

## Lifetime and dark current considerations in absorbing layers based on ternary antimonide alloys

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**The possibilities of high performance achieving in antimonide-based, low-dimensional barrier and photodiode structures using MWIR  $InAs_{1-x}Sb_x$  and  $In_{1-x}Ga_xSb$  absorbing layers have been considered in this work. Lifetime and dark current temperature dependences in ternary antimonide alloys have been calculated. The signal-to-noise ratio has been determined in the operating temperature range. It was received, that for photodiodes based on  $InAs_{0.8}Sb_{0.2}$ , the expected detectivity will be  $D^* \approx 10^{12} \text{ cm}\cdot\text{W}^{-1}\cdot\text{Hz}^{1/2}$  at  $T = 100 \text{ K}$  and for photodiodes based on  $In_{0.7}Ga_{0.3}Sb$  the expected detectivity will be  $D^* \approx 10^{11} \text{ cm}\cdot\text{W}^{-1}\cdot\text{Hz}^{1/2}$  at  $T = 100 \text{ K}$ .**

**Keywords:** MWIR, InAsSb, InGaSb, lifetime, dark current, photodiode.

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