

HSWA-2-30DR+

Frequently Asked Questions(FAQ)

1. When using the HSWA2-30DR+ is it possible during the switching process to operate under the absolute maximum rating?

Absolute Maximum Ratings define the point at which the unit will operate without failure – however, this does not mean that the part will operate to within specified performance at these levels. In general, it is never good to operate continuously at or near the absolute maximum ratings. These values define the limits of survivability of the part. .

2. What is the noise produced by the HSWA2-30DR+?

The HSWA2-30DR+ has an internal generator producing negative voltage for CMOS circuit. It allows the feeding of these devices from single positive supply voltage source. The noise level of the generator is typically lower than -120dBm.

3. What is the noise figure of the switch?

The NF is approximately equal to the insertion loss of the device.

4. Is it possible for the HSWA2-30DR+ to operate at 3.6V control voltage?

Yes. The HSWA2-30DR+ data sheet specifies maximum rating of supply voltage equal to +4V. However, the data sheet performance is guaranteed when working with V_{DD} supply voltage between 2.7V and 3.3V.

5. What is the input impedance at the Control Port of the switch and can an RC filter be used at the Control Port?

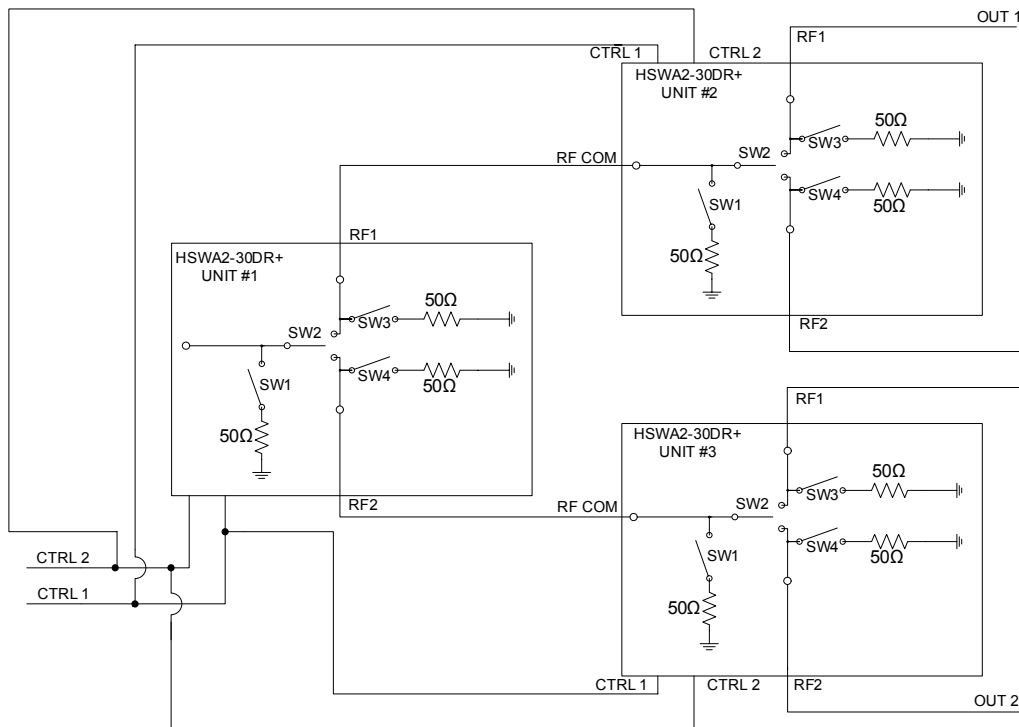
The input impedance of the switch at control port is very high (>100Mohm), therefore the series resistor of the RC filter can be taken within a wide range of values (from 1ohm to 10Mohm) without effecting the switch operation. The capacitor value can be large to filter the noise of the control line at widest frequency range. However, it should be noted that the time constant RxC of the filter should be small enough in order to provide fast switching response for the circuit. According to our datasheet, the switch starts responding when control voltage is 70% of V_{dd} (If $V_{dd} = 3V$, the minimum high control voltage is 2.1V). Output voltage of RC circuit achieves 70% of input voltage at time moment = $1.5xRxC$. The switching of the switch is 2uSec typ. To avoid influence of time delay of the RC filter on switching time of the switch, the $1.5xRxC$ value should be much lower than 2uSec. For example, if we take $R=1Kohm$ & $C=100pF$, then $1.5xRxC = 0.1uSec \ll 2uSec$. In this case, the RC filter does not increase the switching time of the switch. Capacitance and resistance values can be chosen according to system requirements.

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6. What can be done in order to increase isolation?

An approach that is commonly used to improve isolation is to cascade multiple switches in series using common controls.



In the above diagram three HSWA2-30DR+ switches are connected as shown for isolation improvement. The circuit requires only one set of control signals for switching. Please note, when CTRL 1=CTRL 2='0' none of the outputs are selected and the switch is terminated with a 50 Ω resistor. Also – a designer must take care to ensure that the layout of the PCB, DC filtering on the power supply lines and control lines and the surrounding RF environment will support the improved isolation.

7. Do the RF pins require DC blocking?

The HSWA2-30DR+ does not produce any DC voltage at the RF ports if there isn't any DC at RF ports in the system. Therefore, coupling capacitors are not required for such systems. However, for systems with DC, the coupling capacitors are required at all RF ports. A capacitance of 56pF is a good value for frequency range from 500MHz to 3GHz. For lower frequencies the capacitance value should be increased accordingly.

8. What is the purpose of the 10KΩ resistor in parallel with the 100pF capacitor connected to Control 1 and Control 2?

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It is a RC filter for the control signal lines placed on an unshielded Test Board.

9. Is it possible to operate the Switch Control directly from LVTTL (+3.3V supply) without the RC filter?

Yes. If you have clean control signals without any noise or spikes from the environment.

10. Does the HSWA2-30DR+ have an internal negative voltage generator?

Yes. The HSWA2-30DR+ has an internal negative voltage generator which works as a switching regulator. It allows the use of a single positive supply voltage instead of a dual supply voltage. The generator has an operating frequency of approximately 900 KHz.

11. On the HSWA2-30DR+ datasheet the truth table when Control 1 =Control 2 = "High" is written as RF I/O N/A. Can this condition damage the unit?

It cannot damage the unit, but we cannot guarantee any electrical performance including maximum rating during this control condition.

12. I have purchased the HSWA2-30DR+ and I lost the software CD I received with my package. Can you please send me a copy of the software CD?

As you mentioned above the software CD is included in any of Mini Circuits switch purchase. For an additional copy can be downloaded from our web site www.minicircuits.com at http://www.minicircuits.com/downloads/RF_Switch.zip

13. What RF out is selected if the VCC is 0V?

If VCC is 0V the switch is in an undetermined mode where it is not determined which out is selected, if any. MCL cannot guarantee the switch performance under these conditions.