

ISSCC2013 Sweet Memory

Antiques from
the Innovative Attic

Yoshiaki Hagiwara as a presenter at the ISSCC2013 Plenary Panel.



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never stops. it is very hard to catch an electron because we do not know exactly where it is. Our civilization today is based on a technology that controls electrons, down to a single one.

Imagine a photon incident to a bipolar transistor base region. The photon energy creates an electron-hole pair. And the photo-electron can be stored in the base region as one single majority carrier. That is, a bipolar transistor can also function as a photon detector and/or a storage container. I thought that a room in a hotel must be empty and clean before the first hotel guest arrives. So must be this transistor base region empty and clean with no guest electrons at the beginning. This transistor in a dynamic p-n-p capacitor mode is useful since it can capture, confine, and control one single electron. But as a

Yoshiaki Hagiwara shared his memories of Richard Feynman, his mentor and educator at Caltech, and how he learned from him that control of electrons is at the heart of all electronic devices. As an example from his attic, he pointed to the old p-n-p-n junctions that are now incorporated in modern-day image sensors.

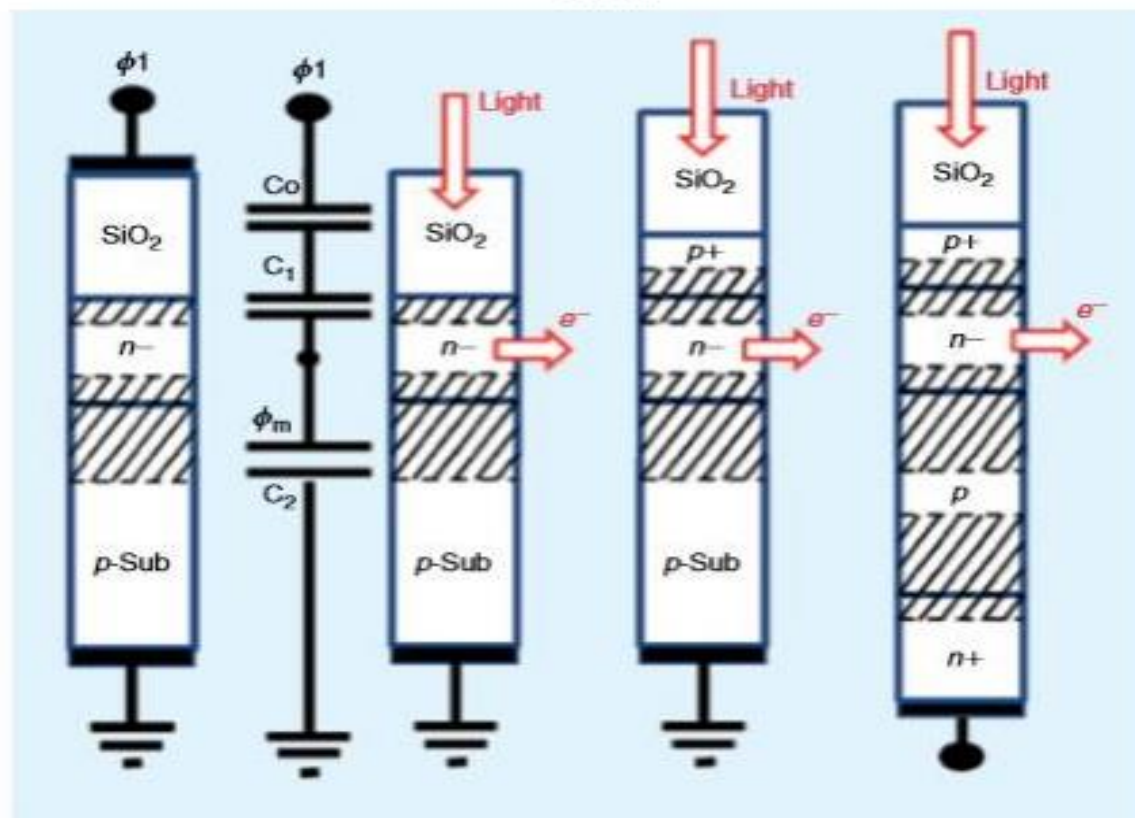


FIGURE 10: From CCD to the dynamic p-n-p-n diode capacitors.