

MMIC'S ON GALLIUM ARSENIDE DEVELOPED IN THE INSTITUTE OF ELECTRONIC MATERIALS TECHNOLOGY

Lech Dobrzański, Wiesław Marciniak

INSTITUTE OF ELECTRONIC MATERIALS TECHNOLOGY

ul.Wólczyńska 133, 01-919 Warszawa, Poland

Two microwave monolithic integrated circuits on gallium arsenide were designed, manufactured and investigated. The circuits exhibit good microwave and pulse performance.

Basic MESFET technology comprising selective ion implantation, rapid thermal processing, plasma enhancement chemical vapor deposition, multilayer metallization and submicron lithography was developed in 1989 - 1990.

In 1991 two MMIC's were designed, produced and investigated :

- 1) The feedback amplifier
- 2) The NOR gate

The amplifier in the classic arrangement [1] presented in fig.1 was fabricated using proprietary MESFET technology.

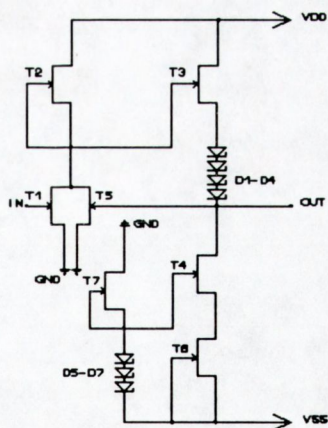


Fig.1

The single amplifying stage in common source arrangement is followed by noninverting source-follower output stage. The feedback FET provides gain-bandwidth exchange.

The amplifier circuit performance was simulated and verified experimentally. The fit of computed DC transfer characteristic to experimental data is presented in fig.2.

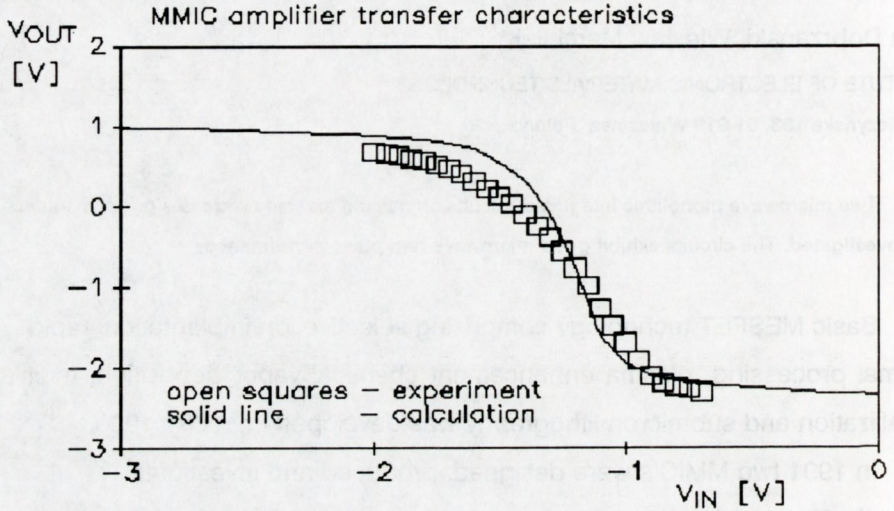


Fig.2

The feedback amplifier exhibits ultra-broadband stable performance starting from DC up to 1.5 GHz.(presented in fig.3)

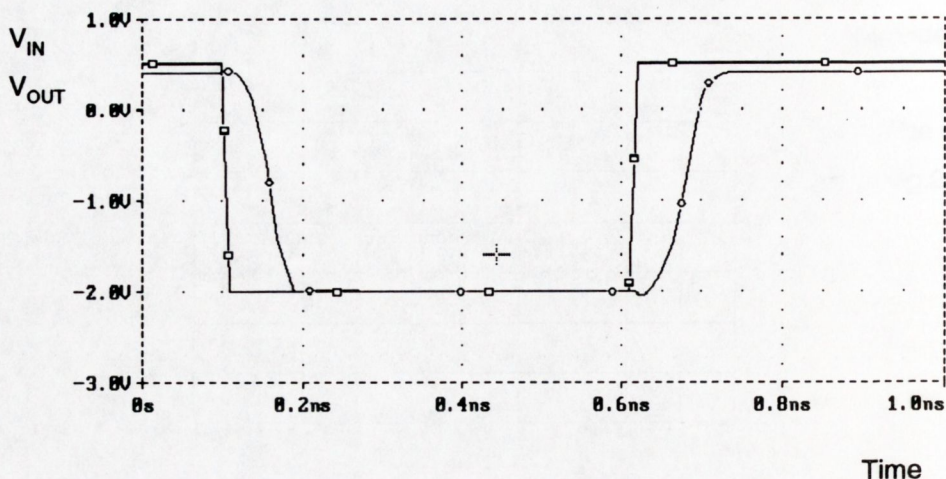


Fig.5

The real delay time was calculated using data obtained from directly measured switching characteristic, due to poor pulse generator rise time. The gate exhibits time delay of $\sim 100\text{ps}$.

Present activity in the field of MESFET technology concerns evaluation of dielectric layers for RTP optimization and for multilevel metallization.

The foundation of digital cells library is started with central financial support. Constructions of merged logic gates and RS flip flop are under development. Program ends in 1993.

Acknowledgment

This work has been sponsored in part by Polish National Scientific Committee (grant No.80343 91 01).

References

- 1) D.P.Hornbuckle and R.L.Van Tuyl, "Monolithic GaAs direct coupled amplifiers", IEEE Trans.Electron Devices, vol. ED-28, pp.175-182, Feb.1981.

Od redakcji

Prezentowany tekst jest skrótem referatu wygłoszonego przez mgr inż. L.Dobrzańskiego na międzynarodowej konferencji IRSEP'92.