Thin Film Technology Corp.

Application Note for the Thin Film Technology High Frequency Crossover Chip

December 2010

Product Description and Applications:

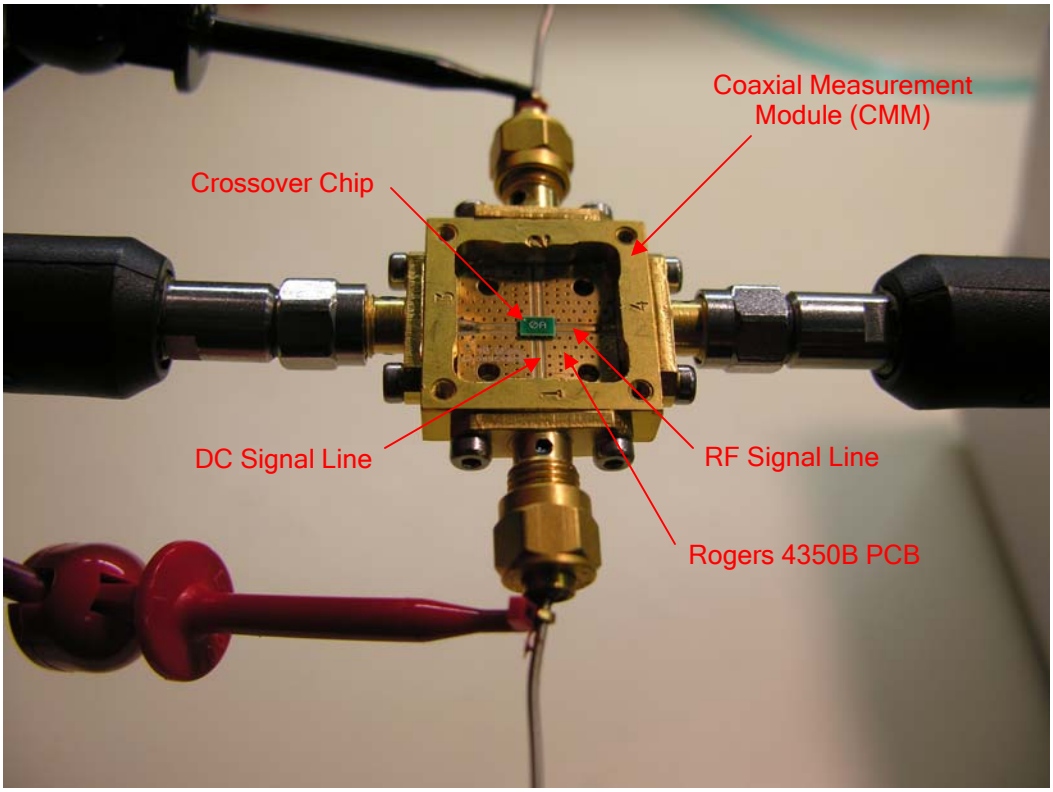
The Thin Film Technology High Frequency Crossover chip is ideal for any application where an RF signal must cross over a DC signal or vice versa. This surface mount component provides excellent signal integrity characteristics beyond 20 GHz with very low signal loss. It allows for circuit routing transitions with traditional BGA manufacturing techniques, on single layer board layouts that normally require significantly more expensive, multi-layer, RF and microwave PCB manufacturing or RF cabling assemblies.

This application note will illustrate the integrity of the signal while crossing an RF signal over a DC signal and also a DC signal crossing over an RF signal.

Test Conditions:

Mounting:	Parts were mounted on a Rogers 4350B PCB and evaluated using Coaxial Measurement Module (CMM) #1057.
DC Source:	Keithley 2400 Source Meter with DC power set to 2 watts.
RF Source:	HP8722D Vector Network Analyzer (VNA).
Test Duration:	10 minutes

Picture of Test Measurement Setup:



Link to 20GHz Product Datasheet: http://www.thin-film.com/uploadedcontent/documents/XO02M610-00.pdf

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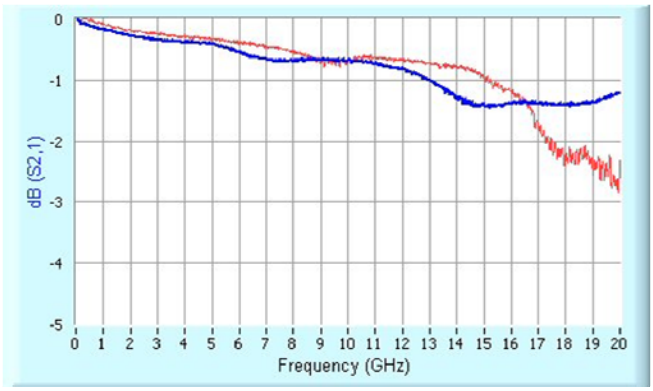
Test Results:

