



CAN1114 SP4T Switch

Product Datasheet

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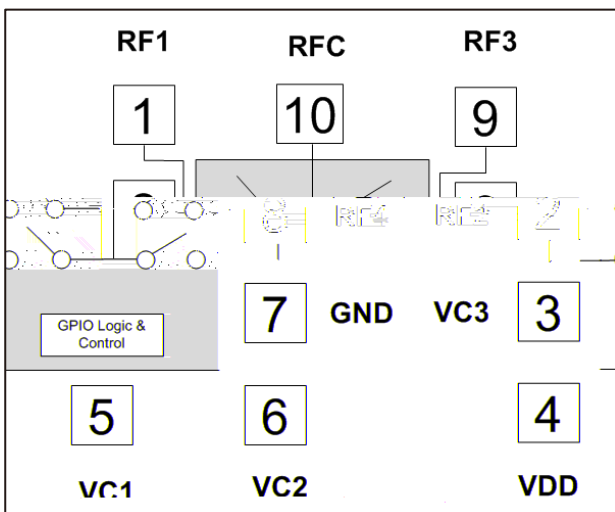
CAN1114

Single Pole Four Throw Switch

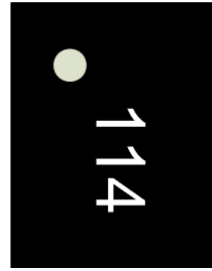
General Description

The CAN1114 is a very low insertion loss SP4T antenna switch specifically designed for high performance antenna tuning application. All RF path performances are enhanced with an ultra-low on state resistance and low off state capacitance. It allows the creation of advanced tuning topologies to maximize TRP and TIS performance in space constrained applications.

The antenna switching is controlled by GPIO configuration, namely three logic control voltage inputs (VC1, VC2 and VC3). Depending on the logic voltage level applied to the control pins, the RFC pin is connected to one of four switched RF outputs (RF1 to RF4). The negative voltage generator enables less parasitic switch capacitance, therefore yielding better isolation and less insertion loss.



Functional Block Diagram



Package

- Standard QFN Package
- 10-pin
- 1.1mmx1.5mm x0.5mm

Features

- Broadband Frequency Range: 0.1 to 3.0 GHz
- Low On-resistance 1.1
- Low Coff 0.18pF
- Off Ports with Open Type Configuration
- 2.5 to 4.8V Supply Voltage Range
- Integrated Logic

Applications

- Antenna Tuning
- Band Switching
- Impedance Tuning

Electrical Specifications

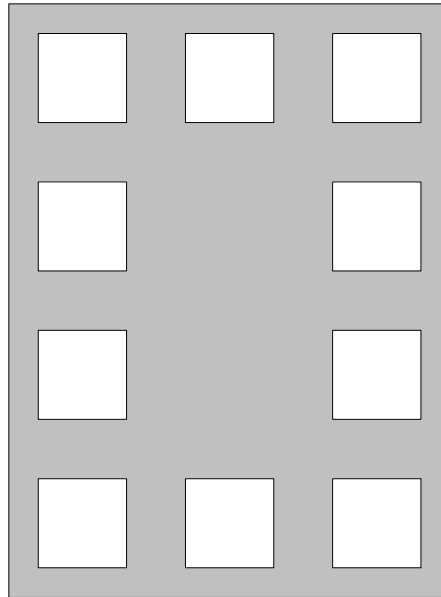
| Parameter | Specification | | | Unit | Conditions |
|--|---------------|------|-----|---------|-------------------------------------|
| | Min | Typ | Max | | |
| RF Performance | | | | | $V_{DD} = 2.85V, V_C = 0/+1.8V.$ |
| Insertion loss (RFC pin to RF1/2/3/4 pins) | | 0.22 | | dB | 700 915 MHz |
| | | 0.37 | | dB | 915 1910 MHz |
| | | 0.59 | | dB | 1910 2700 MHz |
| Isolation (RFC pin to RF1/2/3/4 pins) | | 22 | | dB | 700 915 MHz |
| | | 17 | | dB | 915 1910 MHz |
| | | 15 | | dB | 1910 2700 MHz |
| Input return loss (RFC pin to RF1/2/3/4 pins) | | 21 | | dB | 700 915 MHz |
| | | 15 | | dB | 915 1910 MHz |
| | | 13 | | dB | 1910 2700 MHz |
| R_{ON} | | 1.1 | | | @100MHz |
| Coff | | 0.18 | | pF | @100MHz |
| Start-up Time | | 10 | | μs | V_{DD} from 0V to 90% final value |
| ON Switching speed | | 10 | | μs | 90% final value |
| OFF Switching speed | | 10 | | μs | 90% final value |
| Second Harmonic | | -68 | | dBm | 915 MHz, Pin = 26dBm |
| Third Harmonic | | -86 | | dBm | |
| Second Harmonic | | -77 | | dBm | 1910 MHz, Pin = 26dBm |
| Third Harmonic | | -86 | | dBm | |



