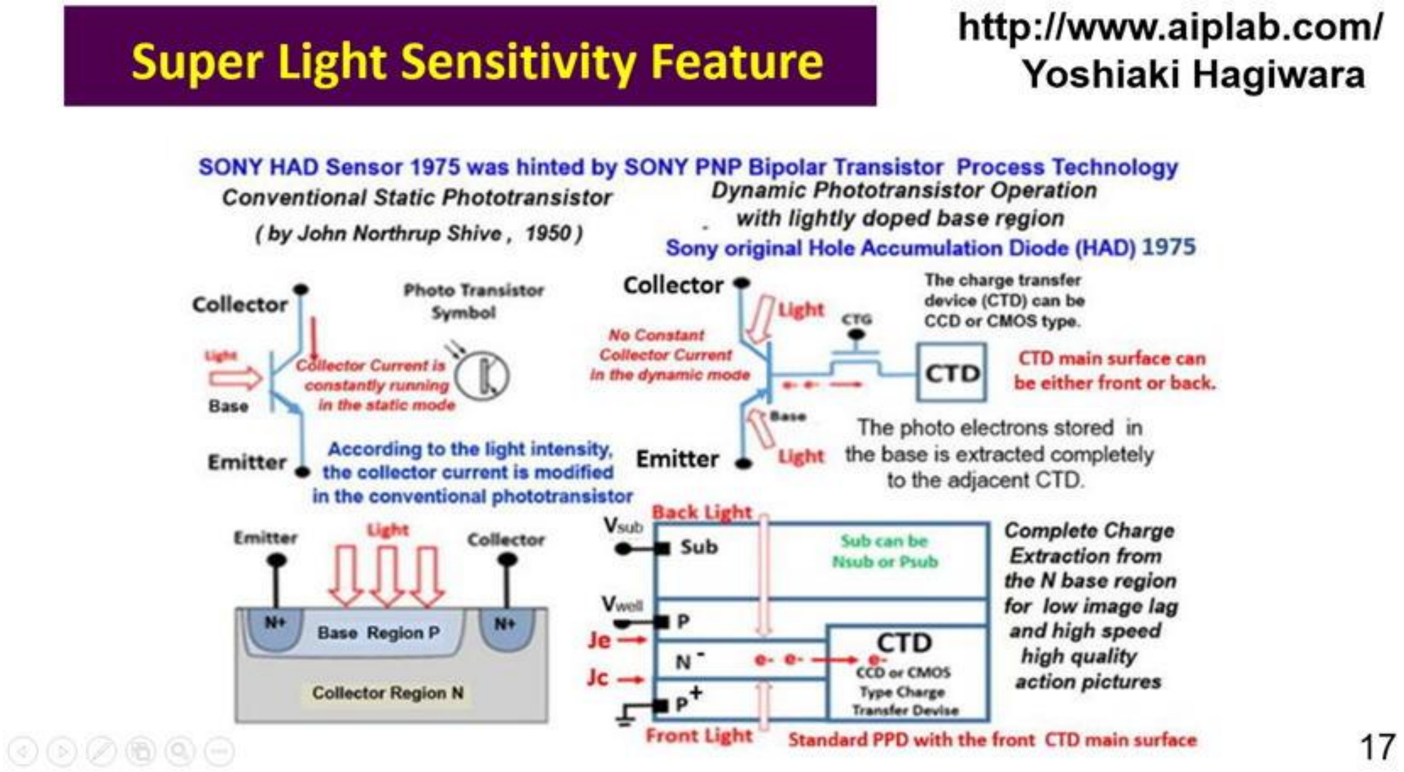

Super Light Sensitivity Feature

http://www.aiplab.com/
Yoshiaki Hagiwara

SONY HAD Sensor 1975 was hinted by SONY PNP Bipolar Transistor Process Technology

Conventional Static Phototransistor
(by John Northrup Shive , 1950)

Dynamic Phototransistor Operation
with lightly doped base region
Sony original Hole Accumulation Diode (HAD) 1975

Collector Current is constantly running in the static mode

According to the light intensity, the collector current is modified in the conventional phototransistor

No Constant Collector Current in the dynamic mode

The charge transfer device (CTD) can be CCD or CMOS type.

CTD main surface can be either front or back.

The photo electrons stored in the base is extracted completely to the adjacent CTD.

Complete Charge Extraction from the N base region for low image lag and high speed high quality action pictures

Standard PPD with the front CTD main surface

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The static operation of the double junction type, the PNP photodiode,
was invented by Shive in 1950 which is a static PNP phototransistor.

Hagiwara proposed in 1975 a dynamic PNP phototransistor,
which is the origin of Pinned photodiode
and which is also called as Hole Accumulation Diode (HAD).

It is well known that this heavily doped surface ion implantation
creates the typical Gaussian P+P doping profile
with the peak dose density at the surface
and gradually deceasing to the substrate uniform impurity doping level.