

I. INTRODUCTION

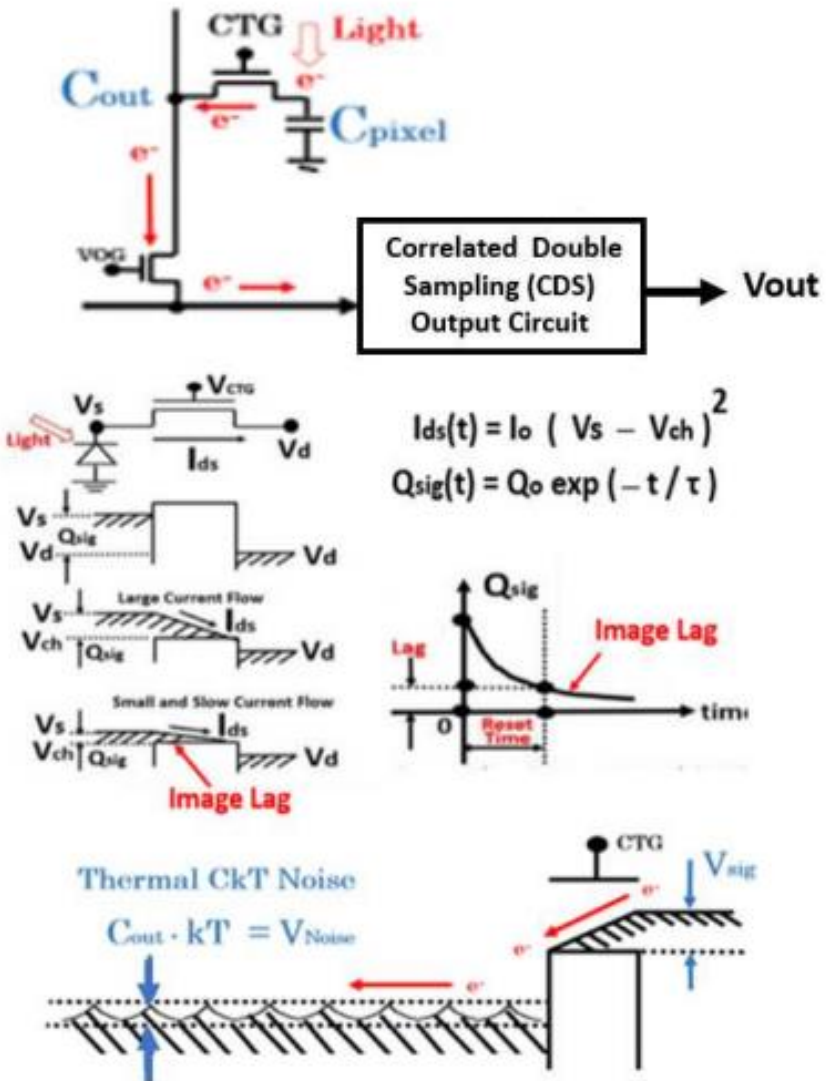


Fig. 1 Classical N+ Floating Surface Single Junction N+P Type Photodiode

Fig. 1 explains a conventional MOS image sensor in the ITIC read-out circuit configuration. A very small N+P single junction photodiode area capacitance with a floating surface N+ diffusion photo-charge storage region and a large output-data-line capacitance are the cause of the serious clock interference noise and the CKT thermal noise. The clock reset time is very short while the channel resistance R gets very large, causing a very large RC delay time and the serious image lag problem.

The CCD dynamic photo capacitor type solid state image sensor was invented in 1970 by Boyle and Smith in Bell Lab. The image sensors using the CCD type CTD were prevailing in 1980s and 1990s. Specially Buried Channel CCD type image sensors have an excellent charge transfer efficiency of about 99.999%, which was good enough in the analog TV era. The CCD image sensors have no image lag problem and very suited for the snapshot and fast action pictures in the analog TV era.