

PHOTOSENSITIVE PROPERTIES OF AVALANCHE LEDs BASED ON NANOSTRUCTURED SILICON

S. Lazarouk, U. Dudzich, A. Klyutsky, A. Dolbik, V. Labunov

Belarusian State University of Informatics and Radioelectronics, P. Browka 6, 220013 Minsk, Belarus

serg@nano.bsuir.edu.by

I. INTRODUCTION

Avalanche LEDs have attracted the attention of scientific community due to their fast time response (less than 1 ps). It allows to use avalanche LEDs for optical interconnects in silicon chips and between silicon chips. In this case avalanched LEDs can be used as light sources as well as light detectors [1]. We have studied the photosensitive properties of avalanched LEDs in this work.

II. RESULTS AND DISCUSSIONS

The photosensitive properties have been measured in avalanche LEDs fabricated by the technology described in [2, 3]. The photocurrent and photovoltage responses have been registered at light exposition from the neighbor LED. Figure 1-a shows the photocurrent in investigated diodes versus light power of neighbor diodes. Photocurrent was measured at diode bias 1V and for different temperatures. Figure 1-b shows the photovoltage versus light power of the neighbor LED at different temperatures. The low temperatures are more attractive for diode operation. Thus the developed avalanche diodes can operate as a light source at bias more than avalanche breakdown voltage as well as photodetectors or photovoltage cells at bias less than avalanche breakdown voltage.

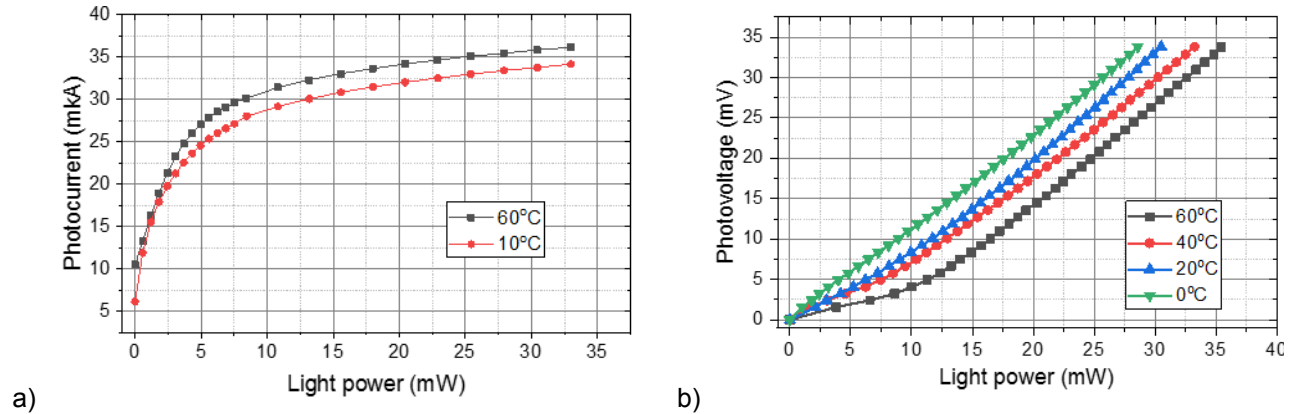


Figure 1. Photocurrent (a) and photovoltage (b) in investigated diodes versus external light power

III. CONCLUSIONS

The performed studying showed the perspective of avalanche LED applications for light signal processing in silicon photonics [4, 5].

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