Abstracts

Theoretical study of p-i-n photodetectors' power limitations from 2.5 to 60 GHz

J. Harari, G. Jin, J.P. Vilcot and D. Decoster. "Theoretical study of p-i-n photodetectors' power limitations from 2.5 to 60 GHz." 1997 Transactions on Microwave Theory and Techniques 45.8 (Aug. 1997, Part II [T-MTT]): 1332-1336.

In this paper, we present a theoretical study and a numerical simulation of various long wavelength top-illuminated p-i-n photodetectors in the frequency range of 2.5-60 GHz under high optical modulated power at 1.55-/spl mu/m wavelength. The modeling includes a monodimensional drift-diffusion model for the device and takes into account the external circuit. We considered six InP/GaInAs/InP photodetectors especially designed to work at 2.5, 10, 20, 30, 40, and 60 GHz, respectively. For the one with the highest frequency, we intentionally sacrificed the quantum efficiency in order to compare them at the end with the results already obtained in the case of waveguide p-i-n photodetectors. The results show the maximum microwave-output power for each photodetector at its specific working frequency. Additionally, we present the effects of the modulation depth, the back illumination, and the wavelength of 1.3 /spl mu/m.

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