Hybridized Visible-NIR Blind (Al,In)GaN Focal Plane Arrays

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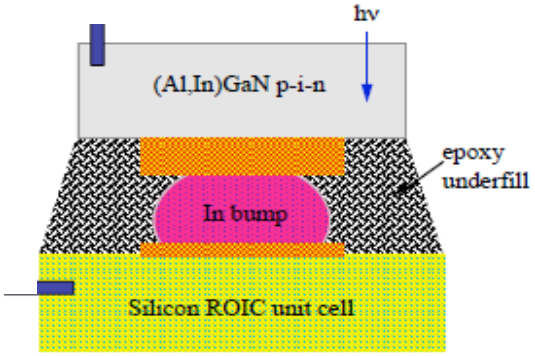
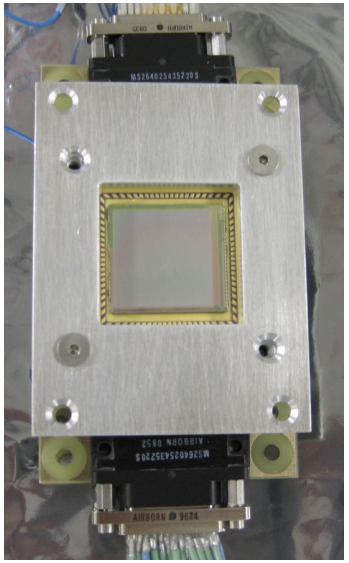
Objective

- Develop solar blind detector arrays that will improve Earth Science atmospheric trace-gas measurement systems.
- Improve UV and near-UV (270-450 nm) trace gas absorption measurements
- Ozone profiling (270-315 nm)
  - Total Ozone, SO_2, HCHO, BrO, NO_2, HCOCHO (310-450 nm)
- Improve sensitivity through confined epitaxy growth technique
  - High quantum efficiency (QE)
  - Low dark current defects
  - High out-of-band rejection



- Unit-cell (18µm pixel) showing the hybridization approach. (above)
- Hybridized 1Kx1K AlGaN array in test carrier. (right)



Accomplishments

- Fabricated large format AlGaN and InGaN PIN photodiode arrays (1Kx1K) using a confined epitaxy growth technique: a first for both configurations.
- Demonstrated diode characteristics of both concepts (a first for InGaN) and UV sensitive (photodiode) characteristics of AlGaN with a 280 nm cut-on wavelength.
- Produced a lower resistivity 50% Al content AlGaN window layer to enable a 270 nm cut-on wavelength for future development.

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$TRL_{in} = 2$ $TRL_{out} = 3$