

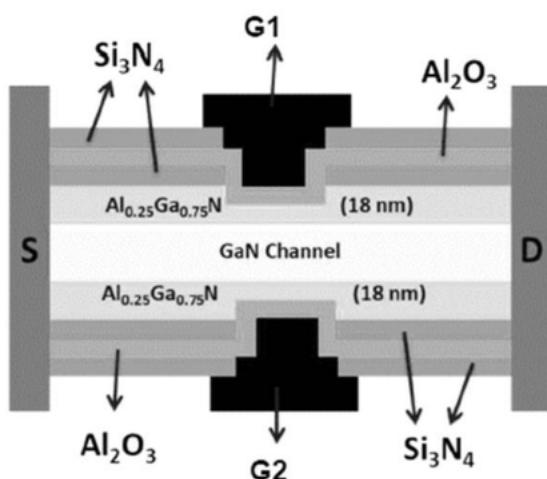
A Gate Terminal with a Dual Contacts for a Hemt and Manufacturing Method Thereof

Seeking parties interested in licensing and commercialization of technology.

Technology Brief

This technology relates to a High Electron Mobility Transistor (HEMT) field-effect transistor device and its manufacturing method, featuring a novel gate terminal configuration designed to enhance electron mobility. The HEMT structure incorporates a gate material formed into an inverted U-shape positioned on top of a hafnium oxide (HfO₂) layer, creating dual contacts across the device. This configuration optimizes the two-dimensional electron gas (2DEG) channel formed at the heterojunction interface between the Aluminum Gallium Nitride (AlGa_{0.25}N) and Gallium Nitride (GaN) layers. By leveraging dual-contact gate control and a high-k dielectric layer, the architecture significantly boosts carrier transport efficiency and switching performance over conventional single-contact HEMT designs.

Block Diagram



Technical Applications

This technology is primarily applied in high-frequency, high-power, and high-efficiency semiconductor electronics. Key application areas include radio frequency (RF) power amplifiers for 5G/6G wireless communications, power conversion modules in electric vehicles (EVs), renewable energy inverters, aerospace and defense radar systems, and high-density power supplies for data centers where fast switching, low conduction loss, and high electron mobility are critical.

Salient Features

- ✓ Inverted U-Shape Dual-Contact Gate
- ✓ Optimized AlGa_{0.25}N/GaN 2DEG Channel
- ✓ Hafnium Oxide (HfO₂) Gate Dielectric

Glimpse of the Technology



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ITNT-TECH-0187



TECHNOLOGY SECTOR

Electronics & Semiconductors



IP STATUS

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TECHNOLOGY READINESS LEVEL

TRL 3

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