

The PGA-103+ is a monolithic amplifier for the 50-4000 MHz range with excellent Noise Figure and a high dynamic range (1dB compression point: 22.5 dBm and ultra-high OIP3, 44 dBm typ. @ 2GHz).

Due to the intrinsic nature of the GaAs PHEMT, it is not unconditionally stable (stability factor $k > 1$ and stability measure $B > 0$) as $k < 1$ for frequencies under 100MHz.

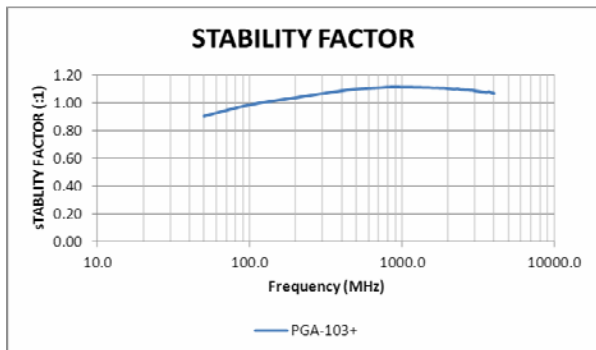
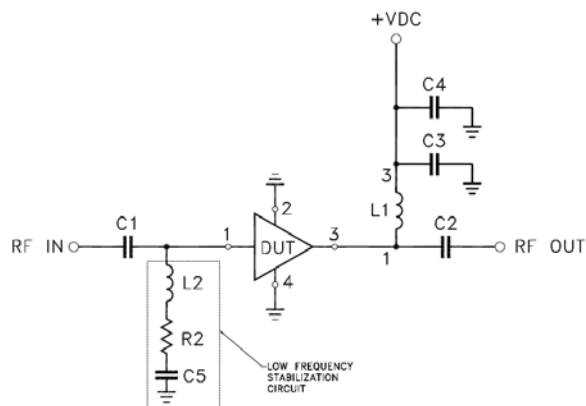


Figure 1 - PGA-103+: stability factor

In order to improve stability additional components need to be added at input, see Figure 2 and associated component values in Table 1.



Component	Value
DUT	PGA-103+
C1,C2	0.01 μ F
C3	0.33 μ F
C4	10 μ F
C5	330 pF
R1	Not Used
R2	150 Ω
L1(RF-Choke)	Mini Circuits TCCH-80+
L2	620nH

Figure 2: Stabilization Circuit (Ref: TB-761-103+)

The stability parameters of the amplifier with the stabilizing network are shown in Figure 3. Note: $k > 1$ and $B > 0$ over entire range.

The performance of the stabilized amplifier:

Performance with and without stabilization is shown in Figures 3 to 11

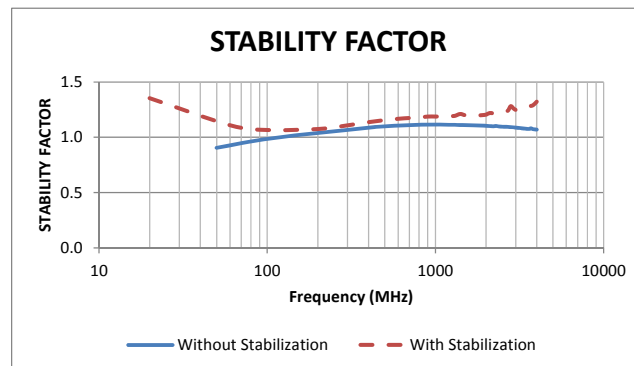


Figure 3 – Stability Factor (k-factor)

