

**μPG2150T5L-EVAL-A**

**Evaluation Board**

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## **Description:**

The uPG2150T5L-EVAL-A evaluation board provides a quick and convenient means of evaluating the performance of the NEC uPG2150T5L switch. In addition to the device, the board provides DC block capacitors, power supply bypass capacitors, and RF and DC connectors.

A DC block capacitor is required at all RF ports. On this board, two parallel capacitors of 22pF are used for this purpose. This configuration minimizes the mismatch effect associated with the serial capacitors over a wide frequency range. In a real application where the operation frequency range is relatively narrow, one DC block capacitor usually is sufficient. The user should select the appropriate capacitor value according to the operation frequencies and the type of capacitor selected. Generally the performance of the switch circuit is not sensitive, to a certain extent, to the value of DC block capacitors.

A 1000pF DC bypass capacitor is used on all control lines. For high speed applications the user may choose smaller capacitance or no capacitor at all.

### **DC supply connectors:**

P1 is control voltage  $V_{cont1}$ , P2 is  $V_{cont2}$ , P3 is  $V_{cont3}$ , and P4 is the ground.  $V_{cont1}$ ,  $V_{cont2}$  and  $V_{cont3}$  should be connected to separate power supplies to provide the required control logic.

### **RF connectors:**

As indicated on the board, J1 is connected to the RF1 port, J2 is connected to the RF2 port, J3 is connected to the RF3 port and J4 is connected to the ANT port.

### **Information on Board Material:**

The board material is 20 mil thick Duroid 6002. Its dielectric constant is 2.94.

### **Switch Logic Table:**

The following table lists the logic table for switch states.

| <b>Vcont1</b> | <b>Vcont2</b> | <b>Vcont3</b> | <b>ANT – RF1</b> | <b>ANT – RF2</b> | <b>ANT – RF3</b> |
|---------------|---------------|---------------|------------------|------------------|------------------|
| H             | L             | L             | ON               | OFF              | OFF              |
| L             | H             | L             | OFF              | ON               | OFF              |
| L             | L             | H             | OFF              | OFF              | ON               |

### **Insertion Loss of Through Board:**

In assessing the insertion loss of the switch by measuring S21 of the evaluation board, it is necessary to take into account the loss through the connectors and PCB trace. To this end a through board was characterized to determine the board/connector loss. The table below lists the board loss at different frequencies.

| <b>INPUT FREQUENCY (GHz)</b> | <b>BOARD LOSS (dB)</b> |
|------------------------------|------------------------|
| 0.5                          | 0.12                   |
| 1.0                          | 0.12                   |
| 1.5                          | 0.17                   |
| 2.0                          | 0.23                   |
| 2.5                          | 0.30                   |
| 3.0                          | 0.40                   |

