![Fraunhofer IZM logo]

SI/PI Design for up to 320 GHz

Circuit and Layout Design for HF-Sensors and High-speed Systems

Fast Facts

1. SI/PI design for up to 320 GHz with bandwidths of max. 100 GHz or 64 Gbit/s
2. Unique design approach for the development of such systems based on material, components, modules, and system design
3. State-of-the-art measuring stations (time and frequency range) and design tools

Fraunhofer IZM is a world leader in the development of highly integrated and reliable packaging concepts. In this regard, our focus is increasingly on the signal and power integrity of modules, which is essential for the functionality of high-frequency, high-performance, and high-speed systems. Over the course of several doctoral theses, methods for ensuring signal and power integrity were developed and evaluated in research projects for the development of industrial/commercial systems.

Methodology and experience

Our work is based on an exact analysis of the target specification of the module to be examined. The first step is to draw up a specification sheet with partners and develop a hardware and packaging concept based on the target specification. Based on this concept, partial specifications are defined for the functional groups of the module and the individual components are selected, developed, and

optimized if necessary, and connected to form a system. In addition to the high-frequency properties, the EMC radiation as well as the manufacturing and component costs are also included in the analysis. This approach has been used in the past to efficiently develop measurement systems, optoelectrical modules, communication front ends (5G, 6G), and radar modules.

Possibilities

High-quality measurement systems are available for the metrological testing of the optimized modules, including

- Full-wave simulation software (ANSYS HFSS & SIwave)
- Material characterization systems for up to 500 GHz
- A vector network analyzer with probing station (up to 500 GHz)
- A laboratory for module tests up to 320 GHz for:
  - Communication: SNR, modulation stability, phase noise, channel measurement
  - Radar: Angle and depth resolution, phase noise
- A bit error rate tester
- BERT up to 64 Gbit/s – PAM4

Range of services

If you have problems with your circuits in terms of signal transmission, crosstalk, EMC, and / or interference with the power supplies, we will be happy to help you! Our team supports you in analyzing your circuits and modules and finding the cause of faults.

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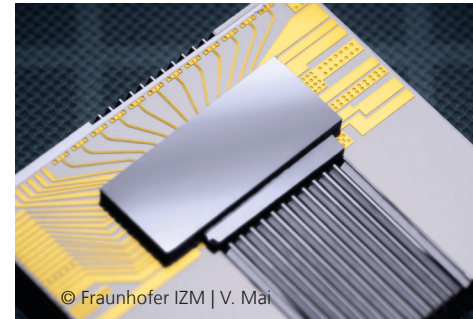
High-power receiver module for ten 40 GHz channels

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