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MICRO-PLASMA FIELD EFFECT TRANSISTORS

NETWORKS, COMMUNICATION, & WIRELESS

Micro-plasma FETs that operate at a wide range of conditions for nuclear, aeronautic, and other applications.

TECHNOLOGY TYPE

Circuits
Semiconductors
Micro-Plasma Devices

STAGE OF DEVELOPMENT

- Proof-of-concept.

- Developed concentrated and distributed plasma sources suitable for different sizes of integrated MOPFET circuits.

IP PROTECTION

U.S. Utility Patent Issued
Micro-Plasma Field Effect Transistors
US8643275B2

U.S. Continuation Issued
Micro-Plasma Field Effect Transistors
US9269521B2

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Reference Number: U-5230

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TECHNOLOGY SUMMARY

Field effect transistors (FETs) are commonly used in circuit boards to amplify or switch electronic signals. Metal-oxide-semiconductor FETs (MOSFETs) are the most common field effect transistor and use electrons to carry currents. However, MOSFETs are highly susceptible to damage through static electricity and fail to work at high temperatures.

University researchers have developed a metal-oxide plasma field effect transistor (MOPFET) that can operate at high temperatures and in ionizing radiation. This MOPFET device utilizes ionized gases as charge carriers, which are unaffected by ionizing radiation and have increased operation efficiency in such conditions. As a result, MOPFETs can be used in nuclear power stations, outer space, engines, and other high-temperature/ionizing radiation applications.

FEATURES AND BENEFITS

- Operates in temperatures up to 600 ˚C.
- Tolerates high levels of ionizing radiation.
- Offers both enhancement and depletion modes of operation.
- Operates at low voltages (5-10V).

RECENT PUBLICATIONS

Zhang, Y., Pai, P., Chowdhury, F. K., & Tabib-Azar, M. (2013). Operation principles of micro-plasma field effect transistor. *2013 Transducers & Eurosensors XXVII: The 17th International Conference on Solid-State Sensors, Actuators and Microsystems*. doi:10.1109/transducers.2013.6626832
Cai, M., Chowdhury, F. K., & Tabib-Azar, M. (2012). Micro-plasma field-effect transistors. *2012 IEEE Sensors*. doi:10.1109/icsens.2012.6411384

INVENTOR PROFILE

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