

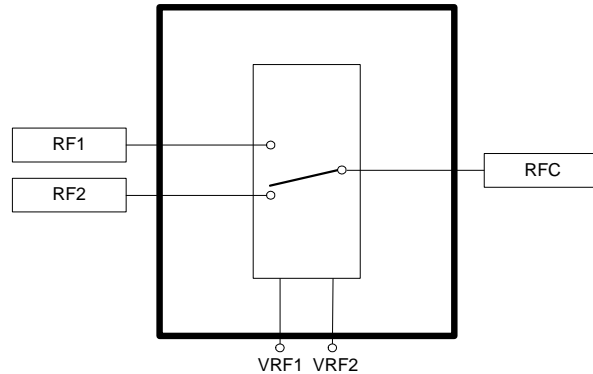
RFMD Green, RoHS Compliant, & Pb-Free Product  
 Package Style: QFN, 6-pin, 2mmx1.3mm

**Features**

- Broadband Performance  
Low Frequency to 6GHz
- Very Low Insertion Loss  
0.26 dB Typ at 1 GHz  
0.32 dB Typ at 2 GHz
- Excellent Harmonics <-75 dBc at 2 GHz
- High IIP<sub>3</sub>: 62 dBm
- 1.8V Capable for Low Power Applications
- PO.1dB > 23 dBm Typ @ 2 GHz
- Compact Footprint  
(2.0mmx1.3mmx0.35mm, 6-pin QFN)

**Applications**

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



Functional Block Diagram

**Product Description**

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 1.8V to 3.6V control voltage. It is fabricated with 0.5µm GaAs pHEMT process, and is packaged in a very compact 2mmx1.3mm, 6-pin, leadless QFN package.

**Ordering Information**

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

**Optimum Technology Matching® Applied**

- |                                      |                                      |  |                                   |
|--------------------------------------|--------------------------------------|--|-----------------------------------|
| <input type="checkbox"/> GaAs HBT    | <input type="checkbox"/> SiGe BiCMOS | <input checked="" type="checkbox"/> GaAs pHEMT | <input type="checkbox"/> GaN HEMT |
| <input type="checkbox"/> GaAs MESFET | <input type="checkbox"/> Si BiCMOS   | <input type="checkbox"/> Si CMOS               |                                   |
| <input type="checkbox"/> InGaP HBT   | <input type="checkbox"/> SiGe HBT    | <input type="checkbox"/> Si BJT                |                                   |

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## Absolute Maximum Ratings

| Parameter  | Rating      | Unit |
|--|-------------|------|
| Voltage  | 6.0         | V    |
| Maximum Input Power (0.6GHz to 2.5GHz), RF1, RF2 | +28         | dBm  |
| Operating Temperature                            | -30 to +85  | °C   |
| Storage Temperature                              | -65 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.

RoHS status based on EUDirective2002/95/EC (at time of this document revision).

