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Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

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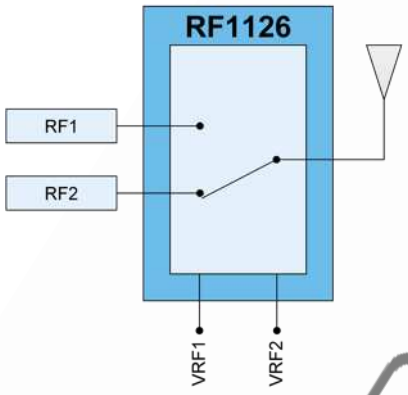
RF1126

Broadband Medium Power SPDT Switch

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 µm GaAs pHEMT process, and is packaged in a very compact 2 mm x 1.3 mm, 6-pin, leadless QFN package.

Functional Block Diagram



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

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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	°C
Storage temperature	-65 to +100	°C

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	Specification			Unit	Condition
	Min.	Typ.	Max.		
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	
Insertion Loss					
RFC – RF1, RFC – RF2		0.21	0.24	dB	RF ON, 50 MHz to 450 MHz
		0.26	0.31	dB	RF ON, 824 MHz to 960 MHz
		0.32	0.40	dB	RF ON, 1850 MHz to 1990 MHz
		0.36	0.45	dB	RF ON, 2170 MHz to 2500 MHz
		0.70		dB	RF ON, 5.8 GHz
Isolation					
RFC – RF1, RFC – RF2	31	33		dB	RF ON, 450 MHz
	25	27		dB	RF ON, 824 MHz to 960 MHz
	18	20		dB	RF ON, 1850 MHz to 1990 MHz
	16	19		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
Second Harmonic		75		dBc	P_{IN} = +15 dBm, 1980 MHz
		69		dBc	P_{IN} = +15 dBm, 2500 MHz
Third Harmonic		90		dBc	P_{IN} = +15 dBm, 1980 MHz
		70		dBc	P_{IN} = +15 dBm, 2500 MHz
IIP3					
RF1 – RFC, RF2 – RFC (Cell)	61	62		dBm	Tone 1: 836.5 MHz @ 16 dBm, Tone 2: 791.5 MHz @ -20 dBm Rx Freq: 881.5 MHz
RF1 – RFC, RF2 – RFC (IMT)	59	60		dBm	Tone 1: 1950 MHz @ 16 dBm, Tone 2: 1760 MHz @ -20 dBm Rx Freq: 2140 MHz
Triple Beat Ratio					
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%
Control Current		0.4	1.0	µA	P_{IN} = 15 dBm

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Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Overall – $V_{control\_high}$ = 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					
RFC – RF1, RFC – RF2		0.21	0.30	dB	RF ON, 450 MHz
		0.26	0.35	dB	RF ON, 824 MHz to 960 MHz
		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					
RFC – RF1, RFC – RF2	30	32		dB	RF ON, 450 MHz
	24	25		dB	RF ON, 824 MHz to 960 MHz
	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}	V_{RF2}	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, 0 V ~ 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.

