

## Limitations of standard approaches in the production of large-format cooled photodetectors of the third and subsequent generations based on HgCdTe

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**The analysis of the main constraining factors of increasing the format of cooled hybrid photodetectors (PDs) is considered: a decrease in the percentage of usable PDs with an increase in the size of read-out integrated circuit (ROIC) and an array of photosensitive elements (PSEs); different changes in the size of ROIC and PCEs when the PDs is cooled to operating temperatures; non-flat shapes of the surfaces of ROIC and PCEs; and the optical system a device based on PDs. It was found that the main constraining factors for increasing the format of cooled HgCdTe-based PDs are different changes in the size of the ROIC and PCEs when the PDs are cooled to operating temperatures, and the most significant are the non-flat shapes of the ROIC and PCEs surfaces. A solution has been proposed to increase the format of cooled hybrid photodetectors by using several smaller ROICs and PCEs installed adjacent to each other, which removes the identified limitations in the manufacture of large-format cooled photodetectors.**

**Keyword:** cooled IR photodetectors, wafer nonflatness, thermocycling, optical system.

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