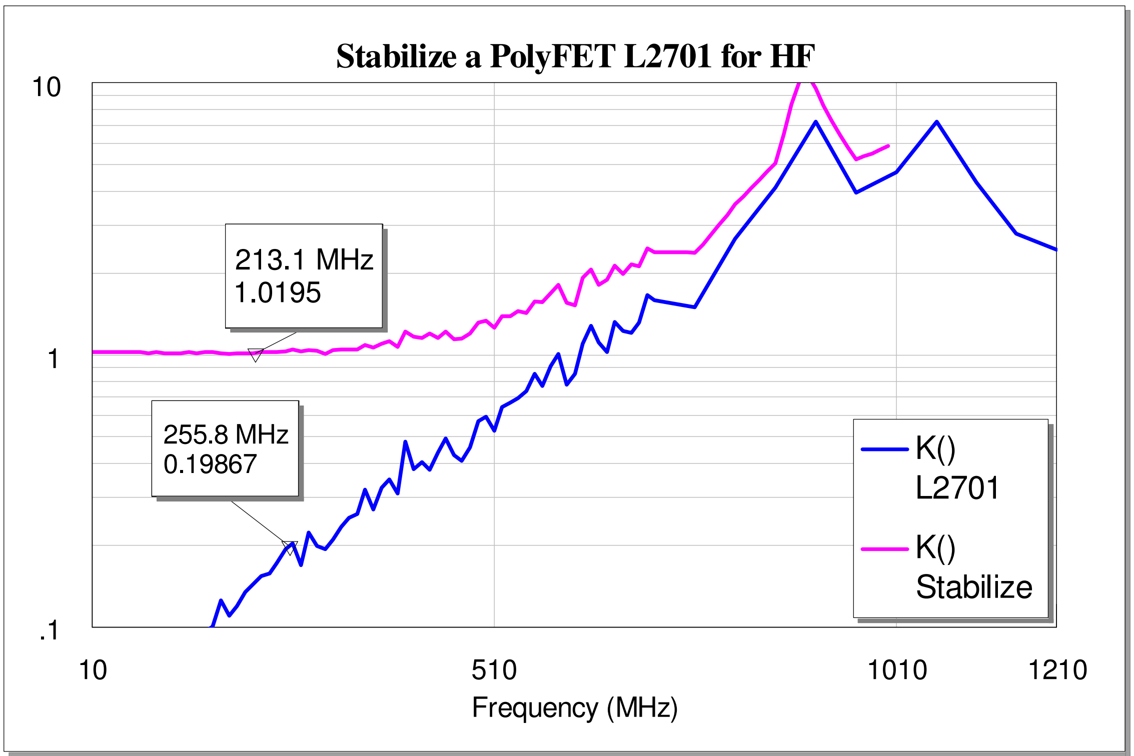
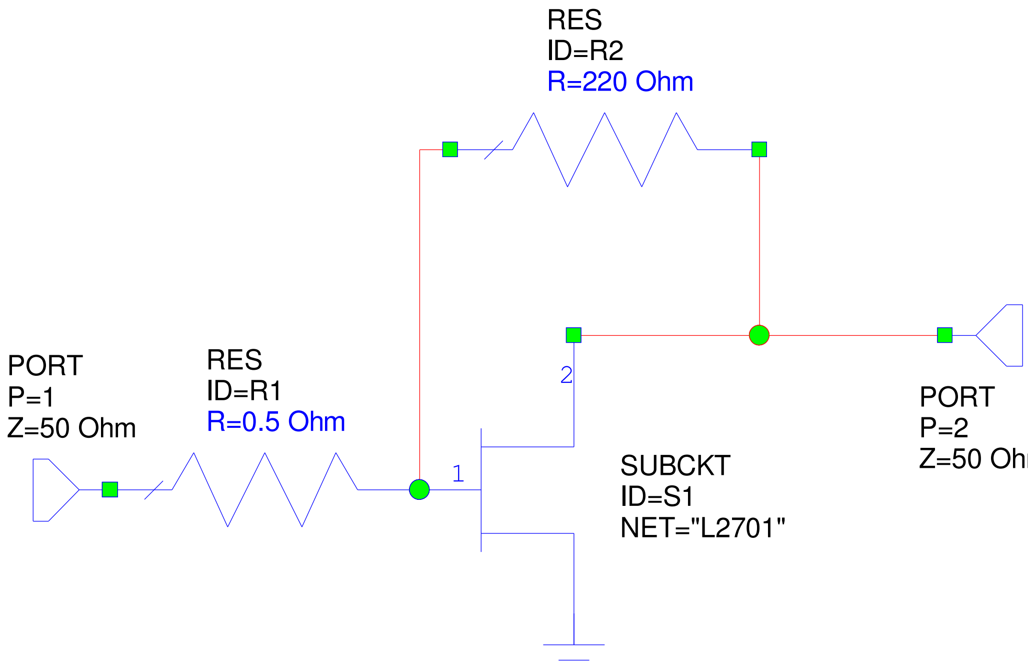
Here is an example of a LDMOS FET from PolyFET Corporation. They are kind enough to provide S data and a Spice model for their FETs. So this provides a nice vehicle to illustrate the challenge of applying these devices to HF. **A stability value** know as the **K** factor is readily calculated from the S data.