Control Logic Table

| Logic State | VC1 | |
|-------------|-----|--|
|-------------|-----|--|

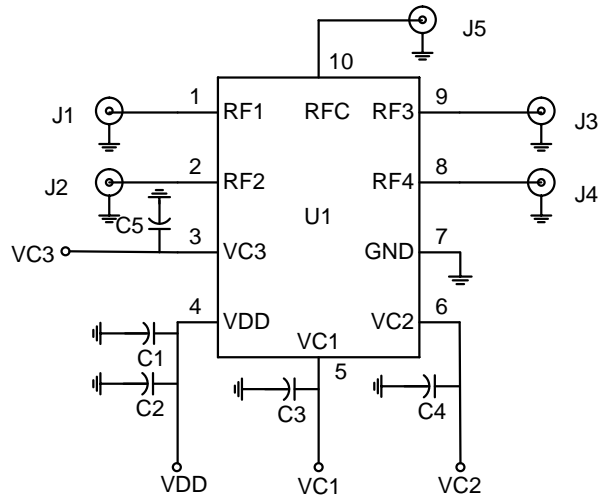
Pin Out



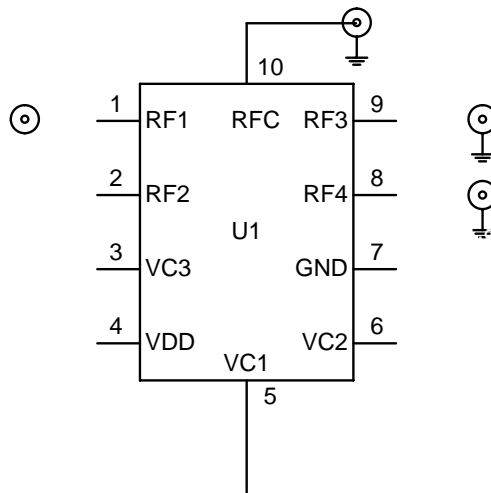
Pin Names and Descriptions

| Pin | Name | Description |
|-----|------|--------------------|
| 1 | RF1 | RF port 1. |
| 2 | RF2 | RF port 2. |
| 3 | VC3 | Control Voltage 3. |
| 4 | VDD | Voltage Supply. |
| 5 | VC1 | Control Voltage 1. |
| 6 | VC2 | Control Voltage 2. |
| 7 | GND | Ground. |
| 8 | RF4 | RF port 4. |
| 9 | RF3 | RF port 3. |
| 10 | RFC | RF common port. |