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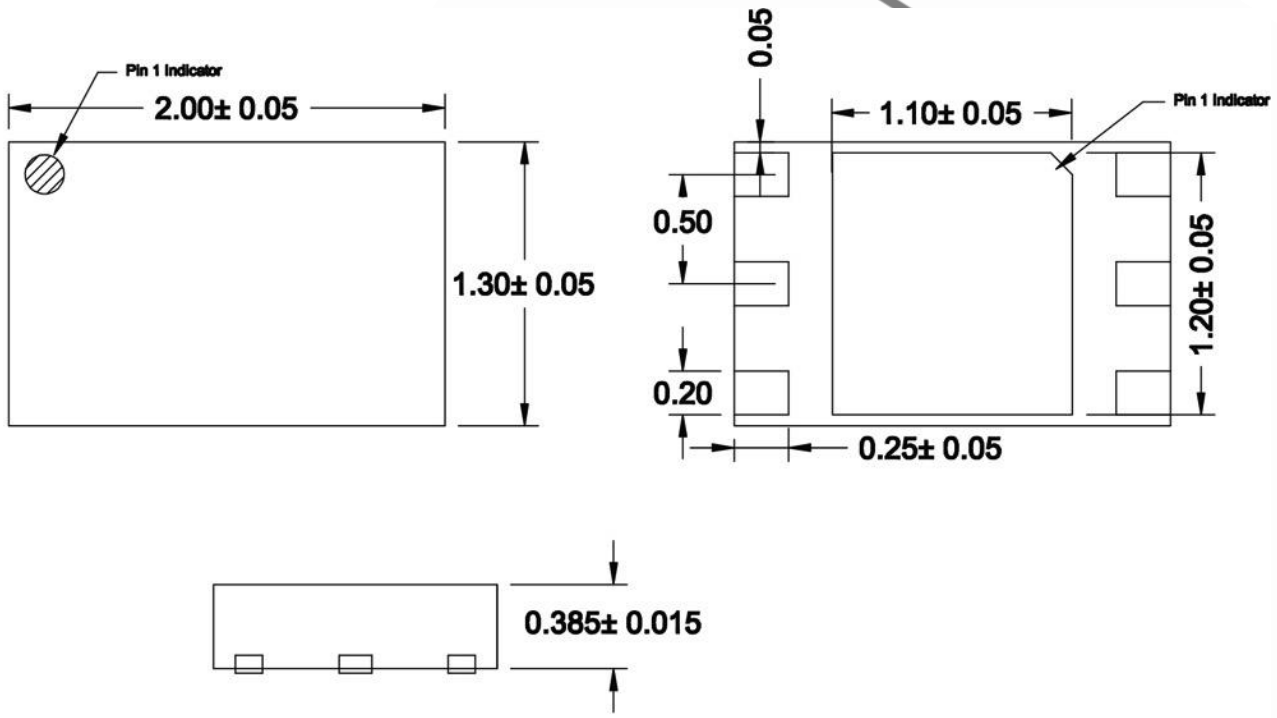
Pin	Function	Description
1	RF1	RF Port 1
2	GND	Ground
3	RF2	RF Port 2
4	VRF2	Control 2
5	RFC	Antenna
6	VRF1	Control 1
Pkg Base	GND	Ground

Package Drawing



Notes:

1) Pin 1 Indicator Shaded Area

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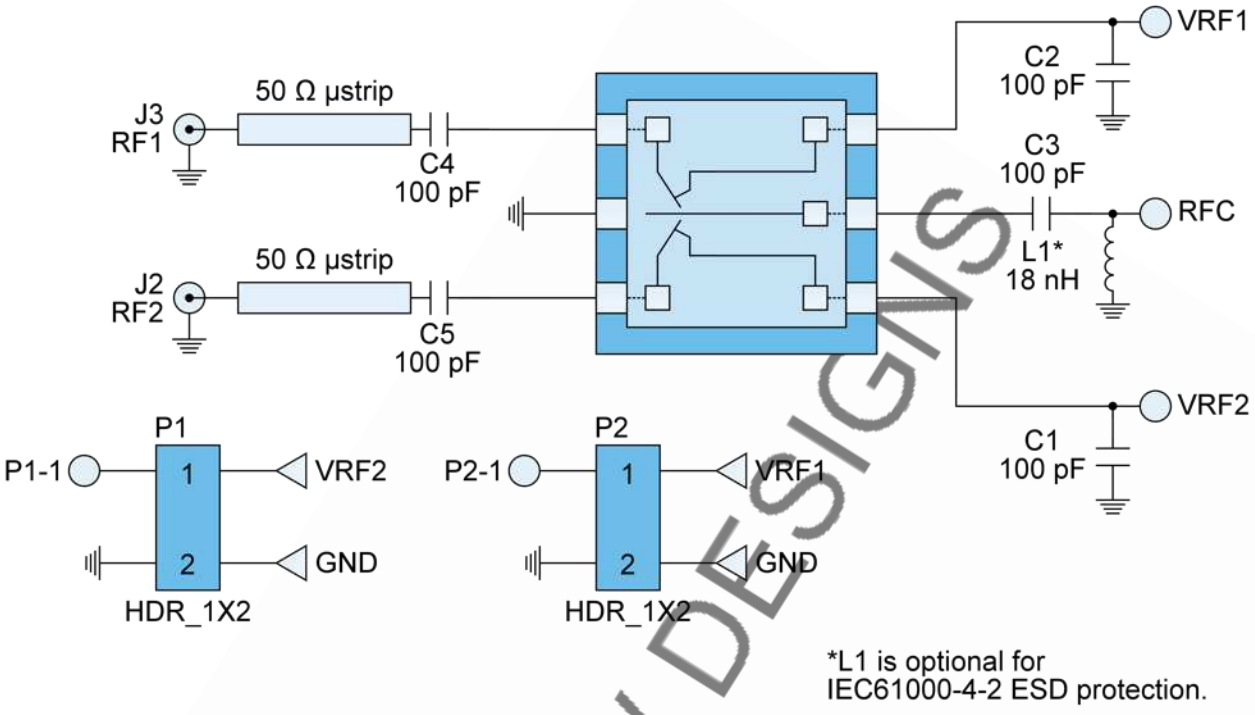
Evaluation Board Schematic



