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IRF510

3–4 minutes

The IRF510 Module has several component parts and includes an Input Matching circuit, an Output Matching Circuit, a Bias Circuit and some power source decoupling. In my designs I have the Drain connected to 12 VDC at all times as this avoids "hot switching" of the drain supply when you go to transmit. Without bias applied the current draw is miniscule. It is the Bias circuit that is turned on when you go to Transmit.

For a bias circuit I have moved past the 5.1 Volt Zener and use a real three terminal regulator such as the 78L05 which is bypassed at the input and output. This is just another measure to insure power supply decoupling. The bias voltage is fed to a 10K pot with the center wiper supplying the bias voltage to the Gate. The wiper connection is bypassed with a 100NF cap and the actual bias voltage is fed to the Gate through a resistor. In some designs (which I have used) the resistor is often 50 Ohms so that with the 100NF providing an AC ground the gate thinks the input is at 50 Ohms. Recently I have reverted to a different approach where the series resistor is now 10K and on the input side of the coupling capacitor to the Gate

I install a 50 Ohm resistor. My reasoning is to provide a constant resistive load to the upstream driver circuit and to force the input to the Gate to see 50 Ohms. I think I saw this approach in a W7ZOI design called "The HexFet Amplifier". My experience so far has indicated this works.

A word here about circuit layout. Earlier I mentioned about cutting off the Drain pin. Keeping in "In's from the Out's" is critical in any amplifier stage. So often when I get emails about a problem with the IRF510 oscillating --it is a layout issue. Look closely at the photos and make your layout look the same.

First a construction note: The PCB used to build this amp was the cut off from the the 30M CW XCVR front panel and the back panel has been used on several other transceivers. So this is recycling what I had. The red wire makes 4 turns thorough a sleeve Type 43 core and this lead is connected at all times to 12 VDC. In the upper left hand corner is the three terminal regulator and voltage is supplied to the Bias circuit as part of the TR relay system. The large pad on the right hand side mid section connects to RG174/U and on to the Low Pass Filter. The PCB is roughly 4 inches long and about 1.5 inches wide. You will also see the output transformer is connected to the IRF510 Tab. Also note the two 100 Ohms resistors in parallel on the input pad that provide "Swamping" to the RF input and helps stabilize the amplifier. The back panel is the heat sink and I used the insulator kit. You should too!

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