1} = V _{RF2} = Low = 0 V, Temp. = 25 °C	
Operating Frequency	50		5800	MHz		
Insertion Loss						
		0.21	0.30	dB	RF ON, 450 MHz	
		0.26	0.35	dB	RF ON, 824 MHz to 960 MHz	
RFC – RF1, RFC – RF2		0.32	0.45	dB	RF ON, 1850 MHz to 1990 MHz	
		0.36	0.50	dB	RF ON, 2170 MHz to 2500 MHz	
		0.70		dB	RF ON, 5.8 GHz	
Isolation						
	30	32		dB	RF ON, 450 MHz	
	24	25		dB	RF ON, 824 MHz to 960 MHz	
RFC – RF1, RFC – RF2	17	19		dB	RF ON, 1850 MHz to 1990 MHz	
	15	18		dB	RF ON, 2170 MHz to 2500 MHz	
		11		dB 🛶	RF ON, 5.8 GHz	
Return Loss	19	26		dB	500 MHz to 3000 MHz	
0.1 dB Compression (P0.1 dB)	7	11		dBm	500 MHz to 3000 MHz	
Switching Speed		160	400	ns	50% control to 10%/90%	
DC Supply	1.8	3.0	3.6	v	VRF1 and VRF2 (H)	
	0		0.4	v	VRF1 and VRF2 (L)	
Control Current		0.4	1.0	μA	P _{IN} = 15 dBm	

Control Logic

	Control Signals		Signal Paths	
	V _{RF1}	VRF2	RF1 – RFC	RF2 – RFC
Valid States	1	0	ON	OFF
Valid States	0	1	OFF	ON
Invalid States	0	0	Indeterminate State*	
Invalid States	1	1	Indeterminate State*	

0: Logic level low, 0 V \sim 0.4 V

1: Logic level high, 1.8 V ~ 3.6 V

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

Pin	Function	Description
1	RF1	RF Port 1
2	GND	Ground
3	RF2	RF Port 2
4	VRF2	Control 2
5	RFC	Antenna
6	VRF1	Control 1
Pkg Base	GND	Ground

Package Drawing



Evaluation Board Schematic



Evaluation Board Layout

Board Thickness 0.067", Board Material FR-4, Multi-layer



Typical Performance Data on Evaluation Board Note: Fixture losses have been de-embedded (Temp. = 25 °C, $V_{RF1} = V_{RF2} = High = 3 V V_{RF1} = V_{RF2} = Low = 0 V$)



Solderability

Compatible with both lead-free (260 °C max. reflow temperature) and tin/lead (245 °C max. reflow temperature) soldering processes. Package lead plating: -Matte Sn

RoHS Compliance

This part is compliant with the 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment), as amended by Directive 2015/863/EU.

This product also has the following attributes:

- Lead free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A (C15H12Br402) Free
- SVHC Free

NOT FOR NEW DESIGNS. Contact Marketing RF1126 Broadband Medium Power SPDT Switch

REVISION HISTORY

REVISION	DESCRIPTION		
DS110405	Release version		
DS140709	Revised minimum operating frequency from 50 MHz to 33 MHz		
DS20170308	Converted from RFMD to Qorvo template		
E (20180508)	Added Not For New Design marking		

Contact Information

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