

SWIR detectors for night vision at AIM

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Detectors for the SWIR spectral range are particularly suitable for observation under haze weather conditions or under twilight or moon light conditions. In addition SWIR detectors allow utilization of the airglow for observation under moonless sky. SWIR detectors are commonly based on InGaAs or HgCdTe, (MCT) respectively, demanding for extremely low dark current to ensure a high signal to noise ratio under low background conditions.

AIM has developed a Read-Out-Integrated-Circuit (ROIC) with 640×512 pixel and 15 μm pixel pitch for low light level applications. The ROIC supports internal or external correlated double sampling (CDS) for reduction of kTC-noise. Along with CDS a rolling shutter (RS) mode has been implemented. The input stage of the ROIC is based on a capacitive transimpedance amplifier (CTIA) with two selectable gain settings. The dark current of our SWIR MCT detectors has been significantly reduced recently to allow for high operating temperatures. In contrast to InGaAs, the MCT material offers the unique possibility to adjust the cut-off wavelength according to the application while maintaining the matching of the lattice constant to the CdZnTe substrate.

The electro-optical parameters of SWIR Focal Plane Arrays (FPA) with 1.8 μm cut-off wavelength have been measured and the key performance parameters will be presented.

Keywords: SWIR, FPA, ROIC, CTIA, CDS, MCT, HgCdTe

Short version:

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