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| Parameter                         | Specification |      |      | Unit | Condition   |
|-----------------------------------|---------------|------|------|------|---|
|                                   | Min.          | Typ. | Max. |      |   |
|                                   |               |      |      |      | $V_{RF1}, V_{RF2} = \text{High} = 3V, V_{RF1} = V_{RF2} = \text{Low} = 0V,$<br>Temp = 25 °C |
| Operating Frequency               | 0.6           |      | 2.5  | GHz  |   |
| <b>Insertion Loss</b>             |               |      |      |      |   |
| RFC - RF1, RFC - RF2              |               | 0.21 | 0.24 | dB   | RF ON, 50MHz to 450MHz  |
|                                   |               | 0.26 | 0.31 | dB   | RF ON, 824MHz to 960MHz   |
|                                   |               | 0.32 | 0.40 | dB   | RF ON, 1850MHz to 1990MHz   |
|                                   |               | 0.36 | 0.45 | dB   | RF ON, 2170MHz to 2500MHz   |
|                                   |               | 0.70 |      | dB   | RF ON, 5.8GHz   |
| <b>Isolation</b>                  |               |      |      |      |   |
| RFC - RF1, RFC - RF2              | 31            | 33   |      | dB   | RF ON, 450MHz   |
|                                   | 25            | 27   |      | dB   | RF ON, 824MHz to 960MHz   |
|                                   | 18            | 20   |      | dB   | RF ON, 1850MHz to 1990MHz   |
|                                   | 16            | 19   |      | dB   | RF ON, 2170MHz to 2500MHz   |
|                                   |               | 11   |      | dB   | RF ON, 5.8GHz   |
| <b>Return Loss</b>                |               |      |      |      |   |
|                                   | 19            | 26   |      | dB   | 500MHz to 3000MHz   |
| <b>Harmonics</b>                  |               |      |      |      |   |
| Second Harmonics                  |               | 75   |      | dBc  | $P_{IN} = +15\text{dBm}$ , 1980MHz  |
|                                   |               | 69   |      | dBc  | $P_{IN} = +15\text{dBm}$ , 2500MHz  |
| Third Harmonics                   |               | 90   |      | dBc  | $P_{IN} = +15\text{dBm}$ , 1980MHz  |
|                                   |               | 70   |      | dBc  | $P_{IN} = +15\text{dBm}$ , 2500MHz  |
| <b>IIP3</b>                       |               |      |      |      |   |
| RF1 - RFC, RF2 - RFC (Cell)       | 61            | 62   |      | dBm  | Tone 1: 836.5MHz @ 16dBm, Tone 2:<br>791.5MHz @ -20dBm RX Freq: 881.5MHz                    |
| RF1 - RFC, RF2 - RFC (IMT)        | 59            | 60   |      | dBm  | Tone 1: 1950MHz @ 16dBm, Tone 2:<br>1760MHz @ -20dBm RX Freq: 2140MHz                       |
| <b>Triple Beat Ratio (TBR)</b>    |               |      |      |      |   |
| Cell/AWS/PCS                      |               | 61   |      | dBc  | VSWR = 2:1  |
| <b>0.1dB Compression (P0.1dB)</b> |               |      |      |      |   |
|                                   | 21            | 23   |      | dBm  | 500MHz to 3000MHz   |
| <b>Switching Speed</b>            |               |      |      |      |   |
|                                   |               | 160  | 400  | ns   | 50% control to 10%/90%  |
| <b>Control Current</b>            |               |      |      |      |   |
|                                   |               | 0.4  | 1.0  | uA   | $P_{IN} = 15\text{dBm}$   |

| Parameter                         | Specification |      |      | Unit | Condition   |
|-----------------------------------|---------------|------|------|------|---|
|                                   | Min.          | Typ. | Max. |      |   |
|                                   |               |      |      |      | $V_{RF1}, V_{RF2} = \text{High} = 1.8V, V_{RF1} = V_{RF2} = \text{Low} = 0V,$<br>Temp = 25 °C |
| Operating Frequency               | 0.6           |      | 2.5  | GHz  |   |
| <b>Insertion Loss</b>             |               |      |      |      |   |
| RFC - RF1, RFC - RF2              |               | 0.21 | 0.30 | dB   | RF ON, 450MHz   |
|                                   |               | 0.26 | 0.35 | dB   | RF ON, 824 MHz to 960MHz  |
|                                   |               | 0.32 | 0.45 | dB   | RF ON, 1850MHz to 1990MHz   |
|                                   |               | 0.36 | 0.50 | dB   | RF ON, 2170MHz to 2500MHz   |
|                                   |               | 0.70 |      | dB   | RF ON, 5.8GHz   |
| <b>Isolation</b>                  |               |      |      |      |   |
| RFC - RF1, RFC - RF2              | 30            | 32   |      | dB   | RF ON, 450MHz   |
|                                   | 24            | 25   |      | dB   | RF ON, 824 MHz to 960MHz  |
|                                   | 17            | 19   |      | dB   | RF ON, 1850MHz to 1990MHz   |
|                                   | 15            | 18   |      | dB   | RF ON, 2170MHz to 2500MHz   |
|                                   |               | 11   |      | dB   | RF ON, 5.8GHz   |
| <b>Return Loss</b>                |               |      |      |      |   |
|                                   | 19            | 26   |      | dB   | 500MHz to 3000MHz   |
| <b>0.1dB Compression (P0.1dB)</b> |               |      |      |      |   |
|                                   | 7             | 11   |      | dBm  | 500MHz to 3000MHz   |
| <b>Switching Speed</b>            |               |      |      |      |   |
|                                   |               | 160  | 400  | ns   | 50% control to 10%/90%  |
| <b>DC Supply</b>                  |               |      |      |      |   |
| VRF1 and VRF2 (H)                 | 1.8           | 3.0  | 3.6  | V    |   |
| VRF1 and VRF2 (L)                 | 0             |      | 0.4  | V    |   |
| Control Current                   |               | 0.4  | 1.0  | μA   | $P_{IN} = 15 \text{ dBm}$   |

## Control Logic

|                | 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* |         |

