

## ELECTRICAL ENGINEERING

### Difference between Buried Photodiode and Pinned Photodiode

What is the difference between Buried Photodiode and Pinned Photodiode? I understand that the P+/N/P structure where the P+ and P layers have the same potential is the Pinned Photodiode. So what is the buried Photodiode?

This is a commonly misunderstood misused set of terminologies.

First off these are not PIN Photodiodes - which stands for P - Intrinsic- N. These have large depletion regions for higher internal QE (Quantum Efficiency) and faster response. You can't make an array with this design though.

Pinning, refers to fermi-level pinning or pinning to a certain voltage level. Or also the forcing or prevention of the fermi-level/voltage from moving in energy space.

You can get surface state pinning from the dangling Si/SiO<sub>2</sub> bonds providing trapping centers. A buried PD (Photodiode) has a shallow implant that forces the charge carriers away from these surface traps. The

PIN Photodiode  
Nishizawa, 1950