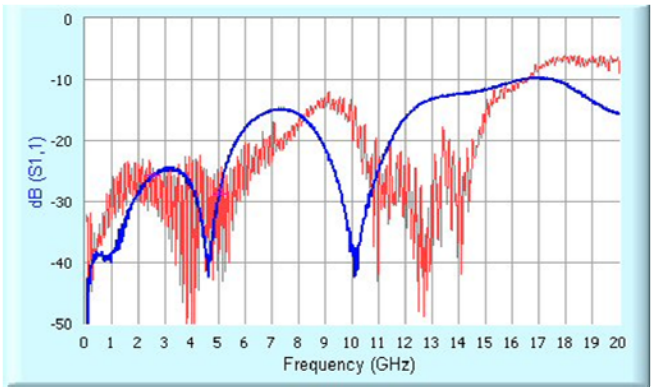
Note: The test fixture used for all measurements shown below was not de-embedded. De-embedding of the test fixture would improve the results even further.

RF Signal Crossing Over DC Signal:

When the RF signal crosses over the DC signal, the RF signal shows a loss of 1dB at around 15 GHz and 2.7dB at 20 GHz. Plots 1 and 2 below show the insertion loss and the return loss of the RF signal passing through the crossover device and over the DC signal. In the plots below, the blue colored lines represent a control signal where the RF signal is going through the crossover chip and the measurement device, but is not crossing over a DC signal. The red colored lines represent the test signal where the RF signal is going through the crossover chip and measurement device and is crossing over the DC signal.



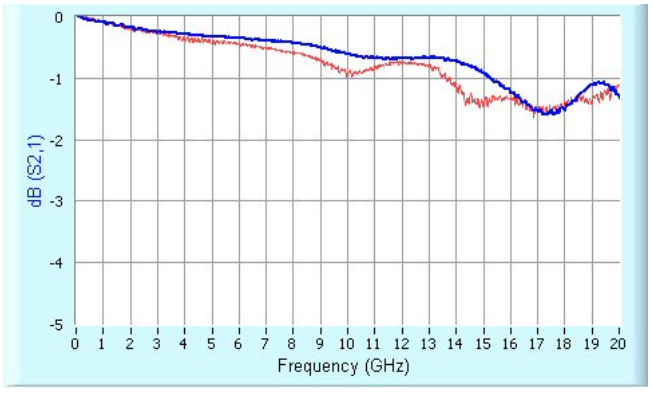
Plot 1 - Insertion Loss plot of an RF signal crossing over a DC signal



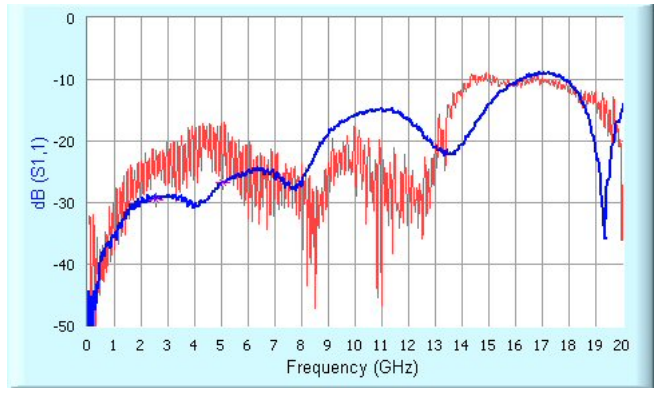
Plot 2 - Return Loss plot of an RF signal crossing over a DC signal

DC Signal Crossing Over RF Signal:

When the DC signal crosses over the RF signal, the DC signal shows a loss of 1dB up to 20GHz. Plots 3 and 4 below show the insertion loss and the return loss of the RF signal while the DC signal is passed through the crossover device and over the RF signal line. In the plots below, the blue colored lines represent a control signal where the RF signal is going through the measurement device but is not being crossed over by a DC signal. The red colored lines represent the test signal where the DC signal is going through the crossover chip and measurement device and is crossing over the RF Signal.



Plot 3 - Insertion Loss plot of an RF signal with a DC signal being crossed over the RF signal via the crossover device



Plot 4 - Return Loss plot of an RF signal with a DC signal being crossed over the RF signal via the crossover device

Conclusion:

The measurement results illustrate that the crossover device is effective in keeping both signals significantly isolated. Each signal generates very little influence on the other signal.