

FEATURES OF OPTRONS. OPTRONS ILLUMINATOR

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Abstract: According to the recommendations of the International Electrotechnical Commission, optoelectronic devices are devices that detect visible, infrared or ultraviolet parts of electromagnetic waves, and emit coherent waves of light. Based on the above, the following processes form the physical foundations of optoelectronics.

Key words: advantages, disadvantages, general schematic view of optical and electrical connections, pairs of diodes, resistors, transistors, and thyristors.

ОСОБЕННОСТИ ОПТРОНОВ. ОПТРОННЫЙ ОСВЕТИТЕЛЬ

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Аннотация: Согласно рекомендациям Международной электротехнической комиссии, оптоэлектронными устройствами называют устройства, обнаруживающие видимую, инфракрасную или ультрафиолетовую части электромагнитных волн и излучающие когерентные волны света. Исходя из вышеизложенного, физические основы оптоэлектроники составляют следующие процессы.

Ключевые слова: преимущества, недостатки, общая схема оптических и электрических соединений, пары диодов, резисторов, транзисторов и тиристоров.

Optoelectronics is a part of the scientific and technical direction, which deals with the phenomena of electronic oscillations in semiconductor materials, the transmission and reception of information, the description of information, its transfer from one form to another, their memory, and storage. is based on the study of phenomena using electro-optical methods. In optoelectronics, it is inappropriate

to consider modern electronic devices, systems based on the use of lasers, holographic residual effect, optorons, indicators as the main element. Also, it is impossible to consider that the currently studied limit of the light wave is a limiting value.

It also synthesizes the high results achieved in the development of the scientific and technical direction of optoelectronics.

The principal advantage of optoelectronics is distinguished by the following important aspects of devices and systems.

1. High information capacity and reception of the frequency of light. This is 10^{13} - 10^{15} times greater than the frequency of ordinary radio engineering vibrations. It is possible to store and write high $\sim 10^2$ bit/cm² information in the memory elements with the help of small light wavelength .
2. The loss of a light beam at an acute angle, the angular wasteful consumption is proportional to the wavelength λ and its value I is equal to one. This property allows the transmission of electromagnetic rays to the desired point in the universe without loss. In small electronic systems, laser beams can be directed to micron surface light-sensing semiconductor surfaces.
3. It is possible to modulate the light beam by time and environment. The elementary surface is extremely small and can be isolated for individual modulation of the perpendicularly incident beam (This property allows to describe very wide and high (information) information. This property is very important for creating high-performance computing techniques.
4. Transmission of information using electroneutral photons (contactless transmission), i.e. (mechanical and electrical) connection; super galvanic connection of input and output; the fact that the information is directed in one direction does not connect the photoreceptor with the light source looking back; creation of highly networked communication systems; connection with an optical channel, not receiving the influence of electromagnetic waves, that is, protection from the influence of the external environment; therefore, optoelectronics gives

designers a convenient opportunity to create new structural types of radioelectronics systems.

5. Reception of a mirrored image: light counting systems, information systems are input parts. This is called the optical eye.

6. Systems created on the basis of microelectronics are the basis of future cybernetics. They are important because of their high capacity, changeability, adaptability, quick assimilation of images, and many connections. The use of light rays (transferring electrical energy to light energy and vice versa) provides an opportunity for the development of functional microelectronics. The main reason for the development of optoelectronics, allows transistor electronics and integrated circuit technology, radio electronics, micromanufacturing. It cannot connect well with existing electronic connectors, pulse transformers, relays, contacts, sockets, and transistors.

The principle of operation of optrons is based on energy cycle. In this case, the electrical energy (signal) in the radiation source is converted into light energy, and vice versa in the photoreceptor, the light signal waits for (issues) an electrical response. Depending on the complexity of the circuit structure, optoelectronics technology is divided into two large groups: optocouplers and optoelectronic integrated circuits. An optocoupler or "elementary optron" is a semi-conductor optoelectronic device consisting of a radiation source and a receiver (photoreceiver) with an electrically isolated optical connection at the input and output. Optoelectronic integrated microcircuits are microcircuits (devices) consisting of one or more optocouplers with one or more rectifiers or amplifiers.

Advantages of Optrons

- lack of electrical connection between input and output and reverse connection between photo receiver and radiation source, so it is designed for high voltage and resistance, and input capacitance is very small.

- the frequency of allowed vibrations is a wide range, that is, the possibility of transmitting a signal from zero to 10¹⁴ Gs
- it is possible to control the effect of output signals on the optical part.
- has an optical channel highly protected against noise, that is, it does not receive the influence of an external electric field.
- has the ability to work together with other semiconductor and microelectronic devices in radio electronic devices.

Disadvantages:

- the power consumption is relatively high because the energy exchange happens 2 ways at once (electricity-light-electricity), 2 times. Also, FIK is not high;
- temperature stability (permanence) and radiation resistance is not very high
- it does not go long, that is, the deterioration of the parameters is observed over time.
- the specific noise level is relatively high
- imperfect in terms of constructive technology, i.e. hybrid (hybrid) technology is needed.

All these disadvantages will be eliminated with the development of optron technology.

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