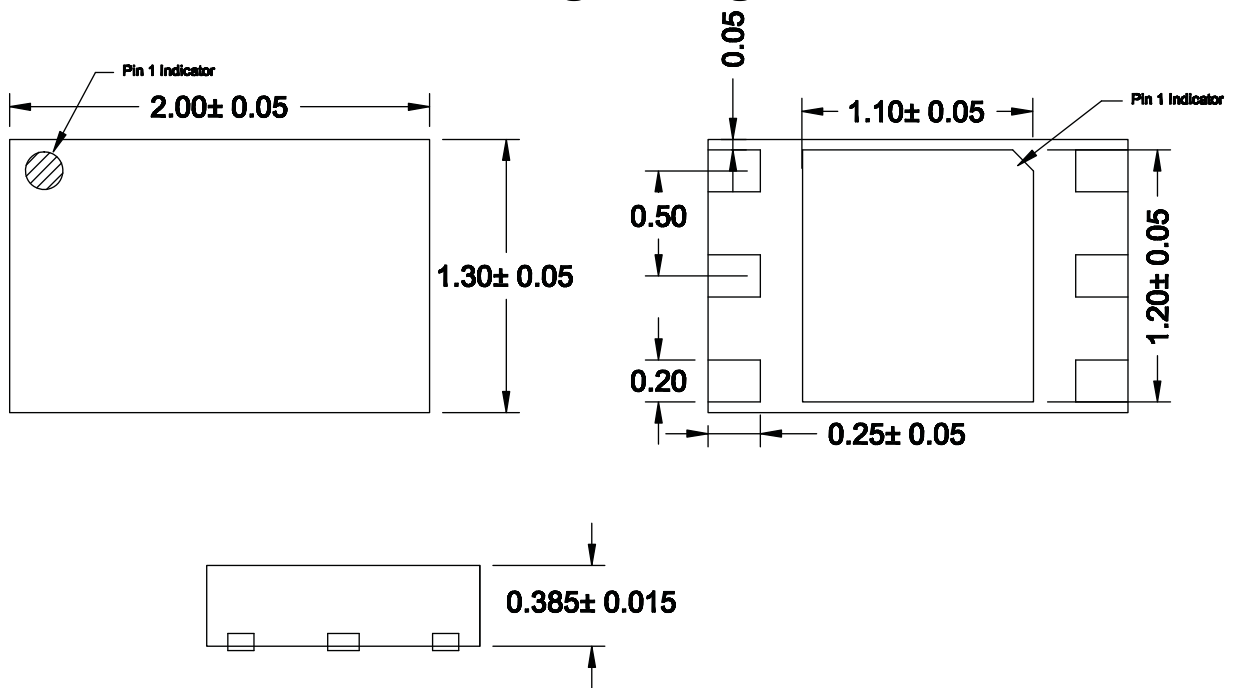
0: Logic level low, 0V~0.4V

1: Logic level high, 1.8V~3.6V

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

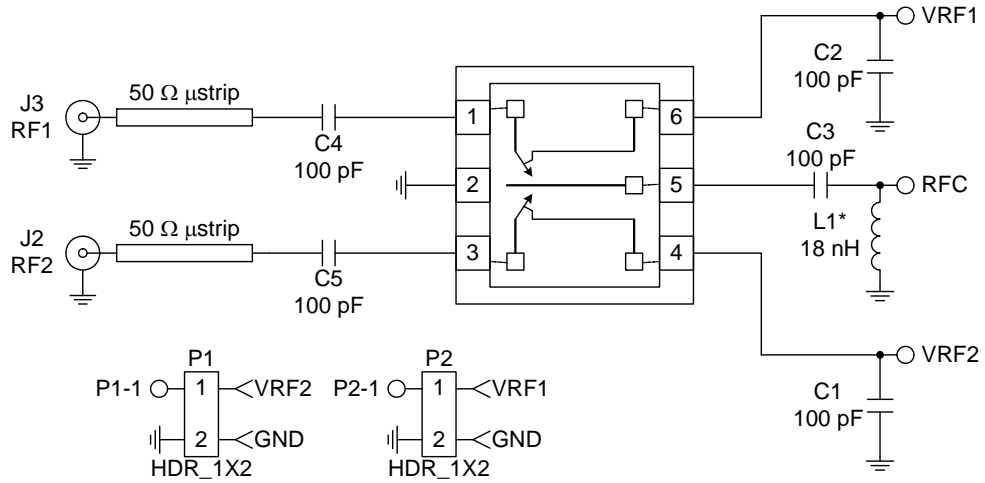
| Pin      | Function | Description |
|----------|----------|-------------|
| 1        | RF1      | RF Port 1.  |
| 2        | GND      | Ground.     |
| 3        | RF2      | RF Port 2.  |
| 4        | VRF2     | Control 2.  |
| 5        | RFC      | Antenna.    |
| 6        | VRF1     | Control 1.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