Evaluation Board Schematic



Application diagram with 8 modes

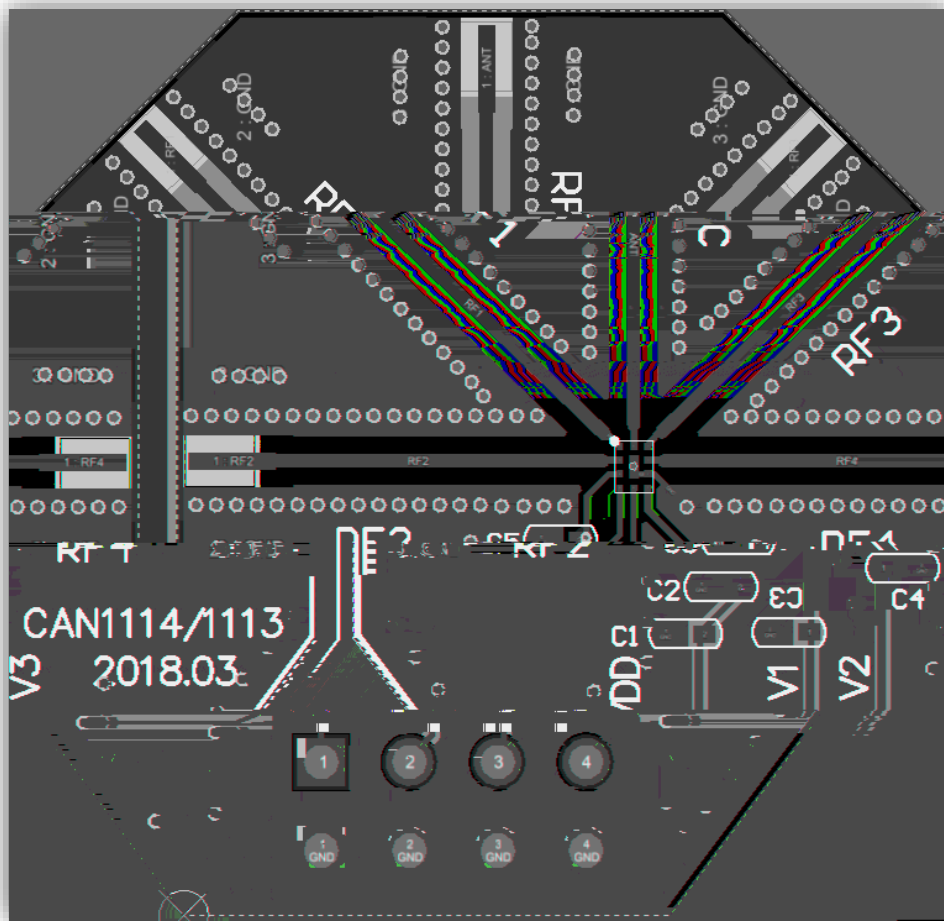


EVB BOM List

| Part Number | Part | Part Description |
|----------------|------------------|---------------------|
| U1 | CAN1114 | CAN1114,SP4T switch |
| J1,J2,J3,J4&J5 | SMA connector | |
| C1,C2,C3,C4,C5 | 0.1u F capacitor | Size:0402 |

Note: DNP components not listed in BOM.

Evaluation Board Layout



EVB Layer Information

| | | |
|----------------------|----------------|-----------------------|
| $\pm 0.1590^{\circ}$ | LAY1 1 OZ | |
| | .008 | MATL. TYPE Rogers4003 |
| | LAY2 1 OZ | |
| | .042 | MATL. TYPE FR4 |
| LAY3 1 OZ | | |
| .008 | MATL. TYPE FR4 | |
| LAY4 1 OZ | | |

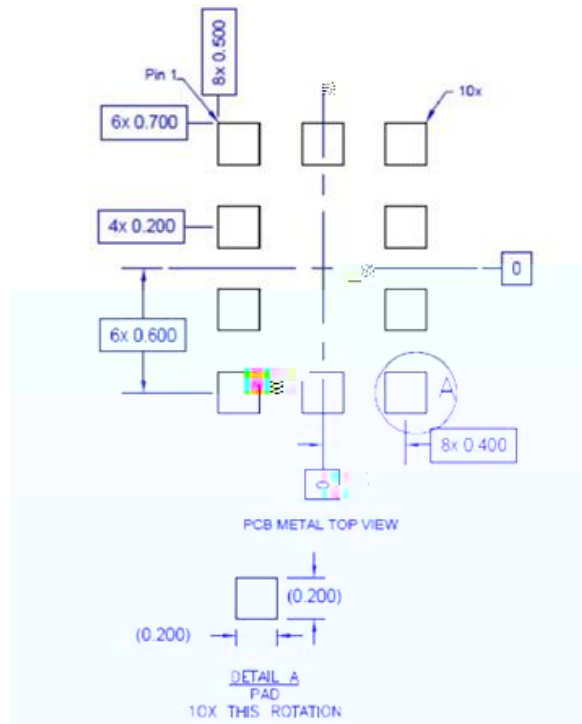


Package Outline and Branding Drawing(Dimensions in millimeters)

