

Power Switch suitable in high radiation Environments

CSIC has developed a silicon-based power switch which is very suitable to be used in high-radiation-level environments. Due to its particular configuration the device presents very high radiation hardness.

Industrial partners from the electronic industry focused on radiation detection are being sought to collaborate through a patent licence agreement.

An offer for Patent Licensing

JFET SWITH OPERATING IN HARSH RADIATION ENVIRONMENTS

There are many environments where there are elevated levels of radiation these includes on one hand, regions of high natural background radiation such as the Space environment, high-flying aircraft, some particular regions on the Earth; and on the other hand places where the radiation is not natural such as nuclear reactors, particle accelerators, commercial irradiators, or radiation emitted from a nuclear explosion.

One of the power electronics concerns nowadays is the search for proper circuits and devices for the power distribution in systems to be operated in harsh radiation environments like the before mentioned.

An electronic device that is mandatory in the power distribution circuits is the power switch. Many of the state-of-the-art power switches used in standard application fields are not valid for radiation harsh applications as they fail under radiation exposure.

In this way, a Junction Field-Effect Transistor and silicon-based device has been developed as a radiation-hard power switch in power distribution applications. Its particular configuration makes it robust to ionizing and non-ionizing damage and very suitable to be implemented in environment with high radiation.



Fig 1) Main examples of Environments where electronic devices should present radiation hardness.

Main innovations and advantages

Its main application are in Space and nuclear reactors, however can be also used in high-flying aircraft, particles accelerator, or any electronic equipment or component that suffers high radiation.

Advantages:

- Device robust to ionizing and non-ionizing damage
- Good current capability
- Uniform voltage distribution over the device and very control of channel depletion.
- High drift region which increases the breakdown voltage of the device.

Patent Status

Priority patent application filed suitable for international extension

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