### Package Drawing



1) PIN 1 INDICATOR SHADED AREA  
Notes:

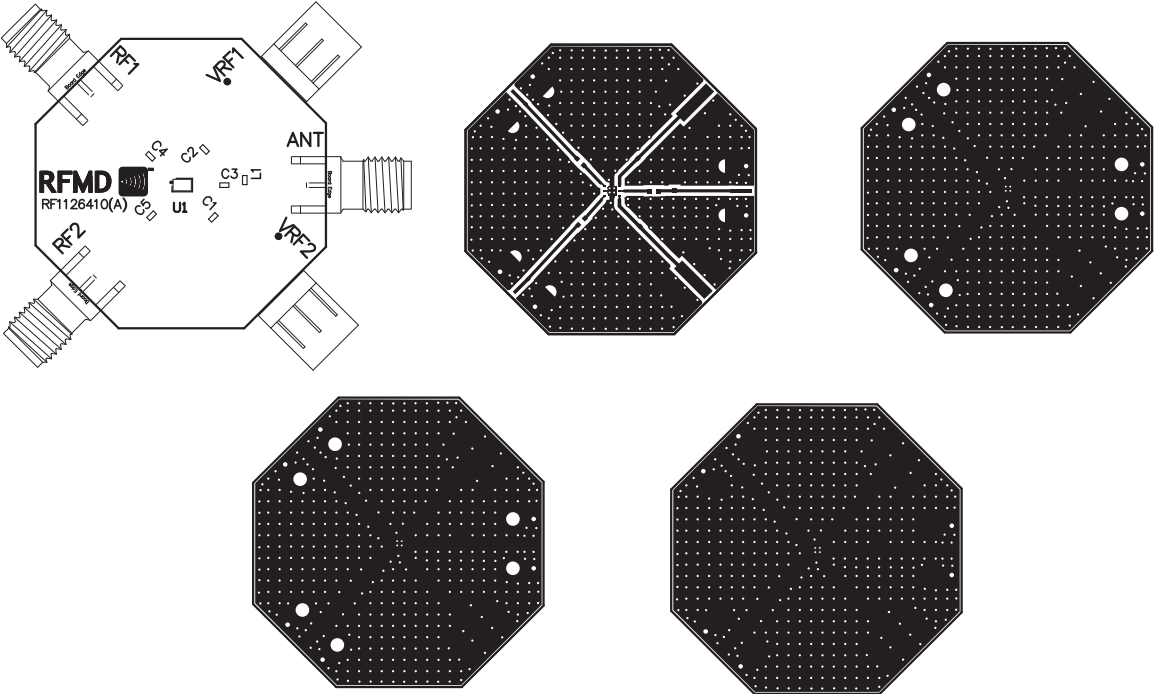
Evaluation Board Schematic



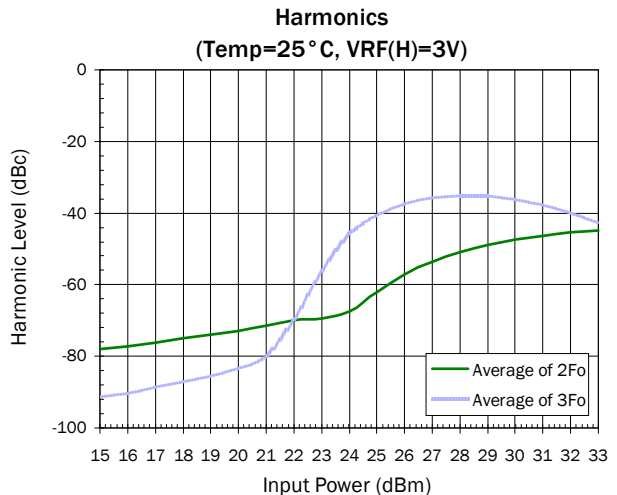
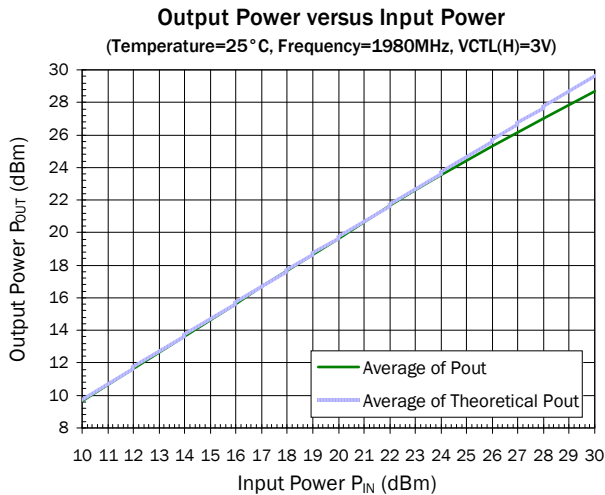
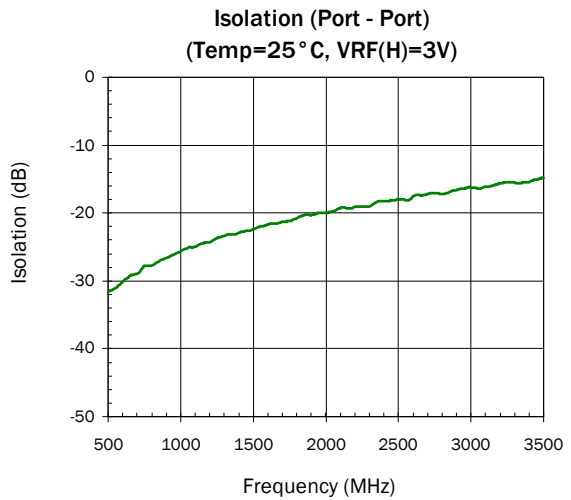
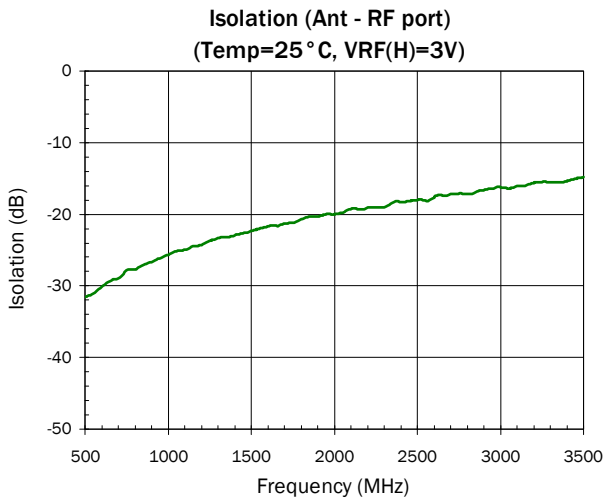
