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Миссия научно-образовательного электронного журнала «ОБРАЗОВАНИЕ И НАУКА В XXI ВЕКЕ» состоит в поддержке интереса читателей к оригинальным исследованиям и инновационным подходам в различных тематических направлениях, которые способствуют распространению лучшей отечественной и зарубежной практики в интернет пространстве.

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Материалы публикуются в авторской редакции. За соблюдение законов об интеллектуальной собственности и за содержание статей ответственность несут авторы статей. Мнение редакции может не совпадать с мнением авторов статей. При использовании и заимствовании материалов ссылка на издание обязательна.

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Название публикации: «PROPERTIES OF INTEGRATED FIELD TRANSISTORS»

Annotation. *The article examines the properties of field-effect transistors whose isolation is separated from the main channel by a dielectric in a field-effect transistor. The gate of the transistor is made of metal and is separated from the semiconductor by a dielectric. Therefore, the formation of a structure consisting of a metal, a dielectric and a semiconductor is described.*

Keywords: *unipolar transistor, metal-dielectric-semiconductor, silicon oxide* SiO_2*, Darlington circuit, stock, source, gate.*

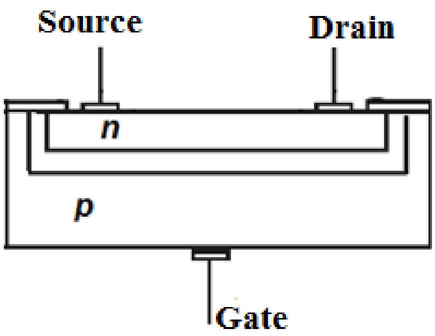
Much attention is now being paid to expanding the functional properties of semiconductor sensors designed for new purposes, which is one of the most promising areas of semiconductor physics in the world. One of the important tasks here is to determine the sensitivity of the field effect transistor to external influences, including light, temperature and pressure.

Today, much attention is focused on studying the photoelectric and thermal parameters of semiconductor sensors around the world. In this regard, it is important to carry out targeted research, including in the following areas: to study the effects of light and pressure in the mode of closing the channel of the field-effect transistor; to determine the possibility of using a field-effect transistor for a new purpose in the mode of channel closure; expanding the functional parameters of semiconductor recorders is one of the current problems.

A field-effect transistor is a semiconductor active device that is controlled by a change in the electric field due to a change in the electrical conductivity in the conduction channel to control the current value.

Field-effect transistors are designed to amplify a variety of electrical signals and powers, and unlike bipolar transistors, only one type of charge carrier is involved in current generation: either electrons or cavities. Therefore, they are also called unipolar transistors.

There are two types of field effect transistors depending on their channel structure and conductivity: field effect transistors controlled by a *p-n* junction and field effect transistors with a metal-dielectric-semiconductor structure. They are also known as MDS transistors.



1-Picture. The structure of a field transistor

The development of the semi-conductor industry has resulted in the development of nanotechnologies. The p-n junction transistor is the simplest single-polar transistor, with the start of the current as a current and the current as a stock. The center electrode is called the control electrode (pic. 1).

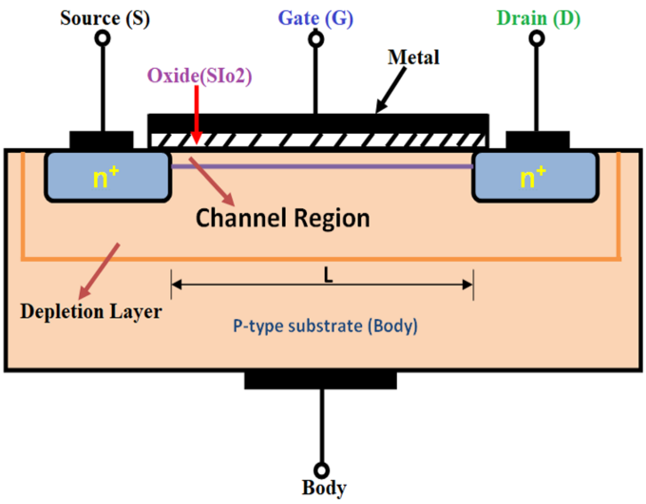
The layer between the source and the stock is called the channel. Its conductivity can be n or p type. If the base semiconductor has n different conductivities, the barrier layer will be p-different semiconductors. Conversely, if it is *p*-different, the barrier is made of *n*-different conductivity semiconductor material.

