

The First Pinned Photodiode was invented by Hagiwara at Sony in 1975 in order to realize the in-pixel electric shutter function. The evidence is given in the Japanese patent application JPA1975-127646, which defined the pinned-surface triple-junction dynamic-thyristor type Pinned Photodiode.

The evidence are given in the Japanese Patent Applications, JPA1975-127646, JPA1975-127646 and JPA1975-134985.

Fig 7 in JPA1975-127646

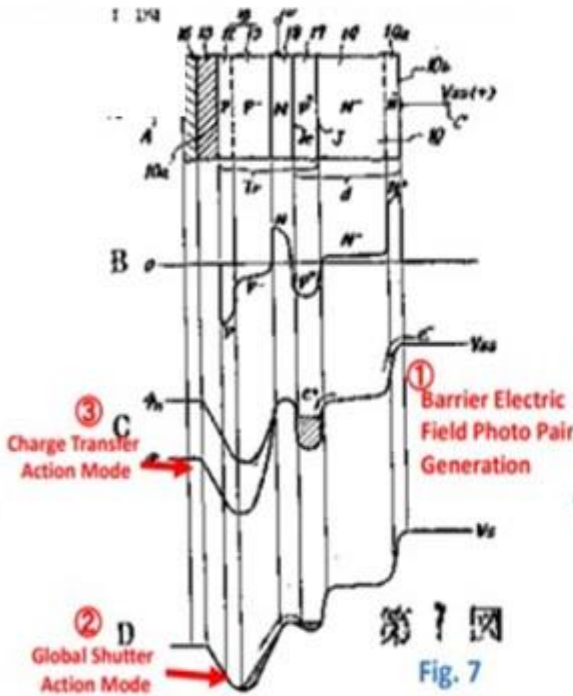


Fig 7 in JPA1975-127647

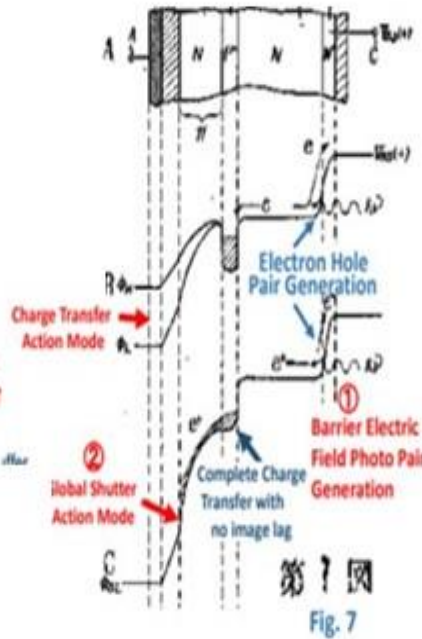
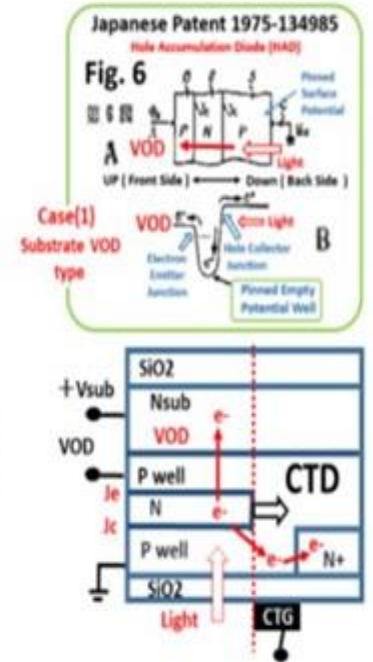
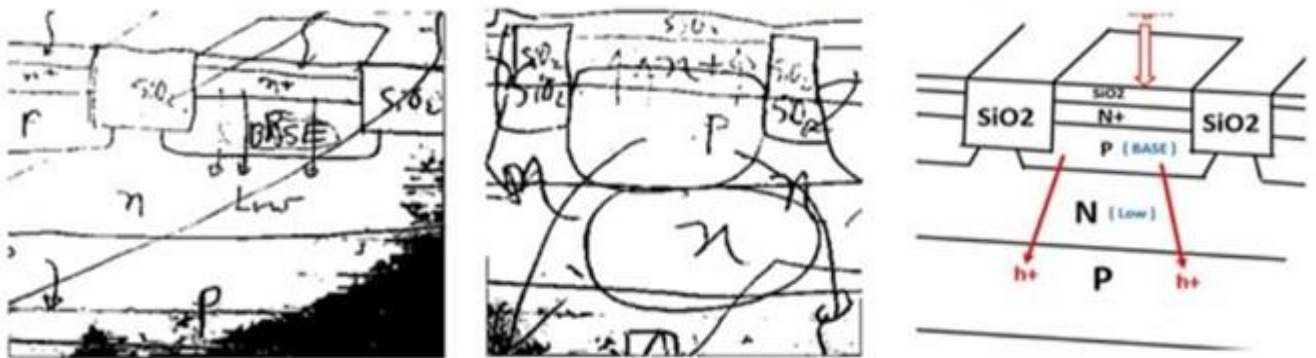


Fig 6 in JPA1975-134985



PPD with in-pixel VOD function was drawn in Hagiwara Lab Note in Feb 1975.



Hagiwara wrote the PPD patent form applied to Sony IP Office on March 5, 1975.

The surface needs to be pinned and fixed to achieve the complete charge transfer mode with no image lag feature, which is a necessary condition to realize the Electric shutter. Any photodiode with some RC delay time constant cannot be used for electric shutter. See JPA1975-127646 and JPA1975-134985 (Japanese patent 1215101).