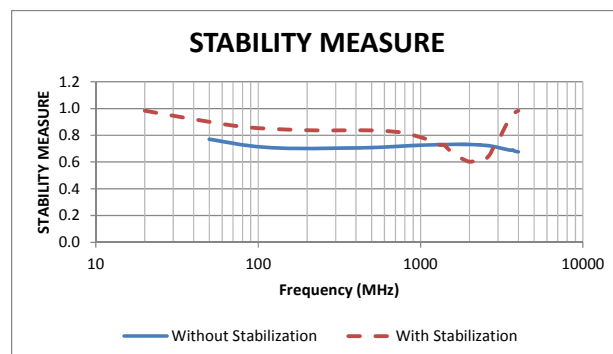


Figure 4 –Stability Measure

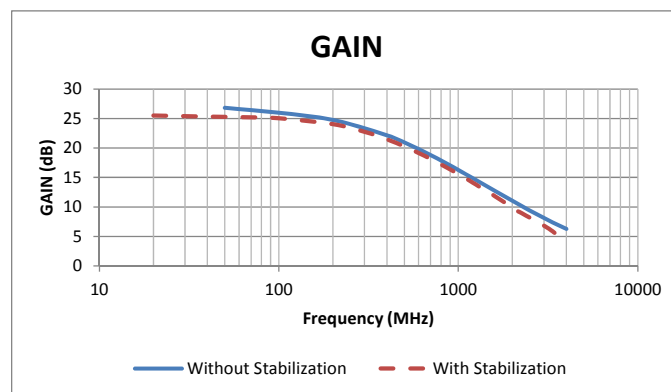


Figure 5 – Gain

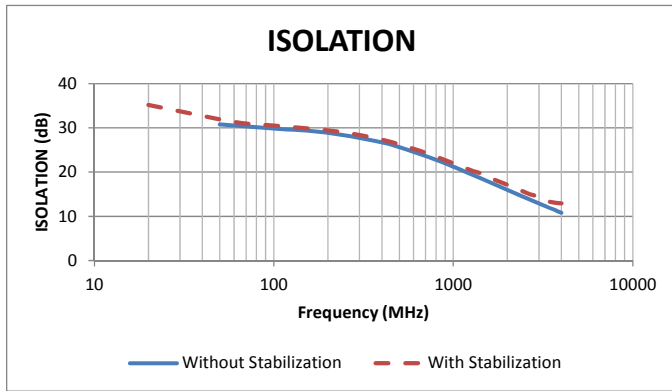


Figure 6 – Isolation

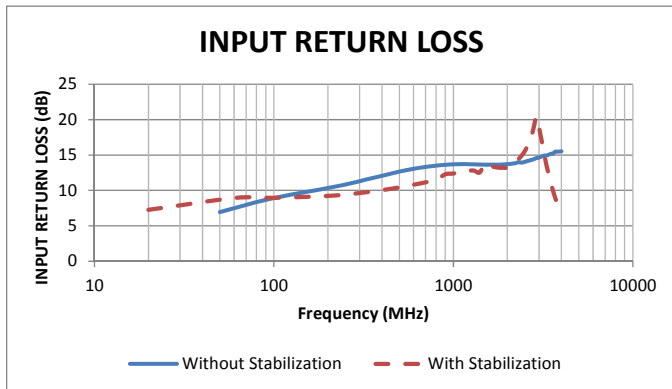


Figure 7 - Input Return Loss

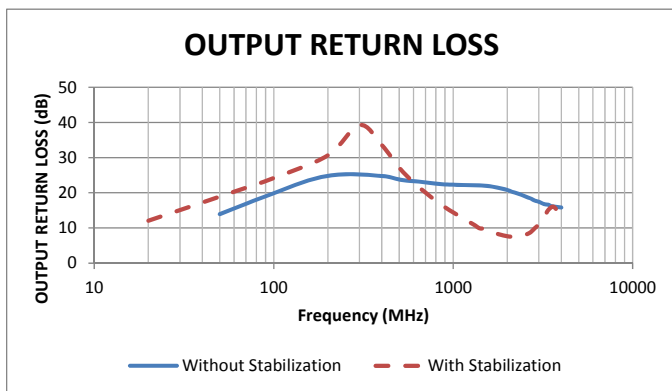


Figure 8 - Output Return Loss

Conclusion:

- Use of the stabilization circuitry has minor impact on all parameters.
- The use of the stabilization circuitry guarantees amplifier’s unconditional stability.

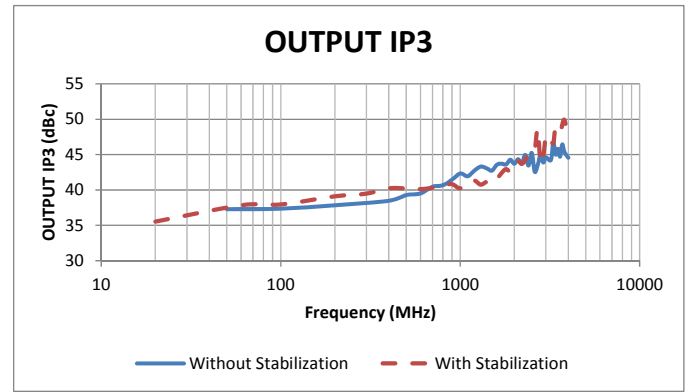


Figure 9 - Output IP3

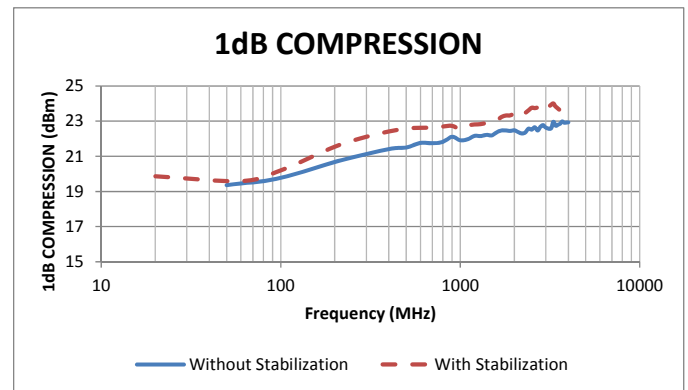


Figure 10 – Output power @ 1dB compression\

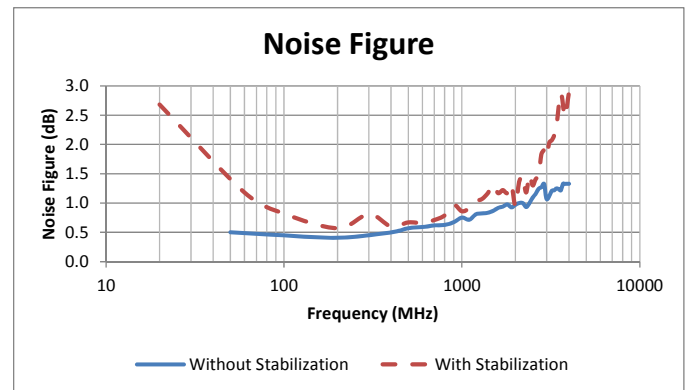


Figure 11 Noise Figure

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