

AN132

Using the Network Analyzer as a Grid Dip Oscillator

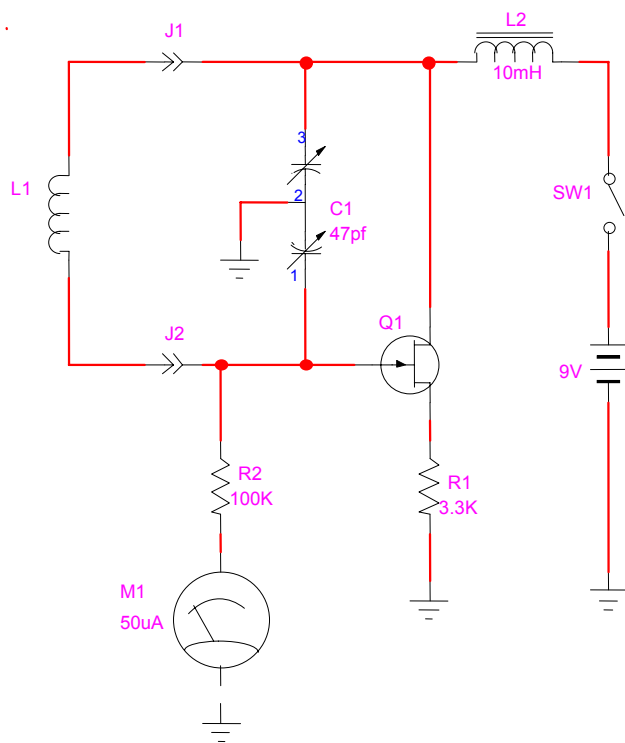
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Abstract:

This paper explains how to use a network analyzer (NA) as a grid dip oscillator (GDO).

Introduction:

The GDO originally used a triode vacuum tube configured as an oscillator, with a sensitive DC current meter measuring its grid current. Most versions found today are solid state (JFET) and have no grid (or grid current), but the name has stuck. This schematic shows an example of a GDO.



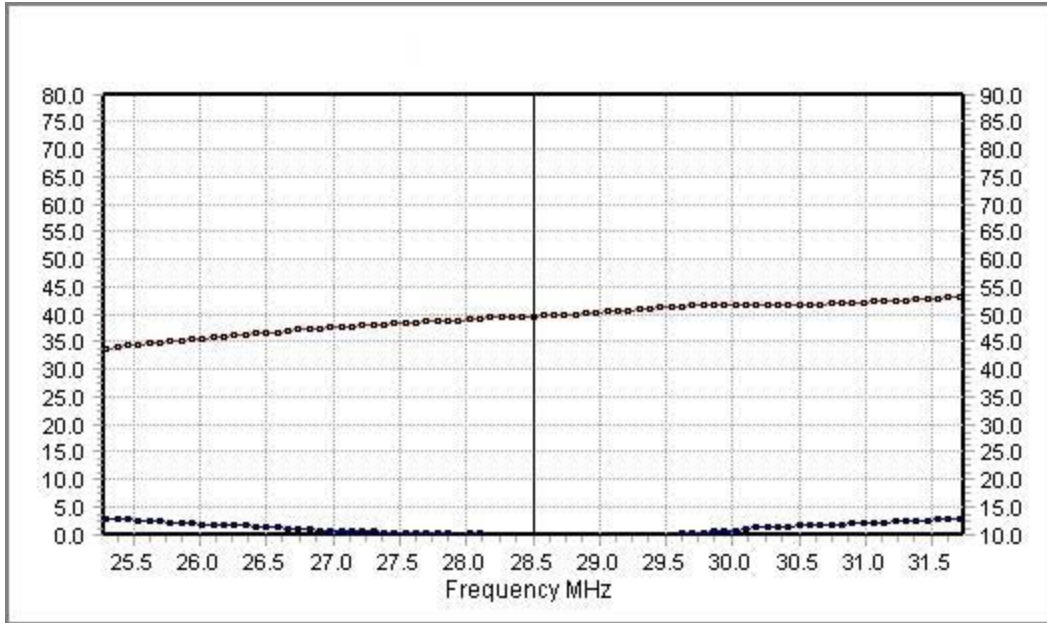
In this circuit, L1 resonates with C1, creating an oscillation. In operation, the RF energy in L1 couples into a tuned circuit under test. When the circuit under test absorbs energy from L1, the gate current in Q1 drops, causing the needle on M1 to dip. L1 plugs into the circuit because GDOs come with a set of inductors to cover several bands of frequencies.

Discussion:

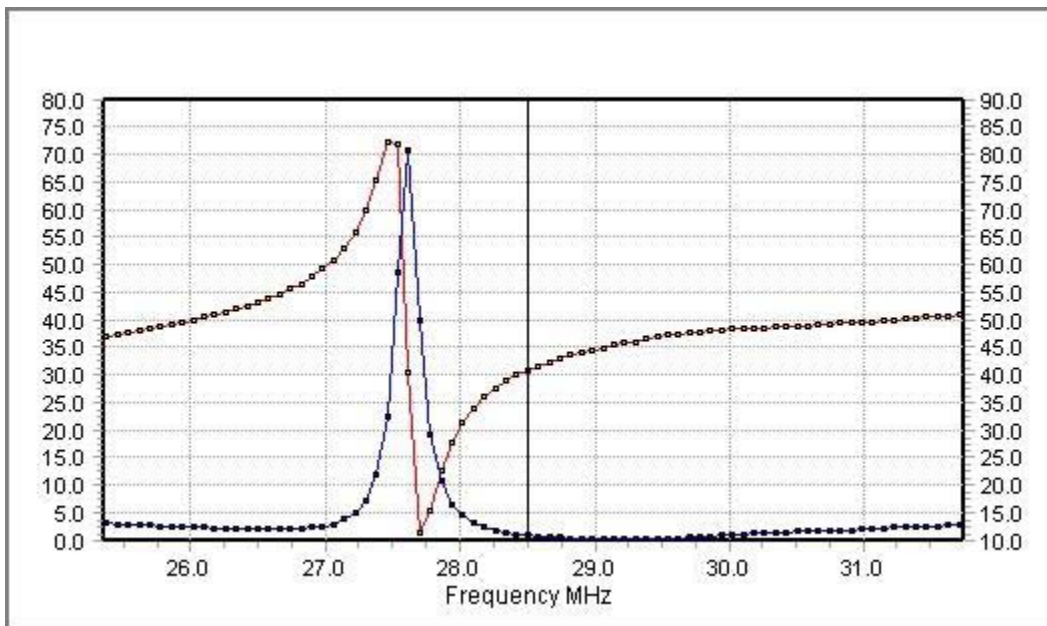
A network analyzer normally has neither a meter nor an external coil for an oscillator. To get the network analyzer to operate like a GDO, we try to couple the S11 port of the network analyzer to the circuit under test and look for a shift in the impedance level. As with any GDO, there must be a strong coupling between the instrument and the load to get a noticeable “dip”. Use a wire loop probe mounted to the end of a coaxial cable to couple the network analyzer to the circuit under test. The exact design of the loop depends on the frequency range of interest. Try to make the loop with a Z of 30 to 70 ohms for best results. Since this application requires strong coupling, the shape factor of the loop depends on physical properties of the circuit under test.



Network Analyzer with GDO Sensing Loop



Resistance and Reactance of Sensing Loop, Uncoupled



Resistance and Reactance of Sensing Loop, Coupled into Resonant Circuit

Conclusion:

A network analyzer may be used in a manner similar to a GDO.