

ABSTRACT

Avalanche photodiode (APD) is photodetector that have internal gains so it is used for long distance optical fiber communication and gives a sensitivity margin relative rather than a PIN diode. Local multiplication in APD provides an important role in creating the gain, multiplication noise, and gain-bandwidth. According to the theory of strengthening of the local field, multiplication noise and gain-bandwidth of the APD is determined by the ratio of electron and hole ionization coefficients of semiconductors in the multiplication.

In this final project is simulation of the APD's parameter for NRZ digital optical signals with bit rate of SDH, and using Visual Studio 2008 programming language to know the characteristics of the APD. Photodetector type is made from silicon APD from PerkinElmer Optoelectronics C30902S series.

Simulations are carried out through changes in the intrinsic width, wavelength, and signal power, and to analyze the effect of changes in input power, wavelength, and width of the intrinsic region to the total current output photodetector. The greater the input power received photodetector, the greater the output current is removed. From the simulation results, it can be concluded that the PPE is used have characteristics intrinsic region width from 0.5 to 1 mm will increase the quantum efficiency. The maximum quantum efficiency is 0.6986. To achieve the multiplication of more than 200 times, PPE must be working at a wavelength between 800-1000 nm.

Key word : APD, Visual Studio 2008 programming, NRZ Code