A Structure For Increasing Mobility In A High-Electron-Mobility Transistor
Tech ID: 27402 / UC Case 2017-462-0

BRIEF DESCRIPTION
A technique that results in a significant increase of electron mobility and sheet charge density at small channel thickness.

BACKGROUND
HEMTs are solid-state electron devices made from a semiconductor heterostructure used to amplify high-frequency signals. Electron mobility is important to device performance and so it is extremely desirable to discover ways to improve electron mobility.

DESCRIPTION
Researchers at the University of California, Santa Barbara have created a channel structure for semiconductor high-electron mobility transistors (HEMTs) that results in a significant increase of electron mobility and sheet charge density at small channel thickness. This enables the fabrication of devices with increased high frequency power performance and allows for better lateral and vertical scalability.

ADVANTAGES
▶ Increased electron mobility
▶ Improved device performance (94 GHz)

APPLICATIONS
▶ High-electron mobility transistors
▶ Power electronics

PATENT STATUS
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<td>United States Of America</td>
<td>Published Application</td>
<td>19-0348532</td>
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OTHER INFORMATION
KEYWORDS
Semiconductor, Transistor, High Electron Mobility, HEMT, indfeat, indpowerelec

CATEGORIZED AS
▶ Nanotechnology
▶ Electronics
▶ Semiconductors
▶ Design and Fabrication

RELATED CASES
2017-462-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS
▶ Achieving "Active P-Type Layer/Layers" In III-Nitride Epitaxial Or Device Structures Having Buried P-Type Layers
▶ High-Quality N-Face GaN, InN, AlN by MOCVD
▶ Defect Reduction in GaN films using in-situ SiNx Nanomask
▶ Device Structures Utilizing Barrier Enhancement Conductive Materials on N-polar III-N
▶ Laser Diode With Tunnel Junction Contact Surface Grating
▶ High Mobility Group-III Nitride Transistors with Strained Channels
▶ Fabrication of Relaxed Semiconductor Films without Crystal Defects
▶ Improved Fabrication of Nonpolar InGaN Thin Films, Heterostructures, and Devices
▶ Methods for Locally Changing the Electric Field Distribution in Electron Devices
Incorporating Temperature-Sensitive Layers in III-N Devices
Controlling Linearity in N-Polar GaN MISHETs
Technique for the Nitride Growth of Semipolar Thin Films, Heterostructures, and Semiconductor Devices
Enabling Epitaxial Growth On Thin Substrates
(In,Ga,Al)N Optoelectronic Devices with Thicker Active Layers for Improved Performance
N-polar III-N Semiconductor Device Structures Enabled by Wet Chemistry
GaN-based Vertical Metal Oxide Semiconductor and Junction Field Effect Transistors
Novel Current-Blocking Layer in High-Power Current Aperture Vertical Electron Transistors (CAVETs)
III-N Transistor With Stepped Cap Layers
Polarization-Doped Field Effect Transistors with Increased Performance
Wafer Bonding for Embedding Active Regions with Relaxed Nanofeatures
III-N Based Material Structures and Circuit Modules Based on Strain Management