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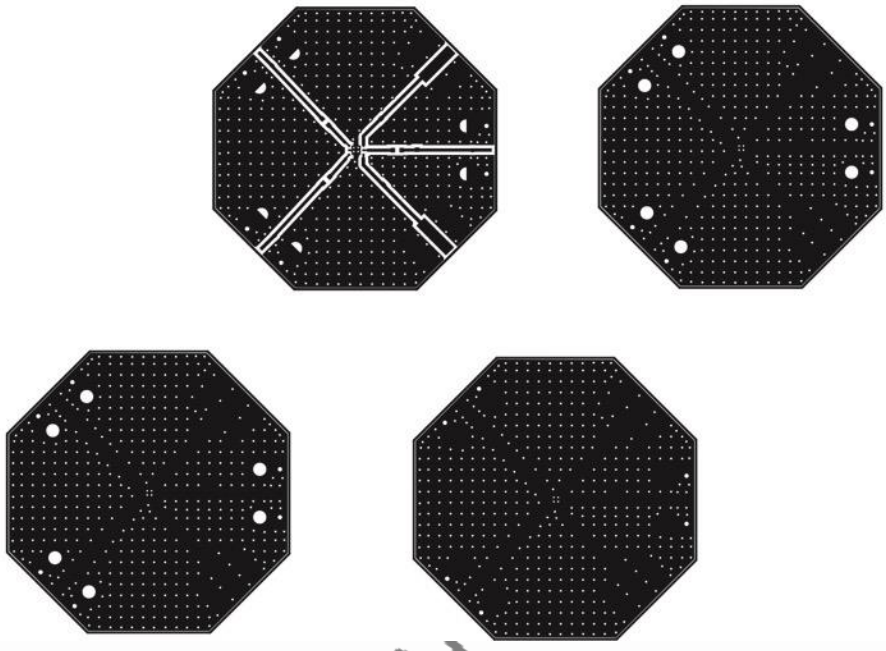
Evaluation Board Layout

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



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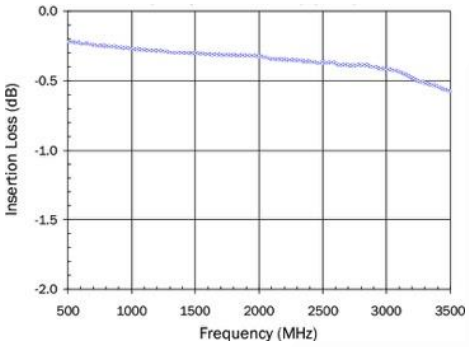
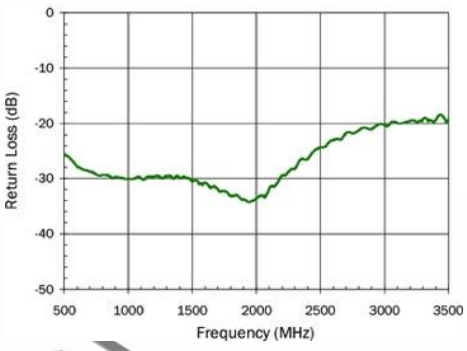
Typical Performance Data on Evaluation Board Note: Fixture losses have been de-embedded
(Temp. = 25 °C, V_{RF1} = V_{RF2} = High = 3 V V_{RF1} = V_{RF2} = Low = 0 V)

