



Field-Plate Mixer

BACKGROUND

Mixers implement frequency up-conversion or frequency down-conversion and have broad applications, particularly in radio frequency transmitters and receivers.

Resistive field-effect transistor (FET) mixers that apply local oscillator (LO) signals to the FET gate and radio frequency (RF) and intermediate frequency (IF) to the drain through filters offer excellent linearity and have been incorporated into single-chip GaAs MMIC receivers and up-converters.

Linearity is a key performance parameter for model mm-wave systems. Thus, there is an ongoing need for semiconductor mixer devices within radar and communications applications.

OUR SOLUTION

Our innovation is a novel enhancement of the FET mixer concept for GaN FETs with field-plate technology. The connectivity of the field-plate is changed whereby the field-plate remains isolated from the FET's electrodes and semiconductor surface.

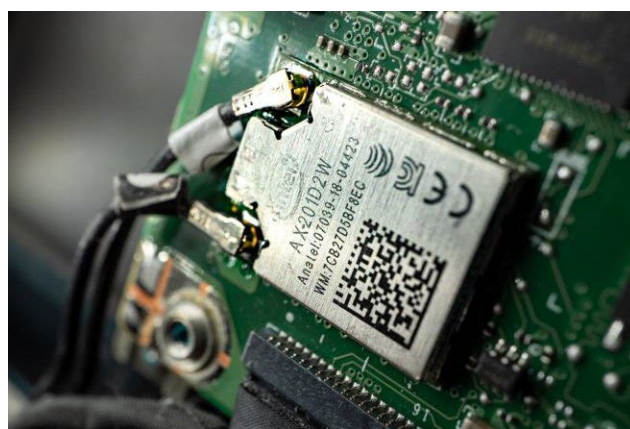
The device includes a FET with a field plate electrode, which is structured and located to be electromagnetically coupled to the FET when carrying a radio frequency oscillation signal, to cause the FET to produce an output signal that is a mixed signal of signals at the gate and the field plate.

APPLICATIONS

- ✓ IF/RF/MMIC
- ✓ Satellite communications
- ✓ Radar applications

ADVANTAGES / BENEFITS

Comparable performance with state-of-the-art GaAs and GaN mixers



Source: Mika Baumeister, <https://unsplash.com/photos/tRupq7rkjvo>

INVENTORS

Professor Simon Mahon, Professor Michael Heimlich

INTELLECTUAL PROPERTY POSITION

Patent filed

PARTNERING OPPORTUNITY

We are seeking an industry partner for further development and commercialisation of this technology through a research collaboration or technology licence.

WOULD YOU LIKE TO KNOW MORE?

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