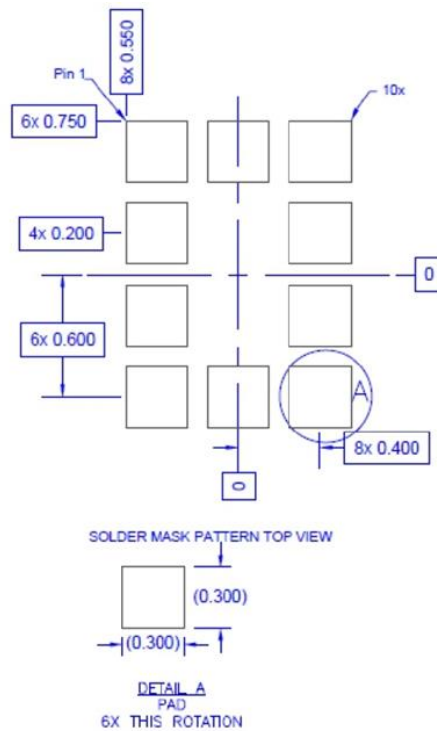
| | MILLMETER | | |
|--------|-----------|------|------|
| SYMBOL | MIN | NOR | MAX |
| A | 0.45 | 0.5 | 0.55 |
| A1 | 0 | 0.02 | 0.05 |
| b | 0.15 | 0.2 | 0.25 |
| e | 0.40BSC | | |
| D | 1.50BSC | | |
| E | 1.10BSC | | |
| L | 0.15 | 0.25 | 0.25 |
| L1 | 0.05 | | |
| aaa | 0.05 | | |
| bbb | 0.07 | | |
| ccc | 0.1 | | |
| ddd | 0.05 | | |
| eee | 0.08 | | |

PCB Design Requirements

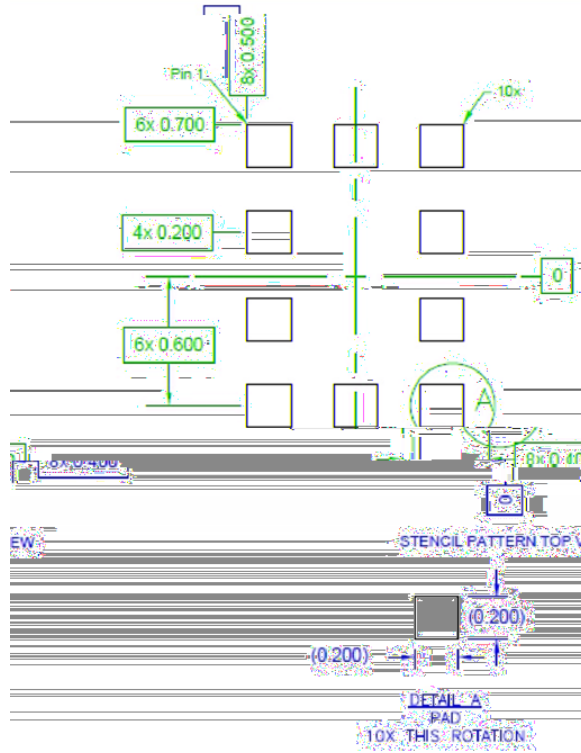
PCB Metal Land Pattern



PCB Solder mask Pattern



PCB Stencil Pattern



Timing Diagram

Power ON and OFF sequence

It is very important that the user adheres to the correct power-on/off sequence in order to avoid damaging the device. The control signals VC1, VC2 and VC3 should be set to 0V unless VDD is set in the operating voltage range.

Power ON

- 1) Apply voltage supply VDD
- 2) Set Controls - VC1, VC2 and VC3
- 3) Wait 15

Change switch position from one RF port to another

- 1) Remove RF
- 2) Change control voltages VC1, VC2 and VC3 to set the switch to desired RF port
- 3) Wait 7

Power OFF

- 1) Remove RF
- 2) Remove control voltages VC1, VC2 and VC3
- 3) Remove VDD