In MD *p*-type transistors, the stock current is also controlled by the gate voltage. When an electric field is created between the core and the base semiconductor, depending on the direction of the field strength, the main current carriers are attracted to either the surface or the size of the Another kind of unipole transistor is called insulated (protected) transistor. From them, the metal barrier is separated from the base layer-channel by a dielectric substance. These transistors are therefore also known as

MDS (metal-dielectric-semiconductor) unipolar transistors. Oxide materials (such as silicon oxide SiO_2) are often used as dielectrics. In this case, the transistor is known as the Metal-Oxide-Semiconductor (MOS) transistor base semiconductor.

In a field-effect transistor, the gate is separated from the main channel by a dielectric. The gate of the transistor is made of metal and is separated from the semiconductor by a dielectric. This results in a structure of metal, dielectric and semiconductor. Oxides are often used as dielectrics. Therefore, a transistor is sometimes called an MOS transistor. There are two types of isolated field-effect transistors: a built-in channel transistor and an induced channel transistor.

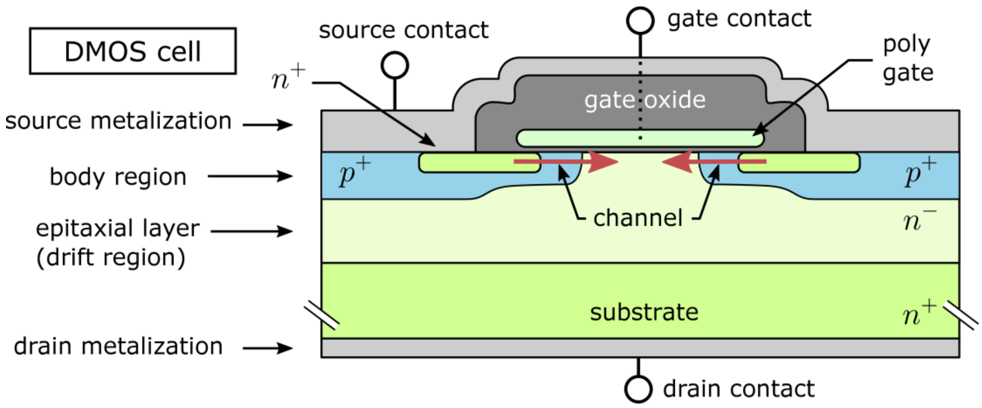
The structure of a channel-mounted transistor is shown in Figure 2. In this transistor, an n-type channel is formed by diffusion between the stem and the stock. When a negative potential is applied to the gate, positive charges are induced in the channel, and a "poor" zone is formed on the charges, increasing the specific resistance of the channel (Figure 2).



Picture 2. The structure of the field-effect transistor

When the negative potential is reached, the current between the demand and the stock stops. The channel installed in the transistor can also be p-type. In this case, a positive voltage is applied to the gap between the barrier and the barrier to reduce the current between the demand and the stock. Channel-mounted MDS transistors are often used in channels with poor channel charge.

The structure of an induced channel transistor is shown in Figure 3. The base of the transistor is made of p-conductive material with high specific resistance. On the upper surface of the semiconductor are formed n-conduction bands and stock fields. There are p-n junctions between the base and these fields. No matter what signal the power supply is connected to between the supply and the stock, one of them will always be closed.



Picture 3. The structure of an induced channel field transistor

Therefore, in the first case, there is no transmission channel. When a small amount of positive potential is applied to the gate, it induces negative charges in the area of the base closest to the gate. As the voltage increases and reaches a certain limit Uzich value, an inversion layer with n-type conductivity is formed on the surface. Through this layer, a current begins to flow from the will to the stock. As the voltage across the gate increases, the throughput of the channel increases. Typically, the Uzich voltage is around 1-6V. Instead of a p-type semiconductor in the transistor, an n-type semiconductor is taken and the p-type is made and the r-channel transistor is formed.

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