STUDYING THE EFFECT OF LIGHT ON A DIODE MODE CONNECTED FIELD TRANSISTOR

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ABSTRACT

This article, based on the latest scientific data with a respective approach, presents research on the topic of field transistors and studied the preparation of the field transistor and the control of the stock current with the shutter voltage supplied from the source, in which it was found that the current flowing from the channel in a bipolar circuit is controlled by the value of the resistance

Keywords: conductivity, diode, unipolar transistors, phototransistor, illumination.

INTRODUCTION

The 20th century and the 21st century have been considered the age of microelectronics and nanoelectronics in the history of mankind. It marks 75 years in 2022 when the first transistor was discovered by Shockley, Barden and Brettein (December 23, 1947), that is, the age of solid-state electronics began. For history, this is an extremely small period. But the science of electronics, formed at this time and developed very quickly, opened the way for humanity not only to the universe, allowing the creation of previously unimaginable, ultra-fast computing machines, fundamentally new information systems, the most accurate, reliable diagnostic devices, extremely compact, capable economic electronic devices, while radically improving the economy, military power of countries that paid attention to this, it has made it possible and gives solutions to the extremely complex environmental problems facing humanity. Diode, transistors are used in the field of technology, in the use of integrated circuits, in the field of nanotechnology.

Scientific research is being carried out to dramatically increase the integration level of integrated circuits and dramatically reduce energy consumption by bringing the dimensions of field transistors to nanosizes, along with bipolar transistors, among the main elements of modern electronic devices in the world. The physics of semiconductors and dielectrics is the most fundamental part of modern physics, based on its achievements, the fields of

instrumentation, radio engineering and microelectronics are developing.

Nowadays, we use semiconductors in almost all our equipment. The more perfect the transistors made on the basis of semiconductors are produced, the more effective the techniques used are. The controlling p - N transitive transistor is the simplest unipolar transistor, with the current beginning being called istock, and the current flow is called stock. The controller in the middle is called the gate electrode.

The layer between Istock and stock is referred to as a channel. Its permeability can be n or P-type. If the base Semiconductor has N-type conductivity, the gate electrode layer is a P-type semiconductor. The structure of the field transistor is followed by another type of unipolar transistors gate electrode as an isolated (protected) transistor. In them, the gate electrode base made of metal will be separated from the layer-channel by a dieletric substance. If the main current carriers are pulled to the surface of the base Semiconductor, the conductivity of the surface layer conduction channel increases, and when pulled into the volume, it decreases. The first-way transistors are called transistors in an enriched type (mode), and the second-way ones are called transistors in a poorer mode.

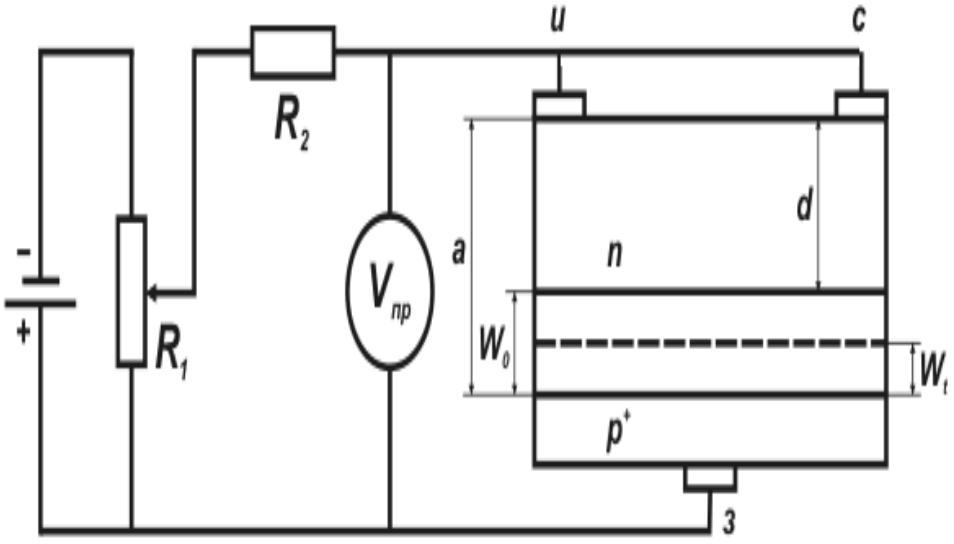

Figure 1. Connection of the field transistor to the circuit in diode mode.

The reverse voltage is given to the P-n-transition of the gate electrode, and the depth of the impoverished layer changes. The larger the reverse voltage, the deeper the poorer layer. Respectively, the channel thickness w will be so small. Thus, it is possible to change the transverse surface and, accordingly, the channel resistance by changing the reverse voltage in gate electrode. In the presence of voltage in the stock, the output current in the channel changes.

To study the effect of light on a field transistor, the input of a field transistor connected in diode mode is connected according to the bipolar transistor in Figure 1, with a single clamping force of 30 V, and when the light is exposed to the field transistor, a change in the output voltage is observed.

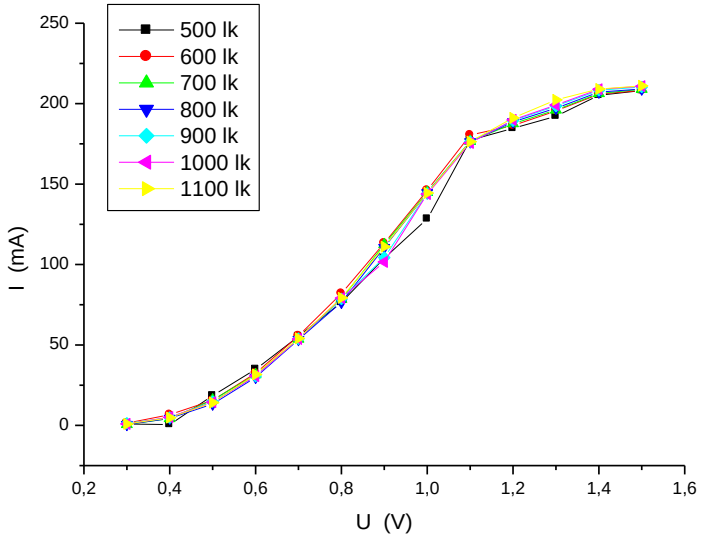

Figure 2.V-I characteristics of diode mode connected field transistor

To research the light effect study scheme field phototranzistor photo reception properties, a cost-effective amplifier based on the input cascade field transistor in connection mode and a single bipolar transistor with a source voltage of 3.0 V combined in Figure1 was assembled . When the field transistor is excited by integral light and the optical signal is increased from 500 lux to 1100 lux, the amplification coefficient decreases, as shown in the drawing. In the input cascade, an increase in sensitivity to a weak light signal is ensured due to the application of a field phototranzistor.

Studies have shown that with a tin lamp whose illumination increases from 500 Lux to 1100 Lux, the output signal value of a diode transistor increases from 0.4 V to 2 v. In the diode mode, the coefficient of light impact on the Connected Field transistor is on average 0.1735 A/V.

CONCLUSION

In the diode mode, the photosyncrasy mechanism of the field transistor has been studied, according to which it has been found that increasing the intensity of illumination increases the depth of absorption of radiation, and the difference in contact potentials in the P-n transition reduces and leads to an increase in the thickness of the conduction part of the n-layer.

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