

Low-Noise JFETS for the Gigahertz Range

Silicon wafer with low-noise JFETs.

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Applications

In x-ray spectroscopy the performance of the detector module naturally depends on the sensor component, but also the quality of the first amplifier stage plays an essential role. The low noise FET transistors developed at Fraunhofer EMFT enable the implementation of extremely low noise amplifiers, thus offering optimization potential in such application areas as:

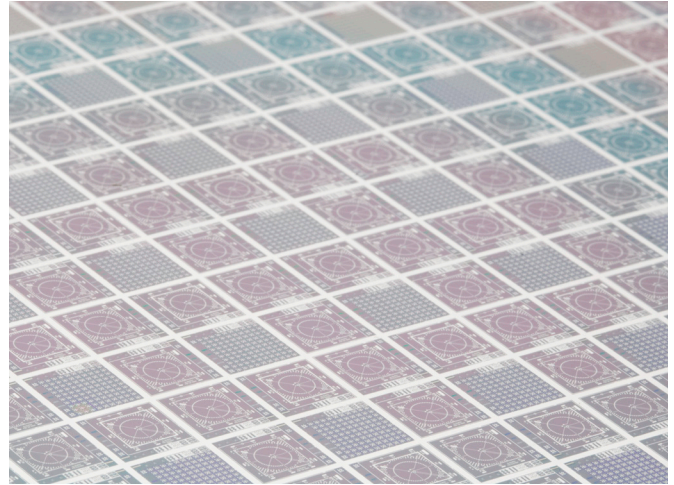
- Material analysis
- Recycling
- Security

Technical Innovation

The Fraunhofer EMFT low noise JFET reaches a transition frequency in the Gigahertz range, which makes it the fastest silicon-based junction field effect transistor currently available. Even at room temperature, the high amplification of the Fraunhofer EMFT low noise JFET enables the measurement of equal spectral resolution in half the time of the transistors currently available on the market. This allows simplified sensor construction, leading to lower cost and power consumption.

Technical data

Ready-made chips, measuring 0,5 x 0,5 mm, (with/without housing) are available for sampling. In addition to the standard interfaces, a feedback capacity and a reset mechanism for a charge amplifier were integrated. Continuous development efforts in the areas of robustness, transition frequency and noise behavior of the JFET, aim at further reduction of the measurement time. In long-time perspective, deployment in high frequency oscillators and mixers is thinkable.



JFET wafer structure in detail. ©Fraunhofer EMFT/Bernd Müller

Fraunhofer Institute for Electronic Microsystems and Solid State Technologies EMFT

Leonhard Sturm-Rogon
Area of competence: Micro- and Nanotechnologies
Phone +49 89 54 75 9 664
Leonhard.Sturm-Rogon@emft.fraunhofer.de

Fraunhofer EMFT
Hansastraße 27 d
80686 München
www.emft.fraunhofer.de



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