

FAST UNCOOLED DETECTOR OF THE IR-FIR RADIATION ON THE BASE OF  
INTRABAND PHOTOCONDUCTIVITY

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Abstract

The fast uncooled detector of IR-FIR radiation is described. Its characteristics are: spectral region is 9-500  $\mu\text{m}$ , time resolution is  $10^{-10}$  s, output signal is up to 10V, and power region is 10W-10mW.

The detector operation is based on the change in the mobility of the charge carriers in semiconductors during intraband absorption of light by free carriers. The temperature, frequency, intensity, and concentration dependences in n, p-Ge and the different mechanisms of intraband photoconductivity are studied.

The detector element is made of p-type germanium with concentration near  $10^{14}$   $\text{cm}^{-3}$ . It is placed into the high frequency arrangement that allows measuring the pulse of radiation with the time resolution up to 200 ps, and inserted in the photoconductivity scheme. The application of the pulse feeding voltage with amplitude up to 750V makes it possible to have the necessary sensibility and linearity of the output signal with the amplitude up to 8V without amplifier.

High output voltage permits us to observe the signal directly on the oscilloscope with the electron beam tube of the "running wave" type.