

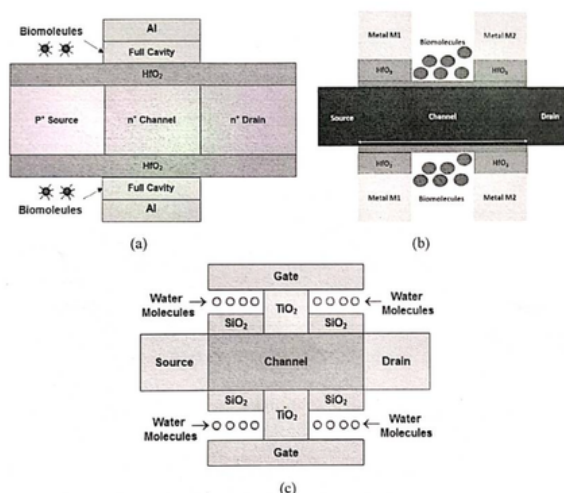
Nanosheet MOSFET for Comprehensive Water Analysis

Seeking parties interested in licensing and commercialization of technology.

Technology Brief

This technology relates to a planar Nanosheet MOSFET device designed for the rapid, label-free analysis of water molecules using dielectric permittivity sensing. The device integrates a silicon source region, channel region, and drain region with a gate structure positioned directly over the channel. An embedded nanocavity with optimized dimensions holds the sample water analyte, while a silicon dioxide insulating layer isolates the gate and channel to minimize leakage current and optimize sensitivity. By measuring changes in drain current induced by variations in the dielectric permittivity of water samples (such as differentiating soft snow dynamics), the planar nanosheet architecture delivers an expanded active sensing surface area, enhanced electric field distribution, and effective suppression of short-channel effects.

Block Diagram



Technical Applications

This technology is primarily applied in high-precision microfluidic sensing, environmental monitoring, and real-time aquatic sample testing. Key applications include municipal water quality monitoring, industrial fluid testing, wastewater analysis, agricultural runoff tracking, and specialized environmental sensing such as analyzing snow and ice melt dynamics based on permittivity changes.

Salient Features

- ✓ Label-Free Permittivity Sensing
- ✓ Enhanced Electrostatic Control
- ✓ High Sensitivity & Signal Clarity

Glimpse of the Technology



REFERENCE NUMBER

ITNT-TECH-0186



TECHNOLOGY SECTOR

Electronics & Semiconductors



IP STATUS

Patent Granted



APPLICATION NUMBER

202541080742



TECHNOLOGY READINESS LEVEL

TRL 3

**Tamil Nadu Technology
Transfer Facilitation Centre
(TNTTFC)**

Mr. G. Daniel Prabhakaran, RTTP
Associate Vice President - iTNT

 tnttfc@tnthub.org

 +91 91766 08820

 <https://techtransfer.itnthumb.tn.gov.in/>