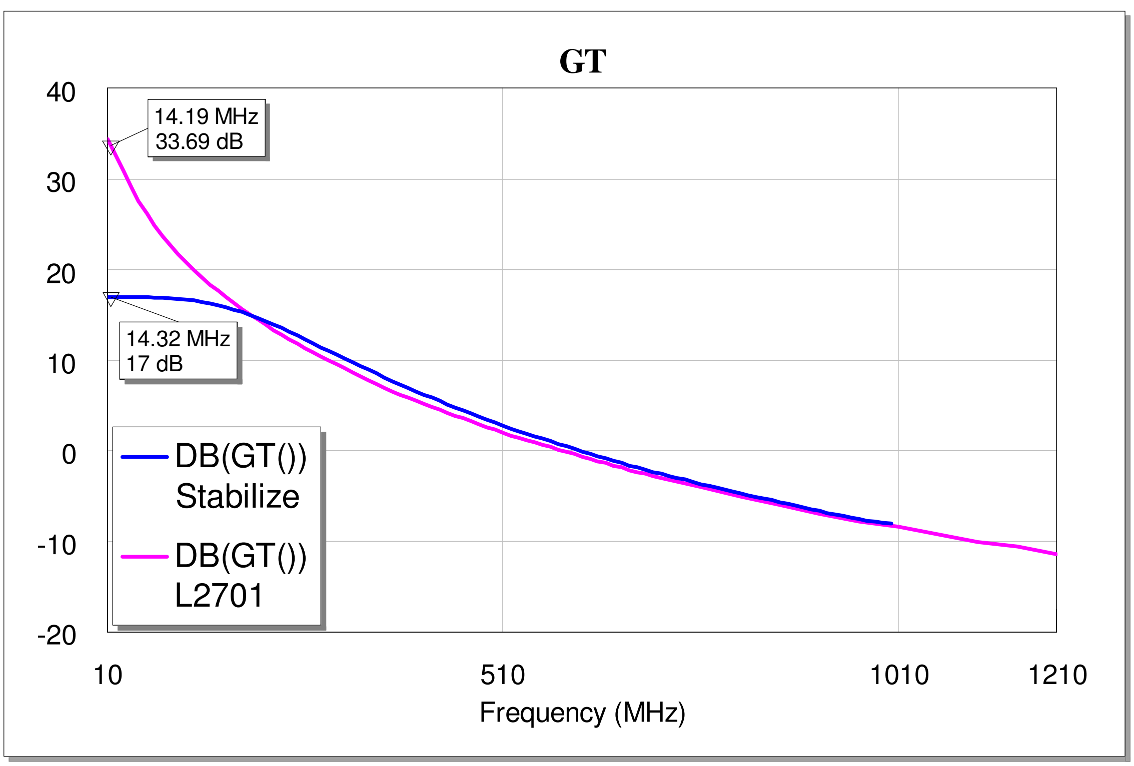


Although the program used here is a commercial simulator, you can run the same case analysis on a hand calculator or write the routine in an XCELL spreadsheet. The **K factor** which is plotted on the Y axis must be greater than unity. If that is the case, then we have the possibly of stabilizing the device. This in itself is no guarantee for several reasons, but it is a reasonable first start. In the BLUE trace it is clear this device alone with no feedback operating in the HF band is a real headache. However, adding simple feedback, shown in the next figure provides promise. Note the PINK trace is above unity down to a frequency of 10 MHz. The feedback for this device is provided in the next figure. In this case a drain to gate connection of a 220 ohm resistor and a small series gate R of just 0.5 ohm is added. The 0.5 ohm most likely provided for free since the input components are to some extent lossy.

Stabilize a LDMOS Device for HF Operation... an Example



The tradeoff for this stability is to reduce the gain from 34 dB down to 17, nearly a 50 % loss. However, for this case a very equitable trade.



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