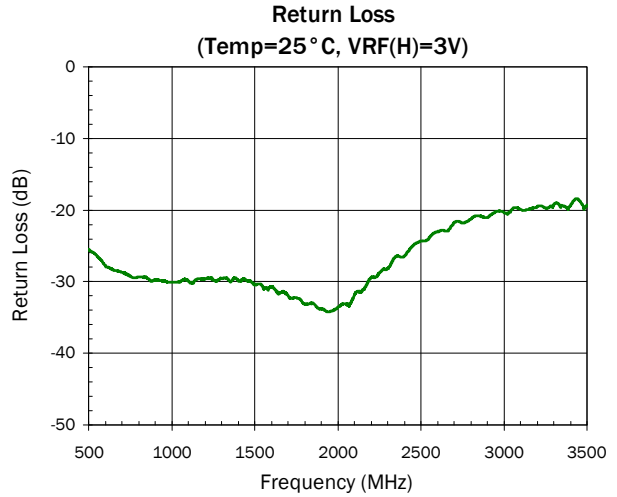
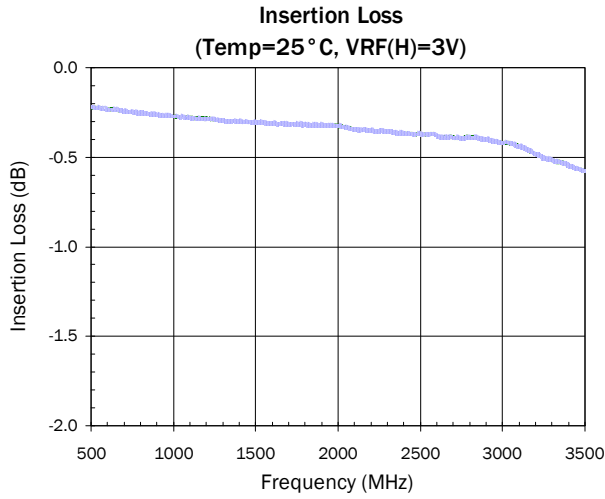
\*L1 is optional for IEC61000-4-2 ESD protection.

## 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, VRF1=VRF2=High=3V VRF1=VRF2=Low=0V)







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