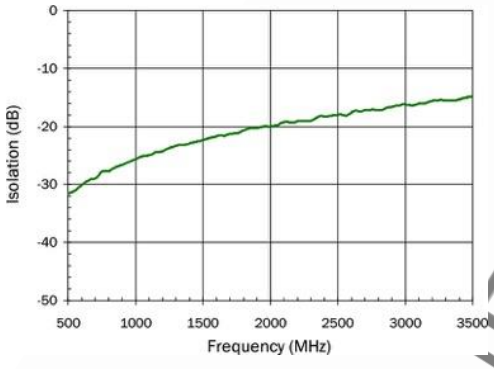
Insertion Loss
(Temp. = 25 °C, VRF(H) = 3 V)



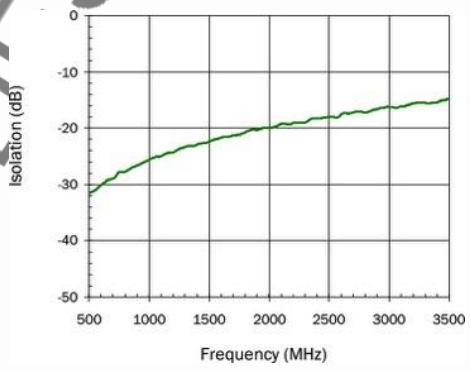
Return Loss
(Temp. = 25 °C, VRF (H) = 3 V)



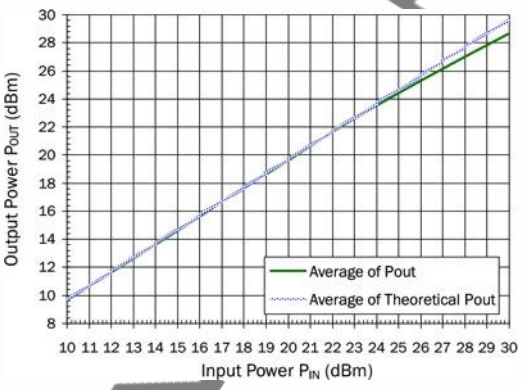
Isolation (Ant - RF port)
(Temp. = 25 °C, VRF(H)=3 V)



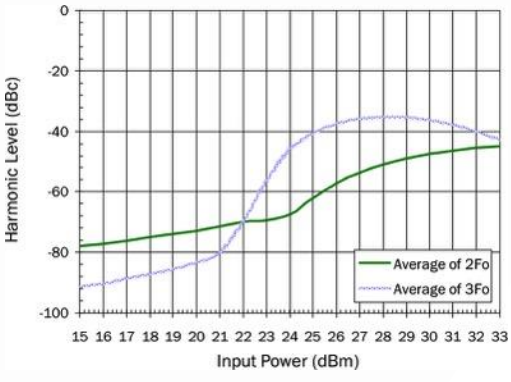
Isolation (Port - Port)
(Temp. = 25 °C, VRF(H) = 3 V)



Output Power versus Input Power
(Temp. = 25 °C, Frequency = 1980 MHz, VCTL(H) = 3 V)



Harmonics
(Temp. = 25 °C, VRF(H) = 3 V)



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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 ($C_{15}H_{12}Br_40_2$) Free
- SVHC Free

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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

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Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

Web: www.qorvo.com

Tel: 1-844-890-8163

Email: customer.support@qorvo.com

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